# 2. Project Description

## 2.1 Project Overview

The Strauss Wind Energy Project (SWEP) is a commercial wind farm proposed by Strauss Wind, LLC (the Applicant, an affiliate of BayWa r.e. Wind, LLC), which would be located on approximately 5,887 acres of rural, agriculturally zoned land south of the City of Lompoc (Figure 2-1, Project Location). The Applicant has entered into long-term leases and easements with the property owners where all Applicant-proposed activities would occur. All work associated with the Project conducted by Pacific Gas and Electric (PG&E) as required for the electrical interconnection of SWEP would occur within PG&E's right-of-way. SWEP would have an aggregate electrical generating capacity of approximately 102 megawatts (MW), which, on an annual basis, would generate enough power to supply approximately 44,700 homes with electricity (USEIA, 2015).[1,2] The proposed Project could potentially generate up to approximately 300 gigawatt-hours (GWh) of electricity annually.[3]

The Project requires a Conditional Use Permit (CUP) pursuant to the Santa Barbara County Land Use & Development Code (LUDC) Section 35.82.060, two variances for reduced setbacks from exterior property lines, and the removal of setback requirements for all internal property lines. The Project would be constructed in one phase and is anticipated to take approximately 10 months. The environmental analysis presented herein assumes an approximate 10-month construction period. The Project is expected to have an operational life of approximately 30 years. Future scenarios could include lease renewals and possible repowering of the wind farm with advanced WTGs or decommissioning the Project and restoring the land.

Following are the major Project components of the Project and are described in detail in Section 2.5 below:

- Up to 30 wind turbine generators (WTGs)
- New access roads and road modifications
- One meteorological towers and two SODAR units
- An on-site communication system
- On-site power collection lines

[1] The project proposes to use 24 each of General Electric (GE) 3.8-MW WTGs, and 6 each of GE 1.79-MW WTGs, for a total of about 102 MW.

[2] The number of homes supplied with electricity per year is based on U.S. Energy Information Administration data from 2015 showing that the average annual electricity consumption the California was 6,684 kilowatt hours (kWh) per year per home. The project would build 30 WTGs equal to 102 MW and would generate approximately 300 GWh per year based on a 34 percent capacity factor. The proposed project generation per year was then divided by the average California electricity consumption value of 6,684 kWh per year per home resulting in the equivalent of 44,700 homes' consumption being generated with Project electricity per year.

[3] To derive GWh per year anticipated, kWh was calculated as discussed above and then converted to GWh.

- An on-site substation, including an approximately 450 s.f. control building
- An on-site Operations and Maintenance (O&M) facility, including a 5,000 s.f. building
- A new 7.3-mile, 115-kilovolt (kV) transmission line to interconnect with the Pacific Gas and Electric (PG&E) electric grid
- A new switchyard
- Upgrades to existing PG&E facilities

## 2.2 Project Objectives

The Applicant has defined the following objectives for the SWEP:

- To develop a wind energy project with a generation capacity of approximately 102 MW of electricity—producing approximately 300 GWh of electricity annually—in an area where the wind resources are known to be sufficient to do so;
- To develop an economically viable wind energy project that will support commercially available financing;
- To begin operating the wind project in time to meet milestones of an existing power purchase agreement and to qualify for certain tax credits; and
- To provide Project property owners with a stable, secondary source of income to supplement income from ranching and farming operations to support ranch maintenance and modifications.

In addition, the Applicant has defined the following objectives of the SWEP to benefit the region and community:

- To meet California energy needs in an efficient, sustainable, and environmentally sound manner, as provided in the Energy Element of the Santa Barbara County Comprehensive Plan, which encourages the use of alternative energy for environmental and economic benefits and encourages opportunities for businesses that develop or market alternative-energy technologies;
- To assist California in meeting its legislated Renewables Portfolio Standard, which requires all retail sellers of electricity (utilities, electric service providers, and community choice aggregators) in the state to source 60 percent of their electricity sales from renewable sources such as wind by 2030, with a goal of 100 percent carbon-free sources of electricity by 2045;
- To offset the need for additional electricity generated from fossil fuels and thereby assist the State in meeting their air quality goals and reducing greenhouse gas emissions;
- To promote the long-term economic viability of agricultural uses in Santa Barbara County, including grazing and dry land farming, by developing an agriculturally compatible land use to supplement income from traditional agricultural activities; and
- To provide Santa Barbara County and the City of Lompoc with additional tax revenues and local jobs benefiting their communities.

# 2.3 Comparison of Lompoc Wind Energy Project and SWEP

The SWEP is located on the site of the previously approved Lompoc Wind Energy Project (LWEP) (see Figure 2-2, Comparison of LWEP and SWEP). A Final Environmental Impact Report (EIR) was certified and a CUP was granted for the LWEP in 2009. The LWEP was never constructed.

The LWEP was approved to use 65 WTGs, which were approximately 400 feet tall. SWEP proposes larger but fewer WTGs, 30 WTGs at 492 and 427 feet tall. The LWEP on-site substation was proposed to be located to the west of San Miguelito Road, whereas the proposed substation for SWEP would be located to the east of San Miguelito Road, approximately 0.2 mile northeast of the LWEP substation location (Figure 2-2, Comparison of LWEP and SWEP).

For LWEP, the transmission line and switchyard would have been built, owned and operated by PG&E. Portions of the PG&E-built LWEP transmission line would have been consolidated with PG&E's existing distribution line and Imerys Mine power line. The switchyard associated with the LWEP would have been located in the PG&E substation, located in the City of Lompoc. SWEP proposes to build, own and operate the Project's transmission line and switchyard. The SWEP line is not proposed to be consolidated with any existing power lines until it reaches the POI. SWEP's proposed switchyard and POI would be located within the northern portion of the Imerys Mine property and adjacent to a residential neighborhood, approximately 0.6 miles from the PG&E substation.

The Applicant has modified the grading plan to allow cut and fill to be balanced on site (Table 2-1, Comparison of LWEP and SWEP). The revised grading plan and WTGs reduce the net area of grading from 235.9 acres in the LWEP, approved by the County in 2009, to 149.9 acres for the Project site. In addition, a total of 18.4 acres would be graded for the SWEP transmission corridor (grading for the LWEP transmission corridor was not analyzed or included in the 2009 version of the LWEP). The proposed SWEP grading plan indicates some cut slopes in excess of 100 feet; however, it does not utilize retention walls. (Retention walls were not identified in the grading plans prepared for the LWEP EIR; however, after LWEP approval and EIR certification, detailed grading plans proposed retention walls.) The net area of grading for SWEP, including the transmission line access roads and modifications to San Miguelito Road is 171.5 acres and shown in (Table 2-1).

SWEP's temporary and permanent land-disturbance areas include turbine pads, access roads, internal power collection lines, substation, switchyard, staging area, the laydown yard, operation and maintenance (O&M) facility, Project transmission line, pull sites along the transmission line, and access roads to the pole locations of the transmission line. The total area of permanent and temporary disturbance would be 171.5 acres. Some of the disturbance area includes existing developed areas, such as unpaved ranch roads, and some of the disturbance area includes sensitive flora, such as oak woodlands, Gaviota tarplant, and wetlands. Table 2-1 lists disturbance areas, including existing unpaved roads that would be improved for access to WTGs and transmission line construction. In some areas, new roads are proposed to gain access to the best wind resources. Similarly, some of the existing roads would not be utilized due to excessive grades or insufficient turning radii to accommodate the transport of turbine components and construction equipment.

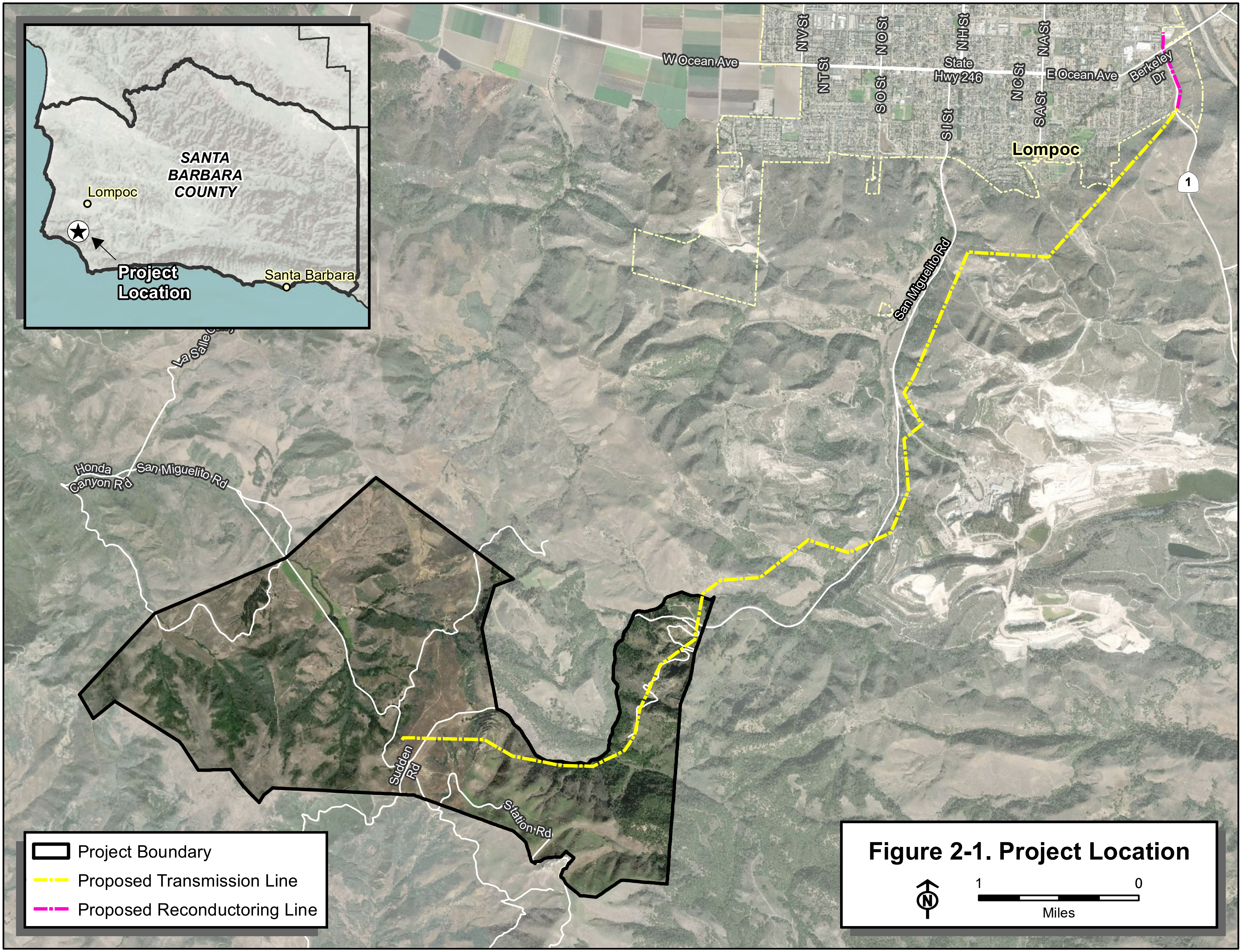


**Figure 2-1. Project Location**

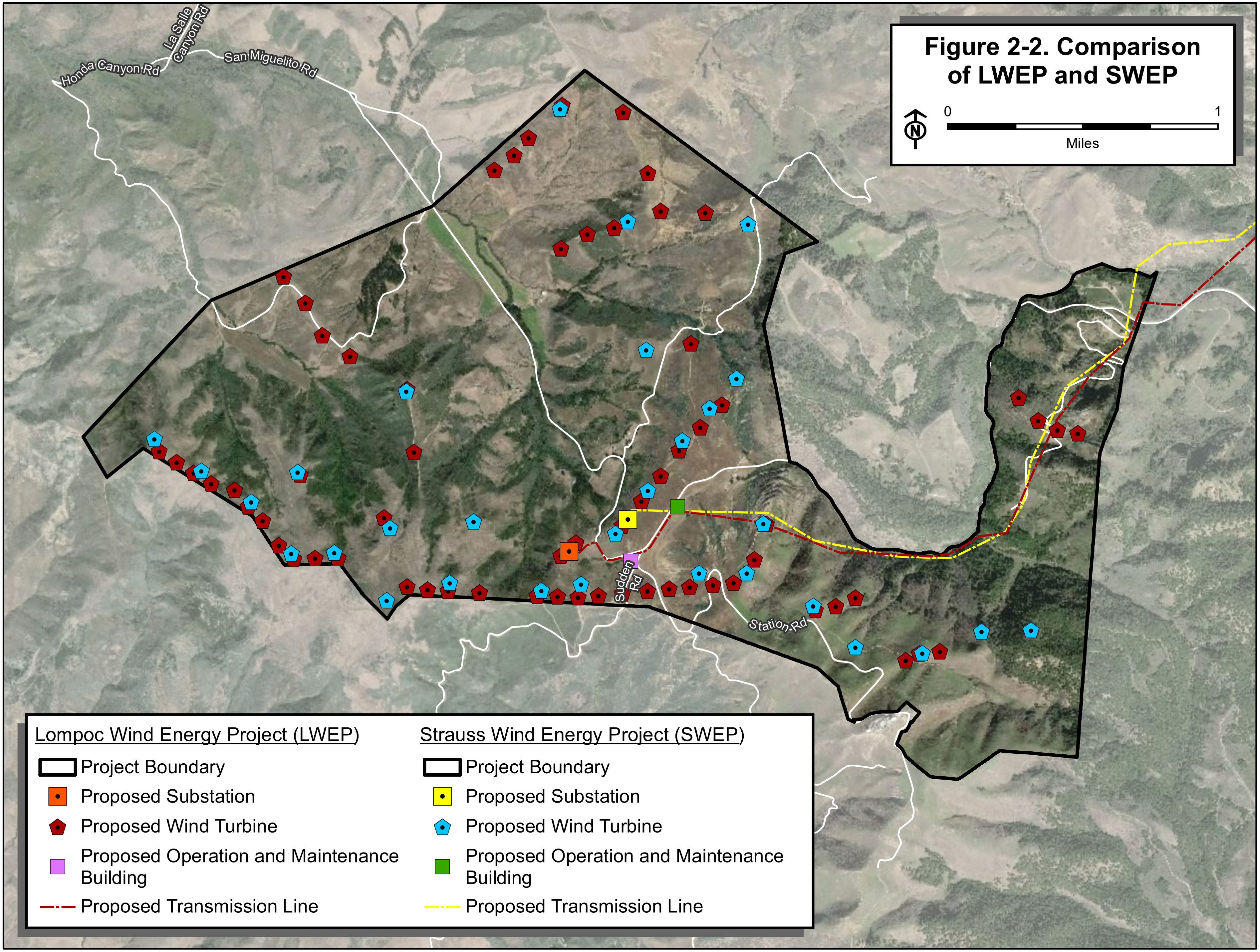


**Figure 2-2. Comparison of LWEP and SWEP**

## Table 2-1. Comparison of Lompoc Wind Energy Project and SWEP

| Project Characteristics | LWEP | SWEP |
|---|---|---|
| *Project Site Disturbance, Excluding Transmission Line and San Miguelito Road (acres)* | | |
| Permanent site disturbance | 40.2 | 149.0 |
| Temporary site disturbance | 195.7 | 0.9 |
| Total site disturbance | 235.9 | 149.9 |
| Total site disturbance as a percentage of total Project Area[1] | 8 percent | 5 percent |
| *Transmission Line Disturbance (acres)* | | |
| Permanent disturbance for Transmission Line Access Roads [2] | Not specified | 14.3 |
| Temporary disturbance for Transmission Line Access Roads[2] | Not specified | 4.1 |
| *San Miguelito Road Modifications (acres)* | | |
| Permanent Disturbance for San Miguelito Road Modifications | None | 3.2 |
| Temporary Disturbance for San Miguelito Road Modifications | Not specified | 0 |
| Total Disturbance for San Miguelito Road Modifications | Not specified | 3.2 |
| *Total Project Disturbance (including Transmission Line and San Miguelito Road) (acres)* | *Not specified* | *171.5* |
| | | |
| *Total Earthwork/Grading Volumes, including Transmission Line (cubic yards)3* | | |
| Cut | 219,000 | 950,237[3] |
| Fill | 182,000 | 961,778[3] |
| | 37,000 net[4] | -11,541 net[5] |
| *Road Modifications, including Transmission Line (miles)* | | |
| Modifications to existing roads to access turbines | Not specified | 1.8[6] |
| New roads to access turbines | 5.5 | 7.1 |
| Modifications to existing roads for transmission line construction | Not specified | 9.0 |
| New roads for transmission line construction | Not specified | 1.1 |
| *San Miguelito Road Modifications (miles)* | | |
| Total length of San Miguelito Road used for site access | Not specified | 7.4 |
| Total length of San Miguelito Road Modification Areas | Not specified | 4.0 |
| *Wind Turbine Generators (WTGs)* | | |
| Total number of proposed WTGs | 65[7] | 30 |
| Number of WTGs by model | 65 ea. 1.5 MW[7] | 6 ea. GE 1.79-MW<br>24 ea. GE 3.8-MW |
| Total height of WTG | 389 or 397 feet (119 or 121 meters) from foundation to blade tip[8] | GE 3.8-MW WTG: 492 feet (150 meters) from foundation to blade tip<br>GE 1.79-MW WTG: 427 feet (130 meters) from foundation to blade tip |
| *Construction Truck Trips* | | |
| Total Truck Trips | 12,270[9] | 16,189[10] |

[1] Total Project Area excluding transmission line and San Miguelito Road = 2,971.4. Note that transmission line work and San Miguelto Road work was not calculated for the previous LWEP.
[2]Permanent and temporary disturbance calculations for the transmission line access roads include both modifications to existing roads and construction of new roads.
[3] Includes existing and new roads for transmission line construction.
[4] LWEP total cut and fill volumes were estimated for roadwork only (401,000 cubic yards [cy]). As a result, actual volumes were likely much greater when considering all Project components.
[5] Earthwork for the Project is expected to be balanced on site as a result of shrinkage and settling.
[6] Includes modification of non-County, on-site ranch roads only.
[7] Section 3.2, *Aesthetics/Visual Resources Impacts*, of the 2009 LWEP Final EIR developed the visual simulations for the WTGs using an 80 unit worst-case scenario as the basis for the analysis because the precise locations of the WTGs were not known at the time of the aesthetics evaluation.
[8] Section 3.2, *Aesthetics/Visual Resources Impacts*, of the 2009 LWEP Final EIR assumed a worst-case scenario total WTG height of 397 feet for visual impact analysis purposes, except for Figure 3.2.18B, which was prepared assuming that six of the WTGs would be 436 feet in height and the other four WTGs would be 389 feet.
[9] Based on a 6-month construction schedule.
[10] Based on a 10-month construction schedule.
SOURCE: County of Santa Barbara Planning and Development Department, Energy Division. August 2008. Certified 10 February 2009. Final Environmental Impact Report: Lompoc Wind Energy Project. County EIR No. 06EIR-00000-00004. State Clearinghouse No. 2006071008. Prepared by Aspen Environmental Group, Agoura Hills, CA.

# 2.4 Location and Setting

The proposed SWEP is located near the City of Lompoc in the unincorporated territory of Santa Barbara County, California (see Figure 2-1, Project Location). The Project site is located on approximately 5,887 acres of primarily rural land within the ridges of the Santa Ynez Mountains, along San Miguelito Canyon, and the White Hills.

The Project's transmission line corridor terminates at the switchyard 0.6 miles southwest of the PG&E substation, which is located in the City of Lompoc. PG&E's line runs the remaining 0.6 miles from the switchyard to the substation. The switchyard location is approximately 100 feet outside the Lompoc city limit south of Sheffield Drive. The border of the Project properties where the WTGs are located is approximately 4.2 miles from the City of Lompoc, 2.3 miles northwest of the coast adjacent to VAFB, 3.5 miles north of Jalama Beach County Park, 3.6 miles southwest of Highway 1 (State Route 1, or SR 1), 4.1 miles southeast of the closest Vandenberg Space Launch Complex, and 7.3 miles southeast of Ocean Beach Park. The closest WTG within the Project properties is located approximately 6.8 miles from the City of Lompoc, 2.3 miles northwest of the coast adjacent to VAFB, 4 miles north of Jalama Beach County Park, 4.8 miles southwest of Highway 1 (State Route 1, or SR 1), 4.3 miles southeast of the closest Vandenberg Space Launch Complex, and 8 miles southeast of Ocean Beach Park. The Project site is bounded by Vandenberg Air Force Base (VAFB) on the south and west sides and private property on the north and east sides. The Project site is accessed via San Miguelito Road, a public road that winds through the area and terminates at the VAFB property line at the northwest edge of the Project site.

The California Coastal Zone intersects with a portion of the southern Project area. In order to provide access to WTGs located in the southeastern portion of the Project, existing roads would to be graded and widened, and some new roads constructed to accommodate construction equipment such as cranes required for WTG construction. No WTGs would be located within or overhanging the Coastal Zone.

The Project site comprises 22 privately owned parcels covering approximately 5,887 acres (see Figures 2-3a and 2-3b, Project Site Plans). This includes 11 parcels with a total size of 2,915.17 acres associated with the primary wind site and 11 parcels with a total size of 2,646.6 acres associated with the transmission line (including all work associated with PG&E's activities). Project activities would occur on 4.5 percent of the total Project area. There are two small parcels owned by the federal government that are located within the Project area: APN 083-100-006 (0.05 acres) and APN 083-250-009 (0.61 acres). These parcels are not part of the Project and no development would occur within these parcels. The landowners and assessor parcel numbers for properties are shown in Table 2-2 (Project Landowners).

The properties on the primary wind site are zoned for agriculture (AG-II-100), and all are under Williamson Act agricultural preserve contracts. Historically, some rock quarrying occurred in the area. The current principal use of the land is cattle grazing. Single-family residences, mobile homes, and agricultural accessory structures are located on seven of the 11 parcels comprising the primary wind site. The adjacent private properties are also agriculturally zoned. The majority (8 of 11) of the transmission line parcels are zoned for agriculture (AG-II-100), and one of the 11 parcels along the transmission line is under a Williamson Act agricultural preserve contract. The remaining 10 parcels along the transmission line consist of the Imerys mine property and properties within the City of Lompoc. More than half of the SWEP transmission line (3.5 of the 6.1 miles) is located on the Imerys mine property which has been an active mine since 1893. The two properties within the City of Lompoc are along the existing PG&E right-of way where reconductoring of the existing line will take place. These parcels are zoned by the City as Residential Agriculture and Planned Commercial Development.

**Table 2-2. Project Landowners**

| Property Owners | Assessor Parcel Numbers (APNs) | Total Property Acreage |
|---|---|---|
| Signorelli Family Trust: Joe and Sylvia Signorelli, Trustees | 083-100-008, 083-250-011, 083-250-016, and 083-250-019 | 765.88 |
| Gerald and Sandra Scolari Revocable Trust: Gerald and Sandra Scolari, Trustees; Rosabel V. Cameron Trust: Rosabel V. Cameron, Trustee and The LeRoy Scolari Trust | 083-090-001 and 083-090-002 | 489.84 |
| Darin Signorelli and Denee Signorelli | 083-090-003 | 421.18 |
| Leroy Scolari Trust | 083-080-004 | 467.87 |
| Joanna M. Signorelli Trust: Joanna Signorelli, Trustee | 083-100-007 | 369.60 |
| John Christian Larsen Family Trust: John C. Larsen, Trustee | 083-100-004 | 257.23 |
| Joseph A. Signorelli, Jr. and Gus Tom Signorelli | 083-090-004 | 199.81 |
| **Transmission Line Property Owners** | **Assessor Parcel Numbers (APN)** | **Total Property Acreage** |
| Celite Corp (Imerys Minerals California, Inc. subsidiary of Imerys Filtration Minerals, Inc.) | 093-140-016, 083-060-013, 083-030-031, 083-030-005, 083-030-006, 083-110-012, 083-110-007, 083-110-008 | 2,383.96 |
| Lompoc Valley Trucking Co., Inc.* | 083-060-017 | 29.75 |
| Bratz Family LLC, Johnson Family Trust, Linda McCaffrey Donelson Trust | 083-110-002 | 500.25 |
| Santa Rita Hills Wine Center Investors, LP | 099-141-034 | 1.73 |

*PG&E reconductoring only within the City of Lompoc

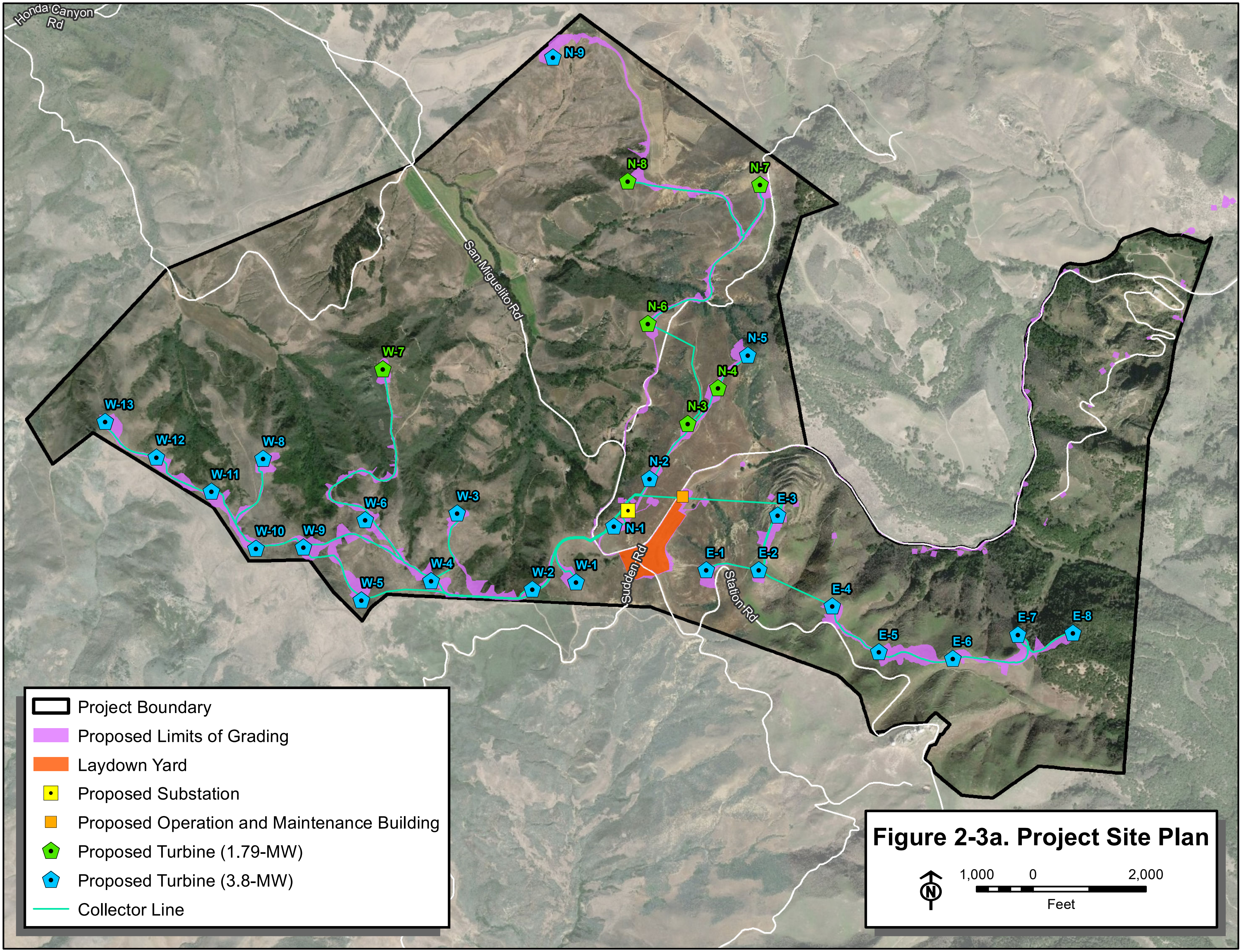

Figure 2-3a. Project Site Plan

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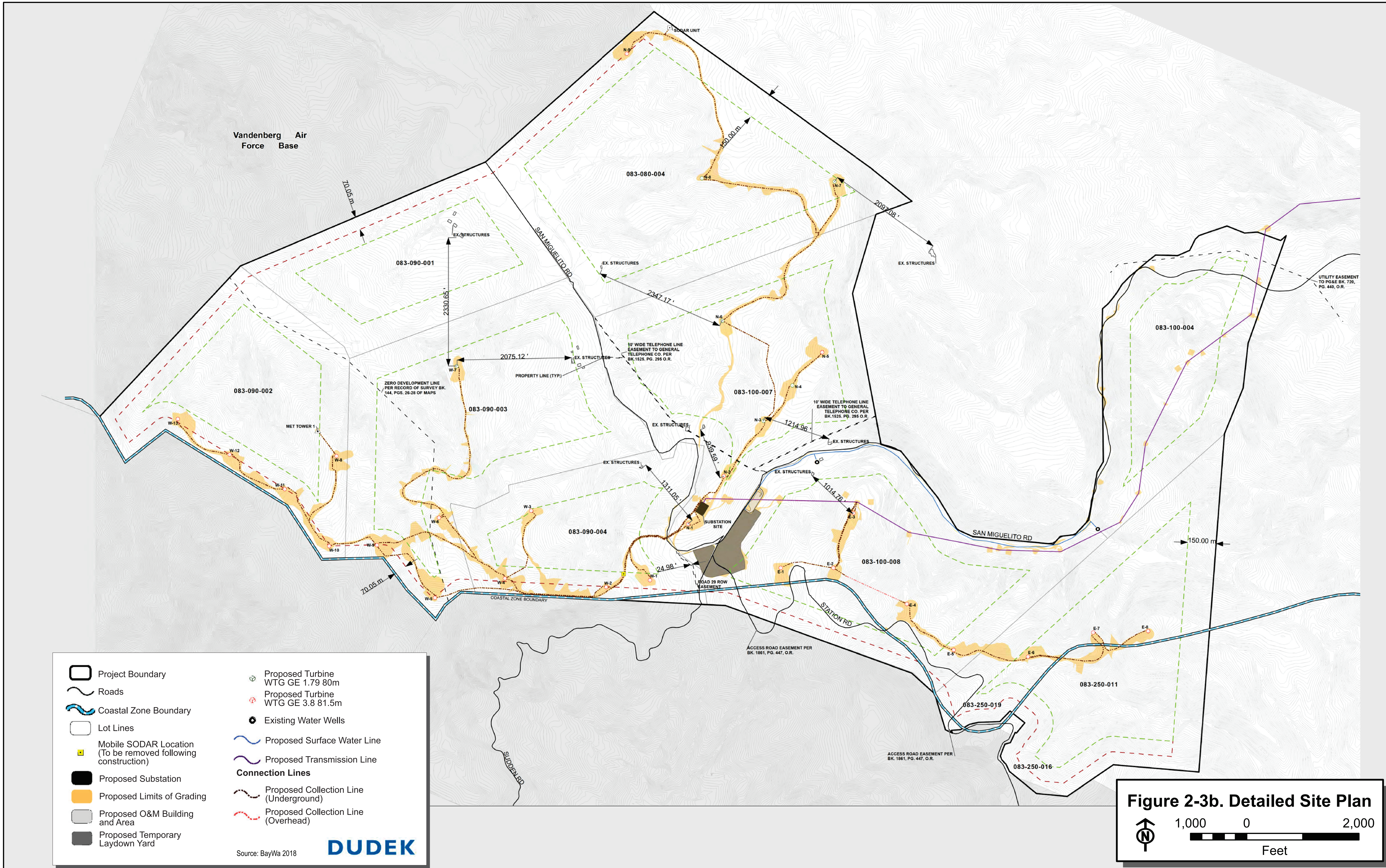


**Figure 2-3b. Detailed Site Plan**

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The nearest private residence on non-Project properties is located approximately 950 feet from the Project area boundary and approximately 2,040 feet from the closest WTG. Within the SWEP's northeastern site boundary, the transmission line would cross San Miguelito Road from south to north and would traverse residential properties within 500 feet of existing homes of participating project landowners. Further northeast, the transmission line would be constructed on the east side of San Miguelito Road. Other structures and uses in the Project vicinity include VAFB's Sudden Peak Tracking Station near the southern perimeter and Frick Springs (water treatment plant located between Miguelito Canyon Road and Miguelito Creek), and a City of Lompoc water facility on San Miguelito Road adjacent to the west side of the Larsen property (northeast section of the Project site, see Figure 2-3b).

The Project area terrain includes rolling hills and rugged, steep slopes. The site's southern boundary with VAFB follows the ridgeline for much of its length. Prevailing winds from the north/northwest regularly flow over the ridges. Some of the prime wind sites in the southern Project area are near the VAFB property line. The Applicant has executed an agreement with the Air Force that outlines the responsibilities of the Applicant for siting the Project in close proximity to VAFB property. Agreement No. USAF-AFSPC-XUMU-15-1-0142 (the "Agreement") establishes policies for evacuation and termination of transmissions of "Specified Turbine(s)" during launch or pre-launch activities upon notice to do so by the VAFB. At this time, no Specified Turbines have been identified.

# 2.5 Project Components

## 2.5.1 Wind Turbine Generators

The Project proposes installation of up to 30 WTGs, each with a nameplate capacity of 1.79 or 3.8 MW. The WTGs would consist of six GE 1.79-MW WTGs and twenty-four GE 3.8-MW WTGs. The 1.79-MW WTGs would be 427 feet (130 meters) in total height from foundation to blade tip and the 3.8-MW WTGs would be 492 feet (150 meters) from foundation to blade tip. The six 1.79-MW WTGs are generally proposed in the northwestern portion of the Project area. The remaining twenty-four 3.8-MW WTGs are proposed throughout the site, generally on or near ridgelines. Table 2-3 (Wind Turbine Generator Model Component Specifications) provides detailed information relating to tower and blade dimensions and total system height.

**Table 2-3. Wind Turbine Generator Model Component Specifications**

| WTG Model | Tower/Hub Height | | Rotor Diameter | | Blade Length | | Total Height Base to Tip | |
|---|---|---|---|---|---|---|---|---|
| | Meters | Feet | Meters | Feet | Meters | Feet | Meters | Feet |
| GE 1.79-100 MW | 80 | 262 | 100 | 328 | 48.7 | 159.8 | 130 | 427 |
| GE 3.8-137 | 81.5 | 267.3 | 137 | 449.5 | 68.5 | 224.7 | 150 | 492 |

The WTG hub height would be between 262 feet (80 meters) and 267.3 feet (81.5 meters) above ground. Each turbine's tower would be constructed of heavy-duty, epoxy-coated, welded steel, and would form a conical shell. The towers would taper from approximately 14 feet in diameter at the base to 10 feet at the nacelle (also called the machine house, i.e. the top portion of the WTG where mechanical and some electrical components are housed). No guy wires would be required to hold the WTGs upright. The fully assembled WTGs would weigh between 250 to 400 tons depending on the model.

The WTGs would be a three-bladed, horizontal axis design, which is the type installed in nearly all modern, commercial wind farms. The blades would be approximately 224.7 feet (for the 3.8-MW WTG) to 160 feet (for the 1.79-MW WTG) long and would be constructed in one piece of laminated fiberglass. A rotor hub, to which the blades would be bolted, would be covered by a composite nose-cone structure to streamline the airflow and protect the equipment. The nacelle would include the drive train (main shaft, bearing and gearbox), generator, and other electrical and hydraulic components. A transformer would be located either at the base of each tower, or inside the tower to increase the generation voltage up to the 34.5 kV of the collector system.

The WTGs would be set back from private property lines at the Project area perimeter by a distance equal to the total system height, as required by LUDC Section 35.57.050, except that the proposed Project would require approval of two variances: (1) to allow the base of the tower of the WTGs to be located 70.05 meters (230 feet) away from exterior property lines located on the south and west sides of the Project site where the boundary is shared with VAFB, and (2) to allow the removal of all setback requirements for all property lines within the Project boundary.

These property lines are interior property lines located between properties that are part of the overall Project site. The intent of these variance requests is to position the WTGs close to the ridgelines to best capture the wind, avoid placement of WTGs on steeper slopes to minimize grading, and optimize WTG layout. In some locations, this would result in placing the WTGs within the setback area. In no case would any WTG component, including blades, intrude onto VAFB property.

The WTG manufacturer's specifications state that the total maximum sound power level in decibels (dB) for the proposed WTGs is 107 A-weighted decibels (dBA). This is the maximum noise emission for WTG hub height wind speeds within its noise-relevant operational range from 4 meters per second (m/s) to 15 m/s.

The proposed Project would use only WTGs that have achieved design certification by a reputable and experienced third-party verification institute, such as DNV GL, TÜV, or other comparable certification bodies for wind turbines, and demonstrate a design life of at least 20 years. The factors involved in certifying WTG design include safety and control system concepts, addressing rotating and still turbine states, and load bearing confirmation. When approved, specific components, such as blades, hub, drive train, generator, safety system, tower, yaw system, and electrical installations, would be reviewed and approved according to minimum standards established by third-party verification institutes. In addition, the Applicant would employ an Independent Engineering (IE) firm to review construction supervision procedures, including materials testing, compliance with the design certificate, quality assurance reports and procedures, corrosion protection, and others. The IE also reviews standards and documentation for supervision during the transportation, erection, and commissioning of the WTGs.

Operational testing of turbine models performed by the laboratories includes measurement of power curves, noise emissions, and loads and stresses, including wind loads imposed on the tower, foundation, drive train, blades, nacelle frame, and power quality. Test data are evaluated for plausibility and compared with the original calculations and mathematical models used for the design.

## Foundations

The WTG foundations would have one of three designs, depending on soil conditions, geotechnical constraints, and other factors, including wind patterns at the site, site access, material availability, and the WTG manufacturer specifications. The three possible types of WTG foundations are (1) Patrick and Henderson Inc. (P&H) patented post-tensioned foundation, (2) rock anchor, or (3) a modified spread-footing method of construction.

The P&H foundation would be drilled or dug to approximately 25 to 35 feet deep, depending on geotechnical conditions and loadings, and would be approximately 18 to 20 feet in diameter. The foundation would be in the configuration of an annulus—two concentric steel cylinders. The central core of the smaller, inner cylinder would be filled with soil removed during excavation. In the cavity between the rings, bolts would be used to anchor the tower to the foundation and the cavity would be filled with concrete. Bolting the tower to the foundation would provide post-tensioning to the concrete. The estimated excavation amounts for the P&H foundation would be approximately 400 cubic yards per WTG. Based on the known soil conditions and geotechnical data collected to date, the Applicant expects that the P&H foundation will be the preferred foundation for the Project.

A rock anchor-type foundation is an alternative to the P&H foundation used for rocky soils. Six to twenty holes, depending on geotechnical data, would be drilled approximately 35 feet into the bedrock, and steel anchors would be epoxy-grouted in place. A reinforced concrete cap containing the anchor bolts would be poured on the top of the steel anchors to support the tower structure. The foundation cap for a rock anchor foundation is best set atop the rock that may vary in depth from the top of turbine pad grade to 4.75 feet below the turbine pad grade. Rock does not need to be ripped or blasted level as a leveling course of 2,000-psi concrete is poured atop the rock and under the foundation cap. If the rock anchor surface is level at 4.75-foot depth, a 24-foot diameter cap would need to remove approximately 124 cubic yards of soil and backfill (uncompacted) around the perimeter of the cap would be needed and backfill around the perimeter of the cap would be approximately 42 cubic yards of the excavated soils. If the foundation cap is 32 feet in diameter and 4.75 feet embedded into the soil atop rock, approximately 200 cubic yards of excavation would be needed and the backfill around the perimeter of the 32-foot cap would be approximately 58 cubic yards. Soil removed for the foundation cap not utilized for backfill can be placed on or around the turbine building pad.

A spread-footing type of foundation may be square or octagonal and formed with reinforcing steel and concrete. Depending on geotechnical data, a spread-type foundation is typically a 60-foot x 60-foot x 10-foot excavation totaling up to approximately 1,333 cubic yards. Approximately 561 cubic yards of concrete is used. The excavated soil is then deposited over the foundation and compacted to 95 percent proctor (laboratory method of experimentally determining the optimal moisture content at which a given soil type will become most dense and achieve its maximum dry density). Total combined excavated volumes for the WTG foundations using a P&H-style are estimated at 12,000 cubic yards in the case of a typical 32-foot-deep P&H-style foundation. In the case of a P&H-style foundation, most of this volume is backfilled into the center of the foundation. The remainder is either used to grade the area around the foundation to allow for positive drainage or used as fill in other areas of the Project site. For all designs, the exposed concrete pad would be approximately 16 feet in diameter and extend less than one foot above grade. A 20-foot-wide graded ring around each foundation consisting of gravel or crushed rock would be utilized for positive drainage and access.

## Layout and Design

Locations for WTGs were determined by the Applicant based on the optimum wind resource on the Project site, constructability and environmental constraints. The original LWEP proposed 65 WTGs, whereas the proposed SWEP reduces the total number of WTGs to 30.

The Project would result in an estimated total of 1.59 acres, or 60,544.50 square feet, of new impervious surface, which represents 0.02 percent of the total Project area. This includes each WTG base, six pad-mount transformers (outside of the 1.79-MW turbines), Project substation control building, Switchyard, O&M facility building, meteorological towers, and transmission line poles (see Table 2-4, Estimated Area of Impervious Surface). All other Project elements and disturbance areas would be restored to a natural state with an approved seed mix or surfaced with gravel.

WTG spacing would be no less than 1.5 rotor diameters (675 to 492 feet or 206 to 150 meters). In most cases, the WTGs would be located farther apart to prevent wind shadowing (wind blockage by WTG structures). The final locations of individual WTGs would be subject to minor adjustment, known as micro siting, until the time of construction.

**Table 2-4. Estimated Area of Impervious Surface**

| | Impervious Area sq ft | No. Units | Subtotal Impervious Area sq ft | 10% Buffer Area | Total Impervious Area sq ft | Total Impervious Area Acres |
|---|---|---|---|---|---|---|
| O&M Facility[1] | 5,000 | 1 | 5,000 | 500 | 5,500 | 0.13 |
| O&M Facility side building | 500 | 1 | 500 | 50 | 550 | 0.01 |
| O&M Parking Lot[2] | 9,677.4 | 1 | 9,677.4 | 967.7 | 10,645.1 | 0.24 |
| O&M Septic and Water Tanks | 386.2 | 1 | 386.2 | 38.6 | 424.8 | 0.01 |
| WTG Base[3] | 270 | 21 | 5,670 | 567 | 6,804 | 0.2 |
| WTG (Spread-Foot Base[3] | 2,376 | 9 | 28,188 | 2,818.8 | 31,006.8 | 0.771 |
| Met Towers | 75 | 3 | 225 | 22.5 | 247.5 | 0.006 |
| Transmission Line (poles)[4] | 20 | 44 | 880 | 88 | 968 | 0.020 |
| Substation | 2,933 | 1 | 2,933 | 293.3 | 3226.3 | 0.229 |
| Switchyard | 550 | 1 | 550 | 55 | 605 | 0.013 |
| Total Project Impervious Surfaces | 21,787.6 | 109 | 54,529.60 | 5,452.90 | 60,544.50 | 1.59 |

[1] Based on O&M facility dimensions of 50 feet by 100 feet
[2] Temporary parking for construction was assumed to be pervious as a result of a gravel surface. Permanent parking for the O&M building is shown as being paved on the site plan and was considered to be impervious.
[3] WTG Base calculations based on tensionless pier foundation type.
[4] Based on 64 - 1,280 foot (average 380 feet) pole spacing and 20 square feet of impervious foundation/structure

Micro-siting is a term that generally refers to the precise placement of wind turbines and associated project components during construction to optimize power production, overall impacts, constructability, or site efficiency (USDOI, 2016). The topography of the site as well as other factors, such as trees and vegetation cover, can influence local wind conditions. Shadowing, potential noise impacts, and turbulence place additional restrictions on the placement of turbines. The siting of turbines has been based on the collection of wind speed data for over 10 years at selected locations and elevations. The WTG configuration is based on the data collected from wind measurements and allows wind farm losses caused by shadowing effects to be minimized, thus ensuring that the wind farm operates efficiently throughout the year. Micro-siting is also used where construction of a WTG or other project component is determined to be infeasible due to geotechnical considerations. The Applicant has attempted to place WTGs and associated project infrastructure to avoid known environmental constraints. Micro-siting adjustments would be limited to a shift of the location of the footprint analyzed in the conceptual grading plan. The Applicant does not expect to materially change the net area of temporary or permanent impact.

As final engineering and design for the Project progresses, the Applicant would review micro-siting decisions with the County. The final grading plan, inclusive of micro-siting adjustments, would be submitted to the County prior to construction to ensure consistency with the environmental analysis.

## Design Safety Features

### WTG Components

The WTGs would be equipped with sensors and yaw and pitch controls to adapt to different wind speeds and directions to maximize power output. The yaw drive ensures that the WTG produces the maximum amount of electrical energy at all times by keeping the nacelle facing into the wind as the wind direction changes. The pitch is the angle of the turbine blade. The WTGs would be microprocessor controlled and operating data would be transmitted to the on-site O&M facility and an off-site remote operation center for system monitoring and control. The remote operation center is a data collection center that could be anywhere, including the Applicant's headquarters. Communications between the WTGs and the remote operations center are completed via digital communication protocols. Each turbine's control system together with the central Supervisory Control and Data Acquisition (SCADA) system in the substation's control house would measure and automatically control operations for fully automated operation, including the following functions:

- Power regulation over a wide range of wind speeds, including startup, shutdown, and generator-grid connection.
- Yaw control, including protection against damage due to abnormal operating conditions or extreme environmental conditions.
- Safety monitoring, enabling automatic shutdown of the WTGs independent of all other controls, thereby protecting them from unsafe conditions.
- Monitoring sensor data for rotor speed, generator current, electrical load, nacelle vibration, yaw error, pitch control, system-hydraulic pressure, temperature, and more.

The controller would adjust the blade pitch periodically using an electric actuator. The actuator would regulate blade pitch to achieve smooth and consistent power curves as wind speed and air density changes. The actuator would adjust the blades' angle-of-attack with the prevailing wind and air density to optimize performance. The rotor would normally be stopped by rotating the blades to increase their aerodynamic drag. A fail-safe hydraulic brake would also be installed on the high-speed shaft, which would be used primarily to prevent rotation during maintenance.

If a critical control parameter is deviated from its normal operating range, the controller would automatically shut down the WTG and notify the operating technician(s) of the fault. In many situations, the controller would analyze the data and restart the WTG if the fault were corrected or the operating conditions returned to normal. If the fault reoccurred, the controller might require a manual start, for which a technician would have to be present to restart the WTG.

Each WTG controller would communicate via fiber-optic cables to the Project O&M facility. This configuration would enable the facility to be controlled to maximize output, minimize maintenance costs and downtime, produce operations reports, and ensure compliance under the Project's performance warranties.

Routine inspections would be performed on all electrical connections periodically, and any faulty cables or damaged insulators would be replaced as needed for the underground/overhead collection system within the Project area.

A possibility exists that severe storms might result in occasional downed power lines or poles. In this case, procedures outlined in the emergency response plan and the standard operating procedures developed for the Project would address problems such as power outages, lightning storms, excessive rains, landslides or mudslides, ice storms, and other weather-related incidents.

## WTG Safety Systems

Each WTG blade is an independent fail-safe system and can stop the rotor from going in overspeed. As a result, the rotor can be brought to a safe condition under all foreseeable conditions. Brake pads on the disc brake system would be spring-loaded against the disc, and power would be required to keep the pads away from the disc. If power were lost, the brakes would immediately be mechanically activated. The aerodynamic braking system would also be configured so that if power were lost, it would be immediately activated. If an emergency stop were executed, remote restarting would not be possible. The WTG would need to be inspected in person and the stop-fault reset manually before automatic reactivation. Each WTG also would be equipped with a brake that generally would be used to keep the rotor from moving while maintenance routines or inspections that require a stationary rotor are performed.

If the SCADA system malfunctioned or failed, or if transmissions/communication were interrupted, the wind turbines are designed to safely self-operate without the requirement of a SCADA or other external monitoring system. Each turbine has installed its own controller system which monitors and controls all components and elements, and in case of an error or abnormality, disconnects from the grid and stops the turbine. Modern wind farms are equipped with SCADA systems to facilitate remote monitoring, analysis and control to improve performance and quality of the energy generated. In the rare event of a communication loss of a turbine with the SCADA central computer or of the SCADA central computer with the operation centers, a wind turbine would continue to operate as long as it is error free. A service technician is then dispatched to manually operate turbines when needed and restore communication as quickly as possible.

The safety systems of all WTGs would comply with the codes set forth by the Occupational Health and Safety Administration (OSHA), the American National Standards Institute (ANSI), and European Union (EU) health and safety standards. Each WTG also would be equipped with vibration, temperature, and humidity sensors in the nacelle and tower. In the event of excess vibration or temperature, the WTG would be halted immediately, and an alarm condition would be activated in the control system that could send a page or message to a cell phone of the on-call operators or the local fire district (first responders), as required.

The nacelle would be accessed using a ladder located inside the tower. Internal ladders and maintenance areas inside the tower and nacelle would be equipped with safety provisions for securing lifelines and safety belts and conform to or exceed ANSI 14.3-1974 (Safety Requirements for Ladders).

The WTGs would be equipped with a lightning protection system that connects the blades, nacelle, and tower to the earthing (grounding) system at the base of the tower. Because the rotor blades would be nonmetallic, they normally would not act as a discharge path for lightning; however, as the highest point of the WTG, the blades sometimes would provide the path of least resistance for a lightning strike. To protect the blades, they would be constructed with an internal copper conductor extending from specially designed receptors at the blade tip down to the rotor hub, which would be connected to the main shaft and establish a path through the nacelle bed frame to the tower base, down to the grounding system embedded underground. An additional lightning rod would extend above the wind vane and anemometer at the rear of the nacelle. Both the rear lightning rod and blades would have conductive paths to the nacelle bed frame, which connects to the tower. The tower base would be connected to the earthing system at diametrically opposed points. The earthing system would consist of a copper ring conductor connected to earthing rods driven into the ground at diametrically opposed points outside of the foundation. The earthing system, with an acceptable resistance (less than 2 ohms), would provide a firm-grounding path to divert harmful stray surge voltages away from the WTG. The controllers and communication interfaces to the Project central control system would use fiber-optic cables and optical signal conversion systems, to protect these systems from stray surges.

### Aviation

After Federal Aviation Administration (FAA) Determination of No Hazard (DNH) certification has been issued for a specific turbine location, micro-siting of more than 1 arc second, approximately 100 feet would require reapplication.

The Federal Aviation Administration (FAA) will require a synchronized, flashing, red light mounted on the top of the nacelle of the WTG located at the end of each WTG string. Additional WTGs within the string would also have such a light so that the maximum distance between lit WTGs would be no greater than 2,640 feet. These lights would be placed in compliance with FAA guidelines.

## 2.5.2 On-Site Substation

All the power generated by the WTGs would be transmitted to the on-site Project substation via the power cable collection system (see Section 2.5.7). The Project substation would step up the voltage from 34.5 kV to 115 kV and serve as the originating point of the proposed 7.3-mile 115-kV overhead transmission line (see Section 2.5.4) that would interconnect the POI at the Project switchyard (see Section 2.5.3) on the Imerys Mine property. The Project substation, transmission line, and switchyard would be under the ownership of the Applicant.

The on-site Project substation would be located entirely on the privately held land of a participating Project landowner within the Project boundary. The Project substation footprint would disturb approximately 1.0 acres of land and be approximately 150 feet by 220 feet in dimension plus 10 feet for the grading berm on either side. Structural and electrical equipment would be installed on top of structural concrete forms, which would be roughly 18 inches above rough grade. The substation perimeter would be entirely secured by an 8-foot chain-link fence topped with three-strand barbed wire, raked outward at a 45-degree angle. A locked, double-swing gate would be installed in the fencing to provide access to the Project substation.

No shrubbery, hedging, or landscaping around the perimeter of the substation is proposed. The entire footprint of the substation would be finished with a graveled layer of clean, washed rock free of sands or organic material. This rock layer would act as a fire barrier and as step protection. In addition, spatial separation of transformers and other design considerations would be incorporated in the design to prevent the risk of fire. The substation would meet or exceed IEEE-979 Substation Fire Protection standards. Detection and extinguishing equipment would be installed in accordance with all applicable code requirements. Project substation signage as required by the NESC, OSHA, and other applicable organizations would be provided.

The highest structure of the substation would be the dead-end structure, which is a self-supporting structure where the conductors of the transmission line mechanically terminate to the substation. The Project substation would be fitted with static poles that would create a shield to protect all of the equipment inside the Project substation from lightning. Static poles may or may not have overhead shield wires attached to enhance lightning protection. The static poles would be approximately 60 feet above the substation grade. A control building would be housed entirely within the Project substation. The control building contains switchboard panels, batteries, battery chargers, supervisory control, meters, and relays, and provides all weather protection and security for the control equipment. The Applicant estimates that the control building would be 15 feet by 30 feet in dimension. The control building would be adequately ventilated to prevent the accumulation of hydrogen gases from battery operation.

The substation would include standard low-illumination, motion-triggered lighting. Exterior light fixtures at the Project substation lighting would be hooded, with lights directed downward or toward the area to be illuminated, and so that backscatter to the nighttime sky is minimized.

## 2.5.3 Switchyard

The proposed switchyard would connect the Project to the PG&E Electrical System. The switchyard would be located on the Imerys Mine property and next to a residential development. The switchyard would be 100’ x 100’ in dimension and the height of required structures will not exceed 55’. It consists of a 115-kV high-voltage breaker, energy metering devices, disconnect switches, surge arrestors and a 15’ x 20’ pre-manufactured concrete control building, which houses protection relays, real-time automation control and communication devices. The Project’s switchyard would be surrounded and secured by an 8 ft. chain linked fence topped with three-strand barbed wire, raked outward at a 45-degree angle. A locked, double-swing gate would be installed in the fencing to provide access to the switchyard. The entire footprint of the switchyard would be finished with a graveled layer of clean, washed rock free of sands or organic material. This rocked layer would act as a fire barrier and as step protection. The switchyard would include standard low-illumination, motion-triggered lighting. The switchyard lighting would be designed so exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated, and so that backscatter to the nighttime sky is minimized. No shrubbery, hedging, or landscaping around the perimeter of the substation is proposed.

## 2.5.4 Project Transmission Line

A new 115-kV transmission line approximately 7.3 miles in length would be constructed to interconnect the Project with the PG&E transmission grid (Figures 2-4a and 2-4b, Project Transmission Line Route). The majority of the land area along the proposed transmission route is within the property of the existing Imerys mine.

The proposed transmission line route would start at the Project substation, located west of San Miguelito Road at the upper (southern) end of Miguelito Canyon and end at the Project switchyard, which would be situated on the Imerys Mine property and adjacent to a residential development. Figures 2-4a and 2-4b show the route, pole locations, access roads required to access the pole locations, and pull sites that would be needed for transmission line construction and maintenance.

The transmission line would be constructed primarily of double, steel H-frame structures with some triple poles at angle points. The poles would be up to approximately 75 feet in height and would be placed up to 1,650 feet (570 feet average) apart based on the terrain and alignment. The Project design assumes that up to 44 new poles would be required. In some locations, engineered structures with concrete foundations might be used to support the conductors. The exact number of poles and their sizes, types, and spacing would be determined as part of final design engineering. The Applicant has acquired easements up to 100 feet wide for the transmission line. In order to ensure reliability, the Project transmission line would use new poles and would partially run parallel to existing power lines. The Applicant assumes that no currently existing power poles would be used up to the POI at the switchyard location.

The transmission line would be constructed by the Applicant and permitted as part of the Project through the Santa Barbara County CUP entitlement process due its direct connection to and interdependency with the Project.

The Applicant would construct the transmission line consistent with accepted industry standards, protective measures, and established industry guidelines. These include the recommended practices and procedures of the IEEE, standards for overhead line construction consistent with CPUC General Order 95 (GO95), avian protection measures consistent with the 2012 Avian Power Line Interaction Committee Guidelines, electric magnetic field design guidelines accepted for transmission design in California, and other applicable rules and standards.

O&M activities for the transmission line would include regular inspections to ensure that the system is in good condition and would not create hazards.

Ongoing fire management and safety would include maintaining a 10-foot buffer of flammable fuels (vegetation) around the base of each transmission pole structure during fire season. Under Public Resources Code, Section 4293, a minimum 10-foot clearance between vegetation and conductors is required for safety and to minimize tree-related outages. Fast-growing trees may be removed or vegetation trimmed back farther than the minimum required to achieve at least 3 to 4 years of clearance before the next trim. In addition, the maintenance program would also include removing dead, rotten, or diseased trees or vegetation that hang over or lean toward the system to prevent a falling hazard.

### 2.5.5 PG&E Electrical System

The Project has an interconnection agreement with PG&E that was executed on July 27, 2017 (expected in April 2019), to connect to their facilities located adjacent to the Cabrillo Substation on the east side of the 12$^{th}$ street (PG&E, 2017). The application was filed on March 31, 2016, and the Queue (Applicant's placement in the Application list) Number for the Applicant is 1320-WD. The Project has complied with Federal Energy Regulatory Commission (FERC) Generator Interconnection Procedures. The Applicant would operate as a wholesale power producer with 100 percent of the output to be exported to the PG&E distribution system. The Point of Change of Ownership (PCO) would occur on the Customer side of a PG&E T-Line disconnect switch at the POI adjacent to the Project switchyard.

# Figure 2-4a. Project Transmission Line Route

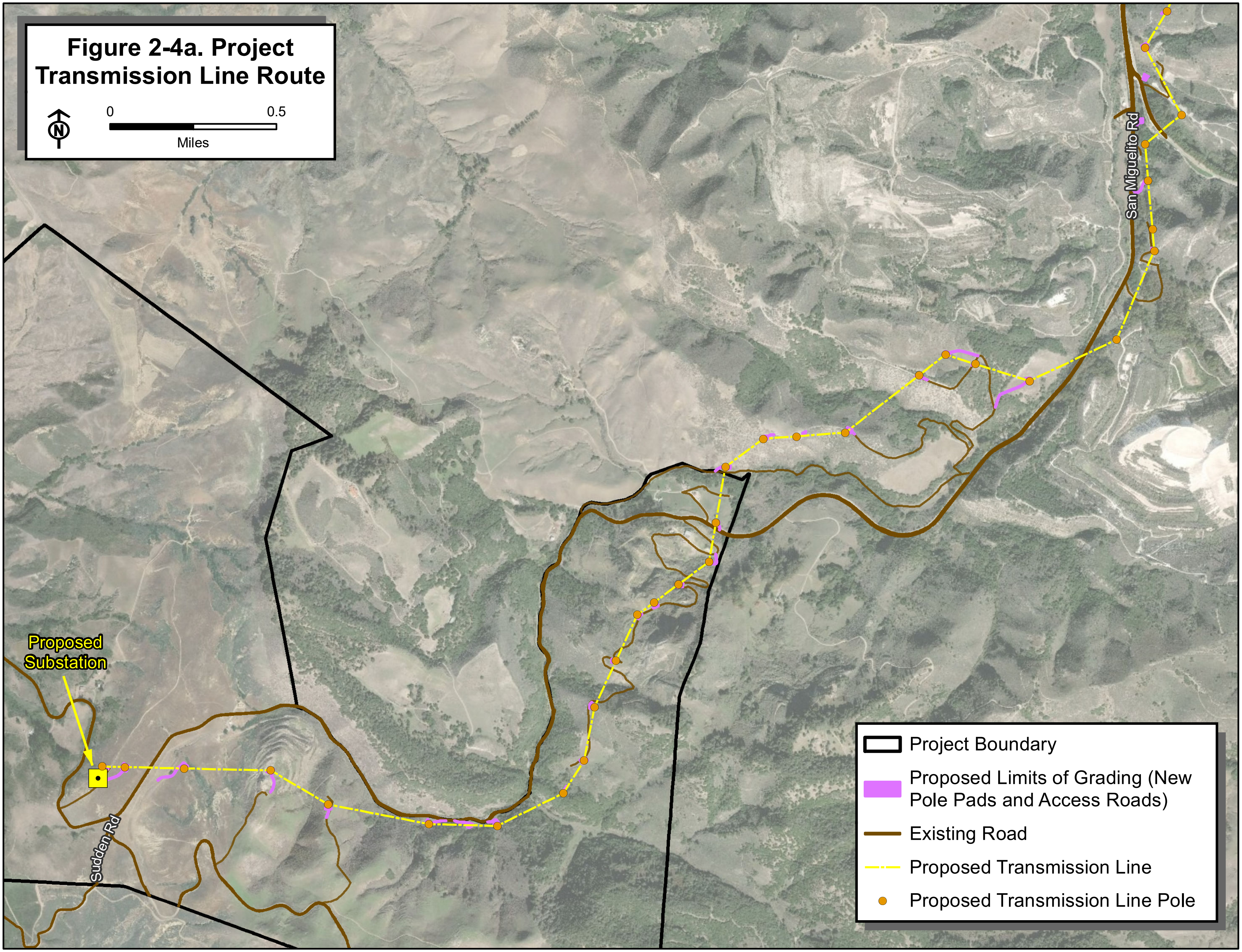
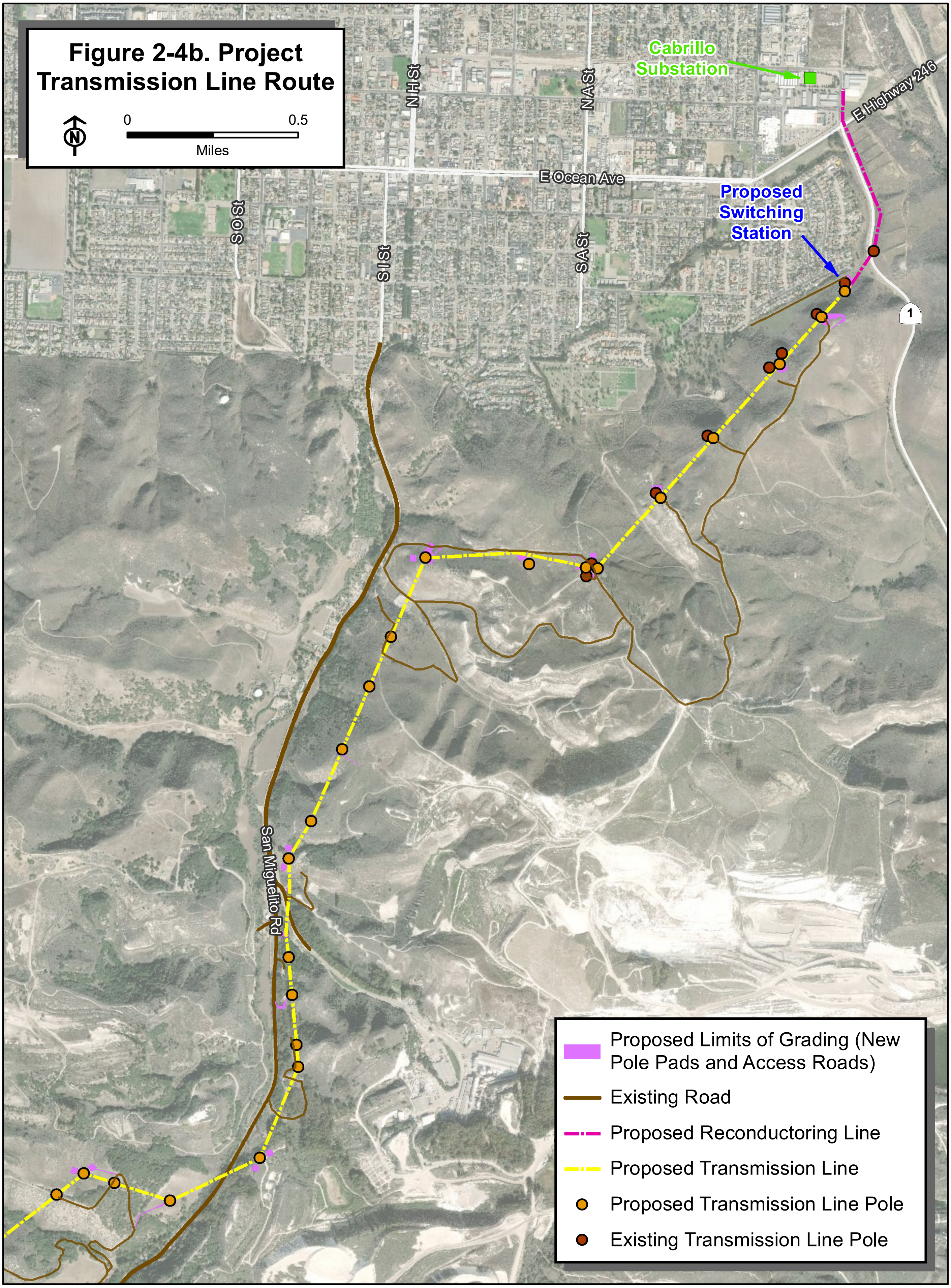


**Figure 2-4b. Project Transmission Line Route**



PG&E would reconductor (replace wires and possibly poles) 0.6 miles along the existing Manville 115-kV power line from the Project's switchyard to an existing pole location outside of Cabrillo Substation, located in the City of Lompoc (see Figure 2-4b). A temporary shoofly, which is a temporary electric line using wood poles, will need to be installed during construction in order to reduce outages to customers along the Manville 115-kV line. This temporary shoofly will utilize a new temporary easement along the western side of N. 12th Street until it crosses over CA-246 where it will follow the existing PG&E Manville 115-kV alignment. The scope will also include raising two additional structures along the Manville 115-kV line southwest of the POI location by approximately 20 feet in order to accommodate the crossing of the SWEP gen-tie line and the existing Manville line. It is expected that PG&E would provide the California Public Utilities Commission (CPUC) with Notice of Construction through an advice letter filing, pursuant to General Order (GO) 131-D, Section XI, Subsection B.4 of the Construction of Facilities that are exempt from a Permit to Construct.

The Project would require upgrades to connect to the PG&E electrical system, as shown in Table 2-5 (Required PG&E Upgrades).

**Table 2-5. Required PG&E Upgrades**

| Type of Upgrade | Upgrade | Description |
|---|---|---|
| Interconnection Facilities Upgrade (IFU) | Developers Gen Site | New Circuit Breaker Station (switchyard) at Point of Interconnection (POI) (pole 2/47): EMS Telemetry, SCADA, (1) Direct Transfer Trip Generators (Rx)<br>Engineering Reviews, Metering Pre-parallel Inspection, & Project Management<br>Information Technology support & Remote Terminal Unit-only Installation and ITTS testing |
| | Transmission Line | Install up to (3) Tubular Steel Poles, (1) span of transmission line conductor, and SCADA* Switches, & PG&E review. |
| Reliability Network Upgrades (RNU) | Divide Substation | Install (1) Direct Transfer Trip Transmission Line (Tx) & Under Voltage Load Shedding Scheme |
| Distribution Upgrades (DU) | Transmission Line | Install temporary shoo-fly, (3) spans of transmission conductors, (4) TSPs, and (2) SCADA SW's |
| | Transmission Line | Reconductor (replace wires and possibly poles) along the existing Manville 115-kV power line for distance of 0.6 miles of the Manville 115 kV Tap Line from pole 2/38 to Pole 2/47. |

*Supervisory Control and Data Acquisition.

In order to avoid any significant impacts on the environment, PG&E would incorporate the Avoidance and Protection Measures listed below when it reconductors (replace wires and possibly poles) from the Project's switchyard to an existing pole location outside of Cabrillo Substation. PG&E will coordinate with the County and provide site access during preconstruction and construction activities to verify that the project is constructed in accordance with the Project Description, including the following measures. If the County monitor observes the construction to be out of compliance, the County shall contact PG&E as soon as possible to resolve the issue and ensure compliance. Enforcement of compliance with these measures is in the jurisdiction of CPUC.

## General

**PL-1: Construction Crew Training:** Construction crews will be trained on avoidance and protection of environmentally sensitive resources along the power line right-of-way including biological, archaeological, and paleontological resources. Continuing tailgate environmental training sessions will be held as new crew members are added.

**PL-2: Materials Storage.** All construction materials and excavated materials will be stored away from public roads, whenever possible, to reduce impacts on mountain views. Materials storage will be confined to within the power line right-of-way and staging areas.

**PL-3: Location of Construction Activities.** Construction activities will be confined to within the power line right-of-way and staging areas, where feasible. Lands adjacent to the power line right-of-way may be used if deemed necessary for construction.

**PL-4: Power Line Alignment.** In accordance with the California Public Utility Commission's standards set forth in General Order 95 (GO 95), and where feasible, the power line will follow the existing power line alignment.

**PL-5: Power Line Relocation/Pole Height.** If poles need to be replaced in areas visible from SR-1, they would be replaced with poles of the same approximate size and height as the existing poles and in the same approximate locations, to minimize visual impacts.

**PL-6: Road Construction / Water Quality.** The grading, construction, and drainage of roads will be carried out to maintain any downstream water quality.

**PL-7: Electric and Magnetic Field Effect Reduction.** The design of the power line shall conform to EMF reduction measures described in the California Public Utilities Guidelines (2006a [EMF Design Guidelines for Electrical Facilities]).

**PL-8: Minimize Grading.** Grading and disturbance of vegetation will be minimized to the extent feasible, consistent with safety and existing requirements. Consistent with the Project Description, grading and disturbance for new access roads will be limited to less than ½ mile of new roads. Grading and disturbance for installation of power poles will be in accordance with the Project Description, including Section 2.5 and Table 2-5.

## Emissions and Dust Reduction

**PL-9: Reduction of Construction Equipment Emissions.** Construction impact mitigation measures for equipment exhaust will be implemented as summarized in the SBCAPCD guide (SBCAPCD, 2007).

**PL-10: Dust Control.** Dust control measures will be implemented, including (1) Application of water sprays to all disturbed active construction areas in dry weather to keep fugitive dust from being transmitted outside of the power line right-of-way; (2) Soil stockpiled for more than 2 days (or less as needed to prevent blowing dust) will be covered, kept moist, or treated with soil binders to prevent dust generation; (3) Trucks transporting soil will be covered in transit; (4) Traffic speeds on all unpaved roads will be 15 miles per hour or less; and (5) The contractor or builder will designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site.

## Biological Resources

**PL-11. Avian Protection.** The power line will be constructed and operated in accordance with PG&E's Avian Protection Plan (APP) and standards for *Raptor-Safe Construction and Wildlife Protection* to minimize the potential for avian electrocutions.

**PL-12. Pre-project surveys.** Pre-project surveys will be conducted for special status species within 30-days prior to initiating work at all proposed power pole locations.

**PL-13. Avoid Sensitive Resources.** The power line design will, if feasible, avoid placement of poles or other construction within the dripline of oak trees and in sensitive species habitat (including habitat of Gaviota tarplant, CNPS List 1B Plant Species, and El Segundo blue butterfly). If such placement is unavoidable, mitigation and compensation measures will be implemented consistent with Santa Barbara County standards.

**PL-14. Minimize habitat disturbance.** The power line design will minimize habitat disturbance by using existing access roads wherever possible and constructing new poles using helicopters if feasible where creation of new access roads would necessitate grading in steep terrain or removal of woodland vegetation.

## Archaeological Resources

**PL-15: Archaeological Resources.** The power line design will, if feasible, avoid placement of poles in any known recorded archaeological sites. If a recorded archaeological site cannot be avoided through power line design, then regulatory mandated Phase 1 and 2 subsurface testing will be conducted to evaluate the nature, extent, and significance of the cultural resources, and appropriate monitoring by a qualified archaeologist and Native American monitor will be conducted during excavation activities.

**PL-16: Temporary Fencing.** Known unevaluated or determined significant archaeological sites and 50-foot buffer areas will be temporarily fenced.

**PL-17: Unanticipated Discoveries.** Should historic or prehistoric artifacts, or other potentially important cultural materials be unearthed or otherwise discovered at any time during activities associated with the development of the power line, work in the immediate vicinity of the discovery will be suspended until the find is evaluated by a qualified archaeologist in coordination with the landowner. If the find is potentially a Tribal Cultural Resource under AB 52, the lead agency shall be notified immediately to take appropriate action. No work shall proceed in the environmentally-sensitive area until the archaeologist or the lead agency has determined the appropriate steps for evaluation and preservation of the find.

In the event of a discovery of human remains, work in the immediate area of the find will be halted and the qualified archaeologist and County Coroner will be notified immediately in accordance with California law. Work will remain suspended until the Coroner can assess the remains. In the event the remains are determined to be prehistoric in origin, the Coroner will notify the Native American Heritage Commission, which will then notify the Most Likely Descendent, who will consult with the archaeologist within 48 hours as provided by law.

## Fire Prevention

**PL-18: Fire Prevention during Construction.** All construction equipment will be equipped with appropriate spark arrestors and carry fire extinguishers. Further, a fire watch with appropriate fire-fighting equipment will be available at the power line site at all times when welding activities are taking place. Welding will not occur when sustained winds exceed that set forth by the SBCFD unless a SBCFD-approved wind shield is onsite.

**PL-19: Emergency Services Communications.** PG&E will coordinate with SBCFD and other local emergency responders regarding the use of dedicated repeaters for emergency services.

**PL-20: Fire Prevention during Operation.** Vegetation clearance within the power line right-of-way will be conducted on a regularly scheduled basis in accordance with PG&E's standard Operation and Maintenance procedures.

**PL-21: Smoking and Open Fires.** Smoking and open fires will be prohibited within the power line right-of-way during construction and operations.

## Geology and Soils

**PL-22: Seismicity.** Power line facilities will be designed to the California Public Utility Commission's standards set forth in General Order 95. [PG&E NOTE: These standards are more stringent than the Uniform Building Code Seismic Zone 4 requirements.]

**PL-23: Erosion Control.** BMPs will be implemented for erosion control. Erosion control structures will be placed between disturbed soil and drainage structures or areas prior to the start of the rainy season.

**PL-24: Soil Stability.** Power line foundations will be designed to tolerate potential differential settlement and expansive soils.

## Noise and Resident Notification

**PL-25: Construction Hours / Noise.** Work hours for all construction activities involving noisy equipment will be restricted to 7:00 a.m. to 6:00 p.m., Monday through Saturday to the greatest extent feasible. Deviations from these times will only be allowed when construction activities cannot safely be interrupted once begun or when existing lines must be taken out of service for construction during the clearance times provided by the California Independent Systems Operator (ISO), which may include a night or a Sunday when electric loads are generally lower.

**PL-26: Resident Notification.** PG&E will issue a Notice of Construction to all residents within 300 feet of the power line right-of-way of construction related activities, including potential lane closures, prior to the commencement of construction activities. PG&E will post signs along public roads in advance of specific lane closures or ingress/egress restrictions. Signs will be legible from bypassing cars.

**PL-27: Noise Reduction.** Construction equipment will be well tuned and maintained according to PG&E's maintenance standards, and the standard noise reduction devices on the equipment will be in good working order. Stationary equipment such as compressors and welding machines will be located away from sensitive receptors to the extent practicable. An exhaust muffler will be installed on the compressed air exhaust of pneumatic tools to be used within 1,500 feet of a residence and this requirement will be included in the construction specifications.

**PL-28: Noise Complaints.** PG&E will provide a phone number for noise complaints on their Notice of Construction to be sent to residents within 300 feet of the power line right-of-way. PG&E will notify the County of all complaints received regarding power line construction.

## Paleontological Resources

**PL-29: Paleontological Monitoring.** PG&E will provide a qualified paleontological monitor for excavation of power line facilities in areas with a "High" paleontological sensitivity where PG&E's construction will disturb soils more than 5 feet below ground surface and auguring/boring more than 5 feet deep and more than 3 feet in diameter. If fossils are discovered, PG&E will immediately notify the County and consult with the County and landowner on fossil assessment and curation activities.

## Hazardous Materials

**PL-30: Hazardous Materials.** BMPs and compliance with all applicable laws for the storage and handling of all hazardous materials and wastes will be implemented during power line construction.

**PL-31: Refueling.** Fueling of construction vehicles and equipment will be conducted in areas that are located a minimum of 100 feet from sensitive areas. Refueling vehicles will have a sign listing pertinent contacts to notify in the event of a spill.

**PL-32: Equipment Leaks.** All equipment will be adequately maintained to minimize operational losses of hazardous materials and to reduce the risk of accidental spillage.

## Traffic

**PL-33: Traffic.** Flaggers will be used when power line related construction vehicles ingress/egress public roads and when lane closures are required.

# 2.5.6 Operation and Maintenance Building/Laydown Yard

The Project proposes an on-site O&M facility near the intersection of San Miguelito and Sudden Road within the area that would be used as a Laydown Yard during the construction phase of the Project (see Figures 2-3a and 2-3b, Project Site Plans). During construction, the space for the Laydown Yard in which the O&M facility would be located consists of 16.5 acres in total. The entire 16.5 acres would be used as a Laydown Yard during construction, which would accommodate the storage and processing of materials for construction, temporary construction trailers and space for construction parking. The laydown area would be large enough to accommodate both storage and approximately 100 worker vehicles during the peak of construction. However, the Applicant anticipates that workers would utilize both the laydown area and individual construction staging areas throughout the site for parking purposes.

During operations, the O&M facility would ultimately occupy approximately 0.39 acres with a 130-foot x 225-foot permanent foundation footprint consisting primarily of the following:

- Main building with offices (50' x 100')
- Spare parts storage room
- Tool crib
- Restroom
- Shop area
- Outdoor storage for large parts
- Outdoor parking facilities for approximately 4–7 O&M staff and visitors
- Turnaround area for large vehicles

- Outdoor lighting
- Storage for oil and lubricants

An O&M facility within the Project boundary would minimize response time and related down time to power delivery related operations. The O&M facility would be made of a corrugated Corten metal of a neutral color. During construction, the O&M facility area would be leveled, graded, and compacted.

Sudden Road would not be vacated. The O&M Facility and Laydown Yards have been designed to allow continued use of all existing roads, including Sudden Road, for property owner access.

## Water and Sewage Disposal

### Water

Water to service the O&M facility would be provided via a new well. A 5,000-gallon water storage tank would be installed to supply water for firefighting. The fire water tank would only be used for fire water storage. Less than 250 gallons per day of potable water would be needed to serve the O&M facility. This water would be provided through an on-site well described below. Water usage at the O&M facility would be used predominantly for sanitation purposes for the O&M staff. Water may be used to clean the blades as needed during operations, but in no case more than once yearly.

Potable water for the O&M facility, including the fire water tank, would be provided by an on-site well located approximately 7,000 feet northeast of the O&M facility along San Miguelito Road. A feasibility analysis and the results of a test well have determined that this well is adequate to serve the O&M facility. The test well at this location confirmed a depth to water in a well at this location at 110.6 feet. Production capacity from a well at this location was confirmed at 60 gallons per minute per Santa Barbara County standards. The Applicant plans to drill another test well closer to the O&M facility, which could be used as an alternative source for O&M water if it is determined to meet County standards.

From the well site, ground water would be pumped into an in-ground line, and sufficiently pressurized to reach the O&M facility. At the O&M facility, water would be deposited into an on-site storage tank of sufficient capacity to provide the domestic demand and the needed fire flow. A dedicated pump would pressurize a fire water line, fire hydrant, and a building sprinkler system. Another dedicated pump would pressurize the domestic system. Final sizing of all components would be determined during final engineering.

### Sewage Disposal

Effluent from the office drains at the O&M facility would be disposed of through a proposed leach line septic system. For such a system the Santa Barbara County Environmental Health requires soil with adequate permeability to absorb leachates after solids are deposited in the septic tank. Additionally, depending upon the permeability of the soil, there is a minimum separation requirement between the bottom of the leach trenches and the ground water table. A wet weather soil boring is required to confirm the highest expected groundwater elevation.

Percolation test results show that the O&M facility site vicinity is characterized by native soils with permeability ranging from 42 to 100 minutes per inch. Groundwater levels are expected to fluctuate with rainfall. Local perched ground water was observed by boring to be at a depth of 9 feet after a period of heavy rain. Design sewage flow generated by the O&M facility is estimated at 250 gallons per day, which is conservative since the California plumbing code estimate roughly 20 gallons per person per day for a typical office. Five to seven employees are expected to occupy the O&M facility, which would make actual use approximately 100 to 140 gallons per day.

The desired onsite disposal system is a conventional in-ground system including a septic tank to remove solids and grease, a 4-inch pipeline at 3 percent slope to a distribution box, and two leach lines, sized to accommodate the design flows for the field soils. The septic tank and leach lines would be located just north of the O&M facility in native soil, beginning just beyond the area of fill for the new building. The septic system design would depend on final engineering calculations. At this time, it is estimated that a 1,000-gallon septic tank with roughly 200 feet of leaching lines (two lines each 100 feet long) would be adequate to dispose of the generated wastes. A leach trench depth of approximately 42 inches would have adequate (more than five feet) separation from the wet weather groundwater location.

## 2.5.7 On-Site Power Collection Cables/Lines and Communication System

### Power Collection System

The power from the turbines would be transmitted to a pad mount step-up transformer adjacent to the tower (1.79-MW turbines) or tower-based transformer (3.8-MW turbines) that would step-up the voltage from 690 V to 34.5 kV. Each string of WTGs would be interconnected via 34.5-kV electrically insulated cables. The power collection cables would transmit the power from each string of WTGs to the Project substation. The underground collector cables would follow roads, except for 2.34 miles. Of those 2.34 miles, 1.84 miles of cables would be underground but outside of the road and 0.5 miles would be installed above ground. To avoid ground disturbance, one small section of aboveground collection line would be installed, supported by single poles or H-frame structures. Another collector section would utilize transmission line structures and be under-built on the transmission line structures to connect this string to the substation. The overhead collection system would be constructed in conformance with good utility practice, the National Electric Safety Code (NESC), ANSI, and Avian Power Line Interaction Committee (APLIC). At the Project substation, the voltage would be increased from 34.5 kV to 115 kV to match the voltage of the PG&E grid at the Point of Interconnection.

All underground collection circuits would be buried in trenches 3 to 4 feet deep. The size of the buried cable would vary depending on the type of cable used and how many turbines are interconnected on the specific circuit. Each circuit is to consist of three 34.5-kV, single-conductor cables with tree retardant polyethylene insulation. The cables would be direct buried in a trefoil configuration together with the communication fiber cable and the ground wire. Sectionalizing connections would be made in above-ground, locked junction boxes. Underground marker balls would be installed at multiple locations to support identification of the collector system underground path. Overhead markers/ stakes would also be installed at multiple locations.

### Communication System

Operation of the Project would be controlled by the automated SCADA system, which would be capable of monitoring all operational parameters and starting and stopping each WTG. The SCADA system would transmit operating parameters and other data from each WTG and the substation to the central computer. The system would allow remote control and monitoring of individual WTGs and the entire Project site locally and remotely. Communication cables would be buried in the same trenches used for the electrical collector lines. Overhead communications lines would be installed on the structures used for overhead lines. Either overhead or underground communications lines would be routed to the substation's control room and from there to the closest access point of the preferred internet service provider.

## 2.5.8 Meteorological Towers and SODAR

Prior to start of construction of the Project, meteorological data would be collected using mobile sonic detection and ranging units (SODAR) that would record weather data necessary to determine the most efficient operational strategy for the WTGs. SODAR units are already on-site and collecting data. The data collected would include wind speed and direction, temperature, humidity, barometric pressure, and rainfall. The data collected would be used to supplement over 10 years of wind data collected from meteorological towers that were once present at the Project site. As a result of their small footprint and mobility, and no permanent ground disturbance, SODAR units can be transported easily with a pickup truck and small utility trailer. As the SODAR unit remains on the trailer, it can be easily parked in a specified location with minimal disturbance.

One permanent meteorological tower, one permanent SoDAR device and one temporary SODAR device would be installed to measure the wind speed for forecasting purposes as required under the California Independent System Operator (CAISO) tariff and the performance of the WTGs post installation. The meteorological tower would be a guy-wired lattice structure, up to 295 feet (90 meters) in height. Tensioned cables (guy-wires) in three directions would be required for the tower to provide required stability. Bird diverters specifically designed for meteorological towers would be used to protect birds and bats from collisions. Diverters would be installed at 50-foot (17 meter) spacing on each guy wire. The meteorological tower would be placed within the boundaries of the Project site as shown on the site plan. The permanent SODAR device is approximately 6' x 6' x 6' and would be located on a 10' x 10' x 4" foundation. As described in Table 2-7, the meteorological tower and SODAR devices would not require road construction or foundation grading; they would be accessed by driving four-wheel drive equipment, such as a crane and back-hoe, across the Project-leased property. A power and communication cable from the closest wind turbine would be installed underground and terminated at the met tower or a small 4 feet wide H-frame structure at the base of the tower.

## 2.5.9 On-Site Access Roads

Numerous dirt roads are present throughout the Project area and maintained by the property owners for agricultural operations. To provide access during construction and operations, 1.76 miles of the existing roads would be improved and widened from their existing widths of 10 to 14 feet, to 22 to 40 feet. These improved roads would be surfaced with gravel. Some road sections would need to be 16 feet wide with 10-foot compacted shoulders on each side or 20 feet on one side to allow crane travel between WTG locations. The roads would remain at the new widths and surfaces.

In addition, approximately 7.05 miles of new roads would be constructed. These new roads would be constructed as gravel roads except where the roadways are too steep for gravel to provide adequate traction, where they would be asphalt paved. Short sections of roadway would also be built in other parts of the Project area. The road work would include trenching and installing underground electrical distribution lines and communication cables. New roads would remain after constructed.

Crossings of minor drainage channels would be accomplished with culverts or at-grade crossings. According to the preliminary grading plan, cut volumes for the entire Project are estimated to be 950,237 cubic yards (cy), and fill volumes are estimated at 961,778 cy, leaving a net differential value of 11,541 cy for all the required Project earthwork. As a result of shrinkage and settling, the Applicant expects earthwork to be balanced on site. All grading would be subject to a final, approved grading and erosion control plan to minimize erosion and ensure adequate slope stabilization. Areas of temporary disturbance would be revegetated following the roadwork.

Table 2-6 (Summary of Road Crossings and Culvert Sizes) provides a summary of road crossings and associated culvert sizes required for the construction of Project road modifications. Watercourse crossings would be improved or upgraded as part of turbine access road modifications. Access roads leading to the crossings would be outward without a roadside ditch to eliminate hydraulic connectivity to the watercourse. Modifications to existing culverts may require the use of steel plates to evenly distribute weight of Project equipment and rip-rap may be placed at the culvert inlet and outlet for erosion protection. Very little modifications would be required at at-grade crossings and would likely include replacement of any displaced rip-rap and removal of a minor amount of sediment.

## Public Access

During construction and O&M, Project-related traffic would be routed to existing roads (subject to modification) and new roads developed for the Project. Project personnel and contractors would adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions, to ensure safe and efficient traffic flow. Signs would be placed along public roads as directed by the County to identify speed limits, temporary traffic hazards, travel restrictions, and other standard traffic control information. In addition, signs would be placed within the Project site in accordance with the Project Safety Plan. Project access roads would be constructed with cattle guards where necessary to meet the standards of both the landowners and the Santa Barbara County Fire Department.

Station Road, which is an existing private road owned by a participating project landowner, provides access to both private lands and the Sudden Peak Tracking Station located on the summit of Sudden Peak. An approximately 900-foot segment of Station Road crosses into and out of Vandenberg Air Force Base property. Use of this segment of road would provide access to eight WTGs located in the southeastern portion of the Project (WTGs E-1 through E-8). The Applicant has permission to access the entirety of this road, including the 900-foot segment of road through VAFB, through an easement. Additionally, no grading or road modification would take place on VAFB property.

During construction, access to adjacent properties would be maintained; however, some traffic interruptions are anticipated. Local roadways have constraints that limit their potential to be used by large trucks. In particular, San Miguelito Road has overhanging trees that may be lower than the vertical clearances of the trucks, and its horizontal curves south of Miguelito County Park have some relatively small radii that would require modification. In order to make these modifications, traffic may need to be temporarily stopped using flaggers or traffic control devices.

Deliveries of the turbine equipment would comply with all permit requirements. Any routing plans, road restriction information, pilot vehicle requirements, and other permit conditions required by the permits would be observed. If during construction road widths are insufficient to accommodate traffic flow in both directions simultaneously, then traffic may need to be temporarily stopped using flaggers or traffic control devices.

## Table 2-6. Summary of Road Crossings and Culvert Sizes

| Crossing No. | Node No. (From Hydro Report) | Location (Lat./Long.) | Description | 100-Year Event Q100 (cfs) | Pipe Slope (%) | Pipe Length – 100 yr (ft) | Pipe Outlet Velocity -100 yr (ft/s) | Pipe Size – 100 yr (in) |
|---|---|---|---|---|---|---|---|---|
| 1 | 30 | 34°34'31.30"N, -120°31'57.39"W | Crossing Nos. 1 through 5, and 7: These are all watercourse crossings that will be improved or upgraded as part of turbine access road modifications. Most of these crossings exist as part of the "ranch road" system but were not engineered. Due to the elevation differentials between the proposed turbine access road finished grade and the natural flowlines of the water courses, pipe culverts are required in the size indicated. All components of the crossing, including pipes and rip-rap have been sized to convey the "un-bulked" 100-year storm water flow. The pipe slopes have been set to be close to the natural watercourse slope, with some adjustment to minimize outlet velocity. The pipes indicated were calculated as circular corrugated metal pipes (CMP), but HDPE or RCP could also be used. Each culvert will include placement of rock rip-rap for protection against erosion at both the inlet and outlet. Rip-rap will be placed a minimum of 1 foot above the high-water line at the pipe ends. Pipes will be placed in gravel bedding and native backfill will be used to bring the access road to finished design grade. Access roads leading to the crossing will be outward without a roadside ditch to eliminate hydraulic connectivity to the watercourse. | 41 | 1.5% | 40 | 7.1 | (1) 36" |
| 2 | 31 | 34°34'35.15"N, -120°31'55.55"W | | 48 | 10% | 50 | 8.4 | (1) 36" |
| 3 | 32 | 34°34'38.81"N, -120°31'54.64"W | | 56 | 10% | 50 | 8.2 | (1) 42" |
| 4 | 33 | 34°35'0.18"N, -120°30'57.91"W | | 37 | 10% | 40 | 13.8 | (1) 36" |
| 5 | 34 | 34°35'13.84"N, -120°30'46.98"W | | 44 | 8% | 85 | 13.7 | (1) 42" |
| 6 | 35 | 34°34'46.83"N, -120°30'33.48"W | Crossing No. 6: This crossing is an existing culvert under San Miguelito Road. The existing pipe size, at roughly 36-inches may be undersized for the 100-year event. The Santa Barbara County Public Works Department will be consulted regarding the existing culvert suitability, and potential modifications will be discussed with the County. Improvements may the use of steel plates to evenly distribute weight of Project equipment. Rip-rap may be placed at the culvert inlet and outlet for erosion protection. | 153 | 2% | 50 | 9.9 | (1) 42"x84" Arch |
| 7 | 36 | 34°34'30.72"N, -120°31'49.15"W | See description above. | 12 | 10% | 60 | 10.8 | (1) 24" |
| 8 | N/A | 34°35'27.37"N, -120°28'22.32"W | This crossing is an existing "at-grade" crossing of San Miguelito Creek that is used for ranch activities, and by utility companies, and based on information from local users, is currently functioning very well. Roughly 7 years ago this crossing was improved as a rock ford by Pacific Gas & Electric. Hydrology and engineering for the rock ford was completed by Pinnacle Engineering. Very little improvements will be required and would likely include replacement of any displaced rip-rap and removal of a minor amount of sediment. | | | | | |

During the construction, and possibly during the operational phase of the Project, the Project operator and landowners using San Miguelito Road and Sudden Road beyond their intersection may request the County to close these roads to public travel. Only the landowners involved in the Project and VAFB would use these roads. A turnaround area would be provided at the end of the public road near the entrance of the Project. This Project component would benefit Project safety and security.

# 2.6 SWEP Construction

## 2.6.1 General Procedures and Schedule

The Project would be constructed in one phase and would begin as soon as the required Project approvals, including the conditional use permit, grading, building, and other permits are obtained from the County and other responsible agencies. Construction is proposed for approximately 10 months (Table 2-7).

**Table 2-7. Project Construction Schedule**

| Project Construction Element | Month | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Access Roads | X | | | | | | | | | |
| Site Roads | | X | X | X | X | X | X | | | |
| Foundations | | | X | X | X | | | | | |
| Collection System | | | | X | X | X | | | | |
| Meteorological Towers | | | | | X | X | X | | | |
| WTG Deliveries | | | | | X | X | X | | | |
| WTG Erection | | | | | | X | X | X | X | |
| Substation | | | | | | X | X | X | X | |
| O&M Building | | | | | | X | X | X | X | |
| T-Line | | | | | | X | X | X | X | |
| Testing & Commissioning | | | | | | | | | X | X |
| Reclamation | | | | | | | | | X | X |

Note: Construction during the rainy season would be conducted in accordance with SWPPP and erosion control measures. In some cases conditions may necessity a delay in activities at specific locations due to impassible terrain, potential erosion, or other environmental constraints.

Normally, construction would occur during daylight hours, Monday through Saturday; however, some activities could require extended hours because of scheduling constraints or other time-sensitive matters, or to maintain structural integrity of concrete placement. Construction would typically proceed according to the following flow of work:

- Grading of field construction office, laydown area, and Project substation
- Construction of site roads, turnaround areas, and crane pads at each WTG location
- Construction of the WTG tower foundations, transformer pads, and meteorological towers
- Installation of the electrical collection system (underground and overhead lines) and transmission line

- Assembly and erection of the WTGs
- Construction and installation of the Project substation and O&M building
- Commissioning and energizing the Project.

### 2.6.2 Construction Access

All Project material, except for access road construction material, which is obtained from grading activities, would be brought to the site via Highway 101 to Highway 246 from the south or via Highway 101 to SR-1 from the north. Turbine foundation material may be brought in from Lompoc. GE 67m blades would be transported over the road to the project site, from the intersection of I-5 and CA-166. The route includes: I-5 at CA-166, CA-166 W, South Thompson Ave N, US-101 S, exit onto Business-101/CA-135 S, CA-1/CA-135 S, CA-1 S, left turn at Vandenberg Air Force Base to stay on CA-1 S, CA-246 E, North F Street S, East Cypress Ave W, South I Street S, San Miguelito Road S (Figure 2-5, Turbine Blade Transportation Route).

### 2.6.3 San Miguelito Road Modifications

The Applicant evaluated San Miguelito Road in February 2016, March 2017, October 2017, August 2018, and February 2019 with the Project's wind turbine manufacturer, transportation company, and project engineers to confirm the feasibility of transportation of project components to the site (ATS, 2017). San Miguelito Road climbs into the mountains south of Lompoc and would require modifications to allow a 224.7-foot (68.5m) blade to travel to the Project site. The Applicant identified 34 sections along the road outside the Project site boundaries that would require modifications. Many of these modifications would widen and many would compact the shoulders along the road to allow for a straighter path or cut and/or fill at unnavigable curves. As a result, approximately 3.2 acres of permanent disturbance would occur, including removal of approximately 158 oak trees. See Section 2.5.9 and Table 2-1 for further information on the proposed modifications and Figures 2-6a through 2-6c, San Miguelito Road Modifications, for illustrations.

### 2.6.4 Construction Workforce

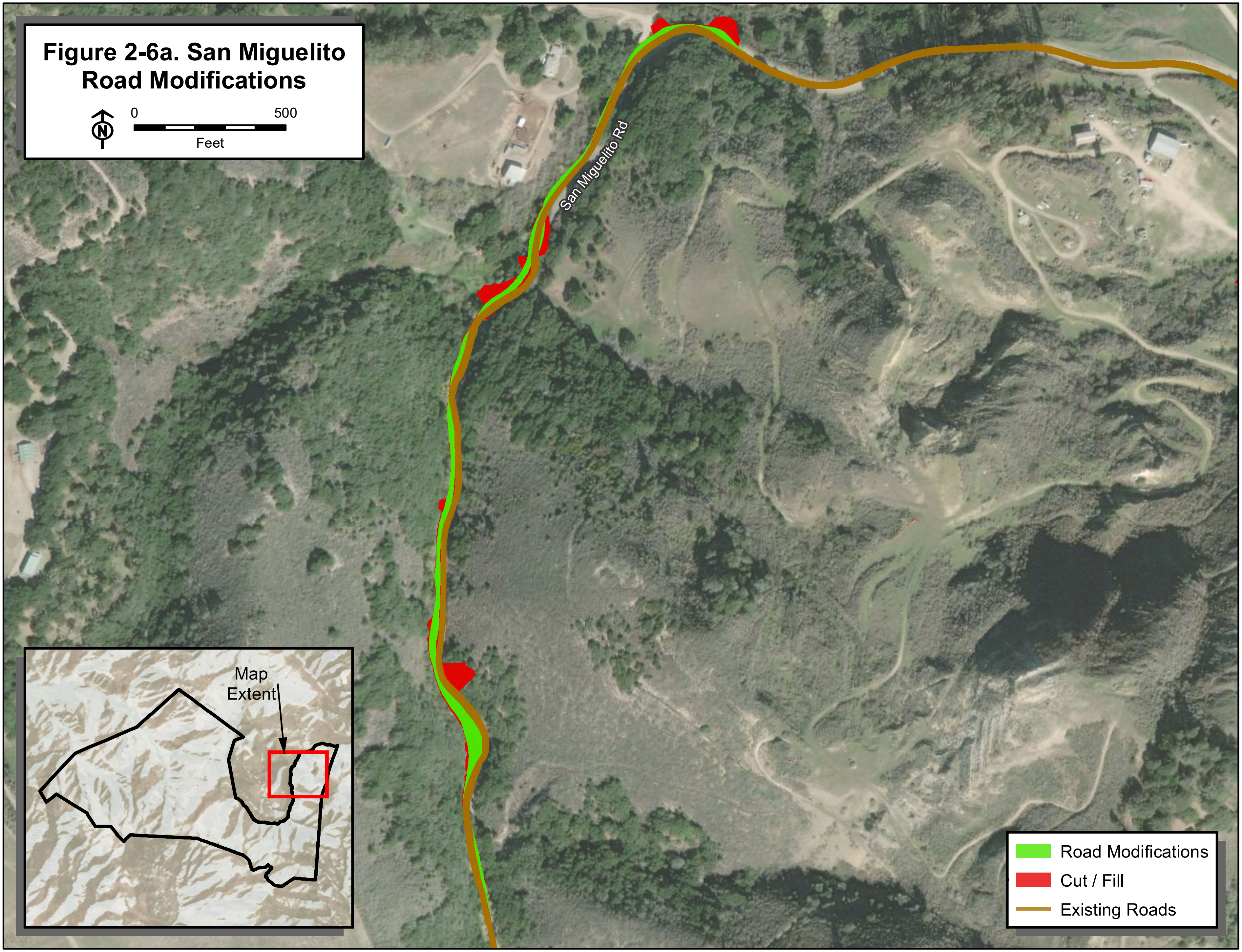
The Project would employ 50 to 100 workers at the site during the peak of construction. It is anticipated that a minimum of 80 percent of the workers would live or stay in the Lompoc area. Assuming 100 workers and 1.1 persons per vehicle, approximately 91 worker vehicles, or 182 one-way vehicle trips, would be required per day (standard carpool factor). The most significant construction activities are expected to occur over a 6-month period, with a few months expected for construction mobilization and demobilization, for an estimated 10-month total construction schedule.

### 2.6.5 Construction Equipment

The estimated numbers and types of construction equipment that would be used during each phase of construction are summarized in Table 2-8 (Construction Equipment). All equipment would be operated with diesel fuel.


Figure 2-5. Turbine Blade Transportation Route
10
0
10
Miles
SAN LUIS OBISPO COUNTY
KERN COUNTY
SANTA BARBARA COUNTY
VENTURA COUNTY
5
Mettler
Maricopa
Nipomo
Santa Maria
Santa Maria
Orcutt
Vandenberg AFB
Vandenberg Village
Mission Hills
Lompoc
Project Boundary
BladeRoute

## Figure 2-6a. San Miguelito Road Modifications



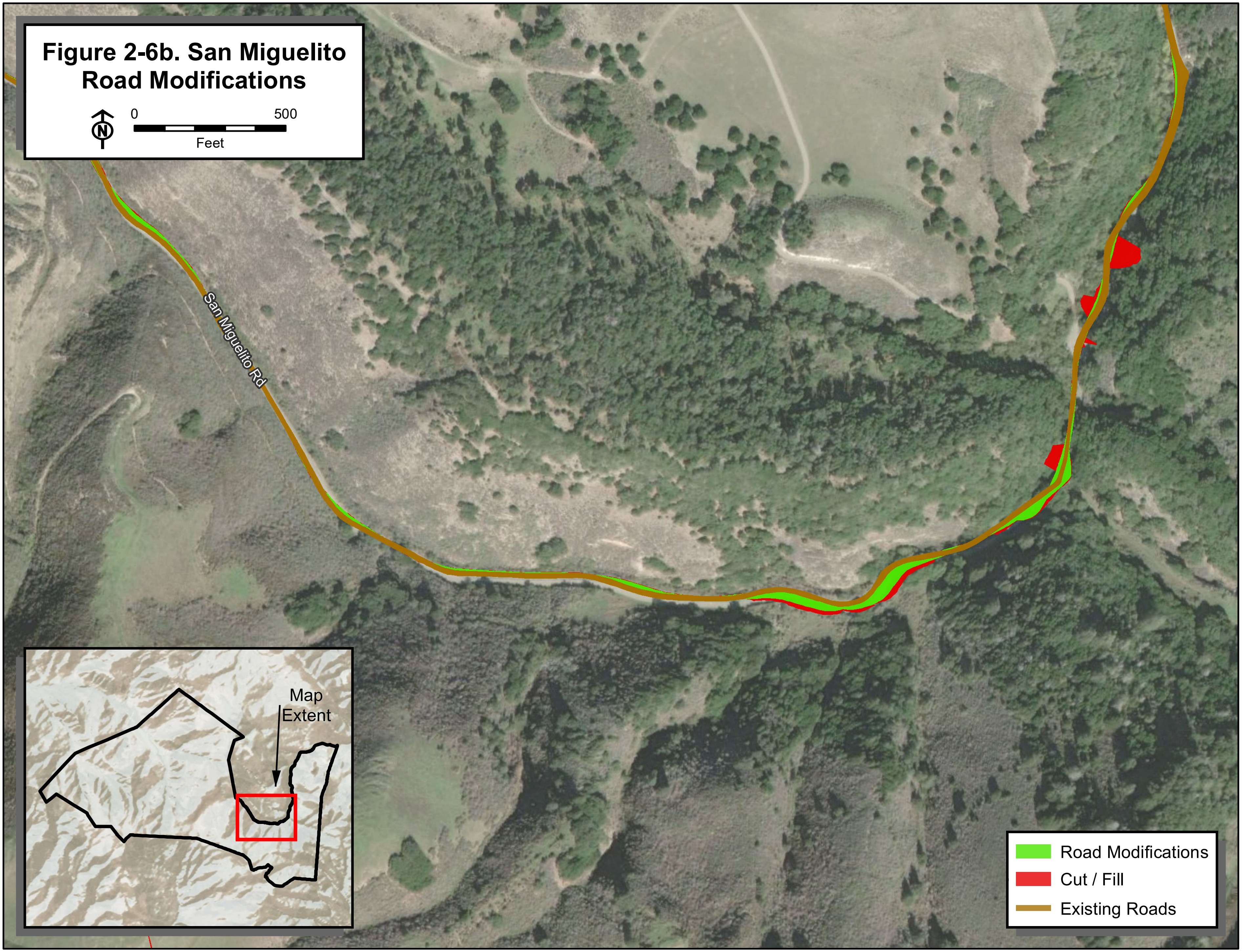


Figure 2-6b. San Miguelito Road Modifications
N
0
500
Feet
San Miguelito Rd
Map Extent
Road Modifications
Cut / Fill
Existing Roads

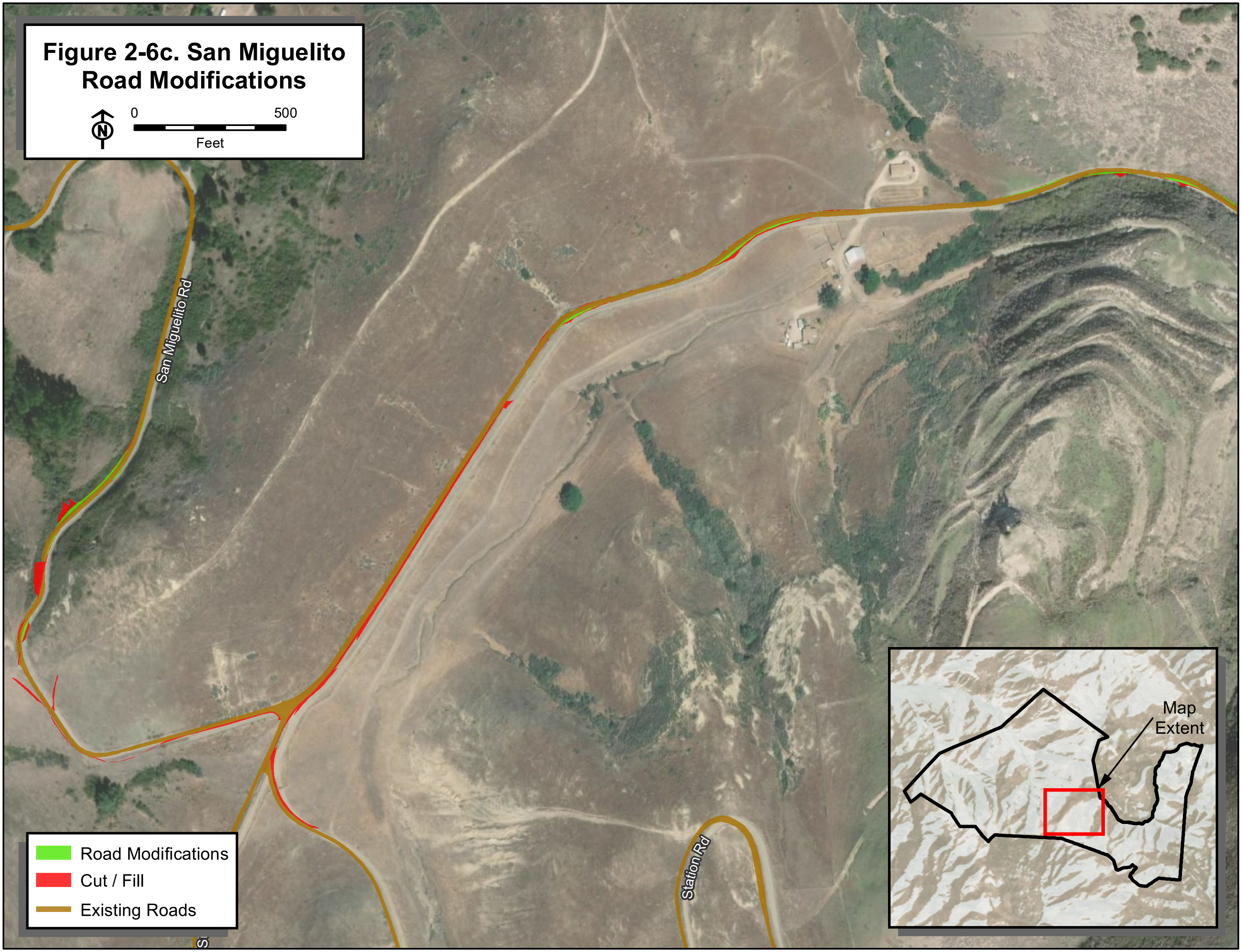



**Figure 2-6c. San Miguelito Road Modifications**

## Table 2-8. Construction Equipment

| Construction Phase | Excavator | D-9 Bulldozer | D-6 Bulldozer | Dump Truck | Compactor | Backhoe | 14-H Grader | Gradall | Water Truck | Front End Loader | Scraper | Articulated Dump Truck | Rock Crusher | Concrete Trucks | CMP Roller | Telehandler | Trencher | Padding Machine | Line Truck | 120-T Crane | 90-T Crane | Prime Mover | Crawler Crane | Pickup Truck | Dump Truck | Generator | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Access Roads | 1 | | 1 | 3 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | 10 |
| Site Roads | 1 | 2 | 1 | 3 | 2 | 1 | 1 | 1 | 7 | 1 | 2 | 2 | 1 | | | | | | | | | | | | | | 25 |
| Foundations | 1 | | | | | 1 | | | | | | | | 6 | 1 | 1 | | | | | | | | | | | 10 |
| Collection System | | | | | | 1 | 1 | | | | | | | | | | 1 | 1 | 1 | | | | | | | | 5 |
| WTG Deliveries | | | | | | | | | | | | | | | | 1 | | | | 1 | 2 | 1 | | | | | 5 |
| WTG Erection | | | | | | | | | | | | | | | | 1 | | | | 1 | 2 | | 1 | | | | 5 |
| Substation | 1 | | 1 | | | 1 | | | | | | | | 1 | | 1 | | | 1 | | 1 | | | | 1 | | 8 |
| T-Line | | | | | | | | | | | | | | | | | | | 3 | | | | | | | | 3 |
| Testing & Commis-sioning | | | | | | | | | | | | | | | | | | | | | | | | 6 | | | 6 |
| Reclamation | | | 1 | 1 | | | | | | 1 | | | | | | | | | | | | | | | | | 3 |
| Office Area | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 |
| Total | 4 | 2 | 4 | 7 | 3 | 5 | 3 | 2 | 8 | 2 | 2 | 2 | 1 | 7 | 1 | 4 | 1 | 1 | 5 | 2 | 5 | 1 | 1 | 6 | 1 | 1 | 81 |

* Estimated construction equipment includes O&M building and meteorological tower construction

### 2.6.6 Field Survey and Construction Specifications

The Applicant performed a civil engineering site survey to identify the planned locations of the WTGs, site roads, and electrical lines. Using data acquired from the geotechnical evaluation prepared by Ninyo & Moore in 2011 and updated in 2017 (N&M, 2017), the Applicant would establish a set of site-specific construction specifications for each WTG and other components of the Project. In order to avoid impacts to sensitive species and cultural resources, any geotechnical drilling within 100 feet of all surface-disturbing activities would require biological and cultural resources monitoring by qualified biologists and archaeologists.

Biological monitoring would be based on protocols established by the USFWS, California Department of Fish and Wildlife (CDFW), and California Native Plant Society (CNPS). Biological monitors would provide a daily monitoring report to be included in a Daily Field Report. To adhere to regulatory standards, on-site surveys by qualified archaeologists are necessary where surveys have not been conducted previously. Archaeologists would complete daily survey logs and reports, and update Project information as appropriate. When geotechnical drilling has been completed, the site would be restored to original grade and seeded with an approved native seed mix.

### 2.6.7 Site Preparation and Road Construction

Site activities would begin with construction of site access entryways from San Miguelito Road, rough grading of access roads, leveling of the construction laydown and site office parking area, and installation of six to eight temporary site office trailers with temporary power at the intersection of San Miguelito Road and Sudden Road. All grading would be done in accordance with a formal Stormwater Pollution Prevention Plan (SWPPP) for the Project.

Access roads would be gravel surfaced unless extremely steep slopes necessitate paving. When rough grade is achieved, base rock would be trucked in, spread, and compacted to create a road base. Capping rock would then be spread over the road base and roll-compacted to finished grade. The width of construction access roads would vary between 22 to 40 feet to accommodate roadway cut and fill, and necessary equipment turning radii and turn-outs. A final pass would be made with the grading equipment to level the road surfaces, and more capping rock would be spread and compacted in areas where needed. In some very steep areas, the road might be paved. Water bars, similar to speed bumps, would be cut into the roads in areas where needed, to allow for natural drainage of water over the road surface and to prevent road washout. All road modifications would be permanent.

V ditches and culverts would be installed, where necessary, to handle excess drainage water. All road work would be performed under final approved grading, erosion control, and stormwater quality management plans. A native seed application would be applied to all cut and fill slopes.

Excess excavated soil and rock would be disposed of on site at approved disposal areas, such as eroded gullies and ravines. Larger excavated rocks also would be disposed of at approved sites or crushed and re-used on site as backfill or roadway material. Project road construction would involve the use of several pieces of heavy machinery, including bulldozers, track-hoe excavators, front-end loaders, dump trucks, motor graders, water trucks, and rollers for compaction. Stormwater measures, such as hay bales and diversion ditches, would control stormwater runoff during construction. Access points from public roads would have locked gates, as agreed upon with the landowners.

## 2.6.8 Equipment and Water Requirements

### Construction Equipment

Heavy equipment would be needed to clear the sites, build roads and WTG foundations, haul and lift materials, and pull the power line as shown in Table 2-9 (Construction Equipment). After roads are opened and foundations built, cranes and trucks would move in to haul and lift the WTG parts into position for assembly. There would be an average of 1,619 truck trips per month during the approximately 10-month construction period as shown in Table 2-10 (Estimated Construction Truck Trips). A total of 554 truck trips to transport WTG parts would occur during Months 5 through 7 of the construction period, as shown in Table 2-10 (Estimated Construction Truck Trips). The trucks would have multiple axles to spread the load on streets and roads and be in compliance with the transportation permits issued by the State of California. The trucks would enter the area from Lompoc using established truck routes and proceed to designated areas for unloading. Foundation material and water would be hauled from local sources, road material would be mainly sourced from cut areas within the Project.

A portable "wet mix" concrete batch plant would be set up to meet construction needs at the staging area located north of the intersection of San Miguelito and Sudden Road. The portable batch plant would consist of equipment that combines various ingredients to form concrete, including water, air, admixtures, sand, aggregate, and cement. Foundations for each WTG would require up to several hundred yards of concrete. The batch plant would be mobilized using approximately five trucks. In addition, the batch plant would require approximately seven truckloads of material per foundation to operate the batch plant. Foundations for each WTG would require several hundred yards of concrete and slurry, which must generally be placed within 45 minutes of being made or "batched." The on-site batch plant would reduce the travel time for the mixer trucks and the number of trips over public roads. Water would be trucked in for the concrete batch plant. Approximately seven concrete trucks would travel between the batch plant and the foundation location using site roads for most of the time. Upon completion of the foundation pours, the batch plant would be disassembled and trucked off site, along with any remaining material that was stored to batch the concrete. After concrete is poured, the chutes of ready mixed concrete trucks and hoppers of concrete pump trucks must be washed out to remove the remaining concrete before it hardens. All concrete washouts would occur using washout pits or containers. All hardened concrete contained in the pits and/or containers would be hauled off site and disposed of accordingly.

### Construction Water

Unless adequate construction water could be obtained from the on-site well as described below, construction water would be transported and/or supplemented with water from the City of Lompoc's Lompoc Regional Wastewater Reclamation Plant (LRWRP) at 1801 W. Central Avenue in Lompoc. The Applicant has received a "Can and Will Serve" Letter from LRWRP for up to 20,000 gallons per day of recycled water for the Project. Water use associated with the batch plant is approximately 10,000 gallons per day. Each WTG foundation uses about 3,300 gallons of water. Reclaimed water from the LRWRP would also be used for dust control during construction. As many as 9,000 gallons of water could be required on dry, dusty days.

The amount of water available through both the Can and Will Serve Letter and the on-site well exceed the total water usage needs for Project construction.

## Table 2-9. Estimated Construction Truck Trips

| Activity | Month | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| WTG Parts Delivery[2] | | | | | 140 | 207 | 207 | | | | 554 |
| WTG Foundation Installation[3] | | | 152 | 51 | 99 | | | | | | 302 |
| Water Trucks[1] | | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 1,344 | 384 | 384 | | 8,832 |
| Access Road Construction[4] | 1,344 | | | | | | | | | | 1,344 |
| Site Road Construction[5] | | 320 | 240 | 240 | 240 | 240 | 240 | 240 | 320 | | 2,080 |
| T-Line[6] | | | | | | 240 | 240 | 240 | 240 | | 960 |
| Meteorological Tower Installation[7] | | | | | | | | 60 | | | 60 |
| Collection System[8] | | | | | | 137 | 20 | 20 | | | 177 |
| WTG Erection[9] | | | | | | 80 | 10 | 10 | 80 | | 180 |
| Services | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | 900 |
| Project Substation[10] | | | | | | | 200 | 200 | 200 | | 600 |
| Reclamation | | | | | | | | | | 200 | 200 |
| Total by Month | 1,444 | 1,764 | 1,836 | 1,735 | 1,923 | 2,348 | 2,361 | 1,254 | 1,324 | 200 | 16,189 |
| Total by Day (22 Construction Days per Month)* | 66 | 80 | 83 | 79 | 87 | 107 | 107 | 57 | 60 | 9 | 74 |

*Additional construction days/months may be added as mitigation pending environmental review. Estimated construction truck trips include O&M building and meteorological tower construction.

1 Water Trucks calculation: 7 trucks times 4 fills times 2 (roundtrip) times 6 days per week times 4 weeks per month equals 1,344 trips per month for 6 months (Month 2-7). This would reduce to 2 trucks per day for two months (Month 8 and 9).

2 WTG Parts Delivery includes transport of tower sections, blades, nacelle, hub, nose cone, and containers of ancillary parts.

3 WTG Foundation Installation includes transport of anchor bolts, CMPs, rebar, and raw materials for the batch plant.

4 Access Road Construction includes transport for tree trimming equipment, asphalt, and gravel trucks.

5 Site Road Construction: It is anticipated rocks will be crushed on site. Re-fueling trucks for heavy equipment and roundtrips for heavy equipment operators are considered.

6 T-Line includes transport for poles, conductor, and bucket trucks.

7 Meteorological Tower Installation includes transport for lattice steel sections and meteorological equipment.

8 Collection System includes transport for pad mount transformers, cable reels, fiber optic cable reels, copper ground reels.

9 WTG Erection includes transport of cranes, telehandlers, and pickup trucks for crews.

10 Project substation includes transport for steel, breakers, transformer, control building, fencing, concrete, and gravel

### Construction Truck Trips

The estimated 8,832 water truck trips in Table 2-9 are based on 7 water trucks operating daily, each cycling 4 times per day, 6 days per week (1,344/month). This estimate is based on the assumption that only LRWRP recycled water would be used for construction; to the extent water from an on-site well could be used, haul trips for construction water would be reduced. During road construction, water would be used for dust control and compaction. Once road construction has been completed, it is assumed that 2 of the trucks would continue with dust control operations to spray down roads in areas of active construction (384/month). In order to reduce the number of truck trips associated with water use during construction, the Applicant would also conduct additional well testing on site to confirm capacity for construction purposes. If sufficient capacity is present at an on-site well, water would either be pumped directly from the on-site well into water trucks on-site, stored temporarily in a retention basin within the laydown yard, or a combination of both.

The running of the concrete from the batch plant to the WTG foundations is not considered in the calculation in Table 2-9, since the batch plant would be located within the Project boundary. The batch plant would be mobilized using 5-7 semi-trucks and would only be operated during working hours on days that WTG, O&M Building, or Substation foundation pours are scheduled.

Raw materials including Portland cement, aggregate, admixtures, etc. would need to be delivered to "feed" the batch plant (96 truckloads/month). Additionally, other materials including anchor bolts, corrugated metal pipes (CMP) and reinforcing steel would also need to be delivered for each wind turbine foundation. Multiple WTG complete sets of these other materials can be delivered in a single truckload. In total, the batch plant feet materials and other WTG foundation materials would require 302 truckloads, assuming post-tensioned foundation construction, which is anticipated to be the preferred method (see section 2.5.1 above).

## 2.6.9 Disturbed Areas

The area of temporary and permanent land disturbance was calculated based on a 30 percent civil design for all project components completed by a registered professional civil engineer. The total acreage of temporary and permanent disturbance has been calculated at 171.5 acres for the Project (Table 2-10, Estimated Temporary and Permanent Land Disturbance). Based on the evaluation of and further engineering work on the grading plan, the Applicant anticipates that the cut and fill can be balanced on site (Table 2-11, Estimated Earthwork). The area of land disturbance includes turbine pads, access roads, internal collection, substation, staging area, O&M facility, transmission line, pull sites, switchyard, and access roads to the pole locations of the transmission line. It is anticipated that all temporary and permanent impacts to soil and vegetation would be limited to the areas delineated in the conceptual grading plan.

## Table 2-10. Estimated Temporary and Permanent Land Disturbance

| Project Component | Area Disturbed per Project Component | Number of Components | Temporary Disturbance (acres) | Permanent Disturbance (acres) |
|---|---|---|---|---|
| Wind Turbine Generators | average of 1.9 acres per turbine pad | 30 (max.) | - | 57.7 |
| Meteorological Towers | 0.13 acres (temp.)<br>270 sq. ft. (perm.) | 3 | - | 0.4 |
| Access Roads – Existing Improved, and new (including San Miguelito Road) | 8.8 turbine access road miles, thereof 0.98 miles on existing field roads, and 0.78 miles modifications on San Miguelito Road[1] | - | - | 76.5 |
| Project Substation | 1.0 acres | 1 | - | 1.0 |
| Project Switchyard | 1.4 acres | 1 | - | 1.4 |
| Power Poles | 20 sq.ft.[2] (perm.) | 44 | 0 | 0.02 |
| Transmission Line Access Roads (including pads and pull sites) | - | - | - | 12.8 |
| Staging Area (Laydown Yard) and O&M Building: | 16.5 acres | 1 | - | 16.5 |
| Internal Collection Lines | 9.57 miles total trench length, whereof only 1.6 miles is outside of access roads[1] | - | 0.6 | - |
| Well Site and Waterline[a] | 0.2 acres | 1 acres | - | 0.2 |
| Transmission Line Pull Sites | 0.6 acres | 7 | 4.1 | - |
| | | Total | 5.0 | 166.5 |

[1] Waterline will be placed on top of existing ground. No grading will be necessary and, thus, there will be no permanent or temporary impacts.

## Table 2-11. Estimated Earthwork

| Item | Description | Length (lf) | Cut (cys) | Fill (cys) | Net Differential |
|---|---|---|---|---|---|
| 1 | New Turbine Access Roads | 37,225 | 617,500 | 630,694 | -13,194 |
| 2 | Existing Turbine Access Roads | 5,164 | | | |
| 3 | San Miguelito Road | 21,176 | 11,110 | 4,600 | 6,500 |
| 4 | New Transmission Line Access Roads | 5,5659 | 218,500 | 221,084 | -2,584 |
| 5 | Existing Transmission Line Access Roads | 47,673 | 34,700 | 35,200 | -500 |
| 6 | Underground Collection Lines | 50,510 | 6,175 | 6,175 | 0 |
| 7 | Domestic Water Line to O&M | 2,650 | 325 | 325 | 0 |
| 8 | O&M Facilities | N/A | 54,937 | 57,000 | -2,063 |
| 9 | Substation Site | N/A | 3,100 | 3,000 | 100 |
| 10 | Switchyard | N/A | 3,900 | 3,700 | 200 |
| Totals | | | 950,237 | 961,778 | -11,541 |

*The volume of the cables, pipes and conduits will compensate for losses due to shrinkage

**With anticipated shrinkage and subsidence this Project is anticipated to "balance."

## 2.6.11 Foundation Construction

Foundations would be required for each WTG, the six pad transformers for the 1.79-MW turbines the Project's substation and switchyard equipment, transmission line poles, and the O&M building. When the roads are completed for a particular group of WTGs, construction of the foundations for these WTGs would commence. Depending on the foundation type used, each WTG foundation could require approximately 90 cy of 4,000- to 6,000-pound-per-square-inch (psi) test concrete and 80 cy of 1,000-psi slurry mix, totaling approximately 18 to 24 truckloads of concrete per WTG. Anchor bolts would be embedded in the concrete, and the foundation would be allowed to cure prior to tower erection.

Foundation construction would include the following stages: drilling, blasting (if required) and hole excavation; outer form setting; rebar and bolt cage assembly; concrete casting and finishing; removal of the forms; backfilling and compaction; construction of the pad transformer foundation; and foundation site area restoration. Excavation and foundation construction would be conducted in a manner that would minimize the size and duration of excavated areas required to install foundations. Portions of the work might require over excavation or shoring.

Backfilling would be completed immediately after approval by the engineer's field inspectors. On-site excavated materials would be used for backfill where possible. Using the tensionless pier foundations, an estimated 25 cy of excavated soil would remain from each WTG. The excess soil not used as backfill for the foundations would be used to level out low spots on the crane pads and roads to make them consistent with the surrounding grade, and exposed soil would be reseeded with a designated mix of grasses around the edges of the disturbed areas. Larger rocks would be disposed off site or crushed into smaller rocks for use as backfill or road material. Excess soil not used around the WTG sites would be disposed of in eroded areas on site.

## 2.6.12 On-site Power Collection System Construction

Although the majority of the collection system would be placed underground within the proposed roads, approximately 1.6 miles of underground collection lines would be outside of the proposed road modifications, and approximately 0.5 mile of overhead collection lines is proposed between the substation site and WTG E-3 as underbuilt to the transmission line, and between WTG E-2 and E-4. The overhead collection line between WTG E-2 and WTG E-4 avoids an underground alternative that would result in significant additional grading in the Coastal Zone. This overhead span across the existing steep terrain would be approximately 1,400 feet and would require two poles placed within the disturbance footprint of WTG E-2 and WTG E-4, respectively. Access to these pole locations would occur on the access roads designed for WTG E-2 and WTG E-4. No additional roads would be required at this location. The overhead collection line between the substation site and WTG E-3 would be co-located on a portion of the Project transmission line. This section of collector line would not result in any additional impacts above those assumed for the transmission line in this location. The overhead collector system would be designed to avoid avian electrocution and collision mortality using the APLIC guidelines (Edison Electric Institute and USFWS, 2005).

After the roads, WTG foundations, and transformer pads are completed for a particular row of WTGs, underground cables would be installed along that road section. Trenches would be cut to the required depth. Cables would be laid in the trenches, surrounded with a cushion of clean fill, inspected, and the trenches backfilled. Shallower trenches might be required where solid rock is encountered. The 34.5-kV cables would be connected to the WTG pad mounted or tower-based transformers, and low-voltage wiring between the transformers and the bus cabinet inside the WTG towers would be completed, inspected, and tested.

The total area of disturbance for the underground power collection cables outside the road would be 0.6 acres, with cut and fill of 6,175 cubic yards of grading to be balanced on-site (Tables 2-10 and 2-11). To construct the overhead collector lines between WTG E-2 and WTG E-4, holes would be drilled and the poles erected with a small crane or boom truck. The poles would be set in place using concrete or compacted clean fill, according to the engineer's specifications. The overhead lines would be connected to the underground cables at each end through a fused disconnect switch, which would ensure personnel safety by breaking the electrical connection in the event of a power surge.

Typical installation of the collection system involves the following:

- The exact location of the collection system trench is surveyed and staked using a registered surveyor.
- A grader is deployed to make two passes along the trench running line to move the topsoil away to the side, if topsoil is to be preserved.
- Trenching is typically performed using a mechanized trencher or excavator.
- The trenching spoil is typically deposited adjacent to the open trench.
- The conductor cables, neutral cable and fiber optic cable get installed. Usually a truck pulls the cable reels adjacent to the trench to lay the cables simultaneously. In some cases, the cable reels are pulled by the trencher itself and immediately installed in the trench behind the trencher.
- A paddling machine usually follows the trencher to screen the spoil and deposit clean spoil on the collection system cables.
- This screened spoil that was deposited in the trench on top of the cables is then compacted, usually using a small compactor.
- The remaining spoil is then deposited into the trench, and compaction is usually specified as 95 percent of natural compaction.

  The topsoil is then bladed back over the trench using a grader.

## 2.6.13 Project Substation and Switchyard Construction

The Project substation and interconnection facilities construction would involve several stages of work, including grading of the Project substation area; installation of a grounding mat; construction of several foundations for the transformers, power circuit breakers, and structures; erection and placement of the steel work and all outdoor equipment; and electrical work for all of the required terminations. Following construction, an inspection and commissioning test plan would be executed prior to the Project substation being energized.

The switchyard footprint would be cleared and graded and would include installation of electrical equipment.

## 2.6.14 Wind Turbine Generators

The WTG components would be delivered to the site via transport trucks in multiple sections; the main components would be off-loaded at the individual WTG sites or staged at the laydown area before transport to the final location. After setting the WTG electrical bus cabinet and ground control panels on the foundation, the tower would be erected by crane in sections. Tower construction would be followed by hoisting and installation of the nacelle; assembly, hoisting, and installation of the rotor; connection and termination of internal cables; and inspection and testing of the electrical system.

The rotors for the 1.79-MW WTGs would be constructed on the ground at the WTG location, connecting the three blades to a hub. The hub rests on a stand, which is removed prior to erection of the assembled rotor. Each blade would be attached to the hub utilizing a crane, which can lift each blade with a spreader bar attachment thereby avoiding the need for a tandem pick of the blade. The assembled rotor would sit approximately 4 feet above the ground on the hub stand, allowing the blades to remain suspended above the ground within the construction staging area, and in any areas immediately surrounding the staging area. Therefore, there is no grubbing or grading required beyond the designated limits of the construction stating area designated for the assembly of the WTG. In cases where the blades overhang, either down-slope or upslope areas, the assembled rotor orientation can change to accommodate the contours. For example, blade number 1 can move from the 12 o'clock position to another position to accommodate the contours. As a result, grubbing and grading would be limited to the designated areas of permanent and temporary disturbance for each WTG. Turbine locations for those turbines have been selected that allow the rotor assembly without the need of additional grading.

The rotors for the 3.8-MW WTGs would be constructed with a single blade lift while suspended from the crane. When the rotor is ready to be attached to the nacelle, the main crane attaches to the hub while a support crane (typically a rough-terrain "RT" style hydraulic crane) attaches to one of the blades. The RT tailing crane does not require a crane pad to be built and is mobilized within the disturbed area where the other turbine equipment (towers, blades, etc.) had been staged around the foundation prior to erection. The two cranes work in tandem until the rotor is rotated 90-degrees. The tailing crane then detaches, and the main crane completes the installation of the rotor to the nacelle main shaft, again, from its location on the crane pad. All grading or grubbing would occur within designated areas of permanent and temporary disturbance for each WTG.

## 2.6.15 Hazardous Materials

Construction equipment and trucks would be properly maintained to minimize leaks of motor oils, hydraulic fluids, and fuels. Major vehicle maintenance would be performed off site at an appropriate facility. Gasoline- and diesel-powered vehicles and equipment would be refueled on site at designated locations by a mobile fuel service truck.

## 2.6.16 Transmission Line Installation

Up to approximately 38,544 feet (7.3 miles) of new transmission line would be engineered, designed, and built by the Applicant. The poles would be installed using standard line trucks where possible, although helicopters could be used in some remote areas to install poles and conductors, in accordance with an FAA Lift Plan. A variety of equipment would be used to construct the transmission line (Table 2-12, Transmission Line Construction Equipment). The turning radius of access roads and inherit gradients may require smaller equipment.

**Table 2-12. Transmission Line Construction Equipment**

| Equipment Type | Number of Equipment |
|---|---|
| Helicopter – UH1 type (If needed) | 1 |
| Medium Size Scrapers, possible 20 CY capacity | 4 |
| Dozers varying in size | 3 |
| Motor graders | 3 |
| Water Trucks and possibly (2) water buffalos | 2 |
| Gradall-type excavator | 1 |
| Track Hoe | 2 |
| Sheepsfoot roller | 1 |
| Rubber tired roller | 3 |
| Skid Steers with brush mulching attachments | 1 |
| Loader with Brush Hog Attachment | 2 |
| Tractors with Backhoe and spreader box attachments | 2 |
| Truck Cranes | 2 |
| Bucket Trucks | 2 |
| Line Trucks and several 4WD pickups and all-terrain vehicles (ATVs) | 3 |
| Cable Stringers and pulling equipment | 2 |

The transmission line route was designed to use existing roads wherever possible, so that grading would be kept to a minimum. Approximately 9.03 miles of existing access roads can be used, a portion of which would require widening or other modifications and approximately 0.91 miles of new access roads would need to be graded. Earthwork amounts for these road modifications are provided in Table 2-11. It is anticipated that the excess fill associated with the transmission line road modifications would be used in the same general vicinity as the cut locations. For example, much of the excess cut would be used for fill needed for the roads in the same area. In addition, many of road modifications for the transmission line would occur within the footprint of the Project site allowing for the convenient use of excess cut associated with these roads to be used as fill for the project O&M facility or in others local areas on the project site. With anticipated shrinkage and subsidence the total Project cut and fill is anticipated to "balance." Ground disturbance and tree removal would occur during construction of the transmission line. Existing dirt roads would be used to access pole locations. Vegetation clearing would be kept to a minimum because the transmission line route could be shifted within the study corridor to avoid impacts to sensitive plant communities where feasible.

## Step 1 – Installing the Supporting Structure Foundations

To install steel poles, a foundation hole would be excavated; forms, rebar, and anchor bolts would be installed; concrete poured; forms removed; soil or gravel replaced around the base; and a pole installed at each of the new pole sites. Installation of wood poles would involve excavating, installing the pole, and backfilling the excavation; no foundation would be required for poles placed in straight spans. Wooden poles may be embedded to a depth of approximately 7 to 12 feet below grade. Material removed during the process would be placed in a location specified by the landowner and/or disposed of according to applicable laws. Temporary disturbance around each structure site would typically be limited to approximately a 50-foot radius (100-foot diameter) centered on the pole. Areas of temporary disturbance from transmission line construction are listed in Table 2-10. Temporary disturbance would consist of soil compaction from placement of crane outrigger pads and from vehicle tracks, as well as movement of workers and equipment.

Placement of the pole structures would require the use of a large auger to dig the foundation hole. The foundation hole would be approximately 5 feet in diameter and from 10 to 20 feet deep. In some cases, a cage of reinforced steel and with anchor bolts would be installed and concrete would be placed in the hole. After the concrete curing period of one month, workers would remove the concrete forms and restore the ground around the foundations. Each pole would have approximately a 5-foot-diameter foundation (approximately 20 square feet of new foundation per structure); areas of temporary and permanent disturbance are shown in Table 2-10.

## Step 2 – Erecting the Supporting Structures

The poles would be installed by conventional methods or by helicopter, as needed. The steel pole shafts may be delivered to the pole site in two or more sections depending on pole design. For safety and ease of construction, the steel poles would be assembled on the ground in the pole laydown area. The sections would be pulled together with a winch and the cross arms bolted to the pole. Insulators would be attached to the cross arms and secured. A crane may be used to erect the poles and set them in the excavation, or on the anchor bolts embedded in the concrete foundation for certain steel poles. Finally, the securing nuts on the foundation would be tightened.

## Step 3 – Stringing the Conductors

Before beginning conductor installation, temporary clearance structures would be installed at road crossings and other locations where the new conductors could accidentally come into contact with electrical or communication facilities and or vehicular traffic during installation. The construction contractor would use a set of temporary clearance structures at all roads, railroad crossings, and other transmission line crossings. These temporary clearance structures would be of wood pole construction that resembles an “H” or “Y,” depending on the design, and placed on each side of the roadway. These structures would be placed at the edge of the roadway and would not require grading; they would not interfere with traffic. These structures would prevent the conductor from being lowered or falling onto the traffic below before tensioning.

The conductor stringing operation would begin with the installation of insulators and sheaves or stringing blocks. The sheaves are rollers attached to the lower end of the insulators that are, in turn, attached to the ends of each supporting structure cross arm. The sheaves would allow the individual conductors to be pulled through each structure until the conductors are ready to be pulled up to the final tension position.

When the pull and tension equipment are set in place, a sock line (a small cable used to pull the conductor) would be pulled from pole to pole, either using a helicopter to place the sock line into the sheaves or using a guide to shoot the sock line from one pole to another. After the sock line is installed, the conductors would be attached to the sock line and pulled in or strung using the tension stringing method. This method would involve pulling the conductor through each pole under controlled tension to keep the conductors elevated above crossing guard structures, roads, and other facilities.

After the conductors are pulled into place, wire or conductor sags would be adjusted to a pre-calculated level. The conductors would then be clamped to the end of each insulator as the sheaves are removed. The final step of conductor installation would be to install vibration dampers and other accessories. The temporary crossing guard structures would be removed after the final step.

Packing crates, spare bolts, and construction debris would be picked up and hauled away for recycling or disposal during construction. The construction contractor would conduct a final survey to ensure that cleanup activities have been completed as required.

PG&E proposes to reconductor (replace wires and possibly poles along the existing Manville 115-kV power line for a distance of 0.6 miles from the POI at the switchyard to an existing pole location in the City of Lompoc outside of the Cabrillo Substation. PG&E proposes the use of a temporary "shoo-fly" line to ensure that the existing Manville 115 kV line remains energized during the reconductoring effort (See Table 2-5). All construction activities by PG&E would occur within the existing PG&E right-of-way and would take place on existing or replacement poles. Following construction activities, a single power line would remain as it exists today between the Project switchyard at the POI and the pole location outside of the Cabrillo Substation.

### 2.6.17 Startup

Each completed WTG would be inspected and checked for mechanical, electrical, and control functions in accordance with the manufacturer's specifications before being released for startup testing. A series of startup procedures would then be performed by the manufacturer's technicians; this process would require approximately 8 to 16 hours per WTG. Final testing would involve mechanical, electrical, control, and communications inspections and tests to ensure that all systems are working properly.

After the WTGs have been commissioned and are producing power, a period of acceptance testing would begin to ensure that the WTGs are performing according to the agreed-upon parameters. During this time, the power produced would be fed into the utility grid. Electrical tests on the transformers, power lines, and Project substation would be performed by qualified engineers, electricians, and test personnel to ensure that electrical equipment is operating within tolerances and that the equipment has been installed in accordance with design specifications, standards and requirements by PG&E and CAISO.

### 2.6.18 Site Restoration and Landscape Plan

Site restoration and cleanup would include reseeding of specifically identified areas subject to temporary disturbance during the first suitable weather conditions after the heavy construction activities have been completed, or as per the Project's restoration and revegetation plan. Temporary disturbance areas around WTG sites would be reseeded with native grasses to allow the current use of the property to continue to the maximum extent practicable while maintaining adequate access to all WTGs. Temporary disturbance on the shoulder areas of access roads (new and improved) would also be reseeded. The 0.24-acre fenced substation area and the 1.4-acre switchyard would be covered with crushed rock; no other landscaping is planned because of this area's interior location within the Project site.

## 2.7 Operation

During the operational phase of the Project, approximately five to seven staff would be employed on site in the O&M facility. Monitoring of WTGs and system operation would occur in the O&M facility. Staff on-site would perform routine maintenance throughout the site, troubleshoot malfunctions, and shut down and restart WTGs when necessary. Operations would be continuously monitored through the SCADA system.

Larger equipment, supplies, and spare parts would be stored in a secured on-site yard, while normal-sized equipment, supplies, and spare parts would be stored inside the O&M facility's shop area. The secured yard would be located adjacent to the O&M facility that would only be accessible to authorized personnel. Spare parts might include large components, such as a spare blade set or gearbox. Specialized equipment not needed routinely would be brought on site as needed. Maintenance of some components of on-site infrastructure (for example, roads and electrical lines) may be subcontracted to qualified local firms.

## 2.7.1 Wind Turbine Generator Maintenance

After the initial startup period, the WTGs would be serviced at regular intervals, taking them offline for one or two days, typically one or two WTGs at a time, depending on the maintenance strategy. Annual overhaul maintenance service would also be performed. The Applicant expects the service program to maintain the WTGs at operational availability 98 percent of the time. Most servicing would be performed on site without using a crane. Service access would be from inside the tower, via a door in the base. The regular routine would consist of inspecting and testing all safety systems; inspecting wear-and-tear on components, such as seals, bearings, and bushings; lubricating the mechanical systems; performing electronic diagnostics on the control systems; pre-tension verification of mechanical fasteners; and inspecting the overall structural components of the WTGs. Electrical equipment, such as breakers, relays, and transformers, are frequently visually inspected, which would not affect overall availability. Testing or calibrations would be performed every 1 to 3 years, which might force outages.

Blade cleaning can be considered when the accumulation of debris on the lead edge reduces aerodynamic performance. WTG tower and blade cleaning is a reactive maintenance activity, not preventative, so there is not a defined periodicity for this work. In the event excessive dirt, grease, or oil is found on the external surfaces of the WTG (hub, blades, nacelle, tower) an evaluation would be performed to determine a safe (personnel, environment or equipment) method of cleaning. In the majority of the cleaning cases, a lift basket is used to hoist a wind turbine technician who would then use a biodegradable cleaner and cloths to perform the cleaning. Cleaning cloth disposal would be contracted through a licensed and approved waste management company in the area. In the event additional cleaning such as pressure washing is required, a third party would be contracted. The standard for pressure washing is that the vendor would truck water to the site and use an environmentally friendly biodegradable cleaner.

Cranes and other large equipment would not be used for routine operation and maintenance activities. If a crane is needed for an unanticipated maintenance or blade replacement in the case of a blade failure (blade failure is an extremely rare occurrence and is not expected throughout the life of the project), it would be brought to the site unassembled so that roads would not have to be re-widened for maintenance, repair activities or blade delivery.

During operation, the collection system would be energized at all times unless the facility is taken offline or certain segments are isolated for repair or maintenance. When the turbines are not producing power (e.g. low winds, curtailment, maintenance, etc.), the collection system would remain energized under a parasitic load to power the turbines and their control systems.

## 2.7.2 Road Maintenance

Project access roads would be periodically graded and compacted to maintain the design, safety, and environmental requirements during the life of the Project. Maintenance of cut-and-fill slopes, culverts, grade separations, and drainage areas would be performed as necessary to minimize erosion problems and maintain functional drainage structures. The Applicant would be responsible for cleaning up all construction debris and maintaining the appearance of all Project roads and rights-of-way in cooperation with the Project landowners.

Public access to public areas would not be impeded by the Project because the proposed facilities are located on private property. For safety, the Project substation and switchyard would be fenced, locked, and properly signed to prevent access to high-voltage equipment. Safety signage would be posted around WTGs, transformers, other high-voltage facilities, and along roads, as required. The Project site is within the County's High Fire Hazard Area. Vegetation would be cleared and clearance maintained around the WTG's, Project substation, switchyard, transformers, and riser poles.

## 2.7.3 Hazardous Materials Handling

Oil, grease and ethylene glycol would be used to lubricate and cool the WTGs and ancillary facilities. The cooling system would contain water and ethylene glycol that would be tested annually. Gearboxes would contain approximately 70 gallons of oil that would not be routinely renewed. Yaw system bearings and control gears would be greased, and the hydraulic oil checked and renewed approximately every 5 years. All testing or replacement would be performed up tower; therefore, all fluids, including those from accidental spills, would be contained within the nacelle and the tower structures. Possible leakage or spillage during WTG operation and maintenance would be confined within the towers. Additionally, the WTG models that would be installed for the Project would be equipped with leak-proof gaskets.

To minimize the potential for harmful effects to people or the environment, stored chemicals, oils and biodegradable cleaning chemicals and detergents would be held in on-site tanks or drums equipped with secondary containment areas to prevent runoff at the O&M facility. No extremely hazardous materials are currently anticipated to be produced, used, stored, transported, or disposed of as a result of the Project. Storage and use of hazardous materials would be subject to a Hazardous Materials Management Plan approved by the SBCFD, which would include safe handling practices from the Material Safety Data Sheets (MSDS).

Potential hazardous materials and chemicals expected to be used or produced by maintenance vehicles during operation of the Project include gasoline, diesel, motor oil, grease, ethylene glycol and combustion emissions. Toxic Air Contaminants (TACS) such as benzene would be emitted at trace levels as byproducts of the combustion of diesel and gasoline.

## 2.7.4 Safety and Emergency Situations

Standard operating procedures and employee training relating to safety, potential emergency situations, and potential malfunctions would address emergency evacuation, emergency response, safety, electrical equipment failures, fire prevention and control, mechanical malfunctions, notification procedures, maintenance activities, and schedules.

Standard operating procedures dictate that WTGs would not be operated at high wind speeds because of the high loads exerted on the equipment. The maximum operating wind speed would be in the range 25 meters per second or 60 miles per hour, depending on the specific model chosen. In higher wind speeds, for equipment protection, the blades would feather and the rotor would free-spin with very low rotational speed.

In the event that severe storms result in a downed overhead line, procedures outlined in the emergency response plan would be applied. Tensioning sites would be located within the overhead distribution line rights-of-way to facilitate line replacements. In the event of a high-voltage grid outage, the WTGs would have internal protective control mechanisms to safely shut them down. The WTGs would require the grid to be energized to generate power when the wind is blowing. A separate low-voltage distribution service feed may be connected to the low-voltage side of the Project substation as a backup system to provide auxiliary power to Project facilities in case of outages. If low voltage service is not available, back-up power would be provided by PG&E's existing 12kv line at the substation in case of an unscheduled outage.

Physical security of the Project site is provided by the installation of locked gates at the entrance to all access roads. In addition, all turbines would be locked as well, as would be the Project substation and control house and switchyard, which would be fenced by an 8-foot high barbed wire reinforced fence. Additionally, remote, around the clock monitoring and surveillance cameras would provide eyes on the wind facilities at all times and report any and all suspected intrusions. If an intrusion is suspected, security personnel would be deployed to the site.

## Fire

The Project site is located entirely within the County's High Fire Hazard Area. Fire features and best management practices within the Project site would include service and access roads, which could serve as firebreaks, and regular clearing of vegetation from areas around transformers and riser poles. Firefighting equipment would be stored at the on-site substation, in the O&M Building and in work vehicles. A 20-pound CO2 fire extinguisher would be stored at the substation and at the O&M Building for small fires. In addition, service pick-up trucks would be equipped with a 5-pound standard fire extinguisher. The design of the substation would take into account local permitting and may be adjusted accordingly. Further, a safety and emergency response plan will be developed in conjunction with the local Fire Marshall.

The substation and switchyard surface would be covered with a layer of rock. This rock layer would act as a fire barrier. In addition, spatial separation of transformers and other equipment would be provided for in the design to prevent fire propagation. The substation and switchyard would meet or exceed Institute of Electrical and Electronics Engineers (IEEE)-979 Substation Fire Protection. Detection and extinguishing equipment shall be installed in accordance with all applicable national and local codes.

Safety signage would be posted where necessary around WTGs, transformers, and other high-voltage facilities, and along roads, in conformance with applicable State and federal regulations. A safety policy plan would be developed and included as part of the mitigation requirements.

## Site Security

For safety and protection, wind energy facilities have multiple layers of security to prevent compromising the facility and the connected Bulk Electric System. The physical security is provided by installing locked gates at the entrance to all access roads. In addition, all turbines are locked and the Project substation switchyard and control houses are also locked and fenced by an 8-foot barbed-wire reinforced fence. Electronic access to any SCADA access point is protected by at least two layers of security using high industry standard VPN technology and secure passwords and 24/7 remote monitoring. In addition, the use of surveillance cameras provides around-the-clock eyes on the wind farm and its

SCADA system, reporting all suspected intrusions or abnormalities to field personnel and the Asset Management Department. Remote Monitoring Operations Rooms and turbine manufacturer's Remote Operation Centers require keycard access to prevent unauthorized access in compliance with FERC/NERC regulations.

# 2.8 Decommissioning

The anticipated life of the Project is estimated to be 30 years. At the end of its useful life, the Project could be "repowered," renovated or upgraded, or decommissioned. The decision to decommission or repower would rest with the operator and depend on energy economics at the time, technological options, and other considerations.

If the Project were repowered, full or partial decommissioning would likely be required before repowering. Depending on the new WTG model selected, some of the Project components could be reused. At this time, projections of what technology would be used to repower the facility cannot be determined. As a result, there is no estimate of what components would be reused or what types of road modifications or modifications would be needed to facilitate decommissioning.

When the Project is decommissioned, all structures and equipment at the site would be dismantled and removed, and the land surface would be restored to as close to the original condition as possible. Reclamation would be conducted on all disturbed areas to comply with County reclamation policy. The short-term goal would be to stabilize disturbed areas as rapidly as possible, thereby protecting sites and adjacent undisturbed areas from degradation.

The leases with local landowners require the Applicant to prepare a reclamation plan for the Project. The County would also require a discretionary permit and a decommissioning and reclamation plan to be developed and implemented. The Applicant proposes that the decommissioning plan would, at a minimum, (1) identify and discuss the proposed decommissioning activities and how they would comply with the applicable regulatory requirements, and (2) describe alternative decommissioning activities.

Decommissioned underground buried cables would remain. The following components proposed would be removed:

- WTGs, including foundations, to a level 4 feet below the existing grade
- Overhead poles and electric lines within the Project area
- Project substation and switchyard
- Project roads, unless the Project landowners wish to retain the improved roads for access throughout their property.

If towers are sold for reuse, they would be dismantled at their bolted joints, removed by crane, and trucked off the site in the same way they were delivered. This might require the roads to be widened to the original construction width for crane access. Units sold as scrap would most likely not require widening of the roads for removal.

# 2.9 Project Approvals

A number of permits and approvals would be required for the Project, as described in this section.

## 2.9.1 County of Santa Barbara

The County of Santa Barbara would need to authorize or approve the following items:

- Conditional Use Permit (CUP), pursuant to Santa Barbara County LUDC Section 35.82.060.
- Two variances, as specified in LUDC Section 35.57.050:
  - Variance No. 1: To allow the base of the tower of the WTG to be setback 70.05 meters (230 feet) feet from the property line adjoining the VAFB.
  - Variance No. 2: To allow the removal of all setback requirements from internal property lines.
- Coastal Development Permit (CDP)
  - The Project would require a total of 6.5 acres of grading for road modifications to access WTGs in the south eastern portion of the Project site.

The County Planning Commission would consider each of these actions. Approval would not be required by the Board of Supervisors unless the CUP, variances or CDP are appealed. After approval of the CUP ,variances and CDP, and after the necessary permit conditions are satisfied, the County would issue zoning clearances.

Other permits or approvals that may be needed from individual County agencies are as follows:

- **Planning and Development Department**
  - Approval of all environmental mitigation plans and future review and approval of the Decommissioning and Site Restoration Plan.
- **Public Works Department**
  - Stormwater Quality Management Plan incorporating Best Management Practices (BMPs).
- **Flood Control District**
  - Plan approval for any road or bridge crossings at creeks or grading for structures within 50 feet from the top of creek banks.
- **Environmental Health Services**
  - Water system/Supply permits for the O&M Building.
- **Air Pollution Control District**
  - None required. The Project would use electric pumps and would be conditioned to require that all construction equipment use ultra-low-sulfur diesel fuel. No permanent stationary sources would occur. However, portable or temporary equipment present on site for more than 12 months, including concrete batch plants, associated engines, and gasoline storage tanks of 250 gallons or more, would require permits.
- **Public Works Department, Roads Division:**
  - Encroachment permits
  - Detailed traffic control plan
  - Fees for increases in peak hour trips, if required
  - Haul permits
  - Bonds
  - Photo documentation of pre- and post-construction road condition of San Miguelito Road beyond the Imerys mine and payment for resulting road damage
- **Santa Barbara County Fire Department (SBCFD):**
  - Annual permits for the use and storage of hazardous and flammable materials/wastes
  - Hazardous Materials Business Plan
  - Fire Protection Plan

- **Building and Safety Division:**
  - Grading and drainage plan and permit
  - Erosion control plan and permit
  - Building and electrical permits

### 2.9.2 Other Permits and Approvals

Additional permits, approvals, and consultations may be needed from the following entities:

- **City of Lompoc**
  - Encroachment permits for work within the City's right-of-way and approval of the Traffic Control Plan.
  -
- **Central Coast Regional Water Quality Control Board**
  - Regional Water Quality Certification (401 permit), Industrial National Pollutant Discharge Elimination System (NPDES) permit, and General Construction Stormwater permit (requirements include preparation of a SWPPP).
- **California Department of Fish and Wildlife (CDFW)**
  - Possible Streambed Alteration Agreement (pursuant to Section 1601 of the California Fish and Game Code)
  - Possible Section 2081 permit (for impacts to state-listed endangered species)
- **California Department of Transportation (Caltrans)**
  - Encroachment permit (for any portions of the power line that extend into or across the SR-1 right-of-way)
  - Hauling truck and overload permits
  - Approve road closures
- **U.S. Army Corps of Engineers (USACE)**
  - Possible Nationwide Permit or Section 404 permit
- **U.S. Fish and Wildlife Service (USFWS)**
  - Consultation for impacts to federally listed species
- **Federal Aviation Administration (FAA)**
  - Review Notice of Proposed Construction or Alteration and make determination regarding the Project's impact to air navigation
  - Review and approve Lift Plan and WTG Lighting Plan

## 2.10 References

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