Project Monitoring Report (PMR)
March 2021

Peninsula Corridor Electrification Project (PCEP)
San Francisco to San Jose, CA

Peninsula Corridor Joint Powers Board (JPB)/Caltrain
San Mateo, CA

Submitted: April 27, 2021

PMOC Contract Number: 69319519D000019
Task Order Number: 69319520F300099 (TO99)

OPs Referenced: 01 - Administrative Conditions and Requirements
25 - Recurring Oversight and Related Reports

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1.0 Executive Summary

Kal Krishnan Consulting Services, Inc. (KKCS) is the Federal Transit Administration's (FTA) Project Management Oversight Contractor (PMOC) for the Peninsula Corridor Electrification Project (PCEP). The Peninsula Corridor Joint Powers Board (JPB) is the grantee which operates commuter rail service as Caltrain. The FTA awarded a $647 million Full Funding Grant Agreement (FFGA) to the JPB on May 23, 2017.

1.1 Project Description

The PCEP corridor is approximately 51 miles in length. This Core Capacity Improvement Project (CC) includes two (2) components: infrastructure and rolling stock. The infrastructure component is comprised of the construction of Traction Power Substations (TPSS), the connection of those substations to the local utility system, and the installation of the Overhead Contact System (OCS) over the tracks beginning at the 4th and King Caltrain Station in San Francisco and ending at Tamien Station in San Jose. The infrastructure work also includes modifications to the wayside signal system and grade crossing signals to accommodate the new electrified rail system. In addition, four (4) existing rail tunnels have been enlarged to accommodate the expanded clearance envelope of the electrified vehicles. An alignment map is provided as information in Attachment I.

The rolling stock component includes the procurement of ninety-six (96) Electric Multiple Unit (EMU) rail vehicles to replace approximately 75% of Caltrain's existing diesel rolling stock. The initial EMU order was supplemented in December 2018 when the JPB exercised an option to purchase an additional thirty-seven (37) EMUs; the resulting fleet will consist of nineteen (19) seven-car trainsets. The additional thirty-seven (37) EMUs are not part of the JPB's Core Capacity grant. Caltrain's Central Equipment Maintenance and Operation Facility (CEMOF) is being modified to service the electrified vehicles.

The PCEP is part of a larger JPB initiative known as the Caltrain Modernization Program (CalMod). The CalMod program separately installed a Positive Train Control (PTC) system, which is an advanced signal system that includes federally mandated safety improvements. *The PTC system is in operation and received final Federal Railroad Administration (FRA) approval on December 17, 2020.*

1.2 Project Status

The PCEP is currently in construction and progress can be summarized as follows:

- Scope – The scope remains as planned.
- Schedule – The current forecasted final completion date (FCD) is in the range between December 6, 2022 and March 31, 2024. ***PMOC Note: The JPB's most recent Master Project Schedule (MPS) update for February 2021 has begun reporting a "Period Range" instead of a fixed date for some Key Milestone. The PMOC has used the earliest FCD of December 6, 2022 throughout this report for uniformity.***
- Cost – The current forecasted project cost is $1.930 billion in year of expenditure (YOE) dollars.
- Significant Project Activities and/or Key Milestones
    - The first major milestone in the Electrification contract is the completion of Segment 4, "Ready for EMU Testing." This milestone is now forecast to occur on August 10, 2021.
    - The first EMU trainset (TS-1) completed its static tests at Stadler's assembly facility in Salt Lake City, Utah and was shipped to the Association of American Railroads' (AAR) Transportation Technology Center, Inc. (TTCI) in Pueblo, Colorado. TS-1 arrived in Pueblo on February 27, 2021 and is undergoing prescribed acceptance and qualification tests. TS-1 is expected to complete testing in November 2021, after which it will be

returned to Stadler's Salt Lake City facility for reconditioning prior to delivery to the JPB. TS-1 will be tested in both a seven-car and eight-car configuration to demonstrate compliance with the JPB's specifications.

1.3 Major Issues and/or Concerns

Summary of Issue/Concern	Electrification Design-Build Contractor Claims
Date Identified	June 2019
Status	The Electrification contractor has submitted a total of four (4) claims; the most significant claim is associated with its efforts to provide Consistent Warning Time (CWT), now known as two speed check (2SC), at grade crossings. Other claims include denial of a Design Variance Request for alternate feeder and contact wire; percent of payment for CWT under Allowance Item #10; and costs for an alternate designer for Segment 1A.
Project Sponsor Action	The JPB and the Electrification contractor have been engaged in a technically facilitated mediation process since October 2019 to resolve these issues. *The JPB reports that the parties are in discussions several times each week and progress is being made with respect to resolving the 2SC issues. The JPB reports that resolving how compensation for the settlement will be paid continues to be troublesome.*
PMOC Recommendation	*Continue the process with a focus on improving field production and resolving all significant open issues between the parties.*

Summary of Issue/Concern	Unresolved Schedule Impacts
Date Identified	November 2018
Status	The JPB is evaluating the Electrification contractor's Time Impact Analysis No. 2 (TIA-2) for changes to the grade crossing warning system. TIA-2 alleges a delay of 1,092 days. *The contractor has recently submitted TIAs 3, 4, and 5 identified as three (3) separate ductbank delays. TIAs 3-5 address alleged delays in November 2020 and January and February 2021. The PCEP team has not completed its analysis of these TIAs because the contractor has not produced an approved monthly schedule for approximately two (2) years.* These delays are independent of delays associated with impacts to OCS foundation construction from differing site conditions; however, the two types of delays are not necessarily additive.
Project Sponsor Action	*The JPB continues to reject the Electrification contractor's schedule updates, including the most recent February 2021 update received March 22, 2021. The contractor's submission of schedule updates is nearly caught up with the contractual requirement for timely submission. The contractor's February 2021 update projects a substantial completion date of May 30, 2024. This date is well beyond the JPB's current forecasted Final Completion Date (FCD) of December 6, 2022, and the August 22, 2022 FCD in the Full Funding Grant Agreement (FFGA).*
PMOC Recommendation	Use contractual tools to encourage BBII's on-time production of required monthly schedule updates. *The JPB should produce a monthly shadow schedule. This proactive approach will increase JPB's knowledge of the controlling operation(s), critical path, contractor's substantial completion date, as well as the FCD for the project, along with defending itself against the contractor's delay claims.*

Summary of Issue/Concern	Management Capacity and Capability
Date Identified	February 2019

Status	The System Integration Lead is only part-time and needs assistance. Scheduling capacity continues to be insufficient to meet the routine demands of the project. Rail Activation Planning is currently being managed by a member of the safety team with rail activation experience until a permanent Rail Activation Manager is hired.
Project Sponsor Action	The JPB reports that it is attempting to hire an additional scheduler to assist with delay analysis. Rail Operations has engaged an independent consultant to assist it in developing materials for incorporation into the overall Rail Activation Plan (RAP). *The Rail Activation process is currently being managed as two concurrent processes with coordination at the committee level. Communication between the PCEP and Rail Operations teams requires improvement.*
PMOC Recommendation	*Add scheduling support and assign technical staff to assist in Systems Integration and testing, and commissioning coordination and oversight.*

Summary of Issue/Concern	OCS Construction Progress
Date Identified	May 2018
Status	Overall progress on the OCS foundations and follow-on electrification work is much slower than originally planned. *Foundations in Segments 3 and 4 are complete and foundation work at the CEMOF recently started. This problem continues to impact design and construction of OCS foundations. Approximately 26%, or 806 of the planned 3108 foundations, remain to be constructed as of 3/30/2021.*
Project Sponsor Action	*The PCEP team continues to coordinate closely with the contractor in an effort to avoid changes in pole locations, particularly those that would require additional rights-of-way. The JPB now expects OCS foundation work to be complete in September 2021.*
PMOC Recommendation	Complete potholing of the remaining foundations as early as possible.

Summary of Issue/Concern	Consistent Warning Time (CWT) or two (2) speed check (2SC) for Grade Crossings
Date Identified	*February 2018*
Status	The Electrification contractor is moving forward with design using a two (2) speed check (2SC) solution which apparently will satisfy FRA and California Public Utilities Commission (CPUC) requirements.
Project Sponsor Action	JPB to submit a Request for Amendment (RFA) to Caltrain's Positive Train Control Safety Plan (PTCSP) under 49 CFR Sec. 236, Subpart I; the RFA will document the design and performance of its 2SC grade crossing warning system. *The FRA and CPUC have observed the installation of 2SC at a location in Segment 4, and the test data has been supplied to the FRA. The FRA has suggested that PCEP complete a few more tests before submitting its RFA. The JPB now expects to submit its Request for Amendment (RFA) in late spring 2021.*
PMOC Recommendation	*Continue close coordination with FRA and CPUC. Resume preparation of GO 88B applications for upcoming jurisdictions.*

Summary of Issue/Concern	*Timely Completion of Signals Design and Installation*
Date Identified	*2019*
Status	*The pace of signals design is slower than required to achieve a satisfactory completion date for the project. The mediation process currently underway is intended to resolve the underlying issues and result in an improved plan for*

	completion of the signals work. Installation of the signal equipment, including cutovers, has been going smoothly.
Project Sponsor Action	*The JPB is working closely with the signals team in an effort to improve production of the design documents. Planning and implementation of the cutovers has been effective and up to eight crews (8) are engaged in signals construction. Ductbank design and construction has emerged recently as a critical path activity.*
PMOC Recommendation	*Continue to work closely with the design teams. Conclude mediation of the signal related issues as quickly as possible consistent with an acceptable outcome.*

1.4 Status of Key Indicators Dashboard

KEY INDICATORS DASHBOARD (POST-GRANT STATUS)					
Project Sponsor:	Peninsula Corridor Joint Powers Board (JPB)				
Project Name:	Peninsula Corridor Electrification Project (PCEP)				
Date:	*April 1, 2021*				
Project Detail					
Oversight Frequency:	Quarterly				
Element	**Status**			**Prior Status (G/Y/R)**	**Issue or Concern**
	G	**Y**	**R**		
PMP	●			●	
MCC		●		●	Continuing need for more Scheduling and Systems Integration support
Cost		●		●	*Cost contingency continues to be drawn down. There is continuing uncertainty related to potential contractor "claims."*
Schedule			●	●	*Sponsor now reporting FCD will be exceeded. Schedule contingency exhausted;* 2 years remain to FCD.
Quality	●			●	
Safety	●			●	*Safety performance by the Electrification contractor has improved.*
Risk		●		●	Claim by Electrification contractor; *slow OCS and signals progress, COVID, and EMU delays and supplier problems.*
Legend					
Green	Satisfactory: No Corrective Action necessary.				
Yellow	Caution: Risk/Issues exist. Corrective Action may be necessary.				
Red	Elevated for immediate Corrective Action: Significant risk to the health of the project.				

1.5 Core Accountability Items through February 2021

Project Status: In Construction		Original (FFGA)	Current Forecast [1]	PMOC Assessment of Current Forecast
Cost	Cost Estimate	$1,930,670,934	$1,930,670,934	The JPB's Total Project Cost has Remained Unchanged
Contingency	Unallocated Contingency	$162,620,294	*$44,008,535*	*The reduction in contingency is consistent with observed trends.*
	Allocated Contingency	$152,913,317	*$14,833,455*	
	Total Contingency	$315,533,611	*$58,841,991*	
Schedule	Final Completion Date	August 22, 2022	*December 6, 2022*	*Optimistic*

Project Progress		Amount ($)	Percent of Total
Total Expenditures	Actual cost of all eligible expenditures completed to date [3]	*$1,104,621,823*	*57.21%*
Planned Value to Date [2]	Estimated value of work planned to date [3]	*$1,214,743,556*	*62.92%*
Actual Value to Date	Actual value of work completed to date [3]	*$797,900,985*	*41.33%*

Contracts Status		Amount ($)	Percent
Total Contracts Awarded	Value of all contracts (design, support, construction, equipment) awarded; % of total value to be awarded [4]	*$1,723,072,670*	*89.25%*
Construction Contracts Awarded	Value of construction contracts awarded; % of total construction value to be awarded [5]	*$1,443,102,723*	*74.75%*
Physical Construction Completed	Value of physical construction (infrastructure) completed; % of total construction value completed	*$739,060,488*	*51.21%*

Rolling Stock Vehicle Status	Date Awarded	No. Ordered	No. Delivered
Electric Multiple Unit (EMU) commuter rail vehicles	08/2016 (A)	133	0

Next Monthly Meeting Date:	*TBD – June 2021*
Next Quarterly Review Meeting Date:	*April 26, 2021*

[1] Current estimate is the remaining balance which includes known change orders that will draw from Contingency funds, both Allocated and Unallocated.
[2] Based upon the Program Schedule and Estimate (Rev. 4B) that were updated in October 2017 to reflect the FFGA delay.
[3] Defined as construction or manufacturing by Balfour Beatty, Stadler, PG&E, CEMOF, Tunnel Mod, and other required projects.
[4] Percentage is calculated based on a project value of $1,930,670,934.
[5] Total construction contracts awarded to date (construction & vehicle contracts only) includes design and executed change orders.

Grant Information

Dollars in thousands reported as of March 31, 2021

FAIN (Source)	Funds Committed*	Funds Disbursed	% Disbursed
Local	$996,521	*$536,579*	*54%*
Federal	$934,150	*$481,945*	*52%*
Total	**$1,930,671**	***$1,018,524***	***53%***

*Definitions from Guidelines and Standards for Assessing Local Financial Commitment, FTA, June 2007

2.0 PMOC Observations and Findings

This progress report covers the period from October 1, 2020 through April 1, 2021. The information contained in this report is based on the PMOC's participation in virtual Quarterly Progress Review Meetings (QPRMs) Nos. 14 and 15 held on October 29, 2020 and January 26, 2021 respectively, virtual monitoring meetings held on March 23 and 25, 2021, FTA-led virtual Risk Refresh workshop meetings on December 8, 10, 15, and 17, 2020, virtual project meeting attendance, document reviews, telephone conversations, and general interaction with the project sponsor's personnel.

2.1 Summary of Monitoring Activities

The PMOC continues to monitor project activities through the activities described above and prepare a monitoring report on the project quarterly. The PMOC anticipates the following focus for upcoming activities.

- The PMOC conducted an FTA-led Risk Refresh workshop in December 2020 and prepared and submitted the draft report to the FTA. The objective of the Risk Refresh was to confirm the likelihood of the project completing within budget and in accordance with the FFGA schedule. FTA is currently reviewing the draft report.
- The PMOC is continuing to focus on the PCEP's schedule performance, including the JPB's mitigation of delays to OCS foundation installation, implementation of the 2SC solution to provide the required warning time at grade crossings, and completion of Time Impact Analysis (TIA-2) related to the 2SC issue. *The PMOC received and reviewed detailed schedule information in conjunction with its Risk Refresh activities. The PMOC's analysis of that information and the resultant conclusions are described in the draft Risk Refresh report. The PMOC recently learned that the Electrification contractor has submitted TIAs 3, 4 and 5 that address duct bank work. These are apparently related to the 2SC issue and the contractor is reviewing this information with the PCEP's lead scheduler.*
- The PMOC continues to monitor the JPB's various activities leading up to the Electrification contractor's completion of Milestone 1, i.e., Segment 4 Ready for EMU Testing; the delivery of EMU Trainset 1 (TS 1) to the JPB; and the testing and acceptance of TS 1 by the JPB. The PMOC is monitoring the Systems Integration, Rail Activation, Safety and Security Certification committees' meetings and their respective schedules and other materials. The PMOC has proposed initiating a phased readiness review of electrified operations by the JPB, and that activity is under consideration by the FTA. The first significant event in the sequence leading to the electrification of Segment 4 will be the energizing of Traction Power Substation Sub-station 2, which is currently scheduled for June 21, 2021.

2.2 Oversight Triggers

The PMOC has identified several areas of continuing concern, as noted in the Key Indicators Dashboard. These are not new issues and have been discussed with the Sponsor, the ACOR, and Region IX leadership during monitoring visits and past QPRMs. Schedule uncertainty is of greatest concern for the following reasons:

- The JPB has exhausted its schedule contingency due to the impact of COVID-19 on the delivery of the EMU vehicles. This was first reported with the publication of the December 1, 2020 schedule update, which also showed a resultant change in the expected FFGA Final Completion Date (FCD) from August 22, 2022 to September 9, 2022. The JPB, as noted earlier, is currently projecting achieving its FCD between December 6, 2022 and March 31, 2024.

- The Electrification design-build contractor implemented a recovery plan and has now delivered its late progress schedules through the month of February 2021; the March 2021 schedule is expected in mid-April 2021. The JPB continues to reject the contractor's schedules and there is currently no approved schedule update for the Electrification design-build contract.
- The PMOC has repeatedly recommended that the PCEP increase scheduling resources to provide capacity to address "what if" scenarios in addition to routine schedule management activities. *The JPB states that it has been unable to find acceptable candidates.* The PMOC notes that the Rail Operations group recently retained a schedule consultant to assist it in its role as part of the Rail Activation planning process.
- The Electrification contractor's progress on OCS, Traction Power System (TPS), and signals work is far behind the initial plan. The original substantial completion date was April 28, 2020, but that date was contractually extended to August 10, 2020. *The PCEP's current forecast for completing the OCS foundations is September 2021. The contractor's February 2021 Progress Schedule Update, received on March 22, 2021, shows a Substantial Completion Date of May 30, 2024. The JPB continues to reject the contractor's schedules and does not agree with this completion date.*

The PMOC, at the FTA request, conducted an independent risk refresh in December 2020 to assess the likelihood of the project meeting the cost and schedule requirements of the FFGA. FTA is currently reviewing the draft report.

2.3 Project Management Plan (PMP) and Sub-Plans

The JPB's Rail Activation Committee (RAC) is continuing to work on its Rail Activation Plan (RAP). The RAP must be in place before testing of the new EMUs can begin. *The RAC is making significant progress in developing the RAP, and the associated Rail Activation Schedule (RAS). JPB's Rail Operations group has hired an independent consultant, supported by a scheduler, to assist them in developing the sections pertaining to Rail Operations responsibilities, as well as the overall RAP.* The PMOC continues to monitor and support this work. The PMOC intends to conduct a modified OP-54 Readiness for Service review prior to the electrification of Segment 4 and the commencement of EMU testing in mid-2021.

2.4 Management Capacity and Capability

The PCEP's office staff has continued to work from home in response to public health directives issued in connection with the COVID-19 pandemic and policy directives issued by the JPB. Internal and external meetings continue using various web-based collaboration platforms such as Zoom, WebEx, Go to Meeting, and Microsoft Teams. Field personnel continue to perform their assigned duties in keeping with applicable safety plans and public health directives. The PCEP's leadership reports that productivity has been largely unaffected by the COVID-19 restrictions. *The JPB and PCEP have once again resumed planning for a return-to-work program following changes to public health restrictions and the growing availability of vaccinations.*

- ***PMOC Recommendations:*** The PMOC continues to encourage the PCEP's leadership and Rail Activation and Systems Integration teams to move forward with their independent work as well as the continuing regularly scheduled coordination meetings. *It now appears that the work of these two groups will not be fully integrated, but will proceed in parallel with frequent coordination meetings.*

2.5 NEPA Process and Environmental Mitigation

The PCEP Final Environmental Impact Report (FEIR) forecasts Caltrain ridership of 69,151 daily boardings in the year 2020 and 111,427 daily boardings in 2040, including service in 2040 to the Transbay Transit Center. This ridership represents an increase of 21.1% and 32.1% respectively, over the projected Caltrain ridership in those years without the core capacity improvements.

The JPB completed acquiring property rights from the Santa Clara Valley Water District (SCVWD). The acquisition did not require any additional environmental actions beyond the permit issued by the District.

The JPB recently determined that the alignment of the interconnections between PG&E's East Grand Ave. substation in South San Francisco and its FMC substation in San Jose, and the JPB's Traction Power Substations 1 and 2 respectively, are slightly different than the alignments that were subject to previous environmental review. The JPB has advised the FTA of this development and has provided the FTA with an assessment of the environmental consequences of the changes. The JPB's opinion is that the environmental consequences of the new alignments are not significantly different than the original alignments. *No additional actions have been reported.* The JPB also continues to monitor the compliance of its construction contractors with the requirements of its FFGA and the supporting environmental documents. *The PCEP reports that tree pruning and removal is approximately 75% complete. Annual surveys are being conducted as required.*

2.6 Project Delivery Method and Procurement

JPB reports all major procurements have been completed as of September 2019.

Consultant Contracts

The JPB awarded contracts in early 2014 for Program Management Consultant Services; EMU Vehicle Consultant Services; and Electrification Services. The JPB awarded a five-year contract to Jacobs Project Management Company (Jacobs) of Oakland, CA in 2019 to support electrification construction, the tunnel notching contract, modifications to the CEMOF, reconstruction of the Santa Clara Drill Track, installation of mini-high block platforms, and other work, as needed.

Electrification Design-Build Contract

JPB is using the Design-Build (D-B) project delivery method for the electrification and related facilities. BBII was selected as the D-B Contractor and provided NTP in June 2017. Work is underway on design and construction activities in all disciplines and all Segments of the corridor.

Supervisory Control and Data Acquisition (SCADA) Equipment

The JPB executed a sole-source contract with ARINC, Inc., for the supply of SCADA equipment in September 2017. The SCADA contract is being managed by the Electrification consultant and installation of the SCADA equipment is being performed by BBII under the Electrification contract. The equipment will be used to control the traction power system including the traction power substations (TPS), wayside power cubicles (WPC), and the OCS. SCADA will be integrated with the base operating system for Caltrain Operations and Control, which is the Rail Operations Center System (ROCS). A separate control console will be established for the Power Director. *Factory Acceptance Testing (FAT) of the equipment is underway, as well as preparation of operation and maintenance manuals and training materials.*

Tunnel Notching, OCS Installation, and Drainage Improvements

A contract was awarded to ProVen Management, Inc. of Oakland, California, for Tunnel Notching and Drainage Improvements on the tunnels in Segment 1 of the PCEP corridor. The contract consists

of two (2) main elements: notching of the four (4) tunnels to increase clearance for the new EMU vehicles; and drainage improvements in tunnels 1 and 4 for the benefit of Caltrain operations. The drainage improvements were performed as a Concurrent Non-Project Activity (CNPA) and the work was paid for by Caltrain. The JPB issued a Notice to Proceed to the contractor on October 6, 2018. Installation of the Overhead Contact System (OCS) in the tunnel bores was later added by Change Order. *Inspection of the OCS in the tunnel bores has been completed and the contractor has demobilized.* The contractor will return for final integrated testing and acceptance once the OCS is electrified.

Used Electrified Locomotives

The JPB, at its June 7, 2018 meeting, approved contracts to acquire and overhaul two (2) used electrified locomotives to perform initial testing of the electrification system. The locomotives arrived at Amtrak's yard in Oakland, CA, on June 6, 2019, and have been prepared for long term storage until needed for testing of the electrified system. *The JPB is currently discussing use of the electric locomotives for initial testing of the electrified OCS in Segment 4 because delivery of the first EMU has been delayed.*

CEMOF Modifications

The JPB awarded a contract to ProVen Management, Inc. in the amount of $6,550,777 to modify the Central Equipment Maintenance and Operations Facility (CEMOF) to accommodate the new EMUs. ProVen was issued a full Notice to Proceed (NTP) on September 16, 2019. The CEMOF contract is the last of the PCEP's major construction contracts. *Completion of the work is nearing completion , which is expected in April 2021. The Electrification contractor has begun installing OCS foundations at the CEMOF and expects to complete this work in April 2021.*

PG&E Interconnection Construction

The JPB executed Modification 2 to Supplement 2 of its Master Agreement with PG&E to construct the interconnections between PG&E's two (2) substations and the JPB's two (2) corresponding TPSS. *Construction of the interconnection between PG&E's FMC substation in San Jose and the PCEP's TPSS 2 was completed on January 18, 2021. The interconnection has not yet been energized. The alignment of the interconnection between PG&E's East Grand Substation in South San Francisco and the PCEP's TPSS 1 is being redesigned to avoid impacts to an adjacent property owner. A larger portion of the interconnection will be placed underground than was first anticipated.*

Recent Procurements

A single quotation was received for supply of scissor-lift platforms for servicing EMU vehicles at the CEMOF; and a contract was awarded to Bailey Specialty Cranes and Aerials, LLC.

A Change Order was issued to Stadler for supply of a pantograph inspection system for the new EMUs.

2.7 Design

BBII is responsible for the Final Design (FD) of the electrification and related facilities under the terms of its D-B contract with the JPB. PGH Wong Engineering, Inc., is the Engineer of Record for the work.

The following electrification design and design-related activities are currently under way:

- Progressed the OCS design with BBII in Segments 1 and 2 and at CEMOF in Segment 4; which includes submittal and review of Design Change Notices for revised foundation locations.

- Continued coordination with FRA and CPUC on grade crossing design and installation.
- Revised the TPS interconnection design for TPS-1.
- Continued to progress TPS-1 interconnection design towards IFC.
- Coordinated design review with local jurisdictions for the OCS, traction power facilities, and bridge attachments design, including responses to comments from jurisdictions.
- Continued to review and coordinate signal and communication design submittals with BBII.
- Worked with BBII through Site Specific Work Plans (SSWP) for upcoming field work.
- The satisfactory completion of the single-phase studies needed to satisfy the requirements of PG&E and Silicon Valley Power (SVP) has proven difficult, and the issue has been elevated to PG&E's leadership for resolution. PG&E has retained an independent consultant to assist in completing the studies.

2.8 Value Engineering and Constructability Reviews

The project sponsor did not undertake a formal VE effort. However, the PCEP team undertook a significant cost reduction effort in late 2014 which identified an estimated $84.3M in potential cost savings achieved by eliminating or deferring certain tasks previously included in the baseline program. In addition, the procurement process for the Electrification D-B contract included the submission of alternate technical proposals (ATPs) to reduce cost or improve schedule. In addition to those ATPs that were incorporated into the Electrification contract, that contract contains a Value Engineering Change Proposal (VECP) clause whereby any savings that result from an accepted VECP are shared by the contractor and the JPB.

2.9 Real Estate Acquisition and Relocation

The project is being constructed primarily in the existing Caltrain corridor on rights-of-way (ROW) controlled by JPB/Caltrain. The PCEP is acquiring real estate for three (3) primary purposes: (1) for placement of Overhead Contact System (OCS) poles; (2) for the two (2) primary Traction Power Substations (TPSS); and (3) to provide electrical clearance and safety zones for the OCS wires. The corridor has been sub-divided into four (4) segments numbered from north to south to manage the electrification and other related work more effectively.

The corridor spans three (3) counties and the JPB must collaborate with Santa Clara County on the south, its home county of San Mateo, and the City and County of San Francisco on the north to exercise eminent domain power as necessary during the ROW acquisition process. The JPB executed an agreement with the Santa Clara Valley Transportation Authority (VTA) to exercise eminent domain on behalf of the JPB for property acquired in Santa Clara County, which includes all of Segment 4 and some portions of Segment 3. The JPB also executed an agreement with the San Mateo County Transit District (SamTrans) to act as the condemning agency for all property in San Mateo County. San Mateo County includes all properties in Segment 2 and some properties in Segments 1 and 3. The JPB was unsuccessful in reaching an agreement with the City Supervisor for the City of San Francisco related to the City's exercise of eminent domain powers on behalf of the JPB for properties located within the City and County of San Francisco (CCSF). *The CCSF includes only properties in Segment 1 that are now needed for construction.*

Real Estate Activities

Initial Electrification construction took place in Segments 4 and 2 and has since been expanded to include all segments. Segment 4 includes electrification of a test track for testing and acceptance of the EMUs. Real estate acquisition is being coordinated with Electrification construction activities; however, the discovery of a variety of unexpected conditions at a large number of the planned OCS

pole locations has resulted in the movement of numerous foundations, which in some cases requires acquisition of new rights-of-way.

The major challenges facing real estate are design changes that are impacting already acquired properties and design changes requiring new or re-defined acquisitions. Potholing for OCS foundations, and follow-on construction work located outside of JPB owned right-of-way (ROW), require that the JPB acquire the property or an appropriate property right. *In some cases, the relocation of poles has resulted in wires crossing parcels previously identified as only needing an electrical safety zone (ESZ); in these cases, a fee acquisition is deemed necessary.*

Three parcels are receiving the majority of the JPB's attention.

- Santa Clara Valley Transportation Authority (VTA) (Segment 4 near TPSS 2) - PG&E needs an easement from VTA. The easement is a required part of the interconnection between PG&E's FMC substation and TPSS 2. The interconnection is complete; however, the easement includes issues of long standing significance between the parties, and is taking a long time to resolve. The JPB is prepared to escalate the issue for resolution by PG&E and VTA executives if staff is unable to resolve the issue in the very near future.
- Bayshore Property (Segment 1 South of tunnels) – This property is held by a foreign developer who is interested in completing a more comprehensive transaction that includes acquisition of other JPB property. The JPB has submitted its offer package to the developer's local representatives, who have asked for asked for a second appraisal. The owner's representatives are arranging for the appraisal. Once the appraisal is complete and final terms are established, the transaction must be reviewed by the principals in China. The JPB is projecting that completion of this transaction may take until June 2021.
- One parcel in Segment 2, owned by the City of Belmont and adjacent to the JPB's ROW, is needed for an OCS pole foundation. The JPB plans to obtain a permit to install the foundation, and the real estate transaction will follow.
- The following additional activities are also underway:
    - Staff continues to review potential new pole locations and provide feedback to the design team.
    - Staff continues to work with PCEP's internal signal team and BBII signal team to determine potential Real Estate interests.
    - **PMOC Observation:** The continued appearance of new or redefined parcels, as a result of shifts in the placement of OCS poles, is problematic if possession is needed before foundations can be constructed. The JPB continues to hold regular meetings with BBII's designers in an effort to avoid or minimize such situations. Parcel availability may now be impacting the contractor's ability to place foundation.

2.10 Third-Party Agreements and Utilities

A significant number of third-party agreements were required to support the PCEP. These agreements are grouped into the following general categories, with status comments as appropriate to each:

Jurisdictional Agreements for Construction and Maintenance

The JPB has executed all agreements except the one with the Town of Atherton (Segment 2), which is no longer being pursued. The Town of Atherton must issue traffic control permits to the contractor, and the Town staff has been cooperative to date.

Jurisdictional Agreements for Exercise of Eminent Domain Powers

The JPB has executed agreements with the Santa Clara Valley Transportation Authority (VTA) and the San Mateo County Transportation District (SamTrans) under which the VTA and SamTrans will exercise eminent domain authority on behalf of the JPB, when such action is required, to acquire the real property rights located in the respective counties for the PCEP. The City and County of San Francisco (CCSF) declined to approve an agreement for use of its eminent domain powers on behalf of the PCEP.

Utility Relocation Agreements

The JPB's right to relocate utilities that exist within its PCEP corridor exists by virtue of the property rights it acquired when it purchased the corridor from the Southern Pacific Transportation Company (SP) in November 1991. The JPB has the right to cause the relocation of both overhead and underground utilities to accommodate its railroad activities upon thirty (30) days' notice to the utilities at the utilities expense. The JPB reports the following activities related to third-party utility work:

- The relocation of Palo Alto Power's (PAP) facilities is complete.
- JPB continues to work with Comcast to relocate the remaining four (4) of twelve (12) conflicting locations in Segment 4. Some locations must be raised to permit OCS installation.
    - **PMOC Observation:** The JPB continues to coordinate closely with the various utility companies, especially on near term conflicts with construction activities.

The JPB also has in place or is negotiating specialized agreements with the following entities:

Pacific Gas & Electric (PG&E)

PG&E will supply power from two (2) existing substations to the new PCEP Traction Power System. Both substations must be modified to provide the required power. The JPB has executed a Master Agreement with PG&E as well as Supplements 1 through 5 to that agreement. Supplement 4, which includes the cost of constructing the substation modifications, was fully executed on October 18, 2018. The parties disagreed on the allocation of costs for the work, and following discussions between the parties, PG&E filed an application with the CPUC for a cost allocation plan. The CPUC's Administrative Law Judge announced a decision on May 7, 2020 that adopted a modified order affirming the cost allocation principles agreed to by the JPB and PG&E.

Construction of the temporary power feed at PG&E's "FMC" substation in San Jose is complete. *Construction of the interconnection to TPSS #2 was completed on January 18, 2021. The interconnection has not been energized or tested. The energization of TPSS 2 is scheduled for June 21, 2021.*

Re-design of a segment of the interconnection between PG&E's East Grand substation and TPSS #1 is underway. The aerial segment is being placed underground to accommodate the adjacent property owner as part of the property acquisition. PG&E continues with the permanent modifications to both its FMC and East Grand Avenue Substations.

The date for PG&E's supply of permanent power to the PCEP has slipped from September 9, 2021 to April 15, 2022 as a result of delays in completing modifications to its substations.

California Public Utilities Commission (CPUC)

The CPUC is the FTA's Certified State Safety Oversight Agency (SSOA) for the State of California, and also has responsibility for grade crossing safety in the state. *The JPB has worked with both CPUC and the FRA to develop the 2SC solution to provide the required grade crossing warning time*

after the system is electrified. CPUC and the FRA have been observing the initial cutovers at the signal locations in Segment 4 and have been satisfied with the results to date.

The JPB must file General Order (GO) 88B forms for each modified crossing for approval by the CPUC; these plans are developed in conjunction with the local jurisdictions. The JPB has thus far submitted six (6) crossings, and the CPUC has approved all six (6). *The JPB expects to resume preparation of the GO 88B forms for the remaining jurisdictions in the near future.* The FRA does not approve the crossings, but has both regulatory and enforcement authority if the crossings do not perform as required by its regulations.

Union Pacific Railroad (UPRR)

The JPB is engaged in on-going confidential negotiations with the UPRR regarding a variety of issues. The UPRR is a tenant and operates service on tracks owned by Caltrain in the PCEP corridor; Caltrain operates service on tracks owned by the UPRR south of the PCEP corridor. The UPRR is considering selling its rights to operate freight service in the Caltrain corridor to a short line operator. This arrangement, if completed, could simplify bringing the freight service operator into conformance with the JPB's PTC system. The JPB stated that it is negotiating with the UPRR to acquire the short line rights for the tracks north of Santa Clara.

The JPB received a letter from the UPRR, dated January 16, 2019, in which the railroad stated that it does not oppose the JPB's plan to provide the required grade crossing warning time, as long as the JPB complies with the CPUC and other regulatory requirements. This letter cleared the way to move forward with final regulatory approvals.

California High Speed Rail Authority (CHSRA)

The California High-Speed Rail Authority (CHSRA) proposes to operate in blended service with Caltrain in the PCEP corridor in the future. The CHSRA's 2018 Business Plan calls for initial construction of the Silicon Valley to Central Valley line from Diridon Station in San Jose to Bakersfield. The plan would also expand electrification of the Caltrain corridor south of San José to Gilroy. The CHSRA released the staff-recommended preferred alternative to the public in July 2019 for comment. The CHSRA Board will decide on the preferred alternative that will be evaluated in the Draft Environmental Impact Report/Environmental Impact Study (EIR/EIS). The CHSRA continues to be in discussions with Caltrain, Caltrans, the City of San José, Santa Clara County, Union Pacific Railroad, and other partners about right-of-way and operational options, including how passenger and diesel freight trains could share the corridor. This sharing may potentially allow enhanced electrified service all the way to Gilroy, eliminating the need to use passenger diesel trains in the corridor and potentially allow the line to be used for express high-speed rail operations between San Francisco and Gilroy.

The JPB has been continuously involved in technical discussions with the CHSRA to ensure that the facilities being constructed as part of the PCEP are consistent with those being planned by the CHSRA. Representatives of the CHSRA are now participating regularly in a variety of PCEP meetings.

The JPB has moved forward with a plan to relocate a number of the OCS poles to permit future curve-straightening by the CHSRA without impacting the electrification system. Straightening of some curves will allow the CHSRA to achieve higher operating speeds. Prior to the issuance of a change order to BBII, the CHSRA will complete an environmental assessment to ensure that there are no new or substantially significant environmental impacts beyond those that were environmentally cleared in the PCEP EIR and Environmental Assessment (EA). This documentation

will be shared with the FTA. All costs associated with the pole relocation work will be paid for by the CHSRA.

Federal Railroad Administration (FRA)

The FRA has authority over the JPB's rail operations. *As noted above and elsewhere in this report, the JPB is coordinating with the FRA on several issues, including technical issues related to the EMUs and resolution of the CWT issue; the agency's PTC program recently received FRA approval.* Issues related to the EMU's are discussed in Section 2.12 of this report. *The JPB continues to hold monthly conference calls with the FRA to discuss EMU issues, and another call to discuss resolution of the 2SC issues.*

2.11 Construction

The JPB provided the following report on infrastructure construction activity.

Overhead Contact System (OCS)

- CEMOF foundation installation is in progress and scheduled to be completed by April 10, 2021.
- Mobilization to Segment 2 Work Areas 1 and 2 will begin on week of April 10, 2021.
- Poles and wire work will continue in Segment 3; this work is scheduled to be completed by April and Segment 4 is scheduled to be completed by the end of June.
- OCS crews will vacate the Santa Clara Drill Track for the foundation crew.
- Foundation and utility pothole continues in Segment 2, Work Areas 1 and 2.

Table 1 – Overhead Contact System Progress as of March 30, 2021

Segment	Work Area	Foundations		Poles	
		Required[a,b,c]	Completed	Required[a,b]	Completed
1	Tunnels	32	32	32	32
	A	303	0	259	0
	B	232	85	177	0
2	5	247	246	212	160
	4	316	315	253	190
	3	177	176	140	43
	2	239	78	205	60
	1	206	79	154	33
3	2	510	510	460	445
	1	391	391	311	306
4	A	241	241	180	170
	B	128	128	124	103
	CEMOF	86	21	81	0
Total		**3,108**	**2,302**	**2,588**	**1,542**

a Foundations required do not match poles required because guy foundations are needed in some locations for extra support.

b Reported number of required poles and foundations fluctuate due to design changes.

c 30 foundations in S2WA5 were installed by the South San Francisco Station project; 65 foundations in S2WA3 were installed by the 25th Avenue Grade Separation project.

Traction Power System (TPS)

- An inbound piece of switchgear for TPSS 2 was dropped and damaged during a customs' inspection at the port. The replacement for the damaged unit is now expected to arrive in mid-May 2021.
- The control building for TPSS 2 is now expected to arrive in late April 2021.
- Continue to address low voltage drop installation at TPS-2.
- Continued low voltage terminations and fence installation at TPS-1.

Table 2 below shows the status of the major elements of each of the individual facilities comprising the TPS.

Table 2 - Traction Power Facilities Progress as of January 15, 2021

Facility	Sitework	Substation Building	Low / High Voltage Equipment	Transformer	Gantry	Overall Percent Complete
TPS-1	97%	88%	93%	100%	87%	93%
TPS-2	88%	88%	88%	100%	94%	91%
SWS-1	89%	88%	88%	100%	89%	91%
PS-1	31%	0%	0%	90%	20%	28%
PS-2	33%	70%	0%	90%	15%	42%
PS-3	0%	0%	0%	0%	0%	0%
PS-4	57%	70%	28%	100%	51%	61%
PS-5	58%	70%	50%	90%	89%	73%
PS-6	94%	70%	90%	100%	86%	88%
PS-7	85%	88%	90%	100%	97%	92%
Wayside Power Cubicles		Required 28; Installed 14				

Notes:
Sitework: Mobilize, Clear and grub, Lighting/Equip Cast in Drilled Hole (CIDH) Foundations, Duct Bank, Drainage, Subgrade, Fence/Concrete Masonry Unit (CMU), Finished Grade;
Substation Building: Earthwork (Excavation/Bedding), Foundation (form, rebar, pour), Set House, Pull Wire;
Low/High Voltage Equipment: Yard Equipment, ATS & AUX, Power Drop;
Transformer: Earthwork (Excavation/Bedding), Foundation (form, rebar, pour), Set Transformer, ABB Fit Up; and
Gantry: Foundations (pothole, drill, pour), Set Gantry, Cables/Pipes/Wires, Gantry Equipment.

Signal System

- *Four cutovers (1, 2, 3A and 3B) have been completed in Segment 4.*
- *Installation of signal ductbank, conduits, and cables continued in Segment 2 and 1.*
- *Case installation continued at Control Point (CP) Center Remote.*
- *Performed signal cutover at CP Delmas to CP Alameda.*
- *Cable terminations and staging continued at CP Stockton and CP Franklin.*
- *Performed pre-testing at CP Bird to CP Mack.*
- *Continued fiber optic cable installation and splicing in Segment 4 at CP Stockton and CP Franklin.*

Supervisory Control and Data Acquisition (SCADA)

- *SCADA Factory Acceptance Test is in progress.*
- *hardware installation at Central Control Facility (CCF) and Back-up Central Control Facility (BCCF) is expected to be complete by the end of June 2021.*

Concurrent Non-Project Activities:

The JPB has an on-going capital construction program that includes several projects that will share some common elements with the PCEP. These projects have been designated as Concurrent Non-Project Activities (CNPAs), and the project elements that will be constructed for the benefit of the PCEP will be appropriately segregated for cost purposes. Some CNPAs have been completed; the following are still active:

- *30 OCS foundations were installed as part of the South San Francisco Station construction project in Segment 2. The project remains in construction although the OCS foundation work is complete.*
- *65 OCS foundations were installed as part of the 25th Avenue Grade Separation Project in San Mateo; the new overcrossing is in service and the project is substantially complete.*
- Installation of additional flip-up seats in EMU bike cars. This work will be funded locally.

2.12 Vehicle Technology and Procurement

The JPB placed an order for ninety-six (96) new bi-level EMU vehicles to be produced by Stadler US, Inc. and delivered in six-car trainsets. The JPB ordered an additional thirty-seven (37) EMUs in December 2018 using an option in the Stadler contract. The JPB has now ordered an electrified fleet of one hundred thirty-three (133) EMUs configured as nineteen (19) seven-car trainsets. The JPB has remaining options to purchase up to fifty-nine (59) more EMUs at prices based on the date when the option is exercised.

The EMU contract contained an option for Stadler to maintain the vehicles; the JPB did not exercise this option and the vehicles will be maintained by TASI, the JPB's current rail operator. The JPB states that Stadler will provide on-site training and assistance for TASI's personnel for two (2) years following vehicle acceptance.

The EMUs were ordered with two (2) sets of doors, one set at approximately 22" above top of rail, and one at approximately 50.5" above top of rail. Initially, only the lower set of doors will be activated, and a small step will automatically deploy outside the vehicle to reduce the boarding height to the current platforms. The PCEP's Change Management Board, at its September 2019 meeting, approved the JPB's request for a change order to install temporary panels in place of the high-level doors until the trains operate in blended service with the CHSRA. The high-level doors will be placed in storage until they are installed for blended service with the CHSRA. When the EMUs operate in blended service with the CHSRA vehicles, the high-level doors will be operated to provide level boarding at the higher CHSRA platforms at those stations served by both systems. See additional discussion under Regulatory Issues below.

Stadler reported the following progress on the vehicles:

- *Trainset 1 (TS 1) arrived at the TTCI in Pueblo, CO, on February 27, 2021 and initial testing is underway. TS 1 has been operated at speeds up to 90 mph; the speed is limited until special instrumented wheelsets are installed after which the train will be tested up to 110 mph. The high speed tests are expected to run the week of April 5, 2021 and observed by the JPB's EMU Steering Committee. Testing at TTCI will include an eight-car trainset using one of the cars from TS 2; these tests will take place through mid-September.*

- *Seisenbacher, Stadler's supplier of interior panels and luggage racks, is unable to fulfill its contractual commitments, which could delay completion of EMU deliveries by six-twelve (6-12) months. Sufficient parts to complete a second trainset (TS 2) are available in Salt Lake City. Stadler's search for a suitable replacement supplier has thus far been unsuccessful.*
- *The first trainset to be delivered to the JPB will likely be TS 2 and the delivery is now expected in December 2021. This is a delay of approximately five (5) months since the last forecast delivery date of July 2021.*
- *One test procedure for the Pueblo tests remains to be approved; specific subject matter experts will be present for the various tests.*
- *COVID-19 related impacts continue to have varying impacts on Stadler's activities, although the number of reported new cases at the Salt Lake City assembly plant have dropped substantially from late 2020:*
- *Stadler has submitted an additional request for an 'excusable delay' due to COVID-19. The extent of the continuing delay is being evaluated.*
- *70 car shells have been shipped from Stadler - Switzerland with 55 onsite in Stadler's Salt Lake City facility.*

Regulatory Issues

- The last FRA on-site design review in Salt Lake City took place July 8-9, 2020, after being re-scheduled due to COVID-19. FRA identified the need for barriers between stored bikes and wheelchair parking areas in the Bike cars. *JPB issued a Change Order to Stadler for installation of the barriers and that work is in progress.*
- *Test Plan: The Pre-Revenue Service Test Plan was submitted to the FRA for approval on January 20, 2021.*
- *A sample car inspection is planned for the third week in June.*
- The FRA, in a letter dated June 8, 2018, denied the JPB's request for a waiver on the use of the high-level doors for emergency egress from the EMUs. The JPB previously developed an alternative to address this possible outcome. The alternative is complicated and requires creation of an interim configuration that replaces the high-level doors with an emergency exit window. The JPB's Change Management Board, as noted above, approved the installation of temporary panels in place of the high-level doors until the trains operate in blended service with the CHSRA.
- The JPB, in response to requests from its bike community, is installing additional flip-up seats and railings in each of its bike cars. The flip-up seats and railings accommodate access to emergency egress windows in the bike cars. The FRA observed the configuration of the bike cars during its July 2020 visit to Stadler's plant and requested that additional barriers be installed between the bicycles and the designated Americans with Disabilities Act (ADA) seating location. *Stadler developed a design proposal which was approved by the JPB, and a Change Order has been issued to Stadler to install the barriers. The FRA will review the installation during its sample car inspection currently scheduled for June 2021.*
- The FRA denied the JPB's request for a waiver for a passenger emergency door opening system that in Caltrain's opinion is safer for its system; the FRA required system will be installed.

2.13 Project Cost

Table 3 below presents the PCEP costs as of February 28, 2020. The JPB re-forecasts the estimated cost at completion (EAC) monthly. The JPB had expected to re-baseline its Capital Cost Estimate in mid-2019 after it had assessed the cost and schedule impacts to the Electrification contract, had issued the CEMOF Modification contract, and completed its Monte Carlo risk assessment update to inform the contingency requirements. However, the re-baselining did not occur. *The JPB is again*

discussing re-baselining the budget following settlement of the current mediation proceedings, and its review of the FTA Risk Refresh results.

Table 3 – Project Cost Table at 2-28-2021 ($ millions)[1]

SCC Category	Original Budget	Current Budget	Expenditures to Date	Earned Value [2]	Estimate to Complete	Estimate at Completion
10 Guideway & Track	$14.3	*$27.4*	*$25.0*	N/A	*$3.1*	*$28.1*
30 Support Facilities	$2.3	*$8.3*	*$6.5*	N/A	*$1.9*	*$8.4*
40 Sitework & Special Cond.	$255.1	*$259.0*	*$218.3*	N/A	*$50.4*	*$268.8*
50 Systems	$504.4	*$505.1*	*$254.8*	N/A	*$273.9*	*$528.7*
Construction Subtotal	**$776.0**	***$799.8***	***$504,6***	N/A	***$329.3***	***$834.0***
60 ROW	$35.7	$35.7	*$21.6*	N/A	*$14.9*	*$36.5*
70 Vehicles	$625.5	*$620.6*	*$253.0*	N/A	*$367.1*	*$620.1*
80 Prof. Services	$323.8	*$369.2*	*$318.4*	N/A	*$67.8*	*$386.2*
90 Unallocated Contingency	$162.6	*$95.5*	$0.0	N/A	*$44.0*	*$44.0*
Capital Cost Subtotal	**$1,923.7**	**$1,920.8**	***$1,097.6***	N/A	***$823.1***	***$1,920.8***
100 Finance Cost	$7.0	$9.9	*$7.0*	N/A	*$2.8*	$9.9
TOTAL	**$1,930.7**	**$1,930.7**	***$1,104.6***	***$797.9***	***$825.9***	**$1,930.7**

[1] Totals may not add due to rounding.

[2] The PCEP does not currently report earned value by SCC; the total earned value is taken from the JPB's Core Accountability submission.

PMOC Note: The JPB publicly reports expenditures against a total project budget of $1,980,252,533. This higher amount includes expenditures prior to the project's entry into the Project Development (PD) phase, which is excluded from the FTA's project budget. Costs incurred prior to the project's entry into the PD phase were removed from the estimate at the FTA's request during its review of the FFGA materials.

Cost Contingency Status

Table 4 summarizes the project contingency as of February 28, 2021 for the project.

Table 4 – Contingency Status ($ millions) [1]

Contingency Category	Baseline Contingency (YOE)	Current Contingency (YOE)	% of Construction Complete and % Contingency Remaining
Allocated	$152.9	*$14.8*	*51.21%*
Unallocated	$162.6	*$44.0*	
TOTAL	**$315.5**	*$58.8[2]*	***18.6%***

[1] Totals may not add due to rounding.

[2] Estimate at Completion

The cost contingency balance is currently above the amount required by the JPB's drawdown curve; however, a significant amount of remaining contingency is already "effectively encumbered" by change orders in progress and other expected adjustments.

Project Funding

The PCEP is relying on several sources of funding to complete the project. The Table in the Executive Summary summarizes the JPB's funding plan, as updated through June 23, 2017. The updated funding plan shows total funding of $1,930.7 billion, including $647 million in Section 5309 funds. The plan also includes federal funding from the Section 5307 Urbanized Area Formula program of $287 million. *The JPB has drawn down a total of $1,018,524 as of March 30, 2021, or 53% of the combined federal and local funds.*

The JPB has in-place an interim financing agreement for up to $150 million to provide additional cash flow flexibility to address differences in the timing of contractor invoices and the availability of drawdowns from funding sources.

The State of California awarded the JPB a $164.5 million grant in 2018 under its Transportation and Intercity Rail Capital Program (TIRCP). The grant will fund the purchase of additional EMUs using options included in the base contract with Stadler. The grant also includes targeted funding for 8-car platforms, improves wayside bicycle facilities (bike sharing and bike parking), and installs a broadband communications system that expands onboard Wi-Fi and enhances reliability by creating the capability to conduct remote diagnostics and optimize ongoing operations and maintenance.

Change Orders

Electrification Contract Changes: *The JPB reported issuing Change Orders (COs) to BBII in the approximate amount of $11.8 million during the period from September 2020 through February 2021. The COs cover installation of the CPUC required shunt wire, 2019 incentive payments, 2019 track access delays, electrical system impact and single phase studies, and work performed at CEMOF.*

EMU Contract Changes: *The JPB issued four (4) Change Orders, including two (2) no cost changes, totaling approximately $985,000 during the period from September 2020 through February 2021. The two (2) cost Change Orders were for procurement of the pantograph inspection system and bike car dividers.*

Tunnel Contract Changes: *The JPB issued one (1) Change Order for additional fencing in the amount of $15,651 during the period from September 2020 through February 2021.*

CEMOF Contract Changes: *The JPB issued Change Orders totaling $473,581 during the period from September 2020 through February 2021. The COs cover the relocation of several utilities encountered at the CEMOF and other minor items.*

Contractor Claims

The Electrification contractor has submitted a total of four claims; the most significant claim is associated with its efforts to provide the required warning time at grade crossings. Other claims include denial of a Design Variance Request for alternate feeder and contact wire; percent of payment for CWT under Allowance Item #10; and costs for an alternate designer for Segment 1A. The four (4) claims are described in greater detail below.

The JPB and BBII, the Electrification contractor, continue to meet in a technically facilitated mediation process in an effort to resolve these issues. *The main issue is related to the 2SC grade crossing warning system. The JPB reports that the parties, including the signal subcontractors, are in discussions several times each week and progress is being made with respect to resolving the 2SC issues. The JPB reports that resolving how compensation for the settlement will be paid continues to be troublesome.*

- The Electrification contractor has been reporting a delay to its substantial completion date for many months based on its alleged inability to begin work on the grade crossing warning system as planned in its baseline schedule. The delay has been day-for-day. The Electrification contractor submitted a delay claim on behalf of its signals' subcontractor, and shortly thereafter, submitted its Time Impact Analysis - 2 (TIA-2) for the delays associated with the grade crossing warning issue. The transmittal letter for TIA-2 presented a Change Order Cost Proposal in the amount of $239,550,209 consisting of $71,882,763 in Direct Costs and $167,667,445 in Delay Costs. The time impact presented in the letter is 1,092 calendar days, made up of 224 calendar days associated with Change Order No. 41 (the 5 MPH Solution) and 868 calendar days to perform the added scope or work. [**PMOC Note:** Prior to the development of the 2SC solution, the contractor had been working on an approach which would have used a series of detectors to provide warning time based on train speeds in 5 mph increments. Change Order No. 41 was issued to the contractor for the direct cost of that work.] The amount of the subcontractor's claim mentioned above is included in the Change Order Cost Proposal. The JPB has denied the contractor's claim. The JPB is proceeding with a detailed review of TIA-2. The TIA process is the first step in determining whether the contractor suffered a delay, who is responsible for the delay, whether there are offsetting delays, and whether the delay is excusable and/or compensable. Once the circumstances are determined, there may be opportunities to mitigate schedule impacts by a variety of techniques.
- The Electrification contractor submitted a Design Variance Request (DVR) in 2017 to substitute alternative products for the specified Autotransformer Feeder (ATF) Wire and Static Wire used in the OCS. The JPB reviewed the request in 2017, but never took the formal action required to approve the request. The JPB subsequently rejected the DVR. The contractor does not agree with the JPB's position and has submitted a claim for resolution.

2.14 Project Schedule

The FFGA was executed on May 23, 2017.

The JPB updates its Master Project Schedule (MPS) monthly; the February 2021 update has a status date of March 1, 2021 and is MPS C21.01. The JPB had planned to re-baseline its current MPS in 2019 to account for significant changes including the contract award dates for the tunnel and CEMOF contracts; differing site conditions impacts on OCS construction; progress on the PG&E substations and interties; and implications of the CWT (now 2SC) issue. The re-baselining did not occur because the PCEP team did not receive an acceptable Time Impact Analysis (TIA-2) from the contractor for the delays associated with resolving 2SC. *Without accurate schedule information related to the 2SC and other signals activities, re-baselining would be largely ineffective.*

The JPB initially rejected TIA-2 as submitted by the contractor in mid-2019; however, the JPB subsequently reviewed TIA-2 to better understand the contractor's position and as an aid in preparing the JPB's own shadow schedules. The evaluation of TIA-2 was never completed. *The mediation that is underway between the JPB and BBII, the Electrification design-build contractor and its signal subcontractors, is focused on establishing a clear date for completion of the 2SC and other signals-related work and settlement of related cost issues. The underlying issues are discussed in the preceding Section 2.13 under the heading Contractor Claims. BBII's most recent Progress Schedule Update Narrative report for February 2021, received March 23, 2021, shows a substantial completion date of May 30, 2024, compared to the contractual date of August 10, 2020, or a total delay of 1,389 calendar days to substantial completion. This substantial completion date compares to the December 6, 2022 FCD carried in the JPB's February 2021 MPS update. The JPB continues to reject BBII's recent schedule updates. The contractor's written narrative is only one factor in*

determining whether the project has been delayed, which party or parties is responsible for that delay, the extent of the delay, and whether the delay is compensable or excusable.

PCEP Master Project Schedule (MPS) Development

The JPB's February 2020 MPS, when considered with the contractor's earlier schedules, provided sufficient detail on the signals design, construction, and testing activities for the PCEP scheduling team to complete the construction of its shadow schedule. The PMOC discussed scheduling progress with the PCEP scheduler on March 17, 2020 in advance of the April 1 Risk Refresh Workshop, and again during its virtual meeting on May 19, 2020. The JPB's April 2020 Internal Risk Refresh Workshop used MPS C19.0 for schedule risk modeling. MPS C19.0 was created using the then current MPS 18.15 with modifications based on signals details contained in BBII's February 2020 progress schedule update. The scheduling team then applied several "mitigation strategies" to reduce the overall duration of the resulting schedule. Some of the mitigation strategies were corrections of errors that resided in BBII's schedule updates, others were based on assumptions of productivity that could be achieved by the contractor working in a more collaborative manner. Following the completion of the Risk Refresh Workshop, MPS C20.0 was introduced with a status date of June 1, 2020. *As noted above, the most recent MPS is C21. 01 with a status date of March 1, 2021.*

The schedule materials provided to the PMOC for use in its December 2020 Risk Refresh were based on the approach to signals completion described above, updated for work accomplished during the intervening period, and revised signals assumptions based on recent experience. The MPS was accompanied by the Rail Activation Schedule, and BBII's September 2020 progress schedule. The JPB linked these three (3) schedule documents to provide a "hybrid" integrated schedule for the PMOC's use. The JPB continues to work on the full integration of the schedules.

Recent Significant Schedule Changes

The following are examples of the significant schedule changes mentioned in the JPB's September 2020 thru February 2021 MPS updates. ***Note that these variances may not reflect the state of the MPS as of the February 2021 update. That information is presented on Table 5 and described in the following paragraphs, beginning with the "Critical Path" heading.***

Electrification

1. *Balfour Beatty continues to lag in submittal of its progress schedules. All progress schedule submittals remain "rejected." The JPB has received batched submittals for review and recently worked with BBII on a recovery plan to get submittals back on schedule. The February 2021 submittal was received on March 23, 2021, and the March 2021 submittal is expected mid-April 2021.*
2. *Delays in traction power switchgear deliveries have resulted in delays to Traction Power Substation 2 (TPSS-2), which subsequently delayed completion of Segment 4. The forecasted substantial completion date for BBII may be in jeopardy due to delays in overall traction power facility (TPF) progress.*
3. *Signals design progress continues to lag behind baseline productivity levels. These productivity issues have delayed BBII's substantial completion from April 2022 to July 2022. This effort now represents the Program's critical path.*
4. *Signal's design and installation progress continues to lag behind baseline productivity levels The low productivity rates for Signal Design and Installation have resulted in a one-month delay to the Electrification schedule.*

5. Design and construction of the TPFs continue to progress at a slow rate. Delays in traction power switchgear have resulted in delays to all completion of TPFs.

EMU Vehicles

6. *COVID-19 related delays to Stadler's assembly and test of EMU trainsets have resulted in later forecasted dates for arrival of the first trainset in Pueblo, CO, as well as arrival of the first trainset on JPB property. These delays resulted in shifting the critical path for the November schedule update from Electrification to EMU Manufacturing and pushed back the Revenue Service Date from 07/22/2022 to 09/09/2022. This remains a fluid situation as the effect of COVID-19 on Stadler during the upcoming winter months remains unknown.*
7. *COVID-19 related delays to Stadler's assembly and test of EMU trainsets have resulted in later forecasted dates for the arrival of the first trainset in Pueblo, CO. These delays resulted in one month schedule slippage in conditional acceptance of trainset 14 and pushed back the Revenue Service Date from 09/09/2022 to 10/10/2022. Due to COVID-19 impact on Stadler's schedule, the program no longer has any schedule contingency.*
8. *COVID-19 continues to impact Stadler's schedule and have shifted the program critical path from Electrification (Signals System) to EMU (Manufacturing of Trainsets).*

SCADA

9. *The executed Electrification Pre-First Article Test (FAT) change request has resulted in a three-month delay in the SCADA contractor ARINC's schedule, which pushes the Installation and Equipment Cutover from 03/18/2021 to 06/24/2021.*

Testing and Commissioning

10. *Due to the delay in BBII's substantial completion, the program schedule no longer reflects a Phased Revenue Service milestone, as the electrification infrastructure is completed after acceptance of the fourteenth trainset.*

PG&E

11. *PG&E has provided a schedule update to JPB on the completion of Permanent Power which will now occur on April 15th, 2022.*

Table 5 below, which is based on the MPS C21.01 with a Data Date of March 1, 2021, shows the current projected dates for completion of various significant project activities.

Table 5 – Schedule Key Milestone Dates

Milestone	Baseline	Grantee Forecast	PMOC Forecast
Design/Build Notice to Proceed:	12/2015	06/2017 (A)	
Final Engineering (FE) Completion:	04/2018	03/2021 (P)	*08/2022* (P)
Systems Integration Testing Completed:	01/2019	*10/22/2022 (P)*	*10/22/2022 (P)*
Design/Build Substantial Completion:	02/2019	*10/22/2022 (P)*	*10/22/2022 (P)*
Conditional Acceptance of First EMU Trainset:		*3/8/2022*(P)	*3/8/2022(P)*
Pre-Revenue Operation Completed:	05/2020	*03/26/2022 (P)*	*03/26/2022 (P)*
Revenue Service Date (without Risk Contingency):	12/2021	*12/06/2022 (P)*	*12/06/2022 (P)*
FFGA Final Completion Date:	05/2020	*12/06/2022* (P)	*12/06/2022* (P)
(P) Planned Date (A) Actual Date			

Critical Path

The PCEP is a core capacity project. The core capacity completion objective will be satisfied when the JPB operates a total of fourteen (14) seven-car trainsets in electrified service.

The critical path of the project currently runs through the design, installation, and integrated testing of the signal system. The recent delay in completion of the signals work shifted the critical path from manufacturing and delivery of the EMU trainsets.

Schedule Contingency Status

The JPB reported the following in its November 2020 schedule update issued December 14, 2020: "Last month, there were 26 days schedule contingency. Due to COVID-19 impact on Stadler's schedule, the program no longer has any schedule contingency."

Revenue Service Date

The JPB's November schedule update also stated: "These [COVID-related EMU] delays resulted in shifting the critical path for the November schedule update from Electrification to EMU Manufacturing and pushed back the Revenue Service Date from 07/22/2022 to 09/09/2022." Note that this date is later than the FFGA Final Completion Date (FCD) of August 22, 2022. The FCD, referred to in the JPB's reports as the Revenue Service Date (RSD), continued to slip and as of the February 2021 schedule update issued March 19, 2021, is projected to be December 6, 2022.

Phased Revenue Service

Earlier versions of the JPB's schedule included revised logic related to the start of passenger service using the new EMUs; that approach was referred to as Phased Revenue Service. The PMOC's understanding was that the JPB intended to conduct a short period of pre-revenue operations following the completion of integrated testing, and then transition to revenue service using the EMUs that have been accepted. This concept was included in the initial version of the Rail Activation Plan.

The PCEP's October 2020 schedule update, issued November 17, 2020 stated: "Due to the delay in BBII's substantial completion, the program schedule no longer reflects a Phased Revenue Service milestone, as the electrification infrastructure is completed after acceptance of the fourteenth trainset."

Next Steps (Schedule)

The lack of an accepted schedule for the electrification work, the consistent late delivery of schedule updates by the contractor, much slower than anticipated production of OCS, TPS and signals work, unresolved time impacts in negotiated change orders, and the earlier reduction in schedule contingency to a very low value, given the amount of work remaining, led the PMOC to recommend that the FTA conduct an independent risk refresh. *The PMOC conducted a risk refresh in early December 2020; additional details are in the immediately following Section 2.15 Project Risk.*

- **PMOC Observations:**
  - Uncertainty regarding the completion schedule for the PCEP is the most pervasive issue affecting the project.
  - The inability or unwillingness of the Electrification contractor to produce realistic schedule updates for completion of the remaining work, which the JPB can accept contractually, is a significant factor preventing the parties from moving forward toward a common goal.

- Despite the JPB's initiation of small groups focused on the resolution of specific issues, e.g., potholing and foundations, new real estate parcels, and signals design, actual progress remains slow and new challenges continue to appear and/or old issues remain unresolved.
- The PMOC's opinion, expressed previously, is that the JPB management team is lean for a project of this size and complexity.

2.15 Project Risk

The PCEP has been implementing its RIMP (Risk Identification and Mitigation Plan) since its development in 2014. The PCEP's Risk Management Lead conducts weekly updates of a sub-set of the Risk Register and the project's Risk Management Committee generally meets monthly to review those risks proposed for retirement, risks with a major change in severity, and proposed additions to the Risk Register. The JPB has also created a "Watch List" of possible occurrences such as currency fluctuations or labor shortages to better understand the PCEP's risk position.

The JPB conducted a Risk Refresh Workshop on April 1, 2020; because of the COVID-19 pandemic, the workshop was held using web-collaboration software. The workshop was well planned and executed, and all risks on the Risk Register were reviewed and re-graded as needed.

The Monte Carlo cost model was run shortly after the workshop was concluded and the direct cost of risk was determined. This information was shared with the JPB's funding partners. Analysis of schedule risk was delayed until additional signal details were incorporated into the Master Project Schedule. The PCEP team applied schedule mitigation strategies to account for inconsistencies in the schedule information obtained from the contractor's schedule before finalizing the schedule results. The mitigated schedule was used to determine the indirect cost of risk, i.e., the cost resulting from the modeled schedule delay multiplied by the daily overhead charges of the various project participants. The total cost of risk is the sum of the direct and indirect costs of risk plus a management reserve. The results of the cost and schedule risk analysis were combined and have been shared with the JPB's funding partners.

The Top Risks, with risk number, are shown in Attachment C. Risks shown in italics are new to the list of Top Risks since the previous monitoring report. **PMOC Note:** Risks graded 12 or higher are now considered Top Risks. Prior to the recent regrading of the Risk Register, risks graded 18 or higher were considered Top Risks.

The following are other current risk related activities:

- *The Rail Activation Risk Register is being maintained by the Rail Activation Committee; however, the PCEP risk lead has not been involved in the Rail Activation risk process since the creation of the original risk register.*
- *The Contractor Risk Management Program was not effectively implemented by the contractor; however, the PCEP team is reviewing and addressing contractor "owned" risks as appropriate.*

FTA Risk Refresh

The PMOC conducted an FTA-led virtual Risk Refresh workshop on December 8, 10, 15, and 17, 2020 and prepared and submitted the draft report to the FTA. The objective of the Risk Refresh was to confirm the likelihood of the project completing within budget and in accordance with the FFGA schedule. The PMOC subsequently briefed the FTA on the results of the Risk Refresh, and FTA is currently reviewing the draft report.

- **PMOC Observations:** *The lack of an approved, updated project schedule for the Electrification contract creates numerous problems for both the PCEP team as well as the contractor. Various parties have expressed a complete lack of confidence in the schedules produced by the contractor, and near-term activities are being managed by team members based on one-on-one conversations regarding the progress or issues affecting the specific topic.*

2.16 Quality Assurance / Quality Control (QA/QC)

Jeff Werner was appointed as the new Quality Assurance Manager for the PCEP.

The following specific quality management activities were reported for the PCEP:

Infrastructure Projects

- *Conducted a Buy America audit of the Electrification contractor on 2/24/21 with one finding; BBII to provide updated confirmation that its purchased materials comply with Buy America requirements.*
- *Provided QA review of BBII submittals of Certificates of Conformance (C of C) and Certificates of Analysis (C of A).*
- *Provided QA review of BBII Non-Conformance Reports (NCRs) and Construction Discrepancy Reports (CDRs) to assure that in-process discrepancies are processed as required.*
- *Provided review of BBII QA Audit Surveillance Reports.*

EMU Quality

- *Vapor Stone Heating Ventilation Air Conditioning (HVAC): All findings closed.*
- *Corrective Action Request (CAR) regarding overall Quality Assurance (QA) issues in Salt Lake City (SLC): Open points are discussed on a weekly basis.*

  - **PMOC Observations and Recommendations:** The PMOC has initiated a discussion on the role of the PCEP's quality management team as related to the Systems Integration, Rail Activation, Safety and Security Certification, and Testing and Start-up activities that will be required as the project develops its overall plan for these current and late-stage activities.

2.17 Safety and Security

The JPB contracts for safety and security consulting services to support the PCEP. The PCEP safety team also supports the JPB, which now has an Acting Director Safety/Security.

The PCEP safety team continues to monitor the safety performance of the various contractors and subcontractors working on the project, including their compliance with Site Specific Work Plans. *The safety team recently audited the COVID-19 related safety performance of the active PCEP contractors and subcontractors. The results of the audit showed good use of Personal Protective Equipment (PPE) and social distancing where possible, consistent with the requirements of particular tasks.*

The safety performance of BBII, the Electrification contractor, has improved and its Recordable Incident Rate is now below industry average.

2.18 Americans with Disabilities Act (ADA)

Early in the development of the project, the PMOC raised a question regarding the need for the PCEP to demonstrate Equivalent Facilitation under the ADA with respect to either the new EMU vehicles or the infrastructure. A conference call was held on November 6, 2015 between members of the

PCEP team, FTA Region IX staff and the PMOC, and the FTA's Office of Civil Rights to discuss the issue. The representative of the Office of Civil Rights stated that based on information presented by PCEP's representatives, the project will not need to demonstrate Equivalent Facilitation because the current access to the vehicles will remain unchanged. This is in compliance with Americans with Disabilities Act (ADA) requirements.

The new EMU vehicles will be equipped with powered on-board lifts to aid passengers using mobility devices. The JPB requested the FTA's concurrence to reduce the number of on-board lifts from 32 per train set to 16 per train set, and to phase the installation of the lifts. The JPB's proposal calls for initial installation of two (2) lifts per train set, one (1) each in the northernmost car and one (1) in the following car, which will be equipped with an accessible restroom. The remaining four (4) lifts per train set are to be installed prior to the start of blended service with the CHSRA trains. The FTA, following its review of the JPB's proposal and further clarification provided by a conference call, concurred with the JPB's proposed reduction in the total number of passenger lifts per train set. The phased installation of the lifts was also discussed and associated grant timing considerations. Caltrain's Rail Operations Department recently requested the interim removal of the two (2) on-board lifts until such time as the EMUs operate in blended service with the CHSRA trains. The justification for this request is that the space occupied by the on-board lifts will interfere with the movement of passengers using the stairs where the lifts are installed. Further, the accommodation of passengers using mobility devices and wishing to use the restroom can be accomplished by de-boarding the passenger and repositioning the train at any station, a procedure currently in use. The change was approved by the Change Management Board at its September 2019 meeting.

The new EMU vehicles must comply with the FTA's current ADA requirements and the guidance in FTA Circular 4710.1.

The FRA conducted an on-site design review of EMU TS1 at Stadler's assembly facility in Salt Lake City, Utah in July 2020. During the review, the FRA expressed concerns related to possible interference between stored bicycles, passengers seated in the bike cars and access to the emergency egress points in the bike cars. *Stadler has completed design of the barrier and a Change Order has been executed for installation of the barriers.*

2.19 Buy America

The JPB continues working on a response to the PMOC's request for confirmation that the JPB's contractors are complying with the Buy America Act as it relates to their individual contracts. *The JPB has promised a response prior to QPRM No. 16.* None of the JPB's contractors have requested Buy America waivers thus far.

The EMU vehicle consultant reports that Stadler's Buy America compliance continues to exceed the 60% requirement. *The JPB's vehicle consultant has begun preliminary planning for an Intermediate Buy America audit to be conducted during the summer of 2021.*

2.20 Start-Up, Commissioning, Testing

The JPB and PCEP team have several activities focused on start-up and testing of both the infrastructure elements of the project as well as the EMU vehicles. Each of the three (3) primary contractors is responsible for developing and conducting test and commissioning plans for its work elements. The PCEP team is responsible for the integration of the major elements and the overall start-up of electrified rail operations.

Electrification Contract (OCS, Traction Power, Signals and Communications)

- BBII is preparing test plans and schedules for its work elements, Operations and Maintenance (O&M) manuals, and is participating in the project-wide Systems Integration, Safety and Security Certification Committee, *Testing and Commissioning, and Rail Activation meetings.*
- BBII has a sub-contracted Safety Certification consultant who is now assisting completion of the required documentation.

EMU Contract

- The FRA-required Pre-Revenue Service Test Plan for the EMUs was submitted in draft form for FRA comment. *Comments have been received from the FRA and revisions are underway.*
- Static testing of Trainset 1 (TS1) was completed at Stadler's Salt Lake City facility and the trainset was shipped to the TTCI in Pueblo, CO where it is undergoing its performance tests. The EMU consultant reports that the tests are progressing with few problems.
- Stadler is participating in the project-wide Systems Integration and Safety and Security Certification Committee meetings.

SCADA Contract

- *The Factory Acceptance Test (FAT) is currently underway.*
- *ARINC is finalizing its Operations and Maintenance manuals and training plans for submission to the JPB.*

Readiness for Electrified Rail Operations

The PCEP's Rail Activation Committee (RAC) meets bi-weekly. The RAC is currently chaired by Sal Gilardi, one of the two principals of the safety contractor, until a permanent chair is named. The RAC includes representatives from the PCEP's technical consultants and the JPB's Rail Operations group. The Rail Operations consultant has engaged a scheduler to further develop the Rail Activation Schedule; the PCEP scheduler is no longer directly involved in the RAP. *The RAC continues to develop the Rail Activation Schedule and include information from other committees such as Testing and Commissioning and Systems Integration.*

- **PMOC Observations:** The PMOC recommended that a separate risk workshop be conducted to identify the potential risks associated with the rail activation process The PCEP Risk Lead conducted a risk workshop for the Rail Activation Committee in May 2020 and a risk register was developed and is being maintained by the RAC.
- *The PMOC continues to monitor the activities of the RAC as well as the other project activities related to start up and testing and safety certification. The PMOC continues to encourage all parties to communicate openly to avoid confusion. The PMOC has encouraged the integration of the PCEP and Rail Operations activities; however, the organizations are proceeding in parallel with coordination as needed.*

2.21 Before-and-After Study Reporting

The PMOC verified that the JPB had prepared a Before and After (B&A) Study Plan during its evaluation of the PCEP's readiness to receive an FFGA. The B&A Plan was reviewed by FTA headquarters staff as part of the FFGA preparation process. The PMOC verified that the JPB has archived Before and After Documentation as of the Entry into Engineering (August 12, 2016). The materials were assembled according to the specifications in Appendix A of the Plan for the Before-and-After Study. The PMOC will verify that the JPB has archived the required materials for Milestone 2, FFGA award. The PMOC will also follow-up with the JPB to encourage early planning to address the After requirements of the plan.

2.22 Lessons Learned

The PMOC routinely encourages the PCEP team to identify and document lessons learned during the course of the PCEP. The PMOC discovered, during a routine review using ACONEX, the project's document control system, that a Draft Lessons Learned Log and two (2) examples of elaborated lessons learned had already been produced. Further inquiry produced the following information.

The PCEP Risk Manager conducted a series of interviews (not for attribution) with members of the PCEP team in 2018, with the objective of developing a list of Lessons Learned. The interviews produced a log of 35 issues which was distilled into two (2) for elaboration as an example of how the material could be further developed. The two topics that were further developed were Contractor Construction Work Windows and Land Acquisition Lesson Learned.

The Lessons Learned materials described above were reproduced as an attachment to the PMOC's Final Monitoring Report under Task Order 005; the report was submitted in June 2020. *The PMOC continues to encourage the PCEP team to document lessons learned on this project.*

Attachment A List of Acronyms

Acronyms	List of Terms
2SC	Two Speed Check Grade Crossing Approach Warning System
AAR	Association of American Railroads
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ARINC	Aeronautical Radio, Incorporated
ATF	Autotransformer Feeder
ATP	Alternate Technical Proposal
BAAQMD	Bay Area Air Quality Management District
BAFO	Best and Final Offer
BART	Bay Area Rapid Transit District
BBII	Balfour-Beatty Infrastructure, Inc.
BCCF	*Back-up Central Control Facility*
BGSP	Broadway Grade Separation Project
Caltrans	California Department of Transportation
CAR	Corrective Action Request
CBOSS	Communications Based Overlay Signal System
CC	FTA's Core Capacity Improvement Program
CCB	Change Control Board
CCF	*Central Control Facility*
CCIP	Contractor Controlled Insurance Program
CCSF	City and County of San Francisco
CDR	*Construction Discrepancy Report*
CEL	Certified Elements List
CEMOF	Central Equipment Maintenance and Operations Facility
CEQA	California Environmental Quality Act
CGA	Construction Grant Agreement
CHSRA	California High-Speed Rail Authority
CIG	FTA's Capital Investment Grant Process
CIL	Certifiable Items List
CMB	Change Management Board
CM/GC	Construction Manager/General Contractor
CNPA	Concurrent Non-Project Activity
CO	Change Order
CP	Control Point
CPUC	California Public Utilities Commission
CSCG	City/County Staff Coordinating Group
CWT	Constant Warning Time
D-B	Design-Build
DBB	Design-Bid-Build
DBE	Disadvantaged Business Enterprise
DEIR	Draft Environmental Impact Report
DQP	Design Quality Plan
DRB	Disputes Review Board
DSC	Differing Site Condition
DSDC	Design Support During Construction
DVR	Design Variance Request
EA	Environmental Assessment
EAC	Estimate at Completion
EE	Entry into Engineering
EIR	Environmental Impact Report
EIS	Environmental Impact Study
EMU	Electric Multiple Unit Rail Vehicle

Acronyms	List of Terms
ESZ	Electrical Safety Zone
ETB	Electrified Trolley Buses
FAI	First Article Inspection
FAT	Factory Acceptance Test
FCD	Final Completion Date
FD	Final Design
FEIR	Final Environmental Impact Report
FERC	Federal Energy Regulatory Commission
FFGA	Full Funding Grant Agreement
FLSC	Fire Life Safety Committee
FMOC	Financial Management Oversight Consultant
FMP	Fleet Management Plan
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FWO	First Written Offer
FY	Fiscal Year
GO	General Order (issued by the CPUC)
HSR	High-Speed Rail
HVAC	*Heating, Ventilation, and Air Conditioning*
ICE	Independent Cost Estimate
I-ETMS	Interoperable Electronic Train Management System
IFB	Invitation for Bids
IFC	Issued for Construction
IGA	Inter-Governmental Agreement
IJ	Insulated Joints
Cal ISO	California Independent System Operator
ITCS	Incremental Train Control System
JPB or PCJPB	Peninsula Corridor Joint Powers Board
Jacobs	Jacobs Project Management Company
KKCS	Kal Krishnan Consulting Services, Inc.
LNTP	Limited Notice to Proceed
LONP	Letter of No Prejudice
LPMG	Local Policy Makers Group
MCC	Management Capacity and Capability
MOU	Memorandum of Understanding
MPS	Master Project Schedule
MRS	Modern Railway Systems
MTC	Metropolitan Transportation Commission
NCR	Non-conformance Report
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NTO	Notice to Owner (for Utility Relocation)
NTP	Notice to Proceed
OCS	Overhead Contact System/Overhead Catenary System
PAP	*Palo Alto Power*
PCEP	Peninsula Corridor Electrification Program
PCWG	Peninsula Corridor Working Group
PD	Project Development Phase
PG&E	Pacific Gas and Electric
PHA	Preliminary Hazard Assessment
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PPE	*Personal Protective Equipment*

Acronyms	List of Terms
ProVen	ProVen Management, Inc.
PS	Paralleling Station for Traction Power Supply
PTC	Positive Train Control
PTCSP	*Positive Train Control Safety Plan (FRA)*
PTG	Parsons Transportation Group
QA	Quality Assurance
QAP	Quality Assurance Plan
QC	Quality Control
QMP	Quality Management Plan
QPRM	Quarterly Progress Review Meeting
RAC	Rail Activation Committee
RAMP	Real Estate Acquisition and Management Plan
RAP	Rail Activation Plan
RAS	*Rail Activation Schedule*
RE	Resident Engineer
RFA	*Request for Amendment*
RFI	Request for Information
RFMP	Rail Fleet Management Plan
RFP	Request for Proposal
RIMP	Risk Identification and Mitigation Plan
RON	Resolution of Necessity (for Eminent Domain purposes)
ROW	Right of Way
RSD	Revenue Service Date or Revenue Service Demonstration
RWIC	Roadway Worker in Charge
RWP	Roadway Worker Protection
RWQCB	Regional Water Quality Control Board
SamTrans	San Mateo County Transit District
SCADA	Supervisory Control and Data Acquisition
SCC	Standard Cost Category
SCVTA/VTA	Santa Clara Valley Transportation Authority
SCVWD	Santa Clara Valley Water District
SF	City of San Francisco
SFCTA	San Francisco County Transportation Authority
SFMTA	San Francisco Municipal Transportation Agency
SHPO	State Historic Preservation Office
SJ	City of San Jose
SLC	Salt Lake City
SMCTA	San Mateo County Transportation Authority
SME	Subject Matter Expert
SOGR	State of Good Repair
SONO	Statement of No Objection
SOO	Statement of Objection
SP	Southern Pacific Transportation Company
SSCP	Safety and Security Certification Plan
SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
SSOA	State Safety Oversight Agency
SSWP	Site Specific Work Plan
SVP	Silicon Valley Power
TAD	Track Access Delay
TASI	Transit America Services, Inc.
TEAM	Transportation Electronic Award Management System
TIA	Time Impact Analysis
TIRCP	Transportation and Intercity Rail Capital Program

Acronyms	List of Terms
TJPA	Transbay Joint Powers Authority
TPF	Traction Power Facility
TPS	Traction Power System
TPSS	Traction Power Substation
TrAMS	Transportation Award Management System
TTCI	Transportation Technology Center, Inc.
TVA	Threat and Vulnerability Analysis
TVM	Transit Vehicle Manufacturer
UPRR	Union Pacific Railroad
USDOT	U. S. Department of Transportation
USFWS	United States Fish and Wildlife Service
VE	Value Engineering
VECP	Value Engineering Change Proposal
VTA	Santa Clara Valley Transportation Authority
WPC	Wayside Power Cabinet
YOE	Year of Expenditure

Attachment B Safety and Security Checklist

Safety and Security Checklist			
Project Overview			
Project Mode	Commuter Rail		
Project Phase	FFGA – Construction		
Project Delivery Methods	Design-Build, Design-Bid-Build		
Project Plans	**Version**	**Review by FTA**	**Status**
Safety and Security Management Plan (SSMP)	*Rev 6*	Y	Reviewed June 2020; *Rev 7 awaiting review*
Safety and Security Certification Plan (SSCP)	Rev 0		Under Review
System Safety Program Plan (SSPP)	Rev 7		Under Review
System Security Plan or Security and Emergency Preparedness Plan (SEPP)	Rev 0		*SSP was audited by CPUC in March 2021 with no findings*
Construction Safety and Security Plan (CSSP)	V3 Part C of SPs		In Contract Documents

Safety and Security Checklist		
Area of Focus	**Y/N**	**Notes/Status**
Safety and Security Authority		
Is the project sponsor subject to 49 CFR Part 659 state safety oversight requirements?	Y	
Has the state designated an oversight agency as per 49 CFR Part 659.9?	Y	California Public Utilities Commission is SSOA; the FTA certified California's SSOA program on October 23, 2018.
Has the oversight agency reviewed and approved the project sponsor's Security Plan or SSPP as per 49 CFR Part 659.17?	TBD	*CPUC audited the System Security Plan during March 2021; there were no findings.*
Did the oversight agency participate in the last Quarterly Review Meeting?	*Y*	*QPRM No. 15 was held January 26, 2021*
Has the project sponsor submitted its safety certification plan to the oversight agency?	TBD	SSCP submitted Rev. 0 which is currently under review.
Has the project sponsor implemented security directives issued by the Department of Homeland Security and/or Transportation Security Administration?	Y	No directives have been received at this time; Transit Police is the liaison between DHS and Caltrain.
SSMP Monitoring		

Safety and Security Checklist		
Area of Focus	**Y/N**	**Notes/Status**
Is the SSMP project-specific, clearly demonstrating the scope of safety and security activities for this	Y	
Does the project sponsor review the SSMP and related project plans to determine if updates are necessary?	Y	
Does the project sponsor implement a process through which the Designated Function (DF) for Safety and DF for Security are integrated into the overall project management team? Please specify.	Y	In the SSMP and Section 11.0 of the PMP.
Does the project sponsor maintain a regularly scheduled report on the status of safety and security activities?	Y	Safety & Security activities are reported in the monthly PCEP report.
Has the project sponsor established staffing requirements, procedures and authority for safety and security activities throughout all project phases?	Y	Section 3.0 of SSMP
Does the project sponsor update the safety and security responsibility matrix/organizational chart as necessary?	Y	
Has the project sponsor allocated sufficient resources to oversee or carry out safety and security activities?	Y	
Has the project sponsor developed hazard and vulnerability analysis techniques, including specific types of analysis to be performed during different project phases?	Y	PHA Rev. 1, APR 16
Does the project sponsor implement regularly scheduled meetings to track to resolution any identified hazards and/or vulnerabilities?	Y	Yes, in Safety and Certification Committee meetings which started in December 2016 on a project level and through our "Capital Safety Committee" which meets monthly. IndustrySafe is also being used to track safety activities.
Does the project sponsor monitor the progress of safety and security activities throughout all project phases? Please describe briefly.	Y	Yes, through the Safety & Security Certification Committee and the Fire/Life Safety Committee which are ongoing committees throughout the life of the project.
Does the project sponsor ensure the conduct of preliminary hazard and vulnerability analyses? Please specify the analyses conducted.	Y	PHA Rev. 1 APR 16, Under review. A PHA has been prepared for changes to the CEMOF facility to accommodate the new EMUs. A PHA has been prepared to address the 2SC grade crossing warning approach and provided to the FRA. TVA Rev. 1 APR 16, Under review. OHA is currently being developed.
Has the project sponsor ensured the development of safety design criteria?	Y	
Has the project sponsor ensured the development of security design criteria?	Y	
Has the project sponsor ensured conformance with safety and security requirements in design?	Y	Design Criteria checklists are currently being developed and reviewed by the Safety & Security Certification Review Committee.

Safety and Security Checklist		
Area of Focus	**Y/N**	**Notes/Status**
Has the project sponsor verified construction specifications conformance?	Y	*All facets of the Electrification construction are underway, OCS, TPS, Signals and Communication.*
Has the project sponsor identified safety and security critical tests to be performed prior to passenger operations?	Y	Addressed in SSMP as required by D/B Contractor during construction.
Has the project sponsor verified conformance with safety and security requirements during testing, inspection, and start-up phases?	Y	Addressed in SSMP and SSCP.
Has the project sponsor evaluated change orders, design waivers, or test variances for potential hazards and/or vulnerabilities?	Y	Through the Change Management Board.
Has the project sponsor ensured the performance of safety and security analyses for proposed workarounds?	Y	This is included in the Rail Activation Committee scope during testing/startup activities. BBII's Safety & Security Certification flow chart identifies the process.
Has the project sponsor demonstrated through meetings or other methods the integration of safety and security in the following? • Activation Plan and Procedures • Integrated Test Plan and Procedures • Operations and Maintenance Plan • Emergency Operations Plan	 Y Y N N	A Rail Activation Plan has been prepared and is being refined for initial testing and operation of the new EMUs. The Rail Activation Committee has been meeting regularly since May 2019 and a Rail Activation Schedule has been prepared and an Integrated Test Plan and Procedures developed.
Has the project sponsor issued final safety and security certification?	N	Project is in construction. *Final Completion Date is 12-06-2022.*
Has the project sponsor issued the final safety and security verification report?	N	Project is in construction. *Final Completion Date is 12-06-2022.*
Construction Safety		
Does the project sponsor have a documented/implemented Contractor Safety Program with which it expects to comply?	Y	The Design/Build contractors "Construction Safety Program" and "Health and Safety Plan" have been accepted.
Does the project sponsor's contractor(s) have a documented company-wide safety and security program plan?	Y	System Safety Plan submitted and Approved 2/1/2017
Does the project sponsor's contractor(s) have a site-specific safety and security program plan?	Y	Rev. 2 submitted and Approved 12/9/2016
How do the project sponsor's OSHA statistics compare to the national average for the same type of work?		The review of the Design-Build contractor's reported OSHA statistics revealed that some incidents had been miss-classified; this raised the Incident Rate above 3.0 for the period. *The project showed a Total Recordable Incident Rate of 1.5 for the year 2020 compared to the most recent (2019) BLS rate of 1.8 for Heavy and Civil Engineering construction.*
If the comparison is not favorable, what actions are being taken by the project sponsor to improve its safety record?		The D-B contractor reviews all incidents with its employees at its monthly safety meetings.

Safety and Security Checklist		
Area of Focus	**Y/N**	**Notes/Status**
Federal Railroad Administration		
If a shared track, has the project sponsor submitted its waiver request application to FRA? (Please identify specific regulations for which waivers are being requested.)	Y	Waivers approved 1/13/2016 for 49 CFR: 49 CFR 238.203, Static end strength; 238.205, Anti- climbing mechanism; and 238.207, link between coupling mechanism and car body.
If a shared corridor, has the project sponsor specified specific measures to address safety concerns?	Y	In Caltrain/TA Services/UP Passenger Train Emergency Preparedness Plan and Caltrain System Safety Program Plan
Is the Collision Hazard Analysis underway?	Y	Car body testing and Collision Analysis has been completed and report sent to FRA.
Other FRA required Hazard Analysis – Fencing, etc.?	TBD	This is an operating ROW, and no service change is expected. Additional right of way fencing is being installed.
Does the project have Quiet Zones?	TBD	This is an operating ROW, and no service change is expected.
Does FRA attend the Quarterly Review Meetings?	*Y*	*FRA attended QPRM No. 15 on January 26, 2021.*

Attachment C Action Items

The following table presents the open Action Items as of the date this report was prepared. New items are indicated by colored text, items whose status has changed from the prior listing are italicized and completed items have been shaded.

No.	Action Item	Discussion	Agreed Due Date	Responsibility Agency/Name	Status
13.01	JPB to review and assess BBII's Buy America compliance practices and results and report on its findings and any needed remedial actions.	Per FTA's direction, the JPB must determine whether BBII is satisfying the BA requirements in its grant.	*NLT QPRM #16*	Larano	*The PCEP's new QA Manager is reviewing BBII's BA documentation.*
13.02	JPB to submit a Request for Amendment (RFA) to Caltrain's Positive Train Control Safety Plan (PTCSP) under 49 CFR Sec. 236, Subpart I; the RFA will document the design and performance of its 2SC grade crossing warning system.	PCEP staff spoke with Carolyn Hayward Williams of FRA and her staff on August 4, 2020. A new strategy was recommended to satisfy FRA's requirements related to implementation of the 2SC solution.	Amendment to be submitted after Caltrain's PTCSP is approved, and documented test results are available from one or more crossings. Schedule for submittal of the RFA is likely first quarter calendar 2021.	Funghi/Cocke and Bouchard	*Caltrain's PTCSP was approved by the FRA on December 17, 2020 FRA approved the JPB's Field Test Request for 2SC on January 6, 2021. The FRA's representative observed cutover 2A testing and test reports have been submitted to the FRA.*

Attachment D Top 5 Project Risks

The top five (5) risks and their respective ranking remains unchanged from the previous report.

Risk No.	Risk Category		Risk Description	Status
	Cost	Sched.		
314	X	X	Design and construction of grade crossing modifications that meets stakeholder and regulatory requirements may cost more than was budgeted and delay the revenue service date.	Design progress is slower than required. Sponsor is engaged in mediation to improve production. *Sponsor reports continuing progress toward settlement.*
303	X	X	Extent of differing site conditions and delays in resolving differing site conditions delays completion of electrification increases program costs. The contractor is encountering more DSCs than anticipated and taking longer to resolve.	This problem continues to impact design and construction of OCS foundations. *Approximately 26% or 806 of the planned 3108 foundations remain to be constructed as of 3/30/2021.*
313	X	X	Sub-optimal contractor sequencing, when progressing design and clearing foundation locations may result in construction inefficiencies	Sponsor holds weekly meetings with Electrification contractor to focus on problem areas and remove impediments where possible.
240	X	X	Property not acquired in time for contractor to do work.	A limited number of problem parcels remain; however, shifting of foundation locations may result in new or altered acquisitions.
267	X	X	Additional property acquisition is necessitated by change in design.	Sponsor meets regularly with contractor and design team to pursue alternatives that would avoid new ROW acquisition.
Top five (5) risks as shown on Risk Register dated 3-19-2021				

Attachment E Awarded Contracts

This information will be provided in a future report following clarification by the FTA. The current list of contracts numbers over 130. Sixty-four (64) contracts have values over $50,000, and fifty-seven (57) have values over $100,000. The total value of awarded contracts is provided in the Core Accountability Table of this report.

Contract	Contractor / Consultant	Base Contract Value	Value of Changes / Amendments	Current Value	Incurred Amount	Start Date (NTP)	Completion Date

Attachment F Rolling Stock Vehicle Status Report

- **Manufacturer/Model Year/Vehicle Model or Type/Propulsion:** Stadler Bi-level Electric Multiple Unit (EMU) Commuter Rail vehicles (a variant of Stadler's "KISS" product line. The JPB plans to operate the vehicles initially in 7-car trainsets and later expand to 8-car trainsets.
- **Piggyback or Option:** Contract contains an option for up to 96 additional EMUs, with the price varying depending on the date the option is exercised. Option vehicles ordered prior to December 31, 2018 are purchased at the original price.
- **Number of Vehicles:** Initial Order of 96 EMUs to be delivered as 6-car trainsets; current order is 133 EMUs delivered as 7-car trainsets.
- Contract Advertisement Date: August 21, 2015
- Contract Award Date: August 15, 2016
- Price per Vehicle (Initial Order): $26,408,000 per 6-car trainset
- Planned Date of First Vehicle Delivery /Actual: July 29, 2019 */ December 1, 2021 (Planned)*
- Initial Vehicle Order (Number of Vehicles and Configuration): 96 EMUs delivered as 6-car trainsets
- Number of Option Vehicles Included in Contract: 96
- Buy America Domestic Content Percentage Required: 60%
- Domestic Content Percentage per Pre-award Audit: 79.38%
- **Latest Domestic Content Percentage Reported and Date:** Domestic content was reported to vary from 63.23% to 74.81% for the four (4) different car type variants as of March 2018.
- Date of Pre-Award Audit: May 25-26, 2016
- Pre-award Audit Report Date: June 21, 2016
- Intermediate Buy America Audit Date (If Planned): March 19-21, 2018; TBD mid-2021
- Date of Post-Delivery Audit: TBD
- Post-Deliver Audit Report Date: TBD
-

Attachment G Project Milestones / Key Events

Milestone	Baseline	Grantee Forecast	Summary of Milestone / Event
New Starts/Core Capacity Grant Agreement:	Not in MPS	05/2017 (A)	
Design/Build Notice to Proceed:	12/2015	06/2017 (A)	
Arrival of first EMU in Pueblo, CO	N/A	*2/27/2021 (A)*	
Arrival of First EMU at JPB	07/2019	*12/01/2021 (P)*	
Final Engineering (FE) Completion:	04/2018	*08/2022 (P)*	
Systems Integration Testing Completed:	01/2019	*10/22/2022* (P)	
Segment 4 Complete to Begin EMU Testing:	11/2019	*08/10/2021* (P)	
Completion of Interconnection from PG&E to TPSS 2	N/A	*1/29/2021 (P)*	
Design/Build Substantial Completion:	02/2019	*10/22/2022 (P)*	
Conditional Acceptance of First EMU Trainset:		*3/8/2022(P)*	
PG&E Provides Permanent Power:	09/2021	*4/15/2022 (P)*	
Pre-Revenue Operation Completed:	05/2020	*03/26/2022 (P)*	
Begin Phased Revenue Service:		*10/3/2022 (P)*	
Revenue Service Date (without Risk Contingency):	12/2021	*12/6/2022 (P)*	
FFGA Final Completion Date:	05/2020	*12/06/22 (P)*	

Attachment H Roadmap to Electrified Rail Service

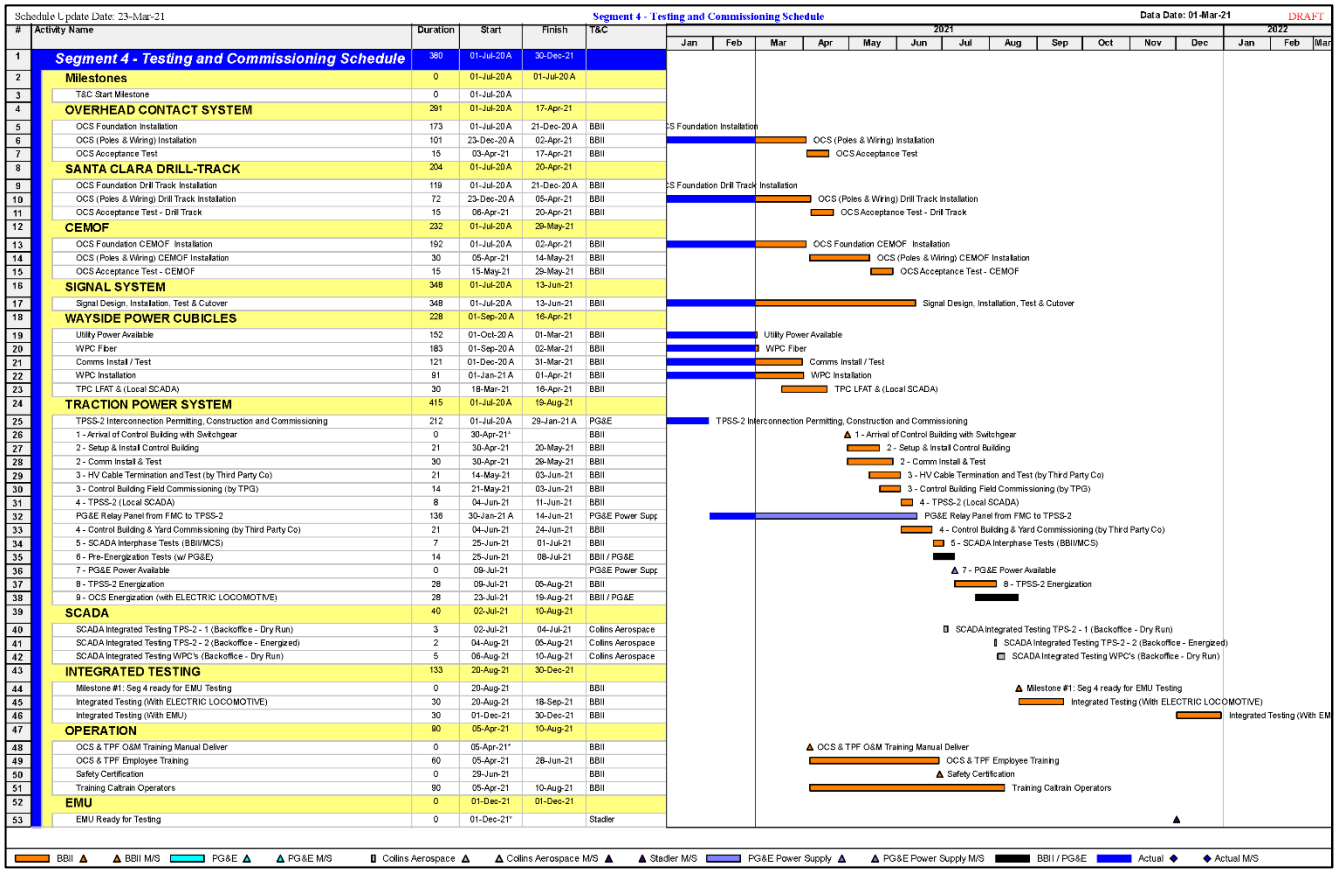
Electrified operations on the Caltrain system will occur in stages. The first stage will be electrification of Segment 4 of the PCEP, including a designated test track. For clarity, Segment 4 is the southerly most segment of the PCEP. Initial electrification will require completion of TPSS 2; completion of the interconnection between PG&E's FMC substation in San Jose and TPSS 2; completion of the OCS system in Segment 4; completion of the signals, communications and SCADA systems in Segment 4; and testing and commissioning of the above components as well as safety certification of the relevant components. Completion of work in Segment 4 is designated as Milestone 1 in the BBII Electrification Design-Build contract. Following electrification of Segment 4 and the test track, local testing of the EMU vehicles will commence following their delivery to the JPB.

The second stage of electrification will include completion of remaining Segments 1, 2 and 3, and the individual elements of each plus the integrated testing, commissioning, and safety certification of the entire project. Final Completion for purposes of the JPB's Core Capacity FFGA requires fourteen (14) seven-car trainsets in weekday revenue service. *The FFGA shows the FCD as August 22, 2022; the JPB's latest published schedule shows the FCD occurring between December 6, 2022 and March 31, 2023.*

The PCEP has an active Rail Activation Committee (RAC) to coordinate the various activities needed to successfully initiate electrified rail operations. The RAC is currently chaired by Sal Gilardi, one of the two principals of the PCEP's safety contractor. The RAC includes representatives from JPB employees assigned to the PCEP, PCEP's technical consultants, the JPB's Rail Operations group, and more recently from BBII, the Electrification contractor. The RAC continues to refine coordination between the rail activation, systems integration, and testing and commissioning meetings to make the resulting RAC meetings more productive. *The RAC meets on a bi-weekly basis to review assigned action items, upcoming activities, and the current schedule; the most recent meeting was held April 1, 2021.*

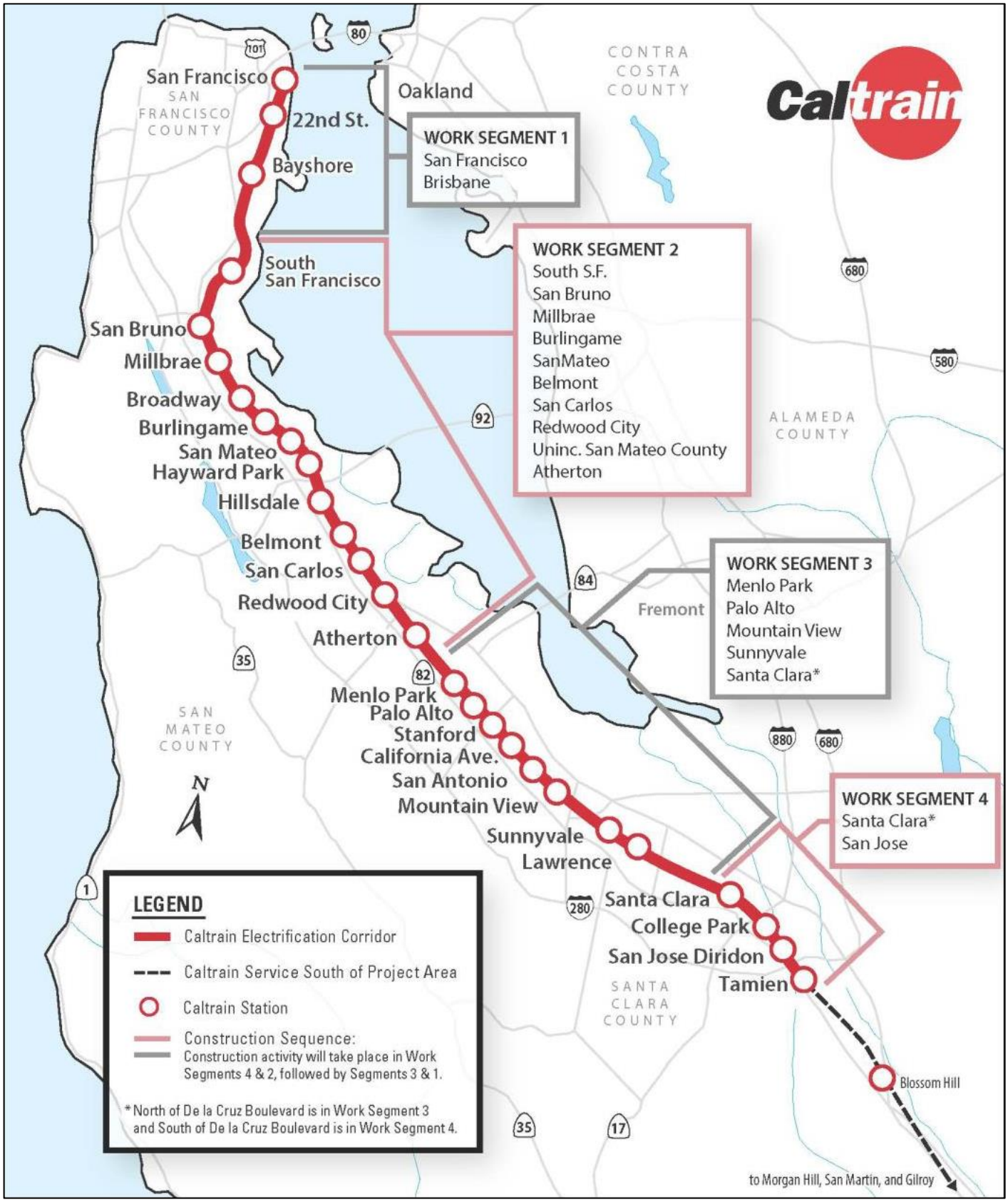
The RAC produced a Draft Rail Activation Plan, which was distributed for review and has recently been revised. The RAC held a Rail Activation Risk Workshop shortly after the Committee was formed and produced a Risk Register with a total of 34 risks. *The RAC maintains a Rail Activation Schedule which is updated regularly; the most recent update is dated March 1, 2021. The RAC is also using a Segment 4 Testing and Commissioning Schedule to focus on the Electrification contractor's Milestone 1, Segment 4 Ready for EMU Testing. The objective of this schedule is to capture the key activities required to achieve Milestone 1 and to update the status of those activities to reflect real time circumstances. The schedule is updated at least biweekly. A copy of the most recent Segment 4 Testing and Commissioning schedule is shown in Figure H-1.*

Figure H-1 Segment 4 Testing and Commissioning Schedule



#	Activity Name	Duration	Start	Finish	T&C
1	**Segment 4 - Testing and Commissioning Schedule**	380	01-Jul-20 A	30-Dec-21	
2	**Milestones**	0	01-Jul-20 A	01-Jul-20 A	
3	T&C Start Milestone	0	01-Jul-20 A		
4	**OVERHEAD CONTACT SYSTEM**	291	01-Jul-20 A	17-Apr-21	
5	OCS Foundation Installation	173	01-Jul-20 A	21-Dec-20 A	BBII
6	OCS (Poles & Wiring) Installation	101	23-Dec-20 A	02-Apr-21	BBII
7	OCS Acceptance Test	15	03-Apr-21	17-Apr-21	BBII
8	**SANTA CLARA DRILL-TRACK**	204	01-Jul-20 A	20-Apr-21	
9	OCS Foundation Drill Track Installation	119	01-Jul-20 A	21-Dec-20 A	BBII
10	OCS (Poles & Wiring) Drill Track Installation	72	23-Dec-20 A	05-Apr-21	BBII
11	OCS Acceptance Test - Drill Track	15	06-Apr-21	20-Apr-21	BBII
12	**CEMOF**	232	01-Jul-20 A	29-May-21	
13	OCS Foundation CEMOF Installation	192	01-Jul-20 A	02-Apr-21	BBII
14	OCS (Poles & Wiring) CEMOF Installation	30	05-Apr-21	14-May-21	BBII
15	OCS Acceptance Test - CEMOF	15	15-May-21	29-May-21	BBII
16	**SIGNAL SYSTEM**	348	01-Jul-20 A	13-Jun-21	
17	Signal Design, Installation, Test & Cutover	348	01-Jul-20 A	13-Jun-21	BBII
18	**WAYSIDE POWER CUBICLES**	228	01-Sep-20 A	16-Apr-21	
19	Utility Power Available	152	01-Oct-20 A	01-Mar-21	BBII
20	WPC Fiber	183	01-Sep-20 A	02-Mar-21	BBII
21	Comms Install / Test	121	01-Dec-20 A	31-Mar-21	BBII
22	WPC Installation	91	01-Jan-21 A	01-Apr-21	BBII
23	TPC LFAT & (Local SCADA)	30	18-Mar-21	16-Apr-21	BBII
24	**TRACTION POWER SYSTEM**	415	01-Jul-20 A	19-Aug-21	
25	TPSS-2 Interconnection Permitting, Construction and Commissioning	212	01-Jul-20 A	29-Jan-21 A	PG&E
26	1 - Arrival of Control Building with Switchgear	0	30-Apr-21*		BBII
27	2 - Setup & Install Control Building	21	30-Apr-21	20-May-21	BBII
28	2 - Comm Install & Test	30	30-Apr-21	29-May-21	BBII
29	3 - HV Cable Termination and Test (by Third Party Co)	21	14-May-21	03-Jun-21	BBII
30	3 - Control Building Field Commissioning (by TPG)	14	21-May-21	03-Jun-21	BBII
31	4 - TPSS-2 (Local SCADA)	8	04-Jun-21	11-Jun-21	BBII
32	PG&E Relay Panel from FMC to TPSS-2	136	30-Jan-21 A	14-Jun-21	PG&E Power Supp
33	4 - Control Building & Yard Commissioning (by Third Party Co)	21	04-Jun-21	24-Jun-21	BBII
34	5 - SCADA Interphase Tests (BBII/MCS)	7	25-Jun-21	01-Jul-21	BBII
35	6 - Pre-Energization Tests (w/ PG&E)	14	25-Jun-21	08-Jul-21	BBII / PG&E
36	7 - PG&E Power Available	0	09-Jul-21		PG&E Power Supp
37	8 - TPSS-2 Energization	28	09-Jul-21	05-Aug-21	BBII
38	9 - OCS Energization (with ELECTRIC LOCOMOTIVE)	28	23-Jul-21	19-Aug-21	BBII / PG&E
39	**SCADA**	40	02-Jul-21	10-Aug-21	
40	SCADA Integrated Testing TPS-2 - 1 (Backoffice - Dry Run)	3	02-Jul-21	04-Jul-21	Collins Aerospace
41	SCADA Integrated Testing TPS-2 - 2 (Backoffice - Energized)	2	04-Aug-21	05-Aug-21	Collins Aerospace
42	SCADA Integrated Testing WPC's (Backoffice - Dry Run)	5	06-Aug-21	10-Aug-21	Collins Aerospace
43	**INTEGRATED TESTING**	133	20-Aug-21	30-Dec-21	
44	Milestone #1: Seg 4 ready for EMU Testing	0	20-Aug-21		BBII
45	Integrated Testing (With ELECTRIC LOCOMOTIVE)	30	20-Aug-21	18-Sep-21	BBII
46	Integrated Testing (With EMU)	30	01-Dec-21	30-Dec-21	BBII
47	**OPERATION**	90	05-Apr-21	10-Aug-21	
48	OCS & TPF O&M Training Manual Deliver	0	05-Apr-21*		BBII
49	OCS & TPF Employee Training	60	05-Apr-21	28-Jun-21	BBII
50	Safety Certification	0	29-Jun-21		BBII
51	Training Caltrain Operators	90	05-Apr-21	10-Aug-21	BBII
52	**EMU**	0	01-Dec-21	01-Dec-21	
53	EMU Ready for Testing	0	01-Dec-21*		Stadler

Attachment I Project Map



Attachment J PMOC Team

The report was prepared by the Task Order Manager, **Mike Eidlin**, J.D. (KKCS) who has more than 40 years of complex project management experience including over 28 years in transit. Mr. Eidlin possesses a B.S. degree, a graduate Degree of Engineer, and a Juris Doctor degree. He is a licensed attorney in the State of Oregon. He has been working as a PMOC for 16 years.

Brett L. Rekola, **P.E. (KKCS)** contributed to the preparation of the report and provided the Quality Assurance of the report. Mr. Rekola is the Program Manager for KKCS' FTA PMOC prime contract. He is a California professional civil engineer with more than thirty (30) years of experience managing railroad maintenance, planning, and design, construction, and rail operations. He has served as a program manager delivering port/rail/public works projects and programs.

Nancy Voltura (KKCS) assisted with the report. Ms. Voltura has over forty (40) years of Quality Assurance (QA) experience working as a QA Engineer, QA Auditor and QA Manager on large design and construction projects. Ms. Voltura is a trained Apparent Cause Analyst evaluating heavy construction quality issues, is a trained professional QA Auditor and has been a certified Lead QA Auditor per ASME/NQA-1 and N45.2.23 standards.

Kevin Byers, P.S.P. (KKCS) assisted with the report. He is KKCS' Project Scheduling Manager, holds a B.S. degree in Construction Management, and has 29 years' experience in scheduling and claims analysis for railroad and rail transit projects.

The administrative Quality Control review of this report was done by **Janice Johnson, (KKCS)**, who also serves as the Contracts & Terms Manager. Ms. Johnson has a background in English Studies and over twenty (20) years of experience providing quality review checks of PMOC work products.