

# PG&E's 2012 Request Window Proposals

## Greater Bay Area - North

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# Transmission Projects Overview

## Projects Seeking CAISO Approval North Coast

- Windsor Substation Interconnection

## Greater Bay Area

- Amazon A100 Data Center – Load Interconnection
- Ames-Palo Alto 115 kV Line
- Christie 115/60 kV Transformer No. 2
- Contra Costa Sub Switch Replacement
- Potrero 115 kV Bus Upgrade
- Moraga-Potrero 230 kV Line



# Windsor Substation Interconnection

## Background

- The transmission system in the Fulton - Fitch Mountain area mainly consists of two 60 kV transmission lines, the Fulton No.1 and the Fulton-Hopland 60 kV lines.
- These lines provide electric power to the PG&E's Fitch Mountain and Geyserville distribution substations and also to the City of Healdsburg Substation.

## Assessment

- No transmission problems identified.
- The completion of Windsor Distribution Substation will improve capacity and reliability to PG&E customers in the Windsor area.

## Scope

- This project proposes to interconnect a new PG&E's distribution substation between Fulton and Fitch Mountain substations. The new Windsor Substation will be looped off the Fulton No.1 60 kV Line and is being designed to accommodate an ultimate build-out for three 30 MVA distribution transformers.

## Other Alternatives Considered

- Status Quo

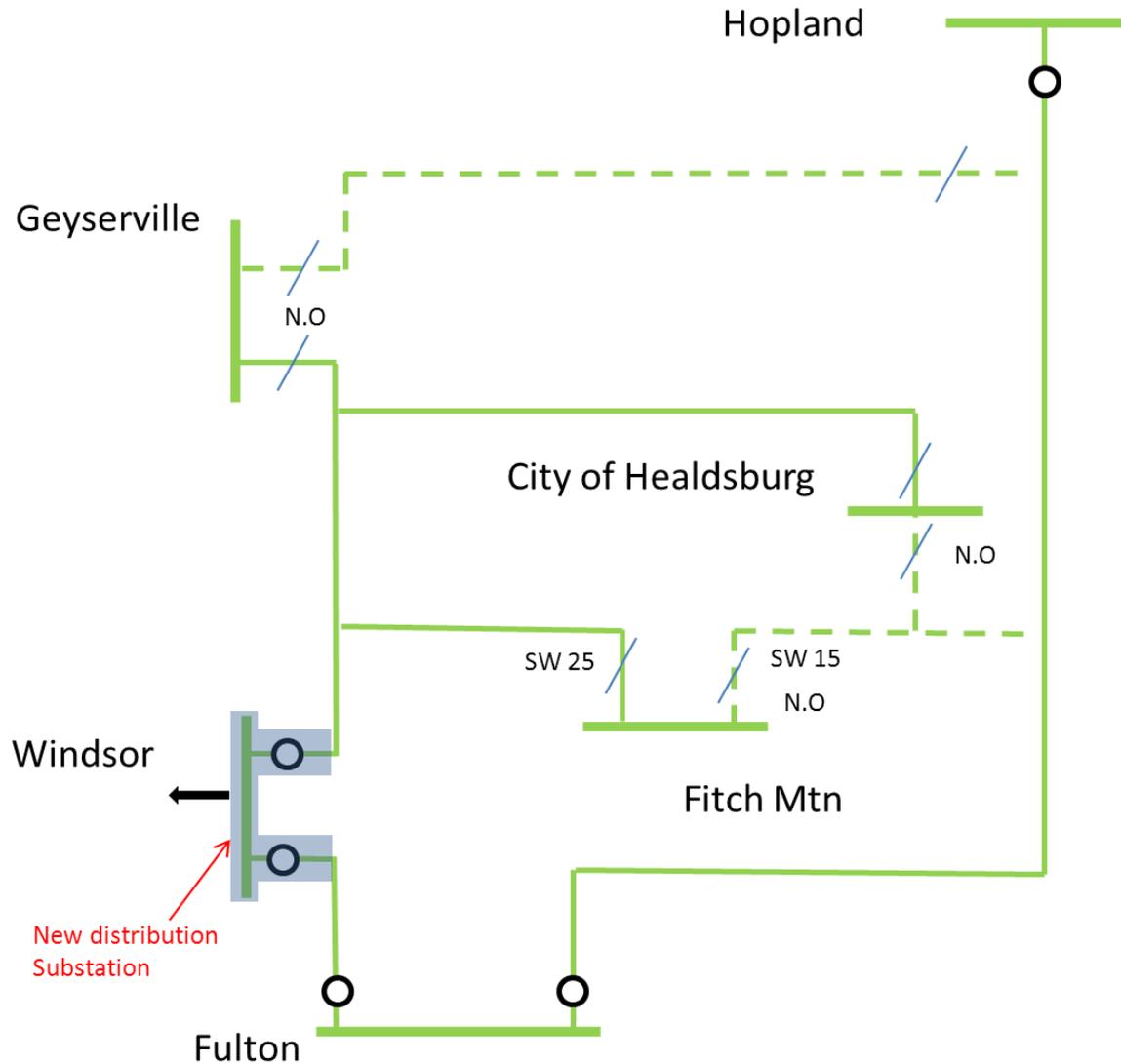
## In Service Date

- May 2015

## Cost

- \$3M - \$6M

# Windsor Substation Interconnection





# Amazon A100 Data Center

## Background

- Customer is proposing to interconnect their customer-owned 115 kV substation (data center) to PG&E's East Shore 115 kV Substation, specifically Bus Section 'E'.
- As requested by Amazon, the expected maximum load of the data center will be approximately 30 MW by 2015.

## Scope

- This project proposes to build a new 2,500 foot 115 kV transmission line from PG&E's East Shore 115 kV Substation to a new substation that will be owned and operated by Amazon.

## Other Alternatives Considered

- Status Quo (no interconnection)

## In Service Date

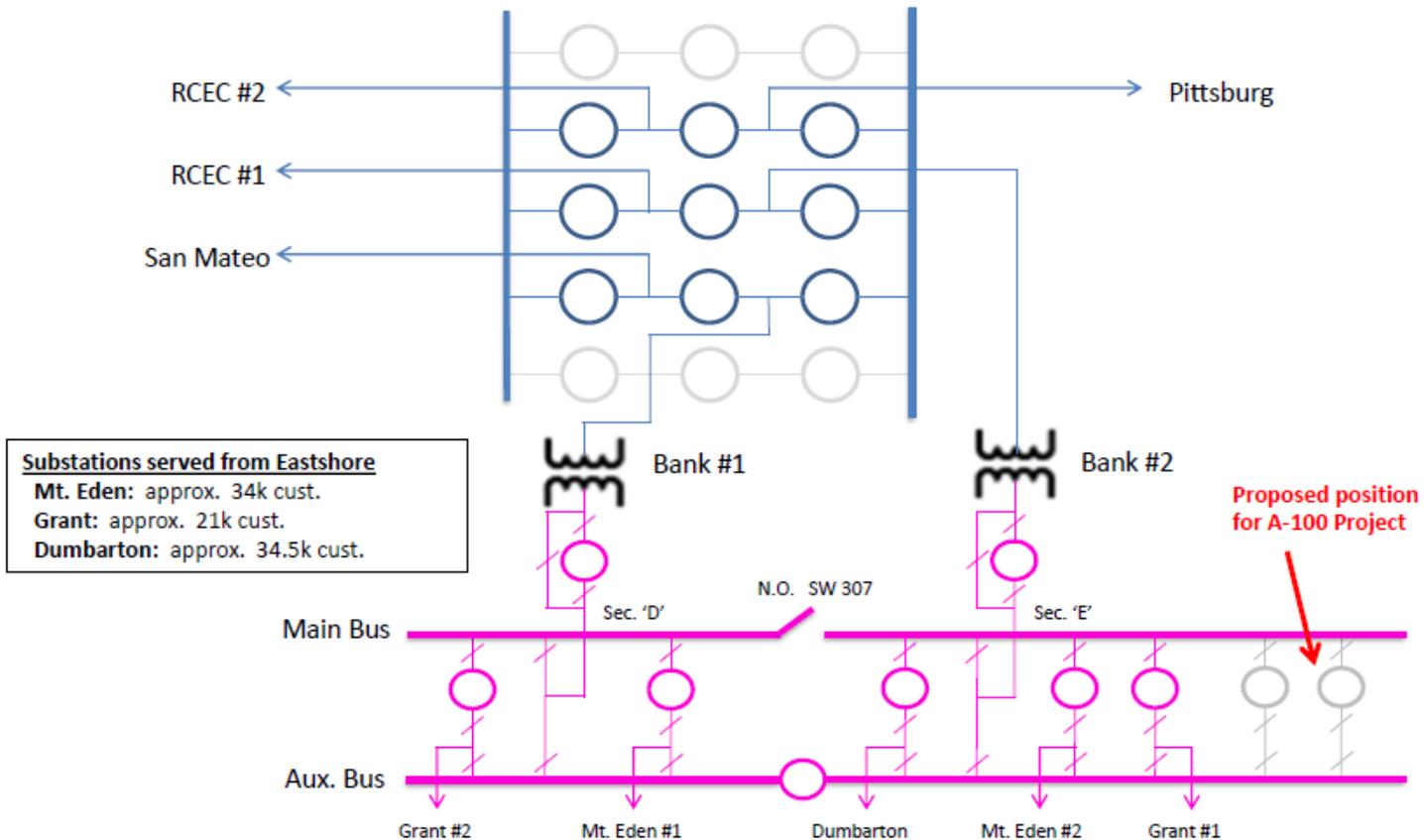
- April 2013

## Cost

- \$2.5M - \$3.5M

# Amazon A100 Data Center

## Existing Eastshore Bus Configuration





# Ames-Palo Alto 115 kV Line

## Background

- The City of Palo Alto is served from three 115 kV transmission lines sharing a common corridor, including Ravenswood-Palo Alto Nos. 1 & 2, and Cooley Landing-Palo Alto 115 kV Lines.
- The City of Palo Alto's 60 kV system has a single interconnection point to CAISO controlled grid at Palo Alto Switching Station.

## Assessment

- An outage of two out of the three 115 kV lines (N-2 or N-1-1) serving the City of Palo Alto during summer peak conditions could result in a thermal overload on the remaining 115 kV line in service.

## Scope

- This project proposes to build a new 115 kV line from Ames utilizing existing towers and right-of-ways and interconnect to the City of Palo Alto's Colorado or Adobe Creek Substation.

## Other Alternatives Considered

- Special Protection Scheme (SPS)
- Palo Alto-SLAC Interconnection

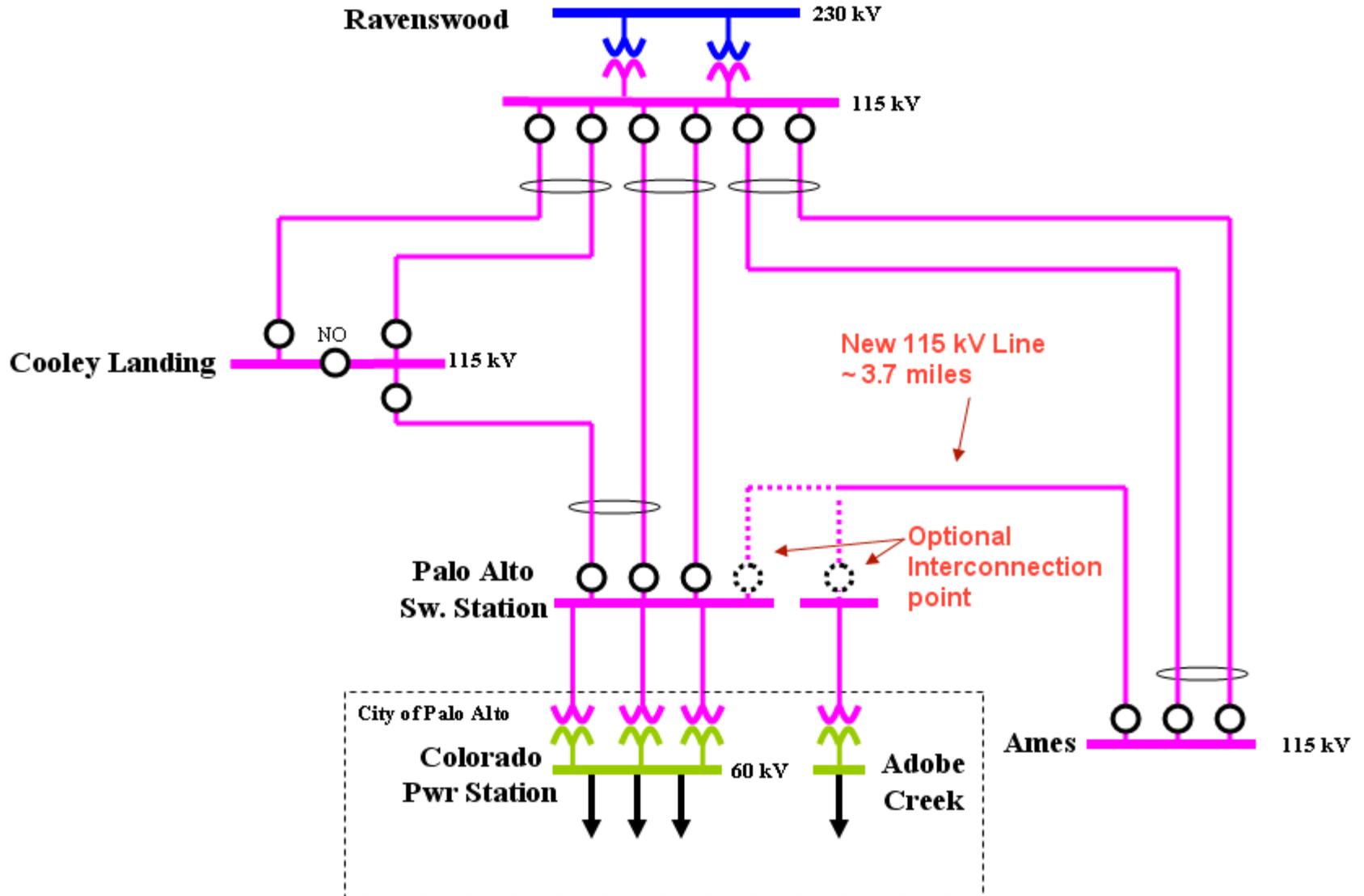
## In Service Date

- May 2016

## Cost

- \$10M - \$20M

# Ames-Palo Alto 115 kV Line





# Christie 115/60 kV Transformer No. 2

## Background

- Christie, located in Contra Costa County in the Bay Area Region, consists of a single 115/60 kV radial transformer bank (four single phase, 30 MVA units). It serves approximately 15,600 customers (40 MW) via Franklin, Stauffer and Ulrich substations, and large load customers - Union Chemical and Port Costa Brick.

## Assessment

- An outage of the Christie Transformer 115/60 kV No. 1 will result in the loss of all the 15,600 customers served from the local 60 kV system. The transformer has an average of 0.2 outages per year.
- Maintenance issues due to radial load

## Scope

- Install a new 115/60 kV three-phase, 100 MVA Transformer No. 2 at Christie Substation.
- Reconfigure the 115 kV bus to a 2-bay breaker and a half configuration.
- Install a new control building to house all 115/60 kV protection and controls.

## Other Alternatives Considered

- Status Quo
- Network the 60 kV system

## In Service Date

- December 2014

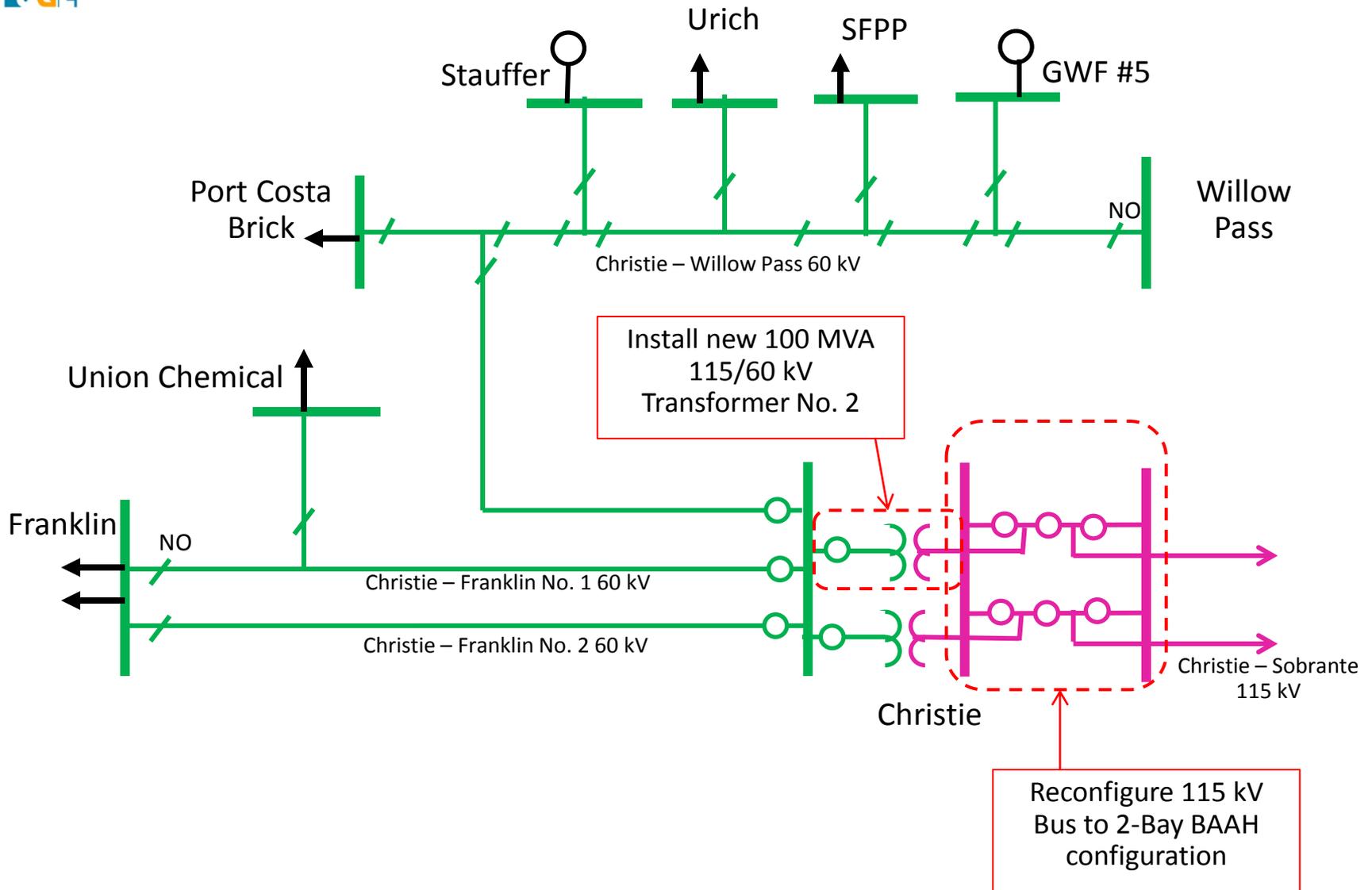
## Cost

- \$12M - \$17M

## Benefits

- This project will improve reliability of electric service for PG&E customers in Contra Costa County
- The BCR is 1.3

# Proposed





# Contra Costa Sub Switch Replacement

## Background

- The Contra Costa PP-Contra Costa Sub 230 kV Line serves as an important path from the wind generation rich Birds Landing area to the Greater Bay Area.
- The existing Contra Costa PP-Contra Costa Sub 230 kV Line is limited by a 1600A switch at Contra Costa Sub.

## Assessment

- An outage of the Birds Landing-Contra Costa PP 230 kV Line overlapped with Gateway Generation Station (L-1/G-1) during summer peak conditions could result in a thermal overload on the Contra Costa PP-Contra Costa Sub 230 kV Line.
- Numerous other 230 kV line outages overlapped with outage of Gateway or Marsh Landing Generating Station could also result in overloading the Contra Costa PP-Contra Costa Sub 230 kV Line.

## Scope

- This project proposes to replace Contra Costa Sub 230 kV Switch No. 237 and any other associated limiting equipment. This project will increase the Contra Costa PP-Contra Costa Sub 230 kV Line summer emergency rating to 1893A.

## Other Alternatives Considered

- Status Quo

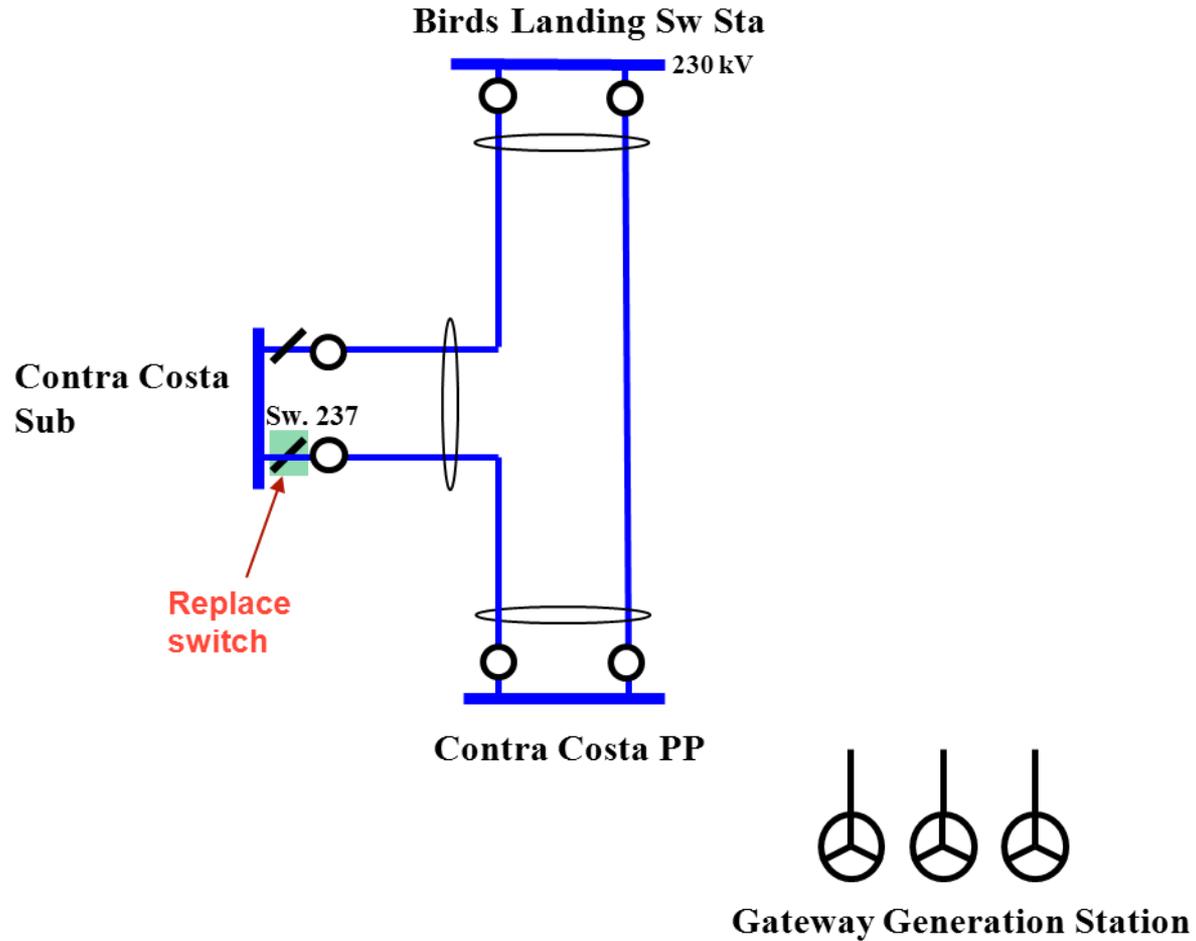
## In Service Date

- May 2015

## Cost

- Less than \$1M

# Contra Costa Sub Switch Replacement





# Potrero 115 kV Bus Upgrade

## Background

- Potrero Substation serves approximately 34,000 local customers in San Francisco as well as serves as an transmission import for the Trans Bay Cable (TBC) and future Embarcadero-Potrero 230 kV Line.
- The Potrero 115 kV bus is a double-bus single breaker configuration with two bus sections separated by sectionalizing breakers.

## Assessment

- A breaker failure of the Potrero 115 kV CB 102 during summer peak conditions could result in a 156% overload on the Potrero-Larkin No. 2 (AY-2) 115 kV Cable.
- A bus fault on Potrero 115 kV Bus Section 1D or 2D during summer peak conditions could result in an overload on the Potrero-Larkin No. 2 (AY-2) or Potrero-Mission (AX) Cables.

## Scope

- This project proposes to upgrade the Potrero 115 kV bus by removing the tie-lines to the retired Potrero Power Plant, moving the location of two elements, and adding two sectionalizing breakers.

## Other Alternatives Considered

- Breaker-and-a-Half (BAAH) bus conversion

## In Service Date

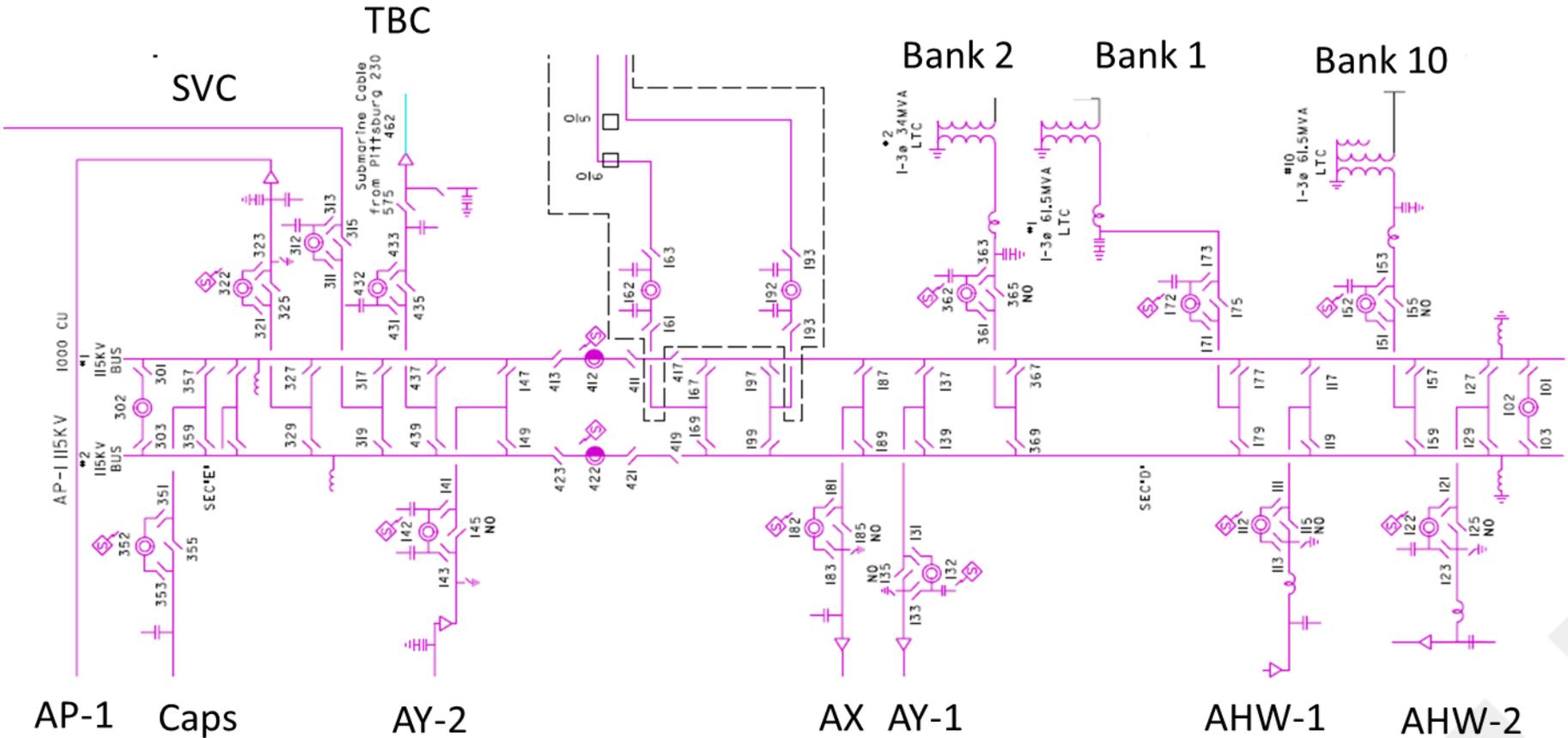
- May 2017

## Cost

- \$10M - \$15M

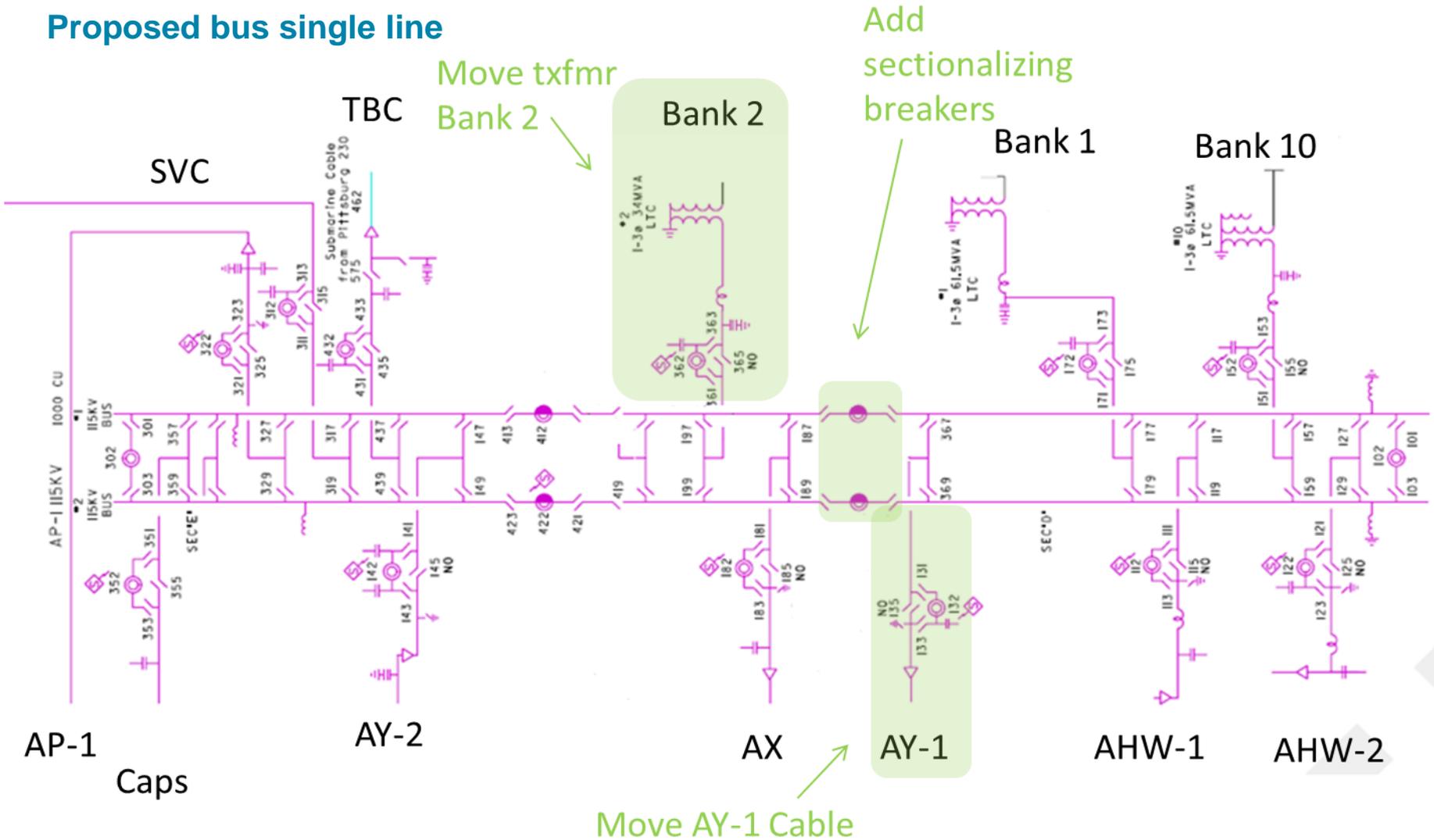
# Potrero 115 kV Bus Upgrade

## Existing bus single line



# Potrero 115 kV Bus Upgrade

Proposed bus single line





# Moraga-Potrero 230 kV Line Project

## Background

- The peak electric demand in the City and County of San Francisco is approximately 970 MW. The City's power needs are satisfied solely through transmission imports because internal generation resources such as Potrero Power Plant no longer exist.

## Assessment

- The loss of AC transmission imports to San Francisco will result in inoperability of the DC Trans Bay Cable (TBC) and therefore result in the loss of all San Francisco demand. Load restoration would only occur after the existing AC supply is restored.

## Scope

- This project proposes to construct a new 230 kV line between Moraga and Potrero Substations. Subject to final siting, the new line is envisioned to be constructed overhead, underground, and submarine.
- The new line will reduce the risk of curtailing San Francisco load and provide support for TBC to operate during the loss of existing AC transmission.

## Other Alternatives Considered

- East Shore-Potrero 230 kV Line
- Newark-Potrero 230 kV Line

## In Service Date

- May 2020

## Cost

- \$450M - \$550M



# Thank You

