File No. _____200767_____ **Committee Item No.** _____3_____

Board Item No. _____49_____

COMMITTEE/BOARD OF SUPERVISORS
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Committee: Budget & Finance Committee   **Date** September 2, 2020

Board of Supervisors Meeting   **Date** September 15, 2020

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Completed by: Linda Wong   **Date** August 28, 2020

Completed by: Linda Wong   **Date** September 3, 2020

1 [Contract - Next Generation Customer Information System - New Real-Time Vehicle Arrival
and Service Update System - Not to Exceed $88,980,877]

2

3 **Resolution approving Municipal Transportation Agency Contract No. 2019-01: Next**

4 **Generation Customer Information System, with Cubic Transportation Systems, Inc. to**

5 **develop, implement, and maintain a new real-time vehicle arrival and service update**

6 **system for Muni in an amount not to exceed $88,980,877 for an initial term of six years**

7 **with two optional five-year terms to cover software subscriptions and equipment**

8 **lifecycle maintenance, to commence following Board approval**.

9

10 WHEREAS, The San Francisco Municipal Transportation Agency (SFMTA) piloted the

11 existing real-time information system in 1999 and entered into a contract in 2001 for

12 systemwide service with NextBus, now a subsidiary of Cubic; and

13 WHEREAS, The NextBus system is currently nearing the end of its useful life; and

14 WHEREAS, There have been many changes in transportation and technology since

15 2001, including on-demand, mobile app-based forms of transportation; and

16 WHEREAS, Research findings suggest that the SFMTA improving the presentation

17 and content of real-time customer information can increase transit ridership, especially when

18 service is less frequent even if there were no improvements to the underlying service itself;

19 and

20 WHEREAS, Research findings showed similar responses across all income levels to

21 the provision of alternative routes and a Muni trip planning app, suggesting that a new system

22 can begin to mitigate a two-tiered, income-based transportation system in a region already

23 confronting gentrification, widening income inequality and racial disparities; and

24 WHEREAS, On September 4, 2018, the SFMTA Board of Directors authorized the

25 SFMTA to issue a Request for Proposals for SFMTA Contract No. 2019-01: Next Generation

1   Customer Information System (Contract), and to negotiate the Contract with the highest-

2   ranked proposer; and

3   WHEREAS, The Next Generation Customer Information System (Next Generation

4   System) will provide more accurate vehicle-arrival predictions; larger, graphical digital or

5   solar-powered signs at transit stops and stations; expanded sign coverage; new customer

6   information, including route alternatives, vehicle crowding, accessibility, real-time service

7   changes, and regional transit; content for signs on-board vehicles; all-in-one trip planner and

8   ticketing app; analytics platform to improve service and operational planning; and a tool for

9   field supervisors to manage operations; and

10   WHEREAS, On March 1, 2019, the SFMTA received six proposals in response to the

11   Request for Proposals; and

12   WHEREAS, On July 1, 2019, the SFMTA issued a notice of intent to negotiate the

13   Contract to Cubic Transportation Systems, Inc., the highest-ranked proposer in the evaluation

14   process; and

15   WHEREAS, Funding for this project will be provided through SFMTA operating funds;

16   and

17   WHEREAS, On July 31, 2018, the SFMTA, under authority delegated by the Planning

18   Department, determined that the proposed authorization is not defined as a "project" under

19   the California Environmental Quality Act (CEQA) pursuant to Title 14 of the California Code of

20   Regulations, Sections 15060(c) and 15378(b); and

21   WHEREAS, A copy of the CEQA determination is on file with the Secretary to the

22   SFMTA Board of Directors and is incorporated herein by reference; and

23   WHEREAS, On June 16, 2020, the SFMTA Board of Directors adopted Resolution No.

24   200616-058, which authorized the Director of Transportation to execute SFMTA Contract No.

25   2019-01: Next Generation Customer Information System, with Cubic Transportation Systems,

1   Inc. to develop, implement, and maintain a new real-time vehicle arrival and service update

2   system for Muni in an amount not to exceed $88,980,877, for an initial term of six years with

3   two optional five-year terms to cover software subscriptions and equipment lifecycle

4   maintenance; and

5   WHEREAS, A copy of the said contract is on file with the Clerk of the Board of

6   Supervisors in File No. 200767, which is hereby declared to be part of this resolution as if

7   set forth fully herein; now, therefore, be it

8   RESOLVED, That the Board of Supervisors authorizes the SFMTA to enter into

9   SFMTA Contract No. 2019-01: Next Generation Customer Information System, with Cubic

10 Transportation Systems, Inc. to develop, implement, and maintain a new real-time vehicle

11 arrival and service update system for Muni in an amount not to exceed $88,980,877, for an

12 initial term of six years with two optional five-year terms to cover software subscriptions and

13 equipment lifecycle maintenance subject to the following condition: that the SFMTA obtain

14 approval from this Board prior to exercising each of the optional five-year terms to cover

15 software subscriptions and equipment lifecycle maintenance; and, be it

16   FURTHER RESOLVED, That within 30 days of the contract being fully executed by all

17 parties, the SFMTA shall provide the final contract to the Clerk of the Board for inclusion into

18 the official file.

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Item 3 Files 20-0767	Department: San Francisco Municipal Transportation Agency

EXECUTIVE SUMMARY

Legislative Objectives

- The proposed resolution would approve a new contract between the San Francisco Municipal Transportation Agency (SFMTA) and Cubic Transportation Systems, Inc. (Cubic) for developing, implementing and maintaining a Next Generation Customer Information System for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance. The proposed resolution requires Board of Supervisors approval for each five-year option to extend.

Key Points

- SFMTA had a prior contract with Cubic (previously known as Next Bus) for the Muni Customer Information System (or Automated Vehicle Location System). According to SFMTA, core components of the Next Bus information technology and signage systems currently installed at Muni bus and station stops will no longer be available from equipment suppliers. SFMTA selected Cubic, the existing contractor, to implement the replacement system following a competitive solicitation.

- The contract is structured into two major phases. In Phase I, Cubic, Inc. will carry out a one-for-one replacement of existing signs at transit stops, plus some limited expansion the number of displays at transit stops. In addition, Cubic will install the core components and infrastructure of the Next Generation System and the signage and communication system of the Central Subway. SFMTA is obligated under the terms of the contract to purchase all system component and supportive services that are outlined in Phase I. Phase II will involve installation of additional signs, enhancements to software, installation of the Analytic Platform, additional cross-system functional integration, and overall improvements in real-time communication of route and service status, and alternative routes. Phase II work will be performed solely at SFMTA discretion

Fiscal Impact

- The capital budget for this contract is $25.4 million and the operating budget for the initial six-year contract term is $16.1 million, totaling $41.5 million in the first six years. The total contract amount, including contingencies, is approximately $89 million. Capital costs of $25.4 million will be paid from the Agency's fund balance, which was $448.8 million as of June 30, 2020. The operating costs will be paid for from SFMTA's operating budget. In the FY 2020-21 – FY 2021-22 budget under consideration by the Board of Supervisors, the operating cost of the proposed contract is expected to be $2.4 million. Following that, according to the cash flow analysis provided by SFMTA, annual operating costs are expected to be $3.0 - $3.1 million through FY 2025-26.

Recommendation

- Approve the proposed resolution.

MANDATE STATEMENT

City Charter Section 9.118(b) states that any contract entered into by a department, board or commission that (1) has a term of more than ten years, (2) requires expenditures of $10 million or more, or (3) requires a modification of more than $500,000 is subject to Board of Supervisors approval.

BACKGROUND

In 2002, the San Francisco Municipal Transportation Agency (SFMTA) and Next Bus, now a subsidiary of Cubic Transportation Systems, Inc. (Cubic), entered into a contract for Next Bus to provide the City with an Automatic Vehicle Location System. This system provides real-time vehicle location and expected arrival time information to SFMTA management and Municipal Railway (Muni) riders.

In 2013, SFMTA entered into a new four-year contract with Next Bus for software and equipment maintenance services for the not-to-exceed amount of $7,890,220 from August 1, 2013 through July 31, 2017. In July 2017, the Board of Supervisors approved the third amendment to the contract, which increased the contract amount to $12,968,676 and extended the contract for one year with an option to extend by an additional year, though July 31, 2019 (File 17-0509). In 2019 and 2020, SFMTA renewed the annual support and maintenance renewal for Next Bus by Cubic under Admin Code 21.30 which provides for extending contracts for proprietary software. These contract extensions were necessary to keep the current Customer Information System running until SFMTA was ready to transition to the Next Generation Customer Information System, which was is in the midst of the procurement process. [1]

Vendor Selection

According to SFMTA, core components of the Next Bus information technology and signage systems currently installed at Muni bus and station stops will no longer be available from equipment suppliers. On September 4, 2018, the SFMTA Board of Directors authorized the SFMTA to issue a Request for Proposals for SFMTA Contract No. 2019-01: Next Generation Customer Information System (Contract), The SFMTA received six proposals in response to the Request for Proposals, which were evaluated by SFMTA and Metropolitan Transportation Commission staff, and on July 1, 2019, the SFMTA issued a notice of intent to negotiate the Contract to Cubic Transportation Systems, Inc., which had the highest scoring proposal.

DETAILS OF PROPOSED LEGISLATION

The proposed resolution would approve a new contract between the SFMTA and Cubic Transportation Systems, Inc. (Cubic) for developing, implementing and maintaining a Next

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[1] Cubic has proprietary rights to NextBus software, equipment and all related services. SFMTA Procurement determined that Cubic was to be treated as a sole source for the purpose of any contract requirement included in the municipal code.

Generation Customer Information System for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance. The proposed resolution requires Board of Supervisors approval for each five-year option to extend.

Services Provided

The proposed contract with Cubic is for licensing, operations, and maintenance of software and equipment and consists of the following five elements: system software, stationary digital signs, on-board digital sign software, mobile app & website, and an analytics tool.

Features the SFMTA will receive as part of the part of the comprehensive IT and communications system upgrade includes new kiosk digital signage system. This will provide a significant larger sign display showing maps of current vehicle locations and arrival times, system-wide maps of vehicle locations, and suggestions for alternative routes in the event of unanticipated service delays, with real time vehicle positions. The system will also provide an app-based real time update on arrival times, real-time update on changes in service status; a trip planner features such as point-to-point directions and transfer instructions, estimates of total trip time, "all-in-one" mobile ticketing app; improved two-way communication with Muni users via phone notification, communication of changes in service status; increased predicative accuracy of arrival times and time to destination; suggested trip and travel itineraries; and information on alternative routes in the event of longer than anticipated wait times to service disruptions and congestion-related arrival delays. The Local Business Entity subcontracting participation requirement for the proposed contract is ten percent.

Project Phasing

The contract is structured into two major phases. In Phase I, Cubic, Inc. will carry out a one-for-one replacement of existing signs at transit stops, plus some limited expansion the number of displays at transit stops. In addition, Cubic will install the core components and infrastructure of the Next Generation System and the signage and communication system of the Central Subway. MTA is obligated under the terms of the contract to purchase all system component and supportive services that are outlined in Phase I.

Phase II will involve installation of additional signs, enhancements to software, installation of the Analytic Platform, additional cross-system functional integration, and overall improvements in real-time communication of route and service status, and alternative routes. Phase II work will be performed solely at MTA discretion.

Contract Monitoring

Appendix H of the proposed contract outlines a timeline for the build-out and implementation of the various components and functional features of the Next Generation System Cubic is expected to deliver over Phase I. The contract also has a detailed specification of benchmarks, and the dates at which certain components are expected to be delivered. Appendix G-1 further details contractor performance measures and liquidated damages if performance measures are not met. The SFMTA project team will be responsible for monitoring and reporting performance. They will

evaluate performance metrics on a six-months basis to determine vendor compliance and work with the vendor to improve performance as necessary.

FISCAL IMPACT

Exhibit 1 shows the contract capital and operating budgets in the initial six-year contract term and two five-year options. The total not-to-exceed contract budget over sixteen years is projected to cost $88,90,877, which includes the ten percent contingency.

Exhibit 1: Contract Budget

| | Total Capital Budget | Operating Budget | | | Total Operating | Total |
		Initial 6-Year Term	First 5-Year Option	Second 5-Year Option		
Base System	$18,750,552	$12,621,722	$17,819,238	$19,050,012	$49,490,972	$68,241,524
Options	4,371,844	1,978,796	2,921,688	3,377,855	8,278,339	12,650,183
Subtotal	23,122,396	14,600,517	20,740,926	22,427,867	57,769,310	80,891,706
10% Contingency	2,312,240	1,460,052	2,074,093	2,242,787	5,776,931	8,089,171
Total Cost	**$25,434,636**	**$16,060,569**	**$22,815,018**	**$24,670,654**	**$63,546,241**	**$88,980,877**

Source: SFMTA

Note: The capital budget of $25.4 million includes Phase 1 ($15.5 million) and Phase 2 ($9.9 million)

As shown in Exhibit 1, the operating budget is expected to increase at year seven by $6,754,449 or 42 percent, from $16,060,569 to $22,815,018. This reflects the fact that implementation and scaling the operation of various components of system will take place over time.[2] At year seven, all ongoing licensing and servicing costs will be billed at rates corresponding to a fully functioning system.

Sources of Funds

According SFMTA, the $25.4 million of capital costs will be paid for using the Agency's fund balance. According to the Budget Outlook Update for FY 2019-20 to FY 2023-24, the SFMTA projected fund balance as of June 30, 2020 is $448.8 million, of which $65.7 million was previously appropriated by the Board of Supervisors in the FY 2020-21 budget.

The operating costs will be paid for from SFMTA's operating budget. In the FY 2020-21 – FY 2021-22 budget under consideration by the Board of Supervisors, the operating cost of the proposed contract is expected to be $2.4 million. Following that, according to the cash flow analysis provided by SFMTA, annual operating costs are expected to be $3.0 - $3.1 million through FY 2025-26 (assuming all optional system enhancement are included).

POLICY CONSIDERATION

SFMTA believes that the $25 million in one-time capital funds will help lay the foundation for long-term SFMTA recovery and growth.   A part of the effort to establish the rationale for funding the Next Generation system, MTA conducted survey research on actual or potential transit users

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[2] In FY 2021-22, operating costs are expected to be $2.2 million, following that, annual operating costs are expected to be $3.0 - $3.1 million.

to determine the degree to which better real-time information could improve confidence in Muni, and bring back riders during the COVID-19 crisis and recovery period. MTA also sought to determine whether better signage displays and more comprehensive, up-to-date information arrival times, travel speeds, estimated time to destination point, and most criticality, the ability suggest alternative routes in the event of unplanned service delays, would favor greater adoption of public transit

SFMTA reports that between 80 and 85 percent of survey respondents stated they would continue to use Muni in the face of a 20-minute wait provided they were presented with an alternative route within 3 blocks that had a shorter wait. There were some minor variants by respondent income, all falling within a range of 5 percent. The percentage of respondent stating they would continue to opt for Muni in the face of a 20 minute wait reported on the current Next Bus display system, but without any information provided an alternative route with shorter waits, ranged for 58 of the lowest income category of respondent to 22 percent for persons in the higher income bracket.[3] SFMTA asserts this as evidence that installation of the Next Generation system is necessary to bring riders back to the Muni system. SFMTA has also pointed to the ability of the Next Generation technological platform to provide information vehicle crowding to allow users to determine whether to board, or wait for the next arrival – a feature that is touted to address user concurs over exposure to COVID-19 on overcrowded, densely packed light rail vehicles and buses.

MTA believes this will lead to perceptions of greater reliably, higher quality of communication real-time information that will allow users of the public transportation system to plan trip itineraries, and make adjustments in response to disruption in service status, bus overcrowding, and delays due to traffic congestion. SFMTA asserts that the ability to display suggested alternative routes at kiosk display signs in the event of longer-than expected arrival delays will lead more current residents to opt for Muni over other modes of potential transportation – in particular, the use of TNCs.

RECOMMENDATION

Approve the proposed resolution.

City and County of San Francisco
Municipal Transportation Agency
One South Van Ness Ave., 7th Floor
San Francisco, California 94103

NEXT GENERATION CUSTOMER INFORMATION SYSTEM
AGREEMENT BETWEEN
THE CITY AND COUNTY OF SAN FRANCISCO AND
CUBIC TRANSPORTATION SYSTEMS, INC.

CONTRACT NO. SFMTA-2019-01

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City and County of San Francisco
Municipal Transportation Agency
One South Van Ness Ave., 7th Floor
San Francisco, California 94103

NEXT GENERATION CUSTOMER INFORMATION SYSTEM
AGREEMENT BETWEEN
THE CITY AND COUNTY OF SAN FRANCISCO AND

CUBIC TRANSPORTATION SYSTEMS, INC.

CONTRACT NO. SFMTA-2019-01

This Agreement is made this [insert day] day of [insert month], 20 [insert year], in the City and County of San Francisco (City), State of California, by and between Cubic Transportation Systems, Inc., 5650 Kearny Mesa Road, San Diego, CA 92111 (Contractor) and City, a municipal corporation, acting through its Municipal Transportation Agency (SFMTA).

Recitals

    A. The SFMTA wishes to retain the services of Contractor to develop, implement, and maintain the Next Generation Customer Information System (Next Generation System), a new real-time vehicle arrival and service update system for the San Francisco Municipal Railway (Muni) public transportation network.

    B. This Agreement was competitively procured, as required by San Francisco Administrative Code Chapter 21.1, using a Request for Proposals (RFP) issued on September 6, 2018, pursuant to which the SFMTA selected Contractor as the highest-qualified proposer.

    C. The Local Business Entity (LBE) subcontracting participation requirement for this Agreement is 10%.

    D. Contractor represents and warrants it is qualified to perform the Services required by the SFMTA as set forth under this Agreement.

    E. Approval for this Agreement was obtained when the Civil Service Commission approved Contract number 46889-17/18 on March 5, 2018.

Now, therefore, the parties agree as follows:

Article 1   Definitions; Interpretation; Reference Information

1.1   Definitions. Capitalized terms used in this Agreement, which are not proper nouns or titles, are defined, where used, in the text of this Agreement or in Appendix A (Definitions).

1.2   Interpretation.

1.2.1   General.

(a)   The language in all parts of this Agreement shall in all cases be construed simply, as a whole and in accordance with its fair meaning and not strictly for or against any Party. The Parties acknowledge and agree this Agreement is the product of an extensive and thorough, arm's length exchange of ideas, questions, answers, information, and drafts during the Proposal's preparation process, that each Party has been given an opportunity to independently review this Agreement with legal counsel, and that each Party has the requisite experience and sophistication to negotiate, understand, interpret, and agree to the particular language of the provisions of this Agreement.

(b)   Accordingly, if an ambiguity in or dispute regarding the interpretation of this Agreement, this Agreement shall not be interpreted or construed against the Party that prepared it, and instead other rules of interpretation and construction will be utilized. The City's final answers to questions posed during the Proposal preparation process for this Agreement shall not be relevant in interpreting this Agreement except as they may clarify provisions otherwise considered ambiguous.

1.2.2   Meaning of Including. In this Agreement, the word "including" (or "include" or "includes") means "including without limitation," and shall not be interpreted as setting forth an exhaustive list.

1.2.3   Meaning of Promptly. In this Agreement, the word "promptly" means as soon as reasonably practicable in light of the then-prevailing circumstances.

1.2.4   Trade Meanings. Unless otherwise defined herein, words or abbreviations that have well-known trade meanings are used herein in accordance with those meanings.

1.3   Reference Information.

1.3.1   Except as provided in Section 1.3.1, Contractor agrees that:

(a)   The SFMTA has provided the Reference Information in Appendix J to this Agreement for Contractor's convenience only;

(b)   Contractor is not entitled to rely on the Reference Information as presenting any design, engineering, or maintenance solutions, or other direction, or as presenting any means or methods, for complying with the requirements of this Agreement;

(c)   The SFMTA is not liable for any cause of action, claim, or loss suffered by Contractor or any Contractor-related entity by reason of any use of or reliance on information contained in the Reference Information;

(d)   The SFMTA has not verified the information in the Reference Information, and does not represent or warrant the information contained in the Reference Information is free from error;

(e)   Contractor will have no right to additional compensation or time adjustment based on any error in the Reference Information;

(f)   Contractor is capable of conducting and obligated hereunder to verify or supplement the Reference Information as necessary to perform the Services; and

(g)   If, and to the extent Contractor or any Contractor-related entity uses information in the Reference Information, such use is entirely at Contractor's risk and at Contractor's own discretion.

1.3.2   Section 1.3.1 notwithstanding, certain information contained in the Reference Information may be used to describe or define requirements under the Agreement. Information or portions of information specifically referenced in the Agreement for purposes of describing or defining certain requirements are deemed incorporated into the Agreement to the extent so referenced.

Article 2   Term of the Agreement; Time; Notice to Proceed; Schedule and Milestones

2.1   Term. The term of this Agreement shall commence on the Effective Date and expire six years from the Effective Date, unless earlier terminated as otherwise provided herein.

2.2   Options to Renew. The SFMTA has two options to renew this Agreement for a period of five years each. The SFMTA may extend this Agreement beyond the expiration date by exercising an option at the Director of Transportation's sole discretion and by modifying this Agreement as provided in Section 11.5 (Modification of this Agreement). The SFMTA will notify Contractor of its intention to exercise an option to extend the term of the Agreement no less than 120 calendar days before the beginning of end of the existing term.

2.3   Time of the Essence. Contractor agrees that, with respect to Contractor's performance of Contractor's covenants, conditions, and obligations under this Agreement, time is of the essence.

2.4   Notice to Proceed. Authorization for Contractor to proceed with performance of the Services will be provided through the SFMTA's issuance of Notice to Proceed. The SFMTA anticipates issuance of Notice to Proceed on the Effective Date.

2.5   Schedule.

2.5.1   Phases I and II. Contractor shall perform the Services in two phases, as described below and in detail in Appendix B.

(a)   Under the Phase I implementation period, Contractor shall complete a 1-for-1 replacement of the Existing System and the installation of the Next Generation System and Central Subway stations. Specifically, Contractor shall complete the tasks below under this Phase I implementation period. These tasks are described in detail in Appendix B.

(i)   Complete the System Design Document, Quality Assurance/Quality Control Plan, Training Plan, Disaster Recovery Plan, Final Schedule, and Final Mobilization Plan;

(ii)   Identify System Software customizations to meet SFMTA requirements;

(iii)   Integrate/coordinate Contractor's System Software with other third-party systems (e.g., OrbCAD, ATCS);

(iv)   Coordinate with the Vendor of the Existing System to transmit and display Customer Information on Legacy Signs during the Transition Period;

(v)   Implement System Software;

(vi)   Train Authorized Users on System Software;

(vii)   Replace all Legacy Signs;

(viii)   Provide Customer Information on Mobile Platform & Website; and

(ix)   Install new Stationary Digital Signs at Central Subway stations prior to opening of the Central Subway. Currently, the Central Subway is slated for opening in June 2021.

(b)   Under the Phase II implementation period, and solely at the SFMTA's direction, Contractor shall complete the following tasks and enhancements following the completion of Phase I:

(i)   Install new Stationary Digital Signs in locations where there are no signs;

(ii)   Implement enhancements to System Software;

(iii)   Implement enhancements to Mobile Platform & Website;

(iv)   Implement Analytics Platform; and

(v)   Integrate the System Software with the On-Board Digital Signs furnished and installed by Vendor(s).

2.5.2   Preliminary Schedule. Contractor represents and warrants the Preliminary Schedule, attached to this Agreement as Appendix H, represents a practical schedule for Contractor to perform the Services required to complete Phases I and II. Contractor shall use the Preliminary Schedule as a foundation to prepare the Final Schedule.

2.5.3   Final Schedule. As material consideration for entering into this Agreement, Contractor hereby commits and the SFMTA is relying on Contractor's commitment, to perform the Services, including implementing the Next Generation System, in accordance with the Final Schedule. The Parties shall use the Final Schedule for planning and monitoring the progress of Contractor's work under this Agreement.

2.5.4   Milestones. Contractor shall achieve certain milestones by the dates indicated below. If Contractor fails to achieve the System Software Transition Milestone and Stationary Digital Signs Transition Milestone by the corresponding dates set forth below, Contractor will be subject to Liquidated Damages in accordance with Appendix G.

(a)   **System Design Document Milestone.** By no later than 90 days from Notice to Proceed, Contractor shall deliver to the SFMTA for the SFMTA's approval the System Design Document, Quality Assurance/Quality Control Plan, Training Plan, Disaster Recovery Plan, Final Schedule, and Final Mobilization Plan.

(b)   **System Software Transition Milestone.** Contractor shall achieve the System Software Transition Milestone by no later than 275 calendar days after Notice to Proceed.

(c)   **Stationary Digital Signs Transition Milestone.** Contractor shall achieve the Stationary Digital Signs Transition Milestone by no later than 525 calendar days after Notice to Proceed.

(d)   **Mobile Platform & Website Milestone.** Contractor shall activate the Mobile Platform & Website for Phase I Initial Deployment by no later than 365 calendar days after Notice to Proceed.

Article 3   Services and Resources

3.1   Services Contractor Agrees to Perform. During the term of this Agreement, Contractor shall perform the services summarized below and described in detail in <u>Appendix B</u> (System Implementation Services), <u>Appendix C</u> (Maintenance Services); and <u>Appendix D</u> (SaaS Applications and SaaS Hosting Services) (collectively, the "Services").

3.1.1   System Implementation Services. Contractor shall furnish all hardware (including installation of hardware), software, documentation, warranties, and training necessary to implement the Next Generation System, as summarized below.

(a)   **General Requirements**.

(i)   <u>System Design Document</u>. Contractor shall implement the Next Generation System in accordance with the System Design Document, the requirements for which are set forth in <u>Appendix B, Section 1.3.1</u>. Contractor shall complete and deliver the System Design Document to the SFMTA for the SFMTA's approval by the date set forth in <u>Section 2.5.4(a)</u>, above.

(ii)   <u>Quality Assurance/Quality Control Plan</u>. Contractor shall implement and maintain the Next Generation System in accordance with the Quality Assurance/Quality Control Plan, the requirements for which are set forth in <u>Appendix B, Section 1.3.2</u>. Contractor shall complete and deliver the final Quality Assurance/Quality Control Plan to the SFMTA for the SFMTA's approval by the date set forth in <u>Section 2.5.4(a)</u>.

(iii)   <u>Training Plan</u>. Contractor shall provide training to SFMTA staff on the use of Next Generation System in accordance with the Training Plan, the requirements for which are set forth in <u>Appendix B, Section 1.3.3</u>. Contractor shall complete and deliver the Training Plan to the SFMTA for the SFMTA's approval by the date set forth in <u>Section 2.5.4(a)</u>.

(iv)   <u>Disaster Recovery Plan.</u> Contractor shall submit the Disaster Recovery Plan, the requirements for which are set forth in <u>Appendix B, Section 1.3.4</u>. Contractor shall complete and deliver the Disaster Recovery Plan to the SFMTA for the SFMTA's approval by the date set forth in <u>Section 2.5.4(a)</u>.

(v)   <u>Final Schedule</u>. Contractor shall implement the Next Generation System in accordance with the Final Schedule, the requirements for which are set

forth in <u>Appendix B, Section 1.3.5</u>. Contractor shall complete and deliver the Final Schedule to the SFMTA for the SFMTA's approval by the date set forth in <u>Section 2.5.4(a)</u>. Any changes to the Final Schedule shall require the approval of the SFMTA.

(vi)   <u>Coordination/Integration with Other Vendors</u>. Contractor shall coordinate with Vendors and/or integrate with Vendors' systems or products as necessary to implement the Next Generation System in accordance with System Design Document and Final Schedule. The requirements for Contractor's coordination/integration with other vendors are set forth in <u>Appendix B, Section 1.4</u>.

(b)   **Elements of the Next Generation System and their Conditions for Initial Deployment.** The Next Generation System consists of the five, interrelated Elements, below, which Contractor shall deliver to the SFMTA in accordance with the System Design Document and Final Schedule. Acceptance testing for the Elements shall be conducted in accordance with Contractor's Quality Assurance/Quality Control Plan. The conditions for Initial Deployment for each Element are also described below.

(i)   <u>System Software</u>. The requirements for the System Software, are set forth in <u>Appendix B, Section 2</u>. The conditions for Initial Deployment of the System Software are that Contractor achieve the System-Software Availability Rate and the initial General Prediction Accuracy Rate set forth in <u>Appendix F, Sections 1.1 and 1.3</u> for at least four weeks in the Test Environment. Contractor shall activate the System Software for Initial Deployment by no later than the System Software Transition Milestone. Contractor shall achieve the final General Prediction Accuracy Rate set forth in <u>Appendix F, Section 1.3</u> by no later than the Stationary Digital Signs Transition Milestone.

(ii)   <u>Stationary Digital Signs</u>. The requirements for the Stationary Digital Signs are set forth in <u>Appendix B, Section 3</u>. The conditions for Initial Deployment of each type of Stationary Digital Signs are that Contractor achieve the Stationary Digital Signs Availability Rate, described in <u>Appendix F, Section 2.1</u>, for at least one installed sign for at least four weeks. For sign types 1, 2, and 3 at all locations that comprise the Existing System, Contractor shall activate each Stationary Digital Signs for Initial Deployment by the Stationary Digital Signs Transition Milestone.

(iii)   <u>On-Board Digital Sign Software</u>. The requirements applicable to the On-Board Digital Sign Software are set forth in <u>Appendix B, Section 4</u>. The conditions for Initial Deployment of Customer Information on On-Board Digital Signs are that Contractor achieve the Transfer Prediction Accuracy Rate described in <u>Appendix F, Section 3.1</u> for at least four weeks in the Test Environment.

(iv)   <u>Mobile Platform & Website</u>. The requirements for the Mobile Platform & Website, are set forth in <u>Appendix B, Section 5</u>. The conditions for Initial

Deployment of the Trip Planner are that Contractor achieve the Trip Planner Availability Rate and the Acceptable Trip Planner Response Rate described in <u>Appendix F, Sections 4.1 and 4.4</u> for at least four weeks in a Test Environment. Contractor shall activate the Trip Planner on the Mobile Platform & Website for Initial Deployment by no later than the end of Phase I.

(v) <u>Analytics Platform</u>. The requirements for the Analytics Platform are set forth in <u>Appendix B, Section 6</u>. Contractor shall activate the Analytics Platform for Initial Deployment by no later than the end of Phase II.

(c) **Other Features of the Next Generation System and their Conditions for Initial Deployment.** The Parties may establish conditions for Initial Deployment or other acceptance criteria for other features of the Next Generation System not listed above. The SFMTA will authorize Contractor's work, if any, on such other features under separate Task Orders, and the conditions for Initial Deployment or other acceptance criteria for these features will be documented in the System Design Document.

3.1.2 Maintenance Services. The Services that Contractor shall perform to maintain the Next Generation System for the term of this Agreement (Maintenance Services) consist of the following: (a) Technical Support Services; (b) Stationary Digital Sign Maintenance Services; and (c) Communications Services. The requirements for the Maintenance Services are set forth in <u>Appendix C</u> (Maintenance Services).

3.1.3 SaaS Applications and SaaS Hosting Services; Contractor Licensed Materials. Contractor must provide the SaaS Applications and Hosting Services described in <u>Appendix D</u> (SaaS Applications & SaaS Hosting Services).

(a) <u>Contractor Licensed Materials</u>. Subject to the terms and conditions of this Agreement, Contractor grants the SFMTA a limited, irrevocable, non-exclusive, non-transferable, non-sublicensable, perpetual, royalty-free, and worldwide license to use, access, and execute the Contractor Licensed Materials, including all updates and improvements, with the Next Generation System. The SFMTA may not on its own, nor allow any third party, to reproduce, copy, distribute, modify, enhance, disassemble, reverse engineer, or decompile any of the Contractor Licensed Materials in whole or in part. The SFMTA and Contractor each acknowledge that, due to the unique nature of the Contractor Licensed Materials and their use in the Next Generation System, there may be no adequate remedy under the disputes provisions of this Agreement for either Party to enforce any breaches of or their respective rights under this paragraph. Accordingly, notwithstanding anything to the contrary in this Agreement, neither Party shall be restricted from pursuing injunctive relief from any court of competent jurisdiction for any breach of this paragraph.

(b) <u>Click-Wrap Disclaimer</u>. No "click to accept" agreement that may be required for the SFMTA or Authorized Users to access the SaaS Applications or Contractor's

Website, and no "terms of use" or "privacy policy" referenced therein or conditioned for use of the SaaS Applications or Contractor's Website(s) shall apply. Only the provisions of this Agreement, as amended from time to time, shall apply to the SFMTA and Authorized Users for access thereto and use thereof. The Parties acknowledge that the SFMTA and each Authorized User may be required to click "accept" as a condition of access to the SaaS Applications through Contractor's Website(s), but the provisions of such "click to accept" agreement and other terms (including any terms of use or privacy policy) referenced therein shall be null and void for the SFMTA and each such Authorized User. The foregoing does not apply to the SFMTA's own click-wrap agreements in the event the SFMTA chooses to have Contractor include terms of use, terms or service, privacy policies, or similar requirements drafted and approved by the SFMTA.

(c)   Title to SaaS Applications. The SFMTA acknowledges that title to the SaaS Applications and SaaS Hosting Services shall at all times remain with Contractor, and that the SFMTA has no rights in the SaaS Applications or SaaS Hosting Services except those expressly granted by this Agreement.

(d)   Authorized APIs. The SFMTA will be permitted to access and use Contractor's Application Program Interfaces (APIs) when commercially available to develop and modify, as necessary, macros and user interfaces for use with any existing or future City systems and infrastructure. For purposes of this Agreement, such development will be deemed an authorized modification but will not be supported by Contractor unless provided for in this Agreement. Functionality and compatibility of SFMTA-developed macros will be sole responsibility of the SFMTA. Any such macros or user interfaces developed by the SFMTA will become the property of the SFMTA. All flat-file exchanges will be over an encrypted file transport service (ftps/vsftpd/scp/sftp) to a secure private ftp site.

(e)   Proprietary Markings. The SFMTA agrees not to remove or destroy any proprietary markings or proprietary legends placed upon or contained within the licensed SaaS Applications or any related materials or Documentation.

3.1.4   **Optional Services and Equipment.** The Parties have identified and priced certain optional services and Equipment in Appendix E; these optional services and Equipment are described in Appendix B. The SFMTA may add such optional services and Equipment to the scope of Services Contractor provides under this Agreement by exercising options at the Director of Transportation's sole discretion and by modifying this Agreement as provided in Section 11.5 (Modification of this Agreement). The SFMTA will notify Contractor of its intention to exercise an option to add optional services and Equipment no less than 90 Days before Contractor initiates work on the services or Equipment.

3.2   **Document Delivery.**

3.2.1   Contractor shall deliver in electronic format completed Documentation for the SaaS Applications and SaaS Hosting Services by no later than the System Software Transition Milestone.

3.2.2   The Documentation shall accurately and completely describe the functions and features of the SaaS Applications and SaaS Hosting Services, including all subsequent revisions thereto. The Documentation shall be understandable by a typical end user and shall provide Authorized Users with sufficient instruction such that an Authorized User can become self-reliant with respect to access and use of the SaaS Applications and SaaS Hosting Services.

3.2.3   The SFMTA will have the right to make any number of additional copies of the Documentation at no additional charge. The SFMTA may withhold its issuance of notice of Initial Deployment for each Element or Sub-Element of the Next Generation System until the SFMTA receives the completed Documentation for the corresponding Element or Sub-Element.

3.3   Program and Project Managers.

3.3.1   The Parties will each designate a Program or Project Manager, who shall be accessible by telephone during the term of the Agreement, and shall be available 9 a.m. to 5 p.m. Monday through Friday, excluding City-designated holidays. The Parties may adjust these hours only upon mutual agreement between the Parties.

3.3.2   Contractor shall use its best efforts to maintain the same Project Manager throughout the term of the Agreement. If Contractor needs to replace its Project Manager, Contractor shall provide the SFMTA written notice thereof at least 45 Days before the date Contractor replaces its Project Manager.

3.3.3   Notwithstanding the foregoing, Contractor shall have the right to appoint temporary Project Managers in connection with short-term unavailability, sick leave, or reasonable vacation leave. Contractor shall notify the SFMTA in advance of any such temporary appointments.

3.3.4   The SFMTA may require Contractor to replace its Project Manager by giving Contractor notification thereof and the SFMTA's objective reasons therefor.

3.3.5   The Program and Project Managers for the Parties are as follows:

For Contractor:

Debra Lindquist
Senior Project Manager
5650 Kearny Mesa Road, San Diego, CA 92111

debra.lindquist@cubic.com
(510) 281 1317

For the SFMTA:

Jason Lee
Program Manager
1 South Van Ness Ave., 3rd Floor, San Francisco, CA 94103
jason.lee@sfmta.com
(415) 701-4612

3.4 **Qualified Personnel**. Contractor shall utilize to perform the Services only competent personnel under the supervision of, and in the employment of, Contractor or Contractor's SFMTA-approved subcontractors. Contractor shall comply with the SFMTA's reasonable requests to assign or remove personnel, but all personnel, including those assigned at the SFMTA's request, shall be supervised by Contractor. Contractor shall commit adequate resources to allow timely performance of the Services.

3.5 **Task Order Process.** The SFMTA may issue task orders on an as-needed basis for as-needed services or Equipment in accordance with the process set forth below.

3.5.1 **Task Order Request.** The SFMTA will define task requirements and provide to Contractor a task order request using the form in Appendix I. The task order request will include: (a) a description of the scope of the as-needed services or Equipment the SFMTA seeks and is not priced in Appendix E, including specific Deliverables, if any; (b) the deadline to respond to the task order request; and (c) the expected timeline (including specific milestones, if any) to complete the as-needed services or deliver the Equipment.

3.5.2 **Information and Data.** Upon receiving a task order request, Contractor shall request in writing any information and data it requires to complete the task order proposal (described below) and perform the task order. Contractor shall identify the timing and priority for which this information and data will be required. The Parties shall reach agreement as to the availability and delivery time for this data and information during initial task order negotiations.

3.5.3 **Task Order Proposal.** By no later than the deadline set forth in the task order request, Contractor shall prepare and submit a task order proposal that includes the following items:

(a)   A work plan that includes a detailed description, by subtask, of the as-needed services to be performed or Equipment to be delivered under the task order;

(b)   A detailed schedule to complete the task order or deliver the Equipment;

(c)   A list of Contractor's personnel and subcontractors, if any, Contractor proposes to work on the task order, and for each proposed personnel and subcontractor, a description of the tasks they will perform;

(d)   LBE subcontractor participation;

(e)   A detailed cost estimate that includes the following, as applicable:

(i)   For as-needed services, estimated hours and labor rates by position (fully burdened hourly rates by position as listed in Appendix E, Section 8). The following labor costs are not allowed and shall not be included in Contractor's cost estimate: labor to prepare monthly invoices or fill out required LBE forms; labor to manage subcontractors; overtime, unless approved in advance by the SFMTA. If the SFMTA approves overtime hours, they shall be billed at the billing rates listed and not at one and one-half times the billing rate;

(ii)   For Equipment not listed or priced in Appendix E, the type or name of equipment, unit cost, quantity, delivery schedule, and payment schedule; and

(iii)   Estimated reasonable out-of-pocket expenses (direct costs).

3.5.4   Negotiation of Task Order Price. The SFMTA Program Manager will review the selected task order proposal and, together with the Contractor, negotiate and finalize pricing for the task order. Pricing for task orders for as-needed services shall be either: (i) a negotiated maximum number of hours using the hourly labor rates set forth in Section 8, Appendix E, plus any SFMTA-approved out-of-pocket expenses, subject to a total not-to-exceed cost; or (ii) a negotiated lump-sum cost. For avoidance of doubt, amounts paid by the SFMTA to Contractor under the subpart (i) option shall be for hours worked and invoiced, subject to caps on hours and cost set forth in the task order. Pricing for tasks orders for Equipment not listed in Appendix E will be based on information in Contractor's task order proposal for the Equipment.

3.5.5   Record of Negotiation. The SFMTA Program Manager will document the task order negotiations and any agreement in a record of negotiations.

3.5.6   LBE Subcontracting Goal. The Contract Compliance Office will review the final negotiated task order scope, schedule, and LBE subcontractor participation against the LBE subcontractor goal for this Agreement. The Contract Compliance Office will track LBE subcontracting participation for each task order against the overall goal set forth in the Agreement.

3.5.7   Notice to Proceed. The SFMTA Program Manager will send to Contractor a written Notice to Proceed, Task Order number, and Purchase Order. Contractor shall use the Task Order number when submitting invoices to the Program Manager for payment.

Contractor shall not commence work under any Task Order until it receives a written Notice to Proceed for the Task Order.

3.5.8 **Changes to Task Order Pricing**. Task Order pricing shall not be modified unless there is a material change in the Task Order's scope of services, in which case a new task order proposal, pricing negotiation, record of negotiations, LBE subcontractor participation goal determination, and Notice to Proceed shall be required before SFMTA approves the change in pricing.

3.5.9 **Failure to Agree on Terms of Task Order**. If the Parties fail to reach agreement on the terms of any task order, the SFMTA may cancel the task order, and have the services completed or Equipment delivered through other available sources.

3.6 **Subcontracting**.

3.6.1 Contractor may subcontract portions of the Services only upon the SFMTAs prior, written approval. Contractor shall be responsible for its subcontractors throughout the term of the Agreement. All Subcontracts shall incorporate the terms of <u>Article 10</u> (Additional Requirements Incorporated by Reference) and <u>Article 13</u> (Data and Security) of this Agreement, unless inapplicable. Neither Party shall, on the basis of this Agreement, 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.

3.6.2 The SFMTA's execution of this Agreement constitutes its approval of the subcontractors listed below.

> HaCon Ingenieurgesellschaft mbH
> Lister Straße 15, 30163
> Hannover, Germany

> OnSign TV, OnSign TV Limited,
> 20/F Central Tower, 28 Queens Rd, Central, Hong Kong

3.6.3 Upon SFMTA's notification to Contractor, and only if Contractor agrees, the SFMTA may be permitted to communicate directly with subcontractors, both orally and in writing. The SFMTA must copy Contractor on all such communications and a Contractor representative shall be present at all meetings between the SFMTA and subcontractor in connection with this Agreement, unless otherwise authorized by Contractor.

3.7 **Independent Contractor; Payment of Employment Taxes and Other Expenses.**

3.7.1 Independent Contractor.

(a)   For the purposes of this <u>Article 3</u>, "Contractor" shall be deemed to include not only Contractor, but also any agent or employee of Contractor. Contractor acknowledges and agrees that at all times, Contractor or any agent or employee of Contractor shall be deemed at all times to be an independent contractor and is wholly responsible for the manner in which it performs the Services under this Agreement.

(b)   Contractor, its agents, and employees shall not represent or hold themselves out to be employees of the SFMTA at any time. Contractor or any agent or employee of Contractor shall not have employee status with the SFMTA, nor be entitled to participate in any plans, arrangements, or distributions by the SFMTA in connection with any retirement, health, or other benefits the SFMTA may offer its employees.

(c)   Contractor or any agent or employee of Contractor shall be liable for the acts and omissions of itself, its employees, and its agents. Contractor shall be responsible for all obligations and payments, whether imposed by federal, state, or local law, including FICA, income tax withholdings, unemployment compensation, insurance, and other similar responsibilities related to Contractor's performing services and work, or any agent or employee of Contractor providing same.

(d)   Nothing in this Agreement shall be construed as creating an employment or agency relationship between the SFMTA and Contractor or any agent or employee of Contractor. Any terms in this Agreement referring to direction from the SFMTA shall be construed as providing for direction as to policy and the result of Contractor's work only, and not as to the means by which such a result is obtained.

(e)   The SFMTA does not retain the right to control the means or methods Contractor uses to perform the Services under this Agreement. Contractor agrees to maintain and make available to the SFMTA, upon request and during Business Hours, accurate books and accounting records demonstrating Contractor's compliance with this section. If the SFMTA determines that Contractor, or any agent or employee of Contractor, is not performing in accordance with the requirements of this Agreement, the SFMTA will provide Contractor with written notice of such failure. Within five business days of Contractor's receipt of such notice, and in accordance with Contractor's policies and procedures, Contractor shall remedy the deficiency. Notwithstanding the forgoing, if the SFMTA believes an action of Contractor, or any agent or employee of Contractor, warrants immediate remedial action by Contractor, the SFMTA will contact Contractor and provide Contractor in writing with the reason for requesting such immediate action.

3.7.2 Payment of Employment Taxes and Other Expenses.

(a) If the SFMTA, in its discretion, or a relevant taxing authority such as the Internal Revenue Service or the State Employment Development Division, or both, determines that Contractor is an employee for purposes of collection of any employment taxes, the amounts payable under this Agreement shall be reduced by amounts equal to both the employee and employer portions of the tax due (and offsetting any credits for amounts already paid by Contractor which can be applied against this liability). The SFMTA shall then forward those amounts to the relevant taxing authority.

(b) If a relevant taxing authority determines a liability for past services performed by Contractor for the SFMTA, then upon notification of such fact by the SFMTA, Contractor shall promptly remit such amount due or arrange with the SFMTA to have the amount due withheld from future payments to Contractor under this Agreement (again, offsetting any amounts already paid by Contractor which can be applied as a credit against such liability).

(c) A determination of employment status pursuant to the preceding two paragraphs shall be solely for the purposes of the particular tax in question, and for all other purposes of this Agreement, Contractor shall not be considered an employee of the SFMTA. Notwithstanding the foregoing, Contractor agrees to indemnify and save harmless the City and its officers, agents and employees from, and, if requested, shall defend them against any and all claims, losses, costs, damages, and expenses, including attorneys' fees, arising from this section.

3.8   Assignment.

3.8.1   The Services to be performed by Contractor are personal in character. Neither this Agreement, nor any duties or obligations hereunder, may be directly or indirectly assigned, novated, hypothecated, transferred, or delegated by Contractor, or, where Contractor is a joint venture, a joint venture partner, (collectively referred to as an "Assignment") unless first approved by the SFMTA by written instrument executed and approved in the same manner as this Agreement in accordance with the Administrative Code.

3.8.2   The SFMTA's approval of any such Assignment is subject to Contractor demonstrating to the SFMTA's reasonable satisfaction that the proposed assignee is:

(a) reputable and capable, financially and otherwise, of performing each of Contractor's obligations under this Agreement and any other documents to be assigned;

(b) not forbidden by applicable law from transacting business or entering into contracts with the SFMTA; and

(c) subject to the jurisdiction of the courts of the State of California.

3.8.3   A change of ownership or control of Contractor or a sale or transfer of substantially all of the assets of Contractor shall be deemed an Assignment for purposes of this

Agreement. Contractor shall immediately notify the SFMTA about any Assignment. Any purported Assignment made in violation of this provision shall be null and void.

3.8.4   Notwithstanding the foregoing, the consolidation or merger of Contractor with, or transfer of assets by Contractor to, an affiliated entity shall not constitute an Assignment of this Agreement for purposes of this paragraph, but in any such case Contractor shall notify the SFMTA in advance such consolidation, merger, or transfer of assets, and Contractor shall remain liable to the SFMTA for Contractor's obligations under this Agreement. As used in this paragraph, the term "affiliated entity" means and includes Contractor's parent companies at any tier, subsidiary companies at any tier, and entities under common ownership with Contractor.

3.9   **Warranty**.

3.9.1   Contractor shall provide the Warranty for Stationary Digital Signs described in this Section and in <u>Appendix C, Section 2.8</u>.

3.9.2   Contractor warrants to the SFMTA that the Services will be performed with the degree of skill and care required by current, good, and sound professional procedures and practices, and in conformance with generally accepted professional standards prevailing at the time the Services are performed so as to ensure that all Services performed are correct and appropriate for the purposes contemplated in this Agreement.

3.9.3   During the Warranty Period, Contractor warrants, to City, that the Equipment will be free from defects in material and workmanship, and Contractor's Equipment will be in accordance with the specifications of this Agreement. If within the Warranty Period any of said Equipment are nonconforming, such Equipment shall, at Contractor's option, be repaired, replaced, corrected or a substitute obtained, in accordance with the terms set forth in <u>Appendix C</u>. This warranty shall not apply to any loss or damage resulting from normal wear and tear or alteration, misuse or abuse or improper installation, operation or maintenance of equipment or software by City or a third party not authorized by Contractor.

3.9.4   Except as expressly set forth in this Agreement, Contractor makes no warranty of any kind whatsoever, and Contractor expressly disclaims any warranties implied by law.

3.10   **Liquidated Damages.** By entering into this Agreement, Contractor agrees that its failure to achieve certain Performance Requirements may be subject to liquidated damages, as described in <u>Appendix G</u> (Liquidated Damages). Liquidated damages shall be the sole remedy for delay damages.

3.11   **Bonding Requirements.** Contractor shall provide performance and payment bonds in different amounts at different times during the term of this Agreement as set forth

below. All bonds must be approved as to sufficiency and qualifications of the surety by the Controller.

3.11.1 Phase I Performance and Payment Bond(s). Prior to and as a condition precedent to issuance of Notice to Proceed, Contractor shall file with the SFMTA one or more corporate surety bonds, in forms approved by the City, to guarantee faithful performance and payment of labor, materials, supplies, and equipment used in the performance of Phase I, in a sum equal to $12,500,000 (Phase I Performance and Payment Bond(s)).

3.11.2 Phase II Performance and Payment Bond(s). Before the start of Phase II, and thereafter before each anniversary of the start of Phase II for the remainder of the initial six-year term, Contractor shall file with the SFMTA one or more corporate surety bonds, in forms approved by the City, to guarantee faithful performance and payment of labor, materials, supplies, and equipment used in the performance of the Agreement for the remainder of the initial six-year term, in a sum not less than $18,750,000 divided by the number of years remaining in the initial six-year term upon completion of Phase I (Phase II Performance and Payment Bond(s)).

3.11.3 Renewal Term Performance Bonds. Before the SFMTA exercises either optional renewal of this Agreement, as described in <u>Section 2.2</u>, and thereafter before each anniversary of the renewal for the remainder of the corresponding five-year extension, Contractor shall file with the SFMTA the following bonds, as applicable, in forms approved by the City:

(a) To guarantee faithful performance and payment of labor, materials, supplies, and equipment used in the performance of the first five-year optional renewal term of this Agreement, one or more corporate surety bonds in a sum not less $3,500,000 (First Renewal Term Performance and Payment Bond(s)); and

(b) To guarantee faithful performance and payment of labor, materials, supplies, and equipment used in the performance of the second five-year optional renewal term of this Agreement, one or more corporate surety bond in a sum not less $3,800,000 (Second Renewal Term Performance and Payment Bond(s)).

3.11.4 Corporate sureties that issue the bonds required under this <u>Section 3.11</u> shall be legally authorized to engage in the business of furnishing surety bonds in the State of California. All sureties shall have a current A.M. Best Rating not less than "A-, VIII" and shall be satisfactory to the SFMTA.

3.11.5 Contractor shall furnish the Phase I and Phase II Performance and Payment Bonds as set forth in <u>Section 3.11.1and 3.11.2</u>, respectively, to guarantee the faithful performance and payment of labor, materials, supplies, and equipment used in the performance

of Phase I and Phase II of this Agreement. These bonds will not cover either of the potential five-year optional terms under Section 2.2. Neither the surety's decision not to issue bonding for either of the five-year optional terms under Section 2.2, nor the failure of Contractor to file other bonds or other security will, under no circumstance, constitute default under the surety's original bond(s) for Phase I and Phase II. And neither a surety's decision not to issue bonding for the second five-year optional term under Section 2.2, nor the failure of Contractor to file other bonds or other security for the second five-year optional term will, under no circumstances, constitute default under the surety's bond for the first five-year optional term.

3.11.6 If any bond provided under this Section 3.11 becomes ineffective, or if the surety that provided the bond no longer meets the requirements hereof, Contractor shall provide a replacement bond in the same form issued by a surety that meets the foregoing requirements, or other assurance satisfactory to the SFMTA in its sole discretion. If the amount of this Agreement is increased in connection with a change order, the SFMTA may, in its sole discretion, require a corresponding proportionate increase in the amount of each bond or alternative security.

Article 4   Financial Matters

4.1   Certification of Funds; Budget and Fiscal Provisions; Termination in the Event of Non-Appropriation.

4.1.1 This Agreement is subject to the budget and fiscal provisions of the City's Charter. Charges will accrue only after the SFMTA issues written authorization (in the form of a Purchase Order) that the funds for the Agreement have been certified by the Controller. The amount of the SFMTA's obligation to Contractor under this Agreement shall not at any time exceed the amount certified for the purpose and period stated in such advance authorization.

4.1.2 This Agreement will terminate without penalty, liability, or expense of any kind to the SFMTA at the end of any fiscal year if funds are not appropriated for the next succeeding fiscal year. If funds are appropriated for a portion of the fiscal year, this Agreement will terminate, without penalty, liability, or expense of any kind at the end of the term for which funds are appropriated. In the event of a termination under this paragraph, Contractor shall be entitled to be paid for any and all work performed up until the effective date of such termination.

4.1.3 The City has no obligation to make appropriations for this Agreement *in lieu* of appropriations for new or other agreements. City budget decisions are subject to the discretion of the Mayor and the Board of Supervisors. Contractor's assumption of risk of possible non-appropriation is part of the consideration for this Agreement.

4.1.4 THIS SECTION CONTROLS AGAINST ANY AND ALL OTHER PROVISIONS OF THIS AGREEMENT.

4.2   Guaranteed Maximum Costs. The City's payment obligation to Contractor cannot at any time exceed the amount certified by City's Controller for the purpose and period stated in that certification. Absent an authorized Emergency per the City Charter or applicable Code, no City representative is authorized to offer or promise, nor is the City required to honor, any offered or promised payments to Contractor under this Agreement in excess of the certified maximum amount without the Controller having first certified the additional promised amount and the Parties having modified this Agreement as provided in Section 11.5 (Modification of this Agreement).

4.3   Compensation.

4.3.1   Compensation Basis. Compensation to Contractor under this Agreement shall be based on:

(a)   for the System Design Document and other Project Planning Deliverables described in Appendix B, Section 1.3, the lump sum amount set forth in Appendix E, Section 1;

(b)   for Coordination/Integration with other Vendors, the lump sum amounts set forth in Appendix E, Section 2;

(c)   for System Software and related Maintenance Services, the lump sum amounts, and one-time and regularly occurring fees (e.g., monthly, annually) set forth in Appendix E, Section 3;

(d)   for Stationary Digital Signs and related Maintenance Services, the per-unit, monthly, and annual fees, as applicable, set forth in Appendix E, Section 4;

(e)   for On-Board Digital Sign Software and related Maintenance Services, the lump-sum amounts and one-time fee(s) set forth in Appendix E, Section 5;

(f)   for the Mobile Platform & Website and related Maintenance Services, the lump sum amounts, one-time and monthly fees, as applicable, set forth in Appendix E, Section 6;

(g)   for the Analytics Platform, the monthly fees set forth in Appendix E, Section 7; and

(h)   for other as-needed services Contractor performs under separate task orders, either a negotiated lump sum price or the fixed fully burdened hourly labor rates, set forth in Appendix E, Section 8, per task or subtask, subject to a cap on the number of hours per task order.

The timing of and conditions for payments to Contractor are set forth by category of Services in Appendix E.

4.3.2 Amount of Agreement. In no event shall the total amount of this Agreement exceed $88,980,877 (not-to-exceed amount) as follows: $41,495,205 for the initial term of the Agreement; $22,815,018 for the first optional renewal term, if any; and $24,670,654, for the second optional renewal term, if any. These amounts include compensation to Contractor for base and optional Services described in this Agreement; these amounts do not include per-transaction and credit card/payment processing charges in connection with purchases of electronic Muni tickets made using the Mobile Ticketing Platform, which charges will deducted from gross ticket, as described in Appendix E, Section 6.4.8.

4.3.3 Payment. Contractor shall provide invoices to the SFMTA as set out in Appendix E. Payment to Contractor shall be made for Services and Equipment identified in the invoice that the Director of Transportation, or their designee, in their sole discretion, concludes have been satisfactorily performed or installed. Payment to Contractor will be made within 30 Days of receipt of invoice, unless the SFMTA notifies Contractor that a dispute exists as to the invoice. The SFMTA will make all undisputed payments, and will notify Contractor, within 21 days of receipt of an invoice, of any error in the invoice or of the supporting documentation The SFMTA's failure to timely notify Contractor of such inadequacy shall not constitute a waiver of the SFMTA's right to seek a credit from Contractor upon the SFMTA's later discovery of errors in the invoices. The SFMTA may withhold as retention a portion of any payment until satisfactory performance of all Services under the Agreement. The SFMTA will not be liable for interest or late charges for any late payments.

4.3.4 Payment Limited to Satisfactory Services. Contractor is not entitled to payments from the SFMTA until the SFMTA approves the Services performed, including any furnished Deliverables, as satisfying the applicable requirements set forth in this Agreement. Payments to Contractor by the SFMTA shall not excuse Contractor from Contractor's obligation to replace unsatisfactory Deliverables, including equipment, components, materials, or Services even if the unsatisfactory character of such Deliverables, equipment, components, materials, or Services may not have been apparent or detected at the time such payment was made. The SFMTA may reject Deliverables, equipment, components, materials and Services that do not conform to the requirements of this Agreement. In such case, Contractor shall replace the deficient items without delay at no cost to the SFMTA.

4.3.5 Withhold Payments. If Contractor fails to provide Services in accordance with Contractor's obligations under this Agreement, the SFMTA may withhold payments due Contractor for those Services until such failure to perform is cured, and Contractor shall not stop work as a result of the SFMTA's withholding of payments as provided herein.

4.3.6   Invoice Format. Invoices furnished by Contractor under this Agreement shall be in a form acceptable to the Controller and the SFMTA, and shall include a unique invoice number. The SFMTA will make payment to Contractor at the electronic address specified in Section 4.3.7, or in such alternate manner as the Parties have mutually agreed upon in writing.

4.3.7   LBE Payment and Utilization Tracking System. Contractor must submit all required payment information using the City's Financial System as required by CMD to enable CCO to monitor Contractor's compliance with the LBE subcontracting commitments in this Agreement. Contractor shall pay its LBE subcontractors within three working days after receiving payment from SFMTA, except as otherwise authorized by the LBE Ordinance. The Controller is not authorized to pay invoices submitted by Contractor prior to Contractor's submission of all required CMD payment information. Failure to submit all required CMD payment information to the City's Financial System with each payment request may result in the Controller withholding 20% of the payment due pursuant to that invoice until the required payment information is provided. Following SFMTA's payment of an invoice, Contractor has 10 Days to acknowledge using the City's Financial System that all subcontractors have been paid. Self-Service Training for suppliers is located at this link: https://sfcitypartner.sfgov.org/Training/TrainingGuide.

4.3.8   Getting Paid for Goods and/or Services from the SFMTA.

(a)   All City vendors receiving new contracts, contract renewals, or contract extensions shall sign up to receive electronic payments through the City's Automated Clearing House (ACH) payments service/provider. Electronic payments are processed every business day and are safe and secure. To sign up for electronic payments, visit www.sfgov.org/ach.

(b)   The following information is required to sign up: (i) the enroller shall be their company's authorized financial representative, (ii) the company's legal name, main telephone number and all physical and remittance addresses used by the company, (iii) the company's U.S. federal employer identification number (EIN) or Social Security number (if they are a sole proprietor), and (iv) the company's bank account information, including routing and account numbers.

4.4   Audit and Inspection of Records. Contractor agrees to maintain and make available to the SFMTA and City, during Business Hours, accurate books and accounting records relating to its Services. Contractor will permit the SFMTA and City to audit, examine and make excerpts and transcripts from such books and records, and to make audits of all invoices, materials, payrolls, records or personnel and other data related to all other matters covered by this Agreement, whether funded in whole or in part under this Agreement. Contractor shall maintain such data and records in an accessible location and condition for a period of not fewer

than five years after final payment under this Agreement or until after final audit has been resolved, whichever is later. The State of California or any Federal agency having an interest in the subject matter of this Agreement shall have the same rights as conferred upon the SFMTA and City by this Section. Contractor shall include the same audit and inspection rights and record retention requirements in all subcontracts.

4.5 **Submitting False Claims**. The full text of San Francisco Administrative Code Chapter 21, Section 21.35, including the enforcement and penalty provisions, is incorporated into this Agreement. Pursuant to San Francisco Administrative Code §21.35, any contractor or subcontractor who submits a false claim shall be liable to the SFMTA and City for the statutory penalties set forth in that section. A contractor or subcontractor will be deemed to have submitted a false claim to the SFMTA if the contractor or subcontractor: (a) knowingly presents or causes to be presented to an officer or employee of the City a false claim or request for payment or approval; (b) knowingly makes, uses, or causes to be made or used a false record or statement to get a false claim paid or approved by the SFMTA; (c) conspires to defraud the SFMTA by getting a false claim allowed or paid by the SFMTA; (d) knowingly makes, uses, or causes to be made or used a false record or statement to conceal, avoid, or decrease an obligation to pay or transmit money or property to the SFMTA; or (e) is a beneficiary of an inadvertent submission of a false claim to the SFMTA, subsequently discovers the falsity of the claim, and fails to disclose the false claim to the SFMTA within a reasonable time after discovery of the false claim.

4.6 **Payment of Prevailing Wages**

4.6.1 **Covered Services.** Services to be performed by Contractor under this Agreement may involve the performance of trade work covered by the provisions of Section 6.22(e) [Prevailing Wages] of the Administrative Code or Section 21C [Miscellaneous Prevailing Wage Requirements] (collectively, "Covered Services"). The provisions of Section 6.22(e) and 21C of the Administrative Code are incorporated as provisions of this Agreement as if fully set forth herein and will apply to any Covered Services performed by Contractor and its subcontractors.

4.6.2 **Wage Rates.** The latest prevailing wage rates for private employment on public contracts as determined by the San Francisco Board of Supervisors and the Director of the California Department of Industrial Relations, as such prevailing wage rates may be changed during the term of this Agreement, are hereby incorporated as provisions of this Agreement. Copies of the prevailing wage rates as fixed and determined by the Board of Supervisors are available from the Office of Labor Standards and Enforcement (OLSE) and on the Internet at http://www.dir.ca.gov/DLSR/PWD and http://sfgov.org/olse/prevailing-wage. Contractor agrees that it shall pay not less than the prevailing wage rates, as fixed and determined by the Board, to all workers employed by Contractor who perform Covered Services under this Agreement.

4.6.3 **Subcontract Requirements.** As required by Section 6.22(e)(5) of the Administrative Code, Contractor shall insert in every subcontract or other arrangement, which it may make for the performance of Covered Services under this Agreement, a provision that said subcontractor shall pay to all persons performing labor in connection with Covered Services under said subcontract or other arrangement not less than the highest general prevailing rate of wages as fixed and determined by the Board of Supervisors for such labor or services.

4.6.4 **Posted Notices.** As required by Section 1771.4 of the California Labor Code, Contractor shall post job site notices prescribed by the California Department of Industrial Relations (DIR) at all job sites where services covered by Chapter 6.22 are to be performed.

4.6.5 **Payroll Records.** As required by Section 6.22(e)(6) of the Administrative Code and Section 1776 of the California Labor Code, Contractor shall keep or cause to be kept complete and accurate payroll records for all trade workers performing Covered Services. Such records shall include the name, address and social security number of each worker who provided Covered Services on the project, including apprentices, his or her classification, a general description of the services each worker performed each day, the rate of pay (including rates of contributions for, or costs assumed to provide fringe benefits), daily and weekly number of hours worked, deductions made and actual wages paid. Every subcontractor who shall undertake the performance of any part of Covered Services shall keep a like record of each person engaged in the execution of Covered Services under the subcontract. All such records shall at all times be available for inspection of and examination by the SFMTA and City and their authorized representatives and the DIR.

4.6.6 **Certified Payrolls.** Certified payrolls shall be prepared pursuant to Administrative Code Section 6.22(e)(6) and California Labor Code Section 1776 for the period involved for all employees, including those of subcontractors, who performed labor in connection with Covered Services. Contractor and each subcontractor performing Covered Services shall submit certified payrolls to the SFMTA and to the DIR electronically. Contractor shall submit payrolls to the SFMTA via the reporting system selected by the SFMTA. The DIR will specify how to submit certified payrolls to it. The SFMTA will provide basic training in the use of the reporting system at a scheduled training session. Contractor and all subcontractors that will perform Covered Services shall attend the training session. Contractor and applicable subcontractors shall comply with electronic certified payroll requirements (including training) at no additional cost to the SFMTA.

4.6.7 **Compliance Monitoring.** Covered Services to be performed under this Agreement are subject to compliance monitoring and enforcement of prevailing wage requirements by the DIR and /or the OLSE. Contractor and any subcontractors performing Covered Services will cooperate fully with the DIR and/or the OLSE and other City employees and agents authorized to assist in the administration and enforcement of the prevailing wage

requirements, and agrees to take the specific steps and actions as required by Section 6.22(e)(7) of the Administrative Code. Steps and actions include but are not limited to requirements that: (i) Contractor will cooperate fully with the Labor Standards Enforcement Officer and other City employees and agents authorized to assist in the administration and enforcement of the Prevailing Wage requirements and other labor standards imposed on Public Works Contractor by the Charter and Chapter 6 of the San Francisco Administrative Code; (ii) Contractor agrees that the Labor Standards Enforcement Officer and his or her designees, in the performance of their duties, shall have the right to engage in random inspections of job sites and to have access to the employees of Contractor, employee time sheets, inspection logs, payroll records and employee paychecks; (iii) the contractor shall maintain a sign-in and sign-out sheet showing which employees are present on the job site; (iv) Contractor shall prominently post at each job-site a sign informing employees that the project is subject to the City's Prevailing Wage requirements and that these requirements are enforced by the Labor Standards Enforcement Officer; and (v) that the Labor Standards Enforcement Officer may audit such records of Contractor as he or she reasonably deems necessary to determine compliance with the Prevailing Wage and other labor standards imposed by the Charter and this Chapter on Public Works Contractors. Failure to comply with these requirements may result in penalties and forfeitures consistent with analogous provisions of the California Labor Code, including Section 1776(g), as amended from time to time.

4.6.8   Remedies. Should Contractor, or any subcontractor who shall undertake the performance of any Covered Services, fail or neglect to pay to the persons who perform Covered Services under this Contract, subcontract or other arrangement for the Covered Services, the general prevailing rate of wages as herein specified, Contractor shall forfeit, and in the case of any subcontractor so failing or neglecting to pay said wage, Contractor and the subcontractor shall jointly and severally forfeit, back wages due plus the penalties set forth in Administrative Code Section 6.22 (e) and/or California Labor Code Section 1775. The SFMTA, when certifying any payment which may become due under the terms of this Agreement, shall deduct from the amount that would otherwise be due on such payment the amount of said forfeiture

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Article 5   Insurance; Indemnity and Warranties

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5.1   Insurance.

5.1.1   Required Coverages. Without in any way limiting Contractor's liability pursuant to the "Indemnification" section of this Agreement, Contractor shall maintain in force, during the full term of the Agreement, insurance in the following amounts and coverages:

(a)   Workers' Compensation, in statutory amounts, with Employers' Liability Limits not less than $1,000,000 each accident, injury, or illness; and

(b)   Commercial General Liability Insurance with limits not less than $1,000,000 each occurrence for Bodily Injury and Property Damage, including Contractual Liability, Personal Injury, Products and Completed Operations; and

(c)   Commercial Automobile Liability Insurance with limits not less than $1,000,000 each occurrence, "Combined Single Limit" for Bodily Injury and Property Damage, including Owned, Non-Owned and Hired auto coverage, as applicable.

(d)   Technology Errors and Omissions Liability coverage, with limits of $10,000,000 each occurrence and each loss and $10,000,000 general aggregate. The policy shall at a minimum cover professional misconduct or lack of the requisite skill required for the performance of services defined in the Agreement and shall also provide coverage for the following risks:

(i)   Network security liability arising from the unauthorized access to, use of, or tampering with computers or computer systems, including hacker attacks; and

(ii)   Liability arising from the introduction of any form of malicious software including computer viruses into, or otherwise causing damage to the SFMTA's or third person's computer, computer system, network, or similar computer related property and the data, software, and programs thereon.

(e)   Contractor shall maintain in force during the full life of the agreement Cyber and Privacy Insurance with limits of not less than $10,000,000 per occurrence. Such insurance shall include coverage for liability arising from theft, dissemination, and/or use of confidential information, including bank and credit card account information or personal information, such as name, address, social security numbers, protected health information or other personally identifying information, stored or transmitted in electronic form.

5.1.2 Commercial General Liability and Commercial Automobile Liability Insurance policies shall be endorsed to provide:

(a)   Name as Additional Insured the City and County of San Francisco, its Officers, Agents, and Employees.

(b)   That such policies are primary insurance to any other insurance available to the Additional Insureds, with respect to any claims arising out of this Agreement, and that insurance applies separately to each insured against whom claim is made or suit is brought.

5.1.3   All policies shall be endorsed to provide 30 Days' advance written notice to the SFMTA of cancellation for any reason, intended non-renewal, or reduction in coverages. Notices shall be sent to the SFMTA's address set forth in <u>Section 11.1</u> (Notices to the Parties).

5.1.4   Should any of the required insurance be provided under a claims-made form, Contractor shall maintain such coverage continuously throughout the term of this Agreement and, without lapse, for a period of three years beyond the expiration of this Agreement, to the effect that, should occurrences during the contract term give rise to claims made after expiration of the Agreement, such claims shall be covered by such claims-made policies.

5.1.5   Should any of the required insurance be provided under a form of coverage that includes a general annual aggregate limit or provides that claims investigation or legal defense costs be included in such general annual aggregate limit, such general annual aggregate limit shall be double the occurrence or claims limits specified above.

5.1.6   Should any required insurance lapse during the term of this Agreement, requests for payments originating after such lapse shall not be processed until the SFMTA receives satisfactory evidence of reinstated coverage as required by this Agreement, effective as of the lapse date. If insurance is not reinstated, the SFMTA may, at its sole option, terminate this Agreement effective on the date of such lapse of insurance.

5.1.7   Before commencing any Services, Contractor shall furnish to SFMTA certificates of insurance and additional insured policy endorsements with insurers with ratings comparable to A-, VIII or higher, that are authorized to do business in the State of California, and that are satisfactory to SFMTA, in form evidencing all coverages set forth above. Approval of the insurance by SFMTA shall not relieve or decrease Contractor's liability hereunder.

5.1.8   The Workers' Compensation policy(ies) shall be endorsed with a waiver of subrogation in favor of the City for all work performed by Contractor, its employees, agents and subcontractors.

5.1.9   If Contractor will use any subcontractor(s) to provide Services, Contractor shall require the subcontractor(s) to provide all necessary insurance and to name the City and County of San Francisco, its officers, agents and employees and Contractor as additional insureds.

5.2   Indemnification

5.2.1   General Indemnification.

(a)   Contractor shall indemnify and hold harmless City and its officers, agents and employees from, and, if requested, shall defend them from and against any and all

liabilities (legal, contractual, or otherwise), losses, damages, costs, expenses, or claims for injury or damages (collectively, "Claims"), arising from Contractor's performance of the Agreement, including any: (i) injury to or death of a person, including employees of City or Contractor; (ii) loss of or damage to property; (iii) violation of local, state, or federal common law, statute or regulation, including privacy or personally identifiable information, health information, disability and labor laws or regulations; (iv) strict liability imposed by any law or regulation; or (v) losses arising from Contractor's execution of subcontracts not in accordance with the requirements of this Agreement applicable to subcontractors; except where such Claims are the result of the sole active negligence or willful misconduct of City. The foregoing indemnity shall include, without limitation, reasonable fees of attorneys, consultants and experts and related costs and City's costs of investigating any claims against the City.

(b)	In addition to Contractor's obligation to indemnify City, Contractor specifically acknowledges and agrees that it has an immediate and independent obligation to defend City from any claim which actually or potentially falls within this indemnification provision, even if the allegations are or may be groundless, false or fraudulent, which obligation arises at the time such Claim is tendered to Contractor by City and continues until the Claim is dismissed or resolved.

5.2.2   Infringement Indemnification.

(a)	If notified promptly in writing of any judicial action brought against City based on an allegation that City's use of the SaaS Application and Services infringes a patent, copyright, or any right of a third-party or constitutes misuse or misappropriation of a trade secret or any other right in intellectual property (Infringement), Contractor will hold City harmless and defend such action at its own expense. Contractor will pay the costs and damages awarded in any such action or the cost of settling such action, provided that Contractor shall have sole control of the defense of any such action and all negotiations or its settlement or compromise, provided, however, that Contractor shall not agree to any injunctive relief or settlement that obligates the City to perform any obligation, make an admission of guilt, fault or culpability or incur any expense, without City's prior written consent, which shall not be unreasonably withheld or delayed.

(b)	If notified promptly in writing of any informal claim (other than a judicial action) brought against City based on an allegation that City's use of the SaaS Application and/or Services constitutes Infringement, Contractor will pay the costs associated with resolving such claim and will pay the settlement amount (if any), provided that Contractor shall have sole control of the resolution of any such claim and all negotiations for its settlement. In the event a final injunction is obtained against City's use of the SaaS Application and Services by reason of Infringement, or in Contractor's opinion City's use of the SaaS Application and Services is likely to become the subject of Infringement, Contractor may at its option and

expense: (i) procure for City the right to continue to use the SaaS Application and Services as contemplated hereunder, (ii) replace the SaaS Application and Services with a non-infringing, functionally equivalent substitute SaaS Application and Services, or (iii) suitably modify the SaaS Application and Services to make its use hereunder non-infringing while retaining functional equivalency to the unmodified version of the SaaS Application and Services. If none of these options is reasonably available to Contractor, then this Agreement may be terminated at the option of either Party hereto and Contractor shall refund to City all amounts pre-paid under this Agreement for the license and use of such infringing SaaS Application and/or Services after the date of such termination.

(c)   Any unauthorized modification or attempted modification of the SaaS Application and Services by City or any failure by City to implement any improvements or updates to the SaaS Application and Services, as supplied by Contractor, shall void this indemnity unless City has obtained prior written authorization from Contractor permitting such modification, attempted modification or failure to implement. Contractor shall have no liability for any claim of Infringement based on City's use or combination of the SaaS Application and Services with products or data of the type for which the SaaS Application and Services was neither designed nor intended to be used.

5.3   Warranties of Contractor

5.3.1   Warranty of Authority; No Conflict. Each Party warrants to the other that it is authorized to enter into this Agreement and that its performance of the Agreement will not conflict with any other agreement.

5.3.2   Warranty of Performance. Contractor warrants that, when fully implemented, the SaaS Applications and Equipment provided under this Agreement shall perform in accordance with the specifications applicable thereto. With respect to all Services to be performed by Contractor under this Agreement, including the Services outlined in <u>Appendices B, C</u>, and <u>D</u>, Contractor warrants that it will use reasonable care and skill. All Services shall be performed in a professional, competent and timely manner by Contractor personnel appropriately qualified and trained to perform such services. In the event of a breach of the foregoing warranty relating to any service under this Agreement within 12 months from the date of provision of such services, Contractor shall, at its sole cost and expense, re-perform such services.

5.3.3   Compliance with Description of Services. Contractor represents and warrants that the SaaS Application and Services specified in this Agreement, and all updates and improvements to the SaaS Application and Services, will comply in all material respects with the specifications and representations specified in the Documentation (including performance, capabilities, accuracy, completeness, characteristics, specifications, configurations, standards,

functions and requirements) as set forth (i) herein or in any amendment hereto, and (ii) the updates thereto.

5.3.4   Title. Contractor represents and warrants to SFMTA that it is the lawful owner or license holder of all Software, materials and property identified by Contractor as Contractor-owned and used by it in the performance of the SaaS Services contemplated hereunder and has the right to permit SFMTA access to or use of the SaaS Application and Services and each component thereof. To the extent that Contractor has used Open Source Software (OSS) in the development of the SaaS Application and Services, Contractor represents and warrants that it is in compliance with any applicable OSS license(s) and is not infringing.

5.3.5   Disabling Code. Contractor represents and warrants that the SaaS Application and Services, and any information, reports or other materials provided to Authorized Users as a result of the operation of the SaaS Application and Services, including future enhancements and modifications thereto, shall be free of any Disabling Code.

5.3.6   Warranty of Suitability for Intended Purpose. Contractor warrants that the SaaS Application and Services will be suitable for the intended purpose of providing a real-time vehicle arrival and service update system for the Muni public transportation network.

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Article 6   Liability of the Parties

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6.1   Liability of the City.

6.1.1   Payment Obligation. The City's payment obligations under this Agreement shall be limited to the payment of the compensation provided for in Section 4.2 (Compensation).

6.1.2   Special Damages. Notwithstanding any other provision of this Agreement, in no event shall the City be liable, regardless of whether any claim is based on contract or tort, for any special, consequential, indirect or incidental damages (collectively, "Special Damages"), including, but not limited to, lost profits, arising out of or in connection with this Agreement or the services performed in connection with this Agreement.

6.1.3   Liability for Use of Equipment. City shall not be liable for any damage to persons or property as a result of the use, misuse or failure of any equipment used by Contractor, or any of its subcontractors, or by any of their employees, even though such equipment is furnished, rented or loaned by City.

6.2   Liability of Contractor.

6.2.1   Direct Damages. Except as provided herein, Contractor' liability to the City under this Agreement shall be limited to the value of direct damages that arise from

Contractor' breach of this Agreement, Contractor' negligence in performing the Services, and Liquidated Damages (collectively, "Direct Damages"). Contractor's liability for Direct Damages shall be limited to the not-to-exceed amount set forth in Section 4.3.2; except that this limitation shall not apply to:

(a)   damages caused by Contractor's gross negligence or reckless or willful acts or omissions, fraud, or illegal or unlawful acts;

(b)   claims, liabilities, or losses that fall within the insurance coverage of this Agreement;

(c)   statutory damages, including those specified in this Agreement;

(d)   wrongful death caused by Contractor;

(e)   Contractor's obligation to indemnify and defend the City and other Indemnified Parties, as set forth in the Agreement;

(f)   Contractor's warranties under this Agreement;

(g)   punitive damages; and

(h)   fines, damages, or expenses caused by Contractor's violation of federal, state, and/or local laws regarding privacy.

6.2.2   Special Damages. In no event shall Contractor be liable, regardless of whether any claim is based on contract or tort, for any special, consequential, indirect, or incidental damages (collectively, "Special Damages"), including lost revenue, arising out of or in connection with this Agreement or the services performed in connection with this Agreement.

Article 7   Payment of Taxes

7.1   Contractor to Pay All Taxes. Except for any applicable California sales and use taxes charged by Contractor to the SFMTA, Contractor shall pay all taxes, including possessory interest taxes levied upon or as a result of this Agreement, or the Services delivered pursuant hereto. Contractor shall remit to the State of California any sales or use taxes paid by the SFMTA to Contractor under this Agreement. Contractor agrees to promptly provide information requested by the SFMTA to verify Contractor's compliance with any State requirements for reporting sales and use tax paid by City under this Agreement.

7.2   Possessory Interest Taxes. Contractor acknowledges that this Agreement may create a "possessory interest" for property tax purposes. Generally, such a possessory interest is not created unless the Agreement entitles Contractor to possession, occupancy, or use of City property for private gain. If such a possessory interest is created, then the following shall apply:

7.2.1   Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that Contractor, and any permitted successors and assigns, may be subject to real property tax assessments on the possessory interest.

7.2.2   Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that the creation, extension, renewal, or assignment of this Agreement may result in a "change in ownership" for purposes of real property taxes, and therefore may result in a revaluation of any possessory interest created by this Agreement. Contractor accordingly agrees on behalf of itself and its permitted successors and assigns to report on behalf of the City to the County Assessor the information required by Revenue and Taxation Code section 480.5, as amended from time to time, and any successor provision.

7.2.3   Contractor, on behalf of itself and any permitted successors and assigns, recognizes and understands that other events also may cause a change of ownership of the possessory interest and result in the revaluation of the possessory interest (see, e.g., Rev. & Tax. Code section 64, as amended from time to time). Contractor accordingly agrees on behalf of itself and its permitted successors and assigns to report any change in ownership to the County Assessor, the State Board of Equalization or other public agency as required by law.

7.2.4   Contractor further agrees to provide such other information as may be requested by the City to enable the City to comply with any reporting requirements for possessory interests that are imposed by applicable law.

7.3   **Withholding.** Contractor agrees that it is obligated to pay all amounts due to the City under the San Francisco Business and Tax Regulations Code during the term of this Agreement. Pursuant to Section 6.10-2 of the San Francisco Business and Tax Regulations Code, Contractor further acknowledges and agrees that City may withhold any payments due to Contractor under this Agreement if Contractor is delinquent in the payment of any amount required to be paid to the City under the San Francisco Business and Tax Regulations Code. Any payments withheld under this paragraph shall be made to Contractor, without interest, upon Contractor coming back into compliance with its obligations.

Article 8   Termination; Disposition of Content; Survival

8.1   **Termination for Convenience.**

8.1.1   The SFMTA shall have the option, in its sole discretion, to terminate this Agreement, at any time during the term hereof, for convenience and without cause. The SFMTA shall exercise this option by giving Contractor written notice of termination. The notice shall specify the date on which termination shall become effective.

8.1.2   Upon receipt of the notice of termination, Contractor shall commence and perform, with diligence, all actions necessary on the part of Contractor to effect the termination

of this Agreement on the date specified by the SFMTA, and to minimize the liability of Contractor and the SFMTA to third parties as a result of termination. All such actions shall be subject to the prior approval of the SFMTA. Such actions may include any of the following, without limitation:

(a)   Halting the performance of all Services under this Agreement on the date(s) and in the manner specified by the SFMTA.

(b)   Terminating all existing orders and subcontracts, and not placing any further orders or subcontracts for materials, Services, Equipment, or other items.

(c)   At the SFMTA's direction, assigning to City any or all of Contractor's right, title, and interest under the orders and subcontracts terminated. Upon such assignment, the SFMTA shall have the right, in its sole discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.

(d)   Subject to the SFMTA's approval, settling all outstanding liabilities and all claims arising out of the termination of orders and subcontracts.

(e)   Completing performance of any Services that the SFMTA designates to be completed prior to the date of termination specified by the SFMTA.

(f)   Taking such action as may be necessary, or as the SFMTA may direct, for the protection and preservation of any property related to this Agreement which is in the possession of Contractor and in which the SFMTA has or may acquire an interest.

8.1.3   Within 30 days after the specified termination date, Contractor shall submit to the SFMTA an invoice, which shall set forth each of the following as a separate line item:

(a)   The reasonable cost to Contractor for all Services prior to the specified termination date, for which Services the SFMTA has not already tendered payment. Reasonable costs may include a reasonable allowance for actual overhead, general and administrative expenses, and profit not to exceed a total of 16.71% of Contractor's direct costs for Services. Any overhead allowance shall be separately itemized. Contractor may also recover the reasonable cost of preparing the invoice.

(b)   The reasonable cost to Contractor of handling material or Equipment returned to the vendor, delivered to the SFMTA or otherwise disposed of as directed by the SFMTA.

(c)   A deduction for the cost of materials or Equipment to be retained by Contractor, amounts realized from the sale of materials or Equipment and not otherwise

recovered by or credited to the SFMTA, and any other appropriate credits to the SFMTA against the cost of the Services or other work.

8.1.4 In no event shall the City be liable for costs incurred by Contractor or any of its subcontractors after the termination date specified by the SFMTA, except for those costs specifically listed in Section 8.1.3. Such non-recoverable costs include, but are not limited to, anticipated profits on the Services under this Agreement, post-termination employee salaries, post-termination administrative expenses, post-termination overhead or unabsorbed overhead, attorneys' fees or other costs relating to the prosecution of a claim or lawsuit, prejudgment interest, or any other expense which is not reasonable or authorized under Section 8.1.3.

8.1.5 In arriving at the amount due to Contractor under this Section 8.1, the SFMTA may deduct: (i) all payments previously made by the SFMTA for Services covered by Contractor's final invoice; (ii) any claim which the SFMTA may have against Contractor in connection with this Agreement; and (iii) any invoiced costs or expenses excluded pursuant to the immediately preceding Section 8.1.4.

8.1.6 The City's payment obligation under Section 8.1 shall survive termination of this Agreement.

8.2 **Termination for Event of Default.**

8.2.1 The SFMTA shall have the right, without further obligation or liability to Contractor, to immediately terminate this Agreement for an Event of Default (see Section 8.2.2, below). The SFMTA shall exercise this right by giving Contractor written notice of default. If the SFMTA terminates for an Event of Default, Contractor shall refund to the SFMTA all amounts paid under this Agreement for the SaaS Applications and SaaS Hosting Services in the same manner as if the SFMTA ceases to use the SaaS Applications and/or Services because of an Infringement under Section 5.2.2.

8.2.2 Each of the following shall constitute an immediate "Event of Default" under this Agreement:

(a) Contractor fails or refuses to perform or observe any material term, covenant, or condition contained in any of the following Sections of this Agreement:

3.8	Assignment
4.5	Submitting False Claims.
Article 5	Insurance; Indemnity and Warranties
Article 7	Payment of Taxes
10.10	Alcohol and Drug-Free Workplace
11.10	Compliance with Laws
Article 13	Data and Security

(b)   Contractor fails or refuses to perform or observe any other material term, covenant, or condition contained in this Agreement, including any obligation imposed by ordinance or statute and incorporated by reference herein, and such default is not cured within 10 Days after written notice thereof from the SFMTA to Contractor. At the SFMTA's sole election, the 10-day cure period will *not* apply to termination for data breach or breach of confidentiality.

(c)   Contractor (i) is generally not paying its debts as they become due, (ii) files, or consents by answer or otherwise to the filing against it of a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency, or other debtors' relief law of any jurisdiction, (iii) makes an assignment for the benefit of its creditors, (iv) consents to the appointment of a custodian, receiver, trustee, or other officer with similar powers of Contractor or of any substantial part of Contractor's property, or (v) takes action for the purpose of any of the foregoing.

(d)   A court or government authority enters an order (i) appointing a custodian, receiver, trustee, or other officer with similar powers with respect to Contractor or with respect to any substantial part of Contractor's property, (ii) constituting an order for relief or approving a petition for relief or reorganization or arrangement or any other petition in bankruptcy or for liquidation or to take advantage of any bankruptcy, insolvency or other debtors' relief law of any jurisdiction, or (iii) ordering the dissolution, winding-up, or liquidation of Contractor.

8.2.3   On and after any Event of Default, the SFMTA shall have the right to exercise its legal and equitable remedies, including the right to terminate this Agreement or seek specific performance of all or any part of this Agreement. In addition, where applicable, the SFMTA shall have the right (but no obligation) to cure (or cause to be cured) any Event of Default on behalf of Contractor. Contractor shall pay to the SFMTA on demand all costs and expenses incurred by the SFMTA in effecting the cure, with interest thereon from the date of incurrence at the maximum rate then permitted by law. The SFMTA shall have the right to offset from any amounts due to Contractor under this Agreement, or any other agreement between City and Contractor: (a) all damages, losses, costs, or expenses incurred by the SFMTA as a result of an Event of Default; and (b) any liquidated damages levied upon Contractor under this Agreement; and (c), any damages imposed by any ordinance or statute that is incorporated into this Agreement by reference, or into any other agreement with the City.

8.3   Bankruptcy.

8.3.1   If Contractor ceases to conduct business in the normal course, becomes insolvent, makes a general assignment for the benefit of creditors, suffers or permits the appointment of a receiver for its business or assets, or avails itself of, or becomes subject to, any

proceeding under the Federal Bankruptcy Act or any other statute of any state relating to insolvency or the protection of rights of creditors, then at the SFMTA's option this Agreement shall terminate and be of no further force and effect.

8.3.2   Upon termination of this Agreement pursuant to this Section, Contractor shall within 48 hours return City Data in an agreed-upon machine-readable format. Once Contractor receives written confirmation from the SFMTA that City Data has been successfully transferred to the SFMTA, Contractor shall, within 30 Days, clear, purge or physically destroy all City Data from Contractor's hosted servers or files, and provide the SFMTA written certification, within five Days, that such clearing, purging or physical destruction has occurred. Secure disposal shall be accomplished by "clearing," "purging" or "physical destruction," in accordance with National Institute of Standards and Technology (NIST) Special Publication 800-88 or most current industry standard.

8.4   Transition Services and Disposition of City Data. Upon expiration or termination of the SaaS Hosting Services under this Agreement:

8.4.1   Contractor may immediately discontinue the SaaS Hosting Services and the SFMTA will immediately cease accessing the SaaS Applications and SaaS Hosting Services. Contractor shall within five Days of the expiration or termination of the SaaS Hosting Services return to the SFMTA all City Data in an agreed-upon machine readable format. This provision shall also apply to all City Data in the possession of subcontractors, agents, or auditors of Contractor. Such data transfer shall be done at no cost to the SFMTA. Once Contractor has received written confirmation from the SFMTA that City Data has been successfully transferred to the SFMTA, Contractor shall within 30 Days clear, purge or physically destroy all City Data from its hosted servers or files and provide the SFMTA written certification within five Days that such clearing, purging or physical destruction has occurred. Secure disposal shall be accomplished by "clearing," "purging" or "physical destruction," in accordance with National Institute of Standards and Technology (NIST) Special Publication 800-88 or most current industry standard.

8.4.2   Contractor shall provide to the SFMTA and/or Successor Service Provider assistance requested by the SFMTA to effect the orderly transition of the SaaS Hosting Services, in whole or in part, to the SFMTA or Successor Service Provider. During the transition period, the SFMTA's access to City Data, SaaS Applications, and SaaS Hosting Services shall continue without alteration. Contractor shall provide such Transition Services on a time and materials basis if the SFMTA opts to return to its own servers or the SFMTA chooses a Successor Service Provider. Transition Services may include:

(a)   developing a plan for the orderly transition of the terminated SaaS Hosting Services from Contractor to Successor Service Provider;

(b)　　if required, transferring the City Data to Successor Service Provider;

(c)　　using commercially reasonable efforts to assist the SFMTA in acquiring any necessary rights to legally and physically access and use any third-party technologies and documentation then being used by Contractor in connection with the Services;

(d)　　using commercially reasonable efforts to make available to the SFMTA, pursuant to mutually agreeable terms and conditions, any third-party services then being used by Contractor in connection with the SaaS Services; and

(e)　　such other activities upon which the Parties may agree.

8.4.3　　Notwithstanding the foregoing, if the SFMTA terminates this Agreement because of Contractor's material breach, the SFMTA may elect to use the Services for a period of no greater than six months from the date of termination at a reduced rate of 20% percent off the then-current Services Fees for the terminated Services. All applicable terms and conditions of this Agreement shall apply to the Transition Services. This Section shall survive the termination of this Agreement.

8.5　　**Remedies.** All remedies provided for in this Agreement may be exercised individually or in combination with any other remedy available hereunder or under applicable laws, rules, and regulations. The exercise of any remedy shall not preclude or in any way be deemed to waive any other remedy. Nothing in this Agreement shall constitute a waiver or limitation of any rights the SFMTA may have under applicable law.

8.6　　**Notice of Termination or Default.** Any notice of termination or default shall be sent by registered mail to the address set forth in Section 11.1 (Notices to the Parties).

8.7　　**Non-Waiver of Rights**. The omission by either Party at any time to enforce any default or right reserved to it, or to require performance of any of the terms, covenants, or provisions hereof by the other Party at the time designated, shall not be a waiver of any such default or right to which the Party is entitled, nor shall it in any way affect the right of the Party to enforce such provisions thereafter.

8.8　　**Survival.**

8.8.1　　This Section and the following Sections of this Agreement listed below, shall survive termination or expiration of this Agreement:

3.7	Independent Contractor; Payment of Employment Taxes and Other Expenses
3.10	Liquidated Damages
4.3.3	Payment Limited to Satisfactory Services

8.9   Data Rights.

8.9.1   Preexisting Data, if any, of each Party that will be included as a Deliverable in <u>Appendix B</u>. Preexisting Data of the SFMTA may only be used by Contractor in performance of the Services, unless such data are otherwise publicly available.

8.9.2   The SFMTA shall have the right to use data Contractor provides as a Deliverable under this Agreement, including any Preexisting Data provided as a Deliverable; except that the SFMTA may use such Preexisting Data only in conjunction with Next Generation Customer Information System for the San Francisco Municipal Railway public transportation network. As to all other data Contractor provides as a Deliverable, the SFMTA's use shall be unrestricted.

Article 9   Rights In Deliverables

9.1   Ownership of Results. Any interest of Contractor or its subcontractors, in the Deliverables, including any drawings, plans, specifications, blueprints, studies, reports, memoranda, computation sheets, computer files and media, or other documents prepared by Contractor or its subcontractors under this Agreement, shall become the property of and will be transmitted to the SFMTA. Unless expressly prohibited elsewhere in this Agreement, however, Contractor may retain and use copies for reference and as documentation of its experience and capabilities.

9.2   Works for Hire. If, in connection with the Services, Contractor or its subcontractor(s) creates Deliverables, including, without limitation, artwork, copy, posters, billboards, photographs, videotapes, audiotapes, systems designs, software, reports, diagrams, surveys, blueprints, source codes, or any other original works of authorship, whether in digital or any other format, such works of authorship shall be works for hire as defined under Title 17 of the United States Code, and all copyrights in such works shall be the property of the SFMTA. If any Deliverables created by Contractor or its subcontractor(s) under this Agreement are ever determined not to be works for hire under U.S. law, Contractor assigns all Contractor's copyrights to such Deliverables to the SFMTA, agrees to provide any material and execute any documents necessary to effectuate such assignment, and agrees to include a clause in every subcontract imposing the same duties upon subcontractor(s). With the SFMTA's prior written approval, Contractor and its subcontractor(s) may retain and use copies of such works for reference and as documentation of their respective experience and capabilities.

Article 10   Additional Requirements Incorporated by Reference

10.1   Laws Incorporated by Reference. The full text of the laws listed in this Article 10, including enforcement and penalty provisions, are incorporated by reference into this Agreement. The full text of the San Francisco Municipal Code provisions incorporated by reference in this Article and elsewhere in the Agreement (Mandatory City Requirements) are available at http://www.amlegal.com/codes/client/san-francisco_ca/ .

10.2   Conflict of Interest. By executing this Agreement, Contractor certifies Contractor does not know of any fact that constitutes a violation of: Section 15.103 of the City's Charter; Article III, Chapter 2 of City's Campaign and Governmental Conduct Code; Title 9, Chapter 7 of the California Government Code (Section 87100 *et seq.*); or Title 1, Division 4, Chapter 1, Article 4 of the California Government Code (Section 1090 *et seq.*). Contractor further agrees promptly to notify the SFMTA if Contractor becomes aware of any such fact during the term of this Agreement.

10.3   Prohibition on Use of Public Funds for Political Activity. In performing the Services, Contractor shall comply with San Francisco Administrative Code Chapter 12G, which prohibits funds appropriated by the City for this Agreement from being expended to participate in, support, or attempt to influence any political campaign for a candidate or for a ballot measure. Contractor is subject to the enforcement and penalty provisions in Chapter 12G.

10.4   Consideration of Salary History. Contractor shall comply with San Francisco Administrative Code Chapter 12K, the Consideration of Salary History Ordinance or "Pay Parity Act." Contractor is prohibited from considering current or past salary of an applicant in determining whether to hire the applicant or what salary to offer the applicant to the extent that such applicant is applying for employment to be performed on this Agreement or in furtherance of this Agreement, and whose application, in whole or part, will be solicited, received, processed

or considered, whether or not through an interview, in the City or on City property. The ordinance also prohibits employers from: (a) asking such applicants about their current or past salary, or (b) disclosing a current or former employee's salary history without that employee's authorization unless the salary history is publicly available. Contractor is subject to the enforcement and penalty provisions in Chapter 12K. Information about and the text of Chapter 12K is available on the web at https://sfgov.org/olse/consideration-salary-history. Contractor is required to comply with all of the applicable provisions of 12K, irrespective of the listing of obligations in this Section.

10.5   Nondiscrimination Requirements

10.5.1 Non Discrimination in Contracts. Contractor shall comply with the provisions of Chapters 12B and 12C of the San Francisco Administrative Code. Contractor shall incorporate by reference in all subcontracts the provisions of Sections 12B.2(a), 12B.2(c)-(k), and 12C.3 of the San Francisco Administrative Code and shall require all subcontractors to comply with such provisions. Contractor is subject to the enforcement and penalty provisions in Chapters 12B and 12C.

10.5.2 Nondiscrimination in the Provision of Employee Benefits. Contractor does not as of the date of this Agreement, and will not during the term of this Agreement, in any of its operations in San Francisco, on real property owned by San Francisco, or where work is being performed for the City elsewhere in the United States, discriminate in the provision of employee benefits between employees with domestic partners and employees with spouses and/or between the domestic partners and spouses of such employees, subject to the conditions set forth in San Francisco Administrative Code Section 12B.2.

10.6   Local Business Enterprise and Non-Discrimination in Contracting Ordinance.
Contractor shall comply with all applicable provisions of Chapter 14B (LBE Ordinance). Contractor is subject to the enforcement and penalty provisions in Chapter 14B. Contractor shall utilize LBE Subcontractors for at least 10% of the Services except as otherwise authorized in writing by the Director of CMD. Contractor shall incorporate the requirements of the LBE Ordinance in each subcontract made in the fulfillment of Contractor's LBE subcontracting commitments.

10.7   Minimum Compensation Ordinance.
Contractor shall pay covered employees no less than the minimum compensation required by San Francisco Administrative Code Chapter 12P, including a minimum hourly gross compensation, compensated time off, and uncompensated time off. Contractor is subject to the enforcement and penalty provisions in Chapter 12P. Information about and the text of the Chapter 12P is available on the web at http://sfgov.org/olse/mco. Contractor is required to comply with all of the applicable provisions of 12P, irrespective of the listing of obligations in this Section. By signing and executing this Agreement, Contractor certifies that it is in compliance with Chapter 12P.

10.8   Health Care Accountability Ordinance. Contractor shall comply with San Francisco Administrative Code Chapter 12Q. For each Covered Employee, Contractor shall provide the appropriate health benefit set forth in Section 12Q.3 of the HCAO. If Contractor chooses to offer the health plan option, such health plan shall meet the minimum standards set forth by the San Francisco Health Commission. Information about and the text of the Chapter 12Q, as well as the Health Commission's minimum standards, is available on the web at http://sfgov.org/olse/hcao. Contractor is subject to the enforcement and penalty provisions in Chapter 12Q. Any Subcontract entered into by Contractor shall require any Subcontractor with 20 or more employees to comply with the requirements of the HCAO and shall contain contractual obligations substantially the same as those set forth in this Section

10.9   First Source Hiring Program. Contractor shall comply with all of the provisions of the First Source Hiring Program, Chapter 83 of the San Francisco Administrative Code, that apply to this Agreement, and Contractor is subject to the enforcement and penalty provisions in Chapter 83. Because Contractor's principal place of business is outside the region, the entry-level positions that would be available to First Source Hiring applicants for work to be performed in the City would be limited to Equipment installation, Warranty Services, and Maintenance Services.

10.10   Alcohol and Drug-Free Workplace. City reserves the right to deny access to, or require Contractor to remove from, City facilities personnel of any Contractor or subcontractor who City has reasonable grounds to believe has engaged in alcohol abuse or illegal drug activity which in any way impairs City's ability to maintain safe work facilities or to protect the health and well-being of City employees and the general public. City shall have the right of final approval for the entry or re-entry of any such person previously denied access to, or removed from, City facilities. Illegal drug activity means possessing, furnishing, selling, offering, purchasing, using or being under the influence of illegal drugs or other controlled substances for which the individual lacks a valid prescription. Alcohol abuse means possessing, furnishing, selling, offering, or using alcoholic beverages, or being under the influence of alcohol.

10.11   Limitations on Contributions. By executing this Agreement, Contractor acknowledges its obligations under section 1.126 of the City's Campaign and Governmental Conduct Code. This section prohibits any person who contracts with, or is seeking a contract with, any department of the City for the rendition of personal services, for the furnishing of any material, supplies or equipment, for the sale or lease of any land or building, for a grant, loan or loan guarantee, or for a development agreement, from making any campaign contribution to (i) a City elected official if the contract must be approved by that official, a board on which that official serves, or the board of a state agency on which an appointee of that official serves, (ii) a candidate for that City elective office, or (iii) a committee controlled by such elected official or a candidate for that office, at any time from the submission of a proposal for the contract until the later of either the termination of negotiations for such contract or twelve months after the date

the City approves the contract. The prohibition on contributions applies to each prospective party to the contract; each member of Contractor's board of directors; Contractor's chairperson, chief executive officer, chief financial officer and chief operating officer; any person with an ownership interest of more than 10% in Contractor; any subcontractor listed in the bid or contract; and any committee that is sponsored or controlled by Contractor. Contractor certifies that it has informed each such person of the limitation on contributions imposed by Section 1.126 by the time it submitted a proposal for the contract, and has provided the names of the persons required to be informed to the City department with whom it is contracting.

10.12   Reserved. (Slavery Era Disclosure).

10.13   Reserved. (Working with Minors).

10.14   Consideration of Criminal History in Hiring and Employment Decisions

10.14.1 Contractor agrees to comply fully with and be bound by all of the provisions of Chapter 12T (City Contractor/Subcontractor Consideration of Criminal History in Hiring and Employment Decisions) of the San Francisco Administrative Code (Chapter 12T), including the remedies provided, and implementing regulations, as may be amended from time to time. The provisions of Chapter 12T are incorporated by reference and made a part of this Agreement as though fully set forth herein. The text of the Chapter 12T is available on the web at http://sfgov.org/olse/fco. Contractor is required to comply with all of the applicable provisions of 12T, irrespective of the listing of obligations in this Section. Capitalized terms used in this Section and not defined in this Agreement shall have the meanings assigned to such terms in Chapter 12T.

10.14.2 The requirements of Chapter 12T shall only apply to a Contractor's or Subcontractor's operations to the extent those operations are in furtherance of the performance of this Agreement, shall apply only to applicants and employees who would be or are performing work in furtherance of this Agreement, and shall apply when the physical location of the employment or prospective employment of an individual is wholly or substantially within San Francisco. Chapter 12T shall not apply when the application in a particular context would conflict with federal or state law or with a requirement of a government agency implementing federal or state law.

10.15   Reserved. (Public Access to Nonprofit Records and Meetings).

10.16   Food Service Waste Reduction Requirements. Contractor shall comply with the Food Service Waste Reduction Ordinance, as set forth in San Francisco Environment Code Chapter 16, including the remedies for noncompliance provided therein.

10.17   Reserved. (Sugar-Sweetened Beverage Prohibition)

Article 11   General Provisions

11.1   Notices to the Parties. Unless otherwise indicated in this Agreement, all written communications sent by the Parties may be by U.S. mail or e-mail, and shall be addressed as follows:

To City: Jason Lee
                      San Francisco Municipal Transportation Agency
                      1 South Van Ness Ave., 3rd Floor
                      San Francisco, CA 94103
                      jason.lee@sfmta.com

To Contractor: Cindy Adamos
                      Cubic Transportation Systems, Inc.
                      5650 Kearny Mesa Road, San Diego, CA 92111
                      cindy.adamos@cubic.com

Any notice of default shall be sent by registered mail. Either Party may change the address to which notice is to be sent by giving written notice thereof to the other Party. If email notification is used, the sender shall specify a receipt notice.

11.2   Compliance with Americans with Disabilities Act. Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services and other activities provided by a public entity to the public, whether directly or through a contractor, shall be accessible to the disabled public. Contractor shall provide the services specified in this Agreement in a manner that complies with the ADA and any and all other applicable federal, state and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents or assigns will constitute a material breach of this Agreement. Contractor shall adhere to the requirements of the Americans with Disabilities Act of 1990 (ADA), as amended (42 U.S.C. Sec. 1201 et seq.) and Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d).

11.3   Incorporation of Recitals. The matters recited above are hereby incorporated into and made part of this Agreement.

11.4   Sunshine Ordinance. Contractor acknowledges that this Agreement and all records related to its formation, Contractor's performance of Services, and City's payment are subject to the California Public Records Act, (California Government Code §6250 et. seq.), and the San Francisco Sunshine Ordinance, (San Francisco Administrative Code Chapter 67). Such records are subject to public inspection and copying unless exempt from disclosure under federal, state or local law.

11.5   Modification of this Agreement. This Agreement may not be modified, nor may compliance with any of its terms be waived, except as noted in <u>Section 11.1</u> (Notices to Parties) regarding change in personnel or place, and except by written instrument executed and approved as required under City law and under the policy of the SFMTA Board of Directors. Contractor shall cooperate with the SFMTA to submit to the CCO any amendment, modification, supplement or change order that would result in a cumulative increase of the original amount of this Agreement by more than 20% (CMD Contract Modification Form).

11.6   Dispute Resolution Procedure.

11.6.1   Negotiation; Alternative Dispute Resolution. The Parties will attempt in good faith to resolve any dispute or controversy arising out of or relating to the performance of services under this Agreement. If the Parties are unable to resolve the dispute, then, pursuant to San Francisco Administrative Code Section 21.36, Contractor may submit to the Contract Administrator a written request for administrative review and documentation of the Contractor's claim(s). Upon such request, the Contract Administrator shall promptly issue an administrative decision in writing, stating the reasons for the action taken and informing Contractor of its right to judicial review. If agreed by both Parties in writing, disputes may be resolved by a mutually agreed-upon alternative dispute resolution process. If the Parties do not mutually agree to an alternative dispute resolution process or such efforts do not resolve the dispute, then either Party may pursue any remedy available under California law. The status of any dispute or controversy notwithstanding, Contractor shall proceed diligently with the performance of its obligations under this Agreement in accordance with the Agreement and the written directions of the City. Neither Party will be entitled to legal fees or costs for matters resolved under this Section.

11.6.2   Government Code Claim Requirement. No suit for money or damages may be brought against the City until a written claim therefor has been presented to and rejected by the City in conformity with the provisions of San Francisco Administrative Code Chapter 10 and California Government Code Section 900, et seq. Nothing set forth in this Agreement shall operate to toll, waive or excuse Contractor's compliance with the California Government Code Claim requirements set forth in San Francisco Administrative Code Chapter 10 and California Government Code Section 900, et seq.

11.7   Agreement Made in California; Venue. The formation, interpretation and performance of this Agreement shall be governed by the laws of the State of California. Venue for all litigation relative to the formation, interpretation and performance of this Agreement shall be in San Francisco.

11.8   Construction. All paragraph captions are for reference only and shall not be considered in construing this Agreement.

11.9   Entire Agreement. This Agreement sets forth the entire agreement between the Parties, and supersedes all other oral or written provisions. This Agreement may be modified only as provided in Section 11.5 (Modification of this Agreement).

11.10   Compliance with Laws. Contractor shall keep itself fully informed of the City's Charter, codes, ordinances and duly adopted rules and regulations of the City and of all state, and federal laws in any manner affecting the performance of this Agreement, and shall at all times comply with such local codes, ordinances, and regulations and all applicable laws as they may be amended from time to time.

11.11   Severability. Should the application of any provision of this Agreement to any particular facts or circumstances be found by a court of competent jurisdiction to be invalid or unenforceable, then (a) the validity of other provisions of this Agreement shall not be affected or impaired thereby, and (b) such provision shall be enforced to the maximum extent possible so as to effect the intent of the Parties and shall be reformed without further action by the Parties to the extent necessary to make such provision valid and enforceable.

11.12   Cooperative Drafting. This Agreement has been drafted through a cooperative effort of City and Contractor, and both Parties have had an opportunity to have the Agreement reviewed and revised by legal counsel. No Party shall be considered the drafter of this Agreement, and no presumption or rule that an ambiguity shall be construed against the Party drafting the clause shall apply to the interpretation or enforcement of this Agreement.

11.13   Order of Precedence. Contractor agrees to perform the services described below in accordance with the terms and conditions of this Agreement, implementing task orders, the RFP, and Contractor's proposal dated March 1, 2019. The RFP and Contractor's proposal are incorporated by reference as though fully set forth herein. Should there be a conflict of terms or conditions, this Agreement and any implementing task orders shall control over the RFP and the Contractor's proposal. If the Appendices to this Agreement include any standard printed terms from Contractor, Contractor agrees that in the event of discrepancy, inconsistency, gap, ambiguity, or conflicting language between the City's terms and Contractor's printed terms attached, the City's terms shall take precedence, followed by the procurement issued by the SFMTA, Contractor's proposal, and Contractor's printed terms, respectively.

Article 12   SFMTA Specific Terms

12.1   Large Vehicle Driver Safety Training Requirements.

12.1.1 Contractor agrees that before any of its employees and subcontractors drive large vehicles within the City and County of San Francisco, those employees and subcontractors shall successfully complete either (a) the SFMTA's Large Vehicle Urban Driving Safety training program or (b) a training program that meets the SFMTA's approved standards

for large vehicle urban driving safety. The SFMTA's approved standards for large vehicle urban driving safety is available for download at www.SFMTA.com/largevehicletrainingstandards. This requirement does not apply to drivers providing delivery services who are not employees or subcontractors of Contractor. For purposes of this section, "large vehicle" means any single vehicle or combination of vehicle and trailer with an unladen weight of 10,000 pounds or more, or a van designed to carry 10 or more people.

12.1.2 By entering into this Agreement, Contractor agrees that in the event Contractor fails to comply with the Large Vehicle Driver Safety Training Requirements, the City will suffer actual damages that will be impractical or extremely difficult to determine; further, Contractor agrees that the sum of up to One Thousand Dollars ($1,000) per employee or subcontractor who is permitted to drive a large vehicle in violation of these requirements is not a penalty, but is a reasonable estimate of the loss that City will incur based on the Contractor's failure to comply with this requirement, established in light of the circumstances existing at the time this Contract was awarded. City may deduct a sum representing the liquidated damages from any money due to Contractor. Such deductions shall not be considered a penalty, but rather agreed monetary damages sustained by City because of Contractor's failure to comply.

Article 13 Data and Security

13.1   City Data

13.1.1 Ownership of City Data. The Parties agree that as between them, all rights, including all intellectual property rights, in and to the City Data, and any derivative works of the City Data, is the exclusive property of the SFMTA. Contractor warrants that the SaaS Applications do not maintain, store, or export the City Data using a database structure, data model, entity relationship diagram or equivalent.

13.1.2 Use of City Data.

(a)   Contractor agrees to hold City Data received from or created on behalf of the SFMTA in strictest confidence. Contractor shall not use or disclose City Data except as permitted or required under this Agreement or as otherwise authorized in writing by the SFMTA. Access to City's Confidential Information must be strictly controlled and limited to Contractor's staff assigned to this Agreement on a need-to-know basis only.

(b)   Contractor is provided a limited non-exclusive license to use the City Data solely for performing its obligations under this Agreement and not for Contractor's own purposes or later use. Nothing herein shall be construed to confer any license or right to the City Data, including user tracking and exception City Data within the system, by implication, estoppel or otherwise, under copyright or other intellectual property rights, to any third party.

(c)   Unauthorized use of City Data by Contractor, subcontractors or other third-parties is prohibited. For purpose of this requirement, the phrase "unauthorized use" means the data mining or processing of data, stored or transmitted by the service, for unrelated commercial purposes, advertising or advertising-related purposes, or for any purpose other than security or service delivery analysis that is not explicitly authorized.

13.1.3 Access to and Extraction of City Data.

(a)   The SFMTA shall have access to City Data 24 hours a day, 7 days a week. The SaaS Applications shall be capable of creating a digital, reusable copy of the City Data, in whole and in parts, as a platform independent and machine-readable file. Such file formats include, without limitation, plain text files such as comma-delimited tables, extensible markup language, and javascript object notation. City Data that is stored in binary formats, including, without limitation, portable document format, JPEG, and portable network graphics files, shall instead be reproducible in the same format in which it was loaded into the SaaS Application. This reusable copy shall be made available in a publicly documented and non-proprietary format, with a clearly defined data structure and a data dictionary for all terms of art contained in the data.

(b)   For purposes of this section, non-proprietary formats include formats for which royalty-free codecs are available to Authorized Users. Contractor warrants that City shall be able to extract City Data from the SaaS Application on demand, by no later than 24 hours of City's request, without charge and without any conditions or contingencies whatsoever (including the payment of any fees to Contractor).

13.1.4 Back-up and Recovery of City Data. As a part of the SaaS Services, Contractor is responsible for maintaining a backup of City Data and for an orderly and timely recovery of such data in the event of data corruption or interruption of the SaaS Services. Unless otherwise described in Appendix D, Contractor shall maintain a contemporaneous backup of City Data that can be recovered within the requirements in this Agreement and as outlined in Appendix D and maintaining the security of City Data as further described herein. Contractor's backup of City Data shall not be considered in calculating storage used by City.

13.1.5 Data Breach; Loss of City Data. In the event of any Data Breach, act, SaaS Software Error, omission, negligence, misconduct, or breach that compromises or is suspected to compromise the security, confidentiality, or integrity of City Data or the physical, technical, administrative, or organizational safeguards put in place by Contractor that relate to the protection of the security, confidentiality, or integrity of City Data, Contractor shall, as applicable:

(a)   Notify City immediately following discovery, but no later than 24 hours, of becoming aware of such occurrence or suspected occurrence. Contractor's report shall identify:

(i)   the nature of the unauthorized access, use or disclosure;

(ii)   the Confidential Information accessed, used or disclosed;

(iii)   the person(s) who accessed, used, disclosed and/or received protected information (if known);

(iv)   what Contractor has done or will do to mitigate any deleterious effect of the unauthorized access, use or disclosure, and

(v)   what corrective action Contractor has taken or will take to prevent future unauthorized access, use or disclosure.

(b)   In the event of a suspected Breach, Contractor shall keep the City informed regularly of the progress of its investigation until the uncertainty is resolved;

(c)   Contractor shall coordinate with the City in its breach response activities, including, without limitation:

(i)   Immediately preserve any potential forensic evidence relating to the breach, and remedy the breach as quickly as circumstances permit;

(ii)   Promptly (within two business days) designate a contact person to whom the City will direct inquiries, and who will communicate Contractor responses to City inquiries;

(iii)   As rapidly as circumstances permit, apply appropriate resources to remedy the breach condition, investigate, document, restore City service(s) as directed by the City; and undertake appropriate response activities;

(iv)   Provide status reports to the City on Data Breach response activities, either on a daily basis or a frequency approved by the City;

(v)   Make all reasonable efforts to assist and cooperate with the City in its Breach response efforts;

(vi)   Ensure that knowledgeable Contractor staff are available on short notice, if needed, to participate in City-initiated meetings and/or conference calls regarding the Breach; and

(vii)   Cooperate with City in investigating the occurrence, including making available all relevant records, logs, files, data reporting, and other materials required to comply with applicable law or as otherwise required by City.

(d)   In the case of personally identifiable information (PII) or protected health information (PHI), at City's sole election, (a) notify the affected individuals as soon as practicable, but no later than is required to comply with applicable law, or, in the absence of any legally required notification period, within five Days of the occurrence; or (b) reimburse City for any costs in notifying the affected individuals;

(e)   In the case of PII, provide third-party credit and identity monitoring services to each of the affected individuals who comprise the PII for the period required to comply with applicable law, or, in the absence of any legally required monitoring services, for no fewer than 24 months following the date of notification to such individuals;

(f)   Perform or take any other actions required to comply with applicable law as a result of the occurrence;

(g)   Recreate lost City Data in the manner and on the schedule set by City without charge to City; and

(h)   Provide to City a detailed plan within 10 Days of the occurrence describing the measures Contractor will undertake to prevent a future occurrence.

(i)   Notification to affected individuals, as described above, shall comply with applicable law, be written in plain language, and contain (at the City's election) information that may include: name and contact information of Contractor's (or City's) representative; a description of the nature of the loss; a list of the types of data involved; the known or approximate date of the loss; how such loss may affect the affected individual; what steps Contractor has taken to protect the affected individual; what steps the affected individual can take to protect himself or herself; contact information for major credit card reporting agencies; and, information regarding the credit and identity monitoring services to be provided by Contractor.

(j)   Contractor shall retain and preserve City Data in accordance with the City's instruction and requests, including, without limitation, any retention schedules and/or litigation hold orders provided by the City to Contractor, independent of where the City Data is stored.

(k)   City shall conduct all media communications related to such Data Breach, unless in its sole discretion, City directs Contractor to do so,.

13.2   Proprietary or Confidential Information

13.2.1 Proprietary or Confidential Information of City. Contractor understands and agrees that, in the performance of the work or services under this Agreement may involve access to City Data that is Confidential Information. Contractor and any subcontractors or agents shall use Confidential Information only in accordance with all applicable local, state and federal laws restricting the access, use and disclosure of Confidential Information, and only as necessary in the performance of this Agreement. Contractor's failure to comply with any requirements of local, state or federal laws restricting access, use and disclosure of Confidential Information shall be deemed a material breach of this Agreement, for which City may terminate the Agreement. In addition to termination or any other remedies set forth in this Agreement or available in equity or law, the City may bring a false claim action against Contractor pursuant to Chapters 6 or 21 of the Administrative Code, or debar Contractor. Contractor agrees to include all of the terms and conditions regarding Confidential Information contained in this Agreement in all subcontractor or agency contracts providing services under this Agreement.

13.2.2 Obligation of Confidentiality. Subject to San Francisco Administrative Code Section 67.24(e), any state open records or freedom of information statutes, and any other applicable laws, Parties agree to hold all Confidential Information in strict confidence and not to copy, reproduce, sell, transfer, or otherwise dispose of, give or disclose such Confidential Information to third parties other than employees, agents, or authorized subcontractors of a Party who have a need to know in connection with this Agreement, or to use such Confidential Information for any purposes whatsoever other than the performance of this Agreement. The Parties agrees to advise and require its respective employees, agents, and subcontractors of their obligations to keep all Confidential Information confidential.

13.2.3 Nondisclosure.

(a) Contractor agrees and acknowledges that it shall have no proprietary interest in any proprietary or Confidential Information and will not disclose, communicate or publish the nature or content of such information to any person or entity, nor use, except in connection with the performance of its obligations under this Agreement or as otherwise authorized in writing by the City, any of the Confidential Information it produces, receives, acquires or obtains from the disclosing Party.

(b) Contractor shall take all necessary steps to ensure that the Confidential Information is securely maintained. Contractor's obligations set forth herein shall survive the termination or expiration of this Agreement.

(c) In the event Contractor becomes legally compelled to disclose any Confidential Information, it shall provide the SFMTA with prompt notice thereof and shall not divulge any information until the SFMTA has had the opportunity to seek a protective order or other appropriate remedy to curtail such disclosure. If such actions by the SFMTA are

unsuccessful, or the SFMTA otherwise waives its right to seek such remedies, Contractor shall disclose only that portion of the Confidential Information that it is legally required to disclose.

13.2.4 Litigation Holds. Contractor shall retain and preserve City Data in accordance with the SFMTA's instruction and requests, including, without limitation, any retention schedules and/or litigation hold orders provided by the SFMTA to Contractor, independent of where the City Data is stored.

13.2.5 Notification of Legal Requests. Contractor shall immediately notify the SFMTA upon receipt of any subpoenas, service of process, litigation holds, discovery, requests, and other legal requests (Legal Requests) related to City's Data under this Agreement, or which in any way might reasonably require access to City's Data, and in no event later than 24 hours after it receives the request. Contractor shall not respond to Legal Requests related to City without first notifying City other than to notify the requestor that the information sought is potentially covered under a non-disclosure agreement. Contractor shall retain and preserve City Data in accordance with the City's instruction and requests, including, without limitation, any retention schedules and/or litigation hold orders provided by the City to Contractor, independent of where the City Data is stored.

13.2.6 Cooperation to Prevent Disclosure of Confidential Information. Contractor shall use its best efforts to assist the SFMTA in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limiting the foregoing, Contractor shall advise the City immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Agreement and Contractor will cooperate with the SFMTA in seeking injunctive or other equitable relief against any such person.

13.2.7 Remedies for Breach of Obligation of Confidentiality. Contractor acknowledges that breach of its obligation of confidentiality may give rise to irreparable injury to the SFMTA, which damage may be inadequately compensable in the form of monetary damages. Accordingly, the SFMTA may seek and obtain injunctive relief against the breach or threatened breach of the foregoing undertakings, in addition to any other legal remedies that may be available, to include, at the sole election of the SFMTA, the immediate termination, without liability to the SFMTA or City, of this Agreement.

13.2.8 Surrender of Confidential Information upon Termination. Upon termination of this Agreement, including but not limited to expiration of the term, early termination or termination for convenience, Contractor shall, within five Days from the date of termination, return to the SFMTA any and all Confidential Information received from the SFMTA, or created or received by Contractor on behalf of the SFMTA, which are in Contractor's possession, custody, or control. The return of Confidential Information to City shall follow the timeframe and procedure described further in this Agreement (Article 8).

13.2.9 Data Security.

(a)   To prevent unauthorized access or "hacking" of City Data, Contractor shall at all times during the term of this Agreement provide and maintain up-to-date security with respect to (a) the Services, (b) Contractor's Website, (c) Contractor's physical facilities, and (d) Contractor's networks. Contractor shall provide security for its networks and all Internet connections consistent with best practices observed by well-managed SaaSs working in Contractor's industry, and shall promptly install all patches, fixes, upgrades, updates and new versions of any security software it employs. Contractor will maintain appropriate safeguards to restrict access to City's Data to those employees, agents or service providers of Contractor who need the information to carry out the purposes for which it was disclosed to Contractor.

(b)   For information disclosed in electronic form, Contractor agrees that appropriate safeguards include electronic barriers (e.g., most current industry standard encryption for transport and storage, such as the National Institute of Standards and Technology's Internal Report 7977 or Federal Information Processing Standards [FIPS] 140-2 [Security Requirements for Cryptographic Modules] or FIPS-197 or successors, intrusion prevention/detection or similar barriers) and secure authentication (e.g., password protected) access to the City's Confidential Information and hosted City Data.

(c)   For information disclosed in written form, Contractor agrees that appropriate safeguards include secured storage of City Data. City Data classified as Confidential Information shall be encrypted at rest and in transit with controlled access. Contractor shall also establish and maintain any additional physical, electronic, administrative, technical and procedural controls and safeguards to protect City Data that are no less rigorous than accepted industry practices (including, as periodically amended or updated, the International Organization for Standardization's standards: ISO/IEC 27001:2005 – Information Security Management Systems – Requirements and ISO-IEC 27002:2005 – Code of Practice for International Security Management, NIST Special Publication 800-53 Revision 4 or its successor, NIST Special Publication 800-18 or its successor, the Information Technology Library (ITIL) standards, the Control Objectives for Information and related Technology (COBIT) standards, or other applicable industry standards for information security), and shall ensure that all such controls and safeguards, including the manner in which Confidential Information is collected, accessed, used, stored, processed, disposed of and disclosed, comply with applicable data protection and privacy laws, as well as the terms and conditions of this Agreement. Contractor warrants to the City compliance with all applicable laws (as periodically amended or updated) that govern data security, including:

(i)   The California Information Practices Act/California Consumer Privacy Act (Civil Code §§ 1798, et seq);

(ii)   The European General Data Protection Regulation (GDPR);

(iii)   Compliance with the following, as applicable: (1) Federal Risk and Authorization Management Program (FedRAMP) certification, where federal funding is involved, and show evidence of having an active compliance program; (2) Based upon the City's classification of Data: relevant security provisions of the Internal Revenue Service (IRS) Publication 1075, including the requirements that Data not traverse networks located outside of the United States; relevant security provisions of the Payment Card Industry (PCI) Data Security Standard (PCI DSS) including the PCI DSS Cloud Computing Guidelines; relevant security provisions of the Social Security Administration (SSA) Document Electronic Information Exchange Security Requirement and Procedures for State and Local Agencies Exchanging Electronic Information with the Social Security Administration;

13.2.10   **Data Privacy and Information Security Program.** Without limiting Contractor's obligation of confidentiality as further described herein, Contractor shall establish and maintain a data privacy and information security program, including physical, technical, administrative, and organizational safeguards, that is designed to: (a) ensure the security and confidentiality of the City Data; (b) protect against any anticipated threats or hazards to the security or integrity of the City Data; (c) protect against unauthorized disclosure, access to, or use of the City Data; (d) ensure the proper disposal of City Data; and, (e) ensure that all of Contractor's employees, agents, and subcontractors, if any, comply with all of the foregoing.

13.2.11   **City's Right to Termination for Deficiencies.** City reserves the right, at its sole election, to immediately terminate this Agreement, without limitation and without liability, if City reasonably determines that Contractor fails or has failed to meet its obligations under this Article 13.

13.2.12   **Data Transmission.** Contractor shall ensure that all electronic transmission or exchange of system and application data with City and/or any other parties expressly designated by City shall take place via encrypted secure means (using HTTPS or SFTP or most current industry standard established by NIST. Contractor shall also ensure that all data exchanged shall be used expressly and solely for the purposes enumerated in the Agreement. Data shall not be distributed, repurposed or shared across other applications, environments, or business units of Contractor. Contractor shall ensure that no City Data of any kind shall be copied, modified, destroyed, deleted, transmitted, exchanged or otherwise passed to other vendors or interested parties except on a case-by-case basis as specifically agreed to in writing by City. The Contractor shall ensure all media and content remains stored within servers located in the United States. Contractor may with a secure login and password access City Data for maintenance and support from outside the continental United States.

13.3   **SSAE 18, SOC 2, Type II Report and/or SOC 1 Audit Report**.

13.3.1 Contractor shall provide to the SFMTA, on an annual basis, an SSAE 18, SOC 2, Type II Report, and an SSAE SOC 1 audit report, to be conducted by an independent third party ("Audit Reports") (if Contractor is using a hosting service provider, Contractor shall provide such Audit Reports it receives from its service provider or providers) as follows: (a) the Audit Reports shall include a 365 day (12-month) testing period; and (b) the Audit Reports shall be available to SFMTA no later than 30 days after they are received by Contractor.

13.3.2 Upon the SFMTA's written request, Contractor shall provide a so-called "negative assurance opinion" to the SFMTA as soon as said opinion is received by Contractor. Contractor shall implement reasonably required safeguards as identified by any audit of Contractor's data privacy and information security program. In the event that an annual Audit Report that finds a material data privacy or information security issue, Contractor shall, upon written request by City, provide to City any additional Audit Reports and "negative assurance opinions" as City may reasonably request in order to help enable City to see if Contractor's mitigation measures have been effective in addressing such issue(s).

13.3.3 **Audit of Contractor's Policies.** Contractor agrees to make its policies, procedures and practices regarding Data Security available to City, if needed, and agrees that City reserves the rights, including making a site visit, scanning for malicious codes, and hiring a third party to perform a security audit if City determines that the Audit Report is unsatisfactory.

13.3.4 **Information Security Audits.** Contractor shall contract with an independent third party to perform yearly information security audits of their primary and backup Data Centers. The annual audits shall include an outside penetration/vulnerability test, and internal penetration and vulnerability tests with the third party directly on the internal network. The summary results of the audits shall be shared with the City. All audit findings shall be remedied.

13.3.5 **Audit Findings.** Contractor shall implement reasonably required safeguards as identified by City or by any audit of Contractor's data privacy and information security program.

13.4 **Payment Card Industry ("PCI") Requirements.** Contractors providing services and products that handle, transmit or store cardholder data, are subject to the following requirements:

13.4.1 **Applications** shall be compliant with the Payment Application Data Security Standard (PA-DSS) and validated by a Payment Application Qualified Security Assessor (PA-QSA). A Contractor whose application has achieved PA-DSS certification shall then be listed on the PCI Councils list of PA-DSS approved and validated payment applications.

13.4.2 Gateway providers shall have appropriate Payment Card Industry Data Security Standards (PCI DSS) certification as service providers (https://www.pcisecuritystandards.org/index.shtml). Compliance with the PCI DSS shall be achieved through a third-party audit process. The Contractor shall comply with Visa Cardholder Information Security Program (CISP) and MasterCard Site Data Protection (SDP) programs.

13.4.3 For any Contractor that processes PIN Debit Cards, payment card devices supplied by Contractor shall be validated against the PCI Council PIN Transaction Security (PTS) program.

13.4.4 For subparts 13.4.1 to 13.4.3 above, Contractor shall provide a letter from their qualified security assessor (QSA) affirming their compliance and current PCI or PTS compliance certificate.

13.4.5 Contractor shall be responsible for furnishing City with an updated PCI compliance certificate 30 Days prior to its expiration.

13.4.6 Bank Accounts. Collections that represent funds belonging to the City and County of San Francisco shall be deposited, without detour to a third party's bank account, into a City bank account designated by the Office of the Treasurer and Tax Collector.

Article 14   Force Majeure

14.1 **Liability.** No Party shall be liable for delay in the performance of its obligations under this Agreement if and to the extent such delay is caused, directly or indirectly, by: fire, flood, earthquake, elements of nature or acts of God; riots, civil disorders, epidemics, pandemics, or any other cause beyond the reasonable control of such Party (a "Force Majeure Event"). In the case of a Force Majeure Event, Contractor shall immediately commence disaster recovery services as described in Section 14.4.

14.2 **Duration.** In a Force Majeure Event, the non-performing Party shall be excused from further performance or observance of the obligation(s) so affected for as long as such circumstances prevail and such Party continues to use its best efforts to recommence performance or observance whenever and to whatever extent possible without delay. Any Party so delayed in its performance shall immediately notify the Party to whom performance is due by telephone (to be confirmed in writing within two Days of the inception of such delay) and describe at a reasonable level of detail the circumstances causing such delay.

14.3 **Effect.** If a Force Majeure Event substantially prevents, hinders, or delays performance of the Services as critical for more than 15 consecutive Days, then at City's option: (i) City may terminate any portion of this Agreement so affected and the charges payable hereunder shall be equitably adjusted to reflect those terminated Services; or (ii) City may terminate this Agreement without liability to City or Contractor as of a date specified by City in

a written notice of termination to Contractor. Contractor shall not have the right to any additional payments from City for costs or expenses incurred by Contractor as a result of any force majeure condition that lasts longer than three Days.

14.4   Disaster Recovery. In the event of a disaster, as defined below, Contractor shall provide disaster recovery services in accordance with the provisions of the Disaster Recovery Plan. Notwithstanding Section 14.1, a Force Majeure Event shall not excuse Contractor of its obligations for performing disaster recovery services as provided in this Section. In the event that a disaster occurs and Contractor fails to restore the hosting services within 24 hours of the initial disruption to Services, City may, in its discretion, deem such actions to be a material default by Contractor incapable of cure, and City may immediately terminate this Agreement. For purposes of this Agreement, a "disaster" shall mean an interruption in the hosting services or the inability of Contractor to provide City with the SaaS Application and hosting services for any reason that could not be remedied by relocating the SaaS Application and hosting services to a different physical location outside the proximity of its primary Data Center.

Article 15   Appendices

15.1   Additional Appendices. The appendices listed below are attached and incorporated into this Agreement as though fully set forth herein and together form the complete Agreement between the Parties; except that Appendix J is incorporated into this Agreement only as set forth in Section 1.3.2.

Appendix	Title
A	Definitions
B	System Implementation Services
C	Maintenance Services
D	SaaS Applications & SaaS Hosting Services
E	Calculation of Charges
F	Performance Requirements
G	Liquidated Damages
H	Preliminary Schedule
I	Task Order Request Form
J	Reference Information

Article 16   MacBride And Signature

16.1   MacBride Principles -Northern Ireland. The provisions of San Francisco Administrative Code §12F are incorporated herein by this reference and made part of this

Agreement. By signing this Agreement, Contractor confirms that Contractor has read and understood that the City urges companies doing business in Northern Ireland to resolve employment inequities and to abide by the MacBride Principles, and urges San Francisco companies to do business with corporations that abide by the MacBride Principles.

[Signatures on following page.]

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the day first mentioned above.

CITY	CONTRACTOR
San Francisco **Municipal Transportation Agency**	**Cubic Transportation Systems, Inc.** DocuSigned by: *Robert Scott* 9EF66D0F52894F7...
Jeffrey P. Tumlin Director of Transportation	**Robert Scott** **VP Contracts & Subcontracts** 5650 Kearny Mesa Road San Diego, CA 92111
Authorized By:	
Municipal Transportation Agency Board of Directors	
Resolution No: _____	Acknowledgement of Large Vehicle Driver Safety Training Requirements:
Adopted: _____	
Attest: _____	
Roberta Boomer, Secretary	By signing this Agreement, Contractor acknowledges that it has read and understands Section 12.1: Large Vehicle Driver Safety Training Requirements.
Board of Supervisors	
Resolution No: _____	
Adopted: _____	
Attest: _____	
Clerk of the Board	
Approved as to Form:	City Supplier Number: **0000022031**
Dennis J. Herrera City Attorney	
By: _____ Isidro Alarcón Jiménez Deputy City Attorney	

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Appendix A

DEFINITIONS

The following definitions apply to this Agreement:

1.   **"Acceptable Trip Planner Response Rate"** has the meaning set forth in No. 4.4 of Appendix F, Table F-1.

2.   "**Acceptance**" means notice from the City to Contractor that the SaaS Applications meets the specifications and requirements contained in the Documentation and Appendices B and/or C.

3.   "**Acceptance Period**" means the period allocated by City to test the SaaS Applications to determine whether it conforms to the applicable specifications and, if appropriate, properly operates in the defined operating environment, is capable of running on a repetitive basis, and is otherwise in compliance with the service level obligations without failure.

4.   **"Accessibility Information"** is a category of Customer Information defined in Appendix B, Section 2.2.1.1.8.

5.   **"Accessible Itineraries"** is a category of Customer Information defined in Appendix B, Section 2.2.1.1.8.

6.   **"Accurate Prediction Range"** means the margin of error within which Vehicle-Arrival Predictions are considered to be accurate for a given prediction time. For example, an Accurate Prediction Range of -2:00 to +3:00 for a Vehicle-Arrival Prediction of 12 minutes means that the prediction would be considered accurate if the vehicle arrived ten minutes zero seconds to 15 minutes zero seconds after the System Software generated the prediction, but not accurate if the vehicle arrived nine minutes 59 seconds or earlier, or 15 minutes one second or later.

7.   **"Accurate Terminal Departure Prediction Range"** means the range of time in which Terminal Departure Predictions are considered to be accurate for a given prediction time. For example, an Accurate Terminal Departure Prediction Range of -1:00 to +4:00 for a prediction of six minutes means that the prediction would be considered accurate if the vehicle departed the terminal five minutes zero seconds to ten minutes zero seconds after the System Software generated the prediction, but not accurate if the vehicle departed four minutes 59 seconds or earlier, or ten minutes one second or later.

8.   "**Agreement**" means this contract document, including all attached appendices, any future amendments, and all applicable City Ordinances and Mandatory City Requirements, specifically incorporated into this Agreement by reference as provided herein.

9.   **"Alternative Routes"** are a category of Customer Information defined in Appendix B, Section 2.2.1.1.5.

10.   "**Americans with Disabilities Act**" or "**ADA**" means a civil rights law established in 1990 that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.

11.   **"Analytics Platform"** means the Element of the Next Generation System that enables the SFMTA to analyze and interpret data generated by the Elements of the Next Generation System. The requirements for the Analytics Platform are set forth in Appendix B, Section 6.

12. **"Analytics Platform Availability Rate"** has the meaning set forth in No. 5.1 of Appendix F, Table F-1.

13. **"Application Programming Interface" or "API"** means a set of subroutine definitions, protocols, and tools for building application software. An API allows two applications to talk to each other.

14. "**Authorized Users**" means persons authorized by the SFMTA or City to access and use the SaaS Applications and SaaS Services, including any City employee, contractor, or agent, or any other individual or entity authorized by City.

15. **"Automatic Train Control System" or "ATCS"** monitors and controls train movements in the underground section of the Muni Metro light rail system.

16. "**Back-Up Environment**" means the Contractor's back-up Data Center for the SaaS Applications and SaaS Services.

17. **"Bay Area Rapid Transit"** or **"BART"** means the San Francisco Bay Area Rapid Transit District.

18. **"Block"** or **"Vehicle Block"** means the schedule of travel of a transit vehicle for a given day, including: (1) a pull-out from the Operating Division; (2) a sequence of trips from the timetable; (3) any dead-head trips; and (4) a pull-in back to the Operating Division.

19. **"Business Hours"** means 8:00am-6:00pm U.S. Pacific Time, Monday to Friday excluding local, state and federal public holidays.

20. "**CCO**" means SFMTA Contract Compliance Office.

21. **"Central Subway"** means the SFMTA's extension of the Muni Metro T Third light rail line from 4th & King Street through South of Market, and Union Square to Chinatown, due to open in 2021.

22. "**City**" or "**the City**" means the City and County of San Francisco, a municipal corporation, acting by and through its Municipal Transportation Agency.

23. "**City Data**" means data, as described in Article 13 of this Agreement, which includes all data collected, used, maintained, processed, stored, or generated by or on behalf of the City in connection with this Agreement, including data resulting from the use of the SaaS Applications and SaaS Services. City Data includes Confidential Information. This includes data that is provided by a third-party to the City for use under this Agreement.

24. **"City Portal**" means an electronic gateway to a secure entry point via Contractor's Website that allows City and its Authorized Users to log in to an area where they can view and download information or request assistance regarding the SaaS Application and Services.

25. "**CMD**" means the Contract Monitoring Division of the City.

26. **"Complementary Sustainable Transportation Option"** means a form of transportation the SFMTA deems compatible with the Guiding Principles for Management of Transportation Services and Technologies.

27. **"Computer Aided Dispatch/Automatic Vehicle Location"** or **"CAD/AVL"** means the SFMTA's computer-aided dispatch and automatic vehicle location system known as OrbCAD. When a Transit Operator logs into OrbCAD, the system is able to associate the operator with a vehicle and Vehicle Block. Among other things, the OrbCAD system provides vehicle location information and passenger loads in real-time. Transit Operators are able to communicate to transportation controllers at the Transportation Management Center via a radio system. The CAD/AVL system enables Transportation Controllers to communicate directly with vehicles and manage service.

28.   **"Conceptual Design Document"** means the document included in Contractor's Proposal that describes the features and functionality of its proposed solution for the Next Generation System.

29.   "**Confidential Information**" means confidential City information, including Personally Identifiable Information, protected health information, or individual financial information (collectively, "Proprietary or Confidential Information") that is subject to local, state, or federal laws restricting the use and disclosure of such information. These laws include, but are not limited to, Article 1, Section 1 of the California Constitution; the California Information Practices Act/California Consumer Privacy Act (Civil Code § 1798 et seq.); the California Confidentiality of Medical Information Act (Civil Code § 56 et seq.); the federal Gramm-Leach-Bliley Act (15 U.S.C. §§ 6801(b) and 6805(b)(2)); the privacy and information security aspects of the Administrative Simplification provisions of the federal Health Insurance Portability and Accountability Act (45 CFR Part 160 and Subparts A, C, and E of part 164); and San Francisco Administrative Code Chapter 12M (Chapter 12M). Confidential Information includes City Data.

30.   **"Content Management System"** means the SaaS Application and Sub-Element of the System Software that enables the SFMTA to format Customer Information presented to the public through the Next Generation System. The requirements of the Content Management System are set forth in Appendix B, Section 2.2.3.

31.   "**Contract Administrator**" means the individual who the SFMTA assigns to administer this Agreement, or his or her designated agent.

32.   "**Contractor**" means Cubic Transportation Systems, Inc., 5650 Kearny Mesa Road, San Diego, CA 92111.

33.   **"Contractor Licensed Materials"** means the System Software sub-elements developed solely by Contractor including Customer Information and System Administration Tool, but excluding the Content Management System, to be integrated with other Elements of the Next Generation System for operational purposes.

34.   "**Contractor Project Manager**" means the individual specified by Contractor pursuant to Section 3.3.5 of the Agreement, as the Project Manager authorized to administer this Agreement on Contractor's behalf.

35.   "**Contractor's Website**" means the website(s) that provide(s) Authorized Users access to the City Portal and SaaS Applications.

36.   **"Customer Information"** means the Sub-Element of the System Software that includes real-time geographic and other information about the SFMTA's transit vehicles, and travel information to help customers plan their trips and use transit efficiently. Customer Information is described in Appendix B, Section 2.2.1.

37.   **"Customer-Facing Interfaces"** means the interfaces viewable by SFMTA customers that are capable of displaying Customer Information. Customer-Facing Interfaces include Stationary Digital Signs, On-Board Digital Signs, and the Mobile Platform & Website.

38.   "**Data Breach**" means any access, destruction, loss, theft, use, modification or disclosure of City Data by an unauthorized party or that is in violation of the Agreement terms and/or applicable local, state or federal law.

39.   "**Data Center(s)**" means a physical location within the United States where Contractor (or its subcontractor) houses and operates the hardware (including computer servers, routers, and other related equipment) on which Contractor hosts on the Internet the SaaS Application and City Data pursuant to this Agreement.

40. "**Day**" (whether or not capitalized) means a calendar day, unless otherwise indicated.

41. "**Delay Communications**" means an automated alert and/or other Customer Information that notifies customers of a perceived delay in their expected travel or waiting times.

42. "**Deliverables**" means Contractor's work product that results from the Contractor provides under this Agreement to the SFMTA. Deliverables include work product expressly identified as "Deliverables" in the contract documents, including Appendices B, C, and D.

43. "**Disabling Code**" means computer instructions or programs, subroutines, code, instructions, data or functions (e.g., viruses, worms, date bombs or time bombs)—including other programs, data storage, computer libraries, and programs that self-replicate without manual intervention, instructions programmed to activate at a predetermined time or upon a specified event, and/or programs purporting to do a meaningful function but designed for a different function—which alter, destroy, inhibit, damage, interrupt, interfere with, or hinder the operation of the City's access to the SaaS Applications and SaaS Services through the Contractor's Website and/or Authorized User's processing environment, the system in which it resides, or any other software or data on such system or any other system with which it is capable of communicating.

44. "**Disaster Recovery Plan**" means Contractor's set of policies, tools, and procedures to enable the recovery or continuation of the Next Generation System's technology infrastructure and systems following a natural or human-induced disaster.

45. "**Documentation**" means technical publications provided by Contractor to City relating to the Next Generation System and use of the SaaS Applications, such as reference, administrative, maintenance, and programmer manuals.

46. "**Effective Date**" means the date on which the SFMTA issues the Notice to Proceed, as provided in Section 2.4 of the Agreement.

47. "**Element**" means one of five main components of the Next Generation System, including the System Software, Stationary Digital Signs, On-Board Digital Sign Software, Mobile Platform & Website, and Analytics Platform.

48. "**End User**" means any Authorized User who accesses the Contractor's Website and uses the SaaS Application and Services.

49. "**Equipment**" means any hardware and other equipment Contractor furnishes and installs as part of the Next Generation System.

50. "**Excess Power**" means the power drawn by the Type 1 Stationary Digital Signs, furnished and installed under this Agreement, that is above the existing power envelope for the Existing System's Type 1 LED signs of 55 Watts.

51. "**Existing System Sign Locations**" means stations, stops, or other locations with stationary digital signs furnished as part of the Existing System, as well as signs installed in stations of the Central Subway.

52. "**Existing System**" means the SFMTA's existing customer information system provided by NextBus.

53. "**Fare Revenue**" means the annual SFMTA revenue for fixed-route passenger transit fares for the preceding fiscal year, as officially published by the SFMTA.

54. "**Final Mobilization Plan**" means the Deliverable that indicates how Contractor will mobilize personnel, Subcontractors, Equipment, materials, and supplies to develop the SaaS Applications and install the Equipment and hardware for the Next Generation System.

55. **"Final Schedule"** means the baseline project schedule that is based on the Preliminary Schedule and shows when Contractor will achieve the tasks, subtasks, Deliverables, milestones, and completion dates required to complete Phase I and Phase II.

56. **"First Optional Extended Warranty"** means the warranty for each Stationary Digital Sign that applies only if the SFMTA exercises its first option to extend the term of this Agreement to ten years. For each sign, the First Option Extended Warranty covers the beginning of the 6th year to the end of the 10th year, following Initial Deployment of the sign.

57. **"General Prediction Accuracy Rate"** has the meaning set forth in No. 1.3 of Appendix F, Table F-1.

58. **"General Transit Feed Specification"** or **"GTFS"** means a common format for public transportation schedules and associated geographic information. There are different GTFS specifications for static and real-time information

59. **"Ghost Bus"** or **"Ghost Train"** means an instance wherein a Customer-Facing Interface displays Customer Information (i.e., Vehicle-Arrival Prediction) for a transit vehicle that never arrives.

60. **"Ghost Bus/Train Incidence Rate"** has the meaning set forth in No. 1.5 of Appendix F, Table F-1.

61. **"Global Positioning System"** or **"GPS"** means a global navigation satellite system that provides geolocation and time information to a GPS receiver.

62. **"Guiding Principles for Management of Transportation Services and Technologies"** means the policy framework approved by the SFMTA and San Francisco County Transportation Authority to evaluate new mobility services to inform decisions, policies and actions regarding Emerging Mobility Services and Technologies.

63. **"Incident"** means any problem or issue with any Element of the Next Generation System. Incidents fall into four severity levels, as described in Appendix C, Table C-1

64. **"Incident Response Rate"** has the meaning set forth in No. 6.1 of Appendix F, Table F-1.

65. "**Incident Severity Level**" means a designation of the effect of an Incident on the Next Generation System, SFMTA customers, and the City. The severity level of an Incident is initially defined by the SFMTA and confirmed by Contractor. Until the Incident has been resolved, the Incident Severity Level may be raised or lowered based on Contractor's analysis of impact to business.

66. **"Incident Ticketing and Tracking Log"** means Contractor-provided electronic log that records the time, location and nature of maintenance-related incidents, as described in more detail in Appendix C, Section 1.3.

67. **"Incident"** means a problem with the Next Generation System identified by the City or Contractor, or self-identified by the Next Generation System, and that requires a response by Contractor to resolve.

68. **"Initial Deployment"** means the SFMTA's initial activation of any Element or Sub-Element of the Next Generation System into production.

69. "**Initial Warranty**" means the warranty for each Stationary Digital Sign that covers the period from Initial Deployment to the end of the 5th year following Initial Deployment for each sign.

70. **"Integrated Vehicle Unit"** means the OrbCAD on-board central computer that provides in-vehicle Computer-Aided Dispatch functionality, controls audio announcements, manages exterior sign displays and performs other functions for the vehicle.

71. **"Interface Control Document"** is a document that describes the interface(s) to a system or subsystem.

72. "**Internet**" means the global network of computers and devices commonly referred to as the "internet," including the World Wide Web.

73. "**Job Assignment**" means associating a transit vehicle with a Vehicle Block and/or run number.

74. "**Leader**" means the Transit Operator of the vehicle of an immediately preceding trip along the same transit route.

75. **"Legacy Sign"** means any stationary digital sign installed and in operation at Existing System Sign Locations before Notice to Proceed.

76. **"Light Emitting Diode"** or **"LED"** means a digital technology that is capable of displaying text.

77. "**Linked Trip**" means an end-to-end journey that involves one or more modes of transportation (e.g., someone driving to BART in an outlying county, taking BART to the Powell Street Station, transferring to a Muni K Ingleside train, and then walking a block to her destination.)

78. "**Liquidated Damages**" means the damages, the amounts of which the Parties mutually designated during the negotiation of this Agreement, for the SFMTA, as the injured Party, to collect from Contractor for Contractor's breach of certain Performance Requirements specified in Appendix G.

79. **"Liquid Crystal Display"** or **"LCD"** means a digital technology that is capable of displaying text and graphics.

80. "**Local Business Enterprise**" or "**LBE**" means a business whose primary place of operations is a fixed office in San Francisco at which location the business conducts, on a regular basis, all of its services, other than work required to be performed at a job site.

81. "**Loop Job**" means an unscheduled, pre-configured work assignment in which a transit vehicle operates over a portion of the route using an existing route pattern.

82. "**Mandatory City Requirements**" means those City laws set forth in the San Francisco Municipal Code, including the duly authorized rules, regulations, and guidelines implementing such laws, which impose specific duties and obligations upon Contractor.

83. "**Mobile Platform & Website**" means the Element of the Next Generation System that includes the Trip Planner.

84. **"Mobile Ticketing Application"** means a Contractor-provided application that enables customers to purchase Muni fare products.

85. "**MuniMobile**" means the SFMTA's mobile application that currently offers mobile ticketing and also includes trip-planning functionality and Vehicle-Arrival Predictions embedded from third-party sites.

86. **"Nearby Vehicles"** means in-service transit vehicles that are within close proximity of a customer's location.

87. "**Next Generation System**" means the Next Generation Customer Information System.

88. "**Not Out**" means a transit vehicle taken out of service by the SFMTA or is not able to assign a Transit Operator to a work shift (Run).

89. "**Notice to Proceed**" means a letter from the SFMTA to Contractor stating the date Contractor can begin work. Notice to Proceed marks the beginning of Phase I and commencement of the term of this Agreement or commencement of a Task Order, as applicable.

90. **"Offline Customer Information"** means Customer Information the Next Generation System generates and automatically displays if the System Software cannot generate or transmit real-time Customer Information because of either external or internal disruptions.

91. "**On-Board Digital Signs**" means a type of Customer-Facing Interface located onboard the SFMTA's transit vehicles.

92. "**On-Board Digital Sign Software**" means the Element of the Next Generation System consisting of software capable of displaying Customer Information, either generated by the Next Generation System or onboard the vehicle, on On-Board Digital Signs. Contractor's responsibilities with respect to On-Board Digital Sign Software are described in Appendix B, Section 4.

93. "**Open Application Programming Interface**" or "**Open API**" means an interface designed to be easily accessible by the wider population of Web and mobile developers. This means an Open API may be used both by developers inside the organization that published the API or by any developers outside that organization who wish to register for access to the interface.

94. "**Open Source Software**" means software with either freely obtainable source code, a license for modification, or permission for free distribution.

95. **"Operating Division"** means an SFMTA facility where transit vehicle storage and maintenance occurs.

96. "**Operating Hours**" means 24 hours, 7 days per week.

97. **"Overestimated Vehicle-Arrival Prediction"** means an inaccurate Vehicle-Arrival Prediction for which the corresponding transit vehicle arrives earlier than the predicted time at the corresponding Transit Stop in an amount of time that exceeds thresholds defined in No. 1.6 of Appendix F, Table F-1.

98. **"Overestimated Vehicle-Arrival Predictions Rate"** has the meaning set forth in No. 1.6 of Appendix F, Table F-1.

99. "**Party**" and "**Parties**" mean the City and Contractor, either collectively or individually.

100. **"Performance Credit"** means credit due to City by Contractor for Contractor's failure to meet Performance Requirements in Appendix F in an amount determined in Appendix G.

101. **"Performance Requirements"** means the metrics and milestones Contractor must achieve relating to the delivery and operation of the Next Generation System, as described in Appendix F.

102. "**Personally Identifiable Information (PII)**" means any information about an individual, including information that can be used to distinguish or trace an individual's identity, such as name, social security number, date and place of birth, mother's maiden name, or biometric records; and any other information that is linked to an individual, such as medical, educational, financial, and employment information.

103. "**Phase I**" means the period of time, under the term of this Agreement, during which Contractor must deploy the System Software, replace all Legacy Signs with Stationary Digital Signs for the Next Generation System, and install Stationary Digital Signs at Central Subway stations.

104. "**Phase II**" means the period of time, under the term of this Agreement, during which Contractor must complete enhancements following the completion of Phase I.

105. "**Platform Audio Visual Sign**" or "**PAV**" means existing LED signs that are located at underground Muni Metro stations. These display Vehicle-Arrival Times for arriving transit vehicles.

106. "**Precedence**" means that, notwithstanding the terms of any other document executed by the Parties as a part of this Agreement, the terms of this Agreement shall control over any discrepancy, inconsistency, gap, ambiguity, or conflicting terms set forth in any other Contractor pre-printed document.

107. "**Preliminary Schedule**" means the project schedule included in Appendix H, that shows the tasks, subtasks, Deliverables, milestones, and completion dates required to complete Phase I and Phase II. The Preliminary Schedule is the basis for the Final Schedule.

108. "**Private Application Programing Interface**" or "**Private API**" means an interface that opens parts of an organization's back-end data and application functionality for use by developers working within (or contractors working for) that organization.

109. "**Production Environment**" means the real-time setting where users may utilize the SaaS Software, and includes the processes, data, hardware, and software needed to perform day-to-day operations.

110. "**Project Data**" means data that is first produced in the performance of this Agreement.

111. "**Proposal**" means Contractor's proposal, dated March 1, 2019, which Contractor submitted to the SFMTA in response to the Request for Proposals.

112. "**Purchase Order**" means the written order issued by the City to the Contractor authorizing the Effective Date of the Agreement or Task Order.

113. "**Quality Assurance/Quality Control Plan**" means the Deliverable that describes Contractor's testing procedures, including the development of prototypes, for implementation of the Next Generation System. The Quality Assurance/Quality Control Plan is described further in Appendix B, Section 1.3.2.

114. "**Reference Information**" means the information provided in Appendix J. See Section 1.3 of this Agreement for certain disclaimers regarding Reference Information.

115. "**Replacement PAV Signs**" means signs Contractor provides to replace existing Platform Audio Visual signs as an option exercisable by the SFMTA.

116. "**Reporting Period**" means every six months from the date Contractor completes Phase I, unless the timing is otherwise modified by the SFMTA and Contractor.

117. "**Request for Proposals**" or "**RFP**" means the Request for Proposal for the Next Generation Customer Information System, RFP No. SFMTA-2019-1, dated September 6, 2018.

118. "**Resolution Time**" means the time elapsed between when an Incident is communicated to the Contractor's designated personnel, irrespective of whether said personnel acknowledges receipt of the message, and when said Incident is resolved via a permanent fix or via a workaround or SaaS Software Patch.

119. "**Revenue Service**" means a transit vehicle traveling along its route capable of picking up and dropping off customers.

120. "**Root Cause Analysis and Recommendation Report**" has the meaning given in Appendix C, Section 1.2.5.

121. "**Run**" means a work shift for a Transit Operator for one day. On any given day, a run number is associated with a specific Transit Operator.

122. "**SaaS Applications**" means the Customer Information, System Administration Tool, Content Management System, Trip Planner, Mobile Ticketing Services (if the SFMTA

exercises this option), and Analytics Platform (each a "SaaS Application"), including their associated Documentation, that Contractor licenses to City and hosts on Contractor's servers or on cloud infrastructure, and that provide the SaaS Services that may be accessed by Authorized Users through the Internet.

123. **"SaaS Software Patch"** means an update to any SaaS Application comprised of code inserted (or patched) into the code of the SaaS Application, and which may be installed as a temporary fix between full releases of a SaaS Application Revision or SaaS Application Version. Such a patch may address a variety of issues, including fixing a software bug, installing new drivers, addressing new security vulnerabilities, addressing software stability issues, and upgrading the software. SaaS Software Patches are included in the payments made by City to Contractor for the SaaS Services under this Agreement

124. "**SaaS Application Revision**" means an update to any current SaaS Application Version of the SaaS Application code that consists of minor enhancements to existing features and code corrections.

125. "**SaaS Application Version**" means the base or core version of any SaaS Application that contains significant new features and significant fixes and is available to the City. SaaS Application Versions may occur as the architecture of a SaaS Application changes or as new technologies are developed. The nomenclature used for updates and upgrades consists of major, minor, build, and fix and these correspond to the following digit locations of a release: a, b, c, d. An example would be NCC 7.4.1.3, where the 7 refers to the major release, the 4 refers to the minor release, the 1 refers to the build, and the 3 refers to a fix.

126. "**SaaS Maintenance Services**" means the activities to investigate, resolve issues with the SaaS Applications and SaaS Services, and correct product bugs arising from the use of the SaaS Applications and SaaS Services in a manner consistent with the published specifications and functional requirements defined during implementation.

127. "**SaaS Services**" means the Services Contractor performs to host the SaaS Applications to provide the functionality described in the Documentation.

128. "**San Francisco Municipal Railway**" or "**Muni**" means the backbone of the City and County of San Francisco's transportation network, providing over 700,000 average weekday trips with a fleet of electric trolley coaches, motor coaches, light rail vehicles, historic streetcars, and cable cars.

129. "**San Francisco Municipal Transportation Agency,**" "**SFMTA,**" or "**Agency**" means the agency of City with jurisdiction over all surface transportation in San Francisco, as provided under Article VIIIA of the City's Charter.

130. "**Scheduled Downtime**" means the time when any SaaS Application or the SaaS Services are not operational for pre-scheduled maintenance or upgrades as approved by the SFMTA.

131. "**Scheduled Maintenance**" means the time during the month, as measured by Contractor, in which access to any SaaS Application or the SaaS Services is scheduled to be unavailable for use by the City due to planned system maintenance and major version upgrades.

132. "**Scheduled Operating Hours**" means Operating Hours less Scheduled Downtime.

133. "**Second Optional Extended Warranty**" means the warranty for each Stationary Digital Sign that applies only if the SFMTA exercises its second option to extend the term of this Agreement to 16 years. For each sign, the Second Optional Extended Warranty covers the beginning of the 11th year to the end of the 15th year, following Initial Deployment of the sign.

134. **"Service-Change Alerts"** are a category of Customer Information defined in Appendix B, Section 2.2.1.1.9.

135. "**Services**" means the work performed by Contractor under this Agreement as specifically described in Appendices B, C, and D, including all services, labor, supervision, materials, equipment, actions and other requirements to be performed and furnished by Contractor under this Agreement.

136. "**SFMTA Program Manager**" means the individual specified by the SFMTA pursuant to Section 3.3 of this Agreement, as the Program Manager authorized to administer this Agreement on the City's behalf.

137. "**Software**" means the SaaS Applications and Contractor-provided Third-Party Software. All Software, revisions and versions provided by Contractor shall be subject to the terms and conditions of this Agreement, including any amendments thereto.

138. "**Spare Ratio**" means the amount of spare Equipment available divided by the Equipment required to provide full service.

139. "**Stationary Digital Signs**" means the Element of the Next Generation System that consists of multiple types of physical Customer-Facing Interfaces located at underground rail stations, above-ground rail platforms and rail and bus stops, including Transit Stops with shelters lacking electrical power and those without shelters at all. Stationary Digital Signs are described further in Appendix B, Section 3.

140. "**Stationary Digital Sign Availability Rate**" has the meaning set forth in No. 2.1 of Appendix F, Table F-1.

141. "**Stationary Digital Signs Transition Milestone**" means the date by which Contractor must have installed Stationary Digital Signs that display Customer Information at Existing System Sign Locations. The Stationary Digital Signs Transition Milestone is set forth in Section 2.5.4 of this Agreement.

142. "**Stationary Digital Sign Scheduled Downtime Rate**" has the meaning set forth in No. 2.4 of Appendix F, Table F-1.

143. "**Stop ID**" means a unique number associated with each SFMTA Transit Stop or station.

144. **"Subcontractor"** means any person or entity who has a direct contract with Contractor to perform a portion of the Services.

145. "**Sub-Element**" means any component of any Element. For example, Customer Information, the System Administration Tool, and the Content Management System are Sub-Elements of the System Software.

146. "**Successor Service Provider**" means a new service provider, if any, selected by City if the SaaS Services are terminated under this Agreement.

147. "**Switchbacks**" means transit trips that do not travel the full length of their scheduled route and turn around early. Switchbacks are a category of Customer Information described in Appendix B, Section 2.2.1.1.11.

148. "**System Administration Tool**" means the SaaS Application and Sub-Element of the System Software that Authorized Users utilize to manage, configure, and interface with the Next Generation System and its Elements. The System Administration Tool and its requirements are described in Appendix B, Section 2.2.2.

149. "**System Design Document**" means the living document that describes the architecture, technical solution and functionality to satisfy the scope of Services. The document

is maintained and released in accordance with requirements set forth in <u>Appendix B, Section 1.3.1</u> and is subject to SFMTA approval.

150. "**System Implementation Services**" means the Services Contractor must provide under this Agreement to implement, and train Authorized Users to use, the Next Generation System. The System Implementation Services are described in <u>Appendix B</u>.

151. "**System Software**" means the Element of the Next Generation System that consists of the Sub-Elements Customer Information, the System Administration Tool, and Content Management System. The System Software is described in <u>Appendix B, Section 2.</u>

152. "**System Software Availability Rate**" has the meaning set forth in No. 1.1 of <u>Appendix F, Table F-1</u>.

153. "**System Software Scheduled Downtime Rate**" has the meaning set forth in No. 1.2 of <u>Appendix F, Table F-1</u>.

154. "**System Software Transition Milestone**" means the date by which stationary digital signs at all Existing System Sign Locations must display Customer Information generated by the Next Generation System. The stationary digital signs may be from either the Existing System or Next Generation System. The System Software Transition Milestone is set forth in <u>Section 2.5.4(b)</u> of this Agreement.

155. "**Terminal Departure Prediction Accuracy Rate**" has the meaning set forth in No. 1.4 of <u>Appendix F, Table F-1</u>.

156. "**Terminal Departure Predictions**" are a category of Customer Information defined in <u>Appendix B, Section 2.2.1.1.2</u>.

157. "**Temporary Service Change**" means a short-term change, realized by real-time updates within OrbCAD, to a previously scheduled service, including route changes (detours), switchbacks, changes to Transit Stop locations, cancellations/suspensions and vehicle substitutions.

158. "**Test Environment**" means the collection of defined hardware and software components with appropriate configuration settings that are necessary to test or validate the application or features under test. Test Environment configuration must be functionally equivalent to the Production Environment in order to uncover any environment/configuration-related issues.

159. "**Third-Party Software**" means the software described in <u>Appendix D</u>, "Third-Party Software-Included in this Agreement."

160. "**Timed Transfer Connection**" means a Transfer Connection where vehicles on two or more routes are scheduled to converge simultaneously and wait for sufficient time for customers to make their transfers.

161. "**Timed Transfer Connections Predictions**" are a category of Customer Information defined in <u>Appendix B, Section 2.2.1.1.4</u>.

162. "**Training Plan**" means a document describing Contractor's approach to training SFMTA staff to use the Next Generation System. The requirements for the Training Plan are set forth in <u>Appendix B, Section 1.3.3</u>.

163. "**Transfer Connection**" means an SFMTA-identified Transit Stop location where customers can conveniently change to interconnecting transit services provided by SFMTA or other Transit Providers.

164. "**Transfer Connections Predictions**" means the predicted departure time for the connecting vehicle at a designated Transfer Connection location.

165. **"Transfer Prediction Accuracy Rate"** has the meaning set forth in No. 3.1 of Appendix F, Table F-1.

166. **"Transit Provider"** means an agency providing a transit service, such as Golden Gate Transit, SamTrans or BART.

167. **"Transit Stop"** means the stop or station on a transit route where vehicles stop to allow customers to board and alight.

168. "**Transit Operator**" means a person who, under general supervision, operates a variety of transit vehicles such as diesel and electric coaches, cable cars, streetcars and light rail vehicles.

169. "**Transition Period**" means the period of time from Notice to Proceed to the end of Phase I.

170. "**Transition Services**" means that assistance reasonably requested by City to effect the orderly transition of the SaaS Services, in whole or in part, to City or to a Successor Service Provider.

171. "**Transportation Controller**" means a person who, under the direction of the Transportation Operations Specialist, monitors bus, trolley, surface light rail and subway transit operations using console equipment and field devices which control, monitor, evaluate performance, provide public information, and related functions in the transportation network for the Transportation Management Center (TMC) and processes and synthesizes the integration of measurable traffic and transportation evaluation data (e.g. traffic volume, queue lengths, average delay, headways, weather, etc.) gathered from multiple data collections systems

172. "**Transportation Management Center**" or "**TMC**" means the SFMTA's facility currently located at 1455 Market Street in which controllers are able to monitor and manage service.

173. **"Trip Itineraries"** are a category of Customer Information defined in Appendix B, Section 2.2.1.1.7.

174. "**Trip Planner**" means the SaaS Application that SFMTA customers utilize to find the optimal route or itinerary to travel between two or more locations, sometimes using more than one mode of transportation. The requirements for the Trip Planner are set forth in Appendix B, Section 5.2.2.

175. "**Trip Planner Availability Rate**" has the meaning set forth in No. 4.1 of Appendix F, Table F-1.

176. "**Trip Planner Efficiency Rate**" has the meaning set forth in No. 4.2 of Appendix F, Table F-1.

177. "**Trip Planner Efficiency Rate – Accessible Itineraries**" has the meaning set forth in No. 4.3 of Appendix F, Table F-1.

178. **"Type-1 Sign"** means any type of Stationary Digital Sign installed at shelters and described in Appendix B, Section 3.2.2.

179. **"Type-2 Sign"** means any type of Stationary Digital Sign installed in outdoor stations and described in Appendix B, Section 3.2.3.

180. **"Type-3 Sign"** means any type of Stationary Digital Sign installed in underground station locations, and described in Appendix B, Section 3.2.4.

181. **"Type-4 Sign"** means any type of Stationary Digital Sign installed at locations without power that incorporates its own sustainable power source (such as solar power), and described in Appendix B, Section 3.2.5.

182. **"Updates"** means new versions of Contractor's System Software firmware and software made available by Contractor to its existing customers that contain bug fixes and/or minor enhancements or improvements, but do not contain significant new features. Updates are generally designated by a change in the version number to the right of the decimal point (e.g., Version 1.1 to Version 1.2).

183. "**Vehicle Block**" means the schedule of travel of a transit vehicle for a given day, including: (1) a pull-out from an Operating Division, (2) Revenue Service trips, (3) any deadhead trips, and (4) a pull-in back to the Operating Division.

184. **"Vehicle-Arrival Prediction Range"** means the time range for the relevant arrival prediction band within which a Vehicle-Arrival prediction is considered accurate, as set forth in No. 1.3 of Appendix F, Table F-1.

185. **"Vehicle-Arrival Predictions"** are a category of Customer Information defined in Appendix B, Section 2.2.1.1.1.

186. **"Vehicle-Generated Customer Information"** means information generated on-board a transit vehicle related to operations (e.g., geolocation, stop request, accessible stop request), and described in Appendix B, Section 4.

187. "**Vendor**" means any contractor providing services or products under a contract with the SFMTA.

Appendix B
SYSTEM IMPLEMENTATION SERVICES

This Appendix B sets forth the Services Contractor must provide under this Agreement to implement, and train Authorized Users to use the Next Generation System (System Implementation Services). Contractor must use industry-proven solutions and current technologies, and must furnish all Equipment, Software, Documentation, and warranties required to provide the System Implementation Services.

The System Implementation Services are described in this Appendix B, and include general requirements and specific requirements with respect to each of the five Elements, including the System Software, Stationary Digital Signs, On-Board Digital Sign Software, Mobile Platform & Website, and Analytics Platform. For these general requirements and each Element, this Appendix B sets forth their respective Deliverables and Functional Requirements, and cross references their respective Performance Requirements in Appendix F.

See Appendix G for descriptions of Liquidated Damages the SFMTA may assess Contractor for failure of Contractor or the Next Generation System to achieve certain Performance Requirements.

Certain existing conditions of the Existing System are included, for Contractor's convenience only, in the Reference Information in Appendix J.

This Appendix B describes certain optional services and Equipment that Contractor must provide but only if the SFMTA excercises the corresponding option(s) described and priced in Appendix E. Those optional services and Equipment are distinguished from Contractor's base scope of Services in the Appendix B by the designation "option"or "optional." The SFMTA may exercise such options in accordance with Section 3.1.4 of the Agreement.

1 GENERAL REQUIREMENTS

The sections below set forth the general requirements that apply to the Next Generation System in general.

1.1 Basis for Next Generation System Solution

The Parties acknowledge that the Conceptual Design Document, which includes the Conceptual System Architecture shown in Figure B-1, below, describes at a high level Contractor's solution and approach to meet the requirements in Appendices B, C, and D, and will be used as the basis for the System Design Document. In the event of any conflicts between the Conceptual Design Document, including Figure B-1, and the requirements in Appendices B, C, and D, the requirements in Appendices B, C, and D shall prevail. Contractor shall receive no subsequent adjustment in price to comply with these requirements.

Figure B-1 Conceptual System Architecture
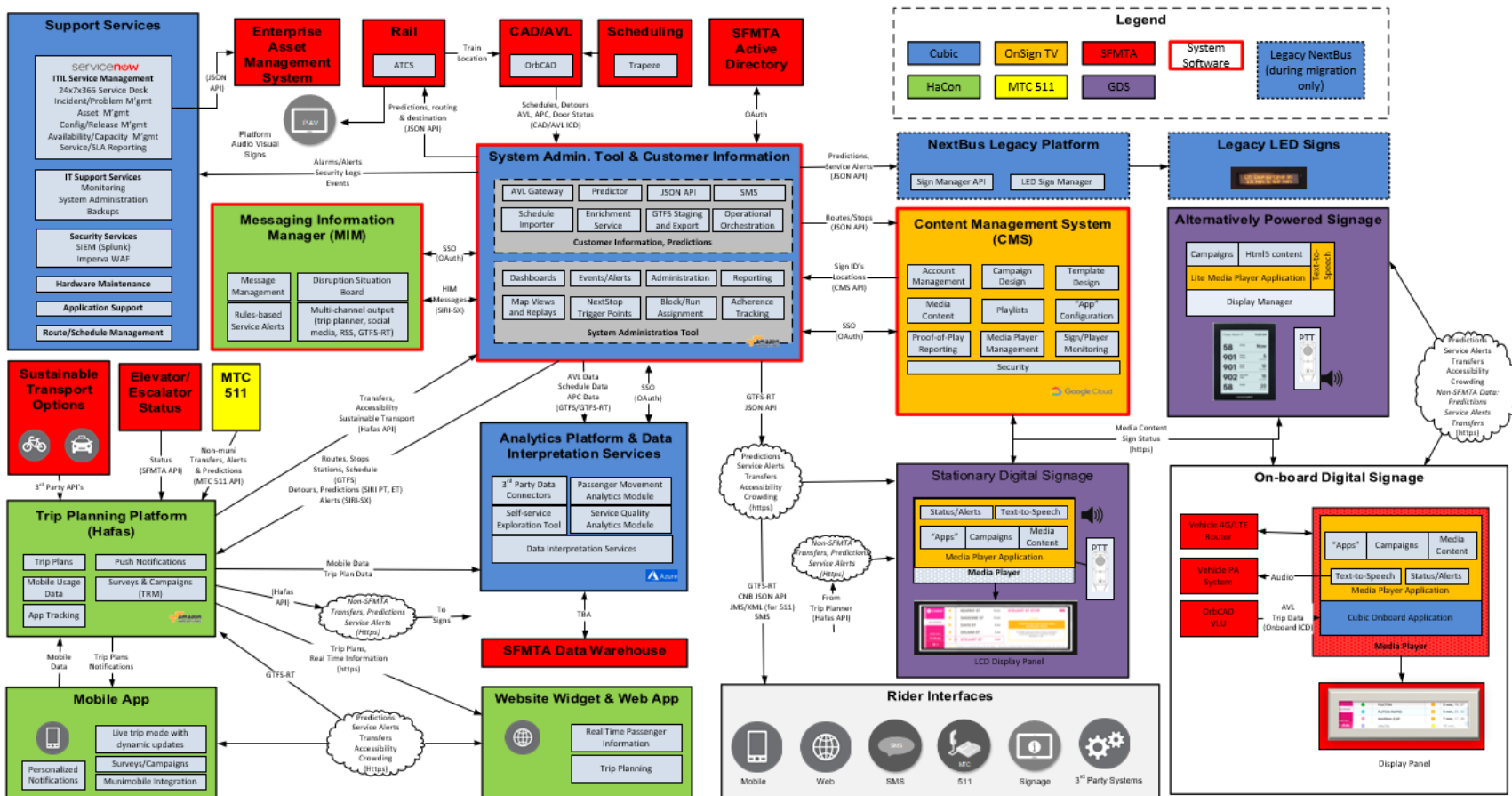
1.2 Deliverables

Contractor must prepare and submit to the SFMTA the following Deliverables as part of the general requirements for the System Implementation Services:

    (a)   Project Planning Deliverables;

        (i)   System Design Document;

        (ii)   Quality Assurance/Quality Control Plan;

        (iii)   Training Plan;

        (iv)   Disaster Recovery Plan;

        (v)   Final Schedule; and

        (vi)   Final Mobilization Plan.

    (b)   List of Vendors with whose systems or products Contractor expects to integrate the Next Generation System;

    (c)   Test Environment; and

    (d)   Documentation.

The timing and other requirements for these Deliverables are set forth in the sections below.

1.3 Project Planning Deliverables

The following Project Planning Deliverables are due to the SFMTA within 90 days of Notice to Proceed. The SFMTA must approve each Deliverable.

1.3.1 System Design Document

    (a)   Contractor must submit to the SFMTA the System Design Document describing the Phase I functionality and solution design no later than 90 days after Notice to Proceed. Contractor must submit to the SFMTA the System Design Document describing the Phase II functionality and solution design no later than 90 days prior to the Stationary Digital Sign Transition milestone. Upon receipt, the SFMTA will review the System Design Document within 30 days. Contractor will coordinate with the SFMTA to incorporate review comments and obtain the SFMTA's approval of this Deliverable within 30 days after initial submission. The Parties acknowledge the System Design Document may differ substantially, but will be based upon, the Conceptual Design Document that was submitted as part of Contractor's RFP response.

    (b)   The System Design Document must describe, in technical detail, how Contractor will meet the requirements set forth in Appendices B, C, and D and in accordance with the Final Schedule.

    (c)   The System Design Document must identify any software and hardware customization to Contractor's base product in order to meet applicable requirements in Appendices B, C, and D. The SFMTA will work with Contractor to prioritize these customizations.

    (d)   The SFMTA and Contractor will jointly review the System Design Document at least once every three years during the term of the Agreement, or more often if either Party

deems necessary, to determine if changes to the Next Generation System are required. Contractor must update the System Design Document during the term of the Agreement to reflect any changes in features, design, engineering, testing, and implementation of the Next Generation System within 10 business days.

(e)   Contractor must seek and receive SFMTA approval for any changes to the Next Generation System.

1.3.2 Quality Assurance/Quality Control Plan

Contractor must submit to the SFMTA the final Quality Assurance/Quality Control Plan no later than 90 days after Notice to Proceed. The Quality Assurance/Quality Control Plan must describe Contractor's testing procedures to implement the Elements of the Next Generation System, including the development of prototypes and acceptance of signs (Section 3.2.1.1).

1.3.3 Training Plan

Contractor must submit to the SFMTA the Training Plan no later than 90 days after Notice to Proceed. The Training Plan must identify the duration, content and timeline of training necessary for all relevant SFMTA staff such that they can utilize the Next Generation System based on their roles.

1.3.4 Disaster Recovery Plan

Contrator must submit to the SFMTA the Disaster Recovery Plan no later than 90 days after Notice to Proceed. The Disaster Recovery Plan must describe Contractor's set of policies, tools, and procedures to enable the recovery or continuation of the Next Generation System's technology infrastructure and systems following a natural or human-induced disaster.

1.3.5 Final Schedule

Contractor must submit to the SFMTA the Final Schedule no later than 90 days after Notice to Proceed. SFMTA will review the Final Schedule within 10 business days. Contractor will coordinate with the SFMTA to incorporate review comments and obtain the SFMTA's approval of this Deliverable within 15 business days after initial submission to the SFMTA. The Final Schedule must be based on the Preliminary Schedule submitted as part of Contractor's RFP response, and must include the information described below.

1.3.5.1 Narrative

Include a schedule narrative that, at minimum, describes Contractor's approach to completing the following tasks:

(a)   Phase I Tasks

(i)   Identify System Software customizations to meet SFMTA requirements;

(ii)   Integrate Contractor's System Software with other third-party systems (e.g., OrbCAD, ATCS);

(iii)   Coordinate with the Vendor of the Existing System to transmit and display Customer Information on Legacy Signs during the Transition Period;

(iv)   Implement System Software;

(v)   Train Authorized Users on System Software;

(vi) Replace all Legacy Signs;

(vii) Provide Customer Information on Mobile Platform & Website; and

(viii) Install new Stationary Digital Signs at Central Subway stations prior to their opening. Currently, the Central Subway is slated for opening in June 2021.

(b) Phase II Tasks

(i) Install Stationary Digital Signs in locations where there are no signs;

(ii) Implement enhancements to System Software; and

(iii) Implement enhancements to Mobile Platform & Website.

1.3.5.2 Gantt Chart

Include a schedule in a Gantt chart showing the tasks, Deliverables, milestones, and completion dates required to complete Phase I and Phase II. This Gantt chart should include dependencies and critical paths.

1.3.5.3 Detailed Task List

Include a detailed task list with scheduled dates for each. The Parties will work together to determine how to present this information.

1.3.6 Final Mobilization Plan

Contractor must submit to the SFMTA the Final Mobilization Plan no later than 90 days after Notice to Proceed. The Final Mobilization Plan must describe how Contractor will mobilize personnel, subcontractors, Equipment, materials, and supplies for software development and hardware installation. Identify locations where personnel, subcontractors, equipment, materials, and supplies will be based.

1.4 Coordination/Integration with Vendors and Other Third Parties and their Systems

(a) The SFMTA has existing contracts with Vendors and relationships with third parties whose systems or products will require integration with the Next Generation System to function. Table B-1, below, lists some current Vendors and third parties with whose systems or products Contractor may be required to integrate the Next Generation System. This list is not exhaustive, and Contractor may be required to coordinate and integrate with Vendors and third parties not listed, and with new Vendors and third parties added during the term of the Agreement.

(b) Contractor must submit to the SFMTA no later than 90 days after Notice to Proceed Contractor's initial list of Vendors and third parties with whose systems or products Contractor expects to integrate the Next Generation System. Contractor must keep this list current and submit the updated list to the SFMTA when there is a change.

(c) Contractor must coordinate with these Vendors and third parties and integrate the Next Generation System with their systems or products, as necessary to provide the Services.

Contractor must provide written notice to the SFMTA before it initiates contact with each Vendor.

(d)   Contractor must integrate all Vendor and third-party software through documented APIs that adhere to open standards, unless the SFMTA approves otherwise.

(e)   Upon the SFMTA's request, Contractor must discuss and resolve system integration issues with Vendors and third parties, which may include Contractor participating in meetings or developing API and data feed specifications.

(f)   The SFMTA will not modify any of its existing contracts with these Vendors in order for Contractor to provide the Services required in Appendix B.

Table B-1: Existing Vendors and their Systems and Products

System or Product	Vendor
OrbCAD Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL) system including On-Board Vehicle Integrated Vehicle Unit	Conduent
Radio communications system	Harris
Automatic Train Control System	Thales
On-Board Digital Signs, Siemens Light Rail Vehicles	Siemens, Conduent, Televic, Future sign vendor*
On-Board Digital Signs, Rubber Tire Vehicles	New Flyer, BYD, Proterra, Conduent, Future sign Vendor*, Future rubber-tire vehicle vendors*
Platform Audio Visual (PAV) signs	Blocka, Penta, Daktronics
Transit Signal Priority	Global Traffic Technologies
Scheduling Software	Trapeze
Website (www.sfmta.com)	FivePaths
MuniMobile App	Moovel or future MuniMobile App Vendor
Passenger Shelters	Clear Channel
Existing Real-Time Predictions System	NextBus
Salesforce Transit Center	Transbay Joint Powers Authority, Pearl Media, ADS
Central Subway Signs	Daktronics
Transit Stop Poles	Clear Channel, Urban Solar
Regional Wayfinding Mapping	City ID
Video Management System	Genetec

* The SFMTA will determine a future Vendor through a separate procurement.

1.5　Data

See <u>Section 13.1</u> of the Agreement for requirements regarding data and security.

1.6　Security

Contractor must adhere to SFMTA's Technology Security and Information Privacy Charter included in <u>Appendix J</u>.

1.7　Test Environment

Contractor must provide a Test Environment to test all hardware and software before any system Element or upgrade goes live in Revenue Service. Contractor must maintain this Test Environment for the term of this Agreement, in order to test new features and functionality and prepare for service changes. Contractor must grant Authorized Users fully-equivalent functionality to the Production Environment and access to reports and systems management in the Test Environment.   The Test Environment must provide equivalent functionality and performance to the Production Environment and scaled to allow test users to undertake functional testing.

1.8　Documentation

(a)　Contractor must provide written Documentation to the SFMTA for all Elements. Documentation must clearly express purpose, methodology, assumptions, and processes appropriate to the subject matter. Contractor must draft Documentation in order to preserve institutional knowledge with the assumption that different Authorized Users will work on the Next Generation System during the term of the Agreement.

(b)　The Parties will work together to determine the appropriate contents for the Documentation for each Element. Examples include:

(i)　Maintenance manuals for hardware;

(ii)　User interface manuals for Transportation Controllers, customer information officers, system administrators and any other pertinent staff of the Transportation Management Center;

(iii)　Manuals for information technology (IT) system administrators;

(iv)　Interface Control Documents;

(v)　Application Programming Interfaces;

(vi)　Traceability matrices that align business requirements, functional requirements, deliverables, and testing outcomes.

(c)　Contractor must submit Documentation to the SFMTA for its review, modification and approval before Initial Deployment of the corresponding Element. The SFMTA will review the Documentation within 21 days of initial submittal to the SFMTA. Contractor will coordinate with the SFMTA to incorporate review comments and obtain the SFMTA's approval of this Deliverable within 30 days after initial submission.

(d)　Contractor must update Documentation as necessary during the term of the Agreement when, for example, it releases a software patch or modifies a feature on the System Software. When Contractor deploys a software upgrade, it must provide a change log describing the changes since the previous version. For user interface manuals described in (b)(ii) above,

Contractor must provide a red-lined version indicating specific changes since that previous version. Contractor must indicate the version number on each page and maintain a list of the current version of each Element.

2 SYSTEM SOFTWARE

The purpose of the System Software is for Contractor to take from various sources real-time locational and other information about the SFMTA's transit vehicles, and to generate and manage Customer Information that helps customers plan their trips and use transit efficiently. Customer Information includes, but is not limited to, Vehicle-Arrival Predictions, terminal departures, transfers, trip planner itineraries, route alternatives, as described below. The System Software must also provide the interface for Authorized Users to administer the Next Generation System (the System Administration Tool) and configure how the Next Generation System will display Customer Information (Content Management System).

2.1 Deliverables

Contractor must deliver to the SFMTA the following Deliverables in connection with the System Software:

(a) Customer Information;

(b) System Administration Tool; and

(c) Content Management System.

The timing and other requirements for these Deliverables are set forth below.

2.2 Functional Requirements

Contractor must ensure the System Software achieves certain functional requirements as described below. If Phase II Enhancements are ready by the end of Phase I, then Contractor may implement those enhancements early but only if approved in its sole discretion by the SFMTA.

2.2.1 Customer Information

The System Software must generate and transmit Customer Information to Customer-Facing Interfaces within the Next Generation System, as described in Section 2.2.1.1. In general, for Stationary Digital Signs and On-Board Digital Signs, Customer Information must be specific to each sign's geographic location. For the Mobile Application & Website, Customer Information must be specific to the customer's geographic location (see Section 5.2 for details); the Mobile Application & Website must use Customer Information to generate customer-specific predictions, travel itineraries, and other information based on customer queries through the Trip Planner. Contractor must identify for the SFMTA inputs Contractor requires to produce Customer Information and associated privacy implications.

The System Software must provide, through various data feeds, subsets of Customer Information to existing and new systems outside the Next Generation System and third-party trip planning applications, as described in Sections 2.2.1.4 and 2.2.1.5.

The System Software must generate and transmit Customer Information to Legacy Signs, as described in Section 2.2.1.6.

2.2.1.1 Customer Information to Customer-Facing Interfaces within the Next Generation System

The sections below describe the initial categories of Customer Information the System Software must generate and transmit to Customer-Facing Interfaces within the Next Generation System. These initial categories of Customer Information are: (a) Vehicle-Arrival Predictions; (b)

Terminal Departure Predictions; (c) Transfer Connection Predictions; (d) Timed Transfer Connection Predictions; (e) Alternative Routes and Stops; (f) Vehicle Occupancy; (g) Trip Itineraries; (h) Accessibility Information and Accessible Itineraries; (i) Service-Change Alerts; (j) Delay Communications; (k) Switchbacks; (l) Offline Customer Information; and (m) Complementary Sustainable Transportation Options.

For each category of Customer Information, the sections below set forth the timeline by which the generation and transmission of the Customer Information must start (e.g., Phase I or Phase II), the content of the Customer Information generated, and the Customer-Facing Interfaces to which the System Software must transmit the Customer Information. The SFMTA retains the right to add additional categories of Customer Information and their respective requirements.

The System Software must enable Authorized Users to display any Customer Information to any Customer-Facing Interfaces. Through the System Administration Tool, Authorized Users must be able to access the Content Management System or other System Software user interfaces to manage Customer Information.

The System Software must continuously update Customer Information at least every 10 seconds, unless otherwise authorized by the SFMTA.

2.2.1.1.1 Vehicle-Arrival Predictions

Contractor must achieve the following requirements by the end of Phase I, except for requirements relating to On-Board Digital Signs, which Contractor must achieve by the end of Phase II.

(a) Content

Vehicle-Arrival Prediction means a real-time prediction for when a vehicle will arrive at a Transit Stop along a route after the initial Transit Stop (i.e., the starting terminal). The System Software must generate and include with each Vehicle-Arrival Prediction additional data that the SFMTA may use to provide more detailed information about the corresponding vehicle. Vehicle-Arrival Prediction content must include the following information, at minimum:

(i) Route;

(ii) Direction;

(iii) Trip pattern;

(iv) Trip destination;

(v) Vehicle Block number;

(vi) Run number;

(vii) Trip identification number;

(viii) Estimated waiting time until the vehicle's arrival (e.g., 5 minutes) at each Transit Stop;

(ix) Estimated arrival time and date (e.g., 4:35 am, October 11, 2019) at each Transit Stop;

(x) Whether arrival time is based on a prediction or the schedule;

(xi)   Current geolocation of the vehicle on a map;

(xii)   Stop ID;

(xiii)   Other attributes reasonably requested by the SFMTA that are available in System Software databases or third-party data feeds as described in the System Design Document.

(b)   Customer-Facing Interfaces

At all times, the System Software must transmit, at minimum, the following Vehicle-Arrival Prediction content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs – For all transit routes that serve the corresponding Transit Stop, Vehicle-Arrival Predictions and trip destinations for at least the next two, consecutive vehicles arriving at the Transit Stop, and real-time vehicle locations shown on a map of the transit routes. Once a vehicle departs a Transit Stop, the System Software will clear the Vehicle-Arrival Prediction from the sign as soon as it has detected that the vehicle has left the stop.

(ii)   To On-Board Digital Signs – The vehicle's route and final destination; the estimated waiting time until the vehicle's arrival for upcoming Transit Stops, corresponding Vehicle-Arrival Prediction times at major upcoming stops to be determined by SFMTA, and the vehicle's current geolocation on a map.

(iii)   To the Mobile Platform & Website – Vehicle-Arrival Predictions in response to queries customers made through the Trip Planner.

2.2.1.1.2 Terminal Departure Predictions

Contractor must meet the following requirements by the end of Phase I.

(a)   Content

Terminal Departure Predictions content must include all content for Vehicle-Arrival Predictions above for a vehicle departing from the initial Transit Stop of a route.

Factors Contractor must consider when generating Terminal Departure Predictions include:

(i)   Vehicle leaves early – Vehicle leaves terminal prior to the scheduled departure time.

(ii)   Late incoming trips – Vehicle arrives late on the incoming trip, and there is insufficient layover/recovery time for the vehicle to depart the terminal on the next trip on time. Some Transit Operators shorten their layover/recovery time in order to expedite their terminal departure for the next trip. Others may take a longer layover/recovery time, resulting in an even later terminal departure.

(iii)   Deadheading – Vehicle is not in Revenue Service when arriving at terminal, either because it has pulled out from an Operating Division or has come from another trip or route with a different terminal, and then operates in Revenue Service when leaving terminal.

(iv)   Interlining – Vehicle arrives at a terminal on one route, and departs terminal serving a different route, sometimes without layover/recovery time.

(v)   Not outs – Vehicle is missing from the schedule and will not provide service.

(vi)   Service gap – The Transit Operator's "Leader" is missing due to a held run in, a vehicle breakdown or other reasons. In this case, Transportation Controllers at the Transportation Management Center may instruct the Transit Operator to leave ahead of schedule in order to close a gap and maintain consistent spacing.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, Terminal Departure Predictions content to Customer-Facing Interfaces as follows:

(i)   To Stationary Digital Signs – At starting terminals.

(ii)   To On-Board Digital Signs – When the corresponding vehicle is approaching an upcoming transfer point that is also a starting terminal.

(iii)   To Mobile Platform & Website – In response to corresponding queries customers make through the Trip Planner.

2.2.1.1.3 Transfer Connections Predictions

Contractor must meet the following requirements by the end of Phase II.

(a)   Content

Transfer connections refer to physical transfers between two connecting routes. Connecting routes include those provided by the SFMTA and other Transit Providers, including BART, AC Transit, Caltrain, Golden Gate Transit, Golden Gate Ferry, SamTrans, the PresidiGO shuttle, WestCAT, San Francisco Bay Ferry, Amtrak Capitol Corridor connecting buses, and others so long as this information is available via a public feed.

Transfer connections may occur at more than one Transit Stop (e.g., at Forest Hill Station, there are two Transit Stops for surface buses, and two Transit Stops associated with the Muni Metro train platforms), or at the same Transit Stop (e.g., transfers occur between the 28 19th Avenue and 29 Sunset northbound buses at the same stop located at Cross Over Drive and Lincoln Way).

Transfer Connections Predictions must include the following content:

(i)   Route, direction and destination for the connecting vehicles.

(ii)   Estimated time that customers have between when their current vehicle arrives at its Transit Stop and when at least the next two vehicles on their connecting route are estimated to arrive at their respective Transit Stop for a transfer connection. For example, customers are traveling on the L Taraval at 6:55 pm and their vehicle is predicted to arrive at Van Ness station at 7:00 pm. To transfer to the 49 Van Ness-Mission predicted to arrive at 7:05 pm and 7:12 pm at Van Ness & Market, the estimated transfer connection predictions would be

5 and 12 minutes. If real-time estimates are not available for connecting routes, the System Software must transmit scheduled arrival times.

(iii)   Estimated arrival time (e.g., 4:35 am) when the next two vehicles on connecting routes arrive at their respective Transit Stops.

(iv)   Current geolocations of the initial vehicle and vehicles on connecting routes, and their respective Transit Stops, on a map.

(v)   Whether arrival times for connecting vehicles are based on a prediction or the schedule.

The System Software must generate arrival time predictions for connecting vehicles for route pairs where customers can make transfer connections. Given that there may be varying distances between Transit Stops, the System Software must only transmit those arrival times to Customer-Facing Interfaces if there is sufficient time for customers to transfer safely. The System Software must determine minimum connection times for each route pair based on horizontal and vertical (i.e., different levels) distances between their respective Transit Stops, configurable walking speeds and other factors, as appropriate.

The System Administrative Tool must enable Authorized Users to configure a generic walking speed between Transit Stops. The Mobile Platform & Website must enable users to personalize their travel speed and indicate accessibility requirements.

The Parties will determine how to best display information about connecting routes that are not in operation. For example, the System Software may either display no information, or indicate no service is available on the connecting route at that time (e.g., on a weekend, it would indicate no service is available for peak-hour express routes).

Option: As an option exercisable by the SFMTA (priced in <u>Appendix E</u>, <u>Section 3.4.1</u>), Contractor must provide Transfer Connections Predictions information for Transit Providers where information is not available through the Metropolitan Transportation Commission's 511 public feed.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Transfer Connections Predictions content to Customer-Facing Interfaces:

(i)   To On-Board Digital Signs – All Transfer Connections Predictions content.

(ii)   To Mobile Platform & Website – All Transfer Connections Predictions content in response to corresponding queries customers make through the Trip Planner.

The Parties will determine the specific Transfer Connections Predictions content and how to best display that content on the On-Board Digital Signs and Mobile Platform & Website. For the Mobile Platform & Website, the content displayed

may vary based on a customer's view (i.e., Point-to-Point Travel, Nearby Vehicles, and Live Travel).

2.2.1.1.4 Timed Transfer Connections Predictions

Contractor must satisfy the following requirements by the end of Phase II.

(a) Content

The SFMTA schedules timed transfer connections at certain locations that serve multiple routes. Timed transfer connections occur when vehicles on two or more SFMTA routes are scheduled to arrive simultaneously and wait a few minutes to enable customers to transfer between their respective Transit Stops. As described in Section 2.2.2.9, the SFMTA will define the times, locations and routes of these connections. The System Software must take into account that vehicles associated with timed transfer connections are scheduled to wait for these connections, rather than immediately departing once customers have boarded and de-boarded. Timed transfer connections may occur at more than one Transit Stop or at the same Transit Stop.

Timed Transfer Connections Predictions must include the following content:

(i) Indication that the connecting vehicle makes a timed transfer connection.

(ii) Route, direction and destination for the connecting vehicles.

(iii) Estimated time that customers have between when their current vehicle arrives at its Transit Stop and when vehicles on their connecting route are estimated to depart from their respective Transit Stop for a transfer connection. If real-time estimates are not available for connecting routes, the System Software must transmit scheduled departure times.

(iv) Estimated departure time (e.g., 4:35 am) when a configurable number of vehicles on connecting routes depart from their respective Transit Stops.

(v) Current geolocations of the initial vehicle and vehicles on connecting routes, and their respective Transit Stops, on a map.

(vi) Indication whether departure times for a connection are based on a prediction or a schedule.

(vii) In generating Timed Transfer Connections Predictions content, the System Software should adhere to the requirements for generating Transfer Connections Predictions content above.

(b) Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Timed Transfer Connections Predictions content to Customer-Facing Interfaces for Transit Stops the SFMTA has designated as Timed Transfer Connections:

(i) To Stationary Digital Signs – Notification that Timed Transfer Connections exist at that Transit Stop and estimated departure time.

(ii) To On-Board Digital Signs – All Timed Transfer Connections Predictions content.

(iii)   To Mobile Platform & Website – All Timed Transfer Connections Predictions content in response to corresponding queries customers make through the Trip Planner.

The Parties will determine specific Timed Transfer Connections Predictions content and how to best display that content on the On-Board Digital Signs and Mobile Platform & Website. For the Mobile Platform & Website, the content displayed may vary based on a customer's view (i.e., Point-to-Point Travel, Nearby Vehicles, and Live Travel).

2.2.1.1.5 Alternative Routes and Stops

Contractor must meet the following requirements by the end of Phase II.

(a)   Content

Alternative Route(s) means one or more different transit routes that potentially serve a customer's origin and destination. Below are examples of Alternative Routes.

(i)   If a customer misses a bus and must wait 20 minutes for the next bus, there may be a nearby parallel route to which a customer could reasonably walk in time to catch an earlier-arriving bus headed in the same direction.

(ii)   On Mission Street, a customer is waiting at a Transit Stop served by the 14 Mission but not the 14R Mission Rapid. It may be quicker for the customer to walk to the next Rapid stop for the 14R rather than to wait for the 14, so long as the 14R has sufficient space available.

(iii)   Service on a particular transit route is not operating, either because it does not provide scheduled service at that time or there has been an unplanned disruption. For example, if the 1AX California Express bus has stopped operating for the day, the System Software would recommend taking the 1 California.

(iv)   There is a blockage on the N Judah rail line at Church & Duboce that is preventing trains from entering the Muni Metro subway. The parallel 6 Haight-Parnassus and 7 Haight-Noriega routes are possible alternatives.

(v)   There is a 45-minute wait on the N Judah rail line in the outbound direction at Powell Station. The 6 Haight-Parnassus and 7 Haight-Noriega that board on Market Street directly above the station are possible alternatives.

(vi)   There is severe crowding on the 38 Geary due to an earlier delay. The parallel 31 Balboa route is a potential alternative, provided vehicles on that route themselves have enough space to board, subject to availability of real-time passenger loading data from OrbCAD.

(vii)   The wayside lift at the Market & 5th St island boarding stop is out of service. A customer requiring the lift is directed to the nearest elevator to access the Powell Station.

The System Software must generate Alternative Route content that includes the following information, at minimum: (1) Name, destination and map of Alternative Routes; (2) directions and travel distances to Transit Stops serving Alternative

Routes using public rights-of-way; (3) Vehicle-Arrival Predictions for these Transit Stops; (4) Vehicle Occupancy for vehicles on Alternative Routes; and (5) Accessible Information content.

The Parties will work together to identify Alternative Routes as described in Section 2.2.2.7.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the Alternative Route content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs – If there is a service delay, a long wait time (as configured by the SFMTA), a reroute, vehicle overcrowding, elevator/escalator outage, or other service interruptions on the route(s) that serve the corresponding Transit Stop, or if the Transit Stop has any permanent or temporary accessibility limitations.

(ii)   To Mobile Platform & Website – In response to corresponding queries customers make through the Trip Planner, sorted by customer-configured preferences including, at minimum: (1) fewest transfers or shortest Transfer Connection Prediction times; (2) fastest travel; and (3) accessible Transit Stops or routes.

(iii)   **Option:** To Mobile Platform & Website – As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.3), (1) most frequent service; and (2) least crowded service.

2.2.1.1.6 Vehicle Occupancy

Contractor must satisfy the following requirements by the end of Phase II.

(a)   Content

Vehicle occupancy provides an indication of passenger loads on vehicles (e.g., crowded, empty) based on vehicle model. The System Software must generate vehicle occupancy content as follows, subject to occupancy data being available in real-time from OrbCAD:

(i)   Real-time vehicle occupancy when passenger loads exceed thresholds the SFMTA establishes by vehicle model using the System Administration Tool. OrbCAD provides real-time passenger loads for vehicles with automatic passenger counters.

(ii)   **Option:** As an option exercisable by the SFMTA (priced in Appendix E, Section 3.4.2), Contractor must implement a database containing historic passenger loading data obtained from vehicles with automatic passenger counters in order to allow estimated vehicle occupancy to be calculated in real-time for vehicles without automatic passenger counters. This estimated loading data will be made available to the Trip Planner to show estimated vehicle occupancy for trip plans planned in advance.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following vehicle occupancy content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs – Real-time vehicle occupancy for at least the next two vehicles;

(ii)   To On-Board Digital Signs – Real-time vehicle occupancy for the next two vehicles on connecting routes at an upcoming Transit Stop;

(iii)   To Mobile Platform & Website – Real-time or estimated vehicle occupancy for vehicles featured in the Trip Planner.

2.2.1.1.7 Trip Itineraries

Contractor must meet the following requirements by the end of Phase I.

(a)   Content

Trip Itinerary means point-to-point travel directions generated in response to queries customers make through the Trip Planner. The System Software must generate Trip Itineraries as follows:

(i)   For any origin-destination pair, optimal, non-circuitous directions. The System Software must prioritize Trip Itineraries by user-configured parameters, such as accessibility requirements, number of transfers, service frequency (**option**), fare, crowding (**option**) and walking distance. If there is no transit itinerary meeting these parameters, the System Software must generate an alternative transit itinerary that can still get the customer from origin to destination without meeting all these parameters. If no such transit itinerary exists, the System Software must (1) refer the user to a transportation service approved by the SFMTA, and (2) record this unfulfilled request in the Analytics Platform by marking such unfulfilled requests through a simple entry in the log files. The log files must be made available to the Analytics Platform for further analysis.

(ii)   For future travel, a Trip Itinerary must include the following information at minimum: (1) walking directions and distance to initial Transit Stop; (2) scheduled times; (3) transit route and direction and/or final destination; (4) scheduled travel time onboard the vehicle; (5) transfers, if necessary, to connecting vehicles, Transfer Connections Predictions, and travel directions and distance to complete transfers; (6) scheduled travel time onboard the vehicle; (7) accessibility (e.g., level boarding, directions to operating elevators and escalators); (8) fares; and (9) walking directions and distance from the final vehicle to the destination.

(iii)   For immediate travel, a Trip Itinerary must include the following information at minimum: (1) walking directions and distance to initial Transit Stop; (2) Vehicle-Arrival Predictions for at least the next two vehicles after considering travel time to the initial Transit Stop; (3) transit route and direction and/or final destination; (4) predicted travel time onboard the vehicle; (5) transfers, if necessary, to connecting vehicles, Transfer Connections Predictions,

and travel directions and distance to complete transfers; (6) predicted travel time onboard the vehicle; (7) accessibility (e.g., level boarding, directions to operating elevators and escalators); (8) fares; and (9) walking directions and distance from the final vehicle to the destination.

(b) Customer-Facing Interfaces

The System Software must transmit, at minimum, the Trip Itinerary content to the following Customer-Facing Interface:

(i) To Mobile Platform & Website – In response to corresponding queries customers make through the Trip Planner.

2.2.1.1.8 Accessibility Information and Accessible Itineraries

Contractor must satisfy the following requirements by the end of Phase II with the goal of implementing as many of these requirements as possible in Phase I.

(a) Content

Accessibility Information means Customer Information specific to accommodate accessible travel needs (e.g., availability of functional elevator and escalators at applicable stops along rail lines, wheelchair ramps at surface rail stops). Accessible Itineraries mean Trip Itineraries that factor in specific accessibility requirements designated by customers in the Trip Planner. The SFMTA will provide accessibility data related to stops, routes, vehicles, elevators and escalators to Contractor in a format to be determined by the Parties and documented in the System Design Document.

The System Software must take into account and communicate the following Accessibility Information content, at minimum:

(i) Accessibility features at Transit Stops (e.g., key stop with wheelchair access, level boarding, and wayside lift).

(ii) Accessibility limitations at Transit Stops that are not fully accessible (e.g., stations that require stair navigation when there are elevator outages; light rail vehicle low-level sidewalk stops that are not accessible to people requiring level boarding; Transit Stops at sidewalks that are too narrow or too steep to accommodate some wheelchair users; Transit Stops where there are no curb ramps or curb ramps are sub-standard).

(iii) Number of wheelchair spaces on each vehicle.

(iv) Accessibility limitations of vehicles and/or routes (e.g., historic cable cars).

(v) Which car of a multiple-car light rail vehicle train to board if exiting at a surface stop with a wheelchair ramp.

(vi) Planned elevator and escalator outages.

(vii) Real-time elevator and escalator outages.

(viii) Locations of and directions to elevators and escalators.

(ix)   Characteristics of street access to and from origin and destination Transit Stops (e.g., street grades, elevation, sidewalk availability and width, crosswalk availability).

The System Software must generate the following Accessible Itineraries content, at minimum:

(i)   A Trip Itinerary that is physically feasible based on user-configured accessibility requirements in the Trip Planner. Accessible Itineraries content may vary based on individual disabilities and the physical attributes of vehicles and Transit Stops (e.g., Customers able to navigate a limited grade or number of steps can use certain stops that do not have curb ramps).

To assist Contractor with processing Accessibility Information and generating Accessible Itineraries, the SFMTA will provide a database of Transit Stops with accessibility limitations and details of those limitations (e.g., requires climbing three steps into a Muni Metro train (no ramp available), steepness of grade, elevator required, sub-standard curb ramp, no curb ramp, flag stop in street). The Parties will determine the appropriate format to intake this data and, where possible, use a transit industry standard format such as GTFS pathways. As indicated in Section 2.2.2.18, Contractor must be able upload data about Transit Stops through the System Administration Tool.

To display Customer Information about elevator and escalator status, Contractor must intake an automated feed to indicate changes in elevator and escalator status at each underground station, and the status of five wayside lifts located at island platforms servicing the F Market & Wharves and M Ocean View rail lines. The Parties will determine the format and specific content of the feed while preparing the System Design Document.

(ii)   **Option:** As an option exercisable by the SFMTA (priced in Appendix E, Section 3.4.3), Contractor must implement an elevator/escalator status interface that allows users to manually indicate changes in elevator and escalator status.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Accessibility Information and Accessible Itineraries content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs – Any accessibility limitations, including planned and real-time elevator and escalator outages, for all routes at the corresponding Transit Stop and upcoming Transit Stops associated with those routes.

(ii)   To On-Board Digital Signs for vehicles traveling on routes serving Transit Stops with accessibility limitations – Any accessibility limitations, including real-time elevator and escalator outages, at upcoming Transit Stops along the route.

(iii)   To On-Board Digital Signs for vehicles traveling on routes that connect with routes at a transfer point with accessibility limitations – Any accessibility limitations, including real-time elevator and escalator outages, for connecting routes at the corresponding transfer point.

(iv)   To Mobile Platform & Website – Accessible Itineraries that reflects user-configured accessibility requirements in the Trip Planner.

2.2.1.1.9 Service-Change Alerts

Contractor must meet the following requirements by the end of Phase II.

(a)   Content

Service-Change Alert means an alert that notifies customers of a Temporary Service Change and other information customers need to plan accordingly to proceed with their travel. Depending on the circumstances, the System Software must generate Service-Change Alerts automatically or deliver canned or pre-formatted alerts written by the SFMTA. Canned messages must be in multiple languages in accordance with the City and County of San Francisco's Language Access Ordinance.

The System Software must be capable of managing Service-Change Alert content and scheduling as follows:

(i)   Manual Management – Contractor must provide a System Administration Tool user interface that allows Authorized Users to create Service-Change Alert text content, configure the applicable routes and stops, and schedule when the Service Change Alert will be pushed to Customer-Facing Interfaces.

(ii)   Automated Processing of Service-Change Alert information from OrbCAD – The System Software must automatically process service changes provided through the OrbCAD feed in order to pre-populate canned text messages, affected stops/routes and duration of service change into the System Administration Tool user interface for subsequent review, approval and distribution to Customer-Facing Interfaces by Authorized Users.

The System Software must automatically generate Service-Change Alert content that includes the following information, at minimum:

(i)   Temporary Service Change details (e.g., route detour, delay or disruption, service suspension, bus substitutions for rail shutdowns).

(ii)   Map of the route detour using data provided through OrbCAD, such as a route trace of the detour.

(iii)   Directions and walking distances using public rights-of-way to closest Transit Stop served by the Temporary Service Change.

(iv)   Vehicle-Arrival Predictions for the Transit Stops served by the Temporary Service Change.

(v)   Upcoming transfer points affected by Temporary Service Changes (e.g., transfer points where customers can connect to routes detoured by the Temporary Service Change).

(vi)   Duration of Temporary Service Change (including future dates for planned changes).

(vii)   Service-Change Alerts for connecting routes operated by other Transit Providers (e.g., BART, Golden Gate Transit, Caltrain), provided through publicly-available data feeds.

The Parties will work together to identify inputs necessary to generate Service-Change Alert content. The System Software must be able to process a wide range of such inputs, including inputs generated in advance (e.g., schedule files containing detour routes and associated schedules) and in real-time (e.g., vehicle and Transit Operator assignments in OrbCAD). For clarity, vehicle and Transit Operator assignments in OrbCAD include when a Transit Operator has logged into an alternative block with known patterns, but with unknown arrival times.

Through the System Administration Tool, Authorized Users must be able to review and modify the automatically-generated System-Change Alert content, and then determine when to publish this content to Customer-Facing Interfaces.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Service-Change Alert content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs at all Transit Stops served by the permanent route – (1) Temporary Service Change details, (2) map of the route detour, and (3) duration of Temporary Service Change.

(ii)   To Stationary Digital Signs at Transit Stops along the permanent route that are not in service due to the Temporary Service Change – (1) Temporary Service Change details, (2) map of the route detour, (3) directions and travel distances using public rights-of-way to closest Transit Stop in service (either for that route or for an Alternative Route) during the Temporary Service Change, (4) Vehicle-Arrival Predictions for that closest Transit Stop, and (5) duration of Temporary Service Change.

(iii)   To Stationary Digital Signs at temporary Transit Stops along the detoured portion of the route during the Temporary Service Change – (1) Temporary Service Change details, (2) map of the route detour, (3) Vehicle-Arrival Predictions, and (4) duration of Temporary Service Change.

(iv)   To On-Board Digital Signs for vehicles traveling on routes detoured by the Temporary Service Change or temporary routes for special events or service disruptions – (1) Temporary Service Change details, (2) map of the route detour, (3) temporary Transit Stops served by the detour, (4) permanent Transit Stops not served by the detour, and (5) duration of Temporary Service Change.

(v)   To On-Board Digital Signs for vehicles traveling on routes that connect with routes affected by a Temporary Service Change – (1) Temporary Service Change details, (2) Transfer points where customers can normally connect but cannot do so during the Temporary Service Change, (3) Transfer Points where customers can connect only during the Temporary Service Change, and (4) Temporary Service Change details for routes operated by other Transit Providers.

(vi)   To Mobile Platform & Website – For itineraries that involve routes affected by Temporary Service Change, (1) Temporary Service Change details, and (2) duration of Temporary Service Change.

2.2.1.1.10 Delay Communications

Contractor must meet the following requirements by the end of Phase II.

(a)   Content

Delay Communications means an automated alert and other Customer Information that notifies customers of a perceived delay in their expected travel or waiting times. A perceived delay may occur when an individual vehicle falls behind schedule (e.g., a vehicle is held at a station or there is traffic congestion) or has not moved after a certain time configured by Authorized Users in the System Administration Tool. A perceived delay may also occur when individual vehicles do not fall behind their schedules but there is a service gap resulting from a missed, cancelled or otherwise altered trip (e.g., a Switchback). In the latter case, customers perceive a delay because their waiting times increase due to the service gap. Examples of causes of perceived delays include:

(i)   Delayed terminal departure.

(ii)   Relief Transit Operator does not arrive at the relief point on time.

(iii)   A disabled door while a light rail vehicle remains in service in the subway.

(iv)   A serious mechanical issue requiring a light rail vehicle to be taken out of service which may block all subsequent light rail vehicles.

(v)   A Switchback that results in a vehicle not continuing to its scheduled destination and missing stops beyond the Switchback point.

(vi)   Incorrectly-displayed Vehicle-Arrival Predictions recognized by the System Software and eliminated (often perceived as a "ghost" vehicle).

Delay Communications content must include the following information, at minimum:

(i)   Delay explanation.

(ii)   Revised Customer Information, including revised Vehicle-Arrival Predictions.

The System Software must detect delays based on (1) receiving vehicle delay status information from the OrbCAD system, or (2) detecting that a vehicle has not moved for an amount of time configured by the SFMTA through the System Administration Tool. The System Software must communicate to Customer-Facing Interfaces the existence of the delay and, if available, the reasons for delay.

The Parties will work together to identify how to explain delays and under which conditions to express Delay Communications content using the process described in Section 2.2.1.7.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Delay Communications content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs – Delay explanation, revised Customer Information, and Alternative Routes (if applicable).

(ii)   To On-Board Digital Signs – Delay explanation and revised Customer Information, and Alternative Routes (if applicable).

(iii)   To Mobile Platform & Website – For existing itineraries, provide a delay explanation and revised Customer Information. If appropriate, issue a revised itinerary to avoid routes affected by the delay.

As described in Section 2.2.2.4, the System Administration Tool must enable Authorized Users to configure the type of messages to communicate in response to different delay events, for each type of customer-facing interface and for stops and routes.

2.2.1.1.11 Switchbacks

Contractor must meet the following requirements by the end of Phase II.

(a)   Content

Switchback means a trip that ends before reaching its scheduled terminus. The System Software must distinguish between full-length trips and Switchbacks, even if the SFMTA does not log a Switchback in the OrbCAD system. As soon as the SFMTA logs a Switchback into the OrbCAD system or the System Software detects that a Switchback has occurred, the System Software must generate and transmit Switchback content that, at minimum, includes the following:

(i)   Notification of Switchback.

(ii)   Switchback location (i.e., final station or stop served on trip).

(iii)   Vehicle-Arrival Prediction for the next vehicle, regardless of destination.

(iv)   Vehicle-Arrival Prediction for the next vehicle traveling the full length of the route.

(v)   Last accessible stop prior to the Switchback.

The System Software must generate and transmit Switchback content as soon as it detects a Switchback.

(b)   Customer-Facing Interfaces

The System Software must transmit, at minimum, the following Switchback content to Customer-Facing Interfaces:

(i)   To Stationary Digital Signs at Transit Stops between the vehicle's current location and the Switchback – (1) Notification of Switchback for affected vehicles, and (2) revised terminus.

(ii)   To Stationary Digital Signs at stops after Switchback – Elimination of prediction for affected vehicle and attribution of cause to Switchback.

(iii)   To On-Board Digital Signs for vehicles affected by Switchback – (1) Notification of Switchback, (2) revised terminus (3) for next stop, Vehicle-Arrival Prediction for next vehicle on the same route and direction traveling to scheduled terminus, and (4) last accessible stop prior to Switchback.

(iv)   To Mobile Platform & Website – When viewing the Nearby Vehicles affected by Switchbacks, show revised terminal.

When viewing live vehicle-tracking, for vehicles affected by Switchbacks, show where applicable:

(v)   Notification of Switchback;

(vi)   Switchback location; and

(vii)   Last accessible stop prior to Switchback.

Provided that the customer has opted in to subscription to service alerts by route and time, also enable customer to plan a new trip and show, where applicable:

(viii)   Vehicle-Arrival Predictions at the next Transit Stop for the next vehicle on the same route and direction, regardless of destination; and

(ix)   Vehicle-Arrival Predictions at the next Transit Stop for the next vehicle on the same route and direction traveling to scheduled terminus.

2.2.1.1.12 Offline Customer Information

Contractor must satisfy the following requirements by the end of Phase I.

(a)   Content

Offline Customer Information means Customer Information the Next Generation System generates and automatically displays if the System Software cannot generate or transmit real-time Customer Information because of either external or internal disruptions (e.g., during a cellular network outage or if the System Software cannot generate Vehicle-Arrival Predictions for any reason). The Parties will work together to determine Offline Customer Information content which, at minimum, includes:

(i)   Schedule-based message (for low-frequency services or times of day) (e.g., "38 Geary: Scheduled at 2:00 am and 2:30 am").

(ii)   Headway-based message (for high-frequency services or times of day) (e.g., "38 Geary: Every 6 minutes").

Using the System Administration Tool, the SFMTA must be able to configure Offline Customer Information content to reflect differences in routes, locations and time of day.

(b) Customer-Facing Interfaces

The Parties will work together to determine when, how and to which Customer-Facing Interfaces the Next Generation System will communicate Offline Customer Information content.

2.2.1.1.13 Complementary Sustainable Transportation Options

Contractor must satisfy the following requirements by the end of Phase II.

(a) Content

A Complementary Sustainable Transportation Option means a mode of transportation the SFMTA deems compatible with the Guiding Principles for Management of Transportation Services and Technologies, and fills gaps in or complements Muni service. Examples of Complementary Sustainable Transportation Options include taxis and bikeshare. Content includes transportation mode, connection points, fares or fees, accessibility, estimated travel time, and other information that the Parties will work together to determine. Contractor must enable the SFMTA to configure which transportation options are included in Complementary Sustainable Transportation Options.

(b) Customer-Facing Interfaces

The Parties will work together to determine when and to which Customer-Facing Interfaces the System Software will transmit Complementary Sustainable Transportation Option content. For example, in response to a customer query using the Trip Planner, the System Software may transmit such content to the Mobile Platform & Website when a "last mile" transit connection is not available.

2.2.1.2 Factors that Affect Accuracy of Customer Information

Based on the SFMTA's experience, the factors described in this section may impact the accuracy of Customer Information. When generating Customer Information, the System Software must take into account these and other factors to be determined by Contractor.

(a) Unknown Association – Vehicle, Vehicle Block, or Run Number

The SFMTA's CAD/AVL System automatically associates a vehicle with a Vehicle Block and Run number when a Transit Operator logs into this system. There may be times, however, when the System Software is unable to receive this association (e.g., the Transit Operator does not log into the CAD/AVL system). The System Software must continue to make predictions reliably even when it does not receive this association, so long as the SFMTA has designated the vehicle is operating in Revenue Service. The Parties will determine how to filter out vehicles not in Revenue Service in the System Design Document.

The System Software must log the geocoordinates, time and date, and vehicle number when unknown associations occur.

(b) Multiple-Car LRV Trains

The SFMTA operates light rail trains with one or more individual light rail cars. The System Software must process coupling and decoupling information from

OrbCAD to identify when multiple cars on a single train serve one or more routes and must provide Customer Information accordingly for each route. For example, if a two-car train serves the same route, the System Software must generate a single Vehicle-Arrival Prediction for the entire train and not separately for each car. If a multiple-car train is uncoupled to serve two or more separate routes (i.e., cars from the train are separated to serve two or more routes at tunnel portals), the System Software must generate Vehicle-Arrival Predictions for each route.

(c)   Event-Based Routes

The SFMTA operates certain routes (e.g., the 78X 16th Street Arena Express to and from Chase Center) before and after special events for which the dates and start and end times vary.

These routes may operate for certain periods of time before and after the event, on fixed schedules (e.g., every 15 minutes for two hours before the start) or based on demand (e.g., buses depart the event once full).

The System Software must differentiate between regular and event-based routes to generate accurate Customer Information for these event-based routes.

(d)   Non-Revenue Service

Transit vehicles will switch from non-Revenue Service to Revenue Service and vice versa throughout the day. For example, a transit vehicle will travel from an Operating Division to its initial terminal in non-Revenue Service, and then switch to Revenue Service upon commencing its route. The System Software must distinguish between non-Revenue Service and Revenue Service and take this into account when generating Customer Information.

(e)   Not-in-Service Transit Vehicles

The SFMTA may take transit vehicles traveling in Revenue Service out of service for various reasons (e.g., mechanical issues). The System Software must provide a tool to allow SFMTA staff to designate individual vehicles out of service or in-service, as conditions warrant, to override automatically-generated designations. The System Software must not generate or transmit Customer Information for not-in-service transit vehicles for display on Customer-Facing Interfaces.

(f)   Transit Vehicle Delays

The SFMTA sometimes holds transit vehicles at or in between stops for various reasons (e.g., a door problem). When this occurs, the System Software must recognize such vehicles and indicate those vehicles are experiencing delays.

(g)   Not Outs

Not Outs are transit vehicles the SFMTA takes out of service before they are scheduled to leave an Operating Division (e.g., because a Transit Operator is unavailable to drive the vehicle). The System Software must recognize Not Outs and modify Customer Information accordingly. For example, if the SFMTA cannot operate the 5:00 pm trip on the 1 California, the Trip Planner would omit that trip from a Trip Itinerary.

(h)   Headway Mode

The SFMTA may operate routes at certain times of the day in headway mode in OrbCAD. When a route is operating in headway mode, the Trapeze schedule assigns vehicles to Vehicle Blocks and Transit Operators to Runs with no timepoints other than a pull-out, pull-in and relief time. OrbCAD then manages vehicles automatically to maintain a specified headway between vehicles. In this mode, OrbCAD or field supervisors will instruct Transit Operators to depart the terminal in order to maintain that specified headway without reference to a scheduled departure time. The System Software must adjust Vehicle-Arrival Predictions and Terminal Departure Predictions to maintain accuracy when the SFMTA manage routes in this mode, as determined by the Parties in the System Design Document.

(i)   Loop Jobs

Loop Jobs are an unscheduled, pre-configured work assignment in which a vehicle operates over a portion of the route using an existing route pattern. The Next Generation System must be able to generate Vehicle-Arrival Predictions for vehicles assigned to a Loop Job based on historical travel times.

2.2.1.3   Customer Information to Existing Systems and Applications outside the Next Generation System

The Existing System provides information to the systems and applications within and outside the SFMTA (e.g., Vehicle-Arrival Predictions to the Automatic Train Control System), as described below. Contractor must work with the Vendors of these systems and applications to ensure they receive this information without interruption during the transition from the Existing System to the Next Generation System.

By no later than the System Software Transition Milestone, the Next Generation System must provide Customer Information to these systems and applications. The Parties will determine and Contractor will set forth in the System Design Document the specific content and format of this information.

(a)   ATCS System Management Center

The ATCS System Management Center tracks and manages light rail train movements in the Muni Metro subway. Currently, the ATCS System Management Center queries the Existing System's API using an HTTP request to receive routes, job-assignments, and destinations of light rail vehicles. More specifically, the Existing System returns the estimated arrival times of the next five trains on every line in an XML feed with a vehicle number, time to arrival and direction.

By the end of Phase I, the System Software must respond to requests by the ATCS System Management Center and return equivalent JSON-formatted data. This will enable ATCS to continue to manage trains within the subway.

(b)   Platform Audio Visual Sign Feed

By the end of Phase I, Contractor must ensure that any pertinent Customer Information, including Vehicle-Arrival Predictions, is forwarded to the PAV

server via a JSON feed for display and announcement on the PAV system. While the PAV system will continue to independently control the layout and formatting of the information displayed on its signs, Contractor must work with the Vendor of the PAV system to ensure the information is properly displayed.

Prior to transitioning from the existing XML feed to the JSON feed, Contractor must work with the SFMTA to minimize disruptions to the ATCS System Management Center and the PAV system.

2.2.1.4 Customer Information to New Systems and Applications outside the Next Generation System

The Next Generation System must provide Customer Information to new systems and applications outside the Next Generation System, as described below. The Parties will determine and Contractor will set forth in the System Design Document the specific content and format of this information. Contractor must work with the Vendors of these systems and applications to ensure they receive this information.

(a)   Metropolitan Transportation Commission (MTC) Feed

The MTC publishes regional transit information. By no later than the System Software Transition Milestone, or as otherwise directed by the SFMTA, Contractor must provide an API or a feed to support the needs of MTC's system.

(b)   Salesforce Transit Center

By no later than the System Software Transition Milestone, or as otherwise directed by the SFMTA, Contractor must provide Customer Information content to display on pylons at the Salesforce Transit Center as described in Section 3.2.7.

(c)   BART Station Canopy Sign Feed (**Option**)

BART is in the process of building canopies at the four downtown San Francisco stations it shares with the SFMTA's Muni Metro System. These canopies will have signs that display real-time arrivals for all BART and Muni Metro trains. As an option exercisable by the SFMTA (priced in Appendix E, Section 2.2), by the end of Phase II, or as otherwise directed by the SFMTA, the System Software must be able to transmit Customer Information to those signs in a format specified by BART and the SFMTA.

2.2.1.5 Customer Information to Third-Party Trip Planning Applications

Through an XML feed, the Existing System provides Vehicle-Arrival Predictions and other information that third parties use for their trip planning applications. Contractor must maintain this XML feed without interruption during the transition from the Existing System to the Next Generation System.

By the end of Phase I, Contractor must produce and make public a General Transit Feed Specification Real Time Feed (GTFS-RT) for third parties to use to access Customer Information for their trip planning applications. The Parties will determine the specific content for this feed while Contractor prepares the System Design Document.

Prior to transitioning to the GTFS-RT feed, Contractor must work with the SFMTA to minimize disruptions to known third-parties that currently utilize the Existing System's XML feed.

The SFMTA may require third parties to sign an agreement in order to receive a GTFS real time feed. In this case, the SFMTA will provide user agreement language to Contractor, and Contractor may not provide access to the GTFS-RT feed to third parties who do not consent to the agreement.

2.2.1.6 Customer Information to Legacy Signs

The Existing System provides vehicle arrival predictions and text messages to Legacy Signs. At most sign locations, push-to-talk buttons are available to provide text-to-speech functionality.

During the Transition Period, which will take place during Phase I, Contractor must replace Legacy Signs with Contractor's new Stationary Digital Signs. The System Software must transmit Customer Information to Legacy Signs by no later than the System Software Transition Milestone Date and until Contractor replaces each Legacy Sign with the corresponding Stationary Digital Signs. Contractor must continue to display the same customer information that is currently available today on the Legacy Signs.

2.2.1.7 How to Communicate Customer Information

The Parties will work together to determine and Contractor will set forth in the System Design Document how the Next Generation System will communicate Customer Information clearly and concisely on Customer-Facing Interfaces.

There may be special situations that merit supplemental information to help customers better understand their travel options. Examples of such situations Contractor must work with the SFMTA to address include:

(a) Overlapping Routes

Certain segments of the Muni system have overlapping routes that serve common destinations. For example, the J Church, K Ingleside, L Taraval, M Ocean View, N Judah or T Third trains all travel from Van Ness Station to Embarcadero Station. In these cases, the Parties will work together to determine and Contractor will set forth in the System Design Document how to best communicate this information so that customers understand they can take the first available train regardless of route.

(b) Delay Communications

As described in Section 2.2.1.1.10, customers may perceive a delay in their expected travel or waiting times when, for example, an individual vehicle falls behind schedule or there is a service gap resulting from a missed, cancelled or otherwise altered trip. Depending on the nature of the delay, the Next Generation System will employ different methods to inform customers. For example, a brief vehicle delay on a route may only necessitate automatically updating Vehicle-Arrival Predictions. In contrast, a subway delay impacts thousands of customers on multiple routes. In this case, Transportation Management Center staff would confirm the delay and initiate an automated communication strategy to various Customer-Facing Interfaces. The Parties will work together to determine and Contractor will set forth in the System Design Document how to best communicate delays to customers.

2.2.1.8 Intake of Data to Generate Customer Information

The System Software must intake real-time and static data from various sources in order to generate Customer Information. Examples of data categories and sample attributes include:

(i)   Real-Time Vehicle Operations (e.g., geolocations, block, schedule).

(ii)   Schedules (including a distinction between Revenue and non-Revenue Service).

(iii)   Routes (e.g., route letter or number, route name, route patterns, vehicle type).

(iv)   Transit Stop Characteristics (e.g., Stop ID, shelter availability, Stationary Digital Sign type and availability, grade, written stop name for On-Board Digital Signs (which may depend on route), annunciated stop name, adjacent Transit Stops where transfer connections are available).

(v)   Transit Station Characteristics (e.g., entrance locations, escalator and elevator locations, vertical distance from platform to the street).

(vi)   Street Characteristics (e.g., bicycle lanes, street grades, elevation, sidewalk availability and width, crosswalk availability).

(vii)   Vehicle Characteristics (e.g., vehicle model, number of seats, seated and standing capacity, number of wheelchair spaces).

(a)   In the System Design Document, Contractor must identify these data sources and recommend the most appropriate means to intake them (e.g., web service, file import). Contractor must document how the data exchange will occur and provide the SFMTA with all relevant documentation (e.g., an Interface Control Document and API).

(b)   If these data sources are generated by the SFMTA, Contractor must receive approval from the SFMTA for its recommended method of data exchange.

2.2.2 System Administration Tool

Before the end of Phase I, Contractor must furnish to the SFMTA a fully-functioning administration tool for SFMTA staff to use to administer the Next Generation System (System Administration Tool). The System Administration Tool must be accessible through a secure website that works on all industry-standard browsers (including Microsoft Edge) and operating systems (e.g., Windows 10) in use during the term of the Agreement. Contractor must update the website to ensure all its features are compatible with supported version of industry-standard browsers.

Below are additional, minimum requirements for the System Administration Tool. Contractor may provide additional features the SFMTA has not identified.

2.2.2.1 Authorized User Access

Contractor must enable the SFMTA to establish user accounts and user groups, and configure permissions to the System Administration Tool such that only authorized personnel may access the System (Authorized Users).

The System Administration Tool must provide for different levels of access for various classes of Authorized Users. The SFMTA must be able to set these levels of access for individual

Authorized Users. Contractor must make the System Administration Tool accessible to these Authorized Users via a secure web interface.

SFMTA desires the Next Generation System to be as configurable by Authorized Users as possible. When operational and communications needs lead to the use of parameters, exposing these parameters in the System Administration Tool and allowing them to be set by Authorized Users permits the SFMTA to configure and re-configure the system.

During the development of the System Design Document, the Parties will agree which items should be configurable and Contractor must subsequently implement those parameters in the Next Generation System.

2.2.2.2   Management of Vehicle-Arrival Predictions for Transit Stops, Routes, and Vehicles

The System Administration Tool must enable Authorized Users to:

(a)   Activate and deactivate Vehicle-Arrival Predictions, and switch to scheduled arrivals, planned headways, or no information at all, for individual Transit Stops, routes, Vehicle Blocks, and vehicles, both in real-time and scheduled in advance;

(b)   Activate and deactivate Vehicle-Arrival Predictions, and switch to scheduled arrivals, planned headways or no information at all, for all routes and stops, both in real-time and scheduled in advance, while preserving Service-Change Alerts and any other messages;

(c)   Activate and deactivate Vehicle-Arrival Predictions for selected route patterns (e.g., the SFMTA may elect not to show a pull-in/pull-out route pattern for a vehicle traveling to or from an Operating Division);

(d)   Assign a Vehicle Block to each transit vehicle and maintain this assignment until an Authorized User removes that assignment through the System Administration Tool or another event occurs based on logic agreed to by the Parties in the System Design Document;

(e)   Assign a Loop Job to each transit vehicle and maintain this assignment until an Authorized User removes that assignment through the System Administration Tool or another event occurs based on logic agreed to by the Parties in the System Design Document;

(f)   Configure the Vehicle-Arrival Predictions display format by Stop ID and time of day and/or estimated waiting time. This would enable Authorized Users to select either the estimated waiting time (e.g., countdown until next arrival) or the estimated arrival time (e.g., the clock time for the arrival). Examples of when the SFMTA may display the clock time may include: (1) during overnight hours when transit service does not start until the morning; (2) during the midday hours when transit service does not start until the beginning of the afternoon peak; or (3) when the next predicted arrival is more than 60 minutes away; and

(g)   Designate whether a transit vehicle, Vehicle Block, or route is in non-Revenue Service and Revenue Service.

2.2.2.3   Offline Customer Information

The System Administration Tool must enable Authorized Users to create, configure and download Offline Customer Information content in advance to communicate on Customer-Facing Interfaces when the System Software cannot generate or transmit real-time Customer Information.

2.2.2.4 Delay Communications

The System Administration Tool must enable Authorized Users to:

(a) Configure the type of messages to communicate in response to different delay events, for each type of Customer-Facing Interface and for stops and routes;

(b) Configure a minimum amount of time that a vehicle has been stationary after which the System Software recognizes there has been a delay, so long as the vehicle is not operating ahead of schedule;

(c) Determine which messages are automatically communicated on Customer-Facing Interfaces and which ones require review and approval; and

(d) Review and modify the automatically-generated Delay Communications content, and then determine when to publish this content to Customer-Facing Interfaces.

2.2.2.5 Temporary Service Changes

The System Administration Tool must enable Authorized Users to:

(a) Import prepared schedules and route traces reflecting Temporary Service Changes at any time, including immediately before or during the Temporary Service Change;

(b) Schedule and configure when the Next Generation System enacts and deactivates Temporary Service Changes (including immediately);

(c) Schedule and configure when the Next Generation System enacts and deactivates Service Change Alerts associated with Temporary Service Changes (including immediately);

(d) Manually restore normal service schedules and routings in the case of unplanned service changes;

(e) Alter routes, schedules, and stops as needed;

(f) Group pre-planned detoured routes impacted by Temporary Service Changes in sets (e.g., all service changes associated with a special event on Market Street or a tunnel closure);

(g) Save individual or sets of Temporary Service Changes for reuse or modification at a later time (e.g., Bay to Breakers, Chinese New Year and Pride Parade reroutes that occur only

once per year, but are repeated from year to year; Market Street closures that can happen at any time);

(h)   Prepare Service-Change Alerts in real-time or in advance of a Temporary Service Change;

(i)   Preview Service-Change Alerts on Customer-Facing Interfaces before transmitting these alerts to customers, with the effective date and duration of the alert configurable by Authorized Users;

(j)   Send Service-Change Alert messages to signs along a route, in a general area (e.g., Downtown core), to the mobile platform, and at a specific stop;

(k)   Set up and configure unplanned job configurations;

(l)   Reassign routes to different bus bays at the Salesforce Transit Center; and

(m)   Provide a Test Environment where Authorized Users can preview service changes.

2.2.2.6   Vehicle Occupancy

The System Administration Tool must enable Authorized Users to establish thresholds by vehicle model to determine a vehicle's general occupancy (e.g., very full, full, uncrowded).

2.2.2.7   Alternative Routes

The System Administration Tool must enable Authorized Users to designate Alternative Routes for each route at any Transit Stop.

The Parties will work together in an iterative process to establish, review and potentially revise configurable parameters (e.g., walking distance, topography, speed, headways, traffic, occupancy levels, directionality, similar service coverage, and reliability) for determining viable Alternative Routes. Contractor must incorporate these parameters to suggest Alternative Routes for each Transit Stop and route pair that Authorized Users will subsequently select. These alternative routes may also include temporary shuttles (e.g., bus shuttles on pre-established routes when there are rail system shutdowns). Contractor must automatically generate Alternative Route content using these selected alternative routes.

2.2.2.8   Transfer Connections

The System Administration Tool must enable Authorized Users to designate Transfer Connections for each route at any Transit Stop.

The Parties will work together in an iterative process to establish, review and potentially revise configurable parameters (e.g., radius from a Transit Stop), for determining viable Transfer Connections. Contractor must incorporate these parameters to present Transfer Connections for each Transit Stop and route pair that Authorized Users will subsequently select.   Contractor must automatically generate Transfer Connections content through the System Administration Tool.

For other regional Transit Providers, the SFMTA will use the System Administration Tool to define transfer connections with connecting routes by specifying the agency name, Stop ID, route, and direction to receive vehicle arrival predictions and other information as determined by the Parties.

2.2.2.9 Timed Transfer Connections

The System Administration Tool must enable Authorized Users to designate Timed Transfer Connections for each route at any Transit Stop, and the times and schedule day (e.g., weekdays, Saturdays, Sunday/holidays) when those Timed Transfer Connections are in effect. The System

Administration Tool must enable Authorized Users to enable and disable individual Timed Transfer Connections.

In the System Design Document, the Parties will determine whether the System Software will intake this information through an interface available to Authorized Users or through a file upload, as described in <u>Section 2.2.2.18</u>.

2.2.2.10 Geofences

Geofences enable the System Software to detect vehicles when these arrive and depart from Transit Stops. The System Administration Tool must enable Authorized Users to configure sizes and shapes for geofences for Transit Stops, generically and on an individual (ad hoc) basis.

2.2.2.11 Minimum Transfer Connection Times

Transfer connection times at transfer points account for average times for customers who walk between the Transit Stops serving connecting routes.

The Parties will work together to establish the parameters (e.g., walking distance, vertical distance, accessibility factors) to determine minimum connection times. Contractor must incorporate these parameters to estimate connection times for each transfer point and route pair.

For each transfer point and route pair, the System Administration Tool must enable Authorized Users to adjust auto-generated minimum transfer connection times to account for varying conditions at different Transit Stops.

2.2.2.12 Pull-Ins/Pull Outs

The System Administration Tool must enable Authorized Users to:

(a) Track actual vs. scheduled times when transit vehicles leave an Operating Division en-route to Revenue Service (pull outs);

(b) Track when a transit vehicle arrives at an Operating Division after completing Revenue Service (pull ins); and

(c) Detect when a transit vehicle is inside an Operating Division.

2.2.2.13 Interactive Map

The System Administration Tool must include an interactive map that enables Authorized Users to, at minimum:

(a)   See past and real-time vehicle location data;

(b)   Select one or more transit routes to display on the map;

(c)   Select individual or multiple transit vehicles to display on the map;

(d)   View schedule and headway adherence;

(e)   View route, Transit Operator, run and block numbers associated with each transit vehicle, and filter vehicles where no such association is available;

(f)   View vehicles that are not in Revenue Service;

(g)   View vehicles for which the System Software is not generating Customer Information;

(h)   Filter transit vehicles whose performance does not meet thresholds configured by the SFMTA (e.g., vehicles running more than 5 minutes late; vehicles with gaps exceeding 130% of scheduled headway);

(i)   Trace past vehicle locations (playback) with a configurable start and end time, including vehicles that were assigned to routes that operated at that time, and set the playback rate at a configurable speed (e.g., 1x, 2x, 5x, 20x, and 60x the true speed).

(j)   Show past and real-time vehicle occupancy;

(k)   Deactivate and add Transit Stops in advance and in real-time for individual transit routes (e.g., for Temporary Service Changes);

(l)   View current sign status (e.g., operational or non-operational);

(m)   Show historical Vehicle-Arrival Predictions for specific Transit Stops and the vehicles for which they are generated, to aid in investigations of Next Generation System accuracy; and

(n)   Show the data source used for geolocations and predictions, to aid in investigations of Next Generation System accuracy.

2.2.2.14 Operations Management Mobile View (for Authorized Users Only)

By the end of Phase II, Contractor must provide a read-only interface accessible through a mobile device to enable the SFMTA to better manage transit operations in the field. This Operations Management Mobile View must allow Authorized Users (e.g., SFMTA transit managers, maintenance technicians, planners and others) to view detailed information about individual transit vehicles and routes on an interactive map, and search for and locate vehicles by route, run number, block number, vehicle number, and Transit Operator.

The read-only interface must be accessible only through a secure login and password. In the System Design Document, the Parties will determine how Authorized Users will view this interface (e.g., a mobile website, a mobile app).

Supplementary information available through this restricted interface includes at minimum:

(a)   Schedule deviation (e.g., + one minute late);

(b)   Irregular headways (i.e., gaps and bunches);

(c)   Route;

(d)   Run numbers;

(e)   Vehicle numbers;

(f)   Block numbers;

(g)   Whether a vehicle is or is not in Revenue Service;

(h)   Whether the System Software is or is not generating Customer Information for the vehicle;

(i)   Transit Operator ID; and

(j)   Real-time vehicle occupancy, if available.

The Parties will work together to design and determine additional information to make available through the Operations Managemnt Mobile View in the System Design Document.

2.2.2.15 Status of Individual Transit Vehicles

The System Administration Tool must enable Authorized Users to monitor the status of individual transit vehicles. Functionality must include the ability to:

(a)   Detect when there is no association between a transit vehicle operating in Revenue Service and its Vehicle Block, run number and/or Transit Operator;

(b)   Detect when the System Software is not generating Customer Information for a specific transit vehicle in Revenue Service; and

(c)   Display all other Customer Information associated with an individual transit vehicle that the System Software generates or receives from the OrbCAD system (e.g., Switchbacks, Delay Communications, Not Outs).

2.2.2.16 Sign Status

The System Administration Tool must enable Authorized Users to monitor the status of all Stationary Digital Signs and On-Board Digital Signs. Such functionality must include the ability to:

(a)   View current sign status (e.g., operational or non-operational);

(b)   View causes for non-operational status per sign (e.g., non-communicating, no power, propagation issue);

(c)   View current status of text-to-speech functionality at each sign location;

(d)   Submit a ticket to Contractor to repair signs;

(e)   Display power remaining if a sign is solar- or battery-powered, and notify the SFMTA when power remaining falls below a threshold configurable by the SFMTA;

(f)   Show current content for any particular sign;

(g)   Detect when a sign is non-operational, and notify the SFMTA indicating the reason for non-operational status;

(h)   Detect when text-to-speech functionality for a sign is non-operational;

(i)   Archive the content of what was displayed on any individual sign at any particular time during the past three months; and

(j)   Modify configuration parameters associated with specific signs.

2.2.2.17 Reporting

The System Administration Tool must produce standard reports, including those listed below. Contractor must retain content of reports in the Existing System, unless the Parties agree that such functionality is no longer necessary in the Next Generation System. For light rail vehicles, the System Administration Tool must enable Authorized Users have the ability to view the performance of both single-car light rail vehicles and multiple-car trains.

(a)   Route, Stop and Vehicle Predictions Accuracy – Past arrival times for all Vehicle-Arrival Predictions by individual route, stop, vehicle and date range.

(b)   General Prediction Accuracy – Past arrival times for all Vehicle-Arrival Predictions within the Accurate Prediction Ranges shown in Appendix F. Reports must compare the percentage of actual Vehicle-Arrival Predictions falling within the Accurate Prediction Ranges to the General Prediction Accuracy Rate to which Contractor has committed in Appendix F.

(c)   Terminal Departure Prediction Accuracy – Past terminal departure times within the Accurate Terminal Departure Prediction Ranges shown in Appendix F. Reports must compare the percentage of actual terminal departure times falling within the Accurate Terminal

Departure Prediction Ranges to the Terminal Departure Prediction Accuracy Rate to which Contractor has committed in Appendix F.

(d) Schedule Adherence – Real-time and historical schedule adherence by route, vehicle and Transit Stop.

(e) Headway Adherence – Real-time and historical headway adherence by route, vehicle and Transit Stop.

(f) Ghost Vehicles – Number and percentage of total Vehicle-Arrival Predictions where a ghost bus or train event occurs, per Transit Stop, route and direction.

(g) Schedule Associations – Real-time assignment of vehicles with its schedule block, run number and/or Transit Operator.

(h) Unknown Schedule Associations – The geocoordinates, time and date, and vehicle number for each instance of unknown associations between a vehicle and its schedule block, run number and/or Transit Operator.

(i) On-Time Performance – On-Time Performance by route and timepoint for a configurable period.

(j) Response Time for Trip Planner Requests – Number of seconds per request between when the System Software receives a customer's Trip Planner query and when it returns a response (excluding communications time to the Mobile Platform & Website). Contractor must enable the SFMTA to view this data on a transaction-level basis as well as in the aggregate (e.g., day, month, quarter, etc.).

(k) Sign Status – Historical sign status and reasons for non-operational status by custom time range.

(l) Text-to-Speech Status – Historical text-to-speech status at each sign location and reasons for non-operational status by custom time range.

(m) Vehicle Customer Information Status – Historical status of the availability of Customer Information for individual transit vehicles.

(n) Mobile Platform & Website Availability – Historical status (operational or non-operational, by cause) on an hourly basis for the term of the Agreement.

(o) Analytics Platform Availability – Historical status (operational or non-operational, by cause) on an hourly basis for the term of the Agreement.

(p) Switchbacks – Number of Switchbacks by route, geographical location, classified by whether the System auto-detected them or received direction from the CAD/AVL system, by day and time.

2.2.2.18 Interface to Upload Data Files

As described in Section 2.2.1.8, the System Software must intake real-time and static data from various sources in order to generate Customer Information. For those data sources originating from the SFMTA that require a file import, the System Administration Tool must enable Authorized Users to upload those files. The Parties will work together to determine the format of those files.

At minimum, the System Administration Tool must enable Authorized Users to import and manage schedule files as follows:

(a) Transit schedules:

    (i) Upload transit schedules to both test (TEST) and production (PROD) environments;

    (ii) Upload transit schedules for all routes associated with a schedule signup (occurs multiple times per year), both in TEST and PROD modes;

    (iii) Upload transit schedules for different types of delays (e.g., school weekdays, non-school weekdays, holiday season weekdays, Saturdays, Sundays, etc.) and associate those schedules with specific calendar days;

    (iv) Establish when a new transit schedule will be moved from the TEST to PROD environment;

    (v) Intake and computationally process a full set of schedules, once received by the System Administration Tool's automated upload tool, in approximately three hours and will notify Authorized Users if there are any errors and warnings.

(b) Transit Stops, including files that contain accessibility information;

(c) Timed Transfer Connections, including a file that designates Timed Transfer Connections for each route at any Transit Stop with the time range and schedule days (e.g., Weekday, Saturday or Sunday) when Timed Transfer Connections are in effect.

(d) Loop Jobs, both active and inactive. Loop Jobs should contain a field where Authorized Users can indicate a layover time for each Transit Stop.

2.2.2.19 Transaction-Level Data Feed

The System Administration Tool must provide a data feed containing all raw transaction-level data generated by the Next Generation System to the SFMTA's data warehouse for analysis and processing. The SFMTA will work with Contractor to define specifications for data transfer.

2.2.2.20 Transit Route Numbers and Names

In some cases, the numbers and names that the SFMTA uses internally for transit routes differ from the numbers and names shown to the public. The System Administration Tool must enable Authorized Users to modify customer-facing route numbers and names.

2.2.2.21 Route Traces

Route traces are the paths that transit vehicles travel along. In some cases, internal route traces differ slightly from customer-facing route traces. The System Administration Tool must enable Authorized Users to modify customer-facing route traces.

2.2.2.22 On-Board Digital Sign Software

The System Administration Tool must enable Authorized Users to manage the On-Board Digital Sign Software, which includes the following functionality, at minimum:

(a)   Edit the stop names for display and annunciation for each route and stop pair;

(b)   Intake an audio file in a format to be determined by the Parties that annunciates, for example, the names of Transit Stops;

(c)   Create general service written messages to display once or at configurable intervals (e.g., every 20 minutes, announce that customer should vacate seats for seniors and people with disabilities; every 10 seconds, check to see if the Transportation Management Center has sent a message to the vehicle);

(d)   Create general service written messages to display at configurable geographic locations;

(e)   Create general service written messages in response to vehicle events ("doors closing", "stop request", etc.); and

(f)   For (c), (d) and (e) above, intake audio files or automatically generate audio files in a format to be determined by the Parties to send to the on-board Integrated Vehicle Unit for annunciation on the public announcement system.

2.2.2.23 Elevator and Escalator Status User Interface (<u>Option</u>)

As an option exercisable by the SFMTA (priced in <u>Appendix E, Section 3.4.3</u>), the System Administration Tool must provide an interface to allow Authorized Users to indicate changes in elevator and escalator status at each underground station, and the status of five wayside lifts located at island platforms servicing the F Market & Wharves and M Ocean View rail lines.

2.2.3 Content Management System

By the end of Phase I, Contractor must provide a Content Management System for Authorized Users to select and design how to display content on Stationary Digital Signs and On-Board Digital Signs in accordance with the requirements below:

2.2.3.1 Authorized User Access

The Content Management System must provide for different levels of access for various classes of Authorized Users. The SFMTA must be able to set these levels of access for individual Authorized Users. Contractor must make the Content Management System accessible to these Authorized Users via a secure web interface.

2.2.3.2 Customer-Facing Interfaces

Prior to Initial Deployment of the Content Management System, the SFMTA will lead an iterative design process for the content and display of Customer Information on Stationary Digital Signs and On-Board Digital Signs. This process may require that the Parties meet with and solicit feedback from stakeholders (e.g., customers, community members and organizations, and other Transit Providers) through SFMTA-led workshops, focus groups, and surveys. The SFMTA will work with Contractor to develop a design review process for this purpose. The Content Management System must enable the SFMTA to configure content that reflects the feedback from this design review process.

After Initial Deployment of the Content Management System, the SFMTA may require that the Parties review the functional capabilities of the Content Management System to determine whether any changes are reasonably necessary to display updated content and formatting.

Contractor must perform these reviews and implement any resulting changes to the Content Management System at no additional cost to the SFMTA, subject to the changes being broadly within the original scope.

2.2.3.3 Internal and External Content

Content managed within the System Software includes Customer Information and other information not generated by the Next Generation System. The Content Management System must be able to use content from the Next Generation System and other sources identified by the SFMTA (e.g., Google Maps, SFMTA-generated database of Transit Stops, MTC's 511 vehicle arrival predictions for other Transit providers, 511 alerts, etc.) for the purpose of displaying this content on Stationary Digital Signs and On-Board Digital Signs. These sources may change during the term of this Agreement.

2.2.3.4 Content Templates

The Content Management System must enable Authorized Users to create and modify content templates. These content templates allow users to group, organize and customize categories of Customer Information based on the location and type of digital signs of the Stationary Digital Signs and On-Board Digital Signs that will display the information. For example, a Real-Time Vehicle Map content template groups and organizes Vehicle-Arrival Predictions content on a map for display on Stationary Digital Signs at a Transit Stop. Table B-2 provides a non-exhaustive list of content templates; for each sign-type, there may be multiple content templates applicable to different situations. Contractor must provide default content templates for testing.

Table B-2: Examples of Anticipated Content Templates

Content Template	Description	Examples of Sign Locations (not exhaustive)
Arrival Countdown	Vehicle-Arrival Predictions, Alternative Routes and Stops, Service-Change Alerts, Accessibility Information and other Customer Information, as appropriate	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4)
Real-Time Vehicle Map	Map showing the real-time vehicle locations of routes serving a stop, Vehicle-Arrival Predictions and Service-Change Alerts	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4)
Terminal Departures	Predicted departures at the start of a route	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4)
Light Rail Vehicle Map	Real-time map of Muni Metro trains and their predicted arrival, Service-Change Alerts and Accessibility Information, as appropriate	Underground rail stations (Stationary Digital Sign Type 3)
Transfer Connections Map	Real-time map of connecting routes and their Vehicle-Arrival Predictions	Underground rail stations (Stationary Digital Sign Type 3)
Delay Communications	Service-Change Alerts and communications around delays in travel and waiting times	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4) Underground rail stations (Stationary Digital Sign Type 3) On-Board vehicles
On-Board Digital Signs	System-generated Customer Information (e.g., Transfer Connections Predictions, route detours) and Vehicle-Generated Customer Information (e.g., next stop, stop request)	On-Board vehicles
Special Events	Special event detours and route cancellations, along with associated Service-Change Alerts (for both pre-planned and unplanned events)	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4) Underground rail stations (Stationary Digital Sign Type 3) On-Board vehicles
"Do it Yourself Transit Display"	Vehicle-Arrival Predictions specific to the location of third parties, directly accessible through a URL or through an API to facilitate customization by third parties	Third-parties such as hospitals, schools, restaurants and businesses (signs owned by third parties, not the SFMTA); signs within SFMTA Operating Divisions or other facilities
Salesforce Transit Center Pylons	Vehicle-Arrival Predictions, Service-Change Alerts, maps, and other Customer Information	Upper level bus deck (PD1 pylon) Lower level bus plaza (PD2 pylon)
Station Entrance	Vehicle-Arrival Predictions and Accessibility Information for trains serving station	Entrances of BART/Muni shared stations (sign owned by BART)
Accessibility Information	Elevator and escalator outages, wheelchair access, required stair navigation, lack of curb ramps, and other accessibility information	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4) Underground rail stations (Stationary Digital Sign Type 3) On-Board vehicles
Real-Time Vehicle Map	Map showing the real-time vehicle locations of routes serving a stop, Vehicle-Arrival Predictions and Service-Change Alerts	Surface-level bus and rail stops (Stationary Digital Sign Types 1, 2 and 4)

At a minimum, the Content Management System must enable Authorized Users to create and modify content templates, including the ability to:

(a)   Design and save multiple content templates for each sign type and download in real-time and in advance;

(b)   Preview Customer Information before implementation;

(c)   View a live display of each template;

(d)   View a live display of individual signs;

(e)   View Customer Information for a specific sign type; and

(f)   View Customer Information at a specific location.

2.2.3.5   Formatting

The Content Management System must enable Authorized Users to configure all parameters for each sign type, including fonts, font sizes, character limits, sign size, and display mode (color vs. black and white). The Content Management System must enable Authorized Users to incorporate images, animations, and video, and apply branding and associated colors to route categories (e.g., coloring "Rapid" routes red, non-"Rapid" routes blue, historic cable cars and streetcars orange).

2.2.3.6   Maps

The Content Management System must enable Authorized Users to access maps from standard third-party sources such as Google Maps, Mapbox, and Open Streetmaps. The system must provide tools to configure map layers, routes, stops, colors, labels, font sizes and other elements.

2.2.4   As-Needed Software Development Services

As directed by the SFMTA, Contractor must provide as-needed software development services not mentioned above. Contractor must perform as-needed software services under Task Orders the SFMTA issues in accordance with Section 3.5 of the Agreement.

2.3   Performance Requirements

The System Software must comply with the applicable Performance Requirements in Appendix F, Table F-1 which include Nos. 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6. Failure to comply with certain of these Performance Requirements may subject Contractor to Liquidated Damages, as indicated in Appendix G.

3   STATIONARY DIGITAL SIGNS

Contractor must furnish and install a network of Stationary Digital Signs as described in this section. Contractor must maintain this network as described in <u>Appendix C</u>.

3.1   Deliverables

Contractor must furnish and, as applicable, install the following deliverables, which include the following Stationary Digital Signs and ancillary equipment:

    (a)   Powered Shelter Signs (Type 1);

    (b)   Powered Signs at Outdoor Rail Platforms (Type 2);

    (c)   Powered Signs at Underground Stations (Type 3);

    (d)   Alternatively-Powered Signs (Type 4); and

    (e)   Other signs, as directed by the SFMTA.

Contractor must install Stationary Digital Signs that display Customer Information at Existing System Sign Locations by the Stationary Digital Sign Transition Milestone in accordance with <u>Appendix F</u>. The functional requirements for the Stationary Digital Signs are set forth in <u>Section 3.2</u>.

3.2   Functional Requirements

The functional requirements for the Stationary Digital Signs are set forth below.

3.2.1   General Requirements

These general requirements apply to all Stationary Digital Signs regardless of type. <u>Sections 3.2.2</u> through <u>3.2.8</u> define requirements to specific sign types.

Contractor must furnish and install Stationary Digital Signs at Transit Stops selected by the SFMTA. <u>Table B-3</u> shows the types of Stationary Digital Signs that Contractor must install at different types of Transit Stops, and whether these signs will replace Legacy Signs or are new signs at locations that do not currently have a sign. For each sign, Contractor must furnish and install all components, including text-to-speech hardware, required for full functionality.

Table B-3: Type of Transit Stop and Stationary Digital Signs

Type of Transit Stop	Powered Signs	Alternatively-Powered Signs
Outdoor bus and rail stops at shelters maintained by SFMTA's shelter Vendor	Type 1 (replace)	Type 4 (new)
Outdoor bus and rail stops at other shelters not maintained by SFMTA's shelter Vendor (e.g., historic shelters, Embarcadero shelters between Ferry Building and Fisherman's Wharf)	Type 1 (replace)	Type 4 (new)
Outdoor "island" bus and rail stops (between two traffic lanes) (e.g., Market Street, rail platforms at Church & Duboce)	Type 1 (replace)	Type 4 (new)
Outdoor curbside bus and rail stops without shelters	None	Type 4 (new)
Outdoor high-level rail platforms (e.g., Third Street T Line stations, South Embarcadero N & T Line stations, San Francisco State University and Stonestown M Line stations)	Type 2 (replace)	None
Fully-enclosed underground rail stations – mezzanine and platforms	Type 3 (replace)	None
Outdoor transit centers (e.g., Unity Plaza)	Type 3 (new)	None
Salesforce Transit Center signs*	See note below (new)	None

* At the Salesforce Transit Center, Contractor must provide monitors (pending approval from the Transbay Joint Powers Authority and the SFMTA) (refer to Section 3.2.7 for requirements)

The following sections describe requirements in detail.

3.2.1.1   Sign Acceptance

In its Quality Assurance/Quality Control Plan (Section 1.3.2), Contractor must:

(a)   Provide drawings and specifications of each sign type in the System Design Document for SFMTA's approval; and

(b)   Provide a prototype for each sign type for SFMTA approval for factory acceptance testing, prior to manufacturing signs in bulk. Contractor must provide SFMTA staff with at least 14 days' notice for in-state factory acceptance testing and 30 days' notice for out-of-state factory acceptance testing.

(c)   Install a prototype of each sign type for SFMTA approval at each type of Transit Stop indicated in Table B-3.

3.2.1.2   Installation of Replacement or New Signs

(a)   At the direction of and at Transit Stops identified by the SFMTA, Contractor must either (i) remove and dispose of Legacy Signs, and install replacement signs, or (ii) install new signs where Legacy Signs do not exist.

(b)   Contractor must install Stationary Digital Signs (new or replacement) without requiring any work that significantly affects (i) the design of the structure to which the signs are attached (e.g., transit shelter, outdoor rail platform, underground rail station), and/or (ii) the design of interior renovation of that structure, in either case due to physical dimension, power

connection, or data communication, and/or coordination with construction trades, including electrical, plumbing, mechanical, or building controls.

(c)   Contractor must install new signs, test and confirm that they are operational no later than 24 hours after Contractor disconnects any Legacy Sign for replacement, unless otherwise authorized by the SFMTA.

(d)   Contractor must install Stationary Digital Signs without interfering with Muni transit operations and in accordance with SFMTA's Roadway Worker Protection policy, as described in Appendix C, Section 2.3.

3.2.1.3 Warranty

The Stationary Digital Signs must have a design life of no less than 15 years after installation. This design life must include routine component refresh performed under the maintenance services in Appendix C, Section 2. Contractor must guarantee the performance of Stationary Digital Signs in accordance with the warranty in Appendix C, Section 2.8.

3.2.1.4 Display Features

Stationary Digital Signs must support all contemporary multimedia display features. Examples of contemporary multimedia features include:

(a)   Different contemporary web fonts and font sizes, and fonts provided by the SFMTA;

(b)   Accents and characters found in foreign languages such as Spanish and Chinese (traditional);

(c)   Static graphics to communicate information such as maps and other detailed, highly visual information;

(d)   Animated graphics to communicate information such as maps and other detailed, highly visual information (for powered signs);

(e)   High-definition video to support information such as advertisements (for powered signs); and

(f)   Color that must meet contemporary color-gamut standards for Liquid Crystal Display (LCD) monitors (for powered signs).

Contemporary multimedia display features may change as technology advances during the term of the Agreement. Contractor must choose signs that would not preclude the implementation of reasonably foreseeable technological improvements over the term of the Agreement.

3.2.1.5 Americans with Disabilities Act

Stationary Digital Signs must comply with the Americans with Disabilities Act (ADA) for the display and annunciation of essential Customer Information such as Vehicle-Arrival Predictions, Transfer Connection Predictions and Service-Change Alerts. Additional information is provided below.

Signs must display information in readable font sizes, depending on the height from the ground and horizontal viewing distance from the customer. Current minimum character heights are provided in Table B-4.

Table B-4: Current Minimum Sign Font Sizes, Americans with Disabilities Act

Height to Finish Floor or Ground from Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	less than 72 inches (1830 mm)	5/8 inch (16 mm)
40 inches (1015 mm) to less than or equal to 70 inches (1780 mm)	72 inches (1830 mm) and greater	5/8 inch (16 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 72 inches (1830 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	less than 180 inches (4570 mm)	2 inches (51 mm)
Greater than 70 inches (1780 mm) to less than or equal to 120 inches (3050 mm)	180 inches (4570 mm) and greater	2 inches (51 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 180 inches (4570 mm)
Greater than 120 inches (3050 mm)	less than 21 feet (6400 mm)	3 inches (75 mm)
Greater than 120 inches (3050 mm)	21 feet (6400 mm) and greater	3 inches (75 mm), plus 1/8 inch (3.2 mm) per foot (305 mm) of viewing distance above 21 feet (6400 mm)

3.2.1.6   Text-to-Speech Functionality

Contractor must provide and maintain text-to-speech functionality that, upon customer request, orally announces Customer Information displayed on Stationary Digital Signs. The SFMTA will determine the specific types of Customer Information requiring annunciation. This text-to-speech functionality applies to all sign types, with limited exemptions which the SFMTA may grant in its sole discretion.

At most Type 1 and Type 2 locations, the Existing System currently features a "push-to-talk" button and speaker currently housed within the same unit. Unless otherwised exempted by the SFMTA, Contractor must install "push-to-talk" buttons at Type 1, Type 2 and Type 3 sign locations where they do not currently exist.

Text-to-speech functionality must be able to annunciate Customer Information text displayed on any sign. The voice must sound natural and not be muffled by any housing.

Contractor's placement of text-to-speech systems must comply with Americans with Disabilities Act requirements. To the extent possible as determined by the SFMTA, the placement must be consistent for each sign type (e.g., a customer should be able to find the text-to-speech system in the same general location at all outdoor powered shelters).

Listed below are certain Vendors and other third parties for whose systems or products Contractor must install its text-to-speech system. Contractor must work with these third parties and Vendors as necessary to ensure their systems or products can accommodate the text-to-speech system:

(a)   Shelters (Clear Channel);

(b)   Salesforce Transit Center PD1 and PD2 Pylons (TJPA and Pearl Media); and

(c)   All BART-owned Muni Metro Underground Stations (BART).

3.2.1.7 Data Communications

At underground stations, the SFMTA will provide Contractor an ethernet connection for data transmission to Stationary Digital Signs. At surface locations, including surface rail stations, Contractor must provide communications between the System Software and Stationary Digital Signs such that Stationary Digital Signs can display Customer Information.

Stationary Digital Signs must support contemporary means of communications, which currently include:

(a)   Long-term evolution (LTE), a standard for high-speed wireless communication for mobile devices and data terminals;

(b)   WiFi, wireless local area networking;

(c)   Bluetooth low energy (BLE); and

(d)   Hard-wired ethernet connection.

Understanding that communications technology may advance during the term of this Agreement, Contractor must ensure that all Stationary Digital Signs can communicate with the System Software to permit the display of Customer Information without service outages over the potential 15-year term of this Agreement.

3.2.1.8 Self-Diagnosis

Stationary Digital Signs must self-diagnose basic operational performance. This includes but is not limited to the status of:

(a)   Power (electric or alternatively-powered);

(b)   Communications with the System Software; and

(c)   Displays of Customer Information.

3.2.1.9 Vandalism Resistance

Stationary Digital Signs must be resistant to vandalism such as graffiti, etching, and disfigurement. Vandalism resistance may include adhesive films and casing.

3.2.1.10 Environmental Durability

Stationary Digital Signs installed outdoors must function in San Francisco's climate, which includes fog, rain, temperatures ranging from 20 to 115 degrees Fahrenheit (measured in the shade) and variable humidity. Note that temperatures may be higher than 115 degrees Fahrenheit if the sign is exposed to the sun.

Stationary Digital Signs installed indoors (e.g., inside rail stations) must function in temperatures ranging from 30 to 105 degrees Fahrenheit and variable humidity. Additionally, signs must function in an environment where there may be dust and grime from trains.

3.2.1.11 Visibility

In accordance with current industry standards regarding luminous intensity, Stationary Digital Signs must be visible in daylight, at dawn and dusk, and at night.

3.2.1.12 Refresh Rate

Powered Stationary Digital Signs must have the capability of refreshing Customer Information at least once every 10 seconds. Alternatively-Powered Stationary Digital Signs must have the capability of refreshing content at least once every 20 seconds to minimize battery power draw.

3.2.1.13 Hours of Operation

Stationary Digital Signs must be functional 24 hours, 7 days per week in accordance with the System Software Availability Rate performance standard to which Contractor agreed in Appendix F. Upon mutual agreement of the Parties, the SFMTA will permit limited outages for sign maintenance or replacement. Approved scheduled outages for sign maintenance or replacement must not exceed 1% of the total possible number of systemwide sign-hours in any given calendar year. A sign-hour is defined as one sign in operation for one hour; for example, if there are 1,000 signs, there would be 8.76 million annual sign-hours (1,000 signs x 365 days/year x 24 hours/day).

3.2.1.14 Ownership

The SFMTA will own title to all Stationary Digital Signs upon purchase.

3.2.1.15 Seismic Safety

Contractor must install seismic restraints for Stationary Digital Signs as required to meet applicable codes and regulations, including the most recent California Building Code.

3.2.1.16 Electrical Safety Codes

Contractor must comply with the National Electrical Code (NEC) and other applicable federal, state and local safety codes.

3.2.1.17 Sign Status Updates

Contractor must track and report to the SFMTA the location and status of all Stationary Digital Signs the SFMTA purchases, whether or not signs are installed. Contractor must track anytime it performs maintenance on, installs or removes any sign. The SFMTA will periodically provide to Contractor sign installations and removals performed by its shelter Vendor, currently Clear Channel, in a format to be determined by the Parties in the System Design Document. Contractor must also track these sign installations and removals.

Contractor's asset management system will export a file containing each sign's current status in an Excel or CSV format at least once a week or at another frequency determined by the Parties and documented in the System Design Document. This status must include the sign type, location (including uninstalled signs in storage), the action taken (e.g., repair), the issue resolution, date of installation or removal, and any other pertinent information. The SFMTA will be responsible for importing this information into its Enterprise Asset Management System.

Contractor must provide the SFMTA with a weekly report on the status of each sign. At the SFMTA's request, Contractor must provide maintenance and status history about specific signs or groups of signs.

3.2.1.18 Remote Management

The SFMTA, or Contractor at the direction of the SFMTA, must be able to manage all Stationary Digital Signs remotely through the System Administration Tool, including settings configuration as well as software and firmware upgrades. See <u>Section 2.2.2.16</u>.

3.2.1.19 National Electrical Manufacturers Association (NEMA) Ratings

Any Stationary Digital Sign exposed to the elements must meet a NEMA rating of 4X (IP66). Within underground stations, Stationary Digital Signs must meet a NEMA rating of 12 (IP52) so long as the sign is in a fully-enclosed environment. At some underground stations and transit centers, such as West Portal Station, the future Chinatown Station, Salesforce Transit Center and other transit centers such as Unity Plaza, some signs will be exposed to the elements and will require a NEMA 4X (IP66) rating.

3.2.2 Powered Shelter Signs (Type-1 Signs)

By the end of Phase I, Contractor must replace all existing Type-1 Signs with Next Generation System Type-1 Signs as described below.

3.2.2.1 Dimensions

Contractor must furnish Type-1 Signs with dimensions, including the sign housing, that fit within the shaded aperture in <u>Figure B-2</u> and confirmed by physical measurement. These maximum dimensions are larger than the dimensions of Existing System's Type-1 Signs in order to take advantage of currently unused space between the top of the existing sign and the horizontal shelter support beam. Unless otherwise authorized by the SFMTA, the new Type-1 Sign will measure 15.5" x 25.6" with a screen measuring 11.8" x 23.0" in order to maximize the surface area to display information.
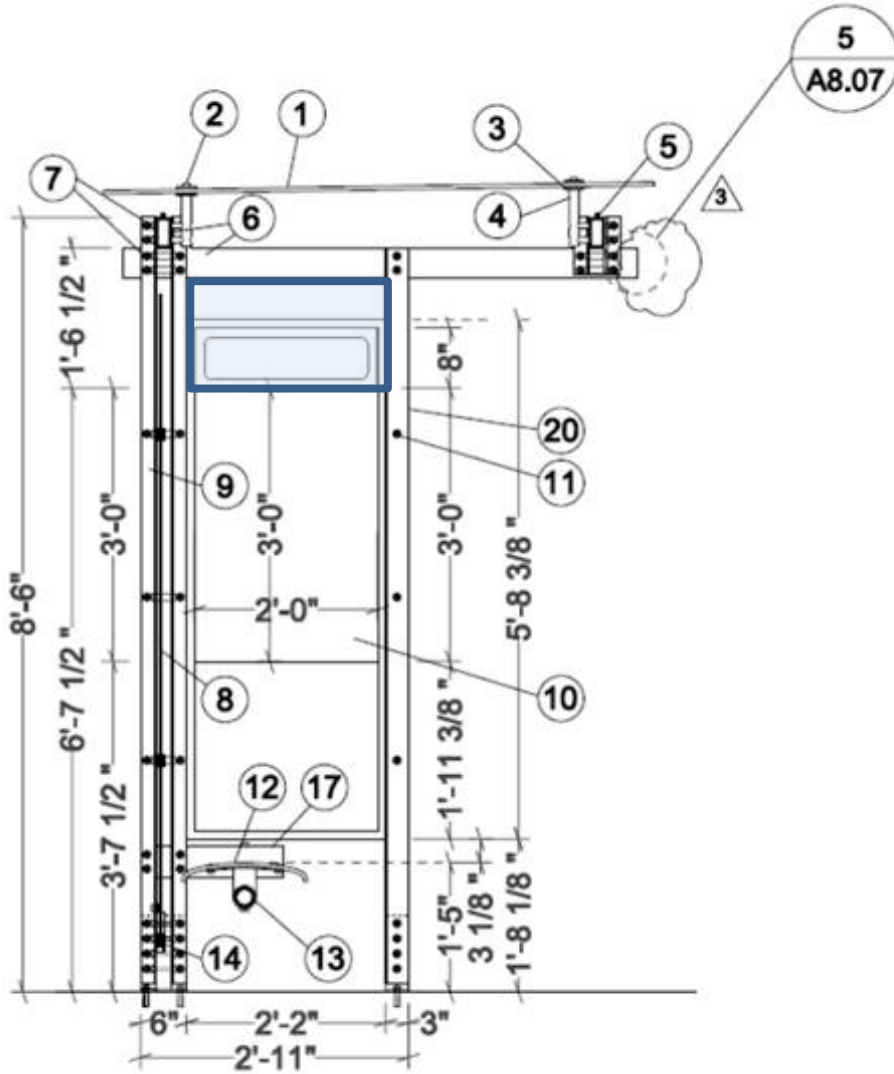
Figure B-2: Type-1 Sign placement within shelter

3.2.2.2 Number of Screens

Contractor must provide both single-sided and double-sided versions of Type-1 Stationary Digital Signs. The single-sided version enables customers to view the sign from one side. The double-sided version enables customers to view the sign from either side. For the double-sided sign, Contractor must provide the option to display either the same content or different content on each side. The SFMTA shall determine the quantities (if any) of each sign version.

3.2.2.3 Resolution

Type-1 Signs must have a minimum resolution of 1920 x 1080 pixels.

3.2.2.4 Weight

Type-1 Signs must not exceed 60 pounds for single-sided signs, or 120 pounds for double-sided signs, so as not to compromise the integrity of the shelter.

3.2.2.5 Video Cameras

Type-1 Signs must include an embedded camera capable of capturing both photographs and video and capable of streaming this information via a standard IP connection. Contractor is not responsible for storing or transmitting captured photographs or video. During the development of the System Design Document, the Parties will work together to allow the SFMTA to evaluate future opportunities to receive streaming video from the camera through its current video management software (VMS) system.

3.2.2.6 Integration with Existing Shelters

Contractor must work with the current shelter Vendor, Clear Channel, or any future shelter vendor to ensure shelters can accommodate Type-1 Signs, as noted below. The SFMTA will not modify its existing contract with Clear Channel to integrate Type-1 Signs into shelters. The SFMTA has identified several issues for Contractor to address with Clear Channel, including:

(a)   Sign fitting – Prior to manufacturing Type-1 Signs, Contractor must install and test a prototype sign in a shelter and work with Clear Channel to ensure fit within the dimensions allowed by the shelter. Contractor must also verify that its sign can fit in all Clear Channel shelters.

(b)   Weight – The sign weight must not exceed 60 pounds (for single-sided signs) and 120 pounds (for double-sided signs) in order to guarantee the shelter's structural integrity. Contractor must work with Clear Channel to ensure the structure can accommodate the sign.

(c)   Power – Type-1 Signs must be powered from the existing 120V AC circuit provided by Clear Channel. The existing power consumption allowance for these circuits is 55 watts. If requested by the SFMTA and subject to (i) and (ii) below, Contractor must enter into a separate agreement with Clear Channel for Type 1 signs, under which agreement Contractor must pay provider(s) for Excess Power. The SFMTA will make this request, if at all, no later than 120 days before Initial Deployment of the first Type 1 Sign(s). The SFMTA will then:

> (i)   Notify, and get agreement from, Clear Channel to enter into an agreement with Contractor for the invoicing of Excess Power charges (invoiced on a quarterly basis); and

> (ii)   Work with Contractor and third-party provider(s) to finalize the fixed monthly fee based on the initial estimated Excess Power consumption for each sign type as set forth in Appendix E, Section 4.4.

(d)   Proof-of-performance cameras – Contractor must work with Clear Channel to maintain proof-of-performance camera functionality while maximizing the area of the Type-1 Signs. This may require moving the proof-of-performance camera to another location.

3.2.3 Powered Signs at Outdoor Rail Platforms (Type-2 Signs)

By the end of Phase I, Contractor must replace with its signs all existing Type-2 Signs at outdoor rail platforms.

At the outdoor 4th and Brannan Station on the Central Subway alignment, Contractor must install and test two Type-2 Signs by the end of Phase I or prior to the opening date of the Central Subway, whichever is earlier.

3.2.3.1 Dimensions

Type-2 Signs must be sized to contain the same information as Type-1 Signs. Because they will generally be hanging from horizontal support beams higher than 10 feet off the ground, the dimensions of Type-2 Signs must accommodate larger font sizes conforming with Americans with Disabilities Act guidelines. Unless otherwise authorized by the SFMTA, Type-2 signs will measure 22.4" x 34.6" with a screen measuring 15.5" x 27.5" in order to to maximize the surface area to display information.

3.2.3.2 Resolution

Type-2 Signs must have a minimum resolution of 1920 x 1080 pixels.

3.2.3.3 Weight

Type-2 Signs must not exceed 200 pounds, so as not to compromise the integrity of the station structure.

3.2.3.4 Installation

Contractor must install all Type-2 Signs, including terminating electrical connections. Figure B-3 includes a photo of existing Type-2 signs at typical outdoor rail platforms on the T Third line and provides a technical drawing of the sign installation. (Specific dimensions and layouts may vary from station to station, i.e., at different T Third stations and at Stonestown and San Francisco State University along the M Ocean View line.) Prior to manufacturing Type-2 Signs, Contractor must install and test a prototype sign at an outdoor rail platform to ensure fit.
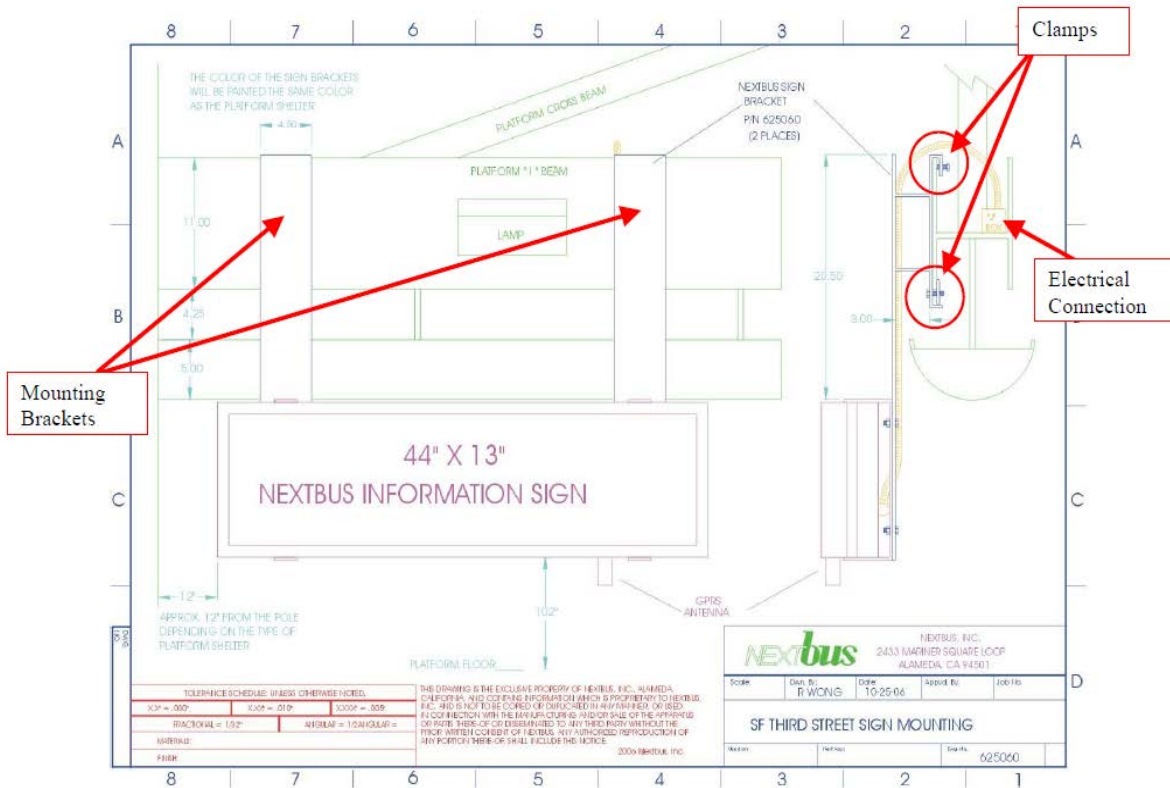
Figure B-3: Existing Powered Signs at Outdoor Rail Platforms

(a) Photo of suspended sign, (b) Technical drawing showing sign installation at a typical T Third outdoor platform (installation may vary from station to station, i.e., at different T Third stations and at Stonestown and San Francisco State University along the M Ocean View line)

3.2.3.5   Power

Type-2 Signs must be powered from the existing 120V AC circuits supporting the Existing System's powered signs at outdoor rail platforms. Type-2 Signs must not exceed 350 watts in power consumption.

3.2.3.6   Number of Screens

Contractor must provide both single-sided and double-sided versions of Type-2 Signs. The double-sided version enables customers to view the sign from either side. For the double-sided sign, Contractor must provide the option to display either the same content or different content on each side. The SFMTA shall determine the quantities (if any) of each sign version.

3.2.4   Powered Signs at Underground Stations and Transit Centers (Type-3 Signs)

By the end of Phase I, and at the direction of the SFMTA, Contractor must replace or install the following Type-3 Signs:

(a)   Dynamic Rail System Map – LCD monitors on rail station platforms that display Vehicle-Arrival Predictions (including train geolocations on a map), elevator and escalator outages and other Customer Information.

(b)   Transfer Connection Map – LCD monitors on station mezzanines that display Transfer Connection Predictions content and other Customer Information.

(c)   For new Central Subway stations, Contractor must install and test Type-3 Signs by the end of Phase I or prior to the opening date of the Central Subway, whichever is earlier.

(d)   At transit centers, Contractor must install and test Type-3 Signs as directed by the SFMTA. An example of a transit center would be at Unity Plaza.

3.2.4.1 Dimensions

Unless otherwise authorized by the SFMTA, Type-3 Signs will measure 27.1" x 43.3" with a screen measuring 20.8" x 36.8" in order to maximize the surface area to display information. The dimensions must be sufficient to accommodate a dynamic map showing the positions of vehicles within a configurable radius as well as the route and expected waiting time.

3.2.4.2 Power

The SFMTA will provide power to Type-3 Signs, so long as the power draw does not exceed the specifications for existing signs, which are:

(a)   Power internal power supply with universal/Auto-Sensing, AC 90 to 260V, 50 / 60 Hz; and

(b)   Power consumption operation/power saving 202 watt, < 5 watt (Support DPMS).

3.2.4.3 Weight

Type-3 Signs must not exceed 75 pounds (excluding casing), so as not to compromise the integrity of the station structure. Any significant deviation from existing Type-3 Signs may require the approval of BART, which owns all current Muni Metro stations except Forest Hill.

3.2.4.4 Casing

If directed by the SFMTA, Contractor must provide protective casing for Type-3 Signs. Casings must not exceed 75 pounds such as not to compromise the integrity of the station structure. Any significant deviation from existing casing for Type-3 Signs may require the approval of BART.

3.2.4.5 Sign Locations and Mounting – Market Street Subway and Twin Peaks Tunnel Stations

Contractor must mount Type-3 Signs at locations the SFMTA identifies. Generally, there will be at least one Type-3 Sign per platform at each current underground station (i.e., Embarcadero, Montgomery, Powell, Civic Center, Van Ness, Church, Castro, Forest Hill, and West Portal). There may also be Type-3 Signs on station mezzanines.

3.2.4.6 Sign Locations, Mounting and Customer Information Requirements – Central Subway Stations

Each of the Central Subway's underground stations (i.e., Yerba Buena/Moscone, Union Square/Market Street and Chinatown) has a unique design. Contractor's Services in connection with Stationary Digital Signs required at each station fall into one of the following categories:

(a)   The Central Subway Project will furnish Type-3 Signs, and Contractor must provide a URL with Customer Information to display.

(b)   The Central Subway Project furnishes power and data connectivity for wall-mounted Stationary Digital Signs, and Contractor must furnish and install Type-3 Signs, enclosures, and transmit and display Customer Information on these signs. These Type-3 Signs must be at least as large as current signs, which measure 42" diagonally at a 16:9 aspect ratio.

(c)   The Central Subway Project provides power and data connectivity for a Type-3 Sign to be housed within a kiosk. The kiosks vary from station-to-station, as detailed below. Contractor must furnish and install Type-3 Signs, housing for the signs (so signs can fit within the kiosk), and transmit and display Customer Information on these signs. Signs must fit within the dimensions of the kiosks.

(d)   PAV signs display Vehicle-Arrival Predictions. At the direction of the SFMTA, Contractor must provide a JSON feed to the PAV sign with real-time predictions. The PAV system independently controls the layout and formatting of the information displayed on its signs.

Table B-5 indicates the real-time information infrastructure provided by the Central Subway Project and the requirements for Contractor at each Central Subway underground station.

Table B-5: Central Subway Customer Information Requirements

Location	Real-Time Information Infrastructure provided by Central Subway Project	Next Generation System Contractor Requirements
(a) Yerba Buena/Moscone Station		
Entrance	1 40" LCD sign	Provide URL with Customer Information to display
Concourse (Mezzanine)	1 wedge-shaped kiosk with: 1 40" LCD sign provided by the Central Subway Project Power and data connectivity to fit a sign	Provide URL with Customer Information to display Provide and install 1 sign and housing and provide associated Customer Information
Platforms	2 wedge-shaped kiosks to fit signs with power and data connectivity 4 PAV signs	Provide and install 1 sign and housing per kiosk and provide associated Customer Information Provide JSON feed to PAV back-end system
(b) Union Square/Market Street Station		
Entrance	1 40" LCD sign	Provide URL with Customer Information to display
Concourse (Mezzanine)	Power and data connectivity for 2 wall-mounted signs 2 PAV signs	Provide and install 2 signs and provide associated Customer Information Provide JSON feed to PAV back-end system
Platforms	2 triangular-shaped kiosks to fit signs (For each kiosk, 1 out of the 3 sides will have space for signs) 4 PAV signs	Provide and install 2 signs and housing (1 for each kiosk), and provide associated Customer Information Provide JSON feed to PAV back-end system
(c) Chinatown Station		
Entrance	Power and data connectivity for a wall-mounted sign 1 PAV sign	Provide and install 1 sign and provide associated Customer Information Provide JSON feed to PAV back-end system
Concourse	1 PAV sign	Provide JSON feed to PAV back-end system
Platforms	Walls at both ends of the platform with Power and data connectivity for a wall-mounted sign 4 PAV signs	Provide and install 1 sign per wall and provide associated Customer Information Provide JSON feed to PAV back-end system

Prior to the SFMTA opening the Central Subway for Revenue Service, Contractor must install Stationary Digital Signs at underground stations at times of day or night approved by the SFMTA. After the Central Subway opens for Revenue Service, Contractor must perform maintenance services as described for these signs in Appendix C.   The following subsection set forth Contractor's requirements for each Central Subway underground station.

3.2.4.6.1 Yerba Buena/Moscone Station

At the Yerba Buena/Moscone Station, there are two wedge-shaped kiosks on the platform and one wedge-shaped kiosk on the concourse (kiosk diagram shown in Figure B-4).

(a)   Contractor must provide and install Type-3 Signs that fits on the "map side" of the kiosk, with the sign width, height and depth not exceeding the space available within the kiosk. The dimensions of the space available for Contractor signs are 40" x 24" x 9." The sign dimensions must be consistent with other Type-3 Signs in other stations, with the exception of the Union Square/Market Street station.

(b)   For the wedge-shaped kiosk on the concourse, the Central Subway Project will furnish a sign for one half of the "map side." Contractor must furnish a Type-3 Sign for the other half of the "map side."

(c)   For each of the two wedge-shaped kiosks on the platform, Contractor must provide a Type-3 Sign on the "map side."

(d)   Contractor must furnish: (1) the Type-3 Sign, which must be flush to the kiosk; (2) the mounting and supports for the sign; (3) any necessary housing; (4) a matching finish consistent with the kiosk's external surface that covers any surface gaps; (5) a power connection to an outlet within the kiosk provided by the Central Subway Project; and (6) a data connection to an RJ45-terminated CAT6 cable within the kiosk provided by the Central Subway Project.

(e)   Contractor must also provide a URL with Customer Information to display on LCD signs at the station entrance and concourse.

Figure B-4: Platform Kiosk at Yerba Buena/Moscone Station
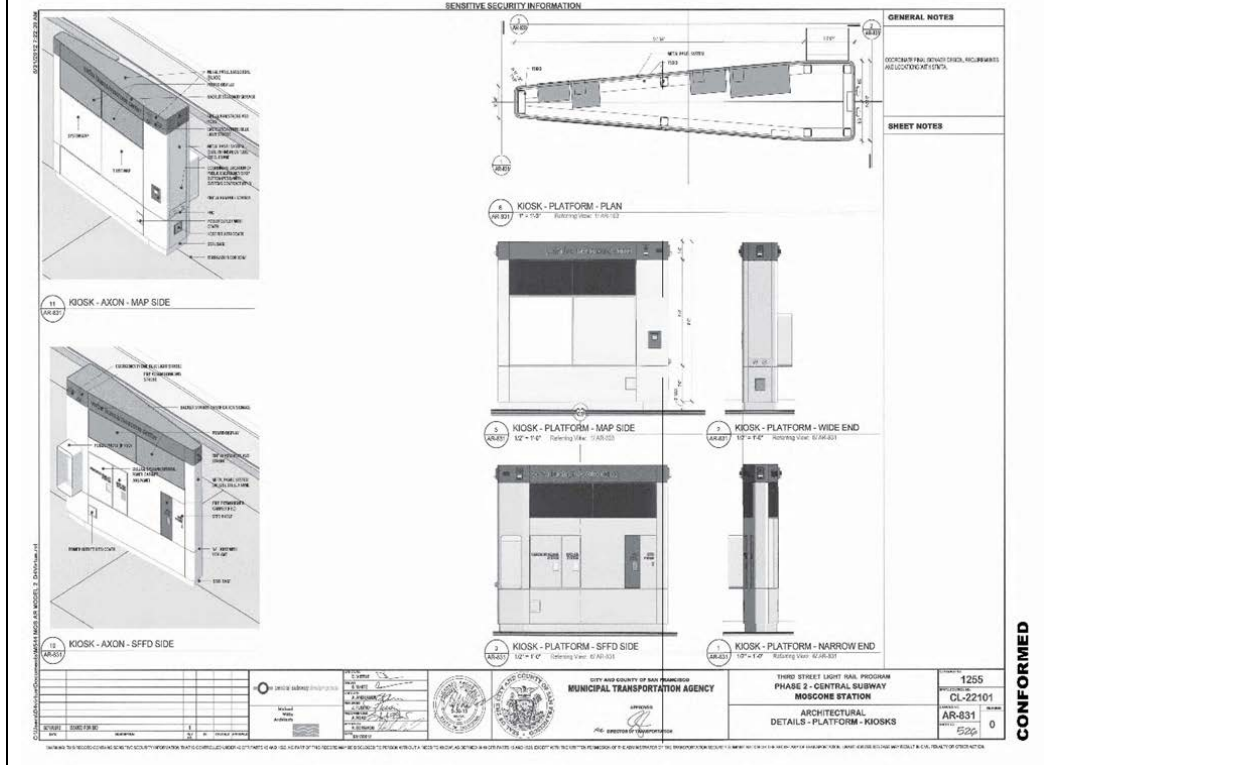
3.2.4.6.2   Union Square/Market Street Station

At the Union Square/Market Street Station, there are two triangular-shaped kiosks as shown in Figure B-5.

(a)   Contractor must provide 32" monitors for two of the three sides for each kiosk. The kiosks are designed to accommodate 32" monitors.

(b)   Contractor must provide and install Type-3 Signs that fit on the "map side" of the kiosk, with the sign width, height and depth not exceeding the space available within the kiosk. The dimensions of the space available for Contractor signs are 32" x 25" x 5."

(c)   Contractor must furnish: (1) the Type-3 Sign, which must be flush to the kiosk; (2) the mounting and supports for the sign; (3) any necessary housing; (4) a matching finish consistent with the kiosk's external surface that covers any surface gaps; (5) a power connection

to an outlet within the kiosk provided by the Central Subway Project; and (6) a data connection to an RJ45-terminated CAT6 cable within the kiosk provided by the Central Subway Project.

(d)   Contractor must provide two Type-3 Signs in wall-mounted enclosures. The Central Subway Project will provide a power connection and a data connection to an RJ45-terminated CAT6 cable.

(e)   Contractor must provide a URL with Customer Information to display on LCD signs displayed at the station entrance and concourse.

Figure B-5: Platform Kiosk at Union Square/Market Street Station
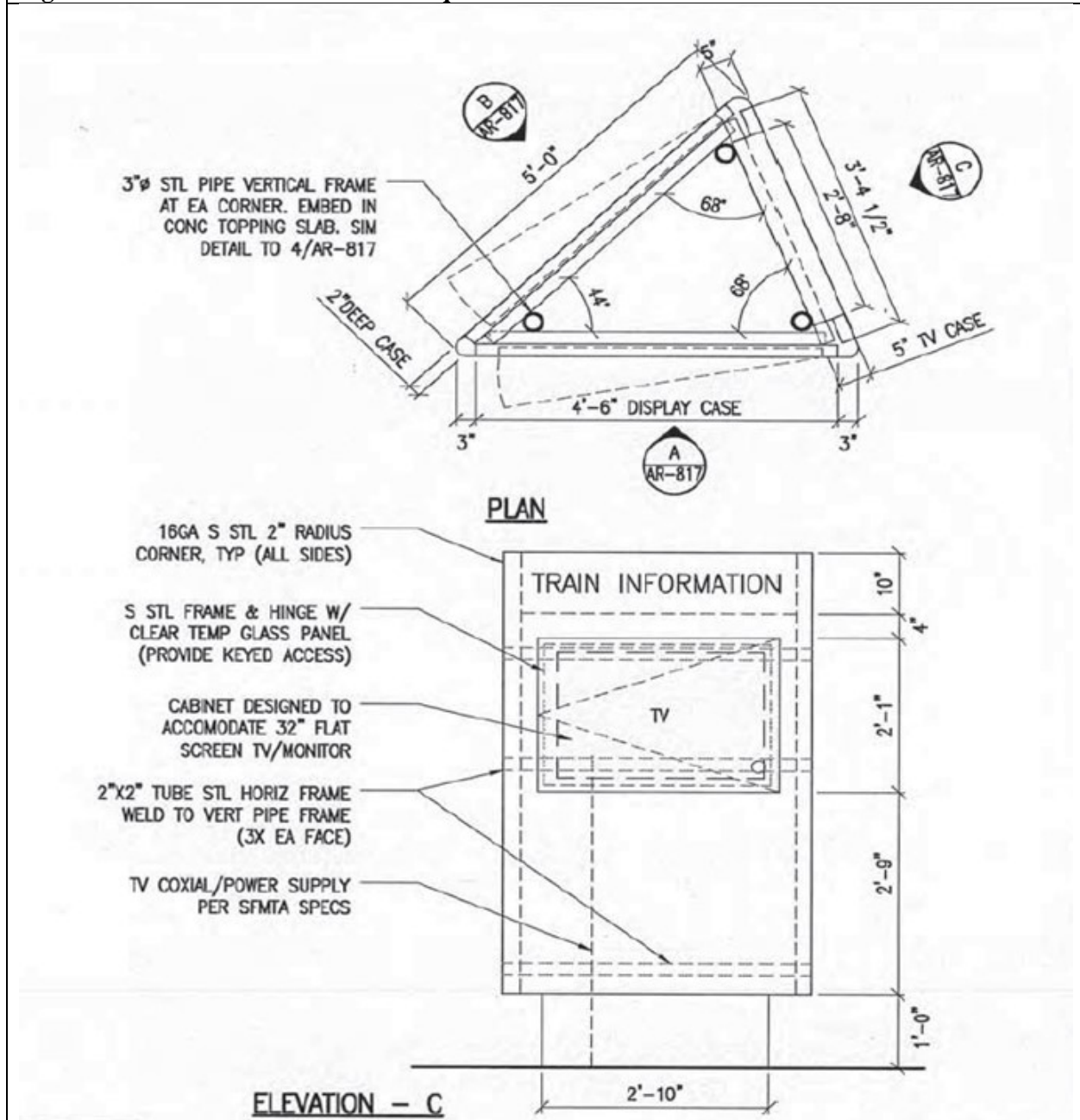
### 3.2.4.6.3 Chinatown Station

As shown in Figure B-6, at the Chinatown Station, there is a wall at either end of the station platform to accommodate a Stationary Digital Sign.

(a)   Contractor must furnish and install a Type-3 Sign that fits with the 3'10" by 4'0" "Map Case" on each wall, with the sign width, height and depth not exceeding the space available. The sign dimensions must be consistent with other Type-3 Signs in other stations, with the exception of the Union Square/Market Street station.

(b)   Contractor must furnish: (1) the Type-3 Sign; (2) the mounting and supports for the sign; (3) any necessary housing; (4) a matching finish consistent with the wall's external surface that covers any surface gaps; (5) a power connection to an outlet provided by the Central Subway Project; and (6) a data connection to an RJ45-terminated CAT6 cable provided by the Central Subway Project.

(c)   Contractor must furnish one Type-3 sign in a wall-mounted enclosure by the entrance. The Central Subway Project will provide a power connection and a data connection to an RJ45-terminated CAT6 cable.

Figure B-6: Wall at End of Platform at Chinatown Station
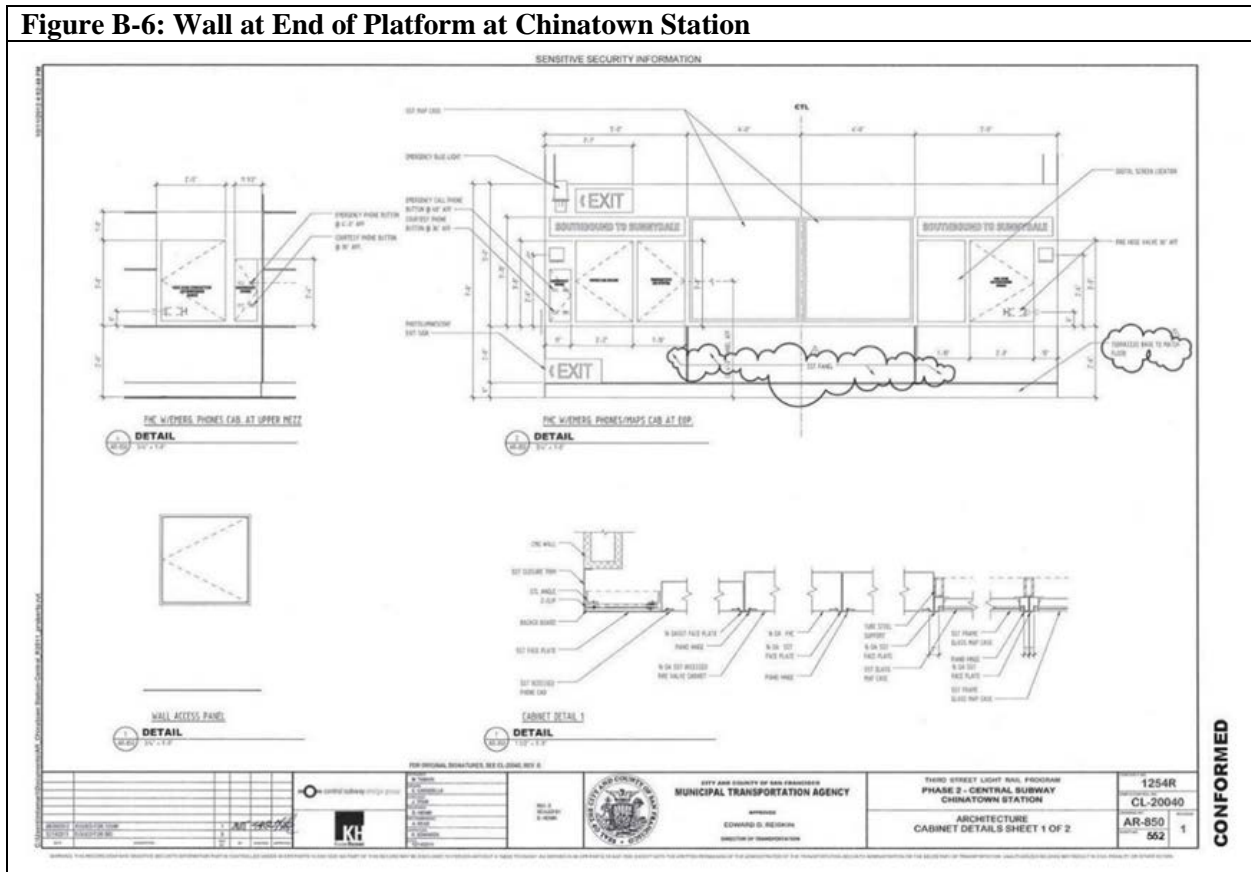
3.2.4.7 Sign Locations and Installation – Outdoor Locations

Contractor must install Type-3 Signs at outdoor locations the SFMTA identifies. Contractor must provide free-standing supports and signs rated for outdoor operation. Prior to installation at each site, Contractor must provide the SFMTA with engineering drawings and a quote for these supports and casing for SFMTA approval and Task Order issuance, in accordance with Section 3.5 of the Agreement.

3.2.5 Alternatively-Powered Signs (Type-4 Signs)

By the end of Phase II, and at the direction of the SFMTA, Contractor must furnish and install Stationary Digital Signs at selected Transit Stops. Transit Stop candidates for Type-4 Signs include:

(a) Outdoor bus and rail stops at shelters maintained by SFMTA's shelter Vendor where power is not available.

(b) Outdoor bus and rail stops at other shelters not maintained by SFMTA's shelter Vendor (e.g., historic shelters, Embarcadero shelters between Ferry Building and Fisherman's Wharf) where installation of Type-1 Signs may not be feasible.

(c) Outdoor "island" bus and rail stops (between two traffic lanes) (e.g., Market Street, rail platforms at Church & Duboce) where power is not available.

(d) Outdoor curbside bus and rail stops without shelters.

3.2.5.1 Power

Type-4 Signs must function 24 hours per day, 7 days per week throughout the year without a connection to the electrical grid. Type-4 Signs may be solar-powered or powered through alternative means. Type-4 Signs may be placed in a variety of environments, including areas that are foggy and/or are in the shadows of tall buildings.

3.2.5.2 Resolution

Type-4 Signs must have the maximum resolution possible within the technical constraints of the alternatively-powered sign. Type-4 signs must be able to display monochrome text and graphics.

3.2.5.3 Sign Location and Installation

At the direction of the SFMTA, Contractor must install signs in unpowered locations visible to waiting customers. Contractor must install signs on SFMTA-provided poles marking all surface-level bus and rail stops. Sign installations must preserve the functionality of the solar-powered lighting on top of the poles.

3.2.5.4 Dimensions

Type-4 Signs must be capable of displaying Customer Information of the same type as Type-1 Signs, subject to the constraints of the Type-4 Sign hardware capabilities. As signs must be placed between 40 and 70 inches off the ground, their dimensions must accommodate font sizes conforming with Americans with Disabilities Act guidelines (current guidelines denoted in Table B-4). Signs must maximize the space available to display Customer Information.

3.2.6 Replacement Platform-Audio Visual Signs (<u>Option</u>)

The SFMTA's existing PAV system displays and annunciates vehicle arrivals, pre-prepared messages and live announcements via signs and the station Public Address system located at underground stations.

This system displays and annunciates route, destination and Vehicle-Arrival Predictions information by processing a combination of feeds from the PAV back-office system, the Existing System and the Automatic Train Control System. In addition to automated content, this system can also communicate ad-hoc messages. Through the PAV back-office content management system, Authorized Users can currently (a) select pre-prepared text and audio messages, and (b) create real-time text and audio messages.

As an option exercisable by the SFMTA (priced in <u>Appendix E, Sections 2.5 and 4.1.1</u>), Contractor must supply and install PAV Replacement Signs that function with certain components of the existing PAV system. In general, the SFMTA envisions that the PAV Replacement Signs will display Customer Information and the PAV system will retain its audio functionality and its content management system. Additional requirements for this optional work are described below.

3.2.6.1 Sign Content

The System Software must interface with the existing PAV system and the Automatic Train Control System so that future PAV Replacement Signs can:

(a)   Display relevant Customer Information (e.g., route, destination, number of light rail vehicles per train), for an approaching train or a train already berthed at a platform, as determined by the SFMTA.

(b)   Remove Customer Information for a train immediately upon its departure from the station.

(c)   Display Customer Information generated through the Next Generation System's System Software and formatted through the Next Generation System's Content Management System.

(d)   Display pre-prepared and real-time text messages that are generated through the PAV content management system and communicated to the System Software via an industry standard feed such as GTFS-RT or API that the Parties will define in the System Design Document.

3.2.6.2 Transmission of Customer Information to Audio System

Contractor must transmit Customer Information to the existing PAV back-office via an open API or industry standard feed (to be defined between the Parties and the PAV Vendor), to allow the PAV back-office to make corresponding audio announcements. Contractor and PAV Vendor will work together to ensure that information displayed on signs and audio annunciations are synchronized and consistent.

3.2.6.3 Replacement PAV Sign Hardware

The current double-sided PAV signs utilize a 258 x 88 pixel color LED array which is sized to accommodate four rows of 4" high text in order to comply with ADA regulations. The overall dimensions of the current PAV sign are approximately 64" x 24".

Contractor must supply and install Stationary Digital LCD signs (Replacement PAV Signs) to replace current PAV signs in accordance with the requirements set forth below. Contractor may refuse to perform this option only if Contractor can demonstrate to the SFMTA that Replacement PAV Sign would require work that significantly (i) affects the design of the structure to which the signs are attached (e.g., underground rail station), (ii) affects the design of interior renovation of that structure, in either case due to physical dimension, power connection, or data communication, and/or coordination with construction trades, including electrical, plumbing, mechanical, or building controls (as described in Section 3.2.1.2), and/or (iii) requires extensive modifications to signs.

(a)   Replacement PAV Signs must be double-sided with each side capable of displaying Customer Information on a minimum of four rows of 4" high characters.

(b)   Replacement PAV Signs must be of similar overall dimensions and weight to the current PAV signs so that new signs can generally be installed at existing locations without modifications to existing mounting infrastructure or cabling. The two options for Replacement PAV Signs are as follows:

(i)   Option 1 (55" 16:9 Sign): This sign will measure 33.8" x 55.1" with a screen measuring 26.8" x 47.7" in order to maximize the surface area to display information.

(ii)   Option 2 (67.5" Stretch Sign): The sign will measure 25.2" x 72.1" with a screen measuring 18.3" x 64.9" in order to maximize the surface area to display information.

(c)   In locations where the mounting infrastructure and/or cabling requires adjustment to permit installation of Replacement PAV Signs (e.g., lowering the sign), the Parties will work together to modify the existing mounting infrastructure at that location to allow for sign installation and maintain compliance with relevant regulations such as ground clearance and track clearance.

(d)   In cases where accommodating Replacement PAV Signs associated with (b) and (c) requires modifications to mounting infrastructure and/or cabling, the SFMTA may undertake the work directly or request Contractor to perform such work under Task Orders in accordance with Section 3.5 of the Agreement.

(e)   The SFMTA will be responsible for disposing of current PAV signs.
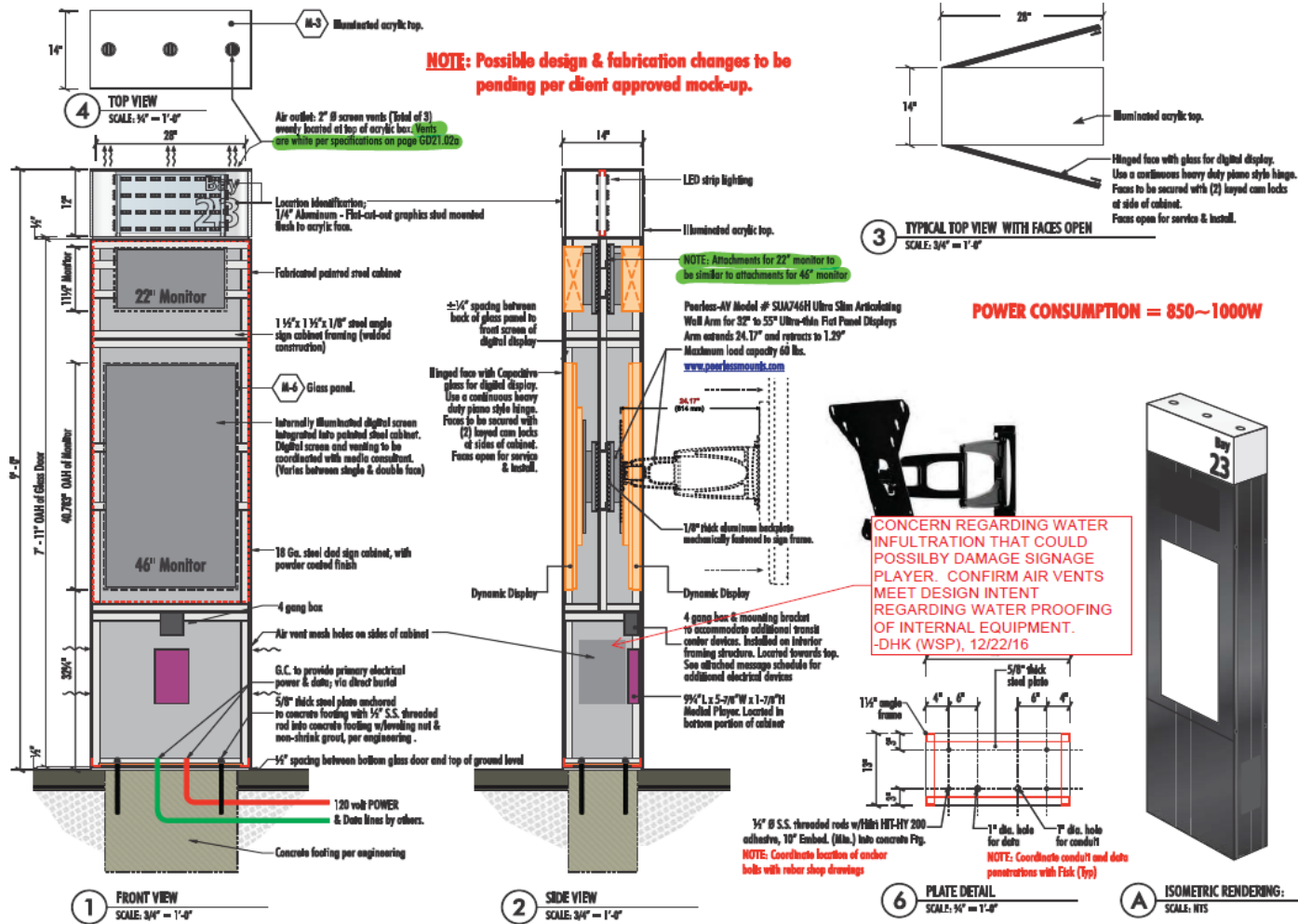
3.2.7 Salesforce Transit Center Digital Signs

The SFMTA has partnered with the Transbay Joint Powers Authority (TJPA) to display Customer Information on new pylons at the new Salesforce Transit Center in the Financial District. A vendor under contract to the TJPA constructed these pylons, which are owned by the TJPA. There are several different types of informational signs, two of which (the PD1 and PD2 pylons, as described below) relate to the display of real-time departure information for individual routes and that are within the scope of the Next Generation System. The primary difference between the PD1 and PD2 pylons is that the PD1 pylon has a top and bottom screen on both sides, while the PD2 pylon has a single screen on one side.

Neither screen was designed to incorporate text-to-speech functionality for people preferring or needing to hear information audibly.

PD1 Pylons are located at each bus bay on the upper bus deck level, where AC Transit, Muni (Route 25 to Treasure Island), Greyhound, WestCAT and Amtrak buses stop. As shown in Figure B-7, the PD1 Pylon screen consists of two primary LCD monitors that are embedded within a fabricated steel cabinet. The first 22" (10.56" x 18.77") monitor is located at the top of the PD1 Pylon. It currently displays the SFMTA logo, route number, and current time of day. Below the top monitor is a 46" monitor (40.082" x 18.77"), which is divided into three zones to display Customer Information. The PD1 consumes roughly 850-1000W of power. Muni currently uses two of the PD1 pylons.

Figure B-7: Salesforce Transit Center PD1 Pylon

PD2 pylons are located at each bay of the lower bus plaza level adjacent to Fremont Street, where Muni rubber-tire vehicles (electric trolley coaches and motor coaches) stop. Each PD2 pylon features an information screen facing customers in the bus waiting areas in the interior of the plaza. There are no information screens on the side of the PD2 Pylons facing Fremont Street, requiring some potential customers to go to the other side of the pylon to view information. As shown in Figure B-8, the PD2 Pylon screen consists of one 46" monitor (40.081" x 22.546"), which is divided into three zones to display Customer Information. The PD2 consumes roughly 850-1000W. There are five PD2 monitors; Muni currently uses four of them.

3.2.7.1   Customer Information Content for Display on Pylons

(a)   Contractor must provide Customer Information to the PD1 and PD2 pylons using unique webpages for each pylon.

(b)   Contractor must ensure that each unique webpage can accommodate different routes at different times because the route(s) associated with each pylon may vary based on the time of day. For example, the 25 Treasure Island bus serves a bus bay on the upper deck during most hours; however, it serves a bus bay on the lower deck during the evening hours when the upper deck is closed.

(c)   Contractor must ensure that each unique webpage can accommodate real-time route reassignments in bus bays without affecting the provisioning of Customer Information for any other system. For example, the 5 Fulton that typically uses Bay B may switch to Bay E temporarily; that change would be reflected on the pylon but not in trip-planning applications.

(d)   Contractor will work with the SFMTA to format and create content to populate the webpages through the System Administration Tool and Content Management System.

(e)   Contractor must prepare webpage URLs for the content management system vendor for digital signs at the Salesforce Transit Center. That vendor will then display the content of the webpages on the pylon screens.

3.2.7.2   ADA-Related Pylon Modifications (Option)

As an option exercisable by the SFMTA (priced in Appendix E, Section 4.1.1), Contractor must work with the TJPA and pylon vendor (ADS) to modify the pylon hardware to implement text-to-speech functionality and signs, as described below. Contractor must receive approval from the SFMTA and TJPA staff before installing or modifying pylons.

(a)   Text-to Speech Functionality

Contractor must implement text-to-speech functionality on the PD1 and PD2 pylons. Contractor must coordinate with the TJPA and pylon vendor on this implementation.

(b)   Additional Screen

For each PD2 pylons, Contractor must provide up to two screens on the side of the pylon facing Fremont Street. The SFMTA will work with Contractor to determine the number and dimensions of the screen(s). Options may include a 22" or 46" monitor, or both (see Figure B-7 and Figure B-8 in this section).

Signs must also not overheat. There is limited space within the pylon interior to accommodate additional hardware

3.2.8 Other Signs

During the term of the Agreement, the SFMTA may identify other signs not mentioned above. As directed by the SFMTA, Contractor must supply and install these signs, and remove any pre-existing signs at the same locations, under Task Orders the SFMTA issues in accordance with Section 3.5 of the Agreement.

3.3 Performance Requirements

Contractor must comply with the Performance Requirements in Appendix F, which will be evaluated every Reporting Period.

4 ON-BOARD DIGITAL SIGN SOFTWARE

The SFMTA plans to install On-Board Digital Signs to display Customer Information on its transit vehicles. Procurement and installation of On-Board Digital Signs and cellular communication routers are not included in the scope of Services for this Agreement. Ongoing cellular data costs for On-Board Digital Signs are not included in the scope of Services for this Agreement.

The SFMTA has initiated a pilot project to prototype electric buses from three manufacturers, which includes On-Board Digital Signs from one or more Vendors. The SFMTA may issue a separate procurement for additional On-Board Digital Signs on other vehicles. For the pilot project, the SFMTA will specify a single type of On-Board Digital Sign to the vehicle manufacturers on which Contractor must display Customer Information.

The requirements set forth below relate to On-Board Digital Sign Software that Contractor must provide to ensure that Customer Information is properly displayed on On-Board Digital Signs and announced on the vehicle's public announcement system. Contractor must work with the On-Board Digital Sign Vendor to meet these requirements.

In the future, if the SFMTA selects a different On-Board Digital Sign Vendor in which the sign interface differs from that provided above, Contractor must integrate with said Vendor under Task Orders the SFMTA issues in accordance with Section 3.5 of the Agreement.

In the context of this section, System-generated Customer Information is information transmitted by the System Software to On-Board Digital Signs, and Vehicle-Generated Customer Information is Customer Information generated on-board a transit vehicle related to operations (e.g., geolocation, stop request, accessible stop request).

4.1 Deliverables

Contractor must deliver to the SFMTA the following Deliverables in connection with On-Board Digital Signs:

    (a)   System-generated Customer Information to display on On-Board Digital Signs and annunciate via the on-board public announcement system; and

    (b)   Vehicle-Generated Customer Information to display on On-Board Digital Signs.

Each Deliverable and its requirements are described below.

4.2 Functional Requirements

4.2.1 On-Board Digital Sign Software and Hardware

By the end of Phase II, or whenever the SFMTA procures On-Board Digital Signs, whichever is sooner, Contractor must provide On-Board Digital Sign Software that displays System-generated Customer Information and sends audio files to the on-board Integrated Vehicle Unit for annunciation on the public announcement system. Contractor and SFMTA will work together to schedule the implementation during the preparation of the Final Schedule.

The On-Board Digital Sign Software must also display Vehicle-Generated Customer Information on rubber-tire vehicles and historic streetcars.

As a future unpriced option, the On-Board Digital Sign Software must also display Vehicle-Generated Customer Information on Light Rail Vehicles.

Contractor must identify any hardware required to:

(a) Display System-generated Customer Information and Vehicle-Generated Customer Information on On-Board Digital Signs; and

(b) Send audio files to the on-board Integrated Vehicle Unit to announce System-generated Customer Information on the public announcement system.

This may include hardware such as media players, audio amplifiers and input/output interface devices to receive, process and communicate content to On-Board Digital Signs and interface with other in-vehicle systems such as the public announcement system and OrbCAD's Integrated Vehicle Unit. The vehicle supplier(s) will procure and install this hardware directly; this is not a Deliverable under this Agreement.

4.2.2 Vehicle-Generated Events

At a minimum, the On-Board Digital Sign Software must generate and communicate Customer Information visually in response to vehicle-generated events listed below. During the development of the System Design Document, the Parties will define the actions in response to one or more of the following vehicle-generated events that Contractor will implement in the On-Board Digital Sign software:

(a) Approach to a Transit Stop (e.g., a configurable location or distance before stop);

(b) Leaving a Transit Stop (e.g., configurable distance after stop);

(c) Approach to a defined location that is not a Transit Stop (e.g., when an express bus enters a non-stop segment of its route);

(d) Stop Request;

(e) Accessible Stop Request (i.e., a stop requested initiated with the accessible stop request button or strip);

(f) Door opening;

(g) Door closing;

(h) Light Rail Vehicle steps moving up (if the SFMTA exercises the option for Light Rail Vehicle integration);

(i) Light Rail Vehicle steps moving down (if the SFMTA exercises the option for Light Rail Vehicle integration); and

(j) Customers standing near the doors.

4.2.3 Types of Customer Information to Communicate on On-Board Digital Signs

At a minimum, On-Board Digital Signs must display System-generated Customer Information and vehicle-generated Customer Information. As described in Section 2.2.2.22, the System Software must enable Authorized Users to manage the content and layout of information on On-Board Digital Signs through the System Administration Tool and Content Management System.

4.2.3.1 System-Generated Customer Information

Contractor must work with the corresponding Vendor(s) of On-Board Digital Sign hardware to display and annunciate System-generated Customer Information.

4.2.3.2 Vehicle-Generated Customer Information

On-Board Digital Signs must be capable of visually communicating vehicle-generated Customer Information. Contractor must integrate with on-board systems such as the Integrated Vehicle Unit provided by the SFTMA'S CAD/AVL system in order to generate and transmit such information.

4.2.4 Actions in Response to Receiving System-Generated or Vehicle-Generated Customer Information

In response to any one or a combination of the above vehicle-generated events, the On-Board Digital Sign Software must be capable of, at a minimum:

(a) Transmitting an audio message to an interior speaker system.

(b) Transmitting an audio message to an exterior speaker system.

(c) Transmitting text for display on On-Board Digital Signs.

(d) Transmitting graphics for display on On-Board Digital Signs.

During the development of the System Design Document, the Parties will define the priority of actions (e.g., queueing messages or interrupting messages currently shown) to display on On-Board Digital Signs in response to the simultaneous generation of System- and Vehicle-generated Customer Information.

4.2.5 Audio Accessibility

To assist customers who prefer or need to receive information audibly, Contractor must enable Authorized Users to provide substitute spoken text for annunciation on a vehicle's public announcement system that conveys the meaning of written text displayed on On-Board Digital Signs.

This spoken and written text does not necessarily need to be identical and could vary based on the length and detail of the message content. For example:

(a) For a Service-Change Alert such as "This train will switch back at 19th Avenue. The following train to Ocean Beach arrives in 5 minutes." the alternative text might be identical to the text displayed on the screen.

(b) For connection opportunities at a major transfer point, the alternative text information might state, "Connections are available to the K, L, M, 36, 43 and 44," whereas the sign might display predicted arrivals for each of these routes by direction.

4.2.5.1 Pre-Recorded Audio

For On-Board Digital Sign content prepared in advance, Contractor must accommodate audio files that pronounce text correctly in a format to be determined by the Parties. This is necessary because the phonetic spelling of a word as articulated through a text-to-speech reader may not necessarily reflect its actual pronunciation.

4.2.5.2 Text-to-Speech Functionality

For all other audio that is not pre-recorded, Contractor must provide text-to-speech functionality and give to the SFMTA to specify phonetic pronunciation for words. The voice must sound natural and not be muffled by any housing.

4.2.6 Integration with Vendor of On-Board Digital Signs

Contractor must incorporate Customer Information referenced in Section 4.2.3 into layouts designed through Contractor's Content Management System, which Contractor will then display in its entirety to the specified future On-Board Digital Signs.

Contractor must ensure that alternative text information (see Section 4.2.5.2 Text-to-Speech Functionality above) is in a format that a standard text-to-speech reader can process to assist customers who prefer or need to receive information audibly.

Contractor must also specify the communication standard it will use for future On-Board Digital Signs. The communication standard must be non-proprietary (e.g., HDMI or DVI) and Contractor must provide any future digital sign Vendor with all required access to ensure that the digital signs can display all content identified in Section 2.2.1.

4.2.7 Testing On-Board Digital Sign Content in Real-Time

Contractor must provide a user interface in which Authorized Users can view snapshots of System-Generated Customer Information on any installed On-Board Digital Sign in real-time, subject to any limitations due to communications latency and geolocation reporting frequency.

4.2.8 Playback of On-Board Digital Sign Content

Contractor must provide an interface in which Authorized Users can view past snapshots of System-Generated Customer Information on any installed On-Board Digital Sign. Contractor must make available these past snapshots for up to 60 days after they have been displayed.

4.2.9 On-Board Digital Sign Content Template History Log (Option)

As an option exercisable by the SFMTA (priced in Appendix E, Section 3.4.4), Contractor must log the history of content templates (campaigns) displayed on On-Board Digital Signs of all vehicles including, vehicle ID and timestamp, at a minimum. The Parties will work together to determine the exact attributes and format of this log. Contractor must automatically and periodically store and transfer this logged data to SFMTA's data warehouse.

4.3 Performance Requirements

Contractor must transmit Customer Information to On-Board Digital Signs at all times. Contractor must adhere to the Performance Requirements in Appendix F, which will be evaluated every Reporting Period.

5 MOBILE PLATFORM & WEBSITE

The SFMTA wishes to provide Customer Information and trip planning tools through its Mobile Platform & Website (currently, MuniMobile and www.sfmta.com) to facilitate travel by transit and other sustainable transportation modes both within San Francisco and between San Francisco and the rest of the region, and to learn about customers' travel behaviors in order to improve service and operational planning.

5.1 Deliverables

Contractor must deliver to the SFMTA the following Deliverables in connection with the Mobile Platform & Website:

(a) Trip Planner, consisting of three views (Point-to-Point Travel View, Nearby Vehicles View, and Live Travel View); and

(b) Data Collection.

Each Deliverable and its requirements are described below.

5.2 Functional Requirements

Contractor must ensure that the Deliverables associated with the Mobile Platform & Website achieve certain functional requirements as described below.

5.2.1 Mobile Platform & Website Integration
5.2.1.1 MuniMobile Integration

Currently, the SFMTA offers a MuniMobile app provided through a Vendor that enables customers to pay Muni fares and plan trips. It is primarily a mobile payment app with two views with embedded links for trip planning: (1) point-to-point travel through Google Maps, and (2) predictions for nearby vehicles through a mobile website provided by the Vendor of the Existing System. In the System Design Document, Contractor must work with the SFMTA to identify how to transition seamlessly from Google Maps point-to-point trip planning to the Contractor-provided Trip Planner (described in Section 5.2.2) once it is ready.

Contractor must provide a mobile solution that allows customers to plan trips and pay their fares using MuniMobile.

By the end of Phase II, Contractor must provide the Data Collection functionality described in Section 5.2.3 within Contractor's new app.

5.2.1.2 SFMTA Website Integration

Contractor must work with the SFMTA and any third-party designated by the SFMTA to ensure that, by the end of Phase I, customers can seamlessly access the Trip Planner described in Section 5.2.2 through the SFMTA website. At a minimum, customers must have two ways to engage with the Trip Planner:

(a) SFMTA.com Customer Information Widget – The SFMTA website currently offers a widget on various key pages which enables users to enter basic parameters that populate a third-party trip planner (currently provided by Google Maps). Contractor must make available to the SFMTA and any third-party designated by the SFMTA a widget that can generate trip plans using the following parameters, which at minimum include:

(i) Origins and destinations, including predictive typing to assist users.

(ii)   Time of travel (immediate vs. in the future).

(iii)   Mode of travel.

(b)   SFMTA.com-Embedded Trip Planner – Contractor must work with the SFMTA and any third parties designated by the SFMTA to embed the Trip Planner in the SFMTA website.

5.2.2   Trip Planner

By the end of Phase I, Contractor must develop and furnish to the SFMTA a Trip Planner that customers may use to plan their transit trips and access Customer Information in real time to assist in trip execution. As described in Section 5.2.1, the Trip Planner must be accessible to customers through, and seamless with, the Mobile Platform and Website.

5.2.2.1   General

(a)   Contractor must work with SFMTA staff and Vendors for MuniMobile and the www.sfmta.com website to integrate the Trip Planner into each platform, such that both platforms provide the functionality described below. The Trip Planner must appear as a part (e.g., a page, view, or screen) of the MuniMobile app and www.sfmta.com, and must incorporate branding as specified by the SFMTA.

(b)   Rather than developing a new application, Contractor may utilize for the Trip Planner a white-label app produced by a third-party with an existing independent transit application. The white-label application must appear as an SFMTA product within MuniMobile and www.sfmta.com.

(c)   Within the Trip Planner, advertising for any product or services will be allowed at the sole discretion of the SFMTA, including advertising seeking to draw customers to Contractor's independent transit application, if it exists. The SFMTA will receive any revenues associated from said advertising.

(d)   Contractor must not require customers to establish accounts as a condition to receive Customer Information from the Trip Planner; customers must be able to access the Trip Planner even if they do not have an account.

(e)   The Trip Planner must adhere to all SFMTA policies and standards. Examples of policies and standards could include map formats and compliance with SFMTA's Guiding Principles for Management of Emerging Transportation Services and Technologies.

(f)   The Trip Planner must consist of the following views (different ways to view Trip Planner information):

(i)   Point-to-Point Travel View;

(ii)   Nearby Vehicles View; and

(iii)   Live Travel View.

(g)   **Option**: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.5), the Trip Planner must communicate with a selected calendar application on a user's

mobile device and suggest a trip itinerary from the user's current location to the location of an upcoming calendar event.

5.2.2.2 User Configurability

The Trip Planner must allow customers to configure and save their trip-planning preferences. Customers must have the choice to filter itineraries based on these preferences. Trip-planning preferences must include at minimum:

(a)   Accessibility requirements (e.g., can navigate stairs, can navigate moderate hills (5% to 10% grade), can navigate steep hills (10%+ grade), or requires an elevator or escalator);

(b)   Maximum number of transfers;

(c)   Lowest fare;

(d)   Maximum travel distance to initial stop;

(e)   Maximum travel distance to an alternative route;

(f)   Approximate travel speed (if possible, automatically through the accelerometer or smartphone hardware);

(g)   Favorite or frequently-visited destinations (e.g., work, home, etc.) (mobile app or cookie-enabled website);

(h)   Favorite or frequently-used stops and routes;

(i)   Favorite or frequently-made point-to-point trips;

(j)   Reminders (e.g., alert before vehicle arrival, transfer, approaching Transit Stop arriving buses, etc.);

(k)   Subscription to Service-Change Alerts by route and time (currently through the SFMTA-hosted GovDelivery system) (includes push notifications when there are Switchbacks enabling the customer to re-plan their trip from the location of the Switchback);

(l)   Bike Accessibility (i.e., whether vehicles on route can accommodate bicycles); and

(m)   Other preferred sustainable transportation modes.

The Trip Planner must allow customers to prioritize (i.e., sort) trip-planning preferenced based on the parameters (b)-(m) above.

Option: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.3), Contractor must also enable customers to filter itineraries for the following trip-planning preferences:

(n)   Service frequency; and

(o)   Crowding (based on historical records).

Option: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.4), the Trip Planner must also enable customers to prioritize (i.e., sort) the following trip-planning preferences from above:

(a)   Accessibility Requirements;

(n)   Service frequency; and

(o)   Crowding (based on historical records).

The Parties will work together to finalize user configurability in the System Design Document.

5.2.2.3   Point-to-Point Travel View

The Trip Planner must generate point-to-point directions for any trip with either an origin or destination within the SFMTA service area, which currently includes the City and County of San Francisco, northern San Mateo County within a half-mile of San Francisco city limits and the Marin Headlands (on weekends and holidays). This includes trips that involve connections with other Transit Providers that interface with the SFMTA, so long as those Transit Providers and/or the Metropolitan Transportation Commission offer a publicly-available feed with transit information.

The Trip Planner must allow customers to enter desired origins and destinations and other trip parameters, and select trip itineraries from a list of alternative itineraries, as described below.

(a)   Entering Origins and Destinations and other Trip Parameters

When planning a point-to-point trip, customers must be able to use the Trip Planner to:

(i)   Choose their starting point by: enabling location services and having their device automatically detect the current location, entering an intersection or address, selecting a location on a map, or other methods mutually agreed upon by the Parties;

(ii)   Search for and select their destination by: entering a specific address, intersection or major landmark; reversing their point of origin and destination; seeing a list of personal frequently-visited destinations (e.g., work, home, etc.) that customers create and have the ability to modify; and seeing a list of destination suggestions based on recent searches. The search tool must be predictive; if a customer begins to type in a word, the Trip Planner must suggest a completed search term;

(iii)   **Option**: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.5) search for and select their destination by seeing a list of destination suggestions based on the addresses of meetings and events they have scheduled from native calendars, if configured by user;

(iv)   Add a mid-route stop; and

(v)   Choose when their trip will start (e.g., immediate departure, by desired arrival time, at a future time and date).

(b)   Menu of Possible Trip Itineraries

Based on the origin and destination entered and customer-configured accessibility requirements, the Trip Planner must produce a menu of possible trip itineraries. When customers review this list, they must be able to:

(i)   Order and/or filter trip itineraries by configurable travel preferences (see Section 5.2.2.2, above);

(ii)   Filter search results by departure or arrival time;

(iii)   Re-plan trip from their current location;

(iv)   View real-time capacity levels of Muni vehicles for potential trip itineraries;

(v)   View Vehicle-Arrival Predictions;

(vi)   View scheduled arrivals and departures (and denote these as "scheduled") if next vehicle arrivals are not available;

(vii)   Upon selecting an individual trip itinerary, view an interactive map that tracks vehicles associated with each route segment of the trip;

(viii) See Service-Change Alerts (including elevator outages) associated with the routes in the itinerary, which may include information about detours or other service changes;

(ix)   If a customer is seeking an immediate departure, display upcoming arrival times within a 2-hour or other configurable period (e.g., if a route begins service at 4 pm, times for that route would only appear after 2 pm); and

(x)   If there are no alternative trip itineraries, enable customer to view a sustainable transportation option approved by the SFMTA.

(c)   Itinerary Details

Upon selecting a specific itinerary, customers must be allowed to:

(i)   View key information about their trip, including origin and destination, the duration and distance of each leg of their itinerary, departure and arrival time;

(ii)   View transfer points and estimated real-time transfer times, for trips involving a transfer;

(iii)   View their trip itinerary on a real-time map, the current location of the vehicle involved, and their current location;

(iv)   See if the trip itinerary involves a route detour, stop closure or relocation, and/or Service Change Alert (which may include Delay Communications);

(v)   View a more efficient, alternative trip itinerary if available, including step-by-step navigation to the alternative stop;

(vi)   Initiate step-by-step/turn-by-turn directions;

(vii)   Activate or deactivate reminders (e.g., when to leave, transfer, get off bus, arriving buses); and

(viii) Add the trip to their Google and other native calendars.

5.2.2.4 Nearby Vehicles View

The Trip Planner must allow customers to view the predicted arrival times of all nearby vehicles, as follows:

(a)   Permit the customer to navigate to the correct stop, route and direction through pull-down menus, interactive map, lists or other means (i.e., if location services is not enabled);

(b)   Automatically identify all transit routes whose nearest stops are within a configurable distance to the current location (i.e., if location services is enabled);

(c)   List all routes and predicted arrival times for the next three vehicles for all stops within a configurable radius, once Trip Planner has determined the customer's location;

(d)   List scheduled arrivals and departures (and denote these as "scheduled") when Vehicle-Arrival Predictions for the next vehicles are not available;

(e)   Display a real-time map showing all nearby transit vehicles along with a customer's location;

(f)   View real-time capacity level representations of nearby transit vehicles, if available;

(g)   Offer sustainable transportation options approved by the SFMTA;

(h)   Provide a link to San Francisco's taxi services (currently Flywheel) under scenarios determined by the SFMTA, such as if there are no transit options within a configurable radius; and

(i)   Prioritize display of routes based on customer-configured route preferences.

5.2.2.5 Live Travel View

The Trip Planner must allow customers to track their trip in real-time while riding on-board a transit vehicle. This will allow customers to estimate when they will arrive at their destination, estimate connection times at potential transfer points, and learn about en-route service disruptions and changes, while on-board a vehicle. In order to minimize the smartphone's battery consumption, the customer must select the live travel view for their current trip.

(a)   Vehicle Detection

   If customers enable location services on their mobile devices, the Trip Planner must detect which SFMTA vehicle they are currently riding. If there is any ambiguity (such as two SFMTA vehicles within close proximity) or the customer has not enabled location services, the Trip Planner must allow the customer to enter a vehicle number so that the mobile app or website can associate the mobile device with a vehicle. If the SFMTA establishes on-board WiFi in the future, the app must have the capability of connecting with this WiFi service to automatically associate the mobile device with a vehicle. As alternative technologies and approaches for identifying vehicles are expected to significantly develop during the term of the Agreement, the Parties will work together to consider alternative solution approaches.

(b)   Live Travel Information

   When using the live travel view, a customer must be able to:

(i)   View a list of all upcoming Transit Stops and corresponding, expected arrival times for their current trip;

(ii)   View their current location and the remainder of their route on an interactive map;

(iii)   Select a stop and see a list of transfer opportunities and associated Transfer Connections Predictions;

(iv)   Provide step-by-step navigation to the Transit Stop for the connecting vehicle in a visual format;

(v)   View and hear (upon request) Service-Change Alerts (which may include Delay Communications) associated with their trip;

(vi)   Activate or deactivate reminders (e.g., when to exit the bus, transfer);

(vii)   Select a destination stop and share it with someone else via text message, Messenger, WhatsApp, etc., with their expected arrival time; and

(viii) Provide feedback on their trip (including an auto-population of the run, route, vehicle number and time).

(ix)   **Option**: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.7), provide step-by-step navigation to the Transit Stop for the connecting vehicle in an audio format.

5.2.2.6 Other Customer-Facing Requirements

(a)   Compatibility with Electronic Devices

(i)   The Trip Planner must operate on applicable iOS, Android, Windows and MacOS platforms. Contractor must maintain the Trip Planner as operating systems evolve or are introduced. The app must also be backward compatible with previous versions of those operating systems that are still supported by Apple, Google and Microsoft. The Trip Planner must be functional on all web browsers in common use. In addition, the Trip Planner must meet or exceed WCAG 2.0 (Level AA) requirements and be compatible with screen readers and other accessible technologies.

(ii)   All elements of the Trip Planner must operate on all major contemporary browsers. Examples of contemporary browsers include Internet Explorer, Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge. Contractor must upgrade the Trip Planner as browsers change or new browsers come into existence, so long as the new browsers capture at least 3 percent of the market share.

(b)   Language Support

The Trip Planner must support foreign languages in accordance with the City and County of San Francisco's Language Access Ordinance (LAO). Currently, the SFMTA prints notices of service changes in Chinese (traditional), Spanish and Tagalog. Ideally, the app and mobile website would also include additional

languages that San Francisco residents and visitors use commonly such as French, German, Japanese and Russian.

(c) Configurable Location Services

The Trip Planner must give customers the choice to opt-in (either at all times, or only while the Trip Planner is in use) or opt-out of location services in a "settings" view. For customers who elect to opt-out of location services on their mobile phone, the Trip Planner must still enable them to access trip planning, Customer Information for surrounding routes and stops and other real-time information. In the System Design Document, Contractor must identify a solution to permit this functionality for SFMTA approval. Examples may include identifying an origin and destination by entering an address or clicking an interactive map, and/or using a pull-down menu to select a route and stop.

(d) Mapping

Contractor's maps for the Trip Planner must be consistent with SFMTA graphic styles and branding for the standardized transit map.

(e) Route Schedules and Maps

By the end of Phase I, the Trip Planner must include:

(i) Maps for individual routes;

(ii) Published timetables by route, direction and day of week (e.g., weekdays, Saturdays, Sundays and holidays) (provided by the SFMTA);

(iii) Stop list by route and direction (provided by the SFMTA); and

(iv) System map showing all routes and streets (provided by the SFMTA).

Option: As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.6), by the end of Phase II, the Trip Planner must include:

(v) Dynamic system map where customers can select a time of day and day of week and see routes in operation colored by scheduled waiting times.

(f) Complementary Sustainable Transportation Options

By the end of Phase II, the Trip Planner must be capable of providing information about complementary sustainable transportation options, such as bikeshare and taxis/on-demand transportation services, provided they comply with SFMTA's Guiding Principles for Management of Emerging Transportation Services and Technologies or any future guidelines. Information includes, but is not limited to:

(i) Links to mobile apps and websites for those transportation options, to be provided by SFMTA; and

(ii) Nearby locations where customers can access those transportation options (e.g., bike sharing docks).

(iii) The SFMTA will have the final decision whether to include or exclude other transportation modes.

(g)   Gamification

It is the SFMTA's intention to increase participation, engagement, and loyalty among customers, and gamification may enable these outcomes. By the end of Phase II, Contractor must design the Trip Planner to enable future gamification at the direction of the SFMTA. One example is a loyalty program that incentivizes customers to ride frequently and use the Mobile Platform & Website, for which the Next Generation System can reward customers based on their behavior. Contractor must implement any gamification features with the collaboration with and approval from the SFMTA. Contractor must implement gamification functionality under Task Orders the SFMTA issues in accordance with Section 3.5 of the Agreement.

(h)   Refresh rate for updated Customer Information

The Trip Planning platform must be capable of refreshing mobile data at least every 15 seconds. The Parties will jointly determine the optimal refresh rate.

(i)   Lost or Unstable Connectivity Usage

The Trip Planner must notify customers if a certain functionality is affected by their device experiencing lost or unstable connectivity (e.g., if a Trip Itinerary cannot be generated due to network loss when entering the subway).

If connectivity is lost or becomes unstable after a customer has performed a Trip Planner query, the received Customer Information must remain available for viewing or usage as long as the Trip Planner remains open. The Trip Planner must retain such Customer Information once connectivity becomes available or stable again.

5.2.2.7   Short Message Service (SMS)/Text Messaging

Contractor must provide SMS/Text Messaging functionality. Specifically, it must enable customers to send a text message to a predefined five-digit SMS code with a unique stop number. Within a few seconds, Contractor must transmit arrival predictions for all vehicles at the stop by SMS back to the customer.

5.2.3   Data Collection

In compliance with federal, state, and local laws, and industry best practices, the Trip Planner must collect anonymomous data in order to provide context-appropriate Vehicle-Arrival Predictions and trip itineraries to customers, and assist the SFMTA with service and operational planning. The data collected must not be capable of being associated with any individual.

Contractor must implement data collection functionality into the Trip Planner by the end of Phase II, but must begin planning and designing this functionality in Phase I. Contractor must also maintain privacy protections detailed below starting in Phase I.

Customers must have the opportunity to expressly "opt in" to location services and acknowledge that they understand that anonymous data are being collected and aggregated to plan and improve the quality of public transportation. Provided that a customer has "opted in" to location services, Contractor must collect data as long as an app is open in the most efficient way possible so as to minimize power consumption on a user's electronic device.

The SFMTA will approve terms & conditions language associated with privacy, data collection and "opt in" to location services.

Contractor must provide basic usage metrics (number of daily/weekly/monthly unique users over time) but will work with the SFMTA to identify more specific user engagement metrics that align with business goals.

Data collection must minimize battery consumption and must not require the app to be open. The types of data the Trip Planner must collect are described below.

5.2.3.1   Trip Planner Requests

The Trip Planner must record anonymous customer requests for Customer Information and trip itineraries. This includes trip requests, lookups for next vehicle arrivals on particular routes, and other data determined by the Parties in the System Design Document.

5.2.3.2   Mode Choices

The Trip Planner must collect mode choice data associated with Linked Trips (e.g., origin, destination, paths and transportation modes), and, if applicable, accessible preferences. Transportation modes include public transportation, bicycling, walking and automobiles.

The Trip Planner must automatically and accurately identify the origins, destinations, paths and mode choice for any Linked Trip (i.e., an end-to-end journey that may involve one or more mode choices) that begins and/or ends within the SFMTA service area, so long as:

(a)   The customer expressly consents in a user agreement and has enabled location services;

(b)   A "localization signal" (e.g., GPS, WiFi, Bluetooth beacons, or comparable technology) is available that allows the approximate position of the smart device to be determined at recurrent intervals (e.g., every few seconds or every few minutes); and

(c)   The Trip Planner receives accurate schedule data, real-time vehicle locations and detours via the System Software through various sources (see Section 2.2.1.8)

Currently, cellular service is not available on underground portions of the light rail network; it is the SFMTA's intent to enable data communications in the future. In cases where the Trip Planner loses a "localization signal" when travel is at or near an underground portion of the light rail network (e.g., entering an underground station where GPS is unavailable, riding a light rail vehicle when entering a tunnel portal and losing a GPS signal), the Trip Planner must notate the possibility that travel involved a light rail train that traveled underground.

Provided that conditions outlined above are met, mode choice data are accurate if they match actual travel with respect to all of the following parameters:

(i)   Origin and destination;

(ii)   Mode choice categories (i.e., walking, biking, private motorized transport and public transport) (does not need to distinguish between private motorized transportation modes such as private automobiles, taxis and Transportation Network Companies); and

(iii)   Routes, through the identification of the transition points between mode choice categories.

These parameters use the following definitions:

(a)   A "location" is a point on Earth described by a coordinate.

(b)   A "stay" is an area where a person remains for at least 15 minutes. It has a radius of 25 meters or more. The center of a Stay is a Location.

(c)   A Linked Trip contains one or more trip legs. It is preceded and succeeded by a stay but does not contain stays. It starts at an origin and ends at destination.

(d)   A Trip Leg is part of a Linked Trip which involves one mode choice category only.

(e)   Origin and destination are locations with timestamps. They have an accuracy of 50 meters and 5 minutes. The location accuracy is subject to availability of GPS or WiFi.

(f)   A transition point is a location with timestamp where the user switches between mode choice categories.

5.2.3.3 Transit Route Assignments

If a trip involves public transportation, the Trip Planner must:

(a)   If the trip involved Muni, assign that trip to an individual route and provide a level of confidence associated with that assignment;

(b)   If the trip involved a connecting Transit Provider, assign that trip to a route and its Transit Provider,;

(c)   Identify transfers, both between Muni vehicles and between Muni and a connecting Transit Provider;

(d)   Identify the origin and destination Transit Stop of the trip;

(e)   Estimate the approximate waiting time for the initial vehicle;

(f)   Estimate the approximate transfer times for subsequent vehicles;

(g)   Estimate the approximate in-vehicle travel times for the initial and subsequent vehicles; and

(h)   Account for accessibility preferences.

This data must be exported to the Analytics Platform for further processing.

5.2.3.4 Association between Trip Planner Requests, Customer Information, and Mode Choice

Contractor must associate Trip Planner requests, Customer Information provided in response to those requests, and subsequent mode choice up to 60 minutes after those requests are made. This includes recording Trip Itinerary options with route(s), Vehicle-Arrival Predictions, Transfer Connection Predictions, and other Customer Information.

5.2.3.5 Trip Volumes

Contractor must record the number of trips by mode choice an anonymized user takes for selected time periods (e.g., monthly).

5.2.3.6 Data Aggregation

To further protect customer privacy, Contractor must provide tiered data access that will allow data to be aggregated at levels appropriate to Authorized Users (e.g., by census tract, ZIP code, Traffic Analysis Zone). For example, the back-end supporting the mobile app must be able to associate individual locations with zip codes such that non-credentialed users would only be able to see the origin and destination of individual trips by zip code.

5.2.3.7 Surveys

The SFMTA must have the ability to create and administer voluntary, anonymous surveys through an online portal. The SFMTA must be able to administer those surveys through the Trip Planner at any time while the app is open, including during the onboarding process (when a customer downloads the app). The Trip Planner must be able to associate survey responses with corresponding data collected in Sections 5.2.3.1 through 5.2.3.6, above, or with data from previous surveys. The Trip Planner must be able to collect data for viewing by Authorized Users through a user interface and export aggregated data from these surveys in a standard format that can be processed for analysis through the Analytics Platform.

The SFMTA must have the ability to avoid repeating the same question from previous surveys to the same user.

The Trip Planner must enable customers to respond to and submit surveys when their mobile device experiences lost or unstable connectivity. The Trip Planner must transmit completed surveys once connectivity becomes available.

5.2.3.8 Customer Feedback

Customers must be able to submit general feedback, feedback about any specific trip or route, or details about issues and incidents through the Mobile Platform & Website from any view. Customers must be also able to log general issues in real time via a simple user interface within the mobile app, including self-reporting of user details, incident type and details, and ability to take and upload geo-tagged photos, with the auto-population (if available) and/or manual entry of the Run, route, Vehicle Number, and time.

The Trip Planner must enable customers to prepare and submit feedback when their mobile device experiences lost or unstable connectivity. The Trip Planner must transmit completed feedback forms once connectivity becomes available.

Contractor must export this raw data in a format to be determined by the Parties. The SFMTA will be responsible for integrating this exported data into SFMTA systems and/or Salesforce cases, and for responding to this customer feedback, if appropriate. In the System Design Document, the Parties will determine the methods in which to implement this requirement.

5.2.3.9 Opt-In Service Subscriptions

The Trip Planner must allow customers to subscribe to Service-ChangeAlerts by route and time (currently through the SFMTA-hosted GovDelivery system).

5.2.4 Mobile Ticketing Platform (Option)

As an option exercisable by the SFMTA (priced in Appendix E, Section 6.4.8), Contractor must deliver by the end of Phase I a fully functioning Mobile Ticketing Platform to replace the platform provided by the SFMTA's existing Vendor. The Mobile Ticketing Application must be

accessible to customers through, and seamless with, the Mobile Platform & Website. The requirements of the Mobile Ticketing Platform are set set forth below.

In anticipation of region's Clipper 2.0 fare collection system, the Parties agree to coordinate additional requrements, if any, for the Mobile Ticketing Platform to integrate with Clipper 2.0. If the Parties cannot agree on the terms of these requirements or if the SFMTA determines to pursue another mobile ticketing solution, then Contractor, upon 180 days' notice from the SFMTA, must cease to provide this service, and the SFMTA's payment obligation to Contractor for the Mobile Ticketing Platform shall end at that time. In no event will such termination occur within the first three years of Initial Deployment of the Mobile Ticketing Platform. The term of the Mobile Ticketing Platform must not exceed the initial term of the Agreement.

5.2.4.1 General

Contractor must deliver a Mobile Ticketing Platform that meets the following general requirements:

(a) Provides Mobile Ticketing Application to sustain the SFMTA's existing mobile ticketing offerings;

(b) Delivers a Mobile Ticketing Application with sophisticated and dynamic ticketing screens on mobile devices for ease of fare validation and inspection and protection against fraud.

(c) Builds the Mobile Ticketing Application on a stable, scalable back-end with sufficient back-up capacity;

(d) Processes, authorizes, collects, and settles all mobile ticket transactions in a timely manner;

(e) Ensures Mobile Ticketing Application satisfy accessibility requirements;

(f) Offers a portal with comprehensive web-based data and reporting tools for Authorized Users; and

(g) Provides reliable customer service and support when SFMTA staff are unable to resolve customer concerns as described in the warranty and maintenance section below.

5.2.4.2 Deliverables

Contractor must provide to the SFMTA the following Deliverables as part of the Mobile Ticketing Platform:

(a) Mobile Ticketing Application;

(b) Customer Web Portal; and

(c) City Portal.

5.2.4.3 Functional Requirements

The Mobile Ticketing Platform must achieve the following functional requirements, at minimum:

(a)   Provide a simple, fast, and customer-friendly interface for purchasing and activating single or multiple tickets, managing accounts and payment methods, and using additional features of the Mobile Ticketing Application.

(b)   Include development of Mobile Ticketing Applications for both Android and iOS device types; the applications must be available in the app stores and meet the following requirements:

(i)   Mobile Ticketing Applications must be developed according to standard mobile application interface guidelines;

(ii)   Contractor must both deploy and manage the applications in the Apple App Store and Google Play Store; and

(iii)   Mobile Ticketing Applications must be backward compatible with previous versions of Android and iOS operating systems still supported by Apple and Google.

(c)   Provide for offline usage of the Mobile Ticketing Application when customer devices are not connected to a network, including offline activation for Muni tickets stored on the device. Purchasing tickets will require a network connection.

(d)   Handle a volume of at least 10,000 customers downloading or using the Mobile Ticketing Application at a given time (such as when special events let out and during peak hours on Muni).

(e)   Handle a volume at least 100,000 sales and activations of Muni tickets per day.

(f)   Provide integration of the Mobile Ticketing Application and Customer Web Portal with the trip planning tools, Customer Information, transit system maps, and customer service/help functions, provided by the Next Generation System, such that customers can pay fares and access trip planning and real-time arrival information from the Mobile Ticketing Application.

(g)   Meet all ADA guidelines (http://www.w3.org/WAI/users/Overview.html) for web and mobile accessibility, including utilizing built-in accessibility features on user devices.

(h)   Be user-configurable and/or capable in multiple languages, including English, Chinese (traditional), Spanish and Tagalog versions at a minimum, to address SFMTA's customer language requirements and the City and County of San Francisco's Language Access Ordinance (LAO), with the ability to expand to more languages.

(i)   Utilize minimal storage space on customer devices; data storage must be optimized and not exceed constraints of the host device.

(j)   Provide for Muni tickets to be stored both locally on customer devices and in the cloud, as follows:

(i)   Ticket storage must be configurable on the Mobile Ticketing Application to allow customers to choose location for tickets to be stored.

(ii)   Default must be to store tickets on customer devices. In the future, the SFMTA may enable cloud storage for ease of transferring tickets between devices or disable cloud storage for protection against fraudulent ticket transfer concerns.

(iii)   System must be capable of transferring only non-activated tickets between devices for those tickets stored on the cloud.

5.2.4.4   Sales Requirements

The Mobile Ticketing Platform must:

(a)   Sell single-ride bus and rail, cable car, 24-hour/day pass, one-, three-, and seven-day passport, bus and rail day pass, and special event fare products on Muni.

(b)   Sell discount and special fares, including senior, disabled, Medicare, and youth fare products on Muni; Promote accountability and protection against discount fare evasion by communicating (e.g., pop-ups, scrim) qualifying requirements (e.g., age requirements, appropriate documentation) to customers through the Mobile Ticketing Application.

(c)   Sell mobile tickets with different activation and expiration requirements.

(d)   Allow customers to purchase a single ticket or multiple tickets in a single transaction. Additionally, for a single event, allow multiple tickets (up to 20) to be purchased and stored both on one customer device and in a single customer account.

(e)   Allow account or payment information to be stored in the customer account for future purchases. Any stored payment information must be secured in a Payment Card Industry Data Security Standard (PCI-DSS) environment to guard against theft payment information in the event the device is lost or stolen.

(f)   Implement any fare changes that the SFMTA implements over the term of the Agreement. Ticket types and prices must be SFMTA-configurable with an administration tool.

(g)   Provide for the implementation and/or deletion of a fare as defined by SFMTA.

(h)   Allow for event-specific promotional fares to be added to the ticket offering, at different price levels.

(i)   Allow tickets for recurring or multi-day special events to be "nested" under a parent title on the ticket sales screen, to provide simplicity and avoid lengthy lists of products on the sales screen.

(j)   Allow for tickets to be purchased from the SFMTA website and transferred to the Mobile Ticketing Application.

(k)   Implement means for customer to validate e-mail address as part of the account registration process.

(l)   Import any customer account-based data provided by the SFMTA or the current Vendor, in a digital format determined by the Parties.

5.2.4.5   Validation and Inspection Requirements

The Mobile Ticketing Services must:

(a)   Provide tickets on customer device screens with multiple security features, such as dynamic visualization, changing date codes, dynamic barcodes, audio validation, account owner photo identification, or any other features recommended by Contractor.

(b)   Provide display of multiple active tickets on single customer device screen.

(c)   Provide for quick and easy visual inspection by the SFMTA's personnel to determine validity of the ticket presented.

(d)   Provide a method for determining when tickets were purchased and activated to protect against onboard purchases being opportunistically made once a transit fare inspector is present.

(e)   Tie to barcode and/or near field communications (NFC)-type inspection capabilities for enabled customer devices.

Contractor will work with SFMTA to define and provide the required specification for a hardware solution for electronic validation of tickets if the SFMTA elects to equip vehicles and/or faregates with validation hardware.

5.2.4.6   Security Requirements

The Mobile Ticketing Services must:

(a)   Meet the latest Payment Card Industry Data Security Standard (PCI-DSS) and operate within PCI-DSS compliance at all times. Contractor must notify the SFMTA of any changes to PCI-DSS and certify that the Mobile Ticketing Platform will meet those requirements within 60 days.

(b)   Meet SFMTA Privacy Policy requirements and embed a link to the Privacy Policy within Terms and Conditions in the app.

(c)   Use enhanced security and encryption of all customer payment information and other PII.

(d)   Provide demonstrable resistance to fraud and security against hacking. Contractor must report to the SFMTA any suspicious fraudulent activity immediately upon Contactor's discovery.

(e)   Disallow ticket activation from multiple devices.

(f)   Ensure the SFMTA is notified immediately in the event of a suspected breach of customer or SFMTA data.

5.2.4.7   Backend Requirements

The Mobile Ticketing Platform back-end software must:

(a)   Operate at all times in the event of a Mobile Ticketing Application outage; Contractor must ensure a resilient and redundant infrastructure to provide high availability as noted in performance metrics.

(b)   Support the latest versions of the Android and iOS operating systems that, together, meet or exceed 95% of the worldwide market share as determined in the reasonable opinion of provider.

(c)   Be scalable to support growth of the Mobile Ticketing Application based on customer use and adoption.

(d)   Be regularly updated to support product development and/or technology advancement.

(e)   Support any operating system (OS) upgrades for host device types (Android and iOS) with certified testing.

> (i)   Support any new OS version within four weeks of public general release of update.

> (ii)   Provide backward compatibility for multiple major versions.

(f)   Provide back-end metrics and performance monitoring and reporting tools.

(g)   Provide the Mobile Ticketing Application in the Google Play and Apple App stores.

(h)   Provide interface for other third-party applications via secure APIs. The SFMTA may provide these APIs to other third-parties by mutual agreement.

5.2.4.8   Data Requirements

The Mobile Ticketing Platform must:

(a)   Provide the SFMTA an interface to both raw and summary transaction data for financial reconciliation processes (i.e., City Portal).

> (i)   List the formats in which data will be available, such as JSON, Excel, CSV, and XML.

> (ii)   Data must reconcile to the settled amount within 99.9% accuracy.

(b)   Provide programmatic access to raw transaction-level data and summary transaction data to the SFMTA through means such as a REST-compliant Web service in a format that can be imported into the SFMTA's data warehouse. Contractor must work with the SFMTA to facilitate the SFMTA's extraction of data from the Mobile Ticketing Application, and ensure that the raw files can be imported and utilized by the SFMTA's systems. This involves providing to the SFMTA secure access to the data, providing the data in a compatible format, providing the data on a daily schedule, and providing a point of contact for any technical issues.

(c)   Provide a data dictionary and documentation of data model.

(d)   Provide location services to associate customer location with (i) fare payment and (ii) other customer data generated under the mobile functionality provided by Contractor, such as

trip planning and real-time arrival information. Provide a customer opt-in/out function settings of the Mobile Ticketing Application.

5.2.4.9 Processing and Settlement Requirements

The Mobile Ticketing Platform must:

(a) Provide hosted payment processing for credit and debit cards, including:

    (i) Acceptance of all major credit and debit card types, including Visa, MasterCard, American Express, Discover, Diners Club, JCB, Maestro, and UnionPay.

    (ii) Acceptance of PayPal and other forms of electronic payment.

    (iii) Acceptance of debit cards used for the SFMTA's transit benefit program, including debit cards provided by Ameriflex, Benefit Resource, Commuter Benefit Solutions, EBPA, EdenRed, Gusto, Navia, TransBen, TranSERVE, and WageWorks.

(b) Include payment methods approved by the SFMTA.

(c) Use enhanced payment method verification, such as CVV, address verification, etc.

(d) Authorize, process, and settle payments in a manner that is fully compliant with all current PCI-SS and applicable financial industry standards.

(e) Securely collect, process, and settle all authorized transactions to the customers' issuing bank accounts daily.

    (i) Any transaction fees, merchant acquirer fees, interchange fees, etc., must be covered by Contractor and included in pricing.

    (ii) If the SFMTA requires Contractor to use City-provided payment gateway, then the fees in (i) above will only include transaction fees and not merchant acquirer fees or interchange fees.

    (iii) All fees must be itemized and reported to the SFMTA for each deposit, which consists of a daily aggregation of all authorized transactions.

(f) Process all refunds and chargebacks initiated by either the customer service interface or the issuing bank.

(g) Settle transactions to the SFMTA no less than once daily by wiring the deposit to the SFMTA's bank account.

The SFMTA will later reconcile revenue on a monthly basis. For each settlement period, Contractor must provide a consistent summary report for that same period. The report must reflect the same total value as the funds transfer, allocating the total wired revenue by product, to aid the SFMTA with the revenue apportionment process.

5.2.4.10 Reporting Requirements

The Mobile Ticketing Platform must:

(a) Provide web-based functionality to support daily financial reporting.

(i) Reports must be made available online for retrieving, reviewing, printing, and downloading transaction and settlement data in Excel and CSV formats.

(ii) Reports must itemize each transaction, including: transaction identifier associated with account, payment method (credit, debit, etc.), card type, value of transaction, date and time of transaction (hr:min:sec), ticket type, passenger type (where applicable), number of tickets sold, and other necessary information.

(iii) Reports must also include any transaction refund or chargeback data (which may be provided by payment processor).

(iv) Reports must include full reconciliation and settlement data.

(v) Financial data must be available to Authorized Users for a minimum of three years from the transaction date, including online per transaction data and summary/statement data.

(vi) Reports must be accessible to Authorized Users at any time.

(vii) Reporting must allow for multiple accounts and user access and must not restrict the number of Authorized Users.

(b) Provide a web-based interface for monitoring real-time ticket sales and activations.

(i) Sales and activation reporting interface, if separate than financial reporting interface, must allow for multiple accounts and user access and must not restrict the number of Authorized Users.

(ii) Sales and activation data must be available online to Authorized Users for a minimum of 24 months from the transaction date.

(c) Provide summary statistical data of customer profiles, such as device types, models, operating system platforms, app versions, customer networks, types of fares purchased, etc.

(d) Provide sample reports and/or links to a reporting demo for both financial reconciliation and monitoring real-time sales and activations.

(e) Provide reports on locations of purchase, activation, and any other applicable functions for customers allowing location information.

5.2.4.11 Customer Service Requirements

The Mobile Ticketing Services must:

(a) Provide a City Portal to manage customer accounts, view transactions, investigate and resolve issues (including password resets), process refunds, cancel or re-issue tickets, and

provide first level customer service support; support data must be available to Authorized Users for a minimum of 24 months.

(b)   Provide service support directly to SFMTA customer service staff for customer and technical issues that cannot be resolved by SFMTA personnel.

(c)   Provide direct means of contact available 24 hours per day, 7 days per week for major system issues affecting the overall ticketing system noting that the majority of the special events occur during evenings and weekends.

(d)   Provide support when customers report lost tickets (due to customer upgrading OS, purchasing new device, unexplained cause, etc.) or ticket transfer requests.

5.2.4.12 Training Requirements

Contractor must:

(a)   Provide training to SFMTA personnel, geared towards education of Transit Operators, inspection/code compliance, customer service staff, financial/reporting, back-office management, etc.

(b)   Use a "Train the Trainer" approach to instructing SFMTA personnel.

(c)   Provide all necessary training materials (presentation slides, reference guides, videos, etc.), as well as manuals for future reference for all Authorized Users.

(d)   Provide subsequent training materials when substantial updates are made to the applications, ensuring SFMTA staff consistently has the most current materials.

5.2.4.13 Testing Requirements

Contractor must:

(a)   Test thoroughly the Mobile Ticketing Platform prior to release to evaluate and prove the design, user functionality, configurability, and security of the Mobile Ticketing Application, inspection devices, and all reporting and customer service interfaces.

(b)   Provide test scripts in advance of each testing phase for SFMTA approval; Contractor must invite the SFMTA to observe and sign off on any testing activities performed by the Contractor.

(c)   Test a wide range of device manufacturers, models, and operating system variations. The SFMTA will provide devices.

(d)   Make sandbox or Test Environments available to the SFMTA throughout solution development and testing.

(e)   Obtain the SFMTA's approval after testing and prior to launch or upgrade of the Mobile Ticketing Services. Contractor must comply with additional development and testing phases in order to meet all requirements agreed upon by the Parties.

5.2.4.14 Marketing Software Module to Support banners, campaigns, surveys and customer loyalty

Contractor must:

(a)   Implement a tool for campaign tracking and advertising attribution.

(b)   Provide a software tool to enable the set-up and management of campaigns; including campaign keyword optimization, surveys, and loyalty programs.

(c)   Produce a campaign wrap-up report including key demographics and key performance indicators at the end of campaign.

5.2.4.15 Other Requirements

The Mobile Ticketing Platform must:

(a)   Be accessible to customers and meet requirements under Title VI of the Civil Rights Act of 1964 requirements as may be applicable to Contractor.

(b)   Be covered under warranty as defined in the Agreement. This should cover maintenance, and support, including regular upgrades/updates and bug corrections to the Mobile Ticketing Application, inspection application, reporting solutions, or customer service solutions.

(c)   Include any required licenses or software. These must be the responsibility of Contractor.

(d)   Allow for an orderly transition of the Services from Contractor to any subsequent contract for similar services in a manner that minimizes inconvenience for MuniMobile customers and the SFMTA.

(e)   Contactor must make all relevant developer guides and any other relevant Documentation to any future MuniMobile Vendor. Contractor must work with future contractor to establish transition plan that provides a seamless customer experience.

5.3   Performance Requirements

Contractor must adhere to the Performance Requirements for the Mobile Platform & Website in Appendix F, which will be evaluated every Reporting Period.

6 ANALYTICS PLATFORM

To help the SFMTA better understand both the supply and demand sides of public transportation, Contractor must develop an Analytics Platform to analyze and interpret data outputs from the System Software and Mobile Platform & Website. The platform will provide insights into ridership patterns and the factors that influence customer mode choice, giving the SFMTA the tools to make more data-driven planning and operational decisions.

6.1 Deliverables

Contractor must deliver to the SFMTA the following Deliverables in connection with the Analytics Platform:

(a) Analytics Platform Reporting Tools and Dashboards; and

(b) Data Interpretation Services.

Each Deliverable and its requirements are described below.

6.2 Functional Requirements

By the end of Phase II, Contractor must deliver to the SFMTA an Analytics Platform that enables the SFMTA to analyze and interpret the large amounts of data generated by public transportation services and the Next Generation System. In particular, the SFMTA wants to better understand ridership patterns and how differences in Customer Information, service, fares and other variables can influence customer mode choice. Below are examples of questions, by subject matter, the Analytics Platform would help answer, both through dashboards and data interpretation services.

(a) Performance Management

(i) On-Time Performance – What are the system's basic on-time performance statistics by route, route segment, and time of day?

(ii) Travel Time Variation – How do vehicle travel times vary from time period and from day-to-day along different route segments?

(iii) Real-Time Prediction Accuracy – How reliable are Vehicle-Arrival Predictions? What changes could improve prediction accuracy?

(iv) Interval Reliability – Where are bunches and gaps most likely to occur?

(v) Stop-to-stop travel times – What is the distribution of travel times (using mean, median, standard deviation, 15th percentile, 85th percentile and other descriptive statistics) for any two stops along a route for a given time period? How do these travel differ by the hour of day and day of week? How have these travel times changed over time?

(vi) Off-Route Vehicles – How often do vehicles operate off-route (e.g., detour, Switchback)?

(vii) Real-Time Service Intervention – Are there any predictive analytics that can assist the SFMTA with making real-time service interventions that would minimize inconvenience to customers during service detours or delays?

(b)   Customer Engagement

(i)   Usage Analytics – How many people are using the Trip Planner? How often do people use the Trip Planner?

(ii)   Satisfaction Surveys – How content are customers with their riding experience?

(iii)   User Testing – How do individuals react to the experiences of the app and website?

(iv)   Focus Groups – How do focus groups perceive new or different features of the Next Generation System?

(v)   A/B Testing – How do different groups of users react to changes in the Trip Planner interface? How do they react to the presentation or content of information?

(c)   Service and Operational Planning

(i)   Service Interventions – What real-time service intervention strategies are most effective to minimize customer inconvenience and delays? By triangulating data from other sources such as CAD/AVL and automatic passenger counters, how do these strategies affect ridership?

(ii)   Customer Travel Time Reliability – How do bunches and gaps affect the predictability of end-to-end customer travel times?

(iii)   Transfer Reliability – Do vehicles arrive on time so that customers can make transfers successfully when there are scheduled timed transfers?

(iv)   Transportation Network Connectivity – How do changes in the transportation network affect customers' ability to move around efficiently?

(v)   Stop Removal Impacts – What are the differences in travel time along a route where a stop has been removed? (Requires Contactor to maintain a history of stops, even after their removal, for future analysis.)

(vi)   Elevator/Escalator Outage Impacts – How do elevator and escalator outages affect customers in general and customers with accessibility requirements?

(d)   Customer Responsiveness to Service Quality and Operational Reliability

(i)   Mode Choice and Abandonment – How often do potential customers look up the next Muni arrival time and either take Muni or decide to use another transportation mode? Under what circumstances does this occur?

(ii)   Wait Tolerance – How long are customers willing to wait for Muni? How does this wait time vary by time of day, route and location?

(iii)   Service Reliability and Abandonment – How do service gaps affect Muni abandonment rates?

(iv)   Latent Demand – Are there many requests for next Muni arrival times when service is sparse and ridership is low? If so, this may suggest that latent demand could materialize with longer service hours and/or more frequent service.

(v)   Crowding – How much crowding are customers willing to accept before choosing a different transportation mode? How does crowding impact travel for customers with accessibility requirements?

(vi)   Pass-ups – How often do pass-ups occur and how do they impact customer travel?

(vii)   Origin-Destination Patterns – At an aggregated level, what route(s) are customers taking to travel from their origin to their destination? Is there trip linking with other transit providers or other transportation modes?

(viii)   Ridership Forecasting – How might proposed service changes affect ridership at a route and network level?

(ix)   Ridership Elasticity – How do implemented service changes affect ridership at a route and network level?

(x)   Muni Transfers – How many customers transfer between different route pairs and at different transfer locations? What is the distribution of transfer times (using mean, median, standard deviation, 15th percentile, 85th percentile and other descriptive statistics) at different transfer locations for any given hour of day or day of week? How long are customers willing to wait for transfers before seeking another form of transportation?

(xi)   Interagency Transfers – How do customers transfer between Muni and other transit systems? How can the SFMTA and other Transit Providers reduce barriers and minimize inconvenience?

(xii)   Customer Feedback – How do service and operational reliability issues impact public perceptions in terms of customer ratings, requests and other feedback?

(xiii)   Fares – How do changes in fare policy or fare levels affect ridership? Do they shift people to other transportation services?

(xiv)   Real-Time Information – How can real-time information be used to influence or alter mode choice?

(xv)   Excess Wait Time – What is the excess wait time (average wait time – scheduled waiting time) by route and time of day resulting from service delays and gaps?

6.2.1   Analytics Platform Reporting Tools and Dashboards

(a)   The Analytics Platform must provide reporting tools and dashboards to help the SFMTA understand trends and analyze data to answer questions listed above. At minimum, the Analytics Platform will contain the following components:

     (i)   Ridership Analytics – Visualizations and statistical analysis across different modes and Transit Stops.

(ii)   Service Quality – Schedule performance analysis, service reliability and network connectivity across transit modes.

(iii)   Mobile Data – Insights into traveler behavior and patterns of mobility demand through the analysis of customer reactions to permanent and temporary changes in the transit network and real-time notifications.

(iv)   Passenger Movement – Origin and destination pairs, transfer points, waiting times and crowding.

The Parties will determine the dashboard content of the Analytics Platform in the System Design Document.

(b)   In addition, Contractor must provide a feed with raw transaction-level data for entry into the SFMTA's data warehouse, such that SFMTA staff can prepare customized data visualizations. Contractor must also permit data downloads from its server and/or directly enter data into SFMTA Data Warehouse for the SFMTA to use and perform its own analytics.

6.2.2   Data Interpretation Services

On an as-needed basis, the SFMTA may request Contractor provide Data Interpretation Services to answer complex questions beyond what automated dashboards can provide. If the SFMTA requests Data Interpretation Services, Contractor will provide professional staff with expertise in analytics to answer the SFMTA's questions. Contractor must perform as-needed Data Interpretation Services under Task Orders the SFMTA issues in accordance with Section 3.5 of the Agreement.

6.3   Performance Requirements

Contractor must adhere to the Performance Requirements for the Analytics Platform in Appendix F, which will be evaluated every Reporting Period.

Appendix C

MAINTENANCE SERVICES

This Appendix C sets forth the scope of Services Contractor must provide under this Agreement to maintain the Next Generation System (Maintenance Services). The Maintenance Services consist of Technical Support Services, Stationary Digital Sign Maintenance Services, and Communications Maintenance Services. Contractor must use industry-proven solutions and current technologies to provide the Maintenance Services commencing from the end of Phase I through the term of the Agreement, as described below.

Contractor must comply with Performance Requirements related to the Maintenance Services as set forth in Appendix F¸ which the SFMTA will evaluate every Reporting Period. SaaS Applications & SaaS Hosting Services are set forth separately in Appendix D.

1   TECHNICAL SUPPORT SERVICES

1.1   General

Contractor must provide technical support for Incidents as set forth in this Section 1 of Appendix C (Technical Support Services). An Incident means any problem or issue with any Element of the Next Generation System. Incidents fall into four severity levels, as described in Table C-1 below.

Table C-1: Incident Severity Levels/Response and Resolution Times

Incident Severity Level	Target Response Time	Target Resolution Time
High Severity: Requires immediate attention – Critical production functionality of the Next Generation System is not available, Authorized Users cannot perform critical operations due to one or more SaaS Applications being unavailable, or there is an outage or major degradation of one or more elements of Customer Information and concurrently affecting more than 20% of locations. Causes a major business impact where delivery of Customer Information is lost or degraded and no workaround is available, and prevents or critically hinders transit operations. Contractor must notify, and keep apprised of its progress to resolve the Incident, designated SFMTA Technology Solutions and Integration including the Chief Technology Officer and the SFMTA Program Manager and Service Desk staff. Contractor must work until it resolves the Incident, and must provide to the SFMTA a written Root Cause Analysis and Recommendations Report within 14 days of final resolution of Incident. See examples, by Element, of high-severity Incidents in Table C-2.	15 minutes	24 hours
Medium Severity: Requires priority attention – Some important production functionality of the Next Generation System is not available, Authorized Users cannot perform routine, non-critical operations on one or more SaaS applications, or one or more elements of Customer Information is unavailable or operating in a degraded mode and concurrently affecting between 5% and 20% of locations. Causes significant business impact where delivery of Customer Information is lost or degraded and no workaround is available, but transit operations continue even if in a limited fashion. Contractor must notify, and keep apprised of its progress to resolve the Incident, designated SFMTA Technology Solutions and Integration staff including the Chief Technology Officer, the SFMTA Program Manager and Service Desk staff. Contractor must work until it resolves the Incident, and must provide to the SFMTA a written Root Cause Analysis and Recommendations Report within 14 days of final resolution of Incident. See examples, by Element, of medium-severity Incidents in Table C-2.	30 minutes	48 hours
Low Severity: Requires attention – There is a problem or inconvenience that has a minor impact on the production functionality of the Next Generation System, Authorized Users cannot perform one or more minor operational functions of the SaaS Applications, or one or more elements of Customer Information is unavailable or operating in a degraded mode and affecting less than 5% of individual locations. Causes a minor business impact where delivery of Customer Information is minimally affected and a workaround is available, and transit operations continue without interruption. Contractor must notify, and keep apprised of its progress to resolve the Incident, the SFMTA Program Manager. Contractor is not required to work until it resolves the Incident, and is not required to provide to the SFMTA a written Root Cause Analysis and Recommendations Report. See examples, by Element, of low-severity Incidents in Table C-2.	4 hours	5 business days (excludes weekends and City holidays)
Service Request: There is a routine or relatively minor issue that has no impact on the production functionality of the Next Generation System, and does not hinder access to the SaaS Applications or Customer Information. Service requests are typically requests for advice or assistance. Examples of service requests include: a geofence around a particular terminal is not configured properly, resulting in incorrect terminal departures; and the Trip Planner is recommending incorrect directions for a specific itinerary.	2 business days	10 business days (or longer, if approved by the SFMTA)

1.2 Incident Reporting and Resolution Process

1.2.1 Report Incidents

(a) Authorized Users and other SFMTA-authorized staff (including 311 and 511 system managers) may report Incidents to Contractor by creating a "ticket" using the Incident Ticketing and Tracking Log (described below).

(b) SFMTA-authorized staff may report Incidents to Contractor by telephone call, text, or email to Contractor's technical support staff or contract person. When reporting Incidents by telephone, text, or email, SFTMA-authorized staff must describe the Incident in detail, and must provide the name and phone number of the SFMTA contact person responsible for addressing the Incident with Contractor.

(c) Customers may report Incidents to Contractor from their mobile Trip Planner app through a means determined by the Parties during the development of the System Design Document.

(d) The Next Generation System (e.g., Stationary Digital Signs and On-Board Digital Signs) must have the capability to report Incidents to the Incident Ticketing and Tracking Log based on the automatic detection of critical faults (e.g., a sign failure).

1.2.2 Log Incidents and Assign Severity Levels

(a) Upon receiving an Incident report by telephone call, text, or email, Contractor must log the Incident into the Incident Ticketing and Tracking Log and assign a severity level based on the information provided in the report. If the Authorized User or other SFMTA-authorized staff making the report indicates the severity level, Contractor must assign that severity level.

(b) If Contractor disagrees with the SFMTA's severity-level assessment, Contractor may request a reevaluation of the severity. After Contractor resolves the Incident, the SFMTA will make a final evaluation as to the Incident's severity. So long as Contractor meets the response and resolution time requirements in Table C-1 within the time limit associated with the final assessment, SFMTA will not assess Liquidated Damages to Contractor.

1.2.3 Respond to Incidents

Contractor must respond to Incident reports within the times set forth in Table C-1, based on the severity level.

1.2.4 Resolve Incidents

(a)   Contractor must resolve Incidents within the times set forth in Table C-1, based on the severity level.

(b)   In resolving Incidents, Contractor must address high- and medium-severity Incidents 24 hours a day, seven days a week. Contractor must address low-severity Incidents and service requests during Business Hours.

(c)   Contractor must provide on-call staff with expertise to address software, hardware, or any other issues within the given response times.

1.2.5 Root Cause Analysis and Recommendations Report

A Root Cause Analysis and Recommendations Report is a written explanation of the reasons why an Incident occurred, and recommendations to avoid similar Incidents in the future. Within five business days, Contractor must prepare and submit to the SFMTA Root Cause Analysis and Recommendations Reports as indicated in this Appendix C.

1.3 Incident Ticketing and Tracking Log

(a)   Contractor must furnish an Incident Ticketing and Tracking Log to track Incidents. Contractor must make the Incident Ticketing and Tracking Log available on both desktop and mobile formats.

(b)   For each Incident, the Incident Ticketing and Tracking Log must assign a unique ticket number and record the following: (i) severity level; (ii) how (e.g., through phone, email, text, etc.) and by whom the Incident was reported (e.g., name of SFMTA staff, auto-reported, etc.); (iii) location (e.g., geographic and within Next Generation System); (iv) description; (v) actual response time; (vi) actual resolution time; and (vii) status of Incident.

(c)   The Incident Ticketing and Tracking Log must keep historical maintenance records of each system component. For example, Contractor and the SFMTA must both be able to look up how many times a particular sign needed repair.

(d)   Contractor must transmit a list of outstanding Incidents (i.e., Incidents that have not been resolved) to designated SFMTA staff, seven days per week, via e-mail.

1.4 Training

Contractor must provide written technical documentation for all System Elements. This includes manuals for different SFMTA staff who will interface with the System.

After SFMTA approves the manuals and at SFMTA direction, Contractor must provide all necessary on-site training courses to train SFMTA staff to cover areas that include, but are not limited to:

(a)   Equipment diagnosis, maintenance, and repair; and

(b)   Software user training.

Contractor must accept input from SFMTA staff during training sessions and must revise manuals accordingly.

Contractor must also provide professional video recordings of sessions for SFMTA staff who cannot attend.

Contractor must provide reasonable, additional training due to staff turnover at the SFMTA's direction.

2   STATIONARY DIGITAL SIGN MAINTENANCE

2.1   Installation and Removal

Contractor must install Stationary Digital Signs, including text-to-speech systems, at new locations (i.e., locations where there are currently no signs), or remove signs and push-to-talk devices from existing locations as directed by the SFMTA. Unless otherwise directed in writing by the SFMTA, Contractor must perform all installation or removal of surface-level Stationary Digital Signs between 8:00 pm to 5:30 am and underground station Stationary Digital Signs between 9:00 pm and 5:30 am, or other hours upon approval from the SFMTA.

2.2   Replacement and Repair

Contractor must continually monitor Stationary Digital Signs for defects, and must repair or replace all Stationary Digital Signs, including text-to-speech systems, as follows:

(a)   Replace and repair Stationary Digital Signs that is reporting a fault/error status through the sign monitoring system or where an Incident has been raised by an Authorized User.

(b)   To gain access to a shelter or underground stop to repair a Stationary Digital Sign, Contractor must contact a staff person designated by the SFMTA of the stop location at which the shelter with a defective Stationary Digital Sign is located to confirm that the shelter is available and to make arrangements for Contractor to perform testing and repairs.

(c)   Contractor must perform all testing and repairs of Stationary Digital Signs at night during the hours 8:00 pm to 5:30 am. Contingent upon the SFMTA making the shelter at which the defective Stationary Digital Sign is installed available to Contractor, Contractor must repair or replace a defective Stationary Digital Sign within two business days of the report of that Stationary Digital Sign as defective on a System Maintenance Report.

(d)   If a Stationary Digital Sign is found defective, Contractor must immediately replace it with a spare unit. Contractor must repair the removed defective Stationary Digital Sign

in Contractor's own facility (or that of a subcontractor) and return that Stationary Digital Sign to the inventory of spares it maintains for the SFMTA.

(e)   All completed repairs must be noted in the Repair Log.

(f)   Contractor must send a report via email no later than 6:30 am each morning clearly identifying the stop locations at which the Stationary Digital Sign is believed to be defective and which Contractor was not able to repair the previous night.

(g)   If power is out at a shelter due to installation of a replacement shelter, Contractor must note that the shelter was removed/replaced on the repair log and the website and remove the notation once power is connected.

(h)   If a malfunction is due to an SFMTA issue, Contractor must contact the designated SFMTA staff member immediately upon discovery.

(i)   Contractor must return all spare parts, including signs, to the SFMTA upon the expiration or termination of the Agreement, or at any time during this Agreement upon request from the SFMTA.

2.3   Contractor Safety

Contractor is wholly responsible for the safety of its personnel while performing work. Contractor must observe all SFMTA safety rules and requirements while present on SFMTA property, including Transit Stops and Operating Divisions. Contractor's personnel and its subcontractors' personnel must obtain safety training and clearance from the SFMTA prior to performing any work on SFMTA rail station platforms, in the subway or in SFMTA Operating Divisions. Specifically, any personnel working in trackway areas, including on rail station platforms and shelters adjacent to rail lines, must complete the SFMTA Roadway Worker Protection (RWP) course.

A minimum of 72 hours in advance of work, Contractor must be RWP-trained and obtain a track clearance permit. Contractor must apply for the permit from the SFMTA Transportation Mangement Center at (415) 759-4396 before performing any work within 48 inches of the outside edge of SFMTA track (the "Safety Envelope"). If workers will be within the Safety Envelope, the Contractor must comply with and train its workers per the SFMTA Rail Safety Training program, in addition to obtaining a clearance permit.

Please refer to the following documents for additional information:

- Guidelines for Working in San Francisco Streets (Blue Book) for additional information - https://www.sfmta.com/sites/default/files/reports-and-documents/2017/10/blue_book_8th_edition_pdf.pdf

- SFMTA Clearance Permit policy - https://drive.google.com/file/d/1hCuelPhxOzzaZiSe_Xg17n2kwwKxDTTp/view

2.4   Spare Equipment

(a)   Spare Equipment enables Contractor to provide replacement signs at a location where a defect has caused either a temporary or permanent sign failure. A failure may involve any sign component, including any potential text-to-speech hardware, hindering full

functionality. Contractor must maintain spare Equipment and have them available for installation to ensure continuous service during equipment repair or replacement.

(b)　　A "spare ratio" is the amount of spare Equipment available divided by the equipment required to provide full service. Contractor must maintain a five percent spare ratio at all times, rounded up to the nearest whole number.

(c)　　Whenever the SFMTA places an order for any type of Stationary Digital Sign, the SFMTA will pay Contractor a one-time five-percent fee to pay for spare Equipment. Contractor must purchase any additional spare signs required to maintain service at all locations with Stationary Digital Signs, including signs necessary if the spare Equipment itself malfunctions. For example, if there are 900 Type-1 Signs, the SFMTA would pay Contractor for 45 signs at the rates Contractor indicates in Appendix E, Section 4.1, including any volume discounts.

2.5　Storage

Contractor must store all Stationary Digital Signs, including any spare Equipment and spare parts.

2.6　Vandalism

Contractor will rectify Incidents associated with vandalism to Stationary Digital Signs according to the following:

(a)　　As part of the site attendance services described within this Appendix C, when the number of vandalism Incidents per month is less than 0.5% of the total installed number of Stationary Digital Signs averaged over a Reporting Period, Contractor will attend site and restore the vandalized sign to an operational state or replace the sign from spare Equipment stock where on-site cleaning/repair is not feasible.

(b)　　When the number of vandalism Incidents per month exceeds 0.5% of the total installed number of Stationary Digital Signs averaged over a Reporting Period, Contractor will attend site and restore the vandalized sign to an operational state or replace the sign from spare Equipment stock where on-site cleaning/repair is not feasible. Costs for time spent attending site in excess of the 0.5% threshold will be chargeable to SFMTA using the labor rates in Appendix E, Section 8.

(c)　　Except as provided in paragraph (d) below, within five business days of any vandalized sign being returned to the workshop for repair or replacement, Contractor will provide to SFMTA a quote for the costs to replace, repair or "make good" the sign, for SFMTA's authorization. On receipt of authorization from SFMTA, Contractor will perform the necessary works to reinstate the sign to an operational state in accordance with Incident resolution times in Table C-1 and invoice SFMTA at the end of the next invoice period for Maintenance Services.

(d)　　Stationary Digital Signs must meet an Impact Resistance rating of IK08 or greater in relation to resistance to vandalism, as defined in the standard EN 62262: 2002. If there is vandalism to a sign whereby it can reasonably be proven that the sign is irreparably damaged through an impact vandalism event that is lower than IK08, then Contractor is responsible for

replacing said sign at its expense and the Incident shall not be counted as part of the 0.5% threshold described in paragraph (b) above.

2.7 Cleaning

Contractor is responsible for cleaning Powered Signs at Outdoor Rail Platforms (Type 2), Powered Signs at Underground Stations (Type 3) and Alternatively-Powered Signs (Type 4). During its site visits in response to both corrective and preventive maintenance for these signs, Contractor must undertake cleaning of the viewing window to remove surface dirt using water, mild soap solution and a non-abrasive cloth in line with the sign manufacturer's recommendations. Contractor will record these cleaning activities in its service management database and publish these records for the SFMTA as part of regular service reporting. On average, Contractor will clean these signs three times annually, with a minimum of twice annually for each sign.

2.8 Warranty
2.8.1 Initial Warranty

Contractor must provide an initial warranty for Stationary Digital Signs at no cost to the SFMTA. For each sign, the initial warranty period begins with the sign's Initial Deployment and ends five years after the sign's Initial Deployment. This warranty covers all parts and consumables necessary to ensure functioning signs at all locations. Contractor is responsible for inventorying, ordering and tracking all parts, and must ensure that sufficient spare parts are available at all times to avoid service outages.

2.8.2 Extended Warranty (**Option**)

As an option exercisable by the SFMTA (priced in Appendix E, Section 4.3), Contractor will provide two extended warranty periods for signs:

(a)   The First Optional Extended Warranty for each sign will last from the beginning of the 6th year to the end of the 10th year following the sign's Initial Deployment.

(b)   The Second Optional Extended Warranty for each sign will last from the beginning of the 11th to the end of the 15th year following the sign's Initial Deployment.

The extended warranty covers all parts and consumables necessary to ensure functioning signs at all locations. Contractor is responsible for inventorying, ordering and tracking all parts, and must ensure that sufficient spare parts are available at all times to avoid service outages.

3   COMMUNICATIONS SERVICES

Contractor must maintain all communications between the System Software and Stationary Digital Signs. Understanding that technology may advance over the term of the Agreement, Contractor must inform the SFMTA of changes that could impact communications between software and signs. If a hardware upgrade is necessary to maintain communications, Contractor must develop a transition plan for the SFMTA's approval to avoid a service outage.

Table C-2: Examples of Incidents by Element

Element	High Severity	Medium Severity	Low Severity
System Software: Customer Information	System stops predicting real-time arrivals for at least 20% of vehicles or 20% of Transit Stops Failure to communicate between the System Software and stationary or on-board signs, resulting in an outage that affects at least 20% of vehicles or 20% of Transit Stops Any unplanned system wide outage that still has not been resolved in 20 minutes after being reported or detected	System stops predicting real-time arrivals for 5% to 20% of vehicles, 5% to 20% of Transit Stops, or more than one route Failure to communicate between the System Software and stationary or on-board signs, resulting in an outage that affects 5% to 20% of vehicles or 5% to 20% of Transit Stops Any unplanned system wide outage that still has not been resolved in 10 minutes after being reported or detected	System stops predicting real-time arrivals for one route (provided that Contractor displays a message conveying this issue to the public) Failure to communicate between the System Software and stationary or on-board signs, resulting in an outage that affects less than 5% of vehicles or 5% of Transit Stops Any unplanned system wide outage that has not been resolved within 5 minutes after being reported or detected
System Software: System Administration Tool	Improperly matches vehicles to wrong Vehicle Block in real-time Failure to upload same-day schedules for a new signup properly	Failure to upload schedules for a new signup properly and signup does not take effect for at least 3 days	Failure to upload schedules for a new signup properly and signup does not take effect for at least 14 days
System Software: Operations Management Mobile View	Operations Management Mobile View functionality does not work.	N/A	N/A
System Software: Content Management System	Authorized Users unable to write and deploy basic text-only messages for customers	Authorized Users not able to create and deploy new visual messages for customers	Authorized Users not able to save an event template
Stationary Digital Signs	Failure to communicate between the System Software and Stationary Digital Signs, resulting in an outage	Failure to communicate between the System Software and Stationary Digital Signs, resulting in an outage	Failure to communicate between the System Software and Stationary Digital Signs, resulting in an outage that affects less than 5% of Transit Stops

Element	High Severity	Medium Severity	Low Severity
	that affects at least 20% of Transit Stops	that affects at least of 5% to 20% of Transit Stops	
On-Board Digital Signs	Failure to communicate between the System Software and On-Board Digital Signs, resulting in an outage that affects at least 20% of vehicles	Failure to communicate between the System Software and On-Board Digital Signs, resulting in an outage that affects 5% to 20% of vehicles	Failure to communicate between the System Software and On-Board Digital Signs, resulting in an outage that affects less than 5% of vehicles
Mobile Platform & Website: Mobile Platform	The back-end system is down, the back-end system does not respond or the back-end performance makes the Mobile Platform unusable. This includes the Mobile Ticketing Application being unable to collect fare revenue or sell fare products.	Entire functions are not available. The Mobile Platform is only available with major restrictions.	Minor errors or deviations from performance. The Mobile Platform is usable with minor restrictions.
Mobile Platform & Website: Trip Planner	Users cannot submit Trip Planner requests for an entered search for any transit stations/stops, addresses or points of interest.	N/A	N/A
Mobile Platform & Website: Data Collection	N/A	N/A	Mobile Platform stops collecting transactional data
Analytics Platform	N/A	N/A	Analytics Platform functionality does not work

Appendix D

SAAS APPLICATIONS & SAAS HOSTING SERVICES

1. Description of the SaaS Applications and SaaS Hosting Services
2. SaaS Data Centers
3. SaaS Maintenance Services
4. City Responsibilities
5. Technical Support & Training

1   Description of the SaaS Applications and SaaS Hosting Services

SaaS Applications and SaaS Hosting Services include the following services:

1.1   SaaS Applications

Use of Contractor's and/or Subcontractor's SaaS Applications operating on hosted equipment located at Contractor's and/or Subcontractor's facility or any Data Center as further described under <u>Section 2</u> (SaaS Data Centers) of this <u>Appendix D</u>. The SaaS Applications are:

(a)   Customer Information;

(b)   System Administration Tool;

(c)   Content Management System;

(d)   Trip Planner;

(e)   Mobile Ticketing Services (if SFMTA exercises this option); and

(f)   Analytics Platform Reporting Tools and Dashboards.

1.2   Access Control

Contractor must provide access for City management of Authorized Users, access rights, and other similar role-based controls as they pertain to the SaaS Applications. Method will be published through Contractor portal and be made available to Authorized Users with elevated privileges.

1.3   Back-Up of City's Data

(a)   Contractor must provide up to 36 months of on-line hourly data retention for SaaS Applications operation and functionality.

(b)   Contractor must ensure incremental City Data is replicated at a minimum of every four hours to an off-site location other than the primary Data Center.

(c)   Contractor must maintain the application structures and procedures to ensure data is protected and that it meets performance requirements.

1.4   SaaS Environments

The SaaS Applications and Saas Hosting Services must be hosted in a certified and secure Tier-3 Data Center or public cloud service provider.

(a)   A Back-up Environment available as needed to serve as the back-up or "failover" environment for the SaaS Applications and SaaS Hosting Services.

(b)   A Test Environment available to the City and Contractor for the evaluation and eventual promotion of SaaS Application updates, patches, fixes or other needed tests. The Test Environment must provide equivalent functionality and performance to the Production Environment and scaled to allow test users to undertake functional testing. The Test Environment must be available to Authorized Users no less than two months before Initial Deployment of the System Software, and must remain available to Authorized Users for the term of the Agreement.

1.5   Reporting

Contractor must report any incidents or breaches within the environment or to the hosted application in accordance with Appendix C, Section 1. In the event of a breach, Contractor must follow the procedures set forth in Section 13.1.5 of the Agreement.

1.6   Availability of SaaS Services

Contractor (or its Hosting Service contractor) must host the SaaS Services on computers owned or controlled by the Contractor (or its cloud service provider) and must provide the City with access to both a Production Environment with SaaS Applications and data and a Test Environment with SaaS Applications via Internet-access to use according to the terms herein.

1.6.1   Hosted System Uptime

Other than Scheduled SaaS Maintenance Services as outlined in Section 3, emergency maintenance described below, Force Majeure as described in the Agreement and lack of Internet availability as described below, Contractor must provide uptime to the SaaS Application and SaaS Hosting Service to meet the System Software Availability Rate performance requirement in Appendix F.

1.6.2   Scheduled SaaS Maintenance

(a)   Contractor must conduct Scheduled SaaS Maintenance during the following hours: Saturdays between 12 AM (Pacific Time) and 5 AM (Pacific Time), or as otherwise agreed with the SFMTA, with the same exclusions noted in Section 1.6.1 above.

(b)   Scheduled SaaS Maintenance shall not exceed an average of four hours per month for each Element or Sub-Element of the System over a 12-month period except for major scheduled upgrades.

1.6.3   Unscheduled SaaS Maintenance.

Contractor must use commercially reasonable efforts to prevent more than one hour of continuous downtime for any month for which unscheduled SaaS maintenance is required. If Contractor fails to meet this obligation for a period of three successive calendar months, Contractor is subject to Liquidated Damages as described in Appendix G.

1.6.4   Emergency Maintenance

If Force Majeure Events or emergencies arise, Contractor shall be entitled to take any actions that Contractor, in good faith, determines is necessary or advisable to prevent, remedy, mitigate, or otherwise address actual or potential harm, interruption, loss, threat, security or like concern to any of the SaaS systems or the SaaS Software. Such emergency maintenance may include, but is not limited to: analysis, testing, repair, maintenance, re-setting and other servicing of the hardware, cabling, networks, software and other devices, materials and systems through which access to and/or use of the SaaS Software by City is made available. Contractor shall endeavor to provide advance written notice of such emergency maintenance to City as soon as is reasonably possible.

1.6.5   Notice of Unavailability

In the event there will be more than 30 minutes downtime of any SaaS Application or Hosted Service components for any reason, including Scheduled SaaS Maintenance or emergency maintenance, Contractor must provide notice to users by posting a web page that indicates that the site is temporarily unavailable and to please come back later. Contractor must also provide advanced e-mail notice to the SFMTA's Service Desk, Chief Technology Officer, Technology Solutions and Integration Management, and the SFMTA Program Manager, which will include at least a brief description of the reason for the downtime and an estimate of the time when City can expect the site to be up and available.

1.7   Changes in Functionality

During the term of this Agreement, Contractor must not reduce or eliminate functionality in any SaaS Application or SaaS Hosting Services.

2   SaaS Data Centers

2.1   Control

The method and means of providing the SaaS Hosting Services shall be under the exclusive control, management, and supervision of Contractor, giving due consideration to the requests of City. Contractor or any previously approved subcontractor must provide the data storage services solely from within the continental United States and on computing and data storage devices residing in the United States.

2.2   Location

The locations of the approved Data Centers or cloud service providers that will be used to host the SaaS Application are as follows: AWS, Azure and Google Cloud (hosted provider).

2.3   Replacement Hosted Provider

In the event Contractor changes the foregoing hosted provider, Contractor must provide City with prior written notice of said change and disclose the name and location of the replacement Hosted Provider. The replacement Hosted Provider must be a reputable Hosted Provider comparable to Contractor's current Hosted Provider, and said replacement Hosted Provider must be located within the United States. The replacement Hosted Provider must perform a SSAE 16, SOC 1 and/or SOC 2/SOC 3 Audit Report at least annually, in accordance with Section 13.3 of this Agreement.

2.4 Notice of Change

If the location of the Data Center used to host the SaaS Application is changed, Contractor must provide City with written notice of said change at least 60 Days prior to any such change taking place. Contractor must disclose the address of the new facility, which must be within the United States. The Data Centers referenced above are subcontractors that must be approved by City.

3 SaaS Maintenance Services

The SaaS Applications maintained under this Agreement shall be the SaaS Applications listed in this Appendix D to this Agreement.

SaaS Applications Core Software means the base software components that are common across multiple Contractor's and/or Subcontractor's customers that use the SaaS Applications.

SaaS Applications SFMTA Software means the SaaS software components that are specific to SFMTA.

The following SaaS Maintenance Services are included as part of this Agreement:

3.1 Contractor Software Version Upgrades, Software Revisions, and Patches.

At least twice a year and at no additional cost to the SFMTA, Contractor must provide and implement all SaaS Applications Version upgrades, SaaS Applications Revisions, and SaaS Applications patches to ensure: (a) the functionality of the SaaS Applications and SaaS Hosting Services, as described in the Documentation, is available to Authorized Users; (b) the functionality of the SaaS Applications and SaaS Hosting Services is in accordance with the representations and warranties set forth herein, including the SaaS Applications and SaaS Hosting Services conforming in all material respects to the specifications, functions, descriptions, standards, and criteria set forth in the Documentation; (c) the Service Level Standards can be achieved; and (d) that the SaaS Applications and SaaS Hosting Services work with the non-hosted browser version.

(a)   Deployment of revisions to SaaS Applications Core Software will be in accordance with Contractor's and/or Subcontractor's routine product release cycle. Deployment of revisions to SaaS Applications SFMTA Software will be mutually agreed upon between the Parties.

(b)   Release of software revisions as defined will be conducted on a schedule as determined by Contractor. Contractor must provide no less than a 20-Day prior written notice of when any such revision is scheduled to be released to allow City to review release documentation regarding software modules being impacted and general revision changes.

(c)   For revisions to SaaS Applications SFMTA Software, Contractor must conduct a deployment of the revision to the City Test Environment. The software deployment will be scheduled in writing five business days prior to actual deployment activities. As part of the upgrade activities within the Test Environment, Contractor may provide nominal testing to ensure all systems are functional and the revision deployment was successful. Post-deployment activities include an e-mail or portal post to serve as written notification that this service has been completed. City shall have a 20-Day test window in which to test and raise issues with Contractor. Test Environment deployment activities will be conducted during a mutually

agreed-to time window and may not necessarily align with the production maintenance windows as described within this document.

(d)   If a SaaS High Severity or Medium Severity Issue has been identified and appropriately triaged and classified by both Contractor and City during the Test Environment deployment test window, Contractor must correct the SaaS Issue. The severity of a SaaS Issue will be initially defined by the City and confirmed by Contractor. Until the SaaS Issue has been resolved, the Severity Level may be raised or lowered based on Contractor's analysis of impact to business. If the SaaS Issue can be corrected and can be redeployed within the remainder of the deployment test window, City will have an additional five Days in which to evaluate and further test for the SaaS Issue resolution. If the SaaS Issue cannot be corrected within the remainder of the test window, Contractor may not deploy without the permission of the SFMTA.

(e)   If at any time during the testing window City identifies the presence of multiple SaaS High Severity or Medium Severity Issues that can be shown to materially impact City's ability to continue testing, City may elect to suspend testing until corrections for the SaaS Issues can be provided. Contractor must deploy corrections immediately upon availability with as much notice as practicable. Upon release of corrections, City will have five Days to commence the testing within the then available remaining testing window.

(f)   Unless outstanding circumstances exist as described here, Contractor will promote revision from Test Environment to Production Environments after the provided test window has elapsed. The software promotion will be scheduled in writing five Days prior to actual deployment activities. As part of the promotion activities within the Production Environments, Contractor may provide nominal testing to ensure all systems are functional and the revision promotion was successful. Post-promotion activities include an e-mail or portal post to serve as written notification that this service has been completed. At the point of e-mail or portal posting, the new revision will be considered "in production" and supported under the maintenance service terms described herein.

(g)   If the SFMTA requests custom software upgrades, the Parties will adhere to the Task Order Process described in Section 3.5 of the Agreement.

(h)   In support of such SaaS Software Version upgrades, SaaS Software Revisions, and SaaS Software patches, Contractor must provide updated user Documentation reflecting the SaaS Software Version upgrades, SaaS Software Revisions and SaaS Software patches as soon as reasonably practical after the SaaS Software Version upgrades, SaaS Software Revisions and SaaS Software patches have been released. Contractor must provide updated user Documentation that corrects SaaS Software Errors or other minor discrepancies.

3.2   Third-Party Software Revisions

At its election, Contractor will provide periodic software revisions of Third-Party Software with the SaaS Software without further charge provided the following conditions are met: (i) the Third-Party Software revision corrects a malfunction or significant publicly disclosed security threat in the Third-Party Software that affects the operation or ability to provide secure use of the SaaS Software; and (ii) the Third-Party Software Revision has, in the opinion of Contractor, corrected malfunctions or a significant security threat identified in the Contractor Software and has not created any additional malfunctions; and (iii) the Third-Party Software revision is

available to Contractor. Contractor Software revisions provided by Contractor are specifically limited to the Third-Party Software identified and set forth in Appendix D to this Agreement.

3.2.1 Response to SaaS Incidents.

See Appendix C, Section 1.

3.2.2 SaaS Software Maintenance Acceptance Period

Unless otherwise agreed to by City on a case-by-case basis, for non-emergency maintenance, City shall have a 20-business-day period to test any maintenance changes prior to Contractor introducing such maintenance changes into production. If the City rejects, for good cause, any maintenance changes during the SaaS Software maintenance acceptance period, Contractor must not introduce such rejected maintenance changes into production. At the end of the maintenance acceptance period, if City has not rejected the maintenance changes, the maintenance changes shall be deemed to be accepted by City and Contractor shall be entitled to introduce the maintenance changes into production.

3.2.3 SaaS Hardware

Contractor must use commercially reasonable efforts to ensure that all hardware (including servers, routers, and other related equipment) on which the applications are deployed are attached to back-up power systems sufficient to maintain the site's availability for so long as any power outage could reasonably be expected to occur, based on the experience of Contractor at its deployment location and consistent with the Tier rating of the Data Center required under Section 2 of this Appendix.

4 City Responsibilities

(a) City shall provide Contractor with timely notification of any SaaS Issues by either of these methods:

(i) Contacting Contractor's Customer Support at 1-877-NextBus (877-639-8287); and sending an email to report issues. E-mail: support@nextbus.com.

(ii) By entering the problem on the Contractor Service Portal. Notifications can be submitted through the City Portal. This is the preferred method by which to contact Contractor.

(iii) If City cannot readily access the Contractor portal, City may contact Contractor at the "800" number listed above.

(b)   Support for Problem Investigation. City shall support all reasonable requests by Contractor as may be required in problem investigation and resolution.

(c)   Designation of Point of Contact. As needed, City shall assign an individual or individuals to serve as the designated contact(s) for all communication with Contractor during SaaS Issue investigation and resolution.

(d)   Discovery of SaaS Software Errors. Upon discovery of an SaaS Software Error, City shall support all reasonable requests by Contractor as may be required in problem investigation and resolution.

5   Technical Support

See Appendix C, Section 1.

6   Additional Requirements

Contractor is responsible for providing and maintaining all software implemented with this solution. Contractor must provide:

(a)   Maintenance and support services for the SaaS Applications as provided in the Agreement to ensure that the SaaS Applications perform in accordance with the requirements and specifications of this Agreement;

(b)   Updates to the SaaS Applications Contractor develops; and

(c)   During any Maintenance Period, Contractor must ensure that the SaaS Applications are at all times compatible with all currently-used web browsers on the version of the Windows operating system used by the SFMTA. The costs of any upgrade to the SaaS Applications to maintain that operating system compatibility must be included in the annual maintenance fee.

Appendix E

CALCULATION OF CHARGES

This <u>Appendix E</u> sets forth the charges Contractor is authorized to invoice to the SFMTA for performing the Services. Authorized charges are broken down and provided herein by category of Service as follows:

1. SFMTA-Approved System Design Document

2. Coordination/Integration with Vendors and Other Third Parties and their Systems

3. System Software and related Maintenance Services

4. Stationary Digital Signs and related Maintenance Services

5. On-Board Digital Sign Software and related Maintenance Services

6. Mobile Platform & Website and related Maintenance Services

7. Analytics Platform and related Maintenance Services

8. Other As-Needed Services (Labor Rates)

1 System Design Document

The SFMTA will pay Contractor the lump-sum total, below, to complete and deliver the System Design Document and other Project Planning Deliverables described in <u>Appendix B, Section 1.3</u>.

Contractor may invoice the SFMTA for the System Design Document and all other Project Planning Deliverables upon the SFMTA's approval of the System Design Document.

Lump-Sum Total	$412,225

2 Coordination/Integration with Vendors and Other Third Parties and their Systems

The SFMTA will pay Contractor the amounts set forth in <u>Sections 2.1</u> through <u>2.6</u>, below, to coordinate/integrate the Next Generation System with systems or products (e.g., software, hardware, or other services) provided by Vendors listed in those respective sections. Contractor may invoice the SFMTA for coordination/integration with Vendors and other third parties and their systems in accordance with <u>Sections 2.1 </u>through <u>2.6</u>. Contractor will not receive additional compensation to coordinate/integrate the Next Generation System with Vendors or other third parties not listed in these sections, unless the SFMTA so approves.

2.1 Coordination/Integration required for System Software Transition

Contractor may invoice the SFMTA the lump-sum total, below, for coordination/integration with the systems and products of the Vendors listed below upon achievement of the System Software Transition Milestone. These costs only include Contractor's scope for coordination and integration and exclude costs for Vendors to coordinate and integrate with the Next Generation System.

Table E-1: One-Time Fees for Coordination/Integration required for System Software Transition

System or Product	Vendor	Amount
OrbCAD	Conduent	$326,348
ATCS	SFMTA/Thales	$126,601
511	MTC	$112,534
	Lump-Sum Total	$565,483

2.2 Coordination/Integration required for transmitting Customer Information to BART Signs (<u>Option</u>)

Only if the SFMTA exercises its option described in <u>Appendix B, Section 2.2.1.4(c)</u>, Contractor may invoice the SFMTA the lump-sum total, below. This price includes costs for Contractor to coordinate/integrate with BART to transmit Customer Information to signs owned by BART.

Table E-2: One-Time Fees for Optional Coordination/Integration for transmitting Customer Information to BART Signs

System or Product	Vendor	Amount
BART Signs (optional)	BART	$98,468
	Lump-Sum Total	$98,468

2.3 Coordination/Integration with Transit Shelters

Contractor shall not invoice the SFMTA separately for coordination/integration with the Vendor providing transit shelters. These costs are included in other cost items.

2.4 Coordination/Integration with Central Subway Signs

Contractor shall not invoice the SFMTA separately for coordination/integration with the Vendor providing Central Subway signs. These costs are included in other cost items.

2.5 Coordination/Integration required for PAV Replacement Signs (<u>Option</u>)

Only if the SFMTA exercises its option described in <u>Appendix B, Section 3.2.6</u>, Contractor may invoice the SFMTA the lump-sum total, below. This price includes the costs relating to the integration with the Vendor of the existing PAV back-office system as described in <u>Appendix B, Section 3.2.6</u>.

Table E-3: One-Time Fees for Optional Coordination/Integration for PAV Replacement Signs

System or Product	Vendor	Amount
PAV Replacement Signs (<u>Option</u>)	Penta	$157,796
	Lump-Sum Total	$157,796

2.6 Coordination/Integration with Other Systems or Products

Contractor shall not invoice the SFMTA separately for coordination/integration with the Vendors providing Salesforce Transit Center signs and Transit Stop poles. These costs are included in other cost items.

3 System Software and related Maintenance Services

3.1 System Software License

The SFMTA will pay Contractor once for a Real-Time Passenger Information System Software License valid for the term of the Agreement, including for any optional extensions. Contractor may invoice the SFMTA for this license upon the SFMTA's approval of the System Design Document.

Lump-Sum Total	$100,000

3.2 Monthly Fees for System Software and related Maintenance Services

The SFMTA will pay Contractor certain monthly fees (i.e., Interim Monthly Fees and Final Monthly Fees) to provide the System Software, described in <u>Appendix B, Section 2</u>, and related Maintenance Services, described in <u>Appendix C, Section 1</u>.

Contractor may invoice monthly fees for System Software and related maintenance services on a quarterly basis, as follows: the Interim Monthly Fees upon Initial Deployment of System Software, for a period of no more than twenty four (24) months; and the Final Monthly Fees upon SFMTA's acceptance of completion of Phase II System Software requirements or at the expiration of the 24-month Interim Monthly Fee period, whichever is sooner. For any month, the SFMTA will calculate the monthly fees owing to Contractor using the Base System Software fees and fees per vehicle, below, as follows:

Monthly Fee = Base System Software Fee + (Fee per vehicle x Number of vehicles for which Contractor generates Customer Information during the month)

Table E-4: Monthly Fees for System Software and related Maintenance Services

| Cost Item | Monthly Fees | |
	Interim Monthly Fees	Final Monthly Fees
Base System Software Fee	$24,831	$6,075
Fee per vehicle (for which Customer Information is generated)	$31.04	$25.37

Quarterly invoices must contain separate line items for the amounts owing to Contractor for each month in the quarter (e.g., January, February, March). The amounts owing to Contractor for any partial month of service shall equal the applicable monthly fees (i.e., Interim Monthly Fees or Final Monthly Fees) multiplied by the number of days in the month Contractor provided the services, divided by the total number of days in the month.

If the SFMTA exercises its options to extend the term of the Agreement, the above Final Monthly Fees will be subject to price escalation upon the beginning of the sixth or eleventh year, as applicable, and as measured by the San Francisco-Oakland-Hayward Consumer Price Index (CPI). The price escalation will be determined based on the cumulative percentage increase in the CPI during the immediately-preceding term.

3.3 One-Time and Monthly Fees for Additional Products and Services to Fulfill Scope of Services Requirements for System Software

Contractor has identified products and services listed below to meet the requirements set forth in Appendix B for System Software. Below is a description of each product and service and the resources to which Contractor has committed.

(a) The SFMTA will pay Contractor for these products and services the amounts indicated in Table E-5 as follows: For the Project Management, Architecture and Training, Contractor may invoice the SFMTA on a monthly basis for an amount equal to the one-time fee divided by the number of months from the Effective Date to Phase II Milestone, as described in the Final Schedule.

(b) For all other line items, a milestone payment equivalent to the one-time fee multiplied by the relevant stated percentage indicated in Table E-5 will be invoiced on successful achievement of the nominated milestones.

3.3.1 Project Management/Architecture/Training

(a) Project Management – Provision of a dedicated Project Manager for Phase I and Phase II to ensure the project is delivered in accordance with Contractor's Project Management processes and ISO 9001 quality standards for a sophisticated system integration project, and provision of a project scheduling resource to maintain the project schedule and report progress.

(b) Architecture – Provision of System Infrastructure, Solution and Cloud Architecture resources to design and document the overall system architecture of the Next Generation System using a standards-based approach and industry-standard open interfaces. These resources will also be used to configure/customize the core Amazon Web Services (AWS) cloud services to ensure all software meets the relevant system availability and recovery performance criteria as well as manage the DevOps change/release processes throughout the deployment phases.

(c) Security Services – Provision of services from Contractor's security team to validate that the solution meets SFMTA and Contractor's security requirements, policies and procedures and meets the objectives of the SFMTA's over-arching ISO27001 compliance. These

cover Contractor's systems as well as its subcontractors' Content Management System and Mobile Platform.

(d)   Training – Provision of training resources to deliver training in accordance with SFMTA requirements.

(e)   Procurement – Provision of procurement services to oversee procurement of all signs from subcontractors along with Quality Assurance/Quality Control inspections.

(f)   Quality Assurance – Provision of oversight from Contractor's Quality Assurance team.

3.3.2   System Configuration/Customization (Phase I)

(a)   Provision of software engineering, development and test resources to perform coding, configure system applications, localize and unit test core solution elements to meet the Phase I functional requirements.

(b)   Provision of engineering management time to oversee all configuration/customization activities for Phase I.

(c)   Test management to oversee development of appropriate test documentation and ensure testing is in-line with Contractor's test processes.

3.3.3   Content Management System Configuration/Template Design

(a)   Configuration and customization of the core Content Management System and media player application to cater for SFMTA-specific network topology and functional requirements.

(b)   Design workshops with SFMTA to design/document sign layouts/templates to be used for displaying sign content (including text-to-speech requirements).

(c)   Design workshops with SFMTA and subsequent development of Content Management System apps to display specific dynamic content.

(d)   Verification/quality assurance of individual and integrated Content Management System artifacts as well as configuration and product release management.

3.3.4   Messaging Information Manager Integration

Provision of software design/development resources to implement interface between Contractor's Messaging Information Manager, which manages and disseminates messages for service alerts, detours, disruptions, and other information, and Contractor's System Software for the exchange of sign messages, including subsequent integration testing.

3.3.5 System Administration Tool Modifications

(a)   Provision of software development and test resources to configure/customize/test components of the System Administration Tool to meet SFMTA operational requirements.

(b)   Implementation of a Schedule Editor, which allows Authorized Users to make and save various service changes and schedule alterations, review the published schedule and perform a quality check on supplied OrbCAD schedule data content.

(c)   Provision of Amazon Web Service (AWS) orchestration engine to orchestrate data across the System Administration Tool, Message Information Manager, and Content Management System interfaces associated with SFMTA-specific operational scenarios.

3.3.6 Reporting/Performance Requirements

(a)   Configuration of IT Service Management Tool (ServiceNow) to monitor/manage SFMTA assets (signs) and Next Generation System subsystems in order to deliver formal operational/Service Level Agreement reports.

(b)   General Next Generation System updates to add new data elements needed to generate reports associated with Service Level Agreements and general performance requirements; general configuration/customization of report templates.

(c)   Integration with non-Contractor systems (Content Management System, Mobile Platform & Website) to deliver performance related data for reporting.

3.3.7 System Configuration/Customization (Phase II)

(a)   Provision of software engineering, development and test resources to perform coding, configure system applications, localize and unit test core solution elements to meet the Phase II functional requirements.

(b)   Provision of engineering management time to oversee all configuration/customization activities for Phase II.

(c)   Test management to oversee development of appropriate test documentation and ensure testing is in-line with Contractor's test processes.

3.3.8 Integration/Testing

(a)   Development and integration resources to undertake overall systems integration between the different Next Generation System components, including the core real-time system (System Administration Tool and Contractor's Predictor software), Trip Planning Platform, Messaging Information Manager, Content Management System, Contractor's IT Service

Management Systems (ServiceNow, Dexda event monitoring system), third-party interfaces not separately listed in <u>Sections 2.1</u> through <u>2.6</u> (e.g., SFMTA elevator/escalator interface).

(b)   Test resources to undertake internal systems integration testing.

(c)   Software support during deployment phases.

(d)   Test resources and test management associated with formal User Acceptance Testing with the SFMTA.

3.3.9   Alternative Stops Interface (Appendix B, Sections 2.2.1.1.5 and 2.2.2.7)

Development of a new User Interface in the System Administration Tool to be able to view and select nearby alternative stops for a particular stop and ability for an Authorized User to select alternative stops.

3.3.10   Automatically-Generated Service-Change Alerts (Appendix B, Section 2.2.1.1.9)

Enhancements to Service-Change Alert functionality to include the automated generation/publishing of service alerts with configurable automated or manual approval. Enhancements also required to publish additional non-textual information such as detour maps and walking directions to alternative stops.

3.3.11   Automatically-Generated Delay Communications (Appendix B, Sections 2.2.1.1.10 and 2.2.2.4)

Automatic generation of Service-Change Alerts under varying operational delay conditions. Delay conditions are either received from OrbCAD or automatically detected by the System Software (e.g., vehicle has not moved for a configurable number of minutes).

3.3.12   Operations Management Mobile View (for Authorized Users only) (Appendix B, Section 2.2.2.14)

Development of a read-only interface accessible through a mobile device to enable the SFMTA to manage transit operations in the field, allowing Authorized Users to view detailed information about individual transit vehicles and routes on an interactive map, search for and locate vehicles, and view supplementary information.

Table E-5: One-Time and Monthly Fees for Additional Products and Services for System Software

Description (Product or Service)	One-Time Fee ($)	Monthly Fee*	Payment Method	Phase	Payment Milestone	%	Payment Milestone	%	Payment Milestone	%
Project Management, Architecture, Training	$1,351,176	$0	Amortized Monthly	I & II	From NTP		To Phase II Milestone			
System Configuration/ Customization (Phase I)	$525,017	$0	Milestone	I	System Design Document	15%	System Software Transition	65%	Stationary Digital Sign Transition or demonstration of compliance to General Prediction Accuracy Rate and System Software Availability Service Level Agreements, whichever the sooner	20%
Content Management System Configuration/ Template Design	$247,574	$0	Milestone	I	System Design Document	15%	System Software Transition	85%		
Messaging Information Manager Integration	$78,175	$0	Milestone	I	System Design Document	15%	System Software Transition	85%		
System Administration Tool Modifications	$337,601	$0	Milestone	I & II	System Design Document	15%	System Software Transition	40%	System Software – Initial Deployment of Phase II	45%
Reporting/ Performance Requirements	$225,068	$0	Milestone	I	System Design Document	15%	System Software Transition	45%	Stationary Digital Sign Transition	40%
System Configuration/ Customization (Phase II)	$787,737	$0	Milestone	II	System Design Document (updated for Phase II)	30%	System Software – Initial Deployment of Phase II	70%		

Description (Product or Service)	One-Time Fee ($)	Monthly Fee*	Payment Method	Phase	Payment Milestone	%	Payment Milestone	%	Payment Milestone	%
Integration/Testing	$731,469	$0	Milestone	I & II	System Software Transition	40%	Stationary Digital Sign Transition or demonstration of compliance to General Prediction Accuracy Rate and System Software Availability SLA's, whichever is sooner	20%	System Software – Initial Deployment of Phase II	40%
Alternative Stops Interface	$42,605	$0	Milestone	II	System Design Document (updated for Phase II)	30%	System Software – Initial Deployment of Phase II	70%		
Automatically-Generated Service-Change Alerts	$66,125	$0	Milestone	II	System Design Document (updated for Phase II)	30%	System Software – Initial Deployment of Phase II	70%		
Automatically-Generated Delay Communications	$42,605	$0	Milestone	II	System Design Document (updated for Phase II)	30%	System Software – Initial Deployment of Phase II	70%		
Operations Management Mobile View (for Authorized Users only)	$38,000	$0	Milestone	II	System Design Document (updated for Phase II)	30%	System Software – Initial Deployment of Phase II	70%		

* Fixed Monthly Recurring Fee for the term of the Agreement, including any extensions (no price escalation)

3.4 One-Time Fees for <u>Optional</u> Products and Services for Enhancements to System Software

Contractor has identified the following optional products and services not listed above for enhancements for System Software. Below is a description of each product and service and the resources.

Contractor may invoice the SFMTA for the following products and services listed in <u>Table E-6</u> upon Initial Deployment of the product or service.

These options shall remain valid for the initial term of the Agreement. Beginning one year after the Stationary Digital Signs Transition Milestone, the SFMTA will permit annual increases in one-time fees for additional products and services listed in <u>Table E-6</u> not to exceed the inflation rate, as determined by the San Francisco-Oakland-Hayward Consumer Price Index (CPI). The Parties will determine which unexercised options to extend in subsequent terms of the Agreement.

3.4.1 Transfer Connection Predictions for Transit Providers outside of MTC Public Feed (Appendix B, Section 2.2.1.1.3)

Allowance for integration of the public feeds of adjacent Transit Providers to allow transfer information to be shown on signs and the Trip Planner. This allowance is for transfer information that is not provided by the MTC 511 public feed.

3.4.2 Provision of Historic Vehicle Occupancy Data for Vehicles without Automatic Passenger Counters (Appendix B, Section 2.2.1.1.6)

This option is described in <u>Appendix B, Section 2.2.1.1.6</u>. Contractor will implement a database containing historic passenger loading data obtained from vehicles/routes with automatic passenger counters in order to allow estimated vehicle occupancy to be calculated in real-time for vehicles without automatic passenger counters. This estimated vehicle occupancy data will be made available to the Trip Planner to show estimated vehicle occupancy for trip plans planned in advance.

3.4.3 Escalator/Elevator Status Interface (Appendix B, Section 2.2.1.1.8)

This option is described in <u>Appendix B, Section 2.2.1.1.8</u> and is for the development of a new User Interface in the System Administration Tool to allow Authorized Users to indicate changes in elevator and escalator status.

3.4.4 Enhanced On-Board Digital Sign Content Template History Log (Appendix B, Section 4.2.9)

This option is described in <u>Appendix B, Section 4.2.9</u> relates to diagnostic logging requirements to routinely log information relating to content being shown on an On-Board Digital Sign with time/date, GPS, vehicle ID and real-time information displayed (predictions/alerts). This price is to develop the enhanced functionality over and above the basic reports that the Content Management System provides which is essentially a proof-of-play report that identifies when campaign(s) were played on the vehicle.

Table E-6: One-Time Fees for Optional Products and Services for System Software

Description	One-Time Fee
Transfer Connection Predictions for Transit Providers outside of MTC Public Feed	$42,605
Provision of Historic Vehicle Occupancy Data for Vehicles without Automatic Passenger Counters	$102,567
Escalator/Elevator Status User Interface	$21,302
Enhanced On-Board Digital Sign Content Template History Log	$21,302

4 Stationary Digital Signs and Related Maintenance Services

4.1 Per-Unit Fees for Initial Deployment

4.1.1 Powered Shelter Signs (Type 1), Powered Signs at Outdoor Rail Platforms (Type 2), Powered Signs at Underground Stations (Type 3), and All Optional Signs

The SFMTA will pay Contractor the applicable per-unit fees, below, for each Stationary Digital Sign ordered.

(a) Sign Hardware, including the sign and equipment to support text-to-speech functionality if applicable;

(b) Casings, applicable to Type 3 signs at designated locations only;

(c) An amount applied toward Contractor's purchase of spare Equipment, equivalent to 5% of the hardware per-unit cost (in (a) above), as described in Appendix C, Section 2.4;

(d) Text-to-speech buttons (if required at site location)

(e) Removal and disposal of existing hardware (if required at site location); and

(f) Installation and testing of the new sign hardware.

No later than 30 days following the completion of the System Design Document, the SFMTA will provide Contractor with quantities for the initial orders for Types 1, 2 and 3 signs to complete the 1-for-1 replacement of Existing System signs.

As an option exercisable by the SFMTA, the SFMTA may order additional screens on existing Salesforce Transit Center pylons (Appendix B, Section 3.2.7.2) and/or Replacement PAV Signs (Appendix B, Section 3.2.6.3)

Contractor may invoice the above fees once at each sign location.

4.1.2 Alternatively-Powered Signs (Type 4)

The SFMTA will pay Contractor the applicable per-unit fees, below, for each Type 4 sign ordered in accordance with the tiered pricing structure in Table E-7. For example, for an order

of 75 Type 4 signs, the total price for the order would be calculated as the sum of the following components:

- Total Price for Sign Hardware = 50 units x (Per-Unit Sign Hardware Fee in ≤50 signs Tier) + 25 units x (Per-Unit Sign Hardware Fee in 51-100 signs Tier).

- Total Price for Spare Equipment = 50 units x (Per-Unit Spares Fee in ≤50 signs Tier) + 25 units x (Per-Unit Spares Fee in 51-100 signs Tier).

- Total Price for Installation and Testing Fee = 50 units x (Per-Unit Installation and Testing Fee in ≤50 signs Tier) + 25 units x (Per-Unit Installation and Testing Fee in 51-100 signs Tier).

Table E-7: One-Time Fees for Stationary Digital Signs

Per-Unit One-Time Fees (excluding Sales Tax)												
	Powered Shelter Signs (Type 1)		Powered Signs at Outdoor Rail Platforms (Type 2)		Powered Signs at Underground Stations (Type 3)	Alternatively-Powered Signs (Type 4)				Salesforce Transit Center Signs (Option)	PAV Replacement Signs (Option)	
											55" 16:9 Sign	67.5" Stretch Sign
Cost Item	Single-Sided	Double-Sided (Minimum 100 signs)	Single-Sided	Double-Sided	All signs	≤50 signs Tier	51-100 signs Tier	101-200 signs Tier	≥200 signs Tier	All signs	All signs	All signs
Sign Hardware*	$4,691	$7,541	$5,057	$8,069	$4,148	$3,158	$3,033	$2,999	$2,319	$5,747	$14,595	$29,541
Casing (if necessary and authorized by the SFMTA)*					$1,392							
Spare Equipment*	$4,691	$7,541	$5,057	$8,069	$4,148	$3,158	$3,033	$2,999	$2,319			
Text-to-Speech Buttons (if necessary and authorized by the SFMTA)*	$760	$760	$760	$760	$760							
Removal and Disposal of Existing Signs	$800	$800	$1,070	$1,070	$1,450						$1,813 (removal only)	$1,813 (removal only)
Installation and Testing	$1,056	$1,235	$2,615	$2,615	$1,867	$1,383	$1,383	$1,383	$1,383	$1,798	$3,771	$3,771

* Subject to state and local sales taxes (currently 8.5%)

Upon ordering any type of Stationary Digital Signs, Contractor may invoice the SFMTA an amount of 20% of the price of the Sign Hardware, including the sign and equipment to support text-to-speech functionality if applicable.

Contractor may invoice the remaining balance of the applicable per-unit fees for any sign type on a monthly basis for each Stationary Digital Sign activated for Initial Deployment during the immediately preceding month.

For Stationary Digital Signs not activated for Initial Deployment within six months of delivery to the SFMTA, the SFMTA will pay Contractor the applicable per-unit sign hardware fee.

Monthly invoices must contain a separate line item for each sign for which Contractor seeks payment with the following information: (1) sign type; (2) applicable pricing; (3) whether the sign was activated for Initial Deployment; and if activated for Initial Deployment, (4) location (e.g., Stop ID and nearest intersection); and (5) date of activation for Initial Deployment.

The invoice must include a separate line item for applicable state and local sales taxes.

Assumptions:

Supply of Power (Types 1, 2, 3 Signs). Contractor has not included any costs associated with the upgrade of power at installation sites, including metering, cabling or any other associated costs imposed by the utility provider and/or site owners.

Contractor's pricing does not include any changes/improvements to the kiosks for Central Subway stations.

Contractor Prevailing Wage rates for sign installation and hardware maintenance services are based on the following categories: Communication & System Installer and Communication & System Technician.

4.2 Monthly Fees for Ongoing Maintenance and Communications

The SFMTA will pay Contractor on a quarterly basis the per-unit monthly fees, below, for each Stationary Digital Sign upon its activation for Initial Deployment. The monthly fees cover: (1) the Maintenance Services described in Appendix C, Section 2; and (2) the communications services described in Appendix C, Section 3. The SFMTA will only pay communications services for signs that use Contractor's cellular data plan during the applicable quarter, and not for communications services the SFMTA provides.

Pricing includes repair and replacement of Stationary Digital Signs due to vandalism subject to the conditions described in Appendix C, Section 2.6.

Quarterly invoices must provide the following information for each month (e.g., January, February, March) in the quarter: (1) quantity of signs covered by Maintenance Services by sign type, and corresponding monthly fees; and (2) quantity of signs covered by communications services by sign type, and corresponding monthly fees. For Maintenance Services only, the fee owing to Contractor for any partial month of coverage shall be pro-rated by sign.

Table E-8: Monthly Fees for Ongoing Sign Maintenance and Communications

Per-Unit Monthly Fees								
	Powered Shelter Signs (Type 1)		Powered Signs at Outdoor Rail Platforms (Type 2)		Powered Signs at Underground Stations (Type 3)	Alternatively-Powered Signs (Type 4)	Salesforce Transit Center Signs (Optional)	PAV Replacement Signs (Optional)
Cost Item	Single-Sided	Double-Sided	Single-Sided	Double-Sided	All signs	All signs	All signs	All signs
Maintenance Services	$57.54	$74.80	$57.54	$57.54	$57.54	$57.54	$25.80	$89.19
Communications	$14.29	$14.29	$14.29	$14.29	■	$14.29	■	■

Beginning one year after the Effective Date of this Agreement, the SFMTA will permit annual increases in the hourly labor and overhead rate for Maintenance Services not to exceed the annual percentage increase in prevailing wage rates, as described in Section 4.6.2 of the Agreement.

If the SFMTA exercises its option(s) to extend the term of the Agreement, the above monthly fees for Communications will be subject to price escalation upon the beginning of the sixth or eleventh year, as applicable, and as measured by the San Francisco-Oakland-Hayward CPI. The price escalation will be determined based on the cumulative percentage increase in the CPI during the immediately-preceding term.

4.3 **Annual Fees for Extended Sign Warranty (Appendix C, Section 2.8.2)**

The SFMTA will provide notification to the Contractor to exercise the Extended Warranty option(s) no later than six months prior to the end of the then-current term of the Agreement.

If the SFMTA exercises its option(s) to extend the warranties covering Stationary Digital Signs, described in Appendix C, Section 2.8.2, the SFMTA will pay Contractor the annual fees below for each Stationary Digital Sign covered under the extended warranty. This pricing accounts for expected inflation for the duration of the Agreement. For each sign, the date of Initial Deployment determines the start and end of the sign's extended warranty.

Table E-9: Annual Fees for Extended Sign Warranty

Per-Unit Annual Fees										
Warranty	Period (determined by date of Initial Deployment)	Powered Shelter Signs (Type 1)		Powered Signs at Outdoor Rail Platforms (Type 2)		Powered Signs at Underground Stations (Type 3)	Alternatively-Powered Signs (Type 4)	Salesforce Transit Center (Optional)	PAV Replacement Signs (55" 16:9 Sign) (Optional)	PAV Replacement Signs (67.5" Stretch Sign) (Optional)
		Single-Sided	Double-Sided	Single-Sided	Double-Sided	All signs	All signs	All signs	All signs	All signs
Initial Warranty	Initial Deployment to the end of year 5	$0; included in Sign Hardware price								
First Optional Extended Warranty	Start of year 6 through end of year 10	$321	$554	$369	$628	$267	$121	$490	$1,526	$3,197
Second Optional Extended Warranty	Start of year 11 through end of year 15	$152	$276	$164	$278	$148	$73	$219	$1,762	$3,692

At the beginning of each fiscal year for the City, Contractor may invoice the SFMTA the annual fees to cover the extended warranty for each Stationary Digital Sign that is not covered under Contractor's initial warranty.

Annual invoices must contain a separate line item for each sign for which Contractor seeks payment with the following information: (1) sign type; (2) location (e.g., Stop ID and nearest intersection); (3) date of Initial Deployment; (4) applicable Warranty (i.e., First Optional Extended Warranty and Second Optional Extended Warranty); and (5) annual fee.

4.4 Monthly Fees for provision of Excess Power for Type 1 Signs (if requested by the SFMTA)

In accordance with Appendix B, Section 3.2.2.6(c), the SFMTA may request that Contractor provide Excess Power for Type 1 Signs. Following Initial Deployment for each Type 1 Sign, Contractor may apply Excess Power charges for said sign.

The Parties will work together to calculate and set the monthly Excess Power consumption per sign using average power consumption based upon the required sign operational duty cycle, which reflects when a sign is turned off or used in reduced brightness mode.

Contractor may invoice the SFMTA on a quarterly basis the aggregated monthly fees for provision of Excess Power required for installed Type 1 Signs using the calculated Excess Power consumption, as charged to Contractor by the relevant utility provider or third-party supplying power on a cost reimbursable basis plus a fixed fee of 7%.

Table E-10 below shows the estimated monthly fees per sign based on current SFMTA power rates and estimated power consumption by each sign.

Table E-10: Estimated Monthly Fees for Excess Power for Type 1 Signs

Sign Type	Max Power (W)	Average Power (W)	Existing Power Envelope (W)	Excess Power (KW)	Power rate (per KWh)	Monthly Cost per Sign	Mark-up	Monthly Fee per Sign
Type 1 (24") Single-Sided	200	150	55	0.095	$0.074	$5.13	7%	$5.49
Type 1 (24") Double-Sided	300	225	55	0.17	$0.074	$9.18	7%	$9.82

5 On-Board Digital Sign Software and related Maintenance Services

5.1 One-Time Fee for Integration of System-Generated Customer Information with On-Board Digital Sign Vendor(s)

The SFMTA will pay Contractor the lump-sum total per Vendor, below, to integrate System-generated Customer Information with On-Board Digital Signs furnished and installed by future Vendor(s), as described in Appendix B, Section 4.2.3.1. Contractor may separately invoice the SFMTA the lump-sum amount, below, upon Initial Deployment of System-generated Customer Information on each Vendor's On-Board Digital Signs.

Beginning one year after the Stationary Digital Signs Transition Milestone, the SFMTA will permit annual increases in the one-time fee for Integration with On-Board Digital Sign Vendor(s) not to exceed the inflation rate, as determined by the San Francisco-Oakland-Hayward Consumer Price Index (CPI).

Lump-Sum Total (per Vendor)	$135,041

5.2 One-Time Fee for Additional Products and Services in Support of On-Board Digital Signs

Contractor has identified the following additional product not listed above for enhancements in support of On-Board Digital Signs.

5.2.1 Automatic Vehicle Annunciation System (AVAS) functionality (software only)

This functionality extends the On-Board Digital Sign annunciation capabilities from simple text-to-speech for selected information being displayed on the signs to Contractor's full Automated Vehicle Annunciation System (NextStop), to provide equivalent functionality to SFMTA's current AVAS solution. A full AVAS solution requires additional I/O integration with On-Board Sign hardware and audio file management capabilities at the System Administration Tool. This enhancement covers the additional software related costs only; additional hardware items are required, and it is assumed that these will be procured/installed directly by the vehicle manufacturers.

The SFMTA will pay Contractor a one-time fee for Contractor-proposed additional products or services as described in the table below upon Initial Deployment of the Product or Service into production.

Description	One-Time Fee
Automatic Vehicle Annunciation System (AVAS) functionality (software only)	$196,501

6 Mobile Platform & Website and related Maintenance Services

6.1 Trip Planning Platform Setup and Configuration for Mobile Platform & Website

The SFMTA will pay Contractor the itemized amounts, below, to setup and configure the Next Generation System's Trip Planner and coordinate the payment functionality with that provided by the current Vendor of the SFMTA's mobile application, as described in Appendix B, Section 5.2.1. Contractor may separately invoice the SFMTA the itemized amounts, below, upon Initial Deployment of the Trip Planner on each platform.

Table E-11: One-Time Fees for Trip Planning Platform Setup and Configuration for Mobile Platform & Website

Platform	Lump-Sum Amounts
Trip Planning Platform Setup and Configuration	$347,444
SFMTA Website Integration	$0
Lump-Sum Total	$347,444

6.2 Monthly Fees for related Maintenance Services

The SFMTA will pay Contractor the monthly fees (i.e., Interim Monthly Fees and Final Monthly Fees), below, to provide the Maintenance Services required for the Mobile Platform and SFMTA

Website to host the Next Generation System's Trip Planner, as described in Appendix B, Section 5.2 and Appendix C, Section 1.

Contractor may invoice these monthly fees on a quarterly basis, as follows:

(a) The Interim Monthly Fees upon Initial Deployment of the Trip Planner on both the Mobile Platform & Website; and

(b) The Final Monthly Fees upon the SFMTA's acceptance of completion of Phase II Mobile Platform & Website requirements.

Table E-12: Monthly Fees for Mobile Platform & Website related Maintenance Services

	Monthly Fees	
Cost Item	Interim Monthly Fees	Final Monthly Fees
Mobile Platform and Website Software	$ 16,690	$ 24,184

If the SFMTA exercises its options to extend the term of the Agreement, the above Final Monthly Fees will be subject to price escalation upon the beginning of the sixth or eleventh year, as applicable, and as measured by the San Francisco-Oakland-Hayward Consumer Price Index (CPI). The price escalation will be determined based on the cumulative percentage increase in the CPI during the immediately-preceding term.

6.3 One-Time and Monthly Fees for Additional Products and Services to Fulfill Scope of Services Requirements for the Mobile Platform & Website

Contractor has identified the products and services listed below to meet the requirements set forth in Appendix B for the Mobile Platform & Website. Below is a description of each product and service and the resources to which Contractor has committed.

For these products and services, Contractor may invoice the SFMTA one-time fees indicated Table E-13 upon successful achievement of the milestones for the corresponding product or service and monthly fees upon Initial Deployment of each product or service.

6.3.1 Website Setup and Configuration

(a) Setup and configuration of Trip Planner web app to meet SFMTA style guidelines.

(b) Work with SFMTA web teams to integrate Trip Planner widget into SFMTA website.

6.3.2 Export of additional Customer Data from Trip Planner to Analytics Platform for Reports/Analytics (Appendix B, Sections 2.2.2.17 and 5.2.3)

Export of real-time and pre-planned Trip Planner queries for travel between two geographical areas and trips by transportation mode to the Analytics Platform.

6.3.3 Traveler Relationship Management Setup/Configuration

Setup and configuration of Contractor's Traveler Relationship Management (TRM) system to meet SFMTA style guidelines; and initial user profile configuration.

6.3.4 Sustainable Transport Modes Integration (Flywheel, GoBike (or equivalent) and one other sustainable transport option of SFMTA's choice) (Appendix B, Section 2.2.1.1.13)

(a)   Integration and configuration of Flywheel and GoBike (or equivalent) APIs into the Trip Planner.

(b)   Integration of one other sustainable transport provider's API into the Trip Planner.

6.3.5 Association between Trip Planner Requests, Customer Information and Mode Choice (Appendix B, Section 5.2.3.4)

Association of Trip Planner requests, Customer Information provided in response to those requests, and subsequent mode choice up to 120 minutes after those requests are made, provided that by then a trip has been performed and concluded and the necessary data from the smart device was uploaded. This includes recording Trip Itinerary options with route(s), Vehicle-Arrival Predictions and Transfer Connection Predictions.

6.3.6 Data Aggregation/Tiered Data Access (Appendix B, Section 5.2.3.6)

To ensure privacy protection, the base Trip Planning Platform (TPP) stores trip logs anonymously in the back-end, so that there is no relation between the user and start/destination. The TPP sends a user's geocoordinates with each request to the back-end, but there is no association between these geocoordinates and the users.

Contractor will store raw data for 5 years generated from the TPP servers and provide Authorized Users with tiered SQL-based access to different levels of aggregated data (e.g., aggregated by ZIP code).

6.3.7 Associating Survey Response Data with other data (Appendix B, Section 5.2.3.7)

Association of survey responses gathered through different Contractor tools (MyMobility, Traveler Relationship Management, HaCon Journey Planning (HAFAS), mobile ticketing) while disassociating data with specific individuals in compliance with legal regulations.

6.3.8 Customer Feedback Segmentation for Surveys (Appendix B, Section 5.2.3.7)

Ability for the SFMTA to design surveys that can avoid repeating the same question from previous surveys to the same user using the Traveler Relationship Management's customer segmentation module.

6.3.9 User Interface to collect Customer Feedback (Appendix B, Section 5.2.3.8)

(a)   User interface to log general issues in real time via a simple user interface within the mobile app, including self-reporting of user details, incident type and details, and ability to take and upload geo-tagged photos, with the auto-population and/or manual entry of the run, route, vehicle number and time.

(b)   Export of aggregated data collected through this user interface for SFMTA integration into SFMTA systems and/or Salesforce cases.

Table E-13: One-Time and Monthly Fees for Additional Products and Services for Mobile Platform & Website

Description (Product or Service)	One-Time Fee ($)	Monthly Fee*	Payment Method	Phase	Payment Milestone	%
Website Setup and Configuration	$47,774	$0	Milestone	I	System Software Transition	100%
Export of additional Customer Data from Trip Planner to Analytics Platform for Reports/Analytics	$14,112	$0	Milestone	II	Phase II Initial Deployment	100%
Traveler Relationship Management Setup/Configuration	$56,460	$0	Milestone	I	System Software Transition	100%
Sustainable Transport Modes Integration	$60,803	$0	Milestone	I	System Software Transition	100%
Association between Trip Planner Requests, Customer Information and Mode Choice	$59,431	$992	Milestone	II	Phase II Initial Deployment	100%
Data Aggregation/Tiered Data Access	$49,527	$826	Milestone	II	Phase II Initial Deployment	100%
Associating Survey Response Data with other data	$58,800	$980	Milestone	II	Phase II Initial Deployment	100%
Customer Feedback Segmentation for Surveys	$21,168	$49	Milestone	II	Phase II Initial Deployment	100%
User Interface to collect Customer Feedback	$20,000	$0	Milestone	II	Phase II Initial Deployment	100%

* Fixed Monthly Fee for term of the Agreement, including any optional extensions (no price escalation). Monthly Fees begin with the Initial Deployment of the corresponding product or service.

6.4 One-Time and Monthly Fees for Optional Products and Services for Enhancements to the Mobile Platform & Website

Contractor has identified the following optional products and services not listed above for enhancements for the Mobile Platform & Website.

Contractor may invoice the SFMTA for the following products and services listed in Table E-14 below and in accordance with the following payment terms:

- One-Time Fees upon the Initial Deployment of the Product or Service into production.

- Monthly Fees on a quarterly basis following Initial Deployment of the Product or Service into production.

These options shall remain valid for the initial term of the Agreement. Beginning one year after the Stationary Digital Signs Transition Milestone, the SFMTA will permit annual increases in the one-time fee (but not the monthly per-unit fee) for additional products and services listed in Table E-14 not to exceed the inflation rate, as determined by the San Francisco-Oakland-Hayward Consumer Price Index (CPI). The Parties will determine which unexercised options to extend in subsequent terms of the Agreement.

Below is a description of each product and service and the resources.

6.4.1 Enhanced Switchback Information (Appendix B, Section 2.2.1.1.11)

Modifications to mobile app and web app live vehicle views to show enhanced information related to Switchbacks.

6.4.2 Commercial Maps and Traffic Data

The base Trip Planner uses the public-domain Open Street Map (OSM) as the base layer on which automobile (private car, taxi, Transportation Network Company vehicle, etc.) routes are calculated, without real-time traffic conditions. Automobile traffic data is not displayed on the app. Points of Interest from the Open Street Map are also included.

As an option exercisable by the SFMTA, Contractor can provide and display real-time traffic data in the app and incorporate in the "car"-routing algorithm (e.g., for taxis or own vehicle, either for comparison or as part of an intermodal route). This requires purchasing licenses for a commercial map, including commercial points of interest, and for Tom-Tom real-time traffic data.

6.4.3 Configurability for Trip Planning Preferences – Maximum Service Frequency and Crowding levels (Appendix B, Section 5.2.2.2)

The base Trip Planner includes all standard configurability methodologies for a trip search. Standard configurable settings include walking speed and maximum distance, direction, favorite stops, destinations, and routes, availability of own bike or own car, as well as reminders and subscriptions to a variety of service alerts. Accessible, barrier-free routing is also a configurable parameter, however, limited to the level of detail provided in GTFS.

User information on the frequency and on the crowding level of a given service is provided in the standard route detail window, by displaying how often a service is available (or when the following services are expected) and how crowded a given service is expected to be, assuming

this information is made available to the Trip Planner. This information is normally sufficient to help a customer decide whether a proposed route has the required frequency and enough space.

However, the base Trip Planner does not include the option of setting a maximum service frequency or a minimum crowding level as a preference or as criteria for the trip search. As an option exercisable by the SFMTA, Contractor will provide these features, which require a change in the routing strategy, according to which not the quickest and most convenient accessible routes are searched but the ones with the "best level of service" or the "best service frequency".

6.4.4   Prioritization of Trip Planning Based on Accessibility, Service Frequency, and Crowding (Appendix B, Section 5.2.2.2)

In this option, the Trip Planner will prioritize trip itineraries based on accessibility, service frequency and crowding parameters. For example, it will list trip itineraries with a route that operates every 10 minutes before a route that operates every 20 minutes. As another example, it will list trip itineraries that do not require level boarding before those that do require level boarding if customers indicate this accessibility need.

6.4.5   Import Address from Meetings in Google/Other Calendars (Appendix B, Sections 5.2.2.1(h) and 5.2.2.3(a))

The base Trip Planner includes several ways to select an origin or a destination, including the current position, any position on the map, or a typed address. These are all included in the base system.

As an option exercisable by the SFMTA, Contractor will provide an option within the Trip Planner to allow the customer to select a destination based on the addresses of calendar meetings and events. This feature can be fulfilled by importing the address and meeting time from the calendars and automatically setting them as destination address and arrival time as input to the Trip Planner.

6.4.6   Dynamic System Map (Appendix B, Section 5.2.2.6(e))

The base Trip Planner includes the download and display of system maps, as delivered by SFMTA, which include all lines and stops. As an option exercisable by the SFMTA, Contractor will build a de facto a dynamic network (shape processing, skeletonization and rendering, etc.) to display the routes in operation in a specified time window. This requires extensive adaptation to the mobile app and web app.

6.4.7   Audio Navigation and Audio Notification of Delays (Appendix B, Section 5.2.2.5(b)(ix))

The base Trip Planner algorithm includes a step-by-step navigation function based on the Live Navigation module. By clicking on the Navigation button for a selected trip, the steps a customer takes – whether transferring at a station or walking to the next stop – are shown on the app in real-time, using real-time updates on schedules, whenever these are available. The base Trip Planner offers visual navigation. Analogously, notification of delays is provided as visual message. Customers may also enable accessibility options as all apps are prepared for barrier-free usage.

As an option exercisable by the SFMTA, Contractor will develop a full-detail audio navigation and audio notification of service delays, which requires either storing all possible navigation

instruction and messages on the mobile phone (with large data storage requirements) or a high bandwidth communication from the server to the smartphone. Alternatively, Contractor may enable as mentioned accessibility options use simple pre-recorded messages (e.g. "turn right").

Table E-14: Optional Products and Services for Enhancements to the Mobile Platform & Website

Description	One-Time Fee	Monthly Fee
Enhanced Switchback Information	$29,400	$490
Commercial Maps and Traffic Data	$29,717	$1,981
Configurability for Trip Planning Preferences: Maximum Frequency of Service	$79,241	$1,322
Prioritization of Trip Planning Based on Accessibility, Service Frequency, and Crowding	$31,698	$529
Import Address from Meetings in Google/Other Calendars	$15,848	$264
Dynamic System Map	$99,052	$1,651
Audio Navigation and Audio Notification of Delays	$79,241	$1,322

* Fixed Monthly Fee for term of the Agreement, including any optional extensions (no price escalation). Monthly Fees begin with the Initial Deployment of the corresponding optional product or service.

6.4.8 MuniMobile Mobile Ticketing Replacement (Appendix B, Section 5.2.4)

Under this option, Contractor provides a replacement of mobile ticketing functionality and service offered by the current Mobile Ticketing Vendor as described in Appendix B, Section 5.2.4. Contractor may separately invoice the SFMTA the lump-sum amount, below, upon Initial Deployment of the MuniMobile Mobile Ticketing Replacement.

Platform	Lump-Sum Amounts
Mobile Ticketing Platform Setup and Configuration	$364,000
Lump-Sum Total	$364,000

Additionally, Contractor can withhold up to the following amounts from fare revenues collected through mobile ticketing:

- Transaction Fee – 4.4% of fare revenue.

- Credit Card/Payment Processor Fees, subject to Appendix B, Section 5.2.4.9(e).

This option would be in effect for a minimum term of three years from Initial Deployment and will not exceed the initial term of the Agreement. The SFMTA may discontinue this option after three years by providing Contractor 180 days notice.

7 Analytics Platform and related Maintenance Services

The SFMTA will pay Contractor the monthly fees (i.e., Interim Monthly Fee and Final Monthly Fee), below, to provide the Analytics Platform software described in Appendix B, Section 6.2.1 and related Maintenance Services described in Appendix C.

Contractor may invoice these monthly fees on a quarterly basis, as follows:

(a)   The Interim Monthly Fees upon Initial Deployment of the Analytics Platform; and

(b)   The Final Monthly Fees upon the SFMTA's acceptance of any SFMTA-approved enhancements to the Analytics Platform or after 24 months of Interim Monthly Fees, whichever is sooner.

Table E-15: Monthly Fees for Analytics Platform and related Maintenance Services

	Monthly Fees	
Cost Item	Interim Monthly Fees	Final Monthly Fees
Analytics Platform software and related Maintenance Services	$31,607	$17,603

If the SFMTA exercises its options to extend the term of the Agreement, the above Final Monthly Fees will be subject to price escalation upon the beginning of the sixth or eleventh year, as applicable, and as measured by the San Francisco-Oakland-Hayward Consumer Price Index (CPI). The price escalation will be determined based on the cumulative percentage increase in the CPI during the immediately-preceding term.

Should the SFMTA request Data Interpretation Services, the SFMTA will pay Contractor in accordance with the Task Order Process described in Section 3.5 of the Agreement using the using the relevant resource rates provided in Section 8 of this Appendix.

8 Other As-Needed Services (Labor Rates)

The schedule below lists the fully-burdened hourly rates that will apply to Contractor's performance of other as-needed services not included in Appendix B. The fully-burdened hourly rates include Contractor's direct cost of labor, overhead, and profit and applies to work performed by Contractor or its Subcontractors. Should the SFMTA request other as-needed services, the SFMTA will pay Contractor in accordance with the Task Order Process described in Section 3.5 of the Agreement using the using the relevant resource rates provided in Table E-16 below.

Beginning one year after the Effective Date of this Agreement, the SFMTA will permit annual increases in the hourly labor and overhead rate not to exceed the inflation rate, as determined by the San Francisco-Oakland-Hayward Consumer Price Index (CPI).

Table E-16: Labor Rates for Other As-Needed Services

Position	Fully Burdened Hourly Rate
Sr. Software Engineer	$182.57
Software Engineer	$115.57
Project Manager	$155.48
System Administrator	$133.83
Data Scientist	$149.00
Support Engineer	$116.69

Appendix F

PERFORMANCE REQUIREMENTS

The SFMTA will use the performance metrics and milestones in this <u>Appendix F</u> to evaluate the performance of Contractor and the Next Generation System against the Performance Requirements, also set forth in this <u>Appendix F</u>. Contractor agrees Contractor and the Next Generation System will perform in accordance with these Performance Requirements, and that failure to do so may subject Contractor to Liquidated Damages, as described in <u>Appendix G</u>. The Performance Requirements for which such Liquidated Damages apply are so indicated in this <u>Appendix F</u>.

The performance metrics, milestones, and Performance Requirements are set forth in <u>Table F-1</u> (which commences on the following page) by Element.

Table F-1: Performance Metrics, Milestones, and Performance Requirements

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
1.	**SYSTEM SOFTWARE**			
1.1	System Software Availability Rate	The System Software is available when all Sub-Elements (i.e., Customer Information, System Administration Tool, and Content Management System) operate during Scheduled Operating Hours. For each Reporting Period, the SFMTA will use available means, including the Incident Ticketing and Tracking Log, to calculate the System Software Availability Rate. System Software Availability Rate = (# of hours System Software is available during the Reporting Period) ÷ (# of Scheduled Operating Hours during the Reporting Period).	≥99.9%	Yes
1.2	System Software Scheduled Downtime Rate	System Software Scheduled Downtime occurs when any Sub-Element (i.e., Customer Information, System Administration Tool, and Content Management System) is not available because of SFMTA-approved scheduled maintenance. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the System Software Scheduled Downtime Rate. System Software Scheduled Downtime Rate = (# of hours of Scheduled Downtime) ÷ (# of hours during the Reporting Period).	≤0.1%	No

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
1.3	General Prediction Accuracy Rate	Vehicle-Arrival Predictions are real-time predictions, provided in minutes, for when a transit vehicle will arrive at a Transit Stop along a route. A Vehicle-Arrival Prediction is accurate if the vehicle arrives at a Transit Stop within the corresponding Accurate Vehicle-Arrival Prediction Range as defined in the following table: 	Initial General Prediction Accuracy Rate: ≥80.0% by the System Software Transition Milestone	No

Accurate Vehicle-Arrival Prediction Range table:

Vehicle Arrival Prediction Times	Accurate Prediction Range* (min:sec)
Arriving to 5 min	-1:00 to +2:00
6 to 10 min	-1:30 to +2:30
11 to 15 min	-2:00 to +3:00
16 to 20 min	-2:00 to +4:00
21 to 30 min	-2:00 to +5:00
31 to 45 min	-2:00 to +6:00
46 to 60 min	-3:00 to +7:00

* Vehicle arrives within the interval specified. For example, a 14-minute predicted arrival time would be "accurate" if the vehicle arrived 12 to 17 minutes (-2:00 to +3:00) later.

For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the General Prediction Accuracy Rate.

General Prediction Accuracy Rate = (# Vehicle-Arrival Prediction Times within the corresponding Accurate Prediction Ranges during the Reporting Period) ÷ (# of Vehicle-Arrival Prediction Times during the Reporting Period).

The calculation excludes Vehicle-Arrival Predictions for vehicles affected by Temporary Service Changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.

Performance Requirement (continued): Final General Prediction Accuracy Rate: ≥90.0% by Stationary Digital Signs Transition Milestone

Liquidated Damages Apply (continued): Yes

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
1.4	Terminal Departure Prediction Accuracy Rate	Terminal Departure Predictions are real-time predictions, provided in minutes, for when a transit vehicle will depart its initial Transit Stop (i.e., starting terminal). A Terminal Departure Prediction Time is accurate if the vehicle leaves a terminal within the corresponding Accurate Terminal Departure Prediction Range as defined in the following table: See sub-table below. * Vehicle departs terminal within the interval specified. For example, a 12-minute predicted departure time would be "accurate" if the vehicle departed the terminal 10 to 17 minutes (-2:00 to +5:00) later. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Terminal Departure Prediction Accuracy Rate. Terminal Departure Prediction Accuracy Rate = (# of Terminal Departure Prediction Times within the Accurate Terminal Departure Prediction Range during the Reporting Period) ÷ (# of Terminal Departure Prediction Times during the Reporting Period). The calculation excludes Terminal Departure Predictions for vehicles affected by Temporary Service Changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.	≥85.0%	Yes
1.5	Ghost Bus/Train Incidence Rate	A Ghost Bus or Ghost Train incident occurs when the System Software generates a Vehicle-Arrival Prediction for a vehicle that never arrives at the corresponding stop. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Ghost Bus/Train Incidence Rate. Ghost Bus/Train Incidence Rate = (# of Ghost Bus/Train Incidents during the Reporting Period) ÷ (# of Vehicle-Arrival Prediction Times during the Reporting Period).	≤1.0%	Yes

Sub-table for 1.4:

Terminal Departure Prediction Times	Accurate Terminal Departure Prediction Range* (min:sec)
Departing to 5 min	-1:00 to +3:00
6 to 10 min	-1:30 to +4:00
11 to 15 min	-2:00 to +5:00
16 to 20 min	-2:00 to +6:00
21 to 30 min	-2:00 to +7:00
31 to 45 min	-2:00 to +8:00
46 to 60 min	-3:00 to +9:00

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
1.6	Overestimated Vehicle-Arrival Predictions Rate	An Overestimated Vehicle-Arrival Prediction occurs if a vehicle arrives significantly before the corresponding Vehicle-Arrival Prediction.	≤1.75%	Yes

An Overestimated Vehicle-Arrival Prediction occurs if a vehicle arrives significantly before the corresponding Vehicle-Arrival Prediction.

A vehicle arrives significantly before its corresponding Vehicle-Arrival Prediction if the Vehicle Arrival Prediction exceeds the Overestimated Vehicle-Arrival Prediction Threshold as defined in the following table:

Vehicle-Arrival Prediction Times	Overestimated Vehicle-Arrival Prediction threshold* (min:sec)
10 to 15 min	< -7:00
16 to 20 min	< -10:00
21 to 30 min	< -12:00
31 to 45 min	< -15:00
46 to 60 min	< -18:00

* Vehicle arrives before the time specified. For example, a 25-minute predicted arrival time would be "overestimated" if a vehicle arrived in 12 minutes, but not if it arrived 14 minutes.

For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Overestimated Vehicle-Arrival Prediction Rate.

Overestimated Vehicle-Arrival Prediction Rate = (# of Overestimated Vehicle-Arrival Predictions during the Reporting Period) ÷ (of Vehicle-Arrival Prediction Times during the Reporting Period).

The calculation excludes Vehicle-Arrival Predictions for vehicles affected by Temporary Service Changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
2.	**STATIONARY DIGITAL SIGNS**			
2.1	Stationary Digital Sign Availability Rate	A Stationary Digital Sign is available if it displays Customer Information. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Stationary Digital Sign Availability Rate. Stationary Digital Sign Availability Rate = # hours of Stationary Digital Signs are Available during the Reporting Period / ((# of Hours during the Reporting Period x # of installed Stationary Digital Signs) – Stationary Digital Sign Scheduled Downtime – Exempted Hours). Exempted Hours means (i) the number of hours when there are sign outages are caused by vandalism, third-party power outages, System Software outages that prevent the transmission of Customer Information or natural Disasters, or (ii) the sum of 24 hours and the number of hours between the time Contractor requests a Track Clearance Permit (if necessary to repair a sign) and the time Contractor is permitted to enter SFMTA property to repair the sign.	≥99.75%	Yes
2.2	System Software Transition Milestone	On the System Software Transition Milestone date all Existing System Sign Locations must have installed Stationary Digital Signs that displays Customer Information provided by the Next Generation System. The installed Stationary Digital Signs may be from either the Existing System or Next Generation System. On or after the System Software Transition Milestone date, the SFMTA will use available means, including the System Administration Tool, to calculate the percentage of Existing System Sign Locations that achieve this milestone (System Software Transition Rate). System Software Transition Rate = (# of Existing System Sign Locations that achieve milestone) ÷ (# of Existing System Sign Locations).	100%	Yes
2.3	Stationary Digital Signs Transition Milestone	On the Stationary Digital Signs Transition Milestone date, all Existing System Sign Locations must have installed a Stationary Digital Sign that displays Customer Information provided by the Next Generation System. On or after the Stationary Digital Signs Transition Milestone date, the SFMTA will use available means, including the System Administration Tool, to calculate the percentage of Existing System Sign Locations that achieve this milestone (Stationary Digital Sign Transition Rate). Stationary Digital Sign Transition Rate = (# of Existing System Sign Locations that achieve milestone) ÷ (# Existing System Sign Locations).	100%	Yes

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
2.4	Stationary Digital Sign Scheduled Downtime Rate	Stationary Digital Sign Scheduled Downtime occurs when an individual Stationary Digital Sign is not available because of SFMTA-approved scheduled maintenance. A Stationary Digital Sign is not available if it does not display Customer Information. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Stationary Digital Sign Scheduled Downtime Rate. Stationary Digital Sign Scheduled Downtime Rate = (# of hours of Stationary Digital Sign Scheduled Downtime during the Reporting Period) ÷ (# of hours during the Reporting Period x # of installed Stationary Digital Signs).	≤0.1%	No
3.	**ON-BOARD DIGITAL SIGN SOFTWARE**			
3.1	Transfer Prediction Accuracy Rate	A connecting route is another Muni route to which customers traveling on Muni may transfer to complete their trip. A Transfer Prediction is a Vehicle-Arrival Prediction for a connecting route. A Transfer Prediction is accurate if the On-Board Digital Signs display an Accurate Vehicle-Arrival Prediction for a connecting route before arriving at the transfer location. A Vehicle-Arrival Prediction is accurate if the vehicle arrives within the Accurate Prediction Range for the corresponding Vehicle-Arrival Prediction Time (see table in Sec. 1.3 above). For each Reporting Period after the installation of On-Board Digital Signs, the SFMTA will use available means including the System Administration Tool to calculate the Transfer Prediction Accuracy Rate. Transfer Prediction Accuracy Rate = (# of Accurate Transfer Predictions during the Reporting Period) ÷ (# of Transfer Predictions during the Reporting Period).	≥90.0%	Yes
4.	**MOBILE PLATFORM & WEBSITE**			
4.1	Trip Planner Availability Rate	The Trip Planner is available if is operational and its contents are available to the public for use through the Mobile Platform & Website. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Trip Planner Availability Rate. Trip Planner Availability Rate = (# of hours the Trip Planner is available during the Reporting Period) ÷ (# of hours during the Reporting Period).	≥99.75%	Yes

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
4.2	Trip Planner Efficiency Rate	A Trip Itinerary is "efficient" based on criteria established in the Agreement. Examples of potential criteria include correctly identifying origin and destination, as well as providing a non-circuitous "efficient" route for the customer. For each Reporting Period, the SFMTA will generate at least 40 random itineraries to calculate the Trip Planner Efficiency Rate. Trip Planner Efficiency Rate= (# of "efficient" sampled Trip Itineraries) ÷ (# of sampled Trip Itineraries).	≥95.0%	No
4.3	Trip Planner Efficiency Rate – Accessible Itineraries	A Trip Itinerary is "efficient" based on criteria established in the Agreement. Examples of potential criteria include correctly identifying origin and destination, as well as providing a non-circuitous "efficient" route for the customer. A Trip Itinerary is accessible if it only includes stops, stations and routes that meet customer-configured accessibility requirements (e.g., customer can navigate stairs, can navigate moderate hills (5% to 10% grade), can navigate steep hills (10%+ grade), or requires an elevator or escalator). For each Reporting Period, the SFMTA will generate at least 40 random itineraries to calculate the Trip Planner Efficiency Rate – Accessible Itineraries. Trip Planner Efficiency Rate – Accessible Itineraries = (# of "efficient" sampled accessible Trip Itineraries) ÷ (# of sampled accessible Trip Itineraries).	≥95.0%	No

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
4.4	Acceptable Trip Planner Response Rate	A Trip Planner Response is the time it takes the System Software to respond to a customer query, excluding any data transmission time. An acceptable Trip-Planner Response takes ≤ 3 seconds. Exempted Trip Planner Customer Queries are the number of Trip Planner customer queries that take place during a 24-hour period when customer queries exceed 1,000,000 or a 1-hour period outside that 24-hour period when customer queries exceed 200,000. For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Acceptable Trip-Planner Response Rate. Acceptable Trip-Planner Response Rate = (# of acceptable Trip-Planner Responses during the Reporting Period – Exempted Trip Planner Customer Queries) ÷ (# of Trip Planner customer queries during the Reporting Period – Exempted Trip Planner Customer Queries).	≥98.0%	Yes
4.5	Mode Choice Data Collection Accuracy Rate	Mode Choice data collection is accurate if, for a trip, it correctly identifies the Origin, Destination, Mode Choice Categories, and transition points, as described in Appendix B, Section 5.2.3.2. For each Reporting Period commencing after the Parties establish the performance metric, the SFMTA will use available means, including a mobile app on a non-anonymized account, to make a minimum of 20 trips using a variety of transportation modes. Mode Choice Data Collection Accuracy Rate = (# of accurate sampled trips) ÷ (# of sampled trips).	Performance Requirement will be mutually agreed between SFMTA and Contractor after a 3-month trial period to be completed before the end of Phase II	No

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
5.	**ANALYTICS PLATFORM**			
5.1	Analytics Platform Availability Rate	The Analytics Platform is available if it is operational and its contents are available to Authorized Users. For each Reporting Period, the SFMTA will use available means, including the System Administration Tool, to calculate the Analytics Platform Availability Rate. Analytics Platform Availability Rate = (# of hours Analytics Platform is available during the Reporting Period) ÷ (# of hours during the Reporting Period).	≥99.9%	No

No.	Performance Metric/ Milestone	Description of Performance Metric/Milestone and Calculation of Contractor's Performance	Performance Requirement	Liquidated Damages Apply
6.	**SYSTEM WIDE**			
6.1	Incident Response Rate	An Incident Response is the time it takes Contractor to respond to a reported Incident. An Incident is "reported" when Contractor receives notice of the Incident through means described in <u>Appendix C, Section 1.2.1</u>. An Incident Response is acceptable if Contractor responds to the reported Incident within the Service Level Agreement Response Time required based on the Incident's severity, as set forth in the following table: {{TABLE}} For each Reporting Period, the SFMTA will use available means including the Incident Ticketing and Tracking Log to calculate the Incident Response Rate. Incident Response Rate = (# of acceptable Incident Reponses during the Reporting Period) ÷ (# of Incident Responses during the Reporting Period).	≥95.0%	No

Inner table (from cell 6.1):

Incident Severity	Service Level Agreement Response Time	Resolution Time
High Severity	15 minutes	24 hours
Medium Severity	30 minutes	48 hours
Low Severity	4 hours	5 business days (excludes weekends and holidays)
Service Request	2 business days	10 business days (or longer at the discretion of the SFMTA)

Appendix G

LIQUIDATED DAMAGES

A.   Contractor acknowledges its failure to perform certain obligations in accordance with the Performance Requirements and Milestones under this Agreement will cause the City, the SFMTA, the SFMTA's customers, and the public to incur cost and inconvenience not contemplated under this Agreement, including loss of fare revenue, loss of public benefit, and damage to the SFMTA's reputation. Contractor acknowledges this cost and inconvenience will constitute damages to the City, and that the exact amounts of these damages will be extremely difficult or impractical to fix. Accordingly, the SFMTA and Contractor agree that the amounts described as Liquidated Damages in this Appendix G are not penalties, but represent a fair and reasonable estimate of the damages that the SFMTA will incur because of Contractors failure to perform, and are fair compensation to the City for its losses.

B.   The SFMTA may assess Liquidated Damages for failures described in Sections 2.2 and 2.3 of Table G-1, below, on a monthly basis following the corresponding milestone date provided therein, until Contractor achieves the applicable Performance Requirement(s) unless Contractor establishes it is not responsible for the failure.

C.   Except for failures described in Sections 2.2 and 2.3, the SFMTA may assess Liquidated Damages for all other failures described in Table G-1, below, following each Reporting Period, unless Contractor establishes it is not responsible for the failure.

D.   The SFMTA may deduct from any money owing to Contractor under this Agreement any sum that represents Liquidated Damages the SFMTA assesses under this Appendix G.

E.   The SFMTA will not issue warning notices before assessing Liquidated Damages. If the SFMTA assesses Liquidated Damages under this Appendix G, the SFMTA will send Contractor written notice of the basis and amount of the assessment.

F.   The SFMTA's failure to assess Liquidated Damages for any failure described in the Appendix G will not constitute a waiver of the SFMTA's right to assess Liquidated Damages for any other such failure, nor will it constitute a waiver of any other right of the SFMTA under this Agreement.

G.   Table G-1, below, describes the Performance Requirements that are subject to Liquidated Damages under this Agreement. For each Performance Requirement, Table G-1 provides the applicable performance metric or milestone, and the methods the SFMTA will use to calculate Contractor's performance and Liquidated Damages, if any.

H.   The SFMTA may deduct from any money due to Contractor under this Agreement a sum representing the Liquidated Damages assessed. Except for failures described in Sections 2.2 and 2.3, total assessments within a given Reporting Period will not exceed 35% of the sum of Contractor's Operating Monthly Fees for System Software and related

Maintenance Services (as set forth in <u>Appendix E, Section 3</u>), Stationary Digital Signs and related Maintenance Services (as set forth in <u>Appendix E, Section 4</u>), Mobile Platform & Website and related Maintenance Services (as set forth in <u>Appendix E, Section 5</u>), during the Reporting Period.

[See <u>Table G-1</u>, beginning on the following page.]

Table G-1: Liquidated Damages for Failure to Achieve Performance Requirements

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages		
1. System Software					
1.1 System Software Availability					
System Software Availability Rate	System Software Availability Rate ≥ 99.9%	For each Reporting Period, the SFMTA will use available means including the Incident Ticketing and Tracking Log to calculate the System Software Availability Rate. System Software Availability Rate = # of hours System Software is available during the Reporting Period / # of Scheduled Operating Hours during the Reporting Period. The System Software is available when all Sub-Elements (i.e. Customer Information, System Administration Tool and Content Management System) operate during Scheduled Operating Hours.	Amount of Liquidated Damages for Reporting Period = (1-A) x B x C		

Amount of Liquidated Damages for Reporting Period = (1-A) x B x C

A	B	C
System Software Availability Rate	Estimated % Muni Ridership Loss when Customer Information is not available*	Fare Revenue for the Reporting Period
99.75%-99.9%	1%	Annual Fare Revenue * (Reporting Period (in months) / 12 months)
99.50%-99.74%	4%	
99.25%-99.49%	18%	
99.00%-99.24%	25%	
98.00%-98.99%	30%	
Below 98.00%	36%	

* Assumes System Software is unavailable because of an unscheduled outage that may occur any time during Scheduled Operating Hours.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
1.2 General Prediction Accuracy			
General Prediction Accuracy Rate	General Prediction Accuracy Rate ≥ 90.0%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the General Prediction Accuracy Rate. General Prediction Accuracy Rate = # Vehicle-Arrival Prediction Times within the corresponding Accurate Prediction Ranges during the Reporting Period / # of Vehicle-Arrival Prediction Times during the Reporting Period. A Vehicle-Arrival Prediction is accurate if the vehicle arrives within the Accurate Prediction Range for the corresponding Vehicle-Arrival Prediction Time. The calculation excludes Vehicle-Arrival Predictions for vehicles affected by Temporary Service Changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.	Liquidated Damages = (*90%* – General Prediction Accuracy Rate) x (60% x *[Contractor's Operating Monthly Fees for System Software (as set forth in <u>Appendix E, Section 3</u>) during the Reporting Period]*)

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
1.3 Terminal Departure Prediction Accuracy			
Terminal Departure Prediction Accuracy Rate	Terminal Departure Prediction Accuracy Rate ≥ 85.0%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Terminal Departure Prediction Accuracy Rate. Terminal Departure Prediction Accuracy Rate = # of Terminal Departure Prediction Times within the Accurate Terminal Departure Prediction Range during the Reporting Period / # of Terminal Departure Prediction Times during the Reporting Period. A Terminal Departure Prediction Time is accurate if the vehicle leaves a terminal within the corresponding Accurate Terminal Departure Prediction Range. The calculation excludes Terminal Departure Predictions for vehicles affected by Temporary Service Changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.	For any Reporting Period, the SFMTA will not assess Liquidated Damages for this failure if the SFMTA assesses Liquidated Damages for General Prediction Accuracy. If Contractor fails to meet this Performance Requirement for two consecutive Reporting Periods, the SFMTA may assess the following: Liquidated Damages = 0.5% of the Contractor's Operating Monthly Fees for System Software (as set forth in _Appendix E, Section 3_) during the Reporting Period.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
1.4 Ghost Bus/Train Incidence			
Ghost Bus/Train Incidence Rate	Ghost Bus/Train Incidence Rate ≤ 1%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Ghost Bus/Train Incidence Rate. Ghost Bus/Train Incidence Rate = # of Ghost Bus/Train Incidents during the Reporting Period / # of Vehicle-Arrival Prediction Times during the Reporting Period. A Ghost Bus/Train incident occurs when the System Software generates a Vehicle-Arrival Prediction for a vehicle that never arrives at the corresponding stop.	For any Reporting Period, the SFMTA will not assess Liquidated Damages for this failure if the SFMTA assesses Liquidated Damages for General Prediction Accuracy. If Contractor fails to meet this Performance Requirement for two consecutive Reporting Periods, the SFMTA may assess the following: Liquidated Damages = 0.5% of the Contractor's Operating Monthly Fees for System Software (as set forth in *Appendix E, Section 3*) during the Reporting Period.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
1.5 Overestimated Vehicle-Arrival Predictions			
Overestimated Vehicle-Arrival Prediction Rate	Overestimated Vehicle-Arrival Prediction Rate ≤ 1.75%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Overestimated Vehicle-Arrival Prediction Rate. Overestimated Vehicle-Arrival Prediction Rate = # of Overestimated Vehicle-Arrival Predictions during the Reporting Period / # of Vehicle-Arrival Prediction Times during the Reporting Period. An Overestimated Vehicle-Arrival Prediction occurs if a vehicle arrives significantly before the corresponding Vehicle-Arrival Prediction. A vehicle arrives significantly before its corresponding Vehicle-Arrival Prediction if the Vehicle-Arrival Prediction exceeds the Overestimated Prediction Threshold indicated in Appendix F, Table F-1 The calculation excludes Vehicle-Arrival Predictions for vehicles affected by temporary service changes where route changes are unknown in advance, Switchbacks and unavailable vehicle location data.	For any Reporting Period, the SFMTA will not assess liquidated damages for this failure if the SFMTA assesses liquidated damages for General Prediction Accuracy. If Contractor fails to meet this Performance Requirement for two consecutive Reporting Periods, the SFMTA may assess the following: Liquidated Damages = 0.5% of the Contractor's Operating Monthly Fees for System Software (as set forth in _Appendix E, Section 3_) during the Reporting Period.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages		
2.　　　Stationary Digital Signs					
2.1 Stationary Digital Sign Availability					
Stationary Digital Sign Availability Rate	Stationary Digital Sign Availability Rate ≥ 99.75%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Stationary Digital Sign Availability Rate. Stationary Digital Sign Availability Rate = # hours of Stationary Digital Signs are available during the Reporting Period / ((# of Hours during the Reporting Period x # of installed Stationary Digital Signs) – Stationary Digital Sign Scheduled Downtime – Exempted Hours). A Stationary Digital Sign is available if it displays Customer Information. Exempted Hours means (i) the number of hours when there are sign outages are caused by vandalism, third-party power outages, System Software outages that prevent the transmission of Customer Information or natural disasters, or (ii) the sum of 24 hours and the number of hours between the time Contractor requests a Track Clearance Permit (if necessary to repair a sign) and the time Contractor is permitted to enter SFMTA property to repair the sign.	Amount of Liquidated Damages for Reporting Period = 70%* x (1-A) x B x C		

Amount of Liquidated Damages sub-table:

A	B	C
Stationary Digital Sign Availability Rate	Estimated % Muni Ridership Loss when Customer Information is not available	Fare Revenue for the Reporting Period
99.75%-99.9%	1%	Annual Fare Revenue * (Reporting Period (in months) / 12 months)
99.50%-99.74%	4%	
99.25%-99.49%	18%	
99.00%-99.24%	25%	
98.00%-98.99%	30%	
Below 98.00%	36%	

*Note: Based on its Next Generation Customer Information System survey, over 70% of SFMTA's customers use existing real-time information signs "always" or "often".

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
2.2 System Software Transition			
System Software Transition Milestone – On the System Software Transition Milestone date, all Existing System Sign Locations must have installed Stationary Digital Signs that display Customer Information provided by the Next Generation System. The installed Stationary Digital Sign hardware may be from either the Existing System or Next Generation System.	System Software Transition Rate ≥ 100%	On or after the System Software Transition Milestone date, the SFMTA will use available means including the System Administration Tool to calculate the percentage of Existing System Sign Locations that achieve the System Software Transition Milestone (System Software Transition Rate). System Software Transition Rate = # of Existing System Sign Locations that achieve milestone / # of Existing System Sign Locations.	After the System Software Transition Milestone date, for each Existing System Sign Location that does not achieve the milestone, the SFMTA may assess the following: Liquidated Damages per day = 0.25% x [Applicable *Sign Type Hardware Cost* as set forth in Appendix E, Table E-7] For any given sign, total assessments will not exceed 25% of the Applicable *Sign Type Hardware Cost* as set forth in Appendix E, Table E-7.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
2.3 Stationary Digital Sign Transition			
Stationary Digital Signs Transition Milestone – On Stationary Digital Signs Transition Milestone, all Existing System Sign Locations must have installed Stationary Digital Signs that displays Customer Information provided by the Next Generation System.

The installed Stationary Digital Signs hardware must be from the Next Generation System. | Stationary Digital Sign Transition Rate ≥ 100% | On or after the Stationary Digital Signs Transition Milestone date, the SFMTA will use available means including the System Administration Tool to calculate the percentage of Existing System Sign Locations that achieve this milestone (Stationary Digital Sign Transition Rate).

Stationary Digital Sign Transition Rate = # of Existing System Sign Locations that achieve milestone / # Existing System Sign Locations. | After the Stationary Digital Signs Transition Milestone date, for each Existing System Sign Location that does not achieve milestone, the SFMTA may assess the following:

Liquidated Damages per day = 0.25% x Applicable *Sign Type Hardware Cost* as set forth in Appendix E, Table E-7.

For any given sign, total assessments will not exceed 25% of the Applicable *Sign Type Hardware Cost* in Appendix E, Table E-7. |
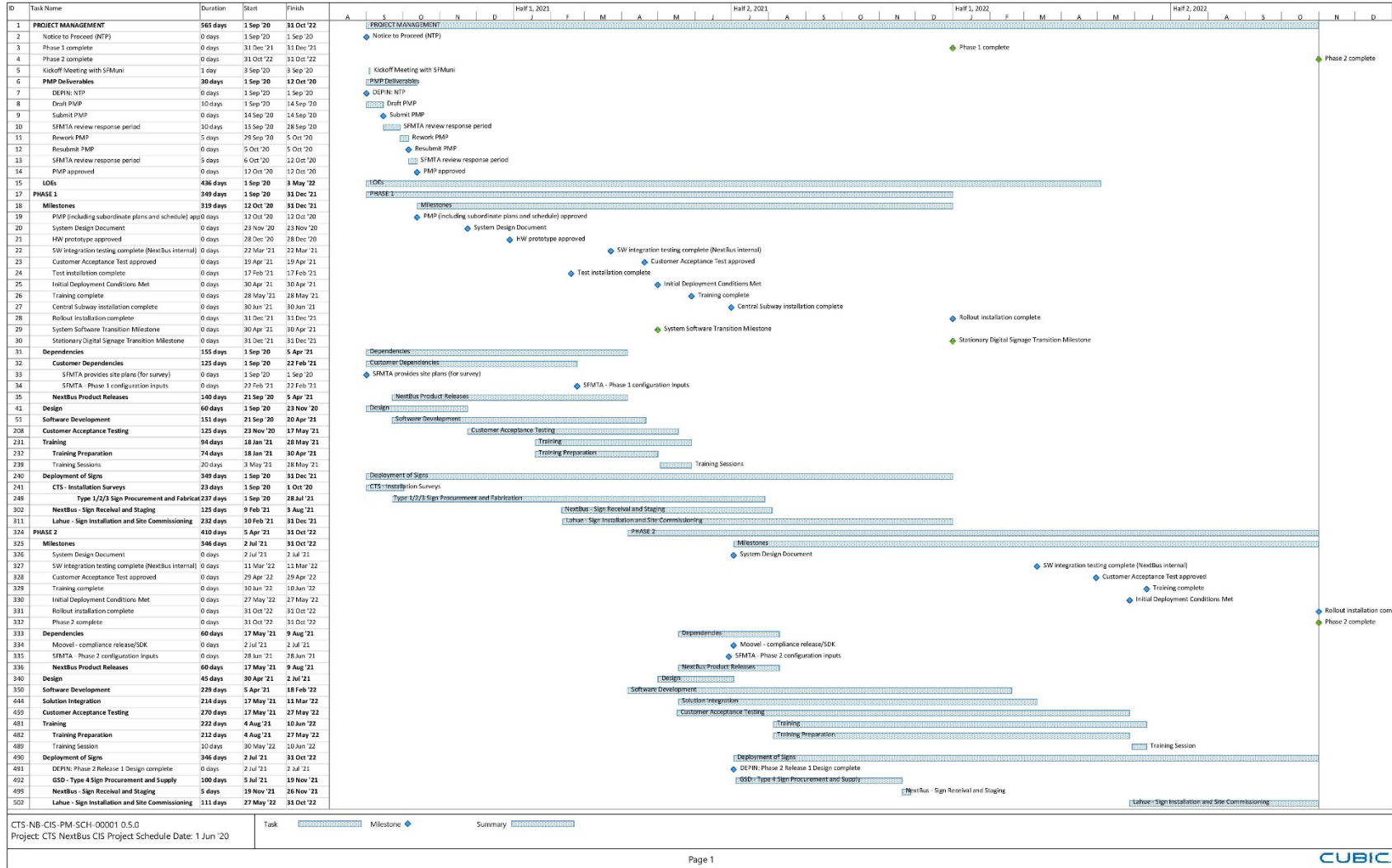
Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
3. **On-Board Digital Sign Software**			
3.1 Transfer Prediction Accuracy			
Transfer Prediction Accuracy Rate	Transfer Prediction Accuracy Rate ≥ 90%	For each Reporting Period after the installation of the On-Board Digital Signs, the SFMTA will use available means including the System Administration Tool to calculate the Transfer Prediction Accuracy Rate. Transfer Prediction Accuracy Rate = # of Accurate Transfer Predictions during the Reporting Period / # of Transfer Predictions during the Reporting Period. A Transfer Prediction is a Vehicle-Arrival Prediction for a connecting route. A connecting route is another Muni route to which customers traveling on Muni may transfer to complete their trip. A Transfer Prediction is accurate if the On-Board Digital Sign displays an Accurate Vehicle-Arrival Prediction for a connecting route before arriving at the transfer location. A Vehicle-Arrival Prediction is accurate if the vehicle arrives within the Accurate Prediction Range for the corresponding Vehicle-Arrival Prediction Time (defined in [Appendix F, Table F-1]).	For any Reporting Period, the SFMTA will <u>not</u> assess liquidated damages for this failure if the SFMTA assesses liquidated damages for General Prediction Accuracy. If Contractor fails to meet this performance requirement for two consecutive Reporting Periods, the SFMTA may assess the following: Liquidated Damages = 0.5% of the Contractor's Operating Monthly Fees for System Software (as set forth in *Appendix E, Section 3*) during the Reporting Period.

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
4. Mobile Platform & Website			
4.1 Trip Planner Availability			
Trip Planner Availability Rate	Trip Planner Availability Rate ≥ 99.9%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Trip Planner Availability Rate. Trip Planner Availability Rate = # of hours Trip Planner is available during the Reporting Period/ # of hours during the Reporting Period. The Trip Planner is available if it is operational and their contents are available to the public for use through the Mobile Platform & Website.	Amount of Liquidated Damages for Reporting Period is shown in the table below: *(1-A) x B x C* [table below] Total assessments within a given Reporting Period will not exceed 35% of Contractor's Operating Monthly Fees for Mobile Platform & Website and related Maintenance Services for the Reporting Period.

Table in last column:

A	B	C
Trip Planner Availability Rate	Percentage	Final Monthly Fee for Mobile Platform and Website Maintenance Services (ref. Appendix E, Section 6.2)
99.75%-99.9%	1%	Monthly Fee * Reporting Period (in months)
99.50%-99.74%	5%	
99.25%-99.49%	10%	
99.00%-99.24%	15%	
98.00%-98.99%	20%	
Below 98.00%	35%	

Performance Metric / Milestone	Performance Requirement	Calculation of Contractor's Performance	Assessment/Calculation of Liquidated Damages
4.2 Trip Planner Response			
Acceptable Trip-Planner Response Rate	Acceptable Trip-Planner Response Rate ≥ 98.0%	For each Reporting Period, the SFMTA will use available means including the System Administration Tool to calculate the Acceptable Trip-Planner Response Rate. Acceptable Trip-Planner Response Rate = (# of acceptable Trip-Planner Responses during the Reporting Period – Exempted Trip Planner Customer Queries) / (# of Trip Planner customer queries during the Reporting Period – Exempted Trip Planner Customer Queries)). A Trip Planner Response is the time it takes the System Software to respond to a customer query, excluding any data transmission time. An acceptable Trip-Planner Response takes ≤ 3 seconds. Exempted Trip Planner Customer Queries are the number of Trip Planner customer queries that take place during a 24-hour period when customer queries exceed 1,000,000 or a 1-hour period outside that 24-hour period when customer queries exceed 200,000.	If Contractor fails to meet this Performance Requirement for two consecutive Reporting Periods, the SFMTA may assess the following: Liquidated Damages = 1% of the Contractor's Operating Monthly Fees (as set forth in Appendix E, Section 6.2) for Mobile Platform & Website during the Reporting Period.

Appendix H
PRELIMINARY SCHEDULE

The schedule on the following page assumes an NTP date of September 1, 2020.

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ID	Task Name	Duration	Start	Finish
1	PROJECT MANAGEMENT	565 days	1 Sep '20	31 Oct '22
2	Notice to Proceed (NTP)	0 days	1 Sep '20	1 Sep '20
3	Phase 1 complete	0 days	31 Dec '21	31 Dec '21
4	Phase 2 complete	0 days	31 Oct '22	31 Oct '22
5	Kickoff Meeting with SFMuni	1 day	3 Sep '20	3 Sep '20
6	PMP Deliverables	30 days	1 Sep '20	12 Oct '20
7	DEPIN: NTP	0 days	1 Sep '20	1 Sep '20
8	Draft PMP	10 days	1 Sep '20	14 Sep '20
9	Submit PMP	0 days	14 Sep '20	14 Sep '20
10	SFMTA review response period	10 days	15 Sep '20	28 Sep '20
11	Rework PMP	5 days	29 Sep '20	5 Oct '20
12	Resubmit PMP	0 days	5 Oct '20	5 Oct '20
13	SFMTA review response period	5 days	6 Oct '20	12 Oct '20
14	PMP approved	0 days	12 Oct '20	12 Oct '20
15	LOEs	436 days	1 Sep '20	3 May '22
17	PHASE 1	349 days	1 Sep '20	31 Dec '21
18	Milestones	319 days	12 Oct '20	31 Dec '21
19	PMP (including subordinate plans and schedule) approved	0 days	12 Oct '20	12 Oct '20
20	System Design Document	0 days	23 Nov '20	23 Nov '20
21	HW prototype approved	0 days	28 Dec '20	28 Dec '20
22	SW integration testing complete (NextBus internal)	0 days	22 Mar '21	22 Mar '21
23	Customer Acceptance Test approved	0 days	19 Apr '21	19 Apr '21
24	Test installation complete	0 days	17 Feb '21	17 Feb '21
25	Initial Deployment Conditions Met	0 days	30 Apr '21	30 Apr '21
26	Training complete	0 days	28 May '21	28 May '21
27	Central Subway installation complete	0 days	30 Jun '21	30 Jun '21
28	Rollout installation complete	0 days	31 Dec '21	31 Dec '21
29	System Software Transition Milestone	0 days	30 Apr '21	30 Apr '21
30	Stationary Digital Signage Transition Milestone	0 days	31 Dec '21	31 Dec '21
31	Dependencies	155 days	1 Sep '20	5 Apr '21
32	Customer Dependencies	125 days	1 Sep '20	22 Feb '21
33	SFMTA provides site plans (for survey)	0 days	1 Sep '20	1 Sep '20
34	SFMTA - Phase 1 configuration inputs	0 days	22 Feb '21	22 Feb '21
35	NextBus Product Releases	140 days	21 Sep '20	5 Apr '21
41	Design	60 days	1 Sep '20	23 Nov '20
51	Software Development	151 days	21 Sep '20	20 Apr '21
208	Customer Acceptance Testing	125 days	23 Nov '20	17 May '21
231	Training	94 days	18 Jan '21	28 May '21
232	Training Preparation	74 days	18 Jan '21	30 Apr '21
239	Training Sessions	20 days	3 May '21	28 May '21
240	Deployment of Signs	349 days	1 Sep '20	31 Dec '21
241	CTS - Installation Surveys	23 days	1 Sep '20	1 Oct '20
249	Type 1/2/3 Sign Procurement and Fabrication	237 days	1 Sep '20	28 Jul '21
302	NextBus - Sign Receival and Staging	125 days	9 Feb '21	3 Aug '21
311	Lahue - Sign Installation and Site Commissioning	232 days	10 Feb '21	31 Dec '21
324	PHASE 2	410 days	5 Apr '21	31 Oct '22
325	Milestones	346 days	2 Jul '21	31 Oct '22
326	System Design Document	0 days	2 Jul '21	2 Jul '21
327	SW integration testing complete (NextBus internal)	0 days	11 Mar '22	11 Mar '22
328	Customer Acceptance Test approved	0 days	29 Apr '22	29 Apr '22
329	Training complete	0 days	10 Jun '22	10 Jun '22
330	Initial Deployment Conditions Met	0 days	27 May '22	27 May '22
331	Rollout installation complete	0 days	31 Oct '22	31 Oct '22
332	Phase 2 complete	0 days	31 Oct '22	31 Oct '22
333	Dependencies	60 days	17 May '21	9 Aug '21
334	Moovel - compliance release/SDK	0 days	2 Jul '21	2 Jul '21
335	SFMTA - Phase 2 configuration inputs	0 days	28 Jun '21	28 Jun '21
336	NextBus Product Releases	60 days	17 May '21	9 Aug '21
340	Design	45 days	30 Apr '21	2 Jul '21
350	Software Development	229 days	5 Apr '21	18 Feb '22
444	Solution Integration	214 days	17 May '21	11 Mar '22
459	Customer Acceptance Testing	270 days	17 May '21	27 May '22
481	Training	222 days	4 Aug '21	10 Jun '22
482	Training Preparation	212 days	4 Aug '21	27 May '22
489	Training Session	10 days	30 May '22	10 Jun '22
490	Deployment of Signs	346 days	2 Jul '21	31 Oct '22
491	DEPIN: Phase 2 Release 1 Design complete	0 days	2 Jul '21	2 Jul '21
492	GSD - Type 4 Sign Procurement and Supply	100 days	5 Jul '21	19 Nov '21
499	NextBus - Sign Receival and Staging	5 days	19 Nov '21	26 Nov '21
502	Lahue - Sign Installation and Site Commissioning	111 days	27 May '22	31 Oct '22

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Task ▬▬▬ Milestone ◆ Summary ▬▬▬

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CUBIC

Appendix I
Task Order Request Form

San Francisco Municipal Transportation Agency

Contract No. and Title:_____

Task Title: _____   **Date Initiated:** _____

Type of Request:

☐   **New Task Order- No.** <u>XX</u>

☐   **Modification - No.** ____(attach approved original and all modifications to date)

Task Start Date: _____   **Modification Start Date:** _____

Estimated Completion Date: _____

Funding Source: _____   **Proposed Task LBE Goal: XX%**

Project Title: _____

Scope of Services to be Performed:

Description

Deliverables:

<u>Description</u>   <u>Date Req'd</u>   <u>Quantity</u>

Appendix J
Reference Information

1 General

The Reference Information provided in the <u>Appendix J</u> provides certain information about the Existing System framed in the context of the five Elements that comprise the Next Generation System (i.e., the System Software, Stationary Digital Signs, On-Board Digital Sign Software, Mobile Platform & Website, and Analytics Platform). The SFMTA has provided the Reference Information in this <u>Appendix J</u> for Contractor's convenience only. Accordingly, the following shall apply:

(a)   Contractor is not entitled to rely on the Reference Information as presenting any design, engineering, or maintenance solutions, or other direction, or as presenting any means or methods, for complying with the requirements of this Agreement.

(b)   The SFMTA is not liable for any cause of action, claim, or loss suffered by Contactor or any Contractor-related entity by reason of any use of or reliance on information contained in the Reference Information.

(c)   The SFMTA has not verified the information in the Reference Information, and does not represent or warrant the information contained in the Reference Information is free from error.

(d)   Contractor will have no right to additional compensation or time adjustment based on any error in the Reference Information.

(e)   Contractor understands the Reference Information is provided on "as-is" conditions. Contractor will be given the opportunity of conducting an inspection of the Reference Information prior to performing the Services.

(f)   If and to the extent Contractor or any Contractor-related entity uses information in the Reference Information, such use is entirely at Contractor's risk and at Contractor's own discretion.

2 System Software

The following section provides an overview of SFMTA's existing customer information system (Existing System), provided by NextBus. Broadly, this section describes how the Existing System:

(a)   Detects vehicle locations on the surface and underground.

(b)   Uses these vehicle locations to generate vehicle arrival predictions.

(c)   Functions under common transit operating conditions.

(d)   Produces outputs to other systems (both managed by the SFMTA and third parties).

(e)   Provides a staff management interface.

Finally, this section describes inputs that could potentially be used to generate accurate Customer Information, a subset of which the Existing System currently uses.

These are not the technical requirements; rather, the information below is provided to help Contractor understand the Existing System in planning for the Next Generation System.

2.1   Detection of Surface Vehicle Locations

To generate vehicle arrival predictions and other Customer Information, the Existing System first must detect vehicle locations.

The SFMTA currently uses Conduent's OrbCAD as its Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL) system to track surface vehicle locations (for all transit modes) as well as capture Transit Operator numbers, routes, runs and schedule block assignments. The SFMTA's standard operating procedures require that Transit Operators log into OrbCAD at the beginning of their runs, which allows the system to associate vehicles with specific operators and schedules (block and run numbers).

Using a GPS tracker, OrbCAD continually generates locational data for each transit vehicle that circulates on the surface. OrbCAD uses an XML feed to provide these data in real-time to other applications. This XML feed contains vehicle identification numbers, dates, locations (latitude and longitude), speeds, directions, and block numbers.

OrbCAD's functionality also allows transportation controllers to modify, reassign and switch back schedule travel plans in real time. For example, a light-rail vehicle traveling on the N Judah line might switch back early at Carl & Hillway instead of continuing to Ocean Beach. Under the SFMTA's standard operating procedures, TMC Transportation Controllers or a Transit Operator can log out of the planned block and log in to a block with an alternative assignment. OrbCAD then reflects the new assignment in its back-end system in real time.

The radio system the SFMTA uses with OrbCAD provides communications between Transit Operators and Transportation Controllers. Using the radio system, the vehicle locational information generated by OrbCAD is sent to its long-term database and replicated in SFMTA's long-term SQL database. The long-term database receives this vehicle locational information every 60 seconds.

The Existing System then receives this locational information through a web service and applies its algorithm to predict real-time arrivals. The Existing System then makes real-time predictions available on signs at shelters (both in visual and audio formats), online, on a mobile app and via feeds for third-parties to incorporate into their mobile apps.

2.2 Detection of Underground Light Rail Vehicle Locations

The SFMTA's existing Automatic Train Control System (ATCS) monitors and controls train movements in the underground section of the Muni Metro light rail system. ATCS uses train control moving block technology to provide OrbCAD with real-time updates of train positions. There are approximately 1,000 track segments over the 5.5-mile length of the subway, which includes portals and turnback facilities. Each segment is associated with a specific geolocation (latitude/longitude) and, if applicable, direction. (Currently, there are no equivalent track segments for surface portions of the light rail system.)

This information is replicated in SFMTA's long-term SQL database. OrbCAD then transmits underground locational information to other systems in the same way it does for surface locations, except that the OrbCAD XML feed is updated every 20 seconds instead of every 60 seconds.

ATCS also provides locational information to the back-end that supports Platform Audio Visual (PAV) signs at Muni Metro stations, which generates its own predictions for trains in the subway.

OrbCAD transmits underground train vehicle locations to the Existing System to generate arrival predictions. The NextBus system then displays vehicle locations and arrival predictions on a schematic diagram of train positions throughout the Muni Metro rail system.

The current technical environment is made of a combination of legacy systems and new initiatives. It is not necessarily the most effective way to receive vehicle location information and generate accurate arrival predictions.

2.3 Communication of Vehicle Locations and Real-Time Service Changes

The Multimodal Transit Management System (MTMS) software the SFMTA uses with OrbCAD currently interfaces with the Existing System by providing critical information necessary to generate predictions. Specifically, the MTMS provides an XML feed that contains the current vehicle location data, including vehicle ID, block ID, date and time stamps, latitude and longitude coordinates, speed, and direction. In addition to these data, the OrbCAD system also provides many other data fields.

The MTMS updates locations every 60 seconds for surface vehicles and every 20 seconds for underground trains.

2.4 Existing Prediction Algorithms

Currently, the Existing System gathers predictions through a service provided by NextBus. After receiving GPS location and other pertinent data through its interface with the MTMS, NextBus applies a proprietary algorithm to generate vehicle arrival predictions. This algorithm incorporates schedule information, historical travel-time data and SFMTA staff configurations.

An additional predictions system, not currently used by the SFMTA, is the OrbCAD-provided SmartTraveler Plus. SmartTraveler Plus uses vehicle schedules and scheduled travel times as well as real-time data to generate vehicle arrival predictions in general transit feed specification (GTFS) open data format. For example, if a bus is currently three minutes late, SmartTraveler Plus will predict that the bus will arrive three minutes late at all upcoming stops relative to the official schedule provided by Trapeze.

SmartTraveler Plus does not incorporate historical performance data or SFMTA staff configurations and is therefore insufficient for SFMTA's needs. While the SFMTA does not currently use the predictions generated by SmartTraveler Plus, these predictions are available through a web services API.

Figure J-1 compares these two predictions systems and illustrates how they can produce different vehicle arrival predictions.
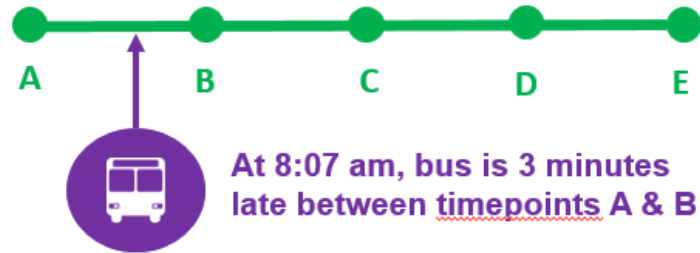
Timepoint	A	B	C	D	E
Official Trapeze Schedule	8:00 am	8:09 am	8:15 am	8:22 am	8:30 am
SmartTraveler Plus Prediction	-	**5 min (8:12 am)**	**11 min (8:18 am)**	**18 min (8:25 am)**	**26 min (8:33 am)**
Schedule and Historical Travel Times Data	8:00 am	8:07 am	8:12 am	8:26 am	8:34 am
Existing System Prediction	**-**	**3 min (8:10 am)**	**8 min (8:15 am)**	**21 min (8:29 am)**	**30 min (8:37 am)**

Figure J-1: Comparison of Different Prediction Algorithms

2.5   Operating Conditions

The SFMTA operates transit services under various conditions that impact vehicle arrival predictions. The following sections describe some, but not all, of these conditions.

2.5.1   Timepoint-Based Scheduling

The SFMTA currently uses Trapeze Software (Trapeze) to create schedules for weekdays, Saturdays and Sunday/holidays. At certain times of the year, the SFMTA may implement special schedules, such as the week between Christmas and New Year's Day when express bus service may not operate. Schedule changes occur approximately three to four times per year.

In timepoint-based scheduling, vehicles are scheduled to arrive and depart at specific times from major stops (timepoints) along each transit route. In timepoint-based scheduling, Transit Operators are instructed not to leave timepoints early so as to maximize schedule adherence.

2.5.2   Headway-Based Operations

In some limited cases, the SFMTA employs de-facto headway-based operations despite using an official timepoint-based Trapeze schedule. Recently, the SFMTA employed a mode in OrbCAD that permits management of vehicles without reference to timepoints on certain routes. Transit Operators do not adhere to their fixed schedule but rather maintain roughly constant time

intervals between vehicles. For example, when a route is operating on a 10-minute headway, Transit Operators would leave the terminal approximately 10 minutes after the previous vehicle departs. An example of such headway-based operations is SFMTA's cable car system. The SFMTA is planning to manage its Rapid service (14R, 38R, etc) using OrbCAD headway mode beginning in mid-2020.

2.5.3   Temporary Service Changes

The SFMTA often encounters situations that require either planned or unplanned temporary service changes. Temporary service changes generally fall in one of the following four categories:

2.5.3.1   Route Changes and Time Known in Advance

In general, this category encompasses special events and construction, where SFMTA staff has lead time to prepare. The SFMTA may or may not create a special schedule for these circumstances. Examples include:

- Special events: Street fairs, Sunday Streets, Bay to Breakers, Chinese New Year Parade, the Pride Parade
- Large-scale conferences or sporting events: Dreamforce, Giants or Warriors games
- Construction activities: Street construction requiring long-term detours, bus substitutions covering portions of the Muni Metro rail system closed for maintenance and repairs

2.5.3.2   Route Changes Known, Time Unknown in Advance

In general, this category encompasses common operational issues that periodically occur, but specific times are not known in advance. Examples include:

- Rail switchbacks at standard turnback points (e.g., Embarcadero Station, Church & 22nd St, Church & Duboce, Carl & Hillway, etc.)
- Muni Metro underground system shutdown
- Muni Metro Church & Duboce portal closure
- Market Street closure

2.5.3.3   Route Changes Unknown, Time Known in Advance

In general, this category encompasses public events on a specific date that could affect service in an unknown way. An example would be a protest that starts at Civic Center Plaza and travels somewhere undetermined in advance or the monthly Critical Mass bicycle ride with no set route.

2.5.3.4   Route Changes and Time Unknown in Advance

This category encompasses spur-of-the-moment events that can occur anywhere, such as police activity or a fire.

2.5.4   "Ghost" Buses and Trains

"Ghost" buses and trains occur when a real-time information system displays a prediction for a transit vehicle that never arrives. This leaves customers frustrated and confused. For example, a "ghost" bus occurs when a countdown sign says that a bus will come in five minutes, but five minutes later the bus does not appear and the prediction resets to 15 minutes. Minimizing "ghost" buses and trains would allay a top customer concern.

"Ghost" buses and trains occur most often around terminals. If a vehicle has not left a terminal after a configurable amount of time following its scheduled departure time, the system will no longer predict departures for that vehicle. This results in that vehicle disappearing from predictions, even though it may merely be late. "Ghost" buses and trains may also occur at other points along a vehicle's route.

2.5.5   Terminal Departures

Terminal departures represent a special case of a regular stop. SFMTA has observed significant limitations in the Existing System's ability to predict a vehicle's departure from its terminal accurately. There are two general reasons: terminal configurations and current location.

2.5.5.1   Terminal Configurations

Some Muni routes have complex movements or complex terminal configurations that make it difficult for software to detect if a given trip has ended or started, causing inaccurate real-time predictions. For example, some vehicles will layover at a terminal outside the designated geofence associated with that terminal.

Existing tools to help with this issue provide the ability to define a custom geofence for these complex terminals. In the Existing System, SFMTA staff can define a polygon with NextBus support. In OrbCAD, SFMTA staff can define a circle with a custom radius with Conduent support.

2.5.5.2   Current Location

The Existing System also does not take into account the current location of a vehicle assigned to a particular run. Instead, it only receives locational data from a vehicle once it has arrived at the terminal after completing its previous trip and checked in to its next trip. In the absence of prediction data, the system will count down to the next scheduled departure regardless of the true position of the vehicle assigned to that departure.

For example, suppose it is 5:00 pm and coach 7702 is assigned to depart outbound from a terminal at 5:03 pm, but it is on an inbound run six minutes away, and the scheduled headway between vehicles is 10 minutes. The Existing System's digital signs will show the next departure is in 3 minutes instead of 6 minutes. At 5:03 pm, if the Existing System has still not detected the presence of the incoming vehicle, the digital signs will show the next scheduled departure is in 10 minutes. Once the vehicle does arrive at the terminal and the Existing System detects it, the signs will announce that the vehicle is departing.

In the above example, the Existing System shows real-time predictions three different ways – the first two of which would have been inaccurate. Furthermore, the countdown sign would have "jumped" between those predictions, potentially causing customer confusion.

Examples of factors that influence terminal departure predictions include:

- The scheduled departure times

- The actual locations of the vehicles assigned to each run, specifically their predicted arrival times at the terminal prior to beginning their trip

- Typical behavior of operators at terminals

Scheduled departure times are available from the schedule information provided to the Existing System and described in Section 2.7.1. As described in Section 2.1, Detection of Surface Vehicle Locations, the CAD/AVL system also provides vehicle locations. The CAD/AVL system also includes Vehicle Block information, which can help to link the vehicle's upcoming trip with its previous trip so that the System would be able to determine if the vehicle is still on its preceding trip and therefore will be late to arrive at the terminal.

In terms of operator behavior at terminals, the SFMTA has identified general categories of behavior, including the predominant category of behavior at each terminal based on time of day. For illustration purposes, below is an example of different types of behavior:

Scenario: Coach 7702 arrives at the terminal five minutes behind schedule (at 5:05 pm). The operator has a scheduled layover of 20 minutes and their next scheduled departure is 5:20 pm.

- Behavior A: Operator takes a shortened layover and departs on time at 5:20 pm.

- Behavior B: Operator takes a full 20-minute break and departs 5 minutes late at 5:25 pm.

Currently, the Existing System does not incorporate any information about different types of operator behavior.

2.5.6 Switchbacks

"Switchbacks" are transit trips that do not travel the full length of their scheduled route and turn around early. Switchbacks are not scheduled. For example, an SFMTA Transportation Controller may instruct a late 5 Fulton Transit Operator traveling outbound to Ocean Beach to turn around early at 8th Avenue and Fulton in order to get back on schedule in the inbound direction.

In the Existing System, most Switchbacks result in incorrect predictions because the prediction systems do not have accurate information about vehicle reassignments. For example, in the 5 Fulton case above, the stops beyond 8th Avenue on Fulton will continue to display predicted arrivals even though the vehicle will no longer serve those stops.

SFMTA staff currently use the existing administrative pages to assign Loop Jobs – an unscheduled, pre-configured work assignment in which a transit vehicle operates over a portion of the route using an existing route pattern. Loop Jobs will involve a Switchback if the vehicle turns around before the end of its regularly-scheduled terminus.

When assigned to a Loop Job, the Existing System will generate predictions for a vehicle based on the configuration of the Loop Job. Currently, SFMTA staff configure Loop Job patterns in Trapeze and assign Loop Jobs in real-time from a drop-down menu from the Existing System's System Administration Tool. For the Muni Metro rail system, the SFMTA has preconfigured Loop Jobs for all Switchback locations so a rail vehicle can be assigned to travel from a terminal to a short location on a loop.

2.5.7 Rail Delays

On occasion, SFMTA Transporation Controllers may hold light rail vehicles for security, mechanical malfunctions, customer incidents and other reasons. Currently, the Existing System may drop predictions for vehicles experiencing delays altogether, creating the false impression that a vehicle has gone out of service.

2.5.8 Not Outs

A "Not Out" occurs when the SFMTA takes a vehicle out of service or is not able to assign a Transit Operator to a work shift (run) because, for example, there are an insufficient number of Transit Operators reporting to work on that particular day. This results in trips the SFMTA planned to operate but knows in advance that it will not be able to service. If the Existing System reverts to schedule mode or is otherwise unable to detect a Not Out, it will incorrectly predict an arrival time for a non-existent vehicle.

2.5.9 Transit Signal Priority (TSP)

The SFMTA is implementing a Transit Signal Priority (TSP) program throughout San Francisco. The purpose of this initiative is to speed up travel times by increasing the likelihood that Muni's transit vehicles will receive a green light at an intersection.

As a bus or train approaches an intersection, sensors mounted on top of the vehicle use GPS to communicate with the traffic signal. Based on the vehicle location and the current status of the traffic signal, the TSP decides to either hold the green light to allow the bus to get through, or shorten the length of a red light to reduce waiting time.

When activated for pre-emption or TSP, the signal at the intersection will change the signal phase lengths for cross traffic and pedestrians, while still allowing pedestrians to finish crossing the street safely.

The Existing System does not interface with the City's TSP system.

All Muni vehicles are equipped with the capability to request TSP at intersections. However, not all intersections are currently equipped with TSP. Therefore, along any given route, a vehicle may encounter intersections both with and without TSP.

Currently, the SFMTA applies TSP as a vehicle approaches an intersection. In the future, the intersections will be able to differentiate between routes and grant priority to certain routes over others.

2.6 Outputs to Other Systems

The Existing System produces various output feeds to support other SFMTA systems as well as third-party transportation apps. These output feeds include:

2.6.1 ATCS System Management Center (SMC)

On its own, the ATCS System Management Center (SMC) does not know a train's route, destination or schedule as it enters the subway at a portal. This information is necessary to route trains appropriately and provide accurate destination and arrival prediction information on PAV signs. To get this data, the ATCS SMC currently relies on the Existing System's API to identify trains in the subway, train job assignments, and train destinations and routing.

The ATCS queries the Existing System via an HTTP request for the estimated arrival times of the next five trains on every line approaching a prediction point. The Existing System returns this data to the ATCS as an XML file with a vehicle number, time to arrival, direction and route pattern.

2.6.2 Platform Audio Visual (PAV) Signs

As shown in Figure J-7(a), PAV signs are located at underground Muni Metro stations and display predicted arrival times for each rail line. For light rail vehicles in the subway, the PAV server receives locations from ATCS. For light rail vehicles on the surface (that have not yet entered the subway), the PAV server currently queries the Existing System's predictions API to populate route names and their predicted arrival times for display on PAV signs. The PAV system independently controls the layout and formatting of the information displayed on its signs.

The data cables to the PAV displays and public announcement (PA) amplifiers (for audio announcements) are not connected directly to the Existing System's predictions feed or the ATCS/SLS feed. Instead, the PAV displays and PA amplifiers communicate with PAV servers via the secure network through a PAV Station Control Unit and a Cisco switch at each station.

The Existing System's predictions feed and ATCS feed interface with PAV system by connecting with the primary PAV server at the Lenox Control Center adjacent to West Portal Station and the back-up PAV server at the Transportation Management Center. The PAV servers process information from the feeds and deliver it to the correct Station Control Unit, which in turn delivers it to the correct audio amplifiers and the correct PAV displays in the correct format with the proper timing.

2.6.3 General Transit Feed Specification (GTFS) Static Feed

The SFMTA currently generates a GTFS Static Feed, which is in available for TEST and PROD (production) environments in order to allow third-parties to prepare their apps for service and schedule changes. The GTFS Static Feed contains transit information such as stops, routes, trips, and other schedule data.

2.6.4 XML Predictions Feed

The Existing System currently produces a customized XML predictions feed that was implemented prior to the adoption of current industry real-time information feed standards. Third parties currently utilize this feed to populate travel information on their mobile apps.

2.6.5 511 Feed

The Metropolitan Transportation Commission (MTC)'s 511 system currently provides regional transit information both online and phone information. The Existing System currently provides a customized predictions feed to the 511 system.

2.7 Other Features of Existing System

This section describes other features of SFMTA's Existing System.

2.7.1 Schedule Uploads

The SFMTA uses Trapeze to schedule its transit vehicles and perform a variety of other functions. To enable the Existing System to represent scheduled arrival times in its back-end database, there is a file interface that permits staff to upload schedule and route files. SFMTA can provide the schedule as flat files in either the Trapeze Standard Data Export format or another format that includes route definition, trips, blocks, and run information. These schedule

files contain timepoints and their associated scheduled vehicle arrival times, run number (Trapeze Standard Data Export only), block number and other information for each trip.

2.7.2 Vehicle Assignments

The schedule of travel of a vehicle for a given day, including (1) a pull-out from an Operating Division (vehicle garage), (2) Revenue Service trips, (3) any deadhead trips, and (4) a pull-in back to the Operating Division, is known as a "vehicle block." In order for the Existing System to generate vehicle predictions, it must be able to associate a vehicle block (which remains the same throughout a schedule signup) with a specific transit vehicle (which may vary from day to day). A "vehicle assignment" is the association between the vehicle block and a specific transit vehicle.

Sources of vehicle assignments currently include: (i) OrbCAD, (ii) an automatic job assignment (also known as Autojobber), and (iii) maintenance assignments (also known as Job Importer) and (iv) staff override. Some vehicles have more than one vehicle assignment source, sometimes with conflicting information. The Existing System enables the Existing System's Vendor to configure which vehicle assignment source takes priority.

Below are details about each vehicle assignment option:

- OrbCAD – OrbCAD is the primary source for vehicle assignments.

- Automatic Job Assignment – An Automatic Job Assignment occurs when the Existing System guesses the association between a vehicle and a scheduled assignment. This guess is based on the vehicle's path of travel, day of week, time of day, and type of vehicle. The Existing System maintains a list of active vehicle identification numbers, vehicle types, and the types of vehicles that can be assigned to each route. The Existing System automatically assigns a job when it knows about service changes which are not loaded into the OrbCAD system. For example, an Automatic Job Assignment would occur when a vehicle traverses a pre-defined detour route associated with a construction project. Since the project's start and end dates are unknown, the Existing System must make an Automatic Job Assignment because the vehicle schedule is not pre-loaded into OrbCAD.

- Maintenance Assignments – Maintenance staff at each Operating Dvision are responsible for assigning vehicles to work assignments each morning. The process is largely managed by paper, and after the assignments are made, designated maintenance staff enter the vehicle assignment information into Trapeze or a companion software called Yard Map. Muni internal information systems process the assignment data and makes it available for the existing prediction systems via electronic transfer (ftp). Though no longer the primary source of vehicle job assignments at Muni, the maintenance assignments provide valuable information to the prediction system when vehicle assignment information is not available from higher priority job sources, such as OrbCAD.

- Staff Override - Staff override functionality is available in the Existing System's System Administration Tool. This functionality is critical for allowing staff to have the final say in vehicle assignments and predictions. Staff can also assign vehicles to "no job" in cases where predictions are undesirable.

In an ideal scenario, all vehicle assignments should be the same, regardless of source. Sometimes, however, different sources provide conflicting information. In the Existing System, NextBus configures priority statuses at the direction of SFMTA staff. This configurability allows staff to identify which sources the prediction algorithm should prioritize when making vehicle assignments.

2.7.3 Predictions Disablement

The SFMTA can currently enable or disable vehicle arrival predictions by route and by stop and can schedule start and end times for these changes. The Existing System's System Administration Tool provides a page to review the status of any enabled or disabled predictions.

2.7.4 Alerts and Messages to Customers

SFMTA staff can currently create, modify, delete, and schedule alerts and messages. They can configure the display of these messages by route and stop.

2.7.5 Modifications to Route Numbers and Names

The SFMTA has the ability to modify existing route numbers and names from what is configured in Trapeze. This functionality is critical to providing customer-friendly numbers and names to the public when SFMTA staff use a different internal number and name.

2.7.6 Replay Map

The Existing System provides tools enabling SFMTA staff to play back past vehicle movements and assignments on an interactive map for routes that are currently operational. The user can set the time and date to start the playback and can set a payback speed ranging from the true speed to 1 minute per second (i.e., 60 times faster than the true speed).

2.8 Inputs to Generate Customer Information

The Existing System uses a subset of the following potential inputs to generate Customer Information, including vehicle arrival prediction times.

2.8.1 Real-Time Vehicle Locations

Currently, the SFMTA provides the Vendor of its Existing System with real-time vehicle locational information generated by OrbCAD via the existing web service. In the future, the SFMTA may work with the OrbCAD Vendor (Conduent) to convey real-time information in an XML feed using the European-standard Service Interface for Real Time Information (SIRI).

2.8.2 Stops and Operating Divisions

In order to generate vehicle arrival predictions, the Existing System currently uses an SFMTA-provided list of stops and stations, along with their attributes shown below. Stop name

- Stop ID
- GPS Coordinates (Latitude and Longitude)
- Route, Route patterns and their associated directions
- Route name (including an alias for the route name)
- Route Schedules

The Existing System also uses an SFMTA-provided list of Operating Divisions and their locations.

2.8.3 Schedules

The Existing System is capable of reading and understanding schedule data provided by Trapeze.

2.8.4 Temporary Service Changes

The Existing System has a limited ability to communicate temporary service changes accurately to customers. As input, it can process a schedule file that contains a detour route, and if available, a schedule associated with that detour route (for pre-scheduled routes).

If there is no schedule associated with a detour route, however, the Existing System is generally unable to provide accurate vehicle arrival predictions at stops affected by the detoured route (either regular stops the detoured route is not serving, or temporary stops the detoured route is serving). This limitation often causes confusion among customers when there are temporary service changes.

In addition, the Existing System has the ability to transmit real-time messages and/or pre-formatted, canned messages in English to stationary digital signs.

2.8.5 Alternative Transit Routes

As illustrated in Figure J-2, in many parts of San Francisco, the interconnectedness and density of the Muni network provides customers with multiple paths to reach their destination. In particular, there may be nearby parallel routes that may be alternatives under the right circumstances. When faced with a long wait, SFMTA research has indicated that many customers would be inclined to remain with Muni if presented with an alternative transit route rather than choosing another transportation option.

Because of San Francisco's unique geography, determining route substitutes require a nuanced analysis of the Muni network. Routes that look close on a map may or may not be substitutes for each other.

Furthermore, if multiple routes serve a stop, a parallel route may be an alternative for one of those routes but not the other.

The Existing System is currently unable to offer alternatives.
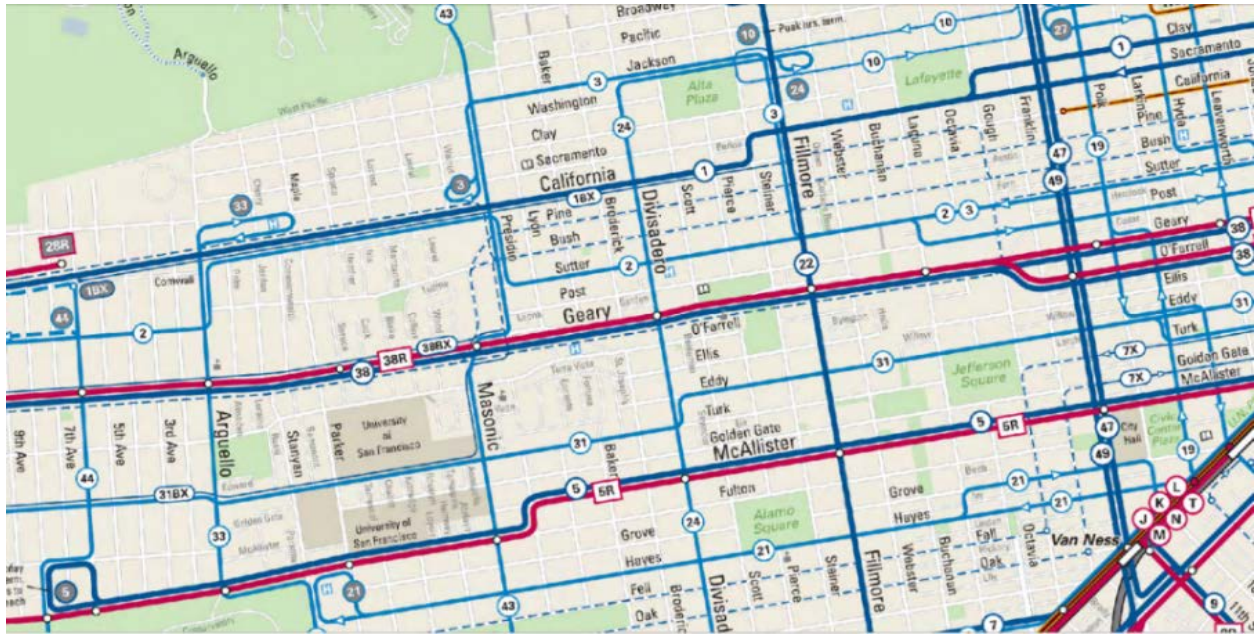
Figure J-2: Muni Network Density and Alternatives

In many parts of San Francisco, the density and interconnectedness of the Muni network provides customers with multiple paths to reach their destination. Taking advantage of the robustness of this network, the new Customer Information System aims to display different alternatives if the initial choice is subject to a long wait, service delay or overcrowding.

2.8.6 Real-Time Automatic Passenger Counter Ridership Data

Since 2015, the SFMTA has been equipping all new rubber-tire vehicles (motor coaches and electric trolley coaches) and light rail vehicles with second-generation Automatic Passenger Counter (APC) sensors. These APCs produce raw data about boardings and alightings for each individual door opening and closing. These raw data are then combined with OrbCAD route and locational information to calculate vehicle occupancy, which is then sent over the radio system approximately every 60 seconds for placement into SFMTA's long-term database for historical ridership analysis.

The Existing System currently does not utilize real-time ridership data.

2.8.7 Vehicle Telematics

SFMTA's newest fleet of rubber tire (New Flyer) and light rail vehicles (Siemens) generate operational data that are uploaded later for processing and storage. Data examples include door opening and closing events, maintenance events and vehicle locations. The Existing System currently does not utilize any vehicle telematics data.

2.8.8 Elevator & Escalator Outages

Currently, station agents and customers may report an elevator or escalator outage to San Francisco's 311 system. Staff at 311 then prepare a message communicating the outage and enters it into the Existing System's system administration tool. These messages are then disseminated to selected stationary digital signs in shelters and underground stations, and posted

on the Existing System's mobile website and mobile app. Station agents also place this information on whiteboards, located at each elevator entrance and at the primary agent booth.

The SFMTA has a feed which indicates changes in elevator status at each underground station. The feed is generated based on the status of a SFMTA-hosted database which is updated by the station agents. The SFMTA has an API for the feed and the information is also made available to the public at www.sfmta.com/Elevators/. In the future, this feed may also include the status of station escalators and five wayside lifts located at island platforms servicing the F Market & Wharves and M Ocean View rail lines. The feed indicates:

- Status changes (from operable to inoperable, or vice versa)

- Effective time (either immediate or planned)

- Up or down direction of travel for escalators (future)

2.8.9 Transit Signal Priority (TSP)

As noted in Section 2.5.9, TSP can speed up travel times by increasing the likelihood that Muni's transit vehicles will receive a green light at an intersection. The Existing System does not interface with the City's TSP system.

2.8.10 Traffic

The Existing System does not explicitly incorporate traffic congestion into its predictions.

2.8.11 Complementary Sustainable Transportation Options

Through feeds or other methods to be determined, the SFMTA will provide information about complementary sustainable transportation options, such as bikesharing and taxis/on-demand transportation services, provided they comply with SFMTA's Guiding Principles for Management of Emerging Transportation Services and Technologies. Information includes, but is not limited to:

- Links to mobile apps and websites for those transportation options

- Nearby locations where customers can access those transportation options (e.g., bike sharing docks)

- Sustainable transportation options that could provide first-mile/last-mile or late-night connections in cases where or when transit is not available

The SFMTA will have sole discretion whether to include or exclude specific other transportation options.

3 Stationary Digital Signs

3.1 Existing Conditions

As a multimodal transit operator, the SFMTA offers customers a variety of vehicle boarding environments. As indicated in Table J-1, they range from sidewalk locations with no amenities to complete underground stations. For this RFP, the SFMTA has arbitrarily assigned numbers to different sign types associated with different waiting environments.

Table J-1: SFMTA Waiting Environments and Existing Stationary Digital Signs

Location	Sign Type
Outdoor bus and rail stops at shelters maintained by SFMTA's shelter Vendor	Type 1
Outdoor bus and rail stops at other shelters not maintained by SFMTA's shelter Vendor (e.g., historic shelters, Embarcadero shelters between Ferry Building and Fisherman's Wharf, Forest Hill Station)	Type 1
Outdoor "island" bus and rail stops (between two traffic lanes) (e.g., Market Street, rail platforms at Church & Duboce)	Type 1
Outdoor high-level rail platforms (e.g., Third Street T Line stations, South Embarcadero N & T Line stations, San Francisco State and Stonestown M Line stations)	Type 2
Fully-enclosed underground rail stations – mezzanine and platforms	Type 3
Salesforce Transit Center pylons	*

* A vendor managed by the Transbay Joint Powers Authority provides signs on one side of the pylon; Contractor must provide signs on the other side as requested by the SFMTA (pending approval from the Transbay Joint Powers Authority).

3.2 Powered Shelter Signs (Type 1)
3.2.1 Curbside Shelters

Currently, the SFMTA has approximately 800 Light Emitting Diode (LED) signs at shelters managed under a contract between the SFMTA and Clear Channel Communications, Inc. ("Clear Channel"). These LED signs can only display text. As shown in Figure J-3(a), these signs are contained in a bezel which is mounted within a shelter panel. Currently, the existing sign dimensions, including the bezel housing, are approximately 10" (height) x 26" (length) x 9" (depth). However, the surface area to display information is much smaller; there is an approximately 2" border around all sides between the outside edge of the bezel and the display area. The existing signs themselves measure 8" (height) x 23.62" (length) x 7.6.3" (depth). In addition, there is currently unused space between the top of the existing sign and the horizontal shelter support beam.

Currently, powered curbside shelter signs (Type 1) utilize 3G communications with the back-end predictions system.

The panel housing shelter signs also contains an encased printed system map and a "Push-to-Talk" button (Figure J-3(c)). When pressed, this button annunciates the content of the LED signs for customers who need (or prefer) audible information. The speaker and the button are enclosed in one unit.

Clear Channel has installed 96 Proof-of-Performance cameras at shelters with large digital display panels. These cameras are mounted on top of existing real-time countdown signs as shown in Figure J-3(d), occupying space that could potentially be used for an enlarged Type 1 sign.

In addition to real-time information signs, these shelters also have a double-sided, glass-enclosed display panel. Currently, both sides display a Muni system map.

(a) Shelter Panel	(b) Engineering Drawing
(c) Push-to-Talk Button	(d) Proof-of-Performance Camera

Figure J-3: Existing Curbside Shelter Sign and Display Panel

In existing shelters, there is a space between the top of the system map case and the horizontal "wave" roof for the real-time information sign. The outside of the bezel that houses the existing shelter sign measures approximately 10" x 26" x 9"; however, the information display is limited to approximately 3.75" x 17" due to the thickness of the bezel and sign edge. There is room for a shelter sign and bezel with dimensions of approximately 14.5" x 26".

3.2.2 Island Shelters

As shown in Figure J-4, the SFMTA also has signs at selected island shelters. These shelters are located on island platforms, which are generally between two lanes of traffic. Due to spacing

constraints, these shelters do not have a panel that houses the signs. Instead, the signs are suspended from a horizontal bar that also supports the shelter's roof. In addition, these signs currently do not support a "Push-to-Talk" feature.

The island shelters use the same LED sign as the curbside shelters with the following dimensions: 8" (height) x 23.62" (length) x 7.63" (depth). In contrast to LED signs at curbside shelters, LED signs at island shelters are not housed in a bezel. Rather, the signs are attached to a horizontal beam that also supports the shelter roof.

Currently, powered curbside shelter signs (Type 1) utilizes 3G communications with the back-end predictions system.

Currently, there are approximately 15 island shelters that include Type 1 Signs. The SFMTA, however, plans to construct another, approximately 35 island shelters (to replace existing curbside shelters) on the Van Ness and Geary Bus Rapid Transit (BRT) lines, and another 11 new island shelters on Market Street between the Ferry Building and Van Ness Avenue as part of the Better Market Street Project.

Figure J-4: Existing Vehicle Prediction Sign at Island Shelter

Some shelters are located on island platforms, which are between two lanes of traffic. Due to spacing constraints, these shelters do not have a panel that houses the signs. Instead, the signs are suspended from a horizontal bar that also supports the shelter's roof.

3.2.3 Non-Shelter Locations

As shown in Figure J-5, shelter signs are geographically dispersed throughout San Francisco providing coverage to most neighborhoods. However, there are some gaps. San Francisco currently has approximately 150 shelters without signs. Providing power to these locations has proven to be technically infeasible and/or cost prohibitive. There are also over 2,500 stops without a shelter, some of which may be suitable for real-time information signs.
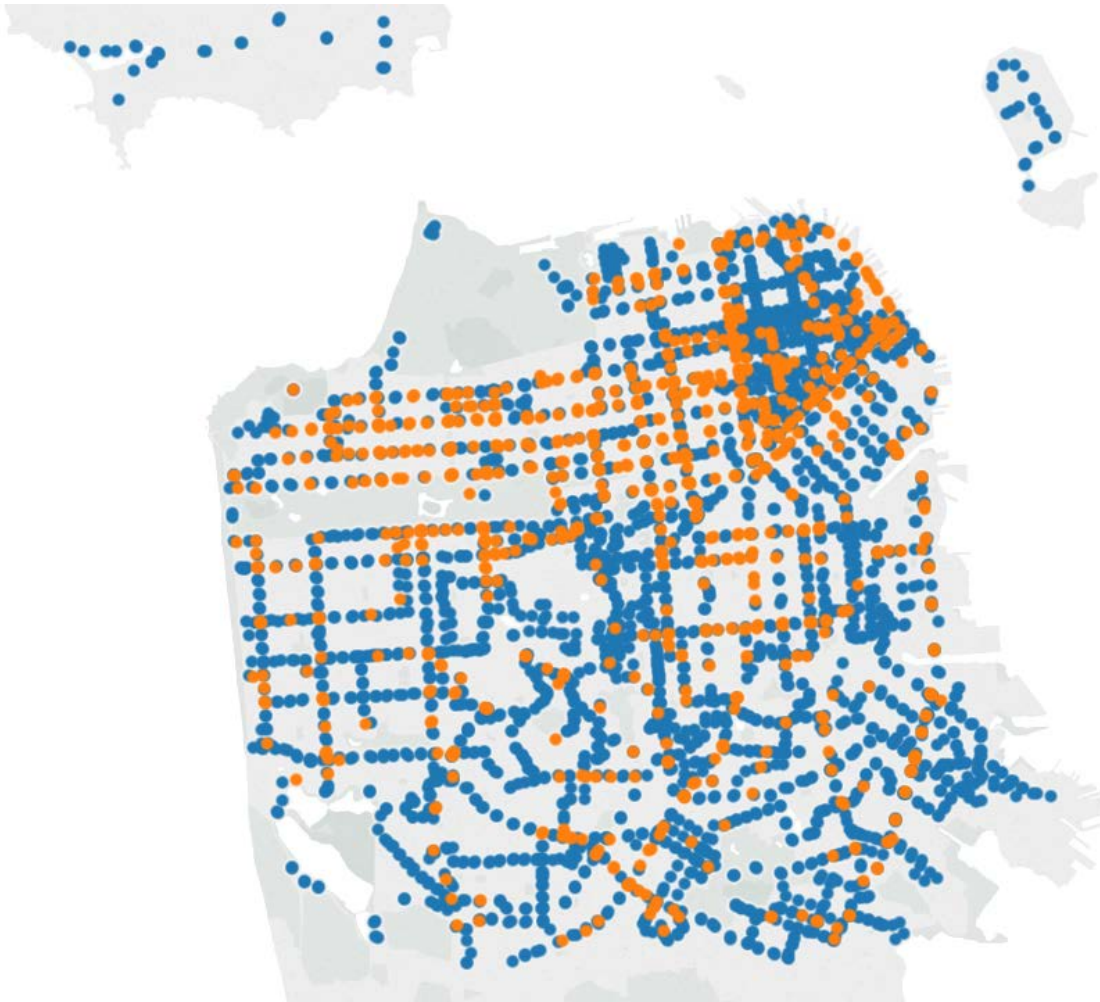
Figure J-5: Existing Stop Locations

Orange indicates stops with shelters; blue indicates stops without shelters. Currently, there are over 2,500 stops without a shelter, some of which may be suitable candidates for real-time information signs.

3.2.4 Powered Signs at Outdoor Rail Platforms (Type 2)

Currently, the SFMTA maintains real-time information LED signs at high-level platforms at outdoor rail stations, primarily along the Third Street corridor and at Stonestown and San Francisco State University on 19th Avenue. This includes the future 4th and Brannan Station as

part of the Central Subway Project and the infill UCSF Mission Bay-Arena Station on the Third Street corridor. As shown in Figure J-6, these signs are attached to horizontal support beams. They have a height of 13.7", width of 43.7" and depth of 4.75."

Powered signs at outdoor rail platforms (Type 2) utilize 3G communications with the back-end predictions system.

There are approximately 50 powered signs at outdoor rail platforms that will require replacement or new signs. New signs will be required for the Central Subway.
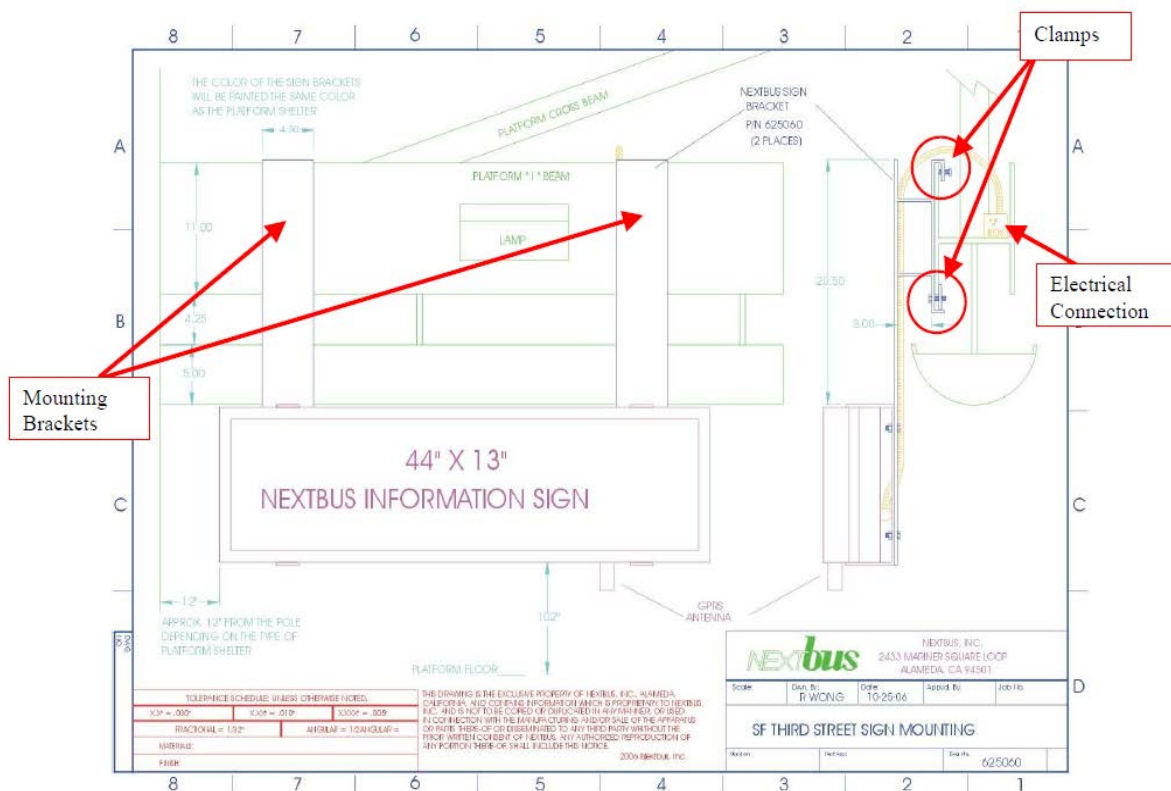
Figure J-6: Powered Signs at Outdoor Rail Platforms

(a) Photo of suspended sign, (b) Technical drawing showing sign mounting at a typical T Third outdoor platform (mounting may vary from station to station, i.e., at different T Third stations and at Stonestown and San Francisco State along the M Ocean View line)

3.2.5 Powered Signs at Underground Stations (Type 3)

Currently, the SFMTA provides several different types of signs at rail station platforms and mezzanines. These include:

- Platform Audio Visual (PAV) signs

- Dynamic Rail System Map - LCD monitors on rail station platforms which indicate train locations and provide real-time arrival information

- Transfer Connection Map - LCD monitors on station mezzanines which indicate surface transfer connections

- Real-time LED signs within station agent booths identical to the ones in shelters

- Computer monitors within station agent booths displaying a website with real-time information

Powered Signs at Underground Stations (Type 3 signs) are also connected to the electrical grid and receive data through an Ethernet connection.

There are approximately 30 current and future underground signs.

(a) Platform Audio Visual Sign	(b) Dynamic Rail System Map

| (c) Transfer Connection Map | |
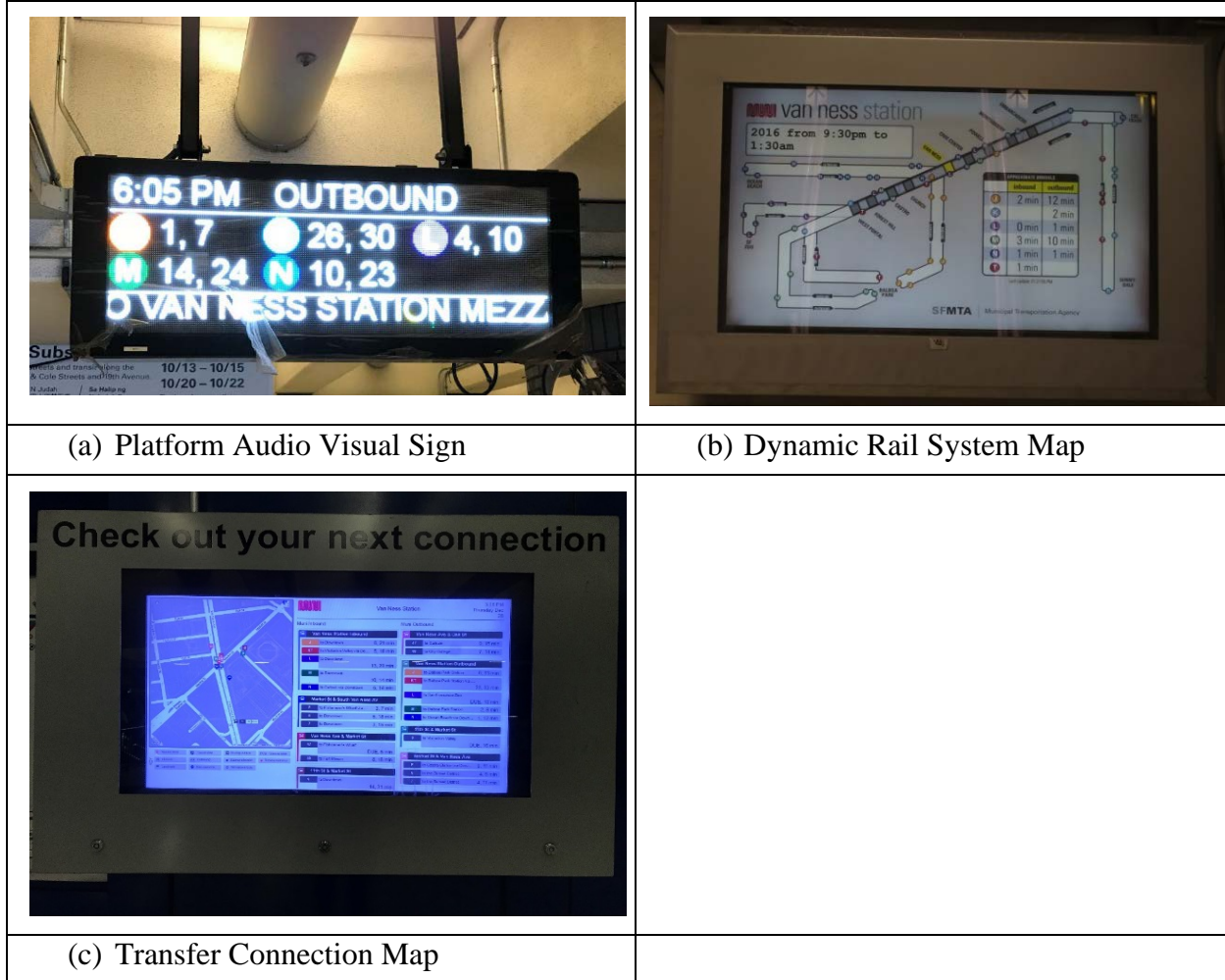
Figure J-7: Existing Powered Signs at Underground Stations

3.2.5.1   Central Subway

Currently, the SFMTA is constructing the Central Subway project linking the Caltrain station to Chinatown. In addition to one surface station at 4th & Brannan, it will include three underground stations – Yerba Buena/Moscone, Union Square/Market Street and Chinatown. Each of these stations is individually-designed.

Table J-2 describes what the Central Subway Project is providing at each station in terms of real-time information signs. In some cases, the Central Subway Project is providing signs. In other cases, it is providing power and data connectivity and/or kiosks in which to fit the sign but not the sign itself.

(a) Yerba Buena/Moscone Station

Location	Real-Time Information Infrastructure provided by the Central Subway Project
Entrance	1 40" LCD sign
Concourse	1 wedge-shaped kiosk with: 1 40" LCD sign
Platforms	2 wedge-shaped kiosks to fit signs (but not the signs themselves) 4 PAV signs

(b) Union Square/ Market Street Station

Location	Real-Time Information Infrastructure provided by the Central Subway Project
Entrance	1 40" LCD sign
Concourse	Power and data connectivity for 2 wall-mounted signs (but not the signs themselves) 2 PAV signs
Platforms	2 triangular-shaped kiosks to fit signs, but not the signs themselves (For each kiosk, 1 out of the 3 sides will have space for signs for a total of 2 signs) 4 PAV signs

(c) Chinatown Station

Location	Real-Time Information Infrastructure provided by the Central Subway Project
Entrance	Power and data connectivity for a sign (but not the sign itself) 1 PAV sign
Concourse	1 PAV sign
Platforms	Walls at the end of both sides of the station platform with power and data connectivity for 1 sign each (but not the signs themselves) 4 PAV signs

3.2.5.2 Outdoor Stops without any Real-Time Signs (Type 4)

As shown in Figure J-5, there are currently approximately 150 shelters without real-time information signs and over 2,500 stops without a shelter or real-time information signs. Many of these stops will become candidates for future alternatively-powered signs.

Over the next few years, the SFMTA will equip solar-powered lighting at the top of poles marking all surface-level bus and rail stops (see Figure J-8), which includes candidate locations for alternatively-powered real-time information signs. These lights draw approximately four watts of power; the solar panels produce five watts of power.

SPECIFICATIONS:

MECHANICAL
WEIGHT: ~18 LBS
HOUSING MATERIAL: ALUMINUM, 14 GA
POLE MOUNT: GALVANIZED STEEL
EXTERIOR HARDWARE: TORX SECURITY DRIVE
FINISH TYPE: POLYESTER POWDER COAT
FINISH COLOR: TO MTA SPECIFICATIONS

ELECTRICAL
OPERATION: ENERGY CONTROL MODULE (ECM)
NO. LED'S: 4
MAX LED POWER: 4W
SOLAR PANEL: 5W
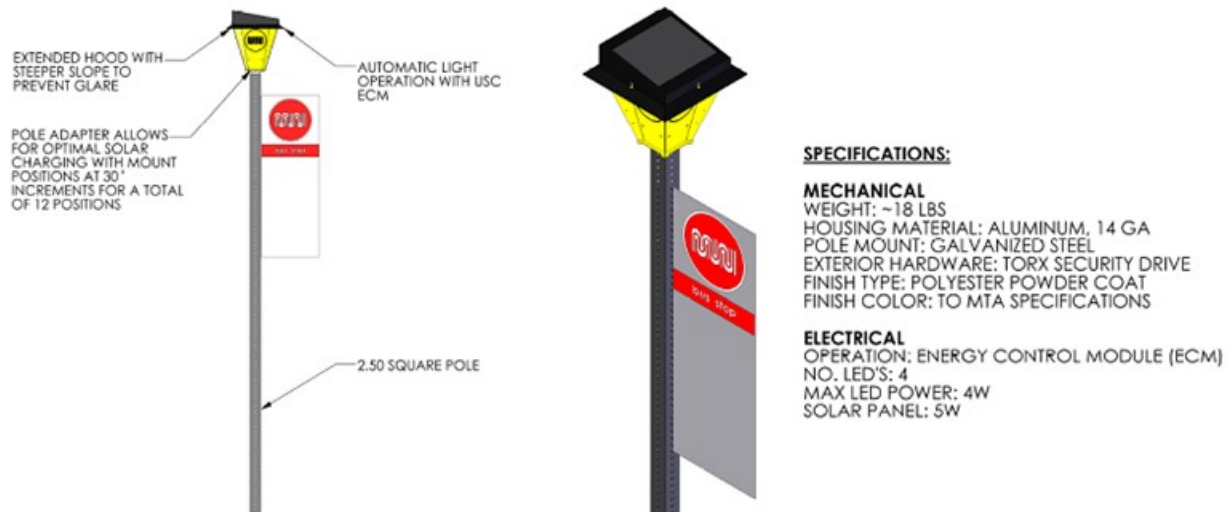
Figure J-8: Solar-Powered Lighting at Outdoor SFMTA Stops

3.2.5.3   Salesforce Transit Center

The SFMTA has partnered with the Transbay Joint Powers Authority (TJPA) to display Customer Information on new pylons at the new Salesforce Transit Center in the Financial District. A vendor under contract to the TJPA constructed these pylons. There are several different types of informational signs, two of which (the PD1 and PD2 pylons, as described below) relate to the display of real-time departure information for individual routes and that are within the scope of the Next Generation System.   TJPA owns these signs.

Neither monitor was designed to incorporate text-to-speech functionality for people preferring or needing to hear information audibly. The SFMTA, the Vendor of the Existing System and the TJPA have worked on a temporary measure to provide text-to-speech functionality.

(a)   PD1 Pylon

PD1 Pylons are located at each bus bay on the upper bus deck level, where AC Transit, Muni (to Treasure Island), Greyhound, WestCAT and Amtrak buses stop. As shown in Figure J-10, the PD1 Pylon screen consists of two primary LCD monitors that are embedded within a fabricated steel cabinet. The first 22" (10.56" x 18.77") monitor is located at the top of the PD1 Pylon. It will display the SFMTA logo, route number, and current time of day.

Below the top monitor is a 46" monitor (40.082" x 18.77"), which is divided into three zones. The top zone of the lower monitor will display line-specific transit alerts, the middle zone will display the next three departures in real-time, as well as a frequency table of how often the service departs during morning, mid-day, and evening. The bottom zone will display contextual trip map and other Agency news and branded content. The PD1 consumes roughly 850-1000W.

Muni currently uses two of the PD1 pylons.

(b)   PD2 Pylon

At the Salesforce Transit Center, PD2 Pylons are located at each bay of the lower bus plaza level adjacent to Fremont Street, where Muni rubber-tire vehicles (electric trolley coaches and motor coaches) stop. Each PD2 Pylon features an information screen facing customers in the bus waiting areas in the interior of the plaza. There are no information screens on the side of the PD2 Pylons facing Fremont Street. Therefore, potential customers on Fremont Street must go to the other side of the pylon to view information.

There are five PD2 monitors; Muni currently uses four of them.
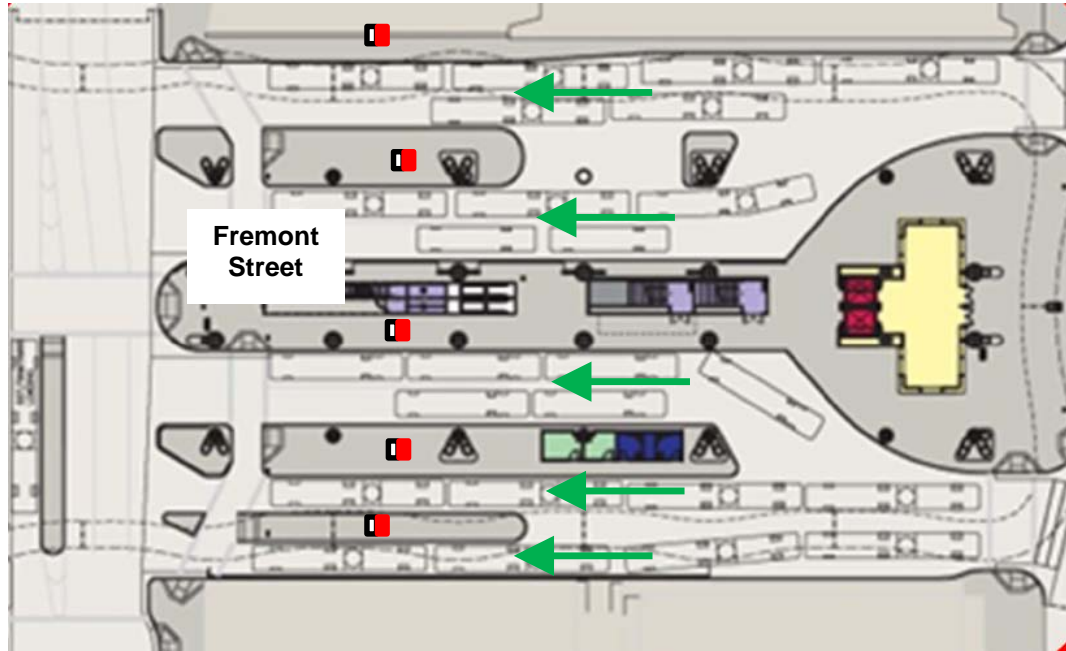
Pylon (information screen on side facing bus bays, not on side facing Fremont Street)	Bus Direction of travel

Figure J-9: Diagram of Bus Plaza at Salesforce Transit Center

The primary difference between the PD1 and PD2 pylons is that the PD2 pylon lacks the top 22" monitor. As shown in Figure J-11, the PD2 Pylon screen consists of one 46" monitor (40.081" x 22.546"), which is divided into three zones. The top zone will display the route, current time and alerts. The middle zone will display the next three departures in real-time, as well as a frequency table of how often the service departs during the morning, mid-day, and evening. The lower zone will display a contextual map, list of stops for that specific line, and information such as fares, agency news, and announcements. The PD2 consumes roughly 850-1000W of power.
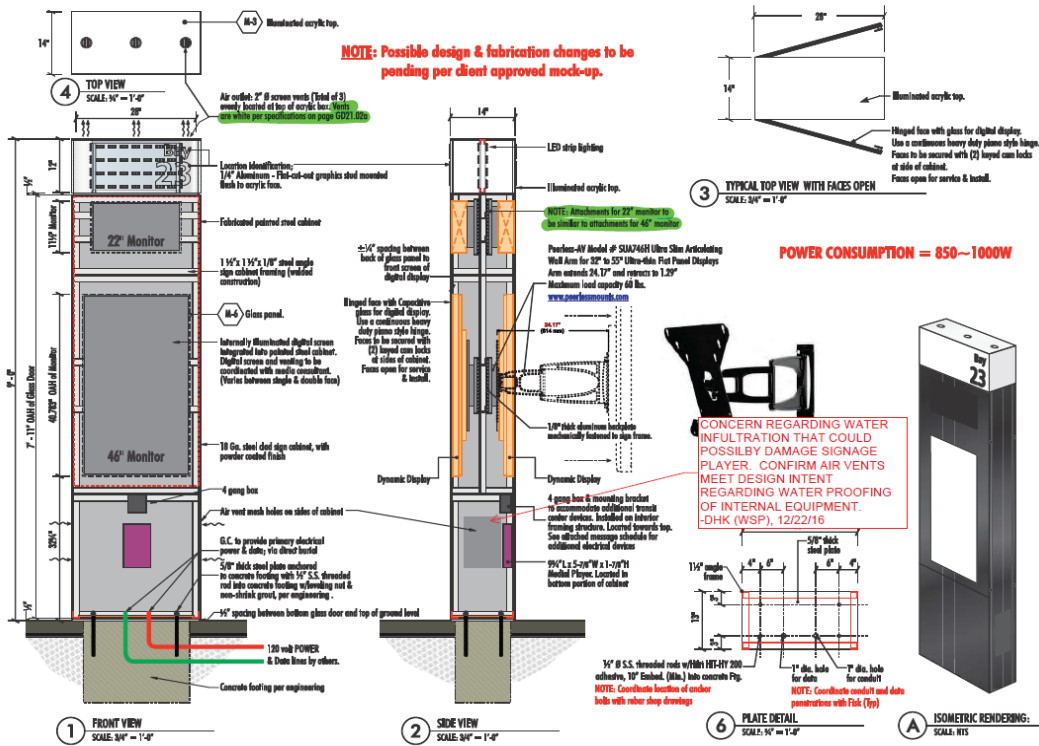
Figure J-10: Salesforce Transit Center PD1 Pylon

Figure J-11: Salesforce Transit Center PD2 Pylon

4 On-Board Digital Sign Software

4.1 Existing Conditions

As shown in Figure J-12, all electric trolley coaches, motor coaches, and light rail vehicles are or will be equipped with a Digital Voice Annunciation System (DVAS) LED screen sign. The DVAS system keeps track of a vehicle's position along its route, allowing the sign to announce and display the next stop in text. The DVAS screen also displays "Stop Requested" when customers pull a cord or presses the stop requested button to ask the operator to let them off at the next stop. While the DVAS system also has the ability to display pre-recorded scrolling text messages, it is not capable of providing information about real-time service changes or transfer connections.

As shown in Figure J-13, the new Siemens light rail vehicles have larger passenger information screens with enhanced visual capabilities with content management provided by Televic. Like other Muni vehicles with the DVAS system, however, these passenger screens can only support pre-recorded messages and stop announcements, not real-time information.

Figure J-12: Existing DVAS Sign on Rubber-Tire Vehicle
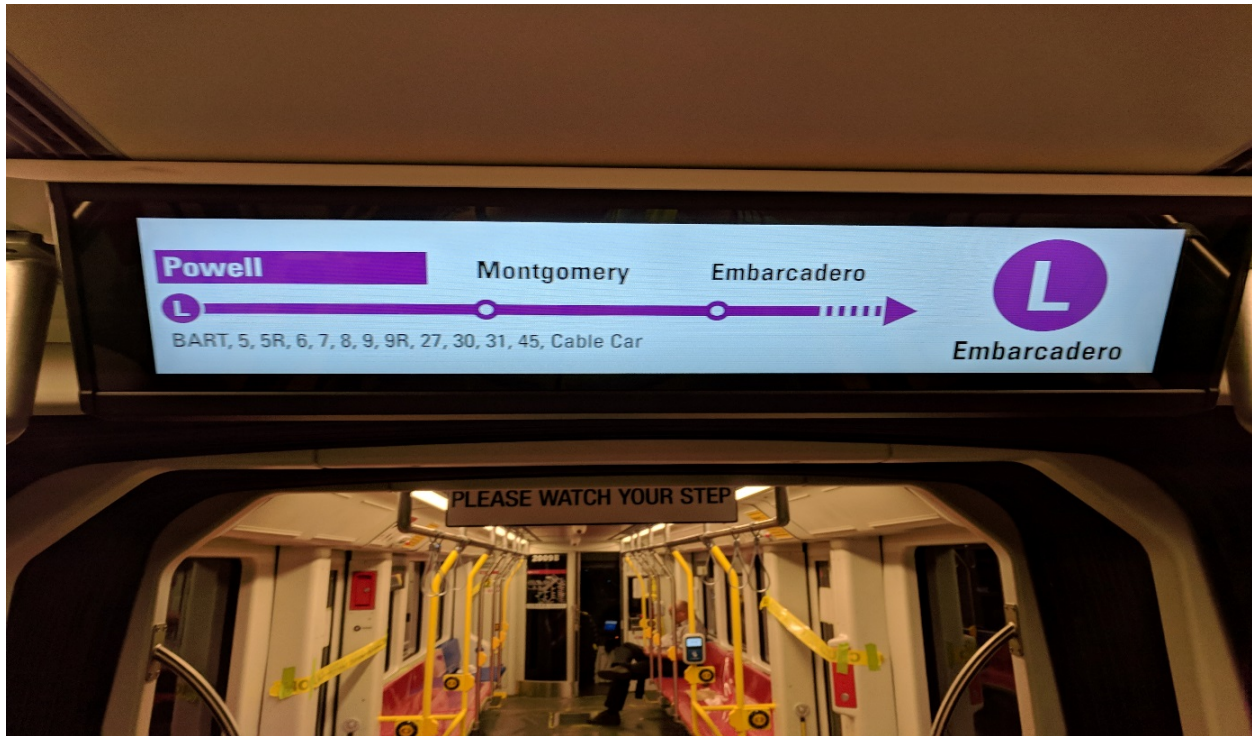
Figure J-13: Existing Passenger Information Screen on New Siemens Light Rail Vehicles

These screens do not provide real-time information. Although they list connecting transit routes, this does not necessarily mean that those routes are operating at that time.

For reference, Table J-3 provides SFMTA's estimated peak vehicle demand, fleet size and possible number of future on-board digital signs by vehicle type.

Table J-3: SFMTA Peak Demand, Fleet Size and Potential Quantity of Future On-Board Signs

Vehicle Type	2020 Fleet Size	2025 Fleet Size	Future On-Board Digital Signs*
60-Foot Motor Coach	224	269	538
40-Foot Motor Coach	333	341	365
60-Foot Trolley Coach	93	93	186
40-Foot Trolley Coach	185	185	185
30-Foot Motor Coach	30	30	30
Light Rail Vehicles	217	219	438
Cable Cars	40	40	0
Historic Streetcars	46	46	0
Total	**1,168**	**1,223**	**1,742**

5 Mobile Platform & Website

5.1 Existing Conditions
5.1.1 Mobile Platform

As shown in Figure J-14, the SFMTA currently has an account-based mobile platform called MuniMobile. Through the app, users can access mobile ticketing, a trip planner for travel between a user-entered origin and destination, and vehicle arrival predictions for routes near the user's current location.

Currently, the trip planner is sourced from Google Maps' transit directions feed based on the origin and destination a user enters. The trip planner works for any origin and destination supported by Google Maps; it is not restricted to the SFMTA service area. The trip planner also includes advertisements for Transportation Network Companies such as Uber and Lyft. Vehicle predictions are provided through an embedded mobile browser which accesses a website provided by the Existing System Vendor. The mobile platform does not collect any information about user requests for transit information or their trip itinerary.
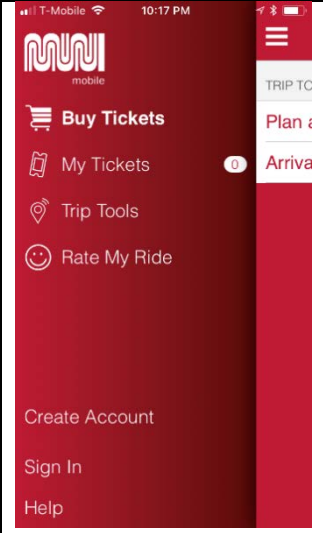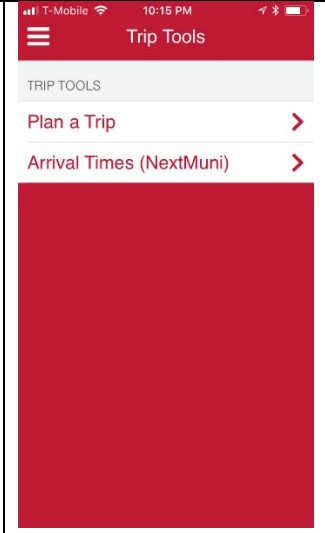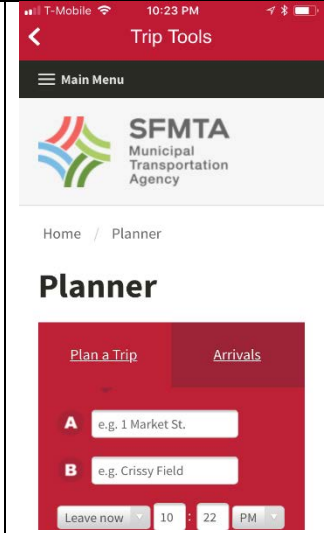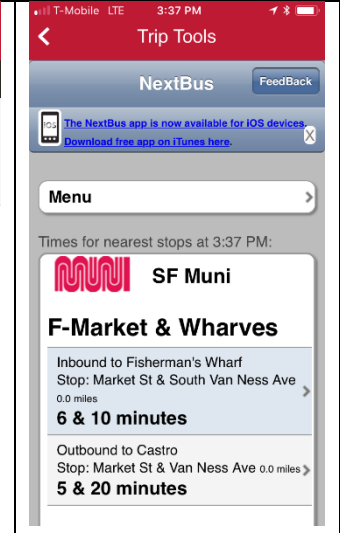

(a) Main Menu, showing ticketing options and trip tools	(b) Trip Tools Menu with two simple views: a trip planner and vehicle predictions	(c) Trip Planner Customers enter an origin and destination and directions are provided through a query to Google Maps Trip Planner	(d) Vehicle Predictions An embedded mobile website provided by the Existing System's Vendor shows all nearby routes

Figure J-14: Existing MuniMobile App

The existing MuniMobile App enables users to access mobile ticketing, a trip planner and vehicle arrival predictions for nearby routes. Currently, the MuniMobile App relies on embedded mobile sites from Google Maps and the Existing System's Vendor, respectively, to provide the trip planner and vehicle arrival predictions.

Separately, the Existing System's Vendor maintains an independent desktop website, mobile website and mobile app. Entering www.nextmuni.com into a browser redirects a user to the

desktop or mobile website, depending on the user's electronic device. This website and app provide next vehicle arrival predictions for nearby vehicles.

5.2 Website

The SFMTA maintains a comprehensive website at www.sfmta.com. This website content is adaptable to any standard electronic device, including desktops, laptops and mobile devices.

On the home page, the SFMTA website prominently features a trip planning tool as it is one of the features that customers use most often. The trip planner is sourced from Google Maps' transit directions feed based on the origin and destination a customer enters. The site also provides links to vehicle predictions provided by the Existing System's Vendor.
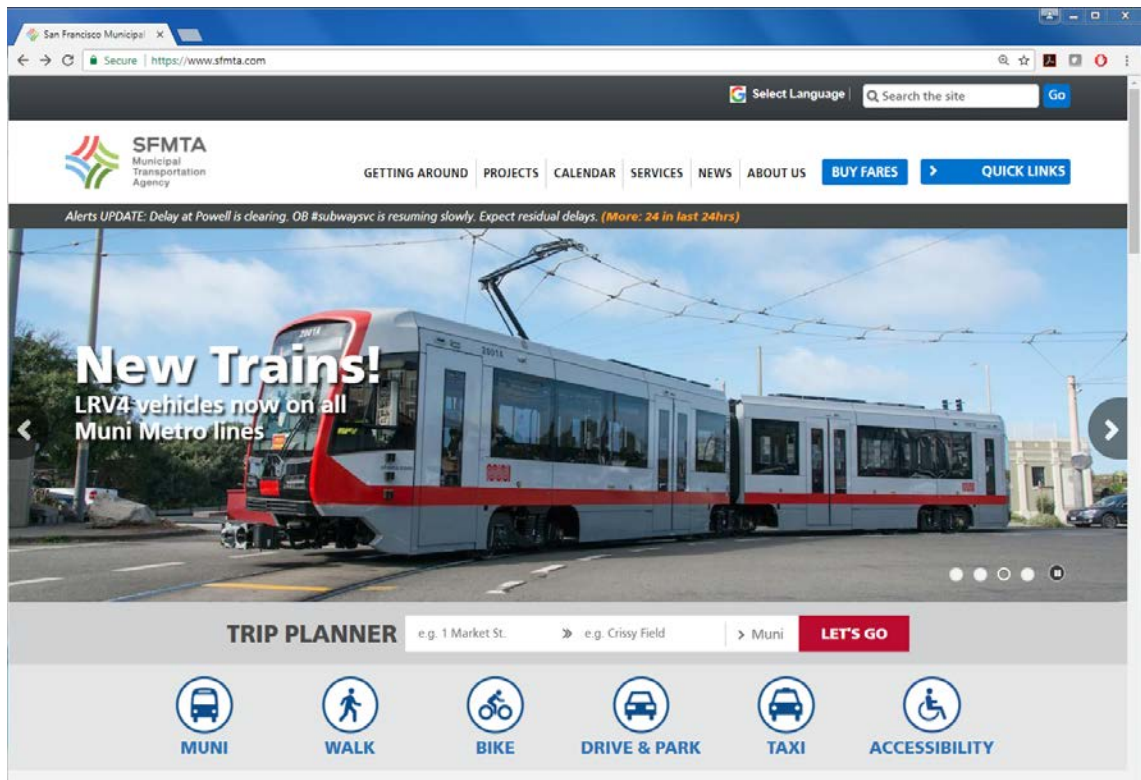

Figure J-15: SFMTA Website, which prominently features the existing trip planning tool

5.3 SMS (Short Message Service)/Text Messaging

Currently, customers can send a text message to a predefined five digit SMS code with a unique stop number. Within a few seconds, arrival predictions for all vehicles at the stop are transmitted by SMS back to the customer.

6 Analytics Platform

6.1 Existing Conditions

The SFMTA has made significant strides in storing, processing and analyzing data generated through automated systems, particularly with regards to transit operations. In 2012, the agency launched Transtat, an online repository of visualized data from a variety of sources including from the Existing System as more recently from the OrbCAD system. Transtat uses Tableau software to visualize data stored in SFMTA's data warehouse.

Examples of Transtat performance metrics include on-time performance (actual vs. scheduled vehicle arrivals at timepoints), route travel time, service regularity (vehicle bunching and gaps) and safety. SFMTA's Technology Solutions and Integration unit has also been developing a data warehouse to structure the data visualized in Transtat.
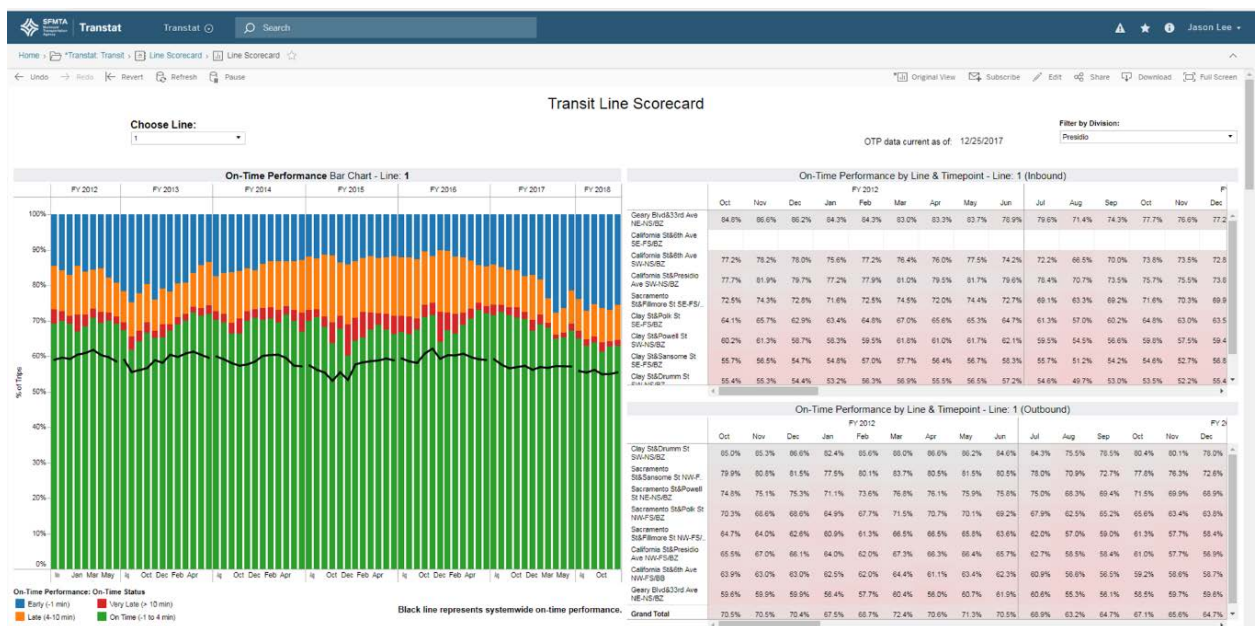

Figure J-16: Transtat

Example of an existing Transtat dashboard showing historical on-time performance overall (and by timepoint) for a Muni route. Transtat uses Tableau software to visualize data stored in SFMTA's data warehouse.

On the transportation demand side, the SFMTA currently has some basic information about its customers. Buses and light rail vehicles that entered service after 2015 come equipped with the second generation of Automatic Passenger Counters for more accurate ridership counts by stop and route. The SFMTA also receives Clipper® smartcard tag transactions, which indicates when and on what vehicle a customer boards.

The SFMTA also has some understanding of customer behavior and preferences through an annual Ridership Survey, less frequent origin-destination and Title VI on-board surveys and a large one-time survey conducted for this Next Generation System project. With representative

survey data, the SFMTA can extrapolate and infer broader travel behavior. However, by their very nature, these surveys query a relatively small percentage of total customers during a snapshot in time. Given a dynamic transportation landscape, it is possible to miss quickly evolving trends through this methodology.

7   Maintenance Services

7.1   Existing Conditions

Currently, the SFMTA has a maintenance agreement with the Existing System's Vendor. This agreement requires the Vendor to repair and replace all defective signs, maintain software and provide continuous predictions. There are liquidated damages assessed for non-performance.

8   Technology Security and Information Privacy Charter Overview

Overview

The SFMTA's commitment to privacy and security is shaped by two principal requirements. First, the SFMTA has a duty to the protection and responsible use of information collected from and about its customers, and all residents and visitors to the City and County of San Francisco. Second, the SFMTA owns significant assets. In particular, some of these assets play a critical role in transportation system operations and safety. Disclosure of private information or assets could result in significant harm to the SFMTA, the City, and the SFMTA's customers. Furthermore, unauthorized changes to the information content of these assets can damage the agency's ability to perform business or damage individual's privacy. Conversely, preventing authorized access to these assets can do significant harm.

The SFMTA Technology Security and Privacy Charter contains the agency's overarching technology and information policy approach. This charter describes the approach taken by SFMTA staff for administering information technology security and information privacy, and reflects management's commitment to a visible and clear set of responsibilities for ensuring technology security and information privacy is coordinated across the agency.

Scope

All SFMTA employees and any other city employed staff working on behalf of the agency, contractors, and vendors who have access to the SFMTA network systems are covered by this policy. Any people not covered by this policy (for example, visitors) must be supervised by an employee at all times while they are on the SFMTA's premises.

Policy

Statement SFMTA is committed to preserving the confidentiality, integrity and availability of all forms of information used by the Agency and maintained on behalf of employees, customers and other government agencies. As a result, specific procedures are developed to help administer and manage the storage and processing of computer information and any non-computer information related to the proper and lawful conduct of the SFMTA.

All SFMTA employees (including contractors and vendors with access to SFMTA systems) and users of SFMTA technology and resources are responsible for adhering to the policies outlined below:

Information security and privacy protection serve as the cornerstones by which members of the SFMTA can demonstrate that they are good stewards of the data entrusted to them.

Everyone within the SFMTA is responsible for ensuring the security of information and systems. This includes but is not limited to compliance with the SFMTA's Password Policy, Acceptable Use Policy, and any forthcoming policies, procedures or standards as well as changes and iterations to current policies and procedures.

SFMTA's Chief Technology Officer will serve as the leader of the technology and information security function in charge of developing, maintaining, disseminating and measuring compliance with this charter through the policies, procedures and standards that are generated in response to this commitment. This does not dismiss each individual user's responsibility for ensuring the security of information and systems.

SFMTA's Chief Technology Officer will ensure the necessary policies, procedures, standards practices and systems are in place to provide appropriate and risk-based network security, endpointe security, incident response, business continuity and disaster recovery of information systems.

SFMTA will maintain information security and privacy policies, procedures, practices based on industry standards such as the National Institute of Standards and Technology and all Federal, State or Local regulations.

Information managed by the SFMTA is subject to release in accordance with the Sunshine Ordinance, the California Public Records Act, litigation and law enforcement subpoenas, except where legally restricted by security and privacy considerations.

Changes necessary to reflect current technology and new methods for ensuring secure business procedures will be supplemented to existing procedures as often as necessary.

All new technology and any external data distribution or storage must be first reviewed and approved by the Chief Technology Officer. The review will ensure all security standards and privacy requirements are met, and the technology is planned and implemented with appropriate compatibility and long-term support considered.

The collection, transmission and storage of information will be evaluated by considering the trade-offs of the business need and value it generates for customer with our ability to protect private and sensitive information and the risk of information breach.

All information stored by the SFMTA and on its behalf by vendors will be protected using appropriate measures based on the risk to and sensitivity of the information.

It is the duty of all employees and contractors to report any actions or conditions that appears to violate the spirit of this policy.

SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
BOARD OF DIRECTORS

RESOLUTION No. 200616-058

WHEREAS, The San Francisco Municipal Transportation Agency (SFMTA) piloted the existing real-time information system in 1999 and entered into a contract in 2001 for systemwide service with NextBus, now a subsidiary of Cubic; and,

WHEREAS, The NextBus system is currently nearing the end of its useful life; and,

WHEREAS, There have been many changes in transportation and technology since 2001, including on-demand, mobile app-based forms of transportation; and,

WHEREAS, Research findings suggest that the SFMTA improving the presentation and content of real-time customer information can increase transit ridership, especially when service is less frequent even if there were no improvements to the underlying service itself; and,

WHEREAS, Research findings showed similar responses across all income levels to the provision of alternative routes and a Muni trip planning app, suggesting that a new system can begin to mitigate a two-tiered, income-based transportation system in a region already confronting gentrification, widening income inequality and racial disparities; and,

WHEREAS, On September 4, 2018, the SFMTA Board of Directors authorized the SFMTA to issue a Request for Proposals for SFMTA Contract No. 2019-01: Next Generation Customer Information System (Contract), and to negotiate the Contract with the highest-ranked proposer; and,

WHEREAS, The Next Generation Customer Information System (Next Generation System) will provide more accurate vehicle-arrival predictions; larger, graphical digital or solar-powered signs at transit stops and stations; expanded sign coverage; new customer information, including route alternatives, vehicle crowding, accessibility, real-time service changes, and regional transit; content for signs on-board vehicles; all-in-one trip planner and ticketing app; analytics platform to improve service and operational planning; and a tool for field supervisors to manage operations; and,

WHEREAS, On March 1, 2019, the SFMTA received six proposals in response to the Request for Proposals; and,

WHEREAS, On July 1, 2019, the SFMTA issued a notice of intent to negotiate the Contract to Cubic Transportation Systems, Inc., the highest-ranked proposer in the evaluation process; and,

WHEREAS, Funding for this project will be provided through SFMTA operating funds; and,

WHEREAS, On July 31, 2018, the SFMTA, under authority delegated by the Planning Department, determined that the proposed authorization is not defined as a "project" under the California Environmental Quality Act (CEQA) pursuant to Title 14 of the California Code of Regulations Sections 15060(c) and 15378(b); and,

WHEREAS, A copy of the CEQA determination is on file with the Secretary to the SFMTA Board of Directors and is incorporated herein by reference; and,

WHEREAS, Because the contract term may exceed ten years and expenditures are anticipated to exceed $10,000,000, the Contract is subject to Board of Supervisors' approval under Charter Section 9.118; now, therefore, be it

RESOLVED, That the SFMTA Board of Directors authorizes the Director of Transportation to execute SFMTA Contract No. 2019-01: Next Generation Customer Information System, with Cubic Transportation Systems, Inc. to develop, implement, and maintain a new real-time vehicle arrival and service update system for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance; and be it further

RESOLVED, That the SFMTA Board of Directors urges the Board of Supervisors to approve the contract.

I certify that the foregoing resolution was adopted by the San Francisco Municipal Transportation Agency Board of Directors at its meeting of June 16, 2020.

_____R. Boomer_____
Secretary to the Board of Directors
San Francisco Municipal Transportation Agency

Next Generation Customer Information System

Fact Sheet

In 2021, the SFMTA will launch the Next Generation Customer Information System – a state-of-the-art real-time Muni vehicle arrival predictions and service update system. Guided by input from over 20 community organizations and 5,800 customers, this new system will introduce features that will revolutionize the transit riding experience in the United States.

For a modest investment, the Customer Information System will instill public confidence in transit, rebuild ridership and help put San Francisco on the path to COVID-19 recovery and a more sustainable future.

Benefits

- Expand access to transit information
- Increase awareness of dynamic transit service plans as the SFMTA rebuilds the Muni network
- Promote inclusivity of the transit system with enhanced multilingual and accessible content
- Encourage social distancing and public safety with vehicle occupancy levels and public service announcements
- Make transportation planning more responsive through two-way app-based communications with customers and a new data analytics platform
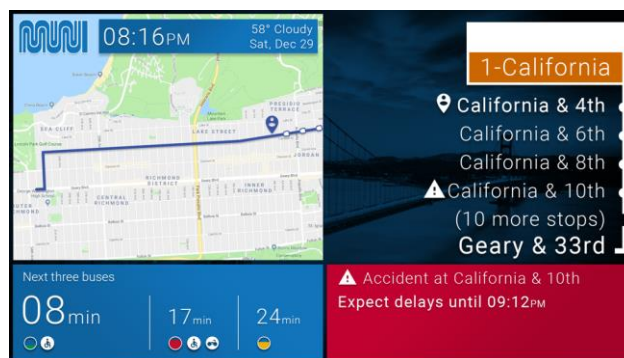
Features

- More accurate Muni predictions and new information to keep customers informed throughout their journey, such as real-time delays and detours, route alternatives, vehicle crowding, live maps, incident reporting, tailored accessibility information, and regional transit services
- Larger, graphical signs at bus shelters and rail stations system-wide to replace obsolete, text-based signs that have reached the end of their service lives and cannot be supported indefinitely
- New solar-powered signs to double sign coverage throughout the city, should resources permit
- New multilingual, profile-based integrated trip planning and mobile payment app
- New products like a fare accumulator that caps payments for bulk rides, so that frequent riders do not have to purchase passes upfront but can instead pay as they ride and still save money
- Dynamic marketing to customers, using points and credits to incentivize sustainable transportation

Funding

- $25 million in one-time capital funds helps lay the foundation for long-term SFMTA recovery and growth, with flexible timing of expenditures based on cash flow and rollout of enhancements
- Diverting these one-time capital funds to the operating budget would not fund other programs sustainably or be as an effective use of limited, short-lived resources
- A modest $47,274 in incremental monthly operating costs supports ongoing expenditures for the base system, with flexibility for expanded services and sign coverage should cash flow allow
- Savings from producing and manually posting fewer temporary laminated signs and revenues from induced ridership growth could help offset operating costs

Budget

Total Capital and Operating Costs

Item	Capital Costs (millions $)	Operating Costs (millions $)			Total Capital & Operating Costs (millions $)
		Initial Term	1st Optional Extension	2nd Optional Extension	
Base System	$18.8	$12.6	$17.9	$19.1	$68.2
System Options	$4.4	$2.0	$2.9	$3.4	$12.7
Total with 10% contingency	$25.4	$16.1	$22.8	$24.7	$89.0

Note: The SFMTA will seek Board of Supervisors approval prior to exercising the 1st and 2nd optional extensions.

Incremental Operating Costs

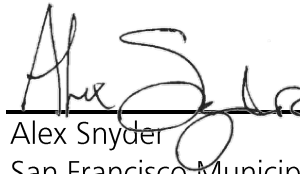| Monthly Operations & Maintenance Costs – Existing vs. Upgraded System				
Service		Existing System Monthly Fee	New System Contract Monthly Fee	Monthly Difference for Upgrades and Enhancements
Software Subscription Services				
System Software (more accurate predictions, route alternatives, transfer connections, real-time service changes and accessible itineraries)	Improved	$73,900	$37,508	$8,242
Mobile Platform & Website Trip Planner Software	New	Not provided	$27,031	
Analytics Platform	New	Not provided	$17,603	
Sign Maintenance & Communications				
Shelter & Outdoor Rail Platform Signs* (larger and more visible signs including graphics)	Improved	$25,843	$65,967	$39,033
Underground Station Signs	Improved	$2,875	$1,784	
Monthly Total		$102,619	$149,892	**$47,274**

* Assuming one-for-one replacement of current 748 shelter signs. The above cost comparison excludes signage network expansion or options.

Request for Proposals for SFMTA Contract No. 2019-01

The San Francisco Municipal Transportation Agency (SFMTA) Board of Directors proposes authorize the Director of Transportation to issue a Request for Proposals for SFMTA Contract No. 2019-01 for the Next Generation Customer Information System, and to negotiate a contract for these services with the highest-ranked proposer for an initial term of six years, which includes system setup and five years of operations, with an option to extend the contract for two additional five-year terms.

Not a "project" pursuant to CEQA as defined in CEQA Guidelines Sections 15060(c) and 15378(b) because the action would not result in a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.

_____   31 July 2018
Alex Snyder   Date
San Francisco Municipal Transportation Agency

July 20, 2020

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 – SFMTA Contract No. 2019-01: Next Generation Customer Information System*

Honorable Members of the Board of Supervisors:

The San Francisco Municipal Transportation Agency (SFMTA) requests that the Board of Supervisors approve SFMTA Contract No. 2019-01: Next Generation Customer Information System, with Cubic Transportation Systems, Inc. to develop, implement, and maintain a new real-time vehicle arrival and service update system for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance. This approval would be subject to the following condition: that the SFMTA obtain approval from the Board of Supervisors prior to exercising each of the optional five-year terms.

On June 16, 2020, the SFMTA Board of Directors authorized the Director of Transportation to execute SFMTA Contract No. 2019-01: Next Generation Customer Information System, subject to approval by the Board of Supervisors. Board of Supervisors' approval is required for Amendments No. 6 under Charter section 9.118(b), because the contract term may exceed ten years and expenditures are anticipated to exceed $10,000,000.

Background
The Next Generation Customer Information System is a state-of-the-art real-time Muni vehicle arrival predictions and service update system. Guided by input from over 20 community organizations and 5,800 customers, it will replace the 20-year old NextBus system and introduce features that will revolutionize the transit riding experience.

For a modest investment, the Customer Information System will instill public confidence in transit, rebuild ridership and help put San Francisco on the path to COVID-19 recovery and a more sustainable future. The system will:

- Expand access to transit information
- Increase awareness of dynamic transit service plans as the SFMTA rebuilds the Muni network

San Francisco Municipal Transportation Agency   1 South Van Ness Avenue, 7th Floor   San Francisco, CA 94103   SFMTA.com

📞 311 Free language assistance / 免費語言協助 / Ayuda gratis con el idioma / Бесплатная помощь переводчиков / Trợ giúp Thông dịch Miễn phí / Assistance linguistique gratuite / 無料の言語支援 / Libreng tulong para sa wikang Filipino / 무료 언어 지원 / การช่วยเหลือทางด้านภาษาโดยไม่เสียค่าใช้จ่าย / خط المساعدة المجاني على الرقم

- Promote inclusivity of the transit system with enhanced multilingual and accessible content

- Encourage social distancing and public safety with vehicle occupancy levels and public service announcements

- Make transportation planning more responsive through two-way app-based communications with customers and a new data analytics platform

The Customer Information System's highlights include:

- More accurate Muni predictions and new information to keep customers informed throughout their journey, such as real-time delays and detours, route alternatives, vehicle crowding, live maps, incident reporting, tailored accessibility information, and regional transit services

- Larger, graphical signs at bus shelters and rail stations system-wide to replace obsolete, text-based signs that have reached the end of their service lives

- New solar-powered signs to double sign coverage throughout the city, should resources permit

- A new multilingual, profile-based integrated trip planning and mobile payment app

- Flexibility to introduce new electronic fare products through the mobile app

- Dynamic marketing to customers, using points and credits to incentivize sustainable transportation

Alternatives Considered

The alternatives to the Next Generation System are (a) to attempt to maintain the existing NextBus system indefinitely, or (b) to stop providing real-time customer information.

Attempting to maintain the existing system indefinitely is not an option due to its age. Because the existing contractor no longer manufactures current sign models, it will become harder and eventually impossible to maintain signs as parts wear out and require replacement. The SFMTA will have to start removing signs from stops.

Ending real-time information altogether is also not feasible given how much SFMTA customers rely on it to plan their trips. Public outreach revealed that most customers (80 percent) check for real-time vehicle arrival information while waiting at their stops "always" or "often".

Funding Plan

The total project budget is an amount not to exceed $88,980,877.

The SFMTA capital budget funds $25,434,635 of the project budget. This capital expenditure

helps lay the foundation for long-term SFMTA recovery and growth, with flexible timing of expenditures based on cash flow and rollout of enhancements. Diverting these one-time capital funds to the operating budget would not fund other programs sustainably or be as an effective use of limited, short-lived resources.

The SFMTA operating budget funds $63,546,241 in operating costs for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance. To ensure cost containment, the contract prevents software subscription fees and operations and maintenance costs from escalating beyond inflation for the optional extensions. The current two-year budget includes $5,570,353 in FY 2021 and $5,718,741 in FY 2022 for ongoing contract-related operating needs. The SFMTA will continue to include the operating costs in subsequent two-year budgets.

The SFMTA estimates that the base system will increase operating costs by $47,274 monthly, with flexibility for expanded services and sign coverage should cash flow allow. This modest amount buys more accurate and enhanced customer information, an all-in-one trip planner and mobile ticketing app, an analytics platform to better plan services; and operating support for upgraded signs. Additionally, these costs cover systems integration, maintenance and warranty, including all parts and consumables for the equipment lifecycle. Savings from producing and manually posting fewer temporary laminated signs and revenues from induced ridership growth could help offset operating costs.

The attached fact sheet summarizes the Customer Information System's benefits and features and provides additional detail about the budget.

Recommendation
The SFMTA recommends that the San Francisco Board of Supervisors adopt the Resolution approving Contract No. 2019-01: Next Generation Customer Information System.

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

Sincerely,

Jeffrey Tumlin
Director of Transportation

# Next Generation Customer Information System

Presentation to Budget & Finance Committee

September 2, 2020

Background

- In 1999, San Francisco piloted the first U.S. real-time information system
- Since then, the technology and transportation landscape has rapidly evolved
- Signs have reached the end of their useful lives and are not replaceable
- Planned with these changes in mind, the Customer Information System is also flexible to meet the challenges of the COVID-19 crisis and recovery
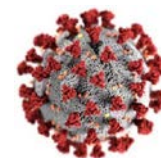

2000 ——————————————————————————————— 2020
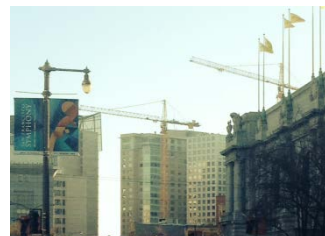
Project Goals

1	Ensure a positive customer experience
2	Increase equitable access to information
3	Reduce waiting and total travel time
4	Shift people towards more sustainable transportation options
5	Help customers make better travel decisions, particularly when faced with service disruptions and gaps
6	Rebuild transit ridership as San Francisco recovers from the COVID-19 crisis and increase discretionary travel over the long-term

Project Milestones
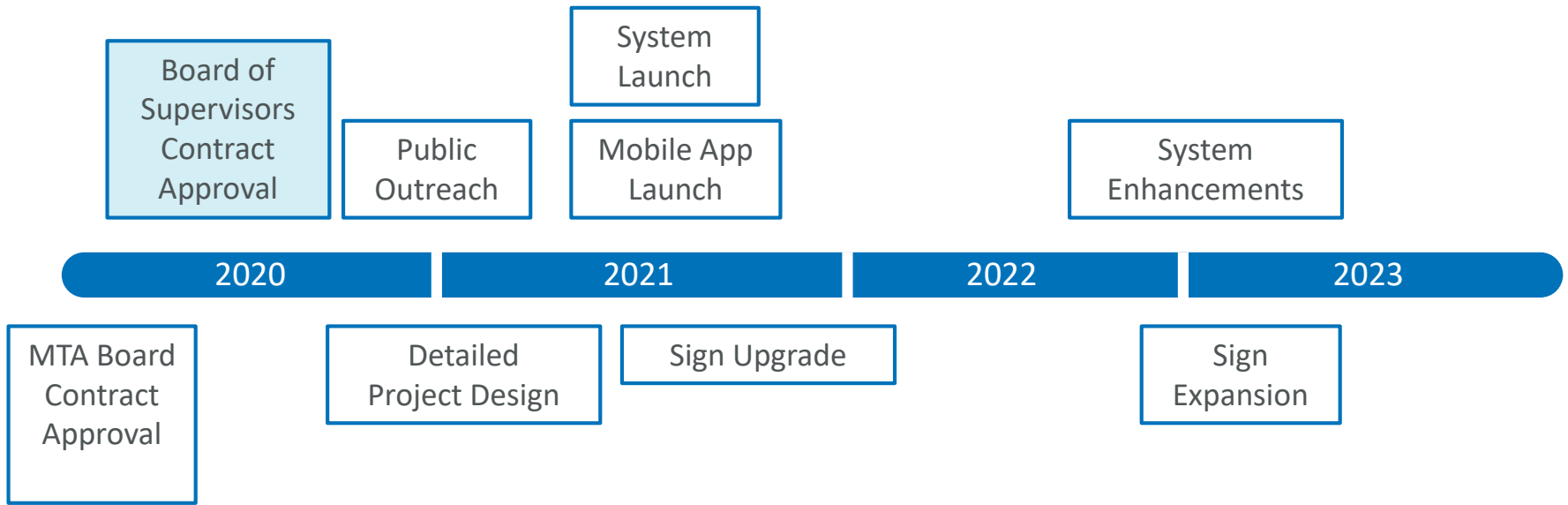
Proposer	Score
Cubic	902.88
Intersection Parent	543.74
B&C Transit Inc	506.55
Pulsar	472.68
Strategic Mapping	446.20
DoubleMap	369.62

Board of Supervisors Contract Approval

Public Outreach

System Launch

Mobile App Launch

System Enhancements

2020 — **2021** — **2022** — **2023**

MTA Board Contract Approval

Detailed Project Design

Sign Upgrade

Sign Expansion

**Phase I
(1-for-1 replacement)**

**Phase II
(Enhancements)**

Shaping the Project through Public Outreach

Quantitative		Qualitative
Comprehensive Survey (Available in English, Chinese and Spanish; online and paper upon request) 5,800+ complete responses; ±1.3% margin of error at a 95% confidence level	**+**	Concept Testing
		Stakeholder Interviews
		Ride-alongs

External Stakeholder Examples

311	SF Board of Supervisors
BART and other transit agencies	SF Travel
Chamber of Commerce	SFMTA Citizens' Advisory Council (CAC)
Chinatown Community Development Center (CCDC)	SFMTA Multimodal Accessibility Advisory Committee (MAAC)
Chinatown Tenants Association	SFMTA Policy and Governance
Hotel Council	SFUSD-Access
Independent Living Resource Center	Senior Action and Disability Network
LightHouse for the Blind	SF Transit Riders
Rebuild Potrero	Transbay Joint Powers Authority
Save Muni	Youth Commission

- The SFMTA conducted extensive quantitative and qualitative research to identify customer requirements for the new system

- The SFMTA will continue outreach efforts in project design and implementation

Flexibility to Meet COVID-19 Crisis and Recovery

Service Awareness	Public Safety	Responsive Planning
• Communicates rapidly-changing transit service plans	• Indicates vehicle occupancy levels to encourage social distancing	• Offers MuniMobile customer survey and incident reporting capabilities to receive public feedback on service changes
• Shows dynamic maps on signs indicating temporary routes and vehicle locations	• Implements double-sided shelter signs to allow customers to view information from a distance outside the shelter	• Provides an Analytics Platform to monitor ridership patterns and determine how to restore routes and close service gaps
• Displays nearby alternative routes on signs at temporarily-discontinued stops	• Communicates alerts and public safety announcements in multiple languages	• Improves spacing between vehicles by providing field supervisors with a mobile tool showing vehicle positions
• Promotes seamless regional connectivity by displaying predictions for partner transit agencies		

Element 1: System Software

New and Improved Customer Information

- More accurate vehicle arrival predictions
- Vehicle locations
- Transfer connection predictions
- Alternative routes
- Vehicle occupancy

- Accessibility information
- Real-time service detours and delays
- Regional transit connections
- Public announcements in multiple languages

Element 2: Stationary Digital Signs

- Provide sign hardware, installation and maintenance services
- Ensure uninterrupted service during transitions
- Ensure full ADA-compliance, including text-to-speech

Existing System

Light Emitting Diode (LED) screens

Next Generation System

Over 5 times larger, Liquid Crystal Display (LCD) screens display:

- Graphics
- Maps with the real-time vehicle positions
- Maps with directions to nearby routes
- Letters and characters in other languages

Up to one-third of signs may be double-sided to improve visibility

Durable to elements and resistant to vandalism

Shelter Sign Size Comparison
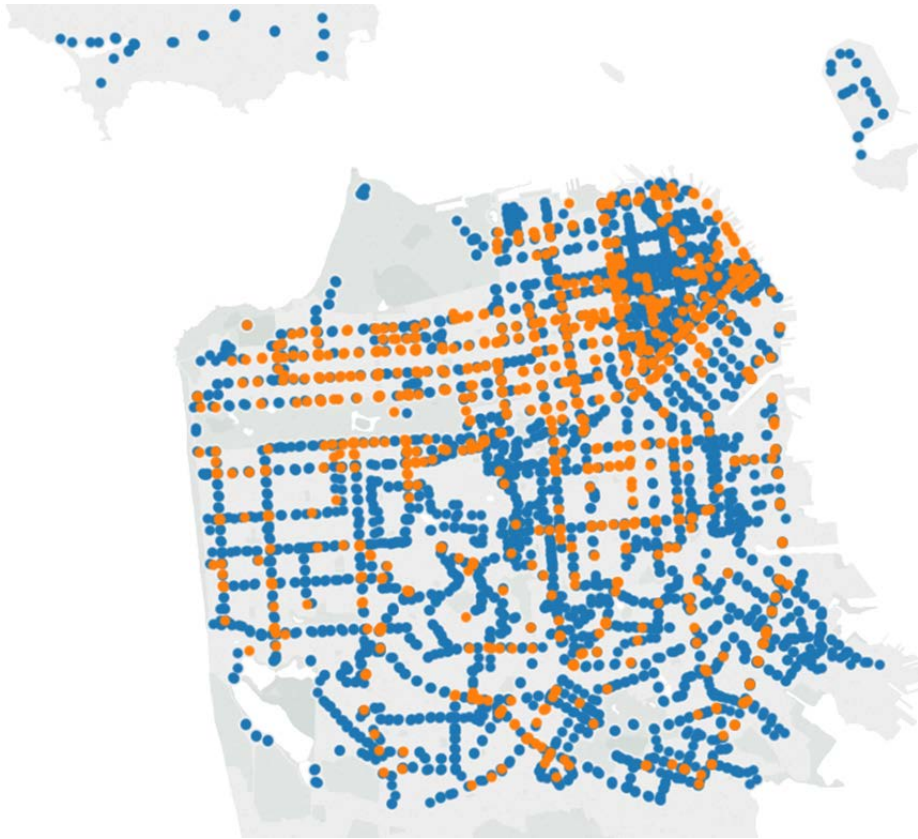
Existing NextBus Sign ►

1 California
8 min & 17 min

Next Generation System Sign ►

Increasing Equitable Access to Information by Expanding the Sign Network to Unpowered Stops

Future Solar-Powered Signs

Existing Powered Signs

🟠 Shelter with Existing Sign (~750)

🔵 Candidate for future Solar-Powered Sign

Up to 800 new locations, including:
- Equity Neighborhoods and other historically-underserved communities
- Lower-frequency routes where vehicle arrival predictions are essential to minimizing wait times

Bayview Signage Expansion

🔴 New signs for tentative shelter locations identified in the Priority Projects for the Bayview Community Based Transportation Plan

🟣 New double-sided outdoor T Third rail platform signs

*All stops without shelters will be candidates for Alternatively Powered Signs
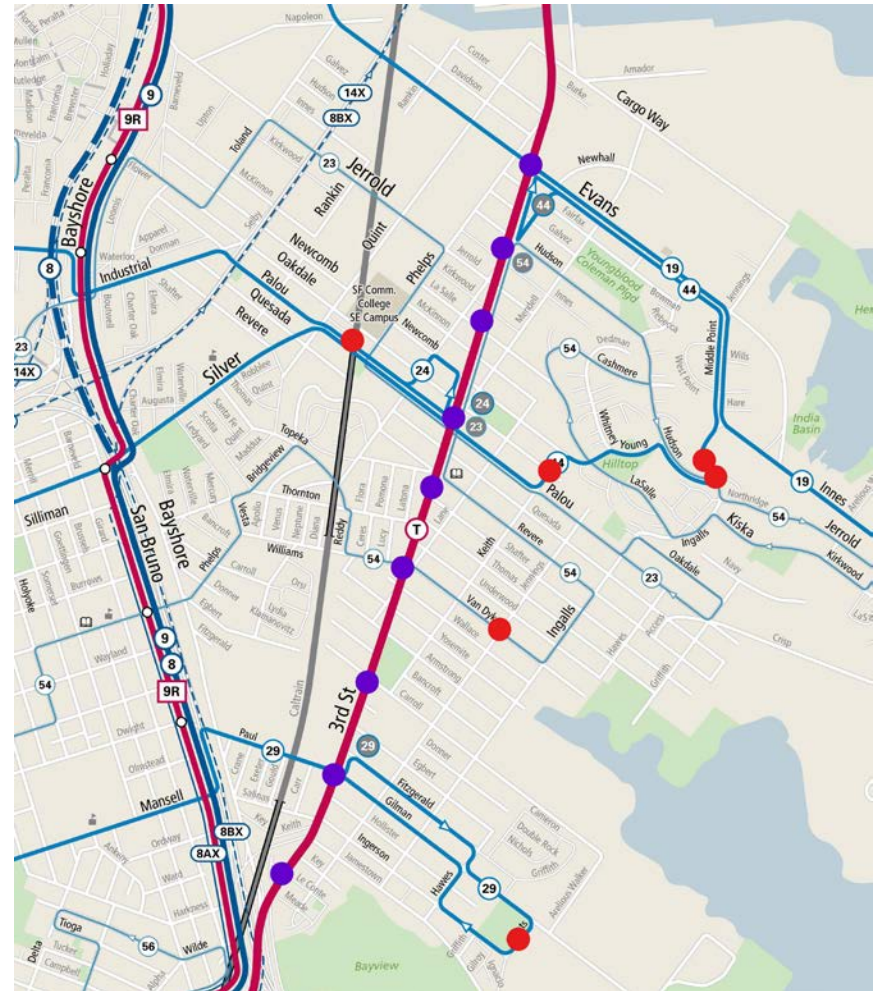
Element 3: On-Board Digital Sign Software

1. **Sign Content**
   - Generate customer information (e.g., reroutes, transfer connections) for display on future signs

2. **Text-to-Speech Functionality**
   - Enable vehicle's public announcement system to voice customer information

3. **Integration with Future On-Board Signs**
   - Able to push content to future on-board signs, including those on the pilot battery electric buses

Element 4: Mobile Platform & Website

1. Trip Planner

- Point-to-point directions, vehicle arrival times and other new customer information
- Live trip tracking to inform customer of changes in journey
- Opt-in features for customers to save trips and profile
- Customer configurable for language, accessibility and service preferences
- Multimodal trip quotes

2. Upgraded MuniMobile App

- Provides all-in-one mobile ticketing and trip planning functionality for transit and multimodal services
- Reflects real-time service changes
- Facilitates opt-in two-way communications with customers

3. Website Integration

- Integrate trip planning functionality into SFMTA website
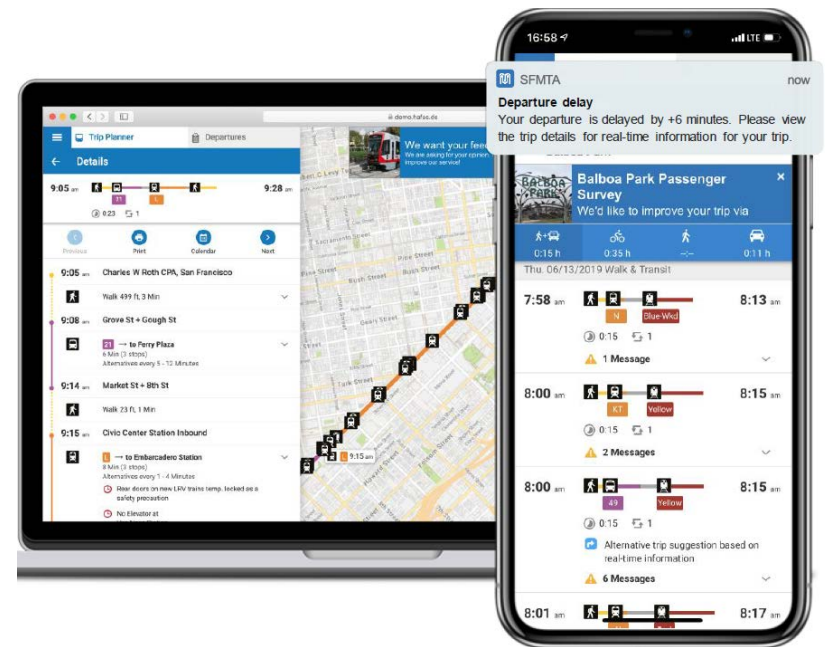
Element 5: Analytics Platform

Provide insights and continual improvement of SFMTA services

1. **Analytics Platform**
   - Create reporting tools and dashboards

2. **Data Interpretation**
   - Analysis will help improve service quality and reliability to enhance the customer experience

Performance Management

- On-Time Performance
- Vehicle Travel Time Variation
- Predictions Accuracy
- Interval Reliability
- Stop-to-stop travel times

Customer Engagement

- Usage
- Satisfaction
- A/B Testing

Service and Operational Planning

- Service Interventions Effectiveness
- Transfer Reliability
- Network Connectivity
- Stop Consolidation Impacts

Customer Experience

- Wait Times
- Crowding
- Travel Time Reliability
- Mode Choice
- Internal and External Transfers
- Unserved or Underserved Travel Needs

Accessibility Features

System Software
- Accessibility information for stops and vehicles
- Planned or real-time elevator and escalator outages

Stationary Digital Signage
- LCD screens accommodate larger text
- Push-to-talk

On-Board Digital Signage
- Accessibility information for upcoming transit stops and connecting routes

Mobile Platform & Website
- Personalized trip planner enables configuration of accessibility preferences (e.g., elevator access, ramps, maximum grade)
- Itineraries provide accessible trips configurable to customer needs

Projected Costs

Item	Total Capital Costs (millions $)	Total Operating Costs (millions $)			Total Capital & Operating Costs (millions $)
		Initial Term	1st Optional Extension	2nd Optional Extension	
Base System	$18.8	$12.6	$17.9	$19.1	$68.2
System Options	$4.4	$2.0	$2.9	$3.4	$12.7
Total with 10% contingency	$25.4	$16.1	$22.8	$24.7	$89.0

Capital Costs
- $25.4 million, including sales tax, options and 10% contingency

Operating Costs
- Incremental $47,274 monthly cost compared to existing system
- $63.5 million for initial term and subsequent optional five-year contract extensions; total contract duration corresponds to the expected lifespan of signs
- Contract ensures cost containment by preventing future software subscription fees and operations and maintenance costs from escalating beyond inflation
- Contract includes warranty covering all parts and consumables for the equipment lifecycle

Capital Costs

Contingency, $2,312,240

Upgrade Subway Signs (option)**, $3,531,473

Software System Design, Integration & Configuration*, $7,790,158

Add Solar-Powered Signs to Double Sign Coverage throughout San Francisco**, $4,686,013

Upgrade Shelter, Surface Rail and Other Existing Signs, $7,114,753
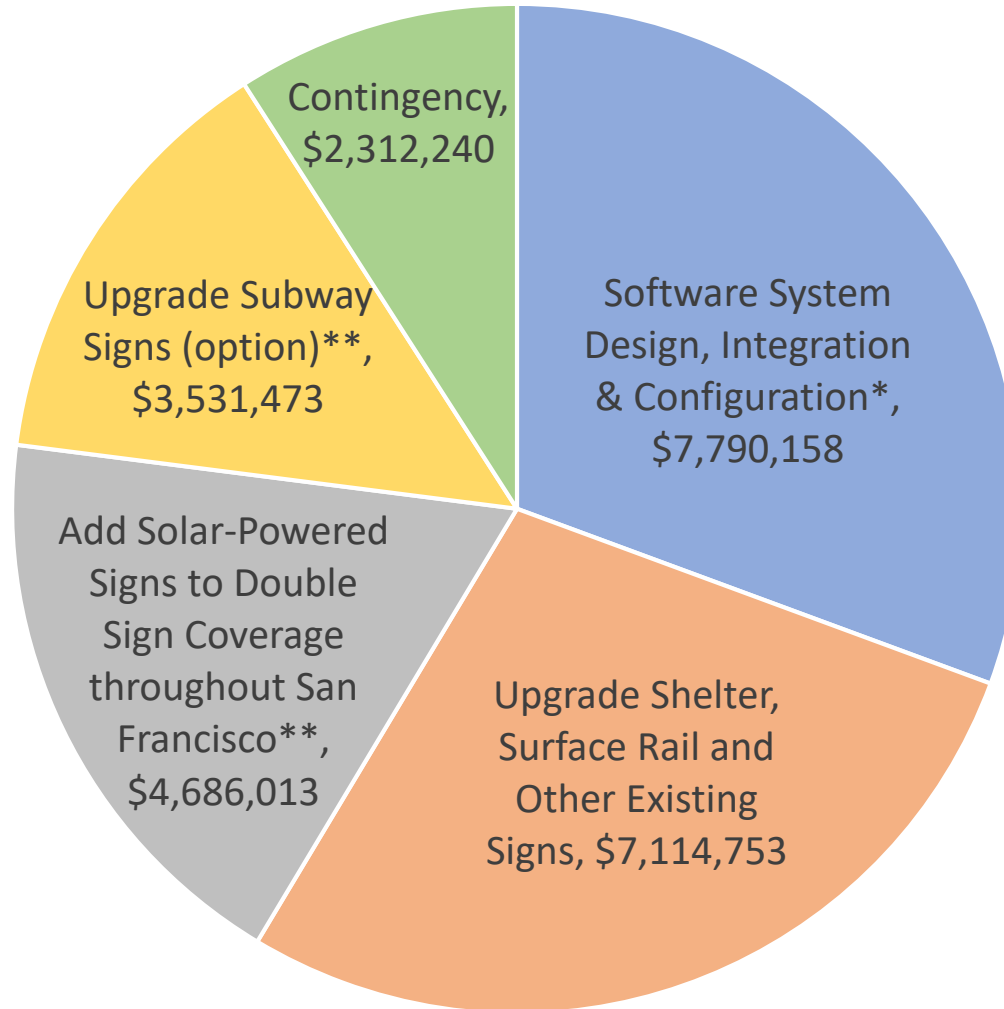
*Includes $808,237 in options for enhanced software features
**Discretionary based on cash flow and funding availability

Operations & Maintenance Cost Comparison

Comparison of Operations & Maintenance Costs – Existing vs. Upgraded System			
Service	**Existing System Monthly Fee**	**New System Contract Monthly Fee**	**Monthly Difference for Upgrades and Enhancements**
Software Subscription Services			
System Software (more accurate predictions, route alternatives, transfer connections, real-time service changes and accessible itineraries) _Improved_	$73,900	$37,508	$8,242
Mobile Platform & Website Trip Planner Software _New_	Not provided	$27,031	
Analytics Platform _New_	Not provided	$17,603	
Sign Maintenance & Communications			
Shelter & Outdoor Rail Platform Signs** (larger and more visible signs including graphics) _Improved_	$25,843	$65,967	$39,033
Underground Station Signs _Improved_	$2,875	$1,784	
Monthly Total	$102,619	$149,892	**$47,274**
** Assuming one-for-one replacement of current 748 shelter signs. The above cost comparison excludes signage network expansion or options.			

Difference in operations and maintenance costs between the existing system's software and signs and its 1-for-1 upgrade in the Next Generation System: $47,274 monthly ($567,292 annually)

Projected Contract Expenditures by Fiscal Year

Projected Contract Cash Flow
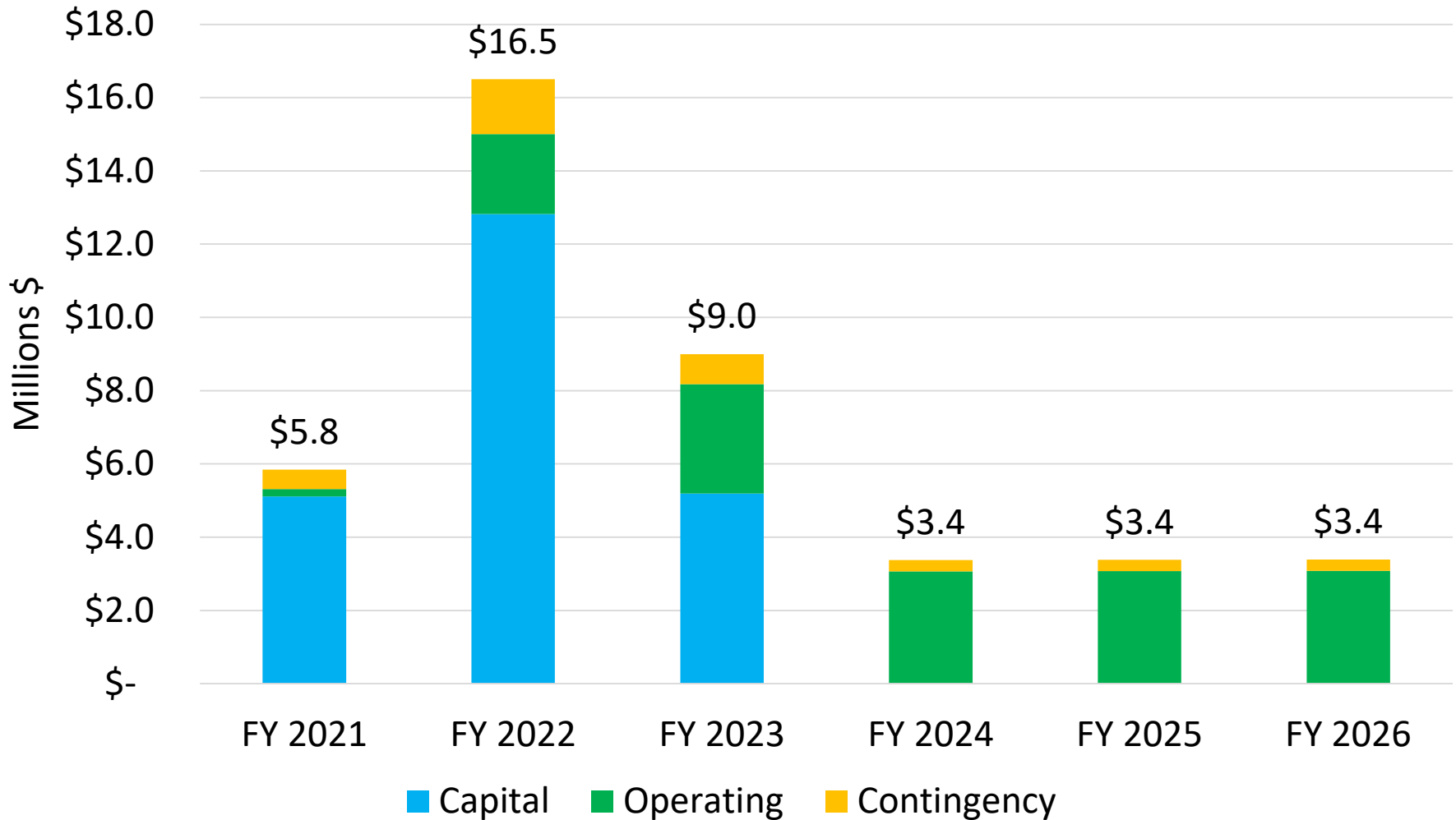
System Upgrade Provides Great Value to San Francisco

System Features	Current	Future
System Software		
Predictions Engine	✔	✔ (improved)
Crowding Level Alerts	✘	✔
Alternative Route Suggestions	✘	✔
Real-Time Temporary Service Changes	✔ (limited)	✔
Connections with other systems	✘	✔
Stationary Digital Signage		
Powered Shelters	✔ (LED)	✔ (LCD)
Unpowered Shelters & Stops	✘	✔
On-Board Digital Signage (back-end)		
Stop Announcements	✔	✔
Connection Times	✘	✔
Service Delay & Reroute Alerts	✘	✔
Mobile Platform & Website		
Mobile App	✔ (primarily mobile ticketing)	✔ (enhanced capabilities)
Accessible Itineraries	✘	✔
Analytics Platform		
Usage Trends & Analytics	✔ (limited)	✔ (enhanced capabilities)

Attached for introduction to the Board of Supervisors is a **resolution approving SFMTA Contract No. 2019-01: Next Generation Customer Information System, with Cubic Transportation Systems, Inc. to develop, implement, and maintain a new real-time vehicle arrival and service update system for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance, to commence following Board approval.**

Please let me know if you have any questions.

_____

Rebecca Peacock (they/she)
(415) 554-6982 | Rebecca.Peacock@sfgov.org
Office of Mayor London N. Breed
City & County of San Francisco

San Francisco Ethics Commission

25 Van Ness Avenue, Suite 220, San Francisco, CA 94102
Phone: 415.252.3100 **.** Fax: 415.252.3112
ethics.commission@sfgov.org **.** www.sfethics.org

Received On:

File #: 200767

Bid/RFP #: SFMTA 2019-01

Notification of Contract Approval

SFEC Form 126(f)4
(S.F. Campaign and Governmental Conduct Code § 1.126(f)4)
A Public Document

Each City elective officer who approves a contract that has a total anticipated or actual value of $100,000 or more must file this form with the Ethics Commission within five business days of approval by: (a) the City elective officer, (b) any board on which the City elective officer serves, or (c) the board of any state agency on which an appointee of the City elective officer serves. For more information, see: https://sfethics.org/compliance/city-officers/contract-approval-city-officers

1. FILING INFORMATION

TYPE OF FILING	DATE OF ORIGINAL FILING (*for amendment only*)
Original	

AMENDMENT DESCRIPTION – Explain reason for amendment

2. CITY ELECTIVE OFFICE OR BOARD

OFFICE OR BOARD	NAME OF CITY ELECTIVE OFFICER
Board of Supervisors	Members

3. FILER'S CONTACT

NAME OF FILER'S CONTACT	TELEPHONE NUMBER
Angela Calvillo	415-554-5184
FULL DEPARTMENT NAME	EMAIL
Office of the Clerk of the Board	Board.of.Supervisors@sfgov.org

4. CONTRACTING DEPARTMENT CONTACT

NAME OF DEPARTMENTAL CONTACT	DEPARTMENT CONTACT TELEPHONE NUMBER
Jason Lee	(415) 701-4612
FULL DEPARTMENT NAME	DEPARTMENT CONTACT EMAIL
MTA Municipal Transportation Agency	jason.lee@sfmta.com

5. CONTRACTOR

NAME OF CONTRACTOR	TELEPHONE NUMBER
Cubic Transportation Systems, Inc.	(510) 281-1317

STREET ADDRESS (including City, State and Zip Code)	EMAIL
5650 Kearny Mesa Rd., San Diego, CA 92111	cindy.adamos@cubic.com

6. CONTRACT

DATE CONTRACT WAS APPROVED BY THE CITY ELECTIVE OFFICER(S)	ORIGINAL BID/RFP NUMBER	FILE NUMBER (*If applicable*)
	SFMTA 2019-01	200767

DESCRIPTION OF AMOUNT OF CONTRACT

$88,980,877

NATURE OF THE CONTRACT *(Please describe)*

Municipal Transportation Agency Contract No. 2019-01: Next Generation Customer Information System is with Cubic Transportation Systems, Inc. to develop, implement, and maintain a new real-time vehicle arrival and service update system for Muni in an amount not to exceed $88,980,877, for an initial term of six years with two optional five-year terms to cover software subscriptions and equipment lifecycle maintenance, to commence following Board approval.

7. COMMENTS

8. CONTRACT APPROVAL

This contract was approved by:

☐	**THE CITY ELECTIVE OFFICER(S) IDENTIFIED ON THIS FORM**
☒	**A BOARD ON WHICH THE CITY ELECTIVE OFFICER(S) SERVES** Board of Supervisors
☐	**THE BOARD OF A STATE AGENCY ON WHICH AN APPOINTEE OF THE CITY ELECTIVE OFFICER(S) IDENTIFIED ON THIS FORM SITS**

9. AFFILIATES AND SUBCONTRACTORS

List the names of (A) members of the contractor's board of directors; (B) the contractor's principal officers, including chief executive officer, chief financial officer, chief operating officer, or other persons with similar titles; (C) any individual or entity who has an ownership interest of 10 percent or more in the contractor; and (D) any subcontractor listed in the bid or contract.

#	LAST NAME/ENTITY/SUBCONTRACTOR	FIRST NAME	TYPE
1	Feldmann	Bradley	Board of Directors
2	Melcher	David	Board of Directors
3	Banerjee	Prith	Board of Directors
4	Blakley	Bruce	Board of Directors
5	Devine	Denise	Board of Directors
6	Breakiron-Evans	Maureen	Board of Directors
7	Flowers	Carolyn	Board of Directors
8	Hamby	Janice	Board of Directors
9	Norris	Steven	Board of Directors
10	Feldmann	Bradley	CEO
11	Aga	Anshooman	CFO
12	Hageman	Hillary	Other Principal Officer
13	Lowinger	Jeffrey	Other Principal Officer
14	Banks	Simon	Other Principal Officer
15	Bax	Chris	Other Principal Officer
16	Behrooznia	Rasheed	Other Principal Officer
17	Blom	Karen	Other Principal Officer
18	Collins Maloney	Kay	Other Principal Officer
19	Crow	Roger	Other Principal Officer

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#	LAST NAME/ENTITY/SUBCONTRACTOR	FIRST NAME	TYPE
20	Custer	Joseph	Other Principal Officer
21	Delfin	Marc	Other Principal Officer
22	DeKozan	David	Other Principal Officer
23	Eskenazi	Laurent	Other Principal Officer
24	Fajardo	Frank	Other Principal Officer
25	Gravett	Leanne	Other Principal Officer
26	Grunewald	Robert	Other Principal Officer
27	Hamilton	Robert	Other Principal Officer
28	Harris	David	Other Principal Officer
29	Harrison	Mark	Other Principal Officer
30	Hedstrom	Daniel	Other Principal Officer
31	Henry	Christian	Other Principal Officer
32	Hoyt	Randy	Other Principal Officer
33	Jenkins	Daniel	Other Principal Officer
34	Karsch	Boris	Other Principal Officer
35	Koblentz	Scott	Other Principal Officer
36	Maloy	Julie	Other Principal Officer
37	McCaffrey	Joseph	Other Principal Officer
38	McLevie	Simon	Other Principal Officer

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#	LAST NAME/ENTITY/SUBCONTRACTOR	FIRST NAME	TYPE
39	Monk	Paul	Other Principal Officer
40	Newberg	Ian	Other Principal Officer
41	Newsome	Matthew	Other Principal Officer
42	Patel	Nehal	Other Principal Officer
43	Piquet	Silvia	Other Principal Officer
44	Price	Jeff	Other Principal Officer
45	Primeaux	Michael	Other Principal Officer
46	Rajendran	Sushil	Other Principal Officer
47	Rowlands	Richard	Other Principal Officer
48	Scott	Robert	Other Principal Officer
49	Spinazze	Jeff	Other Principal Officer
50	Thomas	Will	Other Principal Officer

X	Check this box if you need to include additional names. Please submit a separate form with complete information. Select "Supplemental" for filing type.

10. VERIFICATION

I have used all reasonable diligence in preparing this statement. I have reviewed this statement and to the best of my knowledge the information I have provided here is true and complete.

I certify under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

SIGNATURE OF CITY ELECTIVE OFFICER OR BOARD SECRETARY OR CLERK	DATE SIGNED
BOS Clerk of the Board	

San Francisco Ethics Commission

25 Van Ness Avenue, Suite 220, San Francisco, CA 94102
Phone: 415.252.3100 . Fax: 415.252.3112
ethics.commission@sfgov.org . www.sfethics.org

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NAME OF DEPARTMENTAL CONTACT	DEPARTMENT CONTACT TELEPHONE NUMBER
Jason Lee	SFMTA 2019-01
FULL DEPARTMENT NAME	DEPARTMENT CONTACT EMAIL
MTA Municipal Transportation Agency	jason.lee@sfmta.com

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1	Walker	Thomas	Other Principal Officer
2	Wear	David	Other Principal Officer
3	Wheatley	Dwayne	Other Principal Officer
4	Williams	Rhys	Other Principal Officer
5	Woodroofe	Ian	Other Principal Officer
6	Wright	Marcus	Other Principal Officer
7	Yazdan	Heather	Other Principal Officer
8	Frankenberg	Michael	Subcontractor
9	Dittmann	Andreas	Subcontractor
10	Müller-Haude	Claus	Subcontractor
11	Prado	Dimitri Eberhardt	Subcontractor
12	Teixeira	Ricardo	Subcontractor
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