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October 18, 2024

**The Honorable Members of the Board of Supervisors
City and County of San Francisco
1 Dr. Carlton Goodlett Place, Room 244
San Francisco, CA 94102**

***Subject: Request for Approval – Contract No. SFMTA-2024-40-FTA with Hitachi Rail GTS
USA***

Honorable Members of the Board of Supervisors:

The San Francisco Municipal Transportation Agency (SFMTA) requests that the San Francisco Board of Supervisors authorize the Director of Transportation to execute Contract No. SFMTA-2022-40 FTA with Hitachi Rail GTS USA for design, furnishment, system implementation, support and related services for a Communications-Based Train Control System (CBTC).

The contract term is for 9 years of design and procurement with an amount not to exceed \$212,093,633, followed by 10 years of support with an amount not to exceed \$114,070,833, and two 5-year options to extend the support with an amount not to exceed \$237,681,185, for a total contract term of up to 29 years.

Summary

The Train Control Upgrade Project (TCUP) is a capital project intended to deliver a modern Communications-Based Train Control (CBTC) system to the SFMTA's Muni Metro light rail system, replacing the loop cable based Automatic Train Control System (ATCS) and expanding train control to the surface portions of the Muni Metro network. The CBTC system will leverage significant technological advances to enable the SFMTA to improve reliability, reduce delays, and increase passenger capacity.

On December 6, 2022, the San Francisco Board of Supervisors passed Ordinance 252-22 waiving the Administrative Code prohibition against issuing solicitations for a contract exceeding ten years and authorizing the use of negotiated procurement procedures for a CBTC contract.

In March 2023, the SFMTA issued a Request for Proposals (RFP) for a Supplier to provide a CBTC system to replace the ATCS and extend train control to all parts of Muni's rail network. The Planning Department has determined that the TCUP is statutorily exempt from the California Environmental Quality Act (CEQA). The negotiated contract was approved by the SFMTA Board of Directors on October 15, 2024, and SFMTA is subsequently seeking Board of Supervisors approval as required by Charter section 9.118.



CBTC Project Background

The SFMTA Muni Metro system currently relies on an Automatic Train Control System (ATCS) to operate trains automatically in the 7-mile Market Street Subway and the new 1.6-mile Central Subway. All but one of Muni's rail lines merge into the dual-track Market Street Subway, which requires that trains move quickly through the tunnel to maintain vehicle flow and headways on the branch lines. While many other light rail systems in the United States still operate using older, fixed-block train control systems, Muni was an early adopter of sophisticated loop-cable based ATCS technology. In service since 1998, the ATCS enables safe, high-frequency service in the core of Muni's light rail network and is the backbone of rail service delivery. However, loop-cable based ATCS technology is now outdated, and the ATCS is at the end of its useful life. In its current condition, train control has caused a high number of delays to Muni's rail service due to daily communication failures, train timeouts and component failures. In February 2020, the Muni Reliability Working Group concluded that upgrading the train control system is the investment in Muni infrastructure that would have the greatest benefit to rail service.

The Train Control Upgrade Project (TCUP) is a capital project intended to deliver a modern Communications-Based Train Control (CBTC) system covering both the surface portions of the Muni Metro network and the subways. The TCUP will deliver a system which continues the excellent safety record of the current system, while also increasing the subway's efficiency and reliability. This technology boost will keep subway congestion to a minimum and reduce delays where trains are held between stations. The proposed contract is the result of SFMTA's open procurement to replace its loop-cable based ATCS with the latest generation radio-based CBTC technology.

With this project, CBTC supervision will be expanded to surface rail lines as well, bringing the entire Muni rail network under a single train control and supervision system. On the surface rail lines, the CBTC system will coordinate train movements with street traffic signals, manage surface junctions and oversee vehicle speed and dwell times to keep trains evenly spaced. This control will provide the SFMTA Transportation Management Center with the tools necessary to manage the entire Muni Metro system and minimize conflicts at junctions and delays at tunnel portals.

During its first phase, the project will introduce CBTC to the street-level Embarcadero and northern Third Street corridors, which serve major civic destinations such as Oracle Park, Chase Center, and UCSF Mission Bay, as a technology demonstration phase. In the second phase, the project will replace the existing ATCS in the Market Street Subway and Central Subway by first overlaying the CBTC on top of the existing system until the new CBTC is ready for commissioning. Over the rest of the nine-year span of the project, CBTC will be extended to the surface branches of the J, K, L, M, N and T lines so that Muni Metro train control is provided by a single CBTC system.



CBTC Project Goals, Contract Structure and Scope of Work

The SFMTA intends to contract with Hitachi Rail GTS USA (Supplier) for a long-term partnership in which the Agency and Hitachi Rail GTS USA will work together to improve the reliability and performance of the Muni Metro through implementation, operation and maintenance of the vendor's state-of-the-art CBTC system.

Hitachi Rail GTS USA is the incumbent supplier of SFMTA's existing SelTrac ATCS system, having purchased the business from Thales GTS USA, formerly Alcatel Canada. SelTrac has an international reputation as a quality CBTC product and has a long track record of safe operation, including with SFMTA. However, SFMTA's version of SelTrac had not been regularly updated since it first went into operation in 1998 and has fallen several generations behind the latest version of the product. Learning from the past, the SFMTA recognizes that its CBTC system should not be a static asset but must be adaptable to changes in transit operations and must be able to incorporate improvements in technology.

This Supplier contract includes design, procurement, testing, commissioning, and long-term support of a state-of-the-art CBTC system. The contract is structured to provide incentives to the Supplier to deliver a reliable CBTC system by tying part of their compensation to its system performance metrics, and the CBTC Supplier will be required to update the CBTC system as train control technology advances.

CBTC systems are proprietary, meaning that the system software, system support, and much of the CBTC equipment can only be obtained from a system vendor under sole source contracts. Generally, the vendor has a significant advantage in negotiating such sole-source support contracts after its system is installed. In the past, City procurement regulations that limit the term of a contract to ten years have effectively prohibited combining procurement and long-term support in a single contract. However, with the ordinance passed on December 6, 2022, the San Francisco Board of Supervisors authorized the SFMTA to use negotiated procurement procedures to procure a CBTC system with support services included the authorization to advertise a contract with a 29-year term (to include 20 years of support covering most of the expected 25-year life of the system).

The Supplier contract consists of two parts. The first part of the contract comprises CBTC design, procurement of software and equipment, system testing and certification, and will have a term of nine years. The CBTC will be installed in phases corresponding roughly to each Muni Metro line to give the SFMTA beneficial use of the CBTC before it is fully installed on all rail lines, and to provide opportunities for the new system's performance and stability to be assessed at each installation phase completion milestone. At the end of each phase, the Supplier will test the CBTC to ensure that it meets performance, quality and safety standards and certify each portion of the system for revenue service. The second part of the contract requires the Supplier to provide system support, which includes a supply of spare and replacement parts,



troubleshooting and diagnostics, software updates, and related technical services to assist the SFMTA in maintaining and operating the CBTC for most of its expected 25-year life after installation. The system support phase of the contract has a base term of ten years, with two five-year extension options. Both parts of the contract work together to ensure a reliable CBTC system is delivered and kept in a continuous state of good repair.

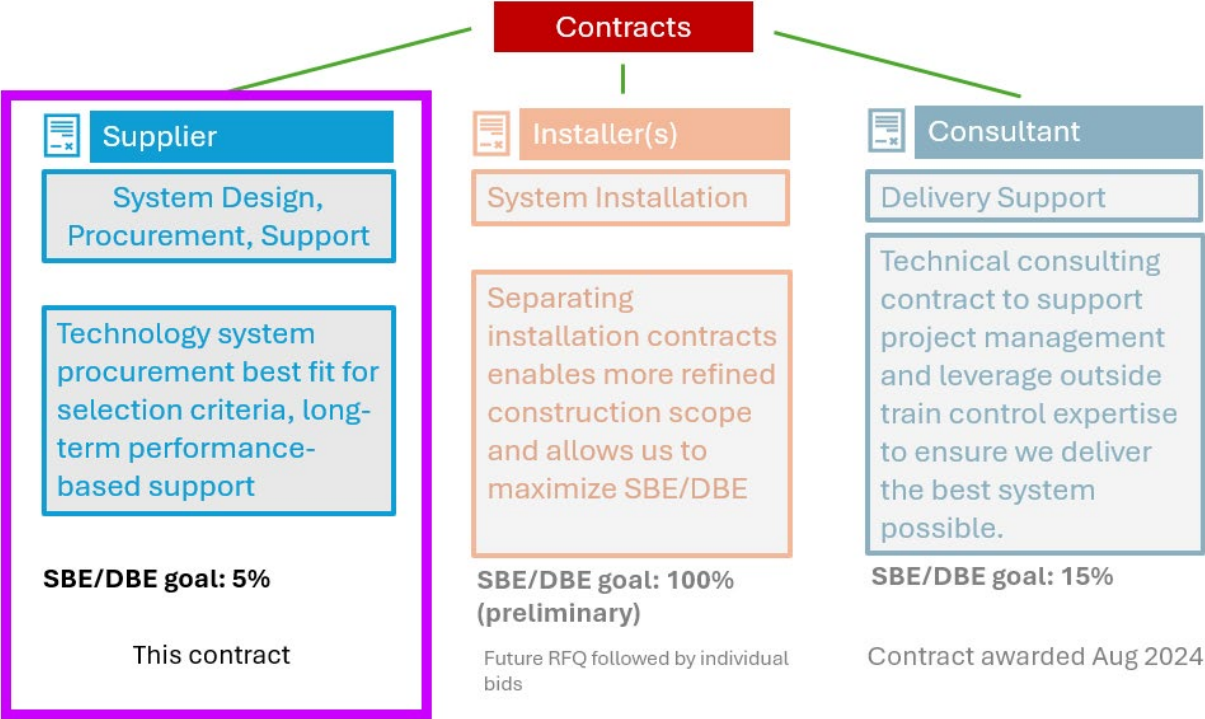
Like the current ATCS, the CBTC system is fundamental to Muni's rail operations. The design of the CBTC and its performance strongly influences the quality of Muni rail service delivery. As a key objective of this project, SFMTA sought to procure a high-quality CBTC system and secure the vendor's commitment to robust long-term support so that the CBTC-system related delays are kept to a minimum. To achieve this, SFMTA set up the RFP to evaluate best value, rather than low bid, and required prospective suppliers to competitively commit to performance targets, which were scored as selection criteria alongside the price. Hitachi Rail GTS USA offered the most competitive performance targets in their proposal, which positively contributed to their score. Those submitted performance values are now included in this contract as performance requirements. After the entire system is fully installed, the Supplier's monthly support service fees will be adjusted based on the system's performance relative to the offered performance requirements. This incentivizes the Supplier to design, furnish, test and support a high-quality CBTC system to maximize the compensation it receives.

The SFMTA will contract separately for the installation of train control equipment on the wayside and on the light rail vehicles. The Supplier will provide instructions to these Installers, witness the installation of its equipment, and assist the SFMTA in quality assurance responsibilities with respect to the Installers' work. At the end of installation, after acceptance by SFMTA, the Supplier will inspect and verify the installation of the CBTC equipment, and test and commission the installed system for operations.

The SFMTA also will contract with WSP/PGH Wong Joint Venture for professional consulting services to support the Agency on this project. This Consultant will assist the Agency in managing the relationship between the CBTC Supplier and Installer(s), augment SFMTA project staff with train control system experts, and support system integration and construction management activities.

At their August 6, 2024, meeting, the SFMTA Board of Directors passed a resolution authorizing the Director of Transportation to execute Contract SFMTA-2024-20-FTA with WSP/PGH Wong Joint Venture for Consultant support, and the San Francisco Board of Supervisors authorized the execution of this Consultant contract on September 17, 2024.

The structure of the separate Supplier, Installer(s), and Consultant contracts is shown in the image below:



Procurement and CBTC Vendor Selection Process

In 2018, the SFMTA released a Request for Information (RFI) to potential CBTC vendors. The purpose of the RFI was to solicit vendor interest and determine the capabilities and offerings of modern CBTC systems. Eight vendors responded, suggesting a high level of interest. However, three of the vendors did not meet federal contracting requirements, and two mergers of the remaining five vendors collapsed the size of the pool to three potential suppliers. The SFMTA released a follow-up RFI in July 2022 as an industry sounding to determine the viability of SFMTA’s anticipated contract, technical, and legal requirements and reassess the state of the industry after COVID. This second RFI informed the final edits to the RFP and associated contract specifications.

The SFMTA then issued a two-stage Request for Proposals (RFP) in March 2023 for the Supplier contract to provide the CBTC system and subsequently hosted a pre-proposal conference with approximately 75 attendees from potential suppliers and subcontractors. In October 2023, SFMTA received two proposals in response to the RFP. In accordance with the negotiated procurement process authorized by the Board of Supervisors for this project, the SFMTA evaluated and scored both proposals using a panel of SFMTA subject matter experts, including an outside panelist from the BART train control project. Based on the evaluation, the SFMTA



determined that both proposing firms qualified for the subsequent Request for Best and Final Offers (BAFO).

In preparation for the release of this Request for BAFOs, the SFMTA conducted in-person discussions with both proposers which allowed each of them to understand the weaknesses of their proposal so that they would have the opportunity to improve in the subsequent submission. The discussions also informed the SFMTA which of its requirements needed to be clarified and/or amended to better align with the capabilities that were available.

The SFMTA issued the Request for BAFOs, with additional clarification and scope refinements informed by the in-person discussions and initial proposal responses, on March 13, 2024. Two responsive proposals were received on June 3, 2024. As a result of the thoughtful information exchange during the in-person discussions and subsequent refinements to the RFP, the SFMTA received much improved offers. They contained more accurate pricing and performance targets, and offered solutions more precisely tailored to the SFMTA’s needs. The SFMTA undertook a revised evaluation and scoring process, using the same evaluation panel from the first round. Based on the evaluations of the BAFOs, Hitachi Rail GTS USA was confirmed as the highest-ranking proposer.

Results of RFP Evaluation

Evaluation Factors	Hitachi Rail GTS USA	Siemens
Total Score (Round 1)	76.09	55.13
Total Score (BAFO)	73.09	58.36

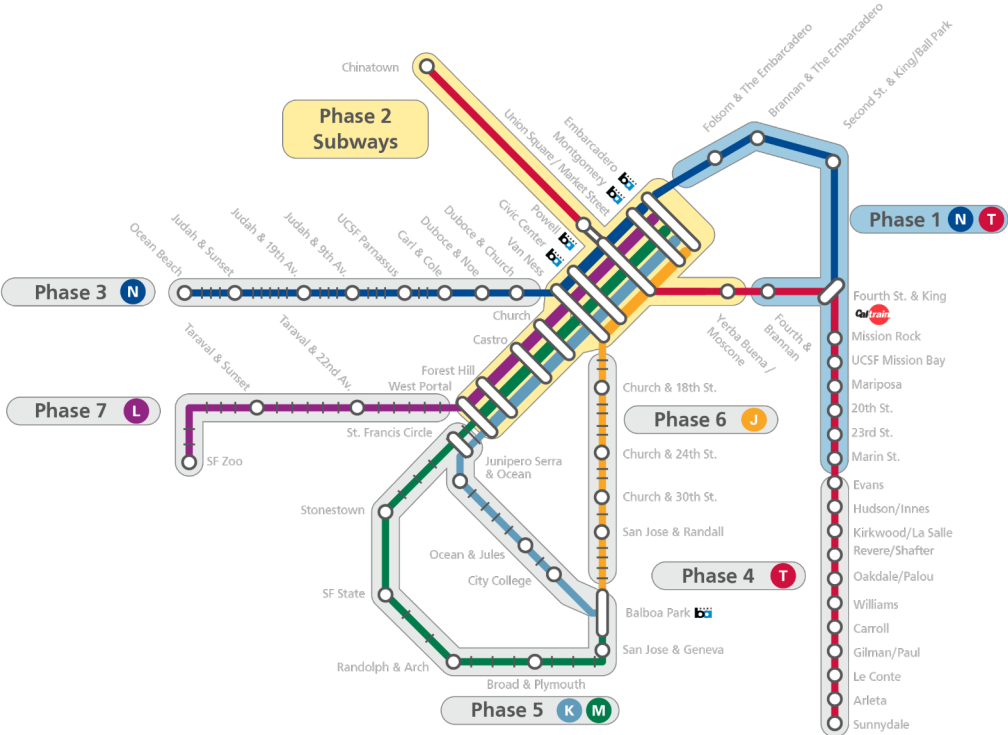
Hitachi Rail GTS USA’s proposal displayed a clear understanding of the SFMTA’s unique rail operating environment, and proposed a CBTC solution that best met the Agency’s objectives. Hitachi Rail GTS USA has extensive worldwide experience delivering successful train control projects and its proposal included the most advanced CBTC technology available in the industry today. Hitachi Rail GTS USA was selected for contract award because it received the highest score with a proposal that best met SFMTA’s requirements at the lowest price while committing to the most ambitious performance targets. In the BAFO, Siemens’ capital procurement price was almost three times higher than Hitachi’s and their ongoing support services price was 1.5 times higher. SFMTA negotiated a contract price with Hitachi Rail GTS USA based on its submitted BAFO price.

Project Approach

The approach offered by Hitachi Rail GTS USA in its proposal meets the SFMTA’s goals and requirements for the project and will result in the best value to the SFMTA. Their SelTrac CBTC system embeds lessons learned from over 25 years of experience working on the Muni Metro system with special emphasis placed on the unique rail system layout with five lines converging into the Market Street subway, and the regular surface/subway transitions at tunnel portals. The



SelTrac system offered by Hitachi Rail GTS USA is several generations ahead of SFMTA’s current train control technology in the subway and is capable of automatic control, safe train movement, system health monitoring, and seamless transitions between subway and surface operations. Hitachi Rail GTS USA’s proposal also includes the replacement of aging surface interlockings which are in need of replacement, integration with surface traffic signals for more reliable surface rail service, the use of transponders for positioning in place of unreliable track circuits, and an innovative means to track heritage and maintenance vehicles. The inclusion of scope addressing all SFMTA surface and subway signaling issues at once will result in future cost savings because we will be able to avoid multiple replacement projects to cover the same scope, and also reuses much of the existing onboard equipment. The CBTC system will be deployed in phases as shown in the below diagram, starting with an initial segment noted as Phase 1 in blue, before proceeding to replace the ATCS in the subway in Phase 2. Subsequent phases will deploy the CBTC system on the surface as shown.



Support Services Approach

The 20-year support services approach included in the contract reflects SFMTA’s commitment to ensure the CBTC system is reliable and kept up to date throughout its expected useful life. The contract requires the Supplier to provide regular software updates and security updates, and to establish an obsolescence management plan to keep the CBTC system current. For the life of the contract, the Supplier will maintain a local inventory of spare parts sufficient to support seamless maintenance and replenish the parts as necessary at no additional cost, which will act as an extended parts warranty for the duration of the support agreement. SFMTA maintenance crews



will use the spare parts provided to perform preventative and corrective maintenance. As part of the support scope, Hitachi Rail GTS USA will provide 24-hour technical support, including an embedded System Support Specialist present in the Transportation Management Center during peak transit hours. This support approach is based on the Supplier's previous 30 years of experience delivering successful train control projects.

Additionally, Hitachi Rail GTS USA has developed training materials instructing SFMTA staff on the operations and maintenance of the CBTC system, so that SFMTA can support the CBTC system. This includes the use of user guides, maintenance manuals, computer-based training modules, training simulators, and other documentation necessary to ensure that training objectives are met. As the system is updated, these training materials will be updated as well.

ALTERNATIVES CONSIDERED

No contract. Under this alternative, the SFMTA would have continued to invest resources necessary to maintain the existing ATCS system, keeping the system in a state of good repair for as long as possible. This approach would cost more than a system replacement in the long term. The ATCS is past the end of its useful life and there are already periodic ATCS failures causing minor to moderate disruption to Muni Metro service. Continuing to use the existing system will likely lead to more frequent and severe ATCS failures. These failures may occur unexpectedly, causing sudden closures of the Market Street and Central Subways, causing significant disruptions to subway service. It is possible that in the future, the ATCS may completely fail and be unrepairable, at which point rail services would be seriously disrupted for a long period of time, forcing the Agency to replace it under a more urgent timeline and likely at greater cost.

ATCS replacement only (No expansion to the surface). The SFMTA also considered curtailing the deployment of the CBTC to a 1:1 replacement of the ATCS in the subways to reduce the project cost. Not expanding CBTC territory to cover the full Muni Metro rail network reduces the overall benefits of the project and is not cost-effective. A large portion of the project cost can be attributed to system design, software, central equipment and vehicle equipment, which does not change significantly with the size of the territory to be covered. Only a small portion of project cost could be recovered by not expanding train control territory to the surface. Moreover, the surface interlocking equipment is also outdated and in need of replacement. The SFMTA would still have to replace the surface interlocking equipment within 5 years to avoid risking service-affecting failures. The surface phases of the TCUP will replace this aging interlocking equipment with the CBTC supplier's more centralized Zone Controllers and Object Controllers. Expanding CBTC to the surface prevents SFMTA from having to perform more interlocking replacement projects in the near future.



FUNDING IMPACT

This contract’s scope includes both the procurement and support of the CBTC system and will be funded by both capital funds and the SFMTA operating budget. The procurement portion of this contract is part of the Train Control Upgrade Project and will be funded by the SFMTA capital budget as described in the SFMTA CIP. As portions of the CBTC system are delivered, the SFMTA will phase in payments of support services funded from its operating budget beginning in Fiscal Year 2032.

The maximum cost of the procurement portion of the contract is \$212,093,633, assuming the contract is escalated at the maximum rate allowed under the contract of 6% annually and all procurement options are exercised. The actual escalation rate for labor will be determined by an average of BLS Series CEU3133500003, Series CEU3133600003 and Series CEU6054000003, which are the average hourly earnings for Electrical Equipment, Appliance and Component Manufacturing, Transportation Equipment, and Professional, Scientific, and Technical Services respectively. The actual escalation rate for materials will be determined by an average of the Producer Price Indices for Series PCU334419334419, Series PCU335 and Series PCU336, which are the PPIs for Semiconductor and Other Electronic Component Manufacturing, Electrical Equipment, Appliance and Component Manufacturing, and Transportation Equipment respectively. If these averages are lower than 6% annually, the total project cost will be reduced. Following is a detailed itemization of contract procurement costs and a detailed project budget covering the first nine years of the contract:

Train Control Supplier Contract (Procurement)	Cost
CBTC System design and engineering services	\$ 43,233,884
Central equipment, simulators, tools, and initial training	\$ 18,025,207
On-board computers and equipment for LRVs	\$ 18,127,571
Wayside equipment and testing services for Initial Technology Demonstration	\$ 23,447,108
Wayside equipment and testing services for Subway Replacement Phase	\$ 18,341,550
Wayside equipment and testing services for subsequent surface phases	\$ 37,284,190
Subtotal Train Control Supplier Contract (Procurement)	\$ 158,459,510
Option 1: Additional LRV onboard equipment (up to 30 vehicles)	\$ 5,516,283
Option 2: Heritage Streetcar onboard equipment (up to 50 vehicles)	\$ 13,923,770
Option 3: Maintenance vehicle onboard equipment (up to 30 vehicles)	\$ 10,803,013
Option 4: Equipment and design services for motorizing up to 10 additional surface rail junctions	\$ 10,226,551
Option 5: Backup control center equipment	\$ 656,305



Option 6: Additional design services to support Heritage Streetcar and/or Maintenance Vehicles	\$ 12,508,200
Subtotal Train Control Supplier Contract (Procurement + Options)	\$ 212,093,633

*All costs escalated to year of expenditure assuming a 6%/yr rate of inflation.

Other Associated Cost Items	Cost
Train control supplier contract (Procurement only)	\$ 212 million
Network infrastructure and systems integration	\$ 64 million
Installation contracts	\$ 99 million
Project management and engineering	\$ 102 million
Consultant contract	\$ 30 million
Testing, training and operational Support	\$ 53 million
Contingency (~25%)	\$ 140 million
Total Project Budget	\$ 700 million

*All costs escalated to year of expenditure.

Capital Funding Plan

The total budget of the Train Control Upgrade Project including all contracts, SFMTA staff cost, contingency, and escalation is approximately \$700 million over the nine-year life of the capital project. Work planned for completion during the current Capital Improvement Program cycle (FY25-29) is fully funded. Work planned for completion in future CIP cycles will be funded through future CIP processes. Identified funds include a combination of regional, state, and federal grants. The capital funding plan for the Train Control Upgrade Project is shown below. Some of the proposed sources come with risks. A Transit and Intercity Rail Program (TIRCP) grant is not yet awarded and there is some risk that Prop B General Funds will not be received. This level of risk is consistent with other projects in the Capital Improvement Plan. The project team is aware of this risk and will work with the Capital Budget team to mitigate funding risk and shift funds within the Capital Improvement Plan as necessary. Project funds in hand are sufficient to fund the project through FY25-26. Values outside of the FY25-29 CIP are tentative pending the approval of each subsequent CIP every two years.

This project is not fully funded; the capital funding plan includes a \$57 million funding need, which appears outside the SFMTA’s CIP planning horizon, starting in FY30. In addition, the funding plan depends heavily on Federal 5337 State of Good Repair formula funds, that if used will risk deferring other projects in the Fixed Guideway capital program which depend on those funds. However, since this is a large, stable project with demonstrable benefits, it is a good candidate for attracting new funding in the form of competitive grants and future bond measures. The project has already been successful in attracting about \$31 million of competitive grant funding from one round of the TIRCP. The Agency has submitted state grant applications



for additional rounds of funding from the TIRCP, which is included in this funding plan, and for the Solutions for Congested Corridors Program. The SFMTA also plans to include this project in future GO Bond campaigns for transportation capital improvements. As these new funds are received, they will both close the funding gap and replace formula funds to reduce the risk to the Fixed Guideway program.

Fund Source	Fund Type	Total (\$)
FTA 5337 State of Good Repair	Federal	\$ 375 million
Caltrans SB1 State of Good Repair	State	\$ 22 million
Transit and Intercity Rail Program (TIRCP)	State	\$ 131 million
General Fund Prop B Transit	Local	\$ 30 million
GO Bond (future)	Local	\$ 30 million
SFCTA Prop L Transportation Sales Tax	Local	\$ 16 million
Revenue Bond*	Local	\$ 24 million
Transportation Sustainability Fee (TSF)*	Local	\$ 12 million
MTC AB 664 Bridge Toll Funds*	Regional	\$ 1 million
Operating Funds*	Local	\$ 2 million
Total Committed Funding for this Project		\$ 643 million
Funding Need		\$ 57 million
Total TCUP Budget		\$ 700 million

*Indicates previously expended capital funds prior to FY25.

Expected capital funding sources for the procurement portion of this contract are shown in the following table:

Fund Source	Fund Type	Total (\$)
FTA 5337 State of Good Repair	Federal	\$ 136,358,027
Caltrans SB1 State of Good Repair	State	\$ 15,247,645
Transit and Intercity Rail Program (TIRCP)	State	\$ 53,000,000
General Fund Prop B Transit	Local	\$ 7,487,960
Total Capital Funding for Supplier Contract (Procurement)		\$ 212,093,633

Future Operating Budget Impact

The contract also includes support services that phase in starting after the new CBTC system has been commissioned in the subways, continuing for 10 years after the procurement portion of the contract ends. Assuming the contract price is escalated at the maximum rate allowed under the contract of 6% annually, the maximum cost of the baseline support provided under this contract is expected to be no more than \$114,070,833. Support services will be covered by the



SFMTA operating budget. This amount will be programmed in future SFMTA operating budget cycles between FY32 and FY44.

The contract includes two options to extend the support services for up to an additional five years each (ten years total). If exercised, these options would also be funded from SFMTA's operating budget. Assuming the option price is escalated at the maximum rate allowed under the contract of 6% annually, the additional support is expected to cost no more than \$237,681,185 and would be programmed in SFMTA operating budget cycles between FY45 and FY54. By signing the contract, the SFMTA is not committing itself to exercise these options, so the SFMTA Board will have the opportunity to review these costs and the cost-effectiveness of the support plan prior to committing to each 5-year extension of support services.

In the past, the cost of support services has not been presented to the SFMTA Board up front during the consideration of purchase agreements for technology systems. However, for systems with a long useful life and an ongoing need for support services such as train control systems, the support costs are significant compared to the initial procurement costs. Currently, the SFMTA pays its legacy train control system vendor for limited support services and for spare parts. The support service price for this contract described above includes all spare parts and support services covered by its existing train control support agreements, allowing the SFMTA to offset some of the current operating budget impacts described in this section by retiring those ongoing expenses.

REQUEST FOR APPROVAL

The SFMTA respectfully requests that the Board of Supervisors authorize the Director of Transportation to execute Contract No. SFMTA-2024-40-FTA with Hitachi Rail GTS USA.

Thank you for your consideration of this proposed Resolution. Should you have any questions or require more information, please do not hesitate to contact me at any time.

Sincerely,

A handwritten signature in blue ink that reads "Jeffrey Tumlin".

Jeffrey Tumlin
Director of Transportation