Revised DEIR Chapter 2 – Project Description

Chapter 2
Project Description

The California Public Utilities Commission (CPUC) is responsible for environmental review and permitting of Horizon West Transmission, LLC's (HWT) (formerly NextEra Energy Transmission West, LLC [NEET West]) and Pacific Gas and Electric Company's (PG&E) (collectively referred to as the "Applicants") proposed Estrella Substation and Paso Robles Area Reinforcement Project (Proposed Project). The Proposed Project would involve construction and operation of a new 230 kilovolt (kV)/70 kV substation and a new approximately 7-mile-long 70 kV power line, and replacement/reconductoring of approximately 3 miles of an existing 70 kV power line. The Proposed Project also anticipates providing for the future establishment of three new distribution feeders from the proposed Estrella Substation, including construction of roughly 1.7 miles of new distribution line and additional reconductoring activities. The distribution components are not planned to be constructed presently, but are being evaluated in the environmental impact report (EIR) because they are reasonably foreseeable (PG&E 2020). These facilities would be located in unincorporated San Luis Obispo County and within the City of Paso Robles (City). The Proposed Project is intended to address identified deficiencies in the electrical grid system in the Paso Robles area and to accommodate projected new growth.

This chapter describes the Proposed Project's purpose and objectives, location and setting, components, construction actions and methods, operation and maintenance, and anticipated permits and approvals. Information presented in this chapter is based primarily on the Proponent's Environmental Assessment (PEA) prepared by SWCA Environmental Consultants, Inc. for HWT and PG&E (NEET West and PG&E 2017) and follow-up requests by the CPUC for additional information.

2.1 Proposed Project Purpose, Need, and Objectives

2.1.1 Purpose and Need

The Proposed Project is needed to provide transmission system redundancy and power support in the event of outages (i.e., contingencies), as well as increased distribution capacity to accommodate forecasted electrical load growth in the Paso Robles area. The Proposed Project would also improve electrical service reliability by reducing the length of distribution feeders in the area. The following subsections provide further detail regarding the fundamental purpose and need of the Proposed Project.

Transmission System

The Proposed Project was identified in the California Independent System Operator's (CAISO) 2013-2014 Transmission Plan as a project needed to mitigate thermal overloads and voltage concerns in the Los Padres 70 kV system (specifically in the San Miguel, Paso Robles, Templeton, Atascadero, Cayucos, and San Luis Obispo areas) (CAISO 2014). CAISO modeling determined that thermal overloads and very low voltage conditions could occur in this system following either one of two Category B (i.e., P1 or N-1)[1] contingencies: loss of the Templeton 230 kV/70 kV #1 Transformer Bank or loss of the Paso Robles-Templeton 70 kV power line.

Essentially, if either the #1 Transformer Bank at the Templeton Substation or the 70 kV power line connecting the Paso Robles and Templeton Substations were to fail for any reason (e.g., vehicular impact to existing infrastructure, vegetation and/or storm damage, wildlife damage to existing electrical connections, and/or mechanical failure), this could result in dangerous overloading and low voltage conditions in the regional system. This is both due to high load (i.e., electrical service demand) in the Paso Robles area relative to substation capacity, as well as lack of redundancy in the system. As shown in Figure 2-1, currently, the only sources of power to the Paso Robles Substation are the San Miguel-Paso Robles 70 kV power line from the north and the Paso Robles-Templeton 70 kV power line from the south, with the latter providing the bulk of the power and the nearest connection to a 230 kV power source. The San Miguel-Paso Robles 70 kV power line does not have the capacity to accommodate the load served through the Paso Robles Substation should the power source from Templeton Substation fail; therefore, thermal overloads and low voltage could occur on this line during one of the Category B/P1 contingencies identified by CAISO (NEET West and PG&E 2017).

Because PG&E has an Under-Voltage Load Shedding (UVLS) scheme that serves to protect the transmission system infrastructure in the event of such overload scenarios, rather than allow the power line to deteriorate or completely fail, load would be systematically shed to bring voltages to acceptable levels. Practically, without the Proposed Project, this could result in 60 to 70 megawatts (MW) of load in the Paso Robles area being dropped during one of the Category B/P1 contingencies described above (CAISO 2014).

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[1] The CAISO uses the National Electric Reliability Commission (NERC) reliability standards to analyze the need for transmission system upgrades. The NERC standards provide criteria for system performance requirements that must be met under a varied but specific set of operating conditions, and prior to 2012, included the following categories:

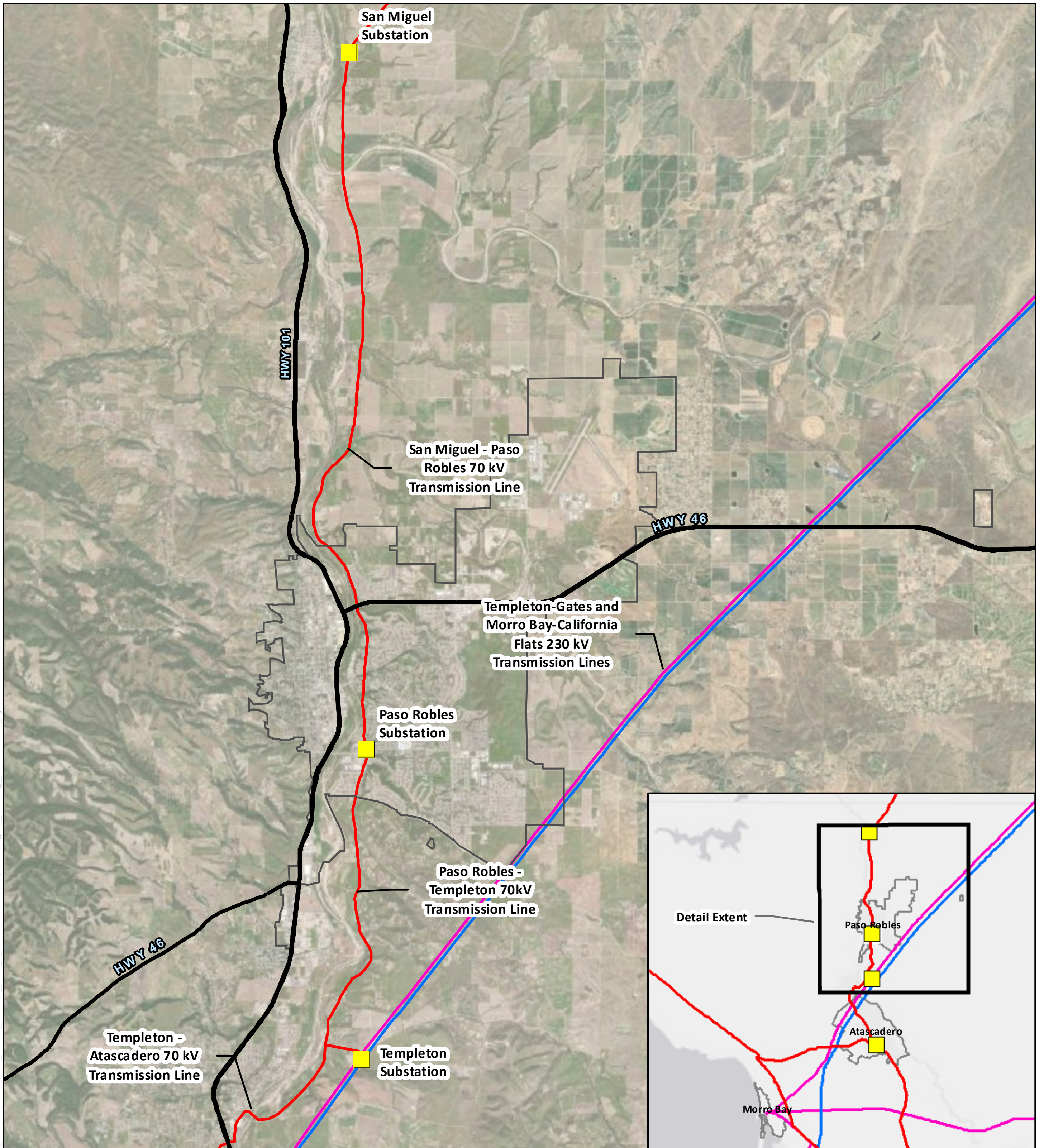
- Category A – System Performance Under Normal Conditions;
- Category B – System Performance Following Loss of a Single Bulk Electric System (BES) Element;
- Category C – System Performance Following Loss of Two or More BES Elements; and
- Category D – System Performance Following Extreme BES Events.

The latest adopted NERC TPL-001-4 transmission reliability standard applies new terminology; P0 through P7 define different scenarios based on the initial system condition and nature of the event (e.g., loss of generator, transmission circuit, bus section fault, etc.). The Category B contingencies identified for the Proposed Project would equate to a P1 (single contingency), while the Category C3 contingency would equate to a P6 (multiple contingency; two overlapping singles) (NERC No Date). The NERC standards allow for load to be dropped for a P6 contingency, but not for a P1 contingency.

NERC also refers to single contingencies (i.e., loss of a single BES element) as N-1 events. A multiple contingency where both BES elements fail at the same time (e.g., two circuits on the same pole line fail when a pole is hit by a vehicle) is known as a N-2 event. A multiple contingency involving the consecutive loss of two single BES elements that are not physically or electrically connected is known as a N-1-1 event. The Category B/P1 contingencies identified for the Proposed Project would be N-1 events, whereas the Category C3/P6 contingency would be a N-1-1 event.

In addition to the above issues, CAISO also identified a Category C3 (i.e., P6 or N-1-1) contingency condition involving loss of the Morro Bay-Templeton and Templeton-Gates 230 kV lines that would result in thermal overloads and low voltages in the underlying 70 kV system. The 2013-2014 Transmission Plan states that with the additional source from the Gates 230 kV system, the Proposed Project would provide robust system reinforcement to the Paso Robles and Templeton 70 kV system operations (CAISO 2014).

Figure 2-1 shows a map depicting the transmission system in the area of Paso Robles. Figure 2-2 and Figure 2-3 show conceptual diagrams of the existing transmission system and the proposed transmission system with the addition of Estrella Substation.



Basemap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics,

Existing Substation

Existing Transmission Lines

70 kV

230 kV

500 kV

Paso Robles City Limits

Highways

N

0 1

Miles

Figure 2-1

Existing Transmission System

Horizon WATER and ENVIRONMENT

Source: Source: NEET West and PG&E 2017

Note: The route variations shown are offset in order to display the alignments of the alternative routes that may overlap in places.

Estrella Substation and Paso Robles Area Reinforcement Project

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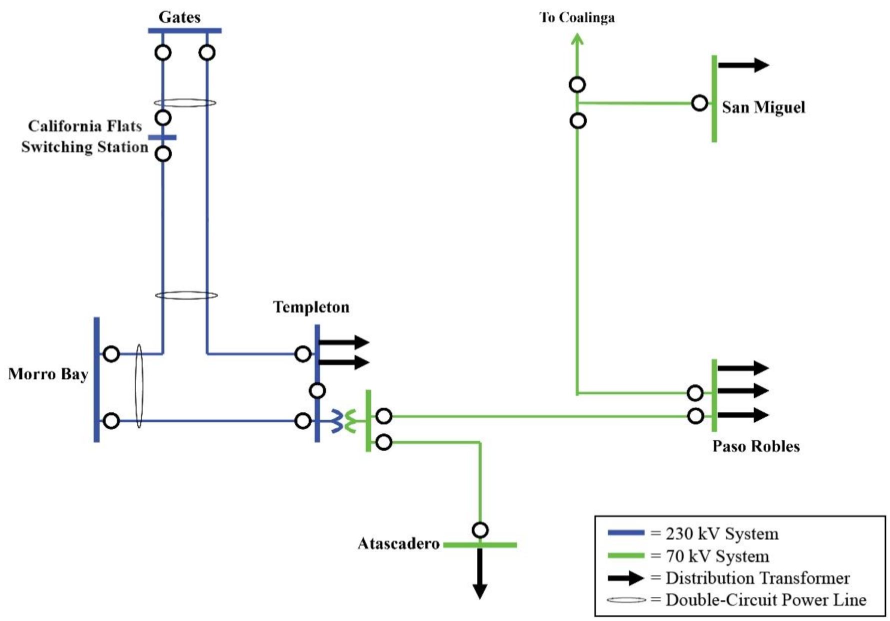
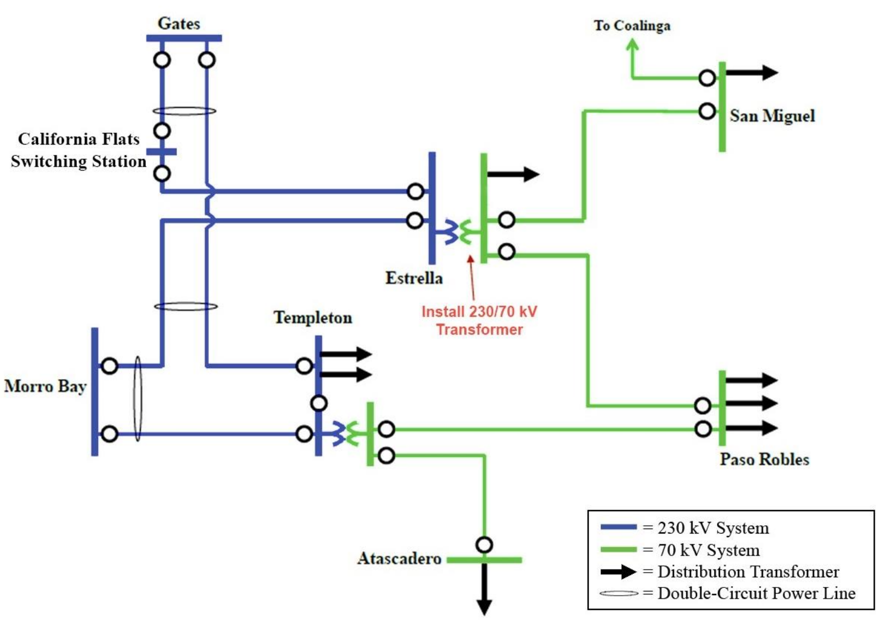
Figure 2-2. Existing Transmission System – Line Diagram



Note: kV = kilovolt

Source: NEET West and PG&E 2017

Figure 2-3. Proposed Transmission System – Line Diagram



Note: kV = kilovolt

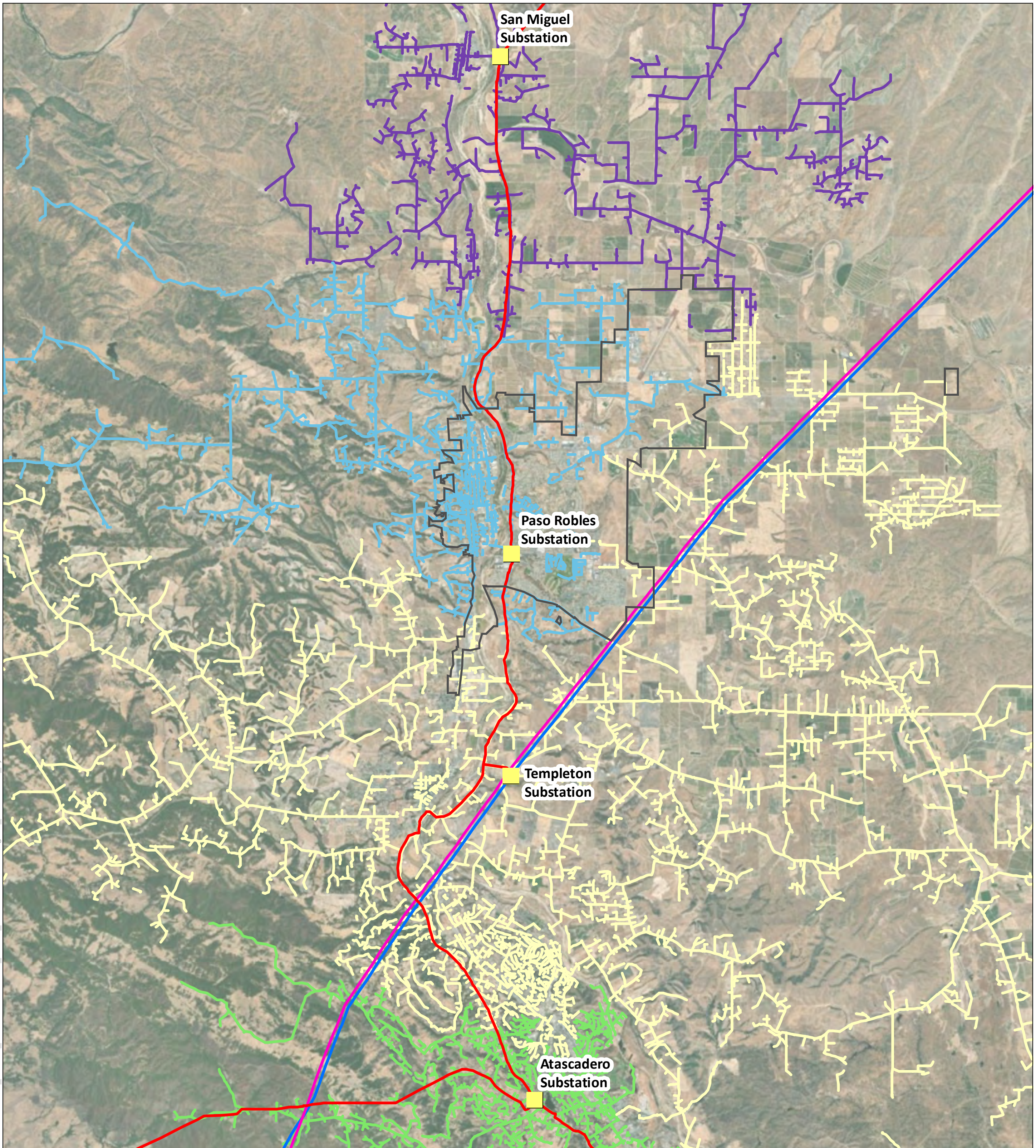
Source: NEET West and PG&E 2017

Distribution System

The Proposed Project also would address existing undesirable conditions and projected load growth in the distribution system in the Paso Robles area. As described in detail in Appendix G of the Applicants' PEA, the Paso Robles system is characterized by very long distribution feeders[2], particularly those extending from Templeton Substation (see Figure 2-4). This is undesirable because long feeders are more susceptible to potential outages caused by vehicle pole strikes, downed vegetation from storms, or other incidents (NEET West and PG&E 2020a). Additionally, outages that occur on long feeders may affect larger numbers of people than similar events that occur on feeders of moderate length. In general, PG&E states that "Reliable distribution systems consist of substations located at regular intervals and sized correctly in terms of capacity and number of feeders to cover the area between substations without overextending some substations and underutilizing others. The Paso Robles Distribution Planning Area (DPA) is not currently in line with these system goals" (NEET West and PG&E 2020a).

Locating the new substation at its proposed location would allow for the long feeders to be split in half and for some of the load currently being served by the Templeton Substation to be served by the new Estrella Substation. Reducing the length of these feeders would reduce potential outages for customers in this area and improve the reliability of the distribution system in this area. Table 2-1 shows historical outages on the Templeton feeders, while Table 2-2 provides more detailed information (including root cause) for the sustained outages on the Templeton feeders. Finally, Table 2-3 provides a comparison of indices for reliability for the Templeton feeders, as compared to the Paso Robles DPA as a whole and to PG&E's entire system. Of note, the information in Table 2-1, Table 2-2, and Table 2-3 shows that (1) numerous sustained and momentary outages have occurred in recent years on the Templeton 21 kV feeders, affecting a substantial number of customers; (2) sustained outages on the Templeton feeders have been caused by a variety of factors and have often lasted quite long (up to 16 hours and 43 minutes); and (3) compared to the Paso Robles DPA and the PG&E system as a whole, the Templeton feeders have a higher average frequency of sustained outages (AIFI) and average frequency of momentary interruptions (MAIFI).

[2] Distribution *circuits* (i.e., electrical lines or conductors) are commonly referred to as *feeders*. They operate at voltages under 50 kV.



Basemap Sources: Source: Esri, DigitalGlobe, GeoEye, Earthstar

Existing Substation

Paso Robles City Limits

Existing Transmission Lines

70 kV

230 kV

500 kV

Existing Distribution

ATASCADERO

PASO ROBLES

SAN MIGUEL

TEMPLETON

N

0 1

Miles

Horizon WATER and ENVIRONMENT

Source: NEET West and PG&E 2017

Figure 2-4
Existing Distribution System

Estrella Substation and Paso Robles Area Reinforcement Project

Table 2-1. Five-Year Outage History of Templeton 21 Kilovolt Feeders (February 2012 to February 2017)

Feeder Name	Area Served Where Outages Occurred	No. of Sustained Outages	No. of Momentary Outages	Average No. of Customer Connections Affected Per Event	Highest No. of Customer Connections Affected by an Event
Templeton 2108	Northern Atascadero	7	10	2,955	3,189
Templeton 2109	Northeast Paso Robles	5	9	2,957	4,325
Templeton 2110	Rural West Paso Robles	4	20	1,802	2,926
Templeton 2111	Western Atascadero	6	10	1,847	2,433
Templeton 2112	Southern Paso Robles	3	10	475	1,068
Templeton 2113	Santa Margarita	7	25	1,911	5,446

Source: NEET West and PG&E 2020a

Table 2-2. Sustained Outage History of Templeton 21 kV Feeders (February 2012 to February 2017)

Feeder Name	Root Cause Explanation of the Sustained Outage	Duration of Sustained Outage	Start Time for Sustained Outage (date and time)	Number of Customers Affected
Templeton 2108	Unknown Cause, Patrol – Not Conducted	39 Minutes	12/11/2014, 17:28	3,115
	Equipment Failure/Involved, Overhead	16 hours and 43 minutes	5/18/2015, 16:22	3,124
	Company Initiated, Personnel, Company	21 minutes	10/5/2012, 15:57	3,146
	Equipment Failure/Involved, Other	21 minutes	3/14/2014, 11:49	3,041
	Unknown Cause, Patrol – Found Nothing	20 minutes	8/29/2014, 13:21	2,307
	Unknown Cause, Patrol – Found Nothing	15 minutes	10/8/2014, 14:06	2,313
	Equipment Failure/Involved, Other	51 minutes	9/27/2013, 7:23	3,011
Templeton 2109	3rd Party, Vehicle	2 hours and 3 minutes	5/5/2012, 3:02	4,305
	3rd Party, Vehicle	20 minutes	3/31/2013, 16:58	2,021
	Company Initiated, Coordination Failure	3 hours and 53 minutes	6/28/2013, 16:14	2,023
	Vegetation, Tree – Fell into Line	3 hours and 25 minutes	2/17/2017, 10:10	332
	Equipment Failure/Involved, Other	56 minutes	7/21/2016, 18:19	2,364
Templeton 2110	Equipment Failure/Involved, Substation	3 hours and 45 minutes	6/21/2016, 16:52	2,924
	Equipment Failure/Involved, Other	24 minutes	6/25/2015, 07:45	1,247
	Vegetation Tree – Branch Fell on Line	7 minutes	6/21/2016, 20:49	491
	Equipment Failure/Involved, Underground	24 minutes	6/1/2016, 23:57	1,247
Templeton 2111	Environmental/External, Lightning	10 hours and 15 minutes	7/19/2015, 2:35	1,406
	Equipment Failure/Involved, Overhead	8 hours and 23 minutes	11/9/2015, 01:37	960
	Vegetation, Tree – Fell into Line	10 hours and 40 minutes	3/5/2016, 23:10	959
	Unknown Cause, Patrol – Found Nothing	1 hour and 15 minutes	4/17/2016, 12:53	960
	3rd Party	52 minutes	4/14/2016, 11:34	2,376

Feeder Name	Root Cause Explanation of the Sustained Outage	Duration of Sustained Outage	Start Time for Sustained Outage (date and time)	Number of Customers Affected
	Vegetation, Tree – Fell into Line	51 minutes	7/10/2012, 13:30	2,376
Templeton 2112	3rd Party, Vehicle	12 hours and 16 minutes	12/17/2016, 00:40	937
	Vegetation, Tree – Branch Fell on Line	5 hours and 29 minutes	7/14/2012, 18:51	428
	Company Initiated, Failed Equipment	1 hour and 37 minutes	11/5/2012, 10:27	428

Source: NEET West and PG&E 2019

Table 2-3. Templeton 21 Kilovolt Feeder Outage Indices, as Compared to Indices for the Paso Robles DPA and PG&E System-wide

Sample	Year	AIDI	AIFI	MAIFI	CAIDI	SO	MO
Templeton Feeders							
Selected Templeton Feeder Outages	2012	28.8	0.590	1.687	48.8	6	13
	2013	52.5	0.570	0.907	92.1	6	9
	2014	14.8	0.598	1.234	24.7	5	12
	2015	64.0	0.490	2.337	130.8	5	25
	2016	112.2	1.463	2.532	76.7	12	21
	2017	24.5	0.290	1.011	84.5	2	7
	Average	49.48	0.67	1.62	76.27	-	-
Paso Robles DPA Feeders							
Other Feeder Outages in the Paso Robles DPA	2012	34.1	0.329	0.835	103.4	12	33
	2013	49.6	0.504	1.611	98.5	16	40
	2014	110.9	0.659	1.144	168.3	25	23
	2015	136.5	0.617	1.021	221.1	22	61
	2016	38.2	0.454	1.440	84.2	22	47

Sample	Year	AIDI	AIFI	MAIFI	CAIDI	SO	MO
	2017	109.0	0.430	1.017	253.7	19	17
	Average	79.70	0.50	1.18	154.87	-	-
System-wide Feeders							
System-wide Feeder Outages	2012	70.8	0.609	1.467	116.1	3,191	7,706
	2013	61.3	0.584	1.350	105.0	2,933	7,521
	2014	73.8	0.643	1.265	114.8	3,419	6,870
	2015	59.5	0.546	1.538	108.8	3,281	8,816
	2016	56.2	0.620	1.311	90.5	3,486	8,154
	2017	82.9	0.312	0.667	266.0	1,893	4,247
	Average	67.41	0.55	1.27	133.53	-	-

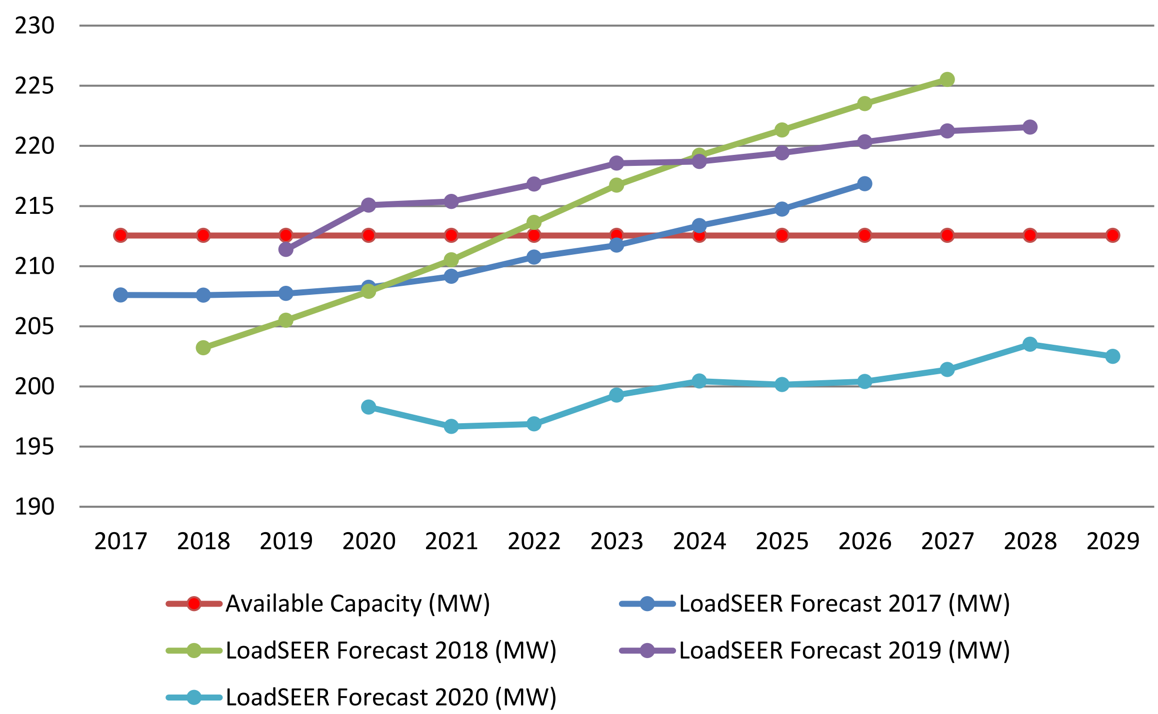
Notes: AIDI = average outage duration; AIFI = average frequency of sustained outages; CAIDI = average service restoration times; DPA = distribution planning area; MAIFI = average frequency of momentary interruptions; MO = momentary outages; PG&E = Pacific Gas and Electric Company; SO = sustained outages

Source: NEET West and PG&E 2019

In addition to the issue of long feeders, the projected growth within the Paso Robles DPA is anticipated to exceed the capacity of the system in the future. The City of Paso Robles (City) expects strong industrial growth to occur north of State Route (SR-) 46 in the Paso Robles city limits (in particular within the Golden Hill Industrial Park and directly south of Paso Robles Airport along Dry Creek Road) within the next 10 years, and a resurgence of residential growth south of SR-46 (NEET West and PG&E 2020a). Overall, City planners are estimating a 50 percent increase in the population of Paso Robles by 2045.

Increases in electrical demand (i.e., load) will place increased demands on the distribution and transmission systems. After using its LoadSEER[3] forecasting tool over the last several years, PG&E predicts that anticipated normal growth in the area, coupled with the addition of large "block loads" (e.g., large new businesses or developments that require large amounts of electricity), will exceed the available capacity of the Paso Robles system within 5 to 15 years (see Figure 2-5).

Figure 2-5. LoadSEER Forecasts (2017-2020), Paso Robles DPA



DPA = distribution planning area; MW = megawatt

Source: NEET West and PG&E 2018, 2019, 2020a, 2020b

[3] LoadSEER is a spatial load forecasting tool which is used by electric distribution system planners to predict load and power changes, where on the grid the loads will occur, how distributed generation changes the load shape, and when it must be supplied (Integral Analytics No Date). PG&E utilizes the LoadSEER forecasting tool to predict growth in area electrical demand within a DPA for a 10-year period into the future, incorporating the most recent 13 years of substation historical peak-load data.

As shown in Figure 2-5, the available capacity in the Paso Robles DPA is currently static at just over 212 MW. This capacity is equal to the cumulative capacities of the four substations (Atascadero, Paso Robles, Templeton, and San Miguel) in the DPA, whereas the LoadSEER forecast prepared for the Paso Robles DPA represents the cumulative load that must be served by the distribution system for this area. The forecasted load has varied considerably over the last 4 years of LoadSEER forecasting by PG&E. The current (2020) forecast does not show that load will exceed available capacity in the next ten years, but additional capacity may be needed in the future. In a practical sense, without addition of a new or expanded substation or other facilities to serve increased load when it materializes, this situation could result in thermal overloads, low voltage, and electrical service outages, as the infrastructure is unable to meet demands. While the LoadSEER forecast takes a conservative approach to predict the peak load in any given year (assuming a 1-in-10 year in terms of heat and electricity usage), the actual recorded peak loads in the Paso Robles DPA have been lower than forecasted in recent years, as shown in Table 2-4.

Table 2-4. Recorded Peak Load in the Paso Robles DPA

Year	Historical Available DPA Capacity	Historical DPA Peak Load
2007	182.46	179.44
2008	197.51	169.40
2009	197.51	164.40
2010[1]	212.55	158.73
2011	212.55	150.69
2012	212.55	173.98
2013	212.55	180.63
2014	212.55	164.74
2015	212.55	169.33
2016	212.55	185.50~~[3]~~
2017	212.55	195.06
2018	212.55	190.30
2019[2]	212.55	168.10

Notes: DPA = Distribution Planning Area; MW = megawatt

1. Paso Robles Bank 1 was replaced in 2010 with a 30 megavolt ampere transformer unit, bringing available DPA capacity to 212.55 ~~megawatt (~~MW~~)~~.
2. Paso Robles Bank 1 capability updated in May 2019 to reflect customer reserve capacity.
3. ~~The original 190.14 MW from 2016 has been corrected to reflect the true value of 185.50.~~

Source: NEET West and PG&E 2020c

The intent of the Proposed Project is to provide enhanced operational flexibility, improved area system reliability, and add capacity to the system with the addition of the new Estrella Substation. The new Estrella Substation would be able to absorb load currently served by other substations within the DPA and alleviate existing undesirable conditions. Additionally, since the new industrial growth is anticipated to occur in the Golden Hill Industrial Park area, the new substation and the reasonably foreseeable new distribution circuits would be well positioned to serve this new load. Please refer to Appendix G of the Applicants' PEA for detailed discussion of the Proposed Project purpose and need, and the modeling conducted for the existing distribution system.

2.1.2 Project Objectives

Applicants' Project Objectives

In their PEA, the Applicants identified the following objectives for the Proposed Project:

- **Reinforce Electrical Reliability by Implementing the CAISO-Approved Electrical Plan of Service.** Increase reliability and mitigate thermal overloads and voltage concerns in the area by having an additional 230 kV source of power that will increase service reliability in northern San Luis Obispo County, and maintain compliance with National Electric Reliability Commission (NERC) reliability standards, as described in the *Estrella Substation Project Functional Specifications* issued by CAISO in June 2014. The Estrella Project is also intended to allow NEET West [HWT] and PG&E to meet their obligation to add the CAISO-approved project to the CAISO-controlled grid, as defined in the *Functional Specifications* and the Approved Project Sponsor Agreement.

- **Meet Expected Future Electric Distribution Demand.** Provide a location for future 21 kV distribution facilities with a 230/70 kV source near the anticipated growth areas in northern Paso Robles to efficiently add distribution capacity and improve service reliability when required in the Paso Robles DPA.

- **Balance Safety, Cost, and Environmental Impacts.** Locate, design, and build the project in a safe, cost-effective manner that will also minimize environmental impacts.

CPUC's Project Objectives

As part of its authority as the lead agency under the California Environmental Quality Act (CEQA) for preparation of the ~~environmental impact report (~~EIR~~)~~ for the Proposed Project, the CPUC is responsible for identifying appropriate project objectives to inform the CEQA process/evaluation, including the development and screening of project alternatives. These objectives may differ from the Applicants' stated objectives. Based on its understanding of the fundamental underlying purpose of the Proposed Project, the CPUC has identified the following CEQA objectives for the Proposed Project:

Transmission Objective: Mitigate thermal overload and low voltage concerns in the Los Padres 70 kV system during Category B contingency scenarios, as identified by the CAISO in its 2013-2014 Transmission Plan.

Distribution Objective: Accommodate expected future increased electric distribution demand in the Paso Robles DPA, particularly in the anticipated growth areas in northeast Paso Robles.

The issue of long feeders and poor service reliability was not identified as a fundamental project objective by the CPUC; however, it is considered a beneficial effect of the Proposed Project.

2.2 Proposed Project Location and Setting

The Proposed Project would be located within the northern portion of San Luis Obispo County, California, including portions of the City of Paso Robles. The nearest communities are San Miguel, which is approximately 9 miles to the northwest, and Templeton, which is approximately 8.5 miles to the southwest. Land uses surrounding the Proposed Project area south of SR-46 are a mixture of intensive agriculture, vineyards, and rural residential development. North of SR-46 and within the City of Paso Robles limits, land uses consist of light industrial development, urban and residential development, and wineries/vineyards. Topography in the vicinity of the Proposed Project is generally rolling hills, with existing elevations ranging from approximately 920 feet to ~~960~~970 feet above mean sea level. Figure 2-6 shows an overview of the Proposed Project components, location, and setting.

2.2.1 Estrella Substation

Estrella Substation would be located on an approximately 15~~-~~ acres ~~portion~~ of a ~~98.6~~20-acre site. The 20-acre site was created from a 98.6-acre parcel of land. The ~~is~~ entire 20-acre site and parcel of land are~~is~~ currently planted with grape vines of 10-foot-wide span lengths. Several existing dirt maintenance roads traverse the parcel. Scattered oak trees are located close to Union Road along with one residential dwelling near the southwest corner of the parcel. Dry Creek, an ephemeral tributary to Huer Huero Creek, passes approximately 1,500 feet to the north of the proposed Estrella Substation site. In addition to the one residence at the southwest corner of the parcel, there is a residence located 1,000 feet to the east of the substation site, and a winery located 1,000 feet to the south. The topography of the site is moderately sloped with rolling hills in the vicinity.

The site is bordered by Union Road to the southeast, PG&E's existing easement for a 230 kV double-circuit transmission line and a 500-kV transmission line to the northwest, and vineyards under cultivation to the south and northeast. The existing transmission lines traverse along the northwest portion of the Estrella Substation site on two sets of lattice steel towers (LSTs).

2.2.2 Power Line

The new 70 kV power line would travel southwesterly from Estrella Substation, spanning over vineyards, and crossing under and paralleling existing 230 kV and 500 kV transmission lines for approximately 0.5 mile. North of Union Road, the new line turns westerly and joins an existing 12 kV overhead distribution line, which becomes an underbuild[4] on the new structures. The new

[4] Distribution underbuild is a lower voltage distribution line placed underneath a higher voltage power line on the same structure or set of structures.

line follows existing distribution lines for about 2.5 miles, extending through vineyards and large residential properties on the north side of Union Road, and then turning northwesterly and crossing Huer Huero Creek and continuing along the north side of Union Road.

Note that a possible Minor Route Variation (MRV) is under consideration at roughly the location where the new 70 kV power line would cross Huer Huero Creek along Union Road. This MRV would only be implemented if a possible golden eagle nest along Huer Huero Creek in this location is confirmed to have eagles present prior to Project construction.

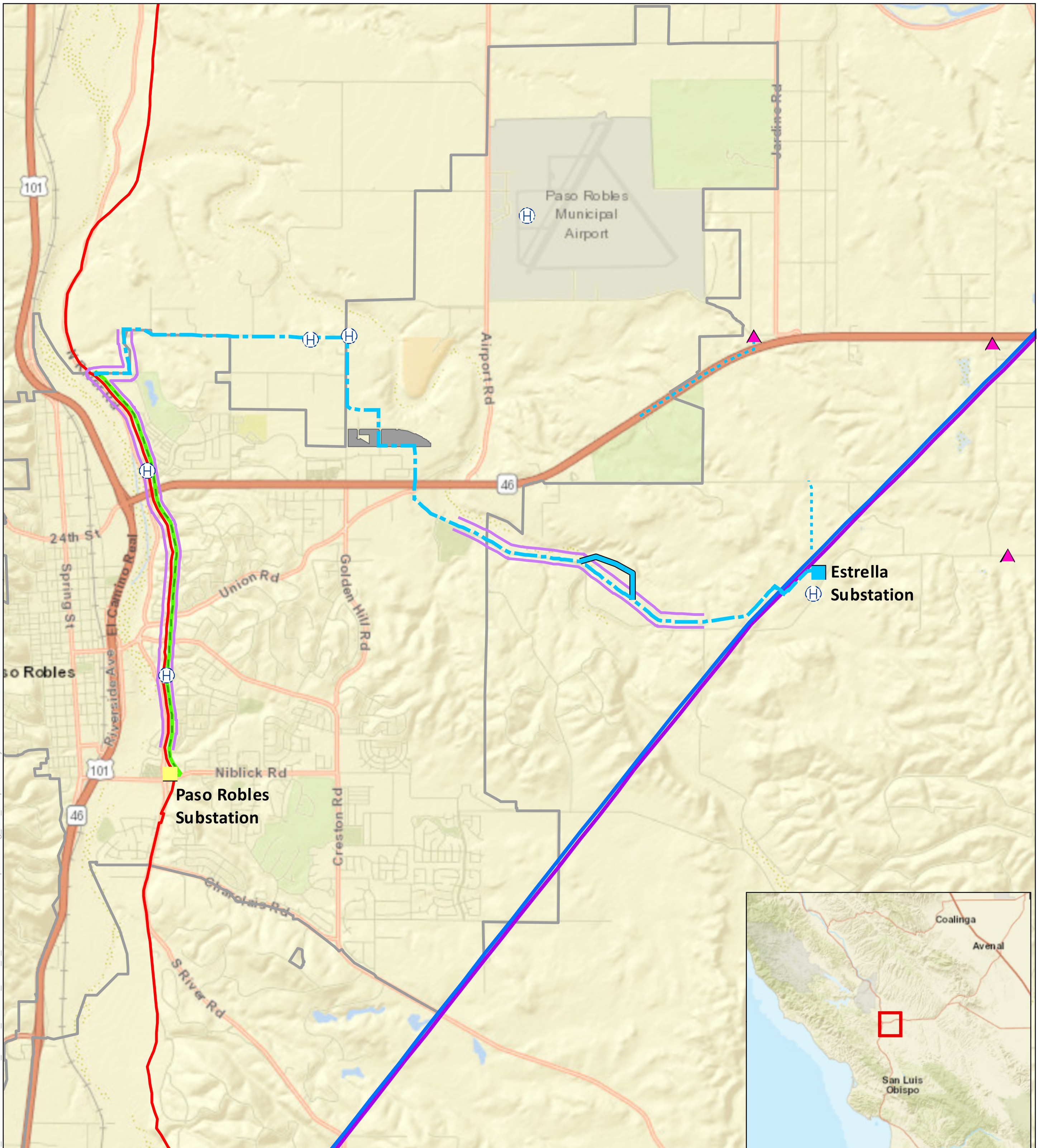
Near the Paso Robles Sports Club, the new 70 kV power line segment leaves the existing distribution alignment and crosses to the southwesterly side of Union Road. The new line continues in a northwesterly direction, crossing SR-46, and then generally traveling westerly for approximately 0.5 mile to Golden Hill Road. At Golden Hill Road, the route heads northerly along the Golden Hill Road alignment for approximately 1 mile and adjacent to the existing light industrial uses to the east and existing residences to the west. The new line then continues generally westerly for approximately 1.5 miles and then southwesterly for 0.5 mile to River Road, adjacent to existing residences, vineyards, and other agricultural uses. At River Road, the new 70 kV power line segment would interconnect with the existing San Miguel-Paso Robles 70 kV power line.

The existing San Miguel-Paso Robles 70 kV power line would then be reconductored south to Paso Robles Substation. This 3-mile-long reconductoring segment runs behind and through predominantly residential areas, extending south along the existing pole line alignment on the easterly side of River Road for about 1 mile, crossing SR-46. The segment then continues southerly for about 2 miles, crossing Union and Creston Roads, then into Paso Robles Substation.

2.2.3 Reasonably Foreseeable Distribution Components

The timing of construction of the distribution components is not known but is expected within 15 years. Based on the most recent load growth forecast (see Figure 2-5), the distribution components of the Proposed Project are not presently needed and are not planned to be constructed at the same time as the rest of the Proposed Project. However, if subsequent load growth forecasts show the need arising sooner or if applications are made for new large block loads, the timing of construction of the distribution components could accelerate.

The reasonably foreseeable new distribution line segments would be installed along an existing unpaved road through agricultural fields and along existing roadways. From Estrella Substation, a new distribution line segment would extend north approximately 0.6-mile along an unpaved road to Mill Road, where it would connect with an existing 21 kV circuit. The second new distribution line segment would follow SR-46 for approximately 1.1 mile and would fill in a gap in the existing distribution network. This portion of SR-46 is largely rural in nature, with the Hunter Ranch Golf Course and agricultural parcels bordering the highway on the south. Reconductoring of existing distribution lines would occur in rural areas of San Luis Obispo County and within portions of the City of Paso Robles.



Source: ESRI 2020, NEET West and PG&E 2017

N

0 0.25 0.5
Miles

Horizon WATER and ENVIRONMENT

Proposed Project

- Estrella Substation
- 70kV Route
- New Distribution Line Segments
- 70 kV Minor Route Variation 1
- Reconductoring Segment
- Distribution Underbuild
- Power Line Staging Areas
- Helicopter Landing Zones
- Additional 21/12 kV Pad-Mounted Transformer
- Paso Robles city limits

Existing Infastructure

- Existing 500 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line
- Existing Substations

Note: Eight miles of distribution line segments would be reconductored in various locations to integrate the proposed substation. PG&E did no specify each location.

Figure 2-6
Proposed Project
Location and Overview

Estrella Substation and Paso Robles Area Reinforcement Project

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2.3 Proposed Project Components

The Proposed Project is comprised of two main components: Estrella Substation and the 70 kV power line. Each of these main components has several subcomponents, which are described below. The reasonably foreseeable distribution components and ultimate substation buildout are also described below.

- Estrella Substation Components:
  - HWT to construct, own and operate a new 230 kV substation with one 230/70 kV three-phase power transformer~~.~~;
  - PG&E to construct, own, and operate a new 70 kV substation including room for reasonably foreseeable 70/21 kV distribution facilities~~.~~; and
  - PG&E to construct, own and operate a new 230 kV transmission line interconnection that will loop the existing ~~Gates-~~Morro Bay-California Flats 230kV transmission line into Estrella Substation.
- 70 kV Power Line Components:
  - PG&E to construct, own and operate a new 70 kV double-circuit power line between the new 70 kV substation and the existing San Miguel-Paso Robles 70 kV power line~~.~~; and
  - PG&E will reconductor and replace poles on a portion of the existing 70 kV power line between the interconnection point of the new 70 kV power line segment and Paso Robles Substation.
- Reasonably Foreseeable Distribution Components:
  - Establish three new 21 kV distribution feeders connecting from Estrella Substation to the existing distribution system, including:
    - Installing a new 30 megavolt amperes (MVA), 70/21 kV three-phase power transformer in the 70 kV substation~~.~~;
    - Constructing 1.7 mile of new distribution line to fill in gaps in future Estrella Feeder #2~~.~~;
    - Installing three new 21/12 kV pad-mounted transformers~~.~~;
    - Reconductoring approximately 8 miles of existing distribution circuits to facilitate integration of the new Estrella feeders~~.~~; and

- Ultimate Substation Buildout:
  - Establish additional 70 kV lines and 21 kV distribution feeders[5], as needed to meet future distribution demand and transmission needs, including the following activities within or adjacent to the Estrella Substation:
    - Constructing an additional 230 kV interconnection between the 230 kV substation and the adjacent 230 kV transmission line~~.~~;
    - Installing an additional 230/70 kV transformer with associated breakers and switches~~.~~; and
    - Installing up to three additional 70/21 kV transformers with associated 70 kV breakers, 21 kV breakers, and switches.

A common neutral[6] would be collocated along the entire length of the 70 kV power line from Estrella Substation to Paso Robles Substation. A fiber optic line for communication services would be installed on the 70 kV power line to provide a fiber optic link between Estrella Substation and Paso Robles Substation.

The Proposed Project components, including estimated permanent ground disturbance acreages, are summarized in Table 2-5.

Table 2-5. Proposed Project Components Summary

Component	Approximate Quantity	Approximate Height Range and Average Height (Feet Above Ground)	Total Approximate Permanent Ground Disturbance (Acres)
Estrella Substation[1]			
Substations			
230 kilovolt (kV) Substation	1	65 (approx. tallest 230 kV dead-end structure)	4.0 (fenced portion)
70 kV Substation	1	37 (approx. tallest 70 kV dead-end structure)	3.5 (fenced portion)

[5] The routes of any future 70 kV power lines and 21 kV distribution lines that could be installed as part of the ultimate Estrella Substation buildout are unknown at this time. As a result, the potential environmental effects associated with the power and distribution lines are not evaluated in this DEIR. The additional equipment within Estrella Substation at ultimate buildout is included in the DEIR's evaluation.

[6] A common neutral conductor runs the entire length of the line from substation to substation where it attaches to the substation ground grids.

Component	Approximate Quantity	Approximate Height Range and Average Height (Feet Above Ground)	Total Approximate Permanent Ground Disturbance (Acres)
230 kV Transmission Line Interconnect			
Lattice Steel Towers	6	39–113 68	0.2
70 kV Power Line[2]			
New 70 kV Power Line Segment			
Light-Duty Steel Poles	63	70–110 91	0.3
Tubular Steel Poles	38	68–133 99	0.2
Wood Distribution Poles	1	46	<0.1
Reconductoring Segment			
Light-Duty Steel Poles	40	76–101 85	0.2
Tubular Steel Poles	9	71–108 88	<0.1
Wood Distribution Poles	6	48–62 56	<0.1
Reasonably Foreseeable Distribution Components[3, 4]			
Wood Distribution Poles	31	40–50 45	<0.1
21/12 kV Pad-Mounted Transformers	3	10	<0.1

Notes: kV = kilovolt;

1. Permanent ground disturbance for Estrella Substation is approximately 15 acres, including the area that would be permanently disturbed outside of the 230 kV and 70 kV substation fence lines.
2. Permanent ground disturbance for the 70 kV power line route assumes a 10-foot radius around each pole location supporting distribution equipment in grassland areas.
3. Installation of the 70/21 kV transformer and associated equipment within the Estrella Substation to support the reasonably foreseeable distribution components would not result in any new permanent ground disturbance, as it would be installed within the fence line of the substation. Reconductoring of existing distribution lines also would not result in new permanent ground-disturbance.
4. With respect to ultimate substation buildout, installation of additional transmission and distribution transformers and associated equipment within the 70 kV and 230 kV substations is assumed to not result in any additional permanent ground disturbance nor increase the height of

the substation. The additional 230 kV interconnection associated with ultimate substation buildout could result in similar ground disturbance to that described for the Proposed Project (see “230 kV Interconnect” within the table).

Source: NEET West and PG&E 2017

Figure 2-7 shows a detailed view of the Proposed Project substation and 70 kV power line components, including construction temporary impact areas (see Section 2.5.2 for discussion of temporary impact areas). As noted in Section 2.2.2, an MRV for the new 70 kV power line is under consideration to avoid a possible golden eagle nest along Huer Huero Creek near Union Road. Figure 2-8 shows this MRV in detail. Additionally, Figure 2-9 shows the reasonably foreseeable new Estrella distribution circuits (or “feeders”) that are anticipated as part of the Proposed Project. Figure 2-10 shows a detailed view of the reasonably foreseeable distribution line segments and pad-mounted transformers that would need to be constructed to establish the Estrella feeders.

2.3.1 Estrella Substation

Estrella Substation would be comprised of two separate and distinct substations located on ~~an~~ approximately 15-acres within a 20-acre site. One 230 kV substation would be constructed and operated by HWT and one 70 kV substation would be constructed and operated by PG&E. The preliminary substation layout is provided in Figure 2-11.

Access to the Estrella Substation site would be off of Union Road, along a new private access road. The access road would be paved up to the second entrance to the 70 kV substation (approximately ~~715~~700 feet) and have an aggregate-surface up to the 230 kV substation access point and the 70 kV substation would have two separate access points. The entrance gates would be a minimum 16 feet in width and would be locked and monitored remotely to limit access to qualified personnel. Warning signs would be posted on the perimeter chain-link fencing and gates, in accordance with the National Electric Safety Code (NESC) and the respective HWT and PG&E guidelines.

Lighting would be installed at Estrella Substation and would conform to NESC requirements. NESC recommends, as good practice, illuminating the substation facilities to a minimum of 22 lux or 2 foot-candles. Lighting would consist of sodium vapor or light-emitting diode (LED) fixtures and would be installed inside the facility and at the entry/exit gates to allow for safe access to the facility and its equipment. The fixtures would be mounted on legs of dead-end or switch support structures, the control enclosure, and on approximately 12-foot-tall galvanized steel lighting poles. Lights would be controlled by a photocell that automatically turns the lights on and off. All on-site lighting would be oriented downward to minimize glare onto surrounding property. Additional manually controlled lighting would also be provided to create safe working conditions at the substation when required. The exact number of fixtures and their output and location would be determined during final facility design.

The 230 kV and 70 kV substations would have their own sources of station power. Power would be supplied by tapping into the existing PG&E ~~Gates–~~Morro Bay-California Flats 230kV transmission~~power~~ line adjacent to the HWT substation site. Electric service would be requested from the local utility and applied for so that power can be served from the existing power lines adjacent to the station.

The existing telecommunications network would connect to Estrella Substation by splicing optical ground wire (OPGW) on the nearby existing 230 kV towers and installing a fiber optic line for communication services on the power line between Estrella and Paso Robles Substations. The communication cables would transition from the last 230 kV tower or 70 kV pole outside of the substation and enter a pull/splice box positioned near the base of each structure. From each pull/splice box, the fiber optic cable would transition underground in 4-inch conduits to the substation. All pull/splice boxes used for telecommunication cable would be 3-foot by 5-foot pre-cast polymer concrete.

230 kV Substation

The 230 kV substation would be owned and operated by HWT. The preliminary configuration for the 230 kV substation (general arrangement and profile view) is provided in Figure 2-12 and Figure 2-13. The tallest structures within the 230 kV substation would be the dead-end structures, which are approximately 65 feet high and 50 feet wide.

The following electrical equipment would be located within the fenced area of the 230 kV substation in the proposed configuration:

- Two 230kV Breaker and a Half bays and two operating buses;
- One three-phase 230/70 kV 200 MVA transformer;
- Twelve 230 and three 70 kV capacitive voltage transformers;
- Thirteen 230 kV and one 70 kV group operated air break switches;
- Five 230 kV and one 70 kV sulfur hexafluoride (SF_6) insulated circuit breakers;
- Eight 230 kV and one 70 kV dead-end steel structures;
- Nine 230 kV and three 70 kV lightning surge arresters; and
- A protection and control enclosure measuring about 50 feet long, 15 feet wide, and 15 feet high would be installed on 10 concrete piers measuring about 11 feet deep. The control enclosure would have redundant air conditioning units installed to protect electronic components.

Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

N

0 125 250 500

Feet

Horizon WATER and ENVIRONMENT

Alignment Components

- 70kV Route
- New Distribution Line Segments
- New 70kV Poles

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Helicopter Landing Zones
- Access Routes
- Substation Temporary Disturbance Area
- Temporary Pull Sites
- Pole Temporary Work Area

Existing Infrastructure

- 70kV Route
- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 1 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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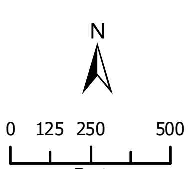
Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,



Horizon WATER and ENVIRONMENT

Alignment Components
- 70kV Route
- 70 kV Minor Route Variation 1
- New 70kV Poles
- Existing Distribution Pole to be Replaced
- Distribution Underbuild

Substation Components
- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas
- Temporary Crossing Structure Work Area
- Access Routes
- Temporary Pull Sites
- Pole Temporary Work Area

Existing Infrastructure
- 70kV Route
- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory
- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 2 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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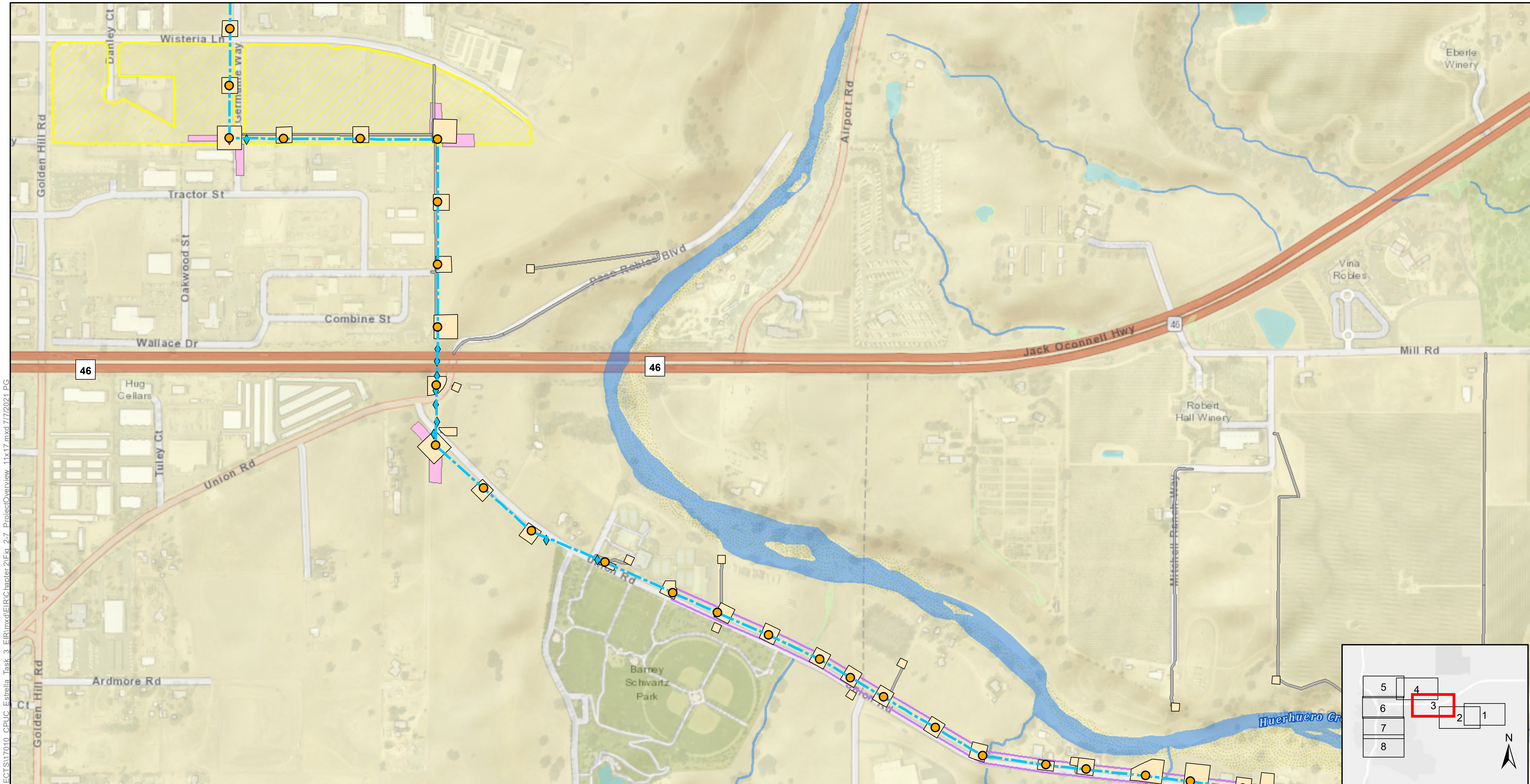

Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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Feet

Horizon WATER and ENVIRONMENT

Alignment Components

- 70kV Route
- 70 kV Minor Route Variation 1
- New 70kV Poles
- Distribution Underbuild

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Temporary Crossing Structure Work Area
- Access Routes
- Temporary Pull Sites
- Power Line Staging Area
- Pole Temporary Work Area

Existing Infrastructure

- 70kV Route
- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Emergent Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 3 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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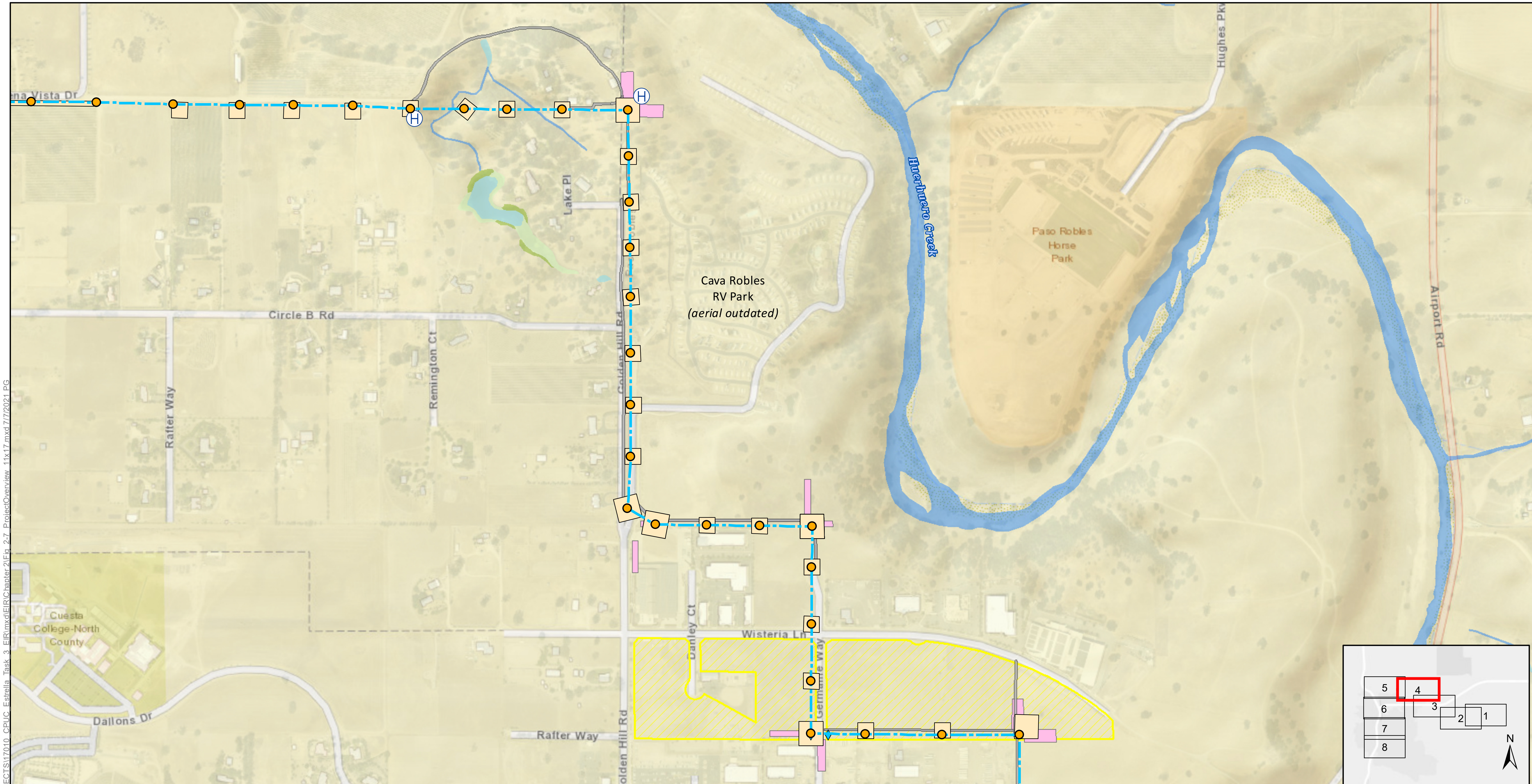

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Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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0 125 250 500
Feet

Horizon WATER and ENVIRONMENT

Alignment Components
- 70kV Route
- New 70kV Poles

Substation Components
- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas
- Temporary Crossing Structure Work Area
- Helicopter Landing Zones
- Access Routes
- Temporary Pull Sites
- Power Line Staging Area
- Pole Temporary Work Area

Existing Infrastructure
- 70kV Route
- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 4 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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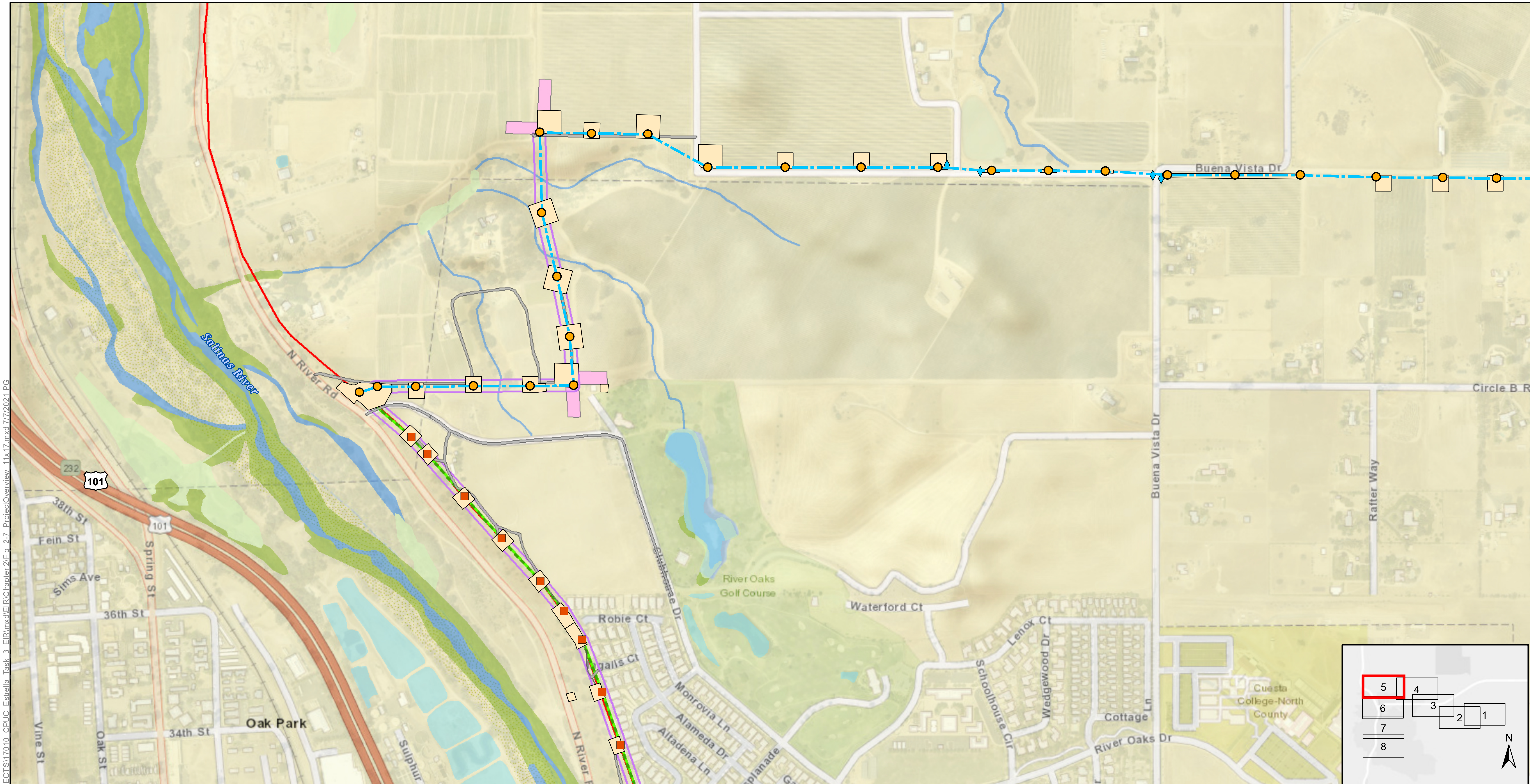

Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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0 125 250 500

Feet

Horizon WATER and ENVIRONMENT

Alignment Components

- 70kV Route
- New 70kV Poles
- Existing 70 kV Pole to be Replaced
- Reconductoring Segment
- Distribution Underbuild

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Temporary Crossing Structure Work Area
- Access Routes
- Temporary Pull Sites
- Pole Temporary Work Area

Existing Infrastructure

- 70kV Route
- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Figure 2-7

Estrella Substation and 70 kV Power Line Components - Detailed View

Sheet 5 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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Feet

Horizon WATER and ENVIRONMENT

Alignment Components

- Existing 70 kV Pole to be Replaced
- Reconductoring Segment
- Existing Distribution Pole to be Replaced
- Distribution Underbuild

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Temporary Crossing Structure Work Area
- Helicopter Landing Zones
- Access Routes
- Temporary Pull Sites
- Pole Temporary Work Area

Existing Infrastructure

- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 6 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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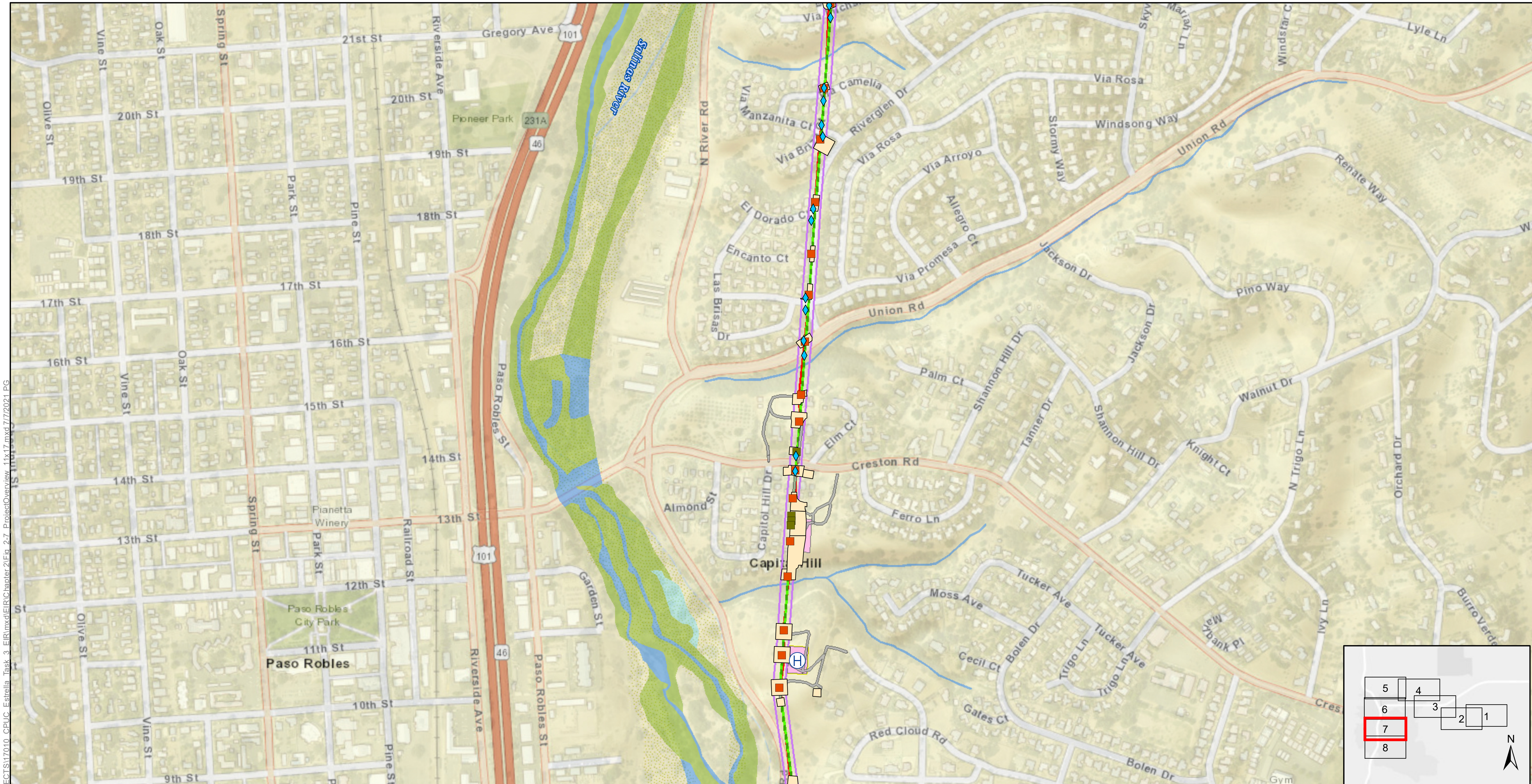

Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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N

0 125 250 500
Feet

Horizon
WATER and ENVIRONMENT

Alignment Components

- Existing 70 kV Pole to be Replaced
- Reconductoring Segment
- Existing Distribution Pole to be Replaced
- Distribution Underbuild

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Temporary Crossing Structure Work Area
- Helicopter Landing Zones
- Access Routes
- Temporary Pull Sites
- Power Line Staging Area
- Pole Temporary Work Area

Existing Infrastructure

- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 7 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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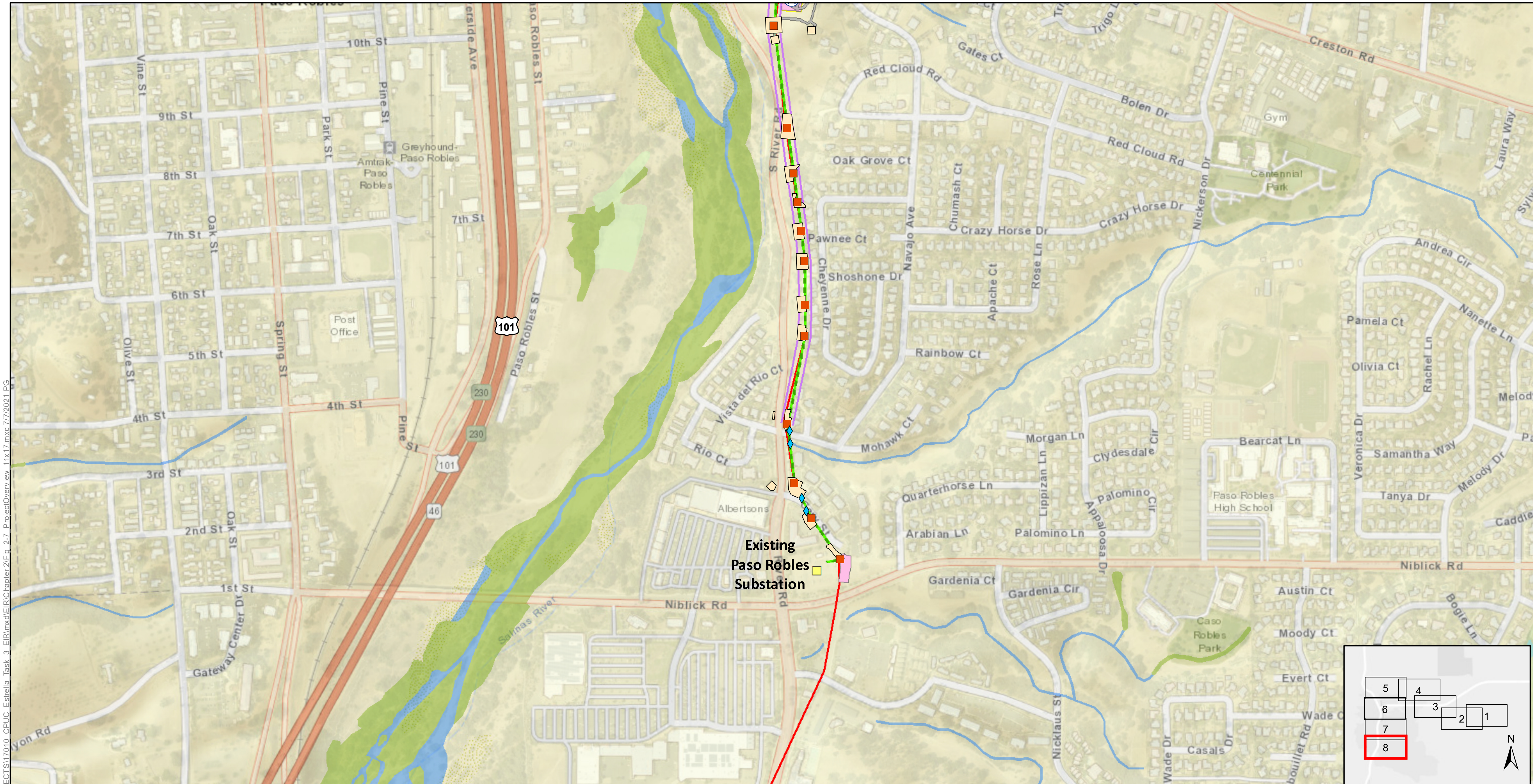

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Basebap Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

N

0 125 250 500

Feet

Horizon WATER and ENVIRONMENT

Alignment Components

- Existing 70 kV Pole to be Replaced
- Reconductoring Segment
- Distribution Underbuild

Substation Components

- Substation Interconnection
- Temporary Shoofly Poles
- Substation Permanent Disturbance Area
- Estrella Substation Parcel

Construction Temporary Disturbance Areas

- Temporary Crossing Structure Work Area
- Helicopter Landing Zones
- Access Routes
- Temporary Pull Sites
- Power Line Staging Area
- Pole Temporary Work Area

Existing Infrastructure

- Existing Substations
- Existing 230 kV Transmission Line
- Existing 70 kV Power Line

National Wetland Inventory

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Figure 2-7
Estrella Substation and 70 kV Power Line Components - Detailed View
Sheet 8 of 8

Estrella Substation and Paso Robles Area Reinforcement Project

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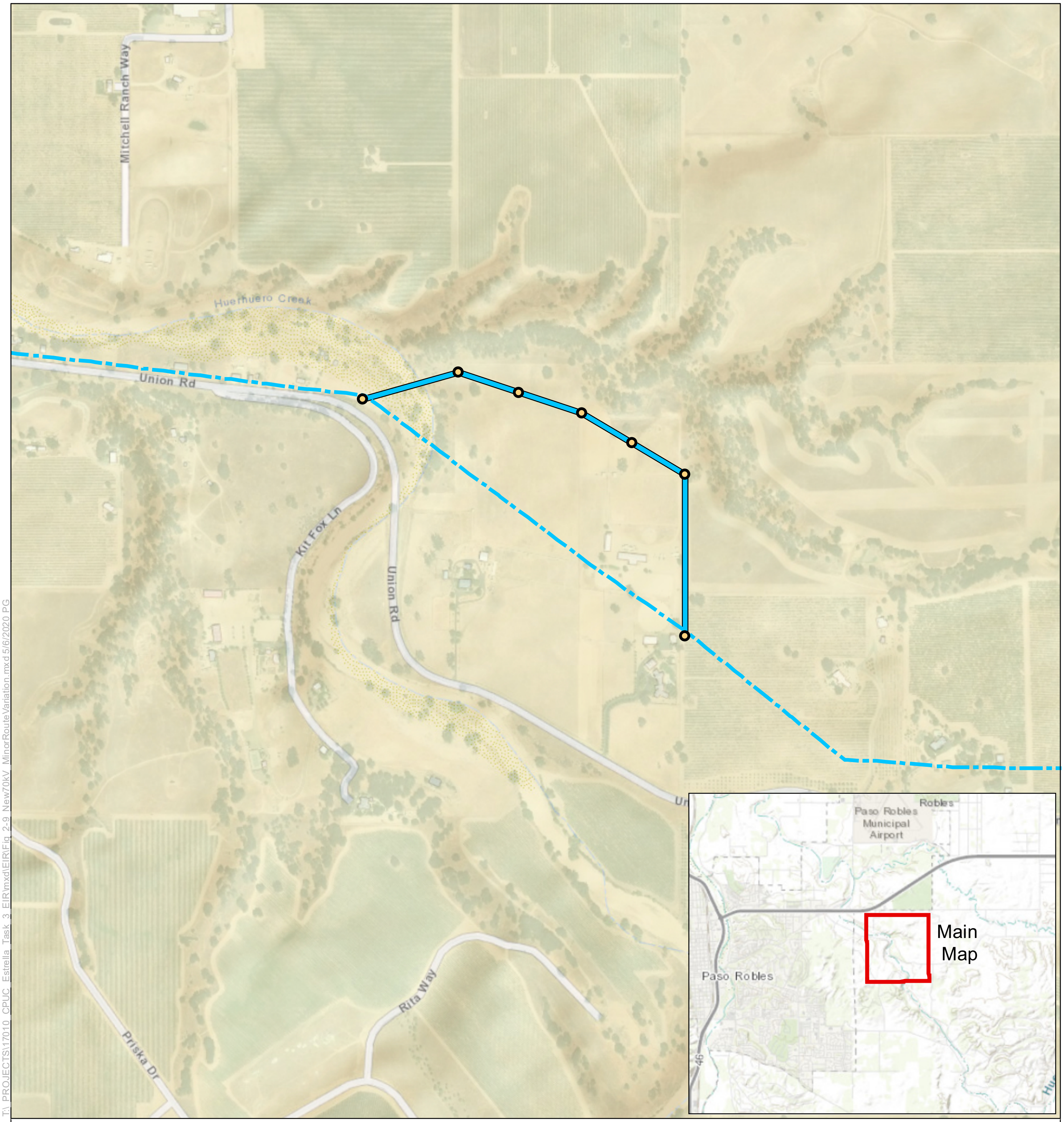

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Source: Paso Robles General Plan 2018, PG&E 2019, SWCA 2017

Proposed Project Components

- 70kV Route
- 70 kV Minor Route Variation 1
- Minor Route Variation Poles

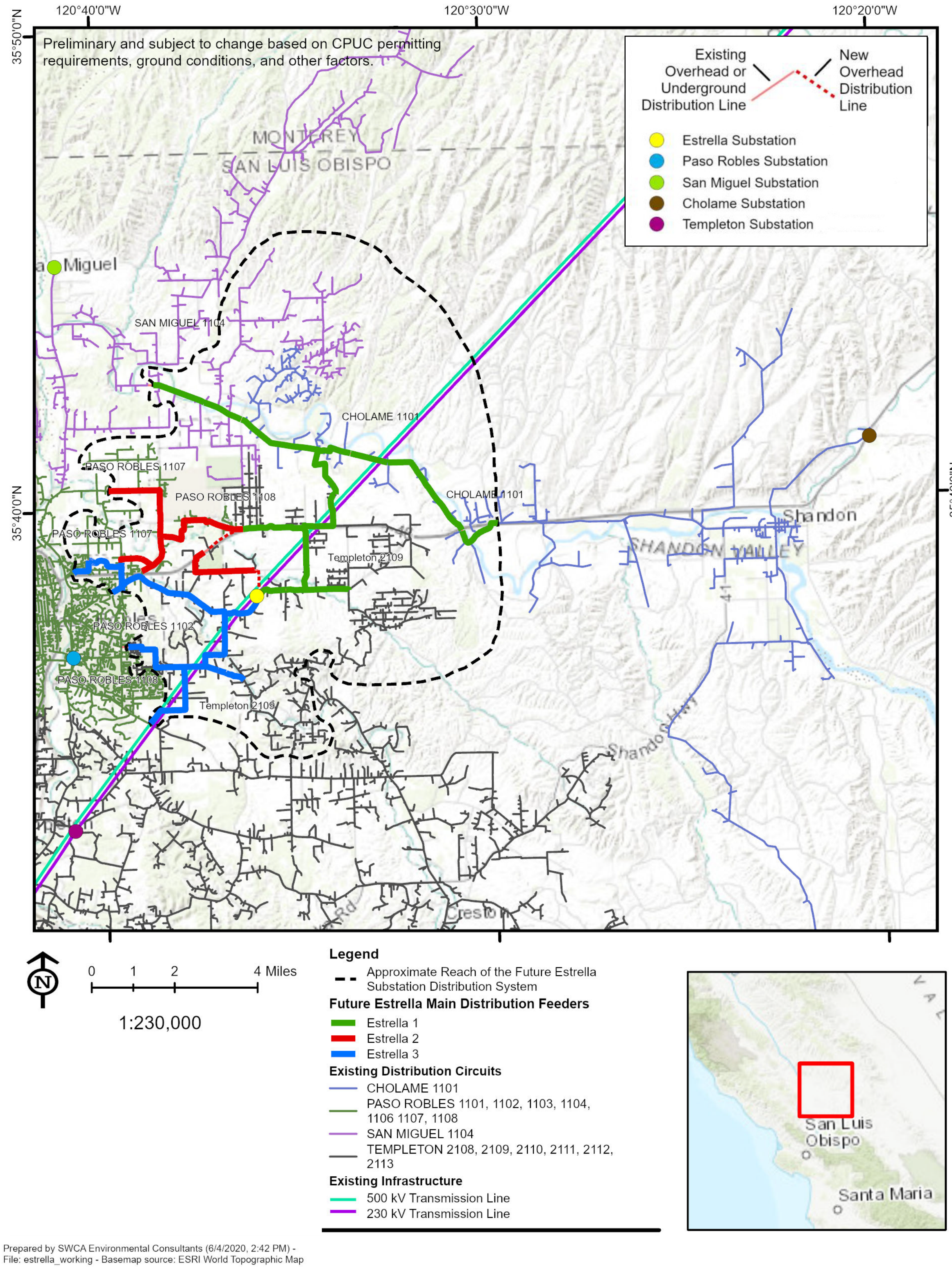
N

0 1,000
Feet

Horizon WATER and ENVIRONMENT

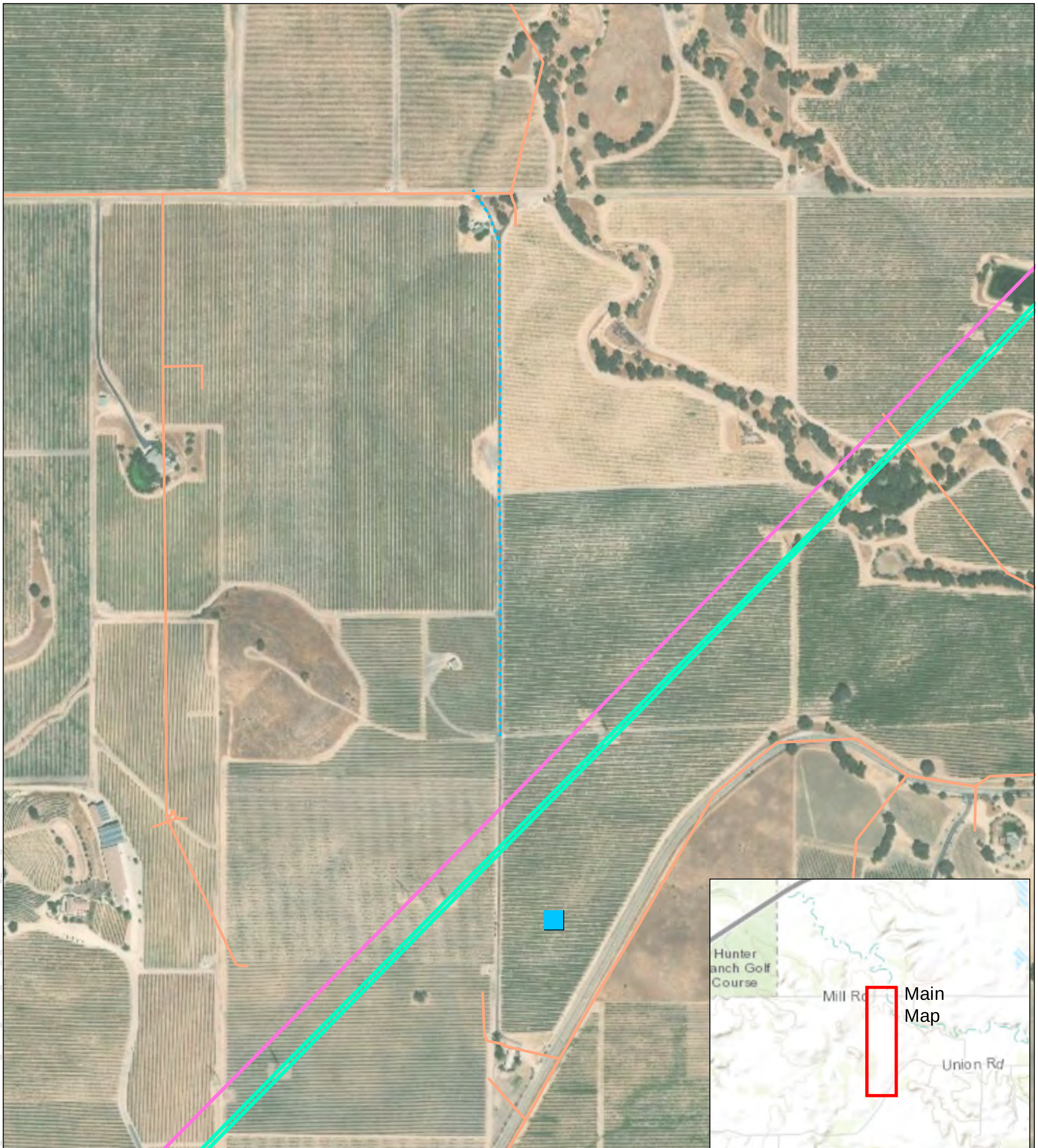
Figure 2-8
New 70 kV Power Line Minor Route Variation

Estrella Substation and Paso Robles Area Reinforcement Project



Source: NEET West and PG&E 2020

Figure 2-9.
Reasonably Foreseeable
New Estrella Distribution Circuits



Source: ESRI 2020, PG&E 2019, SWCA 2017

Proposed Project

- New Distribution Line Segments
- Estrella Substation

Existing Infrastructure

- Existing Overhead or Underground Distribution Line
- 230 kV Transmission Line
- 500 kV Transmission Line

N

0 300 600
Feet

Figure 2-10

New Distribution Line Segments and 21/12 kV Pad-Mounted Transformers - Detail

Page 1 of 5

Horizon WATER and ENVIRONMENT

Source: ESRI 2020, PG&E 2019, SWCA 2017

Figure 2-10
New Distribution Line Segments and 21/12 kV Pad-Mounted Transformers - Detail

N

0 300 600
Feet

Proposed Project

- Additional 21/12 kV Pad-Mounted Transformer
- New Distribution Line Segments

Existing Infrastructure

- Existing Overhead or Underground Distribution Line

Horizon WATER and ENVIRONMENT

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Source: ESRI 2020, PG&E 2019, SWCA 2017

N

0 50 100
Feet

Proposed Project

Additional 21/12 kV Pad-Mounted Transformer

New Distribution Line Segments

Existing Infrastructure

Existing Overhead or Underground Distribution Line

Figure 2-10
New Distribution Line Segments and 21/12 kV Pad-Mounted Transformers - Detail

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Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project

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Source: ESRI 2020, PG&E 2019, SWCA 2017

N

0 50 100
Feet

Proposed Project

Additional 21/12 kV Pad-Mounted Transformer

Existing Infrastructure

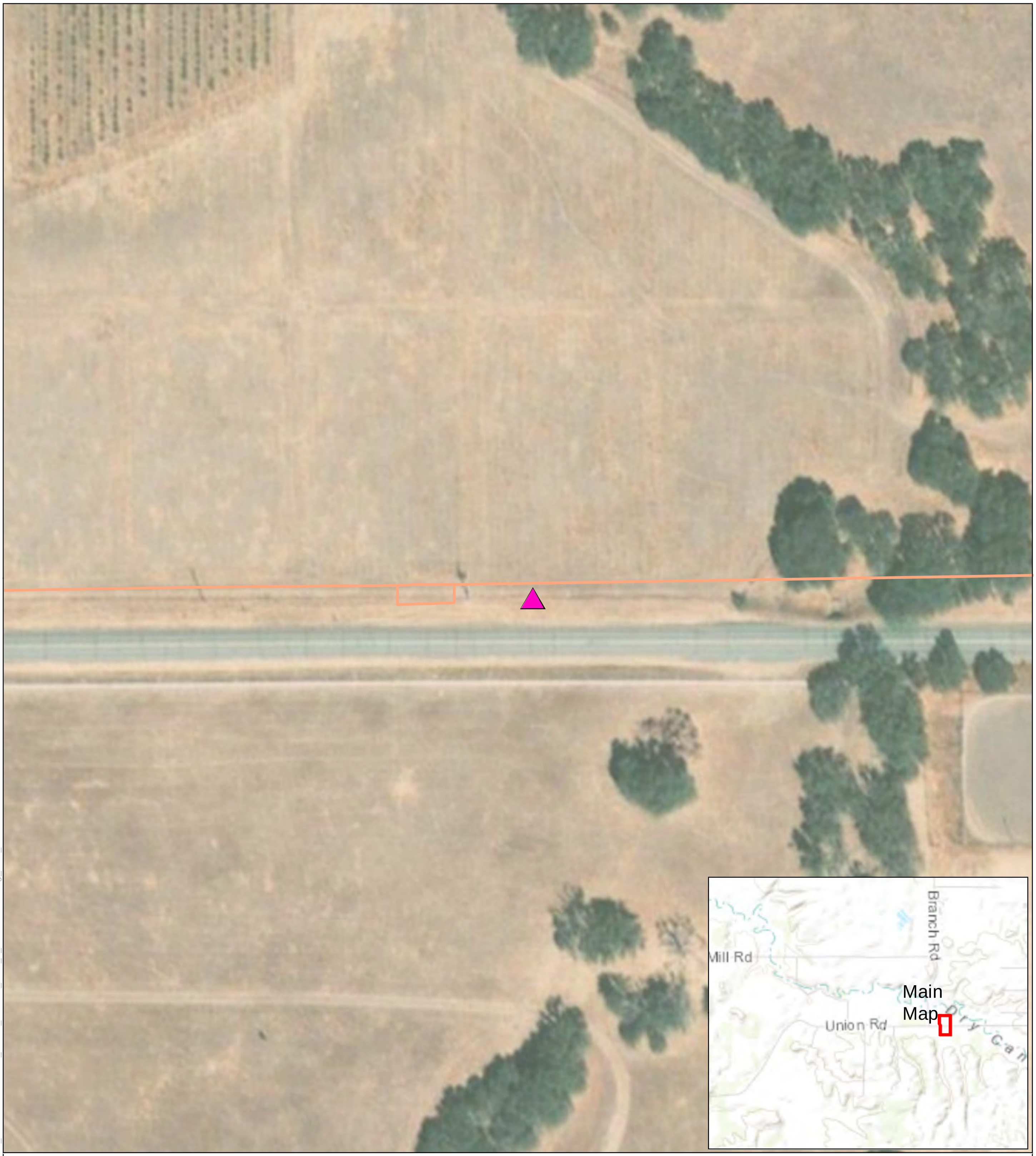
Existing Overhead or Underground Distribution Line

Figure 2-10

New Distribution Line Segments and 21/12 kV Pad-Mounted Transformers - Detail

Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project



Source: ESRI 2020, PG&E 2019, SWCA 2017

N

0 50 100
Feet

Proposed Project

Additional 21/12 kV Pad-Mounted Transformer

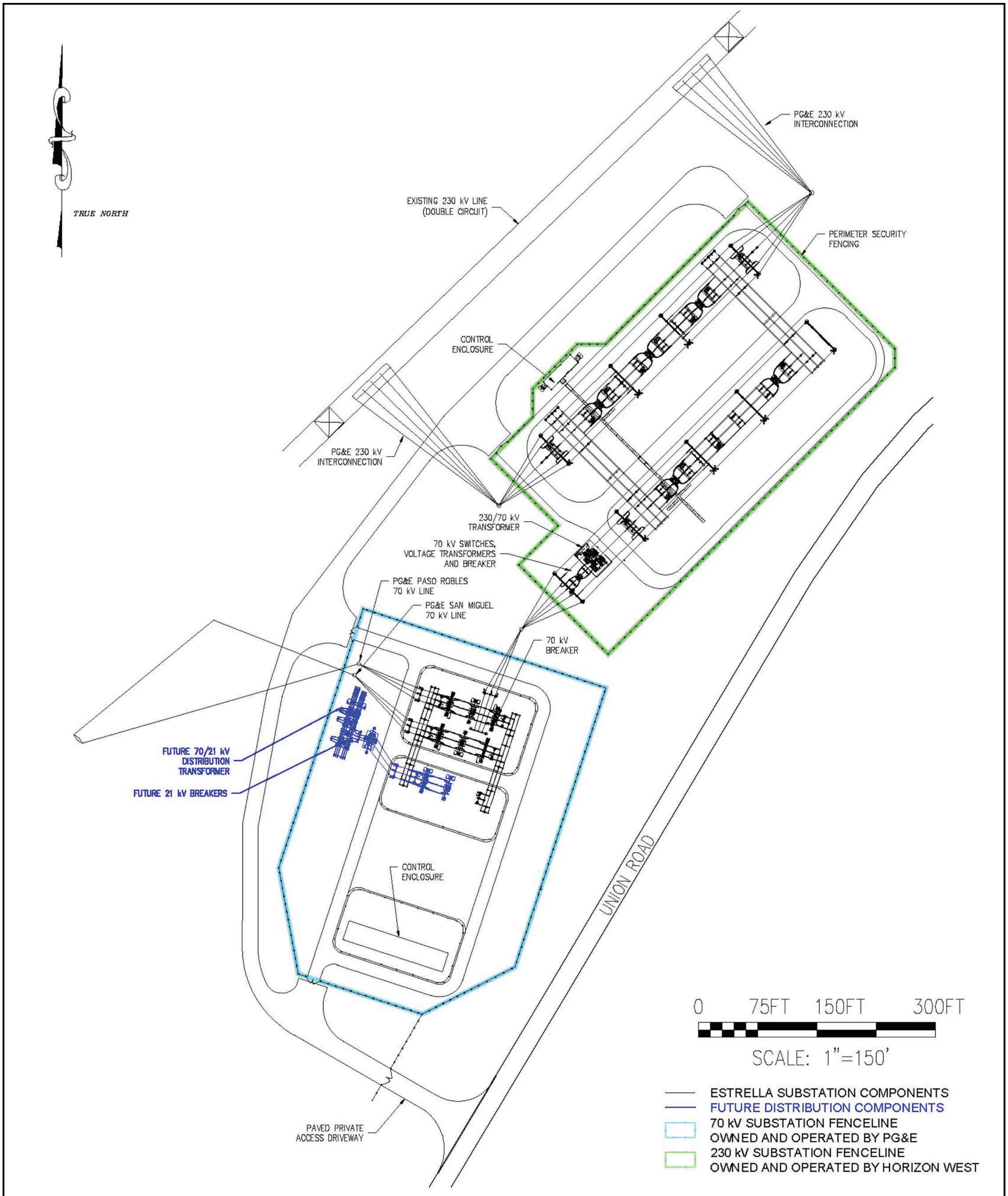
Existing Infrastructure

Existing Overhead or Underground Distribution Line

Horizon WATER and ENVIRONMENT

Figure 2-10
New Distribution Line Segments and 21/12 kV Pad-Mounted Transformers - Detail

Estrella Substation and Paso Robles Area Reinforcement Project

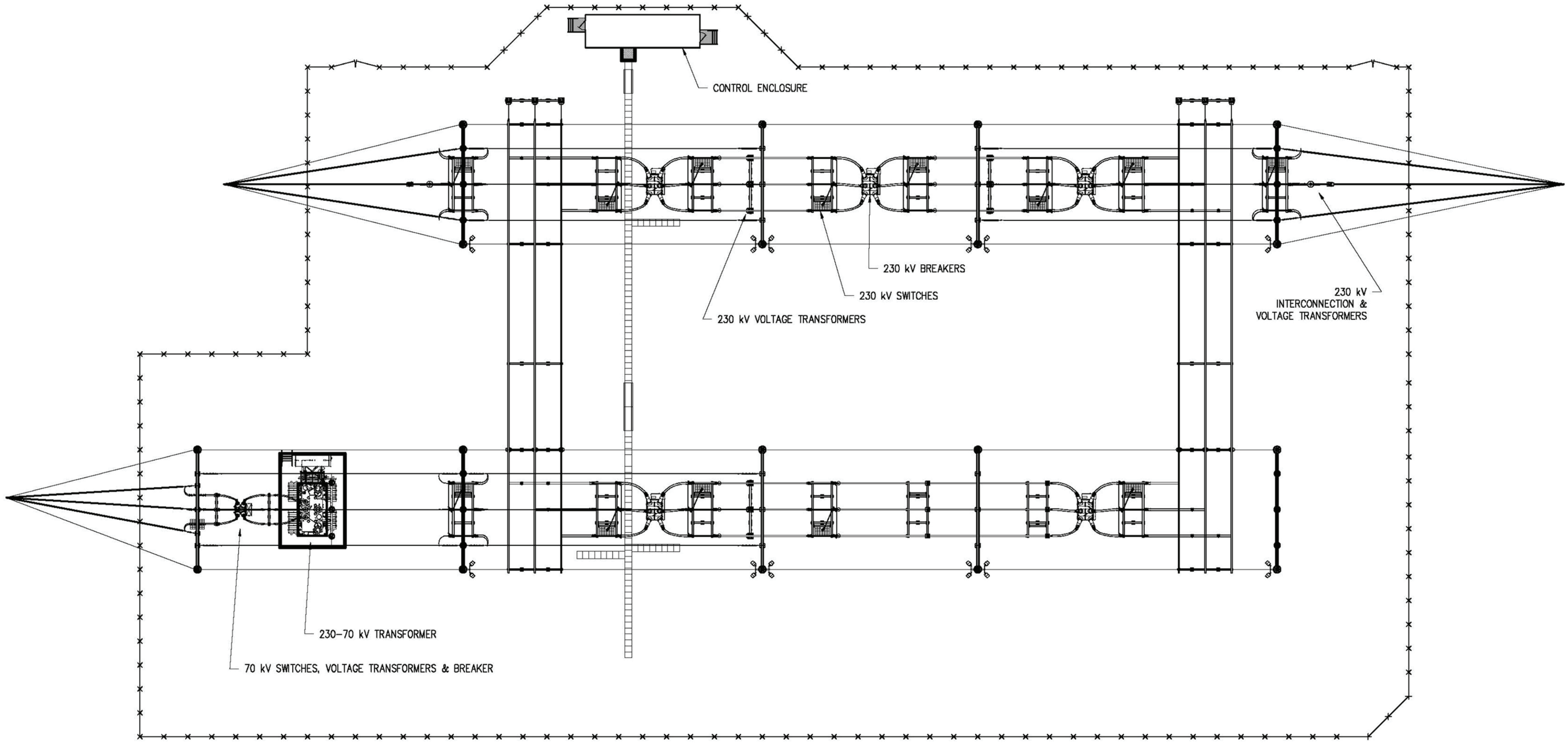


Source: NEET West and PG&E 2021

Figure 2-11.
Preliminary Substation Layout

Prepared by:
Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project

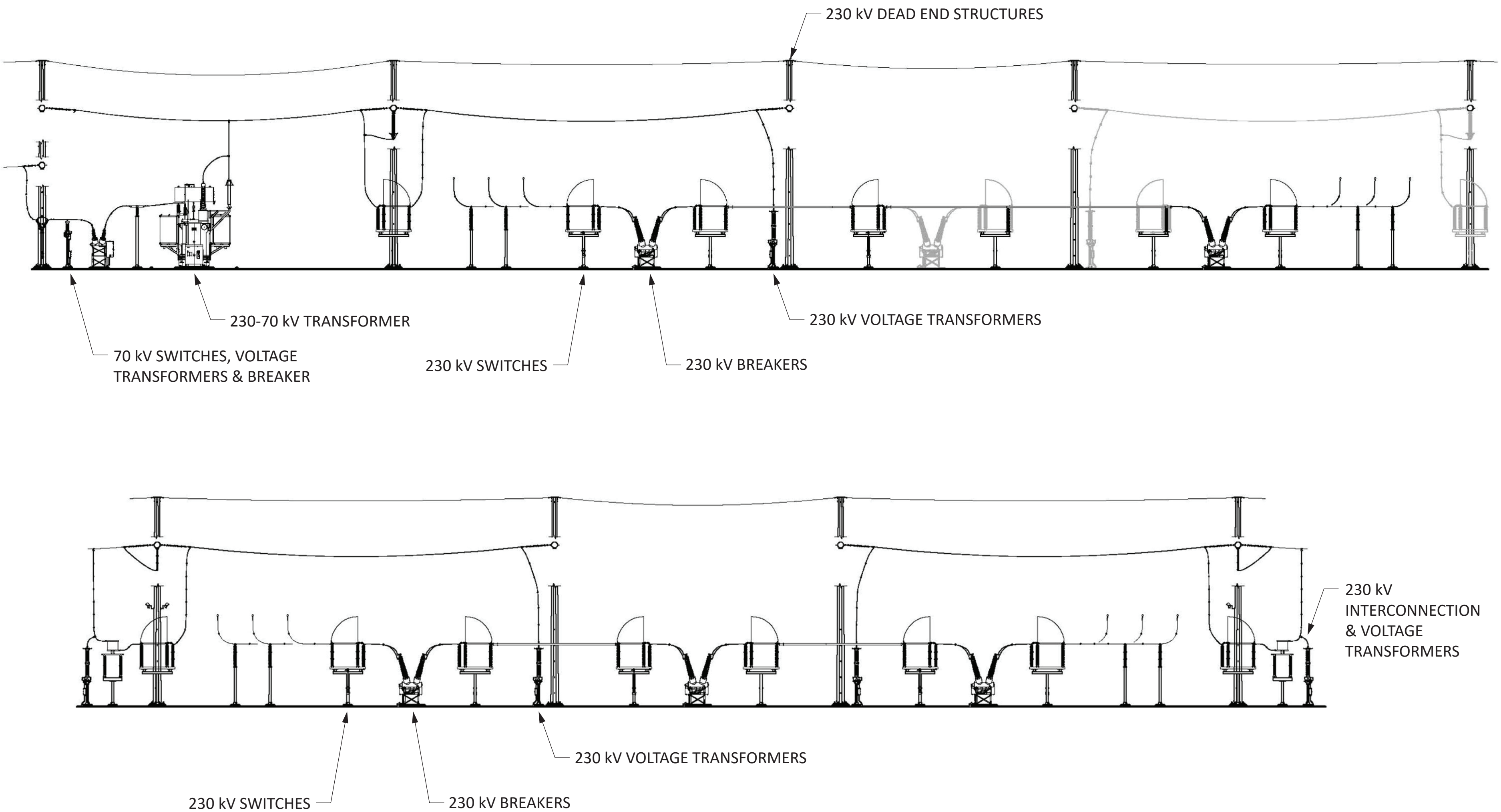


Source: NEET West and PG&E 2021

Figure 2-12.
Proposed 230-kV Substation General Arrangement

Prepared by:
Horizon WATER and ENVIRONMENT

Estrella Substation and Paso Robles Area Reinforcement Project



Source: NEET West and PG&E 2021

Figure 2-13.
Proposed 230-kV Substation Profile View

Estrella Substation and Paso Robles Area Reinforcement Project

Prepared by:
Horizon WATER and ENVIRONMENT

In addition to the electrical equipment, the 230 kV substation would include the following infrastructure:

- Dark Sky Lighting[7] and signage;
- Telecommunications and distribution feeder line for electrical service;
- Secondary containment for transformer oil spill control on applicable equipment;
- One spare SF_6 filler tank;
- Graveled internal access road; and
- Perimeter security fencing

The fenced portion of the 230 kV substation would be approximately 4 acres in size. A~~n~~ ~~approximately 7-foot-tall~~ chain-link fence, a minimum of 7 feet tall and a maximum of 12 feet tall (~~with an additional~~including ~~1 foot~~1.5 feet of barbed wire), would be installed around the remaining perimeter of the 230 kV substation.

The maximum amount of mineral oil required for the three-phase 230/70 kV transformer would be approximately 16,000 to 18,000 gallons. The mineral oil would be utility grade. The 230 kV substation would be constructed with a concrete secondary containment basin (measuring approximately 45 by 34 by 2.5 feet) to provide mineral oil containment for the transformer and would be designed to allow sufficient freeboard to include the oil volume of the transformer plus the precipitation from a 25-year, 24-hour storm event. Following a storm event, rainwater collected in the containment area would be visually inspected for any contamination before allowing to drain off site through existing drainage swales along Union Road.

The 230 kV substation would connect to existing power and telecommunications located on an existing distribution pole at the northeast corner of the substation site along the edge of Union Road. Electricity would be used for construction (i.e., power construction trailers, lighting, and small hand-held machinery or tools) and operation back-up station service power. The electric power and telecommunication circuits (telephone and T1, either copper or fiber) would be brought to the 230 kV substation on either overhead distribution poles or underground conduits. If overhead, up to six approximately 40-foot-tall wood distribution poles may be constructed between the existing distribution pole and the 230 kV substation. The poles would be direct embedded up to approximately 6 feet. If undergrounded, the back-up power and communications would be brought into the 230 kV substation using up to three underground conduits.

[7] Dark sky lighting refers to lights that comply with the International Dark Sky Association Fixture Seal of Approval Program. Lights compliant with this program are typically shielded on the top and sides so light does not go up to the sky and are only used when needed (use motion detectors and only the wattage necessary). Lights are typically “warm” in color, which is generally considered more yellow or orange/amber than white.

230 kV Transmission Interconnection

The 230 kV transmission line interconnection would be owned and operated by PG&E. It would connect the existing 230 kV transmission line to Estrella Substation in two separate locations: a northern and a southern interconnection (refer to Figure 2-11). The 230 kV interconnection structures include LSTs (lattice steel tower) similar to the existing 230 kV transmission line towers. Figure 2-14 shows a representation of the LSTs to be used for the 230 kV interconnection.

The northern interconnection into Estrella Substation would begin with the replacement of an existing 230 kV LST approximately 200 feet to the northeast along the existing 230 kV transmission line alignment. From there, the northern interconnection would continue southwesterly within the existing 230 kV alignment for approximately 60 feet until reaching a new LST. From this point, the northeasterly interconnection would head southeasterly for approximately 180 feet to a new LST. From this tower, the northern interconnection would head southwesterly, terminating at the northerly 230 kV pulloff structure within Estrella Substation.

The southern interconnection would leave the southerly 230 kV pulloff structure within Estrella Substation, heading southwesterly for approximately 60 feet to a new LST. From this tower, the southern interconnection would head northwesterly for approximately 180 feet to a new LST located in line with the existing 230 kV alignment. From this point, the southern interconnection would follow the existing 230 kV alignment approximately 60 feet southwesterly to a new LST. This final tower would interset in the existing 230 kV conductor and complete the 230 kV interconnection.

The six 230 kV interconnection towers would each be mounted on four individual concrete pier foundations, and their base footprint would vary from 25 by 25 feet to 27 by 20 feet. These towers would be configured with six non-reflective, gray porcelain or clear glass insulator strings to support three individual conductors. Three conductors would be installed on each side of the towers and would be arranged in a vertical configuration. New and replacement LSTs within the existing easement would be configured to carry the existing six individual conductors. The overhead conductor would be attached to the new LSTs using non-reflective, gray porcelain or clear glass insulator strings. Structures and conductors would be installed with separation distance and ground clearance in accordance with CPUC General Order (G.O.) 95.

70 kV Substation

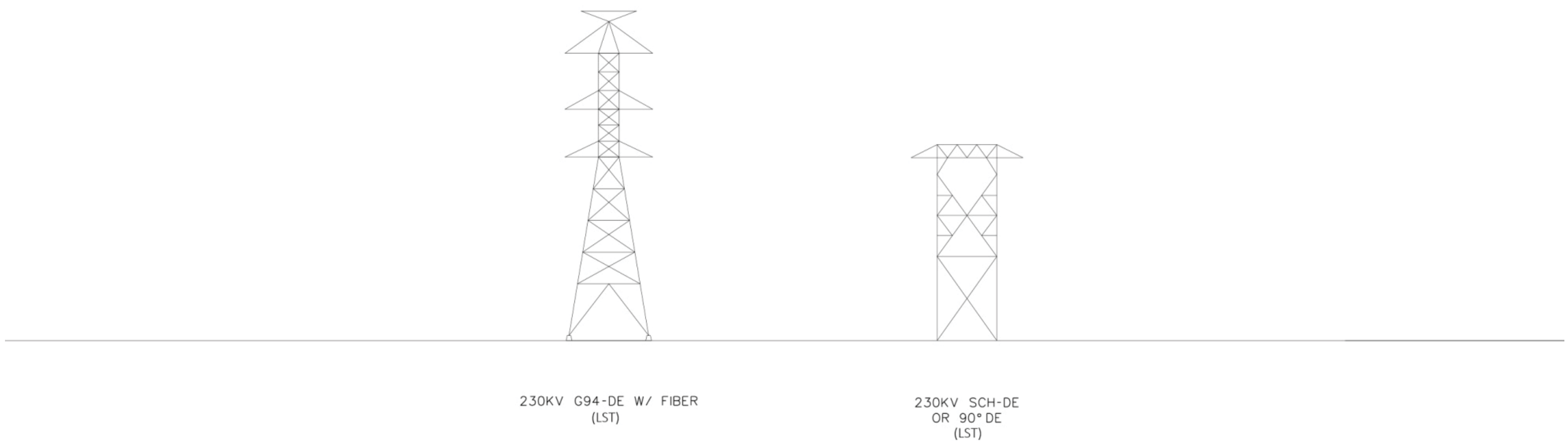
The 70 kV substation would be owned and operated by PG&E. The proposed configuration of the 70 kV substation (general arrangement and profile view) is shown in Figure 2-15 and Figure 2-16. The tallest structures within the 70 kV substation, other than the poles supporting the 70 kV power lines, would be the dead-end structures, which are approximately 37 feet high and 28 feet wide.

The following major electrical equipment would be located within the fenced area of the 70 kV substation in the proposed configuration:

- Two 70 kV aluminum buses;
- Two 70 kV bus voltage transformers;

- Seven line voltage transformers;
- Station service voltage transformer;
- Eleven 70 kV group operated air break switches;
- Five 70 kV SF_6 insulated circuit breakers;
- Nine 70 kV dead-end steel structures;
- Three 70 kV lightning surge arresters; and
- A protection and control enclosure measuring approximately 16 feet wide, 96 feet long, and 11 feet tall would be installed on a concrete pad measuring about 3 feet deep. The exterior of the control enclosure would have an air conditioning unit installed to protect electronic components.

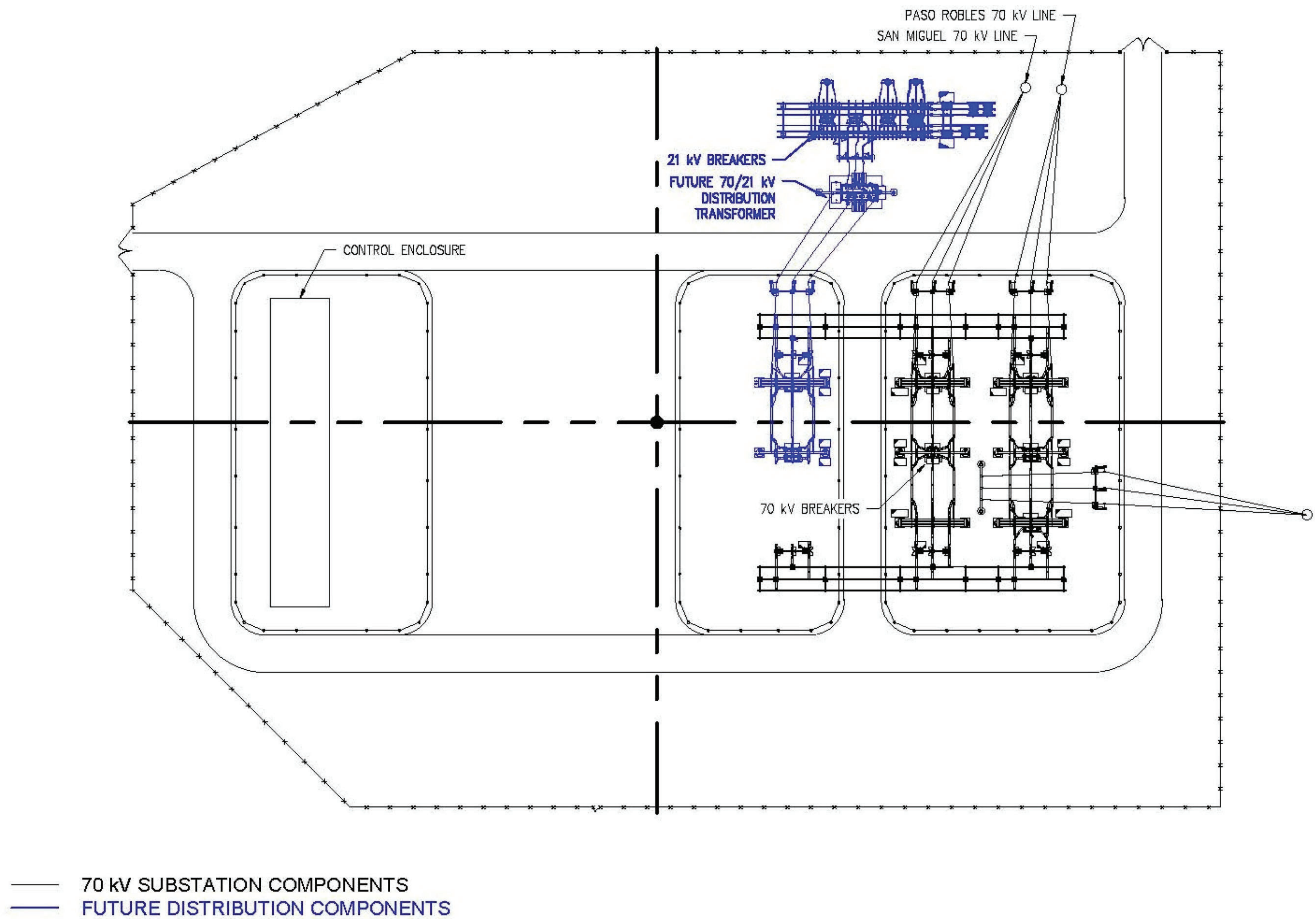
Note: Not to scale. LSTs measure approximately 25 by 25 feet at base.



Source: NEET West and PG&E 2017

Figure 2-14.
Typical Structure Diagram - 230 Kilovolt Interconnection

Estrella Substation and Paso Robles Area Reinforcement Project



Source: NEET West and PG&E 2021

Figure 2-15.
Proposed 70 Kilovolt Substation General Arrangement

Estrella Substation and Paso Robles Area Reinforcement Project

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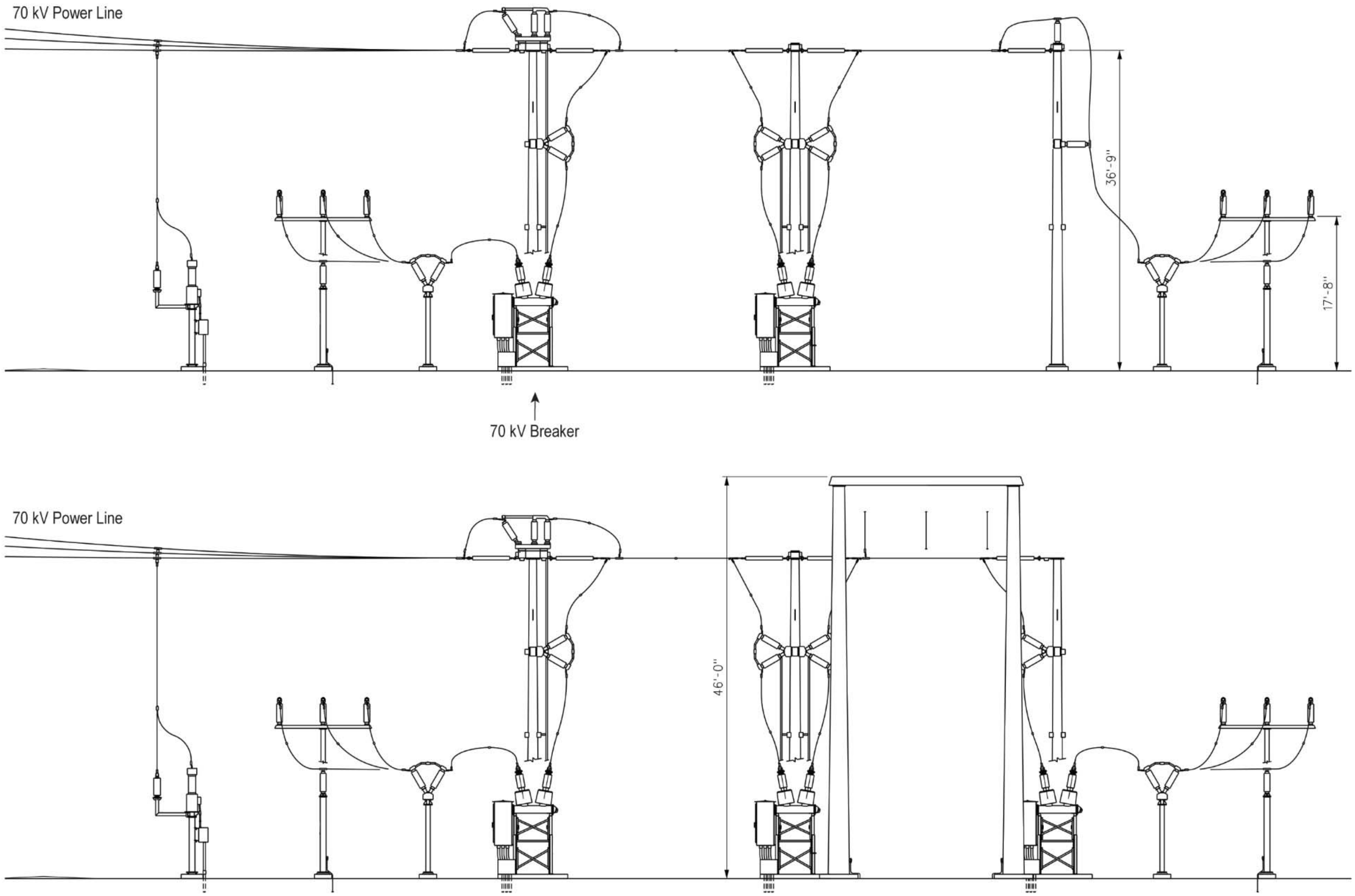


Source: NEET West and PG&E 2017

Figure 2-16.
Proposed 70 Kilovolt Substation Profile View

Estrella Substation and Paso Robles Area
Reinforcement Project

In addition to the electrical equipment, the 70 kV substation would include the following infrastructure:

- Dark sky lighting[8] and signage;
- Battery enclosure;
- Paved internal access road;
- Concrete skimmer/weir; and
- Perimeter security fencing.

The fenced portion of the 70 kV substation would measure approximately 3.5 acres within the parcel acquired from HWT. An approximately 8-foot-tall chain-link fence with additional 1-1/2 foot of barbed and concertina wire would be installed around the remaining perimeter of the 70 kV substation.

The 70 kV substation would not store mineral oil. A concrete skimmer and weir device (flow measurement device) would be constructed at the southeast corner of the substation. This concrete device settles and collects sediment that is washed down by stormwater before it is discharged from the substation.

2.3.2 70 kV Power Line

The new 70 kV power line and reconductoring segments would use a combination of tubular steel poles (TSPs) and light-duty steel poles (LDSPs) for support. LDSPs would have a surface treatment designed to render the appearance of a natural weathering of a wood pole. Figure 2-17 shows typical drawings of each structure type.

Power line structures would vary in height depending on their location and purpose, but typically would range between 80 to 90 feet. Table 2-5 contains approximate height range and average height of power line alignment poles by structure type. The approximate distance from the ground to the lowest conductor is 29 feet. In areas where existing metal fences are in close proximity to the power line easement and cannot be replaced with non-conductive fences, wood or composite (fiberglass) poles would be used. These alternative poles may also be used in areas where existing underground utility metal lines are encountered in close proximity to structure locations, such as gas lines.

Both the new 70 kV power line segment and the reconductoring segment would use overhead aluminum electrical conductors, which, when installed, typically have a shiny surface appearance. This “reflective” or “specular” surface can make a power line more noticeable in appearance against the background landscape, and therefore more visible to small aircraft pilots that fly over the area. Observations by PG&E and other utilities indicate that specular conductor transitions to non-specular (i.e., becomes less shiny) in the course of a few seasons after installation. The new conductors would be installed to meet or exceed the minimum separation

[8] Refer to footnote 7 above for discussion of dark sky lighting.

distances and ground clearances in accordance with CPUC G.O. 95 and would meet raptor safety requirements.

A more detailed description of the required structures and the associated conductors for the new 70 kV power line and reconductoring segment is provided below.

New 70 kV Power Line Segment

The new 70 kV power line segment would consist of approximately 7 miles of double-circuit 70 kV power line on a combination of two types of structures: TSPs and LDSPs. TSPs would be utilized for the portion of the line that would be installed within the existing PG&E transmission corridor. In general, the TSPs would be installed adjacent to existing 500 kV transmission line towers, utilizing an average span length of approximately 650 feet. Each TSP would be installed on one individual concrete pier foundation.

The remainder of the new 70 kV power line segment would utilize both TSPs and LDSPs. These structures would typically be used in locations where the new 70 kV power line segment is not parallel to the existing 500 kV transmission line. TSP structures would be installed generally in locations where the alignment changes direction. The route would utilize an average span length of approximately 300 to 500 feet.

Structures along the new 70 kV power line segment would be configured with six individual aluminum conductors, measuring up to 1.25-inch diameter, and an underhung fiber optic cable, measuring up to 0.75 inch in diameter. Three conductors would be installed on each side of the structures and would be arranged in a vertical configuration. The overhead conductor would be attached to the structures using six post insulators or insulator strings (three per circuit) for tangent configurations, and up to 12 insulator strings (six per circuit) for dead-end configurations.

Reconductoring Segment

Reconductoring and pole replacement would occur on approximately 3 miles of single-circuit 70 kV power line using a combination of TSPs and LDSPs. LDSPs would typically be used in locations where the alignment is generally straight, and either guyed[9] LDSPs or TSPs would be used in locations where the alignment changes direction or where distribution tap spans are supported on line structures.

Anchors and guy wires would be attached to LDSPs and/or wood poles in locations where additional stability is required to support the conductor tension. The new replacement poles would typically be installed within 10 feet of the existing poles, which would result in a typical pole span length of approximately 300 feet.

[9] A guy is a tensioned cable designed to add stability to a free-standing structure. One end of the guy is attached to the structure, and the other is anchored to the ground at some distance from the pole or tower base. The tension in the diagonal guy-wire, combined with the compression and buckling strength of the structure, allows the structure to withstand lateral loads such as wind or the weight of cantilevered structures.

Replacement poles along the reconductoring segment would be configured to continue to carry three existing aluminum conductors, measuring about 1.25 inch in diameter, and an underhung fiber optic cable, measuring up to 0.75 inch in diameter. The conductor would be attached to the poles using three insulators for tangent configurations and six insulators for dead-end configurations.

Distribution Lines and Common Neutral

In locations where existing distribution lines are located in close proximity to the 70 kV power line alignment, the distribution conductors may be collocated on the power line structures. The existing conductors would typically be transferred to the new pole line as a distribution underbuild; however, in locations where the existing conductors are not able to be transferred, they would be replaced with an equivalent conductor. In addition, to meet PG&E power line design standards, a common neutral would be collocated along the entire length from Estrella Substation to Paso Robles Substation.

2.3.3 Reasonably Foreseeable Distribution Components

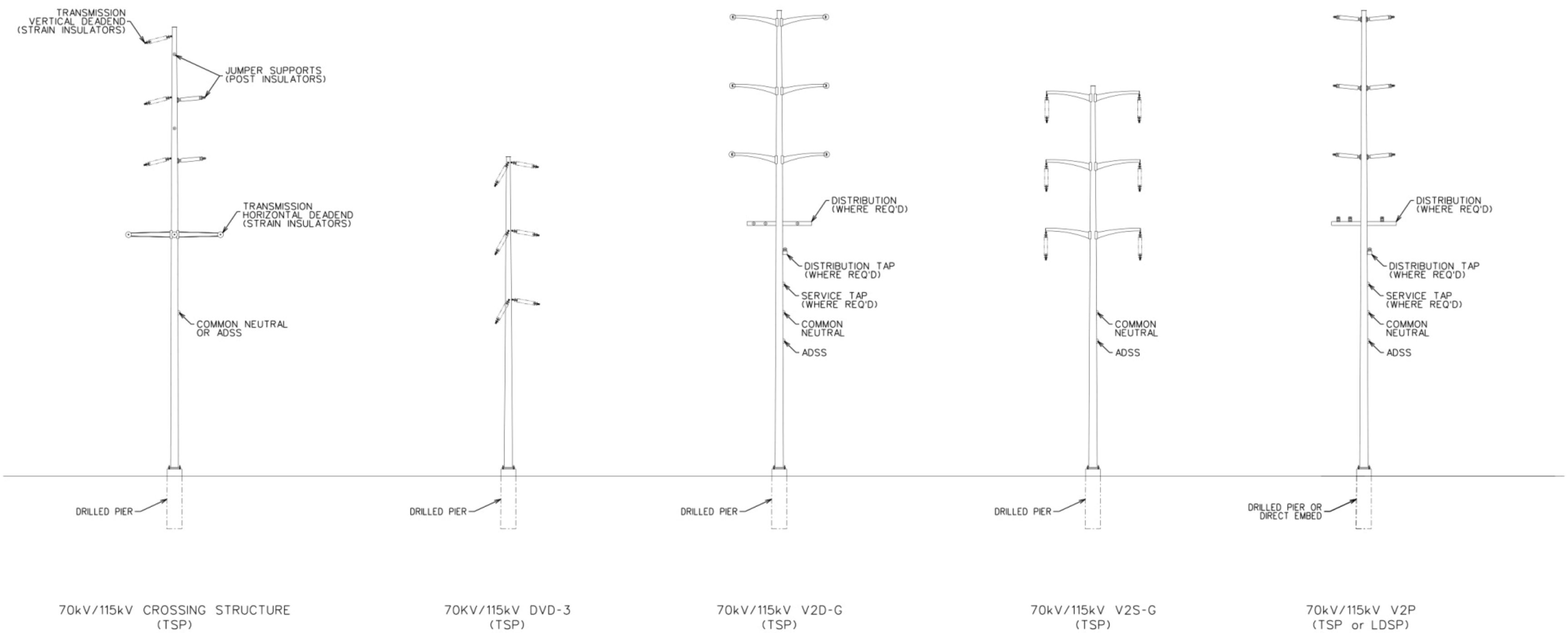
Given that new overhead distribution lines are typically supported by 18 poles per mile, the 1.7 miles of reasonably foreseeable new distribution line would require about 31 new wood poles. It is possible that some existing poles also would need to be replaced to support the reconductored circuits. New wood poles would likely be direct-bury poles (not requiring a foundation) and would require approximately 3 square feet of permanent ground disturbance per pole. The 70/21 kV transformer that would be installed within the 70 kV portion of the Estrella Substation as part of the reasonably foreseeable distribution components would include mineral oil and a concrete secondary containment basin.

2.3.4 Ultimate Substation Buildout

The equipment and facilities associated with ultimate substation buildout would primarily be placed within the fence line of the already-constructed Estrella Substation. The anticipated layout of the Estrella Substation at ultimate buildout is shown in Figure 2-18. The additional 230/70 kV transformer under ultimate buildout is assumed to include the same amount of mineral oil (16,000 to 18,000 gallons) as described for the Proposed Project (see Section 2.3.1), and the same secondary containment structure (i.e., designed to allow sufficient freeboard to include the oil volume of the transformer plus the precipitation from a 25-year, 24-hour storm event). The additional 230 kV interconnection is assumed to include similar structures (LSTs) and follow a similar interconnection process to that described for the Proposed Project in Section 2.3.1 under the header for “230 kV Transmission Interconnection.” The additional 70/21 kV transformers that may be installed to support additional distribution feeders are assumed to include secondary containment, as necessary to contain spills of any stored mineral oil.

While ultimate buildout of the Estrella Substation could add six additional distribution feeders (for a total of nine from the substation), as well as additional 70 kV power lines, the routes, lengths, and associated characteristics of these components are unknown at this time.

Note: Not to scale. LDSPs have a 3-foot diameter at base and a 1-foot diameter at tip. TSPs have a 4-foot diameter at base and a 1.5-foot diameter at tip.

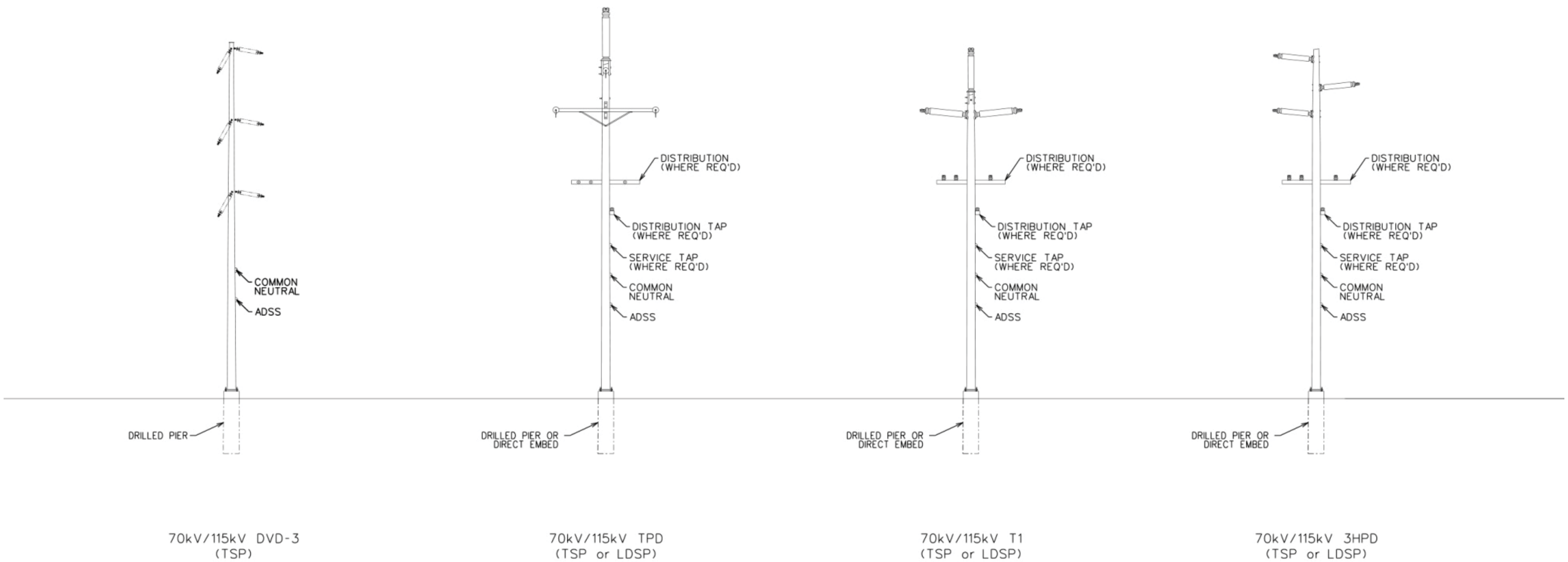


Source: NEET West and PG&E 2017

Figure 2-17.
Typical Structure Diagrams - New 70 Kilovolt Power Line
(sheet 1 of 2)

Estrella Substation and Paso Robles Area Reinforcement Project

Note: Not to scale. LDSPs have a 3-foot diameter at base and a 1-foot diameter at tip. TSPs have a 4-foot diameter at base and a 1.5-foot diameter at tip.



Source: NEET West and PG&E 2017

Figure 2-17.
Typical Structure Diagrams - Reconductoring Segment
(sheet 2 of 2)

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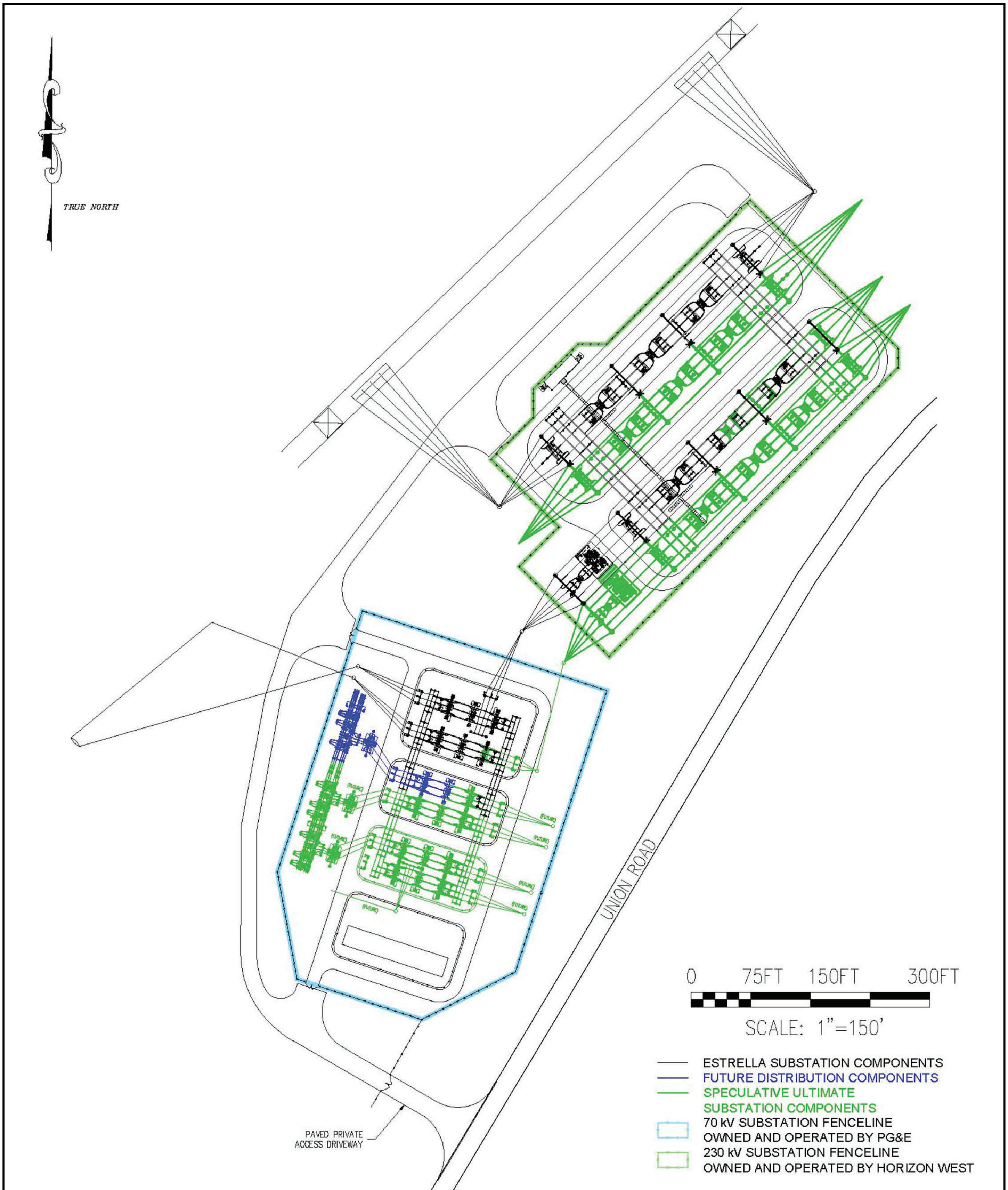
Estrella Substation and Paso Robles Area Reinforcement Project



Source: NEET West and PG&E 2021

Figure 2-18.
Ultimate Substation Buildout

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Estrella Substation and Paso Robles Area Reinforcement Project

2.3.5 Other Substation Modifications

Minor modifications within five existing area substations would be required for the Proposed Project. These modifications include installation and reconfiguration of system protection equipment and/or adjusting relays, and reprogramming supervisory control and data acquisition (SCADA) and telemetry equipment. In addition, the fiber optic telecommunications cable extending from Estrella Substation to Paso Robles Substation along the new 70 kV line will require new network and telecommunications equipment at Paso Robles Substation. The modifications would be made within existing substation fence lines at California Flats Switching Station and Morro Bay, San Miguel, and Templeton substations, while minor excavation outside the fence line of Paso Robles Substation may be required for the telecommunication connection. Table 2-6 below provides a summary of the modifications required at each substation.

Table 2-6. Other Substation Modifications Summary

Substation	Improvements
California Flats 230 kilovolt (kV) Switching Station	Remove outdoor wave trap equipment and existing Morro Bay-California Flats 230 kV protection, and install new protection relays and related equipment within the existing control building. Remove existing relays and install dual-line differential protection relays on the existing Morro Bay-California Flats line to match new Estrella Substation terminal for permissive overreaching transfer tip (POTT) high-speed protection. Install regenerative catalytic oxidizer (RCO) switches, local/remote, and circuit breaker (CB) control through replaced CB relay. Provide breaker failure relay protection.
Morro Bay 230 kV Substation	Remove wave trap equipment. Remove existing relays and install dual-line differential protection relays at CB 482 to match new Estrella Substation terminal for POTT high-speed protection. Install RCO switches, local/remote, and CB control through replaced CB relay. Provide breaker failure relay protection.
Templeton 230/70 kV Substation	Install reverse power relay on the existing Templeton 230 / 70 kV #1 transformer banks to prevent the 70 kV system from feeding the 230 kV system.

Substation	Improvements
San Miguel 70 kV Substation	Remove existing directional overcurrent electro-mechanical relays at CB 22 breaker relay panel. Install two line protection relays in CB 22 relay panel to match new Estrella Substation terminal for step-distance protection. Provide breaker failure relay and reclosing relay protection.
Paso Robles 70 kV Substation	Upgrade the new Estrella-Paso Robles 70 kV power line to meet line ampacity demands of 975A emergency. Upgrade terminal equipment such as insulators, jumpers, and any rigid bus at the breaker to meet 975A ampacity ratings. Remove existing Schweitzer Engineering Laboratories (SEL) 321 and SEL 267 relays at CB 72 breaker relay panel, along with associated auxiliary switch devices. Install two line protection relays in CB 72 relay panel to match new Estrella Substation terminal for step-distance protection. Provide breaker failure relay and reclosing relay protection. Connect new fiber optic line and common neutral into existing substation, including minor trenching outside the fence line. Connection of the fiber optic line requires a shallow trench, measuring 10 to 15 feet in length and a minimum of 24 inches of cover, to be excavated so the fiber optic line can be connected from the last reconductoring pole to inside of the substation.

Notes: CB = circuit breaker; kV = kilovolt; POTT = permissive overreaching transfer tip; RCO = regenerative catalytic oxidizer; SEL = Schweitzer Engineering Laboratories

2.4 Easement Requirements

The parcel of land where Estrella Substation would be constructed is under private ownership. An affiliate of HWT has an option agreement to purchase the approximately ~~15~~20-acre portion of this parcel. Prior to construction, HWT would purchase and hold fee title of this approximately ~~15~~20-acre area. The 15-acre substation footprint would be located entirely within the 20-acre parcel, and~~This area~~ is adequate to accommodate the entire substation facility including all considerations for site grading, equipment laydown and storage, fencing, access and internal circulation, spill and stormwater management, and other operational considerations. Once all of the environmental permits from the applicable siting and regulatory agencies have been obtained, and grading and drainage has been constructed for the entire substation site, HWT would sell the land and/or grant easements to PG&E ~~the land~~ necessary for construction of the 70 kV substation and 230 kV interconnection.

The relocated 230 kV tower and three LSTs associated with the 230 kV interconnection would be installed within the existing transmission line easement. Two additional LSTs or TSPs would be used to complete the interconnection and would be installed on the parcel that would be acquired for the development of Estrella Substation.

New easements would be acquired for the majority of the new approximately 7-mile-long 70 kV power line segment. The easements would be up to 115 feet wide with the width to vary based on the location of the new power line. When on private property, the easement would typically be 70 feet wide, and the poles would be located in the center of the easement (35 feet on each side). In locations where the poles would be adjacent to a county or city road franchise, new poles may be located on private property ranging from 2 to 7 feet outside of the road franchise, so the easement would be 2 to 7 feet on one side and 35 feet on the other. There may be some locations where the pole line may be located within the road franchise. A list of properties likely to require new easements and/or acquisition is provided in the PEA (see Appendix H to the PEA).

The approximately 3-mile-long reconductoring segment would be mostly located within an existing 30- to 40-foot-wide PG&E easement. Easement documents may be updated in some locations to account for slight variations in the new alignment and pole placement, or to clarify or update existing rights. If PG&E discovers an encroachment in the existing 70 kV power line easement, it would determine whether it is a conflict with the operation of the 70 kV power line, and/or what action to take, if any, after further investigation. Such action might include working with the property owner(s) to remove the conflict or minor relocation of the alignment and potential modification of the structure type.

A new 30-foot-wide easement, approximately 0.6 mile in length, would need to be obtained on private property to the north of the 70 kV substation to connect the reasonably foreseeable new distribution facilities to existing distribution feeders on Mill Road. The reasonably foreseeable new 1.1-mile-long segment of distribution line is planned to be installed within the existing road right-of-way.

2.5 Proposed Project Construction

The construction process, methods, equipment and personnel needs, access, temporary work areas, and schedule for the Proposed Project components are described in the following subsections.

2.5.1 Construction Process and Methods

Substation Construction

Grading and Site Preparation

Construction of the Estrella Substation would follow a typical sequence beginning with survey marking of staging areas and work areas, establishment of the private access road, vegetation clearance, fencing installation, grading, installation of culverts and swales, excavation of foundations, installation of facilities, and cleanup and post-construction restoration. Vegetation removal would be limited to areas within survey-marked boundaries, and would be completed utilizing mechanized equipment. To the extent practical, removed vegetation may be disposed of at a landfill. Site construction fencing would be installed during the site preparation stage, and would require digging to a depth of ~~4~~5 feet to install fence~~ing anchor~~ footings.

Based on preliminary grading design, earthwork activities for the substation are anticipated to result in approximately ~~50,000~~68,000 cubic yards of cut and fill, balanced on site to the maximum extent possible. The cut and fill figure does not include approximately 16,500 cubic yards of topsoil which would be stripped and stockpiled during construction. Of the 16,500 cubic yards of topsoil, approximately 4,000 cubic yards would be used on site, and the balance (12,500 cubic yards) would be removed. Generally, grading and excavation would be accomplished in a phased approach. Earthwork activities (e.g., grading, excavation) would be completed to meet project design specifications and match proposed grades, considering the geotechnical conditions at the site. Maximum excavation depths would occur on the transmission portion of the site and at the steel dead-end structures in the 230 kV substation.

Geotechnical borings were performed in the vicinity of the substation site. The borings showed predominately gravel, clay sand and decomposed granite, which can be excavated. It is anticipated that these materials can be excavated using conventional earth-moving equipment. While not expected due to the clay soil, in the event there are areas where bulldozers and backhoes are not able to remove the material, scraping, ripping, drilling, hammering, and cutting may be used to break up the material into manageable pieces. Blasting is not anticipated.

During earthwork, soils and other surficial deposits that do not possess sufficient strength and stability and/or resistance to erosion of support structures, would be removed from the work area. No contaminated soils are expected on this site due to the long-term vineyard use of the site. All clean spoils excavated for the project would be used on site to balance cut and fill calculations, as feasible. All spoils that are not useable and/or reveal contamination, as determined through testing and/or based on visual appearance, would be sent to a properly licensed landfill facility. All recyclables would be taken to a licensed recycle facility, and all refuse would be taken to the Paso Robles Landfill or other suitable landfill facility. Topsoil reuse is not feasible within the fenced substation area; however, topsoil would be conserved at exterior temporary work areas where applicable.

Material that requires processing for construction of Estrella Substation would be mechanically processed on site to achieve a maximum particle size and distribution suitable for conventional placement in engineered fills. In addition to general earth-moving quantities, approximately 4-6 inches of surface gravel would be required to be imported and installed within the substation footprint and along the access road. Additionally, gravel would be placed in the substation staging areas.

Below-Ground Construction

Following site preparation, construction of the substation equipment foundations (consisting of drilled pier, mat, and pad type foundations), underground ducts, and the grounding grid would commence. Foundation construction excavation would be accomplished primarily by backhoes and drill rigs. Forms, reinforcing steel, and concrete would then be installed, as appropriate, to build the foundations for substation equipment and the control enclosures. Structure and equipment foundations would be excavated to an approximate depth of between 10 and

25 feet. Actual depths would depend on the equipment to be installed. Concrete pouring would be required to construct the foundations. Underground bundled polyvinyl chloride (PVC) conduit ducts and below-grade cable trench would be constructed within the substation pad for the power and control circuits.

Above-Ground Construction

Power lines and distribution circuits would be connected inside the substation after substation structures and equipment are installed. Control and protection wiring would be completed during above-ground structure installation. All equipment would be tested after installation and all wiring is landed, and before placing the substation in service. Equipment would be placed in service once individual power lines and circuits are ready to be energized and have been tested.

It is anticipated that all major electrical and substation equipment would be delivered to each substation site and placed directly on foundations and footings once all concrete footings have cured. All new components would be delivered to the site using a flatbed truck and positioned using a small crane or forklift. All equipment including breakers, bus supports, insulators, bus and switches would be installed or anchored into final position, grounded, and if required wired back to the control house. The control house will be delivered and installed on a concrete ~~piers~~slab. The control house building will then be ready for the installation of protective relay panels, batteries, alternating current~~AC~~ and direct current~~DC~~ load centers, SCADA and telecommunication hardware and air conditioning systems. Final equipment testing and commissioning would then be performed in the substation and then in conjunction with PG&E's new and existing facilities.

Access Driveway and Interior Road Construction

Access road construction would begin by excavating to a ~~maximal~~ depth of approximately 2~~7~~ feet at the intersection with Union Road, increasing~~tapering off~~ to 17~~2~~ feet deep for the remainder of the road. Next, the road would be graded and compacted in accordance with engineering standards and geotechnical requirements. Following initial compaction, road base would be imported, distributed on site, and final compacted. Finally, conventional paving equipment would be used to distribute the asphalt road material along the main access route and driveway aprons. Paving of the access road would occur after major construction at the substation site is completed and all heavy equipment is removed from the site.

230 kV Transmission Interconnection Construction

Installation of the 230 kV transmission interconnection to Estrella Substation would require a number of activities including setting the new tower foundations, tower assembly, and partial erection for the new towers. Construction activities would include the following:

- Adjacent to the new 230 kV substation, a temporary connection (commonly referred to as a "shoo-fly") would be installed to ensure that the existing 230 kV transmission line remains in service. Near the existing tap structures at each location, one to three (depending on the orientation of the conductor wires) wood poles would be placed in the ground without foundation and guy-wired for stability. The temporary structures would connect the conductors as necessary for the existing 230 kV transmission line to remain in service.

- The first circuit on the existing double-circuit 230 kV transmission line would be cleared, and the phase conductors would be moved off the two existing LSTs onto the temporary poles. The first circuit would then be re-energized.
- The second circuit on the existing double-circuit 230 kV transmission line would be cleared, and the erection and interset of two new LSTs would be completed. The phase conductors for the circuit would be dead-ended and temporary jumpers would be installed.
- The OPGW at each new tower would be secured.
- The relocated 230 kV tower and three LSTs associated with the 230 kV interconnection would be installed within the existing transmission line easement.~~, an existing LST would be removed, and~~
- ~~t~~Two additional LSTs or TSPs would be used to complete the interconnection and would be installed on the parcel that would be acquired for the development of the Estrella Substation~~would be installed for the Estrella Substation interconnection~~.
- The second circuit on the existing 230 kV transmission line would be re-energized and the first circuit cleared. The existing phase conductors would be transferred from the temporary poles to the new towers. The phase conductors on the new towers would be dead-ended and permanent jumpers installed; the phase conductors would be re-attached, and the first circuit would be re-energized.
- The temporary poles and anchors used for the shoo-fly would be removed.

The 230 kV interconnection LSTs would be installed on concrete pier foundations. Large augers and drill rigs would complete the required excavations and, if necessary, a reinforcing steel rebar cage would then be lowered into the excavation. An approximately 2-foot-tall form would be constructed. Concrete would then be poured to fill the excavation. Each completed foundation would be left to cure for 7 to 14 days. Typical foundation dimensions for the 230 kV interconnection are included in Table 2-7.

Table 2-7. 230 Kilovolt Interconnection Structure Foundation Summary

Foundation Type	Quantity	Approximate Diameter (feet)	Approximate Depth (feet)	Approximate Excavation Volume per LST (cy)	Approximate Concrete Volume per LST (cy)
230 kV Lattice Steel Tower	6	3–4	13–16	2.6–6.1	3.4–7.4

Notes: cy = cubic yards; LST = lattice steel tower

Each LST is comprised of multiple steel members that are connected together with hardware to form the tower. Installation of the tower would begin with the assembly of the tower in one or more sections. This assembly process may occur at one of the staging areas or within the work area at the individual tower's location. Once the first section of the tower is complete, it would be placed onto the cured concrete foundation using cranes and secured using the appropriate hardware. This process would be repeated for any additional sections of the tower until it is complete. Insulators and additional hardware would be added to the tower using a bucket truck and cranes. In areas of difficult terrain, a helicopter may be used to assist with the tower installation process. If applicable, the existing conductor would then be attached to the new tower hardware.

As part of the 230 kV interconnection work, an existing LST would be removed and then replaced by a new LST in a slightly different location. The LST would be removed by disassembling the tower into three sections and lowering each section using a crane, or taking it down in one lift using a crane. Helicopters may be used to assist in the tower removal process. Following disassembly of the tower, its segments would be transported for reuse, recycling, or disposal at an approved facility. Once the LST has been removed, the associated concrete pier foundations would be jackhammered to approximately 3 feet below grade. The remaining void would then be backfilled with native soil saved from other excavations in the surrounding area and returned to its original contours, to the extent feasible, or in accordance with prearranged landowner agreements.

Telecommunications and Power Line Interconnection Construction

For the 230 kV substation, the back-up electric power source and telecommunication lines would be brought to the site either on overhead distribution poles or in underground conduits. If overhead, up to six wood poles (distribution poles, approximately 30 feet tall) may be constructed within the substation permanent disturbance area. The poles would be direct-embedded up to approximately 6 feet. If undergrounded, the back-up power and communications could be brought into the 230 kV substation in up to three underground conduits. Open trenching and/or horizontal directional drilling (HDD) may be used to install the conduits for power and communications cables. Any directional drilling pits would occur within the permanent or temporary disturbance areas. Depending on the voltage level and distance from the PG&E distribution line, either a pole-mounted transformer (on a PG&E pole), located along the existing distribution line that intersects the utility corridor, or a pad-mounted transformer, located adjacent to the control enclosure, would be installed.

For the 70 kV substation, the OPGW cable would be cut at the existing LST that is to be removed. The OPGW cable would then be rolled back to the first LST located both northeast and southwest from where the cable is to be cut. The cable would then extend down a tower leg at each of the towers and enter into a pull box. The pull boxes located near the bases of the existing towers and pull boxes installed near the fence line of the substation would be connected by underground conduit. The OPGW cable would transition on the tower legs to an underground fiber optic duct cable and then travel through 4-inch PVC conduit until terminating inside the 70 kV substation control house. Approximately 3,000 feet of new 4-inch conduit would be installed to complete the telecommunications system extension.

The conduit would be installed using open trenching methods of construction, HDD techniques, or a combination of the two. The actual method of installation would be determined during final design.

Open Trench Method

Excavators and other earth-moving equipment would be used to establish trenches for telecommunication lines, which typically range between 36 and 60 inches in depth, and 24 and 36 inches wide. Depths may vary depending on soil stability, the presence of existing substructures, and discussions with adjacent property owners/farmers.

Once a trench is excavated, large-diameter gravel would be applied to the bottom of the trench to create a level bed for the conduit and act as a French drain. PVC conduit would then be placed in the trench and a granular substrate (typically sand) level would then be layered around the conduits for additional protection and stability. The excavated material would be used to backfill the remainder of the trench. During backfill operations, “warning tape” would be placed at least 12 inches above the conduit. Once the trench is backfilled, the area would be compacted using portable compaction devices.

Horizontal Directional Drilling Method

HDD is a highly specialized boring technique that may be used to install conduits beneath the existing vineyards in the vicinity of the telecommunications system extension. The HDD technology uses a hydraulically powered horizontal drilling rig supported by a drilling mud tank and a power unit for the hydraulic pumps and mud pumps. A variable-angle drilling unit would initially be adjusted to the proper design angle for the particular drill.

The first step would be to drill a fluid-filled pilot bore. The first and smallest of the cutting heads would begin the pilot hole at the surveyed entry point in the entry pit. The first section of the drill stem has an articulating joint near the drill-cutting head that the HDD operator can control. Successive drill stem sections would be added as the drill head bores along the specified route. The drill head would then be articulated slightly by the operator to follow a designed path under the crossing and climb upward toward the exit point. Once the pilot hole is completed, a succession of larger cutting heads and reamers would be pushed and pulled through the borehole until it is the appropriate size for the 4-inch conduit. Using this method, the conduit would be installed up to 10 feet under the existing grade.

An entry pit and an exit pit are required for each HDD to contain the drilling mud. In general, the work area required on both the entry and exit sites would be approximately 50 by 50 feet. A non-toxic, water-based lubricant containing water and bentonite clay, referred to as drilling mud, would be used to aid the drilling, coat the walls of the borehole, and maintain the opening. During the bore, drilling mud would be pumped under high pressure through the drill stem to rotate the cutting head and return the soil cuttings to a pit at the surface entry point. No additives considered hazardous according to federal and state laws would be used during the HDD process. The drilling mud would be received in an approximately 6-foot by 6-foot pit.

The drilling mud returned back through the bore-drilled hole would be pumped from the entry and exit pits to a processing/shaker unit where the soil cuttings are removed, allowing the drilling mud to be reused. It is anticipated that the majority of the drilling mud would be recycled by the drilling contractors and used on subsequent projects. Any excess clean drilling mud would be disposed of at an appropriate waste facility.

Once the borehole reaches the correct diameter, the conduit would be pulled through the borehole until it surfaces on the other side. The installed conduit would then be connected to adjacent splice boxes and/or other sections of conduit, and the entry and exit pits would be backfilled.

In order to facilitate the pulling and splicing of the cables, an underground pull/splice box would be installed at the base of an existing or newly installed structure. All pull/splice boxes used for the project would be pre-cast polymer concrete and traffic-rated boxes, measuring approximately 3 by 5 feet, as shown in Figure 2-19. These splice boxes would provide access during operations to the underground cables for maintenance, inspection, and repair.

An excavator or backhoe would be used to excavate a 5-foot-deep cavity near the base of the pull/splice box, measuring approximately 4 by 6 feet. The pull/splice box would be delivered to the project site on a flatbed truck and lowered into place using a small truck-mounted crane. The pull/splice box would then be connected to the underground conduits before being covered with at least 2.5 feet of compacted fill. The area around the pull/splice box would be restored with native soil saved from the initial excavation.

After installation of the conduit, the project proponents would install the communication cable in the conduits. Each cable segment would be pulled into the conduit, spliced at each splice box, and terminated at the transition where the lines convert to overhead. To pull the cable through the conduit, a cable reel would be placed at one end of the section and a pulling rig would be placed at the other end. A large rope would then be pulled into the conduit using a fish line, and attached to the cable-pulling eyes. The cable-pulling eyes would then be attached to the cable and the cable is then pulled through the conduit. A lubricant would be applied to the cable as it enters the conduit to decrease friction during pulling.

70 kV Power Line Construction

Site Preparation and Grading

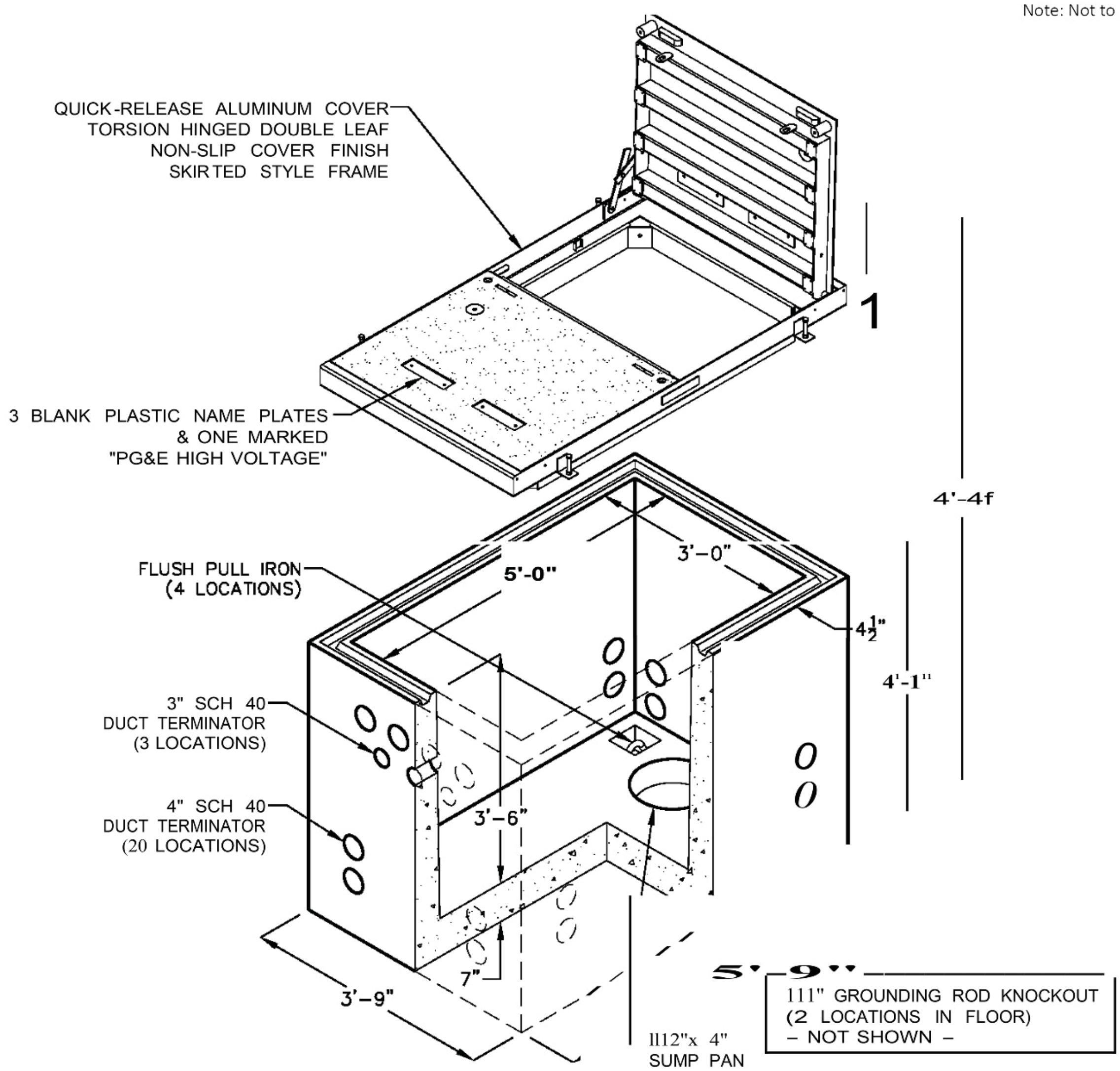
Power line installation would begin with the clearing of the work areas at the location of each structure using a mower and/or backhoe. If necessary, minor grading may be conducted to develop a flat, safe area.

Crossing Structure Installation

Crossing structures would be installed to protect existing roadways and other facilities from sagging conductors during construction. PG&E would auger an approximately 2-foot-diameter, 8-foot-deep hole within each crossing structure work area to facilitate the crossing structure installation. The temporary wood poles would then be placed in the excavations by using a small crane, line truck, or loader, and secured by backfilling and compacting the excavated material into the remaining void. In areas where crossing protection may be short in duration or of low risk, equipment (e.g., line trucks or cranes) may be used in place of crossing structures to shield the crossing from potentially sagging conductors. Crossing structures may also be mounted on line trucks rather than in the ground.

Netting may be used if required for crossing over major roads. A crossing structure would be installed on both sides of the road and netting would be strung between the structures. When crossing SR-46, an additional structure may be needed in the median to help support the netting over the highway. The crossing structure would be installed according to encroachment permit requirements.

Note: Not to scale.



Source: NEET West and PG&E 2017

Figure 2-19.
Typical Pull/Splice Box

Estrella Substation and Paso Robles Area
Reinforcement Project

Power Line Structure Installation

The 70 kV TSPs would be installed on concrete pier foundations. Large augers and drill rigs would complete the required excavations and, if necessary, a reinforcing steel rebar cage would then be lowered into the excavation. An approximately 2-foot-tall form would be constructed, and concrete would then be poured to fill the excavation. Each completed foundation would be left to cure for 7 to 14 days. LDSPs would be direct-embedded and would not require a foundation. Table 2-8 shows a summary of the typical power line structure foundation dimensions.

Table 2-8. Power Line Route Structure Foundation Summary

Foundation Type	Quantity	Approximate Diameter (feet)	Approximate Depth (feet)	Approximate Excavation Volume (cy)	Approximate Concrete Volume (cy)
70 kilovolt (kV) Light Duty Steel Pole	110	3.0	12.0–20.0	3.1–5.2	0
70 kV Tubular Steel Pole	47	4.5–5.0	16.5–18.0	7.9–10.9	9.7–13.1

Notes: cy = cubic yards; kV = kilovolt

Source: NEET West and PG&E 2017

Typical equipment used for power pole installation includes truck-mounted augers and drills to excavate the holes. When foundations are needed, concrete trucks supply and pour concrete into installed holes. Cranes are used to lift and place new poles/towers into the newly installed holes or foundations. Cranes and/or bucket trucks lift workers into elevated positions to work on newly installed poles or towers. Crew cab and pickup trucks are used to transport workers and tools to each installation site. Water trucks and portable water tanks are used to minimize fugitive dust during excavation and restoration activities.

New TSPs, along with crossarms, insulators, and hardware, would be delivered to structure sites in two or more sections using a flatbed truck and assembled on site. The crossarms would be attached, the pole would be placed onto the cured concrete and anchor bolt foundation using cranes, and the pole would be secured using the appropriate hardware. If the pole is delivered in multiple segments due to access restrictions or other engineering considerations, the segments would be placed in order and secured using hardware. In areas of difficult terrain, poles may be delivered and assembled on their foundations using a helicopter. Once the pole is installed, additional hardware would be added to the crossarms using a bucket truck. If applicable, the existing conductor would then be attached to the new TSP hardware. Excess soils would be removed to the staging area and then covered, tested, and disposed of, as required.

Similar to TSPs, LDSPs, as well as crossarms, insulators, hardware, and any wood poles, would be delivered to structure sites in flatbed trucks. As noted above, the LDSPs would be embedded directly into the ground and would not require a separate concrete foundation. Installation includes excavation of an up to 3-foot-diameter, 12- to 20-foot-deep hole. Following the excavation process, the poles, insulators, and hardware would be assembled. The poles would then be placed into the excavated hole using line trucks or cranes, the remaining void would be backfilled, and the backfill area would be compacted using portable compacting machinery. Once the pole is embedded and the backfill area is compacted, additional hardware may be added to the pole using a bucket truck. If applicable, the existing distribution conductor would then be attached to the new LDSP hardware.

Existing Structure Removal

Following the transfer of the existing distribution and 70 kV conductors to the new poles along the reconductoring segment or transfer of the existing distribution line to the new 70 kV power line segment poles, crews would remove existing distribution and power line poles and hardware using cranes, aerial man lifts, and/or helicopters. In the new 70 kV power line segment, approximately 40 existing distribution poles would be removed. In the reconductoring segment, approximately 50 power line poles would be replaced and about 12 existing distribution poles would be removed or replaced. Old wood poles would simply be lifted out of the ground using mechanical equipment. Removal of steel poles would occur by excavating an area around the pole to a depth of approximately 2 to 4 feet, or deeper if requested by private property owners. The pole would then be cut off and the remaining base would be buried in place.

All removed poles would be transported off site to the staging area or to the PG&E Service Center for reuse evaluation. ~~Bases of the poles would then be removed by excavating the area around the base.~~ The remaining void would then be backfilled with native soil saved from other excavations in the surrounding area. The site would be returned, as near as practicable, to its original contours (or in accordance with prearranged landowners agreements, where applicable).

Electric Distribution Line Outages

During construction, sections of distribution lines that would cross the project or would be collocated on the new 70 kV power line segment may be temporarily taken out of service. As part of its normal operating procedures, PG&E's Distribution System Operations group would coordinate taking the distribution lines out of service (i.e., taking a clearance). The Distribution System Operations group would assess how to accomplish the clearances, identify where and when clearances may occur, notify customers being served by the distribution line that power outages could occur, manage the clearances, and retain balance in the system by routing power to minimize customer outages.

To accomplish the clearances and maintain balance in the system, the Distribution System Operations group must operate switches at locations along the distribution lines being taken out of service, or along other distribution lines that may be affected by taking a line out of service. Sometimes ~~the switches are thrown at a~~circuit breakers are opened at a central location, such as a substation~~,~~; and sometimes switches are operated remotely by System Operations. Other times, the System Operations team must physically drive to a field location and operate the switch manually. Because switches are often located above ground level on distribution poles, bucket trucks are used to enable a worker to reach the switches. Operating a switch takes a matter of minutes and the worker would return to other work once the switching is completed. These distribution-switching activities take place throughout PG&E's service territory and are an integral part of PG&E's ongoing operational activities.

Conductor Installation

The new pole line conductor installation process would begin by temporarily attaching sheaves and rollers to the lower end of the insulators to allow the conductor to be pulled along the line. A rope would then be pulled through the rollers from structure to structure. In instances where terrain is difficult, or the use of a bucket truck or aerial man lift is not feasible, this may be accomplished using a helicopter. Once the rope is in place, it would be attached to a steel cable and pulled back through the sheaves. The conductor would then be attached to the steel cable and also pulled back through the sheaves and into place. Pulling would be completed using conventional tractor-trailer pulling equipment located within one of the substations or within designated pull sites located along the alignments. The pulling through each structure would be done under a controlled tension to keep the conductor elevated and away from obstacles.

The reconductoring installation process would be completed in a similar manner to the new pole line conductor; beginning by temporarily attaching sheaves and rollers to the lower end of the insulators, and putting the old conductor into the roller. The new conductor would then be attached to the old conductor and pulled through the sheaves and into place using similar conventional tractor-trailer pulling equipment and methods, as described above.

After the new conductor has been pulled into place, the sag between the structures would be adjusted to a pre-calculated tension. The conductor would then be attached to the end of each insulator, the sheaves would be removed, and vibration dampers and other hardware accessories would be installed. The existing 12 kV distribution line would be transferred from the existing poles to new poles, where applicable. Old line would be removed from the sites on a line truck with trailer.

Reasonably Foreseeable Distribution Components

Construction of the reasonably foreseeable new distribution line segments would follow a similar process to the 70 kV power line construction, but on a smaller scale. No site preparation or grading would be required for the distribution line construction and reconductoring. Distribution poles would be direct-embedded and, once installed, conductors would be strung using reel trailers pulled behind trucks that park in flat areas. No outages would be required for construction of the new distribution line segments except to tie into the existing circuits. During reconductoring, any outages of the existing distribution lines should be minimal and limited to the close proximity to where the work is being done.

The work within the 70 kV substation to establish the reasonably foreseeable distribution feeders would follow a similar process to that described above for the Proposed Project (see “Below-Ground Construction” and “Above-Ground Construction”). This work would require some ground disturbance associated with construction of equipment foundations, but this would take place within the fence line of the already-constructed Estrella Substation. Equipment foundations would likely include drilled pier and pad type foundations. Trenching would likely be done to install additional conduits to route 21 kV cables and control cables between equipment and the existing control building. Once the 70/21 kV transformer is in place, a concrete curb would likely be poured to create a containment basin, then mineral oil would be delivered to complete the final assembly of the unit. The 70/21 kV transformer would be constructed with secondary containment design for oil containment in the event of a spill.

All equipment would be tested after installation and wiring, and before placing in service. Equipment would be placed in service once individual circuits are ready to be energized and have been tested outside the substation.

Ultimate Substation Buildout

Ultimate buildout of the Estrella Substation would follow a similar process to that described for the Proposed Project. Specifically, new equipment (e.g., transformer, breakers, switches, etc.) within the 230 and 70 kV substations would be installed, tested, and commissioned in a similar manner to that described under "Below-Ground Construction" and "Above-Ground Construction" for the Proposed Project. Some ground disturbance would be required for constructing the equipment foundations and substation wiring, but this would occur within the fence line of the already-constructed Estrella Substation. Construction of the additional 230 kV interconnection is assumed to follow a similar process to that described above for the Proposed Project, under the heading "230 kV Transmission Interconnection Construction".

2.5.2 Construction Temporary Work Areas and Access

Construction of the Proposed Project would require establishment of temporary work areas, such as staging areas, structure work areas, conductor pull and tension sites, and helicopter landing areas. Construction of temporary access roads also would be required. While locations for temporary work areas and access roads may need to be adjusted as part of final engineering and at the time of construction due to land use changes, avoidance of unanticipated environmental impacts, and other factors, approximate locations of temporary works areas are shown in Figure 2-6 and Figure 2-7. Table 2-9 provides a summary of the approximated temporary work area/disturbance area requirements for construction of the Proposed Project.

Table 2-9. Proposed Project Temporary Disturbance Areas

Temporary Work Area	Anticipated Site Preparation	Total Approximate Area (Acres)[1]
Estrella Substation		
Substation Work and Staging Areas	Vegetation removal and grading, including grape vines (and roots) and grasses.	~~6.2~~0.2
70 kV Power Line Alignment		
Staging Areas[2]	Vegetation removal may be required, temporary fencing and gates would be installed, gravel would be installed, and temporary power would be supplied by a distribution tap or generator.	35.3
Pole Work Areas[3]	Vegetation removal and minor grading may be required.	44.4
Crossing Structure Work Areas	Vegetation removal may be required.	1.1
Pull and Tension Sites	Vegetation removal may be required.	10.9

Temporary Work Area	Anticipated Site Preparation	Total Approximate Area (Acres)[1]
Landing Zones	Sites would be leveled free of obstacles and debris.	1.4
Access Roads	Existing unpaved roads may be improved within the existing road. Improvements include minor grading/blading and the placement of dirt and/or gravel. Overland access may require vegetation removal.	20.1
Reasonably Foreseeable Distribution Components[4, 5]		
Distribution Pole Work Areas	Vegetation removal may be required.	1.8
21/12 kV Pad-Mounted Transformer Work Areas	Vegetation removal and minor grading may be required.	1.5

Notes: kV = kilovolt; LDSP = light-duty steel pole; LST = lattice steel tower; TSP = tubular steel pole

1. Acreage totals do not account for overlapping work areas.
2. The Golden Hill Industrial Park Staging Area may be replaced with an approximately 10-acre staging area located on Paso Robles Municipal Airport property.
3. Includes work areas for new and replacement LSTs, TSPs, LDSPs, work areas required for removal of existing poles, and existing and new distribution poles.
4. If construction of the reasonably foreseeable distribution components occurs at the same time as the substation and 70 kV project components (not currently predicted), the staging area in the Golden Hill Industrial Park may be used. Otherwise, staging for construction of the distribution components may occur at the PG&E yard at Templeton Service Center.
5. Work within the Estrella Substation (installation of 70/21 kV transformer and associated equipment) for the reasonably foreseeable distribution components would not result in any new temporary disturbance outside of the substation fence line.
6. Specific temporary impact acreages associated with the additional 230 kV interconnection that could be installed as part of ultimate substation buildout are currently unknown. However, it is assumed that the additional 230 kV interconnection would be composed of LSTs, similar to the Proposed Project, which require a work area of 200 by 200 feet for each LST.

Source: NEET West and PG&E 2017

Staging Areas

Proposed Project construction would require four main staging areas: two staging areas supporting construction of the 70 kV power line alignment (one of which may also support construction of the distribution components), and two staging areas supporting construction of Estrella Substation. Depending on the timing of construction of the distribution components of the Proposed Project, an existing PG&E yard at Templeton Service Center may also be used. The largest staging area would be the Golden Hill Road Staging Area, which would be approximately 34.8 acres. The other staging area supporting the 70 kV power line construction would be located at Navajo Avenue, and would be approximately 0.5 acre. The two staging areas supporting construction of the Estrella ~~s~~Substation, totaling approximately 1.9 acres, would be located entirely within the 15-acre permanent disturbance area.

Staging areas would be used for receiving and staging of materials and equipment, laydown areas, and employee parking. Staging areas would also serve as the assembly point for project personnel, as well as in some cases, the location for temporary, portable bathroom facilities; equipment storage during off-work hours and weekends; materials storage; office trailer staging; and a meeting area, as needed, for project management. For work activities at the substation site and the main staging sites, a temporary overhead service drop (tap) or an underground service (run) would be extended to the sites to provide power if existing distribution facilities are present. If a distribution service from nearby distribution lines is not feasible for the staging area sites, these areas could receive power from temporary, portable generators.

Preparation of the two main staging areas supporting the 70 kV power line alignment would take approximately 4 weeks to complete and would include the following actions and improvements:

- Site leveling and grading;
- Installation of temporary in-ground fencing (if not already present), including 6- to 8-foot-tall chain-link fence, with up to 2 feet of barbed wire around the perimeter of each staging area with locking gates to control access;
- Placement of gravel or equivalent material within staging area to control dust, sedimentation, equipment track-out, and prevention of stormwater runoff leaving the site during rain events;
- Installation of temporary power from portable generators and/or taps to existing distribution lines in the area; and~~,~~
- Installation of necessary construction office trailers, sanitary facilities, and storage buildings.

Structure Work Areas

Structure work areas would be established at each new or replacement tower or pole that would be installed as part of the Proposed Project. These work areas would be used to facilitate the tower/pole assembly, erection, and hardware assembly processes. They would also be used to support the conductor installation and/or removal processes. The final tower/pole locations would be determined when engineering is complete and, where feasible, would be adjusted to account for property owner preferences. Structure work areas may also be adjusted to accommodate the final tower/pole locations.

These work areas would typically be centered on the tower/pole location and would vary in size depending on the type of tower/pole being installed. Typical work areas are about 100 feet by 100 feet for LDSPs, 150 by 150 feet for TSPs, and 200 by 200 feet for LSTs. These work areas may be cleared of vegetation and graded, if necessary, prior to their use. Some sites may also require tree trimming, tree removal, and/or vine removal. Work areas for existing and new distribution poles would typically be about 50 by 50 feet.

Temporary work areas would similarly be required for installation of crossing structures. These work areas would typically measure approximately 40 by 40 feet. Preparation of the site would typically be limited to mowing vegetation, as needed, to minimize the risk of fire. Approximate crossing structure locations for the 70 kV power line are depicted on Figure 2-7.

Pull and Tension Sites

Pull and tension sites, also known as stringing sites, would be used to install conductor on support structures. Pull and tension sites would only be needed for the 70 kV power line (not the distribution line). Conductor installation activities at stringing sites would include pull and tension equipment staging, temporary pole anchor installation, and pulling and tensioning of the conductor. In addition, select pull sites may provide the necessary work area needed for telecom-related activities. Proposed pull site locations are depicted on Figure 2-7.

Pull sites would typically be located within the power line easement and can be spaced between 0.5 and 1 mile apart. In locations where pulling would be required through an angle, or at the start of a new direction of the alignment, the pull site may be located at an angle outside the easement or off the end of an easement corner. Pull sites would typically be 70 feet wide and would range between approximately 120 and 150 feet long. Each stringing site would require about 0.25 acre.

Typical equipment required for pull and tension sites includes pullers, tensioners, cranes, crawlers, water trucks, crew cab trucks, and pickup trucks. Construction crews would access pull and tension sites using rubber tire mounted trucks. Access may be required throughout the easement, away from structure work areas and pull sites, to support pull and tension activities.

All pull sites located outside of paved areas may require vegetation trimming/removal to minimize the risk of fire and, depending on the local terrain, some minor grading may be required to ensure a flat and safe work environment. Depending on the time of year and field conditions at the time of construction, gravel may be applied to help stabilize the ground for equipment use.

Helicopter Landing Zones

Helicopter landing zones may be used during construction for the staging, storage, refueling, and operation of helicopters during construction. While the number and exact locations of helicopter landing zones may change depending on site conditions at the time of construction, six sites have been identified for use during the Proposed Project:

- Landing Zone 1: Paso Robles Municipal Airport;
- Landing Zone 2: Estrella Substation site, south of existing temporary worker residence adjacent to Union Road;
- Landing Zone 3: new 70 kV power line segment site north of Golden Hill Road (may be collocated with a stringing site);

- Landing Zone 4: new 70 kV power line segment site south of Buena Vista Drive;
- Landing Zone 5: reconductoring segment site west of Palo Alto Court (may be used as a staging area instead and may be collocated with a stringing site); and
- Landing Zone 6: reconductoring segment site west of Navajo Avenue (may be collocated with a stringing site).

Approximate locations of these potential landing zones are depicted on Figure 2-7. The two non-airport landing zones would measure about 100 by 100 feet, with a 30- by 30-foot touchdown pad area. Because the identified landing zones are comprised of an airport and two disturbed areas within the Proposed Project area, these landing zones would not require extensive preparation.

Construction Access

Construction crews, materials, and equipment would primarily access the Proposed Project site by using U.S. Route 101 and SR-46, and by traveling along Union Road, Golden Hill Road, or North River Road. In addition to using a system of existing paved and unpaved roads, the Applicants may also grade or mow segments of new temporary unpaved roads, or travel overland to provide access to Estrella Substation and/or pole locations along the new 70 kV power line and reconductoring and pole replacement segments. The new and reconductored distribution line segments would be accessed via an existing dirt road north of the proposed substation site and along other existing paved and unpaved roads (no new access would be needed for construction of the distribution components).

Access to the work sites for workers and equipment would occur using rubber tire mounted vehicles. Some 70 kV poles may also be accessed on foot if sensitive resources preclude the use of heavy equipment. For roads that require improvements for access and equipment delivery, grading could be conducted, if necessary, followed by the addition of temporary rock bedding. Equipment required for this work may include a grader, dump truck for gravel delivery, and a loader or tractor to spread rock. Work along the new 70 kV power line segment would occur from the road shoulder, where feasible.

Permanent and construction access to the proposed substations would be immediately off Union Road on a new private access road. The main access road would be paved and measure about ~~1,100~~1,700 feet long and about 20 feet wide. Construction access for the proposed 230 kV interconnection would occur using the same access route being used for substation construction. It is anticipated that access from the substation to the existing 230 kV transmission line would occur using PG&E’s existing utility easement, immediately adjacent to the Estrella Substation property boundary.

Helicopter Access and Use

Light-duty and medium-duty helicopters with a maximum payload capacity of approximately 4,000 and 10,000 pounds may be used to assist with the installation of new 70 kV poles and/or conductor installation and removal. Helicopters would primarily be used for such activities in areas along the power line alignment where limited access or local terrain conditions prohibit the work from being conducted by ground-based crews and equipment. Based on preliminary assessment of the proposed alignment, and for quantitative discussion purposes in the EIR, it is projected that helicopter activities may occur approximately 132 days during the 18-month construction period for the substation and 70 kV power line. It is anticipated that only one helicopter would be used at any one time.

Typical helicopter payloads would include, but not be limited to, poles, sock lines, power line hardware, crewmembers, and equipment. Refueling activities would occur only at the Paso Robles Municipal Airport. Flight paths for helicopters would be from the Paso Robles Municipal Airport and would generally extend directly to and along the power line easement. Helicopter operation would be planned to avoid sensitive receptors. Hours of operations for helicopters would generally be the same as those for construction, 7:00 a.m. to 5:30 p.m., Monday through Friday, and would include Saturdays when needed. In some cases, residents may need to relocate from their home temporarily during helicopter activities; this is discussed further in Section 4.14, “Population and Housing.”

2.5.3 Construction Workforce, Equipment, and Schedule

Different phases of the construction process would require varying numbers of construction personnel. On a typical workday, about 12 to 15 construction crewmembers would be working at Estrella Substation. Similarly, about 10 to 15 construction crewmembers would be working on the installation and/or removal of power line structures and on reconductoring activities. During pulling activities, a larger work team would be required to complete the various work stages. Typically, this activity would require about 30 workers, for short periods of time. During construction of the power line segment, up to four crews of approximately six workers each would be working at any one time. Project equipment, personnel requirements, and task duration by construction activity are presented in Table 2-10.

Construction would typically occur 6 days per week (Monday through Saturday) throughout the duration of construction<u>, although water trucks may be operated on Sundays for fugitive dust control in compliance with the Construction Activity Management Plan</u>. Daily work hours would generally be 10 hours per day with construction typically occurring between 7:00 a.m. and 5:30 p.m. Occasionally, work may occur during the evening hours for activities such as monitoring the substation foundation curing process, and testing and commissioning the new substation components. However, such activities would not normally generate loud nose. Nighttime work may also be required (e.g., when electrical clearances are available or for safe completion of a construction procedure).

2.5.4 Construction Power, Water Use, and Domestic Supply Services

Electric power required for construction of the Estrella Substation would be supplied by tapping into the existing power lines adjacent to the substation site. Small generators may also be used to supply temporary power during construction at the substation site.

The proposed substation site is not located within a water district or sewer service area. Water required for construction may come from several sources, including a private well located adjacent to the western edge of the substation site, a municipal water source, delivery by water trucks, or Lake Nacimiento, which is located northwest of Paso Robles. Another potential water source for construction would be recycled water from the City's newly upgraded wastewater treatment plant.

Table 2-10. Preliminary Construction Workforce and Equipment Use, and Approximate Task Durations

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Estrella Substation					
~~230 kV~~ Entire 15-acre Substation Site					
Access Roads	Workers	10	Skip Loader	2	Month ~~1~~4
	1-Ton Crew Cab Flat Bed, 4 x 4	1	Water Truck	1	
	Dump Truck	2	–	–	
Site Work Area Preparation Mobilization	Workers	10	Roller	2	Month 4-5~~1-2~~
	Bulldozer	1	Grader	1	
	Articulating Dump Truck	4	Tandem Axle Dump Truck	2	
	Scraper	1	Water Truck	2	
	Rubber Tire Loader	1	Pickup Truck	1	
Fence and Gate Installation	Workers	5	3-Ton Flat Bed Truck	1	Month 5~~2~~
	½-Ton Pickup Truck, 4 x 4	1	Bobcat	1	
	1-Ton Crew Cab Flatbed, 4 x 4	1	Water Truck	1	
230 kV Substation					
Foundation Construction	Workers	2–12	Water Truck	1	Month 5-6~~2-3~~
	Hole Digger	1	Pickup Truck	1	
	Backhoe/Dozer/Excavator	1	Crane or Boom Truck	1	
Ground Grid Conduit Installation	Workers	5	Water Truck	1	Month ~~3-4~~6-7
	Trencher	1	–	–	
Steel Bus Erection	Workers	5	Aerial Manlift	1	Month ~~4~~7-8
	Boom Truck	1	Water Truck	1	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Install Yard Rock	Workers	8	Dump Truck	1	Month ~~4-5~~7-8
	Bobcat	1	Water Truck	1	
Transformer and Equipment Delivery and Installation	Workers	5–8	Crane or Boom Truck	1	Month ~~4-5~~8-9
	2-Ton Truck	1	Tractor/Trailer	1	
	Pickup Truck	1	Portable Gas/Diesel Generator	1	
	Bucket Truck	2	–	–	
Control Enclosure Delivery and Install	Workers	6	Crane	1	Month ~~5~~8
Remaining Equipment Delivery and Install	Workers	2–5	Boom Truck	1	Month 8-9~~5-6~~
Cable Installation and Termination	Workers	5	Aerial Manlift	1	Month ~~5-6~~9
Testing and Commissioning	Workers	2–5	Pickup Truck with Trailer	2	Month 9-10~~6-7~~
Cleanup and Restoration	Workers	3	Front-End Loader	1	Month ~~7~~4-10
	Blader	1	Water Truck	1	
	Dump Truck	1	–	–	
70 kV Substation					
Site Work Area Preparation Mobilization	Workers	6	Grader	1	Month ~~1-2~~5
	Backhoe/Dozer/Excavator	1	1-Ton Pickup Truck, 4 x 4	2	
Foundation Construction	Workers	6	Trencher	1	Month ~~2-3~~6-7
	Hole Digger	1	1-Ton Pickup Truck, 4 x 4	1.75	
	Backhoe/Dozer/Excavator	1	–	–	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Ground Grid/Conduit Installation	Workers	4	1-Ton Pickup Truck, 4 x 4	1	Month 6-7~~2-3~~
	Backhoe/Dozer/Excavator	1	Trencher	1	
Steel Bus Erection	Workers	8	Aerial Manlift	2	Month 8~~3-4~~
	Boom Truck	2	1-Ton Pickup Truck, 4 x 4	2	
Equipment Delivery and Installation	Workers	6	Aerial Manlift	2	Month 9~~4~~
	Boom Truck	1	1-Ton Pickup Truck, 4 x 4	2	
Control Enclosure Delivery and Install	Workers	5	1-Ton Pickup Truck, 4 x 4	2	Month 9-10~~4~~
Cable Installation and Termination	Workers	5	1-Ton Pickup Truck, 4 x 4	2	Month 9-10~~4-5~~
Install Yard Rock	Workers	6	Dump Truck	1	Month ~~5~~10
	Bobcat	1	Backhoe/Dozer/Excavator	1	
Cleanup and Restoration	Workers	4	1-Ton Pickup Truck, 4 x 4	1	Month 10~~5~~
Testing and Commissioning	Workers	4	1-Ton Pickup Truck, 4 x 4	1	Month ~~6~~11-12
230 kV Transmission Interconnection					
Site Work Area Preparation Mobilization	Workers	8	Grader	1	Month 1~~-2~~
	½-Ton Pickup Truck, 4 x 4	1	1-Ton Crew Cab Flat Bed, 4 x 4	1	
	Backhoe/Dozer/Excavator	1	Water Truck	1	
Foundation Tower Installation/ Removal of One Tower	Workers	10	Pickup Truck	2	Month 1-7~~2-3~~
	Crane	3	Dump Truck	1	
	Bucket Truck	2	2-Ton Truck	2	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
	Concrete Truck	2	Forklift	3	
	Drill	1	Line Truck	2	
	Backhoe	1	Water Truck	1	
Conductor	Workers	15	Line Truck	2	Month 8~~4~~
	Bucket Truck	2	Pickup Truck/Crew Truck	4	
	Crane	3	–	–	
Cleanup and Restoration	Workers	5	Pickup Truck	1	Month 9~~5~~
	Grader	1	Water Truck	1	
	Backhoe	1	–	–	
70 kV Power Line					
Reconductoring Segment					
Site Work Area Preparation Mobilization	Workers	6	Grader	1	Month ~~1~~3
	1-Ton Crew Cab Flat Bed, 4 x 4	1	Water Truck	1	
	Pickup Truck	1	Backhoe	1	
Pole Installation/Transfer/ Distribution/Removal	Workers	20	Water Truck	1	Month 3-9~~2-7~~
	Crane/Basket	3	Helicopter	1	
	Heavy Crane	1	Bucket Truck	2	
	Drill	1	Line Truck	2	
	1-Ton Crew Cab Flat Bed, 4 x 4	3	2-Ton Truck	3	
	Pickup Truck	3	–	–	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Conductor Installation	Workers	15	Wire Puller	1	Month 5-9~~3-7~~
	Line Truck	2	Tensioner	1	
	Pickup Truck	2	Wire Truck/Trailer	1	
	2-Ton Truck	2	Forklift	1	
	Crane/Basket	2	Medium Duty Helicopter	1	
	Bucket Truck	2	Water Truck	1	
Cleanup and Restoration	Workers	6	Backhoe	1	Month ~~8~~ 10
	Pickup Truck	1	Water Truck	1	
	Grader	1	–	–	
New 70 kV Power Line Segment					
Site Work Area Preparation Mobilization	Workers	6	Grader	2	Month ~~8~~10
	1-Ton Crew Cab Flat Bed, 4 x 4	1	Backhoe	1	
	Pickup Truck	1	Water Truck	2	
Pole Tower Installation	Workers	21	2-Ton Truck	3	Month ~~9-16~~10-18
	Concrete Truck	3	Line Truck	3	
	Backhoe	2	Utility Truck	1	
	Tractor Trailer	1	Water Truck	2	
	Pickup Truck	3	Crane	1	
	Bucket Truck	3	–	–	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Conductor Installation	Workers	18	Wire Truck/Trailer	1	Month 18-20~~17-18~~
	Line Truck	3	Crane with Basket	3	
	Pickup Truck	3	Bucket Truck	2	
	2-Ton Truck	3	Light Duty Helicopter	1	
	Wire Puller	1	Fork Lift	1	
	Tensioner	1	Water Truck	1	
Cleanup and Restoration	Workers	6	Backhoe	1	Month ~~18~~21
	Pickup Truck	1	Water Truck	1	
	Grader	1	–	–	
Reasonably Foreseeable Distribution Facilities[1, 2]					**Total of 19 Weeks**
Mobilization	Workers	6	2-Ton Truck	1	2 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	3	Backhoe	1	
	Water Truck	1	–	–	
Foundation Construction	Workers	2–12	2-Ton Truck	1–3	6 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	1–3	Backhoe	1	
Ground Grid/Conduit Installation	Workers	5–10	2-Ton Truck	1	4 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	1-2	Crane	1	
Steel/Bus Erection	Workers	5	Pickup Truck	1	4 weeks
	Concrete Truck	2	2-Ton Truck	1	
Distribution Bank and Breaker Installation	Workers	5	Semi-trailer Truck	1	3 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	2	Crane	1	

Proposed Project Task	Workers, Equipment	Quantity per Day	Equipment	Quantity per Day	Estimated Work Dates
Distribution Feeder, Conduit, Boxes, Underground Cable, Riser Poles, Line Work	Workers	8	Line Truck	2	6 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	1	Backhoe	1	
	2-Ton Truck	1	Crew Truck	2	
Cable Installation and Termination and Indoor Control Building Work	Workers	3–5	I-Ton Pickup Truck, 4 x 4	1	4 weeks
	1-Ton Crew Cab Flat Bed, 4 x 4	2	2-Ton Truck	1	
	Backhoe	1	–	–	
Testing	Workers	3	I-Ton Pickup Truck, 4 x 4	3–4	4 weeks
Cleanup and Restoration	Workers	3	1-Ton Crew Cab Flat Bed, 4 x 4	1	2 weeks
	1-Ton Pickup Truck, 4 x 4	3	Water Truck	1	
	Backhoe (or similar)	1	–	–	

Notes: kV = kilovolt

1. Assumes build-out of the reasonably foreseeable 70/21 kV facilities within the 70 kV substation and construction/reconductoring of the new Estrella distribution feeders.
2. Specific construction schedule information and personnel and equipment requirements associated with ultimate substation buildout are not known at this time. However, Table 2-10 provides a reasoned approximation of the required number of workers and equipment associated with construction of the Proposed Project, incorporating additional input and construction phasing refinements from HWT in comments on the DEIR and responses to Data Request No. 6.

Source: NEET West and PG&E 2017

Construction of the substation and power line would require approximately 10.3 million gallons of water total during the construction period (about 32 acre-feet), with 8.3 million gallons required for the substation and 2 million gallons required for the power line. About 25 percent of the total water used would be for construction activities (e.g., concrete mixing), with the remaining 75 percent used for dust control during the construction period. Daily water use during the construction period would vary based on the construction phase, but it is estimated that the average water use per day would be about 68,600 gallons. Portable restroom facilities would be provided at the site for worker use during the construction period.

2.5.5 Cleanup and Restoration

Surplus material, equipment, and construction debris would be removed at the completion of construction activities. All man-made construction debris would be removed and recycled or disposed of at permitted landfill sites. Cleared trees would be chipped and stored for later use during site restoration, left on the property owner’s site, or disposed of off-site, depending on landowner and agency agreements.

All areas temporarily disturbed by the Project would be restored to the extent practicable, following construction. These disturbed areas include staging areas and access roads, work areas around each tower/pole, and the areas used for conductor stringing and staging. Post-construction restoration activities would include returning areas to their original contours and drainage patterns in accordance with stormwater pollution prevention plan best management practices and as prearranged through landowner agreements, where applicable.

All temporarily disturbed areas within and around Estrella Substation would be restored to the extent necessary for safe operation. All construction waste would be disposed of in accordance with applicable federal, state, and local laws regarding solid and hazardous waste disposal through transport to an authorized landfill.

2.6 Proposed Project Operations and Maintenance

The Applicants would operate all new and existing components of the Proposed Project according to their respective standard operating protocols and procedures. The Applicants anticipate using similar substation monitoring, control, and data acquisition architecture (e.g., SCADA) as used for their other power delivery assets, including the use of standard monitoring, control, protection equipment, circuit breakers, and other line relay protection equipment. The substation would be dual scanned from PG&E and HWT data centers, and redundant Inter-Control Center Communications Protocol servers would exchange SCADA data with CAISO with real-time situational awareness. The SCADA support personnel would perform daily checks of the applications and hardware to ensure they are in proper working order. The SCADA system would also be maintained to ensure compliance with NERC Critical Infrastructure Protection Standard requirements.

The proposed 230 kV substation would be remotely operated from a control center operated by a HWT affiliate, while the proposed 70 kV substation would be remotely operated by PG&E from its Grid Control Center. HWT and PG&E operations and maintenance personnel would generally perform monthly inspections of their respective substation facilities. More invasive checks, calibrations, and maintenance on the substation components would be performed periodically.

HWT has a CPUC-approved 2020 Wildfire Mitigation Plan (WMP) that provides a strategic framework for systematic reduction of HWT's potential wildfire risk and enhanced transmission system reliability. The 230 kV Estrella Substation would be incorporated into a future annual HWT submission of its WMP.

The proposed 70 kV power line components would operate unattended. An approximately 10-foot radius (approximately 314 square feet) may be maintained around new 70 kV power poles depending on location and equipment installed as required by applicable law, including CPUC G.O. 95. Project proponents may, therefore, keep these areas clear of natural vegetation. Vegetation growing too close to conductors within the easement would be trimmed or removed for safety. Herbicides may be used for some vegetation maintenance activities.

Inspections of the 70 kV power line segments would be performed annually by PG&E routine patrols, either from the ground or by helicopter. A detailed inspection of the power lines is typically performed by staff every 2 years (wood structures), with an air patrol inspection performed in between, as outlined in PG&E's 2016 Electric Transmission Preventative Maintenance Manual. For lines constructed on steel structures, detailed inspections would occur every 5 years. The inspection process involves routine patrols from existing local staff either on the ground or by helicopter tasked with patrolling the power lines. Normal inspection and patrols would typically be completed in a pickup truck and/or an off-road utility vehicle. While not expected, if walking is required, the inspector would complete portions of the inspection on foot. Climbing inspections would be performed on an as-needed basis, based on specific identified conditions and in compliance with CAISO guidelines and regulations.

With build-out of the distribution components, PG&E would continue to operate the 70 kV substation remotely from its Grid Control Center. The distribution feeders would continue to be operated and controlled from PG&E's Distribution Operations Office located in Concord, California. Existing operation and maintenance crews would monitor the distribution facilities as part of their current operation and maintenance activities. The distribution feeders would operate unattended.

2.7 Anticipated Permits and Approvals

The Proposed Project may be subject to a number of other regulatory permits and approvals, depending in part on the environmental analysis contained in this EIR, further surveys of environmental resources on or near the Proposed Project site, and the discretion of the regulatory agencies. Anticipated required permits and regulatory approvals for the Proposed Project are listed in Table-2-11 below.

Table 2-11. Anticipated Permits and Approvals and Applicable Regulatory Requirements

Regulatory Agency	Jurisdiction/Purpose	Permit/Authorization Type
Federal		
Federal Aviation Administration	Determination of No Hazard to Air Navigation	Aeronautical Study (7460-2 form)
State		
California Public Utilities Commission	Construction, modification, or alteration of power line facilities	Permit to Construct (G.O. 131-D)
California Department of Transportation	For use of California State highways for other than normal transportation purposes, including construction activities completed within the easement.	Standard Encroachment Permit
California Department of Transportation	Transport of oversize and/or overweight equipment (e.g., 230/70kv transformer and control house)	Transportation Permit
State Water Resources Control Board	Construction activities disturbing 1 acre or more of soil must submit a Notice of Intent to comply with the terms of the general permit.	National Pollution Discharge Elimination System Storm Water Permit
Local or Regional		
San Luis Obispo Air Pollution Control District	For conducting activities which may result in air pollution.	Air Pollution Control District Permit
City of Paso Robles	Construction in and adjacent to City property and right-of-way.	Encroachment Permit
County of San Luis Obispo	Construction in and adjacent to County property and right-of-way.	Encroachment Permit

Source: NEET West and PG&E 2017

2.8 Applicant Proposed Measures

The Applicants propose to implement measures to avoid and/or reduce potential impacts of the Proposed Project. Applicant-proposed measures (APMs) that would be implemented for the Proposed Project are listed in Table 2 12.

Table 2-12. Applicant-Proposed Measures

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
General				
GEN-1	**Prepare and Implement a Worker Environmental Awareness Program.** The project proponents will prepare and implement a project-specific worker environmental awareness program (WEAP) for construction personnel. All on-site construction personnel will attend the training before they begin work on the project. WEAP training materials will include avoidance and minimization measures being implemented to protect biological resources, surface and groundwater resources, cultural resources, and paleontological resources; minimize air quality impacts; and manage hazardous materials. WEAP training will also discuss terms and conditions of any permits or agreements, information on federal and state environmental laws, and consequences and penalties for violation or noncompliance with these laws and regulations and project permits. Workers will be informed about the presence, identification, life history, and habitat requirements of the special-status species that have a potential to occur in the project area. More specifically, training will include: ▪ Recognizing/avoiding exclusion areas and sensitive habitat and specific avoidance or minimization measures for sensitive species and habitats; ▪ How to identify cultural resources; avoidance requirements and procedures to be followed if unanticipated cultural resources are discovered during construction; disciplinary actions that may occur when historic preservation laws and project proponent policies are violated;	✓	✓	✓

[10] If the distribution components are constructed at the same time as the rest of the Proposed Project.

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	▪ How to identify paleontological resources, including types of fossils that could occur in the project area and types of lithologies in which the fossils could be preserved; avoidance requirements and procedures to be followed if a fossil is discovered during construction; penalties for disturbing paleontological resources; ▪ Hazardous substance spill prevention and containment measures; and ▪ Review of mitigation and avoidance measures. A brochure prepared by the project proponents conveying this information will be prepared for distribution to all construction staff and other individuals who enter the construction footprint. All WEAP trainees will receive a project sticker for their hard hat to show they have been trained, and will sign a training sign-in sheet verifying participation and that they understand the training and will comply with the information presented. Focused trainings may be directed at an individual's job-specific task, provided that the worker conducts activities within a limited scope (pilots, delivery drivers, site visitors, etc.).			
Aesthetics				
AES-1	**<u>Substation Hardscaping.</u>** Decorative rock and/or other hardscape landscaping will be installed between Estrella Substation and Union Road.	✓	N/A	N/A
AES-2	**<u>Light and Glare Reduction.</u>** Construction lighting and permanent substation exterior lighting will be selectively placed and shielded to minimize nighttime glare.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
Agriculture and Forest Resources				
AG-1	**<u>Coordinate with Landowners, Farmers, and Ranchers Regarding Construction Activities.</u>** The project proponents will work with farmers, ranchers, and landowners to schedule project-related construction activities in a manner that avoids conflicts with harvest and planting periods, to the extent feasible, and in a manner that minimizes disruptions to agricultural operations. Access across active fields shall be negotiated with the landowner in advance of any construction activities. Coordination will include advance notice of construction activities and reporting of complaints, as follows: ▪ Prior to construction, the project proponents will give at least 30 days' advance notice of the start of construction-related activities. Notification shall be provided by mailing notices to all properties within 300 feet of the substation or power line route. The notice will describe where and when construction activity is planned and shall provide contact information for a point of contact for complaints related to construction activities. ▪ Prior to commencing ground-disturbing activities, the project proponents will submit a copy of the template used for the notification letter and a list of the landowners notified to the California Public Utilities Commission (CPUC).	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
Air Quality				
AIR-1	**<u>Minimize Reactive Organic Gases (ROG), Oxides of Nitrogen (NOx), and Particulate Matter (PM) Combustion.</u>** ▪ Maintain all construction equipment in proper tune according to manufacturer's specifications; ▪ Fuel all off-road and portable diesel-powered equipment with California Air Resources Board (CARB)-certified motor vehicle diesel fuel (non-taxed version suitable for use off-road); ▪ Use on-road heavy-duty trucks that meet CARB's 2010 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the state On-Road Regulation; ▪ Construction or trucking companies with fleets that that do not have engines in their fleet that meet the engine standards identified in the above two measures (e.g., captive or NOx exempt area fleets) may be eligible by proving alternative compliance; ▪ All on and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated staging areas and substation site to remind drivers and operators of the 5-minute idling limit; ▪ Electrify equipment when feasible; ▪ Substitute gasoline-powered in place of diesel-powered equipment, where feasible; and ▪ Use alternatively fueled construction equipment on site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
AIR-2	**Air Quality Best Available Control Technology for Construction Equipment.** Best available control technology measures for the project include: ▪ Reducing emissions by expanding use of Tier 3 off-road- and 2010 on-road-compliant engines; and ▪ Installing California Verified Diesel Emission Control Strategies.	✓	✓	✓
AIR-3	**Minimize Fugitive Dust.** ▪ Reduce the amount of the disturbed area where possible. ▪ Use water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site. ▪ All dirt stock pile areas should be sprayed daily as needed. ▪ All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by San Luis Obispo Air Pollution Control District. ▪ Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface. ▪ All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114. ▪ Sweep streets at the end of each day if visible soil material extending over 50 feet is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where possible.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
Biological Resources				
BIO-1	**Conduct Pre-Construction Survey(s) for Special-Status Species and Sensitive Resource Areas.** Biologists will conduct pre-construction survey(s) for special-status species and sensitive resource areas immediately prior to construction activities within suitable aquatic and upland habitat for special-status species. If a special-status species is encountered on the project site, the project proponents will be contacted immediately to determine the appropriate course of action. For federally or state listed species, the project proponents will contact the appropriate resource agency (U.S. Fish and Wildlife Service [USFWS] and/or California Department of Fish and Wildlife [CDFW]), as required.	✓	✓	✓
BIO-2	**Avoid Impacts on Nesting Birds.** If work is scheduled during the nesting season (February 1 through August 31), nest detection surveys will correspond with a standard buffer for individual species in accordance with the species-specific buffers set forth in the project proponent's *Nesting Birds: Specific Buffers for PG&E Activities*, and will occur within 15 days prior to the start of work activities at designated construction areas, staging areas, and landing zones to determine nesting status by a qualified biologist. Nest surveys will be accomplished by ground surveys and/or by helicopter and will support phased construction, with surveys scheduled to be repeated if construction lapses in a work area for 15 days between March and July. Access for ground surveys will be subject to property access permission. Helicopter flight restrictions for nest detection surveys may be in effect for densely populated residential areas, and will include observance of appropriate established buffers and avoidance of hovering in the vicinity of active nest sites.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	If active nests containing eggs or young are found, the biologist will establish a species-specific nest buffer, as defined in the project proponent's *Nesting Birds: Specific Buffers for PG&E Activities*. Where feasible, standard buffers will apply, although the biologist may increase or decrease the standard buffers in accordance with the factors set forth in *Nesting Birds: Specific Buffers for PG&E Activities*. Nesting pair acclimation to disturbance in areas with regularly occurring human activities will be considered when establishing nest buffers. The established buffers will remain in effect until the young have fledged or the nest is no longer active as confirmed by the biologist. Active nests will be periodically monitored until the biologist has determined that the young have fledged or once construction ends. Per the discretion of the biologist, vegetation removal by hand may be allowed within nest buffers or in areas of potential nesting activity. Inactive nests may be removed in accordance with PG&E's approved avian permits. The biologist will have authority to order cessation of nearby project activities if nesting pairs exhibit signs of disturbance. All references in this applicant-proposed measure (APM) to qualified wildlife biologists refer to qualified biologists with a bachelor's degree or above in a biological science field and demonstrated field expertise in ornithology, in particular, nesting behavior.			
BIO-3	**<u>Biological Monitoring.</u>** Biologists will monitor initial ground-disturbing activities in and adjacent to sensitive habitat areas to ensure compliance with best management practices and APMs, unless the area has been protected by barrier fencing to protect sensitive biological resources and has been cleared by the biologists. The monitor will have authority to stop or redirect work if construction activities are likely to affect sensitive biological resources.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	If a listed wildlife species is encountered during construction, project activities will cease in the area where the animal is found until the qualified biologist determines that the animal has moved out of harm's way or, with prior authorization from USFWS and/or CDFW if required, relocates the animal out of harm's way and/or takes other appropriate steps to protect the animal. Work may resume once the qualified biologist has determined that construction activities will not harm any listed wildlife species. The project proponents will be responsible for any necessary reporting to USFWS and/or CDFW.			
BIO-4	**Special-Status Species Protection.** All trenches/excavations in excess of 2 feet deep will have a sloped escape ramp or be covered at the end of the day. All trenches and excavations will be inspected for wildlife at the beginning of the workday and prior to backfilling. In addition, open-ended project-related pipes 4 inches or greater in diameter will be capped if left overnight or inspected for wildlife prior to being moved. If a special-status species is discovered in a trench, excavation, or pipe, the animal will be left undisturbed, and the pipe will not be moved until the special-status species has left the area on its own accord. In the event that any special-status species is trapped and unable to leave on its own accord, a permitted biologist, defined as a qualified biologist that holds the appropriate federal and/or state permits, will recover and relocate the special-status species. In addition, all food scraps, wrappers, food containers, cans, bottles, and other trash from the project area will be deposited in closed trash containers or kept in closed vehicles. Trash containers will be removed from the project area on a regular basis.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
BIO-5	**Dead or Injured Special-Status Wildlife.** If any dead or injured special-status wildlife or birds protected by the Migratory Bird Treaty Act are discovered at the project site during construction, work will stop in the immediate vicinity. The project proponents will notify the on-call biologist and the appropriate resource agency (USFWS and/or CDFW) before construction is allowed to resume.	✓	✓	✓
Cultural Resources				
CUL-1	**Retain a Qualified Cultural Principal Investigator.** A cultural resources principal investigator, defined as an archaeologist who meets the Secretary of the Interior's Standards for professional archaeology, will be retained to ensure that all APMs related to archaeological and historical resources are properly implemented. The principal investigator may either be on staff with project proponents or an outside consultant, as appropriate for the project's needs, and will serve in a strictly supervisory capacity, overseeing crews charged with the application of the APMs in the field.	✓	✓	✓
CUL-2	**Avoidance.** The project is designed to avoid impacts to potentially California Register of Historical Resources (CRHR)-eligible resources identified within the study area. Potentially eligible (i.e., not evaluated) resources in the study area include archaeological sites 36052-S-001, 36052-S-002, and 36052-S-003. In addition, the Johnson House was evaluated for the project and is considered CRHR-eligible (pending CPUC concurrence). To avoid indirect and direct impacts to 36052-S-001, 36052-S-002, or 36052-S-003, a 50-foot buffer will be established around the boundary of each respective resource and designated as environmentally sensitive areas. If work within the 50-foot	N/A	✓	N/A

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	buffer cannot be avoided, then monitoring will be required. Methods of environmentally sensitive area delineation may include, as applicable, flagging, rope, tape, or fencing. The environmentally sensitive areas should be clearly marked on all pertinent construction plans. Construction activities will avoid impacts to the Johnson House entirely.			
CUL-3	**Inadvertent Discoveries.** In the event that unanticipated cultural materials are encountered during any phase of construction, all construction work within 50 feet of the discovery will cease and the principal investigator will be consulted to assess the find. Construction activities may continue in other areas. Avoidance of resources is the preferred option. However, if avoidance of a resource is not feasible, project proponents will assess the find for significance, as defined by Public Resources Code (PRC) Section 21083.2, through implementation of Phase II investigations. If resources are found to be significant, a detailed archaeological treatment plan, including Phase III data recovery, will be developed and implemented by a qualified archaeologist.	✓	✓	✓
CUL-4	**Discovery of Human Remains.** If human remains are discovered, all work within 50 feet of the discovery will cease and the environmental inspector or construction supervisor will notify the County coroner immediately. State of California Health and Safety Code Section 7050.5 stipulates that no further disturbance will occur until the County Coroner has made a determination of origin and disposition pursuant to PRC Section 5097.98. The lead cultural resource managers on staff with the project proponents (depending on the location of the remains) and the CPUC will also be notified of the find immediately. If the human remains are determined to be prehistoric, the County Coroner will notify the Native American Heritage Commission (NAHC), which would determine and notify a	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	most likely descendent. The most likely descendent will complete inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.			
CUL-5	**Tribal Construction Monitoring.** If it becomes necessary to work within 50 feet of Dry Creek, Huer Huero Creek, and the Salinas River, or known prehistoric archaeological sites, a tribal monitor will be selected by the CPUC and retained to conduct full-time monitoring of initial ground-disturbing activities (i.e., initial excavation and grading) in areas with high potential to discover prehistoric archaeological resources.	N/A	✓	N/A
CUL-6	**Archaeological Construction Monitoring.** If it becomes necessary to work within 50 feet of Dry Creek, Huer Huero Creek, and the Salinas River, or known prehistoric or historic sites, an archaeological monitor, approved by the principal investigator, will be retained to conduct monitoring of initial ground-disturbing activities (i.e., initial excavation and grading) in areas with high potential to discover prehistoric or historic archaeological resources.	N/A	✓	N/A
Geology and Soils (including Paleontological Resources)				
GEO-1	**Soft or Loose Soils.** Soft or loose soils, such as sands and loamy sands, are likely to be encountered during construction. Where soft or loose soils are encountered during design studies or construction, appropriate measures will be implemented to avoid, accommodate, replace, or improve soft or loose soils. Such measures may include the following:	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	▪ Locating construction facilities and operations away from areas of soft and loose soil.~~;~~ ▪ Over-excavating soft or loose soils and replacing them with non-expansive engineered fill.~~;~~ ▪ Increasing the density and strength of soft or loose soils through mechanical vibration and/or compaction.~~;~~ ▪ Treating soft or loose soils in place with binding or cementing agents.~~;~~ and ▪ Construction activities in areas where soft or loose soils are encountered may be scheduled for the dry season, as necessary, to allow safe and reliable equipment access.			
PALEO-1	**Retain a Qualified Paleontological Principal Investigator.** A paleontological resources principal investigator who meets the standards set forth by the Society of Vertebrate Paleontology will be retained to ensure that all APMs related to paleontological resources are properly implemented.	✓	✓	✓
PALEO-2	**Inadvertent Discoveries.** If paleontological resources are discovered during construction activities, the following procedures will be followed: ▪ Stop work immediately within 50 feet. ▪ Contact the designated lead on staff with the project proponents (depending on the location of the resource) immediately. The designated lead will notify the CPUC. ▪ Protect the site from further impacts, including looting, erosion, or other human or natural damage. ▪ The principal investigator will evaluate the discovery and make a recommendation to the CPUC as to whether or not it is a unique	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	paleontological resource. The CPUC will have 24 hours to respond to this recommendation, and the lack of response within 48 hours will indicate concurrence with the recommendation. ▪ If the resource is not a unique paleontological resource, then it will be documented appropriately, and no further measures will be required. ▪ If the resource is a unique paleontological resource, the principal investigator, in consultation with the project proponent, will recommend resource-specific measures to protect and document the paleontological resource, such as photo documentation and avoidance or collection. The CPUC will have 24 hours to respond to these measures, with no response within 48 hours indicating concurrence. Unique resources inadvertently discovered during augering will be documented as indicated above, but, due to safety concerns, any remaining resource below ground will not be salvaged. If the resource can be avoided, then CPUC concurrence will not be necessary. ▪ If collection is necessary, the fossil material will be properly prepared in accordance with the project proponents, Society of Vertebrate Paleontology guidelines, and CPUC requirements, and/or curation at a recognized museum repository. Appropriate documentation will be included with all curated materials. ▪ Any material discovered on private land is the property of the landowner and permission must be granted by the landowner for the material to be removed and curated. Once the resource is determined to be not unique, or appropriate treatment is completed as described above, work may resume in the vicinity.			

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
PALEO-3	**<u>Paleontological Construction Monitoring.</u>** Paleontological monitors, approved by the paleontological resources principal investigator, will be retained to conduct monitoring of the initial ground-disturbing activities as described below. Monitoring requirements vary with the sensitivity of the mapped sediments and the type of construction activity, as follows: 1. *Estrella Substation:* High Surface Sensitivity – project areas mapped as older alluvium (Qoa) or Paso Robles formation (Qtp): ▪ In locations where the ground has been previously disturbed by agricultural or other development, monitoring is required only when excavations or grading exceed the depth of previous disturbance. For augering within the substation site, the proponents will follow the protocol identified below under Power Line. ▪ In locations where no previous disturbance exists, full-time monitoring is required when excavations, grading, or trenching exceeds 3 feet in depth. During monitoring, a qualified paleontological monitor, as determined by the principal investigator, will observe construction activity as well as check any spoils piles to watch for the appearance of fossil resources. Low Surface Sensitivity – project areas mapped as Holocene alluvium (Qa or Qg) – no fossils at the surface: ▪ No monitoring is required for surface work.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	▪ Should ground disturbance exceed the depth of the Holocene sediments (estimated to be 5 feet), monitoring is required as described above for high sensitivity. 2. *Power Line:* High Surface Sensitivity – project areas mapped as older alluvium (Qoa) or Paso Robles formation (Qtp): ▪ Full-time monitoring will not be required along the power line route. ▪ Augering that uses a drill bit 3 feet, or less, in diameter will not be monitored. Small-diameter drill bits generally result in pulverized rock by the time they reach the surface, so any fossils contained within will not be identifiable. Larger-diameter drill bits (i.e., greater than 3 feet) often bring up intact chunks of rocks that may contain identifiable and scientifically important fossils (particularly microfossils). All large angled tubular steel pole locations will be monitored. ▪ During work, a portion of the excavated material will be examined visually and through screen-sifting, if necessary. If screening is necessary, then a sample of spoils may be collected and processed either on site or off site as work on the pole placement proceeds. Should unique fossil material be discovered, it may be recorded and collected if the resource is determined by the principal investigator to be worth salvaging. Otherwise it will be recorded and included in the final monitoring report. Should it be determined that the type of auger or drill being used renders monitoring not useful (i.e., materials come out of the hole in a			

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	pulverized powder or a silty mud), monitoring will be discontinued. ▪ Because it is extremely unsafe and impractical to excavate fossils from within an auger bore or drill hole, and to do so would unnecessarily disturb fossils further, no effort will be made to collect buried fossils indicated in spoils materials. However, the location and nature of the materials identified will be recorded, and this will be documented in the final monitoring report and reported to repositories as appropriate. These measures are based on the currently available data. As construction proceeds and additional data become available, the principal investigator could revise these measures with CPUC concurrence. Should monitors identify fossil remains during the course of construction, APM PALEO-2 will be implemented. All monitoring activities will be documented on daily logs. Monitoring logs and reports will include the activities observed, geology encountered, description of any resources encountered, and measures taken to protect or recover discoveries. Photographs and other supplemental information will be included as necessary. A final monitoring report will be developed to document locations, methods, and results of monitoring.			
PALEO-4	**Fossil Recovery.** In the event that unique paleontological resources are encountered, protection and recovery of those resources may be required. The principal investigator will oversee the recovery effort in consultation with the project proponents (depending on the location of the resource), the CPUC, and property owners as appropriate. The principal investigator may designate a paleontologist to implement the recovery, prepare specimens for	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	identification and preservation, and complete all field documentation in accordance with the project proponents, Society of Vertebrate Paleontology guidelines, and CPUC requirements, and/or curation at a recognized museum repository. If a fossil is not accepted by a museum for curation, then project proponents will have fulfilled their obligation for fossil recovery.			
Greenhouse Gas Emissions				
GHG-1	**Minimize Operational Sulfur Hexafluoride (SF_6) Emissions.** During operation and maintenance of Estrella Substation, the project proponents will do the following: ▪ Incorporate Estrella Substation into each of the project proponents' system-wide SF_6 emission reduction programs. CARB requires that company-wide SF_6 emission rate not exceed 1 percent by 2020. ▪ Upon construction completion, the project proponents will have implemented a programmatic plan to inventory, track, and recycle SF_6 inputs, and inventory and monitor system-wide SF_6 leakage rates to facilitate timely replacement of leaking breakers. X-ray technology is used to inspect internal circuit breaker components to eliminate dismantling of breakers, reducing SF_6 handling and accidental releases. As active members of the U.S. Environmental Protection Agency's SF_6 Emission Reduction Partnership for Electrical Power Systems, the project proponents have focused on reducing SF_6 emissions from their transmission and distribution operations. ▪ Require that the breakers at Estrella Substation have a manufacturer's guaranteed maximum leakage rate of 0.5 percent per year or less for SF_6.	✓	N/A	N/A

APM No.	Title/Description	Applicability: Estrella Substation	Applicability: Power Line	Applicability: Distribution Components[10]
	▪ Maintain substation breakers in accordance with the project proponents' maintenance standards. ▪ Comply with CARB's Early Action Items as these policies become effective.			
Hazards and Hazardous Materials				
HAZ-1	**<u>Hazardous Substance Control and Emergency Response.</u>** The project proponents will implement hazardous substance control and emergency response procedures as needed. The procedures identify methods and techniques to minimize the exposure of the public and site workers to potentially hazardous materials during all phases of project construction through operation. The procedures address worker training appropriate to the site worker's role in hazardous substance control and emergency response. The procedures also require implementing appropriate control methods and approved containment and spill-control practices for construction and materials stored on site. If it is necessary to store chemicals on site, they will be managed in accordance with all applicable regulations. Material safety data sheets will be maintained and kept available on site, as applicable. In the event that soils suspected of being contaminated (on the basis of visual, olfactory, or other evidence) are removed during site grading activities or excavation activities, the excavated soil will be tested and, if contaminated above hazardous waste levels, will be contained and disposed of at a licensed waste facility. The presence of known or suspected contaminated soil will require testing and investigation procedures to be supervised by a qualified person, as appropriate, to meet state and federal regulations. All hazardous materials and hazardous wastes will be handled, stored, and disposed of in accordance with all applicable regulations, by personnel	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	qualified to handle hazardous materials. The hazardous substance control and emergency response procedures include, but are not limited to, the following: ▪ Proper disposal of potentially contaminated soils. ▪ Establishing site-specific buffers for construction vehicles and equipment located near sensitive resources. ▪ Emergency response and reporting procedures to address hazardous material spills. ▪ Stopping work at that location and contacting the County Fire Department Hazardous Materials Unit immediately if visual contamination or chemical odors are detected. Work will be resumed at this location after any necessary consultation and approval by the Hazardous Materials Unit.			
***Hydrology and* Water Quality**				
HYDRO-1	**Avoidance of Sensitive Aquatic Features.** The project will be designed to avoid sensitive aquatic features (i.e., jurisdictional wetlands, waters, and riparian areas) to the extent feasible. Specific avoidance strategies include the following: ▪ Siting permanent structures in uplands outside of existing drainage features. ▪ Siting staging areas, pole/tower work areas, pull sites, and other temporary staging/materials storage areas in uplands outside of existing drainage features/riparian areas, utilizing developed/urban, agricultural land, or ruderal land in preference to native terrestrial or riparian habitats.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	▪ Selecting access roads and overland travel routes in uplands while avoiding other sensitive features (e.g., steep slopes, rare plant localities, and sensitive wildlife habitats). ▪ Should access or work areas be required through or within jurisdictional wetlands and waters, all regulated activities within jurisdictional wetlands and waters (e.g., waters of the United States and waters of the State) will require regulatory approval/permitting from the appropriate agency including U.S. Army Corps of Engineers [USACE], CDFW, and/or Regional Water Quality Control Board [RWQCB] prior to any work within jurisdictional features. Prior to construction, sensitive aquatic features slated for avoidance will be identified in the field and clearly marked for avoidance using flagging tape, fencing, and/or high-visibility signage. Construction personnel will be trained on feature avoidance marking and associated restrictions.			
Noise				
NOI-1	**<u>Construction Schedule Limits.</u>** The project proponents will limit grading, scraping, augering, and pole installation to 7:00 a.m. to 7:00 p.m. daily. Exceptions for work outside of these hours will follow the notification requirements outlined in APM AG-1.	✓	✓	✓
NOI-2	**<u>Noise Minimization.</u>** The project will incorporate various measures to reduce construction-related noise where feasible using the following methods: ▪ Construction equipment will use noise reduction devices that are no less effective than those originally installed by the manufacturer. ▪ Stationary equipment used during construction will be located as far as practical from sensitive noise receptors.	✓	✓	✓

APM No.	Title/Description	Applicability		
		Estrella Substation	Power Line	Distribution Components[10]
	▪ "Quiet" equipment (i.e., equipment that incorporates noise control elements into the design—compressors have "quiet" models) will be used during construction when reasonably available.			
Transportation and Traffic				
TR-1	**<u>Air Transit Control.</u>** The project proponents will implement the following protocols that pertain to helicopter use during construction: ▪ Comply with all applicable Federal Aviation Administration regulations regarding air traffic; ▪ Helicopter operators will coordinate all project helicopter operations with the Paso Robles Municipal Airport before and during project construction; ▪ Coordinate with potentially affected residents or businesses to minimize the duration of necessary work and any resulting inconvenience; and ▪ Implement a congested area plan if the helicopter work will take place in a congested or densely populated area. A congested area is anywhere that includes the presence of the non-participating public. A densely populated area is an area of a city, town, or settlement that contains a large number of occupied homes, factories, stores, schools, and other structures.	N/A	✓	✓

<u>Notes:</u>

APM = applicant-proposed measure; CARB = California Air Resources Control Board; CDFW = California Department of Fish and Wildlife; CRHR = California Register of Historical Resources; CNG = compressed natural gas; CPUC = California Public Utilities Commission; LNG = liquefied natural gas; N/A = not applicable; NAHC =Native American Heritage Commission; NOx = oxides of nitrogen; PM = particulate matter; PRC = Public Resources Code; ROG = reactive organic gases; RWQCB = Regional Water Quality Control Board; SF_6 = sulfur hexafluoride; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service; WEAP = worker environmental awareness program

2.9 Electric and Magnetic Fields

2.9.1 Overview

The CPUC does not consider electric and magnetic fields (EMF) to be an environmental issue in the context of CEQA because there is no agreement among scientists that EMF creates a potential health risk and because CEQA does not define or adopt standards for defining any potential risk from EMF.

The weather and the earth's geomagnetic field cause naturally occurring EMF, while various technological applications, such as communications technologies, personal electronic devices, electric generation and transmission, and radiological imaging cause man-made EMF. EMFs are typically characterized by their wavelength or frequency as either "non-ionizing" or "ionizing" [11] radiation, as shown in Table 2-13 below. In general, the higher the frequency of EMFs, the shorter their wavelength, and the shorter the wavelength, the greater the amount of energy is imparted when interacting with physical objects. From this table it can be seen that the EMF from the Proposed Project's power line would be "non-ionizing."

Hertz (Hz) is a unit of frequency that is defined as one cycle per second. With respect to EMF, Hz values reflect the rate at which electric and magnetic fields change their direction each second. In the U.S., electric transmission lines typically operate at 60 Hz, which is considered an extremely low frequency (ELF). By comparison, mobile phones operate at between 1.9 and 2.2 billion Hz (gigahertz), while X-rays operate at upwards of 30 X 10^{19} Hz (National Cancer Institute 2020).

Table 2-13. Types of EMF Radiation

Radiation Type	Definition	Forms of Radiation	Source Examples
Non-Ionizing	Low to mid-frequency radiation which is generally perceived as harmless due to its lack of potency.	Extremely Low Frequency Radiofrequency Microwaves Visual Light	Microwave ovens Computers House energy smart meters Wireless (WiFi) networks Cell phones Bluetooth devices Power lines

[11] Ionization is the process by which electrons are freed from atoms or electrons, thereby creating ions or charged particles. Ionizing radiation is radiation that carries enough energy to create ions.

Radiation Type	Definition	Forms of Radiation	Source Examples
			Magnetic resonance imaging devices
Ionizing	Mid to high-frequency radiation which can, under certain circumstances, lead to cellular and/or DNA damage with prolonged exposure.	Ultraviolet X-rays Gamma	Ultraviolet light X-rays ranging from 30 X 10^{16} Hertz (Hz) to 30 X 10^{19} Hz Some gamma rays

Notes: Hz = Hertz; WiFi = wireless

Source: National Institute of Environmental Health Sciences 2020

Electric Fields

Electric fields from power lines are created whenever the lines are energized, with the strength of the field dependent directly on the voltage of the line creating it. Electric field strength is typically described in terms of kV per meter (kV/m). Electric field strength attenuates (reduces) rapidly as the distance from the source increases. Electric fields are reduced in many locations because they are effectively shielded by most objects or materials such as trees or houses.

Unlike magnetic fields, which penetrate almost everything and are unaffected by buildings, trees, and other obstacles, electric fields are distorted by any object that is within the electric field including the human body. Even trying to measure an electric field with electronic instruments is difficult because the devices themselves will alter the levels recorded.

Magnetic Fields

Magnetic fields from power lines are created whenever current flows through power lines at any voltage. The strength of the field is directly dependent on the current in the line. Magnetic field strength is typically measured in milligauss (mG). Similar to electric fields, magnetic field strength attenuates rapidly with distance from the source. However, unlike electric fields, magnetic fields are not easily shielded by objects or materials. The nature of a magnetic field can be illustrated by considering a household appliance. When the appliance is energized by being plugged into an outlet but not turned on, no current flows through it. Under such circumstances, an electric field is generated around the cord and appliance, but no magnetic field is created. If the appliance is switched on, the electric field would still be present and a magnetic field would also be created. The electric field strength is directly related to the magnitude of the voltage from the outlet and the magnetic field strength is directly related to the magnitude of the current flowing in the cord and appliance.

The magnetic field levels of PG&E's overhead and underground transmission lines will vary depending upon the customer power usage. Magnetic field strengths for typical PG&E transmission line loadings at the edge of rights-of-way are approximately 10 to 90 mG (NEET West and PG&E 2017). Under peak load conditions, the magnetic fields at the edge of the right-of-way would not likely exceed 150 mG. The strongest magnetic fields around the outside of a substation come from the power lines entering and leaving the station. The strength of the magnetic fields from transformers and other equipment decreases quickly with distance, such that beyond the substation fence, these magnetic fields are typically indistinguishable from background levels (NEET West and PG&E 2017).

2.9.2 Scientific Background and Regulations Applicable to EMF

EMF Research

For more than 20 years, questions have been asked regarding the potential effects of EMFs from power lines and research has been conducted to provide some basis for response. Earlier studies focused primarily on interactions with the electric fields from power lines. In the late 1970s, the subject of magnetic field interactions began to receive additional public attention and research levels increased. A substantial amount of research investigating both electric and magnetic fields has been conducted over the past several decades; however, much of the body of national and international research regarding EMF and public health risks remains contradictory or inconclusive.

Research related to EMF can be grouped into three general categories: cellular level studies, animal and human experiments, and epidemiological studies. Epidemiological studies have provided mixed results, with some studies showing an apparent relationship between magnetic fields and health effects while other similar studies not showing such a relationship. Laboratory studies and studies investigating a possible mechanism for health effects (mechanistic studies) provide little or no evidence to support this link.

Since 1979, public interest and concern specifically regarding magnetic fields from power lines has increased. The increase has generally been attributed to publication of the results of a single epidemiological study (Wertheimer and Leeper 1979). This study observed a statistical association between the high-current configuration (the “wire code”) of electric power lines outside of homes in Denver and the incidence of childhood cancer. The “wire code” was assumed to be related to current flow of the line. The study did not take measurements of magnetic field intensity. Since publication of the Wertheimer and Leeper study, many epidemiological, laboratory, and animal studies regarding EMF have been conducted.

Methods to Reduce EMF

EMF levels from transmission lines can be reduced in three primary ways: shielding, field cancellation, or increasing the distance from the source. Shielding, which reduces exposure to electric fields, can be actively accomplished by placing trees or other physical barriers along the transmission line right-of-way. Shielding also results from existing structures the public may use or occupy along the line. Since electric fields can be blocked by most materials, shielding is effective for the electric fields but is not effective for magnetic fields.

Magnetic fields can be reduced either by cancellation or by increasing distance from the source. Cancellation is achieved in two ways. A transmission line circuit consists of three “phases”: three separate wires (conductors) on a transmission tower. The configuration of these three conductors can reduce magnetic fields. First, when the configuration places the three conductors closer together, the interference, or cancellation, of the fields from each wire is enhanced. This technique has practical limitations because of the potential for short circuits if the wires are placed too close together. There are also worker safety issues to consider if spacing is reduced. In underground lines, the three phases typically can be placed much closer together than for overhead lines because the cables have dielectric insulation.

The distance between the source of fields and the public can be increased by either placing the wires higher aboveground, burying underground cables deeper, or by increasing the width of the right-of-way. For transmission lines, these methods can prove effective in reducing fields because the reduction of the field strength drops rapidly with distance.

Scientific Panel Reviews

Numerous panels of expert scientists have convened to review the data relevant to the question of whether exposure to power-frequency EMF is associated with adverse health effects. These evaluations have been conducted in order to advise governmental agencies or professional standard-setting groups. These panels of scientists first evaluate the available studies individually, not only to determine what specific information they can offer, but also in terms of the validity of their experimental design, methods of data collection, analysis, and suitability of the authors' conclusions to the nature and quality of the data presented. Subsequently, the individual studies, with their previously identified strengths and weaknesses, are evaluated collectively in an effort to identify whether there is a consistent pattern or trend in the data that would lead to a determination of possible or probable hazards to human health resulting from exposure to these fields.

These reviews include those prepared by international agencies such as the World Health Organization (WHO), the international Non-Ionizing Radiation Committee of the International Radiation Protection Association, and governmental agencies of a number of countries, such as the U.S. Environmental Protection Agency, the National Radiological Protection Board of the United Kingdom, the Health Council of the Netherlands, and the French and Danish Ministries of Health. As noted below, these scientific panels have varied conclusions on the strength of the scientific evidence suggesting that power frequency EMF exposures pose any health risk.

In May 1999, the National Institute of Environmental Health Science (NIEHS) submitted to Congress its report titled, *Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*, containing the following conclusion regarding EMF and health effects:

> Using criteria developed by the International Agency for Research on Cancer (IARC), none of the Working Group considered the evidence strong enough to label ELF-EMF exposure as a known human carcinogen or probable human carcinogen. However, a majority of the members of this Working Group concluded that exposure to power-line frequency ELF-EMF is a possible carcinogen.

In June 2001, a scientific working group of IARC (an agency of WHO) reviewed studies related to the carcinogenicity of EMF. Using standard IARC classification, magnetic fields were classified as "possibly carcinogenic to humans" based on epidemiological studies. "Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence of carcinogenicity in experimental animals.

On behalf of the CPUC, the California Department of Health Services (DHS) completed a comprehensive review of existing studies related to EMF from power lines and potential health risks. This risk evaluation was undertaken by three staff scientists with the DHS. Each of these scientists is identified in the review results as an epidemiologist, and their work took place from 2000 to 2002. The results of this review, titled *An Evaluation of the Possible Risks from Electric and Magnetic Fields from Power Lines, Internal Wiring, Electrical Occupations, and Appliances,* were published in June 2002. The conclusions contained in the executive summary are provided below:

- To one degree or another, all three of the DHS scientists are inclined to believe that EMFs can cause some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig's Disease, and miscarriage.
- They strongly believe that EMFs do not increase the risk of birth defects or low birth weight.
- They strongly believe that EMFs are not universal carcinogens, since there are a number of cancer types that are not associated with EMF exposure.
- To one degree or another, they are inclined to believe that EMFs do not cause an increased risk of breast cancer, heart disease, Alzheimer's Disease, depression, or symptoms attributed by some to sensitivity to EMFs. However, all three scientists had judgments that were "close to the dividing line between believing and not believing" that EMFs cause some degree of increased risk of suicide.
- For adult leukemia, two of the scientists are "close to the dividing line between believing or not believing" and one was "prone to believe" that EMFs cause some degree of increased risk.

The report indicates that the DHS scientists are more inclined to believe that EMF exposure increased the risk of the health problems than the majority of the members of scientific committees that have previously convened to evaluate the scientific literature. With regard to why the DHS review's conclusions differ from those of other recent reviews, the report states:

> The three DHS scientists thought there were reasons why animal and test tube experiments might have failed to pick up a mechanism or a health problem; hence, the absence of much support from such animal and test tube studies did not reduce their confidence much or lead them to strongly distrust epidemiological evidence from statistical studies in human populations. They therefore had more faith in the quality of the epidemiological studies in human populations and hence gave more credence to them.

While the results of the DHS report indicate these scientists believe that EMF can cause some degree of increased risk for certain health problems, the report did not quantify the degree of risk or make any specific recommendations to the CPUC.

In addition to the uncertainty regarding the level of health risk posed by EMF, individual studies and scientific panels have not been able to determine or reach consensus regarding what level of magnetic field exposure might constitute a health risk. In some early epidemiological studies, increased health risks were discussed for daily time-weighted average field levels greater than 2 mG. However, the IARC scientific working group indicated that studies with average magnetic field levels of 3 to 4 mG played a pivotal role in their classification of EMF as a possible carcinogen.

The 2007 WHO [Environmental Health Criteria 238] report concluded that:

- Evidence for a link between ELF (50 to 60 Hz) magnetic fields and health risks is based on epidemiological studies demonstrating a consistent pattern of increased risk for childhood leukemia. However, "…virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status…the evidence is not strong enough to be considered causal but sufficiently strong to remain a concern."
- "For other diseases, there is inadequate or no evidence or health effects at low exposure levels."

2.9.3 Policies, Standards, and Regulations

A number of counties, states, and local governments have adopted or considered regulations or policies related to EMF exposure. The reasons for these actions have been varied; in general, however, the actions can be attributed to addressing public reaction to and perception of EMF as opposed to responding to the findings of any specific scientific research.

In 1991, the CPUC initiated an investigation into electric and magnetic fields associated with electric power facilities. This investigation explored the approach to potential mitigation measures for reducing public health impacts and possible development of policies, procedures or regulations. Following is a brief summary of CPUC guidelines and regulatory activity regarding EMF.

CPUC Decision No. 93-11-013

In Decision No. 93-11-013, the CPUC took interim steps to address EMFs related to electric utility facilities and power lines. Based on its investigation of the possible impacts of EMF exposure associated with electric utility installations, the CPUC recommended the following:

- No-cost and low-cost steps to reduce EMF levels;
- Workshops to develop EMF design guidelines;
- Uniform residential and workplace EMF measurement programs;
- Stakeholder and public involvement; and
- Funding for educational and research programs.

In explaining and justifying its decision, the CPUC stated that although the scientific community had not yet isolated the impact, if any, of utility-related EMF exposures on public health, other jurisdictions and agencies have concluded that the best response to EMFs is to avoid unnecessary new exposure to EMFs if such avoidance can be achieved at a cost that is reasonable in light of the risk identified. The decision stated that “low-cost” steps to reduce EMF levels should be defined as roughly 4 percent of the total cost of a budgeted project, but emphasized that this should not be a hard-and-fast rule and that utilities should implement more or less costly solutions as they are determined to be effective.

CPUC Decision No. 06-01-042 and More Information

In 2006, the CPUC revisited the EMF issue it had covered in its Decision No. 93-11-013 and affirmed its “low-cost/no-cost” policy for mitigation of EMF exposure for new utility transmission and substation projects. Decision No. 06-01-042 also reaffirmed the CPUC’s policy of using a benchmark of 4 percent of transmission and substation project costs for EMF mitigation. In addition, Decision No, 06-01-042 adopted rules and policies to improve utility design guidelines for reducing EMF, and provided for a utility workshop to implement the policies and standardize design guidelines. Finally, Decision No. 06-01-042 restated the CPUC’s position that it is unable to determine whether there is a significant scientifically verifiable relationship between EMF exposure and negative health consequences.

The CPUC’s EMF Design Guidelines for Electrical Facilities (July 21, 2006) document is available at www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/infrastructure/emfs/ca_emf_design_guidelines.pdf~~www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=4884~~. More information about activities taken by the CPUC with respect to EMFs can be found at: www.cpuc.ca.gov/industries-and-topics/electrical-energy/infrastructure/permitting-and-environmental-review/electric-magnetic-fields/puc-actions-regarding-emfs ~~www.cpuc.ca.gov/General.aspx?id=4879~~.

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