



CALTRAIN ELECTRIFICATION UPDATE

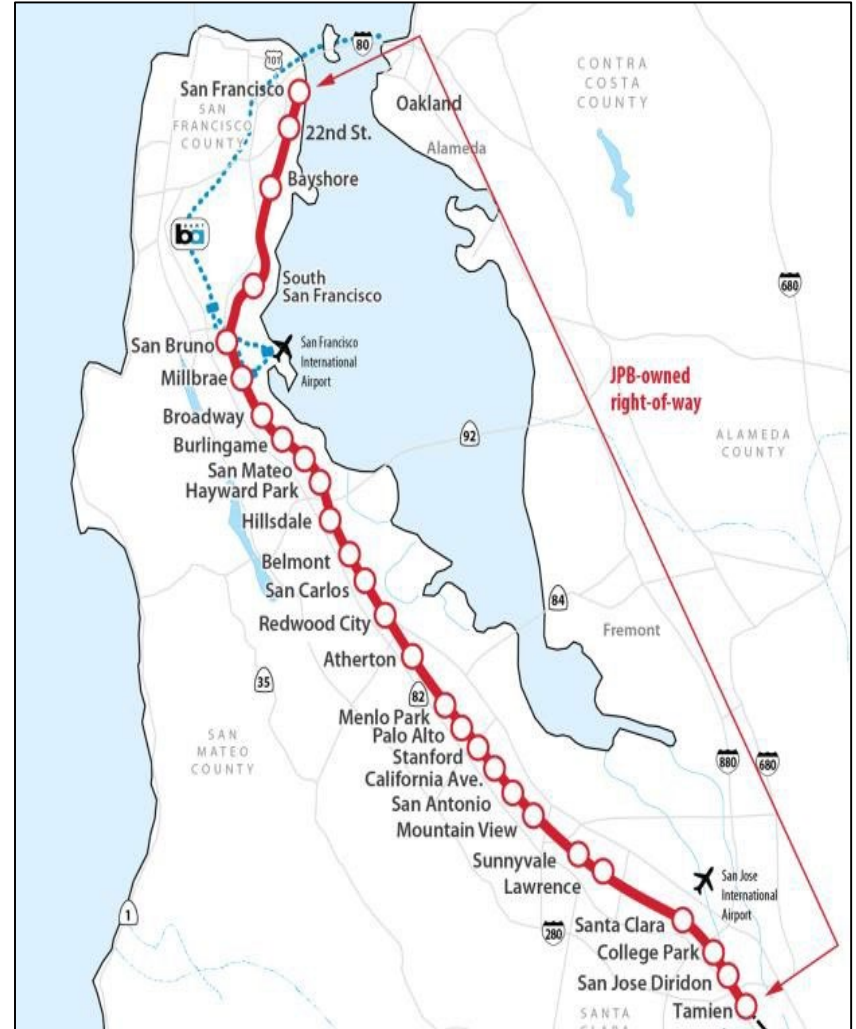
Joint Powers Board
November 4, 2021

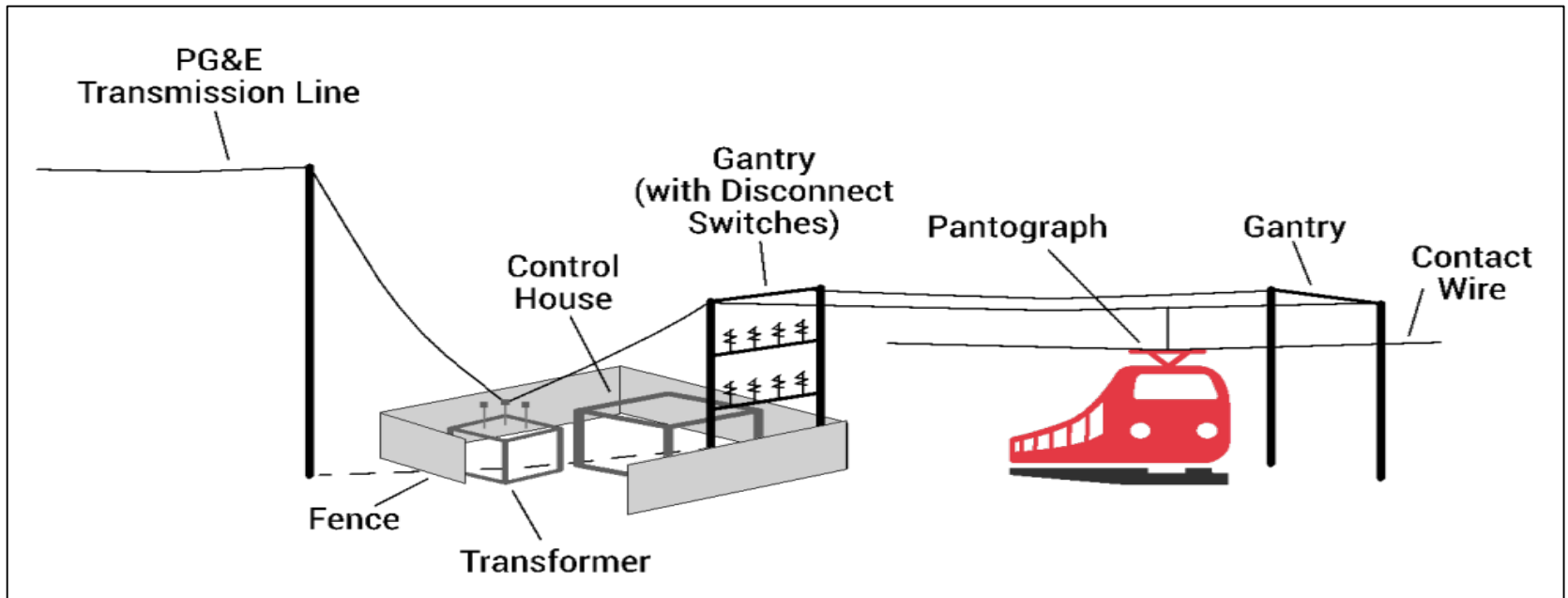


PROJECT OVERVIEW



- Caltrain Electrification
- San Francisco to San Jose (Tamien Station)
- 51 miles
- Updated Project Cost: \$2.31B
- Update Revenue Service: Sept. 2024





Electrification

- Overhead Contact System (OCS)
- Traction Power Facilities
- Signal System

Electric Trains

- 19 7-car train sets (133 cars)
- (Note: 96 cars funded by project; 37 cars funded by State TIRCP)*



**Improved Train
Performance,
Increased Service
and Greater Capacity**



**Improved Regional
Air Quality and
Reduced Greenhouse
Gas Emissions**

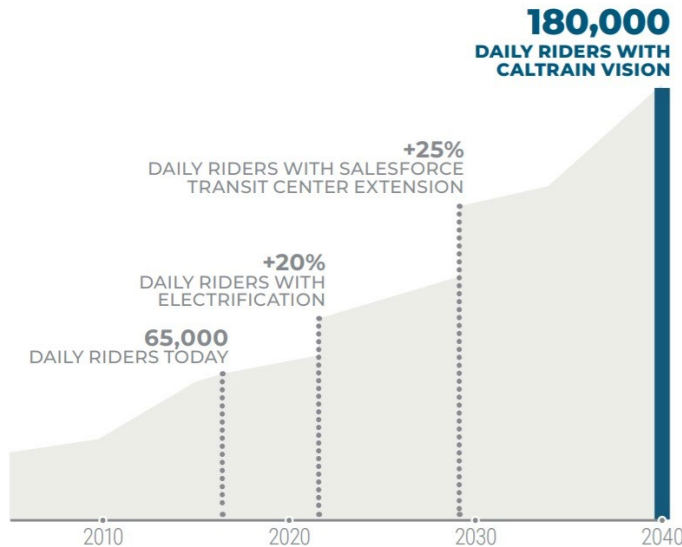
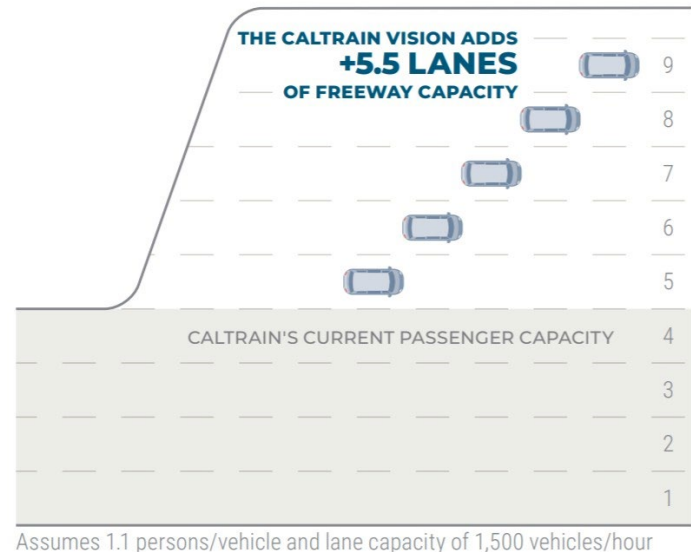


**Positive Economic
Benefits for the
Region**



**Reduced Engine
Noise Emanating
from Trains**

- Electrification sets foundation for future growth of system
- Meet projected regional growth in jobs and housing in the Bay Area
- Triple ridership, increase peak and off-peak service
- Carry equivalent of 5.5 lanes of US 101 highway traffic

**CARRYING MORE PEOPLE****TRAINS VS LANES**

2 SPEED CHECK (2SC) SIGNAL SYSTEM

- **Manages train movements**
 - Multiple signal locations
 - Managed by control center dispatch and train detection
- **Components**
 - Control points/Interlockings
 - Intermediate signal locations
 - Gate activation at crossings

- Current signal system (Constant Warning Time) will not work with electrified system
- New 2SC signal system to be installed
 - Approved by CPUC, FRA, UP
- Additional Crossing Optimization (Wireless) system
 - Part of PTC project
 - To be tested and implemented if proven and approved

- Track circuits (train detection)
- Updates to existing signal locations (156 locations)
- New signal equipment locations (58 locations)
- Insulated joints (isolate electrical current between track circuits)
- Impedance bonds (allows traction power return to go around insulated joints)
- Duct bank/Fiber (communication) installation

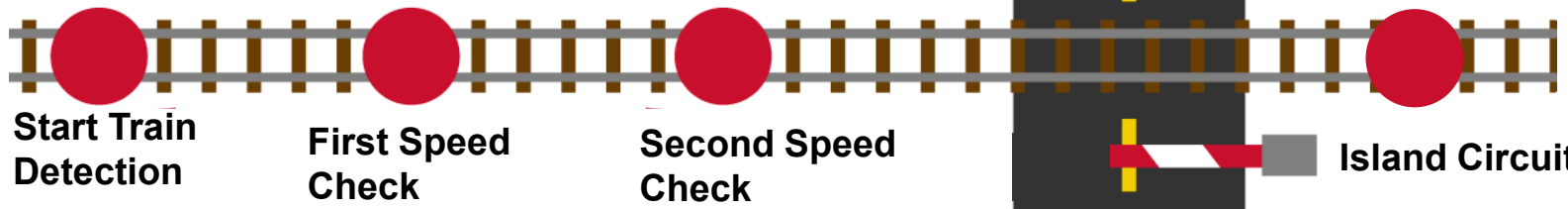
- 41 at-grade vehicular crossings (SF to SJ)
- Pedestrian crossings

| City | Number of Crossings |
|--|---------------------|
| San Francisco | 2 |
| South San Francisco | 1 |
| San Bruno | 1 |
| Millbrae | 1 |
| Burlingame | 5 |
| Burlingame/San Mateo (Peninsula Avenue) | 1 |
| San Mateo | 9 |
| Redwood City | 6 |
| Atherton | 2 |
| Menlo Park | 4 |
| Palo Alto | 4 |
| Mountain View | 2 |
| Sunnyvale | 2 |
| Santa Clara* | 1 |
| San Jose | 2 |

*UPRR owned Reed Street Crossing in Santa Clara

- Today
 - Continuous train speed detection until gates are activated
 - If train speed changes after gates are activated, the system will not adjust to reduce gate down time
- New (2SC)
 - Future system detects speed at a track circuits and categorizes the speed into 1 of 2 speed categories (high or low speed trains)
 - Originated from Association of American Railroads (AAR)
 - Approved by UPRR, FRA, CPUC

Direction of Train Travel →



Start Train Detection

First Speed Check

Second Speed Check

Island Circuit

If high speed,
gates go down

If low speed,
gates go down

Detects train
leaving crossing,
gates go up

If low speed,
gates remain up
until Second
Speed Check

- Different train speed categories for the corridor
- Accommodates necessary slow speeds at terminals
- Corridor-wide
 - High Speed: 41 to 79 mph
 - Low Speed: 0 to 40 mph
- Diridon Terminus
 - High Speed: 21 to 35 mph
 - Low Speed: 0 to 20
- San Francisco Terminus
 - High Speed: 26 to 40 mph
 - Low Speed: 0 to 25 mph

- Minimum required by FRA (safety)
- Gate down time vary at different crossings
- Factors that impact gate down time
 - Track curvature, civil speed restrictions
 - Proximity to terminals and station stops
 - Freight and tenant traffic
 - Train length
 - Speed restrictions
 - Extended crossing approach

- Segment 4 complete
 - Auzeais, W. Virginia
 - Data collection in progress
- Remaining segments
 - Winter 2022 – 2023
- City/County coordination
 - Projected gate down times
 - Actual gate down time following signal cutovers

- Scope and funding included in Positive Train Control (PTC) contract
- Added wireless technology allows signal system to react to train speed
- Proof of concept test anticipated January 2022
- Significant coordination with FRA/CPUC required
- Once crossing optimization is implemented, 2SC will be used for non-equipped trains or as back-up

CONSTRUCTION UPDATE

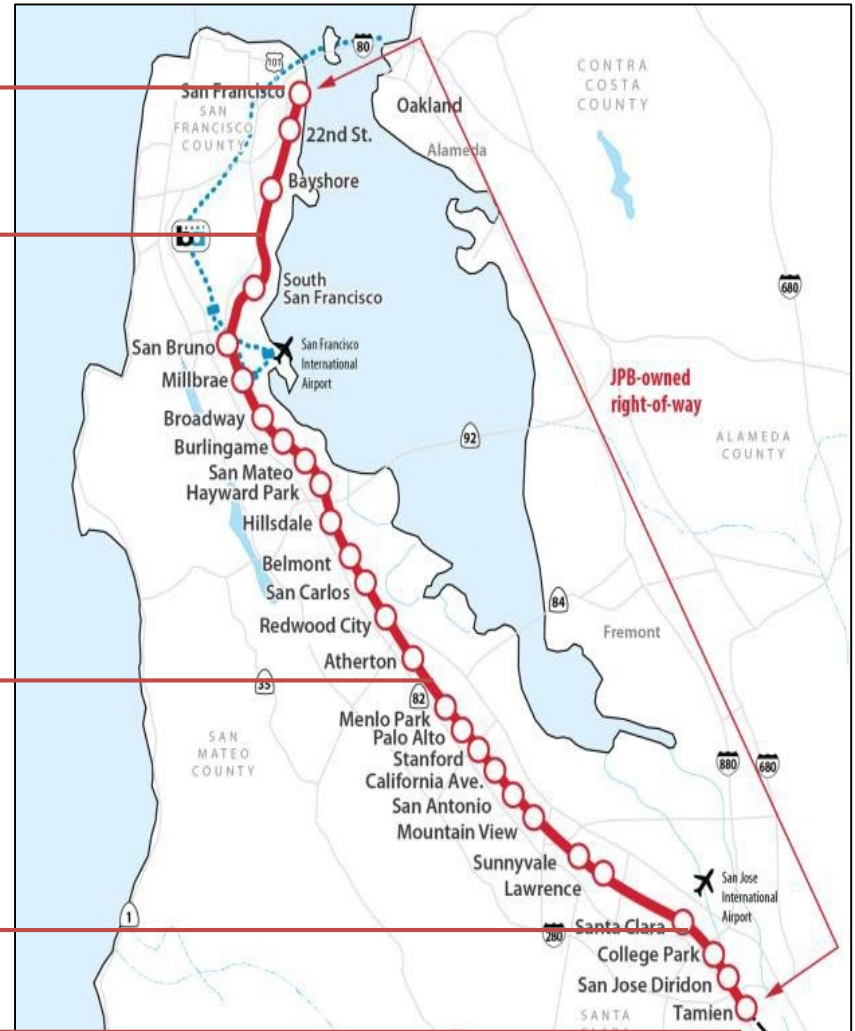


Segment 1
San Francisco to Brisbane

Segment 2
South San Francisco to Atherton

Segment 3
Menlo Park to Santa Clara

Segment 4
Santa Clara to Tamien



- Overhead Contact System (OCS)
 - Foundations 92% complete (89% last month)
 - Poles 67% complete (66% last month)
 - Segment 4 Wire 78% complete (56% last month)
- Traction Power Facilities
 - Transformer installed at 10 of 10 facilities (9 last month)
 - Traction Power Substations 1 98% complete (96% last month)
 - Traction Power Substations 2 96% complete
 - Switching Station 1 94% complete (93% last month)
- Electric Trains (133 cars total)
 - 88 shipped (86 last month)
 - 73 in Salt Lake City manufacturing facility
 - Trainset 1 in Pueblo for on-track testing

| Segment | Foundations Required | Foundations Remaining | Installation Percent Complete | Completed Last Month | Anticipated Completion Date |
|-----------|----------------------|-----------------------|-------------------------------|----------------------|-----------------------------|
| Segment 1 | 569 | 239 | 58% | 101 | 12/30/2021 |
| Segment 2 | 1,179 | Complete | 100% | N/A | Complete |
| Segment 3 | 901 | Complete | 100% | N/A | Complete |
| Segment 4 | 370 | Complete | 100% | N/A | Complete |
| CEMOF | 85 | Complete | 100% | N/A | Complete |

Data as of September 30, 2021

| Segment | Required | Remaining | Installation Percent Complete | Completed Last Month | Anticipated Completion Date |
|-----------|----------|-----------|-------------------------------|----------------------|-----------------------------|
| Segment 1 | 442 | 442 | 0% | 0 | 05/18/22 |
| Segment 2 | 971 | 418 | 61% | 47 | 11/31/21 |
| Segment 3 | 755 | Complete | 100% | Complete | Complete |
| Segment 4 | 304 | 12 | 96% | 4 | 10/31/21 |
| CEMOF | 83 | Complete | 100% | 1 | Complete |

Data as of September 30, 2021

| Segment | Installation Percent Complete | Completed Last Month (in feet) | Anticipated Installation Completion | Testing Percent Complete | Anticipated Testing Completion |
|-----------|-------------------------------|--------------------------------|-------------------------------------|--------------------------|--------------------------------|
| Segment 1 | 0 % | 0 | 06/23/22 | 0 % | 07/20/22 |
| Segment 2 | 20 % | 0 | 12/15/2021 | 8 % | 01/20/22 |
| Segment 3 | 100 % | 0 | 05/03/2021 | 100 % | 05/15/2021 |
| Segment 4 | 78 % | 46,911 | 11/15/21 | 0.0 % | 11/21/21 |

| Segment | 95% Design Percent Complete | Anticipated 95% Design Complete | Installation Percent Complete | Anticipated Installation Complete | Testing Percent Complete | Anticipated Testing Complete |
|------------------|-----------------------------------|------------------------------------|-------------------------------------|---|--------------------------------|------------------------------------|
| Segment 1 | 64% | 03/31/2023 | 21% | 08/31/2023 | 0% | 09/23/2023 |
| Segment 2 | 98% | 07/17/2022 | 25% | 08/01/2022 | 7% | 12/16/2022 |
| Segment 3 | 67% | 12/11/2022 | 21% | 02/28/2023 | 0% | 04/24/2023 |
| Segment 4 | 100% | Complete | 93% | 10/31/2021 | 95% | 11/15/2021 |

Data as of October 21, 2021

| Facility | Sitework | Substation Building | Low / High Voltage Equipment | Transformer | Gantry | Total Completion | Anticipated Completion |
|--------------------|----------|---------------------|------------------------------|-------------|--------|------------------|------------------------|
| TPS-1 (SSF) | 95% | 89% | 98% | 100% | 99% | 96% | 1/30/2022 |
| TPS-2 (San Jose) | 95% | 98% | 100% | 100% | 98% | 98% | 10/15/2021 |
| SWS-1 (RWC) | 93% | 89% | 96% | 100% | 94% | 94% | 12/31/2021 |
| PS-1 (SF) | 65% | 86% | 96% | 100% | 91% | 88% | 1/19/2022 |
| PS-2 (SF/Brisbane) | 87% | 80% | 89% | 100% | 82% | 88% | 12/22/2021 |
| PS-3 (Burlingame) | 26% | 68% | 5% | 47% | 15% | 32% | 4/18/2022 |
| PS-4 (San Mateo) | 90% | 82% | 96% | 100% | 87% | 91% | 11/21/2021 |
| PS-5 (Palo Alto) | 77% | 94% | 96% | 100% | 94% | 92% | 1/7/2022 |
| PS-6 (Sunnyvale) | 93% | 94% | 91% | 100% | 92% | 94% | 10/15/2021 |
| PS-7 (San Jose) | 96% | 99% | 95% | 100% | 97% | 97% | 10/31/2021 |

Wayside Power Cabinets

| Required | Installed |
|----------|-----------|
| 27 | 20 |

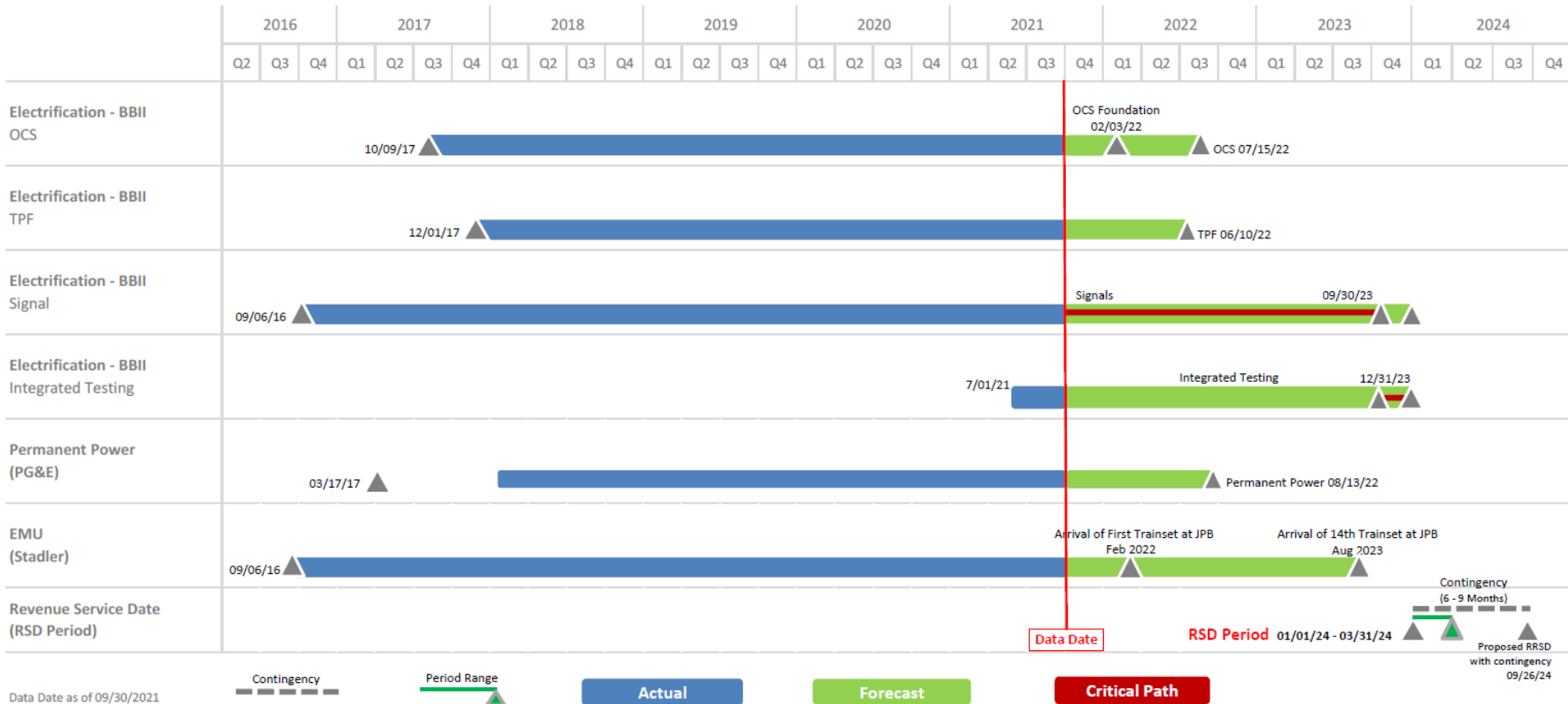
- Production
 - COVID-19-related global safety measures have slowed production
 - Salt Lake City assembly delayed
 - Trainsets 3 to 15 in various states of production
- Testing
 - Dynamic type testing on schedule in Pueblo on trainset 1
 - HVAC type testing trainset 2 ongoing
 - Routine testing trainsets 3 through 6 being performed in SLC
- Schedule
 - First trainset to Caltrain 1st Quarter 2022
 - Acceptance of 14 of 19 trainsets 2nd Quarter 2023

PROJECT UPDATE



Revenue Service September 2024

Contract Baselines vs. Forecast



- As of August 31, 2021
- December update subject to BBI negotiations and budget refresh

| Total Project Cost | \$2.31B <i>(\$1.98B Previous Project Cost)</i> |
|--|--|
| Committed | \$1.85B |
| Carryover Contingency (Previous Budget) | \$129.8M |
| Additional Known (Allocated)* | \$161.0M |
| Additional Reserve* | \$172.0M |

*Note: Total \$333M additional cost recommended by FTA

- Resolve BBII contract commercial issues
- BBII requests for change orders / claims
- Delays in parts supply chain affecting vehicle production schedule
- Continue to mitigate underground site conditions and assist BBII with redesign efforts

- Priority funding opportunities
 - State Budget (MTC Northern California)
 - Federal FY22 appropriations
 - Federal Infrastructure Bill
- Other sources
 - CTC Solutions for Congested Corridors Program (SCCP)
 - CTC Local Partnership Program (LPP)
 - CTC Trade Corridor Enhancement Program (TCEP)
 - Consolidated Rail Infrastructure and Safety Improvement (CRISI)

- Resolve BBII contract commercial issues (December)
- Project Assessment (transition from civil to system work)
- Keep construction moving forward (including 2SC work)
- Budget amendment request to JPB
- FTA / CAHSRA Project Recovery Plan
- FFGA update
- Funding advocacy

QUESTIONS

