



Matthew Fogelson  
Attorney  
Pacific Gas and Electric Company  
77 Beale Street  
Post Office Box 7442, B30A  
San Francisco, CA 94120

June 10, 2014

Mr. Jeff Thomas  
Senior Manager  
Panorama Environmental, Inc.  
One Embarcadero Center, Suite 740  
San Francisco, CA 94111

Re: Santa Cruz 115 kV Reinforcement Project (A.12-01-012)

Dear Mr. Thomas:

This letter responds to Question #7 of your February 27, 2014 request for additional information and data regarding Pacific Gas and Electric Company's (PG&E's) application (A. 12-01-012) and Proponent's Environmental Assessment (PEA) for a Permit to Construct the Santa Cruz 115 Kilovolt (kV) Reinforcement Project (project). The original text of the question is followed by PG&E's response. All portions of the question are addressed, with one exception, which is the request for visual simulations of the underground alignment of the Cox-Freedom Segment. These simulations are currently being prepared and PG&E anticipates submitting them to the California Public Utilities Commission (Commission) in early July.

***CPUC Data Request Question #7-1***

*Assuming this alternative is technically feasible, please provide a revised project description for the underground segment describing the work to be completed including: a) the procedure and process for trench installation of the power line; b) temporary work areas (work and access corridors, staging areas); c) any additional vegetation, tree removals, or grading; d) materials and quantities for trenching and fill including cubic yards reused onsite versus disposed of offsite; e) equipment tables; f) construction crew composition and size; and g) maintenance associated with underground power lines (activity type and frequency).*

***PG&E's Response***

PG&E has prepared a Project Description for the underground segment, which is provided in Attachment A: Project Description and describes the work that would be required to construct the segment based on a 30-percent design level.

***CPUC Data Request Question #7-2***

*Please provide maps indicating revisions of project construction limits including access/work corridors and any added staging areas. Would additional right-of-way be required and if so, how much? Would it impact private yards or other existing structures?*

***PG&E's Response***

Figure 1: Project Overview Map and Attachment A: Alternative 4D Detailed Route Map are provided in Attachment A: Project Description. A discussion of the additional right-of-way (ROW) requirements is provided in Section 1.2 Permanent Land/Right-of-Way Requirements of Attachment A: Project Description.

***CPUC Data Request Question #7-3***

*Please provide revisions to construction schedule.*

***PG&E's Response***

PG&E anticipates that construction of the Alternative 4D would take up to 22 months. Construction would typically occur 5 days per week (Monday through Friday) for 8 hours per day—with the exception of cable installation, which would occur 6 days per week for up to 10 hours per day. Work hours would likely be restricted from 8:30 AM to 4:30 PM to accommodate peak traffic flows. A revised project schedule for the undergrounding is provided in Table 5: Proposed Construction Schedule in Attachment A: Project Description.

***CPUC Data Request Question #7-4***

*Please provide the construction equipment summary (type of equipment, quantity and duration of use by activity) for undergrounding activities and modeling of air impacts with input and output data.*

***PG&E's Response***

The anticipated construction equipment that would be used for each construction activity is provided in Section 1.3.5 Equipment and Personnel of Attachment A: Project Description. The California Emissions Estimator Model (CalEEMod) was used to simulate the anticipated emissions during construction using site-specific information to generate emission rates based on Alternative 4D's anticipated size, schedule, land use, and construction methods. Using this data, the model calculated the maximum daily emissions for a range of pollutants. The CalEEMod input and output are provided in Attachment B: CalEEMod Input and Output Files.

***CPUC Data Request Question #7-5***

*Please provide visual simulations of transition structures and any tree trimming.*

***PG&E's Response***

Visual simulations of Alternative 4D—depicting transition structures and the associated tree removal/vegetation trimming—will be provided in a separate submittal to the Commission in early July.

***CPUC Data Request Question #7-6***

*Please provide an assessment of Santa Cruz long-toed salamander impacts and vegetation mapping impacts covering additional work areas.*

***PG&E's Response***

A Biological Resources Constraints Assessment is provided in Attachment C: Biological Assessment.

***CPUC Data Request Question #7-7***

*Please provide a Cultural Resources Report addendum documenting any potential effects associated with the revised limits of work where expanded beyond currently defined disturbance limits.*

***PG&E's Response***

A Cultural Resources Report addendum is provided in Attachment D: Cultural Resources Report Addendum.

***CPUC Data Request Question #7-8***

*Please provide water usage required for undergrounding (compaction, dust control, etc.)*

***PG&E's Response***

Water is anticipated to be the primary means for dust control during construction of Alternative 4D. Water would be transported to the site in trucks designed for water dispersal onto disturbed areas where grading or routine movement of construction vehicles occurs. Water would be used to wet the disturbed soils to reduce the potential for dust particles to enter the air. A summary of the anticipated water usage is provided in Table 1: Summary of Anticipated Water Usage. It is anticipated that approximately 87,360 gallons of water would be required for construction activities. Water would most likely be obtained from the City of Santa Cruz Municipal Utilities or the City of Santa Cruz Wastewater Treatment Facility near Neary Lagoon.

***CPUC Data Request Question #7-9***

*Please provide traffic routing and road closure requirements for undergrounding; identify emergency access routes to be designated and limitations on emergency access.*

***PG&E's Response***

Construction of Alternative 4D would result in temporary increases in traffic on local highways and Santa Cruz County (County) roads. It is anticipated that construction of Alternative 4D would result in up to 90 peak daily trips. Construction personnel would access the project from the north via State Route (SR-) 1 and from the south via SR-1, SR-152, and SR-129. Employees would then travel along Freedom Boulevard (from the north or south) and travel north via McDonald Road and East Cox Road. Traffic delays could occur when large trucks enter and exit the roadway at designated access points and during temporary work activities. However, traffic

**Table 1: Summary of Anticipated Water Usage**

<b>Activity</b>	<b>Duration (months)</b>	<b>Water Usage (gallons per month)</b>	<b>Total Water Usage</b>
<b>Yard Layout</b>			
Equipment cleaning	21	600	12,600
Sanitation	21	150	3,150
Office usage	21	150	3,150
<b>Construction of Riser Structures</b>			
Equipment and road cleaning	4	3,000	12,000
Concrete placement	0.5	600	300
Concrete truck cleaning	0.5	300	150
Restoration irrigation	2	600	1,200
<b>Vault Construction</b>			
Dust control	2.5	2,250	5,625
Gravel placement	0.5	750	375
Backfill placement	0.25	750	188
Concrete pad placement	0.25	750	188
Equipment cleaning	2.5	450	1,350
<b>Duct Bank Installation</b>			
Saw cutting asphalt	4	450	1,800
Dust control	5.5	2,250	12,375
Concrete placement	0.5	750	3,000
Backfill placement	0.5	750	1,125
Road base placement	0.5	750	1,125
Equipment cleaning	5.5	450	2,475
Road base cleaning	1.5	2,550	3,825
Road restoration	1.5	800	1,200
<b>Total</b>	--	--	<b>87,360</b>

Note: The total anticipated water usage includes a 30 percent contingency.

controls would be implemented to direct local traffic safely around work areas, in accordance with encroachment permit conditions. Preliminary discussions with the County of Santa Cruz Public Works Department indicate that work hours would be restricted from 8:30 AM to 4:30 PM.

The construction methods that would be used for the installation of the underground facilities—including the removal of pavement, trench excavation, concrete pouring, and asphalt paving restoration—would require temporary closures along East Cox Road, McDonald Road, and Day Valley Road. It is anticipated that East Cox Road would be completely closed for approximately 1,900 feet from Day Valley Road to PG&E’s proposed Pole C-89 (near the County’s water pump station) for approximately 65 days during duct bank excavation, installation, backfill, and resurfacing. An additional 175 days of temporary lane closures would also be required for all other construction activities. McDonald Road and Day Valley Road would be completely closed to traffic from Freedom Boulevard to East Cox Road (approximately 2,800 feet) for approximately 50 days during duct bank excavation, installation, backfill, and resurfacing. As with East Cox Road, an additional 150 days of temporary lane closures would also be required. Table 2: Summary of Anticipated Temporary Road Closures provides a summary of anticipated road closures during construction activities. Road closures would be phased so that temporary closures along East Cox Road would not occur until construction activities on McDonald Road and Day Valley Road are complete. All roads would be restored with asphalt paving and re-striping in accordance with the County’s requirements. PG&E would provide traffic controls and/or use flaggers, as well as obtain encroachment permits from the County, as required.

Construction of Alternative 4D may temporarily impact emergency access during lane and road closures along East Cox Road, McDonald Road, and Day Valley Road. PG&E would coordinate with all applicable emergency service providers in the vicinity at least 24 hours prior to any road closures.

#### ***CPUC Data Request Question #7-10***

*Please provide potential impacts from construction to existing infrastructure, in particular the Central Water District’s aging water pipeline system.*

#### ***PG&E’s Response***

Construction of Alternative 4D would involve excavation and grading for the installation of transmission structures. These activities have the potential to unintentionally impact existing underground utilities, particularly in the PG&E ROW, which may result in the disruption of service. PG&E or its contractor would notify Underground Service Alert, in accordance with state law, to ensure that existing utilities are appropriately marked in the field so that they can be avoided.

Construction of Alternative 4D would occur adjacent to existing overhead electrical distribution lines and phone lines. These lines would be elevated and/or insulated to allow for vault and riser construction equipment and materials. Rerouting or outages are not anticipated at this point in the design.

**Table 2: Summary of Anticipated Temporary Road Closures**

<b>Construction Activity</b>	<b>Duration of Work</b>	<b>Traffic Impact</b>
<b>East Cox Road</b>		
Riser site preparation	35 days	Closure of one lane with flaggers
Riser foundation excavation	5 days	Closure of one lane with flaggers
Riser foundation installation	5 days	Closure of one lane with flaggers
Riser structure installation	10 days	Closure of one lane with flaggers
Riser fencing	10 days	Closure of one lane with flaggers
Vault excavation/shoring	12 days (3 days per vault)	Closure of one lane with flaggers
Vault installation	12 days (3 days per vault)	Closure of one lane with flaggers
Vault precast neck installation	4 days (1 day per vault)	Closure of one lane with flaggers
Vault cast neck ring installation	4 days (1 day per vault)	Closure of one lane with flaggers
Vault backfill and shoring removal	8 days (2 days per vault)	Closure of one lane with flaggers
Vault resurfacing	8 days (2 days per vault)	Closure of one lane with flaggers
Duct bank excavation	50 days	Complete road closure
Duct bank installation		
Duct bank backfill		
Duct bank resurfacing	15 days	Complete road closure
Cable racking	12 days (3 days per vault)	Closure of one lane with flaggers
Cable pulling	5 days per section	Closure of one lane with flaggers
Cable splicing	28 days (7 days per vault)	Closure of one lane with flaggers
Cable terminations	7 days	Closure of one lane with flaggers
<b>McDonald Road and Day Valley Road</b>		
Riser site preparation	15 days	Closure of one lane with flaggers
Riser foundation excavation	5 days	Closure of one lane with flaggers
Riser foundation installation	5 days	Closure of one lane with flaggers
Riser structure installation	10 days	Closure of one lane with flaggers
Riser fencing	5 days	Closure of one lane with flaggers

Construction Activity	Duration of Work	Traffic Impact
Vault excavation/shoring	12 days (3 days per vault)	Closure of one lane with flaggers
Vault installation	12 days (3 days per vault)	Closure of one lane with flaggers
Vault precast neck installation	4 days (1 day per vault)	Closure of one lane with flaggers
Vault cast neck ring installation	4 days (1 day per vault)	Closure of one lane with flaggers
Vault backfill and shoring removal	8 days (2 days per vault)	Closure of one lane with flaggers
Vault resurfacing	8 days (2 days per vault)	Closure of one lane with flaggers
Duct bank excavation	35 days	Complete road closure
Duct bank installation		
Duct bank backfill		
Duct bank resurfacing	15 days	Complete road closure
Cable racking	12 days (3 days per vault)	Closure of one lane with flaggers
Cable pulling	5 days per section	Closure of one lane with flaggers
Cable splicing	28 days (7 days per vault)	Closure of one lane with flaggers
Cable terminations	7 days	Closure of one lane with flaggers

During construction, the project may result in the discovery of other underground utilities; such as phone, fiber-optic, electric, and cable. Additional surveys would need to be conducted to determine the extent of other utilities. Utility locations and depth would be coordinated with the applicable utility owner to prevent damaging existing utilities. Regardless, accidental disruptions could still occur.

An existing gas line is located within each of the roads, typically along the side of the road. Gas lines present concerns related to induced current and corrosion potential. PG&E has designed the underground power line to avoid gas lines to the extent feasible; however, the gas lines would be paralleled and/or crossed by the underground duct bank and vaults. In addition, the riser poles would be adjacent to gas lines. Despite their close proximity, no disruption of gas lines is anticipated as a result of project activities.

A major water pump station is located near the northern riser off of East Cox Road. An 8-inch waterline is located on the east side of East Cox Road from the station at Day Valley Road. An additional 6-inch waterline is located along the west side of East Cox Road. Records indicate that the 6-inch waterline is a back-up waterline to the 8-inch waterline located on the east side of East Cox Road. The waterlines continue down East Cox Road onto Day Valley Road and McDonald Road. PG&E has made every effort to design around the waterlines; however, the waterlines would be paralleled and crossed by the underground duct bank and vaults. In addition, the riser poles would be located adjacent to the waterlines. Therefore, there is the potential for construction activities to result in unintended disruptions to the waterlines. Any damage to the waterlines will be repaired as quickly as possible.

The following two potential storm water facilities would be impacted by the construction of Alternative 4D:

- an existing culvert running east/west along Day Valley Road at the intersection of East Cox Road and Day Valley Road; and
- a second culvert running north/south and located on Day Valley Road, between McDonald Road and East Cox Road.

Construction at both locations would require wider excavations and possibly complex steel plating techniques. Trenching could take 7 to 10 days longer at each location than typically required. In addition, traffic control measures would be necessary to complete construction as quickly as possible and to minimize soil movement and water erosion.

Other construction techniques—such as micro-tunneling, jack-and-bore, or horizontal directional drilling methods—could be used for installation of the underground duct bank. However, PG&E does not anticipate that these methods would be required. These types of trenchless techniques are typically more invasive to traffic and road access impacts, and are usually employed only to avoid potentially significant environmental impacts to natural resources.

We trust that the information provided herein is fully responsive to your requests. Should you have any further questions, please do not hesitate to contact me at (415) 973-7475.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Matthew Fogelson', with a long horizontal flourish extending to the right.

Matthew Fogelson  
Attorney

## **ATTACHMENT A: PROJECT DESCRIPTION**

## TABLE OF CONTENTS

<b>1 – PROJECT DESCRIPTION .....</b>	<b>1</b>
1.0 Project Location .....	1
1.1 Project Components .....	2
1.2 Permanent Land/Right-of-Way Requirements .....	7
1.3 Construction .....	12
1.4 Operation and Maintenance .....	25

## LIST OF FIGURES

Figure 1: Project Overview Map.....	3
Figure 2: Typical Riser Pole .....	5
Figure 3: Typical Duct Bank.....	9
Figure 4: Typical Underground Vault.....	11

## LIST OF TABLES

Table 1: Summary of Land Acquisition or Permanent Easements .....	8
Table 2: Temporary Work Area Summary .....	14
Table 3: Construction Personnel Requirements.....	18
Table 4: Construction Equipment Requirements .....	21
Table 5: Proposed Construction Schedule .....	25

## LIST OF ATTACHMENTS

Attachment A: Alternative 4D Detailed Route Map  
Attachment B: Representative Photographs of Typical Underground Construction Methods

## **1 – PROJECT DESCRIPTION**

Pacific Gas and Electric Company (PG&E) is proposing to rebuild a portion of the existing Green Valley-Camp Evers 115 Kilovolt (kV) Power Line as part of the Santa Cruz 115 kV Reinforcement Project (project). An overview map of the project is provided in Figure 1: Project Overview Map. The existing single-circuit line would be rebuilt with a double-circuit line (Northern Alignment) between Green Valley Substation and the vicinity of East Cox Road and Leslie Lane. The project also includes the addition of a 115 kV power line (Cox-Freedom Segment) from the Northern Alignment to Rob Roy Substation. The project is located in unincorporated areas of southern Santa Cruz County, spanning approximately 8.8 miles between an unincorporated area north of Watsonville and the unincorporated community of Aptos, and crossing through the unincorporated communities of Amesti, Corralitos, Pleasant Valley, and Day Valley.

On January 25, 2012, PG&E filed with the California Public Utilities Commission (CPUC) an application for a Permit to Construct the project. The CPUC released a Draft Initial Study/Mitigated Negative Declaration (IS/MND) pursuant to the California Environmental Quality Act (CEQA) for a 49-day public review period on October 18, 2013. After reviewing the comments received on the Draft IS/MND, the CPUC determined that an Environmental Impact Report (EIR) should be prepared in accordance with CEQA. The CPUC is serving as the lead agency for the preparation of the EIR and has requested additional information from PG&E in order to prepare the EIR. These requests include an evaluation of an alternative—the East Cox Road – Undergrounding of the Cox-Freedom Segment Alternative (Alternative 4D)—to the project that would underground a portion of the Cox-Freedom Segment. This document describes the location, project components, temporary and permanent land requirements, and construction methods associated with Alternative 4D.

### **1.0 PROJECT LOCATION**

The project is located in an unincorporated area of Santa Cruz County (County), California, between the cities of Watsonville and Aptos. The project corridor is aligned roughly northwest to southeast and is generally parallel to and northeast of State Route (SR-) 1. The existing power line connects Green Valley Substation—located on Minto Road, approximately 0.25 mile east of Green Valley Road—to Rob Roy Substation—located on Freedom Boulevard, approximately 0.6 mile north of SR-1. Alternative 4D shares the same general alignment as the proposed Cox-Freedom Segment; however, it is limited to area between East Cox Road, just north of Leslie Lane and the intersection of Freedom Boulevard and East Cox Road, as shown in Figure 1: Project Overview Map.

## **1.1 PROJECT COMPONENTS**

Alternative 4D would place the 115 kV power line circuit underground for a length of approximately 4,700 feet, as shown in Figure 1: Project Overview Map. The entire project alternative includes the Northern Alignment, as described in the PEA; undergrounding of a portion of the project along the Cox-Freedom Segment (Alternative 4D); and the remainder of the overhead line of the Cox-Freedom Segment, as described in the PEA. Construction of the underground segment would include the following four major steps:

- installation of two tubular steel pole (TSP) riser structures;
- construction of an underground duct bank system;
- installation of four underground vaults to house cable splices; and
- installation of the underground cable system.

The project components are described further in the following subsections, and are shown in Attachment A: Alternative 4D Detailed Route Map.

### **1.1.0 Riser Poles**

Two TSP riser structures (approximately 100 feet in height) would be required to convert the overhead alignment to an underground configuration. A TSP riser pole (Northern Riser Pole) would replace the proposed dead-end Pole C-89. The underground circuit would leave this location in a duct bank heading south on East Cox Road to the Day Valley Road intersection. The route would then turn west on Day Valley Road and travel approximately 600 feet, before heading south on McDonald Road, continuing south just short of Freedom Boulevard, where a second TSP riser pole (Southern Riser Pole) would be placed approximately 100 feet south of the proposed Pole C-83. The riser poles would be 4 to 5 feet in diameter at the base, would taper to 1.5 to 2 feet at the tip, and would be supported by a concrete pier foundation with a diameter of approximately 6 to 8 feet. The poles would be fabricated using galvanized steel or Corten self-weathering steel. Figure 2: Typical Riser Pole depicts a typical riser pole.

#### **Northern Riser Pole**

The Northern Riser Pole would require an approximately 20-foot-tall and 80-foot-long concrete retaining wall parallel to East Cox Road. Two additional walls would be installed perpendicular to East Cox Road, tapering to the road with grade. The retaining wall would be between 4 or 5 feet above grade where it meets East Cox Road. An approximately 8-foot-tall fence would be constructed alongside East Cox Road, enclosing the retaining wall. A gate would be installed within the fence to allow PG&E service vehicles access during operation and maintenance activities.

#### **Southern Riser Pole**

The Southern Riser Pole may require a small retaining wall or soil benching/sloping may be required. The final site preparation requirements in this location would be determined during the final design phase if this alternative is selected. An existing fence would also be relocated in the vicinity of the Southern Riser Pole.

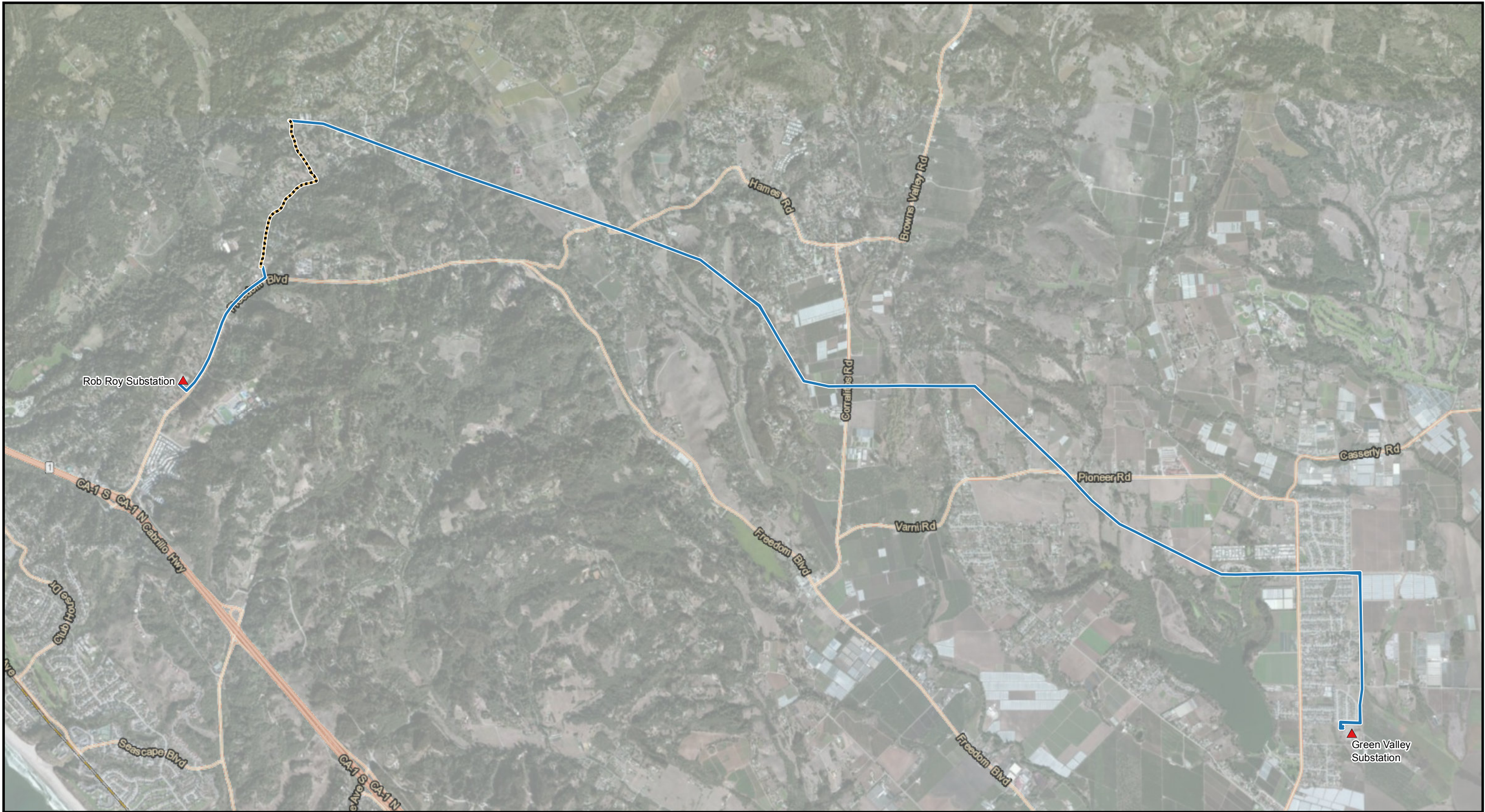


Figure 1: Project Overview Map

Santa Cruz 115 kV Reinforcement Project

▲ Existing Substation

— Proposed Project, Overhead

- - - Underground

Pacific Gas and Electric Company®

1:30,000

0

0.75

1.5

Miles







### **1.1.1 Underground Duct Bank**

Approximately 4,700 feet of new underground duct bank would be installed to connect the two riser poles. The underground duct bank would be comprised of four 6-inch-diameter and one 2-inch-diameter polyvinyl chloride (PVC) conduits encased in concrete with a yielding strength of 2,500 to 4,000 psi, and possibly reinforced with steel rebar. The top of the duct bank system would be installed approximately 36 inches below the road surface or deeper, as required for proper clearance with existing utilities and other facilities. The finished duct bank would be approximately 6 to 10 feet deep and 3 to 5 feet wide. Figure 3: Typical Duct Bank depicts a typical underground duct bank.

### **1.1.2 Underground Vaults**

Four underground vaults would be installed along the route for splicing the cables during construction and for permanent access, maintenance, and repair of the cables. The precast concrete vaults measure approximately 27 feet long, 10 feet wide, and 10 feet deep. When completed, the vaults would have approximately 8-foot by 8-foot concrete aprons that would be exposed and at ground level for foot and vehicle access. The areas adjacent to the vault would have gravel installed for maintenance and access purposes. A typical drawing for the underground vaults has been included as Figure 4: Typical Underground Vault.

### **1.1.3 Underground Cable System**

Three 115 kV cables would be installed in the duct banks to create the 115 kV circuit. All underground cable would utilize extruded dielectric cable with cross-linked polyethylene insulation and a 2,500 kcmil copper conductor.<sup>1</sup>

## **1.2 PERMANENT LAND/RIGHT-OF-WAY REQUIREMENTS**

The majority of the underground duct bank would be installed within paved portions of public roads. The riser poles, underground vaults, and short portions of the underground duct bank would be installed outside of the public road franchise. In these locations, additional permanent easements (i.e., rights-of-way [ROWs]) would be obtained. Preliminary ROW requirements would include all areas within 30 feet of the underground duct bank and vaults. Additional permanent ROW would be secured in the vicinity of the riser poles. The specific dimensions of additional ROWs would vary in each location to accommodate site-specific design and construction constraints, other existing utilities/facilities, access to the adjacent roads, nearby driveways, environmental resource concerns, maintenance accessibility, and topography. Final ROW locations would be determined during the final engineering phase of the project in conjunction with a licensed survey of the existing public road franchise and property boundaries. The preliminary additional ROW requirements are summarized in Table 1: Summary of Land Acquisition or Permanent Easements.

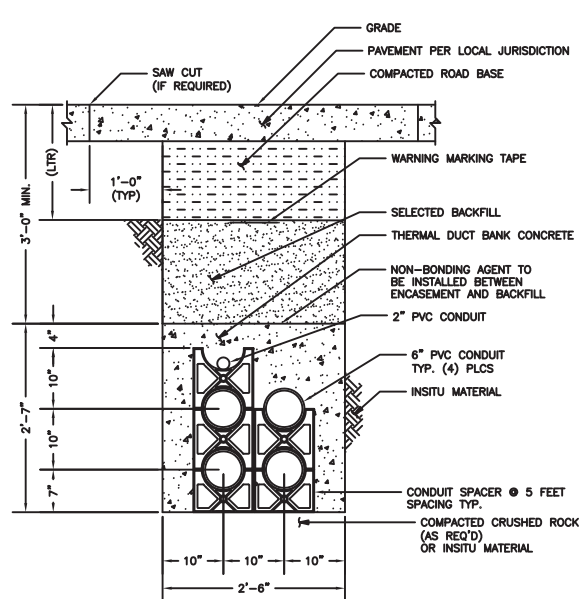
---

<sup>1</sup> kcmil (1,000 cmils) is a quantity of measure for the size of a conductor; kcmil wire size is the equivalent cross-sectional area in thousands of circular mils (cmils). A cmil is the area of a circle with a 0.001-inch diameter.

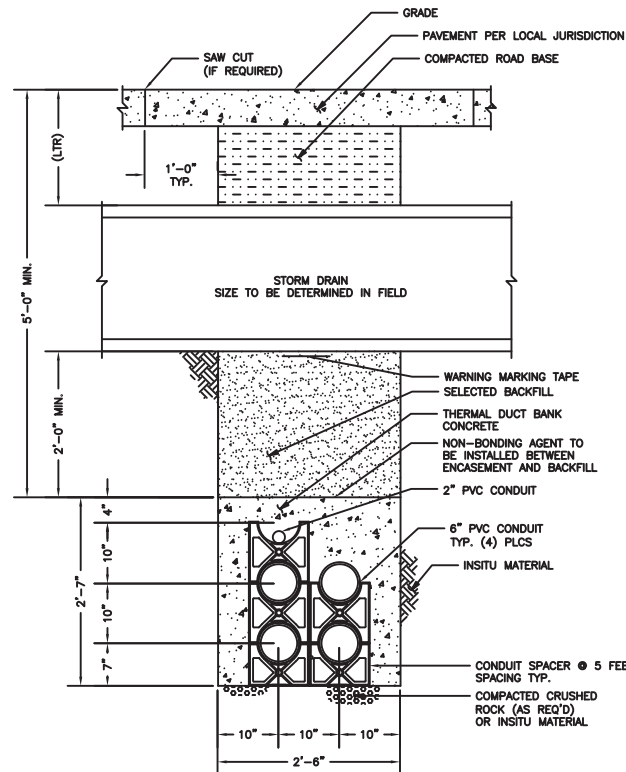
**Table 1: Summary of Land Acquisition or Permanent Easements**

<b>Land Acquisition Area</b>	<b>Approximate Dimensions (feet)</b>	<b>Approximate Size (acres)</b>	<b>Description</b>
Northern Riser Pole	90 by 50	0.11	Vegetation removal/grading, construction of an approximately 50-foot by 80-foot retaining wall, construction of a new fence and gate, aggregate surfacing within entire area, riser pole installation, and duct bank installation.
Vault 4	235 by 40	0.19	Vegetation removal, removal or relocation of an existing fence, vault installation, duct bank installation, installation of approximately 8-foot by 8-foot concrete vault aprons, and aggregate surfacing within the entire area.
Vault 3	200 by 50	0.19	Vegetation removal, removal or relocation of an existing fence, vault installation, duct bank installation, construction of approximately 8-foot by 8-foot concrete vault aprons, installation of bollards, and aggregate surfacing within the entire area.
Vault 2	370 by 40	0.36	Minimal tree trimming, removal or relocation of an existing fence within the County franchise of McDonald Road, vault installation, and duct bank installation.
Southern Riser Pole and Vault 1	300 by 50	0.28	Vegetation removal, possible benching and construction of a retaining wall or other grading measures, construction of a new fence and gate, vault installation, duct bank installation, riser pole installation, construction of approximately 8-foot by 8-foot concrete vault aprons, installation of bollards, and aggregate surfacing within the entire area.
<b>Total</b>	<b>--</b>	<b>1.13</b>	<b>--</b>

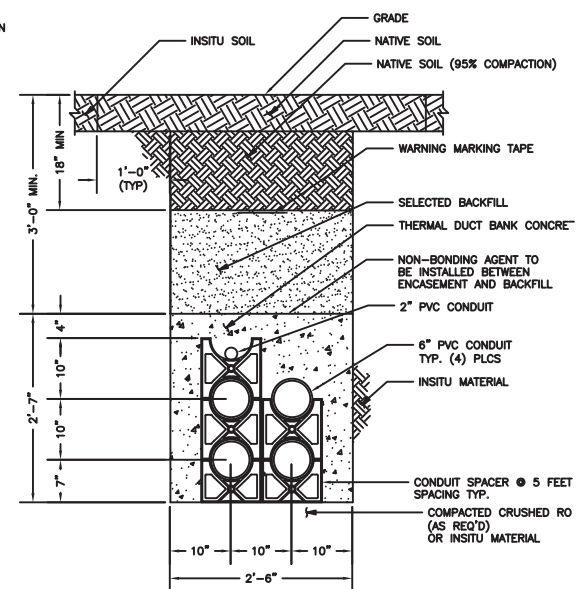
Note: Each land acquisition area would include underground duct banks which would connect to the vaults and/or riser poles.



SECTION 1  
2 X 2 DUCT BANK  
IN ROAD  
SCALE: 1' = 1'-0"

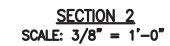
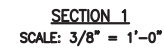
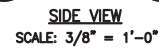
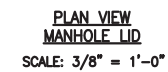
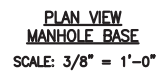


SECTION 2  
STORM DRAIN CROSSING  
2 X 2 DUCT BANK  
SCALE: 1' = 1'-0"



SECTION 3  
2 X 2 DUCT BANK  
IN SOIL  
SCALE: 1' = 1'-0"







### **1.3 CONSTRUCTION**

PG&E would contact the Underground Service Alert prior to the start of ground-disturbing activities in order to identify underground utilities in the immediate area. Construction would proceed as described in the following subsections.

#### **1.3.0 Project Access**

##### **Access Roads**

No new access roads would be required for this alternative. All project work areas would be accessed from existing paved roadways.

##### **Construction Traffic and Circulation**

Construction would require temporary lane closures along East Cox Road, McDonald Road, and Day Valley Road. PG&E would obtain an encroachment permit from the County and implement temporary lane closures (or partial lane closures) in accordance with the encroachment permit requirements. These requirements would include protection of traffic through warning signs, lights, and barricades. Steel plates would be utilized, as needed, to maintain access to properties. At vault locations, traffic would be flagged, with traffic alternating in one direction at a time. In addition to partial lane closures, temporary total road closures would also be required on East Cox Road, McDonald Road, and Day Valley Road during duct bank excavation, installation, backfill, and resurfacing. It is anticipated that approximately 65 days of total road closures would be required on East Cox Road. Approximately 50 days would be required on McDonald Road and Day Valley Road. The closure of East Cox Road would not occur until construction on McDonald Road and Day Valley Road is complete. The anticipated road closures are described in more detail in the subsections that follow. Preliminary discussions with the County of Santa Cruz Public Works Department indicate that work hours would be restricted to between 8:30 AM to 4:30 PM.

##### ***East Cox Road***

East Cox Road would be completely closed between Day Valley Road and PG&E's proposed Pole C-89 (near the County's water pump station), totaling approximately 1,900 feet. Access during this closure would be limited to residents, first responders, police, fire, and ambulances between 8:30 AM to 4:30 PM.

##### ***McDonald Road and Day Valley Road***

McDonald Road and a short portion of Day Valley Road (approximately 550 feet) would also be completely closed from Freedom Boulevard to East Cox Road (approximately 2,800 feet) during construction activities. Access during this closure would be limited to residents, first responders, police, fire, and ambulances between 8:30 AM to 4:30 PM.

#### **1.3.1 Staging Areas**

Construction of the underground route would utilize a 1.5- to 2-acre staging area, which was previously identified for project use in the PEA. The staging area is located at Amesti Road, between Paraiso Drive and Hawthorn Avenue, and would be used to store construction materials and equipment as they arrive on site. In addition, construction trailers would be mobilized to

these areas for use during construction. The site has sufficient space to house both the underground construction equipment and the overhead power line construction equipment for the project. The staging area is accessible from Amesti Road, southwest of Pinto Lake County Park. For security purposes, a chain-link fence would be installed around the entire perimeter of the site. Locking gates would also be installed to control access. Additional security measures would include 24-hour security guards, as well as security lighting, to ensure the safety of equipment and materials stored at the site.

### **1.3.2 Work Areas**

Several temporary work areas would be established outside of the existing public road ROW in order to facilitate construction of the underground power line. A summary of the preliminary locations of these temporary work areas and their dimensions are provided in Table 2: Temporary Work Area Summary. The work areas would be cleared and graded as needed to allow for construction equipment access. The precise locations of these temporary work areas may change as necessary at the time of construction due to land-use changes, unanticipated impacts, and other factors. The temporary work areas would encompass the permanent ROW areas identified in Table 1: Summary of Land Acquisition or Permanent Easements.

### **1.3.3 Methods**

#### **Site Development**

Site development activities would commence with clearing and grading activities in areas located outside of the existing public road ROW. Tree trimming and brush removal are anticipated to be required in all locations. Temporary work area use would result in the removal of up to 55 trees. The trees to be removed would range from 10 to 100 feet tall and from 4 to 73 inches in diameter at breast height. Approximately 25 percent of the trees are non-native trees.

#### **Riser Poles**

##### ***Foundations***

Each riser pole would be supported by a single concrete foundation. A large drilling rig would auger an approximately 6-foot-diameter hole to a maximum depth of approximately 40 feet, requiring the excavation of 105 cubic yards of soil, depending on the conditions.<sup>2</sup> All drilled material would be removed from the site and hauled to an appropriate landfill based on soil characterization.<sup>3</sup> Numerous dump trucks would be required for hauling operations. During the auguring and export process, the excavated soil would be wetted for dust control purposes.

Following the excavation of the foundation hole, a rebar cage and base anchors would be installed into the excavation with a crane. A form would be built to a height of approximately 2 feet above grade and concrete would be poured into the excavation, encasing the rebar cage and base anchors. The concrete would be delivered directly to the pole's location using concrete trucks and would be pumped into the excavation. The concrete would take approximately 10 to 14 days to cure sufficiently prior to setting the riser pole in place atop the foundation.

---

<sup>2</sup> Final foundation sizes would not be determined until final engineering is complete.

<sup>3</sup> At the time this document was prepared, the soil at the proposed riser pole locations had not been characterized or tested for contamination.

**Table 2: Temporary Work Area Summary**

<b>Project Component</b>	<b>Required Improvements</b>	<b>Approximate Dimensions (feet)</b>	<b>Approximate Area (acres)</b>
Northern Riser Pole	Extensive grading and construction of an approximately 20-foot-tall concrete retaining wall, and fence/gate installation.	130 by 90	0.26
Vault 4	Vegetation removal/tree trimming and minor grading may be required; relocation of an existing fence.	300 by 40	0.15
Vault 3	Vegetation removal and minor grading may be required.	180 by 50	0.16
Vault 2	Tree trimming and relocation of an existing fence.	360 by 40	0.22
Southern Riser Pole and Vault 1	Vegetation removal and minor grading may be required; possible benching and/or a retaining wall.	350 by 50	0.37
<b>Total</b>	--	--	<b>1.16</b>

Note: Each temporary work area would include the installation of underground duct banks which would connect to the vaults and/or riser poles.

### ***Riser Pole Installation***

The poles or pole segments, cross arms, insulators, and hardware would then be delivered to the foundation. The cross arms would be attached, the pole would be placed onto the cured concrete foundations 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. Once the pole is installed, additional hardware would be added to the cross arms using a bucket truck. Raising, setting, and finishing the installation would take 3 to 4 days to complete. A photograph of a typical riser pole installation is provided in Attachment B: Representative Photographs of Typical Underground Construction Methods.

### **Underground Duct Bank and Vaults**

Construction and installation of the underground duct banks and vaults would require clearing and grading as needed to allow for site preparation and construction equipment access. In addition, the existing road surface would be removed. Representative photographs of typical underground duct bank and vault installation are provided in Attachment B: Representative Photographs of Typical Underground Construction Methods. Descriptions of the temporary work areas needed for construction are described in Section 1.3.2 Work Areas. Prior to excavation and trenching, other utility companies would be notified to locate and mark existing underground utilities along the proposed underground alignment. Exploratory excavations (i.e., potholing) would also be conducted to verify the locations of existing facilities in the ROW.

### ***Vault Installation***

A large excavation—measuring approximately 34 feet long, 14 feet in width, and up to 15 feet deep—would occur at each vault location using excavators. All excavated material would be removed from the site and hauled to an appropriate landfill. Numerous dump trucks would be required for hauling operations. Approximately 1,000 feet of laydown area would be required along the roadway in the vicinity of the vault location to facilitate the excavation and installation activities. During all excavation activities, soil would be wetted for dust control to maintain acceptable air quality.

Shoring, such as driven sheet piles or slide rail sheeting, would be required for the large vault excavation. Once the initial excavation and shoring is installed, crushed rock would be placed within the excavation and leveled to provide a subbase for the vaults.

Vaults would be constructed of prefabricated, steel-reinforced concrete and designed to withstand the maximum credible earthquake in the area and traffic loading. Following excavation, each vault would be set in as many as three individual pieces using a single 75-ton crane. After the concrete vault sections have been set, concrete necks and rings would be placed and grouted in. The vault excavation would then be backfilled, typically with fluidized thermal backfill (FTB). The backfilling process would require between 1 and 2 days to complete. At this point, vault installation would be complete, and the duct bank would be connected to the vaults.

### ***Duct Bank Installation***

Unless alternate methods are required to cross existing facilities or sensitive resources, duct banks would be installed using open-cut trenching techniques. Excavators and other earth-moving equipment would be used to establish trenches measuring 6 to 10 feet deep and 3 to 5 feet wide. The trench would be widened and shored where necessary to meet California Occupational Safety and Health Administration safety requirements.

Once the trenches for the underground duct bank are completed, PG&E would install the cable conduits (separated by spacers) and pour concrete around the conduits to form the duct banks. Once the PVC conduits are installed, fluidized thermal concrete (FTC) and FTB would be used to backfill the trench. The FTC and FTB would be delivered by way of normal concrete trucks. These specific and specialized concrete mixtures are required as an industry standard for heat dissipation concerns for high-voltage electrical cables.

### ***Cable Pulling, Splicing, and Termination***

After installation of the duct banks and vaults, PG&E would install the underground cables. Each cable segment would be pulled into the duct bank, spliced at each of the vaults along the route, and terminated at the riser poles. To pull the cable through the ducts, a pulling winch would be placed at the opposite end of the cable reels at the far vault location. It is expected that cable would first be pulled at the two riser poles. One of these cable pulls would consist of pulling from the Southern Riser Pole, through Vault 1 and into Vault 2. The other initial pull would consist of pulling from the Northern Riser Pole, through Vault 4 and into Vault 3. The cable would then be pulled from Vault 3 to Vault 2, completing all cable pulls. The cable installation process would take 2 to 3 days to install all cables.

Once all three cables have been pulled through the duct banks, then splicing and termination would begin. A total of 7 days are required to complete three cable splices at each vault location. Splicing typically requires 10 hours per day and 5 to 6 days per week. A splice trailer would be positioned adjacent to the vault manhole openings to facilitate cable splicing at the vaults after the cables are pulled through the ducts. Cable pulling and splicing would require that approximately 500 feet of one lane of traffic be closed in the vicinity of the vault for the operation of construction equipment and material laydown.

Terminations would be performed at the riser poles, where the overhead power line transitions to the underground power line alignment. During termination, an area around the riser pole would be blocked to complete the work. Scaffolding or large bucket trucks would be set up for termination work. Termination at each riser pole would require approximately 7 days. Termination typically takes 10 hours per day and 5 to 6 days per week.

## Dewatering

It is anticipated that groundwater would be encountered during construction of the riser pole foundations and trenching for the underground duct bank and vaults. Groundwater would be pumped out either to a controlled containment and discharge or possible direct ground discharge with an associated filter system. In addition, the following construction dewatering procedures would be implemented during construction:

- A submersible pump would be installed.
- The groundwater would then be pumped to a desiltation tank (i.e., baker tank) at one end for sediment and filtering. Baffles would be installed in the tank to increase sedimentation, and the water in the tank would be allowed to flow out from the opposite end for testing.
- The water would then be tested to ensure compliance with the Regional Water Quality Control Board National Pollutant Discharge Elimination System requirements. If the water quality does not meet permit requirements, additional baker tanks would be used and/or additional treatment or filtering would be performed until the applicable requirements are met.

## Cleanup and Post-Construction Activities

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, as appropriate. Cleared vegetation would either be chipped and stored on the ROW for later use during reclamation or disposed of off site, depending on landowner and agency agreements.

All areas that are temporarily disturbed during construction activities would be restored to pre-construction conditions, to the extent practicable, once construction of the substation is complete. Cleanup efforts would include removal of all construction debris for recycling and/or disposal off site.

### 1.3.4 Equipment and Personnel

Different phases of the construction process would require varying numbers of construction personnel. It is anticipated that up to 37 workers would be employed on site at any given time. In addition to the workforce, there are other personnel that may be on site at any given time, such as safety inspector(s), prime contractor and subcontractor inspectors, various PG&E employees, engineers, city officials, environmental and/or biological monitors, CPUC personnel, and material manufacturer representatives. In order to de-energize the existing lines during testing and final termination, PG&E personnel would perform switching and lockout/tagout operations at the substations. It is also anticipated that workers would be needed at the site laydown yard to perform preparation work for the next day or to stage construction activities. A summary of the anticipated construction personnel by component has been included as Table 3: Construction Personnel Requirements. Table 4: Construction Equipment Requirements provides an overview of the anticipated construction equipment that would be used for each construction activity.

**Table 3: Construction Personnel Requirements**

Position	Approximate Number
<b>Riser Site Prep/Foundation Installation</b>	
Foreman	1
Backhoe Operator	1
Drill Rig Operator	2
Dump Truck Operator	1
Excavator Operator	1
Crane Operator	1
Concrete Truck Operator	1
Concrete Pump Truck Operator	1
Laborer	3 to 4
Lineman	4
Flagman (full time)	2
Flagman (part time)	1
Traffic Control Setup/Removal	4 to 8
<b>Riser Pole Installation</b>	
Foreman	1
Laborer	4
Crane Operator	1
Spotter	1
Lineman	2
Flagman (full time)	2
Flagman (part time)	1
Traffic Control Setup/Removal	4 to 8
<b>Vault Installation</b>	
Foreman	1
Crane Operator	1
Concrete Truck Operator	1
Pump Truck Operator	1
Paving Machine Operator	1
Milling Machine Operator	1
Spotter	1

Position	Approximate Number
Backhoe Operator	1
Dump Truck Operator	2
Laborer	4
Flagmen (full time)	2
Flagman (part time)	1
Traffic Control Setup/Removal	4 to 8
<b>Duct Bank Installation</b>	
Foreman	1
Dump Truck Operator	2
Backhoe Operator	1
Excavator Operator	1
Cement Truck Operator	1
Pump Truck Operator	1
Paving Machine Operator	1
Laborer	4 to 6
Flagman (full time)	2
Flagman (part time)	1
Traffic Control Setup/Removal	4 to 8
<b>Cable Installation</b>	
Foreman	2
Installer	5 to 7
Inspector	1
Bucket Truck Operator	1
Vault/Ladder Attendant	1
Cable Supply Truck Supervisor	1
Cable Personnel	2 to 4
Pulling Winch Truck Operator	1
Cable Reel Break Operator	1
Lubricant Application Personnel	1
Inspector	1
Cable Representative	1
Flagman (full time)	2

East Cox Road - Undergrounding of the Cox-Freedom  
Segment Environmental Impact Summary

Position	Approximate Number
Flagman (part time)	1
Traffic Control Setup/Removal	4 to 8
Splicer	4

**Table 4: Construction Equipment Requirements**

Anticipated Vehicle/Equipment Type	Use	Estimated Hours Operating at Site/Day (per vehicle)	Estimated Quantity Required
<b>Riser Pole Site Preparation/Foundation Installation</b>			
Linemen bucket truck	Transport excavated materials	6	2
Crane	Lower and place riser poles	8	1
Backhoe	Excavation	6	1
Bulldozer	Level out ground prior to drilling	6	1
Concrete Truck	Carry and lay foundation	Not Applicable (NA)	1
Drill Rig	Dig out foundation	8	1
Baker Tank	Hold water/contaminated water removed from the site	NA	1
Dump Truck	Transport excavated materials	NA	2
Pump Truck	Pump concrete into foundation pit	8	1
Water Truck	Dust control	4	1
Traffic Control Truck	Transport traffic control materials	NA	3
Traffic Control Sign	Warn traffic of construction zone	NA	2
Utility Truck	Supply miscellaneous equipment and utilities to the site	NA	1
<b>Riser Pole Installation</b>			
Linemen Bucket Truck	Transport excavated materials	6	2
Crane	Lower and place riser poles	8	1
Water Truck	Dust control	4	1
Traffic Control Trucks	Transport traffic control materials	NA	3

Anticipated Vehicle/Equipment Type	Use	Estimated Hours Operating at Site/Day (per vehicle)	Estimated Quantity Required
Traffic Control Sign	Warn traffic of construction zone	NA	2
Utility Truck	Supply miscellaneous equipment and utilities to the site	NA	1
<b>Vault Installation</b>			
Backhoe	Excavation	8	1
Crane	Place three precast concrete sections of vault	8	1
Dump Truck	Transport excavated materials	NA	2
Bulldozer	Level out ground prior to drilling	4	1
Water Truck	Water supply for vault construction and dust control	4	1
Tractor Trailer	Haul sheet pile and precast concrete vault sections	NA	1
Baker Tank	Hold water/contaminated water removed from the site	NA	1
Pump Truck	Pump flowable fill between excavation and vault	8	1
Concrete Truck	Flowable fill	NA	1
Stake Truck	Transport material	NA	2
Paving Machine	Repaving roadway	8	1
Traffic Control Truck	Transport traffic control materials	NA	3
Traffic Control Sign	Warn traffic of construction zone	NA	2
Utility Truck	Supply miscellaneous equipment and utilities to the site	NA	1

Anticipated Vehicle/Equipment Type	Use	Estimated Hours Operating at Site/Day (per vehicle)	Estimated Quantity Required
<b>Duct Bank Installation</b>			
Dump Truck	Transport excavated materials	NA	2
Backhoe	Excavation	8	1
Small Excavator (i.e., backhoe)	Transport spoils and odd materials	8	1
Steel Plate	Cover excavations within the roadway to maintain traffic access	NA	20
Tractor Trailer	Haul materials	NA	1
Water Truck	Dust control	4	1
Pump Truck	Pump water out of excavation	8	1
Baker Tank	Hold water taken from excavation	NA	1
Concrete Truck	Supply and place thermal backfill	NA	3
Paving Machine	Repave the road	8	1
Traffic Control Truck	Transport traffic control materials	NA	3
Traffic Control Sign	Warn traffic of construction zone	NA	2
Utility Truck	Supply miscellaneous equipment and utilities to the site	NA	1
<b>Cable Installation</b>			
Cable Supply Truck	Cable delivery	NA	1
Cable Pulling Truck	Pull cable through the duct bank	10	1
Splicing Truck	Splicing cable	NA	1
Traffic Control Truck	Transport traffic control materials	NA	3
Traffic Control Sign	Warn traffic of construction zone	NA	2

East Cox Road - Undergrounding of the Cox-Freedom Segment Environmental  
Impact Summary

Anticipated Vehicle/Equipment Type	Use	Estimated Hours Operating at Site/Day (per vehicle)	Estimated Quantity Required
Utility Truck	Supply miscellaneous equipment and utilities to the site	NA	1
Scaffolding	Access for cable termination on riser poles	NA	2

Note: Equipment for which no operating duration is specified may not have an engine. It would either be driven to the site and parked, or it would operate primarily off site by transporting materials to and from the site.

### 1.3.5 Construction Schedule

PG&E anticipates that construction of Alternative 4D would take up to 17 months within a 22-month window. Table 5: Proposed Construction Schedule summarizes the length of time anticipated to be required to construct each component of Alternative 4D. It is anticipated that construction would begin in mid-April 2017 and no work would occur during the Santa Cruz long-toed salamander breeding season (between October 15 and April 15). Construction would typically occur 5 days per week (Monday through Friday) for 8 hours per day, with the exception for cable installation, which would occur 6 days per week for up to 10 hours per day. Preliminary discussions with the County of Santa Cruz Public Works Department indicate that work hours would be restricted to 8:30 AM to 4:30 PM for full road closures. Cable installation would only require one lane of traffic closure allowing for extension of restricted work hours with the County of Santa Cruz anticipated approval.

**Table 5: Proposed Construction Schedule**

Construction Phase	Approximate Duration (months)	Approximate Start Date
Riser Site Prep/Foundation Installation	3.5	Mid-April 2017
Riser Pole Installation	1.5	Mid-October 2017
Vault Installation	2.5	August 2017
Duct Bank Installation	6	Mid-April 2018
Cable Installation	3.5	Mid-October 2018

## 1.4 OPERATION AND MAINTENANCE

Ongoing maintenance would involve both routine preventative maintenance and emergency procedures to maintain service continuity. Inspection, maintenance, and repair of the new 115 kV power lines would continue to be performed as it has been for the existing lines in the project corridor. The riser poles and cables would be inspected annually, at a minimum, for corrosion, equipment misalignment, loose fittings, and other common mechanical problems. Approximately 30-foot by 15-foot work spaces around the riser poles would be maintained. During inspections, one-lane road closures may be required for the inspection of equipment most likely through the use of a bucket truck, and to allow free movement of the truck and inspectors. Two other half-ton work trucks would also be needed on site to assist with traffic control equipment and personnel. These areas would be kept clear of shrubs and other obstructions for inspection and maintenance purposes.

The vaults would require visual inspections for steel corrosion and deflection of the splice supports and major movement of the cable splices. During this inspection, one-lane road closures would be required for the inspection of equipment, most likely through the use of two half-ton work trucks, and to assist traffic control equipment and personnel. PG&E personnel would not enter the vault during this inspection; they would visually inspect through the vault neck at the

manhole entrances. If open circuit testing is required, PG&E personnel would be required to enter the vaults.



**ATTACHMENT A: ALTERNATIVE 4D DETAILED ROUTE MAP**





Attachment A: Alternative 4D Detailed Route Map 1 of 4

Santa Cruz 115 kV Reinforcement Project

Temporary Work Area

Vault

Edge of Pavement

Retaining Wall

Underground Alignment

Northern Alignment

Culvert

Riser Pole

PGE

Pacific Gas and Electric Company

INSIGNIA

ENVIRONMENTAL

1:1,000

0

50

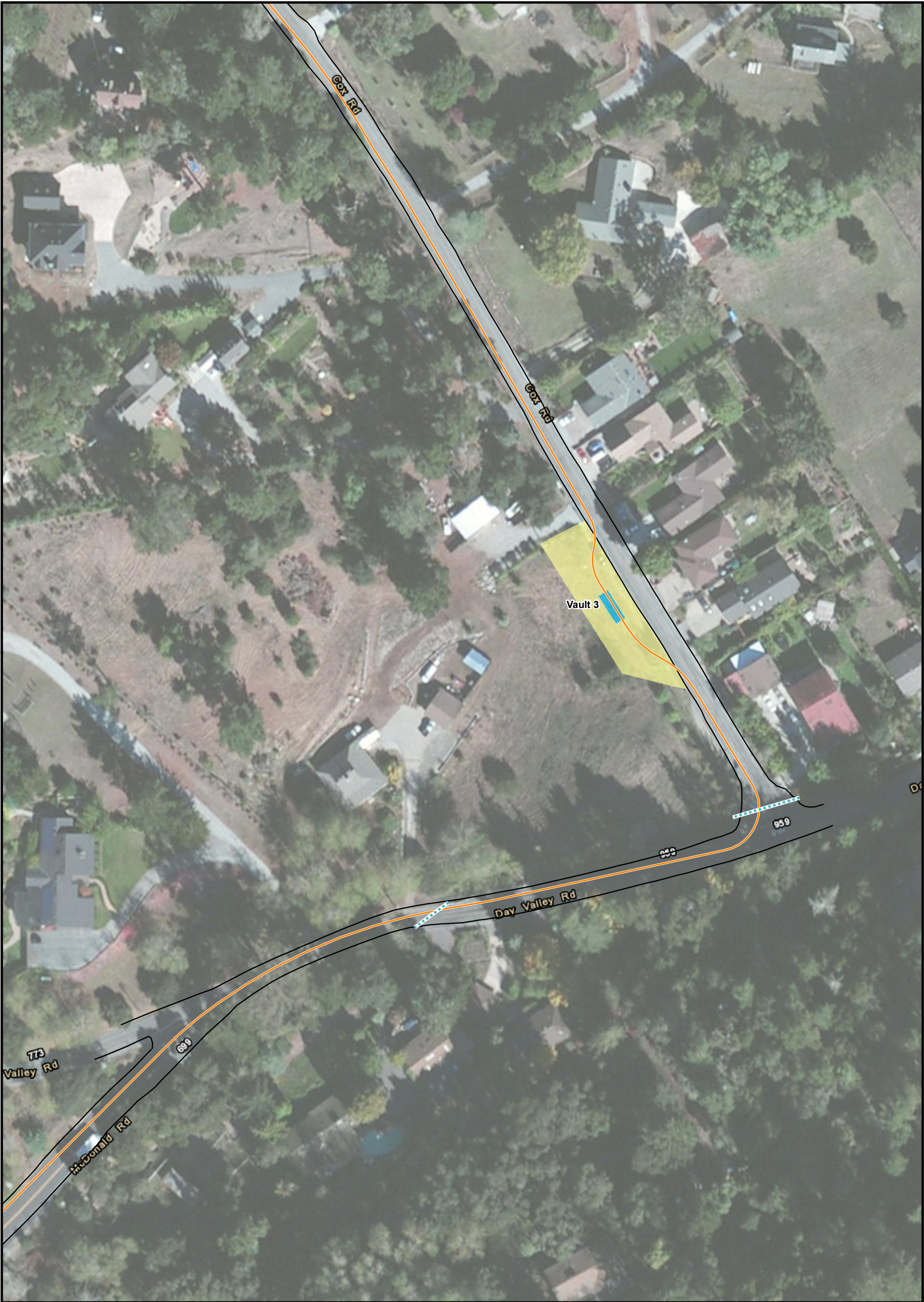
100

200

Feet

Z:\Projects\PGE\_Santa\_Cruz\MXD\CPUC\_DataRequest\_8\Underground\PD\_Underground\_RouteMap\_v2.mxd

6/10/2014



Attachment A: Alternative 4D Detailed Route Map 2 of 4

Santa Cruz 115 kV Reinforcement Project

Temporary Work Area

Vault

Edge of Pavement

Retaining Wall

Underground Alignment

Northern Alignment

Culvert

Riser Pole

Pacific Gas and Electric Company®

INSIGNIA ENVIRONMENTAL

1:1,000

Feet

0

50

100

200

Z:\Projects\PG&E\_Santa\_Cruz\MXD\CPUC\_DataRequest\_8\Underground\PD\_Underground\_RouteMap\_v2.mxd

6/10/2014



Attachment A: Alternative 4D Detailed Route Map 3 of 4

Santa Cruz 115 kV Reinforcement Project

Temporary Work Area

Vault

Edge of Pavement

Retaining Wall

Underground Alignment

Northern Alignment

Culvert

Riser Pole

Pacific Gas and Electric Company

INSIGNIA ENVIRONMENTAL

1:1,000

0

50

100

200

Feet

Z:\Projects\PG&E\_Santa\_Cruz\MXD\CPUC\_DataRequest\_8\Underground\PD\_Underground\_RouteMap\_v2.mxd

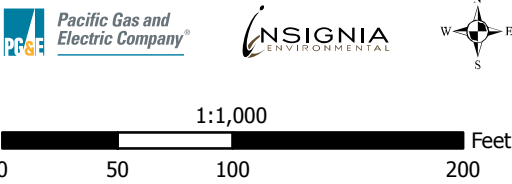
6/10/2014



Attachment A: Alternative 4D Detailed Route Map 4 of 4

Santa Cruz 115 kV Reinforcement Project

- |                     |                       |            |
|---------------------|-----------------------|------------|
| Temporary Work Area | Edge of Pavement      | Riser Pole |
| Vault               | Retaining Wall        |            |
|                     | Underground Alignment |            |
|                     | Northern Alignment    |            |
|                     | Culvert               |            |



**ATTACHMENT B: REPRESENTATIVE PHOTOGRAPHS OF TYPICAL UNDERGROUND  
CONSTRUCTION METHODS**





Photograph 1: Installation of a weathering steel riser pole with cable protecting shroud.

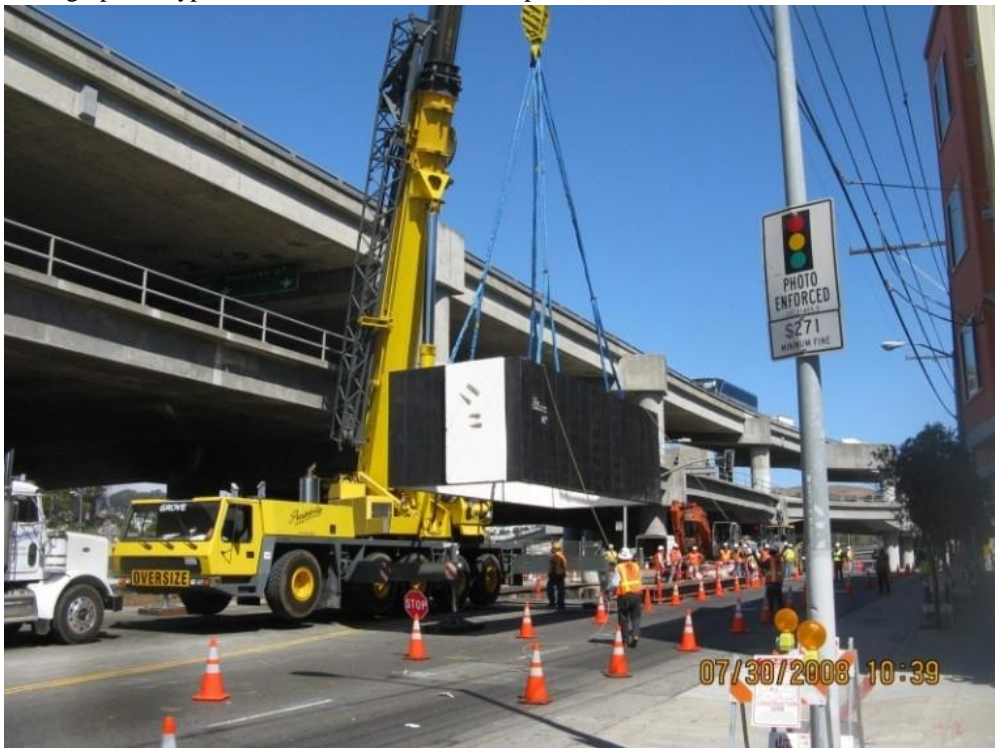


Photograph 2: Typical eight foot by eight-foot concrete apron poured around the vault lids to allow vault ingress and egress.

Attachment B: Representative Photographs of Typical  
Underground Construction Methods



Photograph 3: Typical vault excavation within a public road.



Photograph 4: Typical vault section installation by a crane.



Photograph 5: Typical duct bank excavation with excavators. Dump trucks are positioned Parallel to the trench for extraction of soil.



Photograph 6: Typical concrete duct bank installation.

Attachment B: Representative Photographs of Typical  
Underground Construction Methods



Photograph 7: Typical cable installation.

**ATTACHMENT B: CALEEMOD INPUT AND OUTPUT FILES**

**Santa Cruz 115 kV Reinforcement Project**  
**Santa Cruz County, Summer**

## 1.0 Project Characteristics

---

### 1.1 Land Usage

### 1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	61
Climate Zone	5			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule based upon Project Description, all phases will be 5 days per week except for Cable Installation.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Trips and VMT - Vehicle trips taken from project description.

Grading - Disturbed project area taken from the project description.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	34.00
tblConstructionPhase	NumDays	0.00	93.00
tblConstructionPhase	NumDays	0.00	87.00
tblConstructionPhase	NumDays	0.00	54.00
tblConstructionPhase	NumDays	0.00	131.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	10/30/2017	10/15/2017
tblConstructionPhase	PhaseEndDate	6/1/2018	10/15/2018
tblConstructionPhase	PhaseStartDate	8/16/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	12/1/2017	4/16/2018
tblGrading	AcresOfGrading	32.63	0.63
tblGrading	AcresOfGrading	13.50	0.04
tblGrading	AcresOfGrading	0.00	0.54

tblGrading	MaterialExported	0.00	989.80
tblGrading	MaterialExported	0.00	1,322.20
tblGrading	MaterialExported	0.00	7,835.50
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks

tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

tblTripsAndVMT	HaulingTripNumber	124.00	65.00
tblTripsAndVMT	HaulingTripNumber	165.00	145.00
tblTripsAndVMT	HaulingTripNumber	979.00	1,000.00
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	20.00	28.00
tblTripsAndVMT	WorkerTripNumber	15.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	27.00

tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix

## 2.0 Emissions Summary

---

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.7746	76.7409	43.3356	0.1063	1.2535	3.0809	4.3344	0.3380	2.8344	3.1723	0.0000	10,607.59 91	10,607.59 91	2.6120	0.0000	10,662.45 10
2018	2.4515	25.2330	20.4335	0.0488	0.7025	1.0235	1.7259	0.1892	0.9416	1.1308	0.0000	4,766.052 5	4,766.052 5	1.0522	0.0000	4,788.149 4
2019	0.6005	4.8862	6.3090	0.0147	0.6073	0.2604	0.8677	0.1646	0.2396	0.4042	0.0000	1,314.884 3	1,314.884 3	0.1237	0.0000	1,317.482 6
<b>Total</b>	<b>9.8266</b>	<b>106.8601</b>	<b>70.0781</b>	<b>0.1699</b>	<b>2.5633</b>	<b>4.3648</b>	<b>6.9280</b>	<b>0.6918</b>	<b>4.0156</b>	<b>4.7073</b>	<b>0.0000</b>	<b>16,688.53 59</b>	<b>16,688.53 59</b>	<b>3.7880</b>	<b>0.0000</b>	<b>16,768.08 30</b>

### Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.7746	76.7409	43.3356	0.1063	1.2466	3.0809	4.3275	0.3371	2.8344	3.1715	0.0000	10,607.59 91	10,607.59 91	2.6120	0.0000	10,662.45 10
2018	2.4515	25.2330	20.4335	0.0488	0.6963	1.0235	1.7198	0.1884	0.9416	1.1300	0.0000	4,766.052 5	4,766.052 5	1.0522	0.0000	4,788.149 4
2019	0.6005	4.8862	6.3090	0.0147	0.6073	0.2604	0.8677	0.1646	0.2396	0.4042	0.0000	1,314.884 3	1,314.884 3	0.1237	0.0000	1,317.482 6
<b>Total</b>	<b>9.8266</b>	<b>106.8601</b>	<b>70.0781</b>	<b>0.1699</b>	<b>2.5503</b>	<b>4.3648</b>	<b>6.9150</b>	<b>0.6901</b>	<b>4.0156</b>	<b>4.7056</b>	<b>0.0000</b>	<b>16,688.53 59</b>	<b>16,688.53 59</b>	<b>3.7880</b>	<b>0.0000</b>	<b>16,768.08 30</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.51	0.00	0.19	0.24	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00

## 2.2 Overall Operational

### Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

### Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 3.0 Construction Detail

#### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Riser Site Prep/Foundation Installation	Site Preparation	4/16/2017	8/15/2017	5	87	
2	Vault Installation	Site Preparation	8/1/2017	10/15/2017	5	54	
3	Riser Pole Installation	Building Construction	10/16/2017	11/30/2017	5	34	
4	Duct Bank Installation	Site Preparation	4/16/2018	10/15/2018	5	131	
5	Cable Installation	Building Construction	10/16/2018	1/31/2019	6	93	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

#### OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Riser Site Prep/Foundation Installation	Aerial Lifts	2	6.00	62	0.31
Riser Site Prep/Foundation Installation	Cranes	1	8.00	226	0.29
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Riser Site Prep/Foundation Installation	Crawler Tractors	1	6.00	208	0.43
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41

Riser Site Prep/Foundation Installation	Bore/Drill Rigs	1	8.00	205	0.50
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	8.00	400	0.38
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Installation	Cranes	1	8.00	226	0.29
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Crawler Tractors	1	4.00	208	0.43
Vault Installation	Off-Highway Trucks	1	8.00	400	0.38
Vault Installation	Off-Highway Trucks	1	4.00	400	0.38
Vault Installation	Pavers	1	8.00	125	0.42
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Pole Installation	Aerial Lifts	2	6.00	62	0.31
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Forklifts	0	6.00	89	0.20
Riser Pole Installation	Cranes	1	8.00	226	0.29
Riser Pole Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Pole Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Duct Bank Installation	Excavators	1	8.00	162	0.38
Duct Bank Installation	Graders	0	8.00	174	0.41
Duct Bank Installation	Off-Highway Trucks	1	4.00	400	0.38
Duct Bank Installation	Off-Highway Trucks	1	8.00	400	0.38
Duct Bank Installation	Pavers	1	8.00	125	0.42

Cable Installation	Other General Industrial Equipment	1	10.00	87	0.34
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Cable Installation	Cranes	0	4.00	226	0.29
Cable Installation	Forklifts	0	6.00	89	0.20
Cable Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Riser Site Prep/Foundation Installation	8	28.00	9.00	65.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Vault Installation	6	25.00	12.00	145.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Riser Pole Installation	4	20.00	9.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Duct Bank Installation	5	25.00	10.00	1,000.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Cable Installation	1	27.00	11.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

Water Exposed Area

**3.2 Riser Site Prep/Foundation Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.9700e-003	0.0000	8.9700e-003	1.0200e-003	0.0000	1.0200e-003			0.0000			0.0000
Off-Road	3.0879	37.3018	17.2520	0.0447		1.4958	1.4958		1.3762	1.3762		4,570.3686	4,570.3686	1.4004		4,599.7760
<b>Total</b>	<b>3.0879</b>	<b>37.3018</b>	<b>17.2520</b>	<b>0.0447</b>	<b>8.9700e-003</b>	<b>1.4958</b>	<b>1.5048</b>	<b>1.0200e-003</b>	<b>1.3762</b>	<b>1.3772</b>		<b>4,570.3686</b>	<b>4,570.3686</b>	<b>1.4004</b>		<b>4,599.7760</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0146	0.1682	0.1862	5.4000e-004	0.0129	2.5200e-003	0.0155	3.5400e-003	2.3200e-003	5.8600e-003		53.3255	53.3255	3.6000e-004		53.3332
Vendor	0.1563	1.7670	1.6747	5.3600e-003	0.1610	0.0322	0.1932	0.0456	0.0296	0.0753		529.9887	529.9887	3.7400e-003		530.0672
Worker	0.1498	0.2544	2.6059	5.1800e-003	0.4257	3.7000e-003	0.4294	0.1129	3.3900e-003	0.1163		416.0222	416.0222	0.0247		416.5402
<b>Total</b>	<b>0.3207</b>	<b>2.1896</b>	<b>4.4668</b>	<b>0.0111</b>	<b>0.5997</b>	<b>0.0384</b>	<b>0.6381</b>	<b>0.1621</b>	<b>0.0353</b>	<b>0.1974</b>		<b>999.3364</b>	<b>999.3364</b>	<b>0.0288</b>		<b>999.9406</b>

**3.2 Riser Site Prep/Foundation Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.0300e-003	0.0000	4.0300e-003	4.6000e-004	0.0000	4.6000e-004			0.0000			0.0000
Off-Road	3.0879	37.3018	17.2520	0.0447		1.4958	1.4958		1.3762	1.3762	0.0000	4,570.3686	4,570.3686	1.4004		4,599.7760
<b>Total</b>	<b>3.0879</b>	<b>37.3018</b>	<b>17.2520</b>	<b>0.0447</b>	<b>4.0300e-003</b>	<b>1.4958</b>	<b>1.4999</b>	<b>4.6000e-004</b>	<b>1.3762</b>	<b>1.3766</b>	<b>0.0000</b>	<b>4,570.3686</b>	<b>4,570.3686</b>	<b>1.4004</b>		<b>4,599.7760</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0146	0.1682	0.1862	5.4000e-004	0.0129	2.5200e-003	0.0155	3.5400e-003	2.3200e-003	5.8600e-003		53.3255	53.3255	3.6000e-004		53.3332
Vendor	0.1563	1.7670	1.6747	5.3600e-003	0.1610	0.0322	0.1932	0.0456	0.0296	0.0753		529.9887	529.9887	3.7400e-003		530.0672
Worker	0.1498	0.2544	2.6059	5.1800e-003	0.4257	3.7000e-003	0.4294	0.1129	3.3900e-003	0.1163		416.0222	416.0222	0.0247		416.5402
<b>Total</b>	<b>0.3207</b>	<b>2.1896</b>	<b>4.4668</b>	<b>0.0111</b>	<b>0.5997</b>	<b>0.0384</b>	<b>0.6381</b>	<b>0.1621</b>	<b>0.0353</b>	<b>0.1974</b>		<b>999.3364</b>	<b>999.3364</b>	<b>0.0288</b>		<b>999.9406</b>

**3.3 Vault Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5500e-003	0.0000	3.5500e-003	5.0000e-004	0.0000	5.0000e-004			0.0000			0.0000
Off-Road	2.9716	34.0619	16.3880	0.0368		1.4913	1.4913		1.3720	1.3720		3,768.1412	3,768.1412	1.1546		3,792.3868
<b>Total</b>	<b>2.9716</b>	<b>34.0619</b>	<b>16.3880</b>	<b>0.0368</b>	<b>3.5500e-003</b>	<b>1.4913</b>	<b>1.4948</b>	<b>5.0000e-004</b>	<b>1.3720</b>	<b>1.3725</b>		<b>3,768.1412</b>	<b>3,768.1412</b>	<b>1.1546</b>		<b>3,792.3868</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0523	0.6044	0.6693	1.9400e-003	0.0465	9.0700e-003	0.0556	0.0127	8.3400e-003	0.0211		191.6529	191.6529	1.3100e-003		191.6804
Vendor	0.2083	2.3560	2.2329	7.1500e-003	0.2147	0.0430	0.2576	0.0608	0.0395	0.1004		706.6516	706.6516	4.9900e-003		706.7563
Worker	0.1338	0.2271	2.3267	4.6200e-003	0.3801	3.3000e-003	0.3834	0.1008	3.0300e-003	0.1038		371.4484	371.4484	0.0220		371.9109
<b>Total</b>	<b>0.3945</b>	<b>3.1875</b>	<b>5.2289</b>	<b>0.0137</b>	<b>0.6413</b>	<b>0.0553</b>	<b>0.6966</b>	<b>0.1744</b>	<b>0.0509</b>	<b>0.2252</b>		<b>1,269.7529</b>	<b>1,269.7529</b>	<b>0.0283</b>		<b>1,270.3476</b>

**3.3 Vault Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6000e-003	0.0000	1.6000e-003	2.3000e-004	0.0000	2.3000e-004			0.0000			0.0000
Off-Road	2.9716	34.0619	16.3880	0.0368		1.4913	1.4913		1.3720	1.3720	0.0000	3,768.1412	3,768.1412	1.1546		3,792.3868
<b>Total</b>	<b>2.9716</b>	<b>34.0619</b>	<b>16.3880</b>	<b>0.0368</b>	<b>1.6000e-003</b>	<b>1.4913</b>	<b>1.4929</b>	<b>2.3000e-004</b>	<b>1.3720</b>	<b>1.3722</b>	<b>0.0000</b>	<b>3,768.1412</b>	<b>3,768.1412</b>	<b>1.1546</b>		<b>3,792.3868</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0523	0.6044	0.6693	1.9400e-003	0.0465	9.0700e-003	0.0556	0.0127	8.3400e-003	0.0211		191.6529	191.6529	1.3100e-003		191.6804
Vendor	0.2083	2.3560	2.2329	7.1500e-003	0.2147	0.0430	0.2576	0.0608	0.0395	0.1004		706.6516	706.6516	4.9900e-003		706.7563
Worker	0.1338	0.2271	2.3267	4.6200e-003	0.3801	3.3000e-003	0.3834	0.1008	3.0300e-003	0.1038		371.4484	371.4484	0.0220		371.9109
<b>Total</b>	<b>0.3945</b>	<b>3.1875</b>	<b>5.2289</b>	<b>0.0137</b>	<b>0.6413</b>	<b>0.0553</b>	<b>0.6966</b>	<b>0.1744</b>	<b>0.0509</b>	<b>0.2252</b>		<b>1,269.7529</b>	<b>1,269.7529</b>	<b>0.0283</b>		<b>1,270.3476</b>

**3.4 Riser Pole Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1540	13.7793	6.7024	0.0147		0.5663	0.5663		0.5210	0.5210		1,500.871 1	1,500.871 1	0.4599		1,510.528 2
<b>Total</b>	<b>1.1540</b>	<b>13.7793</b>	<b>6.7024</b>	<b>0.0147</b>		<b>0.5663</b>	<b>0.5663</b>		<b>0.5210</b>	<b>0.5210</b>		<b>1,500.871 1</b>	<b>1,500.871 1</b>	<b>0.4599</b>		<b>1,510.528 2</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1563	1.7670	1.6747	5.3600e-003	0.1610	0.0322	0.1932	0.0456	0.0296	0.0753		529.9887	529.9887	3.7400e-003		530.0672
Worker	0.1070	0.1817	1.8614	3.7000e-003	0.3041	2.6400e-003	0.3067	0.0806	2.4200e-003	0.0831		297.1587	297.1587	0.0176		297.5287
<b>Total</b>	<b>0.2633</b>	<b>1.9487</b>	<b>3.5360</b>	<b>9.0600e-003</b>	<b>0.4651</b>	<b>0.0349</b>	<b>0.5000</b>	<b>0.1263</b>	<b>0.0321</b>	<b>0.1583</b>		<b>827.1474</b>	<b>827.1474</b>	<b>0.0214</b>		<b>827.5960</b>

**3.4 Riser Pole Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1540	13.7793	6.7024	0.0147		0.5663	0.5663		0.5210	0.5210	0.0000	1,500.871 1	1,500.871 1	0.4599		1,510.528 2
<b>Total</b>	<b>1.1540</b>	<b>13.7793</b>	<b>6.7024</b>	<b>0.0147</b>		<b>0.5663</b>	<b>0.5663</b>		<b>0.5210</b>	<b>0.5210</b>	<b>0.0000</b>	<b>1,500.871 1</b>	<b>1,500.871 1</b>	<b>0.4599</b>		<b>1,510.528 2</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1563	1.7670	1.6747	5.3600e-003	0.1610	0.0322	0.1932	0.0456	0.0296	0.0753		529.9887	529.9887	3.7400e-003		530.0672
Worker	0.1070	0.1817	1.8614	3.7000e-003	0.3041	2.6400e-003	0.3067	0.0806	2.4200e-003	0.0831		297.1587	297.1587	0.0176		297.5287
<b>Total</b>	<b>0.2633</b>	<b>1.9487</b>	<b>3.5360</b>	<b>9.0600e-003</b>	<b>0.4651</b>	<b>0.0349</b>	<b>0.5000</b>	<b>0.1263</b>	<b>0.0321</b>	<b>0.1583</b>		<b>827.1474</b>	<b>827.1474</b>	<b>0.0214</b>		<b>827.5960</b>

**3.5 Duct Bank Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0111	0.0000	0.0111	1.5000e-003	0.0000	1.5000e-003			0.0000			0.0000
Off-Road	2.0332	21.7284	14.7883	0.0327		0.9637	0.9637		0.8866	0.8866		3,291.2877	3,291.2877	1.0246		3,312.8048
<b>Total</b>	<b>2.0332</b>	<b>21.7284</b>	<b>14.7883</b>	<b>0.0327</b>	<b>0.0111</b>	<b>0.9637</b>	<b>0.9749</b>	<b>1.5000e-003</b>	<b>0.8866</b>	<b>0.8881</b>		<b>3,291.2877</b>	<b>3,291.2877</b>	<b>1.0246</b>		<b>3,312.8048</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1437	1.5435	1.8479	5.5100e-003	0.1323	0.0246	0.1569	0.0362	0.0226	0.0588		537.3057	537.3057	3.6600e-003		537.3825
Vendor	0.1608	1.7594	1.7401	5.9600e-003	0.1789	0.0321	0.2110	0.0507	0.0295	0.0802		579.7982	579.7982	3.9600e-003		579.8813
Worker	0.1140	0.2017	2.0571	4.6200e-003	0.3801	3.1300e-003	0.3832	0.1008	2.8800e-003	0.1037		357.6609	357.6609	0.0200		358.0808
<b>Total</b>	<b>0.4184</b>	<b>3.5046</b>	<b>5.6451</b>	<b>0.0161</b>	<b>0.6913</b>	<b>0.0598</b>	<b>0.7511</b>	<b>0.1877</b>	<b>0.0550</b>	<b>0.2427</b>		<b>1,474.7648</b>	<b>1,474.7648</b>	<b>0.0276</b>		<b>1,475.3446</b>

**3.5 Duct Bank Installation - 2018****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.0100e-003	0.0000	5.0100e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	2.0332	21.7284	14.7883	0.0327		0.9637	0.9637		0.8866	0.8866	0.0000	3,291.2877	3,291.2877	1.0246		3,312.8048
<b>Total</b>	<b>2.0332</b>	<b>21.7284</b>	<b>14.7883</b>	<b>0.0327</b>	<b>5.0100e-003</b>	<b>0.9637</b>	<b>0.9687</b>	<b>6.7000e-004</b>	<b>0.8866</b>	<b>0.8873</b>	<b>0.0000</b>	<b>3,291.2877</b>	<b>3,291.2877</b>	<b>1.0246</b>		<b>3,312.8048</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1437	1.5435	1.8479	5.5100e-003	0.1323	0.0246	0.1569	0.0362	0.0226	0.0588		537.3057	537.3057	3.6600e-003		537.3825
Vendor	0.1608	1.7594	1.7401	5.9600e-003	0.1789	0.0321	0.2110	0.0507	0.0295	0.0802		579.7982	579.7982	3.9600e-003		579.8813
Worker	0.1140	0.2017	2.0571	4.6200e-003	0.3801	3.1300e-003	0.3832	0.1008	2.8800e-003	0.1037		357.6609	357.6609	0.0200		358.0808
<b>Total</b>	<b>0.4184</b>	<b>3.5046</b>	<b>5.6451</b>	<b>0.0161</b>	<b>0.6913</b>	<b>0.0598</b>	<b>0.7511</b>	<b>0.1877</b>	<b>0.0550</b>	<b>0.2427</b>		<b>1,474.7648</b>	<b>1,474.7648</b>	<b>0.0276</b>		<b>1,475.3446</b>

**3.6 Cable Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3653	3.2472	2.5405	3.1800e-003		0.2567	0.2567		0.2362	0.2362		320.0113	320.0113	0.0996		322.1034
<b>Total</b>	<b>0.3653</b>	<b>3.2472</b>	<b>2.5405</b>	<b>3.1800e-003</b>		<b>0.2567</b>	<b>0.2567</b>		<b>0.2362</b>	<b>0.2362</b>		<b>320.0113</b>	<b>320.0113</b>	<b>0.0996</b>		<b>322.1034</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1768	1.9353	1.9142	6.5600e-003	0.1968	0.0353	0.2321	0.0558	0.0324	0.0882		637.7780	637.7780	4.3500e-003		637.8694
Worker	0.1231	0.2179	2.2217	4.9900e-003	0.4105	3.3800e-003	0.4139	0.1089	3.1100e-003	0.1120		386.2738	386.2738	0.0216		386.7273
<b>Total</b>	<b>0.2999</b>	<b>2.1532</b>	<b>4.1359</b>	<b>0.0116</b>	<b>0.6073</b>	<b>0.0386</b>	<b>0.6460</b>	<b>0.1646</b>	<b>0.0356</b>	<b>0.2002</b>		<b>1,024.0518</b>	<b>1,024.0518</b>	<b>0.0259</b>		<b>1,024.5967</b>

**3.6 Cable Installation - 2018****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3653	3.2472	2.5405	3.1800e-003		0.2567	0.2567		0.2362	0.2362	0.0000	320.0113	320.0113	0.0996		322.1034
<b>Total</b>	<b>0.3653</b>	<b>3.2472</b>	<b>2.5405</b>	<b>3.1800e-003</b>		<b>0.2567</b>	<b>0.2567</b>		<b>0.2362</b>	<b>0.2362</b>	<b>0.0000</b>	<b>320.0113</b>	<b>320.0113</b>	<b>0.0996</b>		<b>322.1034</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1768	1.9353	1.9142	6.5600e-003	0.1968	0.0353	0.2321	0.0558	0.0324	0.0882		637.7780	637.7780	4.3500e-003		637.8694
Worker	0.1231	0.2179	2.2217	4.9900e-003	0.4105	3.3800e-003	0.4139	0.1089	3.1100e-003	0.1120		386.2738	386.2738	0.0216		386.7273
<b>Total</b>	<b>0.2999</b>	<b>2.1532</b>	<b>4.1359</b>	<b>0.0116</b>	<b>0.6073</b>	<b>0.0386</b>	<b>0.6460</b>	<b>0.1646</b>	<b>0.0356</b>	<b>0.2002</b>		<b>1,024.0518</b>	<b>1,024.0518</b>	<b>0.0259</b>		<b>1,024.5967</b>

**3.6 Cable Installation - 2019****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3275	2.9471	2.5044	3.1800e-003		0.2247	0.2247		0.2068	0.2068		314.8774	314.8774	0.0996		316.9695
<b>Total</b>	<b>0.3275</b>	<b>2.9471</b>	<b>2.5044</b>	<b>3.1800e-003</b>		<b>0.2247</b>	<b>0.2247</b>		<b>0.2068</b>	<b>0.2068</b>		<b>314.8774</b>	<b>314.8774</b>	<b>0.0996</b>		<b>316.9695</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1648	1.7425	1.8011	6.5500e-003	0.1968	0.0324	0.2292	0.0558	0.0298	0.0856		627.5193	627.5193	4.1800e-003		627.6071
Worker	0.1082	0.1966	2.0034	4.9800e-003	0.4105	3.2500e-003	0.4138	0.1089	3.0100e-003	0.1119		372.4877	372.4877	0.0199		372.9060
<b>Total</b>	<b>0.2730</b>	<b>1.9391</b>	<b>3.8045</b>	<b>0.0115</b>	<b>0.6073</b>	<b>0.0357</b>	<b>0.6430</b>	<b>0.1646</b>	<b>0.0329</b>	<b>0.1975</b>		<b>1,000.0070</b>	<b>1,000.0070</b>	<b>0.0241</b>		<b>1,000.5131</b>

**3.6 Cable Installation - 2019****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3275	2.9471	2.5044	3.1800e-003		0.2247	0.2247		0.2068	0.2068	0.0000	314.8774	314.8774	0.0996		316.9695
<b>Total</b>	<b>0.3275</b>	<b>2.9471</b>	<b>2.5044</b>	<b>3.1800e-003</b>		<b>0.2247</b>	<b>0.2247</b>		<b>0.2068</b>	<b>0.2068</b>	<b>0.0000</b>	<b>314.8774</b>	<b>314.8774</b>	<b>0.0996</b>		<b>316.9695</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1648	1.7425	1.8011	6.5500e-003	0.1968	0.0324	0.2292	0.0558	0.0298	0.0856		627.5193	627.5193	4.1800e-003		627.6071
Worker	0.1082	0.1966	2.0034	4.9800e-003	0.4105	3.2500e-003	0.4138	0.1089	3.0100e-003	0.1119		372.4877	372.4877	0.0199		372.9060
<b>Total</b>	<b>0.2730</b>	<b>1.9391</b>	<b>3.8045</b>	<b>0.0115</b>	<b>0.6073</b>	<b>0.0357</b>	<b>0.6430</b>	<b>0.1646</b>	<b>0.0329</b>	<b>0.1975</b>		<b>1,000.0070</b>	<b>1,000.0070</b>	<b>0.0241</b>		<b>1,000.5131</b>

**4.0 Operational Detail - Mobile**

#### 4.1 Mitigation Measures Mobile

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Total					

#### 4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493201	0.037430	0.233751	0.143759	0.049898	0.006916	0.012991	0.004894	0.000938	0.002881	0.009199	0.000696	0.003446

#### 5.0 Energy Detail

##### 4.4 Fleet Mix

---

Historical Energy Use: N

#### 5.1 Mitigation Measures Energy

---

#### 6.0 Area Detail

##### 6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Unmitigated	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

## 6.2 Area by SubCategory

### Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
<b>Total</b>	<b>0.0000</b>					<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>			<b>0.0000</b>			<b>0.0000</b>

## 6.2 Area by SubCategory

### Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
<b>Total</b>	<b>0.0000</b>					<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>			<b>0.0000</b>			<b>0.0000</b>

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

## 10.0 Vegetation

**Santa Cruz 115 kV Reinforcement Project**  
**Santa Cruz County, Winter**

## 1.0 Project Characteristics

---

### 1.1 Land Usage

### 1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	61
Climate Zone	5			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule based upon Project Description, all phases will be 5 days per week except for Cable Installation.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Trips and VMT - Vehicle trips taken from project description.

Grading - Disturbed project area taken from the project description.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	34.00
tblConstructionPhase	NumDays	0.00	93.00
tblConstructionPhase	NumDays	0.00	87.00
tblConstructionPhase	NumDays	0.00	54.00
tblConstructionPhase	NumDays	0.00	131.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	10/30/2017	10/15/2017
tblConstructionPhase	PhaseEndDate	6/1/2018	10/15/2018
tblConstructionPhase	PhaseStartDate	8/16/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	12/1/2017	4/16/2018
tblGrading	AcresOfGrading	32.63	0.63
tblGrading	AcresOfGrading	13.50	0.04
tblGrading	AcresOfGrading	0.00	0.54

tblGrading	MaterialExported	0.00	989.80
tblGrading	MaterialExported	0.00	1,322.20
tblGrading	MaterialExported	0.00	7,835.50
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks

tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

tblTripsAndVMT	HaulingTripNumber	124.00	65.00
tblTripsAndVMT	HaulingTripNumber	165.00	145.00
tblTripsAndVMT	HaulingTripNumber	979.00	1,000.00
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	20.00	28.00
tblTripsAndVMT	WorkerTripNumber	15.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	27.00

tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix

## 2.0 Emissions Summary

---

**2.1 Overall Construction (Maximum Daily Emission)****Unmitigated Construction**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.8578	77.1055	45.2479	0.1059	1.2535	3.0813	4.3348	0.3380	2.8348	3.1727	0.0000	10,565.88 42	10,565.88 42	2.6121	0.0000	10,620.73 89
2018	2.5030	25.4516	21.8811	0.0486	0.7025	1.0237	1.7262	0.1892	0.9418	1.1310	0.0000	4,745.985 6	4,745.985 6	1.0523	0.0000	4,768.084 8
2019	0.6278	5.0213	7.0312	0.0145	0.6073	0.2606	0.8679	0.1646	0.2398	0.4044	0.0000	1,295.247 0	1,295.247 0	0.1238	0.0000	1,297.846 5
<b>Total</b>	<b>9.9886</b>	<b>107.5784</b>	<b>74.1603</b>	<b>0.1689</b>	<b>2.5633</b>	<b>4.3656</b>	<b>6.9289</b>	<b>0.6918</b>	<b>4.0164</b>	<b>4.7081</b>	<b>0.0000</b>	<b>16,607.11 68</b>	<b>16,607.11 68</b>	<b>3.7883</b>	<b>0.0000</b>	<b>16,686.67 02</b>

**Mitigated Construction**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	6.8578	77.1055	45.2479	0.1059	1.2466	3.0813	4.3279	0.3371	2.8348	3.1719	0.0000	10,565.88 42	10,565.88 42	2.6121	0.0000	10,620.73 89
2018	2.5030	25.4516	21.8811	0.0486	0.6963	1.0237	1.7201	0.1884	0.9418	1.1302	0.0000	4,745.985 6	4,745.985 6	1.0523	0.0000	4,768.084 8
2019	0.6278	5.0213	7.0312	0.0145	0.6073	0.2606	0.8679	0.1646	0.2398	0.4044	0.0000	1,295.247 0	1,295.247 0	0.1238	0.0000	1,297.846 5
<b>Total</b>	<b>9.9886</b>	<b>107.5784</b>	<b>74.1603</b>	<b>0.1689</b>	<b>2.5503</b>	<b>4.3656</b>	<b>6.9159</b>	<b>0.6901</b>	<b>4.0164</b>	<b>4.7064</b>	<b>0.0000</b>	<b>16,607.11 68</b>	<b>16,607.11 68</b>	<b>3.7883</b>	<b>0.0000</b>	<b>16,686.67 02</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.51	0.00	0.19	0.24	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00

## 2.2 Overall Operational

### Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

### Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 3.0 Construction Detail

#### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Riser Site Prep/Foundation Installation	Site Preparation	4/16/2017	8/15/2017	5	87	
2	Vault Installation	Site Preparation	8/1/2017	10/15/2017	5	54	
3	Riser Pole Installation	Building Construction	10/16/2017	11/30/2017	5	34	
4	Duct Bank Installation	Site Preparation	4/16/2018	10/15/2018	5	131	
5	Cable Installation	Building Construction	10/16/2018	1/31/2019	6	93	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

#### OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Riser Site Prep/Foundation Installation	Aerial Lifts	2	6.00	62	0.31
Riser Site Prep/Foundation Installation	Cranes	1	8.00	226	0.29
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Riser Site Prep/Foundation Installation	Crawler Tractors	1	6.00	208	0.43
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41

Riser Site Prep/Foundation Installation	Bore/Drill Rigs	1	8.00	205	0.50
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	8.00	400	0.38
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Installation	Cranes	1	8.00	226	0.29
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Crawler Tractors	1	4.00	208	0.43
Vault Installation	Off-Highway Trucks	1	8.00	400	0.38
Vault Installation	Off-Highway Trucks	1	4.00	400	0.38
Vault Installation	Pavers	1	8.00	125	0.42
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Pole Installation	Aerial Lifts	2	6.00	62	0.31
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Forklifts	0	6.00	89	0.20
Riser Pole Installation	Cranes	1	8.00	226	0.29
Riser Pole Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Pole Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Duct Bank Installation	Excavators	1	8.00	162	0.38
Duct Bank Installation	Graders	0	8.00	174	0.41
Duct Bank Installation	Off-Highway Trucks	1	4.00	400	0.38
Duct Bank Installation	Off-Highway Trucks	1	8.00	400	0.38
Duct Bank Installation	Pavers	1	8.00	125	0.42

Cable Installation	Other General Industrial Equipment	1	10.00	87	0.34
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Cable Installation	Cranes	0	4.00	226	0.29
Cable Installation	Forklifts	0	6.00	89	0.20
Cable Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Riser Site Prep/Foundation Installation	8	28.00	9.00	65.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Vault Installation	6	25.00	12.00	145.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Riser Pole Installation	4	20.00	9.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Duct Bank Installation	5	25.00	10.00	1,000.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Cable Installation	1	27.00	11.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

Water Exposed Area

**3.2 Riser Site Prep/Foundation Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.9700e-003	0.0000	8.9700e-003	1.0200e-003	0.0000	1.0200e-003			0.0000			0.0000
Off-Road	3.0879	37.3018	17.2520	0.0447		1.4958	1.4958		1.3762	1.3762		4,570.3686	4,570.3686	1.4004		4,599.7760
<b>Total</b>	<b>3.0879</b>	<b>37.3018</b>	<b>17.2520</b>	<b>0.0447</b>	<b>8.9700e-003</b>	<b>1.4958</b>	<b>1.5048</b>	<b>1.0200e-003</b>	<b>1.3762</b>	<b>1.3772</b>		<b>4,570.3686</b>	<b>4,570.3686</b>	<b>1.4004</b>		<b>4,599.7760</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0169	0.1770	0.2601	5.4000e-004	0.0129	2.5300e-003	0.0155	3.5400e-003	2.3300e-003	5.8700e-003		53.1957	53.1957	3.7000e-004		53.2034
Vendor	0.1799	1.8556	2.3061	5.3600e-003	0.1610	0.0324	0.1934	0.0456	0.0298	0.0754		528.3731	528.3731	3.7900e-003		528.4527
Worker	0.1590	0.3166	2.6585	4.9300e-003	0.4257	3.7000e-003	0.4294	0.1129	3.3900e-003	0.1163		396.2909	396.2909	0.0247		396.8089
<b>Total</b>	<b>0.3558</b>	<b>2.3491</b>	<b>5.2247</b>	<b>0.0108</b>	<b>0.5997</b>	<b>0.0386</b>	<b>0.6383</b>	<b>0.1621</b>	<b>0.0355</b>	<b>0.1976</b>		<b>977.8596</b>	<b>977.8596</b>	<b>0.0288</b>		<b>978.4649</b>

**3.2 Riser Site Prep/Foundation Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.0300e-003	0.0000	4.0300e-003	4.6000e-004	0.0000	4.6000e-004			0.0000			0.0000
Off-Road	3.0879	37.3018	17.2520	0.0447		1.4958	1.4958		1.3762	1.3762	0.0000	4,570.3686	4,570.3686	1.4004		4,599.7760
<b>Total</b>	<b>3.0879</b>	<b>37.3018</b>	<b>17.2520</b>	<b>0.0447</b>	<b>4.0300e-003</b>	<b>1.4958</b>	<b>1.4999</b>	<b>4.6000e-004</b>	<b>1.3762</b>	<b>1.3766</b>	<b>0.0000</b>	<b>4,570.3686</b>	<b>4,570.3686</b>	<b>1.4004</b>		<b>4,599.7760</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0169	0.1770	0.2601	5.4000e-004	0.0129	2.5300e-003	0.0155	3.5400e-003	2.3300e-003	5.8700e-003		53.1957	53.1957	3.7000e-004		53.2034
Vendor	0.1799	1.8556	2.3061	5.3600e-003	0.1610	0.0324	0.1934	0.0456	0.0298	0.0754		528.3731	528.3731	3.7900e-003		528.4527
Worker	0.1590	0.3166	2.6585	4.9300e-003	0.4257	3.7000e-003	0.4294	0.1129	3.3900e-003	0.1163		396.2909	396.2909	0.0247		396.8089
<b>Total</b>	<b>0.3558</b>	<b>2.3491</b>	<b>5.2247</b>	<b>0.0108</b>	<b>0.5997</b>	<b>0.0386</b>	<b>0.6383</b>	<b>0.1621</b>	<b>0.0355</b>	<b>0.1976</b>		<b>977.8596</b>	<b>977.8596</b>	<b>0.0288</b>		<b>978.4649</b>

**3.3 Vault Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5500e-003	0.0000	3.5500e-003	5.0000e-004	0.0000	5.0000e-004			0.0000			0.0000
Off-Road	2.9716	34.0619	16.3880	0.0368		1.4913	1.4913		1.3720	1.3720		3,768.1412	3,768.1412	1.1546		3,792.3868
<b>Total</b>	<b>2.9716</b>	<b>34.0619</b>	<b>16.3880</b>	<b>0.0368</b>	<b>3.5500e-003</b>	<b>1.4913</b>	<b>1.4948</b>	<b>5.0000e-004</b>	<b>1.3720</b>	<b>1.3725</b>		<b>3,768.1412</b>	<b>3,768.1412</b>	<b>1.1546</b>		<b>3,792.3868</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0606	0.6360	0.9348	1.9400e-003	0.0465	9.1000e-003	0.0556	0.0127	8.3700e-003	0.0211		191.1862	191.1862	1.3300e-003		191.2140
Vendor	0.2399	2.4741	3.0748	7.1400e-003	0.2147	0.0432	0.2579	0.0608	0.0397	0.1006		704.4975	704.4975	5.0500e-003		704.6035
Worker	0.1420	0.2826	2.3737	4.4000e-003	0.3801	3.3000e-003	0.3834	0.1008	3.0300e-003	0.1038		353.8311	353.8311	0.0220		354.2936
<b>Total</b>	<b>0.4425</b>	<b>3.3927</b>	<b>6.3833</b>	<b>0.0135</b>	<b>0.6413</b>	<b>0.0556</b>	<b>0.6969</b>	<b>0.1744</b>	<b>0.0511</b>	<b>0.2255</b>		<b>1,249.5148</b>	<b>1,249.5148</b>	<b>0.0284</b>		<b>1,250.1112</b>

**3.3 Vault Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.6000e-003	0.0000	1.6000e-003	2.3000e-004	0.0000	2.3000e-004			0.0000			0.0000
Off-Road	2.9716	34.0619	16.3880	0.0368		1.4913	1.4913		1.3720	1.3720	0.0000	3,768.1412	3,768.1412	1.1546		3,792.3868
<b>Total</b>	<b>2.9716</b>	<b>34.0619</b>	<b>16.3880</b>	<b>0.0368</b>	<b>1.6000e-003</b>	<b>1.4913</b>	<b>1.4929</b>	<b>2.3000e-004</b>	<b>1.3720</b>	<b>1.3722</b>	<b>0.0000</b>	<b>3,768.1412</b>	<b>3,768.1412</b>	<b>1.1546</b>		<b>3,792.3868</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0606	0.6360	0.9348	1.9400e-003	0.0465	9.1000e-003	0.0556	0.0127	8.3700e-003	0.0211		191.1862	191.1862	1.3300e-003		191.2140
Vendor	0.2399	2.4741	3.0748	7.1400e-003	0.2147	0.0432	0.2579	0.0608	0.0397	0.1006		704.4975	704.4975	5.0500e-003		704.6035
Worker	0.1420	0.2826	2.3737	4.4000e-003	0.3801	3.3000e-003	0.3834	0.1008	3.0300e-003	0.1038		353.8311	353.8311	0.0220		354.2936
<b>Total</b>	<b>0.4425</b>	<b>3.3927</b>	<b>6.3833</b>	<b>0.0135</b>	<b>0.6413</b>	<b>0.0556</b>	<b>0.6969</b>	<b>0.1744</b>	<b>0.0511</b>	<b>0.2255</b>		<b>1,249.5148</b>	<b>1,249.5148</b>	<b>0.0284</b>		<b>1,250.1112</b>

**3.4 Riser Pole Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1540	13.7793	6.7024	0.0147		0.5663	0.5663		0.5210	0.5210		1,500.871 1	1,500.871 1	0.4599		1,510.528 2
<b>Total</b>	<b>1.1540</b>	<b>13.7793</b>	<b>6.7024</b>	<b>0.0147</b>		<b>0.5663</b>	<b>0.5663</b>		<b>0.5210</b>	<b>0.5210</b>		<b>1,500.871 1</b>	<b>1,500.871 1</b>	<b>0.4599</b>		<b>1,510.528 2</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1799	1.8556	2.3061	5.3600e-003	0.1610	0.0324	0.1934	0.0456	0.0298	0.0754		528.3731	528.3731	3.7900e-003		528.4527
Worker	0.1136	0.2261	1.8990	3.5200e-003	0.3041	2.6400e-003	0.3067	0.0806	2.4200e-003	0.0831		283.0649	283.0649	0.0176		283.4349
<b>Total</b>	<b>0.2935</b>	<b>2.0817</b>	<b>4.2050</b>	<b>8.8800e-003</b>	<b>0.4651</b>	<b>0.0350</b>	<b>0.5001</b>	<b>0.1263</b>	<b>0.0322</b>	<b>0.1585</b>		<b>811.4380</b>	<b>811.4380</b>	<b>0.0214</b>		<b>811.8876</b>

**3.4 Riser Pole Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1540	13.7793	6.7024	0.0147		0.5663	0.5663		0.5210	0.5210	0.0000	1,500.871 1	1,500.871 1	0.4599		1,510.528 2
<b>Total</b>	<b>1.1540</b>	<b>13.7793</b>	<b>6.7024</b>	<b>0.0147</b>		<b>0.5663</b>	<b>0.5663</b>		<b>0.5210</b>	<b>0.5210</b>	<b>0.0000</b>	<b>1,500.871 1</b>	<b>1,500.871 1</b>	<b>0.4599</b>		<b>1,510.528 2</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1799	1.8556	2.3061	5.3600e-003	0.1610	0.0324	0.1934	0.0456	0.0298	0.0754		528.3731	528.3731	3.7900e-003		528.4527
Worker	0.1136	0.2261	1.8990	3.5200e-003	0.3041	2.6400e-003	0.3067	0.0806	2.4200e-003	0.0831		283.0649	283.0649	0.0176		283.4349
<b>Total</b>	<b>0.2935</b>	<b>2.0817</b>	<b>4.2050</b>	<b>8.8800e-003</b>	<b>0.4651</b>	<b>0.0350</b>	<b>0.5001</b>	<b>0.1263</b>	<b>0.0322</b>	<b>0.1585</b>		<b>811.4380</b>	<b>811.4380</b>	<b>0.0214</b>		<b>811.8876</b>

**3.5 Duct Bank Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0111	0.0000	0.0111	1.5000e-003	0.0000	1.5000e-003			0.0000			0.0000
Off-Road	2.0332	21.7284	14.7883	0.0327		0.9637	0.9637		0.8866	0.8866		3,291.2877	3,291.2877	1.0246		3,312.8048
<b>Total</b>	<b>2.0332</b>	<b>21.7284</b>	<b>14.7883</b>	<b>0.0327</b>	<b>0.0111</b>	<b>0.9637</b>	<b>0.9749</b>	<b>1.5000e-003</b>	<b>0.8866</b>	<b>0.8881</b>		<b>3,291.2877</b>	<b>3,291.2877</b>	<b>1.0246</b>		<b>3,312.8048</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1663	1.6247	2.6002	5.5100e-003	0.1323	0.0247	0.1570	0.0362	0.0227	0.0589		535.9999	535.9999	3.7200e-003		536.0780
Vendor	0.1844	1.8472	2.4213	5.9500e-003	0.1789	0.0322	0.2111	0.0507	0.0296	0.0803		578.0283	578.0283	4.0100e-003		578.1125
Worker	0.1192	0.2513	2.0713	4.4000e-003	0.3801	3.1300e-003	0.3832	0.1008	2.8800e-003	0.1037		340.6697	340.6697	0.0200		341.0895
<b>Total</b>	<b>0.4698</b>	<b>3.7232</b>	<b>7.0928</b>	<b>0.0159</b>	<b>0.6913</b>	<b>0.0600</b>	<b>0.7513</b>	<b>0.1877</b>	<b>0.0552</b>	<b>0.2429</b>		<b>1,454.6979</b>	<b>1,454.6979</b>	<b>0.0277</b>		<b>1,455.2800</b>

**3.5 Duct Bank Installation - 2018****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.0100e-003	0.0000	5.0100e-003	6.7000e-004	0.0000	6.7000e-004			0.0000			0.0000
Off-Road	2.0332	21.7284	14.7883	0.0327		0.9637	0.9637		0.8866	0.8866	0.0000	3,291.2877	3,291.2877	1.0246		3,312.8048
<b>Total</b>	<b>2.0332</b>	<b>21.7284</b>	<b>14.7883</b>	<b>0.0327</b>	<b>5.0100e-003</b>	<b>0.9637</b>	<b>0.9687</b>	<b>6.7000e-004</b>	<b>0.8866</b>	<b>0.8873</b>	<b>0.0000</b>	<b>3,291.2877</b>	<b>3,291.2877</b>	<b>1.0246</b>		<b>3,312.8048</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1663	1.6247	2.6002	5.5100e-003	0.1323	0.0247	0.1570	0.0362	0.0227	0.0589		535.9999	535.9999	3.7200e-003		536.0780
Vendor	0.1844	1.8472	2.4213	5.9500e-003	0.1789	0.0322	0.2111	0.0507	0.0296	0.0803		578.0283	578.0283	4.0100e-003		578.1125
Worker	0.1192	0.2513	2.0713	4.4000e-003	0.3801	3.1300e-003	0.3832	0.1008	2.8800e-003	0.1037		340.6697	340.6697	0.0200		341.0895
<b>Total</b>	<b>0.4698</b>	<b>3.7232</b>	<b>7.0928</b>	<b>0.0159</b>	<b>0.6913</b>	<b>0.0600</b>	<b>0.7513</b>	<b>0.1877</b>	<b>0.0552</b>	<b>0.2429</b>		<b>1,454.6979</b>	<b>1,454.6979</b>	<b>0.0277</b>		<b>1,455.2800</b>

**3.6 Cable Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3653	3.2472	2.5405	3.1800e-003		0.2567	0.2567		0.2362	0.2362		320.0113	320.0113	0.0996		322.1034
<b>Total</b>	<b>0.3653</b>	<b>3.2472</b>	<b>2.5405</b>	<b>3.1800e-003</b>		<b>0.2567</b>	<b>0.2567</b>		<b>0.2362</b>	<b>0.2362</b>		<b>320.0113</b>	<b>320.0113</b>	<b>0.0996</b>		<b>322.1034</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2028	2.0320	2.6634	6.5500e-003	0.1968	0.0354	0.2322	0.0558	0.0326	0.0884		635.8311	635.8311	4.4100e-003		635.9238
Worker	0.1287	0.2714	2.2370	4.7500e-003	0.4105	3.3800e-003	0.4139	0.1089	3.1100e-003	0.1120		367.9232	367.9232	0.0216		368.3767
<b>Total</b>	<b>0.3315</b>	<b>2.3033</b>	<b>4.9004</b>	<b>0.0113</b>	<b>0.6073</b>	<b>0.0388</b>	<b>0.6461</b>	<b>0.1646</b>	<b>0.0357</b>	<b>0.2003</b>		<b>1,003.7543</b>	<b>1,003.7543</b>	<b>0.0260</b>		<b>1,004.3004</b>

**3.6 Cable Installation - 2018****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3653	3.2472	2.5405	3.1800e-003		0.2567	0.2567		0.2362	0.2362	0.0000	320.0113	320.0113	0.0996		322.1034
<b>Total</b>	<b>0.3653</b>	<b>3.2472</b>	<b>2.5405</b>	<b>3.1800e-003</b>		<b>0.2567</b>	<b>0.2567</b>		<b>0.2362</b>	<b>0.2362</b>	<b>0.0000</b>	<b>320.0113</b>	<b>320.0113</b>	<b>0.0996</b>		<b>322.1034</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2028	2.0320	2.6634	6.5500e-003	0.1968	0.0354	0.2322	0.0558	0.0326	0.0884		635.8311	635.8311	4.4100e-003		635.9238
Worker	0.1287	0.2714	2.2370	4.7500e-003	0.4105	3.3800e-003	0.4139	0.1089	3.1100e-003	0.1120		367.9232	367.9232	0.0216		368.3767
<b>Total</b>	<b>0.3315</b>	<b>2.3033</b>	<b>4.9004</b>	<b>0.0113</b>	<b>0.6073</b>	<b>0.0388</b>	<b>0.6461</b>	<b>0.1646</b>	<b>0.0357</b>	<b>0.2003</b>		<b>1,003.7543</b>	<b>1,003.7543</b>	<b>0.0260</b>		<b>1,004.3004</b>

**3.6 Cable Installation - 2019****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3275	2.9471	2.5044	3.1800e-003		0.2247	0.2247		0.2068	0.2068		314.8774	314.8774	0.0996		316.9695
<b>Total</b>	<b>0.3275</b>	<b>2.9471</b>	<b>2.5044</b>	<b>3.1800e-003</b>		<b>0.2247</b>	<b>0.2247</b>		<b>0.2068</b>	<b>0.2068</b>		<b>314.8774</b>	<b>314.8774</b>	<b>0.0996</b>		<b>316.9695</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1883	1.8292	2.5298	6.5500e-003	0.1968	0.0326	0.2294	0.0558	0.0300	0.0858		625.6009	625.6009	4.2400e-003		625.6899
Worker	0.1120	0.2450	1.9970	4.7500e-003	0.4105	3.2500e-003	0.4138	0.1089	3.0100e-003	0.1119		354.7688	354.7688	0.0199		355.1871
<b>Total</b>	<b>0.3003</b>	<b>2.0742</b>	<b>4.5268</b>	<b>0.0113</b>	<b>0.6073</b>	<b>0.0359</b>	<b>0.6432</b>	<b>0.1646</b>	<b>0.0330</b>	<b>0.1976</b>		<b>980.3696</b>	<b>980.3696</b>	<b>0.0242</b>		<b>980.8770</b>

**3.6 Cable Installation - 2019****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3275	2.9471	2.5044	3.1800e-003		0.2247	0.2247		0.2068	0.2068	0.0000	314.8774	314.8774	0.0996		316.9695
<b>Total</b>	<b>0.3275</b>	<b>2.9471</b>	<b>2.5044</b>	<b>3.1800e-003</b>		<b>0.2247</b>	<b>0.2247</b>		<b>0.2068</b>	<b>0.2068</b>	<b>0.0000</b>	<b>314.8774</b>	<b>314.8774</b>	<b>0.0996</b>		<b>316.9695</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1883	1.8292	2.5298	6.5500e-003	0.1968	0.0326	0.2294	0.0558	0.0300	0.0858		625.6009	625.6009	4.2400e-003		625.6899
Worker	0.1120	0.2450	1.9970	4.7500e-003	0.4105	3.2500e-003	0.4138	0.1089	3.0100e-003	0.1119		354.7688	354.7688	0.0199		355.1871
<b>Total</b>	<b>0.3003</b>	<b>2.0742</b>	<b>4.5268</b>	<b>0.0113</b>	<b>0.6073</b>	<b>0.0359</b>	<b>0.6432</b>	<b>0.1646</b>	<b>0.0330</b>	<b>0.1976</b>		<b>980.3696</b>	<b>980.3696</b>	<b>0.0242</b>		<b>980.8770</b>

**4.0 Operational Detail - Mobile**

#### 4.1 Mitigation Measures Mobile

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Total					

#### 4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493201	0.037430	0.233751	0.143759	0.049898	0.006916	0.012991	0.004894	0.000938	0.002881	0.009199	0.000696	0.003446

#### 5.0 Energy Detail

##### 5.1 Fleet Mix

---

Historical Energy Use: N

#### 5.1 Mitigation Measures Energy

#### 6.0 Area Detail

---

#### 6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Unmitigated	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

## 6.2 Area by SubCategory

### Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
<b>Total</b>	<b>0.0000</b>					<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>			<b>0.0000</b>			<b>0.0000</b>

## 6.2 Area by SubCategory

### Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
<b>Total</b>	<b>0.0000</b>					<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>			<b>0.0000</b>			<b>0.0000</b>

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

## 10.0 Vegetation

**Santa Cruz 115 kV Reinforcement Project**  
**Santa Cruz County, Annual**

## 1.0 Project Characteristics

---

### 1.1 Land Usage

### 1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	61
Climate Zone	5			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule based upon Project Description, all phases will be 5 days per week except for Cable Installation.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Off-road Equipment - Default equipment quantities set to zero. Equipment list taken from the project description.

Trips and VMT - Vehicle trips taken from project description.

Grading - Disturbed project area taken from the project description.

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	34.00
tblConstructionPhase	NumDays	0.00	93.00
tblConstructionPhase	NumDays	0.00	87.00
tblConstructionPhase	NumDays	0.00	54.00
tblConstructionPhase	NumDays	0.00	131.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	10/30/2017	10/15/2017
tblConstructionPhase	PhaseEndDate	6/1/2018	10/15/2018
tblConstructionPhase	PhaseStartDate	8/16/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	12/1/2017	4/16/2018
tblGrading	AcresOfGrading	32.63	0.63
tblGrading	AcresOfGrading	13.50	0.04
tblGrading	AcresOfGrading	0.00	0.54

tblGrading	MaterialExported	0.00	989.80
tblGrading	MaterialExported	0.00	1,322.20
tblGrading	MaterialExported	0.00	7,835.50
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks

tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

tblTripsAndVMT	HaulingTripNumber	124.00	65.00
tblTripsAndVMT	HaulingTripNumber	165.00	145.00
tblTripsAndVMT	HaulingTripNumber	979.00	1,000.00
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	HaulingVehicleClass		HHDT
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorTripLength	6.60	20.00
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	VendorVehicleClass		HDT_Mix
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripLength	16.80	20.00
tblTripsAndVMT	WorkerTripNumber	20.00	28.00
tblTripsAndVMT	WorkerTripNumber	15.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	27.00

tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix
tblTripsAndVMT	WorkerVehicleClass		LD_Mix

## 2.0 Emissions Summary

---

## 2.1 Overall Construction

### Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.2645	3.0013	1.7333	4.1800e-003	0.0500	0.1187	0.1688	0.0135	0.1092	0.1228	0.0000	377.6262	377.6262	0.0928	0.0000	379.5749
2018	0.1843	1.8446	1.6123	3.6600e-003	0.0638	0.0768	0.1406	0.0173	0.0707	0.0879	0.0000	321.8053	321.8053	0.0663	0.0000	323.1974
2019	8.2300e-003	0.0672	0.0891	2.0000e-004	7.9200e-003	3.5200e-003	0.0114	2.1500e-003	3.2400e-003	5.3900e-003	0.0000	15.8802	15.8802	1.5200e-003	0.0000	15.9120
<b>Total</b>	<b>0.4570</b>	<b>4.9131</b>	<b>3.4347</b>	<b>8.0400e-003</b>	<b>0.1218</b>	<b>0.1990</b>	<b>0.3208</b>	<b>0.0330</b>	<b>0.1831</b>	<b>0.2161</b>	<b>0.0000</b>	<b>715.3118</b>	<b>715.3118</b>	<b>0.1606</b>	<b>0.0000</b>	<b>718.6843</b>

### Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.2645	3.0013	1.7333	4.1800e-003	0.0498	0.1187	0.1685	0.0135	0.1092	0.1227	0.0000	377.6259	377.6259	0.0928	0.0000	379.5745
2018	0.1843	1.8446	1.6123	3.6600e-003	0.0634	0.0768	0.1402	0.0172	0.0707	0.0879	0.0000	321.8051	321.8051	0.0663	0.0000	323.1971
2019	8.2300e-003	0.0672	0.0891	2.0000e-004	7.9200e-003	3.5200e-003	0.0114	2.1500e-003	3.2400e-003	5.3900e-003	0.0000	15.8802	15.8802	1.5200e-003	0.0000	15.9120
<b>Total</b>	<b>0.4570</b>	<b>4.9131</b>	<b>3.4347</b>	<b>8.0400e-003</b>	<b>0.1211</b>	<b>0.1990</b>	<b>0.3201</b>	<b>0.0329</b>	<b>0.1831</b>	<b>0.2160</b>	<b>0.0000</b>	<b>715.3112</b>	<b>715.3112</b>	<b>0.1606</b>	<b>0.0000</b>	<b>718.6837</b>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.54	0.00	0.21	0.27	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00

## 2.2 Overall Operational

### Unmitigated Operational

[illegible]

**Mitigated Operational**

[illegible]

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

### 3.0 Construction Detail

#### Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Riser Site Prep/Foundation Installation	Site Preparation	4/16/2017	8/15/2017	5	87	
2	Vault Installation	Site Preparation	8/1/2017	10/15/2017	5	54	
3	Riser Pole Installation	Building Construction	10/16/2017	11/30/2017	5	34	
4	Duct Bank Installation	Site Preparation	4/16/2018	10/15/2018	5	131	
5	Cable Installation	Building Construction	10/16/2018	1/31/2019	6	93	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

#### OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Riser Site Prep/Foundation Installation	Aerial Lifts	2	6.00	62	0.31
Riser Site Prep/Foundation Installation	Cranes	1	8.00	226	0.29
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Riser Site Prep/Foundation Installation	Crawler Tractors	1	6.00	208	0.43
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41
Riser Site Prep/Foundation Installation	Graders	0	8.00	174	0.41

Riser Site Prep/Foundation Installation	Bore/Drill Rigs	1	8.00	205	0.50
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	8.00	400	0.38
Riser Site Prep/Foundation Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Site Prep/Foundation Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Vault Installation	Cranes	1	8.00	226	0.29
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Graders	0	8.00	174	0.41
Vault Installation	Crawler Tractors	1	4.00	208	0.43
Vault Installation	Off-Highway Trucks	1	8.00	400	0.38
Vault Installation	Off-Highway Trucks	1	4.00	400	0.38
Vault Installation	Pavers	1	8.00	125	0.42
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Vault Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Riser Pole Installation	Aerial Lifts	2	6.00	62	0.31
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Cranes	0	4.00	226	0.29
Riser Pole Installation	Forklifts	0	6.00	89	0.20
Riser Pole Installation	Cranes	1	8.00	226	0.29
Riser Pole Installation	Off-Highway Trucks	1	4.00	400	0.38
Riser Pole Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Duct Bank Installation	Excavators	1	8.00	162	0.38
Duct Bank Installation	Graders	0	8.00	174	0.41
Duct Bank Installation	Off-Highway Trucks	1	4.00	400	0.38
Duct Bank Installation	Off-Highway Trucks	1	8.00	400	0.38
Duct Bank Installation	Pavers	1	8.00	125	0.42

Cable Installation	Other General Industrial Equipment	1	10.00	87	0.34
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Duct Bank Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Cable Installation	Cranes	0	4.00	226	0.29
Cable Installation	Forklifts	0	6.00	89	0.20
Cable Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

**Trips and VMT**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Riser Site Prep/Foundation Installation	8	28.00	9.00	65.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Vault Installation	6	25.00	12.00	145.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Riser Pole Installation	4	20.00	9.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Duct Bank Installation	5	25.00	10.00	1,000.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT
Cable Installation	1	27.00	11.00	0.00	20.00	20.00	20.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

Water Exposed Area

### 3.2 Riser Site Prep/Foundation Installation - 2017

#### Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.9000e-004	0.0000	3.9000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1343	1.6226	0.7505	1.9400e-003		0.0651	0.0651		0.0599	0.0599	0.0000	180.3583	180.3583	0.0553	0.0000	181.5188
<b>Total</b>	<b>0.1343</b>	<b>1.6226</b>	<b>0.7505</b>	<b>1.9400e-003</b>	<b>3.9000e-004</b>	<b>0.0651</b>	<b>0.0655</b>	<b>4.0000e-005</b>	<b>0.0599</b>	<b>0.0599</b>	<b>0.0000</b>	<b>180.3583</b>	<b>180.3583</b>	<b>0.0553</b>	<b>0.0000</b>	<b>181.5188</b>

#### Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.8000e-004	7.6000e-003	9.7500e-003	2.0000e-005	5.4000e-004	1.1000e-004	6.5000e-004	1.5000e-004	1.0000e-004	2.5000e-004	0.0000	2.1022	2.1022	1.0000e-005	0.0000	2.1025
Vendor	7.3000e-003	0.0798	0.0869	2.3000e-004	6.7900e-003	1.4000e-003	8.1900e-003	1.9300e-003	1.2900e-003	3.2200e-003	0.0000	20.8879	20.8879	1.5000e-004	0.0000	20.8910
Worker	6.4900e-003	0.0126	0.1103	2.1000e-004	0.0179	1.6000e-004	0.0180	4.7500e-003	1.5000e-004	4.8900e-003	0.0000	15.6519	15.6519	9.7000e-004	0.0000	15.6723
<b>Total</b>	<b>0.0145</b>	<b>0.1000</b>	<b>0.2069</b>	<b>4.6000e-004</b>	<b>0.0252</b>	<b>1.6700e-003</b>	<b>0.0269</b>	<b>6.8300e-003</b>	<b>1.5400e-003</b>	<b>8.3600e-003</b>	<b>0.0000</b>	<b>38.6420</b>	<b>38.6420</b>	<b>1.1300e-003</b>	<b>0.0000</b>	<b>38.6659</b>

### 3.2 Riser Site Prep/Foundation Installation - 2017

#### Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8000e-004	0.0000	1.8000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1343	1.6226	0.7505	1.9400e-003		0.0651	0.0651		0.0599	0.0599	0.0000	180.3581	180.3581	0.0553	0.0000	181.5186
<b>Total</b>	<b>0.1343</b>	<b>1.6226</b>	<b>0.7505</b>	<b>1.9400e-003</b>	<b>1.8000e-004</b>	<b>0.0651</b>	<b>0.0653</b>	<b>2.0000e-005</b>	<b>0.0599</b>	<b>0.0599</b>	<b>0.0000</b>	<b>180.3581</b>	<b>180.3581</b>	<b>0.0553</b>	<b>0.0000</b>	<b>181.5186</b>

#### Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.8000e-004	7.6000e-003	9.7500e-003	2.0000e-005	5.4000e-004	1.1000e-004	6.5000e-004	1.5000e-004	1.0000e-004	2.5000e-004	0.0000	2.1022	2.1022	1.0000e-005	0.0000	2.1025
Vendor	7.3000e-003	0.0798	0.0869	2.3000e-004	6.7900e-003	1.4000e-003	8.1900e-003	1.9300e-003	1.2900e-003	3.2200e-003	0.0000	20.8879	20.8879	1.5000e-004	0.0000	20.8910
Worker	6.4900e-003	0.0126	0.1103	2.1000e-004	0.0179	1.6000e-004	0.0180	4.7500e-003	1.5000e-004	4.8900e-003	0.0000	15.6519	15.6519	9.7000e-004	0.0000	15.6723
<b>Total</b>	<b>0.0145</b>	<b>0.1000</b>	<b>0.2069</b>	<b>4.6000e-004</b>	<b>0.0252</b>	<b>1.6700e-003</b>	<b>0.0269</b>	<b>6.8300e-003</b>	<b>1.5400e-003</b>	<b>8.3600e-003</b>	<b>0.0000</b>	<b>38.6420</b>	<b>38.6420</b>	<b>1.1300e-003</b>	<b>0.0000</b>	<b>38.6659</b>

**3.3 Vault Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0000e-004	0.0000	1.0000e-004	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0802	0.9197	0.4425	9.9000e-004		0.0403	0.0403		0.0370	0.0370	0.0000	92.2968	92.2968	0.0283	0.0000	92.8907
<b>Total</b>	<b>0.0802</b>	<b>0.9197</b>	<b>0.4425</b>	<b>9.9000e-004</b>	<b>1.0000e-004</b>	<b>0.0403</b>	<b>0.0404</b>	<b>1.0000e-005</b>	<b>0.0370</b>	<b>0.0371</b>	<b>0.0000</b>	<b>92.2968</b>	<b>92.2968</b>	<b>0.0283</b>	<b>0.0000</b>	<b>92.8907</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5200e-003	0.0170	0.0218	5.0000e-005	1.2200e-003	2.5000e-004	1.4600e-003	3.3000e-004	2.3000e-004	5.6000e-004	0.0000	4.6895	4.6895	3.0000e-005	0.0000	4.6902
Vendor	6.0400e-003	0.0660	0.0719	1.9000e-004	5.6200e-003	1.1600e-003	6.7800e-003	1.6000e-003	1.0700e-003	2.6700e-003	0.0000	17.2866	17.2866	1.2000e-004	0.0000	17.2891
Worker	3.6000e-003	7.0100e-003	0.0611	1.2000e-004	9.8900e-003	9.0000e-005	9.9800e-003	2.6300e-003	8.0000e-005	2.7100e-003	0.0000	8.6741	8.6741	5.4000e-004	0.0000	8.6854
<b>Total</b>	<b>0.0112</b>	<b>0.0900</b>	<b>0.1548</b>	<b>3.6000e-004</b>	<b>0.0167</b>	<b>1.5000e-003</b>	<b>0.0182</b>	<b>4.5600e-003</b>	<b>1.3800e-003</b>	<b>5.9400e-003</b>	<b>0.0000</b>	<b>30.6502</b>	<b>30.6502</b>	<b>6.9000e-004</b>	<b>0.0000</b>	<b>30.6648</b>

**3.3 Vault Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0802	0.9197	0.4425	9.9000e-004		0.0403	0.0403		0.0370	0.0370	0.0000	92.2967	92.2967	0.0283	0.0000	92.8906
<b>Total</b>	<b>0.0802</b>	<b>0.9197</b>	<b>0.4425</b>	<b>9.9000e-004</b>	<b>4.0000e-005</b>	<b>0.0403</b>	<b>0.0403</b>	<b>1.0000e-005</b>	<b>0.0370</b>	<b>0.0371</b>	<b>0.0000</b>	<b>92.2967</b>	<b>92.2967</b>	<b>0.0283</b>	<b>0.0000</b>	<b>92.8906</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5200e-003	0.0170	0.0218	5.0000e-005	1.2200e-003	2.5000e-004	1.4600e-003	3.3000e-004	2.3000e-004	5.6000e-004	0.0000	4.6895	4.6895	3.0000e-005	0.0000	4.6902
Vendor	6.0400e-003	0.0660	0.0719	1.9000e-004	5.6200e-003	1.1600e-003	6.7800e-003	1.6000e-003	1.0700e-003	2.6700e-003	0.0000	17.2866	17.2866	1.2000e-004	0.0000	17.2891
Worker	3.6000e-003	7.0100e-003	0.0611	1.2000e-004	9.8900e-003	9.0000e-005	9.9800e-003	2.6300e-003	8.0000e-005	2.7100e-003	0.0000	8.6741	8.6741	5.4000e-004	0.0000	8.6854
<b>Total</b>	<b>0.0112</b>	<b>0.0900</b>	<b>0.1548</b>	<b>3.6000e-004</b>	<b>0.0167</b>	<b>1.5000e-003</b>	<b>0.0182</b>	<b>4.5600e-003</b>	<b>1.3800e-003</b>	<b>5.9400e-003</b>	<b>0.0000</b>	<b>30.6502</b>	<b>30.6502</b>	<b>6.9000e-004</b>	<b>0.0000</b>	<b>30.6648</b>

**3.4 Riser Pole Installation - 2017****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0196	0.2343	0.1139	2.5000e-004		9.6300e-003	9.6300e-003		8.8600e-003	8.8600e-003	0.0000	23.1466	23.1466	7.0900e-003	0.0000	23.2956
<b>Total</b>	<b>0.0196</b>	<b>0.2343</b>	<b>0.1139</b>	<b>2.5000e-004</b>		<b>9.6300e-003</b>	<b>9.6300e-003</b>		<b>8.8600e-003</b>	<b>8.8600e-003</b>	<b>0.0000</b>	<b>23.1466</b>	<b>23.1466</b>	<b>7.0900e-003</b>	<b>0.0000</b>	<b>23.2956</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8500e-003	0.0312	0.0340	9.0000e-005	2.6500e-003	5.5000e-004	3.2000e-003	7.6000e-004	5.0000e-004	1.2600e-003	0.0000	8.1631	8.1631	6.0000e-005	0.0000	8.1643
Worker	1.8100e-003	3.5300e-003	0.0308	6.0000e-005	4.9800e-003	4.0000e-005	5.0300e-003	1.3200e-003	4.0000e-005	1.3700e-003	0.0000	4.3692	4.3692	2.7000e-004	0.0000	4.3749
<b>Total</b>	<b>4.6600e-003</b>	<b>0.0347</b>	<b>0.0647</b>	<b>1.5000e-004</b>	<b>7.6300e-003</b>	<b>5.9000e-004</b>	<b>8.2300e-003</b>	<b>2.0800e-003</b>	<b>5.4000e-004</b>	<b>2.6300e-003</b>	<b>0.0000</b>	<b>12.5323</b>	<b>12.5323</b>	<b>3.3000e-004</b>	<b>0.0000</b>	<b>12.5392</b>

**3.4 Riser Pole Installation - 2017****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0196	0.2343	0.1139	2.5000e-004		9.6300e-003	9.6300e-003		8.8600e-003	8.8600e-003	0.0000	23.1466	23.1466	7.0900e-003	0.0000	23.2956
<b>Total</b>	<b>0.0196</b>	<b>0.2343</b>	<b>0.1139</b>	<b>2.5000e-004</b>		<b>9.6300e-003</b>	<b>9.6300e-003</b>		<b>8.8600e-003</b>	<b>8.8600e-003</b>	<b>0.0000</b>	<b>23.1466</b>	<b>23.1466</b>	<b>7.0900e-003</b>	<b>0.0000</b>	<b>23.2956</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.8500e-003	0.0312	0.0340	9.0000e-005	2.6500e-003	5.5000e-004	3.2000e-003	7.6000e-004	5.0000e-004	1.2600e-003	0.0000	8.1631	8.1631	6.0000e-005	0.0000	8.1643
Worker	1.8100e-003	3.5300e-003	0.0308	6.0000e-005	4.9800e-003	4.0000e-005	5.0300e-003	1.3200e-003	4.0000e-005	1.3700e-003	0.0000	4.3692	4.3692	2.7000e-004	0.0000	4.3749
<b>Total</b>	<b>4.6600e-003</b>	<b>0.0347</b>	<b>0.0647</b>	<b>1.5000e-004</b>	<b>7.6300e-003</b>	<b>5.9000e-004</b>	<b>8.2300e-003</b>	<b>2.0800e-003</b>	<b>5.4000e-004</b>	<b>2.6300e-003</b>	<b>0.0000</b>	<b>12.5323</b>	<b>12.5323</b>	<b>3.3000e-004</b>	<b>0.0000</b>	<b>12.5392</b>

**3.5 Duct Bank Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					7.3000e-004	0.0000	7.3000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1332	1.4232	0.9686	2.1400e-003		0.0631	0.0631		0.0581	0.0581	0.0000	195.5703	195.5703	0.0609	0.0000	196.8489
<b>Total</b>	<b>0.1332</b>	<b>1.4232</b>	<b>0.9686</b>	<b>2.1400e-003</b>	<b>7.3000e-004</b>	<b>0.0631</b>	<b>0.0639</b>	<b>1.0000e-004</b>	<b>0.0581</b>	<b>0.0582</b>	<b>0.0000</b>	<b>195.5703</b>	<b>195.5703</b>	<b>0.0609</b>	<b>0.0000</b>	<b>196.8489</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0102	0.1050	0.1464	3.6000e-004	8.3900e-003	1.6100e-003	0.0100	2.3000e-003	1.4800e-003	3.7900e-003	0.0000	31.8944	31.8944	2.2000e-004	0.0000	31.8990
Vendor	0.0113	0.1196	0.1368	3.9000e-004	0.0114	2.1000e-003	0.0135	3.2300e-003	1.9400e-003	5.1700e-003	0.0000	34.4078	34.4078	2.4000e-004	0.0000	34.4128
Worker	7.3600e-003	0.0151	0.1300	2.9000e-004	0.0240	2.0000e-004	0.0242	6.3800e-003	1.9000e-004	6.5700e-003	0.0000	20.2600	20.2600	1.1900e-003	0.0000	20.2849
<b>Total</b>	<b>0.0288</b>	<b>0.2397</b>	<b>0.4132</b>	<b>1.0400e-003</b>	<b>0.0437</b>	<b>3.9100e-003</b>	<b>0.0477</b>	<b>0.0119</b>	<b>3.6100e-003</b>	<b>0.0155</b>	<b>0.0000</b>	<b>86.5622</b>	<b>86.5622</b>	<b>1.6500e-003</b>	<b>0.0000</b>	<b>86.5967</b>

### 3.5 Duct Bank Installation - 2018

#### Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.3000e-004	0.0000	3.3000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1332	1.4232	0.9686	2.1400e-003		0.0631	0.0631		0.0581	0.0581	0.0000	195.5701	195.5701	0.0609	0.0000	196.8486
<b>Total</b>	<b>0.1332</b>	<b>1.4232</b>	<b>0.9686</b>	<b>2.1400e-003</b>	<b>3.3000e-004</b>	<b>0.0631</b>	<b>0.0635</b>	<b>4.0000e-005</b>	<b>0.0581</b>	<b>0.0581</b>	<b>0.0000</b>	<b>195.5701</b>	<b>195.5701</b>	<b>0.0609</b>	<b>0.0000</b>	<b>196.8486</b>

#### Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0102	0.1050	0.1464	3.6000e-004	8.3900e-003	1.6100e-003	0.0100	2.3000e-003	1.4800e-003	3.7900e-003	0.0000	31.8944	31.8944	2.2000e-004	0.0000	31.8990
Vendor	0.0113	0.1196	0.1368	3.9000e-004	0.0114	2.1000e-003	0.0135	3.2300e-003	1.9400e-003	5.1700e-003	0.0000	34.4078	34.4078	2.4000e-004	0.0000	34.4128
Worker	7.3600e-003	0.0151	0.1300	2.9000e-004	0.0240	2.0000e-004	0.0242	6.3800e-003	1.9000e-004	6.5700e-003	0.0000	20.2600	20.2600	1.1900e-003	0.0000	20.2849
<b>Total</b>	<b>0.0288</b>	<b>0.2397</b>	<b>0.4132</b>	<b>1.0400e-003</b>	<b>0.0437</b>	<b>3.9100e-003</b>	<b>0.0477</b>	<b>0.0119</b>	<b>3.6100e-003</b>	<b>0.0155</b>	<b>0.0000</b>	<b>86.5622</b>	<b>86.5622</b>	<b>1.6500e-003</b>	<b>0.0000</b>	<b>86.5967</b>

**3.6 Cable Installation - 2018****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0121	0.1072	0.0838	1.0000e-004		8.4700e-003	8.4700e-003		7.7900e-003	7.7900e-003	0.0000	9.5802	9.5802	2.9800e-003	0.0000	9.6428
<b>Total</b>	<b>0.0121</b>	<b>0.1072</b>	<b>0.0838</b>	<b>1.0000e-004</b>		<b>8.4700e-003</b>	<b>8.4700e-003</b>		<b>7.7900e-003</b>	<b>7.7900e-003</b>	<b>0.0000</b>	<b>9.5802</b>	<b>9.5802</b>	<b>2.9800e-003</b>	<b>0.0000</b>	<b>9.6428</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2600e-003	0.0663	0.0758	2.2000e-004	6.2900e-003	1.1700e-003	7.4600e-003	1.7900e-003	1.0700e-003	2.8600e-003	0.0000	19.0687	19.0687	1.3000e-004	0.0000	19.0715
Worker	4.0000e-003	8.2200e-003	0.0707	1.6000e-004	0.0131	1.1000e-004	0.0132	3.4700e-003	1.0000e-004	3.5700e-003	0.0000	11.0239	11.0239	6.5000e-004	0.0000	11.0375
<b>Total</b>	<b>0.0103</b>	<b>0.0745</b>	<b>0.1466</b>	<b>3.8000e-004</b>	<b>0.0193</b>	<b>1.2800e-003</b>	<b>0.0206</b>	<b>5.2600e-003</b>	<b>1.1700e-003</b>	<b>6.4300e-003</b>	<b>0.0000</b>	<b>30.0926</b>	<b>30.0926</b>	<b>7.8000e-004</b>	<b>0.0000</b>	<b>30.1090</b>

**3.6 Cable Installation - 2018****Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0121	0.1072	0.0838	1.0000e-004		8.4700e-003	8.4700e-003		7.7900e-003	7.7900e-003	0.0000	9.5802	9.5802	2.9800e-003	0.0000	9.6428
<b>Total</b>	<b>0.0121</b>	<b>0.1072</b>	<b>0.0838</b>	<b>1.0000e-004</b>		<b>8.4700e-003</b>	<b>8.4700e-003</b>		<b>7.7900e-003</b>	<b>7.7900e-003</b>	<b>0.0000</b>	<b>9.5802</b>	<b>9.5802</b>	<b>2.9800e-003</b>	<b>0.0000</b>	<b>9.6428</b>

**Mitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2600e-003	0.0663	0.0758	2.2000e-004	6.2900e-003	1.1700e-003	7.4600e-003	1.7900e-003	1.0700e-003	2.8600e-003	0.0000	19.0687	19.0687	1.3000e-004	0.0000	19.0715
Worker	4.0000e-003	8.2200e-003	0.0707	1.6000e-004	0.0131	1.1000e-004	0.0132	3.4700e-003	1.0000e-004	3.5700e-003	0.0000	11.0239	11.0239	6.5000e-004	0.0000	11.0375
<b>Total</b>	<b>0.0103</b>	<b>0.0745</b>	<b>0.1466</b>	<b>3.8000e-004</b>	<b>0.0193</b>	<b>1.2800e-003</b>	<b>0.0206</b>	<b>5.2600e-003</b>	<b>1.1700e-003</b>	<b>6.4300e-003</b>	<b>0.0000</b>	<b>30.0926</b>	<b>30.0926</b>	<b>7.8000e-004</b>	<b>0.0000</b>	<b>30.1090</b>

**3.6 Cable Installation - 2019****Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4200e-003	0.0398	0.0338	4.0000e-005		3.0300e-003	3.0300e-003		2.7900e-003	2.7900e-003	0.0000	3.8563	3.8563	1.2200e-003	0.0000	3.8819
<b>Total</b>	<b>4.4200e-003</b>	<b>0.0398</b>	<b>0.0338</b>	<b>4.0000e-005</b>		<b>3.0300e-003</b>	<b>3.0300e-003</b>		<b>2.7900e-003</b>	<b>2.7900e-003</b>	<b>0.0000</b>	<b>3.8563</b>	<b>3.8563</b>	<b>1.2200e-003</b>	<b>0.0000</b>	<b>3.8819</b>

**Unmitigated Construction Off-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3800e-003	0.0244	0.0294	9.0000e-005	2.5700e-003	4.4000e-004	3.0100e-003	7.3000e-004	4.0000e-004	1.1400e-003	0.0000	7.6754	7.6754	5.0000e-005	0.0000	7.6764
Worker	1.4300e-003	3.0300e-003	0.0259	6.0000e-005	5.3400e-003	4.0000e-005	5.3800e-003	1.4200e-003	4.0000e-005	1.4600e-003	0.0000	4.3485	4.3485	2.4000e-004	0.0000	4.3537
<b>Total</b>	<b>3.8100e-003</b>	<b>0.0274</b>	<b>0.0553</b>	<b>1.5000e-004</b>	<b>7.9100e-003</b>	<b>4.8000e-004</b>	<b>8.3900e-003</b>	<b>2.1500e-003</b>	<b>4.4000e-004</b>	<b>2.6000e-003</b>	<b>0.0000</b>	<b>12.0239</b>	<b>12.0239</b>	<b>2.9000e-004</b>	<b>0.0000</b>	<b>12.0301</b>

### 3.6 Cable Installation - 2019

#### Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.4200e-003	0.0398	0.0338	4.0000e-005		3.0300e-003	3.0300e-003		2.7900e-003	2.7900e-003	0.0000	3.8563	3.8563	1.2200e-003	0.0000	3.8819
<b>Total</b>	<b>4.4200e-003</b>	<b>0.0398</b>	<b>0.0338</b>	<b>4.0000e-005</b>		<b>3.0300e-003</b>	<b>3.0300e-003</b>		<b>2.7900e-003</b>	<b>2.7900e-003</b>	<b>0.0000</b>	<b>3.8563</b>	<b>3.8563</b>	<b>1.2200e-003</b>	<b>0.0000</b>	<b>3.8819</b>

#### Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3800e-003	0.0244	0.0294	9.0000e-005	2.5700e-003	4.4000e-004	3.0100e-003	7.3000e-004	4.0000e-004	1.1400e-003	0.0000	7.6754	7.6754	5.0000e-005	0.0000	7.6764
Worker	1.4300e-003	3.0300e-003	0.0259	6.0000e-005	5.3400e-003	4.0000e-005	5.3800e-003	1.4200e-003	4.0000e-005	1.4600e-003	0.0000	4.3485	4.3485	2.4000e-004	0.0000	4.3537
<b>Total</b>	<b>3.8100e-003</b>	<b>0.0274</b>	<b>0.0553</b>	<b>1.5000e-004</b>	<b>7.9100e-003</b>	<b>4.8000e-004</b>	<b>8.3900e-003</b>	<b>2.1500e-003</b>	<b>4.4000e-004</b>	<b>2.6000e-003</b>	<b>0.0000</b>	<b>12.0239</b>	<b>12.0239</b>	<b>2.9000e-004</b>	<b>0.0000</b>	<b>12.0301</b>

### 4.0 Operational Detail - Mobile

#### 4.1 Mitigation Measures Mobile

#### 4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Total					

#### 4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.493201	0.037430	0.233751	0.143759	0.049898	0.006916	0.012991	0.004894	0.000938	0.002881	0.009199	0.000696	0.003446

#### 5.0 Energy Detail

##### 5.1 Fleet Mix

---

Historical Energy Use: N

#### 5.1 Mitigation Measures Energy

---

#### 6.0 Area Detail

##### 6.1 Mitigation Measures Area

[illegible]

## 6.2 Area by SubCategory

### Unmitigated

[illegible]

## 6.2 Area by SubCategory

### Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>					<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

## 7.0 Water Detail

---

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

---

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

---

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

## 10.0 Vegetation

---

**Santa Cruz 115 kV Reinforcement Project**  
**Santa Cruz County, Mitigation Report**

**Construction Mitigation Summary**

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Cable Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Duct Bank Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Riser Pole Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Riser Site Prep/Foundation Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vault Installation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**OFFROAD Equipment Mitigation**

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Aerial Lifts	Diesel	No Change	0	4	No Change	0.00
Bore/Drill Rigs	Diesel	No Change	0	1	No Change	0.00
Crawler Tractors	Diesel	No Change	0	2	No Change	0.00
Excavators	Diesel	No Change	0	1	No Change	0.00
Off-Highway Trucks	Diesel	No Change	0	7	No Change	0.00
Cranes	Diesel	No Change	0	3	No Change	0.00
Other General Industrial Equipment	Diesel	No Change	0	1	No Change	0.00
Forklifts	Diesel	No Change	0	0	No Change	0.00
Graders	Diesel	No Change	0	0	No Change	0.00
Pavers	Diesel	No Change	0	2	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	3	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Unmitigated tons/yr							Unmitigated mt/yr					
Aerial Lifts	4.38000E-003	7.25900E-002	9.78000E-002	1.50000E-004	2.56000E-003	2.36000E-003	0.00000E+000	1.38848E+001	1.38848E+001	4.25000E-003	0.00000E+000	1.39741E+001
Bore/Drill Rigs	1.36400E-002	1.98290E-001	8.66700E-002	3.80000E-004	5.70000E-003	5.24000E-003	0.00000E+000	3.52518E+001	3.52518E+001	1.08000E-002	0.00000E+000	3.54786E+001
Cranes	5.66300E-002	6.72280E-001	2.40870E-001	4.90000E-004	2.99700E-002	2.75700E-002	0.00000E+000	4.57621E+001	4.57621E+001	1.40200E-002	0.00000E+000	4.60565E+001
Crawler Tractors	3.12500E-002	4.19070E-001	1.26730E-001	3.60000E-004	1.60000E-002	1.47200E-002	0.00000E+000	3.29923E+001	3.29923E+001	1.01100E-002	0.00000E+000	3.32046E+001
Excavators	1.95200E-002	2.08950E-001	2.21090E-001	3.50000E-004	1.01300E-002	9.32000E-003	0.00000E+000	3.18140E+001	3.18140E+001	9.90000E-003	0.00000E+000	3.20219E+001
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Off-Highway Trucks	1.75640E-001	1.94192E+000	9.48310E-001	2.80000E-003	7.15800E-002	6.58500E-002	0.00000E+000	2.57889E+002	2.57889E+002	7.96000E-002	0.00000E+000	2.59561E+002
Other General Industrial Equipment	1.64700E-002	1.46940E-001	1.17650E-001	1.50000E-004	1.15100E-002	1.05800E-002	0.00000E+000	1.34365E+001	1.34365E+001	4.20000E-003	0.00000E+000	1.35248E+001
Pavers	3.00400E-002	3.33610E-001	2.58870E-001	4.10000E-004	1.63400E-002	1.50300E-002	0.00000E+000	3.80530E+001	3.80530E+001	1.17900E-002	0.00000E+000	3.83007E+001
Tractors/Loaders/Backhoes	3.62500E-002	3.53040E-001	2.95170E-001	3.90000E-004	2.58000E-002	2.37400E-002	0.00000E+000	3.57252E+001	3.57252E+001	1.10400E-002	0.00000E+000	3.59570E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Aerial Lifts	4.38000E-003	7.25900E-002	9.78000E-002	1.50000E-004	2.56000E-003	2.36000E-003	0.00000E+000	1.38848E+001	1.38848E+001	4.25000E-003	0.00000E+000	1.39741E+001
Bore/Drill Rigs	1.36400E-002	1.98290E-001	8.66700E-002	3.80000E-004	5.70000E-003	5.24000E-003	0.00000E+000	3.52518E+001	3.52518E+001	1.08000E-002	0.00000E+000	3.54786E+001
Cranes	5.66300E-002	6.72280E-001	2.40870E-001	4.90000E-004	2.99700E-002	2.75700E-002	0.00000E+000	4.57620E+001	4.57620E+001	1.40200E-002	0.00000E+000	4.60565E+001
Crawler Tractors	3.12500E-002	4.19070E-001	1.26730E-001	3.60000E-004	1.60000E-002	1.47200E-002	0.00000E+000	3.29922E+001	3.29922E+001	1.01100E-002	0.00000E+000	3.32045E+001
Excavators	1.95200E-002	2.08950E-001	2.21090E-001	3.50000E-004	1.01300E-002	9.32000E-003	0.00000E+000	3.18139E+001	3.18139E+001	9.90000E-003	0.00000E+000	3.20219E+001
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Off-Highway Trucks	1.75640E-001	1.94192E+000	9.48310E-001	2.80000E-003	7.15800E-002	6.58500E-002	0.00000E+000	2.57889E+002	2.57889E+002	7.96000E-002	0.00000E+000	2.59560E+002
Other General Industrial Equipment	1.64700E-002	1.46940E-001	1.17650E-001	1.50000E-004	1.15100E-002	1.05800E-002	0.00000E+000	1.34365E+001	1.34365E+001	4.20000E-003	0.00000E+000	1.35248E+001
Pavers	3.00400E-002	3.33600E-001	2.58870E-001	4.10000E-004	1.63400E-002	1.50300E-002	0.00000E+000	3.80530E+001	3.80530E+001	1.17900E-002	0.00000E+000	3.83006E+001
Tractors/Loaders/Balckhoes	3.62500E-002	3.53040E-001	2.95170E-001	3.90000E-004	2.58000E-002	2.37400E-002	0.00000E+000	3.57252E+001	3.57252E+001	1.10400E-002	0.00000E+000	3.59570E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.44043E-006	1.44043E-006	0.00000E+000	0.00000E+000	1.43122E-006
Bore/Drill Rigs	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.13469E-006	1.13469E-006	0.00000E+000	0.00000E+000	1.40930E-006
Cranes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.31113E-006	1.31113E-006	0.00000E+000	0.00000E+000	1.30275E-006
Crawler Tractors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.21241E-006	1.21241E-006	0.00000E+000	0.00000E+000	1.20465E-006
Excavators	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.25731E-006	1.25731E-006	0.00000E+000	0.00000E+000	1.24914E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Off-Highway Trucks	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.16329E-006	1.16329E-006	0.00000E+000	0.00000E+000	1.19433E-006
Other General Industrial Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.48848E-006	1.48848E-006	0.00000E+000	0.00000E+000	7.39385E-007
Pavers	0.00000E+000	2.99751E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.31396E-006	1.31396E-006	0.00000E+000	0.00000E+000	1.30546E-006
Tractors/Loaders/Balckhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.11966E-006	1.11966E-006	0.00000E+000	0.00000E+000	1.11244E-006

### Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input	Mitigation Input	Mitigation Input			
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

Phase	Source	Unmitigated		Mitigated		Percent Reduction	
		PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Cable Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Cable Installation	Roads	0.03	0.01	0.03	0.01	0.00	0.00
Duct Bank Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.55	0.60
Duct Bank Installation	Roads	0.04	0.01	0.04	0.01	0.00	0.00
Riser Pole Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Riser Pole Installation	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Riser Site Prep/Foundation Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.54	0.50
Riser Site Prep/Foundation Installation	Roads	0.03	0.01	0.03	0.01	0.00	0.00
Vault Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.60	0.00
Vault Installation	Roads	0.02	0.00	0.02	0.00	0.00	0.00

### Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.00	0.15		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network			
No	Neighborhood Enhancements	Provide Traffic Calming Measures			
No	Neighborhood Enhancements	Implement NEV Network	0.00		
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00		
No	Parking Policy Pricing	Limit Parking Supply	0.00		
No	Parking Policy Pricing	Unbundle Parking Costs	0.00		
No	Parking Policy Pricing	On-street Market Pricing	0.00		
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00		
No	Transit Improvements	Provide BRT System	0.00		
No	Transit Improvements	Expand Transit Network	0.00		
No	Transit Improvements	Increase Transit Frequency	0.00		
	Transit Improvements	Transit Improvements Subtotal	0.00		
		Land Use and Site Enhancement Subtotal	0.00		
No	Commute	Implement Trip Reduction Program			
No	Commute	Transit Subsidy			
No	Commute	Implement Employee Parking "Cash Out"			
No	Commute	Workplace Parking Charge			
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00		
No	Commute	Market Commute Trip Reduction Option	0.00		
No	Commute	Employee Vanpool/Shuttle	0.00		2.00
No	Commute	Provide Ride Sharing Program			
	Commute	Commute Subtotal	0.00		

No	School Trip	Implement School Bus Program	0.00		
		Total VMT Reduction	0.00		

**Area Mitigation**

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	250.00
No	Use Low VOC Paint (Residential Exterior)	250.00
No	Use Low VOC Paint (Non-residential Interior)	250.00
No	Use Low VOC Paint (Non-residential Exterior)	250.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

**Energy Mitigation Measures**

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00

DishWasher	15.00
Fan	50.00
Refrigerator	15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

## **ATTACHMENT C: BIOLOGICAL ASSESSMENT**

Biological Resources Constraints Assessment – Cox-Freedom Segment  
Underground Alternative

**Santa Cruz 115 kV Reinforcement Project**

**Prepared for:**

Jennifer Stolz, Biologist

Pacific Gas and Electric Company

**Prepared by:**

**AECOM**

**June 2014**



## Table of Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Project Description.....	1
1.2	Construction Overview .....	3
<b>2</b>	<b>METHODS .....</b>	<b>4</b>
<b>3</b>	<b>RESULTS .....</b>	<b>5</b>
3.1	Vegetation Types .....	5
3.2	Special-Status Species .....	6
<b>4</b>	<b>CONCLUSION .....</b>	<b>13</b>
<b>5</b>	<b>REFERENCES.....</b>	<b>17</b>

## List of Figures

Figure 1: Project Location Map .....	2
Figure 2: Spineflower Occurrence Map.....	8
Figure 3: Santa Cruz Long-Toed Salamander Occurrences .....	12

## List of Tables

Table 1: Spineflower Habitat Suitability .....	9
Table 2: Santa Cruz Long-Toed Salamander Habitat Suitability .....	14

## Attachments

Attachment A      Route Maps

## Acronyms and Abbreviations

CEQA	California Environmental Quality Act
CDFW	California Department of Fish and Wildlife
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CPUC	California Public Utilities Commission
EIR	Environmental Impact Report
IS/MND	Initial Study/Mitigated Negative Declaration
kV	kilovolt
PG&E	Pacific Gas and Electric Company
project	Santa Cruz 115 kV Reinforcement Project
SCLTS	Santa Cruz long-toed salamander
TSP	tubular steel poles



# **1 INTRODUCTION**

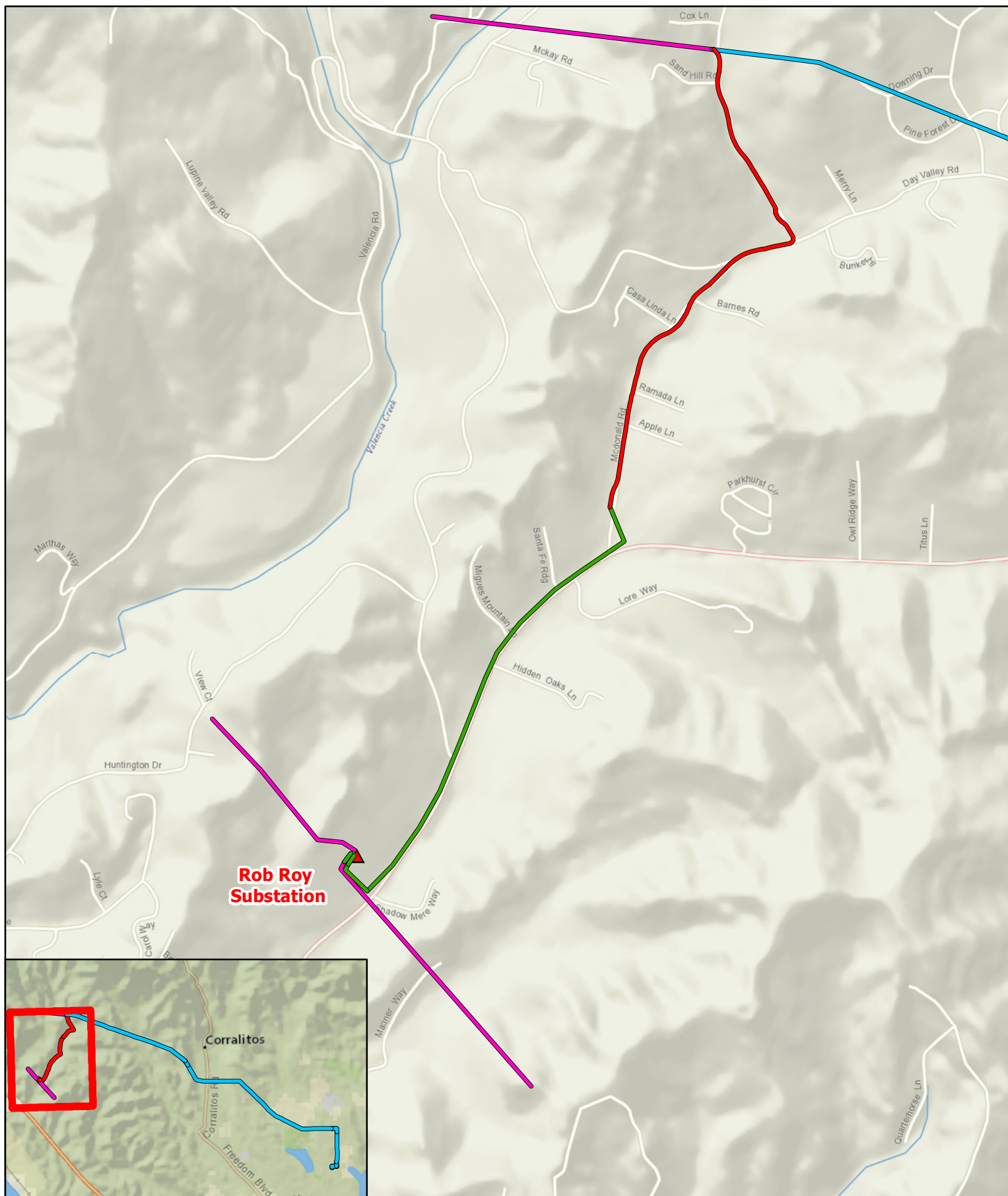
Pacific Gas and Electric Company (PG&E) proposes to rebuild a portion of the existing Green Valley-Camp Evers 115 kV Power Line and to construct a new 115 kV circuit as part of the Santa Cruz 115 kilovolt (kV) Reinforcement Project (project). PG&E filed an application for a Permit to Construct with the California Public Utilities Commission (CPUC) on January 25, 2012. On October 18, 2013, the CPUC released a Draft Initial Study/Mitigated Negative Declaration (IS/MND) for a 49-day public-review period, pursuant to the California Environmental Quality Act (CEQA).

The CPUC has requested additional data pertaining to biological resources to analyze alternatives in a Draft EIR. In response to Data Request #8, this Biological Resources Constraints Assessment was developed to determine the biological resource constraints associated with the construction of the Cox-Freedom Segment Underground Alternative. This assessment focuses on the biological constraints associated only with the construction of an underground portion of the Cox-Freedom Segment and does not include any changes to the Northern Alignment or aboveground portions of the Cox-Freedom Segment.

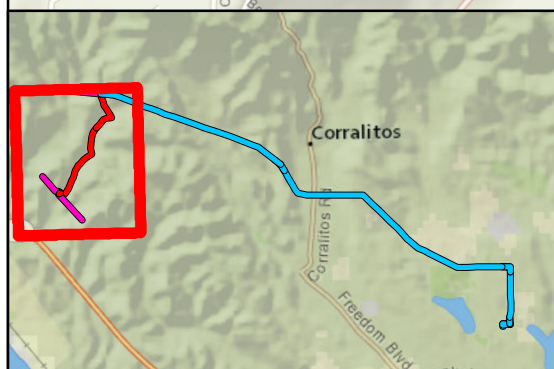
## **1.1 PROJECT DESCRIPTION**

### **1.1.1 LOCATION**

The underground portion of the Cox-Freedom Segment would follow a similar route as the aboveground Cox-Freedom Segment associated with the Cox-Freedom Alternative, with underground power lines beneath or immediately adjacent to East Cox Road, Day Valley Road, and McDonald Road, in the unincorporated community of Aptos. The underground segment would begin at the approximate location where the Northern Alignment crosses East Cox Road, and would transition back to an overhead line along McDonald Road approximately 350 feet from the intersection of Freedom Boulevard. Riser poles, transitioning the overhead conductor to underground cables, would be located at either end of the underground segment. Four vaults—two along East Cox Road and two along McDonald Road, would be installed within the roadways and shoulders. The underground segment alignment and components are shown in Figure 1: Project Location Map and Attachment A: Route Map.



**Rob Roy  
Substation**

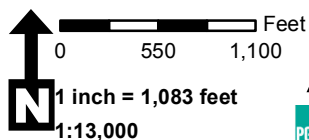


**Project Components**

- Existing 115 kV Power Line
- Northern Alignment
- Cox-Freedom Underground Segment
- Cox-Freedom Overhead Segment
- ▲ Substation

**Santa Cruz 115 kV Reinforcement  
Project**

Figure 1: Project Location Map  
May 27, 2014



Source: PG&E 2012  
Base Image: ESRI 2013

## **1.2 CONSTRUCTION OVERVIEW**

Construction of the underground segment would include the following four major steps:

1. Riser Pole Construction
2. Vault Installation
3. Duct Bank Construction
4. Cable Installation

The following is an overview summary of each of the four major construction steps.

### **1.2.1 RISER POLE CONSTRUCTION**

Two riser poles would be constructed to transition the power line from overhead line to underground cable. These riser poles would consist of self-supported, tubular steel poles (TSP), affixed to concrete foundations. The north riser pole would be located along the western side of East Cox Road, beneath the Northern Alignment. The hillside at this site would be cut back and secured using a new retaining wall. This retaining wall would create a flat area off the road for the new TSP to be constructed.

The south riser pole would be located within a small agricultural field along the west side of McDonald Road, approximately 350 feet from the intersection with Freedom Boulevard. A small amount of grading would be necessary to prepare this area for the riser pole and the necessary vault box.

### **1.2.2 VAULT INSTALLATION**

Four vaults would be installed along the underground alignment. The installation of each vault would require excavation of an approximately 34-foot-long, 14-foot-wide, and 15-foot-deep pit. The proposed Vault 1 area is on the west side of McDonald Road, approximately 350 feet from the Freedom Boulevard intersection, and would be collocated with the south riser pole.

The proposed Vault 2 area is just off the eastern side of McDonald Road, just south of Day Valley Road. Vault installation would require some minor tree trimming to allow delivery by crane. The location is off the road and has aggregate surfacing already in place.

The proposed Vault 3 area is within a small livestock pasture on the west side of East Cox Road, approximately 200 feet from the intersection of East Cox Road and Day Valley Road. Minor vegetation removal would be required to allow vault installation and duct bank installation in and out of the vault.

The proposed Vault 4 area is on the eastern side of East Cox Road, approximately 275 feet north of the Sand Hill Road and East Cox Road Intersection and across the road from the north riser pole. The vault would be placed in a site containing an asphalt drainage ditch, ruderal roadside vegetation, and a small stand of ornamental trees. Some tree removal may be required to prepare the site for excavation.

### **1.2.3 DUCT BANK CONSTRUCTION**

The underground cables would be installed in a duct bank system that would be approximately 3 to 5 feet wide and would consist of 6-inch and 2-inch conduits, all encased with concrete. To install the duct bank system, a trench would be excavated along the length of the underground alignment. All spoils would be hauled off site because the duct bank would be backfilled with concrete and the road surface would be repaved with asphalt. After the duct bank is assembled, it would be backfilled with concrete. The duct bank alignment would be located within paved roadways, with the exception of connections with vaults, which generally would be to the side of the road.

### **1.2.4 CABLE INSTALLATION**

After all of the conduit and vaults are in place, the cable would be pulled through the alignment. The cable would be pulled from vault to vault using specially designed winch and pulley systems. After it is in place, crews working within each vault would splice the cable segments together. The process of cable installation would not include ground-disturbing activities, and construction equipment and vehicles would be confined to previously disturbed construction areas.

## **2 METHODS**

The proposed underground segment corridor already has been studied extensively within the context of an aboveground segment. The following project-specific documents studied the areas in which the proposed underground segment would be constructed, and thus, were reviewed as part of this assessment. These documents include the following:

- Biological Constraints Assessment for the Santa Cruz Reinforcement Project (PG&E 2011)
- 2012 Rare Plant Survey for the Santa Cruz 115 kV Reinforcement Project (PG&E 2012)
- Santa Cruz Long-Toed Salamander Assessment and Fencing Strategy (PG&E 2013)

- Biological Resources section of the Santa Cruz 115 kV Reinforcement Project Mitigated Negative Declaration (CPUC 2013)

In addition to reviewing this documentation, the California Natural Diversity Database (CNDDDB) and California Native Plant Society Inventory of Rare, Threatened, and Endangered Plants of California were reviewed to identify any new species records that have been recorded since the preparation of these documents (California Department of Fish and Wildlife [CDFW] 2014; California Native Plant Society [CNPS] 2014). Photographs collected during construction planning for the proposed underground segment were also reviewed.

## **3 RESULTS**

### **3.1 VEGETATION TYPES**

Based on previous surveys of the project, it was noted that four vegetation types are present within the footprint of the proposed underground segment: annual grassland, ornamental, ruderal, and oak woodland (PG&E 2011, PG&E 2013). In addition, paved or otherwise developed areas were also noted within a large part of the proposed underground segment footprint. The locations of vegetation types within the proposed underground segment footprint are shown in Attachment A: Route Map.

#### **3.1.1 VAULT 1/SOUTH RISER POLE**

The Vault 1/south riser pole area contains annual grassland vegetation characterized by nonnative annual grass species, including wild oats (*Avena* spp.), big quaking grass (*Briza maxima*), and chess (*Bromus* spp.). Two mature orchard trees are located at the southern end of the work area. The work area is located within a grazed field, and thus, vegetative cover is reduced by grazing livestock. The northern portion of the work area is located within an area containing ornamental vegetation consisting of hedge rows and a grass lawn.

#### **3.1.2 VAULT 2/ADJACENT OFF-PAVEMENT DUCT BANK ALIGNMENT**

The Vault 2 area will be centered within a graveled/disturbed roadside pullout with oak woodland habitat along the eastern, southern, and northern edges. The graveled area contains limited or no vegetation. The oak woodland habitat is dominated by mature coast live oak (*Quercus agrifolia*) and has a defined canopy with understory species that include poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), Himalayan blackberry (*Rubus discolor*), and nonnative or native grasses.

#### **3.1.3 VAULT 3**

The Vault 3 area contains annual grassland vegetation characterized by nonnative annual grass species, including wild oats, big quaking grass, and chess. A row of small planted landscape

trees is present along the southeastern end of the work area. The work area is located within a grazed field, and thus, vegetative cover is reduced by grazing livestock.

#### **3.1.4 VAULT 4**

The Vault 4 area contains both ruderal and ornamental vegetation. Ruderal vegetation in this location borders East Cox Road and consists of nonnative invasive broad-leafed and grass species, including bristly ox-tongue (*Helminthotheca echioides*), curly dock (*Rumex crispus*), wild oats, and thistle (*Centaurea* spp.). A small roadside concrete ditch runs along the edge of the road adjacent to this vegetation. Based on preliminary field observations, this ditch is presumed to be under the jurisdiction of the United States Army Corps of Engineers and the CDFW (CPUC 2013). A row of ornamental nonnative trees is located to the east of the strip of ruderal roadside vegetation. This row of trees acts as a visual screen for the adjacent property and shades the ruderal vegetation along East Cox Road.

#### **3.1.5 NORTH RISER POLE**

The north riser pole contains sparse annual grassland habitat extending from East Cox Road up an adjacent roadside bank. Further up the hillside to the west, the habitat transitions to oak woodland habitat. The understory in this area is much sparser than at Vault 2, and is primarily dominated by annual grasses or nonnative broom (*Genista* spp).

#### **3.1.6 DUCT BANK**

The majority of the duct bank is located within paved roadways, except where noted otherwise near Vault 2. These areas contain no vegetation and do not have potential to support sensitive biological resources.

### **3.2 SPECIAL-STATUS SPECIES**

Based on the review of existing information, suitable habitat for three special-status species is present along the underground segment, including:

- Monterey spineflower (*Chorizanthe pungens pungens*) – federally threatened, California Rare Plant Rank 1B.2
- Robust spineflower (*Chorizanthe robusta robusta*) – federally endangered, California Rare Plant Rank 1B.1
- Santa Cruz long-toed salamander (*Ambystoma macrodactylum croceum*) (SCLTS) – federally endangered, state endangered, state fully protected

#### **3.2.1 MONTEREY AND ROBUST SPINEFLOWER**

Monterey spineflower and robust spineflower are both small annual spineflowers in the buckwheat family (Polygonaceae). Recruitment for both species is highly variable from year to

year, dependent on precipitation levels, and plants typically are vegetative beginning in December. These species can occur in coastal dunes as well as in coastal oak woodlands and maritime chaparral where loose, sandy, marine-derived soils are present and competition from other plants is limited.

Inland occurrences within woodland or chaparral communities typically are found in marine-derived sandy soils where openings between other vegetation exist. These species are also often found in grassland habitats where disturbance resulting from road cuts, dune mobilization, vehicle disturbance, mowing, or other factors have been shown to promote development of these species (PG&E 2012).

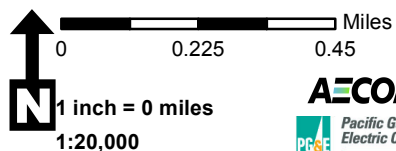
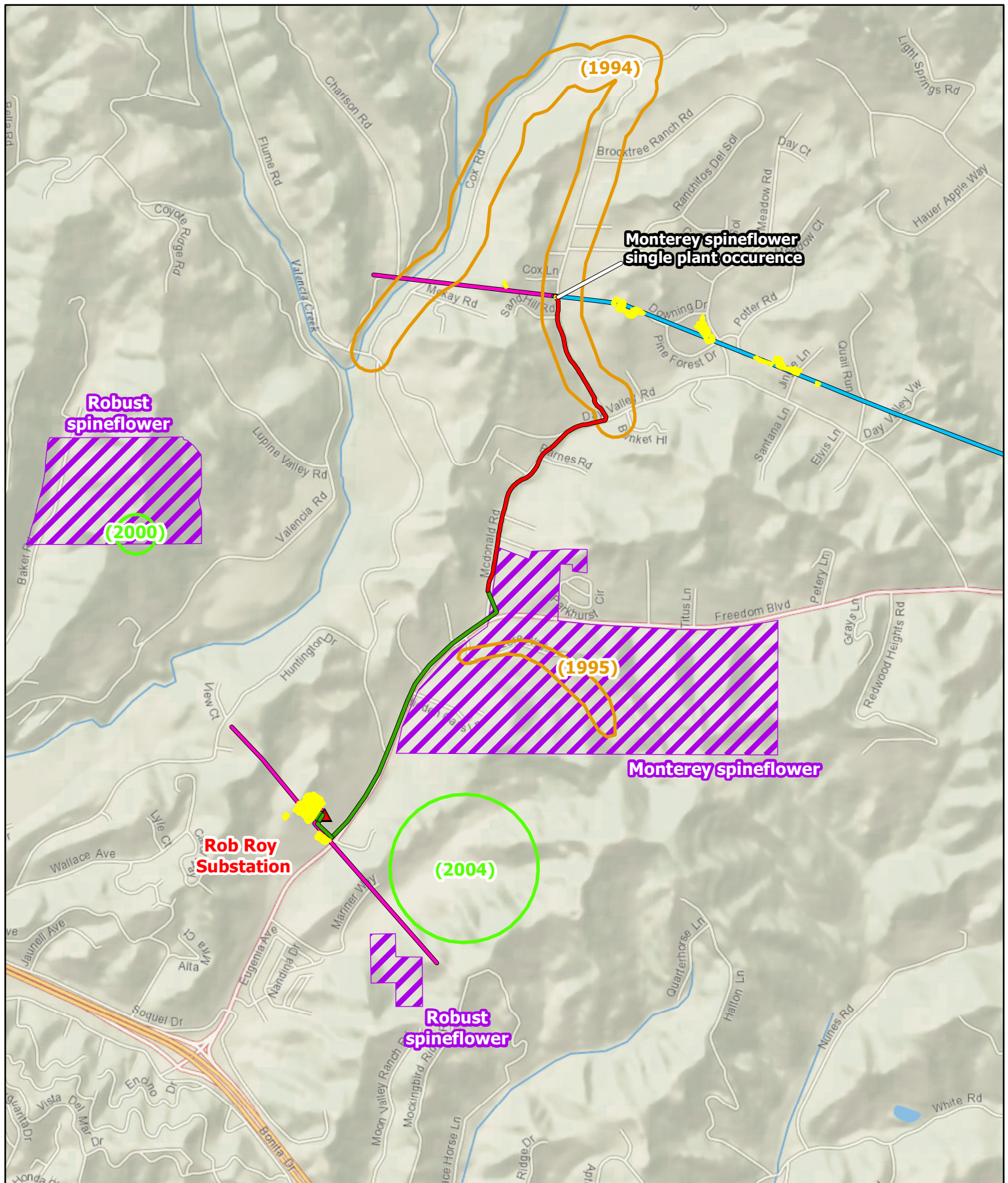
As shown in Figure 2: Spineflower Occurrence Map, occurrences of both robust spineflower and Monterey spineflower have been documented in the nearby area. Further, many observations of Monterey spineflower were made in 2011 along the Northern Alignment near the proposed underground segment. Monterey spineflower was documented along the proposed underground segment in one location during rare plant surveys conducted in 2011 for the project.

At that time, a single plant was observed within a road cut containing sandy soils along the western side of East Cox Road, directly beneath the Northern Alignment, and within the limits of the north riser pole work area.

Although no populations of robust spineflower have been identified during previous field surveys, two known populations of the species are located approximately 0.9 mile from the underground alignment—the Freedom population adjacent to Aptos High School and the Aptos population north of Valencia Creek. Due to their distances from the proposed project, neither of these populations would be affected. In addition, this species has been noted to exhibit varying morphology in the Aptos area and this often has led to it being confused with Monterey spineflower and other members of the *Pungentes* section of the genus *Chorizanthe*, when using conventional keying methods. Therefore, robust spineflowers with atypical morphology could be confused for or intermixed with Monterey spineflower that is found in the project footprint (PG&E 2012).

As noted in Table 1: Spineflower Habitat Suitability, suitable habitat for robust spineflower and Monterey spineflower is present in three locations along the proposed underground alignment. The first location, within the north riser pole work area, is known to have supported Monterey spineflower in 2011. Habitat at this location consists of a sandy eroding hillside along East Cox Road. The remaining two locations, the Vault 3 and Vault 1/south riser pole areas contain suitable sandy soils as well as decreased competition from grasses; however, these species have not been documented in these locations.

Critical habitat for Monterey spineflower is designated along the east side of McDonald Road, near the intersection with Freedom Boulevard and across the street from the Vault 1 area (U.S. National Archives and Records Administration 2008).



#### Project Components

- Existing 115 kV Power Line
- Northern Alignment
- Cox-Freedom Underground Segment
- Cox-Freedom Overhead Segment
- Substation

#### 2012 Populations

- Monterey spineflower
- CNDDDB Occurrences
- Monterey spineflower
- Robust spineflower

#### Santa Cruz 115 kV Reinforcement Project

Figure 2: Spineflower Occurrence Map  
May 27, 2014

Source: PG&E 2012, USFWS 2014, CDFW 2014; Base Image: ESRI 2013

Table 1: Spineflower Habitat Suitability

Underground Segment Work Site	Habitat Description	Distance to Nearest Known Occurrences	Assessment of Spineflower Habitat Suitability
South Riser Pole/Vault 1	The site contains annual grassland habitat within a grazed pasture. Scattered small oak trees with no understory vegetation are present.	Nearest Monterey Spineflower occurrence: 0.17 mile east (within designated critical habitat).  Nearest robust spineflower occurrence: Two occurrences approximately 0.92 mile to west and south, respectively.	Based on the presence of sandy soils and low vegetative cover, this area could support either species. No known populations were recorded here during 2012 surveys. Livestock grazing may help to control competing grasses, which would improve the suitability of the site to support these species over other nearby ungrazed areas. <b>Suitable Habitat</b>
Vault 2/Adjacent off-pavement duct bank alignment	The site contains a graveled roadside pullout and is bordered by overhanging mature oak trees with a dense understory of grasses and herbaceous vegetation.	Nearest Monterey Spineflower occurrence: 0.2 mile northeast.  Nearest robust spineflower occurrence: 1.0 mile west.	This site does not contain suitable habitat due to the shading of the overhanging oak trees, as well as the dense competing understory vegetation. <b>Not Suitable Habitat</b>
Vault 3	The site contains annual grassland habitat within a grazed pasture. Scattered small oak trees are present with no understory vegetation present.	Nearest Monterey Spineflower occurrence: Site is located within a CNDDDB occurrence.  Nearest robust spineflower occurrence: 1.18 miles west.	Based on the presence of sandy soils and low vegetative cover, this area could support either species. No known populations were recorded here during 2012 surveys; however, a non-specific CNDDDB occurrence notes Monterey spineflower along East Cox Road. Livestock grazing may help to control competing grasses, which would improve the suitability of the site to support these species. <b>Suitable Habitat</b>

Underground Segment Work Site	Habitat Description	Distance to Nearest Known Occurrences	Assessment of Spineflower Habitat Suitability
Vault 4	The western half of the site contains a shaded roadside shoulder and drainage ditch dominated by ruderal weedy nonnative grasses and herbaceous species. The eastern half of the site contains a row of overhanging ornamental trees.	Nearest Monterey Spineflower occurrence: Site is across the street from a documented occurrence.  Nearest robust spineflower occurrence: 1.22 miles west.	This site does not contain suitable habitat due to the shading of the overhanging ornamental trees. <b>Not Suitable Habitat</b>
North Riser Pole	The site contains an eroding roadside bank with sparse nonnative grasses and oak trees. Soils in this location are very sandy.	Monterey Spineflower was recorded within this site in 2011 (PG&E 2012).  Nearest robust spineflower occurrence: 1.22 miles west.	This site is known to support Monterey spineflower, with one plant recorded in this location in 2012, as well as a CNDDDB occurrence documenting the species along the road. The site's eroding sandy soils create an area in which competition from other species is limited, which only further increases the suitability of this site. <b>Suitable Habitat/Known to be Occupied</b>

These primary constituents are not present in the portions of the critical habitat bordering McDonald Road and Freedom Boulevard, and thus, the portions of critical habitat closest to the project do not support suitable habitat for the species. As shown in Figure 2: Spineflower Occurrence Map, no portions of the proposed underground segment are located within this critical habitat area.

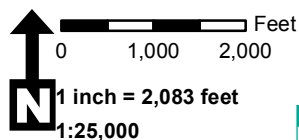
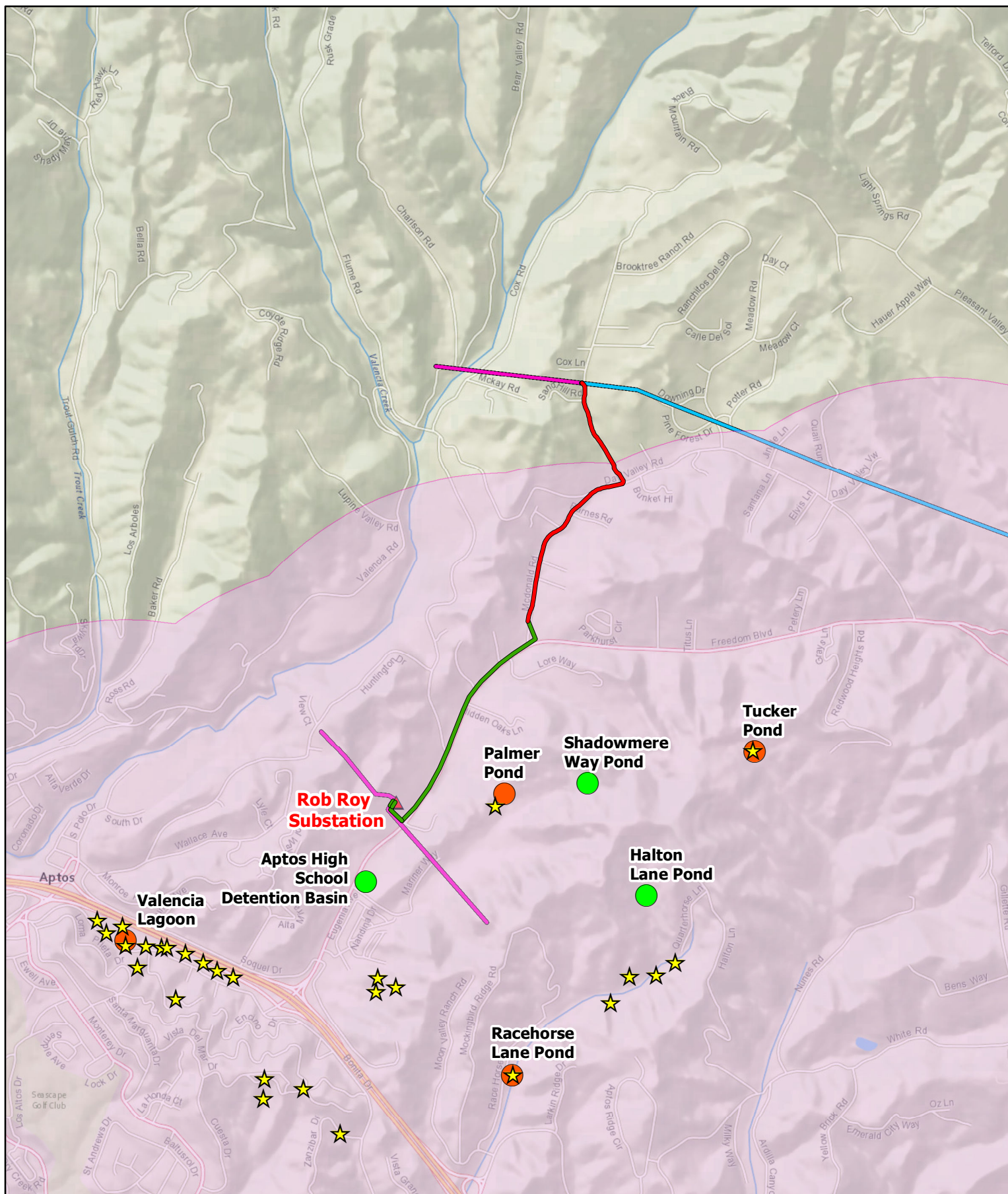
### 3.2.2 SANTA CRUZ LONG-TOED SALAMANDER

SCLTS is a subspecies of long-toed salamander, with a localized and restricted range found only in southern Santa Cruz County and northern Monterey County. The species breeds in seasonal or perennial ponds and sloughs. Breeding sites generally lack exotic predators, such as nonnative fish and American bullfrogs (*Lithobates catesbeianus*) that prey on adults, eggs, and larval salamanders. The few perennial ponds that support both SCLTS and invasive aquatic species have sufficient submergent and emergent vegetative cover to protect eggs and larvae from predation, although survivorship of larvae and recruitment of metamorphs could be reduced when compared to habitat that is not shared with these predators.

During the dry season, SCLTS retreat to suitable upland habitat where they remain underground in small mammal burrows and other moist refugia, such as beneath fallen logs or rocks and within plant root systems. Adult SCLTS remain in these upland habitats during the summer months and then begin to emerge during rainy nights in the fall and winter to migrate to breeding ponds. During the wet season, salamanders may migrate up to 1 mile from their upland habitat to suitable aquatic habitat. During this migration, they travel through both upland and dispersal habitat. Dispersal habitat is only suitable for the species during the wet season, as these areas do not contain suitable vegetation cover or burrows needed by the species during the dry season. After breeding, adults return to suitable upland habitat. Larvae developing in ponds begin metamorphosis in spring and summer, and then seek refuge in upland areas as well (PG&E 2013).

No aquatic breeding habitat is located within or adjacent to the proposed underground segment. Two known breeding locations—Palmer Pond and Tucker Pond—are within approximately 1 mile of the proposed underground segment. In addition, three suitable breeding locations where no surveys have been conducted—Aptos High School Detention Basin, Halton Lane Pond, and Shadowmere Way Pond—are located within approximately 1 mile of the proposed underground segment. As SCLTS can migrate up to 1 mile from upland habitat to aquatic habitat, salamanders using these ponds for breeding could be using some suitable habitats along the underground alignment for upland refuge or as a migratory corridor. As shown in Figure 3: Santa Cruz Long-Toed Salamander Occurrences, these ponds are all located south of the underground alternative.

Using the habitat assessment conducted by PG&E in 2013, the habitats along the proposed underground segment were evaluated to determine their suitability to support the SCLTS.



#### Project Components

- Existing 115 kV Power Line
- Northern Alignment
- Cox-Freedom Underground Segment
- Cox-Freedom Overhead Segment
- ▲ Substation
- Potential SCLTS Dispersal Range

- ★ SCLTS Observations
- Known Breeding Site
- Suitable Breeding Site

#### Santa Cruz 115 kV Reinforcement Project

Figure 3: Santa Cruz Long-Toed Salamander Occurrences  
May 27, 2014

Source: PG&E 2014  
Base Image: ESRI 2013

As shown in Table 2: Santa Cruz Long-Toed Salamander Habitat Suitability, Vault 2 is located within suitable upland habitat, Vault 1/south riser pole and Vault 3 are within dispersal habitat only, and Vault 4 and the north riser pole are outside the range of the species.

The Vault 2 area is partially located within suitable upland habitat for the species. At this location, oak woodland habitat bordering the vault to the east, south, and north contains dense understory vegetation and woody materials suitable for supporting the species during the dry season. While the vault itself will be largely centered within a previously disturbed gravel area, the installation of the vault, as well as the construction of the duct bank entering and exiting the vault, will impact this suitable upland habitat. The Vault 1/south riser pole and Vault 3 areas are located within vegetated areas; however, these locations do not contain the dense vegetation or other cover needed for upland habitat. As such, these areas are only suitable to SCLTS as dispersal habitat for use during the wet season because the lack of suitable cover would prevent individuals from seeking long-term or dry season refuge.

As shown in Attachment A: Route Map, the north riser pole and Vault 4 areas are outside the likely range of the species because the distance to nearest known and suitable breeding habitat exceeded the maximum dispersal distance of 1 mile. Therefore, SCLTS is not expected to be present in this portion of the underground segment along East Cox Road, regardless of the time of year or vegetation present.

While much of the duct bank is located within 1 mile of known or suitable breeding habitat, this work would largely be confined to existing paved roadway surfaces. As such, these areas contain very low quality dispersal habitat that would only be crossed for short times during migrations.

## **4 CONCLUSION**

The total amount of occupied Monterey spineflower habitat within the footprint of the underground segment is approximately 0.09 acre. This is mainly resulting from construction of a permanent retaining wall and work space associated with the north riser pole in the location of a known Monterey spineflower occurrence. Both the Vault 1/south riser pole and Vault 3 areas contain suitable habitat; however, these areas were not confirmed to support spineflower species in 2011, and thus, the underground segment at these locations would not be considered an impact to either Monterey spineflower or robust spineflower.

Construction of the proposed underground segment would be primarily confined to existing paved roadways, with the exception of the vaults and riser poles. Of the components located outside of the paved roadway, only the Vault 2 area would require work within suitable upland habitat for SCLTS. The work at this location would occupy less than 0.01 acre of suitable upland habitat for SCLTS.

**Table 2: Santa Cruz Long-Toed Salamander Habitat Suitability**

<b>Underground Segment Work Site</b>	<b>Habitat Description</b>	<b>Nearest Known Breeding Aquatic Feature</b>	<b>Nearest Suitable Breeding Aquatic Feature</b>	<b>Habitat Connectivity of Adjacent Areas to Breeding Habitat</b>	<b>Assessment Habitat within Project Footprint Boundaries</b>
South Riser Pole/Vault 1	The site contains annual grassland habitat within a grazed pasture. Scattered small oak trees are present with no understory vegetation present.	0.6 mile	0.5 mile	The site is located along a roadside. Surrounding native habitats are fragmented and the connectivity of the area to suitable breeding habitat is limited by development.	No upland habitat is present due to a lack of suitable vegetation. Site provides disturbed dispersal habitat. <b>Disturbed Dispersal Habitat Only</b>
Vault 2/Adjacent off-pavement duct bank alignment	The site contains a graveled roadside pullout and is bordered by overhanging mature oak trees with a dense understory of grasses and herbaceous vegetation.	0.9 mile	0.8 mile	The site is located along a roadside. Surrounding native habitats are fragmented and the connectivity of the area to suitable breeding habitat is limited by development.	Oak woodland habitat within a portion of work area provides suitable upland habitat. The graveled portion of the site provides disturbed dispersal habitat. <b>Suitable Upland and Dispersal Habitat</b>
Vault 3	The site contains annual grassland habitat within a grazed pasture. Scattered small oak trees are present with no understory vegetation present.	1.0 mile	1.0 mile	The site is located along a roadside. Surrounding native habitats are fragmented and connectivity of the area to suitable breeding habitat is limited by development.	No upland habitat is present due to a lack of suitable vegetation. The site provides disturbed dispersal habitat. <b>Disturbed Dispersal Habitat Only</b>

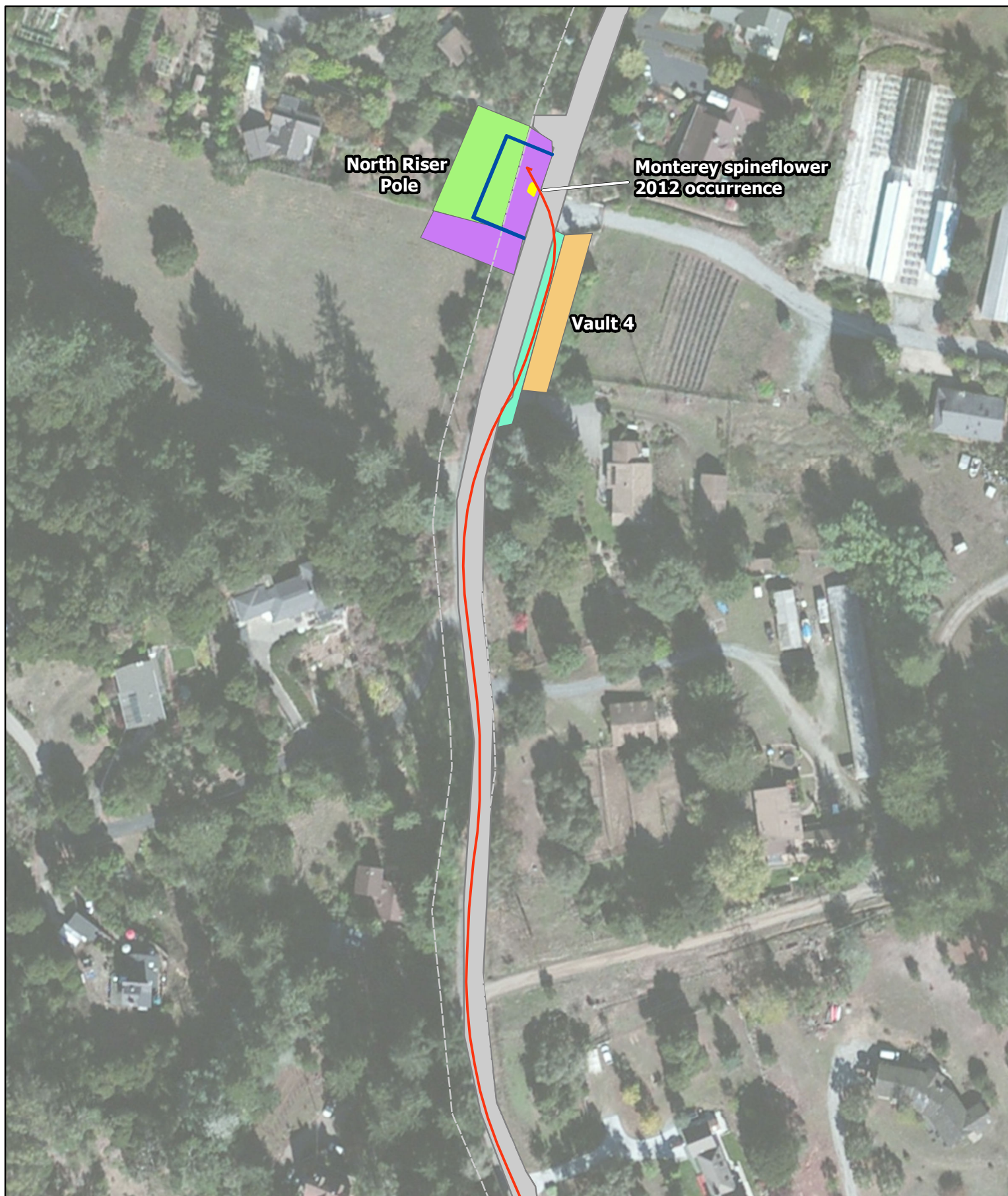
Underground Segment Work Site	Habitat Description	Nearest Known Breeding Aquatic Feature	Nearest Suitable Breeding Aquatic Feature	Habitat Connectivity of Adjacent Areas to Breeding Habitat	Assessment Habitat within Project Footprint Boundaries
Vault 4	The western half of the site contains a shaded roadside shoulder and drainage ditch dominated by ruderal weedy nonnative grasses and herbaceous species. The eastern half of the site contains a row of overhanging ornamental trees.	1.3 miles	1.3 miles	The site is located along a roadside. Surrounding native habitats are fragmented and connectivity of the area to suitable breeding habitat is limited by development.	No upland habitat is present due to a lack of suitable vegetation. The site is outside the current reported SCLTS range; the site is greater than 1.0 mile from nearest known or potential breeding pond. Due to the location of the site outside of the reported range of the species, as well as the distance to known breeding habitat, it is unlikely that SCLTS would use this site. <b>No Suitable Habitat</b>
North Riser Pole	The site contains an eroding roadside bank with sparse nonnative grasses and oak trees. Soils in this location are very sandy.	1.3 miles	1.3 miles	The site is located along a roadside. Surrounding native habitats are fragmented and connectivity of the area to suitable breeding habitat is limited by development.	No upland habitat is present due to a lack of suitable vegetation. The site is outside the current reported SCLTS range; the site is greater than 1.0 mile from nearest known or potential breeding pond. Due to the location of the site outside of the reported range of the species, as well as the distance to known breeding habitat, it is unlikely that SCLTS would use this site. <b>No Suitable Habitat</b>

## 5 REFERENCES

- California Department of Fish and Wildlife (CDFW). 2014. *California Natural Diversity Database (CNDDDB)*. Available: <http://www.dfg.ca.gov/biogeodata/cnddb/>. Accessed March 31, 2014.
- California Native Plant Society (CNPS). 2014. *Inventory of Rare, Threatened, and Endangered Plants of California*. Available: <http://www.rareplants.cnps.org/>. Site visited April 1, 2014.
- California Public Utilities Commission (CPUC). 2013. *Mitigated Negative Declaration – Santa Cruz 115 kV Reinforcement Project*. Available: [http://www.cpuc.ca.gov/Environment/info/panoramaenv/SantaCruz\\_115kVReinforcement/images/Santa\\_Cruz\\_ISMND.html](http://www.cpuc.ca.gov/Environment/info/panoramaenv/SantaCruz_115kVReinforcement/images/Santa_Cruz_ISMND.html). Accessed March 31, 2014.
- Pacific Gas and Electric Company (PG&E). 2011. *Biological Constraints Assessment for the Santa Cruz Reinforcement Project*.
- . 2012. *Rare Plant Survey Report for the Santa Cruz 115 kV Reinforcement Project*.
- . 2013. *Santa Cruz Long-Toed Salamander Assessment and Fencing Strategy*.
- U.S. Fish and Wildlife Service (USFWS). 2014. *Critical Habitat Portal*. Online: <http://ecos.fws.gov/crithab/>. Accessed April 1, 2014.
- U.S. National Archives and Records Administration. 2008. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Monterey Spineflower (Chorizanthe pungens var. pungens)*. *Federal Register* Vol. 73, No. 6/Wednesday, January 9, 2008/Rules and Regulations.

## **Attachment A: Route Map**





**North Riser Pole**

**Monterey spineflower 2012 occurrence**

**Vault 4**



0 55 110 Feet

1 inch = 117 feet  
1:1,400



**Roadway Features**

- Right-of-Way
- Retaining Wall

**Project Features**

- Cox-Freedom Underground Alignment
- Cox-Freedom Overhead Alignment

**Vegetation Types**

- Paved/Gravel
- Annual Grassland
- Ornamental
- Ruderal
- Oak Woodland

Source: PG&E 2012  
Base Image: ESRI 2013

**Santa Cruz 115 kV Reinforcement Project**

Project Route Map (Page 1 of 5)  
June 2, 2014



**Approximate Boundary of SCLTS Dispersal**

**Vault 3**



0 55 110 Feet

1 inch = 117 feet  
1:1,400



**Roadway Features**

- Right-of-Way
- Retaining Wall

**Project Features**

- Cox-Freedom Underground Alignment
- Cox-Freedom Overhead Alignment

**Vegetation Types**

- Paved/Gravel
- Annual Grassland
- Ornamental
- Ruderal
- Oak Woodland

Source: PG&E 2012  
Base Image: ESRI 2013

**Santa Cruz 115 kV Reinforcement Project**

Project Route Map (Page 2 of 5)  
June 2, 2014



**Vault 2**

0 55 110 Feet



1 inch = 117 feet  
1:1,400

**AZCOM**



**Roadway Features**

- Right-of-Way
- Retaining Wall

**Project Features**

- Cox-Freedom Underground Alignment
- Cox-Freedom Overhead Alignment

**Vegetation Types**

- Paved/Gravel
- Annual Grassland
- Ornamental
- Ruderal
- Oak Woodland

Source: PG&E 2012  
Base Image: ESRI 2013

**Santa Cruz 115 kV Reinforcement Project**

Project Route Map (Page 3 of 5)  
June 2, 2014



0 55 110 Feet

1 inch = 117 feet  
1:1,400



#### Roadway Features

- Right-of-Way
- Retaining Wall

#### Project Features

- Cox-Freedom Underground Alignment
- Cox-Freedom Overhead Alignment

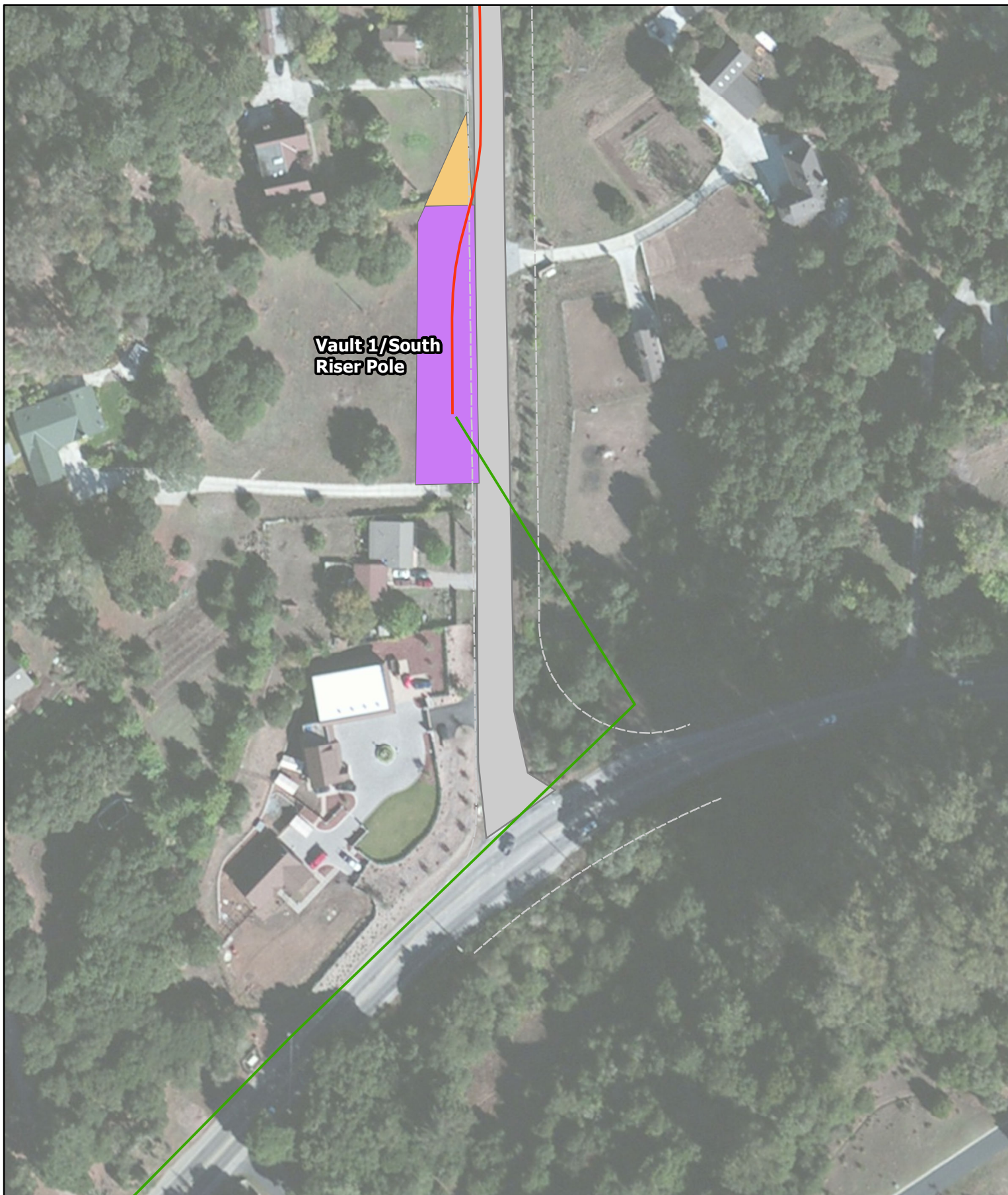
#### Vegetation Types

- Paved/Gravel
- Annual Grassland
- Ornamental
- Ruderal
- Oak Woodland

Source: PG&E 2012  
Base Image: ESRI 2013

### Santa Cruz 115 kV Reinforcement Project

Project Route Map (Page 4 of 5)  
June 2, 2014



**Vault 1/South  
Riser Pole**



0 55 110 Feet

1 inch = 117 feet  
1:1,400



#### Roadway Features

- Right-of-Way
- Retaining Wall

#### Project Features

- Cox-Freedom Underground Alignment
- Cox-Freedom Overhead Alignment

#### Vegetation Types

- Paved/Gravel
- Annual Grassland
- Ornamental
- Ruderal
- Oak Woodland

Source: PG&E 2012  
Base Image: ESRI 2013

#### Santa Cruz 115 kV Reinforcement Project

Project Route Map (Page 5 of 5)  
June 2, 2014

**ATTACHMENT D: CULTURAL RESOURCES REPORT ADDENDUM**

**This attachment has been omitted for the purposes of confidentiality.**