

**THIS PRINT COVERS CALENDAR ITEM NO.: 12**

**SAN FRANCISCO  
MUNICIPAL TRANSPORTATION AGENCY**

**DIVISION:** Transit

**BRIEF DESCRIPTION:**

Authorizing the Director of Transportation to execute Contract Modification No. 9 to SFMTA Contract No. 2013-19: Procurement of New Light Rail Vehicles, with Siemens Mobility, Inc., to update and enhance vehicle equipment, and, using funds from the escalation allowance, resolve an issue regarding escalation costs for the 151 Phase 2 vehicles, for an overall amount not to exceed \$80,085,460, with no increase in the total Contract price or Contract term.



**SUMMARY:**

- In 2014, the SFMTA Board of Directors approved Contract No. 2013-19 with Siemens Industry, Inc. (Siemens) to provide up to 260 Light Rail Vehicles (LRVs) for an amount not to exceed \$1,192,651,577, and a term not to exceed 15 years.
- Through Contract Modifications Nos. 1 through 5, the SFMTA authorized an expansion fleet of 68 vehicles (24 from the base contract, 40 from an option in the Contract of up to 85 vehicles, and four “Phase W” vehicles to provide enhanced service during basketball games and other events at the new Chase Center), and approved updates to the vehicle design, including the installation of additional track brakes, optional spare parts and equipment.
- Through Contract Modifications Nos. 6, 7 and 8, the SFMTA approved feedback-driven passenger comforts and engineering refinements, updates to vehicle equipment, including cameras, provisions for weight incentives, and funding of Phase 2 acceleration activities essential to the early fleet replacement plan.
- The proposed Contract Modification No. 9 updates vehicle equipment, including sensing capabilities of the center doors, enhancements of cameras, changes to the operator cab and controls in response to operator feedback, and scope changes in preparation for the next generation Clipper. The Modification also resolves an issue with Siemens over calculation of escalation to the price of the 151 Phase 2 vehicles as well as the formula to be applied to Option 2 vehicles to be exercised in Modification No. 10 (submitted concurrently).

**ENCLOSURES:**

1. Resolution
2. Modification No. 9 to Siemens Contract
3. Central Subway Final SEIS/SEIR - <https://www.sfmta.com/reports/central-subway-final-seisseir>
4. Event Center FSEIR - <https://sfgov.org/sfplanningarchive/environmental-impact-reports-negative-declarations>

**APPROVALS:**

	<b>DATE</b>
DIRECTOR  _____	<u>July 28, 2021</u>
SECRETARY  _____	<u>July 27, 2021</u>

**ASSIGNED SFMTAB CALENDAR DATE:** August 3, 2021

**PURPOSE**

The purpose of this item is to obtain authorization for the Director of Transportation to execute Contract Modification No. 9 to SFMTA Contract No. 2013-19: Procurement of New Light Rail Vehicles, with Siemens Mobility, Inc., to update and enhance vehicle equipment, and, using funds from the escalation allowance, resolve an issue regarding escalation costs for the 151 Phase 2 vehicles, for an overall amount not to exceed \$80,085,460, with no increase in the total Contract price or Contract term.

**STRATEGIC PLAN GOALS AND TRANSIT FIRST POLICY PRINCIPLES**

This request supports the following SFMTA Strategic Plan Goals:

Goal 1: Create a safer transportation system for everyone

Objective No. 1.2: Improve safety of the transit system

Objective No. 1.3: Improve security for transportation system users

Goal 2: Make transit and other sustainable modes of transportation the most attractive and preferred means of travel

Objective No. 2.1: Improve transit service

Objective No. 2.2: Enhance and expand use of the city's sustainable modes of transportation.

Goal 3: Improve the quality of life and environment in San Francisco and the region

Objective No. 3.5: Achieve financial stability for the agency

Goal 4: Create a workplace that delivers outstanding service

Objective No. 4.2: Improve the safety, security, and functionality of SFMTA work environments.

This item will support the following Transit First Policy Principles:

1. Improves the safe and efficient movement of people and goods.
2. Improves public transit as an attractive alternative to travel by private automobile.
8. Allocates transit investments to meet the demand for public transit generated by new public and private commercial and residential developments.
9. Promotes the use of regional mass transit and the continued development of an integrated, reliable, regional public transportation system.

**DESCRIPTION**

**Background**

In 2014, the SFMTA Board of Directors approved Contract No. 2013-19 with Siemens Industry, Inc. (Siemens) to provide up to 260 Light Rail Vehicles (LRVs or LRV4s), including an option for up to 85 LRVs to handle growth related to the Central Subway Project and systemwide ridership increases (the LRV4 Contract or the Contract), all for an amount not to exceed \$1,192,651,577, and a term not to exceed 15 years.

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The LRV4 Contract includes the replacement of the 151 Breda LRVs (Phase 2), which are scheduled for retirement beginning in 2021. Replacing these older and less reliable vehicles is an established need in the SFMTA Capital Plan and will have immediate impact on overall system performance.

The LRV4 Contract includes the delivery of vehicles in two phases: Phase 1, for 68 expansion vehicles (24 from the base Contract, 40 from the option [Option 1], and 4 Phase W vehicles); and Phase 2, for 151 replacement vehicles. Phase 1 deliveries are complete and in revenue service. Phase 2 deliveries are due to commence in fall 2021, with completion of Phase 2 currently scheduled for 2025, which would mark successful completion of the early fleet replacement plan.

There have been eight modifications to the Contract:

- Through Contract Modifications Nos. 1 through 4, the SFMTA authorized the expansion fleet of 68 vehicles referenced above, and approved updates to the LRV4 design, the addition of optional spare parts and equipment, and miscellaneous other changes to the Contract.
- On October 22, 2019, the Director of Transportation executed Contract Modification No. 5 to expedite the design and pilot installation of track brakes to the power trucks as a method to reduce the frequency of flat spots on wheels caused by activation of the push button emergency brake (PBEB).
- On December 6, 2019, the parties entered into Contract Modification No. 6 for the design of feedback-driven changes to the interior configuration and seating, along with other engineering refinements that improve fleet performance, including installation of track brakes on all remaining Phase 1 vehicles. Also included in Contract Modification No. 6 were provisions for weight incentives and other administrative issues, and initiation of Phase 2 long-lead activities essential to the early fleet replacement plan.
- On March 27, 2020, the parties entered into Modification No. 7 to complete Phase 2 long-lead activities, implement interior configuration and seating changes based on the approved re-design, complete installation of the track brakes, and provide for other equipment updates and vehicle enhancements.
- On October 30, 2020, the Director of Transportation executed Contract Modification No. 8 to the Agreement to further modify the Vehicles, including adding larger cab monitors and a second sensitive edge to the middle doors, delete fareboxes for 141 of the 151 Phase 2 Vehicles (which will be equipped with fareboxes recovered from retired Breda vehicles), and expedite work to avoid Phase 2 production delays.

Forty-five vehicles remain in the Contract option after completion of Phase 2; a request to exercise Option 2 for 30 additional LRVs is presented in a concurrent calendar item for Contract Modification No. 10.

**Modification No. 9**

This Modification No. 9 accomplishes the following:

- **Vehicle enhancements** to implement system updates on all future production vehicles and, where appropriate, retrofit vehicles previously delivered; as well as provide for **Maintenance Support** and tools.
- **Phase 2 escalation** on the 151 Option 2 Vehicles.

***Vehicle Enhancements and Maintenance Support***

Some of the vehicle enhancements update onboard electronic equipment and systems to match the latest generation available from the supplier, as adopted by the SFMTA or by the region in the case of the next generation Clipper system. Other enhancements respond to passenger and operator feedback to add features after Phase 1 deployment. The modification also provides maintenance support through the purchase of additional tools and replacement of tires prematurely worn due to a flat wheel issue that has since been resolved.

In the coming year, the entire region is migrating to the next generation Clipper system. The new system brings improvements for passengers, but requires completely new equipment on our bus and rail fleets. LRV4 Phase 2 production has been planned to accommodate new wiring, brackets, and next generation Clipper equipment from the start. All new Clipper devices will be provided as part of the regional Clipper contract administered by the Metropolitan Transportation Commission (MTC) – not by Siemens. This results in significant Contract cost savings reflected in the table below.

The changes detailed in the table below improve the efficiency of maintenance and operations, and address the safety and comfort of our passengers. These changes go beyond the original requirements of the Contract and are distinct from fleet defects or warranty issues, for which Siemens is responsible.

**Table 1**

**Modification No. 9 Changes**

<b>Change Order Title</b>	<b>Description</b>	<b>Continuous Improvement Benefits</b>	<b>No. of Vehicles Impacted</b>	<b>Per Vehicle Cost</b>	<b>Total Mod 9 Cost</b>
Sensitive Edge on Middle Doors	Upgrade middle doors from single to dual sensitive edge design on remainder of fleet.	Passenger/Maintenance/Operations	169	\$6,227	\$1,052,370
Rear View Monitors and Exterior Cameras Upgrade	Upgrade rear view monitors with larger screens and improved cameras on remainder of fleet.	Passenger/Operations	169	\$18,144	\$3,066,407
Additional Cab Mirrors	Add adjustable mirror improving operator	Passenger/Operations	219	\$2,259	\$494,662

<b>Change Order Title</b>	<b>Description</b>	<b>Continuous Improvement Benefits</b>	<b>No. of Vehicles Impacted</b>	<b>Per Vehicle Cost</b>	<b>Total Mod 9 Cost</b>
	view of aisle behind cab.				
Master Controller Additional Adjustability	Increase adjustability of the master controller (forward/aft and up/down).	Operations/Maintenance	219	\$3,204	\$701,625
Reversal of Sanding and Gong Footswitches	Reverse the position of the sanding and gong footswitches.	Operations	219	\$246	\$53,768
Moving Flasher Light Button	Move the emergency light pushbutton to right side of cab.	Operations	219	\$999	\$218,707
Clipper Equipment Deduction	Clipper equipment no longer to be provided by Siemens.	Passenger/Operations	151	-\$20,912	-\$3,157,709
Clipper Next Gen Design Changes	Next Generation of Clipper requires new provisions for installation (power/bracketry).	Maintenance		N/A	\$56,656
Clipper Next Gen Wiring Retrofits	Next Generation of Clipper requires wiring retrofits.	Passenger/Operations		N/A	\$287,497
Tire Replacement Support	Replace tires on trucks prematurely worn due to flat wheels (20 car sets)	Maintenance		N/A	\$1,593,750
Tow Bars and Strap Adaptors	Provide 18 Tow bars and Strap adaptors for mobile response units.	Operations/Maintenance		N/A	\$281,703
Interior Seating Mock-Up	Provide a seating mock-up to demonstrate the new interior layouts	Passenger/Operations/Maintenance		N/A	\$58,485
	Total Changes				\$4,707,921
	Escalation for Phase 2				\$75,377,539
	<b>TOTAL</b>				<b>\$80,085,460</b>

***Phase 2 Escalation Calculation***

Section 7.5.3 of the Contract defines the escalation period between Contract start and Phase 2, which the parties have agreed is 5 years and 8 months. The total escalation amount is mutually agreed to be 14.7091% over this period, which is 2.44% per year compounded, for Phase 2 vehicles, spare parts, and tools.

Originally, the Contract described the method for calculating escalation, but included a technical inconsistency between the escalation calculation formula (which calls for monthly labor index values) and the identified labor indices (which are published annually, not monthly, by the Bureau of Labor Statistics). Using other monthly indices, as the SFMTA had done twice before during the Contract, resulted in a lower escalation percentage than using the annual index. With respect to escalation on the Phase 2 vehicles, Siemens argued that the annual index stated in the Contract should be used. The parties recently resolved this issue by agreeing to calculate monthly index values from the annual index stated in the Contract – derived by evenly dividing the published annual change into 12 equal months. This methodology has been used to establish the escalation amounts reflected in the prices shown in Exhibit 1A of the Contract. The methodology has also been documented in formal correspondence and will be used for other escalation calculations required under the Contract.

**STAKEHOLDER ENGAGEMENT**

The LRV4 vehicle now in Phase 2 production is the result of extensive stakeholder engagement with multiple groups, including vehicle operators, rail maintenance, labor representatives, the riding public, the SFMTA Citizens' Advisory Council (CAC), and the SFMTA Multimodal Accessibility Advisory Committee (MAAC), the SFMTA Board, and the Board of Supervisors.

Vehicle operators are a major stakeholder that have been involved in shaping changes to the operator cab and controls included in this Contract Modification. Change Orders 46 (additional cab mirrors), 47 (master controller additional adjustability), 48 (reversal of sanding and gong footswitches), and 49 (relocation of flasher light button) are the result of ongoing engagement with the operators and coordination with labor representatives. Operators have provided valuable feedback to the original vehicle design following real world experience operating these vehicles in revenue service for an extended period, and this input resulted in these improvements to vehicle operability, operator comfort, and overall safety.

The vehicle interior seating mock-up, Change Order 55, is the culminating step in the Phase 2 interior seating redesign and reconfiguration. That process involved numerous stakeholder groups, including rail maintenance, transit management, transit operators, safety, accessible services, communications, as well as the CAC and MAAC.

**ALTERNATIVES CONSIDERED**

The Agency considered the continuation of the procurement without the equipment updates to the electronic systems and the design enhancements as detailed above. However, the Agency believes that these equipment updates and design enhancements improve maintainability, operational functionality, and eliminate the need for future retrofits.

The Agency also considered proceeding with the passenger interior reconfiguration without the

vehicle interior seating mock-up. The mock-up requires that Siemens demonstrate all aspects of the vehicle interior and allow for minor refinements prior to full production and potentially avoid later changes that could be costly or slow production.

**FUNDING IMPACT**

**Contract Cost**

The total cost of Modification No. 9 is \$80,085,460 (see Table 1), which includes \$4,707,921 for the vehicle modifications and \$75,377,539 in escalation (see also Table 3 below).

The Contract included allowances for escalation totaling \$233,079,464, as shown in Table 2 below:

**Table 2**

	<b>Value</b>	<b>Escalation Allowance</b>	<b>Total</b>
Phase 1 - 24 Vehicles	\$146,217,251		\$146,217,251
Phase 2 – 151 Vehicles	\$502,414,750	\$133,300,188	\$635,714,938
Option 1 – 40 Vehicles	\$161,134,617	\$810,360	\$161,944,977
Option 2 – up to 45 Vehicles	\$149,805,495	\$98,968,916	\$248,774,411
<b>Total</b>	\$959,572,113	\$233,079,464	\$1,192,651,577

The escalation of cost items that are required by the Contract to be escalated represents the largest portion of this Modification No. 9. Escalation is applied to the Phase 2 vehicles and recurring costs from Modification No. 3 and Modification No. 6 (Price items 12B and 19). This cost has been anticipated and previously budgeted as part of the escalation allowance. The escalation applied to the Phase 2 vehicles is less than anticipated in the original Contract and allows the Contract changes to be added without increasing the overall not-to-exceed amount in the Contract, as shown in Table 3 below.

**Table 3**

	<b>Value</b>	<b>Escalation Allowance Applied or Available</b>	<b>Total</b>
Base Phase 1 - 24	\$146,217,251		\$146,217,251
Base Phase 2 - 151	\$502,414,750	\$75,377,539	\$577,792,289
Option 1 - 40 Cars (Exercised in Mod 1)	\$161,134,617	\$810,360	\$161,944,977
Phase W - 4 Cars (Modification 4)	\$15,875,000		\$15,875,000

Option 2 - 45 Cars (not yet exercised)	\$149,805,495	\$72,767,279 (Available)	\$222,572,774
Modifications (2, 3, 5-9)	\$68,249,286		\$68,249,286
<b>Total</b>	<b>\$1,043,696,399</b>	<b>\$148,955,178</b>	<b>\$1,192,651,577</b>

**Budget and Funding Plan**

The current budget and funding plan for the Project is provided in Table 4 below:

**Table 4**

<b>Budget Item</b>	<b>Funding</b>
SFMTA Labor & Other Direct Cost	\$ 65,000,000
Consultant Services	\$4,550,000
Contracts/Purchase Orders	\$1,035,495,800
Contingency	\$ 8,329,200
<b>Total</b>	<b>\$ 1,113,375,000</b>

<b>LRV4 Funding Plan (as of 7/6/2021)Funding Source</b>	<b>Amount</b>
Bridge Tolls (MTC)	\$ 59,118,014
CCSF-ERAF	\$ 19,247,904
CCSF-IPIC	\$ 3,378,000
Central Subway	\$ 16,800,000
Developer Fees	\$ 17,417,081
FTA	\$ 547,596,035
Prop K Sales Tax	\$ 191,885,171
Revenue Bond	\$ 145,050,650
RM3	\$ 5,327,475
SFMTA Operating	\$ 8,000,000
TIRCP	\$ 113,140,000
<b>Grand Total</b>	<b>\$ 1,126,960,330</b>



**ENVIRONMENTAL REVIEW**

The procurement of new light rail vehicles is subject to the California Environmental Quality Act (CEQA).

On June 19, 2014, the San Francisco Planning Department determined (Case Number 2014.0929E) that the Procurement of New Light Rail Vehicles is statutorily exempt from CEQA as defined in Title 14 of the California Code of Regulations Section 15275(a), which provides an exemption from environmental review for the institution or increase of passenger or commuter service on rail lines already in use.

The vehicles to be used for the Central Subway Project are within the scope of the Central Subway Final Supplemental Environmental Impact Statement/Supplemental Environmental Impact Report (Central Subway SEIS/SEIR), Case No. 1996.281E.

The vehicles to be used to provide enhanced Muni service to the Golden State Warriors Event Center Project are within the scope of the Golden State Warriors Event Center and Mixed Use Development at Mission Bay Blocks 29-32 Final Subsequent Environmental Impact Report (Event Center FSEIR), Case No. 2014.1441E.

The contract modifications are within the scope of the environmental review discussed above. No new significant effects have been identified, there is no substantial increase in significant effects already identified, and no new mitigation is required.

Copies of the CEQA determination are on file with the Secretary to the SFMTA Board of Directors, and may be found in the records of the Planning Department at <https://sfplanning.org/> and 49 South Van Ness Avenue, Suite 1400, in San Francisco. The CEQA determination is incorporated herein by reference.

**OTHER APPROVALS RECEIVED OR STILL REQUIRED**

The City Attorney and the Contract Compliance Office have reviewed this item.

**RECOMMENDATION**

Staff recommends that the SFMTA Board authorize the Director of Transportation to execute Contract Modification No. 9 to SFMTA Contract No. 2013-19: Procurement of New Light Rail Vehicles, with Siemens Mobility, Inc., to update and enhance Vehicle equipment, and, using funds from the escalation allowance, resolve an issue regarding escalation costs for the 151 Phase 2 Vehicles, for an overall amount not to exceed \$80,085,460, with no increase in the total Contract price or Contract term.

SAN FRANCISCO  
MUNICIPAL TRANSPORTATION AGENCY  
BOARD OF DIRECTORS

RESOLUTION No. \_\_\_\_\_

WHEREAS, In 2014, the SFMTA Board of Directors approved Contract No. 2013-19 with Siemens Industry, Inc. (Siemens), to provide up to 260 Light Rail Vehicles (LRVs or Vehicles), including two options for expansion LRVs (the Contract), all for an amount not to exceed \$1,192,651,577, and a term not to exceed 15 years; and,

WHEREAS, The Contract included the replacement of the SFMTA's 151 Breda LRVs, as replacing these older and less reliable vehicles is an established need in the Agency's Capital Plan and will have immediate impact on overall system performance; and,

WHEREAS, On March 31, 2015, the SFMTA Board approved Modification No. 1 to the contract to exercise Option 1 for 40 additional LRVs to be delivered after the Phase 1 delivery of 24 Vehicles; and,

WHEREAS, On October 30, 2015, the Director of Transportation, approved Modification No. 2 to the Contract to update the list of approved major suppliers, and clarify contract language; and,

WHEREAS, On August 16, 2016, the SFMTA Board approved Modification No. 3 to the Contract, which added design changes to provide enhancements to passengers, enable full systems integration, and reduce the life-cycle costs of the LRVs, in the amount of \$19,596,728, with no increase in the total Contract price; and,

WHEREAS, On June 17, 2017, the SFMTA Board authorized the Director of Transportation to execute Modification No. 4 to SFMTA Contract No. 2013-19: Procurement of New Light Rail Vehicles (LRV4), with Siemens Industry, Inc., to provide four additional LRV4 vehicles (funded by the Golden State Warriors) to serve the Chase Center, for an amount not to exceed \$15,875,000, with no increase in the total Contract price and no increase in the overall term of the Contract; and,

WHEREAS, On November 28, 2018, the Director of Transportation approved the assignment of the Contract from Siemens Industry, Inc., to Siemens Mobility, Inc.; and,

WHEREAS, On October 22, 2019, the Director of Transportation, under his delegated authority, executed Contract Modification No. 5 to expedite the design and pilot installation of track brakes to the power trucks as a method to reduce frequency of flat spots on wheels caused by activation of the push button emergency brake in the amount of \$466,505, with no increase in the total Contract price; and,

WHEREAS, On November 19, 2019, the SFMTA Board approved Contract Modification No. 6, to enhance the vehicle design with passenger comforts, updated operator cab features, and

engineering refinements that improve fleet performance; and to advance Phase 2 long-lead activities to accelerate fleet replacement, for an amount not to exceed \$9,799,688, with no increase in the total Contract price, achieved through a decrease in the escalation allowance, and no increase in the term of the Contract; and,

WHEREAS, On March 27, 2020, the parties entered into Modification No. 7 to complete Phase 2 long-lead activities, implement interior configuration and seating changes based on the approved re-design, complete installation of the track brakes, and provide for other equipment updates and vehicle enhancements; and,

WHEREAS, On October 30, 2020, the Director of Transportation executed Contract Modification No. 8 to the Agreement to further modify the Vehicles including adding larger cab monitors and a second sensitive edge to the middle doors, delete fareboxes for 141 of the Vehicles, and expedite work to avoid Phase 2 production delays; and,

WHEREAS, Contract Modification No. 9 will update vehicle equipment including center door sensing capabilities, complete enhancements of cameras, make changes to the operator cab and controls, and scope changes in preparation for the next generation Clipper; and,

WHEREAS, Using funds from the escalation allowance, Contract Modification No. 9 resolves an issue between Siemens and the SFMTA regarding the proper method for calculating escalation costs for the 151 replacement Vehicles; and,

WHEREAS, On June 19, 2014, the San Francisco Planning Department determined (Case Number 2014.0929E) that the Procurement of New Light Rail Vehicles is statutorily exempt from California Environmental Quality Act (CEQA) as defined in Title 14 of the California Code of Regulations Section 15275(a), which provides an exemption from environmental review for the institution or increase of passenger or commuter service on rail lines already in use; and,

WHEREAS, The Vehicles to be used for the Central Subway Project are within the scope of the Central Subway Final Supplemental Environmental Impact Statement/Supplemental Environmental Impact Report (Central Subway SEIS/SEIR), Case No. 1996.281E; and,

WHEREAS, The Vehicles to be used to provide enhanced Muni service to the Golden State Warriors Event Center Project are within the scope of the Golden State Warriors Event Center and Mixed Use Development at Mission Bay Blocks 29-32 Final Subsequent Environmental Impact Report (Event Center FSEIR), Case No. 2014.1441E; and,

WHEREAS, The changes in the current Contract Modification are within the scope of the environmental review discussed above; no new significant effects have been identified, there is no substantial increase in significant effects already identified, and no new mitigation is required; and,

WHEREAS, Copies of the CEQA determination are on file with the Secretary to the SFMTA Board of Directors, and may be found in the records of the Planning Department at <https://sfplanning.org/> and 49 South Van Ness Avenue, Suite 1400 in San Francisco, and such determination is incorporated herein by reference; now, therefore, be it

RESOLVED, That the SFMTA Board of Directors has reviewed the Central Subway SEIS/SEIR and the Event Center FSEIR and finds that since the certification of the two documents, no changes have occurred in the proposed project or in the circumstances under which the project would be implemented that would cause new significant impacts or a substantial increase in the severity of impacts identified and analyzed in those documents, and that no new information has emerged that would materially change the analysis or conclusions set forth in the two documents; the actions approved herein would not necessitate implementation of additional or considerably different mitigation measures that those identified in those documents; and be it further

RESOLVED, That the SFMTA Board authorizes the Director of Transportation to execute Contract Modification No. 9 to SFMTA Contract No. 2013-19: Procurement of New Light Rail Vehicles, with Siemens Mobility, Inc., to update and enhance Vehicle equipment, and, using funds from the escalation allowance, resolve an issue regarding escalation costs for the 151 Phase 2 Vehicles, for an overall amount not to exceed \$80,085,460, with no increase in the total Contract price or Contract term.

I certify that the foregoing resolution was adopted by the San Francisco Municipal Transportation Agency Board of Directors at its meeting of Augst 3, 2021.

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Secretary to the Board of Directors  
San Francisco Municipal Transportation Agency

**CITY AND COUNTY OF SAN FRANCISCO  
MUNICIPAL TRANSPORTATION AGENCY  
ONE SOUTH VAN NESS AVE, 7<sup>TH</sup> FLOOR  
SAN FRANCISCO, CA 94103**

**MODIFICATION NO. 9 TO  
AGREEMENT BETWEEN SIEMENS MOBILITY, INC.  
AND  
THE CITY AND COUNTY OF SAN FRANCISCO FOR  
PROCUREMENT OF NEW LIGHT RAIL VEHICLES (LRV4)  
(SFMTA No. 2013-19)**

This Modification No. 9 to Agreement is made and entered into on \_\_\_\_\_, by and between Siemens Mobility Inc. (Contractor), and the City and County of San Francisco, a municipal corporation (City), acting by and through its Municipal Transportation Agency (SFMTA).

**RECITALS**

- A.** On September 30, 2014, the City entered into an agreement with Contractor (Agreement) to provide 175 light rail vehicles (LRVs), together with associated equipment and spare parts, as well as Options for additional LRVs and parts.
- B.** On March 31, 2015, the City approved Modification No. 1 to the Agreement to exercise Option 1 in accordance with Section 64.1 of the Agreement for 40 additional LRVs to be delivered after the Phase 1 delivery of 24 Vehicles, and to exercise Options for additional Spare Parts and Equipment, in accordance with Sections 64.2, 64.3 and 64.4 of the Agreement.
- C.** On October 30, 2015, the City approved Modification No. 2 to the Agreement to update the list of approved major suppliers listed in Section 29, clarify the purpose of Item 1.1 (Allowance) in Exhibit 2 of Volume I, and specify the payment structure for changes to the LRVs paid under Item 1.1.
- D.** On August 16, 2016, the City approved Modification No. 3 to the Agreement to update the list of approved major suppliers, modify radio/CAD/AVL systems on the Vehicles, including related price and payment schedules, provide extra time for delivery of the Vehicles and other project submittals, add a new parent

company guarantee, and make miscellaneous changes to the Technical Specification.

- E.** On June 20, 2017, the City approved Modification No. 4 to the Agreement to procure four additional LRVs to be delivered after the 24th production LRV, which Vehicles shall be part of the production fleet, conform to all requirements of the Technical Specification, and all prior design approvals and Buy America audits.
- F.** On November 28, 2018, the SFMTA, through the Director of Transportation, approved an Assignment and Assumption Agreement, assigning the Contract from Siemens Industry, Inc., to Siemens Mobility Inc.
- G.** On October 22, 2019, the City approved Modification No. 5 to the Agreement to commence design of and expedite the addition of track brakes to the power trucks on eight LRVs as a method to reduce frequency of flat spots on wheels caused by activation of the push button emergency brake.
- H.** On December 6, 2019, the City approved Modification No. 6 to the Agreement to (i) update the Vehicles with multiple enhancements to improve passenger comfort, operational functionality, and maintainability and fleet reliability; (ii) continue installation of the track brakes; and (iii) initiate activities for the accelerated Phase 2 delivery schedule.
- I.** On March 27, 2020, the City approved Modification No. 7 to the Agreement to (i) further update the Vehicles enhancements including seating changes; (ii) complete installation of the track brakes; and (iii) complete activities for the accelerated Phase 2 delivery schedule.
- J.** On October 30, 2020, the City approved Modification No. 8 to the Agreement to (i) further modify the Vehicles including adding larger cab monitors and a second sensitive edge to the middle doors; and (ii) delete fareboxes for 141 of the Vehicles; as well as expedite work to avoid Phase 2 production delays.
- K.** The SFMTA now wishes to modify the Agreement to add design refinements for Phase 2 production and updates to Phase 1 Vehicles, including (i) upgrading the center doors with additional sensing capabilities; (ii) completing installation of larger monitors and improved cameras initiated in Modification No. 8; (iii) making changes to the operator cab and controls in response to operator feedback; and (iv) providing for the next-generation Clipper equipment implementation on LRV4. In addition, using funds from the escalation allowance, the parties have resolved an issue regarding Phase 2 Vehicle escalation costs. These changes do not increase the overall Contract amount.

Now, therefore, the parties agree that the Agreement shall be modified as follows:

1. Section 29 (Subcontracting) is amended in its entirety to read as follows:

Contractor may subcontract portions of the Work only upon prior written approval of City. Contractor is responsible for its subcontractors throughout the course of the performance of the Work. City's execution of this Agreement constitutes its approval of the major subcontractors/suppliers listed below. Neither party shall contract on behalf of or in the name of the other party. Any agreement made in violation of this provision shall be null and void.

	<b>COMMODITY</b>	<b>SUPPLIER</b>
1	<b>Automatic Passenger Counting System (APC)</b>	INIT
2	<b>Advanced Train Control System (ATCS)</b>	Thales
3	<b>CCTV System</b>	Kratos, Securitas, DTI Group, Televic
4	<b>Communications - Radio</b>	Harris
5	<b>Doors</b>	Ultimate Transportation N. America
6	<b>Event Recorder</b>	Hasler Rail
7	<b>Friction Brake System</b>	Tec Tran Brakes (Wabtec)
8	<b>Heating, Ventilation and Air Conditioning (HVAC)</b>	Thermo King Corp.
9	<b>Passenger Information System, Infotainment (PIS)</b>	Televic
10	<b>CAD/AVL</b>	Xerox, Conduent
11	<b>Couplers</b>	Voith
12	<b>Lighting (exterior)</b>	TDG
13	<b>Lighting (interior)</b>	TDG
14	<b>Pantograph</b>	Schunk
15	<b>Sanders</b>	Knorr
16	<b>Seats (passenger)</b>	Freedman Seating Company
17	<b>Seats (driver)</b>	Seats Incorporated
18	<b>Steps</b>	Vapor Stone Rail Sys (Wabtec)
19	<b>Train to Wayside Communication System</b>	Vecom

2. Exhibit 1A (Schedule of Prices) of the Agreement is replaced in its entirety with a new Exhibit 1A (Schedule of Prices), which is attached to this Modification. Price items reflect escalation totaling 14.7091% cumulatively over 5 years and 8 months. The Phase 2 Vehicle price (Exhibit 1A, item 2.2) of \$3,826,439 reflects escalation.

3. *Exhibit 2 (Payment Schedule) of the Agreement is replaced in its entirety by a new Exhibit 2 (Payment Schedule), which is attached to this Modification.*
4. *Exhibit 3A (Project Delivery Schedule) of the Agreement is replaced in its entirety with a new Exhibit 3A (Project Delivery Schedule), which is attached to this Modification.<sup>1</sup>*
5. *Exhibit 5, Section 1.1.3 (Exceptions to Warranty) is amended in its entirety to read as follows:*

The warranty shall not apply to scheduled maintenance items and items furnished by the SFMTA, except to the extent such equipment may be damaged by the failure of a part or component for which the Contractor is responsible.

The warranty on owner-specified Clipper equipment (purchased and installed by Contractor) shall be for one year. However, related brackets, wiring, and similar hardware used by Contractor to install the Clipper equipment are not included as owner-specified Clipper equipment.

The Contractor is not required to provide a warranty on owner-specified Genfare farebox equipment (purchased and installed by Contractor) after Vehicle Acceptance.

6. *Exhibit 6 of the Agreement, as amended, is further modified; the Contractor shall increase the existing Parent Company Guarantees to reflect the increase in the Contract Amounts for each one, respectively, as follows, until the work is complete:*
  - \$1,576,757 for the 24 Base Order Vehicles (Guarantee number 466742);
  - \$2,627,929 for the Option 1 Vehicles (Guarantee number 484678);
  - \$262,793 for the Phase W Vehicles (Guarantee number 556963);
  - \$36,663,876 for the Phase 2 Vehicles (Guarantee number 634590)

Contractor shall execute amended Guarantees upon execution of this Modification.

7. *A new Exhibit 10 (Modification No. 9 Change Orders) is added to the Agreement and is attached to this Modification.*

Change Order Nos. 44-49, and 54-55 are changes requested by the SFMTA after the First Article Inspection (FAI) process in Section 20.9.3 of the Technical

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<sup>1</sup> Exhibit 3A, Project Delivery, as included in this Modification No. 9, does not include any time adjustments that might be required by the ongoing effects of the COVID-19 pandemic, as notified to the SFMTA in serial letter SII-MTA-1127, and subsequent letters.



Specifications (FAI Changes).

- A. Change Order 44 (Sensitive Edge on Middle Doors) – Complete implementation of new door specification for both door leafs of the middle doors to be modified to each include a sensitive edge. This change, initiated in Contract Modification 8, covers remaining installations for 28 Phase 1 and 141 Phase 2 Vehicles.
  - B. Change Order 45 (Rear View Monitors and Exterior Cameras Upgrade) – Complete planned upgrades and replacements including interim upgrade to touch-sensitive screens on Phase 1 Vehicles and subsequent replacement with newly defined Phase 2 technology enhancements of larger monitors and improved cameras. This change, initiated in Contract Modification No. 8, covers remaining installations for 28 Phase 1 and 141 Phase 2 Vehicles.
  - C. Change Order 46 (Additional Cab Mirrors) – Add adjustable mirror allowing operators to look through the curved cab wall at passengers in the lead car.
  - D. Change Order 47 (Master Controller Additional Adjustability) – Increase adjustability of the master controller towards the dash.
  - E. Change Order 48 (Reversal of Sanding and Gong Footswitches) – Reverse the position of the sanding and gong footswitches.
  - F. Change Order 49 (Moving Flasher Light Button) – Move the emergency light pushbutton to a location accessible by the operator’s right hand.
  - G. Change Order 54 (Tow Bars and Strap Adaptors) – Provide an additional 18 tow bars and 18 strap adaptors over and above the two of each previously supplied during Phase 1 implementation.
  - H. Change Order 55 (Interior Seating Mock-Up) – Provide a seating mock-up to demonstrate the new interior layouts previously approved and funded under Contract Modification No. 7, and refine design concepts prior to serial production for Phase 2 Vehicles, and prior to the retrofit of previously Accepted Vehicles.
8. *Section 15.1.4.1 of the Technical Specification (Seat Construction) is modified to add a new subsection 2 to read as follows:*
- 2. The seat construction and attachments of the seat to the carbody shall also comply with APTA-RT-LRT-RP-001-11 and be tested accordingly.
9. *Section 22.2.7.3 of the Technical Specification (On-Site Personnel) is modified to add a new subsection 2 to read as follows (Change Order 53):*
- 2. Contractor shall provide maintenance support to augment SFMTA capabilities and capacity to manage wheel slide incidents and tire replacements, including the replacement of up to 20 carsets of tires.

10. Section 23.3.1 of the Technical Specification (Fare Collection), is replaced in its entirety (Change Orders 50-52) to read as follows:

**23.3.1 Fare Collection**

1. Contractor shall supply and install a fare collection system compatible with the SFMTA LRT system, as specified in the table below for Vehicles 2001-2068.

**Table 23-1. Fare Collection**

No.	Defined System	Equipment	Qty	Current Location
1-1	Fare Collection	Farebox	2	One in each cab
1-2		Drivers Console	2	One in each cab
1-3		Passenger Device	4	Two in each carbody half
1-4		Power Module	2	One for each carbody half

2. Beginning with Phase 2, Contractor shall make provisions for owner-supplied fare collection equipment for both cash (Genfare) and electronic fare collection (Clipper C2 next generation) systems. Provisions shall include power, cabling, connections, and attachment points specific to equipment provided by the SFMTA. Contractor shall make provisions for a fare collection system compatible with the SFMTA LRT system per Section 23.1.2, as specified below:
- Contractor shall provide fareboxes for Vehicles 2069 – 2078, but not for Vehicles 2079 and beyond. Contractor shall install all materials and equipment necessary for the installation of such fareboxes, including the base and cables.
  - Clipper C2 equipment (driver’s consoles, passenger devices, and power modules) shall not be provided for Vehicles 2069 and beyond.
  - For Clipper power provisions, Contractor shall provide electrical circuit breakers appropriate for C2 equipment.
  - For Clipper wiring, Contractor shall provide 50 C2 wiring harnesses; required harnesses beyond 50 will be owner-supplied. Contractor shall install wiring harnesses on all Vehicles.
  - For the Clipper antenna, Contractor shall install the C2 Clipper antenna, which will be owner-supplied equipment.

11. **Release.** Contractor acknowledges and agrees that the amounts agreed for the work described in Modifications Nos. 1-8 and this Modification No. 9 shall be full accord and satisfaction for all past, current and prospective costs incurred in

connection with Contractor's performance of all work for all executed Modifications up to and including the work covered under this Modification No. 9, without limitation, including any and all markups and overhead. If this modification involves the granting of an extension of time, with or without cost, Contractor releases the City from all claims and costs associated with such extension of time. Said costs may include, but are not limited to, costs for labor, materials, equipment, disruption, lost productivity, escalation, delay, extended overhead, administration and extended performance time. Contractor releases the City from all claims for which full accord and satisfaction is made, as set forth above. Notwithstanding the foregoing, this Release does not apply to work associated with change orders that are currently under discussion between Contractor and the City at the time of this Modification. This paragraph replaces the release paragraphs in Modification Nos. 1, 2, 3, 4, 5, 6, 7, and 8.

12. **Effective Date.** Each of the amendments set forth above shall be effective on and after all parties have signed the Amendment.
13. **Legal Effect.** Except as expressly modified by this Modification No. 9, all other terms and conditions of the Contract remain unchanged and in full force and effect.

IN WITNESS WHEREOF, the parties hereto have entered into and executed this Modification No. 9 on the date set forth on page 1 above.

**CITY**

**San Francisco Municipal Transportation Agency**

\_\_\_\_\_  
Jeffrey P. Tumlin  
Director of Transportation

San Francisco Municipal Transportation Agency  
Board of Directors  
Resolution No.  
Dated:

Attest:

\_\_\_\_\_  
Secretary, Board of Directors

Approved as to Form:

Dennis J. Herrera  
City Attorney

By: \_\_\_\_\_  
Robin M. Reitzes  
Deputy City Attorney

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**Attachments**

- Exhibit 1A – Schedule of Prices
- Exhibit 2 – Payment Schedule
- Exhibit 3A – Project Delivery Schedule
- Exhibit 10 – Modification No. 9 Change Orders

**CONTRACTOR**

**Siemens Mobility, Inc.**

\_\_\_\_\_  
Michael Cahill  
President

\_\_\_\_\_  
Christopher Halleus  
Vice President, FBA

City vendor number: 50009  
Federal Taxpayer ID No.13-2762488

## EXHIBIT 1A Schedule of Prices

### BASE

ITEM	ORIGINAL CONTRACT/ MOD NO.	DESCRIPTION	UNIT PRICE	QUANTITY	EXTENDED PRICE <sup>4</sup>
Item 1	Original	Engineering Design, Project Management and Design Qualification Testing	Lump Sum		\$37,541,102
Item 1.1	Original, Mod 2, Mod 7 adjustment	Allowance for (a) regulatory mandated changes, (b) passenger enhancements, and (c) system modifications in order for Vehicle to interface with other SFMTA projects (e.g., radio project)	Lump Sum		\$0 <sup>1</sup>
Item 2.1	Mod 1	Vehicle Price for Base Order Phase 1	\$3,327,250	24 Cars	\$79,854,000
Item 2.2	Mod 1	Vehicle Price for Base Order Phase 2	\$3,826,439 <sup>3</sup>	151 Cars	\$577,792,289
Item 3	Original	Operating, Maintenance and Parts Manuals	Lump Sum		\$809,478
Item 4.1	Original	Training	Lump Sum		\$361,557
Item 4.2	Original	Train Simulator (1) (In accordance with Section 22.2.8 of Technical Specifications)	Lump Sum		\$1,704,650
Item 5.1	Mod 1	Spare Parts (Total of Exhibit 1.B, Phase 1)	Lump Sum		\$14,153,840
Item 5.2	Mod 1	Spare Parts (Total of Exhibit 1.B, Phase 2) <sup>2 5</sup>			
Item 6	Original	Special Tools, Test and Diagnostic Equipment (Total of Exhibit 1.D)	Lump Sum		\$1,792,624
Item 7.1	Mod 1	Option 1 for 40 Additional New Light Rail Vehicles	\$3,349,270 <sup>3</sup>	40 Cars	\$133,970,800

Item 8.1	Mod 1	Additional Spare Parts (Exhibit 1.C Phase 1) <sup>5</sup>	Lump Sum		\$11,269,527
Item 8.2	Mod 1	Additional Spare Parts (Exhibit 1.C Phase 2) <sup>2 5</sup>			
Item 9	Mod 1	Spare parts for Option Cars <sup>2 5</sup>	Lump Sum		\$15,000,000
Item 10	Mod 1	Train Simulator (2) (In accordance with Section 22.2.8 of Technical Specifications) <sup>2</sup>	Lump Sum		\$1,704,650
Item 11	Mod 3	Modification No. 3 (Non-recurring costs)			
Item 11.1	Mod 3	Engineering	Lump Sum		\$6,128,416
Item 11.2	Mod 3	SIBAS Expert 2 Monitoring and Diagnostic Software	Lump Sum		\$71,000
Item 12	Mod 3	Modification No. 3 (Base Recurring Costs)			
Item 12A	Mod 3	Base Phase 1	\$62,313 <sup>6</sup>	24 Cars	\$1,495,514
Item 12B	Mod 3	Base Phase 2	\$62,313 <sup>6</sup>	151 Cars	\$9,409,275
Item 13	Mod 3	Modification No. 3 Option 1 (Recurring Costs)	\$62,313 <sup>6</sup>	40 Cars	\$2,492,523
Item 14	Mod 4	Modification No. 4 (Vehicle Price for Phase W)	\$3,968,750 <sup>3</sup>	4 Cars	\$15,875,000
Item 15	Mod 5	Track brakes Phase 1			
Item 15.1	Mod 5	Non-recurring costs for track brake, including engineering, testing, and updates to manuals.	Lump Sum		\$286,617
Item 15.2	Mod 5	Installation of track brakes on 8 Phase 1 Cars.	\$22,486	8 Cars	\$179,888
Item 16	Mod 6	Weight Incentives	TBD	TBD	TBD
Item 17	Mod 6	Non-recurring Engineering Costs			
Item 17.1	Mod 6	Phase 1, Option 1, Phase W Engineering Costs for Changes 8 – 25	Lump Sum		\$492,738

Item 17.2	Mod 6	Phase 2 Preliminary Design Work, Single Transverse Seat	Lump Sum		\$714,694
Item 17.3	Mod 6	Phase 2 Preliminary Design Work, Double Transverse Seat	Lump Sum		\$159,140
Item 18	Mod 6	Recurring Costs Phase 1, Option 1, Phase W			
Item 18.1	Mod 6	Modifications Performed at Siemens Facility (Change Orders 8 - 11)	\$11,179	68 Cars	\$760,172
Item 18.2	Mod 6	Modifications Performed at SFMTA (Change Orders 12 - 24)	\$2,284	68 Cars	\$155,312
Item 19	Mod 6	Recurring Costs for Phase 2 (Change Orders 9 - 24)	\$4,172	151 Cars	\$629,972
Item 20	Mod 6	Track Brake Installation on 60 Phase 1, Option 1, Phase W Cars	\$21,411	60 Cars	\$1,284,660
Item 21	Mod 6	Initial Production Acceleration Activities	Lump Sum		\$5,603,000
Item 22	Mod 7	Continued Production Acceleration Activities	Lump Sum		\$19,899,553
Item 23	Mod 7	Engineering Costs for Modification 7 (Change Orders 28-36, 38-40)	Lump Sum		\$2,809,279
Item 24	Mod 7	Phase 1, Option 1, and Phase W Recurring Costs Modifications Performed at SFMTA (Change Orders 28, 30, 31, 33)	\$3,472	68 Cars	\$236,096
Item 25	Mod 7	Phase 1, Option 1, and Phase W Vehicle Interior Redesign Modification Performed at SFMTA (Change Order 38)	\$109,998	68 Cars	\$7,479,864
Item 26	Mod 7	Recurring Costs for Phase 2	\$67,552	50 Cars	\$3,377,600

		Modification 7 (50 LRVs 69-118) (Change Order 28, 31, 32, 33, 34, 35, 37, 39)			
Item 27	Mod 7	Recurring Costs for Phase 2 Modification 7 (101 LRVs 119-219) (Change Order 28, 31, 32, 33, 34, 35, 37, 40)	\$86,254 <sup>2</sup>	101 Cars	\$8,711,654
Item 28	Mod 7	Additional Training Allowance	Lump Sum		\$1,000,000
Item 29	Mod 8	Non recurring Costs Change Orders 41, 43	Lump Sum		\$1,000,546
Item 30	Mod 8	Recurring Costs Phase 1, Option 1 and Phase W			
Item 30.1	Mod 8	Recurring Costs Securitas Monitors Change order 41	\$6,947	68 Cars	\$472,396
Item 30.2	Mod 8	Recurring Costs Phase 1, Option 1, Phase W, Retrofit of Door system changes (Change Order 43)	\$19,198	40 Cars	\$767,920
Item 30.3	Mod 8	Recurring Costs Phase 1, Options 1, Phase W Retrofit of Rear View Monitor system (Change Order 41)	\$38,201	40 Cars	\$1,528,040
Item 31	Mod 8	Recurring Costs Phase 2			
Item 31.1	Mod 8	Recurring costs Phase 2 Recurring (Change Orders 41, 43)	\$24,395	10 Cars	\$243,950
Item 31.2	Mod 8	Recurring costs Phase 2 Recurring costs (Change Orders 42)	- \$27,294	141 Cars	- \$3,848,454
Item 32	Mod 9	Non-recurring costs	Lump Sum		\$885,063
Item 33	Mod 9	Tire replacement per truck set	\$65,477	20 Cars	\$1,309,540
Item 34	Mod 9	Retrofit of door system changes Change Order 44	\$18,589	28 Cars	\$520,492



Item 35	Mod 9	Retrofit of rear view monitor system Change Order 45	\$37,759	28 Cars	\$1,057,252
Item 36	Mod 9	Retrofit of Phase 1 Change Orders 46 to 52	\$14,445	68 Cars	\$982,260
Item 37	Mod 9	Phase 2 recurring costs - Change Orders 44 & 45	\$18,021	141 Cars	\$2,540,961
Item 38	Mod 9	Phase 2 Recurring costs Orders 46 to 52	-\$18,133	151 Cars	-\$2,738,083
Item 39	Mod 9	Retrofit of Phase 2 Change Orders 46 to 49	Lump Sum	15 Cars	\$150,436
				<b>SUBTOTAL</b>	<b>\$970,078,803</b>

### Option

ITEM	CONTRACT MOD.	DESCRIPTION	UNIT PRICE	QUANTITY	EXTENDED PRICE <sup>4</sup>
Item 7.2		Option 2 for 1 to 45 additional Light Rail Vehicles	\$3,329,011 <sup>2</sup>	45 Cars	\$149,805,495

### Escalation

ITEM	CONTRACT MOD.	DESCRIPTION	UNIT PRICE	QUANTITY	EXTENDED PRICE <sup>4</sup>
Allowance	Original, Mod 6, Mod 7, Mod 8 adjustment	Allowance for escalation in accordance with Agreement, Section 7.5	n/a	n/a	\$72,767,279

<b>Not to exceed CONTRACT LIMIT</b>	<b>\$1,192,651,577</b>
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#### Notes:

- <sup>1</sup> Allowance used and incorporated into Contract Modification Nos. 7 and 8 (Items 26-35).
- <sup>2</sup> This price does not include escalation. Escalation will be applied in accordance with Section 7.5 of the Agreement; the parties have agreed that the escalation will be 14.7091% for Phase 2, items 5.2 and 8.2.
- <sup>3</sup> Price includes escalation. Item 2.2 includes escalation required on items 2.1, 12B, and 19, as per letter SII-MTA 1301, which is incorporated herein by reference as though fully set forth.
- <sup>4</sup> Prices do not include sales taxes.
- <sup>5</sup> The prices of spare parts (recorded in Exhibits 1B and 1C - Nominal Spare Parts) that are affected by the changes (trucks, wheels, seats) in Modification No. 7 will be adjusted to reflect the cost of those changes as presented in the Change Orders.
- <sup>6</sup> Extended price reflects the Change Order; unit price is rounded.

**Exhibit 2**  
**PAYMENT SCHEDULE**  
 (All Item references are to Exhibit 1.A)

Item 1 - Engineering Design, Project Management and Design Qualification Testing

	Milestone	Percent of Bid Item
A	Submittal and approval of Test Program, System Safety, Reliability, Maintainability and other plans as negotiated with SFMTA	2%
B	Completion and approval of preliminary design review	2%
C	Completion and approval of final design review	35%
D	Completion and approval of Vehicle performance qualification testing	30%
E	Completion and approval of test program as specified	26%
F	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 1		100%

Item 2 – Vehicle Price for Base Contract

Item 2A – Vehicle Price for Base Contract (Cars 1 - 24)

	Milestone	Percent of Bid Item
A	Placement of contracts with the following major subcontractors (Cars 1 - 24).* <ul style="list-style-type: none"> <li>• Propulsion</li> <li>• Friction Brake</li> <li>• Air Comfort</li> <li>• Door Operators &amp; Controls</li> <li>• Carbody</li> <li>• Train Control</li> <li>• Coupler</li> <li>• Communication</li> </ul>	2%
B	Delivery of complete set of subsystems to site of installation.	20%/Vehicle
C	Vehicle structure complete and ready for shipment to final assembly site	20%/Vehicle

	Milestone	Percent of Bid Item
D	SFMTA approval for shipment of Vehicle from final assembly site to SFMTA property	25%/Vehicle
E	Conditional Acceptance of Vehicle by SFMTA	30%/Vehicle
F	Completion and Acceptance of all Contract requirements for Phase 1 (Retention)	3%
Total for Item 2A		100%

\* Payment will be made only to the extent that deposits have been paid to suppliers and up to the amount of the deposits or 2%, whichever is the lesser value; in addition Contractor must provide security for payment under Section 7.3 of the Agreement.

Item 2B – Vehicle Price for Base Contract (Cars 25 - 175)

Item 2B.1 – Vehicle Price for Base Contract (applies to 107 of 151 Phase 2 Vehicles)

	Milestone	Percent of Bid Item
A	Placement of contracts with the following major subcontractors (Cars 25 - 175).* <ul style="list-style-type: none"> <li>• Propulsion</li> <li>• Friction Brake</li> <li>• Air Comfort</li> <li>• Door Operators &amp; Controls</li> <li>• Carbody</li> <li>• Train Control</li> <li>• Coupler</li> <li>• Communication</li> </ul>	2%
B	Delivery of complete set of subsystems to site of installation.	20%/Vehicle
C	Vehicle structure complete and ready for shipment to final assembly site	20%/Vehicle
D	SFMTA approval for shipment of Vehicle from final assembly site to SFMTA property	25%/Vehicle
E	Conditional Acceptance of Vehicle by SFMTA	30%/Vehicle
F	Completion and Acceptance of all Contract requirements for Phase 2 (Retention)	3%
Total for Item 2B.1		100%

Item 2B.2 – Vehicle Price for Base Contract (applies to 44 accelerated Vehicles of 151 Phase 2 Vehicles ) \*\*

	Milestone	Percent of Bid Item
A	Placement of contracts with the following major subcontractors (Cars 25 - 175).* <ul style="list-style-type: none"> <li>• Propulsion</li> <li>• Friction Brake</li> <li>• Air Comfort</li> <li>• Door Operators &amp; Controls</li> <li>• Carbody</li> <li>• Train Control</li> <li>• Coupler</li> <li>• Communication</li> </ul>	2%
B	Delivery of complete set of subsystems to site of installation.	35%/Vehicle
C	Vehicle structure complete and ready for shipment to final assembly site	20%/Vehicle
D	SFMTA approval for shipment of Vehicle from final assembly site to SFMTA property	20%/Vehicle
E	Conditional Acceptance of Vehicle by SFMTA	20%/Vehicle
F	Completion and Acceptance of all Contract requirements for phase 2 (Retention)	3%
Total for Item 2B.2		100%

\* Payment will be made only to the extent that deposits have been paid to suppliers and up to the amount of the deposits or 2%, whichever is the lesser value; in addition, Contractor must provide security for the payment, as required under Section 7.3 of the Agreement.

\*\* 44 of 151 Phase 2 Vehicles are classified as “accelerated” and shall apply to every other Vehicle to be delivered after the 63<sup>rd</sup> Vehicle of Phase 2 (Phase 2 Cars 65, 67, 69, etc.) unless otherwise agreed between the Parties.

Item 3 - Operating, Maintenance and Parts Manuals

	Milestone	Percent of Bid Item
A	Acceptance of draft manuals	5%
B	Delivery and Acceptance of Operating, Maintenance and Parts Manuals	90%
C	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 3		100%

Item 4 – Training and Train Simulator

Item 4.1 – Training

	Milestone	Percent of Bid Item
A	Completion of training program and delivery and Acceptance of all deliverables	95%
B	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 4		100%

Item 4.2 – Train Simulator

	Milestone	Percent of Bid Item
A	Delivery and Acceptance of Train Simulator	95%
B	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 4.2		100%

Item 5 - Spare Parts

	Milestone	Percent of Bid Item
A	Delivery and Acceptance of spare parts. Delivery and payment will be on a line-item basis.	95%
B	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 5		100%

Item 6 – Special Tools, Test and Diagnostic Equipment

	Milestone	Percent of Bid Item
A	Delivery and Acceptance of diagnostic test equipment, special tools, bench test equipment	95%
B	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 6		100%

Item 7 - Option for 1 to 85 Additional New Light Rail Vehicles

Item 7.1 - Option 1 for 40 Additional New Light Rail Vehicles

Progress payments will be made in accordance with Item 2A

Item 7.2 – Option 2 for 1 to 45 Additional New Light Rail Vehicles

Progress payments will be made in accordance with Item 2B.1

Item 8 – Additional Spare Parts

Progress payments will be made in accordance with Item 5.

Item 9 – Spare Parts for Options

Progress payments will be made in accordance with Item 5.

Item 10 – Train Simulator

Progress payments will be made in accordance with Item 4.2.

Item 11 - Modification No. 3 Work (Non-Recurring Costs)

Item 11.1 – Engineering

	Milestone	Percent of Bid Item
A	Conceptual design review / preliminary design review / plan	20%
B	Final design review	40%
C	First article inspection	20%
D	System Acceptance test	15%
E	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 11.1		100%

Item 11.2 – SIBAS Expert 2 Monitoring and Diagnostic Software

	Milestone	Percent of Bid Item
A	Delivery and Acceptance of SIBAS Expert software	62%
B	Completion by SFMTA of two SIBAS Expert training sessions	33%
C	Completion and Acceptance of all Contract requirements (Retention)	5%
Total for Item 11.2		100%

Item 12 - Modification No. 3 (Base Recurring Costs)

Item 12A – Base Phase 1

	Milestone	Percent of Bid Item
A	Delivery to site of installation of equipment required by Modification No. 3	42%
B	SFMTA approval for shipment from final assembly site to SFMTA property of Vehicle with equipment Installed as required for Phase 1	25%
C	SFMTA Conditional Acceptance of Vehicle with equipment installed as required for Phase 1	30%
D	Completion and Acceptance of all Contract requirements for Phase 1 (Retention)	3%
Total for Item 12A		100%

Item 12B – Base Phase 2

	Milestone	Percent of Bid Item
A	Delivery to site of installation of equipment required by Modification No. 3	42%
B	SFMTA approval for shipment from final assembly site to SFMTA property of Vehicle with equipment installed as required for Phase 2	25%
C	SFMTA Conditional Acceptance of Vehicle with equipment installed as required for Phase 2	30%
D	Completion and Acceptance of all Contract requirements for Phase 2 (Retention)	3%
Total for Item 12B		100%

Item 13 – Option 1 (Recurring Costs)

	Milestone	Percent of Bid Item
A	Delivery to site of installation of equipment required for Option 1	42%
B	SFMTA approval for shipment from final assembly site to SFMTA property of Vehicle with equipment installed as required for Option 1	25%
C	SFMTA Conditional Acceptance of Vehicle with equipment installed as required for Option 1	30%
D	Completion and Acceptance of all Contract requirements for Option 1 (Retention)	3%
Total for Item 13		100%

Item 14 - Contract Modification 4: Vehicle Price for Phase W

	Milestone	Percent of Bid Item
A	Placement of contracts with the following major subcontractors (Cars 25 – 28).* <ul style="list-style-type: none"> <li>• Propulsion</li> <li>• Friction Brake</li> <li>• Air Comfort</li> <li>• Door Operators &amp; Controls</li> <li>• Carbody</li> <li>• Train Control</li> <li>• Coupler</li> <li>• Communication</li> </ul>	2%
B	Delivery of complete set of subsystems to site of installation.	20%/Vehicle
C	Vehicle structure complete and ready for shipment to final assembly site	20%/Vehicle
D	SFMTA approval for shipment of Vehicle from final assembly site to SFMTA property	25%/Vehicle
E	Conditional Acceptance of Vehicle by SFMTA	30%/Vehicle
F	Completion and Acceptance of all Contract requirements for Phase W (Retention)	3%
Total for Item 14		100%

\* Payment will be made only to the extent that deposits have been paid to suppliers and up to the amount of the deposits or 2%, whichever is the lesser value; in addition Contractor must provide security for payment under Section 7.3 of the Agreement.



Item 15 - Modification No. 5 Work

Item 15.1 – Non-Recurring Costs

	Milestone	Percent of Bid Item
A	Submittal and approval of engineering submittals and test documentation and manuals for additional track brakes on power trucks	100%

Item 15.2 – Vehicle Installation

	Milestone	Percent of Bid Item
A	Installation, testing, and Acceptance of track brakes on power trucks on 8 LRVs	100%

Item 16 – Weight Incentives – Actual amount will be determined according to Section 19.2 of the Agreement.

Item 16.1 – Phase 1, Option 1, and Phase W Weight Incentives

	Milestone	Percent of Bid Item
A	SFMTA for approval of shipment of Vehicle 2068 from final assembly site to SFMTA	100%

Item 16.2 – Phase 2 Weight Incentives

	Milestone	Percent of Bid Item
A	SFMTA approval of shipment of Vehicle from final assembly site to SFMTA	100%

Item 17 – Non-Recurring Engineering Costs for Modification No. 6 Work

Item 17.1 – Phase 1, Option 1, and Phase W Non-Recurring Engineering

	Milestone	Percent of Bid Item
A	Submittal and approval of design documentation for Change Orders 8 – 11	55%
B	Submittal and approval of field modification instructions and/or design/software documentation for Change Orders 12 – 24	45%
Total for Item 17.1		100%

Item 17.2 – Phase 2 Preliminary Design Work, Single Transverse Seat

	Milestone	Percent of Bid Item
A	Submittal and approval of preliminary design review for Change Order 26 - single transverse arrangement	75%
B	Submittal and approval of final design review for Change Order 26 - single transverse arrangement	25%
Total for Item 17.2		100%

Item 17.3 – Phase 2 Preliminary Design Work, Double Transverse Seat

	Milestone	Percent of Bid Item
A	Submittal and approval of carshell analysis for Change Order 27 - double seat arrangement	100%

Item 18 – Recurring Costs for Modification No. 6 – Phase 1

Item 18.1 – Modifications Completed at Siemens Facility

	Milestone	Percent of Bid Item
A	Completion of installation of modifications for Change Orders 8 -11 Phase 1, Option 1, and Phase W Cars	100%

Item 18.2 – Modifications Completed at SFMTA

	Milestone	Percent of Bid Item
A	Completion of installation of modifications for Change Orders 12 - 24 for Phase 1, Option 1, and Phase W Cars	100%

Item 19 – Recurring Costs for Modification No. 6 – Phase 2

	Milestone	Percent of Bid Item
A	Completion of installation of modifications for Change Orders 9 - 24 for Phase 2 Cars	100% per Vehicle

Item 20 – Track Brake Modifications

	Milestone	Percent of Bid Item
A	Completion of installation of modifications for track brakes in 28 Cars (Change Order 25)	33%
B	Completion of installation of modifications for track brakes in 48 Cars (Change Order 25)	33%
C	Completion of installation of modifications for track brakes in 68 Cars (Change Order 25)	34%
Total for Item 20		100%

Item 21 – Initial Production Acceleration Activities

	Milestone	Percent of Bid Item
A	Occupation and fit-out of satellite facility	50%
B	Completion of installation of major equipment items (crane, integration and lifting/turning equipment) at satellite facility	50%
Total for Item 21		100%

Item 22 – Continued Production Acceleration Activities

	Milestone	Percent of Bid Item
A	Commencement of carshell production	20%
B	Completion of first carshell	10%
C	Vehicle assembly readiness – paint booth, test pit installed	10%
D	Shipment of first Phase 2 Vehicle	10%
E	Recurring amounts paid evenly in quarterly increments June 2020 to December 2025	50%
Total for Item 22		100%

Item 23 – Non-Recurring Engineering Costs for Modification No. 7 Work

	Milestone	Percent of Bid Item
A	Approval of field modification instructions for Vehicle interior retrofit and reconfiguration, single transverse (Change Orders 38 and 39)	20%
B	Approval of final design review and testing for Vehicle interior redesign, double transverse, (Change Order 40)	40%
C	PIS Software releases (Change Orders 29, 36) and field modification instructions, software releases, or engineering documentation for all other (non-interior) Change Orders (Change Orders 28, 30-35)	40%
Total for Item 23		100%

Item 24 – Recurring Costs for Modification No. 7 – Phase 1, Option 1, Phase W

	Milestone	Percent of Bid Item
A	Completion of installation of modifications in 34 Cars for Change Orders 28, 30, 31, and 33 Phase 1, Option 1, Phase W Cars	50%
B	Completion of installation of modifications in 34 Cars for Change Orders 28, 30, 31, and 33 Phase 1, Option 1, Phase W Cars	50%
Total for Item 24		100%

Item 25 – Recurring Costs for Modification No. 7 – Vehicle Interior Redesign Phase 1, Option 1, Phase W

	Milestone	Percent of Bid Item
A	Completion of retrofit of Vehicle interior for Change Order 38 Phase 1, Option 1, Phase W	100% per Vehicle

Item 26 – Recurring Costs for Modification No. 7 – 50 Phase 2 Vehicles, 69-118 (Change Orders 28, 31-35, 37, 39)

Progress Payment will be made in accordance with Exhibit 2, Item 2B.1

Item 27 – Recurring Costs for Modification No. 7 – 101 Phase 2 Vehicles, 119-219 (Change Orders 28, 31-35, 37, 40)

Progress Payments will be made in accordance with Exhibit 2, Item 2B.1 and 2B.2 according to Vehicle number.

Item 28 – Additional Training Allowance

	Milestone	Percent of Bid Item
A	Delivery and Acceptance of training – Payment will be on a per module basis	100% per Module

Item 29 – Non-Recurring Costs for Modification No. 8

	Milestone	Percent of Bid Item
A	Approval of FDR supplement (Change Order 41)	60%
B	Approval of FDR supplement (Change Order 43 - Doors)	40%
Total for Item 29		100%

Item 30 – Recurring Costs for Modification No. 8 – Phase 1, Option 1, Phase W

Item 30.1 – Modifications for Change Order 41 (Securitas Monitors)

	Milestone	Percent of Bid Item
A	Installation, testing and Acceptance of modifications in 68 Phase 1, Option 1, Phase W Cars (Change Order 41)	100% Per Vehicle

Item 30.2 – Modifications for Change Order 43 (Doors)

	Milestone	Percent of Bid Item
A	Installation, testing and Acceptance of door modifications in 40 Phase 1, Option 1, Phase W Cars (Change Order 43)	100% Per Vehicle

Item 30.3 – Modifications for Change Order 41 (Rear View Monitors)

	Milestone	Percent of Bid Item
A	Installation, testing and Acceptance of modifications to rear view monitor system in 40 Phase 1, Option 1, Phase W Cars (Change Order 41)	100% Per Vehicle

Item 31 - Recurring Costs for Modification No. 8, Phase 2

Item 31.1 – Recurring Costs for Modification No. 8 – 10 Phase 2 Vehicles, (Change Orders 41, 43)

Progress Payments will be made in accordance with Exhibit 2, Item 2B.1 and 2B.2 according to Vehicle number.

Item 31.2 – Recurring Costs for Modification No. 8 – 141 Phase 2 Vehicles, (Change Orders 42)

Progress Payments will be made in accordance with Exhibit 2, Item 2B.1B and 2B.2B according to Vehicle number.

Item 32 – Non-Recurring Costs for Modification No. 9

	Milestone	Percent of Bid Item
A	Tire replacement set-up complete (Change Order 53)	30%
B	Shipment and approval of tow bars and strap adaptors (Change Order 54)	30%
C	Field modification instructions (FMIs) approved for Change Orders 46-52	40%
Total for Item 32		100%

Item 33 – Costs for Modification No. 9 - Tire Replacement

	Milestone	Percent of Bid Item
A	Tire replacement for trucks on 20 Cars (60 trucks total) complete, returned, and Accepted by SFMTA (Change Order 53)	100% per truck

Item 34 – Recurring Costs for Modification No. 9 Retrofit of Door Systems – 28 Phase 1, Option 1, Phase W Vehicles

	Milestone	Percent of Bid Item
A	Retrofit of door systems (Change Order 44)	100% per Vehicle

Item 35 – Recurring Costs for Modification No. 9 Retrofit of Rear View Monitor Systems – 28 Phase 1, Option1, Phase W Vehicles

	Milestone	Percent of Bid Item
A	Retrofit of rear view monitor systems (Change Order 45)	100% per Vehicle

Item 36 – Recurring Costs for Modification No. 9 – 68 Phase 1, Option 1, Phase W Vehicles

	Milestone	Percent of Bid Item
A	Retrofit of operator cab and Clipper equipment (Change Orders 46-52)	100% per Vehicle

Item 37 – Recurring Costs for Modification No. 9 – 141 Phase 2 Vehicles, (Change Orders 44 and 45)

Progress Payments will be made in accordance with Exhibit 2, Item 2B.1 and 2B.2 according to Vehicle number.

Item 38 – Recurring Costs for Modification No. 9 – 151 Phase 2 Vehicles, (Change Orders 46 to 52)

Progress Payments will be made in accordance with Exhibit 2, Item 2B.1 and 2B.2 according to Vehicle number.

Item 39 – Costs for Modification No. 9 – Retrofit of 15 Phase 2 Vehicles, (Change Orders 46 to 49)

	Milestone	Percent of Bid Item
A	Completion of cab improvement modifications Retrofit of 15 Phase 2 Vehicles, (Change Orders 46 to 49)	100%



## EXHIBIT 3

### PROJECT DELIVERY AND VEHICLE DELIVERY SCHEDULE

#### A. Project Delivery Schedule

Item	Date
Notice To Proceed	9/30/2014
Project Plan	11/29/2014
Training Start	4/17/2017
Training Complete	8/15/2017
Special Tools / Diagnostic Test Equipment	4/17/2017
Delivery of Publications (Manuals, Parts Book, Drawings) - Prelim	2/16/2017
Delivery of Publications (Manuals, Parts Book, Drawings) - Final	11/13/2017
Delivery of Spare Parts (Phase 1)	8/15/2017
Contract Mod 3, Item 12 Completion Of Vehicle Modifications In Base Vehicles (Modification 3)	Per Vehicle Delivery
Contract Mod 3, Item 13 Completion of Vehicle Modifications in Option 1 Vehicles (Modification 3)	Per Vehicle Delivery
Contract Mod 5, Item 15.1 Completion of Engineering for Additional Track Brakes	9/30/2019
Contract Mod 5, Item 15.2 Installation of Additional Track Brakes on 8 Vehicles	10/31/2019
Contract Mod 6, Item 17.1 A – Phase 1, Option 1, Phase W - Submittal of Design Documentation for Change Orders 8 – 11	5/31/2017
Contract Mod 6, Item 17.1 B – Phase 1, Option 1, Phase W - Submittal of Field Modification Instructions and or Software/ Design Documentation for Change Orders 12 – 24	1/3/2020
Contract Mod 6, Item 17.2 A - Phase 2 Preliminary Design Work, Single Transverse Seat, Completion of Preliminary Design Review for Change Order 26 - Single Transverse arrangement	1/24/2020
Contract Mod 6, Item 17.2 B - Phase 2 Preliminary Design Work, Single Transverse Seat, Completion of Final Design Review for Change Order 26 - Single Transverse arrangement	3/15/2020
Contract Mod 6, Item 17.3 A – Phase 2 Preliminary Design Work, Double Transverse Seat, Submittal of Carshell Analysis for Change Order 27 - Double Seat Arrangement	2/28/2020
Contract Mod 6, Item 18.1 A – Modifications Completed at Siemens Facility, Completion of Installation of modifications for Change Orders 8 - 11 Phase 1, Option 1, Phase W Cars	10/8/2019
Contract Mod 6, Item 18.2 A – Modifications Completed at SFMTA, Completion of Installation of modifications for Change Orders 12 - 24 for Phase 1, Option 1, Phase W Cars	10/1/2020
Contract Mod 6, Item 19 A – Completion of Installation of modifications for Change Orders 8 - 24 for Phase 2 Cars	Per Phase 2 Vehicle Delivery
Contract Mod 6, Item 20.1 A – Retrofit Track Brakes in 60 Cars Phase 1, Option 1, Phase W, Completion of Installation of modifications for Track Brakes in 28 Cars (Change Order 25)	2/15/2020

Contract Mod 6, Item 20.1 B – Retrofit Track Brakes in 60 Cars Phase 1, Option 1, Phase W, Completion of Installation of modifications for Track Brakes in 48 Cars (Change Order 25)	3/15/2020
Contract Mod 6, Item 20.1 C – Retrofit Track Brakes in 60 Cars Phase 1, Option 1, Phase W, Completion of Installation of modifications for Track Brakes in 68 Cars (Change Order 25)	4/15/2020
Contract Mod 6, Item 21 A – Production Acceleration, Occupation of Facility, Change Order 28	11/30/2019
Contract Mod 6, Item 21 B – Production Acceleration, Completed Installation of Major Equipment Items (Crane, Integration and Lifting/turning equipment) Change Order 28	3/31/2020
Delivery of Spare Parts (35% of Phase 2 Quantity)	5/15/2021
Delivery of Spare Parts (35% of Phase 2 Quantity)	With Delivery of 50th Vehicle (Phase 2)
Delivery of Spare Parts (30% of Phase 2 Quantity)	With Delivery of 100th Vehicle (Phase 2)
Acceptance of Training Simulator 1	5/31/2018
Delivery of Additional Spare Parts (Exhibit 1 C)	TBD
Delivery of Spare Parts for Option Vehicles	TBD
Delivery of Training Simulator 2	TBD
Contract Mod 7, Item 22 A – Commencement of Carshell Production	6/15/2020
Contract Mod 7, Item 22 B – Completion of First Carshell	9/15/2020
Contract Mod 7, Item 22 C – Vehicle Assembly Readiness – Paint Booth, Test Pit Installed	12/15/2020
Contract Mod 7, Item 22 D – Shipment of First Phase 2 Vehicle	5/15/2021
Contract Mod 7, Item 23 A – Approval of Field Modification Instructions for Vehicle Interior Retrofit and Reconfiguration, Single Transverse, Change Orders 38 and 39	9/15/2020
Contract Mod 7, Item 23 B – Approval of Final Design Review and Testing for Vehicle Interior Redesign, Double Transverse, Change Order 40	12/15/2020
Contract Mod 7, Item 23 C – PIS Software releases (Change Orders 29, 36) and Field Modification Instructions, Software Releases, or Engineering Documentation for all other (non-interior) Change Orders (Change Orders 28, 30-35)	9/15/2020
Contract Mod 7, Item 24 A – Completion of Installation of Modifications in 34 Cars for Change Orders 28, 30, 31, 33 Phase 1, Option 1, Phase W Cars	12/15/2020
Contract Mod 7, Item 24 B – Completion of Installation of Modifications in 34 Cars for Change Orders 28, 30, 31, 33 Phase 1, Option 1, Phase W Cars	5/15/2021
Contract Mod 7, Item 25 – Completion of Retrofit of Vehicle Interior for Change Order 38 Phase 1, Option 1, Phase W	12/15/2022

Contract Mod 7, Item 26 – Completion of Installation of Vehicle modifications for Modification No. 7 – 50 Phase 2 Vehicles	Per Phase 2 Vehicle Delivery
Contract Mod 7, Item 27 – Completion of Installation of vehicle modifications for Modification No. 7 – 101 Phase 2 Vehicles	Per Phase 2 Vehicle Delivery
Contract Mod 8, Item 29 A – Approval of FDR Supplement for Modification of Rear View Monitor System (Change Order 42)	12/15/2020
Contract Mod 8, Item 29 B – Approval of FDR Supplement for Modification of Door System (Change Order 43)	12/31/2020
Contract Mod 8, Item 30.1 – Completion of Retrofit of Securitas Monitors for 68 vehicles Phase 1, Option 1, Phase W (Change Order 41)	10/31/2020
Contract Mod 8, Item 30.2 – Completion of Retrofit of Door Modification for 40 Phase 1, Option 1, Phase W Vehicles (Change Order 43)	12/22/2022
Contract Mod 8, Item 30.3 – Completion of Retrofit of Rear View Monitor System for 40 Phase 1, Option 1, Phase W Vehicles (Change Order 41)	8/31/2021
Contract Mod 8, Item 31.1 Completion of Installation of Door and Rear View Monitors upgrades for 10 Phase 2 Vehicles (Change Order 41, 43)	Per Phase 2 Vehicle Delivery
Contract Mod 9, Item 32 A – Tire Replacement Set Up Complete (Change Order 53)	12/15/2022
Contract Mod 9, Item 32 B – Shipment and Approval of Tow Bars and Strap Adaptors (Change Order 54)	12/24/2021
Contract Mod 9, Item 32 C – FMIs Approved for Change Orders 46-52	12/15/2022
Contract Mod 9, Item 33 – Tire Replacement for Trucks on 20 Cars complete, returned, and Accepted by SFMTA (Change Order 53)	12/15/2022
Contract Mod 9, Item 34 – Retrofit of Door Systems (Change Order 44)	12/15/2022
Contract Mod 9, Item 35 – Retrofit of Rear View Monitor Systems (Change Order 45)	3/31/2022
Contract Mod 9, Item 36 – Retrofit of Operator Cab and Clipper Equipment (Change Orders 46-52)	12/15/2022
Contract Mod 9, Item 37 – Completion of Installation of vehicle modifications for Modification No. 9 – 141 Phase 2 Vehicles, (Change Orders 44 and 45)	Per Phase 2 Vehicle Delivery
Contract Mod 9, Item 38 – Completion of Installation of vehicle modifications for Modification No. 9 – 151 Phase 2 Vehicles, (Change Orders 46 to 52)	Per Phase 2 Vehicle Delivery
Contract Mod 9, Item 39 – Retrofit of 15 Phase 2 Vehicles, (Change Orders 46 to 49)	2/28/2022

Note: See Exhibit 3.B for Vehicle Delivery Schedule.

**Exhibit 10**

**Modification No. 9 Change Orders**

<b>Change Order No.</b>	<b>Description</b>	<b>Technical Specification (TS) Change vs. FAI Change</b>	<b>Total</b>
44	Sensitive Edge on Middle Doors (NRE + 141 Phase 2 + 28 Phase 1)	FAI Change	\$1,052,370
45	Rear View Monitors and Exterior Cameras Upgrade (141 Phase 2 + 28 Phase 1)	FAI Change	\$3,066,407
46	Additional Cab Mirrors	FAI Change	\$494,662
47	Master Controller Additional Adjustability	FAI Change	\$701,625
48	Reversal of Sanding and Gong Footswitches	FAI Change	\$53,768
49	Moving Flasher Light Button	FAI Change	\$218,707
50	Clipper Equipment Deduction (Contractor no longer providing system equipment for Phase 2)	TS Change	-\$3,157,709
51	Clipper Next Generation Design Changes	TS Change	\$56,656
52	Clipper Next Generation Wiring Retrofits	TS Change	\$287,497
53	Tire Replacement Support	TS Change	\$1,593,750
54	Tow Bars and Strap Adapters	FAI Change	\$281,703
55	Interior Seating Mock Up	FAI Change	\$58,485
		<b>Change Orders Total</b>	<b>\$4,707,921</b>
		<b>Escalation</b>	<b>\$75,377,539</b>
		<b>Mod 9 Total</b>	<b>\$80,085,460</b>