

# PG&E's 2016 Request Window Proposals

## CAISO 2016/2017 Transmission Planning Process

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Transmission System Planning  
September 22, 2016



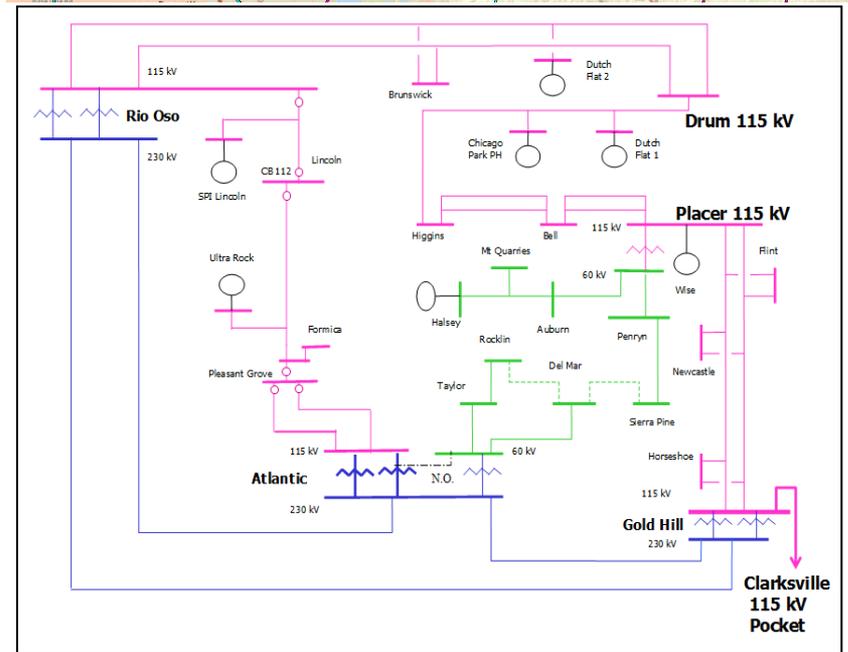
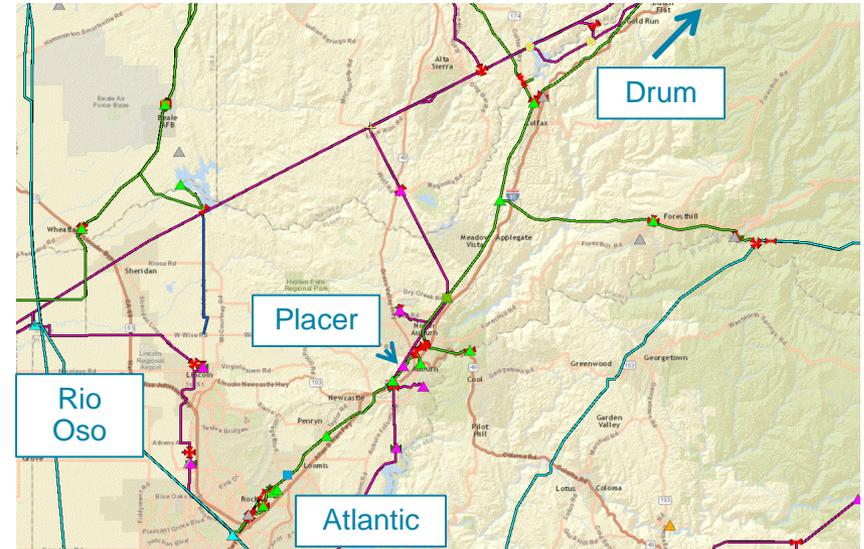


# Transmission Project Overview

## Project Seeking CAISO Approval – Sierra

1. Placer 115 kV Area Voltage Support

- Placer and Drum area is located within Sierra division
- Local 115 kV and 60 kV system is served mainly from 230 kV system at Rio Oso and Gold Hill as well as by local generation
- Major generation source in the area is Drum Powerhouse
- More than 52,000 customers in the area
- High voltages during normal system condition (P0)
- Low voltages during low hydro and system outage conditions



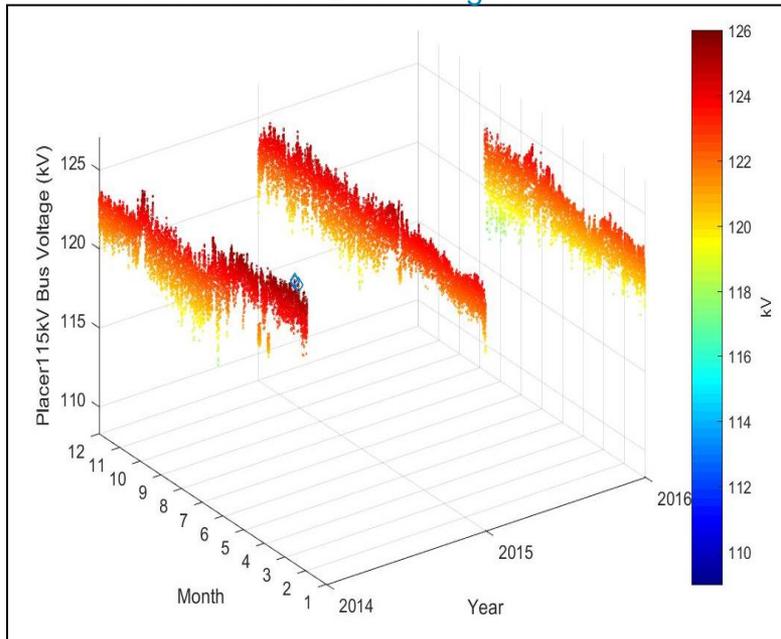
# Assessment - High Voltage Issues

## Historical Operating Voltages Data

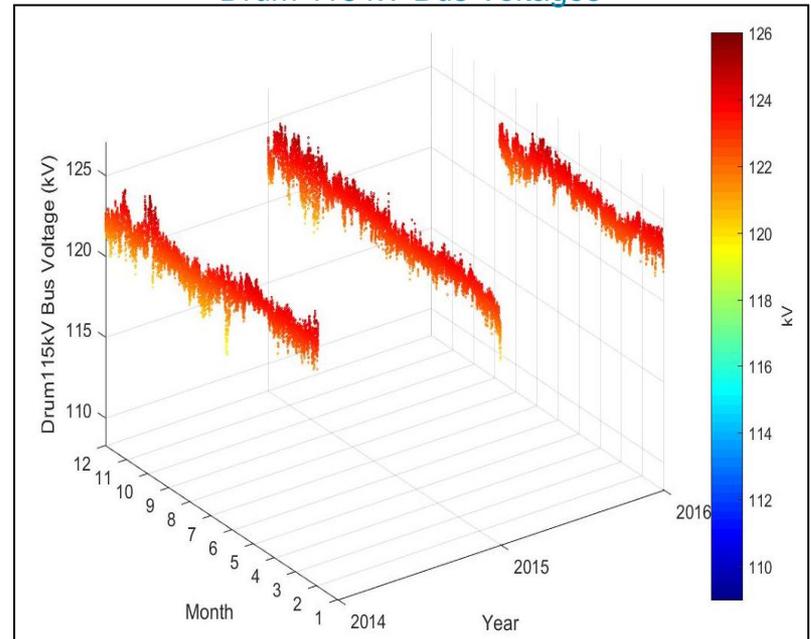
- 2014 Through 2016 Recorded Operating Voltage Data at Placer & Drum 115 kV Buses

Representative Buses	MAX Voltage		% of Period
	1/30/14 - 8/25/16		121 kV (1.052 PU) or higher
	kV	Per Unit	1/30/14 - 8/25/16
Drum 115 kV Bus	125.6	1.092	99%
Placer 115 kV Bus	126.2	1.097	86%

Placer 115 kV Bus Voltages



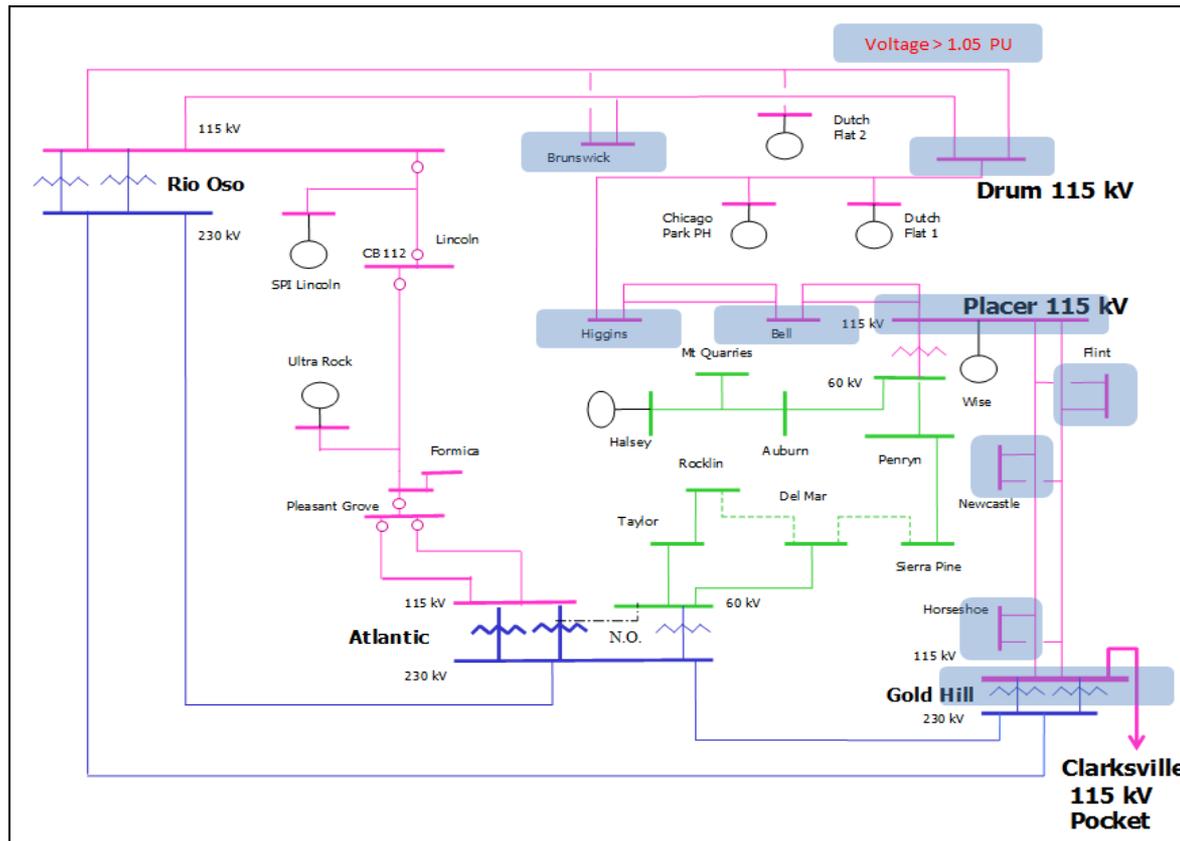
Drum 115 kV Bus Voltages



# Assessment - High Voltage Issues Cont.

## High Voltages in 10-Year Planning Horizon

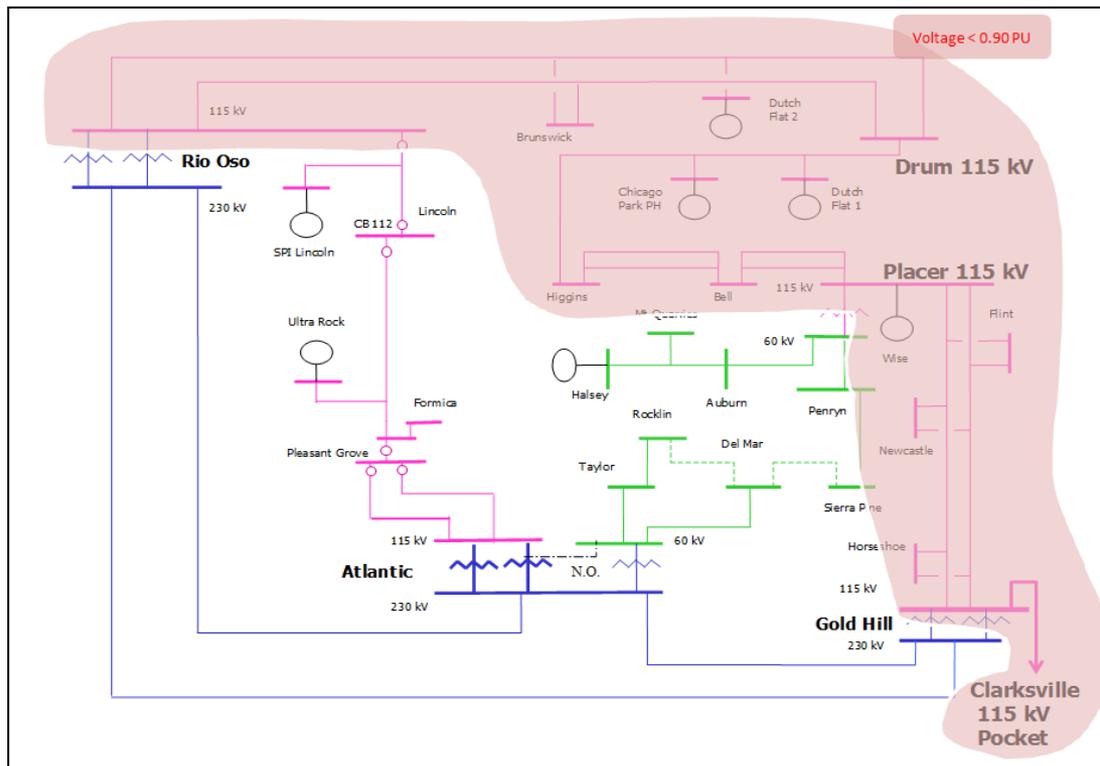
- High voltages are observed in 2021 Minimum Load case
- 2026 Summer Peak case also indicated voltages higher than 1.05 per unit in some of the substations in the area
- All the CAISO approved high voltage mitigation projects were modeled in these cases



# Assessment - Low Voltage Issues

## Low voltages in the area

- Low voltages are seen during system clearance, specially during low hydro in the area
- Low voltages are observed both in the near-term (2021) and long-term (2026) planning summer peak cases
  - Low voltages during Gold Hill Bank No. 1 & 2 outage (Category P6)
  - Low voltages during Internal breaker fault condition (Category P2-4)





# Proposed Project

Power flow analysis was performed and was determined that a voltage support device is needed in the area

## Preferred Location

- Placer 115 kV Substation

## Preferred Scope

- Install +100/-200 MVAR SVC
- Associated bus connection and bay work

## Proposed In-Service Date

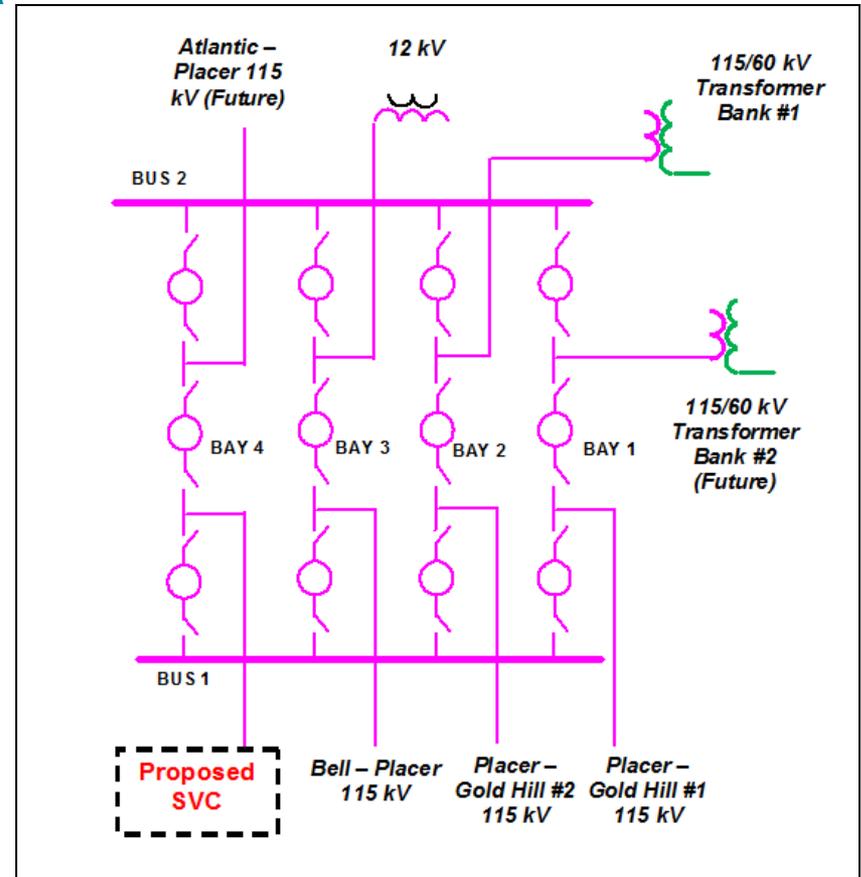
- December 2022 or Earlier

## Estimated Cost

- \$30M - \$40M

## Alternatives Considered

- Drum 115 kV Substation, but not feasible mainly due to space constraint at the substation
- Gold Hill 115 kV, not as effective in mitigating the concerns and more costly due to substation requirements



# Thank you



# PG&E's 2016 Request Window Proposals

## CAISO 2016/2017 Transmission Planning Process

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Transmission System Planning  
September 22, 2016





# Transmission Projects Overview

## Projects Seeking CAISO Approval

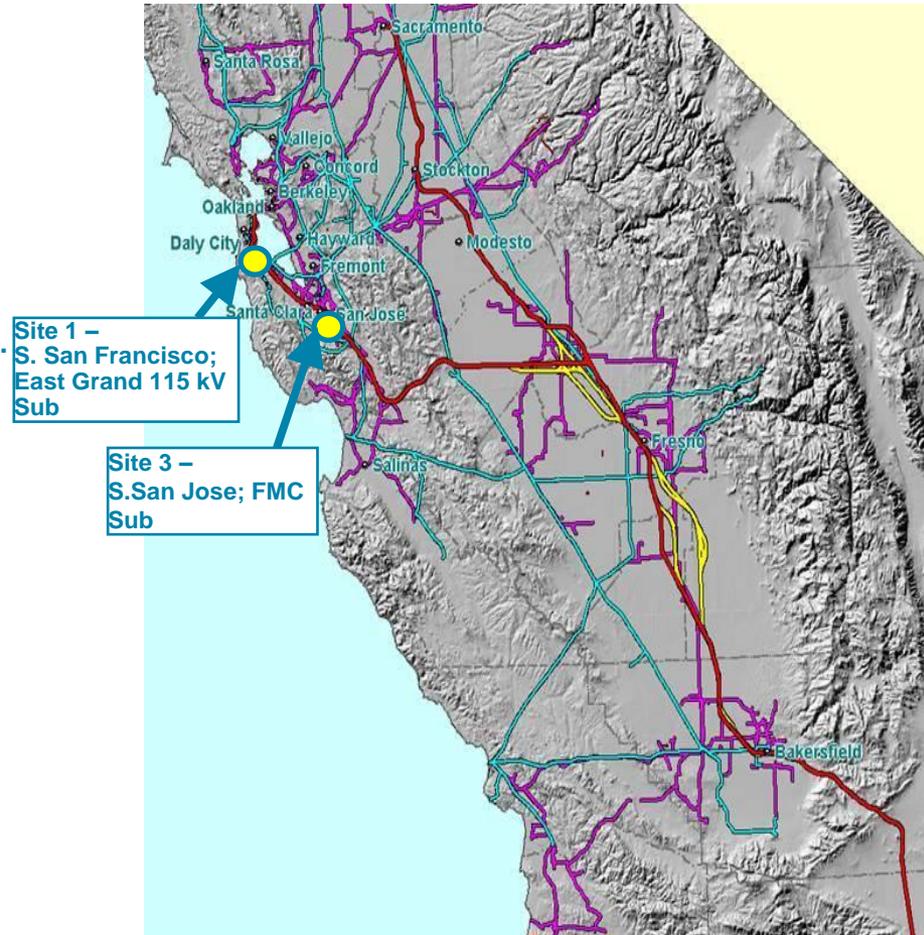
1. Caltrain Electrification Project
  - Site 1 – South San Francisco near East Grand 115 kV substation
  - Site 3 – South San Jose near FMC 115 kV substation



# Caltrain Electrification Project

## Project Background

- Caltrain plans to interconnect two Traction Power Substations (TPS) into PG&E's transmission system.
- TPS at Site 1 is in South San Francisco near the East Grand 115 kV substation and TPS at Site 3 is in South San Jose near the FMC 115 kV substation.
- Each TPS will have two radial 115 kV connections to the PG&E substation.
- Caltrain's electrification program will also support eventual shared use of the Caltrain corridor by California High Speed Rail (CHSR)
- Total ultimate blended Caltrain/CHSR load is 94 MVA
- Caltrain is requesting service to initiate testing in 2018, with the system fully operational by June 2020.
- Estimated Cost (AACE Level 5): \$228M





# Site 1 - South San Francisco: East Grand 115 kV Substation

## Project Scope:

- Interconnect project via two radial lines, 0.4 miles from TPS Site 1 to East Grand 115 kV substation.
- Rebuild East Grand 115 kV substation to a 4 Bay BAAH arrangement.

## Load Forecast:

- Year 2020 (Caltrain): 23 MVA
- Year 2026 (Caltrain/CHSR): 55 MVA

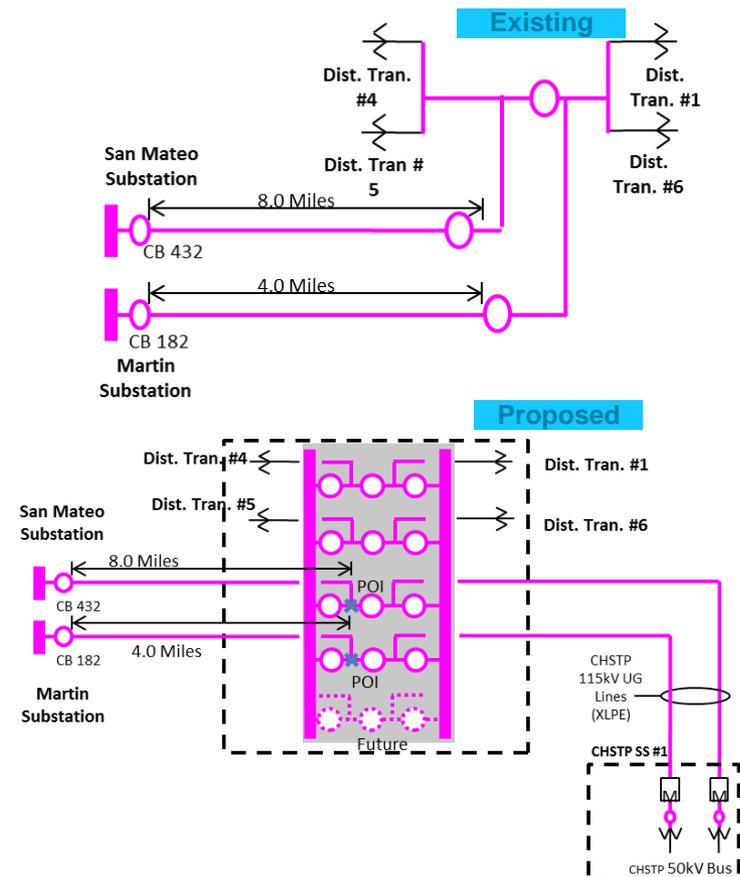
## Assessment:

No adverse transmission impact identified due to the interconnection of this project in the San Francisco Peninsula area.

**Requested In Service Date:** June 2020

**Estimated Cost (AACE Level 5):** \$104M

- Interconnection Facility - \$18 M
- Network Upgrades - \$86 M





# Site 3 - South San Jose: FMC 115 kV Substation

## Project Scope:

- Interconnect project via two radial lines, 0.2 miles from TPS Site 3 to FMC 115 kV substation.
- Rebuild FMC 115 kV substation to a GIS 4-Bay BAAH arrangement.

## Load Forecast:

- Year 2020 (Caltrain): 21 MVA
- Year 2026 (Caltrain/CHSR): 39 MVA

## Assessment:

Increased or new overloads on the Trimble - San Jose 'B' 115 kV line due to several P2, P3 and P6 contingencies.

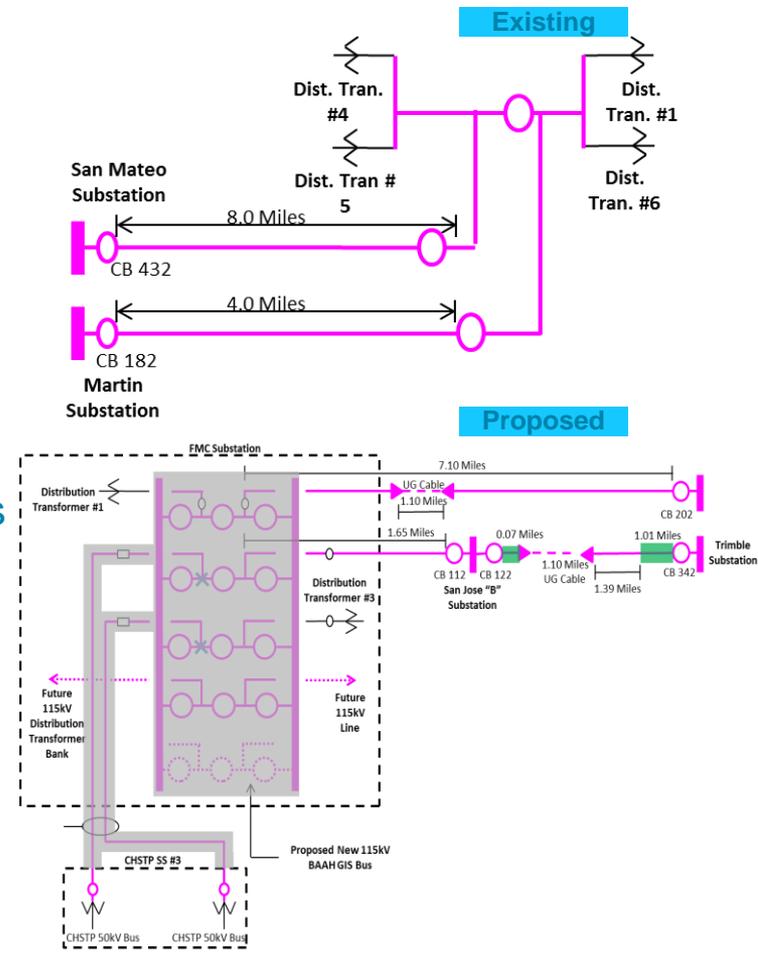
## Mitigation:

Rerate, else reconductor 1.1 miles of the overhead sections of the Trimble – San Jose 115 kV with conductors rated to achieve at least 825/975 Amps under Normal/Emergency rating.

**Requested In Service Date:** June 2020

**Estimated Cost (AACE Level 5):** \$124M

- Interconnection Facility - \$9M
- Network Upgrades - \$104M
- Capacity Upgrade -\$11M (if Rerate not feasible)



# Thank you

