

2019 SDG&E Grid Assessment Results

CAISO Stakeholder Meeting

September 25-26, 2019



Proposed Project List

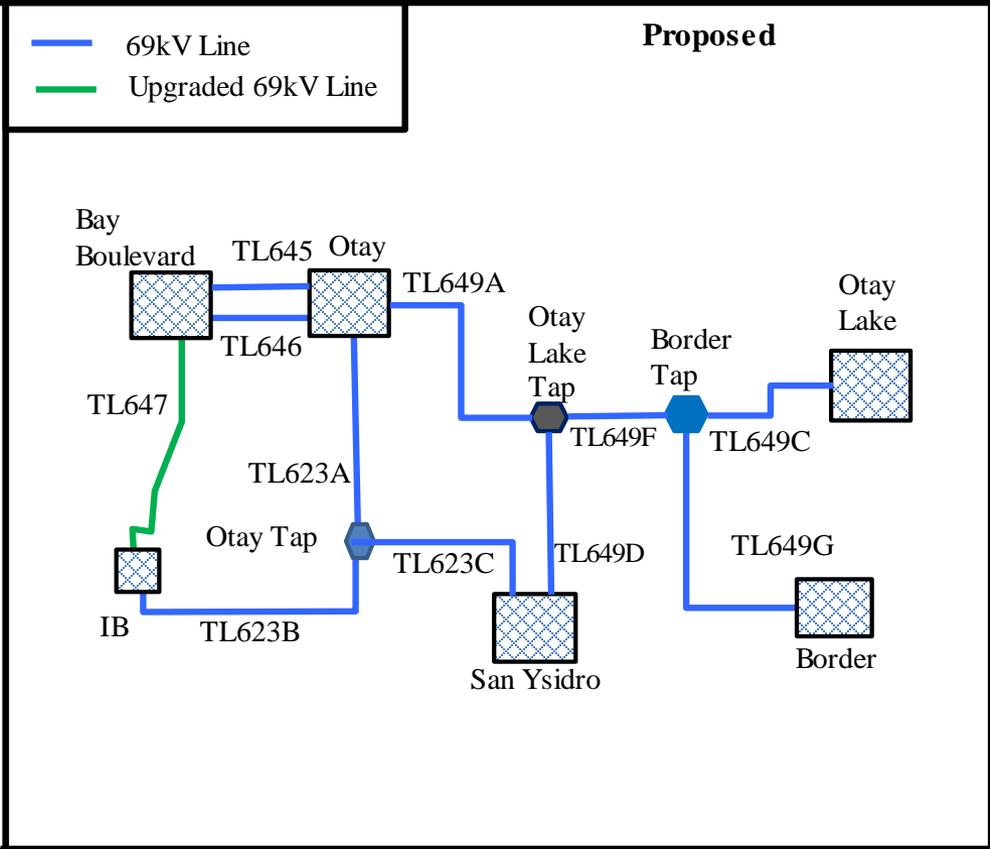
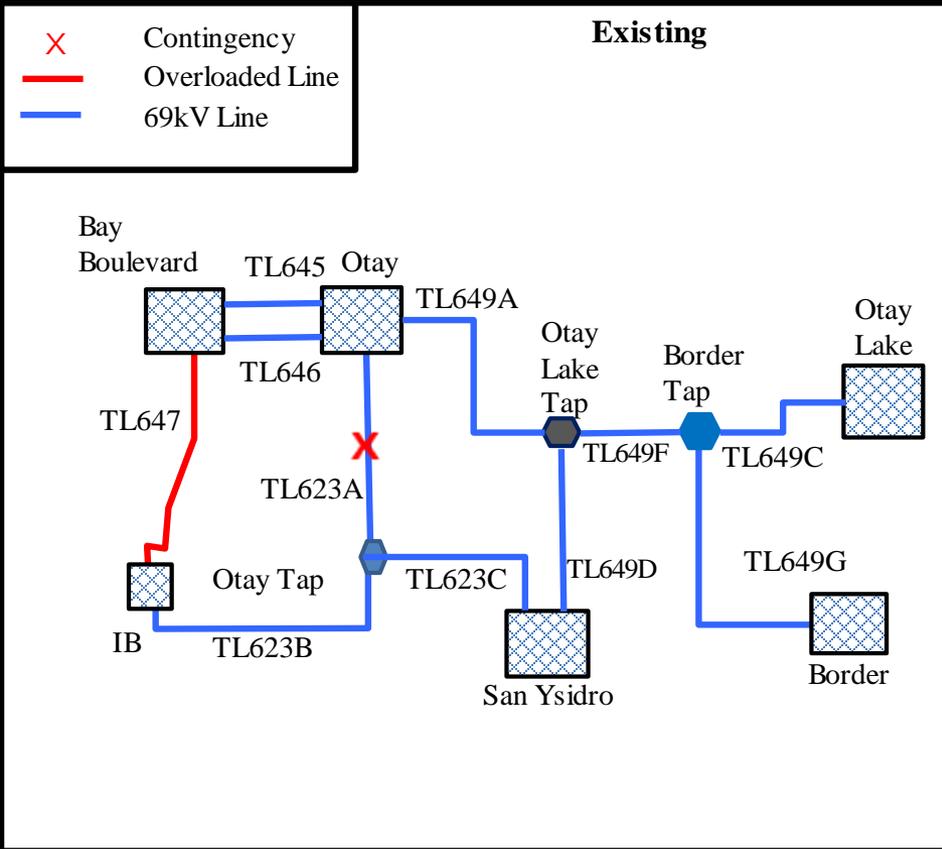
- TL 647 Reconductor
- TL 693 Loop-in - Ocean Ranch Reliability
- TL 6925 Reconductor
- SA-AIS 230kV Redundant Bus Differential Relay
- New 230kV Bay Boulevard-Silvergate
- New 230kV Encina- San Luis Rey
- New 230kV Phase Shifter at Suncrest



69-138 kV Project Proposals

Presenter: Charles Cerezo

<u>Project Title</u>	<u>District</u>	<u>Proposed ISD</u>	<u>Project</u>
TL647 Reconductor	Metro	2022	2018-0178



Drivers:

- Category P2.1 NERC Violation
- Mitigate thermal overload on TL647 (Bay Boulevard-Imperial Beach) for the N-1 of TL623A (Otay-Otay Tap) starting in 2029.

Scope:

- Upgrade TL647 to a minimum continuous rating of 110 MVA

Benefits:

- Mitigate P2.1 NERC Violation
- Increase Reliability

Cost:

- \$6M – \$10M

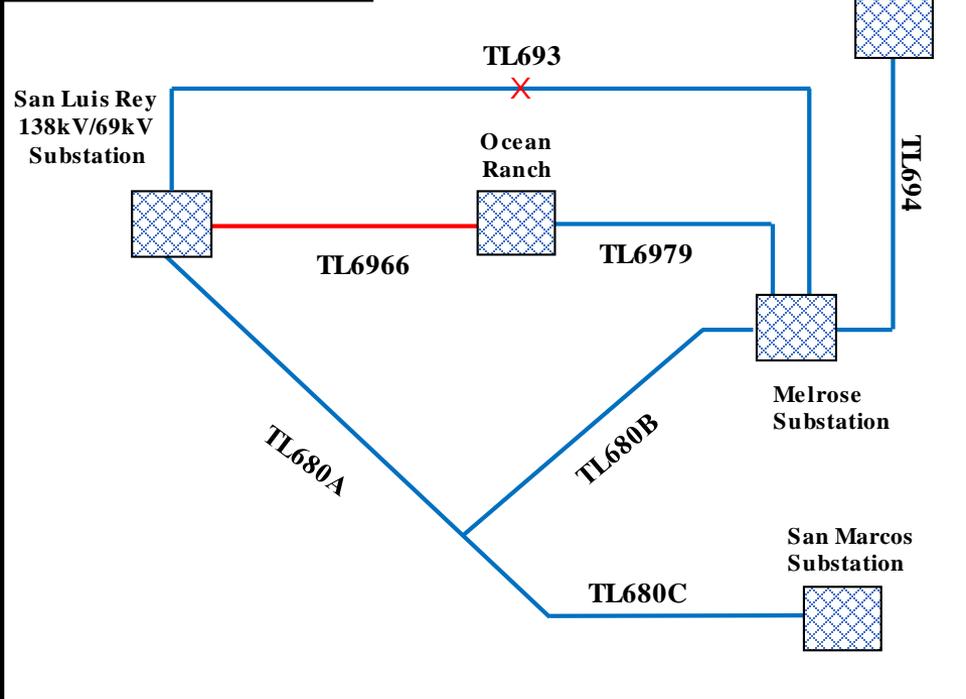
Alternatives:

- 10MW Battery at Otay – \$20-30M

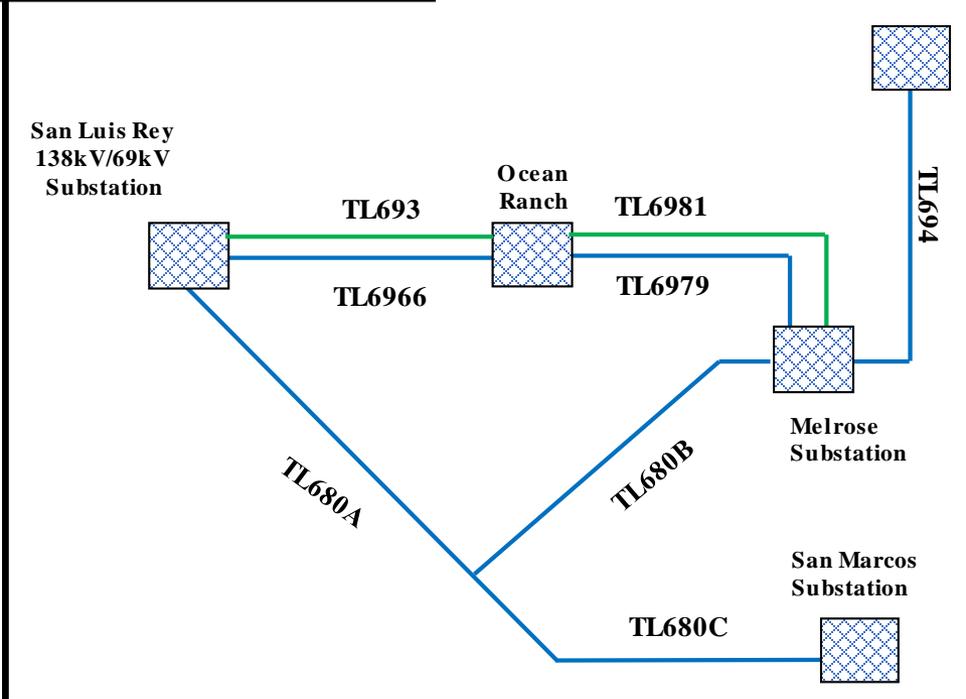


<u>Project Title</u>	<u>District</u>	<u>Proposed ISD</u>	<u>Project</u>
TL-693 Loop-In	North Coast	2020	2019-0231

✗ Contingency
— Overloaded Line
— 69kV Line



— 69kV Line
— Upgraded Line



Drivers:

- Category P1 NERC Violation
- Beginning in 2020, the N-1 of TL693 (San Luis Rey – Melrose) overloads TL6966 (San Luis Rey – Ocean Ranch).

Scope:

- Loop-In TL693 to Ocean Ranch

Benefits:

- Mitigation of a P1 violation
- Maintain/Improve reliability in the area

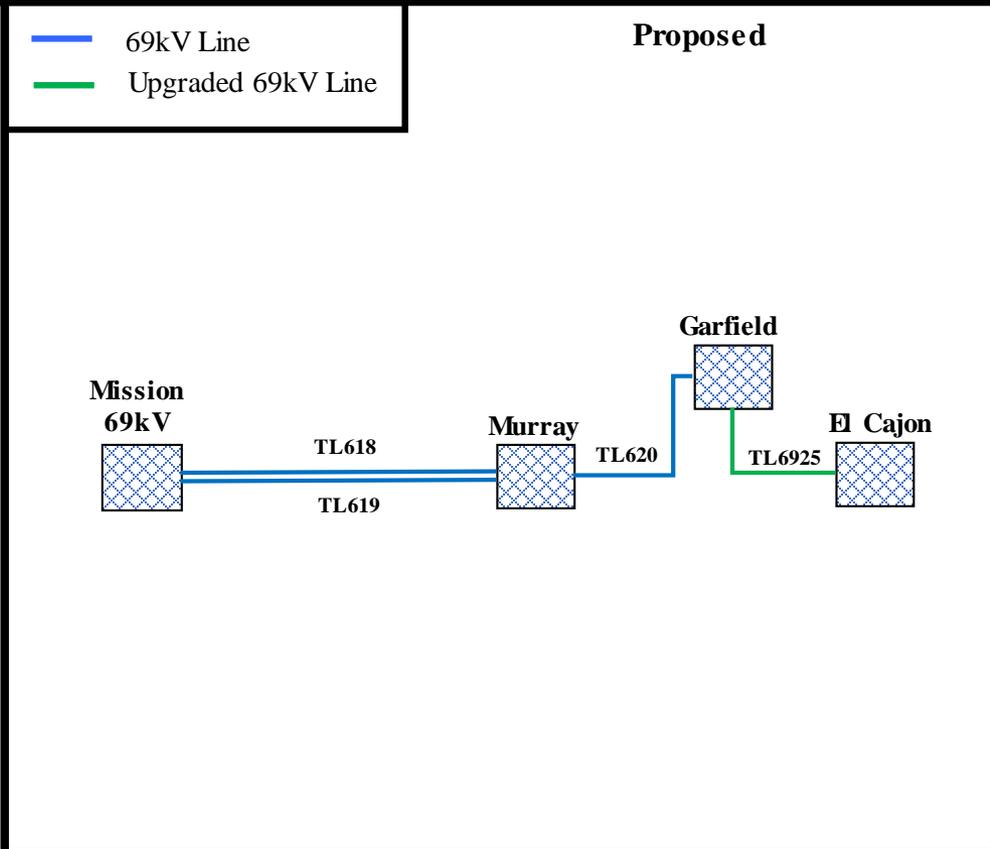
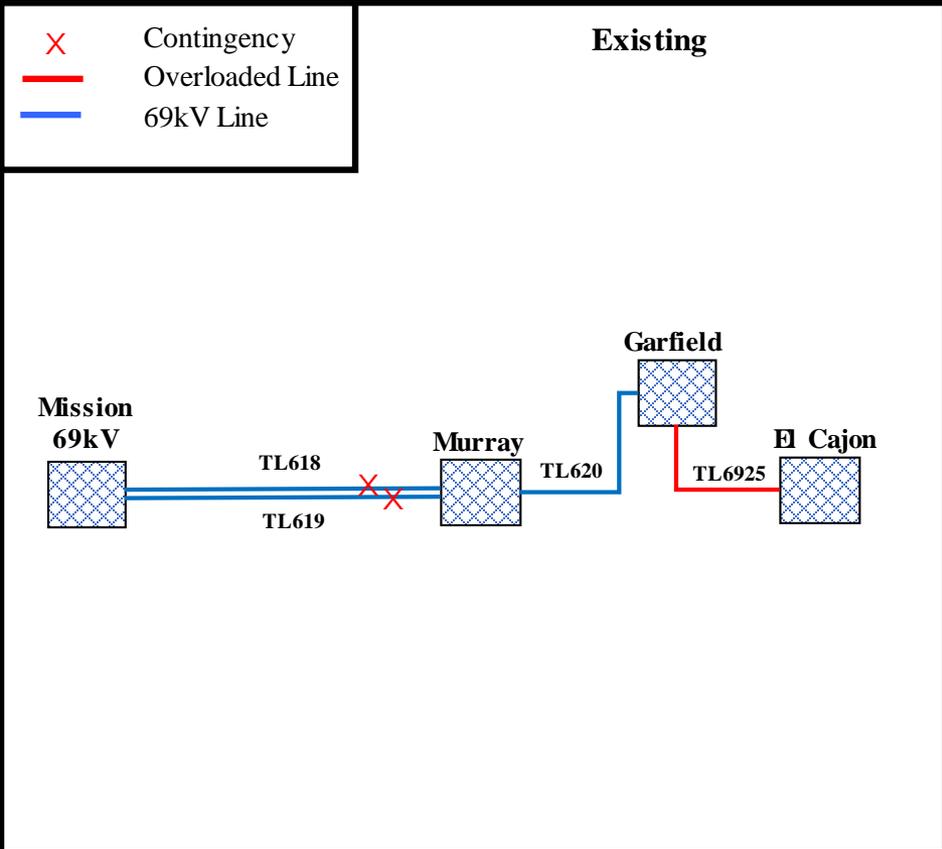
Cost:

- \$3M – \$6M

Alternatives:

- Reconductor 1.2 miles of TL6966 to 1033 ACSR – \$7M – \$10M
- Install 10MW Battery at Ocean Ranch – \$20M – \$30M

<u>Project Title</u>	<u>District</u>	<u>Proposed ISD</u>	<u>Project</u>
TL 6925 Reconductor	Eastern	6/1/2022	2019-0242



Drivers:

- Category P2.2 NERC Violation.
- A bus section outage of Murray 69kV North Bus will radialize Murray and Garfield, overloading and TL6925 (EC-GA).
- Generation redispatch does not mitigate overload.

Scope:

- Reconductor 1.5 miles of TL 6925 to meet continuous rating of at least 118 MVA.

Benefits:

- Avoid dropping 20MW of load to offset overload.
- Increase capacity to growing residential load at Murray.

Cost:

- \$8M - \$12M





230 kV Project Proposals

Presented by Derick Chan, P.E. and
Denden Tekeste, P.E.

Project Title

District

Proposed ISD

Project

**SA-AIS 230kV Redundant Bus
Differential Relay**

North Coast

2022

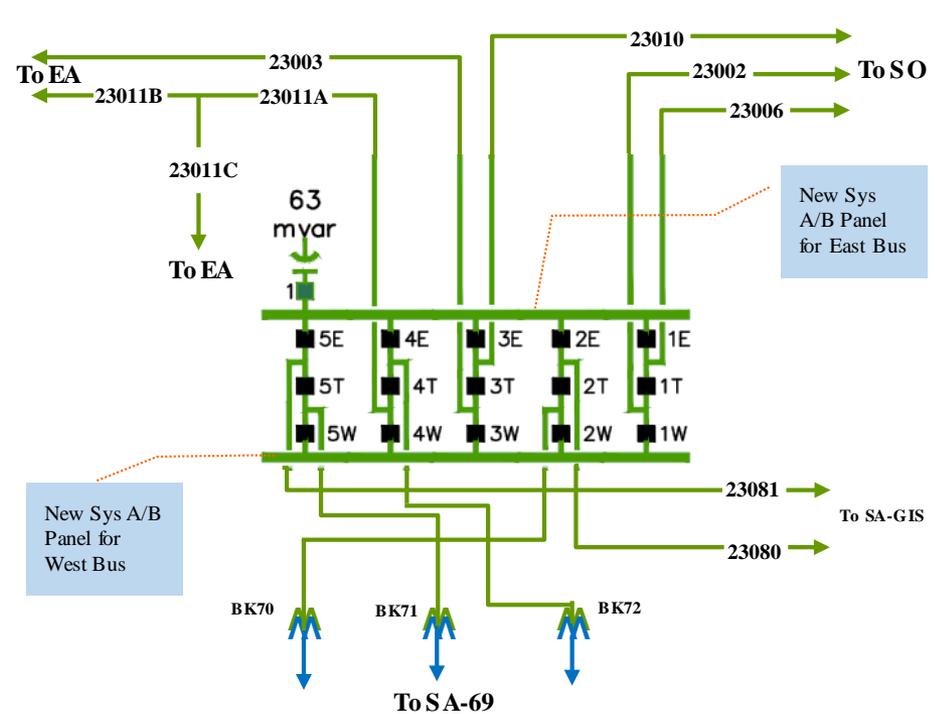
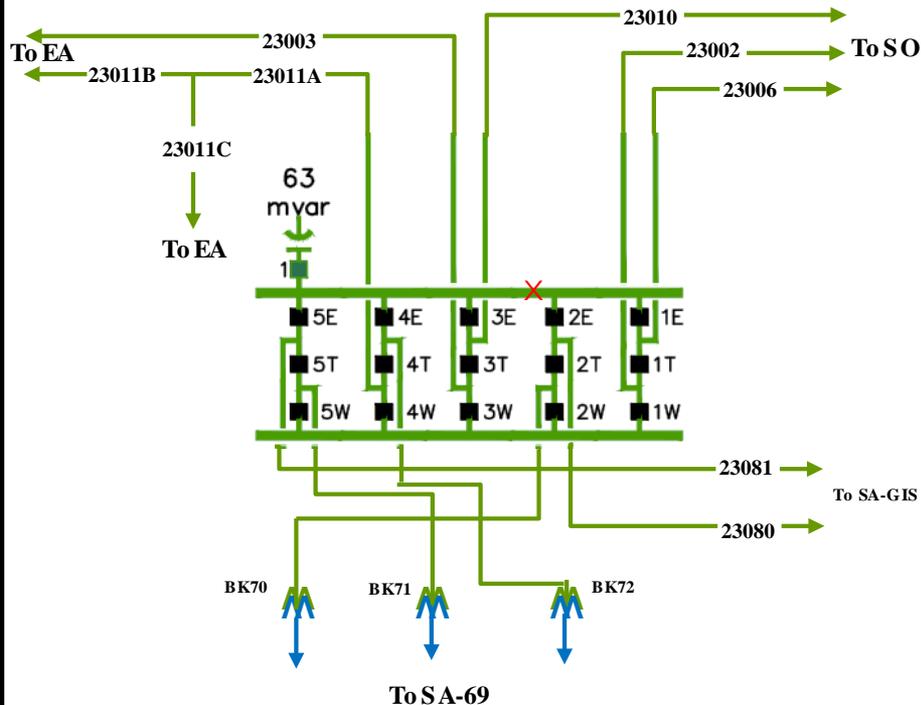
2019-0245

× Contingency 69kV Line

Existing

69kV Line

Proposed



Drivers:

- Category NERC P5.5 Violation (Fault plus relay failure to operate)
- Delayed fault clearing on a SA-230kV bus due to the failure of a non-redundant bus differential relay will cause the remote end breakers of SA-AIS 230kV to open on Zone 2.
- This event will TRIP all the 230kV sources into SA-230kV bus and radialize OS-69 which will overload the TA-138/69 to OS-69 path.

Scope:

- Install redundant bus differential relay to San Luis Rey AIS 230kV.

Benefits:

- Increased Reliability

Cost:

- \$850K

Alternatives:

- None



Project Title

New 230 kV
Bay Blvd-Silvergate TL

District

N/A

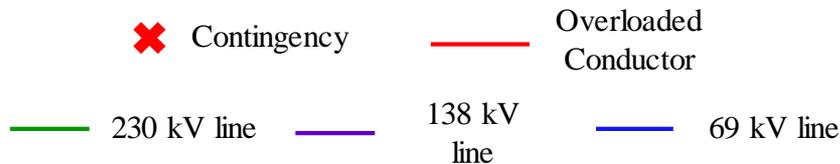
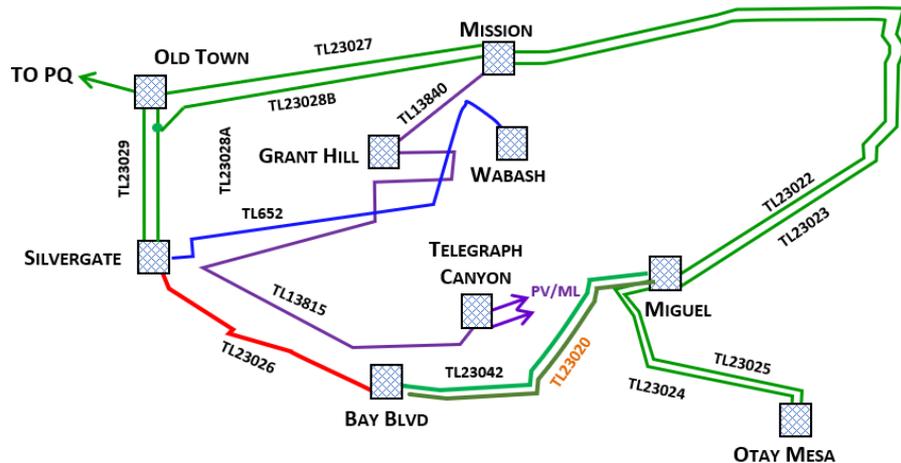
Proposed ISD

June 2023

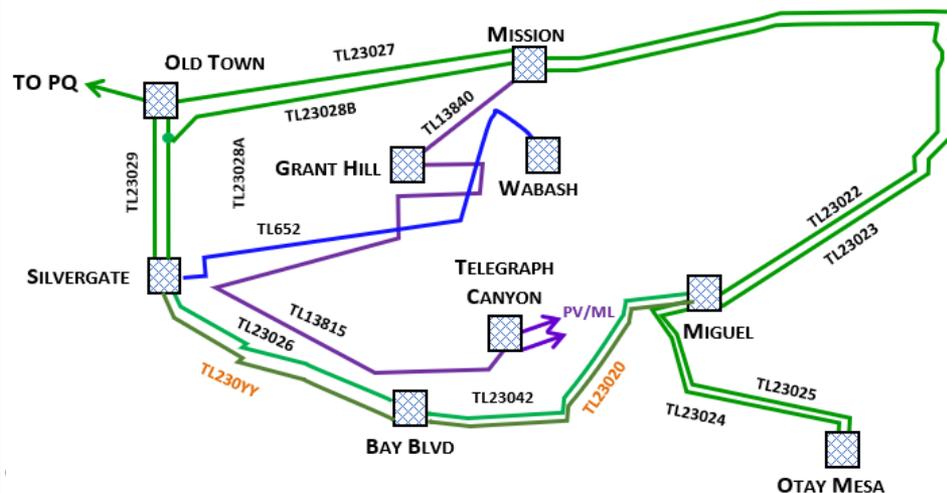
Project

2019-0248

Existing



Proposed



Drivers:

- Category NERC P1 Violation, Loss of TL23071 (SX-PQ) overloads TL23026 (SG-BB), 106%

Scope:

- Add a second 230 kV line from Bay Blvd to Silvergate with a minimum rating of 912/1176 MVA to mitigate new NERC thermal violation

Benefits:

- Reinforce Southern 230kV loop
- Increase operational flexibility

Cost:

- \$150 M to \$200 M



Project Title

**TL230XX New 230 kV
Encina-San Luis Rey #2**

District

North Coast

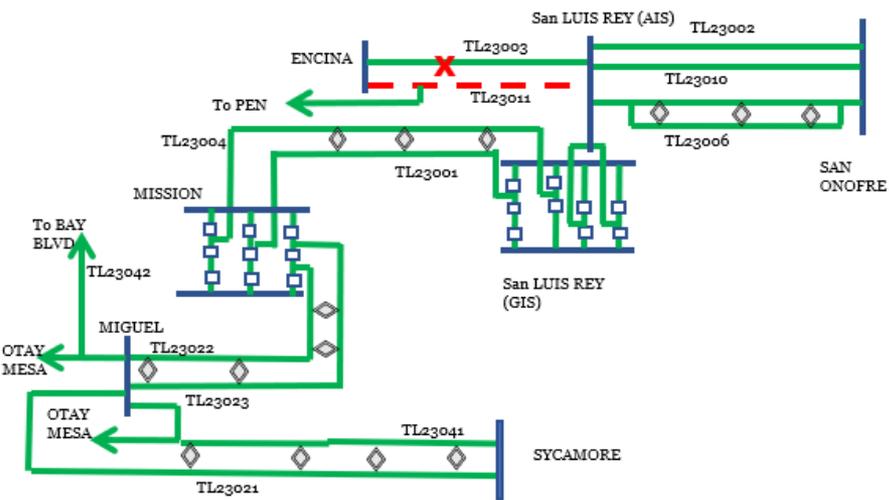
Proposed ISD

6/1/2024

Project

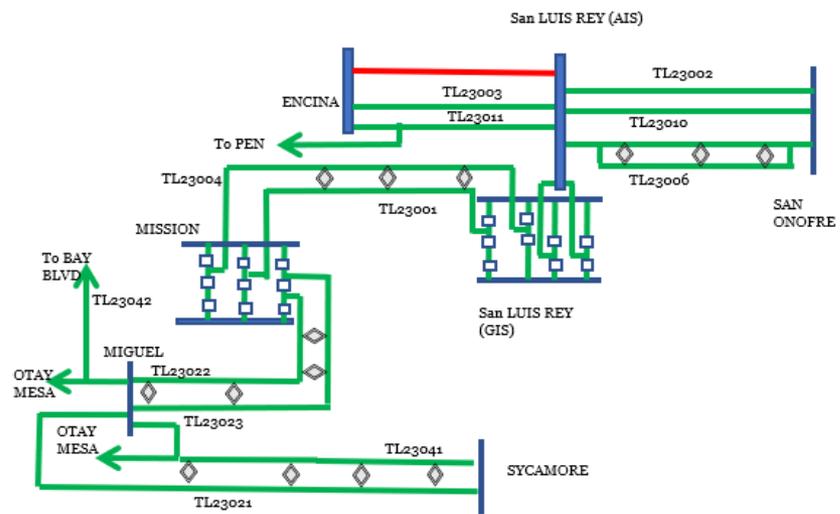
2019-0258

Existing



Contingency ✗
 Overloaded Line - - -
 Common Structure ◇

Proposed



New 230kV Lines —
 Common Structure ◇

Drivers:

- Category NERC P1 violations

Issues:

- High San Onofre Northbound flow, loss of TL23003 (Encina-San Luis Rey) loads TL23011 (Encina-San Luis-Escondido) to 106% - 120% of its rating limit.

Scope:

- Construct a new third 230kV line EA-SA by using the abandoned TL 13802 line (between EA and SA).

Cost:

- \$150 M to \$170 M

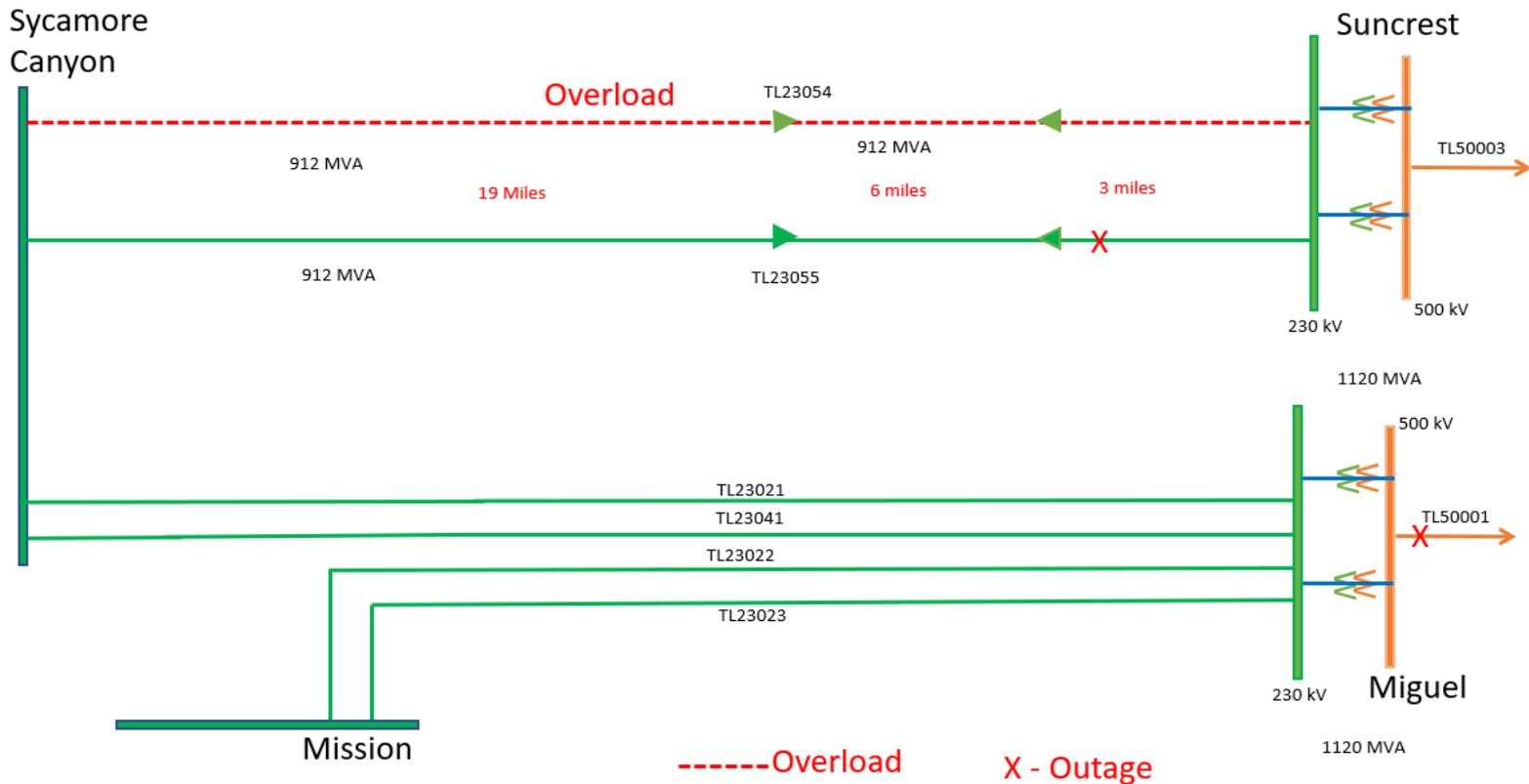


New 230kV Phase Shifting Transformers (PST) at Suncrest

- Primary Driver – Reliability and Economic Issues on the Suncrest path
- The TL23054/55 230 kV Sycamore-Suncrest lines, are the most limiting elements on the Suncrest Path
- An Operating Nomogram/RAS has been established in SDG&E SOP (GIP2005) to ensure safe operation due to the thermal limits on TL23054 and TL23055
- A P-6 contingency overload on TL23054 and TL23055 could have an adverse impact on reliability as identified by CAISO as potential critical elements for import IROL for Planning Horizon
- A system operating with IROL, if violated, could lead to instability, uncontrolled separation, or cascading outages that adversely impact the reliability of the Bulk Electric System.

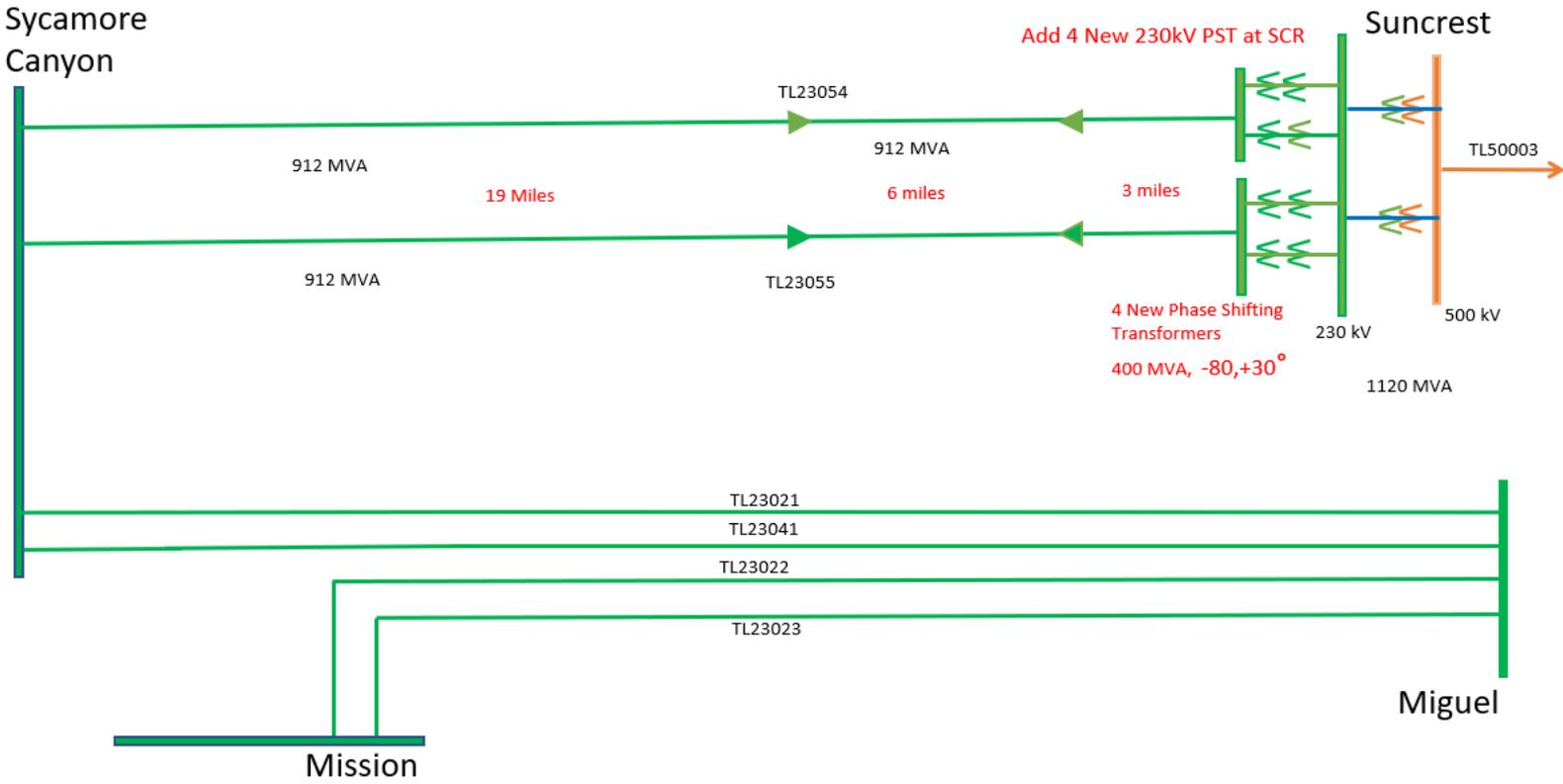
New 230kV PST Substation at Suncrest

Current configuration



New 230kV PST Substation at Suncrest

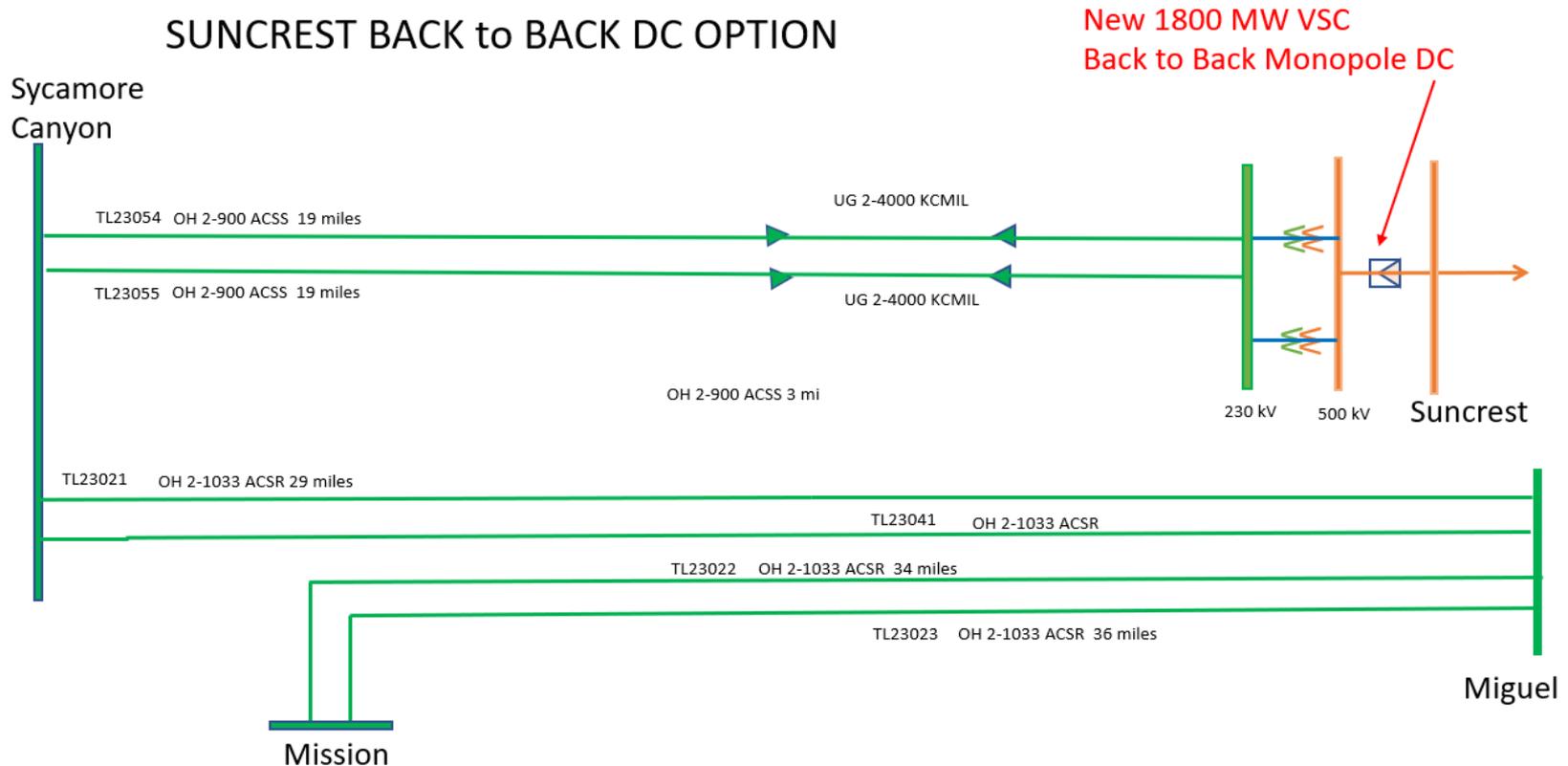
Proposed



New 230kV PST Substation at Suncrest

Alternative:

SUNCREST BACK to BACK DC OPTION





Thank You

Please address questions to Denden Tekeste - dtekeste@sdge.com