Appendix J.1

Noise Analysis Report

Noise Analysis Report

Starlight Solar Project

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Prepared for:
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&
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EXECUTIVE SUMMARY

The proposed Starlight Solar project would allow an unmanned renewable energy solar and battery storage project in the Boulevard area of unincorporated San Diego County.

Operation of the project would generate 45 dBA Leq or less at all property lines.

Construction traffic would generate up to 66 dBA Leq (8 hours) at residences. Project construction would generate noise levels up to 74 dBA Leq (8 hours) at residential property lines. Project blasting would generate noise levels up to 98 dBA Lmax no more than once per day at residential property lines.

Pile driving would generate vibration levels of 0.02 in/sec PPV or below at all residences and the school. Construction would generate vibration levels of 0.002 in/sec rms or below at all residences and the school.

The project would be in compliance with the County Noise Ordinance.

The project would increase the noise level at nearby NSLUs by up to 5 dBA CNEL, to a level below 60 dBA CNEL, and would result in no direct or cumulatively considerable impacts.

No significant impacts were identified. The methodology and findings of this analysis are discussed in the following pages.

1.0 INTRODUCTION

This report assesses potential noise impacts associated with the proposed Starlight Solar project in the Boulevard area of unincorporated San Diego County.

1.1 Project Description

Project Background

Starlight Solar, LLC (Applicant) is requesting a Major Use Permit (MUP) from San Diego County (County) to develop, finance, construct, and operate an unoccupied renewable energy solar and battery storage project in the southeastern region of the county.

The project would use photovoltaic (PV) electric generation system technology to produce up to 100 megawatts (MW) of alternating current (AC) solar energy at the utility scale. The project would also include a 217.4-MW battery energy storage system (BESS) and a collector substation. Additionally, the project would include the creation of a biological conservation easement within portions or all of assessor parcel numbers (APNs) 659-130-03, 659-140-01, and 659-140-02. No project impacts or development would occur within the conservation easement parcels.

The project is located within the Mountain Empire Subregional Plan area in unincorporated San Diego County. The project includes the MUP project site of approximately 581 acres, an off-site generation tie-line (gen-tie) area of 7 acres, an off-site vehicle turnaround area of 0.06 acre, and an off-site conservation easement of 448 acres. The project would be constructed in two separate phases. Phase I encompasses approximately 125 acres and includes the development of a PV system capable of generating up to 20 MW of solar energy and 17.4 MW of BESS. Phase II encompasses approximately 456 acres and includes the development of a PV system capable of generating up to 80 MW of solar energy and providing 200 MW of battery storage.

Project Location

The project site encompasses approximately 588 acres in unincorporated San Diego County, south of the community of Boulevard and approximately 0.93 mile north of the United States border. The community of Boulevard encompasses approximately 4 square miles and includes the communities of Manzanita, Tierra del Sol, and Live Oak Springs. Boulevard is a census designated place with a population of approximately 410 people (US Census 2023).

The project site is located approximately one mile south of Interstate 8 (I-8) and Old Highway 80, and east of Tierra Del Sol Road. Regional access to the project site would be provided by State Route 94 and I-8. Access to the project site would be provided by Jewel Valley Road, which runs north to south and connects to Old Highway 80 in the town of Boulevard. Additional emergency fire access would be provided via Tule Jim Lane which connects to Old Highway 80.

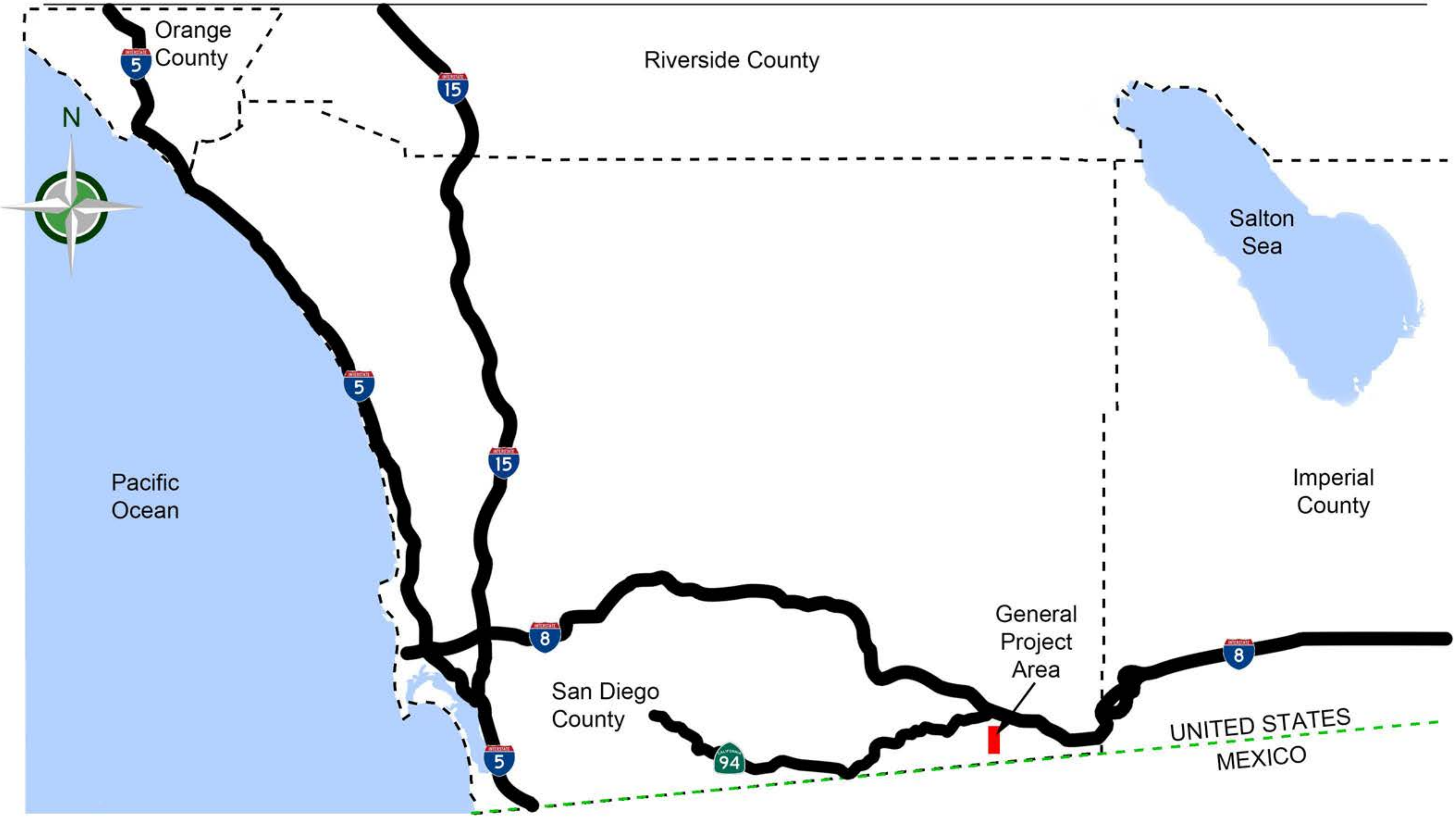

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FIGURE 1
Regional Map

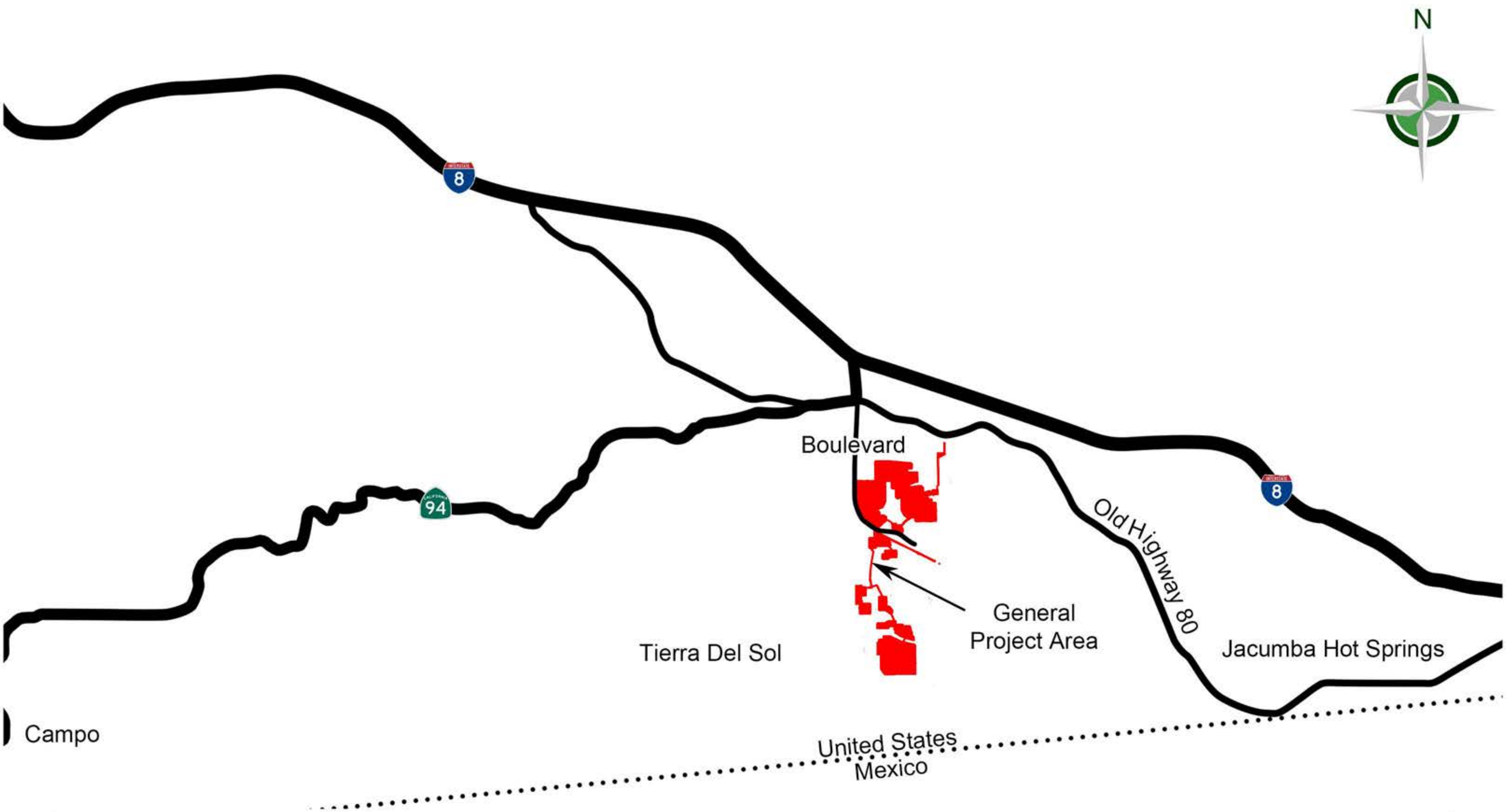

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FIGURE 2
Vicinity Map

The project site would be divided into eight solar array areas totaling approximately 581 acres. An underground gen-tie line would be located on the east side of Tule Jim Lane and connect into the southeastern corner of the SDG&E Boulevard Substation. Although the majority would be underground, the gen-tie line would have one overhead portion in order to cross Tule Jim Road and would encompass 7 acres. An off-site vehicle turnaround area on Jewel Valley Road would be 0.06 acre in size.

Land Use and Zoning

The County's General Plan (County of San Diego 2022) designates the project site as Rural Lands 80 (RL-80) and the County's Zoning Ordinance identifies the site as General Rural (S-92) (Figure 5). The County's General Regulation Section 6954 states that solar energy systems for off-site use are considered Major Impact Service and Utility in all zones and thus require the approval of an MUP (County of San Diego 2022).

The project site is within the Mountain Empire Subregional Plan, which contains five subregional group areas. The project site is located in the Boulevard Subregional Planning area.

In the County, several resource conservation planning efforts have been completed or are in progress with the goal of establishing a regional preserve system that will protect sensitive habitats and the species that depend on them. The ultimate goal is the establishment of biological preserve areas in conformance with the California Natural Community Conservation Planning Act and federal Endangered Species Act, contributing to the preserve system already established by the approved subregional Multiple Species Conservation Program. The project site is within the East County Multiple Species Conservation Program area, which is still in the planning process. Parts of the project area are defined as "Agricultural or Natural Upland" within a Focused Conservation Area of the draft Multiple Species Conservation Program (County of San Diego 2023).

Existing Conditions

The entire project site is currently undeveloped. It lies within the boundaries of the privately owned Empire Ranch, an approximately 3,795-acre ranch that stretches from south of Old Highway 80 to the United States border with Mexico. Beyond the project site boundaries, Empire Ranch currently contains a ranch compound with residential buildings, structures for livestock, private roads, and an airstrip. Empire Ranch also previously contained agricultural uses, which are currently reduced in scale. A section of the San Diego and Arizona Eastern Railway that is no longer in service runs east to west through the southern portion of the project site. Boundary Creek also flows in a southeastern direction directly south of Jewel Valley Road.

The project site is surrounded by unpaved roads, other rural residential development, an electrical substation, and undeveloped land. The SDG&E Boulevard East Substation is located on approximately 2 acres to the northeast of the project site, directly south of Old Highway 80.

The project site is topographically diverse. In the northern portion of the site, east- and south-facing sloping hillsides are characteristic, with elevations up to 3,650 feet above mean sea level (amsl) in the northeast. In the southern portion of the site, elevation decreases to 3,450 feet amsl. There are 14 natural vegetation communities and land cover types and three additional cover types within the category of disturbed or developed land.

Solar Facility

The project would be an unoccupied solar energy generation and storage facility which would produce a total rated capacity of 100 MW of AC generating capacity. The project would also include 217.4 MW of AC energy storage. The power produced by the proposed solar facility would interconnect into the Boulevard East Substation via an underground gen-tie line. The underground gen-tie would have one aboveground section crossing Tule Jim Lane.

The project would include the following primary components:

- Approximately 235,516 modules would be mounted on support structures (typically single-axis). The final number of modules and support structures will depend on the final design.
- A 1,500-volt direct current (DC) underground collection system would link the modules to the inverters and eight solar array systems based on current design standards.
- Inverter/transformer platforms, located throughout the solar facility, would convert the DC power generated by the modules into AC power, a compatible form for use with the transmission network.
- A 34.5-kilovolt (kV) underground AC collection system would link the inverters to the on-site collector substation.
- A 6,500-square-foot on-site collector substation, a 400-square-foot storage building, and a 450-square-foot control enclosure building would be located on the northeastern tip of the project site within an approximately 3-acre substation site.
- The gen-tie line would run from the on-site project substation to the Boulevard East Substation. It will consist of two lines—a 69-kilovolt (kV) line and a 138-kV line—that will be strung overhead to cross Tule Jim Lane and will be located underground the rest of the way.
- A 217.4-MW BESS would be located on approximately 5.14 acres in two locations.
- The project would include a Supervisory Control and Data Acquisition (SCADA) system.
- A 24-foot-wide perimeter access and array-connecting roads and 20-foot-wide internal access roads would be used to provide operational vehicles access to the site.
- Project equipment would be surrounded by 30- to 100-foot fuel modification zones.
- Biological resource mitigation land would be conserved and managed south and west of the project area within APNs 659-130-03, 659-140-01, and 659-140-02.

The project would be constructed in two separate phases, and operation would begin at different times. Phase I encompasses approximately 125 acres and includes the development of a PV system capable of generating up to 20 MW of solar energy and producing 17.4 MW of battery storage. Phase II encompasses approximately 456 acres and includes the development of a PV system capable of generating up to 80 MW of solar energy and producing 200 MW of battery storage.

PV MODULES AND SUPPORT STRUCTURES

PV modules generate electricity by safely converting the energy of the sun's photons into DC electrons. The project would include approximately 235,516 PV modules, which would be installed in rows (arrays). Arrays that are grouped together are referred to as an array field.

The modules would be mounted on support structures that allow them to be positioned to maximize the amount of the sun's solar energy captured. Each row of PV modules would be single-axis trackers oriented east-west or a fixed-tilt oriented north-south, or both. Single-axis tracking systems would employ a motor mechanism that allows the arrays to track the path of the sun (from east to west) throughout the day. Fixed-tilt arrays are placed on a fixed angle at the optimum tilt. The support structure would be elevated at least 1 foot above the base flood elevation. The PV modules and support structures would be a maximum of 12 feet in height.

The PV modules are uniformly dark in color, non-reflective, and designed to be highly absorptive of all light that strikes their glass surfaces. Most PV modules have a guaranteed useful life of 25 years in adverse weather conditions.

The solar PV modules would be mounted on support structures supported by a pile-driven foundation that allow them to be properly positioned for maximum capture of the sun's solar energy. The support structures are typically mounted on metal pipe columns or I-beam foundations 6 inches in diameter. The beams would be driven into the soil using a pile/vibratory/rotary driving technique. Driven pier foundations are a "concrete-free" foundation solution that would result in minimal site disturbance and facilitate site reclamation during decommissioning. Most pier foundations would be driven to approximate depths of 5 to 10 feet depending upon the required embedment depth.

ELECTRICAL (DC) UNDERGROUND COLLECTION SYSTEM

PV modules would be electrically connected to adjacent modules to form module "strings" using wiring attached to the support structures. PV module strings would be electrically connected to each other via underground wiring. Wire depths would be in accordance with local, state, and federal codes. String wiring terminates at PV module array combiner boxes, which are lockable electrical boxes mounted on or near an array's support structure. Output wires from combiner boxes would be routed along an underground trench system approximately 3 to 4 feet deep and 1 to 3 feet wide, including trench and disturbed area, to the inverters and transformer pads. The solar arrays would be connected via an underground collection system that would be located within existing driveways and access roads.

INVERTER AND MEDIUM VOLTAGE TRANSFORMERS

The power cables from multiple module strings are consolidated via combiner boxes throughout the solar field and delivered to the inverters via underground cables. Inverters are a key component of solar PV power-generating facilities because they convert the DC generated by the PV modules into AC power that is compatible for use with the transmission network. The inverters are connected directly to the medium-voltage transformers step up the AC voltage to collection-level voltage (34.5 kV). The inverters would be fully enclosed and located adjacent to medium-voltage transformers, both of which would be installed on concrete foundations. These concrete foundations would be a minimum of 1 foot above base flood elevation. The inverter dimensions would be approximately 40-feet-long, 10-feet-wide, and 12-feet-tall.

At each of the inverter/transformer locations, the transformer would be connected sequentially to an underground medium AC voltage collection system which would carry the power to the on-site collector substation. The underground electrical cables will be installed using standard trenching techniques, with directional boring techniques available to avoid sensitive resources, as necessary. The trenches would be filled with base material above and below the conductors and communications lines to ensure adequate thermal conductivity and electrical insulating characteristics.

SUBSTATION

The project includes an approximately 3-acre substation that would be located near the northeastern portion of the project site. The substation equipment would use earth-toned coloring and the tallest equipment within substation boundaries would have a maximum height of 50 feet. The substation is where all of the underground 34.5 kV feeder circuits are collected and combined, the voltage is then stepped up to 69 kV or 138 kV via a transformer.

The major components of the proposed collector substation are as follows:

- Switchgear
- Transformers
- Circuit breaker
- Controls and protection
- Metering
- Footings
- Reinforced concrete foundations
- Oil containment area for the transformers

During operation of the collector substation, operation and maintenance staff would visit the substation periodically for maintenance. Maintenance trucks would be used to perform routine maintenance, including equipment testing, monitoring, repair, routine procedures to ensure service continuity, and standard preventative maintenance.

GENERATION-TIE LINE

The gen-tie line would consist of two lines connecting the project to the Boulevard Substation. The gen-tie would begin at the on-site substation on the eastern end of the project site along Tule Jim Lane. From the on-site substation, the gen-tie would cross Tule Jim Lane with a short overhead section (two 50-foot-high steel poles). Once across Tule Jim Lane, the gen-tie would head north underground along the east side of Tule Jim Lane for approximately 0.6 mile before interconnecting to the southeast corner of the Boulevard Substation. The gen-tie would avoid the residence located on the east side of Tule Jim Lane and south of the Boulevard Substation. The gen-tie easement would be located approximately 160 feet south and 230 feet east of the residence and approximately 75 feet in width.

CONTROL SYSTEM

The proposed project would be designed with a comprehensive SCADA system for remote monitoring of facility operations and remote control of critical components. The SCADA system connects the solar facility to the plant operator and the independent system operator. The SCADA system would be monitored remotely, and no daily on-site operations and maintenance facilities or personnel would be necessary. The SCADA system would be located in the substation area and would be comprised of rack-mounted servers and software to allow for the continuous monitoring and control of PV inverters, solar trackers, PV weather monitoring system, substation equipment, BESS, and other equipment throughout the solar facility. The SCADA system would be used to provide critical operating information (e.g., power production, equipment status and alarms, and meteorological information) to the power purchaser, project owners and investors, grid operator, and project operations teams. The system will also facilitate production forecasting and other reporting requirements for project stakeholders.

The data collection system would also include a meteorological data collection system. The meteorological data collection system would have the following weather sensors: a pyranometer for measuring solar irradiance, a thermometer to measure air temperature, a barometric pressure sensor to measure atmospheric pressure, and two sensors to measure wind speed and direction.

BATTERY ENERGY STORAGE SYSTEM (BESS)

The proposed project includes two battery electrical storage systems (BESS) that would store up to approximately 217.4 MW (868 MWH) of electricity for dispatch into the local SDG&E grid via the same point of interconnection as the solar array. Phase I of the project would include a 17.4-MW BESS on Area A-1 covering 32,000 square feet directly adjacent to the on-site substation and Phase II would include a 200-MW BESS on Area A-2 covering 192,000 square feet.

The BESS would consist of individual battery containers in cabinets which are 6 feet wide, 5.5 feet deep, and 8 feet tall. The BESS cabinets would be double-loaded along a 70-foot-long concrete foundation. In addition, a power conversion system would be constructed adjacent to the BESS which would be 20 feet long, 8 feet wide, and 9.5 feet tall. The power conversion systems would be located on a concrete foundation measuring 20 feet long and 8 feet wide and each BESS cabinet would have a 5-foot-wide access drive aisle. The entire BESS area would be fenced for security and to restrict access.

BATTERY MODULES, TECHNOLOGY AND FIRE PROTECTION

As described above, each battery storage container would be located within a metal frame storage cabinet with insulation, air conditioning, and fire suppression, with separate enclosures for the electronic controls, inverters, and rectifiers. The primary storage components would consist of self-contained electrochemical battery systems using conventional storage technologies with proven safety and performance records using the same chemistries and vendors as the batteries in a typical cell phone. The battery storage cabinet is designed such that the periodic maintenance and replacement of underperforming battery components(each a single “module”) can be easily performed on an as-needed basis, whereby each individual module can be replaced without needing to replace the entire system. The BESS modules and associated infrastructure (e.g., inverters, switches) would be serviced regularly via planned maintenance and on an as-needed basis by certified technicians.

DC electricity would be collected from the batteries and conveyed to the inverters. A series of battery modules form a battery "rack," and each rack is connected to a battery management system to control that specific rack and control the voltage, current, and other operations. A number of series circuits are combined together to form an individual parallel circuit; parallel circuits are grouped together in individual racks which are sized appropriately, and each rack contains a rack-level battery management system. The number of racks will vary according to final proposed project specifications and can be sized to accommodate electrical design. Racks combine multiple parallel circuits through a fused bus system to collect the energy into one set of DC collection cables. The fuses within the racks create another line of protection from overcurrent. These cables run from the racks to the inverters, where they would terminate in the DC side of the inverter.

The battery will be a high-density, lithium phosphate battery that is rechargeable. These batteries will allow a safe and effective installation into a shipping container and are well-suited to perform beyond the planned daily operations for this facility (i.e., approximately one complete cycle each day). The proposed project would use a built-in fire protection system and would include a fire extinguishing system. The system would be designed in accordance with National Fire Protection Association (NFPA) safety standards.

The containers would be situated to enable emergency/fire response access. The containers would be sited with a 100-foot fuel modification zone from off-site areas as a buffer against potential wildfire ignitions. The containers would not be walk in containers, thus the battery storage containers would be non-habitable structures per the state and local fire codes that are in place at the time a building permit application is submitted to the County.

The proposed batteries and containers also include the following important monitoring and safety components:

- Modular battery racks designed for ease of maintenance
- Integrated heat and fire detection and suppression system
- Explosive gas monitoring
- Exhaust/ventilation systems
- Integrated air conditioning system
- Integrated battery management system

Electrical isolation monitoring devices are present on each DC battery bus to detect faults and disconnect the system before a serious problem occurs. The heat and fire detection system would be linked to an automatic inert gas suppression system within each container. The containers would also have a basic interior containers sprinkler system with several sprinkler heads for coverage and an external dry standpipe for fire fighters to connect and pump water.

Critical information from the BESS, equipment data from the DC:DC converters and inverters would be monitored by the battery monitoring system inside the containers, at the metering at the inverter cabinets and at the SCADA control system described in more detail below.

The battery management system within each container would track the performance, voltage and current, and state of charge of the batteries. The system would proactively search for changes in performance that could indicate impending battery cell failure, and power down and isolate those battery strings in order to avoid potential failures.

The battery management system would be purchased from vendors who are on track to have their equipment meet the following Underwriters Laboratories (UL) listings: UL 9540, 1741, 1973, 1642, and any other UL standards at the time of the application of the building permit. The NFPA has developed a new Standard for the Installation of Energy Storage Systems (NFPA 855). This standard addresses the design, construction, installation, commissioning, operation, maintenance, and decommissioning of stationary energy storage systems.

VEHICLE ACCESS ROADS

Access to the solar facility would be provided via Jewel Valley Road. The site entrance would feature a manual swing gate and a sign with a lighted directory map and contact information. Additionally, emergency fire access will be provided via Tule Jim Lane which would feature a 24-foot gate. All entrance gates would feature fire authority approved strobe light activation and a 'Knox Box' key-operated switch to allow ease of access for emergency service providers. All access to the site has been designed per the County Fire Code. The project would include dual-purpose internal fire response access and service access roads. The all-weather perimeter access road and array-connecting roads within the fenced solar facility would be constructed to an improved width of 24 feet on 28 feet of graded area. The internal access would allow for two-way access of fire apparatus throughout the solar facility in order to access all of the inverter/transformer pads. The interior on-site vehicle access roads would be constructed to an improved width of 20 feet on 24 feet of graded area. All internal access would be designed to provide a minimum inner turning radius of 28 feet, would be graded and maintained to support the imposed loads of fire apparatus (not less than 75,000 pounds), and would be designed and maintained to provide all-weather driving capabilities. The max gradient of all access roads would not exceed 12 percent.

A vehicle turnaround location will be created along Jewel Valley Road in the center of the project site. The turnaround shall be designed in accordance with County of San Diego design standard DS-06 for a County emergency fire apparatus (County of San Diego 2012).

All internal access road surfaces would be Class II, a road composed of decomposed granite and would be permeable in order to reduce fugitive dust and erosion in accordance with County Code Section 87.428, Dust Control Measures, and with San Diego Air Pollution Control District Rule 55, which regulates fugitive dust emissions from any commercial construction or demolition activity capable of generating fugitive dust emissions.

SECURITY LIGHTING, FENCING, AND SIGNAGE

The eight solar arrays and 581-acre solar facility would be fenced along the entire facility boundary for security. The fencing would meet National Electrical Safety Code requirements for protective arrangements in electric supply stations. Fencing would be up to 7 feet in height total, with a 6-foot-high chain-link perimeter fence and 1 foot of three strands of barbed wire along the top. Areas of the project site subject to higher flood flows would use breakaway fencing perpendicular to the flow path (see Figure 8).

For electrical safety, the following signage will be posted on the project site in Spanish and English:

- 12-inch by 18-inch system identification signs will be located at the gated entrances. These will include the name of the site and contact information as provided by SDG&E.
- 10-inch by 14-inch Private Property/No Trespassing and High Voltage Signs will be located at gated entrances and at 100-inch intervals along fencing.
- A reflective sign at the main entrance with inverter and contact information for a 24-hour remote operations center for the project.

All lighting would have bulbs that do not exceed 100 watts or equivalent, and all lights would be shielded, directed downward, and would comply with the County of San Diego Light Pollution Code, also known as the Dark Sky Ordinance, Section 51.201 et seq. Outdoor lighting circuits will incorporate dusk-to-dawn photo cell controllers, occupancy sensors, and/or switches as appropriate. Additionally, lighting for the project would be designed in accordance with the San Diego County Zoning Ordinance, Performance Standards Section 6320, 6322, and 6324, which guide performance standards for glare, and controls excessive or unnecessary outdoor light emissions (County of San Diego 2012).

DETENTION BASIN AND STORMWATER FACILITIES

The project would include the construction of two detention basins, one located at the northeastern portion of the project area between the proposed substation and Phase I BESS, and one located east of the Phase II BESS.

A series of stormwater piping are proposed in the north and northeastern portion of the project site. These facilities include but are not limited to storage piping, conveyance piping, headwalls, cleanouts, and rip rap.

The detention basins and storage piping would provide stormwater detention to limit water flowing from the site due to new impervious surface resulting from the BESS facility and substation. The detention basins would be designed in accordance with the County of San Diego's Hydraulic Design Manual.

WATER TANKS (FIRE PROTECTION)

The project would install a total of six 10,000-gallon water tanks with Fire Department connections available. The water tanks will be 12 feet wide and 15 feet tall. Water would be stored in aboveground tanks complying with the San Diego California Fire Agency requirements and with National Fire Protection Act 22, Private Fire Protection Water Tanks. The water tanks would be located strategically across the various areas of the project site. Three water tanks would be located in Area A-1, two water tanks would be located in Area A-2, and two water tanks will be in Area G at the southern extent of the project. A procedure for ongoing inspection, maintenance, and filling of tanks would be in place. The tank and fire engine connections would be located on the side of the access driveways. The width of the driveway at the water tank location would be at least 24 feet (travel width) to allow for fire engines to park and connect to the tank while leaving the road open. The tanks would be labeled "Fire Water: 10,000 gallons" using earth-tone reflective paint.

FUEL MODIFICATION ZONES

A minimum 30-foot wide fuel modification zone would be provided from the chain link fence perimeter of the solar facility between the PV modules and the off-site wildland fuels. This area would include contiguous fuel modification from the perimeter fence inward and would include the perimeter fire access road. Additionally, a minimum 100-foot-wide fuel modification zone would surround the two BESS areas.

Open Space Easement Areas

The project contains open space easement areas within the MUP project site. No development would occur within the open space easement areas. These areas would be fenced with a 6-foot-high chain-link perimeter fence and 1 foot of three strands of barbed wire along the top. Each open space easement area would include a gated entrance.

As described in the Biological Resources Report, to protect sensitive biological resources, a biological open space easement will be granted over 448 acres of sensitive vegetation communities, special-status plant species, and habitat for special-status species. This biological open space easement will be granted to the County or other approved conservation entity. Granting of this open space would authorize the County and its agents to periodically access the land to perform management and monitoring activities for the purposes of species and habitat conservation. This easement is for the protection of biological resources and prohibits all of the following on any portion of the land subject to said easement: grading; excavation; placement of soil, sand, rock, gravel, or other material; clearing of vegetation; construction, erection, or placement of any building or structure; vehicular activities; trash dumping; or use for any purpose other than as open space.

Operation and Maintenance

PV MODULES AND SUPPORT SYSTEMS

The PV modules and tracking systems would be inspected periodically. Electrical components would be tested routinely according to manufacturer's recommendations. In the event that remote monitoring indicates a problem, such as low performance in a section of the array field, a crew would investigate and correct the problem on an as-needed basis. It is anticipated that PV panel washing would occur two to three times per year. Washing of the PV panels would be undertaken using either a self-propelled powered mechanical system (e.g., MultiOne Solar Panel Washer or Mazaka Solar Cleaner or comparable motorized equipment) or a portable pressure washer towed by a pick-up truck. Washing would occur during daylight hours, so no lighting would be required.

OPERATIONAL WATER DEMAND

Project operation would require water for potable use, dust control, panel washing, and fire protection. Panel washing would consist of approximately two to three washings per year of the PV panels. Additionally, water would have to be resupplied to the on-site water tanks due to minor evaporation and leakage. Water used during project operation would be supplied by the Jacumba Community Services District (JCSD) located in Jacumba Hot Springs, California. The primary source of water from the JCSD is the Highland Center Well. If needed, the Park Well is the designated backup water source. The Padre Dam Municipal Water District is also a viable source of water to supply operational needs. Additionally, water would have to be resupplied to the on-site water tanks due to minor evaporation and leakage. Annual operational water demand would be approximately 1.22 acre-feet per year. Six 10,000-gallon water tanks throughout the site would provide emergency water access for fire suppression. The tanks would be inspected, maintained, and filled as part of operations and maintenance activities.

FIRE PROTECTION

There are several fire stations within the project area; these include California Department of Forestry and Fire Protection (CAL FIRE), San Diego County Fire Protection District (SDCFPD), and U.S. Forest Service fire stations. The Boulevard area is serviced by the CAL FIRE's Boulevard Fire Station (Station 47). Fire emergencies that may occur at the project site would be primarily responded to by CAL FIRE's Boulevard Fire Station (Station 47), which is staffed by both volunteer reserve and career firefighters. Additional responses would be available from SDCFPD's Jacumba and Lake Moreno Station (Stations 43 and 42, respectively), and CAL FIRE's Campo Station (Station 40). Helicopter water drops may also be used as appropriate. Other fire protection would be provided from mutual aid resources from throughout San Diego County and the state, when necessary. Clearing and grubbing of approximately 558 acres would be required for construction and access to the project site. Consistent with County requirements for discretionary approvals for projects in wildland/urban interface areas, a Fire Protection Plan (FPP) would be prepared for the project.

Construction

Phase I and Phase II of the project would be constructed separately. Construction of Phase I would occur over approximately 12 months and Phase II would occur over approximately 18 months. It is anticipated there would be approximately a one-year gap between construction of Phase I and Phase II. With the exception of the substation, which would be constructed during Phase I, construction of both phases of the project would include the following construction activities:

- Site mobilization
- Site preparation (including access driveways and staging areas), grading, and stormwater protections
- Fence installation
- Substation installation
- Pile driving
- Blasting

- Tracker and PV module installation
- DC electrical
- Underground medium AC voltage electrical
- Inverter/Transformer platform installation
- BESS installation
- Commissioning

The airstrip within the center of the project site would be utilized as a construction laydown area during both phases of construction.

SITE PREPARATION, GRADING, AND STORMWATER PROTECTION

Construction of the project would involve clearing and grubbing of the existing vegetation within the project site. Approximately 561 acres throughout the site would be disturbed. Grading would also be required throughout some portions of the project site. Grading is expected to be balanced on site, with approximately 350,000 cubic yards of cut redistributed across the site. The maximum vertical depth of excavation would be 19 feet and the maximum vertical height of fill would be 18 feet. Once complete, the project site would contain approximately 7 total acres of impervious surfaces.

Blasting activities may be required to facilitate siting of array foundations and the gen-tie. The Applicant would obtain a blasting permit from the County prior to initiating any blasting activities. Blasting activities would typically involve drilling multiple 2-inch-diameter holes into a boulder or bedrock to a depth of approximately 40 inches. Charges, typically weighing between 2.5 and 5 pounds each, would then be inserted into each drilled hole and detonated sequentially. The necessity and extent of blasting would not be known until surface clearing is completed. However, it is preliminarily estimated that approximately 5,000 cubic yards of rock would be blasted during the early stages of excavation and mass grading for Phase 1 and Phase 2. Blasting would occur at 2- to 3-day intervals, with no more than one blast per day.

The project would implement the following measures in compliance with the Grading Ordinance (County Code Section 87.428) to minimize fugitive dust (PM10) during the construction phase of the proposed project. These measures would include:

- The applicant would apply water three times per day or as necessary depending on weather conditions to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction. These measures would be applied to all active construction areas, unpaved access driveways, parking areas and staging areas as necessary.
- Sweepers and water trucks will be used to control dust and debris at public street access points.
- Internal construction driveways will be stabilized by paving, chip sealing, or nontoxic soil binders after rough grading.
- Exposed stockpiles (e.g., dirt, sand) will be covered and/or watered or stabilized with nontoxic soil binders, tarps, fencing, or other suppression methods as needed to control emissions.

- Traffic speeds on unpaved driveways will be limited to 15 mph.
- All haul and dump trucks entering or leaving the site with soil or base material will maintain at least 2 feet of freeboard, or cover loads of all haul and dump trucks securely.
- Disturbed areas will be reseeded with a native plant hydroseed mix as soon as possible after disturbance.
- In order to provide dust control and minimize erosion during project operation, at least 70% vegetation cover shall be maintained during project operation on the portions of the solar facility development footprint within the perimeter fencing not overlain by vehicle access driveways and internal access, inverter/transformer platforms, battery storage containers, and the substation. These areas shall be reseeded with a native hydroseed mix that shall be approved by the County Landscape Architect prior to reseeding.

WATER USE DURING CONSTRUCTION

Water use during construction would primarily consist of watering for dust control. Water for dust control would be applied by water trucks throughout the duration of construction activities. Non-potable groundwater would be supplied by the JCSD. The Padre Dam Municipal Water District would also be a viable secondary source of water. The total proposed extraction of non-potable groundwater for Project construction of both phases is 28 acre-feet or approximately 9.12 million gallons. Phase 1 would use approximately 11.2 acre-feet and Phase 2 would use approximately 16.8 acre-feet.

Activities requiring water-use during construction consist of the following:

- Dust control. The majority of the project's construction-related water demand would be for the purpose of dust control. The initial clearing, grubbing and grinding of each array subarea would require the most intensive use of water. During this phase of construction, which is expected to occur in the first two to three months following mobilization, heavy equipment (e.g., tractors/loaders/backhoes, scrapers, skid steer loaders, graders, and dumpers/tenders) would be clearing woody vegetation, rocks, and other debris/vegetation over large contiguous areas of each site, requiring relatively large volumes of water to control dust. Watering for dust control would continue to occur throughout the construction period but would be geographically limited (to active work areas), and less intense in nature as tracker installation and assembly proceeds. This is because a permeable nontoxic soil binding agent would be applied to any bare inactive areas following initial site clearing. Construction-related water demand estimates for dust control have accounted for the entire development footprint and construction duration of each phase and have included a contingency for high wind days.
- Mass grading. Various levels of cut/fill are required to level sites and properly prepare foundations, including the compaction and watering necessary to achieve engineered specifications. Water requirements associated with hydration of fills are limited to surfaced roads, parking lots and facility foundation pads (e.g., warehouse building, the collector substation, and inverters), and are usually dependent on the difference between the "optimum" and actual soil moisture content on the construction site. The lowest value of soil moisture observed during geotechnical exploration of each site and the total volume of earthwork (350,000 cubic yards) anticipated was used to estimate water demands for mass grading.

- Soil stabilization. Following initial clearing, grubbing, and grinding of each site, a permeable nontoxic soil binding agent would be applied to the prepared surfaces of the site to stabilize soils. Because active operational areas, such as fire, access, and service roads would be surfaced with disintegrated granite, application of soil binders would be limited to bare surfaces not being actively used for construction.
- Fire protection. The project would provide six permanent 10,000-gallon water storage tanks. These tanks would be installed at the start of construction and would be labeled "fire water" using reflective paint. These tanks would either be elevated or equipped with a pump and would not suffer appreciable evaporation losses because they would be enclosed and watertight.

INSTALLATION OF UNDERGROUND MEDIUM VOLTAGE COLLECTION SYSTEM

Trenching is required for installation of the AC medium voltage underground electrical collection system and telecommunication lines. Trenches would be approximately 3 to 4-feet-deep and 1 to 3 feet wide and would connect all of the solar array areas. The trenches would be filled with base materials above and below the conductors and communication lines to ensure adequate thermal conductivity and electrical installation characteristics. The topsoil from trench excavation would be set aside the trench before the trench is backfilled and would ultimately comprise the uppermost layer of the trench. Excess material from the foundation and trench excavations would be used for site leveling. Where possible, trenching would be located beneath existing driveways and access roads to minimize disturbance.

PV SYSTEM INSTALLATION

The PV system installation includes piles, racking, module assembly, and DC wiring as follows:

- Pile: The piles that would be driven into the soil using a pile/vibratory/rotary driving technique like that used to install freeway guardrails. The pile would be driven to approximate depths of 5-10 feet deep depending upon required embedment depth. The spacing of the piles is determined by the ultimate ground coverage ratio that are surveyed and pined to exact location.
- Racking: The racking is assembled on top of the piles manually and tightened and adjusted with handheld electric ratchet guns.
- Module assembly: The modules are manually lifted and adjusted on top of the racking.
- Above-ground DC wiring: The modules are strung together and manually connected with twist connectors.

INSTALLATION OF BATTERY ENERGY STORAGE SYSTEM

The BESS installation would include the following:

- Concrete Foundation: Concrete foundation pads would be constructed at the site.
- Battery Storage Equipment: The equipment would be delivered to the site by truck and lifted off the truck by a forklift or crane.

- Wiring and Commissioning: The fully integrated container would then be wired into the inverter/ transformer platforms.

The battery storage equipment would be constructed on concrete pads, and each set of equipment would be bolted to the pads. The power conditioning system (PCS) and the medium voltage control system (i.e., inverters and transformers) would be constructed on level concrete pads between the battery storage containers. Minor rough grading may be needed for the preparation of the proposed PCS and medium voltage control system pads if the pads cannot be constructed using the existing slope.

CONSTRUCTION WORKFORCE AND TRAFFIC

Construction would employ approximately 75 workers per day during the peak construction period for Phase 1 and 210 workers per day during the peak construction period for Phase 2. In addition to this direct labor workforce, approximately 10 to 15 additional workers at the site would engage in supervision, contract services, administration, and other non-direct labor activities. Local hires will be encouraged and engaged where feasible.

Average truck traffic would be approximately 164 trucks per day during Phase 1 and 466 trucks per day during Phase 2. The Project would use a just-in-time delivery system with supplies and components delivered on a schedule to minimize on-site storage needs.

CONSTRUCTION EQUIPMENT AND MATERIALS

Standard construction equipment would be used during construction, including earth-moving equipment (e.g., bulldozers, excavators, backhoes) and road-building equipment (e.g., compactors, scrapers, graders). Construction equipment would include air compressors, all-terrain passenger vehicles, backhoes, cranes, a drill rig, flat-bed trucks, a front-end loader, pick-up trucks, a pile driver, a trencher, and water trucks.

Decommissioning

DISMANTLING

The aboveground (detachable) equipment and structures would be disassembled and removed from the site when it became time to remove or replace equipment. Detachable elements include all PV modules and support structures, battery storage units, inverters, transformers, and associated controllers. Removal of the fencing, substation, and aboveground conductors on the transmission facilities would also be implemented. Underground collector and transmission components would be removed. Most of these materials can be recycled or reclaimed. Remaining materials that cannot be recycled or reclaimed would be limited and would be contained and disposed of offsite, consistent with the County of San Diego Construction Demolition and Debris Management Plan (County Ordinance 68.508- 68.518).

It is estimated that the amount of water necessary to dismantle the solar facility would be less than that required for construction because there would be no need to use water to hydrate and compact on-site fills. The activities associated with decommissioning would not include grading.

RECYCLING

The majority of the components of the proposed solar facility are made of materials that can be readily recycled because the components of the PV modules can be broken down. Generally, if the PV panels can no longer be used in a solar facility, the aluminum can be resold, and the glass can be recycled. Any hazardous components of the PV panels would be removed and properly disposed of offsite prior to recycling. Other components of the solar facilities, such as the rack structures and mechanical assemblies, can be recycled as they are made from galvanized steel. Equipment such as inverters, transformers, and switchgear can be either reused or their components recycled. Equipment pads made from concrete can be crushed and recycled. The electrical wiring is made from copper and/or aluminum and can be reused or recycled as well. All recycling would be in accordance with state and County regulations.

REMOVAL SURETY

The final decommissioning plan(s) that would be provided prior to issuance of the building permits for the proposed project would comply with Section 6954.b.3 (d) of the County of San Diego Zoning Ordinance (County of San Diego 2014) for removal surety as follows:

> The operator shall provide a security in the form and amount determined by the Director to ensure removal of the Solar Energy System. The security shall be provided to PDS (Planning & Development Services) prior to building permit issuance. Once the Solar Energy System has been removed from the property pursuant to a demolition permit to the satisfaction of the Director, the security may be released to the operator of the Solar Energy System.

Financial responsibility for decommissioning would be an obligation of the owner of the solar facility.

1.2 Environmental Noise Background

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies by location and is termed ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 1.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound source generating a sound level is added to another sound source generating the same sound level, the resultant sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by dBF Associates, Inc.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (Leq) is often used to describe the time-varying character of community noise. The Leq is the energy-averaged A-weighted sound level during a measured time interval. It is equal to the level of continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the Lmax and Lmin indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The Lmin value obtained for a particular monitoring location is often called the “acoustic floor” for that location.

The Community Noise Equivalent Level (CNEL) is a descriptor representing a 24-hour, time-weighted, annual average noise level based on the “A-weighted” decibel. In the calculation process, noise occurring in the evening time period (7 p.m. to 10 p.m.) is penalized by adding 5 dB, while noise occurring in the nighttime period (10 p.m. to 7 a.m.) is penalized by adding 10 dB. These time periods and decibel increases are intended to reflect a typical person's increased sensitivity to noise during late-night and early morning hours. This descriptor is used by the State of California and the County of San Diego to evaluate land-use compatibility with regard to noise.

1.3 Environmental Vibration Background

Groundborne vibration is defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of input excitation. Vibration consists of waves transmitted through solid material. There are several types of wave motion in solids, unlike in air, including compressional, shear, torsional, and bending. The solid medium can be excited by forces, moments, or pressure fields.

Groundborne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hz. Most environmental vibrations consist of a composite, or “spectrum” of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz.

Groundborne vibrations for this study are expressed in terms of peak particle velocity (PPV) or root-mean-square (rms) in inches per second (in/sec). The PPV is the velocity of the soil particles resulting from a disturbance. Agencies such as the Federal Office of Surface Mining (OSM) use the PPV descriptor because it correlates well with damage or complaints. The rms descriptor is typically used to assess human response.

Noise and airborne vibration perceived during blasting is the result of an air blast. An air blast is a pressure disturbance that travels through the air like any other sound, and it is quantified in the same manner as any noise event. Because of the impulsive nature of the blast, it is commonly referred to as an “over-pressure” (a temporary increase in air pressure over the standard atmospheric pressure). Generally, air blasts are of short duration, usually 2 to 10 seconds. Because the air blast contains mostly low frequencies (typically less than 250 Hz), it is often felt rather than heard. The over- pressure (and resultant noise) is a function of the source strength (charge weight), weather conditions, and distance to the receiver. The peak sound level (Lpeak) is the maximum instantaneous sound level during a stated time and is often used for measurement of blast noise.

1.4 Applicable Noise Regulations and Standards

1.4.1 County of San Diego General Plan

The County of San Diego establishes Noise Compatibility Guidelines in the Noise Element of its General Plan [County of San Diego 2011].

In the Single Family Residential land use category, noise levels up to 60 dBA CNEL are considered Acceptable at outdoor use areas; noise levels up to 75 dBA CNEL are considered Conditionally Acceptable.

In the School land use category, noise levels up to 65 dBA CNEL are considered Acceptable at outdoor use areas; noise levels up to 75 dBA CNEL are considered Conditionally Acceptable.

1.4.2 County of San Diego Noise Ordinance

Section 36.404: General Sound Level Limits states:

> (a) Except as provided in section 36.409 of this chapter, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in Table 36.404, when the one-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.

San Diego County Code Table 36.404, Sound Level Limits in Decibels (dBA)

ZONE	TIME	ONE-HOUR AVERAGE SOUND LEVEL LIMITS (dBA)
(1) R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-90, S-92 and R-V and R-U with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
(2) R-RO, R-C, R-M, S-86, V-5 and R-V and R-U with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
(3) S-94, V-4 and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
(4) V1, V2 V1, V2 V1 V2	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
(5) M-50, M-52 and M-54	Anytime	70
(6) S-82, M-56 and M-58	Anytime	75
(7) S-88 (see subsection (c) below)		

(b) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision making body approving the Major Use Permit determined that those noise mitigation measures reduce potential impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.

(c) S88 zones are Specific Planning Areas which allow different uses. The sound level limits in Table 36.404 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 36.404, subsection (1) apply to property with a residential, agricultural or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52, or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) If the measured ambient noise level exceeds the applicable limit in Table 36.404, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(e) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The one-hour average sound level limit applicable to extractive industries, however, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is located.

(f) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond six feet from the boundary of the easement upon which the facility is located.

Section 36.409: Sound Level Limitations on Construction Equipment states:

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410: Sound Level Limitation on Impulsive Noise states:

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

San Diego County Code Table 36.410A. Maximum Sound Level (Impulsive) Measured at Occupied Property in Decibels (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning, or civic use	82
Agricultural, commercial, or industrial use	85

1.4.3 Vibration

Section 4.3 of the Noise Guidelines for Determining Significance [County of San Diego 2009] provides vibration thresholds of significance. There would be an impact if:

> Project implementation will expose the uses listed in Table 4 and 5 (Table 2 and 3 of this report) to ground-borne vibration or noise levels equal to or in excess of the levels shown.

Table 2. Guideline for Determining the Significance of Ground-Borne Vibration and Noise Impacts

Land Use Category	Ground-Borne Vibration Impact Levels (inches/sec rms)		Ground-Borne Noise Impact Levels (dB re 20 microPascals)	
	Frequent Events [1]	Occasional or Infrequent Events [2]	Frequent Events [1]	Occasional or Infrequent Events [2]
Category 1. Buildings where low ambient vibration is essential for interior operations. (research & manufacturing facilities with special vibration constraints)	0.0018 [3]	0.0018 [3]	Not applicable [5]	Not applicable [5]
Category 2. Residences and buildings where people normally sleep. (hotels, hospitals, residences, & other sleeping facilities)	0.004	0.01	35 dBA	43 dBA
Category 3. Institutional land uses with primarily daytime use. (schools, churches, libraries, other institutions, & quiet offices)	0.0056	0.014	40 dBA	48 dBA

Source: U.S Department of Transportation, Federal Transit Administration, “Transit Noise and Vibration Impact Assessment,” May 2006.

Notes:

“Frequent Events” is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

“Occasional or Infrequent Events” are defined as fewer than 70 vibration events per day. This combined category includes most commuter rail systems.

This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Vibration-sensitive equipment is not sensitive to ground-borne noise.

There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 5 gives criteria for acceptable levels of ground-borne vibration and noise for these various types of special uses.

For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds one inch per second. Non-transportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in San Diego County.

Table 3. Guideline for Determining the Significance of Ground-Borne Vibration and Noise Impacts for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Levels (inches/sec rms)		Ground-Borne Noise Impact Levels (dB re 20 microPascals)	
	Frequent Events [1]	Occasional or Infrequent Events [2]	Frequent Events [1]	Occasional or Infrequent Events [2]
Concert Halls, TV Studios, and Recording Studios	0.0018	0.0018	25 dBA	25 dBA
Auditoriums	0.004	0.01	30 dBA	38 dBA
Theaters	0.004	0.01	40 dBA	48 dBA

Source: U.S Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes:

"Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

"Occasional or Infrequent Events" are defined as fewer than 70 vibration events per day. This combined category includes most commuter rail systems.

If the building will rarely be occupied when the trains are operating, there is no need to consider impact.

For historic buildings and ruins, the allowable upper limit for continuous vibration to structures is identified to be 0.056 inches/second rms. Transient conditions (single-event) would be limited to approximately twice the continuous acceptable value.

1.4.4 Blasting Regulations

Blasting activity must conform to the guidelines specified in the County of San Diego Consolidated Fire Code (2020). Blasting must be conducted by a blaster who has been approved by the Sheriff to conduct blasting operations and who has been placed on the list of approved blasters. Residents within 600 feet of blasting must be notified at least 24 hours prior to the blast. Blasting shall only be allowed Monday through Saturday, between the hours of 7:00 a.m. and 6:00 p.m. or ½ hour before sunset, whichever occurs first, unless special circumstances warrant another time or day and the Issuing Officer grants approval of the change in time or day.

The owner of any property in the unincorporated area of the County on which any blasting is intended to occur, shall give, or cause to be given, a one-time notice in writing, for any proposed blasting to the local fire agency and dispatch center and to all residences, including mobile homes, and businesses within 600 feet of any potential major blast location or 300 feet from any potential minor blast location. The notice shall be given not less than 24 hours, but not more than one week, before a blasting operation and shall be in a form approved by the Issuing Officer. The minimum 24-hour notice requirement may be reduced to a lesser period but not less than one hour if the Issuing Officer determines that special circumstances warrant the reduction in time. Adequate precautions shall be taken to reasonably safeguard persons and property before, during and after blasting operations. These precautions shall include:

1. The blaster shall retain an inspector to inspect all buildings and structures, including mobile homes, within 300 feet of the blast site before blasting operations, unless inspection is waived by the owner and/or occupant.
2. An inspector shall complete and sign pre-blast inspection reports identifying all findings and inspection waivers.
3. The blaster shall retain an inspector to conduct a post-blast-inspection of any building and structure for which a written complaint alleging blast damage has been received. A written report of the inspection shall be immediately filed with the Issuing Officer and provided to any person who made a complaint for damages.
4. All major blasting operations shall be monitored by an approved seismograph located at the nearest structure within 600 feet of the blasting operation. All daily seismograph reports shall be maintained by the blaster for three years from the blasting.

Federal Office of Surface Mining

The OSM, formerly known as U.S. Bureau of Mines, recommends a PPV safety level of 2.0 in./sec. for residential structures.

30 CFR Ch. VII, §816.67(b)(1)(i), which contains the limits included in U.S. Bureau of Mines publication RI8485, states:

> Airblast shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area…

Lower frequency limit of measuring system, in Hz (±3 dB)	Maximum level, in dB
0.1 Hz or lower—flat response[1]	134 peak.
2 Hz or lower—flat response	133 peak.
6 Hz or lower—flat response	129 peak.
C-weighted—slow response[1]	105 peak dBC.

[1]Only when approved by the regulatory authority.

30 CFR Ch. VII, §816.67(d)(2)(i), which contains the limits included in U.S. Bureau of Mines publication RI8508, states:

The maximum ground vibration shall not exceed the following limits at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area:

Distance (*D*), from the blasting site, in feet	Maximum allowable peak particle velocity (*V*max) for ground vibration, in inches/second[1]	Scaled-distance factor to be applied without seismic monitoring (*Ds*)
0 to 300	1.25	50
301 to 5,000	1.00	55
5,001 and beyond	0.75	65

[1]Ground vibration shall be measured as the particle velocity. Particle velocity shall be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity shall apply to each of the three measurements.

1.5 Environmental Settings and Existing Conditions

1.5.1 Settings and Location

The project site is located south of Old Highway 80, between Jewel Valley Road and Tierra Del Sol Road, in the Boulevard Subregional Planning Area of unincorporated San Diego County. Zoning for the site and all adjacent properties S92. Surrounding land uses consist of single-family residences and vacant land.

1.5.2 Existing Noise Conditions

Some land uses are considered sensitive to noise. Noise sensitive receptors are land uses associated with indoor and/or outdoor activities that may be subject to stress and/or significant interference from noise. They often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities and libraries. Industrial, commercial, agricultural and urban reserve land uses are generally not considered sensitive to ambient noise.

Noise-sensitive land uses (NSLUs) near the site include the single-family residences to the north, east, and west; and the Clover Flat Elementary School approximately 0.78 mile to the north. The primary noise source in the project vicinity is distant vehicular traffic on I-8 and vehicular traffic on California State Route 94 (SR 94) (Old Highway 80). There are no additional NSLUs that are reasonably foreseeable in the project area.

1.6 Methodology and Equipment

1.6.1 Noise Measuring Methodology and Procedures

A noise measurement survey of the existing ambient noise environment was conducted in the project area. A series of sound level measurements was conducted at nine locations on Wednesday, June 8, 2022. The measurement results are shown in Table 4 below and correspond to the locations depicted on Figure 3.

A RION Model NL-31 American National Standards Institute (ANSI) Type 2 Integrating Sound Level Meter was used as the data-collection device. The meter was mounted to a tripod and placed roughly 5 feet above local ground to simulate the average height of the human ear. The sound level meter was calibrated before and after the measurement periods.

Weather conditions during the measurements were 80–95°F, 50–60% relative humidity, clear skies, and 1–4 mph wind from the west. The measured sound levels in the project area ranged from approximately 30–43 dBA Leq.

1.6.2 Noise Modeling Software

The Cadna/A Noise Prediction Model was used to estimate project-generated hourly noise levels. Cadna/A is a Windows-based software program that predicts and assesses noise levels near noise sources. The model uses industry-accepted propagation algorithms and accepts sound power levels (in decibels re: 1 picoWatt) based on ISO 9613-2 standards. ISO 9613-2 is an internationally recognized standard that establishes a method for calculating the attenuation of sound during propagation outdoors, in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level.

The project site configuration, including ground elevations and equipment heights, was imported into Cadna/A from the project CAD files. Because of the uncertainty associated with any computer model, the site operating parameters were designed to evaluate a worst-case condition. Model receptors were placed at project property lines closest to the given activities, five feet above ground level.

Table 4. Sound Level Measurements (dBA)

Measurement Location		Time	Leq	Lmin	Lmax	L10	L50	L90	Noise Sources
ML1	32.6465548, -116.2886682 1758 Jewel Valley Road	11:00 – 11:15	43.0	30.9	55.4	46.4	40.1	34.2	Wind in trees, birds, light vehicle, two high overhead jets
ML2	32.6555851, -116.2865613	11:30 – 11:45	35.3	28.3	49.9	38.2	33.3	30.9	Distant I-8, insects, two high overhead jets
ML3	32.6599830, -116.2730700 Tule Jim Lane	12:10 – 12:25	33.7	25.2	47.3	36.2	32.2	28.9	Distant I-8, wind in trees
ML4	32.6509663, -116.2728720 Tule Jim Lane	14:15 – 14:30	37.7	25.6	52.3	38.0	32.5	27.2	Distant I-8, wind in bushes, distant overhead jet
ML5	32.6464989, -116.2720713 1635 Tule Jim Lane	14:35 – 14:50	42.1	25.2	56.3	40.7	30.9	26.6	Insects, wind, distant roadway traffic
ML6	32.6443169, -116.2727774 1631 Tule Jim Lane	14:55 – 15:10	37.0	22.9	50.4	40.7	32.0	26.0	Birds, distant roadway traffic, distant overhead jet
ML7	32.6415691, -116.2784664	15:10 – 15:25	32.8	24.6	55.4	35.8	30.2	26.5	Insects, vehicle on Jewel Valley Road, distant overhead jet
ML8	32.6331360, -116.2797773 Hidden Jewel horse ranch	15:30 – 15:45	29.8	20.7	51.4	29.3	24.3	22.3	Horses, insects, wind
ML9	32.6585602, -116.2865962	16:10 – 16:25	37.6	29.1	55.1	40.4	35.0	31.4	Distant I-8, wind, birds

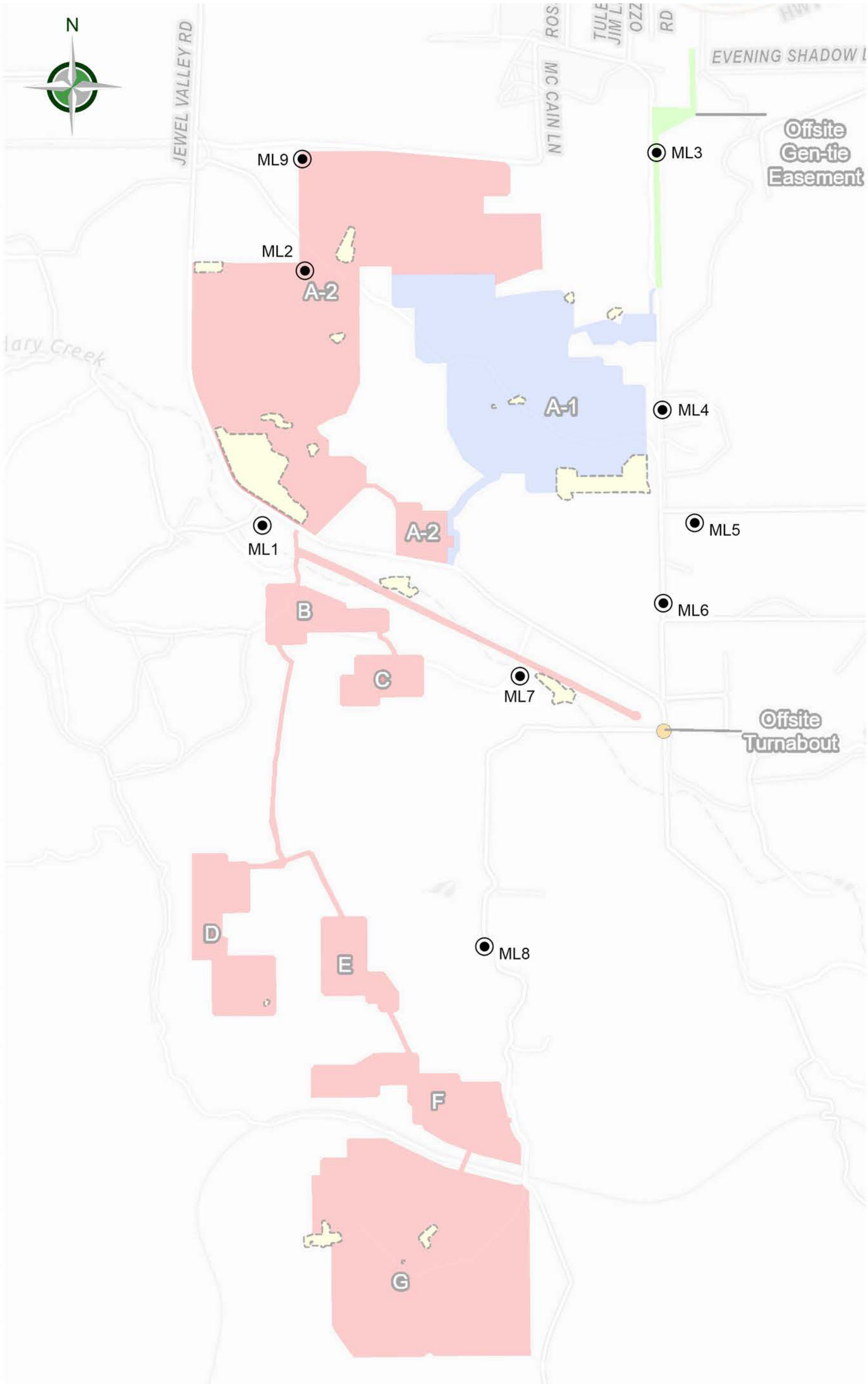


FIGURE 3
Sound Level Measurement Locations

1.6.3 Vibration Calculations

Blasting vibration was estimated using Equation 13 from the Caltrans Transportation and Construction Vibration Manual [2013].

$$PPV = K\,(D_s)^{-1.6}$$

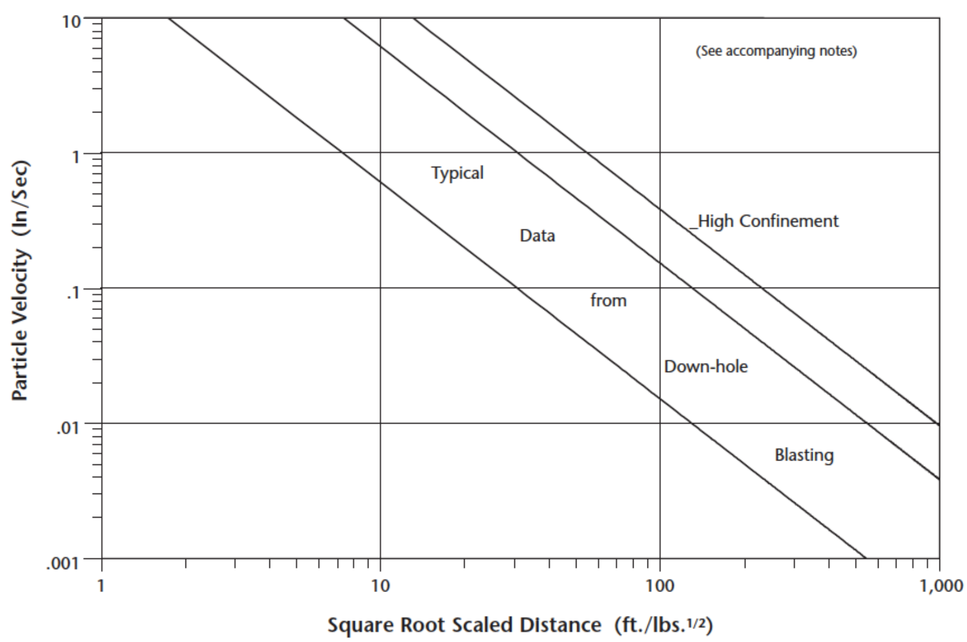
Where:

PPV = peak particle velocity (in in/sec),

D_s = square-root scaled distance (distance to receiver in ft. divided by square root of charge weight in lbs.)

K = a variable subject to many factors, as described below

This equation yields the following typical data [Caltrans 2013].



Pile driving vibration was estimated using Equation 10 from the Caltrans Transportation and Construction Vibration Manual [2013].

$$PPV_{Vibratory\ Pile\ Driver} = PPV_{Ref}\,(25/D)^n \quad (in/sec) \qquad\qquad (Eq.\ 10)$$

Where:

PPV_{Ref} = 0.65 in/sec for a reference pile driver at 25 ft

D = distance from pile driver to the receiver in ft.

n = 1.1 (the value related to the attenuation rate through ground)

Vibration levels in terms of in/sec rms can be expressed as velocity decibels (VdB), as described by Equation 5-1 in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual [FTA 2018]:

$$L_v = 20\log\left(\frac{v}{v_{ref}}\right)$$

where:

L_v = velocity level, VdB

v = rms velocity amplitude

v_{ref} = 1 x 10^{-6} in/sec in the USA
= 1 x 10^{-8} m/sec internationally

Using this equation, 0.01 in/sec rms is equal to 80 VdB.

FTA Equation 7-3 was used to estimate vibration levels at a distance:

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25})$$

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB

L_{vref} = the source reference vibration level at 25 ft, VdB

D = distance from the equipment to the receiver, ft

Vibration levels were converted from PPV to rms using the following guidance [Caltrans 2013].

> Vibration amplitudes are usually expressed as either "peak", as in peak particle velocity, or "rms" (root mean square), as in rms acceleration. The relationship between the two is the same as with noise. The rms value is approximately 0.71 x the peak value for a sine wave representing either displacement, velocity, or acceleration.

2.0 PROJECT-GENERATED AIRBORNE NOISE

2.1 Guidelines for the Determination of Significance

A significant impact would occur if:

The project will generate airborne noise which, together with noise from all sources, will be in excess of either of the following:

A. Non-Construction Noise: The limit specified in San Diego County Code Section 36.404, General Sound Level Limits, at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise. Section 36.404 provides the following limits:

San Diego County Code Section 36.404, Sound Level Limits in Decibels (dBA)

ZONE	TIME	ONE-HOUR AVERAGE SOUND LEVEL LIMITS (dBA)
(1) R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-90, S-92 and R-V and R-U with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
(2) R-RO, R-C, R-M, S-86, V5 and R-V and R-U with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
(3) S-94, V-4 and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
(4) V1, V2 V1, V2 V1 V2	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
(5) M-50, M-52 and M-54.	Anytime	70
(6) S-82, M-56 and M-58.	Anytime	75
(7) S-88 (see subsection (c) below)		

(a) If the measured ambient noise level exceeds the applicable limit stated above, the allowable one hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(b) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones; provided however, that the one-hour average sound level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is actually located.

(c) S88 zones are Specific Planning Areas which allow for different uses. The sound level limits in Table 36.404 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 36.404, subsection (1) apply to property with a residential, agricultural or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond six feet from the boundary of the easement upon which the facility is located.

The property line noise level limits applicable to the project are:

- 50 dBA Leq at all property lines from 7:00 a.m. to 10:00 p.m.
- 45 dBA Leq at all property lines from 10:00 p.m. to 7:00 a.m.

B. Construction Noise: (A significant impact would occur if) Noise generated by construction activities related to the project will exceed the standards listed in San Diego County Code Section 36.409, Sound Level Limitations on Construction Equipment.

Section 36.409 states:

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

2.2 Potential Operational Noise Impacts (Non-Construction Noise)

Noise from operation of the proposed project would result from the transformers and battery storage containers.

There would be 33 inverter / transformer platforms spaced evenly throughout the PV module areas. The collector substation at the northeast corner of the PV module area would include five transformers. National Electrical Manufacturers (NEMA) Standards Publication ST 20-2014 governs maximum allowable noise levels from transformers; a transformer may not produce more than 67 decibels at 1 foot.

There would be 378 battery storage containers in two areas near the northeast corner of the PV module area. The HVAC units for the containers have not been selected. It was assumed that each container would be fitted with one HVAC unit that produces a sound pressure level of 63 dBA or less at 5 feet. This assumption is based on previous experience with projects involving cooling for similar-sized electrical equipment boxes in similar environments. The noise source height is assumed to be approximately 3 feet above ground.

2.2.1 Project-Generated Noise Levels

Cadna/A was used to calculate estimated project-generated hourly noise levels from all onsite noise sources. Noise levels at project property lines would range up to 37 dBA Leq at the property line corner closest to the BESS area (southwest corner of APN 612-090-570). The noise level near the residential structure would be approximately 32 dBA Leq.

Noise levels would be in compliance with the County Noise Ordinance. Noise impacts from onsite operations would be less than significant.

2.2.2 Design Considerations

The project would not include noise-reducing features as design considerations. No mitigation measures were necessary.

2.3 Potential Construction Noise Impacts

The highest construction noise levels would be produced by construction traffic and foundation placement, grading, road construction, or blasting. Cadna/A was used to calculate estimated noise levels from construction noise sources. TNM was used to calculate estimated construction traffic noise levels. Arithmetic calculations based on a point source decay of 6 dBA per doubling of distance was used to calculate estimated blasting noise levels.

Standard construction equipment would be used during construction, including earth-moving equipment (e.g., bulldozers, excavators, backhoes) and road-building equipment (e.g., compactors, scrapers, graders). Construction equipment would include air compressors, all-terrain passenger vehicles, backhoes, cranes, a drill rig, flat-bed trucks, a front-end loader, pick-up trucks, a pile driver, a trencher, and water trucks.

Construction activity and delivery of construction materials and equipment would be limited to between 7:00 a.m. and 6:00 p.m.

Table 5. Construction Noise Source Levels

Noise Source	Noise Level	Number
Bulldozer	86 dBA at 10 meters	2
Excavator	80 dBA at 10 meters	2
Backhoe	69 dBA at 10 meters	2
Compactor	80 dBA at 10 meters	2
Scraper	82 dBA at 10 meters	2
Grader	86 dBA Lmax at 10 meters	2
Air Compressor	75 dBA at 10 meters	2
Crane	71 dBA at 10 meters	2
Drill Rig	82 dBA at 10 meters	1
Loader	79 dBA at 10 meters	1
Pile Driver	75 dBA at 10 meters	4
Trencher	78 dBA at 10 meters	1
Water Truck	81 dBA at 10 meters	2

Source: DEFRA 2005

The noise source heights are approximately 12 feet above local ground.

2.3.1 Construction Traffic

The closest residences to the project construction vehicle route are along Jewel Valley Road:

- approximately 2,000 feet south of Old Highway 80, roughly 90 feet east of the centerline
- approximately 5,000 feet south of Old Highway 80, roughly 70 feet west of the centerline

In this area, Jewel Valley Road has a grade of approximately 7% up to the north.

During Phase I, the project would generate 90 light-duty worker trucks, 164 heavy-duty material trucks, and 3 water trucks on Jewel Valley Road in each direction per day. During Phase II, the project would generate 225 worker trucks, 466 material trucks, and 3 water trucks on Jewel Valley Road in each direction per day. It was assumed that each truck would enter / exit the work area during the same one-hour period, at a speed of 30 mph. The resulting noise levels are detailed in Table 6.

Table 6. Construction Traffic Noise Levels (dBA)

Phase	Receptor	Morning		Afternoon	
		1-Hour Average	8-Hour Average	1-Hour Average	8-Hour Average
Phase I	East Residence	63.9	55.9	69.6	59.6
	West Residence	66.1	58.1	69.5	59.5
Phase II	East Residence	68.3	60.3	74.0	66.0
	West Residence	70.6	62.6	74.0	66.0

The project would result in construction traffic noise levels up to approximately 66 dBA Leq (8 hours). The project would result in no construction traffic noise impact.

2.3.2 Foundation Placement

The PV panels would be placed in rows and supported by foundations. Each typical 300-foot-long row would have 13 foundations. Rows would be placed at an 18.5-foot spacing. Therefore, there would be one foundation per approximately 427 square feet.

The project site is 585 acres, almost all of which would hold PV panels. As such, the project would require approximately 59,678 foundations. Over a 12-month construction period with 25 work days per month, each day approximately 199 foundations would be set within a roughly 1.95-acre area.

Each foundation would be set using a pile driver. It was assumed that there would be four pile drivers simultaneously operating, and each could drive five piles per hour. A mini piling rig produces a sound level of 75 dBA at 10 meters (~33 feet) [DEFRA 2005]. No downtime for maintenance or breaks was considered in the calculations.

The closest foundations to a project property line would be set approximately 30 feet away. Over the course of a full day of construction in which 200 foundations are set, assuming a square work area, the furthest piles would be driven roughly 315 feet from the same property line; at that distance, the sound level would be approximately 55 dBA. At the closest property line to pile driving, considering the movement of equipment throughout the work area, the average property line noise level would be approximately 67 dBA Leq (8 hours). The project would result in no foundation placement noise impact.

2.3.3 Grading

It is assumed that grading within any given area would be accomplished with one bulldozer, one excavator, and one backhoe. It was assumed that the equipment would operate continuously within a rectangular five-acre area. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations.

The closest grading area to a project property line would occur adjacent to the property line. Over the course of a full day of construction in which the equipment continuously moves throughout the work area, the average property line noise level would be approximately 74 dBA Leq (8 hours). The project would result in no grading noise impact.

2.3.4 Road Construction

It is assumed that road construction within any given area would be accomplished with one compactor, one scraper, and one grader. It was assumed that the equipment would operate continuously within a linear two-acre area. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations.

The closest road construction area to a project property line would occur adjacent to the property line. The property line noise level would be approximately 70 dBA Leq (8 hours). The project would result in no road construction noise impact.

2.3.5 Blasting

Blasting was assumed to generate a noise level of up to 94 dBA Lmax at 50 feet [FHWA 2006]. The closest property line is approximately 30 feet from a potential blast location. At this location, the blast noise level would be up to approximately 98 dBA Lmax. The project would blast no more than once per day. As such, the project would not exceed 82 dBA Lmax for more than 25 percent of the time. The project would result in a less than significant blasting noise impact.

2.4 Vibration

The proposed project could have a significant effect with respect to vibration if:

- The PPV from blasting exceeds 1 in/sec at residences or the school
- The PPV from pile driving exceeds 0.1 in/sec at residences or the school
- The rms from other construction activities exceeds 0.01 in/sec rms at residences or 0.014 in/sec rms at the school

Blasting would use charges up to 5 pounds in weight. Using the Caltrans guidance in Section 1.6.3 of this report, blasting vibration would be less than 1 in/sec PPV at distances beyond 15 feet from a blast. All residences and the school are over 15 feet from potential blasts; thus, all blasts would result in vibration levels less than 1 in/sec PPV.

A typical vibratory pile driver produces 0.17 in/sec PPV at 25 feet [FTA 2018]. Pile driving would occur as close as 175 feet from the closest residence (1909 Jewel Valley Road); the school is further away. Using the Caltrans guidance in Section 1.6.3 of this report, pile driving would generate vibration levels of 0.02 in/sec PPV or below at all residences and the school.

In this project, the piece of construction equipment expected to generate the highest level of vibration is a large bulldozer, which produces a vibration level of 87 dBA [FTA 2018]. The bulldozer could operate as close as 125 feet from the closest residence (1909 Jewel Valley Road) and approximately 4,450 feet from the school. At 125 feet, the vibration level would be approximately 66 VdB, which is equal to approximately 0.002 in/sec rms. Vibration levels from construction activities other than blasting or pile driving would not exceed 0.01 in/sec rms at all residences or 0.014 in/sec rms at the school.

The project would result in no vibration impact.

Project Blasting Details

Removal of soil and overburden, loose, poorly consolidated materials require the use of tractors and excavators. Hard rock formations will require drilling and blasting to fracture and to loosen the rock. Ground vibrations and airblast over pressure are part of the output of the rock blasting operations.

No two blasts will be identical. Blast designs will be modified to reflect the unique conditions of each locality. Factors that affect noise and vibration transmission include explosive composition, charge weight and delays, distance, depth of burial of the charge, and geologic formations. Air overpressure transmission is also affected by intensity, terrain features (trees, foliage, and other screening) orientation of the blast face, atmospheric conditions, temperature gradients and wind direction and velocity.

Blasting operations will be designed to minimize noise and vibration. A blasting contractor would be hired to complete all blasting related activities in compliance with County of San Diego Consolidated Fire Code (2020) and Federal Office of Surface Mining (OSM).

A licensed blasting contractor who has been approved by the Sheriff to conduct blasting operations and who has been placed on the list of approved blasters would be responsible for performing and supervising all blasting activities, including the following:

- Pre-blast notifications and warning signaling
- Pre-blast inspection
- Drill pattern design
- Loading of explosives
- Blasting safety procedures
- Blasting site security
- Post-blast inspections and re-entry procedures
- Blast log and history

Blasting shall only be allowed Monday through Saturday, between the hours of 7:00 a.m. and 6:00 p.m. or ½ hour before sunset, whichever occurs first. There would be a maximum of one blast per day. No explosives would be stored on site.

The blasting contractor would inspect all drill holes and maintain a drill log. Each drill log would be reviewed prior to loading any explosive or detonation device into any hole. Explosives used for blasting usually consist of a primer, secondary explosive and an initiator. The blasting contractor would use ammonium nitrate mixed with fuel oil (ANFO) as the primary blasting agent. Non-electric delay blasting caps would be used to initiate the blasting agent. Delays are used to allow sufficient rock movement to create a free face to which subsequent delays can move and still provide the interaction between periods to increase rock breakage from the collision of the moving rock.

Pattern blasting is a common technique used in production blasting. This method is used when rock materials occur over a wide area. As implied by the name, blasting holes are drilled to follow a pre-designed pattern. The depth and spacing of holes is controlled to provide the maximum fracture with the minimum amount of ground vibration.

The typical blasting pattern is 150 feet × 24 feet and consists of 60-120 drill holes 3.75 inches in diameter. Depth of the drill holes in these patterns are specific to each application as determined by the blasting contractor.

The blasting contractor would control blasting-induced vibration and noise. General control measures include:

1. Stemming will be of uniform size in order to ensure consistency between individual shots.
2. The weight of explosives used per delay will be determined by adherence to the Scaled Distance Equation.
3. Independent delays will be used for each blast hole to control vibration.
4. No blasting will take place when wind velocity equals or exceeds 15 miles per hour. A licensed blasting contractor will determine wind speed through the use of a recording anemometer located a minimum of ten feet above ground level near the on-site project office.

Ground vibrations, noise level, and air overpressure would be monitored during each blast for compliance with the limits by 30 CFR Ch. VII, §816.67(b)(1)(i) and §816.67(d)(2)(i). Following each blast, seismographs shall be checked to ensure that the blasting has not exceeded applicable noise and vibration criteria at the residential structures within 600 feet of the blast activity. If residents request, homes within 600 feet of the blasting operations shall be inspected for damage.

The blasting contractor will ensure compliance with 30 CFR Ch. VII, §816.67(b)(1)(i) and §816.67(d)(2)(i).

3.0 NOISE SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE

3.1 Guidelines for the Determination of Significance

Project implementation will result in the exposure of any on- or off-site, existing or reasonably foreseeable future NSLU to exterior or interior noise (including noise generated from the project, together with noise from roads [existing and planned], railroads, airports, heliports and all other noise sources) in excess of any of the following:

A. Exterior Locations:

i. 60 dB (CNEL); or

ii. An increase of 10 dB (CNEL) over pre-existing noise.

In the case of single-family residential detached NSLUs, exterior noise shall be measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

(1) Net lot area up to 4,000 square feet:	400 square feet
(2) Net lot area 4,000 square feet to 10 acres:	10% of net lot area
(3) Net lot area over 10 acres:	1 acre

For all other projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

3.2 Potential Noise Impacts

The one-hour average sound level at the closest residence to the BESS area (APN 612-090-570) would be approximately 32 dBA.

Assuming the sound level would be the same at all times of the day and night, the project CNEL would be 39 dBA. The ambient noise level in this area is estimated to be approximately 36 dBA CNEL, based on nearby noise measurements. Using logarithmic decibel addition, 36+39 dBA ≅ 41 dBA. As such, the project could increase the noise level at this residence by up to approximately 5 dBA CNEL, to a level below 60 dBA CNEL, and would result in no direct or cumulatively considerable impacts. All other residences would have substantially lower noise exposure.

4.0 SUMMARY OF PROJECT IMPACTS, MITIGATION, AND CONCLUSIONS

4.1 Project Features

The project would not include noise-reducing features as design considerations. No mitigation measures were necessary.

4.2 Project-Generated Airborne Noise

Operation of the project would generate 45 dBA Leq or less at all property lines.

Construction traffic would generate up to 66 dBA Leq (8 hours) at residences. Project construction would generate noise levels up to 74 dBA Leq (8 hours) at residential property lines. Project blasting would generate noise levels up to 98 dBA Lmax no more than once per day at residential property lines.

Pile driving would generate vibration levels of 0.02 in/sec PPV or below at all residences and the school. Construction would generate vibration levels of 0.002 in/sec rms or below at all residences and the school.

The project would be in compliance with the County Noise Ordinance. No impacts were identified. No mitigation is required.

4.3 Noise Sensitive Land Uses

The project would increase the noise level at nearby NSLUs by up to 5 dBA CNEL, to a level below 60 dBA CNEL.

No impacts were identified. No exterior mitigation measures are required.

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6.0 LIST OF PREPARERS

This noise analysis report was prepared by the following dBF Associates, Inc. staff:

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