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SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY

DIVISION: Finance and Information Technology

BRIEF DESCRIPTION:

Authorizing 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 one year of system setup and five years of operations, with an option to extend the contract for two additional five-year terms.

SUMMARY:

- In 2001, the SFMTA entered into a contract with NextBus to establish the nation's first large-scale real-time information system (Existing System).
- Leveraging significant technological advances since then, the SFMTA is seeking to replace the Existing System with the Next Generation Customer Information System (Next Generation System or Project).
- To inform the features and functionality of the Next Generation System, the SFMTA conducted extensive outreach.
- New and enhanced features will include: more accurate vehicle arrival predictions and other customer information; enhanced digital message signs at existing stops and stations; alternatively-powered signage at new locations; system-generated alternative routes with shorter waiting times; more balanced ridership loads on vehicles, through passenger crowding alerts; an innovative mobile- and web-based trip planner; improved stop-based accessibility information and elevator/escalator outage alerts; and improved service and operational planning through an analytics platform to understand customer preferences.
- The Next Generation System will establish the back-end infrastructure to transmit and display customer information on future on-board digital signs, which the SFMTA intends to procure under a separate contract.
- Staff expects to select the contractor during the first quarter of 2019 and present a contract for approval in mid-2019.

ENCLOSURES:

1. SFMTAB Resolution
2. Next Generation Customer Information System: Stakeholder Engagement Report
3. Request for Proposals

APPROVALS	**DATE**
DIRECTOR 	8/29/2018
SECRETARY 	8/27/2018

ASSIGNED SFMTAB CALENDAR DATE: September 4, 2018

PURPOSE

To authorize the Director of Transportation to issue a Request for Proposals (RFP) for SFMTA Contract No. 2019-01: 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 one year of system setup and five years of operation, with an option to extend the contract for two additional five-year terms.

STRATEGIC PLAN GOALS AND TRANSIT-FIRST POLICY PRINCIPLES

The Next Generation System will further the following goals of the Strategic Plan:

Goal #1: Create a safer transportation experience for everyone

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

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

The Next Generation System will further the following Transit-First Policy Principles:

1. To ensure quality of life and economic health in San Francisco, the primary objective of the transportation system must be the safe and efficient movement of people and goods.
2. Public transit, including taxis and vanpools, is an economically and environmentally sound alternative to transportation by individual automobiles. Within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile.
3. The ability of the City and County to reduce traffic congestion depends on the adequacy of regional public transportation. The City and County shall promote the use of regional mass transit and the continued development of an integrated, reliable, regional public transportation system.
4. The City and County shall encourage innovative solutions to meet public transportation needs wherever possible and where the provision of such service will not adversely affect the service provided by the Municipal Railway.

DESCRIPTION

Background

Following a successful pilot program on the 22 Fillmore line in 1999, the SFMTA contracted with NextBus in 2001 to launch the nation's first large-scale real-time transit information system that became known as NextMuni. By providing customers with an expectation of when their transit vehicle would arrive, NextMuni helped revolutionize the transit-riding experience in the United States and became a model for other cities. Two decades later, NextMuni continues to deliver vehicle arrival predictions through countdown signs at stations and shelters, and the SFMTA provides data used in third-party trip-planning apps. The system's design has not fundamentally changed since inception.

Meanwhile, San Francisco has seen an explosion of app-based carsharing, bikesharing, private commuter vans, scooters, and Transportation Network Company vehicles. With these new services, customers have grown accustomed to a state-of-the-art technological landscape that continues to redefine the transportation industry through on-demand services and real-time information both before and during one's trip.

The SFMTA's contract with NextBus expires on July 31, 2019. With a chance for a refresh, the SFMTA is looking to leverage the many innovations in technology and transportation that have occurred since 2001 to create a much more advanced Next Generation System: one with readily-available technology that satisfies – and even exceeds – today's customer expectations. In doing so, the SFMTA hopes the new system will contribute to the City's and region's mobility, accessibility and economic health by retaining and growing transit ridership.

Informed by extensive public outreach, the Next Generation System will incorporate the following innovations:

1. More sophisticated and accurate vehicle arrival predictions
2. Alternatively-powered digital message signs to expand access to information at select unpowered shelters and stops
3. Reductions in travel times, by displaying alternative routes with shorter waits on digital signage at stops
4. More balanced passenger loads on transit vehicles, by providing crowding alerts and suggesting parallel services with space available
5. Strengthened network connectivity, by showing transfer connection times on-board vehicles
6. Communicating service delays and disruptions on-board vehicles through mobile alerts and apps
7. Providing stop-based accessibility information and elevator/escalator outage alerts to facilitate travel for seniors and people with disabilities
8. Employing data analytics to understand customer preferences and improve service and operational planning.

Request for Information

On April 5, 2017, the SFMTA released a Request for Information (RFI) for the Next Generation System. The purpose of the RFI was to solicit vendor interest and confirm whether the improvements the SFMTA desired were technically feasible. Over two dozen vendors responded, suggesting a high level of interest. After reviewing the responses, the SFMTA is confident that the innovations listed above are attainable and thus have established them as requirements in the RFP.

Procurement Schedule

The tentative procurement schedule is as follows:

- RFP Issuance: September 5, 2018
- Proposal Due Date: November 16, 2018

- Contractor selection: First Quarter, 2019
- Award date: Second Quarter, 2019

Scope of Services

The scope of services for the Next Generation System contract includes the development, delivery, and maintenance of interrelated system elements described below.

System Software

The new contractor must provide software (System Software) that generates Customer Information, monitors system status through a System Administration Tool, and displays context-specific information on a variety of customer interfaces through a Content Management System.

The Customer Information must include vehicle arrival predictions, transfers, alternatives, itineraries and other information the Next Generation System will generate for display on customer-facing interfaces. The System Administration Tool must enable the SFMTA to configure and interface with the System Software, and the Content Management System must allow the SFMTA to format content presented to the public.

The System Software must also generate Customer Information to display on customer-facing interfaces and devices – Stationary Digital Signage, On-Board Digital Signage, and the Mobile Platform & Website – as described below.

Stationary Digital Signage

The contractor must replace the SFMTA's existing Stationary Digital Signage with contractor-furnished signage where real-time signs are currently provided, at over 850 locations. The new contractor must also install Stationary Digital Signage at new locations where real-time signs currently do not exist.

The Stationary Digital Signage will consist of multiple types of screens located at underground Metro stations, above-ground rail platforms and rail and bus stops, including stops with shelters lacking electrical power and those without shelters at all. These signs will provide next vehicle arrival predictions, service alerts and nearby alternatives if applicable.

On-Board Digital Signage

As opposed to on-board systems that only provide pre-recorded content, the SFMTA is considering implementing a future on-board signage system that will also provide dynamic real-time information to assist customers along their journey.

The contractor's System Software must generate customer information to display on future On-Board Digital Signage aboard rubber-tire vehicles (motor coaches and electric trolley coaches) and light rail vehicles. These signs, which the SFMTA intends to procure under a separate

contract, will give customers real-time information such as a vehicle's current location, predicted arrival times for upcoming stops, transfer opportunities and connecting times with other routes, and unplanned service changes. The contractor will be required to integrate the Next Generation System with the supplier of future On-Board Digital Signage.

Mobile Platform & Website

The contractor must develop trip planning tools and provide real-time information on the SFMTA's online and mobile platforms. These tools will permit customers to access information through electronic devices such as a desktop computer, laptop, tablet or mobile app. The contractor must design its trip planning tools and real-time information to be accessible on as many electronic devices as possible to maximize the number of communication channels available to customers.

Analytics Platform

The Analytics Platform will enable the SFMTA to analyze and interpret the voluminous data generated by the Next Generation System. The platform would provide insights into ridership patterns and the factors that influence customer mode choice, giving the SFMTA the tools to make more informed planning and operational decisions.

Project Phasing

The Project consists of two phases.

Phase I is the implementation period for system setup, which includes a one-for-one replacement of the Existing System and the installation of the Next Generation System at Central Subway stations. The contractor must provide basic vehicle arrival predictions, install new signs at locations with existing real-time signs as well as at Central Subway stations, and add basic trip planning functionality to the Mobile Platform and Website. The SFMTA anticipates Phase I to last approximately one year, from the beginning of the third quarter of 2019 to the end of the second quarter of 2020. To ensure uninterrupted real-time information service during the transition period, the SFMTA is also working to extend the contract with NextBus for the Existing System by one year to July 31, 2020.

Phase II is the implementation period for system enhancements. Enhancements include adding features to the mobile app, expanding signage, and providing better transfer and route alternatives information. The SFMTA anticipates Phase II to last approximately two years following the conclusion of Phase I.

Evaluation and Selection Process

Proposers will be evaluated by an evaluation committee comprised of staff from the SFMTA and other City departments with subject matter expertise. This committee will score the Proposal (consisting of a written proposal, conceptual design document, performance requirements, and pricing) and an oral interview, if any.

The Proposer with the highest total evaluation score will be eligible for contract award. If the SFMTA elects not to have oral interviews, the Proposer with the highest score for the Proposal will be eligible for contract award.

SFMTA's Contract Compliance Office has set a Local Business Enterprise subcontracting participation requirement for the contract of ten percent of the total value of the services to be provided.

STAKEHOLDER ENGAGEMENT

To develop requirements for this Request for Proposals, the SFMTA conducted extensive public outreach to vet staff-generated ideas and determine the highest-priority desired enhancements.

Over 5,800 customers representing the diversity of SFMTA customers responded to an extensive survey conducted both online and in paper, and available in three languages: English, Chinese and Spanish. In addition, the SFMTA conducted many qualitative outreach sessions to understand how information could influence travel behavior. Through its research, the SFMTA has identified opportunities to provide more (and better) information at different points along a customer's journey. Such information can help the agency serve latent transit demand.

Through this process, the SFMTA discovered:

- Most customers depend on real-time vehicle arrival predictions when riding.
- In lieu of on-time performance, customers use real-time information to assess whether their bus arrived late or on-time.
- There are many opportunities to improve key trip-planning information. For example, most customers do not believe the SFMTA's predictions to be accurate, rating predictions a 2.5 out of 5 on the online survey.
- Most customers are willing to wait only 10 to 15 minutes for their next vehicle without any real-time information, and even less if a transfer is required.
- As income rises, people are less willing to wait for Muni. However, with better real-time information, respondents are more likely to ride Muni across all income levels.
- Providing transfer time predictions could increase customers' willingness to transfer between routes.
- Customers with prepaid passes are more likely to ride Muni than those who pay per ride.

The SFMTA also received input from the SFMTA Citizens' Advisory Council, and from transit industry professionals during presentations to the Transportation Research Board and American Public Transportation Association.

To refine requirements and project scope, the project team convened an internal technical working group consisting or representatives from Communications, Sustainable Streets, Taxi and Accessible Services, and Transit divisions,

Based on this external and internal feedback, staff believes that Muni could become the first transit system in the United States to implement many of the contemplated features.

ALTERNATIVES CONSIDERED

The alternatives to the Next Generation System are (a) to attempt to maintain the Existing System, or (b) to stop providing SFMTA customers with real-time information.

Attempting to maintain the Existing System indefinitely is not an option due to its age. NextBus is phasing out support for existing hardware and software. Soon it will not be possible to maintain the Existing System from a technical perspective.

Ending real-time information altogether is also not recommended given how much SFMTA customers rely on it to plan their trips. Public outreach revealed that, for example, the vast majority of customers (80%) check for real-time vehicle arrival information while waiting at their stops "always" or "often".

In the short term, the SFMTA will need to keep the Existing System operational during the transition period to the Next Generation System to ensure uninterrupted delivery of real-time information while the new system is installed.

FUNDING IMPACT

The SFMTA will not know the budgetary impact of the Next Generation System until staff negotiates the contract, and the SFMTA Board approves associated expenditures. To encourage competitive pricing, the cost proposal will comprise 15 percent of the total evaluation score.

Funding will come from local sources.

ENVIRONMENTAL REVIEW

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).

A copy of the CEQA determination is on file with the Secretary to the SFMTA Board of Directors and is incorporated herein by reference.

OTHER APPROVALS RECEIVED OR STILL REQUIRED

On March 5, 2018, the Civil Service Commission approved Personal Services Contract 46889-17/18 for the Next Generation Customer Information System.

The City Attorney's Office has reviewed this item.

RECOMMENDATION

Staff recommends that the SFMTA Board of Directors authorize the Director of Transportation or his designee to issue a Request for Proposals for SFMTA Contract No. 2019-01: Next Generation Customer Information System, and to negotiate a contract with the highest-ranked proposer for a term of six years, which includes one year of system setup and five years of operations, with an option to extend the contract for two additional five-year terms.

SAN FRANCISCO
MUNICIPAL TRANSPORTATION AGENCY
BOARD OF DIRECTORS

RESOLUTION No. _____

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 existing system is currently nearing the end of its useful life, and its vendor no longer supports rising customer needs; and,

WHEREAS, There have been many changes in transportation and technology since 2001, including on-demand, mobile app-based forms of transportation; and,

WHEREAS, The Next Generation Customer Information System aims to grow transit ridership through improved vehicle predictions; modernized and expanded signage; information about transfers, transit alternatives, real-time service changes, vehicle occupancy, and accessibility; and enhanced data analytics to understand customer preferences and improve service and operational planning; and,

WHEREAS, The SFMTA proposes to solicit proposals from firms that can deliver a complete Next Generation Customer Information System that satisfies these requirements with the purpose of selecting the most qualified bidder whose proposal represents the best value to the SFMTA; and,

WHEREAS, Due to the potential value and term of the proposed agreement, it 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 issue a Request for Proposals for SFMTA Contract No. 2019-01: Next Generation Customer Information System, and to negotiate a contract for these services with the highest-ranked proposer for a six-year initial term that includes an installation period plus five years of operations commencing on May 1, 2019, or later, with the option to extend for up to two five-year terms for a total term not to exceed sixteen years, subject to the approval of the San Francisco Board of Supervisors.

I certify that the foregoing resolution was adopted by the San Francisco Municipal Transportation Agency Board of Directors at its meeting of September 4, 2018.

_____
Secretary to the Board of Directors
San Francisco Municipal Transportation Agency

Next Generation

Customer Information System

Stakeholder Engagement Report

September 2018

EXECUTIVE SUMMARY

In 2001, the San Francisco Municipal Transportation Agency (SFMTA) revolutionized the transit-riding experience by implementing NextMuni: the nation's first large-scale real-time transit information system designed to predict when transit vehicles would arrive. Provided by NextBus (now a subsidiary of Cubic), this information system fundamentally changed how people used Muni by delivering vehicle arrival predictions through signs at stops, mobile apps, and other means, times have changed.

In the intervening years, San Franciscans have grown accustomed to a vastly different technological landscape that continues to redefine the transportation industry through on-demand service offerings and access to trip information via mobile devices throughout their travel. Seeking to stabilize and increase ridership, transit operators like the SFMTA are working to adapt and innovate in this rapidly-changing environment.

With the existing system nearing the end of its useful life, the SFMTA is investing in the Next Generation Customer Information System to empower Muni customers to confidently take mass transit to their destinations quickly and reliably.

Last year, the SFMTA embarked on an extensive public outreach effort, including a comprehensive survey, concept testing and ride- along interviews, to shape the features and functionality of the new system. Major elements of the system include:

- Employing a more sophisticated and accurate vehicle arrival predictions
- Implementing alternatively-powered signage at unpowered shelters and stops to expand customer access to information
- Reducing travel times by showing nearby alternative routes with shorter waits on digital signage at stops
- Balancing capacity by providing crowding alerts and suggesting parallel services with space available
- Strengthening network connectivity by showing transfer connection times on-board vehicles
- Communicating service delays and disruptions on-board vehicles
- Providing real-time stop and route accessibility information (e.g., elevator/escalator outage alerts) to facilitate travel for seniors and persons with disabilities
- Improving the rider experience via an enhanced mobile platform
- Using data to better understand customer preferences and improve service and operational planning

The Next Generation system reflects an agency-wide effort to improve Muni service for everyone who lives in, works in, or visits San Francisco.

BACKGROUND

The SFMTA's Next Generation Customer Information System marks the latest step in the evolution of real-time transit information.

Two decades ago, transit systems relied solely on published timetables to communicate the arrival times for buses and trains. In San Francisco, a city with high levels of congestion which contributes to bus and rail delays, the Muni transit system used to only publish general schedule information to avoid disappointing customers if their vehicle did not arrive on time. Timetable booklets did not list specific times for most trips and instead provided scheduled service frequency. As a result, customers would venture out to their stop and hope that Muni would come shortly. In reality, customers could end up waiting a highly variable amount of time.

In 1999, NextBus conducted a pilot program of real-time information on the 22 Fillmore line. Digital displays at shelters on the route showed predicted vehicle arrival times, giving customers a much better expectation of how long they would have to wait for Muni. After this successful demonstration project, the SFMTA contracted with NextBus in 2001 to launch the nation's first large-scale real-time transit information system that became known as NextMuni.

NextMuni revolutionized public transportation in North America by making transit much easier to use. Later adopted by many other transit systems, this basic model continues to delivers vehicle arrival predictions through countdown signs located at waiting shelters and stations, and now through mobile apps and online.

NextMuni's design has not fundamentally changed since its inception. Meanwhile, technology has dramatically shaped the transportation landscape. People have grown accustomed to on-demand service offerings and access to trip information via mobile devices throughout their travel. These innovations have disrupted the transportation industry, providing people with more customized services but also causing widespread impacts from a systemwide perspective.

Once at the vanguard of American public transportation, the SFMTA's original real-time information system is nearing the end of its useful life. It is not feasible to maintain the core predictions platform of the current system procured in 2001 and simply make cosmetic changes to hardware and software systems. Consequently, the SFMTA is eager to leverage the many innovations in technology and transportation that have occurred in the nearly two decades since the original system was installed. In doing so, the SFMTA seeks to upgrade to a revolutionary Customer Information System that satisfies (and even exceeds) customer expectations.

CONTEXT

After increasing 36 percent between 1995 and 2014, U.S. transit ridership has begun to fall, even as the economy and demand for transportation services have grown — with buses nationally plunging a particularly steep 9 percent since 2014. Some speculate that low gas prices, gentrification, Transportation Network Company (TNC) services such as Uber and Lyft, and rising car ownership are driving this decline.

Left unaddressed, these ridership losses could fuel a cyclical downward spiral of heavier congestion, slower service, fare increases and service reductions leading to further ridership losses. While ridership has increased In San Francisco recently, the threat of the nationwide trend away from transit is especially alarming. A 47-square mile city surrounded by water on three sides, San Francisco is projected to face a 26-percent population increase from 870,000 to 1.1 million residents. There is simply no room to accommodate more cars.

As this trend continues and customer behavior adapts to new transportation options, it is imperative that the SFMTA pursue ridership-growing initiatives and that the transit industry evolve its current models and understanding of mode choice to remain competitive.

In recent years, San Francisco's transportation environment has been radically upended by an explosion of app-based carsharing, bikesharing, private commuter vans, scooters, and Transportation Network Company (TNC) ride-hailing services. While many of these services deliver personalized mobility by facilitating end-to-end travel with minimal trip-planning involved, they come at the expense of the greater public's transportation needs. According to *TNCs Today: A Profile of San Francisco Transportation Network Company Activity*, a study developed by the San Francisco County Transportation Authority (SFCTA) in partnership with researchers from Northeastern University, TNCs comprise 20 to 26 percent of vehicle trips in Downtown and South of Market: areas where Muni service is the most robust, but also most vulnerable to congestion (see Figure 1).

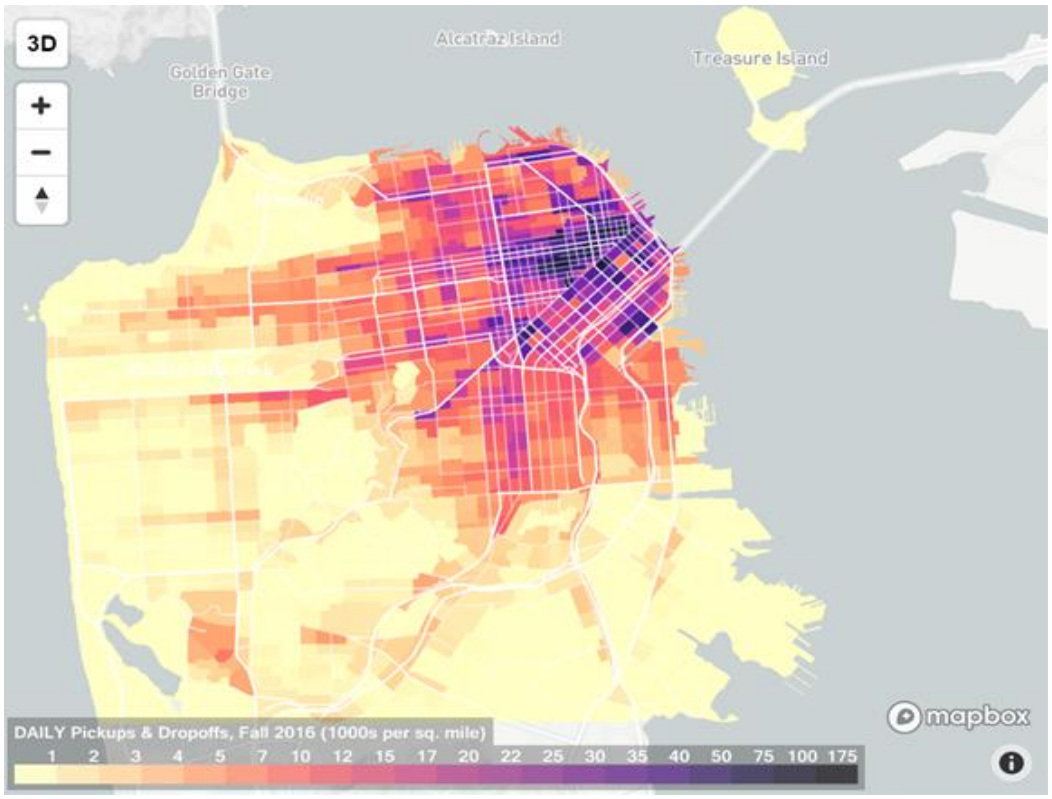


Figure 1: TNC Pickups & Dropoffs, Fall 2016

Moreover, the SFMTA has observed that the arrival of TNCs may have negatively affected ridership in part due to the prevalence of associated advertising on third-party public transportation mobile applications (see Figure 2). The outreach and research outlined in this report support the conclusion that TNC services may siphon ridership away from transit. This shift is alarming as it could impact the livability and sustainability of heavily-congested, dense cities like San Francisco.

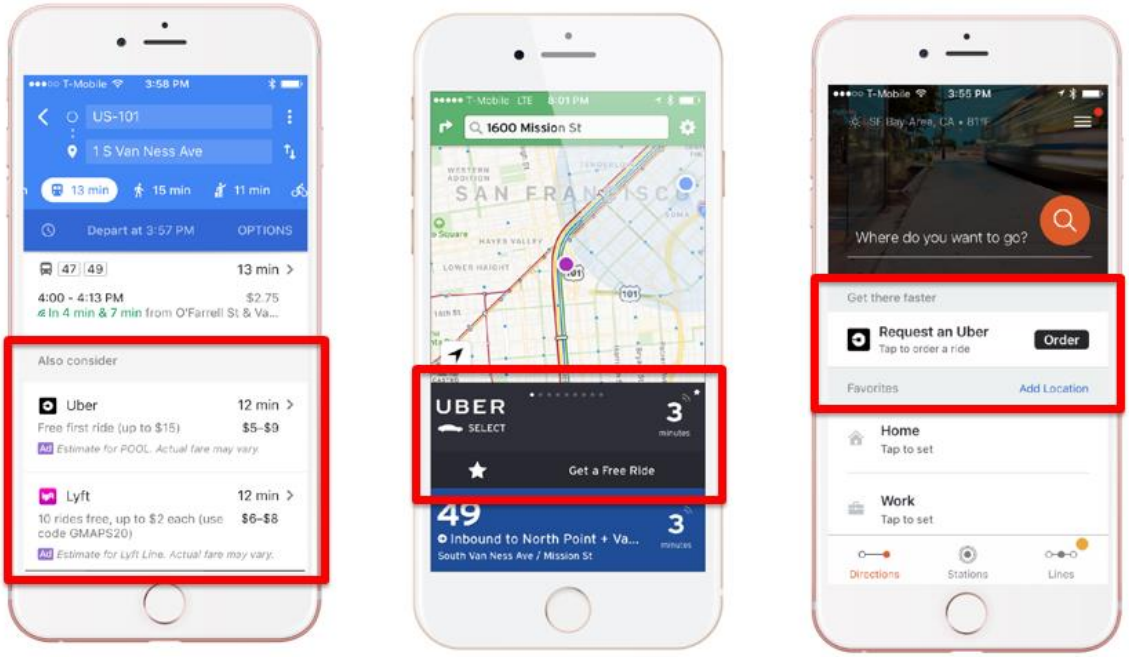


Figure 2: Popular Transit Apps Prominently Advertise TNCs

The SFMTA is thus investing in the next generation of real-time customer information to make Muni the preferred travel choice of San Francisco. By adopting technological advancements designed to align with the transportation landscape of the future, the Next Generation Customer Information System can potentially recapture, retain, and grow transit ridership. Critically, much like the first-generation system, the SFMTA can help establish best practices for real-time information, paving the way for industry-wide adoption and transit revitalization across the country.

OUTREACH METHODOLOGY

Reflecting a customer-centric approach, the SFMTA conducted extensive public outreach to assess the potential for the Next Generation System to build transit ridership, identify how customers would react to contemplated new features, and inform the next generation system's design.

This process included a comprehensive online survey and in-person qualitative research. The SFMTA sought to understand how different customers characterize, locate, and use valuable information and the specific contextual factors, reasoning, and motivations behind mode choice and information needs. Within this research, the SFMTA also created space for customers to express any other features they would like to see. This outreach has allowed the agency to validate the new system's potential to increase mode share and to uncover and incorporate customer information needs into system requirements.

This effort included focus groups involving participants with and without disabilities from diverse sociodemographic backgrounds, as well as a comprehensive multi-lingual survey of over 30 questions in both online and paper formats.

Survey

The comprehensive online survey, distributed from May to October 2017, sought to capture customer travel patterns, inner reasoning, reactions, and preferences pertaining to transit (the themes and types of questions asked are captured in Table 1). This information helped the SFMTA address its key objective: assessing how customer information could influence travel behavior towards transit.

Some key questions this research helps answer include:

- How long are customers willing to wait for transit?
- How do customers perceive that transit is "on-time" versus "late"?
- What are the salient factors influencing travel choice?
- Can providing real-time information help retain transit customers who might otherwise use another mode?
- How might third-party apps influence travel choice?
- How can real-time information improve willingness to transfer between routes?
- How can real-time information reduce behavioral differences across demographic groups?

To publicize the survey, the SFMTA leveraged press releases, social media, agency listservs and notices on digital signs at shelters and on buses. To increase participation among underrepresented populations, the SFMTA also provided Chinese and Spanish translations, and distributed paper versions to various stakeholder groups and community organizations.

With 5,856 people completing the 10-to-15-minute survey, this sample size reflects a margin of error of ±1.5% at a 95 percent confidence level.

Table 1: Survey Topics

Survey Topic	Description
Transportation System Usage	
Transportation Mode Usage	Frequency of use of Muni, other transit systems, walking, bicycling, Transportation Network Companies, taxis, employer shuttles, driving alone and carpooling
Willingness to Wait	Maximum desired wait time without any real-time information during the day, during the evening and when transferring
Direct vs. Transfer Trips	Frequency of riding a direct route vs. transfers
Fare Payment	Fare Media Usage (for example, unlimited-ride passes vs. pay-as-you-go)
Muni Route(s)	Regularly-ridden Muni routes
Customer Information	
Information Tools Usage	Usage of different information tools (for example, shelter signs, mobile apps, website trip planners, information hotline)
Mobile Apps	Usage of different mobile apps
Opinions of Existing System	Five-point scale rating of different elements of the existing system
Desired Features	Free-form response
Situational Questions (Stated Preference)	
Mode Share-Direct Trip	Mode preference in four scenarios when going from work or school: • Customer arrives at stop. Countdown sign predicts a 20-minute wait • Countdown sign displays an earlier-arriving alternative route 3 blocks away • Customer checks smartphone before walking to stop, which predicts a 20-minute wait • Customer's smartphone app also advertises for-profit TNC services
Mode Share-Transfers	Mode preference in two scenarios when going from work or school: • Smartphone app shows two routes to reach the destination but not the connection time • Smartphone app also shows estimated connection time
Crowding	Mode preference when countdown sign shows a currently full vehicle followed by a vehicle currently with space available

Demographic Questions	
Demographics	Residential ZIP code, age, ethnic background, gender identity, annual household income and disability
Motor Vehicles	Number of motor vehicles in household

Table 2: Survey Demographics

Category	Percentage
Age (n=5,789)	
Under 18	2.7%
18 to 24	8.1%
25 to 34	25.8%
35 to 44	20.1%
45 to 54	18.2%
55 to 64	12.2%
65 and above	12.9%
Gender Identity (n=5,628)	
Female	47.3%
Male	51.7%
Another Gender Identity	1.1%
Household Income (n=5,262)	
Less than $25,000	12.7%
$25,000 to $49,999	13.4%
$50,000 to $74,999	15.1%
$75,000 to $99,999	12.2%
$100,000 to $124,999	12.3%
$125,000 to $149,999	8.1%
$150,000 to $199,999	10.3%
$200,000 or more	16.1%
Race/Ethnicity (n=5,494)	
Asian/Pacific Islander	22.8%
Black/African American	3.2%
Latino/Hispanic	7.3%
Native American	0.3%
White/Caucasian	57.5%
Another Race/Ethnicity	2.9%
Multiracial	6.0%
Disability (n=5,824)	
Yes	8.6%

No	91.4%
Motor Vehicles in Household (n=5,850)	
0	30.6%
1	42.0%
2	19.7%
3 or more	7.7%

In order to capture diverse feedback and to isolate key demographic factors influencing mode choice, the survey asked voluntary questions on age, residential ZIP code, ethnic background, gender identity, household income, disability status and vehicle ownership. These demographic questions came at the end of the survey to avoid response bias. Each demographic question had at least a 90 percent completion rate.

Based on these responses as shown in Table 2, the SFMTA concludes that the survey has a geographically-representative sample from San Francisco and nearby counties fairly reflective of Muni ridership. Applying these results, the SFMTA conducted a series of binary logistic regressions to the data to determine which demographic factors most impacted transit mode choice with respect to real-time information. The results of these analyses are discussed in the following section.

Qualitative Research

To supplement the survey, the project team conducted focus groups with various stakeholders, including demographic groups that might potentially be underrepresented in the survey. This included Senior and Disability Action, Independent Living Resource Center, LightHouse for the Blind and Visually Impaired, and the Youth Commission. As well, the project team met with community stakeholders in the Bayview, Chinatown, the Mission, Potrero Hill, and Visitacion Valley.

In addition, the project team held "ride-along" immersive field research sessions with customers to observe and better understand their travel behavior. Research was conducted in diverse neighborhoods throughout San Francisco. Focus groups and 1:1 interviews lasted 90-minutes. Discussions focused on how different customers characterize, locate, and use information.

Summary

With its mixed quantitative and qualitative methodology, large sample size, and focus on underrepresented populations, the outreach conducted by the SFMTA provides a rich data set to analyze how the next generation of real-time information could influence customer

perceptions and their resultant mode choices. Moreover, with results representing a diverse ridership base, the collected data also provides empirical evidence into how demographic variables can shape travel decisions among disaggregated subpopulations.

Most importantly, the results of this research (described in the following section) demonstrate how new types of real-time information – such as alternative routes and transfer connections – could help transit providers retain and increase ridership, and present an opportunity for the SFMTA to assist transit professionals and researchers elsewhere facing similar issues.

FINDINGS

Through its extensive mixed-method research, the project team made the following findings about how customers interpret and utilize real-time information, as well as how customers perceive the utility of the existing system:

Predictions Importance

Key Findings	Implication
Nearly all customers at least sometimes rely on real-time vehicle arrival predictions when riding Muni.	The existing system remains a critical investment the SFMTA has made in improving the transit customer experience. It is therefore imperative that predictions and real-time information are accurate and meet the needs of customers.

When asked when they check for their vehicle arrival when riding Muni, a near-unanimous 94 percent of customers said they check while waiting at their stop at least "Sometimes," "Often," or "Always" (see Figure 3). This could be via the availability of signage or from a mobile app. A significant 79 percent of customers said they check while walking to their stop and 87 percent indicated they check before walking to their stop.

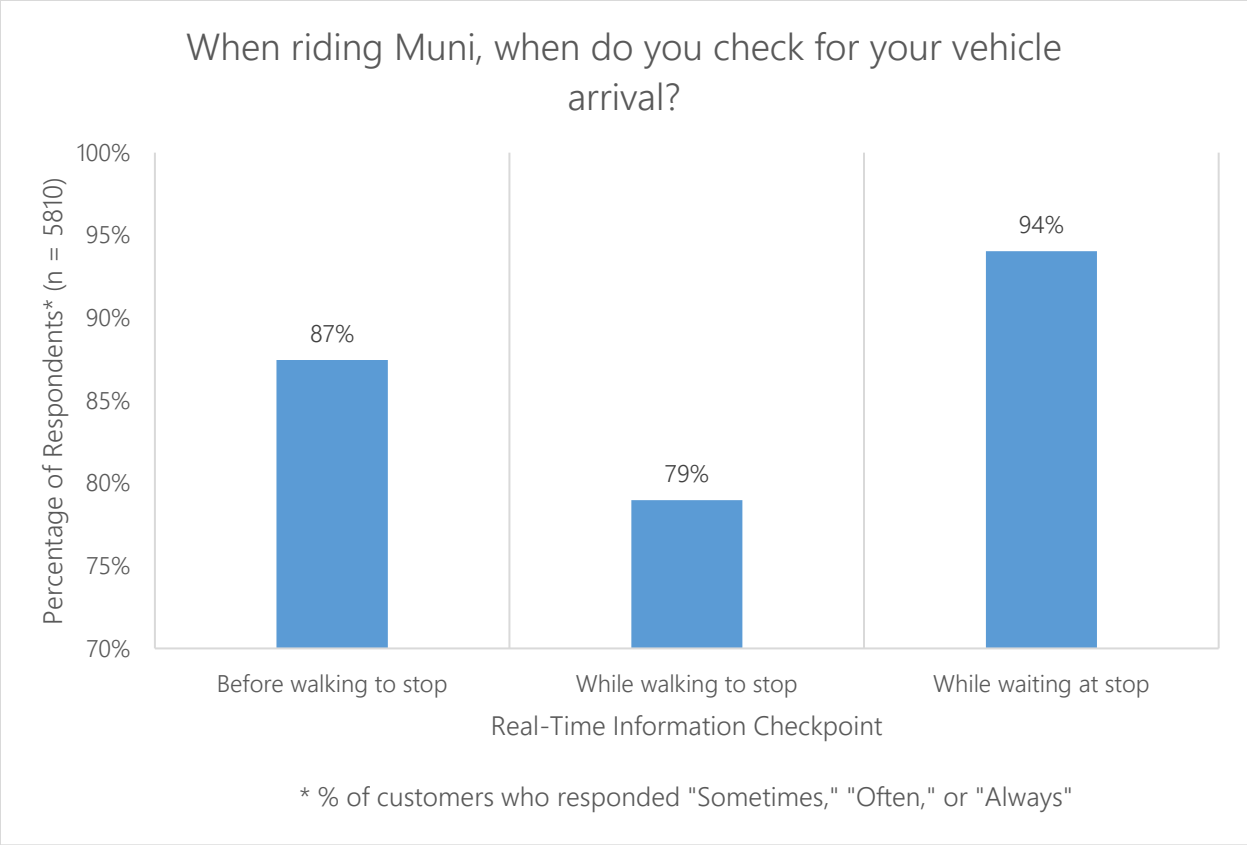


Figure 3: Customer Utilization of Real-Time Vehicle Arrival Predictions

Service Reliability

Key Findings	Implication
In lieu of on-time performance, customers use real-time information to assess whether their bus was late or on-time. While important, survey respondents reported not believing the SFMTA's predictions to be accurate, rating predictions a 2.5/5 on the online survey.	Improving prediction accuracy of real-time information can enhance customer perceptions that Muni is "reliable" and "on-time," thus increasing satisfaction and possibly one's willingness to ride transit.

Continuous, accurate real-time information is paramount to meeting customer expectations for service reliability. Transit systems that operate in mixed traffic – the vast majority of service in the United States – have challenges maintaining scheduled service frequency and consistent headways. This difference between actual and scheduled service is due to traffic congestion, variable passenger loads, the deployment of wheeltchair ramps, and other

factors. All Muni routes, including the Muni Metro light rail system, operate all or portions of their services on surface streets, making them likely to encounter headway variability.

Per City Charter Section 8A.103, "a (Muni) vehicle is considered on-time if it is no more than one minute early or four minutes late as measured against a published schedule that includes time points." Focus groups revealed that SFMTA customers rarely consult the official schedule because service is generally frequent, and timetables are only available online. When asked about vehicle "lateness," focus groups reported that they define a late vehicle as one that does not arrive according to real-time predictions.

This suggests that improving prediction accuracy can enhance perceptions that Muni is "reliable" and "on-time," thus increasing satisfaction and possibly one's willingness to ride transit.

Existing Trip-Planning Information Quality

Key Findings	Implication
When asked to rate the quality of existing trip-planning information, customer responses were mixed. Aggregating the responses of customers who rated the quality of such information as "Excellent," "Very Good," or "Good" showed that only a few elements of key trip-planning information provided by the SFMTA are considered good by a slim majority of customers.	With inadequate trip-planning information, customers may be tempted to utilize other sources of information to plan their trips or to not ride Muni at all. Many third-party providers that these customers may turn to also advertise transportation services incompatible with the SFMTA's sustainable transportation goals.

As seen in Figure 4, on a scale of 1 to 5 (1 = "Poor," 3 = "Good," 5 = "Excellent"), only 49 percent of survey respondents rated current prediction accuracy as either "Excellent," "Very Good," or "Good." (The average response was a 2.5.) This likely contributes to the widespread perception of Muni as late or delayed.

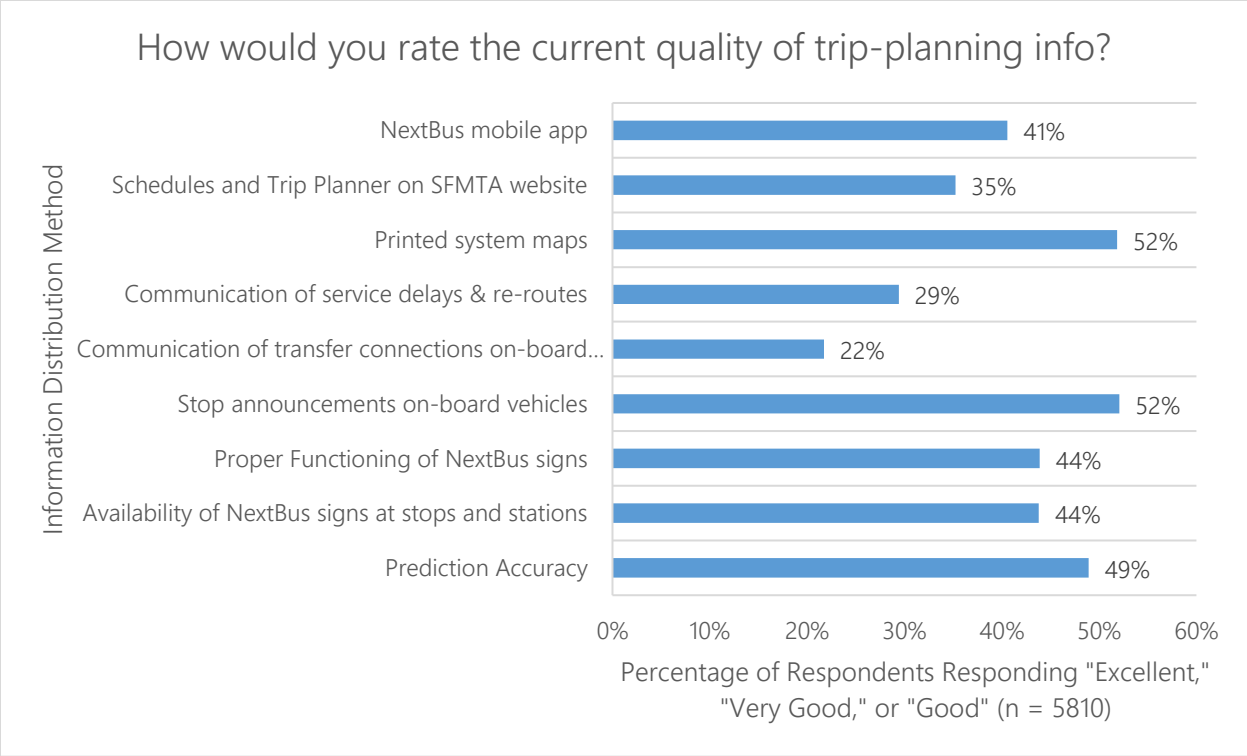


Figure 4: Customer Perceptions of Existing Trip-Planning Information Provided by the SFMTA

When service disruptions occur, the existing customer information system is unable to provide real-time information about the incident. Unsurprisingly, only 29 percent of respondents ranked the current communication of service delays and reroutes as either "Excellent," "Very Good," or "Good." (The average response was a 2.0.) By providing real-time updates on unplanned service changes and offering alternatives, the SFMTA anticipates that the Next Generation system will reduce the impacts of delays and disruptions for customers, which in turn will improve perceptions of system reliability.

Service Frequency

Key Finding	Implication
On average, most survey respondents were willing to wait only 10-15 minutes for their next Muni vehicle, and even less if a transfer is required. While the current average willingness to wait uncovered through the survey (10-15 minutes) aligns well with scheduled SFMTA daytime route frequencies, it does not align well with	Real-time information is particularly important to customers riding at night, during off-peak periods, and for transfers because service is often less frequent and missing a bus has a more adverse impact in terms of time lost.

scheduled frequencies during the night and off-peak periods (20-30 minutes).	

While Muni offers some of the highest levels of transit service in the country, there are also weaker parts of the network (see Figure 5). In some outer neighborhoods, or in general during evenings and weekends, many routes operate every 20 to 30 minutes.

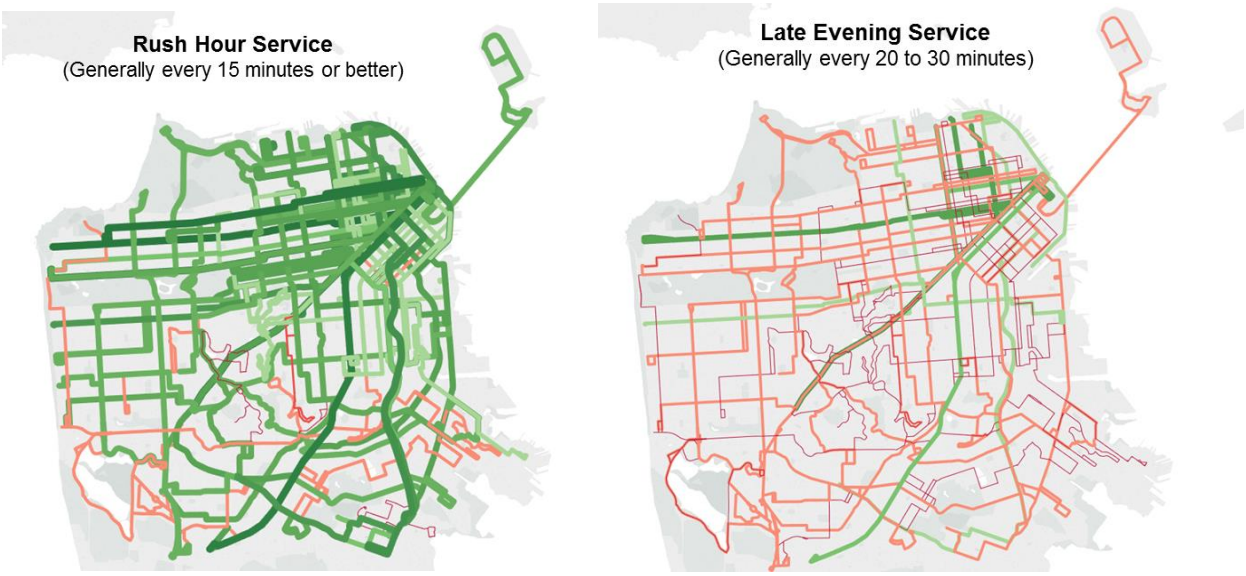


Figure 5: Muni Service Frequency (Green indicates service 15 minutes or better)

Even with this high level of service, customer expectations of maximum waiting times are also high. The survey asked respondents to indicate how long they would be willing to wait if they had just arrived at a stop without real-time information. The median respondent reported a willingness to wait between 10 to 15 minutes (see Table 3). Few people are willing to wait 20 minutes or more, which is how often many routes are scheduled to operate at night or other off-peak periods, or when there are service gaps. The willingness to wait also declines noticeably for transfers.

Table 3: Percentage of Customers Willing to Wait for Transit without Real-Time Arrival Information

Waiting Time Until Next Muni Vehicle	During the Day (n=5,856)	During the Evening or Night (n=5,856)	When Transferring (n=5,856)
5 min	97%	94%	93%
10 min	73%	67%	59%
15 min	35%	34%	22%
20 min	14%	15%	8%

30 min	5%	5%	3%

While Muni's frequent service during the daytime aligns well with customer expectations, the discrepancy between willingness-to-wait and service frequency suggests the importance of having real-time information, particularly during off-peak periods and for transfers.

OPPORTUNITIES

The SFMTA Customer Information System Project Team also uncovered the following opportunities to influence ridership that may be granted by the Next Generation System.

Transit Customer Information and Mode Choice

To measure how real-time information delivered at different times and places could impact mode choice, the SFMTA designed situational questions to test the following questions:

- Can providing nearby alternative routes with shorter waits help retain transit customers who might otherwise use another transportation mode?
- How do customers respond to transit information disseminated through third-party mobile apps that often advertise private ride-hailing services?
- Does real-time transfer information increase the willingness to transfer between routes?

The survey asked respondents to imagine scenarios where they were going home from work or school and had to wait 20 minutes, which is not uncommon if there is a service gap or during evenings and weekends. Suspecting that few respondents would be willing to wait that long, the project team designed questions to determine whether different types of real-time information could effectively extend one's willingness to wait. Without access to *any* real-time information, only 14 percent of respondents indicated they would wait all 20 minutes before abandoning transit and seeking other transportation.

In Scenario 1 (the base case), respondents arrive at their stop and see a digital sign predicting a 20-minute wait. The survey asked customers what they did the last time they encountered a similar situation. In Scenario 2, the sign suggested an alternate route three blocks away arriving sooner. In Scenario 3, before walking to their stop, customers consulted their smartphone and saw their wait would be 20 minutes. Finally, Scenario 4 was identical to Scenario 3 except that a TNC advertisement accompanied the wait prediction.

As shown in Figure 6, the presentation and content of real-time information influenced mode choice significantly, even when Muni service itself did not change.

In Scenario 1, only 45 percent of respondents took Muni, either waiting the entire 20 minutes or finding an alternative transit route on their own. Proactively suggesting an alternative route (Scenario 2) boosted Muni's mode share to 82 percent. When respondents checked a mobile app before walking to their stop (Scenario 3), 72 percent chose Muni. Finally, when the mobile app also advertised TNC services (Scenario 4), Muni's mode share fell by 7 percentage points.

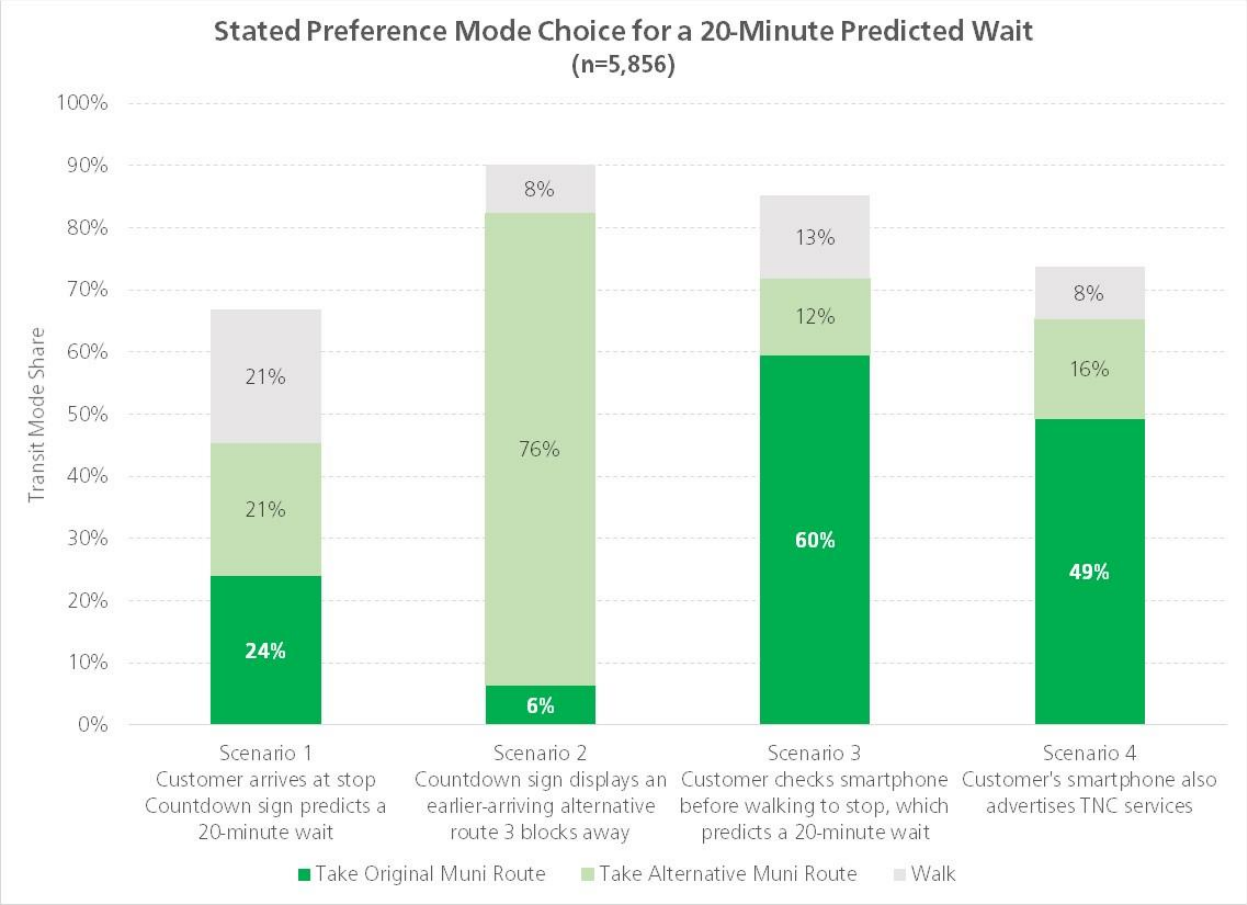


Figure 6: Stated Preference Mode Choice for Scenarios Involving a 20-Minute Wait

Demographic Variables Influencing Mode Choice

Key Finding	Implication
The more income a customer has, the more likely they are to abandon Muni service during a service delay.	Real-time information has the potential to increase customers' perceptions of reliability and in turn increase and retain ridership.
Customers living in TNC-dense ZIP codes (Marina, Hayes Valley, etc.) are less likely to ride Muni during a delay.	In TNC-dense areas, which often overlap with the densest and most frequent parts of Muni's network, and where there are generally many transportation options competing for customers, real-time information such as nearby alternative

	routes has the potential to steer customers toward public transit.

Because high-density TNC areas also overlap with the densest and most frequent parts of Muni's network (see Figure 1), there could easily be occasions where someone could take a nearby alternative Muni route rather than a TNC if the Next Generation Customer Information System informed them of that option.

To investigate the viability of this, the SFMTA conducted binary logistic regressions on customer demographics for each scenario to determine their potential influence mode share. Model results are described below (p-values were statistically significant at or below the 0.05 level).

Income

In recent years, rapid employment and population growth have contributed to widening income inequality, racial disparities, and gentrification in the San Francisco Bay Area. Coinciding with these broader economic and social trends, the proliferation of profit-driven private transportation has also raised the prospect of a two-tiered, income-based transportation system. The analysis confirms that income strongly influences transportation choices – in the base case (Scenario 1), up to a 29-percentage-point mode share difference exists between the lowest and highest income brackets (29 vs. 58 percent, Figure 7(a)).

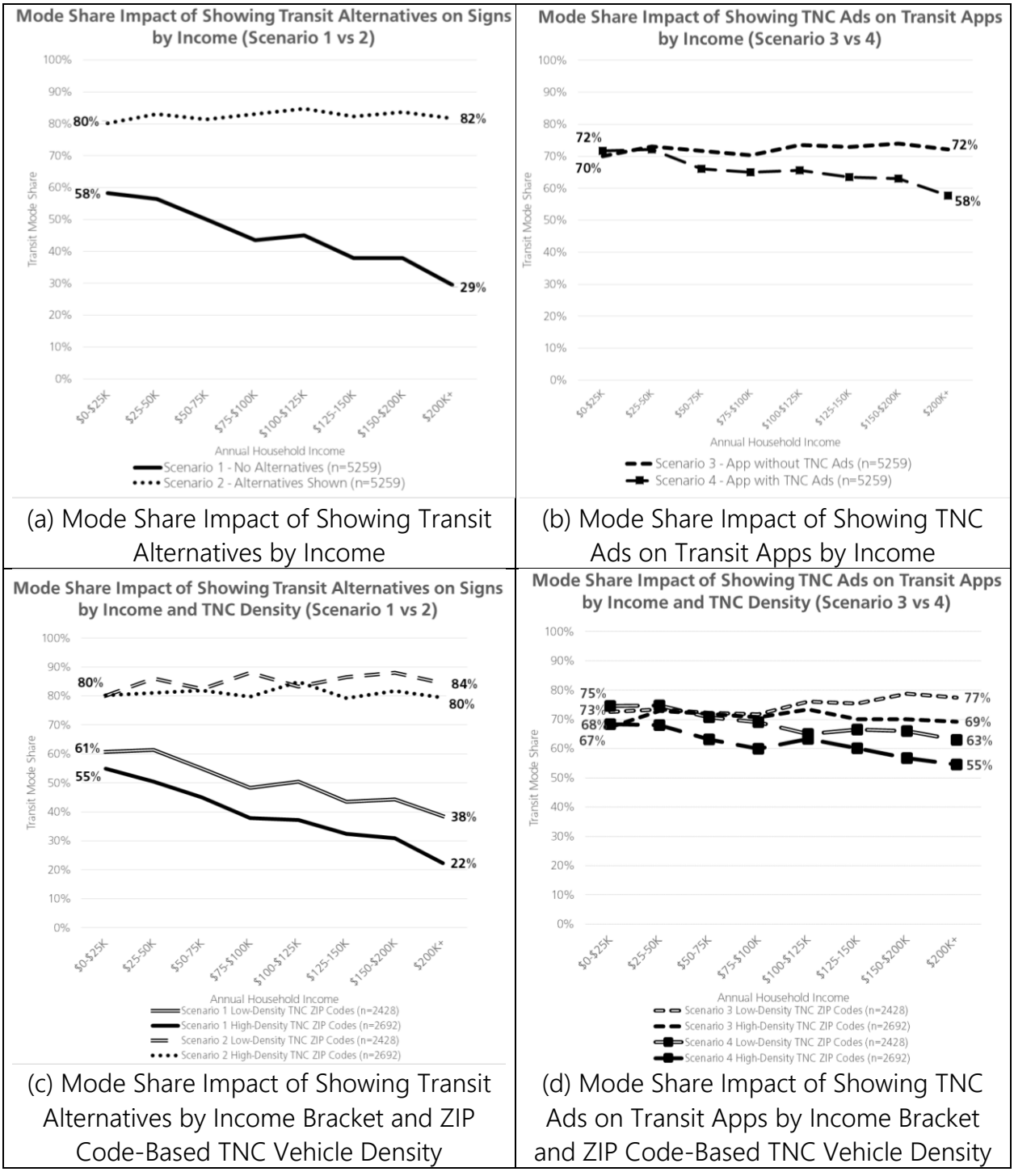
Figure 7(a) and (b) show how the next generation of real-time information might alter customer behavior to sharply reduce or even virtually eliminate the influence of income disparities on transit mode share. Faced with waiting 20 minutes at a stop (Scenario 1), people are far more likely to shift away from Muni as their income increases. In contrast, when the stop's countdown sign offers a nearby alternative (Scenario 2) or customers can consult their smartphones before walking to their stop (Scenario 3), income disappears as a statistically-significant variable. The income gap, however, reappears when customers see prediction information on a mobile app that also advertises TNCs (Scenario 4).

TNC Vehicle Density

As shown in Figure 1, TNC vehicle trips are most highly concentrated in San Francisco's northeastern quadrant, followed by outlying commercial districts. To gauge whether TNC availability influences transit ridership, the analysis assigned San Francisco ZIP codes into two categories based on TNC density.

Combining both income and TNC density, Error! Reference source not found.(c) and (d) show that people living in TNC-dense neighborhoods are statistically less likely to ride Muni

in all scenarios, and that this gap generally holds across all income brackets. Most significantly, when faced with a 20-minute wait (Scenario 1), highest-income earners living in high-density TNC ZIP codes are 16 percentage points less likely to take Muni than highest-income earners living in low-density TNC ZIP codes (22 vs. 38 percent, Figure 7(c)).



(a) Mode Share Impact of Showing Transit Alternatives by Income

(b) Mode Share Impact of Showing TNC Ads on Transit Apps by Income

(c) Mode Share Impact of Showing Transit Alternatives by Income Bracket and ZIP Code-Based TNC Vehicle Density

(d) Mode Share Impact of Showing TNC Ads on Transit Apps by Income Bracket and ZIP Code-Based TNC Vehicle Density

Figure 7: Stated Preference Transit Mode Share by Income and ZIP Code-Based TNC Vehicle Density

While these results suggest that the SFMTA currently might be losing significant ridership in high-density TNC areas, the Next Generation Customer Information System could alter this dynamic. Most strikingly, suggesting transit alternatives to avoid a 20-minute wait (Scenario 2) lifted transit mode share by 25 to 58 percentage points (55 vs. 80 percent at the lowest-income level and 22 vs. 80 percent at the highest-income level, Figure 7(c)). Because high-density TNC areas also overlap with the densest and most frequent parts of Muni's network (Figure 8), there could easily be occasions where someone could take a nearby alternative Muni route rather than a TNC if the Next Generation Customer Information System informed them of that option.

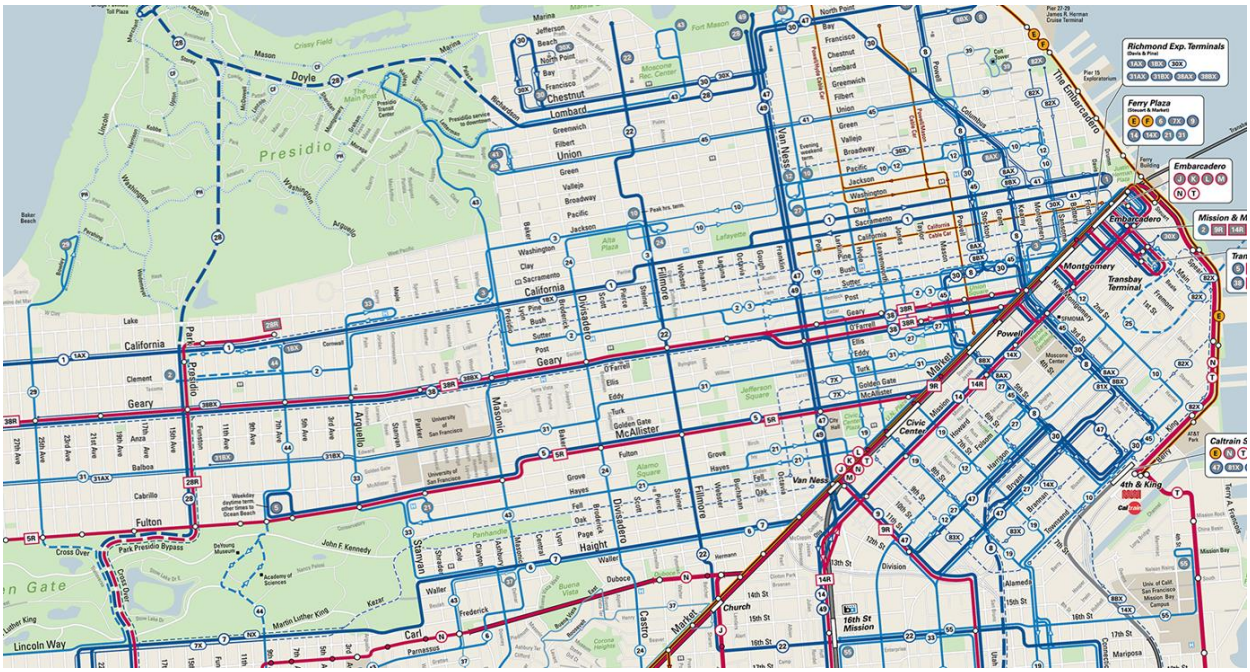


Figure 8: Muni Network Density and Alternatives

Other Notable Findings

Key Finding	Implication
Customers with prepaid passes are more likely to ride Muni than those who pay per ride. Pay-as-you-go customers might be more likely than pass holders to consider and choose other transportation modes for each trip.	In addition to increasing monthly pass usage, the agency may wish to design and promote other fare products that not only accommodate flexibility but also encourage more frequent transit use.

Providing transfer time predictions increased respondents' willingness to transfer between routes.	Real-time transfer information has the potential to keep customers in the Muni ecosystem.
When providing crowding estimate information, a significant percentage of customers stated that they lacked confidence in accuracy of such a prediction.	When designing how customers will experience real-time crowding and nearby alternative route information, accuracy is paramount.

Fare Payment Method

Likely due to the availability of SFMTA fare products for low- and moderate-income San Franciscans, including the Lifeline Pass and the Free Muni for Youth, Seniors and People with Disabilities programs, only 2 percent of survey respondents cited expensive fares as a deterrent to riding transit.

Nevertheless, the analysis uncovered a correlation between fare payment method and mode choice. Of respondents stating they rode Muni at least four days per week, 34 percent reported paying per ride, despite likely riding enough to make purchasing an unlimited-ride pass financially worthwhile. While the causality is uncertain, the SFMTA hypothesizes that by not making an upfront financial commitment to transit, pay-as-you-go customers may be deliberating more about their options for each trip and choosing other transportation modes. Consequently, the number of pay-as-you-go respondents choosing transit is a statistically-significant 5 to 14 percentage points lower than the number of pass-holders depending on the scenario (see Figure 9).

In addition to encouraging monthly passes, agencies may wish to consider other fare options that not only accommodate flexibility but also encourage more frequent transit use. Starting September 2018, the SFMTA is offering a new day pass on its MuniMobile app, lower visitor pass prices on Clipper/MuniMobile, and capped rate increases for the combined BART/Muni 'A' monthly pass.

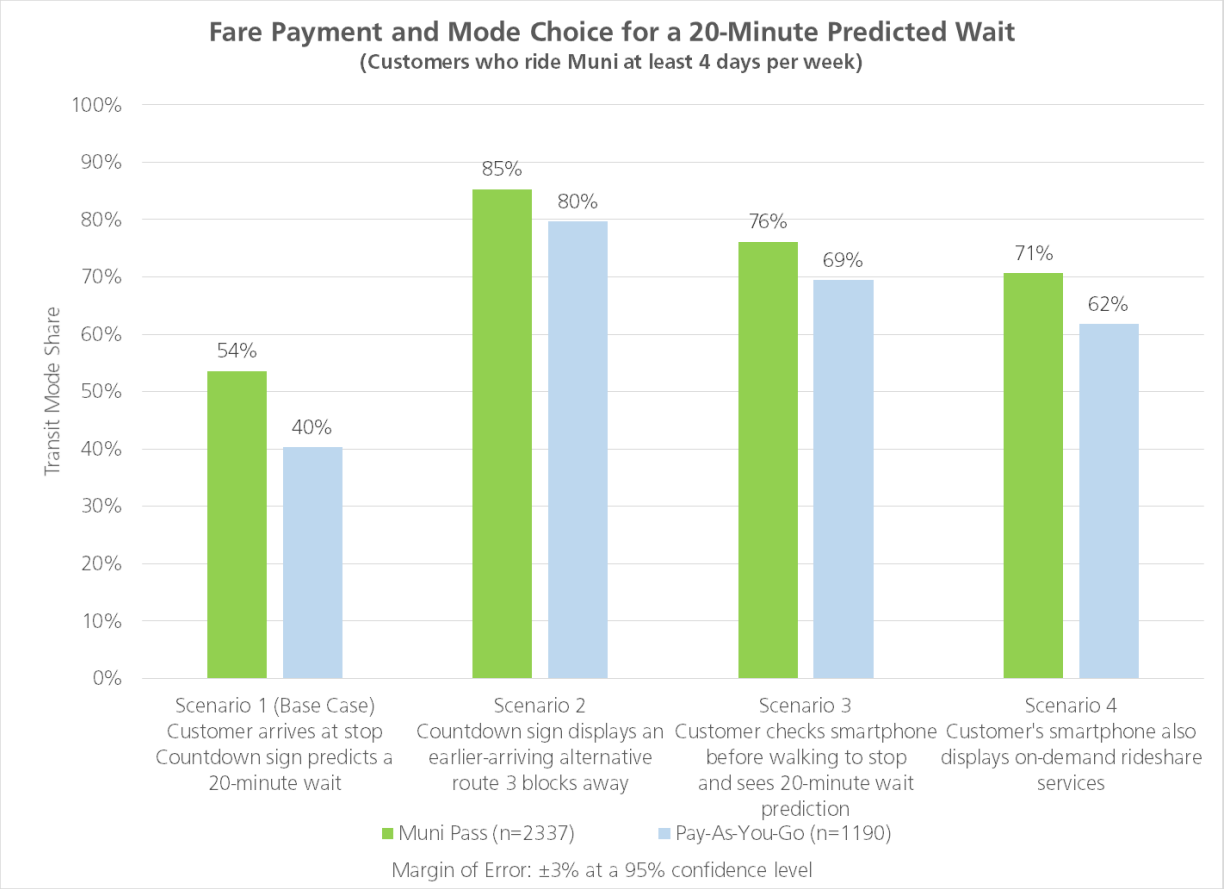


Figure 9: Fare Payment, Customer Information and Mode Choice

Transfers

Two questions asked customers how they would return home from work or school if their trip required transferring between two Muni vehicles, with and without a real-time prediction of the connection time. Respondents could choose whether they would take Muni all the way, take Muni until the transfer point and then find another transit mode to their destination, call a TNC or use a taxi. Providing transfer time predictions (assuming a hypothetical 6-minute wait) boosted the percentage of respondents who would take Muni for at least the first portion of their trip from 75 to 90 percent and for the entire length of their trip from 48 to 83 percent.

Crowding

State-of-the-art Automatic Passenger Counters installed on all buses and light rail vehicles purchased after 2014 give the SFMTA the technical ability to report ridership loads and crowding alerts in real time through its new radio communications system. To determine whether such information would be useful, the survey asked what customers would do if the countdown sign showed that a currently-full vehicle would be arriving in 2 minutes followed

by vehicle with space available in 6 minutes. In addition, the survey asked participants why they made their choice in an open-ended question.

While 65 percent chose to wait for the following vehicle, 25 percent opted to try to board the first vehicle despite it being full. In open-ended responses, customers explained that they chose the first vehicle because they did not have time to wait for the second vehicle or lacked confidence in the predictions. Many respondents felt the second vehicle would not arrive in the predicted 6 minutes, would have filled up before reaching their stop, or would have to turn back before the end of the line. While they might have felt less comfortable on the first vehicle, at least their departure was guaranteed. The extra 4-minute wait represented an additional time investment, which would leave customers feeling "burned" if the second vehicle failed expectations. Considering this feedback, the SFMTA will conduct further research to explore how best to present vehicle occupancy information.

Deterrents to Transit Ridership and How the Project Would Address Them

Finally, SFMTA's survey asked customers to recall the last time they chose another form of transportation over Muni, and to select up to two factors that influenced their decision. As shown in Figure 10, the majority of responses identified service-related factors. The Next Generation System could mitigate some of these factors and turn negative experiences into neutral or even positive ones. Over the long term, improved customer satisfaction would translate into ridership retention and growth.

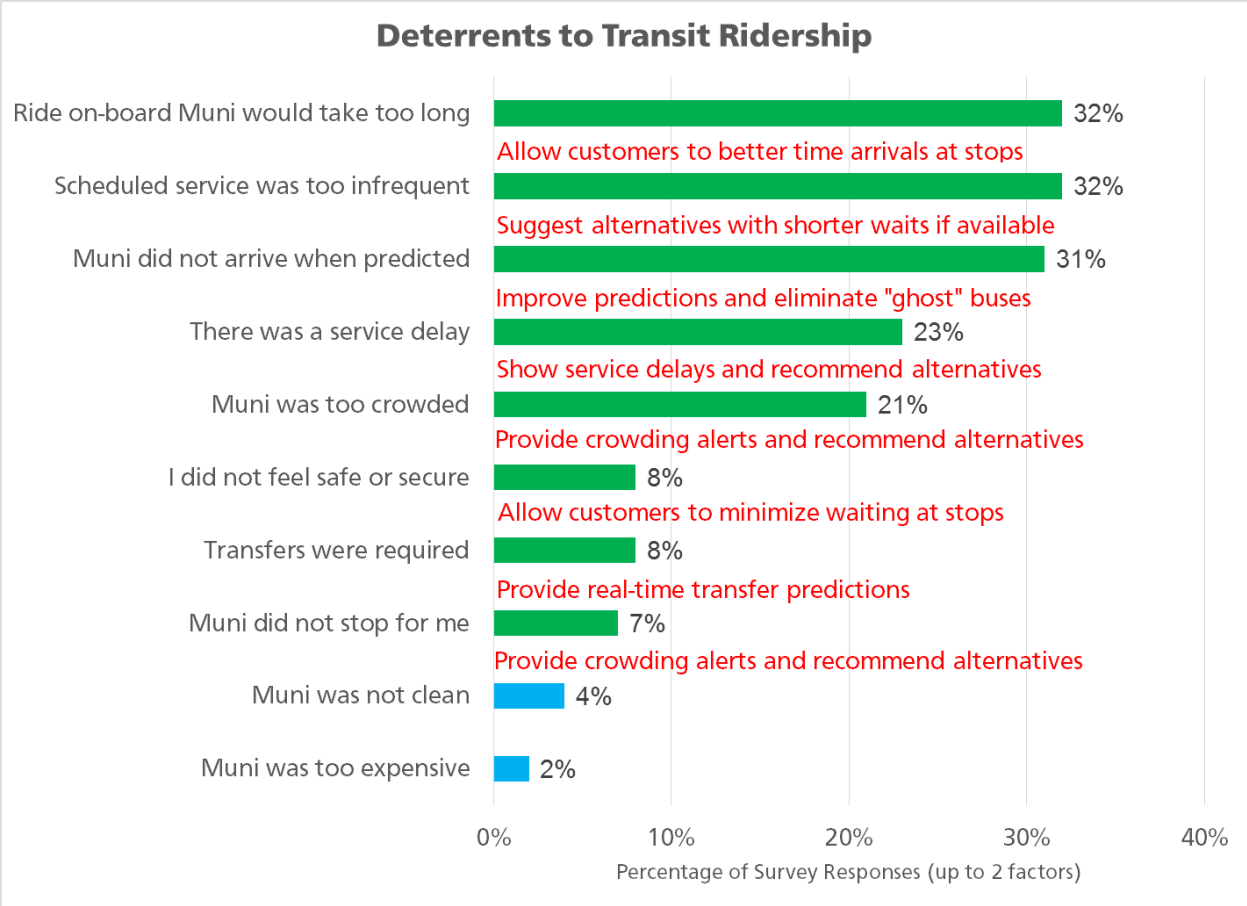


Figure 10: Deterrents to Transit Ridership and How the Project Would Address Them

INNOVATIONS

Based on what the SFMTA learned from its public outreach initiative, the Next Generation System must provide accurate, context-sensitive and comprehensive data for Muni to compete with other transportation options. Therefore, the new system will focus on: improving prediction accuracy, keeping customers continually informed, retaining those who might otherwise use less sustainable transportation modes, and using data analytics to improve service and operational planning.

Examples of innovations include:

- Employing a more sophisticated and accurate vehicle arrival predictions
- Implementing alternatively-powered signage at unpowered shelters and stops to expand customer access to information

- Reducing travel times by showing nearby alternative routes with shorter waits on digital signage at stops
- Balancing capacity by providing crowding alerts and suggesting parallel services with space available
- Strengthening network connectivity by showing transfer connection times on-board vehicles
- Communicating service delays and disruptions on-board vehicles
- Providing real-time stop and route accessibility information (e.g., elevator/escalator outage alerts) to facilitate travel for seniors and persons with disabilities
- Improving the rider experience via an enhanced mobile platform
- Using data to better understand customer preferences and improve service and operational planning

CONCLUSION

In the new millennium, San Francisco has emerged as a real-life laboratory to explore how technology can radically alter the transportation landscape. Fifteen years ago, this high-tech hub helped revolutionize the transit riding experience by informing customers when their vehicle was coming in real time. Yet this first-generation real-time transit information system has unfortunately remained relatively static. Today, San Francisco residents and visitors seemingly have more transportation options than ever – and consumer expectations have grown.

SFMTA's Next Generation Customer Information System must adapt to this reality. Traditional demand and mode choice models must also evolve in response to new transportation options. San Francisco is fortunate that Muni still attracts a ridership base representative of its ethnic and socioeconomic diversity. However, the project team's research findings suggest that the status quo could intensify inequities by dividing transportation services into two income-based systems. Losing transit customers to private or ride-hailed automobiles could lead to a downward spiral: Muni could become slower and less attractive as TNC-induced traffic congestion increases, while less fare revenue due to lower ridership could lead to service cuts and fare increases.

With these challenges also come opportunities. Using public input, the project will focus on improving prediction accuracy, keeping customers informed throughout their journey particularly with respect to service disruptions and transfers, leveraging mobile technology and offering alternatives and other supplementary information. This outreach has affirmed that real-time information at the right times and places could potentially increase transit ridership across all demographics, leading to a more equitable and sustainable

transportation system. Moreover, it will broaden transit's constituency and deepen public support for system investments that benefit all customers, including historically-disadvantaged populations.

It is SFMTA's hope that the lessons learned from implementing the Next Generation Customer Information System will in turn help other transit systems prepare for the future.

APPENDIX – STAKEHOLDERS ENGAGED

311
Access SFUSD
American Public Transportation Association
BART
Better Market Street
Building Owners and Managers Association of San Francisco
Chinatown Community Development Center (CCDC)
CivicMakers
Conduent
EMPOWER
Hotel Council
Independent Living Resource Center of San Francisco
LightHouse for the Blind and Visually Impaired
Mayor's Office of Disability
Mayor's Office of Neighborhood Services
Mercy Housing
Northwest Transit Exchange
Paratransit
Rail~Volution
Rebuild Potrero
San Francisco Board of Supervisors
San Francisco Mayor's Office
San Francisco Transit Riders
SaveMuni
Senior & Disability Action Network
SF Travel
SFMTA Board of Directors
SFMTA Citizens' Advisory Council
SFMTA Multimodal Accessibility Advisory Committee (MAAC)
SFMTA Policy and Governance (PAG)
SPUR
The Public Voice
TransitCenter
Transbay Joint Powers Authority
Transit Riders Union
Transportation Research Board
UCSF Parnassus
Youth Commission

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City and County of
San Francisco

Request for Proposals for
Next Generation Customer Information System

RFP No. SFMTA-2019-01

(CCO No. 18-1474)

Date Issued:	September 5, 2018
Pre-Proposal Conference:	October 3, 2018 at 1 pm PT
Proposal Due:	November 16, 2018 at 2 pm PT

San Francisco Municipal Transportation Agency (SFMTA)
Request for Proposals for Next Generation Customer Information System

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I. Introduction and Schedule

A. General

The San Francisco Municipal Transportation Agency (SFMTA) seeks Proposals from qualified firms to develop, construct, and maintain the Next Generation Customer Information System (Next Generation System or Project), a new real-time vehicle arrival and service update system for the San Francisco Municipal Railway (Muni) public transportation network.

The Next Generation System will replace an existing real-time passenger information system (Existing System) that has served San Francisco for more than 15 years, and leverage transportation technology innovations to help customers make better travel decisions and improve the overall public transit experience.

The SFMTA's contract with the vendor of the Existing System expires on July 31, 2019. The SFMTA is currently working to extend this contract to allow for a seamless transition from the Existing System to the Next Generation System. The Contractor for the Next Generation System must work with the vendor of the Existing System to ensure there is no interruption in service during the transition period.

The Scope of Services (Services) are described in Section II. Description of Services and Appendix H: Detailed Scope of Services. The SFMTA anticipates the successful Proposer (Contractor) will perform the Services in two phases. At a high level, Phase I is the implementation period system setup, which includes a for a 1-for-1 replacement of the Existing System and the installation of the Next Generation System at Central Subway stations, while Phase II is the implementation period for enhancements. The SFMTA is utilizing this phased approach so that the Contractor can manage the implementation of a complex project with many requirements while ensuring that customers experience a seamless transition from the Existing System to the Next Generation System.

The SFMTA anticipates awarding a contract for the Next Generation System (Agreement) for an initial term of six years that includes an equipment installation period plus five years of operations, with the option to extend for up to two five-year terms. The Agreement's total term, as extended, will not exceed sixteen years.

B. Project Background

Operated by the SFMTA, Muni is the backbone of the City and County of San Francisco's (City's) multimodal transportation network, providing approximately 725,000 average weekday trips with a growing fleet of over 1,100 vehicles consisting of electric trolley coaches, motor coaches, light rail vehicles, historic streetcars and cable cars. Muni operates approximately 80 routes and serves over 3,500 stops.

The Next Generation System must be designed to increase public confidence in Muni so customers can take public transit to their destinations quickly and reliably anywhere in San Francisco. By retaining and growing transit ridership, the Next Generation System will contribute to the City's and region's mobility, accessibility and economic health.

In 1999, the SFMTA helped revolutionize the transit-riding experience by launching the nation's first large-scale real-time transit information system. This Existing System revolutionized how people used transit by providing them with estimated Muni arrival times. This basic model, still largely employed throughout North American transit systems, delivers vehicle arrival predictions through countdown signs located at waiting shelters and stations, and through mobile applications (apps) and online.

The SFMTA is looking to leverage the many innovations in technology and transportation that have occurred in the past 15 years to create a much more advanced Next Generation System with the latest readily-available technology that satisfies and even exceeds today's customer expectations. Over the years, customers have grown accustomed to app-based on-demand transportation services and real-time information throughout one's journey. The Next Generation System must adapt to an evolving, more competitive transportation landscape.

To develop the requirements for this RFP, the SFMTA conducted extensive public outreach to determine the highest-priority desired enhancements. Over 5,800 customers representing the diversity of SFMTA customers responded to an extensive survey conducted both online and on paper. In addition, the SFMTA conducted many qualitative outreach sessions to understand how information could influence travel behavior. Through this research, the SFMTA identified opportunities for improved real-time information to better serve customers and attract transit ridership.

Guided by public feedback, the Next Generation System will employ the latest technology to make transit easier and more convenient to ride in an environment of increasing transportation choices and congestion. Examples of innovations include:

- Develop a more sophisticated and accurate solution to predict vehicle arrivals and generate other customer information
- Implement alternatively-powered signage to expand access to information at selected unpowered shelters and stops
- Reduce travel times by showing nearby alternative routes with shorter waits on digital signage at stops
- Balance capacity by providing vehicle crowding alerts and suggesting parallel services with space available
- Strengthen network connectivity by showing transfer connection times on-board vehicles
- Communicate service delays and disruptions on-board vehicles through mobile alerts and apps
- Provide stop accessibility information and elevator/escalator outage alerts to facilitate travel for seniors and people with disabilities
- Use data from mobile technologies to understand customer preferences and improve service and operational planning

C. Project Goals

The Next Generation System will position the SFMTA to compete more effectively in an environment of increasing transportation choices. Extensive research confirms that enhanced real-time information throughout one's entire journey has the potential to enable the SFMTA to achieve the following Project goals:

1. Increase ridership through discretionary travel
2. Shift people towards more sustainable transportation options
3. Reduce waiting and total travel time
4. Help customers make better travel decisions, particularly when faced with service disruptions and gaps

D. Schedule

The tentative schedule for this RFP is shown in Table 1**.** The SFMTA reserves the right to change this schedule at any time.

Table 1: Key Procurement Dates

Event	Date
RFP is issued by the SFMTA:	September 5, 2018
Pre-Proposal Conference:	October 3, 2018
Deadline for submission of written questions or requests for clarification:	October 12, 2018
Proposal due date:	November 16, 2018

E. Pre-Proposal Conference

The SFMTA encourages Proposers to attend a Pre-Proposal Conference on October 3, 2018 from 1:00 pm to 4:00 pm, to be held at SFMTA Headquarters at 1 South Van Ness Ave, 7th Floor, San Francisco, California. The SFMTA will address Proposers' questions and will provide any new or additional information concerning the RFP or selection process at the Pre-Proposal Conference.

The Pre-Proposal Conference will begin at the time specified, and Proposer representatives are urged to arrive on time. The SFMTA will not repeat topics already covered for the benefit of late arrivals. Failure to attend the Pre-Proposal Conference will not excuse the successful Proposer from any obligations under the Contract.

F. Clarification Questions

Proposers must submit all clarification questions concerning this Request for Proposals in writing by email and only during the question-and-answer period, ending October 12, 2018, no later than 5:00 pm Pacific Time and directed to: Carlos.Peza@sfmta.com.

Please include "SFMTA-2019-01" in the subject line of your email.

Questions and answers will be posted publicly at the Office of Contract Administration's (OCA) Bid and Contracts Listing website: http://mission.sfgov.org/OCABidPublication. It is the responsibility of Proposer to check the Website for posting of questions and answers.

G. Contractors Unable to do Business with the City

1. General

Proposers that do not comply with laws set forth in San Francisco's Municipal Codes may be unable to enter into a contract with the City. Some of the laws are included in this RFP, or in the sample terms and conditions that the SFMTA will provide as part of an upcoming Addendum.

2. Companies Headquartered in Certain States

The Contract awarded, if any, under this procurement will be subject to the requirements of Administrative Code Chapter 12X, which prohibits the City from entering into contracts with companies headquartered in states with laws that perpetuate discrimination against LGBT populations or where any or all of the work on the contract will be performed in any of those states. Proposers that have their United States headquarters in a state on the Covered State List, as that term is defined in Administrative Code Section 12X.3, or where any or all of the work on the contract will be performed in a state on the Covered State List, may not enter into contracts with the City. A list of states on the Covered State List is available at the website of the City Administrator: http://sfgsa.org/chapter-12x-anti-lgbt-state-ban-list

II. Description of Services

This Section II provides a general description of the Next Generation System and its structure, as well as the anticipated phasing of the Services. Please refer to Appendix H: Detailed Scope of Services in this RFP for more specific requirements.

A. Elements of the Next Generation System

The successful Proposer (Contractor) must implement a system that is based on proven solutions that use current technologies, and must provide all required hardware, software, training, documentation, warranties and maintenance services necessary as described in Appendix H: Scope of Services. In general, the Scope of Services for the Next Generation System includes the five elements listed below ("Elements").

1. System Software
2. Stationary Digital Signage
3. On-Board Digital Signage
4. Mobile Platform & Website
5. Analytics Platform

In ***Figure 1***, the SFMTA provides a conceptual diagram of the Next Generation System and how the Elements interrelate at a high level.

Contractor must also integrate the Next Generation System with other SFMTA systems and other third-party transportation apps. The Contractor must coordinate with current or future vendors managing those systems or hardware components to develop an interface standard that will enable those vendors to either retrieve or receive real-time information data.

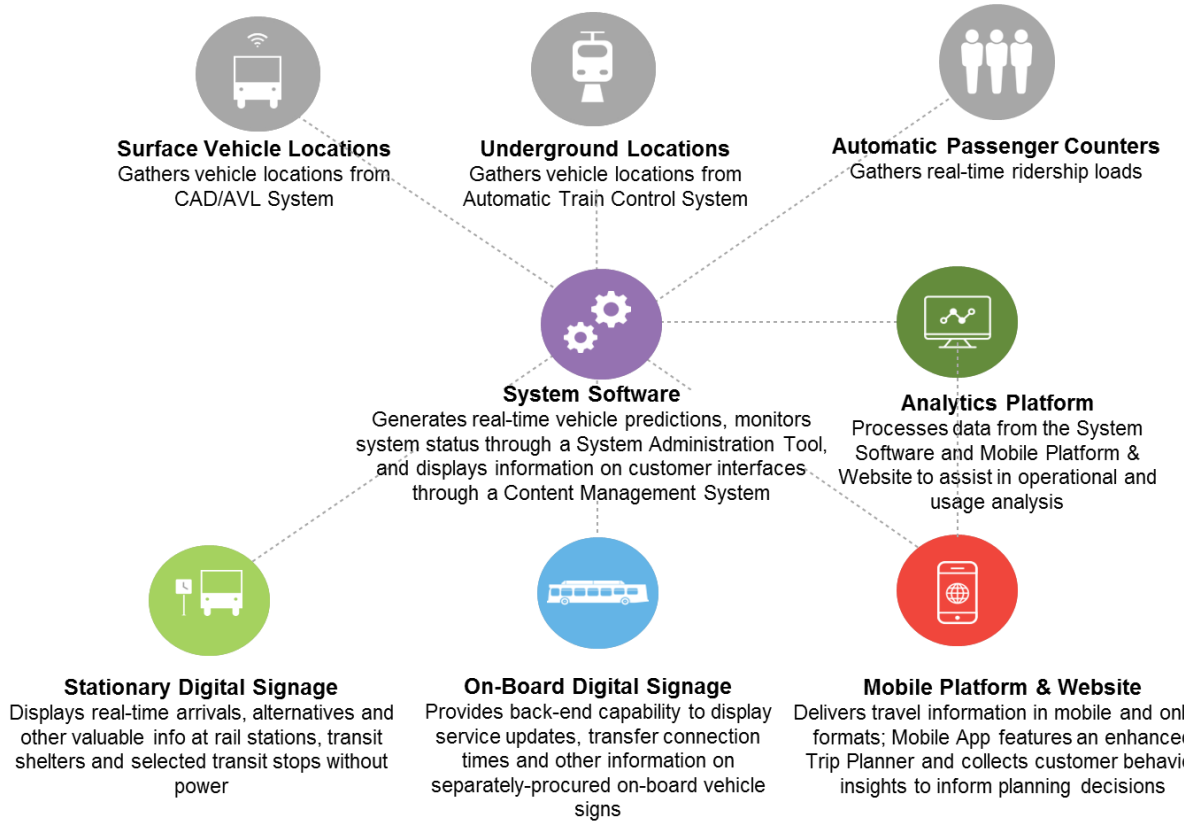

Figure 1: Next Generation Customer Information System Elements

1. System Software

Contractor must provide software (System Software) that generates Customer Information, monitors system status through a System Administration Tool, and displays context-specific information on variety of customer interfaces through a Content Management System. Customer Information must include vehicle arrival predictions, transfers, alternatives, itineraries and other information that the Next Generation System will generate for display on customer-facing interfaces. The System Administration Tool must enable SFMTA to configure and interface with the System Software, and the Content Management System must allow the SFMTA to format content presented to the public.

The System Software must also generate Customer Information to display on customer-facing interfaces and devices – Stationary Digital Signage, On-Board Digital Signage, and the Mobile Platform & Website – described below.

2. Stationary Digital Signage

Contractor must replace the existing Stationary Digital Signage, where real-time signs are currently provided by the vendor of the Existing System, with Contractor-furnished signage at the over 850 locations. The Contractor must also install Stationary Digital Signage at an undetermined number of new locations where real-time signs currently do not exist.

Stationary Digital Signage consists of multiple types of screens located at underground rail stations, above-ground rail platforms and rail and bus stops, including stops with shelters lacking electrical power and those without shelters at all. These signs will provide next vehicle arrival predictions, service alerts and nearby alternatives if applicable.

3. On-Board Digital Signage

As opposed to on-board systems that only provide pre-recorded content, the SFMTA is considering implementing a future on-board signage system that will also provide dynamic real-time information to assist customers along their journey.

Contractor's System Software must generate Customer Information to display on future On-Board Digital Signage aboard rubber-tire vehicles (motor coaches and electric trolley coaches) and light rail vehicles. These signs, which the SFMTA intends to procure under a separate contract directly with a signage supplier and/or through a vehicle manufacturer, will give customers real-time information such as a vehicle's current location, predicted arrival times for upcoming stops, transfer opportunities and connecting times with other routes, and unplanned service changes. Contractor will be required to integrate the Next Generation System with the supplier of future On-Board Digital Signage.

4. Mobile Platform & Website

Contractor must develop trip planning tools and provide real-time information on SFMTA's online and mobile platforms. These tools will permit customers to access information through electronic devices such as a desktop computer, laptop, tablet or mobile app. Contractor shall design its trip planning tools and real-time information to be accessible on as many electronic devices as possible to maximize the number of communication channels available to customers.

5. 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 system-generated 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 informed planning and operations decisions

B. Systems Integration

The Next Generation System will operate within a complex technical ecosystem guiding the deployment, tracking and management of SFMTA transit vehicles. **Figure *2*** is a high-level schematic example of how the Next Generation System might integrate with other major SFMTA software and hardware systems.

SFMTA's current technical environment represents a combination of legacy systems and new initiatives. Proposers must review the details of SFMTA's Technical Environment (please see Appendix L: Technical Environment and propose effective solutions to achieve requirements

outlined in this RFP. Proposers do not necessarily need to replicate the Existing System, particularly with regards to communications and interfaces with other systems.

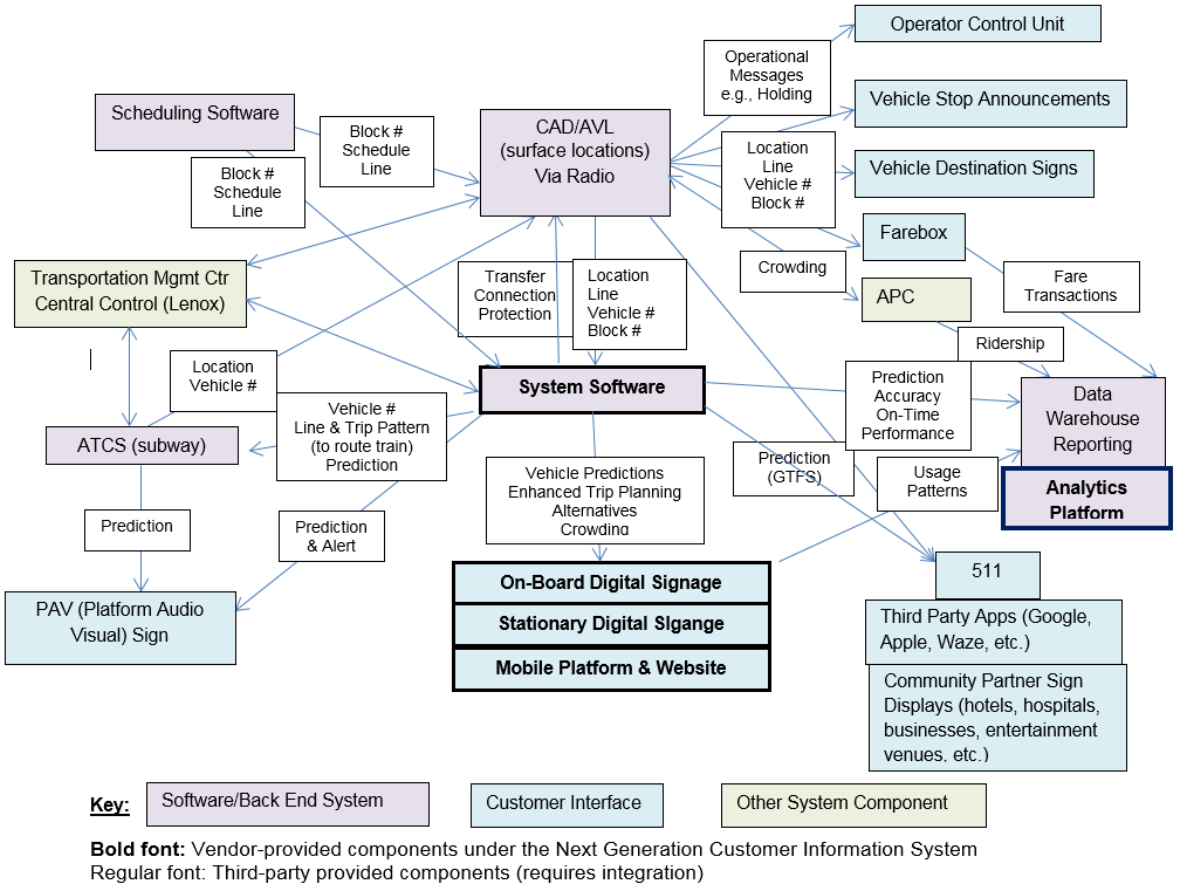

Figure 2: Next Generation Customer Information System Integration Diagram

C. Project Implementation

Contractor must complete the Services in two phases:

1. Phase I – Base System

Phase I is the implementation period for a 1-for-1 replacement of the Existing System and the installation of the Next Generation System at Central Subway stations. Contractor must develop and implement parts of the System Software needed to provide basic vehicle arrival predictions, replace the Stationary Digital Signage with Contractor-furnished signage at locations where real-time signs are currently installed, install new Stationary Digital Signage at Central Subway stations prior to opening of that rail extension, and add basic trip planning functionality to the Mobile Platform & Website.

During the transition from the Existing System to Phase I of the Next Generation System, Contractor must ensure a seamless transition such that customers continue to receive uninterrupted real-time information on all of the Existing System's customer interfaces, including Stationary Digital Signage. Contractor must also work with the SFMTA to enable third parties that currently utilize Existing System predictions to transition to the Next Generation System without interruption. During the transition period, Contractor must cooperate fully with the Existing System's vendor.

2. Phase II –System Enhancements

Phase II is the implementation period for system enhancements. Enhancements include adding features to the mobile app, expanding signage, and providing better transfer and route alternatives information. Contractor must install Stationary Digital Signage at new locations where real-time signs or not currently provided, coordinate with SFMTA contractors who will install future On-Board Digital Signage, and perform the Analytics Platform Services .

D. Maintenance Services

Contractor must provide support and maintenance of all features of the Next Generation System, including both hardware and software. Contractor's support operation of the Next Generation System will include: (1) Customer Support Services, (2) Stationary Digital Signage Maintenance Services, (3) Software Maintenance Services, and (4) Communication Maintenance Services.

III. Submission Requirements

A. Time and Place for Submittal of Proposals

Proposals must be received by 2:00 pm PT on November 16, 2018. Proposers must submit their Proposals in an electronic format, either by email to Carlos.Peza@sfmta.com or on a USB drive to:

Carlos F. Peza
SFMTA Contracts & Procurement
One South Van Ness Ave., 3rd Fl.
San Francisco, CA 94103-5417

For emailed Proposals, Proposers are fully responsible for ensuring their Proposals are received by the time and date indicated. The SFMTA will not accept late Proposals, even in cases of known email system failure. Accordingly, if using email, Proposers are encouraged to submit their Proposals at least 24 hours before the time and date due.

B. Proposal Format

All electronic documents that comprise Proposal must be legible and easily viewable on a computer monitor, laptop, or (electronic) tablet. Text in Proposals must be unjustified (i.e., with a ragged-right margin), and font must be 11-point or larger serif (e.g., Times Roman, and not Arial). Pages must have margins of at least 1" on all sides (excluding headers and footers).

All electronic files must include scanned portable document file (PDF) copies of all documents and forms that require signature. Signatures must be by an official from a firm on Proposer's team authorized to submit a Proposal on behalf of the Proposer team.

Proposals shall be submitted in six separate electronic files, as listed below. Each such electronic file shall be clearly marked "SFMTA 2019-01" and, as applicable, "Part 1," "Part 2," "Part 3," etc.

- Part 1 – Written Proposal: One electronic copy of the Written Proposal (See Section III.C for content and organization requirements for the Written Proposal), including completed and signed Appendices D, E and F of this RFP. The Conceptual Design Document, the Proposer's Financial Statements, and Performance Requirements Worksheet should be included as separate files on the electronic submission.
- Part 2 – Conceptual Design Document: One electronic copy of the Conceptual Design Document (See Section E. Part 2 – Conceptual Design Document for content and organization requirements).

Part 3 – Performance Requirements: One electronic copy of the completed Appendix K: Performance Requirements (Performance Requirements Worksheet) (See Section

- F. Part 3 – Performance Requirements)
- Part 4 – Financial Information and Subcontractor Commitment Letters: One electronic copy of Proposer's Financial Information and Subcontractor Commitment Letters (See

Section G. Part 4 – Financial Information and Subcontractor Commitment Letters for content and organization requirements).

- Part 5 – Cost Proposal: One electronic copy of the completed Appendix G: Cost Proposal (See Section H. Part 5 – Cost Proposal).
- Part 6 – CMD Attachment 2: One electronic copy of the completed and signed forms provided in Appendix A: CMD Attachment 2 (see Section I. Part 6 – CMD Attachment).

C. Proposal Content and Evaluation Criteria

Each of Part 1 through Part 6 of Proposal must include the items described in Section III.D through Section III.I, respectively, organized in the order set forth therein.

The evaluation criteria, type of evaluation (e.g., pass/fail v. scored evaluation), and maximum points (if any) that apply to each item are set forth in Section III.D though Section III.I, immediately after the item's description. Page limits are indicated for each item where applicable. Formatting requirements are set forth in Section III.B.

Failure of Part 1 through Part 6 of Proposal to include the items requested in this Section III.D through Section III.I, as applicable, section may result in a determination by the SFMTA that the entire Proposal is non-responsive.

D. Part 1 – Written Proposal

Include in Part 1 of Proposal all items requested under this Section III.D, in the order specified herein. The maximum number of points available for the entire Written Proposal shall be 160.

1. Letter of Introduction

Provide a Letter of Introduction that includes the following:

(a) A brief summary of Proposer's team, its experience, the Proposal content, the name, title, phone number, email address of the Proposer's team contact.

(b) A statement confirming Proposer is willing and able to perform the Services described in the RFP if the SFMTA selects it as the successful Proposer.

(c) A statement confirming the Cost Proposal was arrived at independently, without collusion, consultation, communication, or agreement as to any matter related to the Proposal with any other Proposer

(d) A statement acknowledging the Proposal, including Cost Proposal, is valid for a period of 270 days

(e) In Accordance with Administrative Code Chapter 12X, the Letter of Introduction shall also contain the following statement: "I certify that my company is headquartered at the following address, _____. I will notify the City if my company's headquarters moves."

The Letter of Introduction must be signed by an authorized representative of the Proposer. The authorized representative must have authority to obligate the Proposer team to perform the commitments made in the Proposal. The Letter of Introduction must not exceed three pages.

Evaluation Criteria: Proposal includes a Letter of Introduction that meets the requirements of Section III.D.1.

Evaluation Basis: Pass/Fail

2. Table of Contents

Provide a table of contents showing the applicable section headings and sub-headings, section numbering, and page numbers.

Evaluation Criteria: Proposal includes a table of contents that meets the requirements of Section III.D.2.

Evaluation Basis**:** Pass/Fail

3. Executive Summary

Provide an executive summary of Proposer's solution and indicate how the solution addresses the SFMTA's goals for the Project, described in Section I.C.

The executive summary shall be no longer than 4 pages.

Evaluation Criteria: Proposal includes an executive summary that meets the requirements of Section III.D.3.

Evaluation Basis: Pass/Fail

4. Proposer's Team & Management Structure

Provide the narrative descriptions and charts listed below to describe Proposer's team and management structure. The narrative descriptions and charts shall not to exceed six pages in the aggregate.

(a) Proposer's Team – List all business entities (e.g., prime and subcontractors, any relevant joint venture or partnership agreement) that comprise Proposer's team. For each such entity, state the number of years it has been in existence.

(b) Technical Capability – Describe the technical capability and proposed roles and responsibilities of each member firm of the Proposer team, including any known subcontractors. With respect to roles and responsibilities, identify which business entity or entities will be responsible for each Element of the Project's Scope of Services, described in Appendix H.

(c) Management Structure – Describe Proposer's team and management structure, including a description of any teaming arrangements, and identification of the team member who will lead Proposer's team and function as the SFMTA's primary point of contact. Describe how Proposer's management structure would facilitate completion of the work required for the Next Generation System by phase (i.e., Phase I and Phase II).

(d) Organization Chart – Provide an organization chart showing Proposer's internal organizational structure, subcontracting organization, and reporting requirements, and other material personnel Proposer wishes to identify, and their reporting relationships. The organization charts must highlight key areas of scope and risk for the Project.

(e) Data Interpretation Services – Describe Proposer's approach to provide objective and independent interpretation of data, while avoiding potential conflicts of interest that might arise from self-evaluation (e.g., determining how Proposer's own predictions impact transportation mode choice and achieve other project goals).

(f) Distinguishing Factors – Describe how Proposer's team distinguishes itself from other competing Proposers.

(g) Communications Structure – Describe Proposer team's internal communication and coordination protocols among all levels of Proposer's organization and with the SFMTA.

(h) Experience Working Together – Describe any prior experience of Proposer's team, including any known subcontractors, working together on projects similar in size and scope to the Next Generation System.

Evaluation Criteria:

i. Proposer's team demonstrates the required technical capability, technical experience, management and communications structures, experience of working together to successfully perform the work required for the Next Generation System, and independence.

ii. Proposer's organization is clearly and logically shown on the organization charts, and targets key areas of scope and risk for the Project

Evaluation Basis: Scored (35 points maximum)

5. Key Personnel

Provide the following information about key personnel:

(a) A list of the names and titles of Proposer's project manager, the individual(s) providing the Data Interpretation Services (see 6.3.2 Data Interpretation Services of Appendix H: Detailed Scope of Services), and all other key personnel on Proposer's team. For each key personnel, provide a brief summary of their company affiliation and proposed role. This list shall not exceed one page.

(b) An organization chart showing all key personnel on Proposer's team. This organization chart shall not exceed one page.

(c) For each key personnel, a résumé that clearly provides the following information: (i) the specific title or position the individual would fill on Proposer's team; (ii) the individual's

project experience (by project name), including specific projects on which the individual performed a role comparable to their potential role on the Project, and how that experience relates to their potential role on the Project; and (iii) the names, telephone numbers, and email addresses of not less than three professional references. References must be from project owners or clients only. Limit each résumé to 3 pages.

(d) A written assurance from Proposer's lead firm that the key personnel listed and identified will perform the Services if Proposer is awarded a contract under this procurement. This written assurance shall affirm that key personnel will not be substituted or reassigned to another project without the SFMTA's prior approval.

Evaluation Criteria: The extent to which Proposer's key personnel and other proposed personnel (if any) demonstrate the experience necessary to perform the roles for which they are identified and would provide value to the SFMTA and the Project.

Evaluation Basis: Scored (15 points maximum)

6. Proposer's Experience

Provide a list of no more than three transit-related projects or service contracts on which Proposer's team, including any known subcontractors, performed services similar in scope and complexity to those described in Appendix H: Detailed Scope of Services. Such projects or service contracts may include any performed for the SFMTA. One of these projects or service contracts must involve real-time predictions as a key component.

For each project or service contract provide the information listed below. Limit to two pages the information provided for each project or service contract.

(a) Name of project or service contract.

(b) Summary description of the project or service contract, and Proposer team member's scope of services for the project or service contract. Indicate whether scope of services included development, construction, and maintenance of passenger information or similar systems. Describe how, if at all, the project or service contract is similar in size and scope to the Next Generation System.

(c) Client or reference name, email address and telephone number.

(d) Names of Proposer team members (e.g., firms and individuals) that worked on the project or service contract.

(e) Proposer team's final budget in relation to initial budget (in $US).

(f) Proposer team's final schedule for system implementation, in relation to initial schedule (in days).

Evaluation Criteria:

i. Proposer's depth of experience working on projects or service contracts similar in size, scope, and complexity to the Project.

ii. Proposer's record of completing contracts within budget and on time

iii. Proposer team has worked on at least one project similar in size or scope to the Next Generation System.

Evaluation Basis: Scored (40 points maximum)

- Evaluation criteria i and ii – Scored (40 points maximum)
- Evaluation criterion iii – Pass/Fail; the SFMTA may, in its sole discretion, deem Proposer not responsive if Proposer does not cite at least one project similar in size or scope to the Next Generation System.

7. Project Understanding and Approach

To convey Proposer's understanding and proposed approach to delivering the Next Generation System, provide the following, not to exceed 10 pages in the aggregate:

a. Overall Project Understanding

Describe how Proposer's solution for the Next Generation System will achieve customer satisfaction levels that would allow Muni to become the preferred travel choice in today's transportation landscape. The proposed solution must promote travel choices that are consistent with SFMTA's Guiding Principles for Management of Emerging Transportation Services and Technologies (see Appendix J: Guiding Principles for Management of Emerging Transportation Services and Technologies).

b. Key Issues

The SFMTA has identified the key issues listed below, which are specific to the Next Generation System. For each key issue, please provide the explanations requested.

i. Integration with other SFMTA Vendors

To implement the Next Generation System, Contractor must coordinate with other SFMTA vendors and/or integrate with their existing systems or products as described in Section 1.1 Coordination/Integration with Other Vendors and their Systems of Appendix H: Detailed Scope of Services. Describe how Proposer would integrate with each vendor.

ii. Mobile App Data Collection and Analytics

Explain how Proposer's solution for mobile app data collection and analytics would assist the SFMTA in understanding ridership trends and changes, as well as in improving service.

iii. Future On-Board Digital Signage

Describe the steps Proposer would take to engage a future on-board signage vendor to integrate Proposer's back-end system with physical signage. This explanation is separate from the technical explanation of integration, which Proposer must address in the On-Board Digital Signage section of the Conceptual Design Document.

iv. Design Review and Testing - Iterative Design

Describe Proposer's process to test the five Elements of the Next Generation System during the design, implementation, and post-implementation stages, which at any time could include customer engagement and feedback. Anticipating that all designs could be subject to

modifications even after deployment, explain how Proposer will engage with the SFMTA to understand customer needs, prototype designs and refine the product.

c. System Risks

Identify and describe any key implementation and maintenance risks that Proposer would anticipate on the Project. For each risk, identify potential impacts and mitigation strategies. Specifically address the need to minimize impacts to customers during the Transition Period between the Existing System and the Next Generation System.

Evaluation Criteria:

i. The extent to which Proposer demonstrates an understanding of the overall Project that is consistent with making Muni the preferred travel choice in San Francisco.

ii. The extent to which the system architecture approach makes technical sense, is well-organized, and adequately covers the Scope of Services.

iii. The extent to which Proposer provides a logical approach to the key issues.

iv. The extent to which Proposer conveys its understanding of key risks involved in implementing and maintaining the Next Generation System

v. The extent to which Proposer's implementation approach conveys a realistic and achievable solution to reduce impacts to customers during the Transition Period between the Existing System to the Next Generation System

Evaluation Basis: Scored (35 points maximum)

8. Project Implementation

Provide an Implementation Plan that contains the items listed below. This Implementation Plan shall not exceed 15 pages, inclusive of all exhibits.

a. Preliminary Mobilization Plan

Provide a Preliminary Mobilization Plan describing how Proposer 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.

b. Schedule Narrative

Provide a narrative describing Proposer's Preliminary Schedule to deliver the Next Generation System. At a minimum, the narrative must describe Proposer's approach to the following tasks:

Phase I tasks

- Complete Final Design Document
- Customize System Software to meet SFMTA needs and requirements
- Integrate Contractor's System Software with other Third-Party Systems (e.g., OrbCAD, ATCS)

- Coordinate with the vendor of the Existing System to transmit and display Customer Information on existing proprietary Stationary Digital Signage during the Transition Period
- Implement System Software
- Train relevant Staff on using System Software
- Replace the Existing System's Stationary Digital Signage
- Provide Customer Information on MuniMobile and SFMTA's website before the contract for the Existing System ends
- Install new Stationary Digital Signage at Central Subway stations prior to their opening

Phase II tasks

- Install new Stationary Digital Signage
- Implement enhancements to System Software
- Implement enhancements to Mobile Platform & Website

c. Preliminary Schedule

Provide a Preliminary Schedule in a Gantt chart showing the tasks, subtasks, Deliverables, milestones, and completion dates required to complete Phase I and Phase II. Assume that the SFMTA will issue a Notice to Proceed on May 1, 2019 and the contract with the vendor of the Existing System ends on July 31, 2020.

d. Quality Assurance/Quality Control Plan

Provide a Quality Assurance/Quality Control Plan that describes Proposer's testing procedures, including the development of prototypes, for implementation of the Next Generation System.

e. Training Plan

Provide a Training Plan that describes Proposer's approach to training SFMTA staff to use the Next Generation System.

Evaluation Criteria: The extent to which Proposer's Implementation Plan conveys a realistic approach to implement the Next Generation System and minimize service interruptions during the Transition Period.

Evaluation Basis: Scored (25 points maximum)

9. Level of Customization

The SFMTA would like to understand the levels of hardware and software customization required to implement the Next Generation System. Complete Table 2 to indicate and describe the level of customization Proposer's solution would require for each listed deliverable. The levels of customization are as follows:

i. Low – "Out of the box" or "off the shelf" and requires no-to-minimal customization

ii. Medium – Moderate customization.

iii. High – Fully-customized

Table 2: Level of Customization for Hardware & Software Deliverables

Deliverable	Customization (Low, Medium or High)	Description
1. System Software		
Customer Information		
System Administration Tool		
Content Management System		
2. Stationary Digital Signage		
Powered Shelter Signage		
Powered Signage at Outdoor Rail Platforms		
Powered Signage at Underground Stations		
3. On-Board Digital Signage		
Signage Content		
Integration with On-Board Signage Vendor		
4. Mobile Platform & Website		
Integration with Existing SFMTA Mobile Platform		
Integration with Existing SFMTA Website		
Trip Planner		
SFMTA Staff Interface on Mobile Platform		
Data Collection		
5. Analytics Platform		
Analytics Platform		

Evaluation Criteria: The extent to which Proposer's Level of Customization for Hardware & Software Deliverables is appropriate to meet the requirements of Section III.D.9. Implementation Plan

Evaluation Basis: Scored (10 points maximum)

E. Part 2 – Conceptual Design Document

Include in Part 2 of Proposal Proposer's Conceptual Design Document. In general, the Conceptual Design Document must describe the features and functionality of Proposer's solution, as well as Proposer's approach to meeting the requirements set forth in the Scope of Services.

Table 3, below, provides the required organization and maximum point allocation for the Conceptual Design Document.

For each Deliverable, the Conceptual Design Document must include the specific information requested in this Section III.E. Any detailed technical information included in the Conceptual Design Document must accompanied by an explanation in layperson's terms.

Limit the Conceptual Design Document to 125 pages, including illustrations and diagrams.

Prior to contract award, the SFMTA will work with the successful Proposer to revise this Conceptual Project Design Document to reflect any necessary adjustments to meet the Scope of Services requirements. Following contract award, Contractor shall prepare a Final Project Design Document for SFMTA approval. Contractor acknowledges that its solution as implemented may differ in appearance and functionality from what it has described in its Conceptual Project Design Document.

Table 3: Organization of and Point Allocation for Conceptual Design Document

Section Number and Title	**Conceptual Design Document Subsection Number and Title**	Corresponding Requirements in Appendix H: Detailed Scope of Services	Max. Points
1. Introduction	(None)	(None)	0
2. System Architecture	2. System Architecture	(None)	25
3. System Software	3a. Customer Information 3b. System Administration Tool 3c. Content Management System	2.3.1 Customer Information 2.3.2 System Administration Tool 2.3.3 Content Management System	170
4. Stationary Digital Signage	4a. Powered Sheltered Signage 4b. Powered Signage at Outdoor Rail Platforms 4c. Powered Signage at Underground Stations 4d. Alternatively-Powered Signage	3.3.2 Powered Sheltered Signage 3.3.3 Powered Signage at Outdoor Rail Platforms 3.3.4 Powered Signage at Underground Stations 3.3.5 Alternatively-Powered Signage	85
5. On-Board Digital Signage	5a. Signage Content 5b. Integration with On-Board Digital Sign Vendor	4.3.1 Signage Content 4.3.3 Integration with On-Board Digital Sign Vendor	35

Section Number and Title	Conceptual Design Document Subsection Number and Title	Corresponding Requirements in Appendix H: Detailed Scope of Services	Max. Points
6. Mobile Platform & Website	6a. Integration with Existing SFMTA Mobile Platform 6b. Integration with Existing SFMTA Website 6c. Trip Planner 6d. SFMTA Staff Interface on Mobile Platform 6e. Data Collection	5.3.1 Integration with Existing SFMTA Mobile Platform 5.3.2 Integration with Existing SFMTA Website 5.3.3 Trip Planner 5.3.4 SFMTA Staff Interface on Mobile Platform 5.3.6 Data Collection	100
7 Analytics Platform	7a. Analytics Platform 7b. Data Interpretation Services	6.3.1 Analytics Platform 6.3.2 Data Interpretation Services	80
8. Maintenance Services	8a. Customer Support 8b. Stationary Digital Signage 8c. Software 8d. Communications	7.3.1 Customer Support 7.3.2 Stationary Digital Signage 7.3.3 Software 7.3.4 Communications	50
Total			545

Evaluation Criteria: Evaluators will score proposals based on how well the proposed features and functionality articulated in the Conceptual Design Document align with the requirements set forth in the Scope of Services. Higher points will be awarded to approaches that are creative, logical, and most plausible.

Evaluation Basis: Scored (555 points maximum, with maximum points for individual sections indicated in Table 3 above)

1. Introduction

Provide a brief narrative summarizing why Proposer's solution is best suited to meet the SFMTA's goals in Section I. Introduction and Schedule C. Project Goals.

2. System Architecture

Provide a high-level diagram and description of the system architecture that fulfills the requirements of the Scope of Services (Appendix H: Detailed Scope of Services). This system architecture must include all hardware and software components, their relationships between one another, and a data flow diagram. Proposer must provide a diagram that is more detailed than ***Figure 1***. Proposer's diagram does not have mirror the design shown in ***Figure 1***.

3. System Software

a. Customer Information

i. General Approach

Describe how Proposer's solution would generate the outputs of Customer Information described in Section 2.3.1 Customer Information of

Appendix H: Detailed Scope of Services Although Proposer is not required to release its source code, Proposer must clearly identify the factors it would use as inputs and how it would weigh each of those factors to produce accurate Customer Information.

Based on SFMTA's Technical Environment (please see Appendix L: Technical Environment), propose the most effective method to receive vehicle location information and provide timely and accurate predictions.

ii. Common Operating Situations

Describe how Proposer's solution to generate Customer Information would address common operational situations such as those in Section 2.2.5 Operating Conditions of Appendix H: Detailed Scope of Services in order to produce the most accurate real-time information. Based on the SFMTA's current Technical Environment, propose approaches to increase the frequency of real-time updates (currently every 60 seconds).

Describe how Proposer's solution to determine a job assignment (i.e., associating a vehicle with a schedule block and/or run number) would make a prediction for vehicle arrivals when that job assignment is not provided through OrbCAD. This could occur if an operator is unable to log into OrbCAD successfully.

Describe how Proposer's solution would minimize "ghost" buses and trains described in Section 2.2.5.4 "Ghost" Buses and Trains of Appendix H: Detailed Scope of Services.

Describe how Proposer's solution would address the issues relating to terminal departures as explained in Section 2.3.1.1 Outputs b. Terminal Departure Predictions of Appendix H: Detailed Scope of Services.

Describe how Proposer's solution would auto-detect a switchback when a Transit Controller does not enter the switchback into SFMTA's CAD/AVL system, given the constraints detailed in Section 2.3.1.1 Outputs h. Switchbacks of Appendix H: Detailed Scope of Services.

Describe how and when Proposer's solution would recommend route alternatives as per Section 2.3.1.1 Outputs f. Alternatives of Appendix H: Detailed Scope of Services.

iii. Accuracy of Vehicle Arrival Predictions

Proposer must commit to the accuracy of the predicted arrival times that its solution would produce for SFMTA vehicles. In ***Table 4***, Proposer must indicate the levels of accuracy to which it will commit for each predicted terminal-departure time if the SFMTA selects it as the successful Proposer.

- Row A lists certain, predicted arrival times shown on customer-facing interfaces (e.g., Stationary Digital Signage and Mobile Platform & Website).
- For each predicted arrival time in Row A, Row B provides the time range within which a vehicle may arrive such that the SFMTA would consider the predicted arrival time to be accurate.
- Row C lists the SFMTA's desired levels of accuracy for each predicted arrival time in Row A.

- Row D indicates the minimum-acceptable levels of accuracy for each predicted arrival time in Row A.
- Row E provides spaces where Proposer must indicate the level of accuracy to which it will commit for each predicted arrival time in Row A when vehicle locations are transmitted every 60 seconds. For example, for all 5-minute predictions that Proposer's solution generates, for what percentage of those predictions do the corresponding vehicles arrive within the 4 to 7 minute time range?
- Row F provides spaces where Proposer must indicate the level of accuracy to which it will commit for each predicted arrival time in Row A when vehicle locations are transmitted every 30 seconds.

The SFMTA may deem a Proposal non-responsive if Proposer cannot guarantee a minimum percentage of 75% for any of the above categories.

The SFMTA will not take into account the following factors when determining actual levels of accuracy: temporary service changes and switchbacks (refer to Sections *2.3.1.1 Outputs* g. *Temporary Service Changes* and h. *Switchbacks*) that the SFMTA has not entered into the CAD/AVL system; and when the CAD/AVL system does not produce vehicle location information.

Table 4: Proposed Accuracy of Vehicle Arrival Predictions

A	Predicted Arrival Times	Arriving	5 min	10 min	15 min	20 min	30 min
B	Actual Arrival Time Ranges (min:sec)	0:00 to 2:00	4:00 to 7:00	8:00 to 13:00	13:00 to 18:00	18:00 to 24:00	28:00 to 35:00
C	Desired Levels of Accuracy	≥90%	≥90%	≥90%	≥90%	≥90%	≥90%
D	Minimum Levels of Accuracy	75%	75%	75%	75%	75%	75%
E	Proposed Levels of Accuracy, 60-second updates (%)						
F	Proposed Levels of Accuracy, 30-second updates (%)						

iv. Accuracy of Terminal Departure Predictions

Proposer must commit to the accuracy of the predicted departure times that its solution would produce for SFMTA vehicles at terminals. In

Table 5: Proposed Accuracy of Terminal Departure Predictions

, Proposer must indicate the levels of accuracy to which it will commit for each predicted terminal-departure time if the SFMTA selects it as the successful Proposer.

- Row A lists certain, predicted terminal-departure times shown on customer-facing interfaces (e.g., Stationary Digital Signage and Mobile Platform & Website).
- For each predicted terminal-departure time in Row A, Row B provides the time range within which a vehicle may depart such that the SFMTA would consider the predicted terminal-departure time to be accurate.
- Row C lists the SFMTA's desired levels of accuracy for each predicted terminal-departure time in Row A.
- Row D provides spaces where Proposer must indicate the level of accuracy to which it will commit for each predicted terminal-departure time in Row A when vehicle locations are transmitted every 60 seconds. For example, for all 5-minute predictions that Proposer's solution generates, for what percentage of those terminal-departure predictions do the corresponding vehicles depart within the 4 to 7 minute time range?
- Row E provides spaces where Proposer must indicate the level of accuracy to which it will commit for each predicted terminal-departure time in Row A when vehicle locations are transmitted every 30 seconds.

The SFMTA will not take into account the following factors when determining actual levels of accuracy: temporary service changes and switchbacks (refer to Sections 2.3.1.1 Outputs g. Temporary Service Changes and h. Switchbacks) that the SFMTA has not entered into the CAD/AVL system; and when the CAD/AVL system does not produce vehicle location information.

Table 5: Proposed Accuracy of Terminal Departure Predictions

A	Predicted Terminal-Departure Times	Departing	5 min	10 min
B	Actual Terminal-Departure Time Ranges (min:sec)	0:00 to 2:00	4:00 to 7:00	8:00 to 13:00
C	Desired Levels of Accuracy	≥85%	≥85%	≥85%
D	Proposed Levels of Accuracy, 60-second updates (%)			
E	Proposed Levels of Accuracy, 30-second updates (%)			

b. System Administration Tool

Describe the features and functionality of Proposer's System Administration Tool and how SFMTA employees will use it efficiently and intuitively. Proposer may include screenshots and other illustrations to describe the features and functionality.

c. Content Management System

Describe the features and functionality of Proposer's Content Management System and describe how this system will enable SFMTA employees to design and display content on different customer-facing interfaces. Proposer may include screenshots and other illustrations to describe the features and functionality.

4. Stationary Digital Signage

The Next Generation System will include the following sign types, which are described in Section 3.3 Technical Requirements of Appendix H: Detailed Scope of Services: (a) Powered Shelter Signage, (b) Powered Signage at Outdoor Rail Platforms, (c) Powered Signage at Underground Stations, and (d) Alternatively-Powered Signage. Proposer may propose additional sign types for the SFMTA's consideration.

a. Powered Shelter Signage

b. Powered Signage at Outdoor Rail Platforms

c. Powered Signage at Underground Stations

d. Alternatively-Powered Signage

For each sign type, including any additional sign types that Proposer proposes, provide the following information:

(a) A narrative description of the sign

(b) A narrative description of how the sign would improve the customer experience and maximize the ability for customers to receive information in text and graphical formats

(c) An estimate of how long it will take to install the sign from the time Proposer arrives at the transit stop or station, including time for preparation, removal and cleanup

(d) A conceptual rendering of the sign, including showing how it will fit in the transit stop or station environment

(e) Technical specifications (e.g., dimensions, power consumption, expected lifecycle, Americans with Disabilities Act (ADA)-compliance, and solar panels and battery storage, if applicable)

(f) How Proposer's solution will accommodate text-to-speech functionality, including placement of the text-to-speech system rand any modifications required to existing facilities and integration required with vendors

(g) Describe how signage will avoid overheating

(h) For Powered Shelter Signage only, describe how the solution will preserve Proof-of-Performance camera functionality described in Section 3.2.1 Powered Shelter Signage (Type 1) of Appendix H: Detailed Scope of Services.

(i) For Alternatively-Powered Signage only, describe how the solution will preserve the lighting functionality of transit stop poles described in Section 3.2.4 Outdoor Stops without any Real-Time Signage (Type 4) of Appendix H: Detailed Scope of Services.

5. On-Board Digital Signage

At a future date, the SFMTA plans to install on board its transit vehicles digital signage that will provide real-time Customer Information. The SFMTA intends to procure the signage directly with a signage supplier and/or through a vehicle manufacturer that subcontracts with a signage supplier. As part of the contract for the Next Generation System, Contractor must generate the content that will populate future on-board digital signs and coordinate with the on-board digital signage vendor to ensure the signs receive and display the content.

a. Signage Content

Describe generally how Proposer's solution would generate the Customer Information described in Section 4.3.1 Signage Content of Appendix H: Detailed Scope of Services on a continuous basis for signs on individual vehicles. Proposer must consider operational conditions such as constantly-changing vehicle locations and a 60-second transmission frequency of vehicle locations from the CAD/AVL system to the System Software. Specifically, describe how Proposer's solution will ensure this information is accurate and timely for transfer connection times, service delays and disruptions.

b. Integration with On-Board Digital Signage Vendor

Describe how Proposer will coordinate with a future vendor of the on-board digital signage to ensure signs receive and display Customer Information, given that specifications for the future signs are unknown at this time. Specifically, describe how Proposer would address alternative methods for formatting data for transmission to the vendor of the on-board digital signage, as discussed in Section Contractor must provide a mobile website for internal use to test the accuracy of the content generated by the System Software. The mobile website must replicate the content to be displayed on future on-board digital signage and provide and update arrival time information while the vehicle is operating. The mobile website must enable SFMTA staff must be able to enter a vehicle number and the mobile website and then must replicate what the on-board digital sign would display for that vehicle as it approaches each stop.

4.3.4 Integration with On-Board Digital Signage Vendor. Identify any other technical integration issues and suggest approaches to address them.

6. Mobile Platform & Website

As part of the Next Generation System, the SFMTA plans to expand the functionality of its existing mobile application (MuniMobile) and website to provide for enhanced trip planning capabilities, and utilize the mobile platform to understand customer travel patterns to improve service and operational planning.

a. Integration with MuniMobile

The MuniMobile application currently provides for mobile ticketing and limited trip planning functionality through third-party mobile websites embedded into the application. The MuniMobile application and its mobile ticketing functionality are managed under a separate

contract. Describe how Proposer will coordinate with the MuniMobile contractor to replace the third-party mobile websites and integrate its Trip Planner into MuniMobile from both a technical and aesthetic perspective.

b. Integration with SFMTA Website

The SFMTA does not currently offer a single online location where customers can access all available Customer Information, including trip itineraries and vehicle arrival predictions. Describe how Proposer's solution would enable customers to access pertinent Customer Information, including the Trip Planner, through the SFMTA's desktop and mobile websites.

c. Trip Planner

Describe the features and functionality of Proposer's trip planning solution (Trip Planner) and how it will generally meet the requirements set forth in Section 5.3.4 Trip Planner of Appendix H: Detailed Scope of Services. Specifically, provide a narrative and screenshots, as applicable, to describe how the Trip Planner will convey Customer Information. Examples include: itineraries within the Muni service area; itineraries involving Muni and regional transit operators (e.g., BART or Caltrain); vehicle arrival predictions for nearby transit routes and stops; and transfer connection times, service delays and disruptions once on board (trip-tracking).

Propose performance metrics the SFMTA would use to determine whether any particular itinerary generated by the Trip Planner is efficient. An "efficient" itinerary is non-circuitous and logical from a user's perspective. The SFMTA may use Proposer's performance metrics as set forth in Appendix K: Performance Requirements.

d. SFMTA Staff Interface on Mobile Platform

The SFMTA would like authorized staff to access through the mobile application certain operational information that would not be applicable to other users, such as operator IDs and block numbers. Please describe in general how Proposer's solution will provide this functionality. Describe how the solution will restrict access to the information to authorized SFMTA users, and provide a user-friendly interface given that staff will be using this feature in the field.

e. Data Collection

Proposer's mobile solution must collect pertinent data about travel patterns to assist the SFMTA with service and operational planning.

Describe how Proposer's mobile solution will collect the data listed in Section 5.3.7 Data Collection of Appendix H: Detailed Scope of Services. For example, describe the points during a customer's journey at which the mobile solution would collect data.

Identify any limitations in Proposer's data collection methodology that might impact information accuracy.

Describe procedures Proposer will enact to protect Personally-Identifiable Information.

Describe how Proposer's mobile solution will minimize power consumption a customer's mobile device.

7. Analytics Platform

The Next Generation System's System Software and Mobile Platform & Website will generate large volumes of data related to operations, predictions accuracy, customer preferences, travel patterns, and other topics the SFMTA intends to use to improve customer service and operational planning. Contractor must analyze and create reports for the SFMTA using these data, and provide an Analytics Platform that SFMTA staff can use to analyze and interpret these data on their own.

a. Analytics Platform

Provide a high-level diagram and description of Proposer's Analytics Platform, including the platform architecture and data flow, and screenshots of reporting tools and dashboards that represent a broad range of topics.

b. Data Interpretation Services

Describe the types of information and reports (e.g., latent demand, mode choice and abandonment, customer travel-time reliability) Proposer would provide as part of its data interpretation services that SFMTA staff could not generate, or easily generate, through their own use of the Analytics Platform. See Section 6.3 Technical Requirements of Appendix H: Detailed Scope of Services for additional examples of the types of information and reports the SFMTA seeks.

8. Maintenance Services

The Contractor must provide maintenance services to ensure the Next Generation System operates 24 hours a day, seven days a week.

a. Customer Support

Describe how Proposer will structure its customer support services taking into account the incident response times set forth in Section 7.3.1 Customer Support of Appendix H: Detailed Scope of Services. Provide details with respect to staffing resources, and the features and functionality of its solution for incident ticketing and tracking.

b. Stationary Digital Signage

Describe Proposer's approach to maintaining stationary digital signage taking into account the signage replacement time set forth in Section 7.3.2.2 Replacement and Repair of Appendix H: Detailed Scope of Services. Specifically, provide details with respect to (i) Proposer's approach to monitoring status of signage to detect outages, and (ii) staffing resources.

c. Software

Describe Proposer's approach to push software patches, enhancements, extensions, and other changes while minimizing service interruptions. Specifically, describe how Proposer will provide advance notice and documentation of these changes.

Describe Proposer's procedure for testing upgrades and updates before software deployment.

d. Communications

Describe Proposer's general approach to provide uninterrupted communications between the System Software and customer-facing interfaces. Describe how Proposer will plan for possible obsolescence in the technology it selects for its communications solution.

F. Part 3 – Performance Requirements

The SFMTA will use the metrics listed in Appendix K: Performance Requirements to evaluate the performance of the Next Generation System. Complete and provide the worksheet in Appendix K: Performance Requirements. For each metric listed, review the SFMTA's performance goal and indicate the performance level to which Proposer commits if awarded the contract.

Contractor's solution must achieve the performance levels indicated in its Proposal, and failure to do so may result in assessment of Liquidated Damages as set forth in the Contract.

Evaluation Criteria: Evaluators will score Proposals based on how close Proposer's standards are to the SFMTA's desired goals and how the standards rank relative to those of other Proposers.

Evaluation Basis: Scored (30 points maximum)

G. Part 4 – Financial Information and Subcontractor Commitment Letters

Include in Part 4 of Proposal the following:

1. General Information

(a) Legal name and address of Proposer.

(b) Number of years the Proposer has been in business.

(c) Legal form of company (partnership, corporation, joint venture, etc.). (If joint venture, identify the members of the joint venture and provide all information required within this section for each member. If a corporation, certify that the corporation is in good standing with the California Secretary of State).

(d) If the Proposer is wholly-owned subsidiary of a "parent company," provide the legal name and form of the parent company.

(e) Tax Identification Number.

(f) Data Universal Numbering System (DUNS) Number.

(g) Address(es) of office(s) that will work on this Project.

(h) Name, title, address, e-mail address, and telephone number of the person to contact concerning the proposal.

(i) State whether the Proposer has filed bankruptcy in the last ten (10) years.

(j) Identify and describe any conditions (e.g., bankruptcy, pending litigation, planned office closures, impending merger) that may impede the Proposer's ability to complete the project. If no such condition exist, Proposer shall so affirmative state.

2. Financial Statements

Audited financial statements for the past three fiscal years, a Dun & Bradstreet report or a one-page summary from a CPA firm. There is no page limit for financial statements.

3. Subcontractors Letters of Commitment

Letters of commitment for each subcontractor listed in the Proposal.

Evaluation Criteria:

i. Proposal includes requested financial information, financial documentation, and letters of commitment from each subcontractor listed in the Proposal.

ii. The information provided does not in the SFMTA's sole determination disclose any information that would materially adversely affect Proposer's ability to implement the Next Generation System should it be awarded the Contract.

Evaluation Basis: Pass/Fail

H. Part 5 – Cost Proposal

Include in Part 5 of Proposal a Cost Proposal in the form of the pricing sheet in Appendix G: Cost Proposal. The Cost Proposal must include the pricing information requested in the pricing sheet. No portions of the Proposal, other than the Cost Proposal, shall contain any pricing information. The pricing sheet will automatically calculate a hypothetical Total Contract Price for evaluation purposes only; the SFMTA does not guarantee it will pay Contractor this Total Contract Price.

The Cost Proposal with the lowest Total Contract Price will receive the maximum 200 points. All other Cost Proposals will be scored as follows:

$$\frac{Lowest\ Total\ Contract\ Price}{Proposer's\ Total\ Contract\ Price} \times 200$$

Table 6: Sample SFMTA Point-Awarding Formula

Proposer	Proposed Total Cost	Calculation of Points	Points Assigned
Proposer A	$100,000	Full 200 points	200
Proposer B	$120,000	$100,000 divided by $120,000 multiplied by 200	167
Proposer C	$150,000	$100,000 divided by $150,000 multiplied by 200	133

The SFMTA intends to award the Agreement to the Proposer the SFMTA determines will provide the best overall program services to the Agency. The SFMTA reserves the right to accept other than the lowest-priced offer.

I. Part 6 – CMD Attachment 2

Include as Part 6 of Proposal one electronic copy of the completed and signed forms provided Appendix A of this RFP (see Section V.O and Appendix A: CMD Attachment 2).

Evaluation Criteria: Proposal includes the forms required in CMD Attachment 2.
Evaluation Basis: Pass/Fail

J. Oral Interviews

Following the evaluation of Proposals, the SFMTA may invite each Proposer team that has a statistical chance of being selected as the successful Proposer (based on the score of their Proposal) to participate in an oral interview before some or all members of the evaluation committee. The SFMTA will extend these invitations, if at all, in writing to eligible Proposers.

Proposer teams invited for oral interviews will appear (in no particular order) before the evaluation committees and present the various elements of their respective, Proposals. For example, Proposers may be required to demonstrate working prototypes of their solution's System Software (i.e., Customer Information, System Administration Tool, and Content Management System), Stationary Digital Signage (at least one sign type), On-Board Digital Signage (sample content only, not a physical sign), Mobile Platform & Website (mobile app), and Analytics Platform. The SFMTA would *not* expect a production-ready demonstration; rather, enough sample material for the evaluation committee to grasp the design approach and get "a feel" for what the system would look like.

The SFMTA will identify the duration of and the exact subject matter for the oral interviews in its written invitation to eligible Proposers. Proposer teams invited for oral interviews may be required to furnish additional information prior to or at the interview.

Presentations at the oral interviews must be made by the key personnel who will be assigned to the contract if awarded. These key personnel must actively participate during the oral interviews.

The SFMTA reserves the right not to hold oral interviews and select a Proposers based on the Proposal only.

Evaluation Criteria: The SFMTA will identify the evaluation criteria for the oral interviews at the time its invites eligible Proposers to the oral interviews.
Evaluation Basis: Scored (65 points maximum)

IV. Evaluation, Selection Pre-Proposal Conference and Contract Award

A. Evaluation and Selection Process

Proposers will be evaluated by an Evaluation Committee comprised of individuals from the SFMTA and other City departments with subject matter expertise.

The evaluation and selection process will consist of three steps, as follows:

- Step 1 – Evaluation of Proposals. The evaluation committee will evaluate and score each Proposal based on the criteria described in Section III.D through III.I.
- Step 2 – Oral interviews. Some or all members of the evaluation committee may conduct and score oral interviews as described in Section III.J.
- Step 3 – Tabulation of total evaluation scores. The SFMTA will tabulate the scores of the Proposals and the oral interviews as described in Section IV.B.

B. Total Evaluation Score

The maximum total evaluation score possible for each Proposer is 1,000 points, broken down as shown below.

	Maximum Points
PROPOSAL	
Part 1 – Written Proposal	160
Part 2 – Conceptual Design Document	545
Part 3 – Performance Requirements	30
Part 4 – Financial Information and Subcontractor Commitment Letters	0
Part 5 – Cost Proposal	200
Part 6 – CMD Attachment 2	0
PROPOSAL TOTAL	**935**
ORAL INTERVIEWS	**65**
TOTAL EVALUATION SCORE	**1,000**

For each Proposer, as applicable, the SFMTA will add the score from the Proposal to the score from the oral interview, if any. The Proposer with the highest total evaluation score will be eligible for selection and contract award. If the SFMTA elects not to have oral interviews, the Proposer with the highest score for the Proposal will be eligible for selection and contract award.

An Evaluation Committee comprised of individuals from the SFMTA and other City departments with subject matter expertise will evaluate the Written Proposals in accordance with the criteria established in Section III.Submission Requirements. Following the submission and evaluation of Proposals, the SFMTA may elect to invite Proposers who have a statistical chance of being selected Contractor to make a presentation to and be interviewed by the committee as part of the selection process.

After the oral interview, the SFMTA will combine all scores, rank the Proposers and select the highest-ranked Proposer to commence contract negotiations.

C. Contract Award

The SFMTA will evaluate and rank Proposals as described herein, and intends to invite the Proposer with the highest total evaluation score to commence contract negotiations. The Agency's scoring of any Proposal or invitation to any Proposer to negotiate a contract shall not imply acceptance by the SFMTA of all terms of the Proposal, which are subject to further negotiations and approvals before the SFMTA may be legally bound thereby. The Proposer must anticipate that the contract may differ from the Proposal. If a satisfactory contract cannot be negotiated in a reasonable time with a Proposer, then the SFMTA, in its sole discretion, may terminate negotiations with that Proposer and begin contract negotiations with the next highest-scoring Proposer.

V. Terms and Conditions for Receipt of Proposals

A. Errors and Omissions in RFP

Proposers are responsible for reviewing all parts of this RFP and complying with all Proposal submission requirements. Proposers must promptly notify the SFMTA, in writing, if the Proposer discovers any ambiguity, discrepancy, omission, or other error in the RFP. Any such notification shall be directed to the SFMTA promptly after discovery, but in no event later than five working days prior to the date for receipt of Proposals. The SFMTA will issue modifications and clarifications to the RFP as Addenda as provided below.

B. Inquiries Regarding RFP

All communications regarding the RFP must be directed in writing to:

Carlos.Peza@sfmta.com

Please include "SFMTA-2019-01" in the subject line of your email.

C. Objections to RFP Terms

If a Proposer objects on any ground to any provision or legal requirement of the RFP, the Proposer must, not more than 10 calendar days after the RFP is issued, provide written notice to the SFMTA setting forth with specificity the grounds for the objection and all relevant facts. The failure of a Proposer to object in the manner set forth in this paragraph shall constitute a complete and irrevocable waiver of any such objection.

D. Bid Addenda

The SFMTA may modify the RFP prior to the Proposal due date by issuing Bid Addenda, which will be posted on the OCA's Bid and Contracts Listing website: http://mission.sfgov.org/OCABidPublication

The Proposer is responsible for ensuring that its Proposal reflects any and all Bid Addenda issued by the SFMTA prior to the Proposal due date, regardless of when the Proposal is submitted. Therefore, the SFMTA recommends that the Proposer consult the OCA Bids & Contracts Listing website frequently, including shortly before the Proposal due date, to confirm that the Proposer is aware of, and its Proposal is responsive to, all Bid Addenda.

E. Term of Proposal

By submitting a Proposal, a Proposer warrants that the price stated and personnel proposed to perform the services described in the RFP are valid for 270 calendar days from the Proposal due date, and that the quoted prices are genuine and not the result of collusion or any other anti-competitive activity.

F. Revision of Proposal

A Proposer may revise its Proposal at any time before the deadline for submission of Proposals. The Proposer must submit a revised Proposal in the same manner as the original. A revised Proposal must be received on or before the Proposal due date.

In no case will a statement of intent to submit a revised Proposal, or commencement of a revision process, extend the Proposal due date for any Proposer.

At any time during the Proposal evaluation process, the SFMTA may require a Proposer to provide oral or written clarification of its Proposal. The SFMTA reserves the right to make an award without requesting such further clarification.

G. Errors and Omissions in Proposal

Failure by the SFMTA to object to an error, omission, or deviation in the Proposal will in no way modify the RFP or excuse the selected Proposer from full compliance with the specifications of the RFP or any contract awarded pursuant to the RFP.

H. Financial Responsibility

The SFMTA shall have no financial responsibility for any costs incurred by a firm in responding to this RFP. Submitted Proposals are the property of the SFMTA and may be used by the SFMTA in any way it deems appropriate.

I. Proposer's Obligations under the Campaign Reform Ordinance

Proposers must comply with Section 1.126 of the S.F. Campaign and Governmental Conduct Code, which states:

> No person who contracts with the City and County of San Francisco for the rendition of personal services, for the furnishing of any material, supplies or equipment to the City, or for selling any land or building to the City, whenever such transaction would require approval by a City elective officer, or the board on which that City elective officer serves, shall make any contribution to such an officer, or candidates for such an office, or committee controlled by such officer or candidate at any time between commencement of negotiations and the later of either (1) the termination of negotiations for such contract, or (2) three months have elapsed from the date the contract is approved by the City elective officer or the board on which that City elective officer serves.

If a Proposer is negotiating for a contract that must be approved by an elected local officer or the board on which that officer serves, during the negotiation period the Proposer is prohibited from making contributions to:

- the officer's re-election campaign

- a candidate for that officer's office
- a committee controlled by the officer or candidate.

The negotiation period begins with the first point of contact, either by telephone, in person, or in writing, when a contractor approaches any city officer or employee about a particular contract, or a city officer or employee initiates communication with a potential contractor about a contract. The negotiation period ends when a contract is awarded or not awarded to the contractor. Examples of initial contacts include: (1) a vendor contacts a city officer or employee to promote himself or herself as a candidate for a contract; and (2) a city officer or employee contacts a contractor to propose that the contractor apply for a contract. Inquiries for information about a particular contract, requests for documents relating to a Request for Proposal, and requests to be placed on a mailing list do not constitute negotiations.

Violation of Section 1.126 may result in the following criminal, civil, or administrative penalties:

1. Criminal. Any person who knowingly or willfully violates section 1.126 is subject to a fine of up to $5,000 and a jail term of not more than six months, or both.
2. Civil. Any person who intentionally or negligently violates section 1.126 may be held liable in a civil action brought by the civil prosecutor for an amount up to $5,000.
3. Administrative. Any person who intentionally or negligently violates section 1.126 may be held liable in an administrative proceeding before the Ethics Commission held pursuant to the Charter for an amount up to $5,000 for each violation.

For further information, Proposers shall contact the San Francisco Ethics Commission at (415) 581-2300.

J. Communications Prior to Contract Award

It is the policy of the SFMTA that only SFMTA staff identified in the RFP as contacts for this competitive solicitation are authorized to respond to comments or inquiries from Proposers or potential Proposers seeking to influence the contractor selection process or the award of the contract. This prohibition extends from the date the RFP is issued until the date when the contractor selection is finally approved by the SFMTA Board of Directors and, if required, by the San Francisco Board of Supervisors.

All firms and subcontractor(s) responding to this RFP are notified that they may not contact any SFMTA staff member, other than the person(s) identified in the RFP as the authorized contact, for the purpose of influencing the contractor selection process or the award of the contract from the date the RFP is issued to the date when the contract award is approved by the SFMTA Board of Directors and, if required, by the San Francisco Board of Supervisors. This prohibition does not apply to communications with SFMTA staff members regarding normal City business not regarding or related to this RFP.

Any written communications sent to one or more members of the SFMTA Board of Directors concerning a pending contract solicitation shall be distributed by the SFMTA to all members of the SFMTA Board of Directors and the designated staff contact person(s) identified in the RFP.

Except as expressly authorized in the RFP, where any person representing a Proposer or potential Proposer contacts any SFMTA staff for the purpose of influencing the content of the competitive solicitation or the award of the contract between the date when the RFP is issued and the date when the final selection is approved by the SFMTA Board of Directors, and, if required, by the San Francisco Board of Supervisors, the Proposer or potential Proposer shall be disqualified from the selection process. However, a person who represents a Proposer or potential Proposer may contact City elected officials and may contact the Director of Transportation of the SFMTA if s/he is unable to reach the designated staff contact person(s) identified in the RFP or wishes to raise concerns about the competitive solicitation.

Additionally, the firms and subcontractor(s) responding to this RFP are prohibited from providing any gifts, meals, transportation, materials or supplies or any items of value or donations to or on behalf of any SFMTA staff member from the date the RFP is issued to the date when the contract award is approved by the SFMTA Board of Directors and if required, by the San Francisco Board of Supervisors.

All lobbyists or any agents representing the interests of a Proposer (including prime contractors and subcontractor(s)) are also subject to these prohibitions.

A Proposer must submit with its Proposal an executed Attestation of Compliance (see Appendix D: Attestation of Compliance) certifying compliance with these requirements. The Attestation of Compliance must be signed by all firms and subcontractor(s) named in the Proposal. A Proposal that does not include the executed Attestation of Compliance as required by this section will be deemed non-responsive and will not be evaluated. Any Proposer who violates the prohibitions of this section, directly or through an agent, lobbyist or subcontractor, will be disqualified from the selection process.

K. Sunshine Ordinance

In accordance with S.F. Administrative Code Section 67.24(e), proposals and bids, all other documents submitted with the Proposal, and records of communications between the City and persons or firms seeking contracts shall be open to inspection immediately after a contract has been awarded. Nothing in this provision requires the disclosure of a private person's or organization's net worth or other proprietary financial data submitted for qualification for a contract or other benefits until and unless that person or organization is awarded the contract or benefit. Information that a Proposer provides that is covered by this section will be made available to the public upon request.

L. Public Access to Meetings and Records

If a Proposer receives a cumulative total per year of at least $250,000 in City funds or City-administered funds and is a non-profit organization as defined in Chapter 12L of the S.F. Administrative Code, the Proposer must comply with Chapter 12L. The Proposer must include in its Proposal (1) a statement describing its efforts to comply with the Chapter 12L provisions regarding public access to Proposer's meetings and records, and (2) a summary of all complaints concerning the Proposer's compliance with Chapter 12L that were filed with the City in the last two years and deemed by the City to be substantiated. The summary shall also describe the

disposition of each complaint. If no such complaints were filed, the Proposer shall include a statement to that effect. Failure to comply with the reporting requirements of Chapter 12L or material misrepresentation in Proposer's Chapter 12L submissions shall be grounds for rejection of the Proposal and/or termination of any subsequent Agreement reached on the basis of the Proposal.

M. Reservations of Rights by the City

The issuance of this RFP does not constitute an agreement by the City that any contract will be awarded by the City. The City expressly reserves the right at any time to:

1. Waive or correct any defect or informality in any response, Proposal, or selection process;
2. Reject any Proposal or all Proposals;
3. Reissue a Request for Proposals;
4. Prior to submission deadline for Proposals, modify all or any portion of the selection procedures, including deadlines for accepting responses, the specifications or requirements for any materials, equipment or services to be provided under this RFP, or the requirements for contents or format of the Proposals;
5. Procure any materials, equipment or services specified in this RFP by any other means; or
6. Determine that no project will be pursued.

In submitting a Proposal, a Proposer acknowledges and agrees that the City shall not be liable for any costs or other damages incurred by a Proposer if the City determines not to award a contract, rejects any or all Proposals, or exercises any of the reserved rights described herein.

N. No Waiver

No waiver by the SFMTA of any provision of this RFP shall be implied from any failure by the SFMTA to recognize or take action on account of any failure by a Proposer to observe any provision of this RFP.

O. Local Business Enterprise Requirements

The requirements of the Local Business Enterprise and Non-Discrimination in Contracting Ordinance set forth in Chapter 14B of the San Francisco Administrative Code as it now exists or as it may be amended in the future (collectively the "LBE Ordinance") shall apply to this RFP.

1. LBE Subcontracting Participation

The LBE subcontracting participation requirement for this contract is ten percent (10%) of the total value of the services to be provided. The LBE subcontracting requirements shall also apply to any Additional Services authorized after issuance of the Notice to Proceed. Proposers are advised that they may not discriminate in the selection of subcontractors on the basis of race, gender, or other basis prohibited by law, and that they shall undertake all

required good faith outreach steps in such a manner as to ensure that neither Minority Business Enterprises (MBEs), Woman Business Enterprises (WBEs) and Other Business Enterprises (OBEs) are unfairly or arbitrarily excluded from the required outreach.

Each Proposer shall demonstrate, in its Proposal, that it either: 1) qualifies for the good faith efforts exception set forth in Section 14B.8(B) by demonstrating that it exceeds the established LBE subcontracting participation requirement by 35 percent or more (13.5% for this RFP), or 2) meets the established LBE subcontracting participation requirement AND used good-faith outreach to select LBE subcontractors as set forth in S.F. Administrative Code Chapter 14B Section 14B.8 and 14B.9. For each LBE identified as a subcontractor, the Proposal must specify the value of the participation as a percentage of the total value of the contract (that is, the total value of the goods and/or services to be procured, the type of work to be performed), and such other information as may reasonably be required to determine the responsiveness of the Proposal. LBEs identified as subcontractors must be certified with the Contract Monitoring Division as Small or Micro-LBEs at the time the Proposal is submitted, and must be contacted by the Proposer (prime contractor) prior to listing them as subcontractors in the Proposal. If a Proposer does not demonstrate in its Proposal that it exceeds the established LBE subcontracting participation requirement by at least 35 percent, such Proposer must meet the established LBE subcontracting participation requirement AND demonstrate adequate good faith efforts to meet the LBE subcontracting participation requirement. **Any Proposal that does not meet the requirements of this section will be deemed non-responsive.**

a. Documentation of Good Faith Outreach Efforts

In addition to demonstrating that it will achieve the level of subconsulting participation required under this RFP (but except if a Proposer exceeds the LBE subconsulting participation requirement by 35 percent or more), a Proposer shall also undertake and document in its submittal the good faith efforts required by Chapter 14B.8(C) & (D) and CMD Attachment 2, Requirements for Architecture, Engineering and Professional Services Contracts.

Proposals that do not comply with the material requirements of S.F. Administrative Code Section 14B.8 and 14B.9, CMD Attachment 2 and this RFP will be deemed non-responsive and will be rejected. During the term of the contract, any failure to comply with the level of LBE subcontractor participation specified in the contract shall be deemed a material breach of contract. Subcontracting goals can only be met with CMD-certified Small and/or Micro-LBEs located in San Francisco.

2. LBE Participation and Ratings Bonuses

The City strongly encourages Proposals from qualified LBEs. Pursuant to Chapter 14B, the following rating discount will be in effect for the award of the contract for any Proposers who are certified by CMD as a LBE, or joint ventures (JV) where the joint venture partners are in the same discipline and have the specific levels of participation as identified below. Certification applications may be obtained by calling CMD at (415) 581-2319. The rating discount applies at each phase of the selection process. The application of the rating discount is as follows:

a. A 10 percent discount to any Proposal submitted by a Small or Micro- LBE; or a joint venture among Small and/or Micro-LBE Proposers; or

b. A 5 percent discount for each JV that includes at least 35 percent (but less than 40 percent) participation by Small and/or Micro-LBE prime Proposers; or

c. A 7.5 percent discount for each JV that includes 40 percent or more in participation by Small and/or Micro-LBE prime Proposers; or

d. A 2 percent discount to any Proposal from a Small Business Administration (SBA)-LBE, except that the 2 percent discount shall not be applied at any stage if it would adversely affect a Small or Micro-LBE Proposer or a JV with LBE participation.

If applying for a rating discount as a joint venture: The LBE must be an active partner in the joint venture and perform work, manage the job and take financial risks in proportion to the required level of participation stated in the Proposal, and must be responsible for a clearly defined portion of the work to be performed and share in the ownership, control, management responsibilities, risks, and profits of the joint venture. The portion of the LBE joint venture's work shall be set forth in detail separately from the work to be performed by the non-LBE joint venture partner. The LBE joint venture's portion of the contract must be assigned a commercially useful function.

3. Application of the Ratings Bonus

The following rating bonus shall apply at each stage of the selection process, i.e., qualifications, proposals, and interviews:

a. Contracts with an estimated cost in excess of $10,000 and less than or equal to $400,000. A 10 percent rating bonus will apply to any proposal submitted by a CMD certified Small or Micro LBE. Proposals submitted by SBA-LBEs are not eligible for a rating bonus.

b. Contracts with an estimated cost in excess of $400,000 and less than or equal to $10,000,000. A 10 percent rating bonus will apply to any proposal submitted by a CMD certified Small or Micro-LBE. Pursuant to Section 14B.7(E), a 5 percent rating bonus will be applied to any proposal from an SBA-LBE, except that the 5 percent rating bonus shall not be applied at any stage if it would adversely affect a Small or Micro-LBE proposer or a JV with LBE participation.

c. Contracts with an estimated cost in excess of $10,000,000 and less than or equal to $20,000,000. A 2 percent rating bonus will apply to any proposal submitted by a Small LBE, Micro LBE and SBA-LBE.

d. JV with LBE participation. The rating bonus for a JV with LBE participation is as follows for contracts with an estimated cost of in excess of $10,000 and less than or equal to $10,000,000:

   i. 10 percent for each JV among Small and/or Micro LBE prime proposers.

   ii. 5 percent for each JV which includes at least 35% (but less than 40%) participation by Small and/or Micro-LBE prime proposers.

iii. 7.5 percent for each JV that includes 40% or more in participation by Small and/or Micro-LBE prime proposers.

iv. The rating bonus will be applied by adding 5%, 7.5%, or 10% (as applicable) to the score of each firm eligible for a bonus for purposes of determining the highest-ranked firm. Pursuant to Chapter 14B.7(F), SBA-LBEs are not eligible for the rating bonus when joint venturing with a non LBE firm. However, if the SBA-LBE joint ventures with a Micro-LBE or a Small-LBE, the joint venture will be entitled to the joint venture rating bonus only to the extent of the Micro-LBE or Small-LBE participation described in ii. and iii. above.

e. The rating bonus does not apply for contracts estimated by the contract awarding authority to exceed $20 million.

4. CMD Forms to be Submitted with Proposal

a. A Proposal must include the following Contract Monitoring Division (CMD) Forms contained in the CMD Attachment 2: 1) CMD Contract Participation Form, 2) "Good Faith Outreach" Requirements Form, 3) CMD Non-Discrimination Affidavit, 4) CMD Joint Venture Form (if applicable), and 5) CMD Employment Form. If these forms are not submitted with the Proposal, the Proposal may be determined to be non-responsive and rejected.

b. A Proposer must submit one electronic copy of the above forms with its Proposal as a separate electronic file on the media that contains the Proposal (see Section III.B).

If you have any questions concerning the CMD Forms, you may call Lome Aseron, SFMTA Contract Compliance Office at (415) 701-5332.

P. Employment Non-Discrimination and Economically Disadvantaged Workforce Hiring Provisions

1. General

As a material condition of contract award, the Proposer and its subcontractors agree to comply with the nondiscrimination in employment provisions required by Chapter 12B of the Administrative Code and the hiring of economically disadvantaged persons, as required by the City's First Source Hiring Program, Chapter 83 of the Administrative Code.

2. Nondiscrimination Provisions

As a material condition of the contract, the selected Proposer represents and agrees that:

a. It does and will not, during the term of the contract or any contract amendment, discriminate in the provision of benefits between its employees with spouses and employees with domestic partners.

b. The selected Proposer and its subcontractors on this contract will not discriminate against any employee or applicant for employment because of race, color, religion, ancestry, national origin, age, sex, sexual orientation, gender identity, domestic partner status, marital status, disability or AIDS/HIV status, weight, height, or association with members of classes protected under this chapter or in retaliation for opposition to any practices forbidden under this chapter. Discrimination on the basis of sex includes sexual harassment as defined in Section 16.9-25(b) of the Code. The consultant, contractor or subconsultant/subcontractor will take action to ensure that applicants are employed, and that employees are treated equally during employment, without regard to the fact or perception of their race, color, creed, religion, ancestry, national origin, age, sex, sexual orientation, gender identity, domestic partner status, marital status, disability, weight, height, or AIDS/HIV status. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rate of pay or other forms of compensation; and selection for training, including apprenticeship.

3. Non-Compliance with Chapter 12B Prior to Contract Award

As a material condition for award of the contract, the selected Proposer and its subcontractors must be in compliance with the nondiscrimination provisions of Chapter 12B, on all existing City contracts prior to award of this contract. The SFMTA shall have the authority to review the selected Proposer's and subcontractors' prior performance to ensure compliance with the nondiscrimination provisions of Chapter 12B.

If the SFMTA determines that there is cause to believe that any contractor or subcontractor is not in compliance with the nondiscrimination provisions of Chapter 12B, the SFMTA will attempt to resolve the non-compliance through conciliation.

a. If the non-compliance cannot be resolved, the SFMTA will submit to the contractor or subcontractor a written Finding of Non-compliance.

b. The SFMTA will give the contractor or subcontractor an opportunity to appeal the Finding.

c. The SFMTA may, by written notice, stay the award of any contract to a Proposer where the Proposer or any subcontractor is the subject of an investigation for a violation of the City's non-discrimination ordinance(s).

4. Complaints of Discrimination after Contract Award

a. A complaint of discrimination in employment initiated by any party after contract award shall be processed in accordance with CCO procedures.

b. A finding of discrimination may result in imposition of appropriate sanctions, including:

(i) There may be deducted from the amount payable to the contractor or subcontractor under this contract a penalty of $50 for each person for each

calendar day the person was discriminated against in violation of the provisions of the contract.

(ii) The contract may be canceled, terminated or suspended in part by the SFMTA.

(iii) The consultant, subconsultant or vendor may be determined ineligible to perform work or supply products on any City contract for a period not to exceed two years.

Said sanctions are not the City's exclusive remedies, which may be imposed in combination with additional legal remedies, sanctions or penalties.

5. Trainees – SFMTA Employment Training Program

a. **Trainee Requirements:** Contractors shall comply with the City's First Source Program, Administrative Code Section 83 (see Section VI.E below), which fosters employment opportunities for economically disadvantaged individuals. Contractors must notify the First Source Program of all open, entry-level positions and consider all program referrals fairly and equally.

In addition, the SFMTA requires contractors to hire a minimum number of professional service trainees in the area of the contractor's expertise. These hires count toward the First Source Hiring requirements. Trainees may be obtained through the City's One Stop Employment Center, which works with various employment and job training agencies/organizations or other employment referral source.

Number of Trainees

Project Fees	To Be Hired
$0 – $499,999	0
$500,000 – $899,999	1
$900,000 – $1,999,999	2
$2,000,000 – $4,999,999	3
$5,000,000 – $7,999,999	4
$8,000,000 – $10,999,999	5
$11,000,000 – $13,999,999	6
(> = $14M, for each additional $3 million in contractor fees, add one additional trainee)	

b. The trainee must be hired by the contractor or by any subcontractor on the project team.

c. No trainee may be counted towards meeting more than one contract goal.

d. A trainee must meet qualifications for enrollment established under the City's First Source Hiring Program as follows:

(i) "Qualified" with reference to an economically disadvantaged individual shall mean an individual who meets the minimum bona fide occupational

qualifications provided by the prospective employer to the San Francisco Workforce Development System in the job availability notices required by the Program, and

(ii) "Economically disadvantaged individual" shall mean an individual who is either: (1) eligible for services under the Workforce Investment Act of 1988 (WIA) (29 U.S.C.A 2801 et seq.), as determined by the San Francisco Private Industry Council; or (2) designated "economically disadvantaged" for the First Source Hiring Administration, as an individual who is at risk of relying upon, or returning to, public assistance.

e. On-the-job training (to be provided by the contractor): The contractor shall hire the trainee on a full-time basis for at least 12 months or on a part-time basis for 24 months, with prior approval offering him/her on-the-job training which allows the trainee to progress on a career path.

f. Contractor shall submit for the City's approval a description and summary of training proposed for the trainee, along with the rate of pay for the position.

g. The trainee's commitment does not require that he/she is used only on this project; the trainee may also be used on other projects under contract to the Proposer that may be appropriate for the trainee's skill development.

VI. Contract Requirements

A. Standard Contract Provisions

The selected Proposer will be required to enter into a contract substantially in the form of the Agreement for Professional Services, attached hereto as Appendix C. Failure to timely execute the contract, or to furnish any and all insurance certificates and policy endorsement, surety bonds or other materials required in the contract, shall be deemed an abandonment of a contract offer. The SFMTA, in its sole discretion, may select another firm and may proceed against the original selectee for damages.

B. Nondiscrimination in Contracts and Benefits

As a material requirement of the contract, the selected Proposer shall comply with Chapters 12B and 12C of the San Francisco Administrative Code. Generally, Chapter 12B prohibits the City and County of San Francisco from entering into contracts or leases with any entity that discriminates in the provision of benefits between employees with domestic partners and employees with spouses, and/or between the domestic partners and spouses of employees. The Chapter 12C requires nondiscrimination in contracts in public accommodation.

Additional information on Chapters 12B and 12C is available on the CMD's website at: http://sfgsa.org/index.aspx?page=6058.

C. Minimum Compensation Ordinance (MCO)

As a material requirement of the contract, the selected Proposer shall comply with the Minimum Compensation Ordinance (MCO), as set forth in S.F. Administrative Code Chapter 12P. Generally, this Ordinance requires contractors to provide employees covered by the Ordinance who do work funded under the contract with hourly gross compensation and paid and unpaid time off that meet certain minimum requirements.

For additional information about the MCO, and for the amount of hourly gross compensation currently required under the MCO, see http://sfgov.org/olse/mco. Note that this hourly rate may increase on January 1 of each year and that contractors will be required to pay any such increases to covered employees during the term of the contract.

D. Health Care Accountability Ordinance (HCAO)

As a material requirement of the contract, the selected Proposer shall comply with the Health Care Accountability Ordinance (HCAO), as set forth in S.F. Administrative Code Chapter 12Q. Contractors shall consult the San Francisco Administrative Code to determine their compliance obligations under this chapter. Additional information regarding the HCAO is available on the web at http://sfgov.org/olse/hcao.

E. First Source Hiring Program (FSHP)

If the contract is for more than $50,000, then the City's First Source Hiring Program (Admin. Code Chapter 83) may apply. Generally, this ordinance requires contractors to notify the First Source Hiring Program of available entry-level jobs and provide the Workforce Development System with the first opportunity to refer qualified individuals for employment.

Contractors are directed to consult the San Francisco Administrative Code to determine their compliance obligations under this chapter. Additional information regarding the FSHP is available on the web at http://oewd.org/first-source and from the First Source Hiring Administrator, business.services@sfgov.org or call (415) 701-4848.

F. Conflicts of Interest

The selected Proposer must agree to comply fully with and be bound by the applicable provisions of state and local laws related to conflicts of interest, including Section 15.103 of the City's Charter, Article III, Chapter 2 of City's Campaign and Governmental Conduct Code, and Section 87100 et seq. and Section 1090 et seq. of the Government Code of the State of California. The selected Proposer will be required to acknowledge that it is familiar with these laws; certify that it does not know of any facts that constitute a violation of said provisions; and agree to immediately notify the City if it becomes aware of any such fact during the term of the Agreement.

Individuals who will perform work for the SFMTA on behalf of the selected Proposer might be deemed "contractors" under state and local conflict of interest laws. If so, such individuals will be required to submit a Statement of Economic Interests, California Fair Political Practices Commission Form 700, to the City within ten calendar days of the SFMTA's notice of award of the contract.

VII. Protest Procedures

A. Protest of Non-Responsiveness Determination

Within five working days of the SFMTA's issuance of a notice of non-responsiveness, any Proposer that believes the SFMTA has incorrectly determined that its Proposal is non-responsive may submit a written notice of protest. Such notice of protest must be received by the SFMTA on or before the fifth working day following the SFMTA's issuance of the notice of non-responsiveness. The notice of protest must include a written statement specifying in detail each and every one of the grounds asserted for the protest. The protest must be signed by an individual authorized to represent the Proposer, and must cite the law, rule, local ordinance, procedure or RFP provision on which the protest is based. In addition, the protestor must specify facts and evidence sufficient for the SFMTA to determine the validity of the protest.

The SFMTA reserves the right to proceed with its selection process to evaluate responsive Proposals pending the Agency's determination of the validity of a protest.

B. Protest of Non-Responsible Determination

Within five working days of the SFMTA's issuance of a notice of a determination of non-responsibility, a vendor that would otherwise be the lowest responsive proposer may submit a written notice of protest. The vendor will be notified of any evidence reflecting upon their responsibility received from others or adduced as a result of independent investigation. The vendor will be afforded an opportunity to rebut such adverse evidence, and will be permitted to present evidence that they are qualified to perform the contract. Such notice of protest must be received by the SFMTA on or before the fifth working day following the SFMTA's issuance of the notice of non-responsibility. The notice of protest must include a written statement specifying in detail each and every one of the grounds asserted for the protest. The protest must be signed by an individual authorized to represent the proposer, and must cite the law, rule, local ordinance, procedure or RFP provision on which the protest is based. In addition, the protestor must specify facts and evidence sufficient for the City to determine the validity of the protest.

C. Protest of Contract Award

Within five working days of the SFMTA's issuance of a notice of intent to award the contract, any firm that has submitted a responsive Proposal and believes that the SFMTA has incorrectly selected another Proposer for award may submit a written notice of protest. Such notice of protest must be received by the SFMTA on or before the fifth working day after the SFMTA's issuance of the notice of intent to award.

The notice of protest must include a written statement specifying in detail each and every one of the grounds asserted for the protest. The protest must be signed by an individual authorized to represent the Proposer, and must cite the law, rule, local ordinance, procedure or RFP provision on which the protest is based. In addition, the protestor must specify facts and evidence sufficient for the SFMTA to determine the validity of the protest.

The SFMTA reserves the right to proceed in contract negotiation with the selected Proposer pending the Agency's determination of the validity of a protest.

D. Delivery of Protests

All protests must be received by the due date. A protestor bears the risk of non-delivery within the deadlines specified herein. Protests or notice of protests made orally (e.g., by telephone) will not be considered. Protests must be delivered via email to:

Carlos.Peza@sfmta.com

Appendix A: CMD Attachment 2

City and County of San Francisco

Contract Monitoring Division

Requirements for Architecture, Engineering and Professional Services
Contracts, for contracts $55,000 and over

Appendix A is a separate file to be downloaded from the online posting for this RFP in the San Francisco Office of Contract Administration's (OCA) Bids and Contracts Database.

You may access the website at the following link:

http://mission.sfgov.org/OCABidPublication/

Appendix B: Standard Forms

The requirements described in this Appendix are separate from those described in Appendix A.

A. How to become Eligible to Do Business with the City

Before the City can award any contract to a contractor, all vendors must meet the minimum requirements described below. There may be additional requirements placed upon a vendor depending on the type of good or service to be purchased.

B. Mandatory Forms

At a minimum, in order to become eligible to do business with the City, a vendor must submit the following documents to the Vendor File Support Division via the City's supplier portal located at https://sfcitypartner.sfgov.org/

1. Vendor Application Packet (includes *New Vendor Number Request Form* and *IRS Form W-9*)
2. CCSF Vendor - Business Registration (Electronic Submission - you must have a vendor number to complete)
3. CMD 12B-101 Declaration of Nondiscrimination in Contracts and Benefits

C. Vendor Eligibility and Invoice Payment

Vendors must have a City-issued vendor number, have all compliance paperwork submitted and approved by the City, and have an executed contract or purchase order before payments can be made. Once a vendor number has been assigned, an e-mail notification will be provided by the City's Vendor File Support Division. This notification will include instructions on how to sign up to receive payments through the City's supplier portal located at https://sfcitypartner.sfgov.org/.

D. Vendor Eligibility Forms

Form	Purpose/Info	Routing
CCSF Vendor - Business Registration (Electronic Submission - you must have a vendor number to complete)	This declaration is required for city vendors to determine if you are required to obtain a Business Registration Certificate.	https://sfcitypartner.sfgov.org/
Declaration of Nondiscrimination in Contracts and Benefits *with supporting documentation* (Form CMD-12B-101)	This Declaration is used by the City's Contract Monitoring Division to determine if a vendor offers benefits to employees. When a vendor offers benefits, it must be verified that all benefits, including insurance plans and leaves, are offered equally to employees with spouses and employees with domestic partners. For more information and assistance, please visit	https://sfcitypartner.sfgov.org/

	the City Administrator's Contract Monitoring Division Equal Benefits web page.	
Vendor Profile Application	Includes New Vendor Number Request Form and IRS Form W-9.	https://sfcitypartner.sfgov.org/

E. Supplemental Forms

Form:	Required If:
Minimum Compensation Ordinance (MCO) Declaration (pdf)	You have at least $25,000 ($50,000 for non-profit organizations) in cumulative annual business with a City department or departments and have more than 5 employees, including employees of any parent, subsidiaries and subcontractors.
Health Care Accountability Ordinance (HCAO) Declaration (pdf)	You have at least $25,000 ($50,000 for non-profit organizations) in cumulative annual business with a City department or departments and have more than 20 employees (more than 50 employees for nonprofit organizations), including employees of any parent, subsidiaries or subcontractors.
Insurance Requirements (pdf)	The solicitation requires the successful proposer to demonstrate proof of insurance.
Payment (Labor and Material) Bond (pdf)	The solicitation requires the awarded vendor to post a Payment (Labor and Material) bond.
Performance Bond (pdf)	The solicitation requires the awarded vendor to post a Performance bond.
Local Business Enterprise Program Application (Contract Monitoring Division)	You desire to participate in the City's Local Business Enterprise Program which helps certain financially disadvantaged businesses increase their ability to compete effectively for City contracts

For further guidance, refer to the City's supplier training videos that are located online at: https://sfcitypartner.sfgov.org/ .

Appendix C: Sample Software as a Service Agreement (Form P-648)

City and County of San Francisco

Municipal Transportation Agency

One South Van Ness Ave., 7th Floor

San Francisco, California 94103

SOFTWARE AS A SERVICE AGREEMENT

BETWEEN THE CITY AND COUNTY OF SAN FRANCISCO AND

[Insert name of contractor]

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

SOFTWARE AS A SERVICE AGREEMENT
BETWEEN THE CITY AND COUNTY OF SAN FRANCISCO AND
[Insert name of contractor]
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 [name and address of Contractor] (Contractor) and City, acting through its Municipal Transportation Agency (SFMTA).

Recitals

A. The SFMTA wishes to retain the services of Contractor to develop, construct, and maintain a 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 through a Request for Proposals (RFP) issued on September 5, 2018, pursuant to which City selected Contractor as the highest-qualified scorer.

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

D. Contractor represents and warrants that it is qualified to provide the Software as a Service (SaaS) Application and perform the Services required by City 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

The following definitions apply to this Agreement:

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

1.2 "**Acceptance Period**" means the period allocated by City to test the SaaS Application 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.

1.3 "**Agreement**" means this contract document, including all attached appendices, and all applicable City Ordinances and Mandatory City Requirements, which are specifically incorporated into this Agreement by reference as provided herein.

1.4 "**Authorized Users**" means persons authorized by City to access the City Portal and use the SaaS Application, including any City employee, contractor, or agent, or any other individual or entity authorized by City.

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

1.6 **"Business Hours"** means 6:00am-6:00pm U.S. Pacific Time.

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

1.8 "**City**" or "**the City**" means the City and County of San Francisco, a municipal corporation.

1.9 "**City Data**" means that data, as described in Article 13 of this Agreement, which includes, without limitation, all data collected, used, maintained, processed, stored, or generated by or on behalf of the City, including data resulting from the use of the SaaS Service. City Data includes Confidential Information.

1.10 "**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.

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

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

1.13 "**Confidential Information**" means confidential City information, including, but not limited to, personally-identifiable information (PII), 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 (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).

1.14 "**Contractor**" or "**Consultant**" means [insert name and address of contractor].

1.15 "**Contractor Project Manager**" means the individual specified by Contractor pursuant to Section 4.2.1 hereof, as the Project Manager authorized to administer this Agreement on Contractor's behalf.

1.16 "**Contractor's Website**" means the website that provides Authorized Users access to the SaaS Application Services.

1.17 "**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.

1.18 "**Data Center(s)**" means the data center(s) located in the United States that will be used to host the SaaS Application and City Data.

1.19 "**Days**" means calendar days.

1.20 "**Deliverables**" means Contractor's work product resulting from the Services that are provided by Contractor to City during the course of Contractor's performance of the Agreement, including, without limitation, the work product described in the "Scope of Services," attached as Appendix A.

1.21 "**Disabling Code**" means computer instructions or programs, subroutines, code, instructions, data or functions (e.g., viruses, worms, date bombs or time bombs)—including, but not limited to, data storage, computer libraries, 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 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.

1.22 "**Documentation**" means technical publications provided by Contractor to City relating to use of the SaaS Application, such as reference, administrative, maintenance, and programmer manuals.

1.23 "**Effective Date**" means the date on which the City's Controller certifies the availability of funds for this Agreement, as provided in Section 3.1.

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

1.25 "**Internet**" means that certain global network of computers and devices commonly referred to as the "internet," including, without limitation, the World Wide Web.

1.26 "**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.

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

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

1.29 "**Performance Credit**" means credit due to City by Contractor with regard to Contractor's service level obligations in Appendix D (Service Level Obligations).

1.30 "**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.

1.31 **"Purchase Order**" means the written order issued by the City notifying the Contractor of the Effective Date.

1.32 "**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 Contractor pre-printed document.

1.33 "**SaaS Application**" means the licensed and hosted computer program residing in Contractor's servers that provides the SaaS Services that may be accessed by Authorized Users through the Internet.

1.34 "**SaaS Implementation and Training Services**" means the services by which the Contractor will implement all necessary Software configurations and modules necessary to make the SaaS Application available and accessible to City.

1.35 "**SaaS Issue**" means a problem with the SaaS Services identified by the City that requires a response by Contractor to resolve.

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

1.37 "**SaaS Services**" means the Services perfomed by Contractor to host the SaaS Application to provide the functionality listed in the Documentation.

1.38 "**SaaS Severity Level**" means a designation of the effect of a SaaS Issue on the City.

1.39 "**SaaS Software**" means those SaaS licensed programs and associated documentation licensed to City by Contractor as listed in this Agreement and Appendices, and any modification or Upgrades to the program(s) provided under this Agreement.

1.40 "**SaaS Software Error**" means any failure of SaaS Software to conform in all material respects to the requirements of this Agreement or Contractor's published specifications.

1.41 "**SaaS Software Error Correction**" means either a modification or addition that, when made or added to the SaaS Software, brings the SaaS Software into material conformity

with the published specifications, or a procedure or routine that, when observed in the regular operation of the SaaS Software, avoids the practical adverse effect of such nonconformity.

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

1.43 "**SaaS Software Version**" means the base or core version of the SaaS Software that contains significant new features and significant fixes and is available to the City. SaaS Software Versions may occur as the SaaS Software architecture 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 4 refers to a fix.

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

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

1.46 "**Services**" means the work performed by Contractor under this Agreement as specifically described in the "Scope of Services" attached as Appendix A, including all services, labor, supervision, materials, equipment, actions and other requirements to be performed and furnished by Contractor under this Agreement.

1.47 "**SFMTA Project Manager**" means the individual specified by the SFMTA pursuant to Section 4.2.1 hereof, as the Project Manager authorized to administer this Agreement on the City's behalf.

1.48 "**Software**" means the SaaS Software 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.

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

1.50 "**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.

1.51 "**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 mimic the production environment in order to uncover any environment/configuration-related issues.

1.52 "**Third-Party Software**" means the software described in Appendix B, "Third-Party Software-Included in this Agreement."

1.53 "**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 Successor Service Provider.

Article 2 Term of the Agreement

2.1 **Term.** The term of this Agreement shall commence on the later of: (i) [insert Contractor's start date]; or (ii) the Effective Date and expire on [insert expiration date], unless earlier terminated as otherwise provided herein.

2.2 **Options to Renew.** The City has two options to renew the Agreement for a period of five years each. The City may extend this Agreement beyond the expiration date by exercising an option at the Director of Transportation's sole and absolute discretion and by modifying this Agreement as provided in Section 11.5 (Modification of this Agreement).

Article 3 Financial Matters

3.1 **Certification of Funds; Budget and Fiscal Provisions; Termination in the Event of Non-Appropriation**. This Agreement is subject to the budget and fiscal provisions of the City's Charter. Charges will accrue only after the City 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 City's obligation hereunder shall not at any time exceed the amount certified for the purpose and period stated in such advance authorization. This Agreement will terminate without penalty, liability or expense of any kind to City 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. 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.

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

3.2 **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 such 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).

3.3 **Compensation.**

3.3.1 **Amount of Agreement.** In no event shall the amount of this Agreement exceed [insert whole dollar amount in numbers and words -- no pennies and no ".00"]. The breakdown of charges associated with this Agreement appears in Appendix C. Appendix C breaks down these authorized charges by category of Services as follows: Final Design Document; Stationary Digital Signage and related Maintenance Services; On-board Digital

Signage and related Maintenance Services; Mobile Platform and Website and related Maintenance Services; coordination /integration with other vendors; System Software and related Maintenance Services; Analytics Platform and related Maintenance Services; Maintenance Service; other products or services required for Scope of Services; other as-needed services; optional products or services; and SaaS Application and Hosting Services.

3.3.2 **Payment**. Contractor shall provide an invoice to the SFMTA on a monthly basis for Services completed in the immediately preceding month, unless a different schedule is set out in Appendix C (Calculation of Charges). Compensation shall be made for Services identified in the invoice that the Director of Transportation, or his or her designee, in his or her sole discretion, concludes has been satisfactorily performed. Payment shall be made within 30 Days of receipt of the invoice, unless the City notifies the Contractor that a dispute as to the invoice exists. The City may withhold a portion of payment as retention until satisfactory performance of all Services under the Agreement, as described in Appendix C. In no event shall City be liable for interest or late charges for any late payments.

3.3.3 **Payment Limited to Satisfactory Services.** Contractor is not entitled to any payments from City until the SFMTA approves Services, including any Deliverables, as satisfying all of the requirements of this Agreement. Payments to Contractor by City shall not excuse Contractor from its 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 City may reject Deliverables, equipment, components, materials and Services that do not conform to the requirements of this Agreement. In such case, Contractor must replace the deficient items without delay at no cost to the City.

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

3.3.5 **Invoice Format**. Invoices furnished by Contractor under this Agreement must be in a form acceptable to the Controller and City, and must include a unique invoice number. City will make payment to Contractor at the electronic address specified in Section 3.3.6, or in such alternate manner as the Parties have mutually agreed upon in writing.

3.3.6 **LBE Payment**. Contractor must submit all required CMD payment forms to enable CCO to monitor Contractor's compliance with the LBE subcontracting commitments in this Agreement. Contractor shall pay its LBE subcontractors within three business 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 forms. Failure to submit all required CMD payment forms with each payment request may result in the Controller withholding 20% of the payment due pursuant to that invoice until the required CMD payment forms are provided. Following SFMTA's payment of an invoice, Contractor has 10 Days to submit a CMD Form 9 Payment Affidavit verifying its payments to LBE subcontractors.

3.3.7 **Getting Paid for Goods and/or Services from the City.**

(a) All City vendors receiving new contracts, contract renewals, or contract extensions must 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 must 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.

3.4 **Audit and Inspection of Records**. Contractor agrees to maintain and make available to the City, during Business Hours, accurate books and accounting records relating to its Services. Contractor will permit 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 City by this Section. Contractor shall include the same audit and inspection rights and record retention requirements in all subcontracts.

3.5 **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 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 City 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 City; (c) conspires to defraud the City by getting a false claim allowed or paid by the City; (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 City; or (e) is a beneficiary of an inadvertent submission of a false claim to the City, subsequently discovers the falsity of the claim, and fails to disclose the false claim to the City within a reasonable time after discovery of the false claim.

Article 4 SaaS Services and Resources

4.1 **SaaS Licensed Software.** Subject to the terms and conditions of this Agreement, Contractor grants City and Authorized Users a renewable, irrevocable, non-exclusive, royalty-free, and worldwide license to access, display, and execute the SaaS Application and SaaS Services during the Term of this Agreement and any renewals thereof, if any.

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

4.1.2 **SaaS Application Title.** City acknowledges that title to each SaaS Application and SaaS Services shall at all times remain with Contractor, and that City has no rights in the SaaS Application or SaaS Services except those expressly granted by this Agreement.

4.1.3 **Authorized APIs.** City shall be permitted to access and use Contractor's SaaS 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 shall be deemed an authorized modification but will not be supported by Contractor unless provided for in this Agreement. Functionality and compatibility of City-developed macros will be sole responsibility of City. Any such macros or user interfaces developed by City shall become the property of City. All flat-file exchanges will be over an encrypted file transport service (ftps/vsftpd/scp/sftp) to a secure private ftp site.

4.1.4 **Proprietary Markings**. City agrees not to remove or destroy any proprietary markings or proprietary legends placed upon or contained within the Licensed SaaS Application or any related materials or Documentation.

4.2 **Project Managers; Services Contractor Agrees to Perform.**

4.2.1 **Project Managers.** Contractor and SFMTA shall each designate a Project Manager, who shall be accessible by telephone throughout the duration of the Agreement and shall be available 9 a.m. to 5 p.m. Monday through Friday, excluding City-designated holidays. These hours may be adjusted by mutual agreement between the SFMTA and Contractor. The SFMTA and Contractor shall use their best efforts to maintain the same Project Manager throughout the duration of the Agreement. However, if a Party needs to replace its Project Manager, the Party shall provide the other Party written notice thereof at least 45 Days prior to the date the Project Manager shall be replaced. Notwithstanding the foregoing, the Parties have the right to appoint temporary Project Managers in connection with short term unavailability, sick leave or reasonable vacations. Parties shall notify each other in advance of any such temporary appointments. The SFMTA may require Contractor to replace its Project Manager, by giving Contractor notification thereof and the SFMTA's objective reasons therefor.

Contractor Project Manager:[Name]
[Address]
[e-mail]
[phone number]

SFMTA Project Manager:[Name]
[Address]
[e-mail]
[phone number]

4.2.2 **Services Contractor Agrees to Perform**. During the Term of this Agreement, Contractor shall perform all of the services set forth in Appendix A (Scope of Services, Appendix B (SaaS Application and Hosted Services), and the following:

(a) Provide all hardware, software and other equipment at Contractor's hosting site as described in Appendix B or any description of Services (and any applicable disaster recovery site) as necessary to host and deliver the SaaS Application and Services described in Appendices A and B.

(b) Provide Authorized Users access to the SaaS Application and Services pursuant to the grant of access in Section 4.1.

(c) Comply with the Service Level Obligations described in Appendix D. It is mutually agreed and understood, that the Service Level Obligations will be applied beginning on the first full calendar month following the Acceptance of the SaaS Application and Services.

(d) Maintain the correct operation of the SaaS Application and Services, Contractor's Website, and provide SaaS Maintenance Services and support services as specified in this Agreement.

(e) Provide telephone support for Authorized Users in the operation of the SaaS Application and Services.

(f) Provide Disaster Recovery Services as described in Section 14.4 and Appendix E.

4.3 **Acceptance Testing; Document Delivery; Training**.

4.3.1 After the SFMTA has obtained access to the SaaS Application and Services, and subsequent to each SaaS Software version upgrade, revision and patch as further outlined in Appendix B, the SFMTA and Contractor shall conduct user acceptance testing as outlined in Appendices A and B, as the case may be, to verify that the SaaS Application and Services substantially conform to the specifications and the SFMTA's requirements contained therein. In the event that the SFMTA determines that the SaaS Services do not meet such specifications, the SFMTA shall notify the Contractor in writing, and Contractor shall modify or correct the SaaS Services so that it satisfies the Acceptance criteria. The date of Acceptance will be that date upon which the SFMTA provides Contractor with written notice of satisfactory completion of Acceptance testing. If the SFMTA notifies Contractor after the Acceptance Testing Period that the SaaS Services do not meet the Acceptance criteria outlined in Appendices A and B, as the case may be, then the SFMTA shall be entitled to terminate this Agreement in accordance with the procedures specified in Article 8, and shall be entitled to a full refund of any fees paid as part of this Agreement prior to termination.

4.3.2 **Document Delivery.** Contractor shall deliver completed Documentation in electronic format for the SaaS Application and Services at the time it gives the SFMTA access to

the SaaS Application and Services. The Documentation will accurately and completely describe the functions and features of the SaaS Application and 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 Application and Services. The SFMTA shall have the right to make any number of additional copies of the Documentation at no additional charge. The SFMTA may withhold its issuance of the notice of final Acceptance until the SFMTA receives the completed Documentation.

4.4 **Qualified Personnel**. Contractor shall use only competent personnel under the supervision of, and in the employment of, Contractor (or Contractor's authorized subcontractors) to perform the Services. Contractor shall comply with the SFMTA's reasonable requests regarding assignment and/or removal of personnel, but all personnel, including those assigned at the SFMTA's request, must be supervised by Contractor. Contractor shall commit adequate resources to allow timely completion of the Services within the project schedule specified in this Agreement.

4.5 **Subcontracting**.

4.5.1 Contractor may subcontract portions of the Services only upon prior written approval of the SFMTA. Contractor is responsible for its subcontractors throughout the course of the work required to perform the Services. All subcontracts must incorporate the terms of Article 10 (Additional Requirements Incorporated by Reference) and Article 13 (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.

4.5.2 City's execution of this Agreement constitutes its approval of the subcontractors listed below.

[Insert names of desired approved subcontractors here or state where the names of the subcontractors may be found elsewhere in this agreement.]

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

4.6.1 **Independent Contractor**. For the purposes of this Article 4, "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 and work requested by City under this Agreement. Contractor, its agents, and employees will not represent or hold themselves out to be employees of the City at any time. Contractor or any agent or employee of Contractor shall not have employee status with City, nor be entitled to participate in any plans, arrangements, or distributions by City pertaining to or in connection with any retirement, health or other benefits that City may offer its employees. Contractor or any agent or employee of Contractor is 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, but not limited to, 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. Nothing in this Agreement shall be construed as creating an employment or agency relationship between City and Contractor or any agent or employee of Contractor. Any terms in this Agreement referring to direction from City 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. City does not retain the right to control the means or the method by which Contractor performs work under this Agreement. Contractor agrees to maintain and make available to City, upon request and during Business Hours, accurate books and accounting records demonstrating Contractor's compliance with this section. Should City determine that Contractor, or any agent or employee of Contractor, is not performing in accordance with the requirements of this Agreement, City shall provide Contractor with written notice of such failure. Within five business days of Contractor's receipt of such notice, and in accordance with Contractor policy and procedure, Contractor shall remedy the deficiency. Notwithstanding, if City believes that an action of Contractor, or any agent or employee of Contractor, warrants immediate remedial action by Contractor, City shall contact Contractor and provide Contractor in writing with the reason for requesting such immediate action.

4.6.2 **Payment of Employment Taxes and Other Expenses**. Should City, in its discretion, or a relevant taxing authority such as the Internal Revenue Service or the State Employment Development Division, or both, determine 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). City shall then forward those amounts to the relevant taxing authority. Should a relevant taxing authority determine a liability for past services performed by Contractor for City, upon notification of such fact by City, Contractor shall promptly remit such amount due or arrange with City 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). 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 City. Notwithstanding the foregoing, Contractor agrees to indemnify and save harmless 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.

4.7 **Assignment**. The Services to be performed by Contractor are personal in character and neither this Agreement nor any duties or obligations hereunder may be assigned or delegated by Contractor unless first approved by City by written instrument executed and approved in the same manner as this Agreement. Any purported assignment made in violation of this provision shall be null and void.

4.8 **Warranty**. Contractor warrants to City that the Services will be performed with the degree of skill and care that is 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.

4.9 **Liquidated Damages.**

4.9.1 Contractor acknowledges that Contractor's failure to perform certain obligations under this Agreement, within the respective time limits or performance requirements imposed, will cause the City to incur costs and inconvenience not contemplated under this Agreement, that this cost and inconvenience will constitute damages to the City, the SFMTA, and the public, and that the exact amount of these damages will be extremely difficult or impractical to fix. The Parties agree that the amounts described below as liquidated damages are not penalties, that these amounts represent a fair and reasonable estimate of the damages the City will incur for the failures described, and that these amounts are fair compensation to the City for its losses.

(a) For each day after July 1, 2020 that Contractor fails to complete Phase 1 of the Project, Contractor agrees to pay the SFMTA liquidated damages in the amount of [*Note to Proposers - This figure will be issued in an Addendum*] per day.

(b) For each failure of Contractor to achieve the Performance Requirements indicated in Appendix F, Contractor agrees to pay the SFMTA liquidated damages in the amount indicated in Appendix F for such failure.

4.9.2 The SFMTA may deduct a sum representing the liquidated damages from any money due to Contractor under this Agreement or any other contract between City and Contractor.

4.10 **Bonding Requirements.** The Contractor is required to furnish a performance bond on the form in a form acceptable to the City, in a sum of not less than [insert bonding level] of the annual amount of the contract to guarantee the faithful performance of this contract.

Article 5 Insurance; Indemnity and Warranties

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 must 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 $X,000,000 each occurrence and each loss and $2,000,000 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 contract 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 City'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 $X,000,000 per occurrence. Such insurance shall include coverage for liability arising from theft, dissemination, and/or use of confidential information, including but not limited to, 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 must 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 City of cancellation for any reason, intended non-renewal, or reduction in coverages. Notices shall be sent to the City address set forth in Section 11.1 (Notices to the Parties). All notices, certificates and endorsements shall include the SFMTA contract number and title on the cover page.

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 City receives satisfactory evidence of reinstated coverage as required by this Agreement, effective as of the

lapse date. If insurance is not reinstated, the City 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 City 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 City, in form evidencing all coverages set forth above. Approval of the insurance by City 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 the 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 the Contractor as additional insureds.

5.2 **Indemnification**

5.2.1 **General Indemnification.** 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 or in any way connected with Contractor's performance of the Agreement, including but not limited to, 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 but not limited to 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. 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 at all times thereafter.

5.2.2 **Infringement Indemnification.** 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. 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: (a) procure for City the right to continue to use the SaaS Application and Services as contemplated hereunder, (b) replace the SaaS Application and Services with a non-infringing, functionally equivalent substitute SaaS Application and Services, or (c) 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 the applicable Authorization Document or relevant part of such Authorization Document may be terminated at the option of either Party hereto and Contractor shall refund to City all amounts paid under this Agreement for the license of such infringing SaaS Application and/or Services. 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 Application to be configured and 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 Scope of Services outlined in Appendix A, and SaaS Application and Hosted Services outlined in Appendix B, 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 City 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 City 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 at the time of their receipt by Authorized Users.

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.

Article 6 Liability of the Parties

6.1 **Liability of City**. CITY'S PAYMENT OBLIGATIONS UNDER THIS AGREEMENT SHALL BE LIMITED TO THE PAYMENT OF THE COMPENSATION PROVIDED FOR IN SECTION 3.3.1 (PAYMENT) OF THIS AGREEMENT. NOTWITHSTANDING ANY OTHER PROVISION OF THIS AGREEMENT, IN NO EVENT SHALL CITY BE LIABLE, REGARDLESS OF WHETHER ANY CLAIM IS BASED ON CONTRACT OR TORT, FOR ANY SPECIAL, CONSEQUENTIAL, INDIRECT OR INCIDENTAL 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.

6.2 **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.

6.3 **Liability for Incidental and Consequential Damages**. Contractor shall be responsible for incidental and consequential damages resulting in whole or in part from Contractor's acts or omissions.

Article 7 Payment of Taxes

7.1 Except for any applicable California sales and use taxes charged by Contractor to City, 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 City to Contractor under this Agreement. Contractor agrees to promptly provide information requested by the City to verify Contractor's compliance with any State requirements for reporting sales and use tax paid by City under this Agreement.

7.2 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 the 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.

Article 8 Termination; Disposition of Content; Survival

8.1 **Termination for Cause and/or Convenience.** City shall have the right, without further obligation or liability to Contractor:

8.1.1 To immediately terminate this Agreement if Contractor commits any breach of this Agreement or default (see Section 8.2 below) and fails to remedy such breach or default within 10 Days after written notice by City of such breach (10-day cure period), in which event Contractor shall refund to City all amounts paid under this Agreement for the Licensed SaaS Application and/or Services in the same manner as if City ceased to use the SaaS Application due to infringement under Section 5.2.2. At City's sole election, the 10-day cure period will ***not*** apply to termination for data breach and/or breach of confidentiality; or

8.1.2 To terminate this Agreement upon 30 Days' prior written notice for City's convenience and without cause, provided that except for termination due to an uncured breach as set forth in this Section and in the event of Infringement, City shall not be entitled to a refund of any amounts previously paid under this Agreement.

8.2 Each of the following shall constitute an immediate event of default (Event of Default) under this Agreement:

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

3.5 Submitting False Claims.

4.7 Assignment

Article 5 Insurance; Indemnity and Warranties

Article 7	Payment of Taxes
10.10	Alcohol and Drug-Free Workplace
11.10	Compliance with Laws
13.2	Nondisclosure of Private, Proprietary or Confidential Information

8.2.2 Contractor fails or refuses to perform or observe any other term, covenant or condition contained in this Agreement, including any obligation imposed by ordinance or statute and incorporated by reference herein, and such default continues for a period of 10 Days after written notice thereof from the SFMTA to Contractor.

8.2.3 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.

8.2.4 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.

8.2.5 On and after any Event of Default, City shall have the right to exercise its legal and equitable remedies, including, without limitation, the right to terminate this Agreement or to seek specific performance of all or any part of this Agreement. In addition, where applicable, City shall have the right (but no obligation) to cure (or cause to be cured) on behalf of Contractor any Event of Default; Contractor shall pay to City on demand all costs and expenses incurred by City in effecting such cure, with interest thereon from the date of incurrence at the maximum rate then permitted by law. City shall have the right to offset from any amounts due to Contractor under this Agreement or any other agreement between City and Contractor: (i) all damages, losses, costs or expenses incurred by City as a result of an Event of Default; and (ii) any liquidated damages levied upon Contractor pursuant to the terms of this Agreement; and (iii), 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.** In the event that either Party shall cease conducting business in the normal course, become insolvent, make a general assignment for the benefit of creditors, suffer or permit the appointment of a receiver for its business or assets or shall avail itself of, or become 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 option of the other Party this Agreement shall terminate and be of no further force and effect. 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 has received written confirmation from City that City Data has been successfully transferred to City, Contractor shall within 30 Days

purge or physically destroy all City Data from its hosted servers or files and provide City with written certification within five Days that such purge and/or physical destruction has occurred. Secure disposal shall be accomplished by "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 Content.** Upon expiration or termination of the SaaS Services under this Agreement:

8.4.1 Contractor may immediately discontinue the SaaS Services and City shall immediately cease accessing the SaaS Application and Services. Contractor shall within five Days of the expiration or termination of the SaaS Services return City's data in an agreed-upon machine readable format. This provision shall also apply to all City Data that is in the possession of subcontractors, agents or auditors of Contractor. Such data transfer shall be done at no cost to the City. Once Contractor has received written confirmation from the SFMTA that City Data has been successfully transferred to City, Contractor shall within 30 Days purge or physically destroy all City Data from its hosted servers or files and provide City with written certification within five Days that such purge and/or physical destruction has occurred. Secure disposal shall be accomplished by "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 City and/or Successor Service Provider assistance requested by the SFMTA to effect the orderly transition of the SaaS Services, in whole or in part, to City or to Successor Service Provider. During the transition period, SaaS and City Data access shall continue to be made available to City without alteration. Such Transition Services shall be provided on a time and materials basis if the SFMTA opts to return to its own servers or SFMTA chooses a Successor Service Provider. Transition costs may include: (a) developing a plan for the orderly transition of the terminated SaaS 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. Notwithstanding the foregoing, should City terminate this Agreement due to Contractor's material breach, 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 of 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 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 that City may have under applicable law.

8.6 Any notice of default must 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:

3.3.2	Payment Limited to Satisfactory Services
3.4	Audit and Inspection of Records
3.5	Submitting False Claims
4.6	Independent Contractor; Payment of Employment Taxes and Other Expenses
Article 5	Insurance; Indemnity and Warranties
6.1	Liability of City
6.3	Liability for Incidental and Consequential Damages
Article 7	Payment of Taxes
8.4	Transition Services and Disposition of Content
8.7	Non-Waiver of Rights
9.1	Ownership of Results
9.2	Works for Hire
11.6	Dispute Resolution Procedure
11.7	Agreement Made in California; Venue
11.8	Construction
11.9	Entire Agreement
11.10	Compliance with Laws
11.11	Severability
13.2.1	Proprietary or Confidential Information of City
13.2.5	Notification of Legal Requests

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 for the purposes of this Agreement, shall become the property of and will be transmitted to City. However, unless expressly prohibited elsewhere in this

Agreement, 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 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 City. 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 City, 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 City'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 that it 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 City if it 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 **Reserved.**

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 Sections12B.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. Contractor is subject to the enforcement and penalty provisions in Chapter 12P. 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. Contractor shall choose and perform one of the Health Care Accountability options set forth in San Francisco Administrative Code Chapter 12Q.3. Contractor is subject to the enforcement and penalty provisions in Chapter 12Q.

10.9 **First Source Hiring Program.** Contractor must 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.

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 that it is familiar with section 1.126 of the City's Campaign and Governmental Conduct Code, which prohibits any person who contracts with 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, or for a grant, loan or loan guarantee, from making any campaign contribution to (1) an individual holding a City elective office if the contract must be approved by the individual, a board on which that individual serves, or the board of a state agency on which an appointee of that individual serves, (2) a candidate for the office held by such

individual, or (3) a committee controlled by such individual, at any time from the commencement of negotiations for the contract until the later of either the termination of negotiations for such contract or six months after the date the contract is approved. 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 20 percent in Contractor; any subcontractor listed in the bid or contract; and any committee that is sponsored or controlled by Contractor. Contractor must inform each such person of the limitation on contributions imposed by Section 1.126 and provide the names of the persons required to be informed to City.

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 but not limited to 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: **[insert name or title of department contact person, name of department, mailing address, and e-mail address]**

To Contractor: **[insert name of contractor, mailing address, and e-mail address]**

Any notice of default must 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 must 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, must 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 **Reserved.**

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 Section 11.1 (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 the 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 contract 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 must 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 [Insert Date of Proposal]. 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.

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 the 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 the 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, shall remain the exclusive property of the City. The Contractor warrants that the SaaS Application does not maintain, store, or export the City Data using a database structure, data model, entity relationship diagram or equivalent that is itself a trade secret or which would cause substantial injury to the competitive position of the Contractor if published.

13.1.2 **Use of City Data**. Contractor is provided a limited non-exclusive license to use the City Data solely for performing its obligations under the 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 within the system, by implication, estoppel or otherwise, under copyright or other intellectual property rights, to any third party. Unauthorized use of City Data by Contractor or 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**. City shall have access to City Data 24 hours a day, 7 days a week. The SaaS Application shall be capable of creating a digital,

reusable copy of the City Data, in whole and in part, as an independent platform 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 must 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. For purposes of this section, non-proprietary formats include formats for which royalty-free codecs are available to End Users. Contractor warrants that City shall be able to extract City Data from the SaaS Application on demand, but no later than 24 hours of City's request, without charge and without any conditions or contingencies whatsoever (including, but not limited to, 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 Appendices A and/or B, 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, and 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 Data 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 18 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) Without limiting Contractor's obligations of indemnification as described in Article 5 of this Agreement, indemnify, defend, and hold harmless City for any and all claims, including reasonable attorneys' fees, costs, and expenses incidental thereto, which may be suffered by, accrued against, charged to, or recoverable from City in connection with the occurrence;

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

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

(j) 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.

(k) 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.

(l) 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 the Contractor pursuant to Chapters 6 or 21 of the Administrative Code, or debar the 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, the 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 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 agree to advise and require their respective employees, agents, and subcontractors of their obligations to keep all Confidential Information confidential.

13.2.3 **Nondisclosure.** The receiving Party of proprietary or Confidential Information agrees and acknowledges that it shall have no proprietary interest in the 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 disclosing Party, any of the Confidential Information it produces, receives, acquires or obtains from the disclosing Party. The receiving Party shall take all necessary steps to ensure that the Confidential Information is securely maintained. The receiving Party's obligations set forth herein shall survive the termination or expiration of this Agreement. In the event the receiving Party becomes legally compelled to disclose any of the Confidential Information, it shall provide the disclosing Party with prompt notice thereof and shall not divulge any information until the disclosing Party

has had the opportunity to seek a protective order or other appropriate remedy to curtail such disclosure. If such actions by the disclosing Party are unsuccessful, or the disclosing Party otherwise waives its right to seek such remedies, the receiving Party 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 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.

13.2.5 **Notification of Legal Requests.** Contractor shall immediately notify City upon receipt of any electronic discovery, litigation holds, discovery searches, and expert testimonies 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 subpoenas, service of process, and other 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**. Each Party shall use its best efforts to assist the other Party in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limiting the foregoing, each Party shall advise the other Party immediately in the event either Party 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 each Party will cooperate with the other Party in seeking injunctive or other equitable relief against any such person.

13.2.7 **Remedies for Breach of Obligation of Confidentiality**. Each Party acknowledges that breach of its obligation of confidentiality may give rise to irreparable injury to the other Party, which damage may be inadequately compensable in the form of monetary damages. Accordingly, a Party 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, in the case of City and at the sole election of City, the immediate termination of this Agreement, without liability to City.

13.2.8 **Surrender of Confidential Information upon Termination**. Upon termination of this Agreement, in whole or in part, each Party shall, within five Days from the date of termination, return to the other Party any and all Confidential Information received from the other Party, or created or received by a Party on behalf of the other Party, which are in such Party's possession, custody, or control; provided, however, that Contractor shall return City Data to City following the timeframe and procedure described further in this Agreement. Should Contractor or City determine that the return of any Confidential Information, other than City Data, is not feasible, such Party shall destroy the Confidential Information and shall certify the same in writing within five Days from the date of termination to the other Party, pursuant to Article 8 of this Agreement.

13.2.9 **Data Security.** To prevent unauthorized access or "hacking" of City Data, Contractor shall at all times during the Term provide and maintain up-to-date security with

respect to (a) the Services, (b) the 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 the financial services industry, and shall promptly install all patches, fixes, upgrades, updates and new versions of any security software it employs. Contractor shall 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. For information disclosed in electronic form, Contractor agrees that appropriate safeguards include electronic barriers (e.g., "firewalls," Transport Layer Security (TLS), Secure Socket Layer [SSL] encryption or most current industry standard encryption, intrusion prevention/detection or similar barriers) and secure authentication (e.g., password protected) access to the City's Confidential Information and hosted City Data. 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 also shall 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, 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 the following (as periodically amended or updated) as applicable:

(a) The California Information Practices Act (Civil Code §§ 1798, et seq):

(b) Compliance with the following, as applicable:

(i) Federal Risk and Authorization Management Program (FedRAMP) certification, where federal funding is involved, and show evidence of having an active compliance program;

(ii) 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;

- Relevant security provisions of the Criminal Justice Services (CJIS) Security policy.
- Relevant security provisions of the Medi-Cal Privacy and Security Agreement between the California Department of Health Care Services and the County of San Francisco;

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. In no case shall the safeguards of Contractor's data privacy and information security program be less stringent than the safeguards used by City.

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 Section.

13.2.12**Data Transmission.** The 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 encryption methods, or other means, as directed by the SFMTA). The 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 the Contractor. The 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. Contractor shall not access City Data from outside the continental United States.

13.3 **SSAE 16, SOC 2/SOC 3 and/or SOC 1 Audit Report**.

13.3.1 During the Term of the Agreement, Contractor shall provide, on an annual basis, the SSAE 16, SOC 2/SOC 3 and/or SOC 1 Audit report ("Audit Reports") (if Contractor is using a hosting service provider, the Audit Report it receives from its service provider) as follows: (a) the Audit Reports shall include a 365-day (12-month) testing period; and (b) the Audit Reports shall be available to City no later than 30 Days after they are received by Contractor. Upon City's written request, Contractor shall provide a so-called "negative assurance opinion" to City as soon as said opinion is received from Contractor's hosting service provider.

Contractor shall on an annual basis, and otherwise as reasonably requested by City: (i) provide the foregoing Audit Reports to City and (ii) request such "negative assurance opinions" on City's behalf. Contractor shall implement reasonably required safeguards as identified by City or by any audit of Contractor's data privacy and information security program.

13.3.2 **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, but not limited to, making a site visit, scanning for malicious codes, and hiring a third party to perform a security audit if City determines that the SSAE Audit Report is unsatisfactory.

13.3.3 **Information Security Audits.** The Contractor must contract with an independent third party to perform yearly Information Security Audits of their primary and backup Data Centers. The annual audits must 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 must be shared with the City. All audit findings must be remedied.

13.3.4 **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 must 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 items 13.3.1 to 13.3.3 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, 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 attached as Appendix E hereto, or as otherwise set forth in this Agreement or any Statement of Work. 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 following appendices are attached and incorporated into this Agreement as though fully set forth herein and together form the complete Agreement between the Parties:

15.2 **Appendices:**

A. SaaS Implementation and Training Services

B. SaaS Application & Hosting Services

C. Calculation of Charges

D. Service Level Obligations

E. Disaster Recovery Plan

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**	**[company name]**
_____	_____
Edward D. Reiskin Director of Transportation Authorized By: Municipal Transportation Agency Board of Directors	**[name of authorized representative]** **[title]** **[optional: address]** **[optional: city, state, ZIP]**
Resolution No: _____ Adopted: _____ Attest: _____ Roberta Boomer, Secretary Board of Supervisors	Acknowledgement of Large Vehicle Driver Safety Training Requirements: By signing this Agreement, Contractor acknowledges that it has read and understands Section 12.1: Large Vehicle Driver Safety Training Requirements.
Resolution No: _____ Adopted: _____ Attest: _____ Clerk of the Board Approved as to Form: Dennis J. Herrera City Attorney	City vendor number: **[vendor number]**

By: _____ Isidro Alarcón Jiménez Deputy City Attorney	

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Appendix A
Scope of Services

[To be included during contract negotiations]

Appendix B

SaaS Application & Hosting Services

I. Description of the SaaS Application and Hosted Services
II. SaaS Data Centers
III. SaaS Maintenance Services.
IV. City Responsibilities
V. Technical Support & Training

I. Description of the SaaS Application and Hosted Services: "SaaS Application and Hosted Services" include the following services [describe the SaaS Application and/or provide functional, performance, etc. references]:

A. Software: Use of Contractor's Software operating on hosted equipment located at Contractor's facility and/or any Data Center as further outlined under Section II (SaaS Data Centers) of this Appendix B. This includes:

1. …
2. ….
3. ….

B. Third-Party Software:

1. Providing certain third-party software required to operate the SaaS Software, including ……., and other bundled third-party software packages required to support the operation of the SaaS Software.

2. Inclusion of regular Software and Contractor-supplied third-party software updates, patches and fixes as scheduled by Contractor.

C. Remote Software: Contractor shall provide access to and use of a remote software tool for City management of Authorized Users, access rights and other similar role-based controls as they pertain to the SaaS Services. Method will be published through Contractor portal and be made available to Authorized Users with elevated privileges.

D. Back-Up of City's Data:

1. Contractor shall provide up to 36 months of on-line hourly data retention for SaaS Software operation and functionality.

2. Contractor shall provide incremental City Data backups at a minimum of every four hours to an off-site location other than the primary hosting center.

3. Contractor shall provide weekly, off-site backups with a duration that matches the agreed-upon backup schedule and retention to a location other than the primary hosting center. Off-site backups to include previous eight weeks.

E. SaaS Environments: The SaaS Application and Hosted Services shall be hosted in a certified and secure Tier-3 data hosting center.

1. A single Back-up Environment available as needed to serve as the back-up or "failover" environment for the SaaS and Hosted Services

2. A single test environment available to the City and Contractor for the evaluation and eventual promotion of SaaS Software updates, patches, fixes or otherwise deemed tests. The test environment shall perform at 50% or better of the production environment.

F. Reporting: Contractor shall provide electronic notification within two hours of discovery and subsequent monthly reporting of any incidents or breaches that had occurred within the environment or to the hosted application. In the event of a breach, Contractor shall follow the procedures set forth in Section 13.1.5 of the Agreement.

G. Availability of SaaS Services: Contractor (or its Hosting Service contractor) shall host the SaaS Services on computers owned or controlled by the Contractor (or its contractor) and shall provide the City with access to both a production environment with SaaS Application and data and a test environment with SaaS Application via Internet-access to use according to the terms herein.

1. Hosted System Uptime: Other than Scheduled SaaS Maintenance Services as outlined in Section III, emergency maintenance described below, Force Majeure as described in the Agreement and lack of Internet availability as described below, Contractor shall provide uptime to the SaaS Application and Hosted Service to achieve a 99.9999% Service Level Availability.

2. Scheduled SaaS Maintenance

A. Contractor shall conduct Scheduled SaaS Maintenance during the following hours: Saturdays between 12 AM (Pacific Time) and 8 AM (Pacific Time), with the same exclusions noted in subsection 1. above.

B. Scheduled SaaS Maintenance shall not exceed an average of four hours per month over a 12-month period except for major scheduled upgrades.

3. Unsch eduled SaaS Maintenance. Contractor shall use commercially reasonable efforts to prevent more than one hour of continuous down time during Business Hours in 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 shall furnish City with a Performance Credit in the amount of 10% of the Services Fees (as calculated on a monthly basis for the reporting month. For each month (after the three successive calendar months) in which the Contractor fails to meet the obligation, the Performance Credit shall be increased by 5% (e.g., to 15%, 25%, 25%, and so forth). The City may deduct Performance Credits from monies due to the Contractor.

4. Emergency Maintenance. If Force Majeure Events or emergencies arise or continue, 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.

5. Notice of Unavailability: In the event there will be more than 30 minutes down time of any SaaS or Hosted Service components for any reason, including, but not limited to ,Scheduled SaaS Maintenance or emergency maintenance, Contractor shall provide notice to users by posting a web page that indicates that the site is temporarily unavailable and to please come back later. Contractor shall also provide advanced e-mail notice to XXXX@sfgov.org which will include at least a brief description of the reason for the down time and an estimate of the time when City can expect the site to be up and available.

H. Changes in Functionality. During the term of this Agreement, Contractor shall not reduce or eliminate functionality in SaaS Services. Where Contractor has reduced or eliminated functionality in SaaS Services, City, in its sole election, shall: (i) have, in addition to any other rights and remedies under this Agreement or at law, the right to immediately terminate this Agreement and be entitled to a return of any prepaid fees; or, (ii) determine the value of the reduced or eliminated functionality and Contractor shall immediately adjust the Services fees accordingly on a prospective basis.

II. SaaS Data Centers

A. Control: The method and means of providing the 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 shall provide the Services (including data storage) solely from within the continental United States and on computing and data storage devices residing in the United States.

B. Location: The locations of the approved Data Centers that will be used to host the SaaS Application are as follows:

Data Center:

[name and address]\

Data Center:

[name and address]

C. Replacement Hosted Provider: In the event Contractor changes the foregoing Hosted Provider, Contractor shall provide City with prior written notice of said change and disclose the name and location of the replacement Hosted Provider. The replacement Hosted Provider shall be a reputable Hosted Provider comparable to Contractor's current Hosted Provider, and said replacement Hosted Provider shall be located within the United States. The replacement Hosted Provider shall 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.

D. Notice of Change: If the location of the Data Center used to host the SaaS Application is changed, Contractor shall provide City with written notice of said change at least 60 Days prior to any such change taking place. Contractor shall disclose the address of the new facility, which shall be within the United States. The Data Centers referenced above are subcontractors that must be approved by City.

E. Subcontractors. Contractor shall not enter into any subcontracts for the performance of the Services, or assign or transfer any of its rights or obligations under this Agreement, without City's prior written consent and any attempt to do so shall be void and without further effect and shall be a material breach of this Agreement. Contractor's use of subcontractors shall not relieve Contractor of any of its duties or obligations under this Agreement.

III. SaaS Maintenance Services.

A. The SaaS Software maintained under this Agreement shall be the SaaS Software set forth in Appendix B to this Agreement.

B. The following SaaS Maintenance Services are included as part of this Agreement:

1. Contractor Software Version Upgrades, Software Revisions and Patches. Contractor shall provide and implement ALL SaaS Software Version upgrades, SaaS Software Revisions and SaaS Software patches to ensure: (a) that the functionality of the SaaS Software and SaaS Services, as described in the Documentation, is available to Authorized Users; (b) that the functionality of the SaaS Software and SaaS Services is in accordance with the representations and warranties set forth herein, including but not limited to, the SaaS Software and SaaS Services conforming in all material respects to the specifications, functions, descriptions, standards, and criteria set forth in the Documentation; (c) that the Service Level Standards can be achieved; and (d) that the SaaS Software and SaaS Services work with the non-hosted browser version.

a. Deployment of these revisions will be mutually agreed upon between Contractor and City.

b. Release of software revisions as defined will be conducted on a schedule as determined by Contractor. Contractor shall provide no less than a 30-Day prior written notice of when any such revision is scheduled to be released. City will be granted a 15-Day evaluation window to review release documentation regarding software modules being impacted and general revision changes.

c. After the evaluation period, Contractor shall conduct a deployment of the revision to the City test environment. The software deployment will be scheduled in writing five 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-ail or portal post to serve as written notification that this service has been completed. City shall have a 45-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 Severity Level 1 or Severity Level 2 Issue has been identified and appropriately triaged and classified by both Contractor and City during the Test Environment deployment test window, Contractor shall 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 testing 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 will deploy immediately upon availability with as much notice as practicable. City will be allowed an additional five testing Days to evaluate the correction post the test window if desired.

e. If at any time during the testing window City identifies the presence of multiple SaaS Severity Level 1 or Severity Level 2 Issues that can be shown to materially impact City's ability to continue testing, City may, in writing, elect to suspend testing until corrections for the SaaS Issues can be provided. Contractor shall 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 and Back-up 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 and Back-up 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. In support of such SaaS Software Version upgrades, SaaS Software Revisions and SaaS Software patches, Contractor shall provide updated user technical 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. Updated user technical documentation that corrects Saas Software Errors or other minor discrepancies will be provided to Contractor's customers when available.

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 Technology System and has not created any additional malfunctions; and (iii) the Third-Party Software revision is available to Contractor. City is responsible for obtaining and installing or requesting installation of the Third-Party Software revision if the Third-Party Software was not licensed to City by or through Contractor. Contractor Software revisions provided by Contractor are specifically limited to the Third-Party Software identified and set forth in Appendix B to this Agreement.

C. Response to SaaS Issues. Contractor shall provide verbal or written responses to SaaS Issues identified by City in an expeditious manner. Such responses shall be provided in accordance with the Target Response Times defined under Section V.

D. 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 shall 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.

E. SaaS Hardware: Contractor shall 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 I.E of this Appendix.

IV. City Responsibilities

A. City shall provide Contractor with timely notification of any SaaS Issues by either of these methods:

1. Contacting Contractor's Customer Support at 1-800-xxx-xxxx.

2. 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.

3. 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. 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 agrees, if requested by Contractor, to submit to Contractor a listing of output and any other data that Contractor may require in order to reproduce the SaaS Software Error and the operating conditions under which the SaaS Software Error occurred or was discovered.

V. Technical Support

A. Contractor shall provide technical support for SaaS Severity Level 1 and Severity Level 2 Issues 24 hours per day, seven days per week, 365 days per year.

B. 24x7 Technical Support: Authorized Users may make Technical Support requests by calling or emailing Contractor's Technical Support staff or by submitting a request via Contractor's customer service web portal. The Technical Support staff shall assign to the request the SaaS Severity Level (as defined herein) indicated by the requestor. SaaS Severity Level 1 and 2 items will be addressed 24/7. SaaS Severity Level 3 and 4 items will be addressed during Business Hours.

1. **Business Hours:** Technical Support is available during Business Hours by accessing the Contractor's subscriber Portal (or Toll-free at 800-XXX-XXXX, or by emailing xxxx@ssss.com if access to the Contractor's subscriber Portal is not readily available to City).

After hours: On-call technical support is available after 6pm and before 6:00am Pacific Time 24-hours a day/7 days a week/365 days a year, including Service Provider Holidays and weekends by accessing the Contractor's subscriber Portal or calling Contractor's Toll –free number 800-XXX-XXXX.

SaaS Severity Level	*Target Response Time*
SaaS Severity Level 1: *Requires immediate attention– Critical production functionality is not available or a large number of users cannot access the SaaS Application. Causes a major business impact where service is lost or degraded and no workaround is available, preventing operation of the business.*	*Request Response Time: 30 minutes.* *Request Resolution Time Target: < 2 hours.* *Maximum Permitted Request Resolution Time: < 48 hours*
SaaS Severity Level 2: *Requires priority attention - Some important production functionality is not available, or a small number of users cannot access the system. Causes significant business impact where service is lost or degraded and no workaround is available; however, the business can continue to operate in a limited fashion.*	*Request Response Time: 1 hr.* *Request Resolution Time Target: < 4 hours* *Maximum Permitted Request Resolution Time: < 96 hours*
SaaS Severity Level 3: *Requires attention –There is a problem or inconvenience. Causes a business impact where there is minimal loss of service and a workaround is available such that the system can continue to operate fully and users are able to continue business operations.*	*Request Response Time: 1 hr.* *Request Resolution Time Target: < 6 hours* *Maximum Permitted Request Resolution Time: < 7 Days*
SaaS Severity Level 4: *There is a problem or issue with no loss of service and no business impact.*	*Request Response Time: 1 hr.* *Request Resolution Time Target: < 24 hours* *Maximum Permitted Request Resolution Time: < 7 Days*

Appendix C
Calculation of Charges

Appendix D

Service Level Obligations

A. Time is of the Essence. For the term of this Agreement, Contractor shall provide SaaS Services, Force Majeure events excepted, during the applicable Service Windows and in accordance with the applicable Service Levels as described herein, time being of the essence.

B. Service Levels.

1. "Availability" Service Level:

a. Definitions:

i. Actual Uptime: The total minutes in the reporting month that the Services were actually available to Authorized Users for normal use.

ii. Scheduled Downtime: The total minutes in the reporting month during which Scheduled SaaS Maintenance was performed.

iii. Scheduled Uptime: The total minutes in the reporting month less the total minutes represented by the Scheduled Downtime.

b. Service Level Standard. Services shall be available to Authorized Users for normal use 100% of the Scheduled Uptime.

i. Calculation: (Actual Uptime / Scheduled Uptime) * 100 = Percentage Uptime (as calculated by rounding to the second decimal point)

ii. Performance Credit.

(a) Where Percentage Uptime is greater than 99.9999%: No Performance Credit will be due to City.

(b) Where Percentage Uptime is equal to or less than 99.9%: City shall be due a Performance Credit in the amount of 20% of the Services Fees (as calculated on a monthly basis for the reporting month) for each full 1% reduction in Percentage Uptime.

(c) Subsequent Failures to Maintain Standard: For each similar failure in a subsequent month, the Performance Credit shall be increased by 5%. For example, the second time the monthly Percentage Uptime is equal to or less than 99.9%, the Performance Credit shall be 25% of the Services Fees; the third time, 30%, and so forth. The City may deduct Performance Credits from monies due to the Contractor.

2.Response Time Service Level.

a. Definition(s).

i. Response Time: The interval of time from when an Authorized User requests, via the Services, a Transaction to when visual confirmation of Transaction completion is received by the Authorized User. For example, Response Time includes the period of time representing the point at which an Authorized User enters and submits data to the Services and the Services display a message to the Authorized User that the data has been saved.

ii. Total Transactions: The total of Transactions occurring in the reporting month.

iii. Transaction(s): Services webpage loads, Services webpage displays, and Authorized User Services requests.

b. Service Level Standard. Transactions shall have a Response Time of two seconds or less 99.9% of the time each reporting month during the periods for which the Services are available.

i. Calculation. ((Total Transactions – Total Transactions failing Standard) / Total Transactions) * 100 = Percentage Response Time (as calculated by rounding to the second decimal point).

ii. Performance Credit.

(a) Where Percentage Response Time is greater than 99.9%: No Performance Credit will be due to City.

(b) Where Percentage Response Time is equal to or less than 99%: City shall be due a Performance Credit in the amount of 20% of the Services Fees (as calculated on a monthly basis for the reporting month) for each full 1% reduction in Percentage Response Time.

(c) Subsequent Failures to Maintain Standard: For each similar failure in a subsequent month, the Performance Credit shall be increased by 5%. For example, the second time the monthly Percentage Response Time is equal to or less than 99%, the Performance Credit shall be 25% of the Services Fees; the third time, 30%, and so forth. The City may deduct Performance Credits from monies due to the Contractor.

3.“Technical Support Problem Response” Service Level.

a. Definition.

i. Total Problems: The total number of problems occurring in the reporting month.

b. Service Level Standard. Problems shall be confirmed as received by Contractor 100% of the time each reporting month, in accordance with the Request Response Time associated with the SaaS Severity Level.

i. Calculation. ((Total Problems – Total Problems failing Standard) / Total Problems) * 100 = Percentage Problem Response (as calculated by rounding to the second decimal point). Note: This Calculation must be completed for each SaaS Severity Level.

ii. Performance Credit.

(a) SaaS Severity Level 1 – 2.

(1) **Where Percentage Problem Response is greater than 99.9%**: No Performance Credit will be due to City.

(2) **Where Percentage Problem Response is equal to or less than 99%:** City shall be due a Performance Credit in the amount of 20% of the Services Fees (as calculated on a monthly basis for the reporting month) for each full 1% reduction in Percentage Problem Response.

(b) SaaS Severity Level 3 – 4.

(1) **Where Percentage Problem Response is greater than 99.9%**: No Performance Credit will be due to City.

(2) **Where Percentage Problem Response is equal to or less than 99%:** City shall be due a Performance Credit in the amount of 20% of the Services Fees (as calculated on a monthly basis for the reporting month) for each full 1% reduction in Percentage Problem Response.

(c) Subsequent Failures to Maintain Service Level: For each similar failure in a subsequent month, the Performance Credit due for the particular SaaS Severity Level shall be increased by 5%. For example, the second time the monthly Percentage Problem Response is equal to or less than 99% (for Severity Level 1-2), the Performance Credit shall be 25% of the Services Fees; the third time, 30%, and so forth. The City may deduct Performance Credits from monies due to the Contractor.

C. Service Level Reporting. On a monthly basis, in arrears and no later than the 15th day of the subsequent month following the reporting month, Contractor shall provide reports to City describing the performance of the SaaS Services and of Contractor as compared to the service level standards described herein. The reports shall be in a form agreed-to by City, and, in no case, contain no less than the following information: (1) actual performance compared to the Service Level Standard; (2) the cause or basis for not meeting the service level standards described herein; (3) the specific remedial actions Contractor has undertaken or will undertake to ensure that the service level standards described herein will be subsequently achieved; and, (4) any Performance Credit due to City. Contractor and City will meet as often as shall be reasonably requested by City, but no less than monthly, to review the performance of Contractor as it relates to the service level standards described herein. Where Contractor fails to provide a report for a service level standard described herein in the applicable timeframe, the service level standard shall be deemed to be completely failed for the purposes of calculating a Performance

Credit. Contractor shall, without charge, make City's historical service level standard reports to City upon request.

D. Failure to Meet Service Level Standards. In the event Contractor does not meet a service level standard described herein, Contractor shall: (a) owe to City any applicable Performance Credit, as liquidated damages and not as a penalty; and, (b) use its best efforts to ensure that any unmet service level standard described herein is subsequently met. Notwithstanding the foregoing, Contractor will use its best efforts to minimize the impact or duration of any outage, interruption, or degradation of Service. In no case shall City be required to notify Contractor that a Performance Credit is due as a condition of payment of the same.

E. Termination for Material and Repeated Failures. City shall have, in addition to any other rights and remedies under this Agreement or at law, the right to immediately terminate this Agreement and be entitled to a return of any prepaid fees where Contractor fails to meet any service level standards described herein: (1) to such an extent that the City's ability, as solely determined by City, to use the SaaS Services is materially disrupted, Force Majeure events excepted; or, (2) for four months out of any 12-month period.

F. Audit of Service Levels. No more than quarterly, City shall have the right to audit Contractor's books, records, and measurement and auditing tools to verify service level obligations achievement and to determine correct payment of any Performance Credit. Where it is determined that any Performance Credit was due to City but not paid, Contractor shall immediately pay to City the applicable Performance Credit.

Appendix E

Disaster Recovery Plan

[SaaS provider shall provide a business continuation strategy that can be implemented in the event of a catastrophic failure at the hosting primary site. Such a strategy should provide how quickly the backup site will be live and function, e.g. 48 hrs. The business continuity strategy must include documented drills. The first drill must happen within 2 months of contract signing and then once per year thereafter. The drill plans, action items and project plan for follow-ups must be shared with the City.]

Appendix F

Performance Requirements

[To be inserted from Contractor's Proposal.]

Appendix D: Attestation of Compliance

To be completed by all Proposing Firms and All Individual Subcontractors

(Please check each box, sign this form and submit it with your response.)

Name of individual completing this form: _____

The form is submitted on behalf of firm: _____

Name of RFP: **SFMTA-2019-01**

1. I attest that I and all members of the firm listed above will and have complied to date with Section V.J of the above RFP. ☐ Yes

2. I understand that if my firm or any members of the firm listed above are found to be in violation of Section V.J of the above RFP, this will disqualify my firm and any Proposal in which my firm is named from further consideration. ☐ Yes

I have entered required responses to the above questions to the best of my knowledge and belief.

Signature: _____

Date: _____

Appendix E: Certification Regarding Debarment, Suspension, and Other Responsibility Matters

To be completed by all Proposing Firms and All Individual Subcontractors

By signing and submitting its Proposal, the Proposer or proposed subcontractor certifies as follows:

(1) _____
(Proposer or Proposed Subcontractor Business Name)

certifies to the best of its knowledge and belief that it and its principals:

a. Are not presently debarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from contracting with any federal, state or local governmental department or agency;

b. Have not within a three-year period preceding the date of this Proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state or local) contract; violation of federal or state antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (1)b of this certification; and

d. Have not within a three-year period preceding the date of this Proposal had one or more public contracts (federal, state, or local) terminated for cause or default.

(2) Where the firm executing this RFP Appendix E is unable to certify to any of the statements in this certification, such firm shall attach a detailed explanation of facts that prevent such certification.

(3) The certification in this clause is a material representation on fact relied upon by the San Francisco Municipal Transportation Agency (SFMTA).

As the authorized certifying official, I certify that the above-specified certifications are true.

_____

Business Name

_____ _____

Authorized Representative Name (print) Authorized Representative Title (print)

_____ _____

Authorized Representative Signature Date

Appendix F: Certification Regarding Lobbying

To be completed by all Proposing Firms and All Individual Subcontractors

_____

(Proposer or Proposed Subcontractor Business Name)

Certifies that it will not and has not paid any person or organization for influencing or attempting to influence a member of the San Francisco Municipal Transportation Agency (SFMTA) Board of Directors, or an officer or employee of the SFMTA in connection with the contract to be awarded pursuant to this Request for Proposals (RFP), except as expressly authorized in this RFP. The Proposer or proposed subcontractor submitting this certification shall also disclose the name of any lobbyist registered under Article II of the San Francisco Campaign and Governmental Conduct Code who has made lobbying contacts on its behalf with respect to the contract to be awarded pursuant to this RFP.

This certification is a material representation of fact upon which reliance was placed for the purposes of the SFMTA's evaluation of Proposals and award of a contract pursuant to the RFP. Submission of this certification is a prerequisite for submitting a Proposal responsive to the RFP.

Following submission of Proposals with this signed certification, any firm who 1) pays any person or organization for influencing or attempting to influence a member of the SFMTA Board of Directors, or an officer or employee of the SFMTA in connection with the contract to be awarded pursuant to this RFP, except as expressly authorized in the RFP, 2) fails to disclose the name of any lobbyist registered under Article II of the San Francisco Campaign and Governmental Conduct Code who has made lobbying contacts on its behalf with respect to the contract to be awarded pursuant to this RFP, or 3) pays or agrees to pay to any SFMTA employee or official or to any member of the selection panel or other person involved in the making of the contract on behalf of the SFMTA any fee or commission, or any other thing of value contingent on the award of a contract, will disqualify any Proposal in which that firm is named as a prime contractor, joint venture partner or subcontractor from the selection process.

By signing and submitting its Proposal, the Proposer or proposed subcontractor also certifies to the SFMTA that the Proposer or proposed subcontractor has not paid, nor agreed to pay, and will not pay or agree to pay, any fee or commission, or any other thing of value contingent on the award of a contract to any SFMTA employee or official or to any member of the selection panel or other person involved in the making of the contract on behalf of the SFMTA. As the authorized certifying official, I certify that the above-specified certifications are true.

Business Name

Authorized Representative Name (print)

Authorized Representative Title (print)

Authorized Representative Signature

Date

Appendix G: Cost Proposal

To be completed by all Proposing Firms and Submitted as a Separate Electronic File;
Do Not Include the Fee or Cost Proposal in Your Main Proposal Document File

Proposer must complete the attached Excel Spreadsheet by filling in highlighted cells. The spreadsheet will automatically calculate a price, which will serve as the basis for scoring (see Section H. Part 5 – Cost Proposal). The price calculated in the spreadsheet is for scoring purposes only; the SFMTA does not guarantee that it will pay Contractor that amount.

Proposer's price must be all-inclusive to meet the requirements outlined in the Scope of Services, including any integration with other vendors, project development and overhead costs.

Appendix H: Detailed Scope of Services

This Appendix H sets forth the scope of services (Services) Contractor must perform to develop, deliver, and maintain the City's Next Generation Customer Information System (Next Generation System).

Contractor shall implement a system that is based on proven solutions that use current technologies. The vendor shall provide all required hardware, software, training, documentation, warranty and maintenance necessary to meet the Scope of Service requirements.

The Next Generation System will consist of the following five, interrelated elements executed throughout two project phases: (1) System Software, (2) Stationary Digital Signage, (3) On-Board Digital Signage, (4) Mobile Platform & Website, and (5) Analytics Platform. For each element, the sections below describe the general purpose, existing conditions, technical requirements and performance requirements.

Listed below are the Deliverables Contractor must submit to the SFMTA in a timely manner:

1. SFMTA-Approved Project Design Document
2. System Software
    a. Customer Information
    b. System Administration Tool
    c. Content Management System
3. Stationary Digital Signage
    a. Powered Shelter Signage
    b. Alternatively-Powered Signage
    c. Powered Signage at Outdoor Rail Platforms
    d. Powered Signage at Underground Stations
    e. Powered Text-to-Speech Systems at Each Signage Location
4. On-Board Digital Signage
    a. Back-End Support to Display Messages on Future On-Board Signs
    b. Back-End Support to Announce On-Demand Messages Displayed on Future On-Board Signs
5. Mobile Platform & Website
    a. Mobile App
    b. Website Integration
    c. Trip Planner
    d. SFMTA Staff Interface on Mobile App
    e. Data Collection
6. Analytics Platform

a. Analytics Platform

b. Data Interpretation Services

7. System Maintenance

a. Customer Support Services

b. Stationary Digital Signage Maintenance Services

c. Software Maintenance Services

d. Communication Maintenance Services

Contractor's performance of Services must adhere to the SFMTA-Approved Project Design Document.

1. General Requirements

1.1 Coordination/Integration with Other Vendors and their Systems

Contractor must coordinate with Vendors and/or integrate with Vendors' systems or products.

For software, Contractor must integrate its software through documented APIs (Application Programming Interface) that adhere to open standards. As directed by the SFMTA, Contractor must discuss and resolve system integration issues with other Vendors, which may include participating in meetings or developing APIs and feed specifications.

Table 7 contains possible vendors with which Contractor may need to integrate. Depending on the final Customer Information System design, integration may or may not be required with these Vendors, and Contractor may need to integrate with other vendors not listed below. Contractor must enter into any business relationship necessary (e.g., subcontract) to perform this work. The SFMTA will not modify any of its existing contracts with these Vendors.

Table 7: Other Vendors and Related Systems or Products

System or Product	Vendor
OrbCAD Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL) system	Conduent
Radio communications system	Harris
Automatic Train Control System	Thales
On-Board Digital Signage, Siemens Light Rail Vehicles	Siemens, Future signage vendor*
On-Board Digital Signage, Rubber Tire Vehicles	New Flyer, Future signage vendor*
Platform Audio Visual (PAV) signs	Penta, Daktronics
Transit Signal Priority	Global Traffic Technologies
Scheduling Software	Trapeze

Website (www.sfmta.com)	FivePaths or Drupal
MuniMobile App	Moovel**
Passenger Shelters	Clear Channel
Existing Real-Time Predictions System	NextBus
Salesforce Transit Center	Transbay Joint Powers Authority, Pearl Media, ADS
Central Subway signage	Daktronics
Transit Stop Poles	Clear Channel, Urban Solar
Regional Wayfinding Mapping	City ID
Video Management System	Genetic

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

** The SFMTA may conduct a new procurement in 2018, potentially resulting in a different vendor.

1.2 Interfaces

To facilitate interoperability and data exchange, all system components and interfaces should conform to open standards, including non-proprietary development and protocols. The system components must interface with each other through a non-proprietary, Private API (Application Programming Interface), regardless of whether or not the same Contractor or Subcontractor is responsible for different components. This non-proprietary interface will facilitate integration, particularly in case there are changes in vendors or scope of services during the Contract.

1.3 Data

The SFMTA will own all data associated with the Next Generation System. Contractor must adhere to all local, state and federal regulations relating to customer privacy, including any Personally-Identifiable Information (PII). Contractor may not release or monetize any data, either in aggregated or disaggregated form, to any third party without the express written permission of the SFMTA.

1.4 Schedule

Contractor must submit an SFMTA-approved Final Schedule for the Next Generation System no later than two months after receiving Notice to Proceed.

1.5 Design Review and Change Process

The Conceptual Project Design Document will set forth the conceptual design for the Next Generation System that Proposer has submitted in its response to the requirements set forth in this RFP.

1.5.1 Overall System Architecture and Data Flow Review

At the beginning of Contract negotiations, the SFMTA and Contractor will initiate a design review process for the overall system architecture and data flow. Contractor must anticipate that there may be substantive changes that require redesigning the system architecture and data flow to meet the requirements outlined in the Scope of Services. Prior to Contract Award and Notice to Proceed, the SFMTA and Contractor will agree on this basic system architecture and data flow.

1.5.2 SFMTA-Approved Project Design Document

Within two months following Notice to Proceed, Contractor must prepare an SFMTA-Approved Project Design Document. This document will include a detailed technical description of how Contractor will meet all requirements set forth in Appendix H: Detailed Scope of Services. Contractor must acknowledge that the SFMTA-Approved Project Design Document may differ substantially from its in appearance and functionality from what it has described in its Conceptual Project Design Document.

The SFMTA-Approved Project Design Document will be a living document to be updated through design, engineering, testing and implementation. Over the potential 16-year lifespan of this contract, there may be significant changes in technology and standards. As such, the SFMTA and Contractor will concurrently review the System's design at least once every three years, or more often if either the SFMTA or Contractor deems necessary, to determine if any modifications to the overall system architecture and data flow are required. Contractor must seek and receive SFMTA approval for any design changes, and update the SFMTA-Approved Project Design Document as necessary.

1.5.3 System Product and Customer Interface Design Review

In building and designing the Next Generation System, trip planning tools and real-time information for online and mobile platforms, the Proposer must work with the SFMTA in an iterative process to understand customer needs, prototype designs and refine the product. This process will continue after Contract award and will include ongoing customer engagement and feedback (via the Mobile Platform & Website and other means); Contractor may be required to attend workshops and/or facilitate customer focus groups to receive public input. Contractor may need to modify its initial design significantly to meet requirements and satisfy customer needs.

Contractor must conduct a Design Review of the customer interface with SFMTA staff. SFMTA will approve the final design. A design review will consist of the following stages:

i. Review of overall concept of operations and system interfaces

ii. As necessary, iterative workshops and/or focus groups with stakeholders to refine and develop additional use cases relevant to customer interactions and impacted SFMTA staff

iii. As necessary, iterative workshops to review requirements/specifications derived from concept, interfaces, and use cases

In addition, Contractor must work with the SFMTA to solicit public feedback via the Mobile Platform & Website and, if directed by the SFMTA, modify the System accordingly. The SFMTA and Contractor will concurrently review the System's design at least once every six months during the Contract, or more often if either the SFMTA or Contractor deems necessary,

to determine if any modifications are required. Contractor must seek and receive SFMTA approval for any design changes.

1.6 Security

Contractor must adhere to SFMTA's Technology Security and Information Privacy Charter detailed in Appendix M: Technology Security and Information Privacy Charter.

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. It must maintain this test environment for the contract's duration, in order to test new features and functionality and prepare for service changes. Contractor must grant SFMTA staff fully-equivalent functionality and access to reports and systems management in the test environment. Unless otherwise permitted by the SFMTA, the test environment must use identical software, hardware and other equipment as the revenue service system.

1.8 Documentation

Contractor must provide written technical documentation for all system elements. Documentation must clearly express purpose, methodology, assumptions and processes appropriate to the subject matter. Contractor must write documentation in order to preserve institutional knowledge with the assumption that different Contractor employees and SFMTA staff will work on the Next Generation System during the potential 16-year lifespan of the Contract. Contractor must submit said documentation to the SFMTA for its review, modification and final approval.

Contractor must submit documentation that includes, but is not limited to:

i. A maintenance manual for each type of hardware

ii. A manual for Transit Controllers, Public Relations Officers, System Administrators and any other pertinent Transportation Management Center Staff

iii. A manual for Information Technology (IT) system administrators

iv. An Interface Control Document (ICD) for each subsystem

v. A Product Requirements Document for the overall system and derived subsystems

1.9 Correspondence with Subcontractors

Upon notification to Contractor, the SFMTA must be permitted to correspond with any and all subcontractors, both orally and in writing.

2. System Software

2.1 Purpose

The general purpose of the System Software element is for Contractor to take real-time geographic and other information about the SFMTA's transit vehicles to generate and manage information that helps customers plan their trips and use transit efficiently. Such System-generated information includes vehicle arrival predictions, terminal departures, transfers, trip planner itineraries, route alternatives and other information (Customer Information) as described below. The System Software element must also provide an interface for SFMTA staff to administer the Next Generation System.

2.2 Existing Conditions

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:

i. Detects vehicle locations on the surface and underground
ii. Uses these vehicle locations to generate vehicle arrival predictions
iii. Functions under common transit operating conditions
iv. Produces outputs to other systems (both managed by the SFMTA and third parties)
v. 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 technical requirements; rather, the information below is provided to help Proposers understand the Existing System in planning for the Next Generation System. The SFMTA expects that Proposers may propose a solution that differs from the Existing System's design, which dates back more than 15 years.

2.2.1 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, the TMC staff 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 at the Transportation Management Center (TMC). 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 signage 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.

2.2.2 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. 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.

As detailed in Appendix L: Technical Environment, 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.

2.2.3 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.

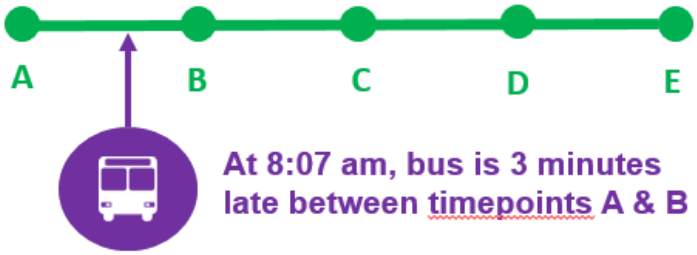
2.2.4 Existing Prediction Algorithms

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 3 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 3: Comparison of Different Prediction Algorithms

2.2.5 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.

2.2.5.1 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.

2.2.5.2 Headway-Based Operations

In some limited cases, the SFMTA employs de-facto headway-based operations despite using an official timepoint-based Trapeze schedule. Transit Operators do not adhere to their fixed schedule but rather maintain roughly constant time intervals between vehicles. For example, on a 10-minute headway-based route, Transit Operators would leave approximately 10 minutes after the previous vehicle departs. An example of such headway-based operations is SFMTA's cable car system.

2.2.5.3 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:

a. 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:

i. Special events: Street fairs, Sunday Streets, Bay to Breakers, Chinese New Year Parade, the Pride Parade

ii. Large-scale conferences or sporting events: Dreamforce, Giants or Warriors games

iii. Construction activities: Street construction requiring long-term detours, bus substitutions covering portions of the Muni Metro rail system closed for maintenance and repairs

b. 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:

i. Rail switchbacks at standard turnback points (e.g., Embarcadero Station, Church & 22nd St, Church & Duboce, Carl & Hillway, etc.)

ii. Muni Metro underground system shutdown

iii. Muni Metro Church & Duboce portal closure

iv. Market Street closure

c. 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.

d. 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.

2.2.5.4 "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.

2.2.5.5 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.

a. 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.

b. 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 signage 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 signage 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 signage 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:

i. The scheduled departure times

ii. The actual locations of the vehicles assigned to each run, specifically their predicted arrival times at the terminal prior to beginning their trip

iii. Typical behavior of operators at terminals

Scheduled departure times are available from the schedule information provided to the Exisitng System and described in Section 2.2.7.1 Schedule Uploads. As described in Section 2.2.1 Detection of Surface Vehicle Locations, the CAD/AVL system also provides vehicle locations.

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.

i. Behavior A: Operator takes a shortened layover and departs on time at 5:20 pm.

ii. 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.

2.2.5.6 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, a Transit 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.

2.2.5.7 Rail Delays

On occasion, the SFMTA's Transportation Management Center 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.

2.2.5.8 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.

2.2.5.9 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 lengths for cross traffic and pedestrians, while still allowing pedestrians to finish crossing the street safely.

TSP has resulted in faster transit service. For example, the SFMTA has realized a four to five minute improvement (10 percent) along the Mission Street corridor. The Existing System does not interface with the City's TSP system.

2.2.6 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:

2.2.6.1 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, and direction.

2.2.6.2 Platform Audio Visual (PAV) Signs

As shown in Figure 11(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 backup 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.

2.2.6.3 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.

2.2.6.4 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.

2.2.6.5 511 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.

2.2.7 Other Features of Existing System

This section describes other features of SFMTA's Existing System.

2.2.7.1 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.

2.2.7.2 Vehicle Assignments

The schedule of travel of a vehicle for a given day, including (1) a pull-out from a division (vehicle garage), (2) revenue service trips, (3) any deadhead trips, and (4) a pull-in back to the 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 SFMTA staff to configure which vehicle assignment source takes priority.

Below are details about each vehicle assignment option:

i. OrbCAD – OrbCAD is the primary source for vehicle assignments.

ii. 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.

iii. Maintenance Assignments – Maintenance staff at each division 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.

iv. 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.

2.2.7.3 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.

2.2.7.4 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.

2.2.7.5 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.

2.2.7.6 Replay Map

The Existing System provides tools enabling SFMTA staff to play back past vehicle movements and assignments on an interactive map. 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).

2.2.8 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.

2.2.8.1 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).

2.2.8.2 Stops and 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. In the future, the SFMTA could expand these attributes to support enhanced Next Generation System functionality. Examples of existing and potential future attributes include:

Existing Attributes

i. Stop name
ii. Stop ID
iii. GPS Coordinates (Latitude and Longitude)
iv. Route, Route patterns and their associated directions
v. Route name (including an alias for the route name)
vi. Route Schedules

Potential Future Attributes

i. Accessibility
ii. Waiting Amenities and Facilities (e.g., Shelters, benches)
iii. Availability of Real-Time Information Signage
iv. Transfer opportunities to other Muni routes and their stop locations (if available)
v. Transfer opportunities to services operated by transit partners and their stop locations (if available)
vi. Potential alternative routes and their stop locations (if available)

The Existing System also uses an SFMTA-provided list of divisions and their locations.

2.2.8.3 Schedules

The Existing System is capable of reading and understanding schedule data provided by Trapeze.

2.2.8.4 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 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 signage.

2.2.8.5 Alternative Transit Routes

As illustrated in **Figure *4***, 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 4: 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.

2.2.8.6 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.

2.2.8.7 Vehicle Telematics

SFMTA's newest fleet of rubber tire (New Flyer) and light rail vehicles (Siemens) generate real-time operational data. Data examples include door opening and closing events, maintenance events and vehicle locations. The Existing System currently does not utilize any vehicle telematics data.

2.2.8.8 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 is developing an automated feed to indicate changes in elevator and escalator status at each underground station. In the future, this feed may also include the status of five wayside lifts located at island platforms servicing the F Market & Wharves and M Ocean View rail lines. The feed will indicate:

i. Status changes (from operable to inoperable, or vice versa)

ii. Effective time (either immediate or planned)

iii. Up or down direction of travel for escalators

2.2.8.9 Transit Signal Priority (TSP)

As noted in Section 2.2.5.9 Transit Signal Priority (TSP), 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.

2.2.8.10 Traffic

The Existing System does not explicitly incorporate traffic congestion into its predictions.

2.2.8.11 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. (Appendix J: Guiding Principles for Management of Emerging Transportation Services and Technologies contains these principles, which have been approved by the SFMTA Board of Directors.) Information includes, but is not limited to:

i. Links to mobile apps and websites for those transportation options

ii. Nearby locations where customers can access those transportation options (e.g., bike sharing docks)

iii. 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.

2.3 Technical Requirements

Contractor's System Software must provide each of the following Deliverables in accordance with the technical requirements detailed in this Section:

1. Customer Information

2. System Administration Tool

3. Content Management System

The SFMTA expects Contractor to initiate this work in Phase I with an understanding that completing this process will likely last through Phase II. If features are readily available, the

SFMTA would prefer accelerating implementation of associated functionality by the end of Phase I.

2.3.1 Customer Information

The System Software must generate a wide range of outputs, including predictions and other context-specific, customer-facing information (Customer Information). The System Software must transmit information to a variety of customer-facing interfaces.

Contractor must customize Customer Information pushed to Stationary Digital Signage and On-Board Digital Signage to each sign type and geographic location. Customer Information transmitted to the Mobile Application & Website Element must be specific to and based on the customer's geographic location, such that mobile application and website can use this information to generate predictions and other information based on customer queries.

Subject to SFMTA approval, Contractor must incorporate any inputs it deems necessary to produce accurate Customer Information that can meet the standards to which Contractor has committed in Section 2.4 Performance Requirements. Inputs may include any of those denoted in Section 2.2.8 Inputs to Generate Customer Information provided they are technically feasible, and others not enumerated there.

2.3.1.1 Outputs

The sections below describe the initial, key categories of Customer Information the System Software must generate and transmit to other elements of the Next Generation System (i.e., outputs). For each category, the sections below set forth: the timeline by which the generation and transmission of data must start (e.g., Phase I or Phase II); the content of the information generated; and the other elements of the System to which the System Software must transmit Customer Information. The SFMTA retains the right to add additional categories of Customer Information.

Customer-facing outputs must include:

a. Basic Vehicle Arrival Predictions

Contractor must satisfy the following requirements by the end of Phase I, with the exception of requirements relating to On-Board Digital Signage, which must be at the end of Phase II.

Information Content

For each stop or station in the Muni System, the System Software must generate and transmit vehicle arrival time predictions for the next two vehicles for all routes serving that stop or station. The System Software must also indicate when no service is available for a particular route at that stop or station.

The System Software must generate and associate with each prediction the following data: (i) trip pattern; (ii) trip destination; (iii) block number; (iv) direction; (v) trip identification number; (vi) the estimated waiting time until the arrival; (vii) the estimated arrival time, (viii) whether the prediction is based on schedule or departure time; and (ix) other attributes reasonably requested by the SFMTA such as crowding data, for example.

Information Transmitted to Customer-Facing Interfaces

i. To Stationary Digital Signage – The System Software must transmit any information necessary to stationary digital signage at a stop or station such that said signage can communicate (a) vehicle arrival prediction times for all routes serving that location, and (b) current vehicle locations on a route map, provided that the signage type can accommodate graphics.

ii. To On-Board Digital Signage – The System Software must transmit any information necessary to future on-board digital signage such that said signage can communicate that vehicle's arrival prediction times for upcoming stops as well as that vehicle's current location on a route map.

iii. To the Mobile Platform & Website – The System Software must transmit any information necessary to respond to any trip planning queries from the Mobile Platform & Website that require communicating vehicle arrival prediction times as well as current vehicle locations on a route map.

b. Terminal Departure Predictions

Contractor must satisfy the following requirements by the end of Phase I, with the exception of requirements relating to On-Board Digital Signage, which it must complete by the end of Phase II.

Information Content

The System Software must generate accurate terminal departure predictions. Terminal departure predictions must account for and reflect the following scenarios:

1. Operator Leaves Early – Vehicle leaves terminal prior to the scheduled departure time.
2. Late Incoming Trips – Vehicle arrives late on the incoming trip, and there is insufficient layover/recovery time to depart the terminal for the next trip on time. Some operators shorten their layover/recovery time in order to expedite their terminal departure for the next trip. Others may choose to take the full layover/recovery time, resulting in an even later terminal departure.
3. Deadheading – Vehicle is not in revenue service when arriving at terminal, either because it has pulled out from a division or has come from another trip or route with a different terminal, and then operates in revenue service when leaving terminal
4. Interlining –Vehicle arrives at a terminal on one route, and departs terminal serving a different route
5. Not Outs – Vehicle is missing from the schedule and will not provide service.
6. Service Gap – The Transit Operator's "Leader" (the immediately preceding trip) 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.

Information Transmitted to Customer-Facing Interfaces

i. To Stationary Digital Signage – The System Software must transmit any information necessary to stationary digital signage at a terminal such that said signage can communicate accurate terminal departure predictions.

ii. To On-Board Digital Signage – The System Software must transmit any information necessary to future on-board digital signage such that said signage can communicate accurate terminal departures predictions where a vehicle is approaching an upcoming transfer point that is also a terminal.

iii. To the Mobile Platform & Website – The System Software must transmit any information necessary to respond to any trip planning queries from the Mobile Platform & Website that require communicating terminal departure predictions.

c. Transfers

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

Information Content

The System Software must generate transfer wait-time predictions. A transfer wait time is the amount of time a transit customer, on a trip requiring one or more transfers to connecting routes, waits for the next vehicle after arriving at a transfer point. Connecting routes include transit services operated by the SFMTA as well as partner transit systems, including BART, AC Transit, Caltrain, Golden Gate Transit, SamTrans, the PresidiGO shuttle, WestCAT, ferries, Amtrak Capitol Corridor connecting buses, and others.

At a minimum, the System Software must generate transfer wait-time predictions for the next two, successive vehicles on connecting routes.

The System must only display connecting vehicles where the predicted transfer time is equal to or greater than a minimum connection time threshold. Configurable by SFMTA staff through the System Administration Tool, this minimum connection time should be unique for each stopID pair associated with a transfer and reflects the estimated time it takes for customers to make a transfer safely. Transfers may require different walking distances, crossing streets and using stairs, elevators or escalators. For example, at the Forest Hill Station, transfers between buses occur at street level (some are on the same side of the street; others require waiting for a traffic signal to cross a street) while transfers between buses and light rail vehicles necessitate riding an elevator or traversing a flight of stairs, and in some cases also crossing a street. Therefore, connections between different pairs of routes would have different minimal connection thresholds.

For transfer connections between SFMTA and non-SFMTA services, the System Software must provide wait times in real time if the relevant information (e.g., arrival time predictions) is available through a public API or a private API that the SFMTA can access, and must generate scheduled departure times (i.e., departure times based on a published schedule) if the relevant information is not available through a public API. In either case, the System Software must indicate whether transfer wait times are real time or scheduled.

If a connecting route is not in operation, the System Software must indicate no service is available on the connecting route during that time (e.g., on a weekend it would indicate no service is available for peak-hour express routes).

Information Transmitted to Customer-Facing Interfaces

i. To On-Board Digital Signage – The System Software must transmit any information necessary to future on-board digital signage such that said signage can communicate transfer wait-time predictions for any upcoming transfer point along the vehicle's route, and transfer points in relation to the vehicle's current location on a map.

ii. To the Mobile Platform & Website – The System Software must transmit any information necessary to respond to any queries from the Mobile Platform & Website that require communicating predicted transfer wait times as well as transfer locations on a map.

d. Itineraries

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

Information Content

Given an origin and destination, the System Software must generate plausible, non-circuitous route itineraries if at least one exists. The System Software must prioritize route itineraries by configurable parameters, such as accessibility requirements, number of transfers, service frequency, fare, crowding and walking distance.

At a minimum, a trip itinerary must include the following information:

i. Walking distance to initial stop;

ii. Vehicle arrival predictions for the next two vehicles (if queried in real-time) or scheduled times (if queried in advance);

iii. Transit route and direction and/or final destination;

iv. Predicted travel time onboard the vehicle (if queried in real-time) or scheduled travel time onboard the vehicle (if queried in advance);

v. Transfers, if necessary, to connecting vehicles and walking distances to complete the transfer, predicted transfer wait-time predictions (if queried in real-time) or scheduled transfer times (if queried in advance), predicted travel time onboard the vehicle (if queried in real-time) or scheduled travel time onboard the vehicle (if queried in advance);

vi. Accessibility requirements (e.g., level boarding);

vii. Fare;

viii. Other information, yet to be determined.

Information Transmitted to Customer Interfaces

i. To the Mobile Platform & Website – The System Software must transmit any information necessary to the Mobile Platform & Website in order to display a trip itinerary or itineraries in response to a trip planning query.

e. Accessible Information and Itineraries

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

Information Content

The System Software must generate and transmit accessibility information and accessible itineraries. Accessibility information includes, but is not limited to, real-time and planned elevator and escalator outages at applicable stops along rail lines.

If the System Software generates vehicle arrival predictions or a trip itinerary that includes a route, stop or station that is not fully accessible (including temporary elevator and escalator outages), it must also generate an alternative fully-accessible vehicle prediction or trip itinerary meeting configurable customer requirements.

For some customers, there may be itineraries that are not feasible, such as ones that involve:

i. Stations that require stair navigation when there are elevator outages

ii. Light rail vehicle low-level sidewalk stops (each line has alternative stops with wheelchair ramps)

iii. Stops at sidewalks that are too narrow or too steep to accommodate some wheelchair users

iv. Stops where there are no curb ramps or curb ramps are sub-standard.

v. Historic cable cars that are not accessible

The SFMTA will provide Contractor with a database of stops with accessibility limitations with details of those limitations (e.g., requires climbing three steps into a Metro train (no ramp available), steepness of grade, elevator required, sub-standard curb ramp, no curb ramp, flag stop in street).

Information Transmitted to Customer Interfaces

i. To Stationary Digital Signage – The System Software must transmit any information necessary to stationary digital signage such that said signage can communicate relevant and applicable accessible information. For example, if a route serves an upcoming station with an elevator and/or escalator outage, signage along that route prior to that station must be able to communicate an outage notification.

ii. To On-Board Digital Signage – The System Software must transmit any information necessary to future on-board digital signage such that the said signage can communicate any accessibility limitations for any stop or station that a vehicle is approaching. This includes communicating elevator and/or escalator outages on on-board signage for any light rail vehicle or surface-level connecting vehicle approaching the station with an outage.

iii. To the Mobile Platform & Website – The System Software must transmit any information necessary to respond to any trip planning queries from the Mobile Platform & Website that require an accessible itinerary. Note that accessibility requirements may vary from customer to customer; in the Mobile Platform & Website, customers configure their own 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).

f. Alternatives

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

Information Content

The System Software must automatically generate viable alternative route information. A route is "viable" if a customer could conceivably reach a destination more quickly or ride on a less-crowded vehicle compared to using their originally-planned route.

Below is a non-exhaustive list of examples where the System Software could offer an alternative to customers:

i. If a customer just missed a bus and had to wait 20 minutes, there may be a nearby parallel route to which a customer could conceivably walk in time to catch an earlier-arriving bus headed in the same direction.

ii. On Mission Street, a customer is waiting at a local stop served by the 14 Mission but not the 14R Mission Rapid. It could be quicker for the customer to walk to the next Rapid stop for the 14R rather than to wait for the 14, provided that the 14R has sufficient space available.

iii. Service on a particular 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 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 severe crowding on the 38 Geary due to an earlier delay. The parallel 31 Balboa route is a potential alternative.

In consultation with Contractor, SFMTA staff will determine credible alternatives for each stop and route pair which take into account various factors like walking distance, topography, speed, headways, traffic, crowds, and reliability.

Information Transmitted to Customer Interfaces

i. To Stationary Digital Signage – The System Software must transmit any information necessary to stationary digital signage such that said signage is able to help customers make informed decisions about their travel choices. This must include communicating viable alternative route options, walking distances and how to reach the alternative stop using public rights-of-way, and vehicle arrival prediction times for the alternative route. A "viable" alternative would need to account for the fact that the System Software does not know the customer's ultimate destination, but is aware of the originally-planned route and as well as potential alternative routes that a customer could conceivably access at their current stop or at another stop within walking distance from the current stop.

ii. To the Mobile Platform & Website – The System Software must transmit any information necessary to respond to any trip planning queries from the Mobile Platform & Website such that the trip planner can display complete alternative itineraries. It must sort through alternative options based on customer-configured preferences for the following parameters:

(a) Most frequent service;

(b) Least crowded service;

(c) Fewest transfers or shortest transfer wait-time predictions;

(d) Fastest travel;

(e) Accessible stops or routes;

(f) Other factors, yet to be determined.

g. Temporary Service Changes

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

Information Content

When there are temporary service changes, the System Software must:

i. Transmit real-time messages and/or pre-formatted, canned messages to the appropriate customer interfaces upon activation by SFMTA staff and/or under conditions pre-approved by SFMTA staff. Often, these messages will be specific to stops, stations and/or routes affected by temporary service changes. The System Software must support messages in multiple 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 Filipino.

ii. Generate information about the route detour and schedule by processing (i) a schedule file that contains a detour route; and (ii) if available, a schedule associated with that detour route (for pre-scheduled reroutes)

iii. Generate vehicle prediction arrival times for temporary service changes, including when (i) an operator has logged into an alternative block with known patterns, but with unknown arrival times; (ii) an operator has logged into a special block with no pattern and no schedule data; and (iii) an SFMTA transit controller has entered vehicle assignments into OrbCAD (see Section 2.2.7.2 Vehicle Assignments), including Loop Jobs (see Section 2.2.5.6 Switchbacks).

In addition, the System Software must provide for a test environment where SFMTA staff can preview service-change alerts on Stationary Digital Signage, On-Board Digital Signage and the Mobile App & Website before transmitting these alerts to customers.

Information Transmitted to Customer Interfaces

The System Software must transmit these service-change alerts to customer interfaces in real time or in advance of a planned service change, as determined by SFMTA staff. The number of days' notice to customer shall be determined and configurable by SFMTA staff.

i. To Stationary Digital Signage – The System Software must transmit any information necessary to stationary digital signage to help customers waiting at stops and stations affected by service reroutes and disruptions to use transit to reach their destinations. Specifically, information transmitted to stationary digital signage must:

(a) Inform customers at stops citywide, along a route or within a general area (e.g., the Downtown core) that a service disruption may affect their travel, both in real-time and in advance of planned disruptions (number of days configurable by the SFMTA)

(b) Inform customers using canceled stops of the duration that regular service will not be stopping there, both in real-time and in advance (number of days configurable by the SFMTA)

(c) At canceled stops, provide the alternative location where to board service and/or alternative route(s) and where to board them

(d) At existing stops temporarily served by the route detour, indicate that the detoured route will be stopping there

(e) Provide vehicle arrival predictions at stops temporarily served by the detoured route, if special schedules are available

ii. To On-Board Digital Signage – The System Software must transmit any information necessary to future on-board digital signage such that said signage can:

(a) If the vehicle is traveling on a detoured route, display stops served by the detour and do not display stops not served by the detour

(b) If a vehicle is approaching a transfer point for a detoured route, display that customers can transfer to the detoured route

(c) If a vehicle is approaching the regular transfer point for a route that has been detoured, display that a transfer is not available

iii. To the Mobile Platform & Website – The System Software must transmit any information necessary to the Mobile Platform & Website such that the trip planner reflects any temporary service changes and reroutes.

h. Switchbacks

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

Information Content

The System Software must:

i. Distinguish between full-length trips and switchbacks

ii. Auto-detect a switchback if a Transit Controller is unable to enter it into SFMTA's CAD/AVL system

iii. Provide predictions of when the next vehicle traveling the full length of the route will arrive

Information Transmitted to Customer Interfaces

i. To Stationary Digital Signage - The System Software must transmit any information necessary to stationary digital signage such that said signage updates a switched-back vehicle's revised terminal.

ii. To On-Board Digital Signage - The System Software must transmit any information necessary to future on-board digital signage such that said signage displays the switched-back vehicle's revised terminal, as well as the estimated vehicle arrival prediction time for the next vehicle traveling the route's full length.

iii. To the Mobile Platform & Website - The System Software must transmit any information necessary to the Mobile Platform & Website such that the trip planner reflects the switch-backed vehicle's revised terminal (i.e., the vehicle would not appear in a search where a customer needed to travel the full length of the route).

i. Vehicle Occupancy

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

Information Content

Contractor must work with the SFMTA to develop how to express crowding in a user-friendly way to customers. If vehicle crowding exceeds a threshold configurable by the SFMTA, the System must be capable of providing an alternative and its associated vehicle arrival prediction if available (as described in Section f. Alternatives above) including estimated time arrivals.

Information Transmitted to Customer Interfaces

i. To Stationary Digital Signage - The System Software must transmit any information necessary to stationary digital signage such that said signage can display the approximate occupancy of the next two vehicles, and recommend alternatives if vehicle crowding exceeds a threshold configurable by the SFMTA.

ii. To On-Board Digital Signage - The System Software must transmit any information necessary to future on-board digital signage such that said signage can display the approximate occupancy of connecting vehicles at transfer points.

iii. To the Mobile Platform & Website - The System Software must transmit any information necessary to the Mobile Platform & Website such that the trip planner can display approximate vehicle occupancy alongside vehicle arrival predictions, and recommend alternatives if vehicle crowding exceeds a threshold configurable by the SFMTA.

j. Complementary Sustainable Transportation Options

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

Information Content

In some cases, there are no transit options that a customer can conceivably use. If there is no transit service available within a walking distance configurable by the SFMTA, or a "last mile" transit connection is not available, System Software must generate information such as a phone number or link to a complementary sustainable transportation option if one exists. A complementary sustainable transportation option must be approved by the SFMTA and adhere to the SFMTA's Guiding Principles for Management of Emerging Transportation Services and Technologies (see Appendix J: Guiding Principles for Management of Emerging Transportation

Services and Technologies). If a customer configures a preference for only accessible itineraries, the System Software must only present accessible alternative transportation options.

Information Transmitted to Customer Interfaces

i. To Stationary Digital Signage - The System Software must transmit any information necessary to stationary digital signage at a stop or station such that said signage can display complementary sustainable transportation options when transit service is not available.

ii. To the Mobile Platform & Website - The System Software must transmit any information necessary to display complementary sustainable transportation options in response to any trip planning queries from the Mobile Platform & Website when transit service is not available.

2.3.1.2 Mandatory Operating Conditions

By the end of Phase I, the System Software must meet the following requirements relating to standard transit operating conditions:

a. Combined Routes

Where applicable and directed by the SFMTA, the System Software must be able to process combined segments of separate routes when there is significant overlap between the routes. This would enable customers to be able to view the next vehicles on a combined segment of a corridor without having to look up separate routes.

For example:

i. Between the Van Ness and Embarcadero Muni stations, customers can take any train (J Church, K Ingleside, L Taraval, M Ocean View, N Judah or T Third)

ii. On Van Ness Avenue between North Point and Market, customers can take either the 47 Van Ness or 49 Van Ness-Mission routes

b. Unknown Association: Vehicle, Schedule Block and/or Run Number

With a required Operator log in, SFMTA's CAD/AVL system automatically associates a vehicle with a schedule block and/or run number under normal circumstances. However, there may be times when the System Software is unable to receive this association. The System Software must continue to make predictions reliably even without this association.

c. Multiple Car Trains

The SFMTA often currently operates light rail vehicles as two-car trains along the same route. In the future, the SFMTA may operate three-car or even four-car trains. The System Software must:

i. Portray multiple-car trains as one service from the customer's perspective (e.g., "L Taraval – 3 minutes" indicates a L Taraval train is approaching, regardless of its consist size)

ii. For reporting purposes, have the ability to view the performance of both individual light rail vehicles and multiple-car trains

iii. Currently, the SFMTA does not operate mixed-route light rail vehicles in the same train consist. The System must be able to detect when a train has mixed-route vehicles if the SFMTA elects to operate them in the future.

d. Pull Outs and Pull Ins

The System must:

i. Track actual vs. scheduled times when a vehicle leaves a division en-route to revenue service (pull outs)

ii. Track when a vehicle arrives at a division after completing revenue service (pull ins)

iii. Detect when a vehicle is inside a division

e. "Not In Service" Vehicle Patterns

The System must remove any "Not In Service" pattern vehicles from predictions. "Not In Service" trips have pattern names whose last two characters are "NS."

f. Rail Delays

When a light rail train experiences long delays (as described in Section 2.2.5.7 Rail Delays), the System must continue to show predictions for the train and indicate that the train is being held for an undetermined length of time. The SFMTA will provide Contractor with the appropriate messaging to communicate the delay.

g. Semi-Annual Time Changes

The System must handle the transition between Pacific Standard Time and Pacific Daylight Savings Time, and vice versa.

h. System Outages/No Predictions Available

If, for any reason, the System Software is unable to generate predictions, the System Software must automatically provide an alternative default message that SFMTA staff can configure through its System Administration Tool. This default message must be tailored to each stop location based on the route(s) that stop there and time of day. An example of an alternative message might be:

i. Schedule-Based Message (for low-frequency services or times of day): "38 Geary: Scheduled at 2:00 am & 2:30 am"

ii. Headway-Based Message (for high-frequency services or times of day): "38 Geary: Every 6 minutes"

i. Night/"Owl" Timed Transfer Connections

During the late evening and overnight hours, the SFMTA schedules timed transfer connections for selected routes at designated locations. Timed transfer connections are when vehicles on two different routes are scheduled to arrive at a transfer point simultaneously and wait a few minutes to enable customers to transfer. The System Software must:

i. Distinguish timed transfer connections from ordinary transfer connections

ii. Communicate the existence of timed transfer connections during en-route travel as well as trip planning done in advance

j. Not Outs

The System must not make predictions for "Not Outs" or other trips that the system can logically determine will not be served (e.g., job assignments are not filled or are taken out of service).

2.3.1.3 Outputs to Other Systems

As described in Section 2.2.6 Outputs to Other Systems above, the Existing System produces various output feeds to support other SFMTA systems as well as third-party transportation apps.

Contractor must integrate the Next Generation System with other SFMTA systems to keep them functioning without interruption during the transition to the Next Generation System, as described below. Contractor must work with vendors managing those systems to develop an interface standard that will enable those vendors to either retrieve or receive real-time information data. Depending on the case, Contractor must define either an API or feeds to achieve this goal.

If there are future changes to the feed formats and/or there are additional feeds added, Contractor must update and/or add its feeds accordingly with approval from SFMTA staff.

The following are specific requirements for each system:

a. ATCS System Management Center (SMC)

As described in Section 2.2.6 Outputs to Other Systems above, the ATCS System Management Center relies on the Existing System's predictions API to identify trains in the subway, train job assignments, and train destinations and routing. Upon being queried by ATCS via an HTTP request, the Existing System returns the estimated arrival times of the next five trains on every line in an XML file with a vehicle number, time to arrival and direction.

Over the long term, OrbCAD may provide this functionality. By the end of Phase I, the System Software must respond to requests by the ATCS SMC and return similar XML-formatted data. This will enable ATCS to continue to manage trains within the subway.

b. Platform Audio Visual (PAV) Sign Telnet Feed

By the end of Phase I, Contractor must ensure that any Customer Information, including vehicle arrival predictions entered through the System Administration Tool, is forwarded to PAV server via a Telnet Feed for display on PAV signs. The PAV system will continue to independently control the layout and formatting of the information displayed on its signs.

c. BART Station Canopy Sign Feed

BART is in the process of building canopies at the four Downtown San Francisco stations which it shares with the SFMTA's Muni Metro system. These canopies will have LED signs that display real-time arrivals for all BART and Muni Metro trains. By the end of Phase II, or as otherwise directed by the SFMTA, the System Software must be able to communicate Muni light rail routes and their associated predictions with those signs in a format specified by BART and the SFMTA.

d. 511 Feed

The Metropolitan Transportation Commission (MTC) is currently contemplating substantial changes to its 511 regional transit information system. As directed by the SFMTA, Contractor must provide an API or a feed to support the needs of the 511 system.

e. General Transit Feed Specification (GTFS) Realtime Feed

By the end of Phase I, Contractor must produce and make public a GTFS Realtime Feed, which supports the following types of information:

i. Trip updates - delays, cancellations, changed routes

ii. Service alerts - stop moved, unforeseen events affecting a station, route or the entire network

iii. Vehicle positions - information about the vehicles including location and congestion level

The SFMTA may require that public data consumers sign a user agreement in order to receive a GTFS feed. The SFMTA will provide user agreement language to Contractor. Contractor must not provide access to the GTFS Realtime Feed to third parties who do not consent to the user agreement.

Contractor must also work with the SFMTA to facilitate uninterrupted service while transitioning from the Existing System's XML predictions feed to the Next Generation's GTFS RealTime Feed.

2.3.1.4 Integration with Existing Stationary Digital Signage

The transition from the Existing System to the Next Generation System, which will take place during Phase I, requires Contractor to replace the Existing System's legacy Light Emitting Diode (LED) signage, described in Sections 3.2.1 Powered Shelter Signage (Type 1) and 3.2.2 Powered Signage at Outdoor Rail Platforms (Type 2), with its new Stationary Digital Signage.

During the transition period, Contractor must ensure the uninterrupted display of Customer Information at locations where Stationary Digital Signage currently exists. This requires Contractor to send real-time arrival predictions, service alerts and other messages to the legacy signs until it has replaced all of those signs.

The Existing System's back-end system currently transmits predictions and other information to a proprietary sign management subsystem for display on the legacy signs. For a one-time integration cost, the Vendor of the Existing System has committed to perform non-recoverable engineering work to modify its sign management subsystem such that Contractor can send service messages and real-time predictions to the LED signs via an API.

The legacy LED signs can display two lines of text and 16 characters per line, for a total of 32 characters per frame. A text message is limited to 255 total characters and is broken up into multiple frames and shown on the sign by scrolling the frames up after 2 seconds. The impression time for a message that fits on one frame is 3 seconds on the LED signs. At most sign locations, "Push-to-Talk" buttons are available to provide text-to-speech functionality.

2.3.1.5 System Administration Tool Changes

Contractor must ensure that any changes made through the System Administration Tool are fed into and reflected in the System Software back-end.

2.3.2 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 in administering the System (System Administration

Tool). Below are minimum requirements; Contractor may offer additional features the SFMTA has not identified.

The System Administration Tool must include a secure website that works on all contemporary standard browsers (dating as far back as Internet Explorer 11) and operating systems (currently Windows 10 and Windows 7, as stated in Appendix L: Technical Environment). 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.

2.3.2.1 Management of Predictions for Stops, Routes and Vehicles

The System Administration Tool must enable SFMTA staff to:

i. Activate and deactivate vehicle arrival predictions and/or switch to scheduled arrivals for individual stops, routes and vehicles, both in real-time and scheduled in advance

ii. Activate and deactivate 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/from a division)

iii. Set the block/job assignment for each vehicle (from an OrbCAD feed or entered manually through the System Administration Tool)

iv. Configure the predictions display format by StopID and time of day and/or estimated waiting time. This would allow the user to select either the estimated waiting time (i.e., countdown until next arrival) or the estimated arrival time (i.e., the clock time for the arrival). Examples of when the SFMTA may display the clock time may include (a) during overnight hours when service does not start until the morning, (b) during the midday hours when service does not start until the beginning of the afternoon peak, or (c) when the next predicted arrival is more than 60 minutes away.

2.3.2.2 Temporary Service Changes

The System Administration Tool must enable SFMTA staff to:

i. Import pre-prepared schedules reflecting temporary changes at any time, including immediately before or during the temporary change

ii. Schedule and configure when temporary service changes will take effect (including immediately)

iii. Manually restore normal service schedules and routings in the case of unplanned service changes

iv. Alter routes, schedules and stops as needed

v. Group detour routes in sets (e.g., all service changes associated with a special event or a tunnel closure)

vi. Save temporary service changes for reuse and/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)

vii. Send service alert messages to signage along a route, in a general area (e.g. Downtown core), to the mobile platform, and at a specific stop

viii. Set up and configure unplanned job configurations

ix. Input a Loop Job, as a manual override in case the System Software did not register a Loop Job from OrbCAD

x. Preview service change alerts on signage, the Mobile App & Website, before transmitting these alerts to customers.

xi. Provide a test environment where SFMTA staff can preview service changes

2.3.2.3 Alternative Transit Routes

The System Administration Tool must enable SFMTA staff to identify and manage alternative routes manually as described in Section 2.3.1.1 Outputs Alternatives above. In addition, the System Administration Tool must support uploading a file with all stop and route pairs with associated alternatives in an SFMTA-approved format.

2.3.2.4 Atypical Vehicle Staging Areas

If Contractor's generated predictions do not or cannot account for vehicles that typically stop outside the designated geofence associated with that stop, the System Administration Tool must provide an interface that enables SFMTA staff to create a custom polygon or a circle with a configurable radius for any stop. Contractor must treat such geofence information as inputs to generate predictions. Contractor may propose another solution, which must be approved by the SFMTA.

2.3.2.5 Minimum Connection Time Configurability

For each StopID associated with a transfer, the System Administration Tool must enable the SFMTA to configure a minimum connection time (please refer to Section 2.3.1.1 Outputs c. Transfers). This time would reflect walking distances and/or navigation between different levels. SFMTA will provide Contractor with transfer opportunities associated with each StopID.

2.3.2.6 Terminal Departures Configurability

For terminals, the System Administration Tool must enable SFMTA staff to configure prediction parameters based upon Contractor's proposed solution to addressing real-time predictions for terminal departures.

2.3.2.7 Interactive Map – Historical and Real-Time Vehicle Locations

The System Administration Tool must include an interactive map enabling users to:

i. Visualize historical and real-time vehicle location data

ii. Select a route or routes to display

iii. Select individual or multiple vehicles to display

iv. View schedule and headway adherence

v. View Operator, Run and Block Numbers associated with each vehicle

vi. Highlight vehicles that surpass "exception" SFMTA-configurable thresholds (e.g., vehicles running more than 5 minutes late; vehicles with gaps exceeding 130% of scheduled headway)

vii. Vary the "playback" rate for historical data, including but not limited to 1x, 2x, 5x, 20x, and 60x the true speed.

viii. Show ridership loads obtained through an Automatic Passenger Counter data feed from CAD/AVL

ix. Enable SFMTA staff to deactivate and add stops in real-time for individual routes, reflecting where there has been a temporary route detour

2.3.2.8 Signage Status

The System Administration Tool must include functionality to monitor the status for all Stationary Digital Signage and On-Board Digital Signage. Status describes whether a sign is operational or non-operational, and the reason why it is non-operational. Functionality must include the ability to:

i. View existing signage status

ii. Archive and view historical status (operational or non-operational) by hour for each individual sign

iii. Submit a service request for signage repair

iv. Display power remaining if a sign is solar- or battery-powered, and provide an email or text alert when power remaining falls below a configurable threshold

v. Show current content for any particular sign

vi. Detect when a sign is non-operational or not communicating, and send an email or text alert indicating this status

vii. Detect when text-to-speech sign functionality is non-operational

viii. Archive the content of what was displayed on any individual sign at any particular time during the past three months

2.3.2.9 Vehicle Prediction Status

The System Administration Tool must enable SFMTA staff to monitor the status of the Customer Information System with respect to individual vehicles. Functionality must include the ability to:

i. Detect when there is no association between a vehicle and its schedule block, run number and/or operator

ii. Detect when the System is not generating predictions for a specific vehicle in revenue service (as opposed to a vehicle positioned in a division)

2.3.2.10 Reporting

The System Administration Tool must provide standard reports that include, but are not limited to:

i. General Predictions Accuracy – Historical actual arrival times when predictions show "Arriving," "5 min," "10 min," "15 min," "20 min," and "30 min". Reports must compare the percentage of actual arrival times falling within the "Accuracy Interval" range specified in Table 4 of Section III.Submission Requirements to the percentages which Contractor has committed.

ii. Terminal Departures Predictions Accuracy – Historical actual terminal departure times when predictions show "Departing," "5 min," and "10 min." Reports must compare the percentage of actual terminal departure times falling within the "Accuracy Interval" range specified in Table 5: Proposed Accuracy of Terminal Departure Predictions of Section III.Submission Requirements to the percentages which Contractor has committed.

iii. Schedule Adherence – Real-time and historical schedule adherence by line, vehicle and stop

iv. Headway Adherence – Real-time and historical headway adherence by line, vehicle and stop

v. "Ghost" vehicles – Quantity and percentage of total vehicle predictions where a "ghost" bus or train event occurs, with regards to stop location, time and route

vi. Unknown Schedule Associations – Quantity and percentage of vehicles where there is no association between a vehicle and its schedule block, run number and/or operator

vii. Real-Time Information Usage – Usage of on-demand real-time customer information queries (including mobile app, text messaging and accessible itinerary queries)

viii. Real-time assignment of vehicles and vehicle assignment sources

ix. On-Time Performance – On-Time Performance by route, timepoint for a configurable period

x. Response Time for Trip Planner Requests – Number of seconds elapsed per request between when the back-end receives a customer's query for any information described in Section 5.3.4 Trip Planner 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.)

xi. Signage Status – Historical status reports by custom date range

xii. Mobile Platform & Website Availability – Log of Mobile Platform & Website status (operational or non-operational) on an hourly basis

xiii. Analytics Platform Availability – Log of Analytics Platform status (operational or non-operational) on an hourly basis

xiv. Switchbacks – Log of switchback occurrence, classified by whether the System auto-detected them or received direction from the CAD/AVL system.

The System Administration Tool must enable exporting of data into standard Excel and database files.

Contractor must work with the SFMTA to develop new reports as necessary.

2.3.2.11 Schedule Upload Interface

The System Administration Tool must enable SFMTA staff to:

i. Independently upload schedule data to both test (TEST) and production (PROD) environments

ii. Provide TEST and PROD environments. This will enable SFMTA staff to review new routes, stops, and other schedule data before they are put into production for public consumption.

iii. Upload schedules for all routes associated with a schedule signup (occurs two to four times per year), both in TEST and PROD modes

iv. Upload schedules for individual routes, both in TEST and PROD modes

v. Indicate when a new transit schedule will be promoted from the TEST to PROD environment

vi. Upload an unlimited number of schedules

vii. Push schedules via a service (should the SFMTA select this method in the future)

2.3.2.12 Transaction-Level Data Feed

Contractor must provide a feed containing all raw transaction-level data generated by the Next Generation System through a feed to the SFMTA's data warehouse for analysis and processing. SFMTA Technology staff will work with Contractor to define specifications for data transfer. The SFMTA shall own all data.

2.3.2.13 Modifications to Route Numbers and Names

In some cases, internal route numbers and names may differ slightly from the numbers and names shown to the public. The System Administration Tool must enable SFMTA staff to modify customer-facing route numbers and names.

2.3.2.14 Modifications to Route Traces

In some cases, internal route traces (the path that a transit route follows) may differ slightly from the route alignment shown to the public. The System Administration Tool must enable SFMTA staff to modify customer-facing route traces.

2.3.2.15 Predictions Refresh

Contractor must ensure that changes made through the System Administration Tool are fed into and reflected as inputs to the Predictions back-end.

2.3.3 Content Management System

The requirements for the Content Management System (CMS) are described below.

The Next Generation System will have distinct informational templates associated with different customer interfaces. For example, the standard shelter screen would show predictions for the next arriving vehicles, alternative routes and service updates. On the other hand, screens at underground stations might have two different content templates: a map showing real-time train locations and another map with connecting bus locations. The information displayed will be based on the context of the sign location and type.

By the end of Phase I, Contractor must provide a CMS via a secure web interface or application and enable the SFMTA to configure permissions to the CMS such that only authorized personnel may access the system.

This CMS must allow SFMTA staff to create and lay out informational content to display on a variety of customer interfaces, including Stationary Digital Signage and On-Board Digital Signage.

2.3.3.1 Web Interface Functionality

The CMS web interface or application must permit SFMTA staff to make changes to content templates, including the ability to:

i. Design and save content configurations
ii. Preview content before implementation (in test mode)
iii. See the content in real-time (in production mode)
iv. See content for a specific sign type
v. See content at a specific location
vi. Add or remove space for service notices based on need
vii. Specify the dimensions for each sign type
viii. Deploy event templates and messages in real time
ix. Schedule event templates and messages for the future

2.3.3.2 Information Formatting

The CMS must enable SFMTA staff to configure rules about each of the sign types, including character limits, sign size, video capability, and display mode (color vs. black and white). It must also permit SFMTA staff to apply branding to routes (e.g., "Rapid" routes are red, non-Rapid" routes are blue, historic cable cars and streetcars are orange).

2.3.3.3 Content Templates and Messages

The CMS must enable SFMTA staff to create content templates and messages, including:

i. Generic and configurable content templates (e.g., <Route Number> <Route Destination> <First Vehicle Predicted Wait> <Second Vehicle Predicted Wait>, <Next Stop>)
ii. Specific messages for individual signs, groups of signs based on location or route, and groups of signs based on sign type (e.g., "N Judah construction this weekend: Bus shuttles between Ocean Beach and Church & Duboce" on all N Judah stops and stations)

In consultation with the SFMTA, Contractor must develop draft designs for content templates (see Table 8 for examples). Following agile product development standards, Contractor must participate in a series of iterative Design Review meetings with SFMTA staff to finalize templates.

Table 8: Examples of Content Templates

Content Template	Description	Sign Location
Arrival Countdown	Predicted vehicle arrivals, alternatives if appropriate and service notices such as elevator outages and fare changes	Surface-level bus and rail stops (Stationary Digital Signage Types 1, 2 and 4)
Real-Time Vehicle Map	Map showing the real-time vehicle locations of routes serving a stop	Surface-level bus and rail stops (Stationary Digital Signage Types 1, 2 and 4)
Terminal Departures	Predicted departures at the start of a route	Surface-level bus and rail stops (Stationary Digital Signage Types 1, 2 and 4)
Light Rail Vehicle Map	Real-time map of Muni Metro trains and their predicted arrivals (see Figure 5) and service notices such as elevator outages	Underground rail stations (Stationary Digital Signage Type 3)
Transfer Connections Map	Real-time map of connecting routes and their predicted arrival times (see Figure 6)	Underground rail stations (Stationary Digital Signage Type 3)
On-Board	Next stops, connecting routes and their estimated waiting times at transfer points, and route detours	On-Board vehicles
Special Events	Special event detours and route cancellations, along with associated service messages (pre-planned and unplanned events)	Surface-level bus and rail stops (Stationary Digital Signage Types 1, 2 and 4), Underground rail stations (Stationary Digital Signage Type 3), On-Board vehicles
"Do it Yourself Transit Display"	Arrival predictions specific to the location of third parties, directly accessible through a URL	Third-parties such as hospitals, schools, restaurants and businesses (signs owned by third parties, not SFMTA); signs within SFMTA operating divisions or other facilities
Station Entrance	Train Arrival Times	Entrances of BART/Muni shared stations (sign owned by BART)

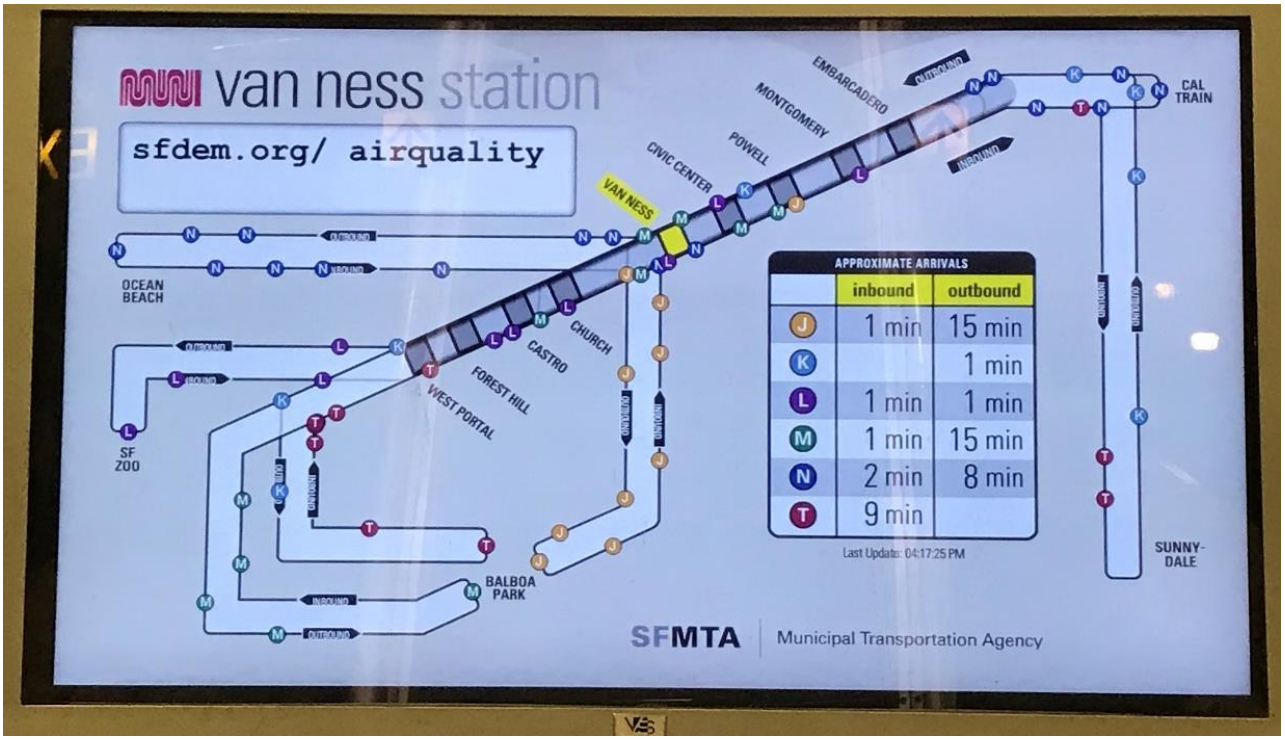


Figure 5: Current Example of Content Template: Light Rail Vehicle Map*

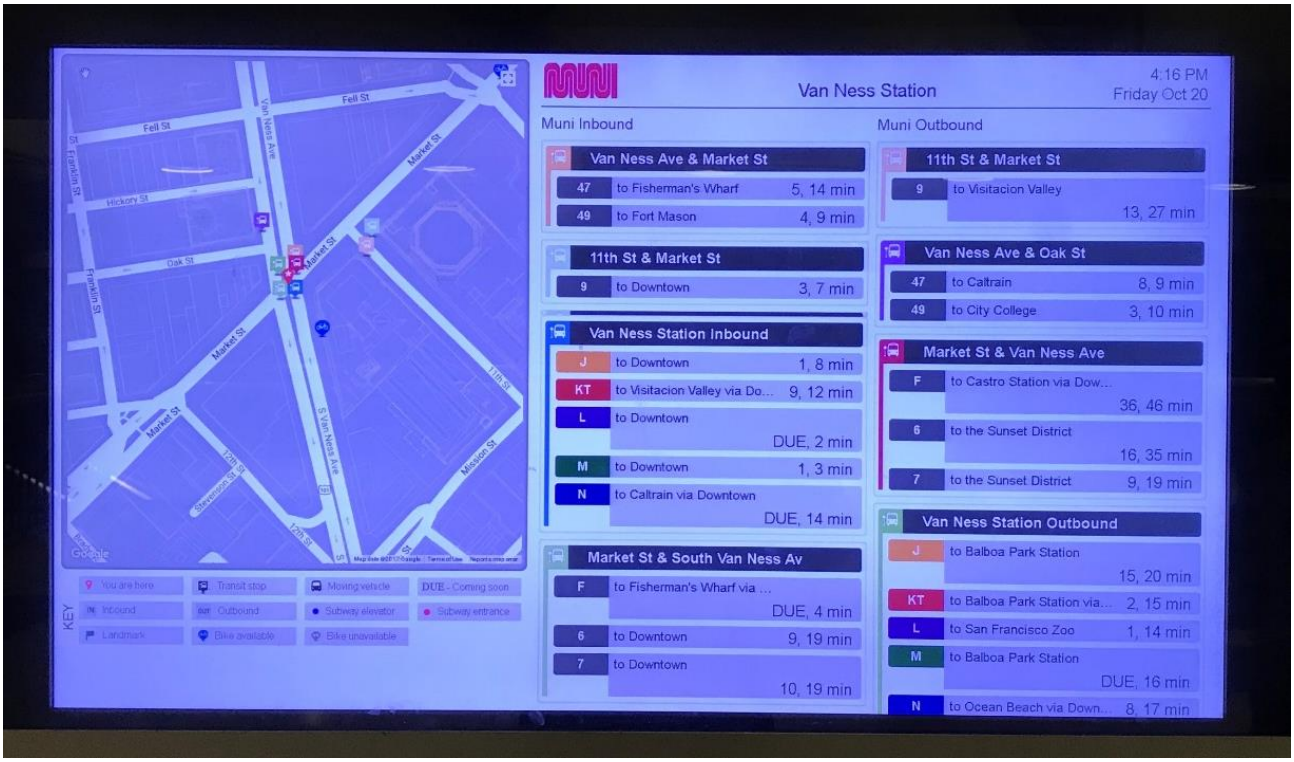


Figure 6: Current Example of Content Template: Transfer Connections Map*

(Note: Photo does not imply SFMTA endorsement of a particular vendor.)

2.3.4 As-Needed Software Services

As directed by the SFMTA, Contractor must provide as-needed software services not directly mentioned above. Contractor and the SFMTA must collaborate to define the scope of any software changes.

2.4 Performance Requirements

SFMTA customers rely on accurate, real-time information for transit services 24 hours per day, 7 days per week. Except for a limited amount of scheduled downtime approved by the SFMTA, the System Software (i.e., Customer Information, System Administration Tool and Content Management System) must be operational at all times. Accordingly, Contractor must adhere to the following Performance Requirements, which the SFMTA will evaluate every 6 months.

2.4.1 Unscheduled Outages

An unscheduled outage occurs when any component of the System Software (i.e., Customer Information, System Administration Tool and Content Management System) is not operational. For Customer Information, an unscheduled outage occurs if the System Software does not generate any predictions for any transit routes. For the System Administration Tool and Content Management System, an unscheduled outage occurs when SFMTA staff are unable to interact with either of those subsystems.

Unscheduled outages of the System Software must not exceed [TBD-Proposer to indicate in Proposal] percent of the total number of hours in the reporting period. The percentage of unscheduled outages is calculated as follows:

$$\frac{\#\ \boldsymbol{of\ hours\ of\ unscheduled\ outages}}{\boldsymbol{total\ hours\ during\ the\ reporting\ period}}$$

2.4.2 Scheduled Downtime

Scheduled Downtime means the time when any component of the System Software (i.e., Customer Information, System Administration Tool and Content Management System) is not operational for pre-scheduled maintenance or upgrades as approved by the SFMTA.

Scheduled Downtime must not exceed [TBD-Proposer to indicate in Proposal] percent of the total number of hours in the reporting period. Every 6 months, the SFMTA will use the Incident Ticketing and Tracking Log to determine the cumulative number of unscheduled offline hours. The percentage of scheduled downtime will be calculated as follows:

$$\frac{\#\ \boldsymbol{of\ hours\ of\ Scheduled\ Downtime}}{\boldsymbol{total\ hours\ during\ the\ reporting\ period}}$$

2.4.3 General Prediction Accuracy

Prediction Accuracy refers to the percentage of actual vehicle arrivals falling within the "Accuracy Interval" indicated in Table 4 of Section III.Submission Requirements E. Part 2 – Conceptual Design Document.

Every 6 months, the SFMTA will use the System Administration Tool to generate a report detailing actual arrival times after showing "Arriving," "5 min," "10 min," "15 min," and "20 min" for each timepoint. The percentage of actual arrival times falling within the "Accuracy Interval" range specified in Table 4 will be compared to the percentages to which Contractor has

committed. Exclusions exist for any records involving “Temporary Service Changes” and/or any records in which vehicle location data is unavailable. General Prediction Accuracy will be calculated as follows:

$$\frac{\#\ of\ timepoint\ observations\ within\ Accuracy\ Interval\ Range}{total\ timepoint\ observations}$$

2.4.4 Terminal Departure Prediction Accuracy

Terminal Departure Prediction Accuracy refers to the percentage of actual vehicle departures falling within the "Accuracy Interval" indicated in Table 5 of Section III.Submission Requirements E. Part 2 – Conceptual Design Document.

Every 6 months, the SFMTA will use the System Administration Tool to generate a report detailing actual terminal departure times after showing "Arriving,” “5 min,” and “10 min” for each route terminal. The SFMTA will compare the percentage of actual terminal departures falling within the “Accuracy Interval” range specified in Table 5 with the percentages to which Contractor has committed. Exclusions exist for any records involving “Temporary Service Changes” and/or any records in which vehicle location data is unavailable. Terminal Departure Prediction Accuracy will be calculated as follows:

$$\frac{\#\ of\ terminal\ departures\ within\ Accuracy\ Interval\ Range}{total\ terminal\ departure\ observations}$$

Contractor must work with the SFMTA to refine predictions for terminal departures for as long as the percentage of actual vehicle departures falling within the “Accuracy Interval” is less than the percentage to which Contractor has committed.

2.4.5 “Ghost” Bus/Train Incidence

The percentage of ghost buses and trains, as defined in Section 2.2.5.4 “Ghost” Buses and Trains, will be evaluated relative to the total number of terminal departures.

Every six months, the SFMTA will run a report using the System Administration Tool on “ghost” bus or train events. The SFMTA will compare this number to the total number of revenue service trips to calculate the percentage of “ghost” buses or trains. Exclusions exist for any records involving “Temporary Service Changes” and/or any records in which vehicle location data is unavailable. The percentage of “Ghost” buses and trains will be calculated as follows:

$$\frac{\#\ of\ ghost\ buses\ and\ trains}{total\ revenue\ service\ trips}$$

3. Stationary Digital Signage

3.1 Purpose

Although San Francisco is a hub of the tech industry, many customers do not own smartphones or maintain a data plan. In addition, the City has many residents and welcomes millions of visitors each year who, even with a smartphone, may need additional tools to navigate San Francisco's geography and complex public transportation system. An additional benefit of stationary digital signage is that it can display context-specific transit information based on its location. Thus, it is imperative to maintain a widespread signage network so that customers have access to real-time arrivals and Muni system status without relying on a smartphone app.

3.2 Existing Conditions

As a multimodal transit operator, the SFMTA offers customers a variety of vehicle boarding environments. As indicated in Table 9, 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 9: SFMTA Waiting Environments and Existing Stationary Digital Signage

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 signage on one side of the pylon; Contractor must provide signage on the other side as requested by the SFMTA (pending approval from the Transbay Joint Powers Authority).

3.2.1 Powered Shelter Signage (Type 1)

3.2.1.1 Curbside Shelters

Currently, the SFMTA has over 850 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 *7***(a), these signs are contained in a bezel which is mounted within a shelter panel. Currently, the existing sign dimensions are approximately 10" high x 26" wide housing. However, the surface area to

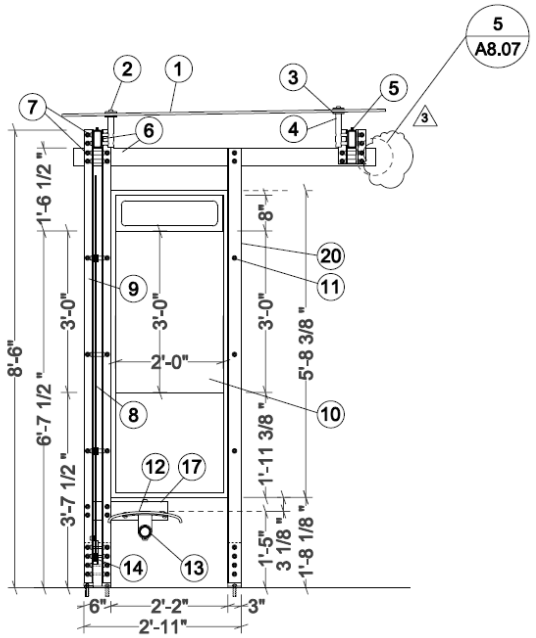
display information is much smaller; there is an approximately 2” border around all sides between the outside edge of the bezel and the display area. In addition, there is currently unused space between the top of the existing sign and the horizontal shelter support beam.

The panel housing the shelter signage also contains an encased printed system map and a “Push-to-Talk” button (**Figure *7*** (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 *7***(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 7: 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"; 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". (Note: Photo does not imply SFMTA endorsement of a particular vendor.)

3.2.1.2 Island Shelters

As shown in **Figure *8***, the SFMTA also has signage at selected island shelters. These 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 signage. Instead, the signage is 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.

Figure 8: 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 signage. Instead, the signage is suspended from a horizontal bar that also supports the shelter's roof. (Note: Photo does not imply SFMTA endorsement of a particular vendor.)

3.2.1.3 Non-Shelter Locations

As shown in **Figure *9***, 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 9: 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.

3.2.2 Powered Signage 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 *10***, these signs are attached to horizontal support beams. They have a height of 13.7", width of 43.7" and depth of 4.75."

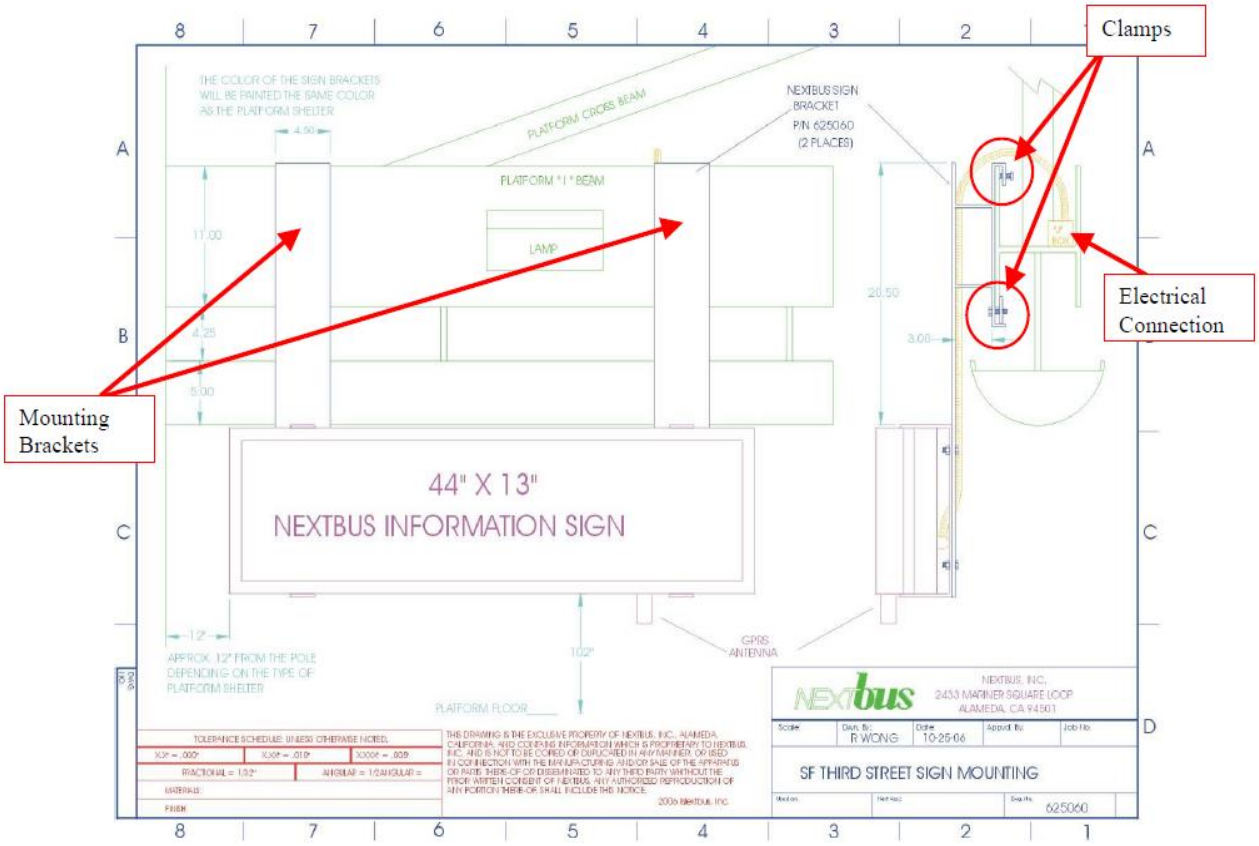


Figure 10: Powered Signage at Outdoor Rail Platforms

(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)

(Note: Photos do not imply SFMTA endorsement of a particular vendor.)

3.2.3 Powered Signage at Underground Stations (Type 3)

Currently, the SFMTA provides several different types of signage at rail station platforms and mezzanines. These include:

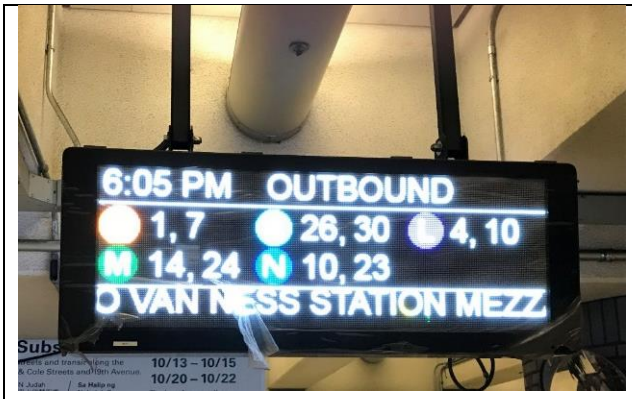
i. Platform Audio Visual (PAV) signs

ii. Dynamic Rail System Map - LCD monitors on rail station platforms which indicate train locations and provide real-time arrival information

iii. Transfer Connection Map - LCD monitors on station mezzanines which indicate surface transfer connections

iv. Real-time LED signs within station agent booths identical to the ones in shelters

v. Computer monitors within station agent booths displaying a website with real-time information



(a) Platform Audio Visual Sign

(b) Dynamic Rail System Map

(c) Transfer Connection Map

Figure 11: Existing Powered Signage at Underground Stations

(Note: Photos do not imply SFMTA endorsement of a particular vendor.)

3.2.3.2 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 10 describes what the Central Subway Project is providing at each station in terms of real-time information signage. In some cases, the Central Subway Project is providing signage. In other cases, it is providing power and data connectivity and/or kiosks in which to fit signage but not the signage itself.

Table 10: Real-Time Information Infrastructure Provided by Central Subway Project

(a) Yerba Buena/Moscone Station

Location	Real-Time Information Infrastructure provided by the Central Subway Project
Entrance	1 40" LCD sign
Concourse	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 a 2 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

3.2.4 Outdoor Stops without any Real-Time Signage (Type 4)

As shown in **Figure *9***, 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 signage.

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 *12***), which includes candidate locations for alternatively-powered real-time information signage. These lights draw approximately four watts of power; the solar panels produce five watts of power.

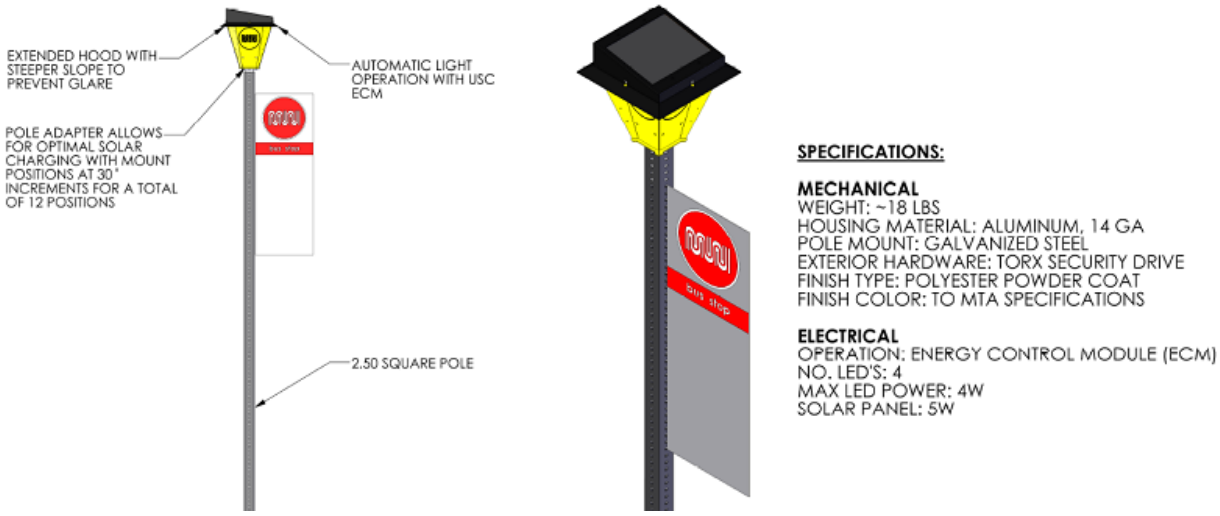


Figure 12: Solar-Powered Lighting at Outdoor SFMTA Stops

3.2.5 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.

3.2.5.1 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 14, 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.

3.2.5.2 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.

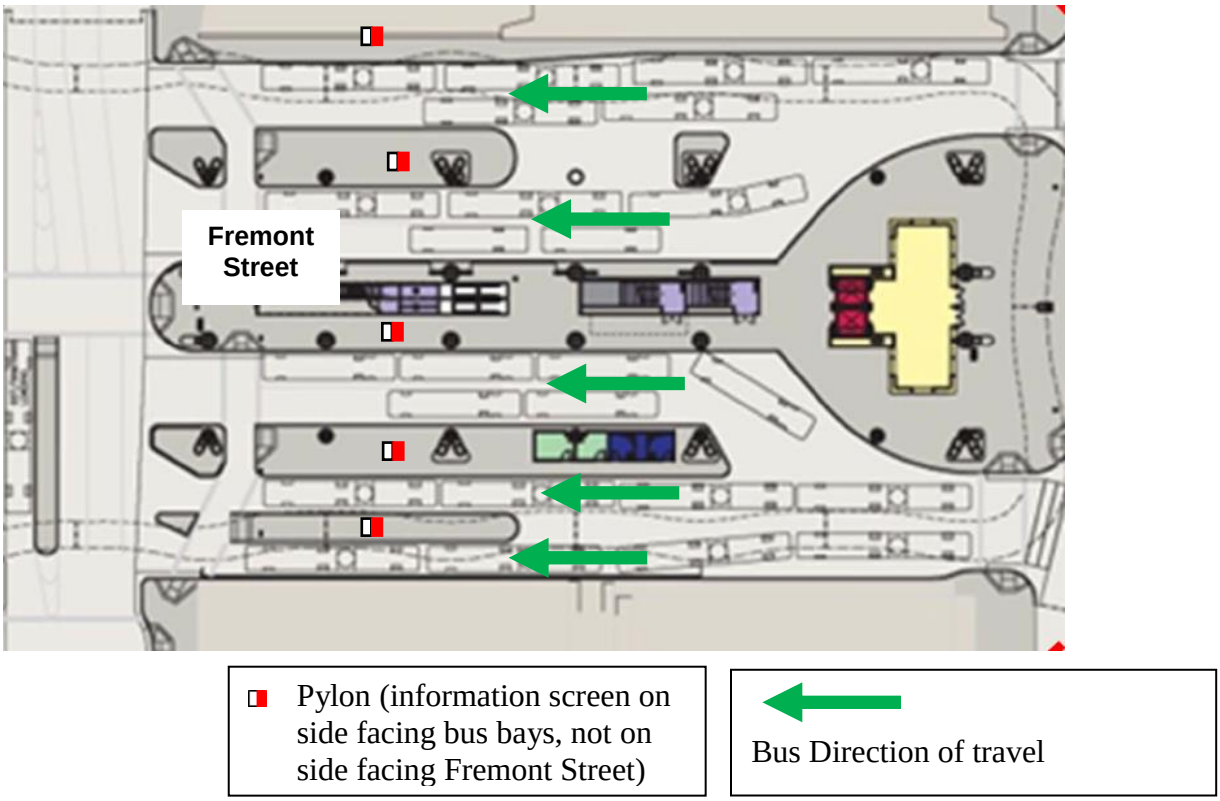


Figure 13: Diagram of Bus Plaza at Salesforce Transit Center

The primary difference between the PD1 and PD2 pylons is that the PD2 pylon lacks the top 22" monitor. As shown in Figure 15, 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.

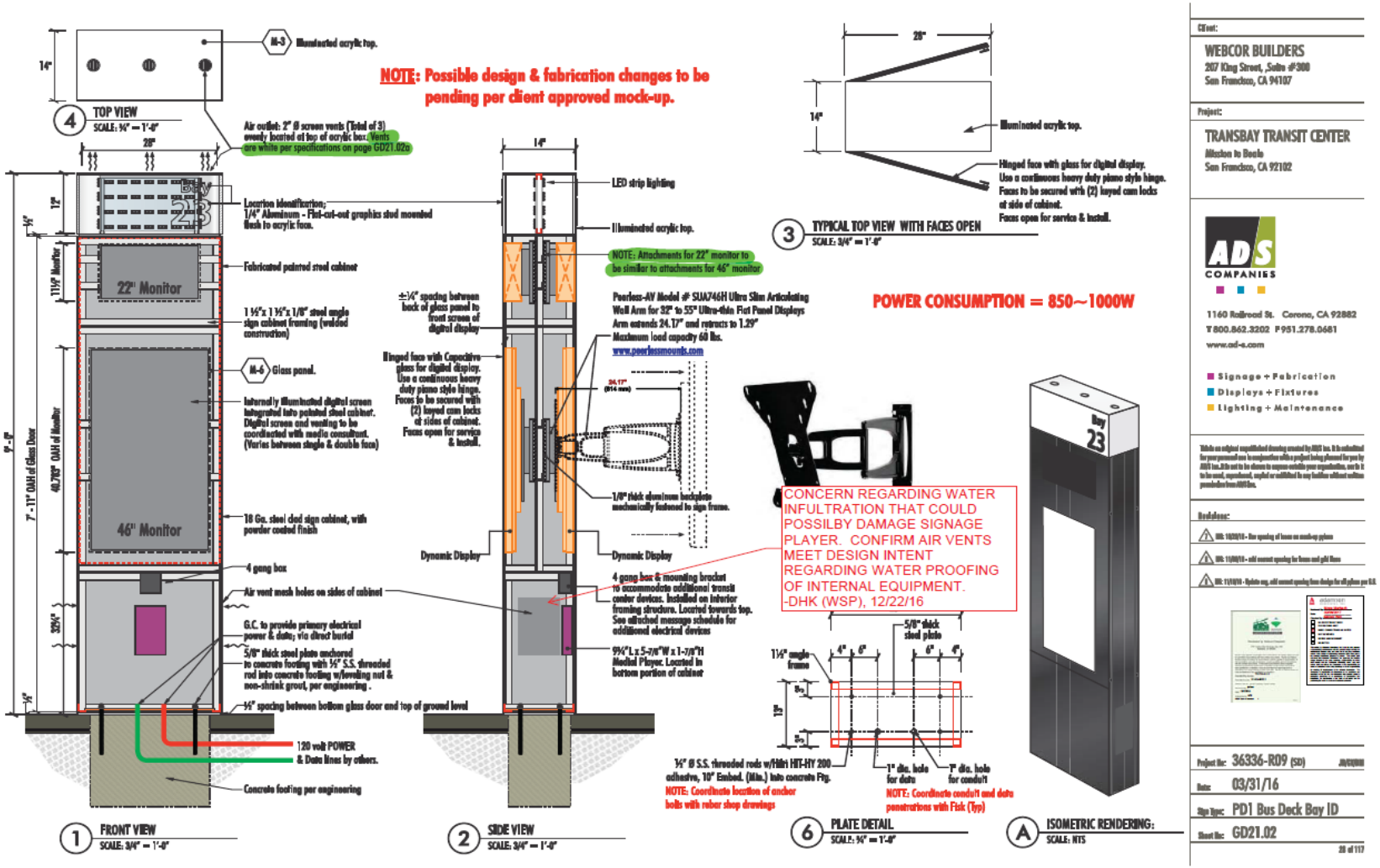


Figure 14: Salesforce Transit Center PD1 Pylon

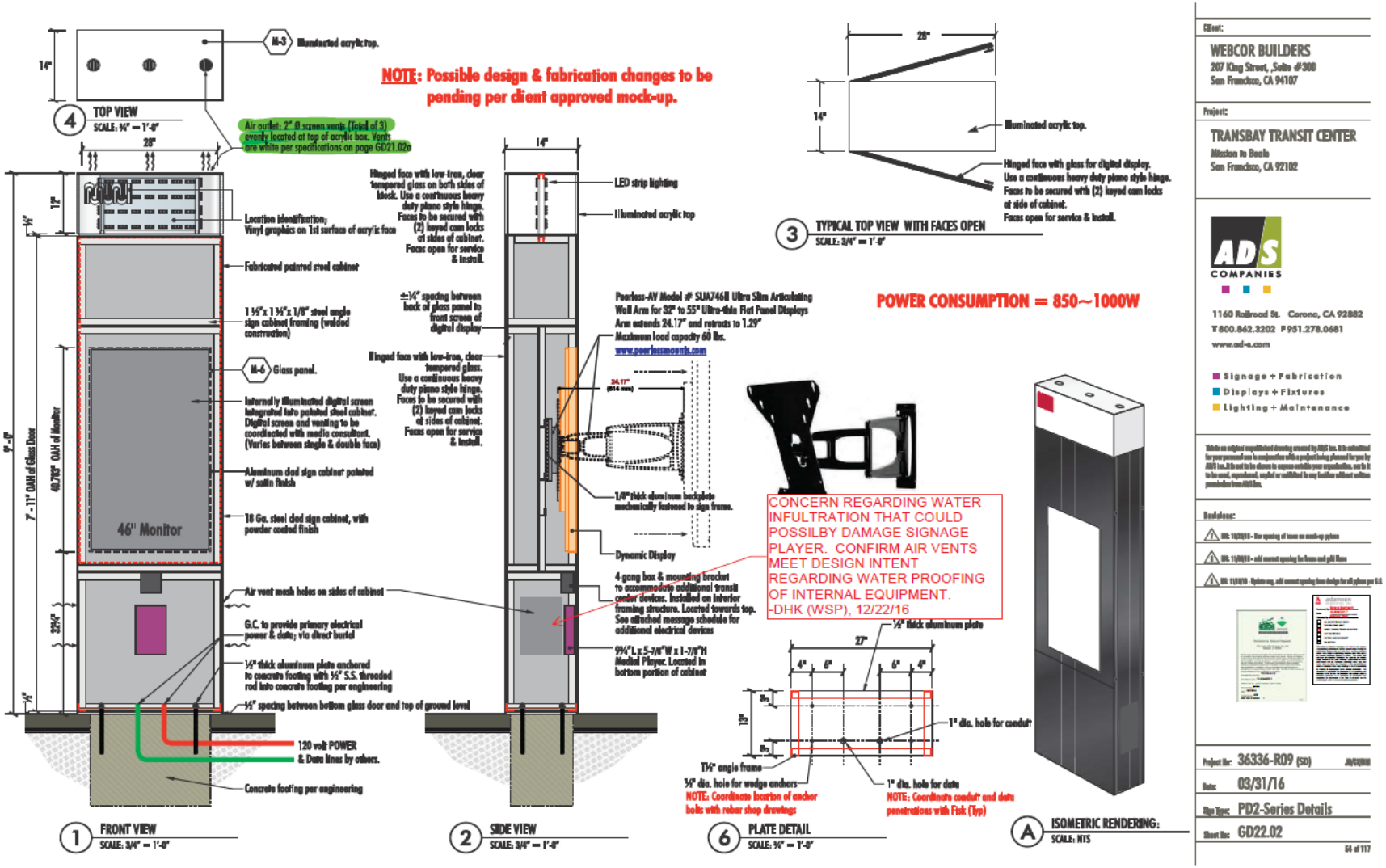


Figure 15: Salesforce Transit Center PD2 Pylon

3.3 Technical Requirements

Contractor must provide the following Stationary Digital Signage and equipment:

i. Powered Shelter Signage
ii. Alternatively-Powered Signage
iii. Powered Signage at Outdoor Rail Platforms
iv. Powered Signage at Underground Stations
v. Text-to-Speech Functionality

Each deliverable and its requirements are described below.

3.3.1 General Requirements

As shown in Table 11, Contractor must provide replacement and new signage depending on the waiting environment. Section 3.2 Existing Conditions contains detailed information about current types of signs that Contractor must replace.

Signage includes all components, including any potential text-to-speech hardware, required for full functionality.

The following sections describe requirements in detail. Contractor must install all replacement signage in Phase I and new signage in Phase II.

Table 11: SFMTA Waiting Environments and Future Stationary Digital Signage

Location	Powered	Alternatively-powered
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, Forest Hill Station)	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	-	Type 4 (new)
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 (replace)	-
Fully-enclosed underground rail stations – mezzanine and platforms	Type 3 (replace)	-

Location	Powered	Alternatively-powered
Salesforce Transit Center signage	See note below (new)	
Fully-enclosed underground rail stations – Station entrances	Type 5 (optional)	-

* At the Salesforce Transit Center, Contractor must provide 46" monitors (pending approval from the Transbay Joint Powers Authority and the SFMTA) and provide content for display on signage provided by another vendor (refer to Section 3.3.5 Salesforce Transit Center)

3.3.1.1 Removal and Disposal of Existing Signage and Installation of Replacement Signage

Contractor must replace all of the Existing System's Stationary Digital Signage with its new signs no later than July 1, 2020, or the termination of the contract with the Existing System, whichever is sooner.

Wherever Contractor provides replacement signage as indicated in Table 11, it must also remove and dispose of the Existing System's signage.

Prior to completing the installation of Contractor's replacement signage, Contractor must ensure that any remaining signage provided by the vendor of the Existing System can display Customer Information generated by the Next Generation System (see Section 2.3.1.4 Integration with Existing Stationary Digital Signage for detailed requirements).

For any particular Stationary Digital Signage location, Contractor will have 24 hours to transition between existing and new signage in order to avoid a long-term outage of real-time information. Installation must not interfere with normal transit operations. The SFMTA has the authority to prioritize certain locations for replacement. If a sign provided by vendor of the Existing System malfunctions or breaks during the transition period, Contractor must replace that sign with a new sign to ensure uninterrupted service.

3.3.1.2 Lifespan

Contractor must provide digital signage that, with standard maintenance and parts replacement, will continue to function for the entirety of this Agreement and two potential five-year extensions (a total of 16 years).

3.3.1.3 Display Features

Digital signage must be able to support contemporary multimedia display features. At this time, examples of contemporary features include:

i. Different contemporary web fonts and font sizes

ii. Accents and characters found in foreign languages such as Spanish and Chinese (traditional)

iii. Both animated and static graphics to communicate information such as maps and other detailed, highly visual information

iv. High-definition video to support information such as but not limited to advertisements (for powered signs)

v. 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 Contract. Contractor must choose signage that would not preclude the implementation of reasonably foreseeable technological improvements over the next 16 years.

3.3.1.3 Americans with Disabilities Act

Stationary Digital Signage must comply with the Americans with Disabilities Act (ADA) requirements. This includes, but is not limited to:

a. Font Sizes

Signs must display information in readable font sizes, depending on the height from the ground and horizontal viewing distance from the customer. Minimum character heights are denoted in Table 12. Appendix I: Americans with Disabilities Act (ADA) Compliance Requirements provides more detailed guidance.

Table 12: Signage 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

Height to Finish Floor or Ground from Baseline of Character	Horizontal Viewing Distance	Minimum Character Height
		mm) of viewing distance above 21 feet (6400 mm)

b. Text-to-Speech Functionality

Contractor must provide and maintain text-to-speech functionality that, upon customer request, verbally announces essential information that is displayed on signage. This text-to-speech functionality applies to all sign types, with exemptions granted at the SFMTA's discretion for which an alternative system provides equivalent audible information (e.g., on station platforms, the platform Audio Visual (PAV) signs provided by another Vendor announce train arrivals).

The Existing System features a "Push-to-Talk" button and speaker that are currently housed within the same unit. Contractor can use a different type of technology as long as it provides the same functionality. The voice must sound natural and not be muffled by any housing.

Appendix I: Americans with Disabilities Act (ADA) Compliance Requirements 1. Text-to-Speech Systems details requirements for the placement of text-to-speech systems to be compliant with the Americans with Disabilities Act. To the extent possible, the placement must be consistent for each sign type. (For example, a user should be able to find the text-to-speech system in the same general location at all outdoor powered shelters.)

Contractor must work with other vendors to ensure that its infrastructure can accommodate the text-to-speech system. This includes, but is not limited to:

i. Shelters (Clear Channel)

ii. Salesforce Transit Center PD1 and PD2 Pylons (TJPA and Pearl Media)

iii. All Muni Metro Underground Stations with the exception of Forest Hill (which are owned by BART), if replacement signs vary significantly in dimensions and weight from existing signs

3.3.1.4 Data Communications

At underground stations, the SFMTA will provide an Ethernet connection for data transmission. At surface locations, including surface rail stations, Contractor must provide communications between the System Software and Stationary Digital Signage such that Stationary Digital Signage can display Customer Information.

Digital signage must be able to support contemporary means of communications, which currently include:

i. Long-Term Evolution (LTE), a standard for high-speed wireless communication for mobile devices and data terminals

ii. WiFi, wireless local area networking

iii. Bluetooth Low Energy (BLE)

Understanding that communications technology may advance over the duration of the contract, Contractor must ensure that all Stationary Digital Signage can communicate with the System Software to permit the display of real-time information without service outages over the potential 16-year life of the contract.

3.3.1.5 Self-Diagnosis

Signs must be capable of self-diagnosing basic operational performance. This includes but is not limited to the status of:

i. Power (electric or alternatively-powered)

ii. Communications with back-end systems

iii. Informational displays

3.3.1.6 Vandalism Resistance

Digital signage must be resistant to vandalism such as graffiti, etching and disfigurement. Vandalism resistance may include adhesive films and casing.

3.3.1.7 Environmental Durability

Outdoor signage 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.

Indoor signage (inside rail stations) must function in temperatures ranging from 30 to 105 degrees Fahrenheit and variable humidity. Additionally, signage must function in an environment where there may be dust and grime from trains.

3.3.1.8 Visibility

In accordance with current industry standards regarding luminous intensity, signs must be visible in daylight, at dawn and dusk, and at night.

3.3.1.9 Refresh Rate

Signs must have the capability of refreshing at least once every 5 seconds for powered signs, and once every 20 seconds for alternatively-powered signs.

3.3.1.10 Hours of Operation

Signs must be functional 24 hours, 7 days per week. Upon mutual agreement, the SFMTA will permit limited outages for sign maintenance and/or replacement. Approved scheduled outages for sign maintenance and/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).

3.3.1.11 Ownership

The SFMTA will own all signs.

3.3.2 Powered Shelter Signage (Type 1)

By the end of Phase I, Contractor must replace Type 1 signs both in Standard Shelters and Island Shelters, as described in Sections 3.2.1.1 Curbside Shelters and 3.2.1.2 Island Shelters.

3.3.2.1 Dimensions

Contractor must supply signs with dimensions no larger than 25" high x 14.5" wide (this size permits a standard wide-screen 16:9 aspect ratio), including the sign housing. These maximum dimensions are larger than the current dimensions in order to take advantage of currently unused space between the top of the existing sign and the horizontal shelter support beam. Signs must maximize the surface area to display information. Prior to mass-producing the signs, Contractor must produce a prototype sign to test on a shelter and cooperate with the existing shelter vendor, Clear Channel, to ensure fit within the dimensions allowed by the shelter.

3.3.2.2 Resolution

Given power constraints, signs shall must have the maximum resolution possible.

3.3.2.3 Font

Since Type 1 signs are placed approximately 80" off the ground, they must accommodate a 2" character height in conformance with Americans with Disabilities Act guidelines denoted in Table 12.

3.3.2.4 Video Cameras

Type 1 signs must include an embedded camera which is capable of recording photographs or video. Contractor must provide the specific camera model and type to allow the SFMTA to evaluate opportunities to receive streaming video through its current Video Management Software (VMS) system (Genetic).

3.3.2.5 Integration within Existing Shelters

Contractor must partner with the current shelter vendor, Clear Channel, or any future shelter vendor to accommodate Type 1 signs. Contractor may establish a separate contract with Clear Channel to meet integration requirements. The SFMTA will not modify its existing contract with Clear Channel to accommodate Type 1 signs. The SFMTA has identified several issues for Contractor to address with Clear Channel, including, but not limited to:

i. Sign Fitting: Prior to manufacturing the signs, Contractor must produce a prototype sign to test on a shelter and cooperate with the existing shelter vendor to ensure fit within the dimensions allowed by the shelter.

ii. Weight: The sign weight must not exceed 100 pounds in order to guarantee the shelter's structural integrity. Contractor is responsible for working with Clear Channel to ensure the structure can accommodate the sign.

iii. Power: Existing real-time information signage consumes 55 watts at 120V AC. If Contractor's signage exceeds this power draw, Contractor is responsible for working with Clear Channel to ensure there is sufficient power for the signage.

iv. Proof-of-Performance Cameras: Contractor is responsible for working with Clear Channel to maintain Proof-of-Performance camera functionality while maximizing the Type 1 sign area. This may involve moving the Proof-of-Performance camera to another location.

3.3.3 Powered Signage at Outdoor Rail Platforms (Type 2)

By the end of Phase I, Contractor must replace all Type 2 signage at outdoor rail platforms.

3.3.3.1 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, Type 2 signs must accommodate a 3" character height in conformance with Americans with Disabilities Act guidelines denoted in Table 12. This is 50% greater than Type 1 signs. Type 2 signs should be able to accommodate informational displays with the same aspect ratio as Type 1 signs (i.e., if Contractor chooses a 16:9 aspect ratio for Type 1 signs, it should provide the same 16:9 aspect ratio for Type 2 signs).

3.3.3.2 Resolution

Signs must have the maximum resolution possible while not exceeding power requirements.

3.3.3.3 Weight

The sign weight should not exceed 200 pounds, such as not to compromise the integrity of the station structure.

3.3.3.4 Installation

Contractor is responsible for installing all Type 2 signs, including establishing electrical connections. ***Figure 10*** includes a photo of current Type 2 signage at typical outdoor rail platforms on the T-Third line and provides a technical drawing of the sign mounting. (Specific mounting dimensions and layouts 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.) Contractor must produce a prototype sign to test at an outdoor rail platform to ensure fit.

3.3.3.5 Power

The sign must hook up to a 120 V power supply currently provided by an SFMTA contractor. While the current maximum power consumption is 155 watts, future Type 2 signs must not ordinarily draw more than 100 watts.

3.3.4 Powered Signage at Underground Stations (Type 3)

By the end of Phase I, and at the direction of the SFMTA, Contractor must replace the following Type 3 signs at existing underground stations:

i. Dynamic Rail System Map - LCD monitors on rail station platforms which indicate train locations and provide real-time arrival information

ii. Transfer Connection Map – LCD monitors on station mezzanines which indicate surface transfer connections

For new Central Subway stations, Contractor must complete installation of Type 3 signs by the end of Phase I or prior to the opening date of the Central Subway, whichever is earlier.

Contractor is not responsible for replacing any of the other Type 3 signs mentioned in Section 3.2.3 Powered Signage at Underground Stations (Type 3).

3.3.4.1 Dimensions

Type 3 signs must be at least as large as current signs, which measure 42" diagonally at a 16:9 aspect ratio. 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.

3.3.4.2 Power

The SFMTA will provide power to these signs.

3.3.4.3 Weight

The sign weight should not exceed 75 pounds (excluding casing), such as not to compromise the integrity of the station structure. Any significant deviation from existing Type 2 signs may require the approval of BART, which owns all Muni Metro stations except Forest Hill.

3.3.4.4 Casing (optional)

If directed by the SFMTA, Contractor must provide protective casing for the sign. Casing must not exceed 125 pounds such as not to compromise the integrity of the station structure. Any significant deviation from existing casing for Type 2 signs may require the approval of BART.

3.3.4.5 Sign Locations and Mounting – Market Street Subway and Twin Peaks Tunnel stations

Contractor is responsible for mounting signs at locations that the SFMTA will identify. Generally, there will be at least one Type 3 sign per platform at each underground station (Embarcadero, Montgomery, Powell, Civic Center, Van Ness, Church, Castro, Forest Hill and West Portal). There may also be Type 3 signs on station mezzanines.

3.3.4.6 Sign Locations and Mounting – Central Subway stations

As described in Section 3.2.3.2 Central Subway, the SFMTA is constructing the Central Subway project linking the Caltrain station to Chinatown. Each underground station – Yerba Buena/Moscone, Union Square/Market Street and Chinatown – has a unique design.

Individual real-time information signs at each of the three stations fall into one of the following categories:

i. The Central Subway Project provides real-time information signage. Contractor must provide a URL with real-time information content to display.

ii. The Central Subway Project provides power and data connectivity for a wall-mounted sign. Contractor must provide signs, enclosures and associated real-time information content. These must be at least as large as current signs, which measure 42" diagonally at a 16:9 aspect ratio.

iii. The Central Subway Project provides power and data connectivity for a sign to be housed within a kiosk. The kiosks vary from station-to-station, as detailed below. Contractor must provide signs, housing for the signs (so signs can fit within the kiosk) and associated real-time information content. Signs must fit within the dimensions of the kiosks.

iv. Platform Audio Visual (PAV) signs (see Section 2.2.6.2 Platform Audio Visual (PAV) Signs) display real-time train arrivals. Contractor must provide a Telnet feed to the PAV

sign (see Section 2.3.1.3 Outputs to Other Systems above) with real-time predictions. The PAV system independently controls the layout and formatting of the information displayed on its signs.

Table 13: Central Subway Real-Time Information Requirements

(a) Yerba Buena/Moscone Station

Location	Real-Time Information Infrastructure provided by Central Subway Project	Customer Information System Contractor Requirements
Entrance	1 40" LCD sign	Provide URL with real-time information content 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 real-time information content to display Provide 1 sign and housing and associated real-time information content
Platforms	2 wedge-shaped kiosks to fit signs with power and data connectivity 4 PAV signs	Provide 1 sign and housing per kiosk and associated real-time information content Provide Telnet feed to PAV back-end system

(b) Union Square/Market Street Station

Location	Real-Time Information Infrastructure provided by Central Subway Project	Customer Information System Contractor Requirements
Entrance	1 40" LCD sign	Provide URL with real-time information content to display
Concourse (Mezzanine)	Power and data connectivity for 2 wall-mounted signs 2 PAV signs	Provide 2 signs and associated real-time information content Provide Telnet feed to PAV back-end system
Platforms	triangular-shaped kiosks to fit signs (For each kiosk, 1 out of the 3 sides will have space for signs) 4 PAV signs	Provide 2 signs and housing (1 for each kiosk), and associated real-time information content Provide Telnet feed to PAV back-end system

(c) Chinatown Station

Location	Real-Time Information Infrastructure provided by Central Subway Project	Customer Information System Contractor Requirements
Entrance	Power and data connectivity for a wall-mounted sign 1 PAV sign	Provide 1 sign and associated real-time information content Provide Telnet feed to PAV back-end system
Concourse	1 PAV sign	Provide Telnet 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 1 sign per wall and associated real-time information content Provide Telnet feed to PAV back-end system

Prior to the opening of the Central Subway for revenue service, Contractor must install signage 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 detailed in adhere to guidelines in Maintenance Section 7.3.2.1 Installation and Removal below.

The following subsection details Contractor requirements for each Central Subway underground station.

a. 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 16). Contractor must provide and install digital signage that fits on the "Map Side" of the kiosk, with the signage width, height and depth not exceeding the space available within the kiosk. The dimensions of the space available for Contractor signage are 40" x 24" x 9." The sign dimensions must be consistent with other Type 3 signs in other stations, which the exception of the Union Square/Market Street station.

For the wedge-shaped kiosk on the concourse, the Central Subway Project will provide a sign for one half of the "Map Side." Contractor must provide a sign for the other half of the "Map Side".

For each of the two wedge-shaped kiosks on the platform, Contractor must provide a sign on the "Map Side."

Contractor must provide (i) the sign, which must be flush to the kiosk, (ii) the mounting and supports for the sign, (iii) any necessary housing (iv) a matching finish consistent with the kiosk's external surface that covers any surface gaps, (v) a power connection to an outlet within the kiosk provided by the Central Subway Project, and (vi) a data connection to an RJ45-terminated CAT6 cable within the kiosk provided by the Central Subway Project.

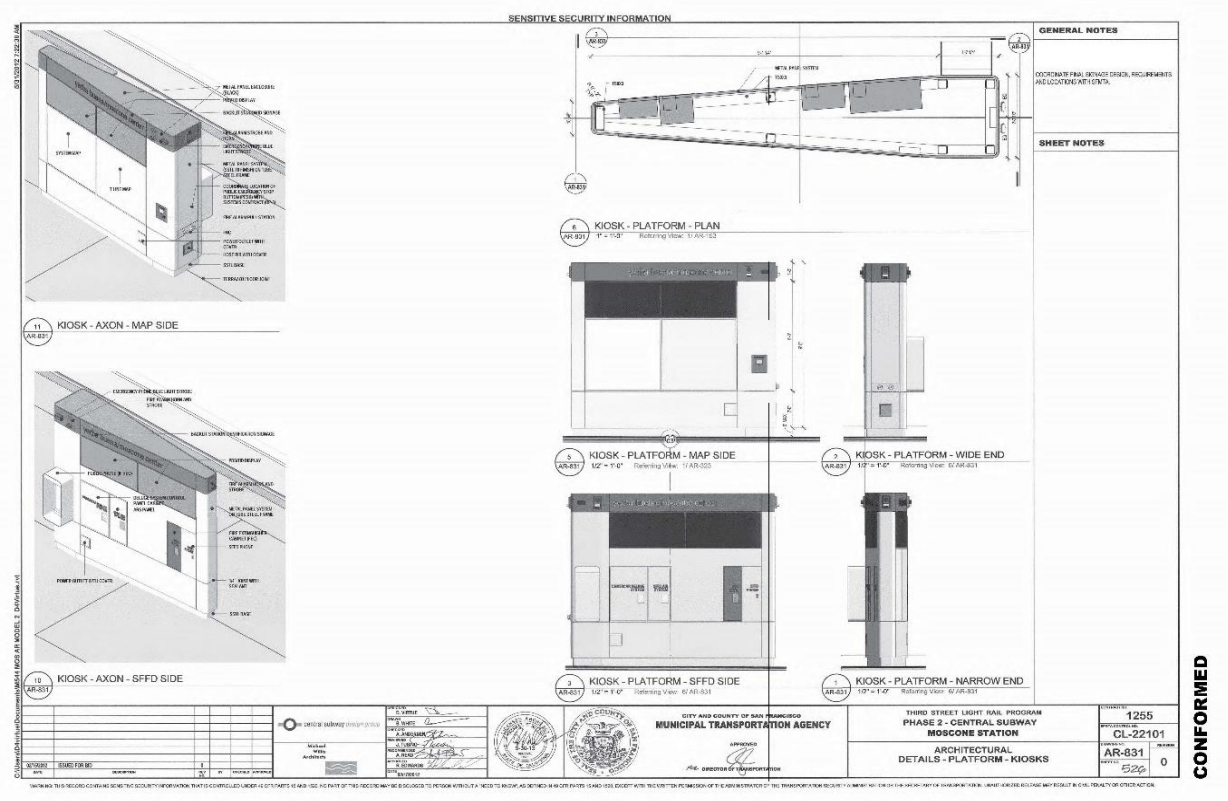


Figure 16: Platform Kiosk at Yerba Buena/Moscone Station

Contractor must also provide a URL with real-time information content to display on LCD signs at the station entrance and concourse.

b. Union Square/Market Street Station

At the Union Square/Market Street Station, there are two triangular-shaped kiosks as shown in Figure 17. Contractor must provide 32" monitors for two out of the three sides for each kiosk. The kiosks are designed to accommodate 32" monitors. Contractor must provide and install digital signage that fits on the "Map Side" of the kiosk, with the signage width, height and depth not exceeding the space available within the kiosk. The dimensions of the space available for Contractor signage are 32" x 25" x 5."

Contractor must provide (a) the sign, which must be flush to the kiosk, (b) the mounting and supports for the sign, (c) any necessary housing (d) a matching finish consistent with the kiosk's external surface that covers any surface gaps, (e) a power connection to an outlet within the kiosk provided by the Central Subway Project, and (f) a data connection to an RJ45-terminated CAT6 cable within the kiosk provided by the Central Subway Project.

In addition, Contractor must provide two Type 3 sign in wall-mounted enclosures. The Central Subway Project will provide a power connection and a data connection to an RJ45-terminated CAT6 cable.

Finally, Contractor must also provide a URL with real-time information content to display on LCD signs displayed at the station entrance and concourse.

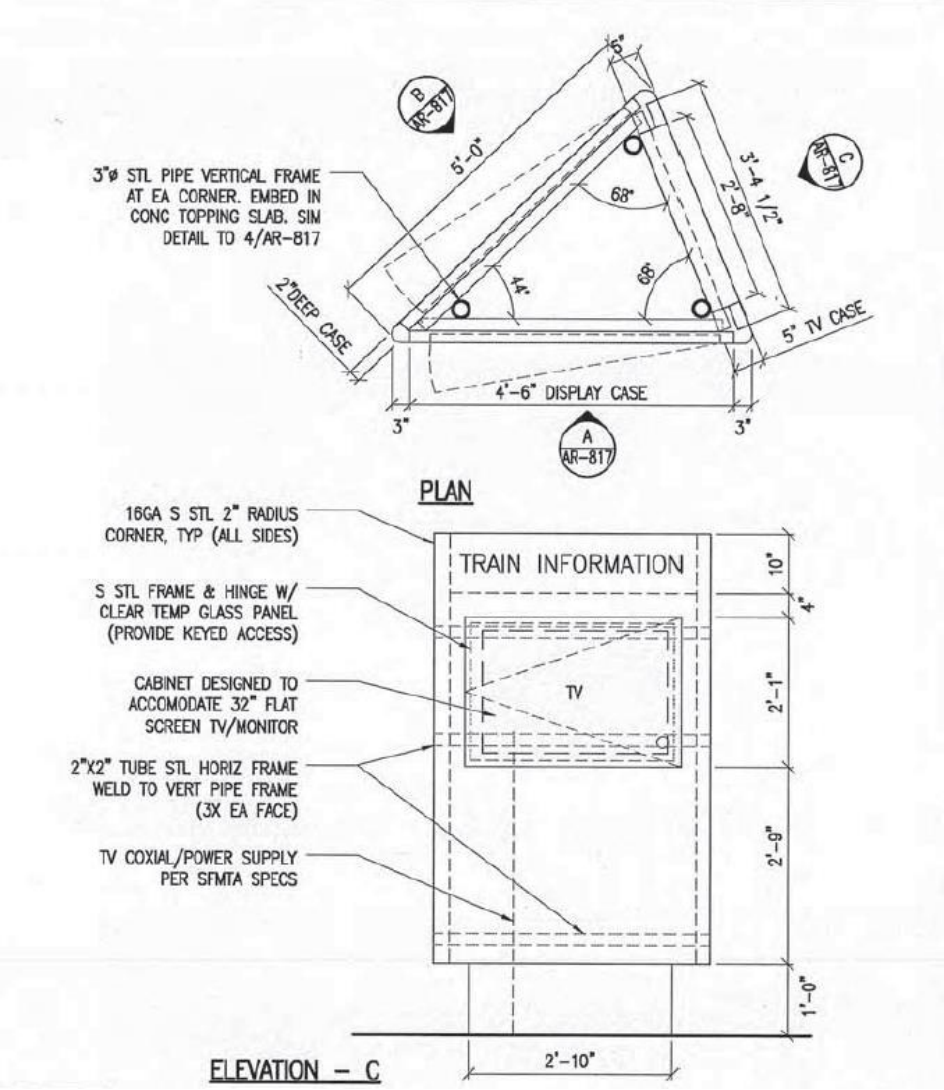


Figure 17: Platform Kiosk at Union Square/Market Street Station

c. Chinatown Station

As shown in Figure 18 below, at the Chinatown Station there is a wall at either end of the station platform to accommodate a real-time information sign. Contractor must provide and install digital signage that fits with the 3'10" by 4'0" "Map Case" on each wall, with the signage width, height and depth not exceeding the space available. The sign dimensions must be consistent with other Type 3 signs in other stations, which the exception of the Union Square/Market Street station.

Contractor must be responsible for providing (a) the sign (b) the mounting and supports for the sign, (c) any necessary housing (d) a matching finish consistent with the wall's external surface that covers any surface gaps, (e) a power connection to an outlet provided by the Central Subway Project, and (f) a data connection to an RJ45-terminated CAT6 cable provided by the Central Subway Project.

In addition, Contractor must provide 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.

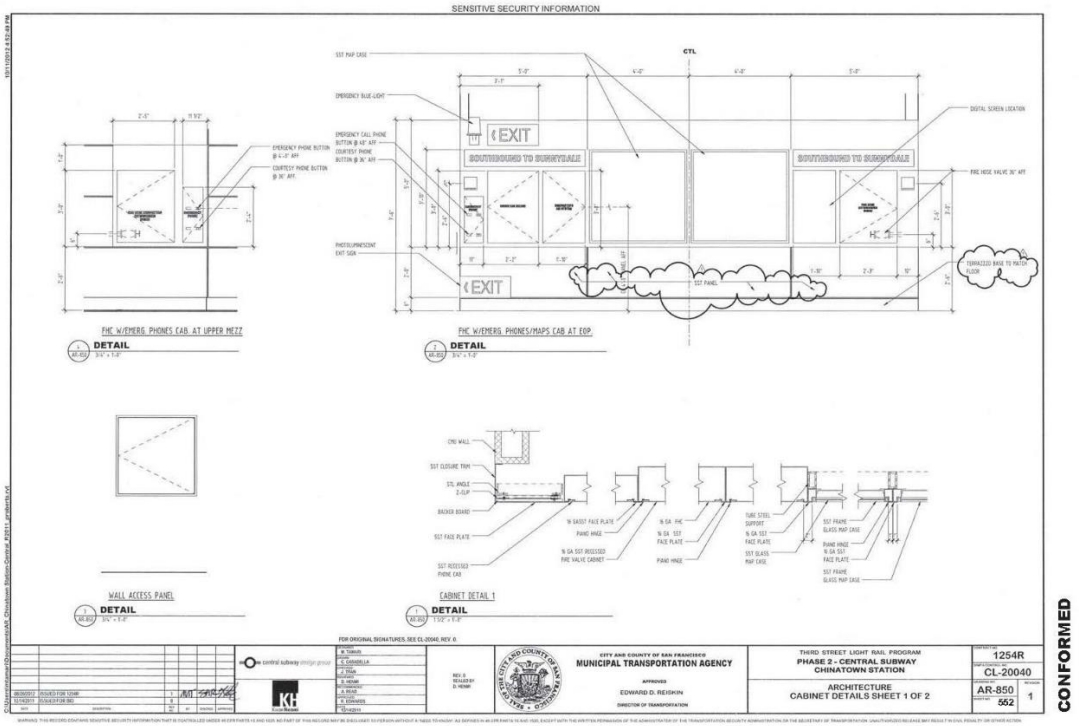


Figure 18: Wall at End of Platform at Chinatown Station

3.3.5 Salesforce Transit Center

3.3.5.1 Webpage Displaying Real-Time Information

To ensure that customers have access to real-time information while in the Salesforce Transit Center, Contractor must coordinate with the Transbay Joint Powers Authority (TJPA) and Pearl Media, the content management system vendor for digital signage at the Salesforce Transit Center.

Through the Content Management System described in Section 2.3.3 Content Management System, Contractor must enable SFMTA staff to develop and maintain multiple webpages associated with content for each pylon. This pylons will show service alerts, a route's next two departures and destinations in real-time, a frequency table of how often the service departs by time of day and day of week, a route map and other information.

At different times of the day, or at the discretion of the SFMTA, a bus bay may serve a different route. For example, the 25 Treasure Island bus will serve a bus bay on the upper deck during most hours, but will serve a bus bay on the lower deck during the evening hours when the upper deck is closed. Thus, the route(s) associated with each pylon may vary based on the time of day.

Contractor must send webpage URLs to Pearl Media for the PD1 and PD2 signs to display in the appropriate places on the pylon screens. The dimensions for each webpage are 1080 x 720 pixels for the PD1 and 1080 x 640 pixels for the PD2.

Contractor must collaborate with the SFMTA to ensure that the content displayed on the webpage is consistent with SFMTA brand guidelines.

3.3.5.2 Webpage Displaying Real-Time Alerts

To ensure that customers have access to real-time alerts while in the Salesforce Transit Center, Contractor must coordinate with the Transbay Joint Powers Authority (TJPA) and Pearl Media to develop and maintain unique webpages featuring relevant service alerts for each pylon. (The SFMTA would manage the content of service alerts through the Content Management System described in Section 2.3.3 Content Management System.)

Contractor must send the webpage URL to Pearl Media for the PD1 and PD2 signs to display in their respective top zones. The dimensions for this webpage are 1080 x 480 pixels for the PD1 and 1080 x 640 pixels for the PD2.

The Contractor must collaborate with the SFMTA to ensure that the content displayed on the webpage is consistent with SFMTA brand guidelines.

3.3.5.3 Text-to-Speech Functionality

Because neither the PD1 nor PD2 signs were designed to incorporate text-to-speech functionality, the SFMTA, the Vendor of the Existing System and the TJPA have worked on a temporary measure to provide text-to-speech functionality. Contractor must implement a permanent solution for text-to-speech functionality to replace this temporary measure.

3.3.5.4 Signage

Pending approval from the Transbay Joint Powers Authority and the SFMTA, for each of the four PD2 pylons, Contractor must provide a sign on the side of the pylons facing Fremont Street. Currently, the SFMTA does not know the exact dimensions of the screen at this time; one option may be to have the dimensions consistent with the 46” monitor (40.082” x 18.77”) monitor on the reverse side of the pylon (see Section 3.2.5.2 PD2 Pylon). This will enable potential customers traveling along Fremont Street to easily see the route(s) that stop at each bus bay without having to enter into the bus plaza.

The signage shall also not overheat. There is limited space within the pylon interior to accommodate additional hardware.

Contractor must coordinate with the Transbay Joint Powers Authority and pylon vendor (ADS) to alter pylon hardware for proper integration.

3.3.6 Alternatively-Powered Signage (Type 4)

By the end of Phase II, and at the direction of the SFMTA, Contractor must provide and install stationary digital signage at selected stop locations without power, including:

i. Shelters where providing power has proven to be technically infeasible and/or cost prohibitive

ii. Outdoor curbside bus and rail stops without shelters

3.3.6.1 Power

Signage must be functional 24 hours per day, 7 days per week throughout the year without a connection to the electrical grid. Signs may be solar-powered or powered through alternative

means. Signs may be placed in a variety of environments, including areas that are foggy and/or are in the shadows of tall buildings.

3.3.6.2 Resolution

Signs must have the maximum resolution possible within the technical constraints of the alternatively-powered sign.

3.3.6.3 Sign Location and Mounting

With the permission of the SFMTA, Contractor must install signs in unpowered locations visible to waiting customers. Signs may be mounted on poles marking all surface-level bus and rail stops or through other means in order to preserve the functionality of the solar-powered lighting on top of the poles, as described in in Section 3.2.4 Outdoor Stops without any Real-Time Signage (Type 4). The SFMTA invites Proposers to propose signs which would integrate with the design for solar-powered lighting. At its discretion, the SFMTA may brand any new pole and sign.

3.3.6.4 Dimensions

Type 4 signs must be sized to contain the same information as Type 1 signs. As signs must be placed between 40 and 70 inches off the ground, they must accommodate a 5/8" character height in conformance with Americans with Disabilities Act guidelines denoted in Table 12. Contractor may consider sizing Type 4 signs to accommodate informational displays with the same aspect ratio as Type 1 signs (i.e., if Contractor chooses a 16:9 aspect ratio for Type 1 signs, it should provide the same 16:9 aspect ratio for Type 4 signs). Signs must maximize the space available to display information.

3.3.7 Powered Signage at Underground Station Entrances (Type 5) (Optional)

In partnership with the Metropolitan Transportation Commission, BART is beginning to install signage at the entrances of shared BART/Muni Metro stations on Market Street (i.e., Embarcadero, Montgomery, Powell and Civic Center). These signs will indicate arrival times of both BART and Muni Metro trains.

In the future, the SFMTA may install identical or similar signs at the entrances of Muni-only stations (e.g., Castro, Church and Van Ness) which would show arrival times of Muni Metro trains and other service-related information. At that time, the SFMTA would provide sign specifications and request Contractor to provide said signs.

3.4 Performance Requirements

Contractor must adhere to the following Performance Requirements, which will be evaluated every six months.

3.4.1 Availability

Signage Availability pertains to the percentage of hours (excluding Scheduled Downtime) that signage, found at powered and unpowered stops, with or without shelters are operational. Exemptions will apply in the case of outages caused by vandalism, third-party power outages, or natural disasters.

To determine Availability, every six months, the SFMTA will run a report using the System Administration Tool on signage status. Availability will be calculated as follows:

$$\frac{(\#\ \boldsymbol{of\ hours\ signs\ are\ operational - Scheduled\ Downtime}) - \boldsymbol{Exempted\ Hours}}{\boldsymbol{total\ hours\ during\ the\ reporting\ period - Exempted\ Hours}}$$

The calculation will exclude time elapsed when signs are unavailable due to an exemption (Exempted Hours).

3.4.2 Signage Transition

Contractor must ensure that all existing signage has been replaced or can communicate with Contractor's new back-end system prior to December 31, 2019.

On or after January 1, 2020, the SFMTA will run a report using the System Administration Tool on signage status to determine the number of functional new signs. The SFMTA will work with its Existing System vendor to quantify the number of existing signs that are receiving Customer Information from Contractor. The SFMTA will add these two numbers and compare them with the number of all signs.

3.5.3 System Transition

Contractor must ensure that all existing signage has been replaced and can communicate with Contractor's new back-end system by July 31, 2020.

On July 31, 2020, the SFMTA will calculate the percentage of installed new signs will as follows:

$$\frac{\boldsymbol{total\ number\ of\ signs - existing\ LED\ signs\ receiving\ Contractor's\ feed}}{\boldsymbol{total\ number\ of\ signs}}$$

3.4.4 Scheduled Downtime

Scheduled Downtime is the time when any type of Stationary Digital Signage is not operational for pre-scheduled maintenance or upgrades as approved by the SFMTA.

Scheduled Downtime must not exceed [TBD-Proposer to indicate in Proposal] percent of the total number of hours in the reporting period. Every six months, the SFMTA will use the Incident Ticketing and Tracking Log to determine the cumulative number of unscheduled offline hours. The percentage of scheduled downtime will be calculated as follows:

$$\frac{\boldsymbol{\#\ of\ hours\ of\ Scheduled\ Downtime}}{\boldsymbol{total\ hours\ during\ the\ reporting\ period}}$$

4. On-Board Digital Signage

4.1 Purpose

In addition to real-time vehicle arrival information prior to boarding, updating customers about points of interest, transfers and service changes as a vehicle travels along its route can help them reach their destinations worry-free. It is also indispensable to visitors and others who may be less familiar with the City's geography.

As opposed to on-board systems that only provide pre-recorded content, the SFMTA is looking to implement a future on-board digital signage system that will also provide dynamic real-time information to assist customers along their journey. Such signage is already available on some transit systems both internationally and in the United States, as shown in Figure 19.

The SFMTA is not including on-board digital signage procurement as part of this contract. However, the successful Contractor must provide content to any future on-board signs. The SFMTA may issue a future RFP for the signage itself and/or may contract with vehicle manufacturers to subcontract with on-board digital signage suppliers.

By offering dynamic transit information, on-board signs would open up new avenues to communicate with SFMTA customers. For example:

i. Transfer Opportunities and their Connection Times – Following best practices, on-board signage with real-time transfer connections will notify customers when their transfer point is approaching and help them better manage the "last mile" leg of their trip. While connecting services may appear physically on a system map, not all routes operate at all times. Real-time information on-board vehicles can tell a customer whether their connecting bus is just a few minutes away or not operating at all, allowing them to assess their options and avoid attempting to make a non-existent connection. By reducing customer uncertainty about transfers, on-board signage could increase a customer's willingness to consider transit for a non-direct trip and to more destinations, thus potentially increasing transit ridership even among frequent transit customers.

ii. Service Delays and Disruptions – Customers will receive real-time service updates, including reroutes, delays and disruptions applicable to their route and location. This will enable customers to stay informed about their journey, know when they might expect to reach their destinations and make decisions whether to find alternative transportation.

Figure 19: On-Board Digital Signage Example

Transfers are necessary to support a comprehensive transit system that facilitates travel between multiple origins and destinations, not just to or from downtown. Best practices that reduce the uncertainty and trepidation associated with transfers include on-board signage that alert customers of intersecting routes and their connection times. (Note: Photo does not imply SFMTA endorsement of a particular vendor.)

4.2 Existing Conditions

As shown in **Figure *20***, 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 *21***, 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 20: Existing DVAS Sign on Rubber-Tire Vehicle

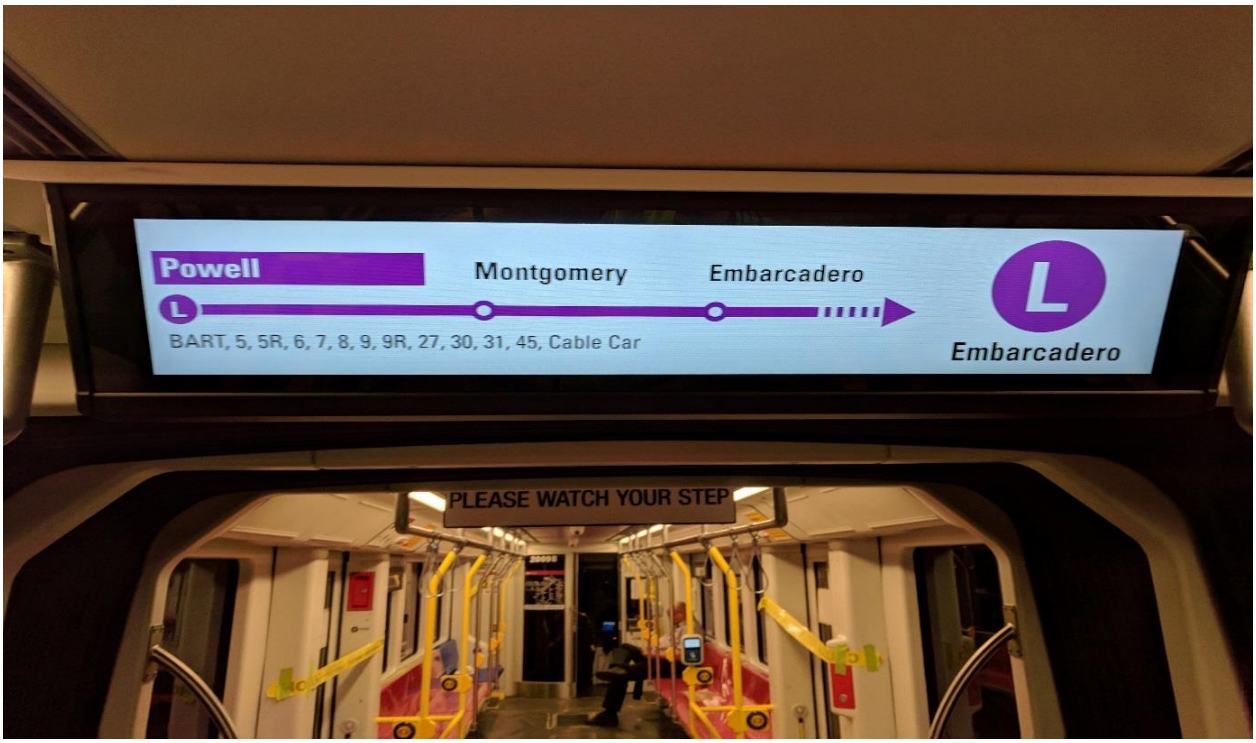


Figure 21: Existing Passenger Information Screen on New Siemens Light Rail Vehicles

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. (Note: Photo does not imply SFMTA endorsement of a particular vendor.)

For reference, Table 14 provides SFMTA's estimated peak vehicle demand, fleet size and possible number of future on-board digital signs by vehicle type.

Table 14: SFMTA Peak Demand, Fleet Size and Potential Quantity of Future On-Board Signs

	Fall 2020	2025

Vehicle Type	Peak Vehicle Demand	Fleet Size	Future On-Board Digital Signs*	Peak Vehicle Demand	Fleet Size	Future On-Board Digital Signs*
60-Foot Motor Coach	187	224	448	225	269	538
40-Foot Motor Coach	285	357	357	292	365	365
60-Foot Trolley Coach	77	93	186	77	93	186
40-Foot Trolley Coach	153	185	185	153	185	185
30-Foot Motor Coach	23	30	30	23	30	30
Siemens LRV4 Light Rail Vehicles	177	56	112	187	165	330
Breda LRV4 Light Rail Vehicles		149	0		56	0
Cable Cars	27	40	0	27	40	0
Historic Streetcars	29	46	0	29	46	0
Total	**958**	**1,180**	**1,318**	**1,013**	**1,249**	**1,634**

4.3 Technical Requirements

To supplement the existing DVAS system, the SFMTA would like to implement enhanced on-board digital signage. By the end of Phase II, or whenever the SFMTA procures on-board digital signage, whichever is sooner, Contractor must provide the content that will populate future on-board digital signs. Contractor will **not** provide on-board digital signage under the Next Generation System contract.

Contractor must provide the following On-Board Digital Signage Deliverable:

i. Back-end support and functionality to display content on future on-board signage and related alternative text-to-speech information

4.3.1 Signage Content

At any given time, the real-time information pertinent to customers will vary based on their vehicle's route and location. As part of the Content Management System (see Section 2.3.3 Content Management System), the System Software must automatically generate real-time content specific to the on-board digital sign associated with all vehicles in revenue service. Through the Content Management system, the SFMTA must have the ability to override, alter or cancel automatically generated content.

The actual information displayed on future On-Board Digital Signage will depend on context. Examples of information that Contractor must be able to push to On-Board Digital Signage in the appropriate context includes, but are not limited to:

i. Current route and final destination associated with that vehicle

ii. Estimated arrival times at the next three stops

iii. Estimated arrival times at major upcoming stops

iv. A list of connecting transfer routes at the next three stops, including other transit partners such as BART and Caltrain. The SFMTA will work with Contractor to provide a list of applicable transfer opportunities at each stop

v. Automatically-generated real-time service changes, delays and disruptions applicable to their route and location (see Section 2.3.1.1 Outputs g. Temporary Service Changes)

vi. Manual messages that Transportation Management Center staff or other SFMTA staff enter into the Content Management System about real-time service changes, delays and disruptions applicable to their route and location

vii. A map displaying the location of the vehicle's current location

viii. A map displaying the location of transfer points relative to the vehicle's current location

ix. Messages that regional transit partners (e.g., BART, Golden Gate Transit, Caltrain) enter into 511 real-time alerts about real-time service changes, delays and disruptions applicable to their route and location

x. Switchbacks that require customers to exit the vehicle prematurely, and the estimated time when the following vehicle operating in normal service will arrive

xi. Predicted arrival times of SFMTA connecting transfer routes by destination (if connecting transfer routes are not operating at that time, do not display them)

xii. Predicted arrival times of connecting transfer routes by other transit partners (if available through a feed), or scheduled arrival times (if real-time information is not available)

xiii. Customer alerts if a vehicle is arriving at a stop where a regularly-scheduled connecting transfer route is not available due to a real-time service change, delay or disruption (see Section 2.3.1.1 Outputs g. Temporary Service Changes)

xiv. Customer alerts if a vehicle is arriving at a temporary stop where a regularly-scheduled connecting transfer route has been detoured due to a real-time service change, delay or disruption (see Section 2.3.1.1 Outputs g. Temporary Service Changes)

xv. Customer alerts if a vehicle is arriving at an underground station where an elevator and/or escalator is out of service (for on-board signs on both the light rail vehicle itself and any surface-level connecting vehicle)

4.3.2 Text-to-Speech Functionality

Contractor must generate alternative text information in a format that future On-Board Digital Signage can verbalize in order to assist customers who prefer or need to receive information audibly.

This alternative text information may or may be identical to what is displayed on the screen, depending on the length and detail of the message content. For example:

i. For a service 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.

ii. 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.

4.3.3 Mobile Website Test Interface

Contractor must provide a mobile website for internal use to test the accuracy of the content generated by the System Software. The mobile website must replicate the content to be displayed on future on-board digital signage and provide and update arrival time information while the vehicle is operating. The mobile website must enable SFMTA staff must be able to enter a vehicle number and the mobile website and then must replicate what the on-board digital sign would display for that vehicle as it approaches each stop.

4.3.4 Integration with On-Board Digital Signage Vendor

Contractor must be capable of both:

i. Providing the information specified in Section 4.3.1 Signage Content to any future On-Board Digital Sign Vendor in a mutually-agreed upon format, which the Vendor will then incorporate into its own Content Management System for display on the on-board screen

ii. Incorporating information in Section 4.3.1 Signage Content into a layout designed through the Contractor's Content Management System, which Contractor will then push in its entirety to any future On-Board Digital Sign Vendor

The SFMTA shall determine which of the above options to implement in consultation with Contractor and any future On-Board Digital Sign Vendor.

Contractor must ensure that alternative text information (see Section 4.3.2 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 and Contractor must provide any future digital sign vendor with all required access to ensure that the digital signs can display all content highlighted in Section 4.3.1 Signage Content.

The SFMTA may initiate a pilot project to prototype electric buses from different manufacturers as soon as late 2018 or early 2019, which will include on-board signs with one or more vendors. Based on lessons learned during the pilot project, the SFMTA may issue a separate procurement for these signs and/or contract with vehicle manufacturers to subcontract with on-board digital signage suppliers. Contractor must work with any On-Board Digital Signage Vendor to ensure that content is properly displayed and announced on the signs.

4.4 Performance Requirements

SFMTA customers rely on accurate, real-time information for transit services 24 hours per day, 7 days per week. The On-Board Digital Signage must be operational at all times. Accordingly, Contractor must adhere to the following Performance Requirements, which will be evaluated every six months.

4.4.1 Information Accuracy

Information Accuracy is defined as the percentage of actual stops where on-board digital signage displays accurate information. The methodology to assess Information Accuracy varies based on whether or not On-Board Digital Signage hardware has been installed.

i. Before On-Board Digital Signage hardware is installed – Every 6 months, the SFMTA will evaluate the accuracy of the On-Board Digital Signage content by riding 10

randomly-selected trips end-to-end on 10 different routes. The SFMTA will verify whether the on-board digital signage mobile website displays the appropriate information (e.g., transfer connections and their arrival times) as the vehicle approaches each stop.

ii. After On-Board Digital Signage hardware is installed – Every 6 months, the SFMTA will evaluate the accuracy of the On-Board Digital Signage content by riding 10 randomly-selected trips end-to-end on 10 different routes. The SFMTA will verify whether on-board digital signage (e.g. transfer connections and their arrival times) displays correct information as the vehicle approaches each stop. (The SFMTA will grant an exemption from this requirement if the On-Board Digital Signage hardware vendor has communications (or other) issues that prevent the proper display of information on the signs.)

5. Mobile Platform & Website

5.1 Purpose

The purpose of the Mobile Platform & Website is to (a) provide trip planning tools and real-time transit information on SFMTA's online and mobile platforms, including its website and mobile app, MuniMobile, (b) facilitate travel by transit and other sustainable transportation modes both within San Francisco and between San Francisco and the rest of the region, and (c) collect data that provides insights into customer travel behavior in order to improve service and operational planning.

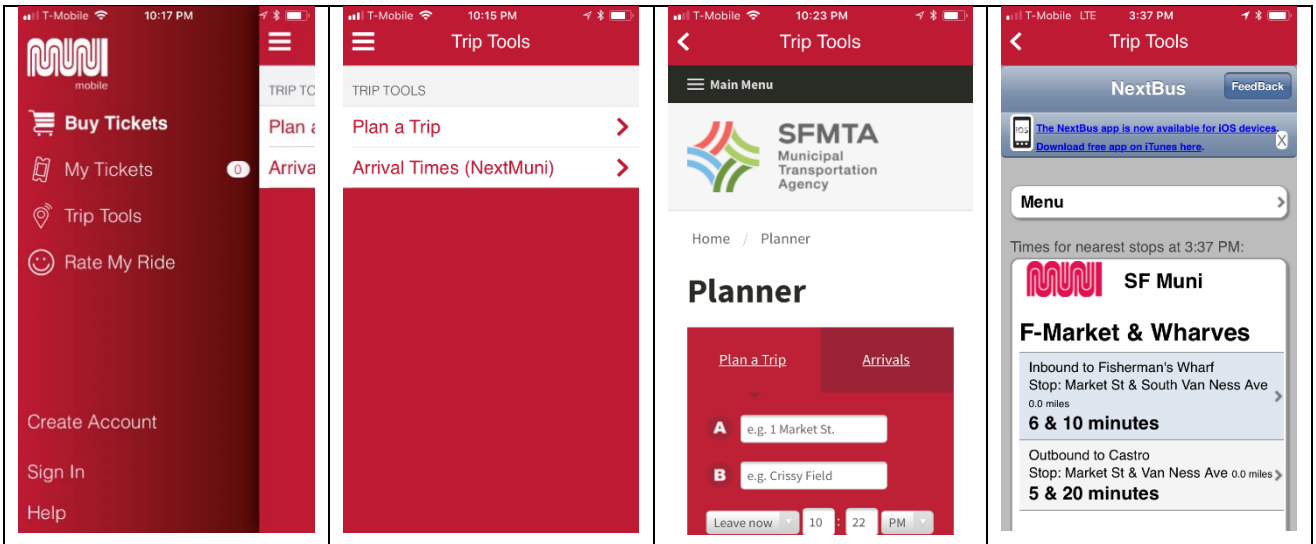
5.2 Existing Conditions

5.2.1 Mobile Platform

As shown in **Figure *7***, 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.

In the last quarter of 2018, the SFMTA will enter into a contract with a vendor to develop a second-generation MuniMobile ticketing app.



(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 22: 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. (Note: Photo does not imply SFMTA endorsement of a particular vendor.)

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.

5.2.2 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 vendor.

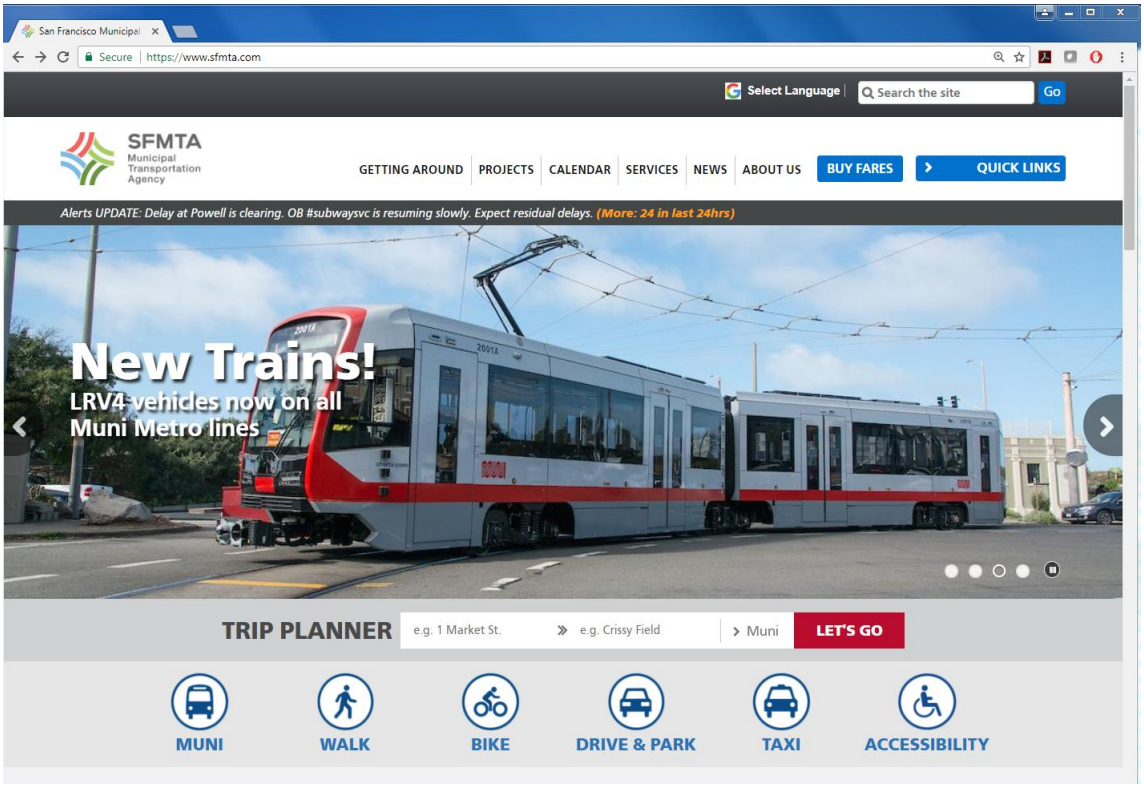


Figure 23: SFMTA Website, which prominently features the existing trip planning tool

5.2.3 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.

5.3 Technical Requirements

Contractor must provide trip planning tools and real-time information on SFMTA's online and mobile platforms, including its website www.sfmta.com and mobile app MuniMobile. This will permit customers to access information electronically through a variety of electronic devices, such as a desktop computer, laptop, tablet or mobile app. While certain features such as real-time location tracking may only apply to mobile devices, Contractor must design its trip planning tools and real-time information to be accessible on as many electronic devices as possible to maximize the number of communication channels available to customers. The Mobile Platform must adhere to or exceed the Web Content Accessibility Guidelines (WCAG) 2.0.

The deliverables for the Mobile Platform & Website are:

i. Mobile App (functionality coordinated with the future MuniMobile ticketing vendor)
ii. SFMTA Website Integration (private API or embedded)
iii. Trip Planner
iv. SFMTA Staff Interface on Mobile App
v. Data Collection

Each deliverable and its requirements are described below.

5.3.1 Mobile App

Contractor must provide a customized trip planner and vehicle predictions app.

By the end of Phase I, Contractor must work with the MuniMobile vendor to produce a single mobile app that retains currently-available features and functionality. Specifically, on a single mobile platform, customers must be able to access mobile ticketing, a basic trip planner for travel between a user-entered origin and destination, and vehicle arrival predictions for routes near the user's current location. Advertising for any product or services will be at the sole discretion of the SFMTA.

By the end of Phase II, Contractor must fully integrate into the MuniMobile App all the additional Next Generation System features and functionality described below and in Sections 5.3.4 Trip Planner and 5.3.5 SFMTA Staff Interface on Mobile Platform .

In order to facilitate mobile payments, the SFMTA currently requires MuniMobile users to establish an account linked to a credit or debit card. Contractor will not have access to financial information and cannot require a customer to establish an account to receive real-time trip planning information.

Rather than developing a new mobile app, Contractor may provide a white-label app produced by a third-party with an existing independent transit app. The white-label app must appear as an SFMTA product within MuniMobile. Within its white-label app, advertising for any product or services will be at the sole discretion of the SFMTA, including advertising seeking to draw customers to Contractor's independent transit app if it exists. SFMTA will receive any revenues associated from said advertising.

The app 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 (See Appendix J: Guiding Principles for Management of Emerging Transportation Services and Technologies.)

Contractor must work with SFMTA staff and its MuniMobile app vendor to coordinate functionality. In particular, the parties must jointly design how trip planning and real-time information will integrate into a single mobile platform.

5.3.2 Website

Contractor must provide a responsive website accessible from an SFMTA-defined URL (currently http://www.nextmuni.com). This website must include the features and functionality described in Section 5.3.4 Trip Planner. Contractor must partner with SFMTA's web development team to ensure that the website has appropriate SFMTA branding.

The trip planner must appear as a part of the sfmta.com website without attribution to Contractor's trip planner. Advertising for any product or services will be at the sole discretion of the SFMTA, including advertising seeking to draw customers to Contractor's independent transit app if it exists. The SFMTA will receive any revenues associated from said advertising.

5.3.3 SFMTA Website Integration

By the end of Phase I, Contractor must make available trip planning and real-time information content to the SFMTA web development team for seamless integration into www.sfmta.com.

Contractor must work with SFMTA staff and its website vendor to design how trip planning and real-time information will integrate into the SFMTA.com website.

5.3.4 Trip Planner

Contractor's online and mobile platform trip planning and real-time information tools must address the multitude of SFMTA customers who have different needs and levels of familiarity with public transportation in San Francisco. These customers have different ways of viewing and interpreting the same underlying travel information. Examples of different users and their needs include:

i. Customers who need *point-to-point directions***.** These include tourists, newcomers to the city or even regular riders who are traveling to a new locations on transit. They need to provide an origin and destination using either a mobile device's location services or manual entry in order for a trip planner to determine the best option for them. They may need immediate travel information or may be planning a trip in the future.

ii. Customers who need to know *the next vehicle arrival times* for nearby route(s) and/or stop(s). This can include people listed above, as well as regular riders who already know which route(s) they need to take or stop(s) around them and do not need or want to spend time providing an origin or destination. They are most interested in how long they will need to wait for their route or scanning different route options to see which one is coming the soonest.

iii. Customers who need to *track their trip* once on board Muni. These customers may need to estimate when they will reach subsequent stops, determine how long their future connection time will be at potential transfer points, or find out when their in-vehicle delay is expected to be resolved. This can include everyone listed above, as well as customers who did not need directions or the next vehicle arrival (for example, someone who saw their bus coming and hopped aboard).

Contractor's online and mobile trip planning tools must support all three of these primary functions and enable customers to access them intuitively and directly. Some customers may need all three functions; others may need only one. For example, a customer who opens the mobile app after having boarded should not need to navigate through multiple screens and enter in an origin and destination in order to find out how long they will need to wait for their connecting bus.

The features required by the end of Phase I are indicated below. However, if Contractor is able to integrate features delineated for Phase II as part of Phase I, Contractor may do so upon approval from the SFMTA.

5.3.4.1 Configurability

By the end of Phase I, the online and mobile trip planning tools must enable customers to configure their trip-planning preferences. Examples of configurable options include, but are not limited to:

i. 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) Maximum number of transfers

ii. Maximum frequency of service
iii. Lowest fare
iv. Crowding (based on historical records)
v. Maximum walking distance to initial stop
vi. Maximum walking distance to an alternative route
vii. Approximate walking speed (if possible, automatically through the accelerometer or smartphone hardware)
viii. Direction
ix. Bookmarking frequently-visited destinations (e.g., work, home, etc.) (mobile app or cookie-enabled website)
x. Bookmarking favorite or frequently-used stops and routes
xi. Reminders (e.g., alert before vehicle arrival, transfer, approaching stop, get off bus, arriving buses, etc.)
xii. Subscription to service alerts by route

The mobile app must enable customers to save their preferences.

5.3.4.2 Point-to-Point Directions

By the end of Phase I, the Mobile Platform & Website shall enable customers to receive point-to-point directions.

a. Entering Origins and Destinations

The trip planner must support any trip with an origin or destination within the SFMTA service area, which 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 operators that interface with the SFMTA, provided those operators offer an Open API with transit information.

When planning a trip from point A to point B, customers must be able to:

i. Choose their starting point by:
    a. Enabling Location Services and having their device automatically detect the current location
    b. Entering an intersection or address
    c. Selecting a location on a map
ii. Search for and select their destination by:
    a. Entering in a specific address, intersection or major landmark
    b. Reversing their point of origin and destination
    c. Seeing a list of personal frequently-visited destinations (e.g., work, home, etc.) that customers create and have the ability to modify

d. Seeing a list of destination suggestions based on the addresses of meetings and events they have scheduled from Google and native calendars, if configured by user

e. Seeing a list of destination suggestions based on recent searches. The search tool should be predictive; if a user begins to type in a word, the app would suggest a completed search term.

iii. Add a mid-route stop or additional destination

iv. Choose when their trip will leave (e.g., immediate departure, by desired arrival time, at a future time and date)

v. Configure personal route preferences (e.g., maximum walking distance)

b. Reviewing Potential Trip Itineraries

Based on the origin and destination, the online and mobile platform must produce a list of potential 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 5.3.4.1 Configurability 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 nearby Muni vehicles

v. View real-time arrival predictions for the next 3 approaching vehicles

vi. View scheduled arrivals and departures (and denote them as scheduled) if next vehicle arrivals are not available

vii. View an interactive map tracking vehicles associated with those route itineraries

viii. See 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)

c. Reviewing a Specific Trip Itinerary

Upon selecting a specific itinerary, customers must be able 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 real-time service change

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. Turn on or off reminders (e.g., when to leave, transfer, get off bus, arriving buses)

viii. Add the trip to their Google and other native calendars

5.3.4.3 Next Vehicle Arrival Predictions – Nearby Vehicles

By the end of Phase I, Contractor's online and mobile platforms must enable customers to view the predicted arrival times of all nearby vehicles. Specifically, it must:

i. Permit the customer to navigate to the correct stop, route and direction through pull-down menus, interactive map, lists or other means (if Location Services is not enabled on a mobile app or website)

ii. Automatically identify all routes whose nearest stops are within a configurable distance to the current location (if Location Services is enabled on a mobile app or website)

iii. List all routes and predicted arrival times for the next 3 vehicles for all stops within a configurable radius, once the mobile app or website has determined the customer's location

iv. List scheduled arrivals and departures (and denote them as scheduled) when next vehicle arrivals are not available

v. Display a real-time map showing all nearby transit vehicles along with a customer's location

vi. Display sustainable transportation options such as bikeshare

vii. Provide a link to San Francisco's taxi services (currently Flywheel) under specified scenarios, such as if there are no transit options within a configurable radius

5.3.4.4 Trip-Tracking (On-Board/Live Travel)

By the end of Phase II, Contractor must enable customers to use the mobile app or website to track their trip in real-time while riding on-board a 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.

If customers enable Location Services on their mobile devices, the mobile app or website 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 mobile app or website 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.

When using live trip tracking, a customer must be able to:

i. View a list of all subsequent stops and their expected arrival times

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 their expected connection times

iv. Provide step-by-step navigation to the stop for the connecting vehicle in both an audio and visual format

v. View and hear (by request) service delays and real-time alerts associated with their trip (see Section 2.3.1.1 Outputs g. Temporary Service Changes above)

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

viii. Link to 311 to report issues or incidents (including an auto-population of the run, route, vehicle number and time)

ix. Send a security-related message (to the Transportation Management Center)

x. Provide feedback on their trip (including an auto-population of the run, route, vehicle number and time)

5.3.5 SFMTA Staff Interface on Mobile Platform

By the end of Phase II, the app and website must also enable SFMTA staff such as Transit Managers, Maintenance Technicians, Planners and others to access more detailed information about individual vehicles via a secure login and password. This would facilitate managing service in the field. Examples of supplementary information available through this SFMTA Staff Interface include, but are not limited to:

i. Schedule deviation (e.g., + 1 minute late)

ii. Irregular headways (i.e., gaps and bunches)

iii. Run numbers

iv. Block numbers

v. Operator ID

This read-only interface would also enable staff to search for and locate a vehicle by run, block or operator.

5.3.6 SMS (Short Message Service)/Text Messaging

By the end of Phase I, Contractor must duplicate the current 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.

5.3.7 Data Collection

In conformance with federal, state and local laws and regulations as well as industry best practices, the mobile app and website should be capable of collecting basic user data in order to provide context-appropriate vehicle predictions and trip planning to customers and to assist SFMTA with service and operational planning. Although Contractor must implement user data collection functionality by the end of Phase II, Contractor 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 "opt in" to Location Services and acknowledge that they understand that travel data is being collected 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 will additionally 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.

Where possible, Contractor must associate data collected with a specific account or mobile device.

i. **Real-Time Information/Trip Planning Requests:** The app must record user requests for real-time information and trip planning. This includes origin and destination, lookups for next vehicle arrivals on particular routes, or any other pertinent information.

ii. **Travel Diaries:** Provided that the customer consents in a User Agreement and has enabled Location Services, the app must be able to identify the origins, destinations, paths and transportation modes used for any Linked Trip (an end-to-end journey that may involve one or more modes of transportation) that begins and/or ends within the SFMTA service area. These transportation modes include, but are not limited to, public transportation, bicycling, walking and automobiles (distinguishing among taxis, private automobiles and emerging mobility services). If a person has configured a preference for accessible itineraries, the diary must also note this information.

iii. **Transit Route Assignments:** If a customer uses public transportation, the app must:

   a. Assign a trip to an individual vehicle and route with a provided level of confidence associated with that estimate, if the customer rode Muni

   b. Assign a trip to a route and transit operator, if the customer rode a connecting transit provider other than Muni

   c. Identify transfers, both between Muni vehicles and between Muni and a connecting public transportation provider

iv. **Association between Real-Time Information/Trip Planning Requests and Actual Travel:** Contractor must associate with real-time information/trip planning requests with subsequent use of transportation modes up to 60 minutes after those requests are made. This will permit the SFMTA to understand whether the request for transit information resulted in a potential customer taking transit or some other form of transportation.

v. **Mobile Payment Method Data:** Contractor must coordinate with SFMTA's MuniMobile payment platform vendor to associate travel with fare payment method (e.g., pass vs. single ride).

vi. **Surveys:** The SFMTA must have the ability to create surveys through an online portal and administer those surveys through the app at any time while the app is open, including during the onboarding process (when a customer downloads the app). Surveys may include demographic and attitudinal questions.

vii. **Opt-In Service Subscriptions:** The app must enable customers to subscribe to information or messages about services.

5.3.8 Data Policies

Contractor must abide by the following data policies.

i. **Privacy:** Contractor must comply with all local, state and federal regulations related to Personally-Identifiable Information (PII).

ii. **Data Usage:** Contractor must associate all records with a mobile device and customer account (if established), but keep all data anonymized and encrypted. Contractor must not distribute any data without the express written permission of the SFMTA, including for business development purposes. Contractor may not share, sell, or profit off this data in conjunction with a third party. In consultation with SFMTA Technology staff, Contractor must establish a transaction-level data feed to SFMTA's data warehouse in a format specified by the SFMTA.

iii. **Data Ownership:** The SFMTA will retain ownership over all data, and the mobile app and website.

iv. **Data Aggregation:** To protect customer privacy, the Data Collection must provide tiered data access that will allow data to be aggregated at levels appropriate to the user. 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.

v. **Data Retention:** Contractor must retain all raw data for a minimum of five years. Contractor must retain any data required to create aggregated reports for the Contract duration.

5.3.9 Other Customer-Facing Requirements

5.3.9.1 Compatibility with Electronic Devices

By the end of Phase I, the app and website must operate on applicable iOS, Android, Windows and MacOS platforms. Contractor must upgrade its app and website 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 website must be functional on all web browsers in common use. In addition, the app and website must meet or exceed WCAG 2.0 requirements and be compatible with screen readers and other accessible technologies.

All elements of Contractor's website 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 website as browsers change or new browsers come into existence, provided that the browsers capture at least 3 percent of the market share.

5.3.9.2 Language Support

By the end of Phase I, Contractor's app and mobile website 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

Filipino. 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.

5.3.9.3 Configurable Location Services

By the end of Phase I, Customers must have the ability to opt-in (either at all times or only while the app 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 app must still enable them to access trip planning, real-time vehicle arrivals for surrounding routes and stops and other real-time information. Proposer must suggest options to permit this functionality; 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.

5.3.9.4 Mapping

The SFMTA is currently partnering with the Metropolitan Transportation Commission (MTC) and several Bay Area cities on a regional wayfinding project. The project's purpose is to encourage sustainable forms of movement with a new system of improved pedestrian and transit information. Project outcomes include developing consistent graphic styles and branding for a standardized transit map as well as a regional transit and wayfinding mapping platform that provides operators and cities with improved mapping resources.

By the end of Phase II, or later depending on the schedule of the regional wayfinding project, Contractor's maps for the Mobile App and Website must be consistent with the graphic styles and branding for the standardized transit map. Contractor must design its platform to accommodate map formats associated with this project. Because the project is still in its initial stages, specific map formats are not known at this time.

5.3.9.5 Route Schedules and Maps

By the end of Phase II, Contractor's online and mobile trip planning tools must include:

i. Maps for individual routes
ii. Published timetables by route, direction and day of week (provided by the SFMTA)
iii. Stop list by route and direction (provided by the SFMTA)
iv. System Map showing all routes and streets (provided by the SFMTA)
v. Dynamic System Map where customers can select a time of day and day of week and see routes in operation colored by scheduled service frequency

5.3.9.6 Complementary Sustainable Transportation Options

By the end of Phase II, the app 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 (see Appendix J: Guiding Principles for Management of Emerging Transportation Services and Technologies). Information includes, but is not limited to:

i. Links to mobile apps and websites for those transportation options

ii. Nearby locations where customers can access those transportation options (e.g., bike sharing docks)

iii. The SFMTA must have the final decision whether to include or exclude other transportation modes.

5.3.9.7 Gamification

By the end of Phase II, Contractor must design the Mobile Platform to enable future gamification at the direction of the SFMTA. Gamification will allow the SFMTA to motivate participation, engagement, and loyalty among customers. Contractor must not implement any gamification features without collaboration with and approval from the SFMTA.

5.4 Performance Requirements

When planning trips using a mobile device, SFMTA customers rely on accurate, timely, real-time information that is easy to understand. In addition, customers with disabilities rely on accessible transit routes. On a six-month basis, Contractor must adhere to the following Performance Requirements.

5.4.1 Availability

Mobile Platform & Website Availability pertains to the percentage of hours that the Mobile Platform & Website and other associated content are available to the public for use.

To determine Availability, on a six-month basis, the SFMTA must run a report using the System Administration Tool on Mobile Platform status. Availability must be calculated as follows:

$$\frac{\#\ of\ hours\ Mobile\ Platform\ \&\ Website\ are\ operational}{total\ hours\ during\ the\ reporting\ period}$$

5.4.2 Trip Planner Efficiency

The percentage of planned trip itineraries that are "efficient," as agreed upon by Contractor and the SFMTA and established in the Contract.

SFMTA staff will generate 40 random itineraries every six months. The trip planner must identify each origin and destination correctly and provide a plausible, non-circuitous "efficient" route for customers based on mutually-agreed upon criteria.

5.4.3 Trip Planner Efficiency – Accessible Itineraries

The percentage of accessible planned trip itineraries that are "efficient," as agreed upon by Contractor and the SFMTA and established in the Contract.

SFMTA staff will generate 40 random itineraries every six months (see Section 5.4.2 Trip Planner Efficiency above, some of which require accessible vehicles and/or stops. The trip planner must identify each origin and destination correctly and provide a plausible, non-circuitous "efficient" route that is accessible.

5.4.3 Trip Planner Response Time

Response Time is defined as the number of seconds it takes for a trip planning request to process and complete on the back-end.

On a six-month basis, the SFMTA must run a Response Time for Trip Planner Requests report using the System Administration Tool. The SFMTA will determine the percentage of requests that fall outside the agreed-upon standard established between the SFMTA and Contractor (which includes non-responsiveness).

5.4.4 Data Collection Error Rate - Travel Diaries

Data Collection Error Rate is defined as the percentage of trips in Travel Diaries (see Section 5.3.7 Data Collection that have incorrect information associated with them. In this case, the information of importance is a customer's travel path as well as the time and mode of transportation.

Each 6 months, SFMTA staff will use a mobile app on a non-anonymized account to make a minimum of 20 trips using a variety of transportation modes. The mobile app must properly track those trips from end-to-end with the correct travel path, time and mode of transportation (transit, bicycling, walking and automobiles – preferably distinguishing between private vehicles and TNCs). The SFMTA will then determine the percentage of these trips properly assigned in the Travel Diary to determine the error rate.

6. Analytics Platform

6.1 Purpose

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.

6.2 Existing Conditions

Over the last five years, 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.

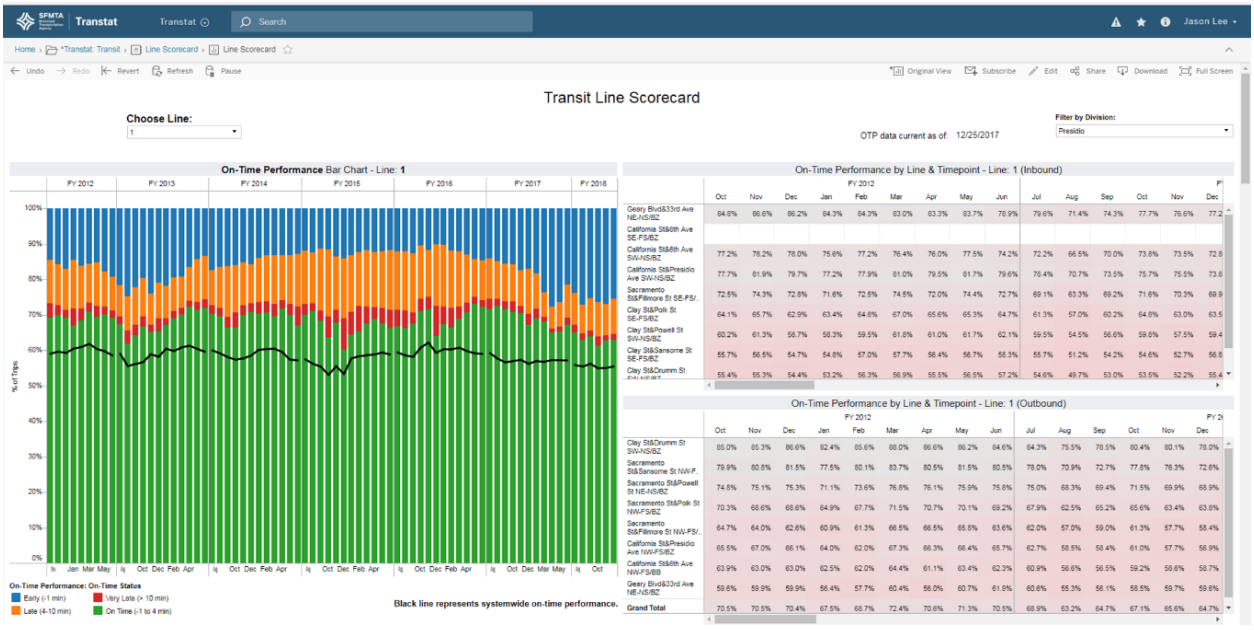


Figure 24: Transtat

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.

6.3 Technical Requirements

The deliverables for the Analytics Platform are:

i. Analytics Platform

ii. Data Interpretation Services

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

6.3.1 Analytics Platform

Through the Analytics Platform, Contractor must significantly enhance the SFMTA's current capabilities to process and interpret data. Rather than being prescriptive, the following general requirements are intended to serve as guidelines for Proposers to be creative in their approaches to developing an Analytics Platform.

The Next Generation System will produce large amounts of data (described in Section 5.3.7 Data Collection above) that could provide new insights. While the SFMTA acknowledges that Contractor may already have standard reporting tools, the agency is most interested in what supplemental analytics and data interpretation Contractor can offer and how Contractor can address limitations in current data sources with data generated by the Next Generation System. In particular, the SFMTA would like to better understand ridership patterns and how differences in real-time information, service, fares and other variables can influence customer mode choice.

As with other industries and other modes within the transportation industry, this understanding of customer behavior is fundamental to enabling the SFMTA to make more informed planning and operational decisions. The Analytics Platform can help the agency calibrate ridership models and secure project resources required to address unmet or underserved transit demand. It will also position the SFMTA to improve its customer relationship management.

Contractor must provide reporting tools and dashboards to help the SFMTA to understand trends and analyze data. 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 SFMTA to use and perform its own analytics.

6.3.2 Data Interpretation Services

Through the Analytics Platform, the SFMTA would like to answer many questions related to transit system performance, operations, Next Generation System usage, mode choice, and

customer behavior. While automated dashboards can provide many answers, the level of complexity of these questions may necessitate supplementary approaches. For example, Contractor may wish to engage an independent and objective party such as an academic institution to help mine and interpret data with an emphasis on advanced statistical modeling, operations research and traveler behavior.

The SFMTA is particularly interested in determining whether the Next Generation System can influence mode choice through changes in the display and content of real-time information. Independence in data interpretation will increase confidence in the results, particularly as it relates to evaluating the System's efficacy in achieving project goals and avoiding potential conflicts of interest.

6.3.3 Examples of Questions Answered through the Analytics Platform

The following questions are examples of questions that the Analytics Platform would help answer, both through dashboards and data interpretation services. This is not an exhaustive list; the SFMTA expects that new data and interpretation of that data will raise even more questions. Contractor must coordinate with SFMTA project staff to identify and recommend further data collection and analysis.

6.3.3.1 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 real-time 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)?

6.3.3.2 Customer Engagement

i. **Usage** – How many people are using the app and website? How often do people use the app?

ii. **Satisfaction** – How content are customers with their riding experience?

iii. **A/B Testing** – How do users react to changes in the app or website interface? How do they react to the presentation or content of information?

iv. **Focus Groups** – How do focus groups perceive new or different features?

6.3.3.3 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 (APCs), 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** – During owl periods, 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.)

6.3.3.4 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?

vi. **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?

vii. **Ridership Forecasting** – How might proposed service changes affect ridership at a route and network level?

viii. **Ridership Elasticity** – How do implemented service changes affect ridership at a route and network level?

ix. **Muni Transfers –** How many customers transfer between different route pairs and at different transfer locations? What is the distribution of travel times (using mean, median, standard deviation, 15^{th} percentile, 85^{th} 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?

x. **Interagency Transfers** – How do customers transfer between Muni and other transit systems? How can the SFMTA and partner transit agencies reduce barriers and minimize inconvenience?

xi. **Customer Feedback** – How do service and operational reliability issues impact public perceptions in terms of customer ratings, requests and other feedback?

xii. **Fares** – How do changes in fare policy or fare levels affect ridership? Do they shift people to other transportation services?

xiii. **Real-Time Information** – How can real-time information be used to influence or alter mode choice?

Contractor must provide recommendations for action to the SFMTA based on the data and analysis derived from the Analytics Platform.

6.4 Performance Requirements

Contractor must adhere to the following Performance Requirements, which will be evaluated every fiscal quarter.

6.4.1 Availability

Analytics Platform Availability pertains to the percentage of hours that the Analytics Platform and all associated content are functioning.

Every 6 months, the SFMTA will run a report using the System Administration Tool on Analytics Platform status to determine Availability. Availability is calculated as follows:

$$\frac{\#\ of\ hours\ Analytics\ Platform\ is\ operational}{total\ hours\ during\ the\ reporting\ period}$$

7. Maintenance Services

7.1 Purpose

As SFMTA customers depend on transit service 24-hours per day, 7-days per week, the Next Generation System must function properly at all times with only limited windows for pre-scheduled maintenance and repair. This includes predictions, signage, communications and the back-end system. Regular and preventative maintenance is essential to ensure overall System reliability. The SFMTA has the sole discretion in deciding when to permit maintenance and other system updates. Contractor is expected to work within the operational needs of the SFMTA.

7.2 Existing Conditions

Currently, the SFMTA has a maintenance agreement with the existing real-time information vendor. This agreement requires the vendor to repair and replace all defective signage, maintain software and provide continuous predictions. There are liquidated damages assessed for non-performance.

7.3 Technical Requirements

By the end of Phase I, Contractor must provide the SFMTA with the following maintenance services to support operation of the SFMTA's Next Generation System:

i. Customer Support Services
ii. Stationary Digital Signage Maintenance Services
iii. Software Maintenance Services
iv. Communication Maintenance Services

7.3.1 Customer Support

Contractor must provide overall customer support to maintain operations and address Incidents. An Incident is a malfunction or delayed function of any system function or component, including but not limited to software, transit stop and platform information display signs, hardware, communications, mobile app or website, XML data feed, arrival prediction and real time location reporting.

7.3.1.1 Severity Levels for Assignment of Incidents

The SFMTA classifies an incident into one of four categories described below:

i. High Severity – A High Severity Incident is a major production system interruption that is very critical and causes significant adverse impacts to the Customer Information System. It will generally affect customers who depend on real-time information to use the Muni transit system efficiently. A High Severity Incident also covers any element that internal SFMTA staff depend on to operate the transit system (see Table 15 below for examples). For High Severity Incidents, Contractor must notify and keep Technology Solutions and Integration management and the project manager apprised, work until it resolves the Incident and provide written Root Cause Analysis and Recommendations report.

ii. Medium Severity – A Medium Severity Incident is one that has a high impact on a large number of users while the system is in production mode. These are problems that could escalate to High Severity if not addressed quickly (see Table 15 below for examples). For Medium Severity Incidents, Contractor must notify and keep senior Information Technology management and the project manager apprised, resolve the issue within 2 calendar days, work until it resolves the Incident and provide a written Root Cause Analysis and Recommendations report.

iii. Low Severity – A Low Severity Incident is a routine problem that impacts relatively few customers or a non-critical software or hardware problem (see Table 15 below for examples). For Low Severity Incidents, Contractor must notify and keep the Information Technology project manager apprised and resolve the issue within 5 business days.

iv. Service Request – A service request is of a routine nature where the SFMTA is requesting advice or assistance for non-problem related issues. Examples of Service Request Incidents include but are not limited to:

a. A geofence around a particular terminal is not configured properly, resulting in incorrect terminal departures

b. The mobile app is recommending incorrect directions for a specific itinerary

Table 15: Non-Exhaustive Examples of Incident Severity by Feature

Deliverable	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 stops Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects at least 20% of vehicles or 20% of stops Any unplanned systemwide 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 stops, or more than one route Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects 5% to 20% of vehicles or 5% to 20% of stops Any unplanned systemwide 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 back-end and stationary or on-board signage, resulting in an outage that affects less than 5% of vehicles or 5% of stops Any unplanned systemwide outage that has not been resolved within 5 minutes after being reported or detected
System Software: **System Administration Tool**	Improperly matches vehicles to wrong schedule 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: **Content Management System**	SFMTA staff unable to write and deploy basic text-only messages for customers	SFMTA staff not able to create and deploy new visual messages for customers	SFMTA staff not able to save an event template
Stationary Digital Signage	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects at least 20% of vehicles or 20% of stops	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects at least 5% to 20% of vehicles or 5% to 20% of stops	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects at less than 5% of vehicles or less than 5% of stops

Deliverable	High Severity	Medium Severity	Low Severity
On-Board Digital Signage	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects at least 20% of vehicles	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects 5% to 20% of vehicles	Failure to communicate between the back-end and stationary or on-board signage, resulting in an outage that affects less than 5% of vehicles
Mobile App & Website: **Mobile App**	Any unplanned mobile app or website outage that still has not been resolved in 20 minutes after being reported or detected Predictions do not match predictions generated by the System Software	Any unplanned mobile app or website outage that still has not been resolved in 10 minutes after being reported or detected	Any unplanned mobile app or website outage that has not been resolved within 5 minutes after being reported or detected
Mobile App & Website: **Trip Planner**	Trip planning functionality does not work		
Mobile App & Website: **SFMTA Staff Interface**	SFMTA Staff Interface functionality does not work	N/A	i.
Mobile App & Website: **Data Collection**	N/A	N/A	Mobile app stops collecting transactional data
Mobile App & Website: **Analytics Platform**	N/A	N/A	Analytics Platform functionality does not work

Table 16 summarizes the severity of Incidents and required Contractor response times. Contractor must provide on-call staff with expertise to address software, hardware or any other issues within the given response times.

Table 16: Severity of Incidents and Contractor Response Times

Incident Severity	Service Level Agreement Response Time	Resolution Time
High Severity	15 minutes	1 day
Medium Severity	30 minutes	2 days
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)

Contractor must work in good faith with the SFMTA and its other contractors to resolve an Incident in the amount of time indicated in Table 16, even if during the resolution process it is determined another party is partially or entirely responsible or Contractor disagrees with SFMTA's initial severity assessment. For example, if the Next Generation System is not able to generate predictions because the CAD/AVL system is not functioning properly, Contractor must work with the SFMTA and the CAD/AVL vendor) to identify the technical issues causing the outage.

If Contractor disagrees with SFMTA's severity initial assessment, it 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. As long as Contractor has met the resolution requirements in Table 16 within the time limit associated with the final assessment, SFMTA will not assess Liquidated Damages to Contractor.

7.3.1.2 Incident Reporting

Contractor must provide the following means to report Incidents:

i. **Incident Ticketing and Tracking Log** – Any internal or external staff authorized by the SFMTA, including the 311 and 511 System Managers, may create a ticket in an Incident Ticketing and Tracking Log (see below)

ii. **Automatically-Generated Incidents** – Through self-diagnosis, Stationary Digital Signage must automatically generate a Problem incident into the Incident Ticketing and Tracking Log (see Section 3.3.1.5 Self-Diagnosis above). The System must also have the capability of receiving self-diagnosis reports through a feed from future On-Board Digital Signage.

iii. **Email** – SFMTA staff may send Contractor an email with an Incident report. SFMTA must provide to Contractor as much information as it knows concerning the Problem, and must provide the name and phone number of the SFMTA contact person responsible for addressing the Problem with Contractor. Contractor must log the Problem into the Incident Ticketing and Tracking Log if the SFMTA has not already done so.

iv. **Phone** – SFMTA staff may call the phone number at any time and leave detailed Incident reports on voice-mail. SFMTA will provide to Contractor as much information as it knows concerning the Problem, and must provide the name and phone number of the SFMTA contact person responsible for addressing the Problem with Contractor. Contractor must log the Problem into the Incident Ticketing and Tracking Log if the SFMTA has not already done so.

7.3.1.3 Incident Ticketing and Tracking Log

Contractor must provide an Incident Ticketing and Tracking Log to track any system Problem. This log must record the time, location and nature of the Problem, and assign an individual tracking number to each Problem, complaint or inquiry reported through means described above.

Contractor must log calls and track details, assignments and journal service and support so that call data can be effectively reported as to type, severity, duration and frequency of Problems reported, response times, and time and actions required to the resolve Problems. This log must also provide current information about the status of a repair. In addition, 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.

Contractor must transmit any outstanding items on the Incident Ticketing and Tracking Log to designated SFMTA staff, seven days per week, via e-mail.

7.3.1.4 Training

As noted in ***1. General Requirements*** of ***Appendix H: Detailed Scope of Services***, 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 approval of the manuals and at SFMTA direction, Contractor must provide on-site training courses to train SFMTA staff to cover areas that include, but are not limited to:

i. Equipment diagnosis, maintenance, and repair

ii. Software user training

iii. Contractor must receive input from SFMTA staff during training sessions and must revise manuals accordingly.

iv. Contractor must also provide professional video recordings of sessions for SFMTA staff who cannot attend.

The following are some specific maintenance requirements relating to Stationary Digital Signage, Software and Communications.

7.3.2 Stationary Digital Signage Maintenance

7.3.2.1 Installation and Removal

Contractor must install signage, including text-to-speech systems, at new locations or remove signage 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 Signage between 8:00 pm to 5:30 am and underground

Stationary Digital Signage between 9:00 pm and 5:30 am, or other hours upon approval from the SFMTA.

7.3.2.2 Replacement and Repair

For all Stationary Digital Signage, including text-to-speech systems, Contractor must be responsible for replacement and repair as follows:

i. Contractor must continually monitor defective or non-functioning Stationary Digital Signage, and must replace and repair said Stationary Digital Signage that have stopped reporting or otherwise non-functioning.

ii. 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.

iii. Contractor must perform all testing and repairs of Stationary Digital Signage 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 Signage is installed available to Contractor, Contractor must repair or replace a defective Stationary Digital Sign within 2 business days of the report of that Stationary Digital Sign as defective on a System Maintenance Report.

iv. 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.

v. All completed repairs must be noted in the Repair Log.

vi. 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.

vii. 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.

viii. If a malfunction is due to an SFMTA issue, contractor must contact the designated IT person immediately upon discovery.

ix. Contractor must return all spare parts, including signs, to the SFMTA upon the expiration or termination of Contract, or at any time during this agreement upon request from the SFMTA.

7.3.2.3 Contractor Safety

Contractor is wholly responsible for the safety of its personnel while performing work on SFMTA property. Contractor must observe all SFMTA safety rules and requirements while present on SFMTA property, including passenger loading platforms, transit stops, stations, and 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 divisions. Specifically, any personnel working in trackway areas, including on rail station platforms, must complete the SFMTA Roadway Worker Protection (RWP) course.

7.3.2.4 Spares

Spare equipment enables Contractor to provide replacement signage at a location where a defect has caused either a temporary or permanent signage failure. A failure may involve any signage component, including any potential text-to-speech hardware, hindering full functionality. Contractor must maintain spares and have them available for installation to ensure continuous service during equipment repair or replacement.

A "spare ratio" is the amount of spare equipment available divided by the equipment required to provide full service. Contractor must maintain a 5 percent spare ratio at all times, rounded up to the nearest whole number.

Whenever the SFMTA places an order for any type of Stationary Digital Signage, the SFMTA will pay Contractor a one-time 5 percent fee to pay for spare equipment. Contractor is responsible purchasing any additional spare signs required to maintain service at all locations with Stationary Digital Signage, 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 G: Cost Proposal, including any volume discounts.

7.3.2.5 Initial Warranty

Contractor must provide an initial warranty for Stationary Digital Signage at no cost to the SFMTA. For each sign, the initial warranty period begins at installation and ends five years after installation.

This warranty covers all parts and consumables necessary to ensure functioning signage 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.

7.3.2.5 Extended Warranty (Optional)

The SFMTA may exercise options for two extended warranty periods:

i. If the SFMTA exercises the option for the first extended warranty period, the first extended warranty period for each sign will last from the beginning of the 6th year following the sign's installation to the end of the 10th year following the sign's installation.

ii. If the SFMTA exercises the option for the second extended warranty period, the second extended warranty period for each sign will last from the beginning of the 11th year following the sign's installation to the end of the 15th year following the sign's installation.

The extended warranty covers all parts and consumables necessary to ensure functioning signage 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.

7.3.2.5 Storage

Contractor must store all Stationary Digital Signage, including any spares and spare parts.

7.3.2.6 Vandalism and Cleaning

Contractor's Proposal includes a description of how its signage is resistant to vandalism. If there is vandalism to the sign whereby the sign is irreparably damaged and Contractor specified that signage could withstand such vandalism, Contractor is be responsible for replacing said signage at its expense.

Contractor is responsible for cleaning (a) Powered Signage at Outdoor Rail Platforms (Type 2), Powered Signage at Underground Stations (Type 3) and Alternatively-Powered Signage (Type 4).

7.3.3 Software

7.3.3.1 General

Contractor is responsible for providing and maintaining all software implemented with this solution.

Contractor must provide:

i. Maintenance and support services for the Licensed Software as provided in the Agreement to ensure that the Licensed Software performs in accordance with the requirements and specifications of this Agreement;

ii. Whatever improvements, enhancements, extensions and other changes to the Licensed Software Contractor may develop

iii. Licensed Software updates, as required, to cause it to operate under new versions or releases of the Operating System during the Warranty Period and any Maintenance Period.

During any Maintenance Period, Contractor must ensure that the Licensed Software is at all times compatible with any Windows operating system supported by Microsoft and is also compatible with the immediately previous version of that operating system. The costs of any Upgrade to the Licensed Software to maintain that operating system compatibility must be included in the annual maintenance fee.

7.3.3.2 Updates & Upgrades

At least twice per year, Contractor must provide software upgrades and other enhancements at no additional charge. Contractor must provide SFMTA with documentation of all changes associated with System upgrades.

Contractor must also provide software patches as necessary between upgrades.

Contractor must test all patches, upgrades and updates before deployment. Contractor must obtain approval from the SFMTA no less than seven (7) calendar days before deploying a software upgrade or update.

The SFMTA may request custom software upgrades, which shall be priced either on a negotiated fixed fee or on a time and material basis using the hourly labor rates agreed upon by the SFMTA and Contractor. Contractor shall also provide a guaranteed maximum price associated with all software upgrades for the duration of the Contract.

7.3.3.3 System Administration

Contractor shall also be responsible for the following System Administration activities:

i. Maintaining Contractor's network system infrastructure for managing, storing, archiving, and protecting SFMTA's customer, prediction, and other data

ii. Performing daily backup of all customer and real-time predictive data to ensure secure data storage and quick recovery

iii. Ensure continuous data protection and data integrity

iv. Providing on-going remedial software support by qualified software / system engineers

v. Maintaining system availability with minimal interruptions caused by periodic scheduled backup or other unscheduled interruptions

vi. Working directly with wireless carriers to resolve Problems originated by the wireless carriers

vii. Maintaining data feeds

viii. Maintain all critical system updates and security updates

ix. Maintaining internet connectivity of servers

x. Updating application software on servers including Interfaced Software Updates

7.3.4 Communications

Contractor shall maintain all communications between the System Core and the Stationary Digital Signage and future On-Board Digital Signage. Understanding that technology may advance over the duration of the contract, Contractor shall inform the SFMTA of changes that could impact communications between software and signage. 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.

7.4 Performance Requirements

Contractor must adhere to the following Performance Requirements, which the SFMTA will evaluate every six months.

7.4.1 Service Upkeep

Service Upkeep is defined as the number of tickets responded to in accordance with the Service Level Agreement Response Time (based on Section 7.3.1.1 Severity Levels for Assignment of Incidents).

On a six-month basis, using the Incident Ticketing and Tracking Log, the SFMTA shall identify the number of tickets responded to within the designated response time and compare this to the total number of tickets. The SFMTA will then compare this percentage to the performance standard established in the Service Level Agreement.

$$\frac{\#\ of\ tickets\ responded\ to\ within\ designated\ response\ time}{total\ \#\ of\ tickets}$$

Appendix I: Americans with Disabilities Act (ADA) Compliance Requirements

This appendix provides technical guidance on complying with the requirements set forth in the Americans with Disabilities Act.

1. Text-to-Speech Systems

The following guidelines pertain to the placement and design of text-to-speech systems. These systems enable customers to hear what is presented on visual screens.

1.1 Reach Ranges

1.1.1 General

Reach ranges shall comply with 1.1.1.

Advisory 1.1.1 General: The following table provides guidance on reach ranges for children according to age where building elements such as coat hooks, lockers, or operable parts are designed for use primarily by children. These dimensions apply to either forward or side reaches. Accessible elements and operable parts designed for adult use or children over age 12 can be located outside these ranges but must be within the adult reach ranges required by 1.1.1.

Table 17: Accessible Reach Ranges

Forward or Side Reach	Ages 3 and 4	Ages 5 through 8	Ages 9 through 12
High (maximum)	36 in (915 mm)	40 in (1015 mm)	44 in (1120 mm)
Low (minimum)	20 in (510 mm)	18 in (455 mm)	16 in (405 mm)

Children's Reach Ranges

1.1.2 Forward Reach

Unobstructed: Where a forward reach is unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

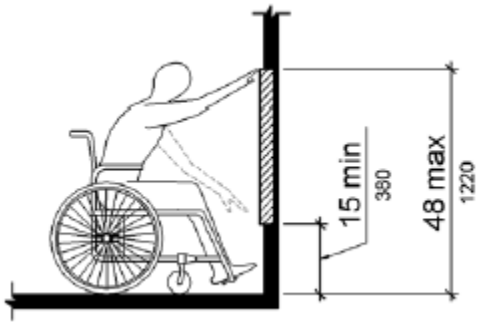


Figure 25: Unobstructed Forward Reach

Obstructed High Reach: Where a high forward reach is over an obstruction, the clear floor space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 48 inches (1220 mm) maximum where the

reach depth is 20 inches (510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach shall be 44 inches (1120 mm) maximum and the reach depth shall be 25 inches (635 mm) maximum.

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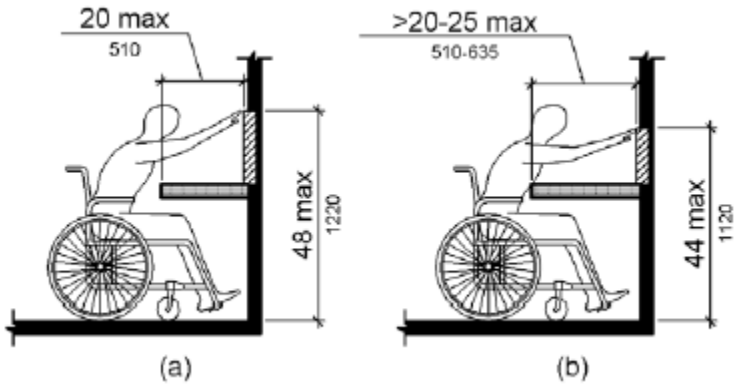

Figure 26: Obstructed High Forward Reach

1.1.3 Side Reach

Unobstructed: Where a clear floor or ground space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 48 inches (1220 mm) maximum and the low side reach shall be 15 inches (380 mm) minimum above the finish floor or ground. EXCEPTIONS: An obstruction shall be permitted between the clear floor or ground space and the element where the depth of the obstruction is 10 inches (255 mm) maximum.

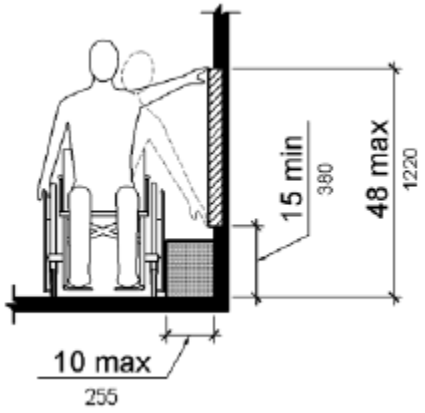

Figure 27: Unobstructed Side Reach

Obstructed High Reach: Where a clear floor or ground space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 34 inches (865 mm) maximum and the depth of the obstruction shall be 24 inches (610 mm) maximum. The high side reach shall be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach shall be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

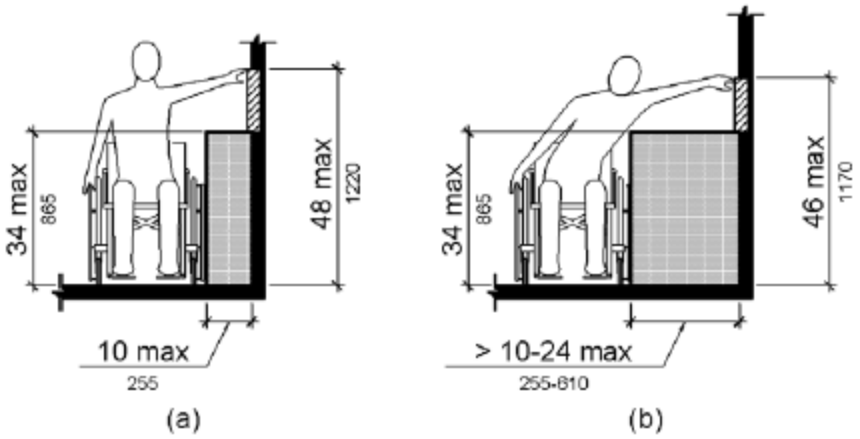

Figure 28: Obstructed High Side Reach

1.2 Operable Parts

1.2.1 General

Operable parts shall comply with 1.2.1.

1.2.2 Clear Floor Space

A clear floor or ground space shall be provided.

1.2.3 Height

Operable parts shall be placed within one or more of the reach ranges specified in 1.1.

1.2.4 Operation

Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.

2. Typography

The following guidelines pertain to height requirements for any and all characters displayed on Stationary Digital Signage or On-Board Digital Signage.

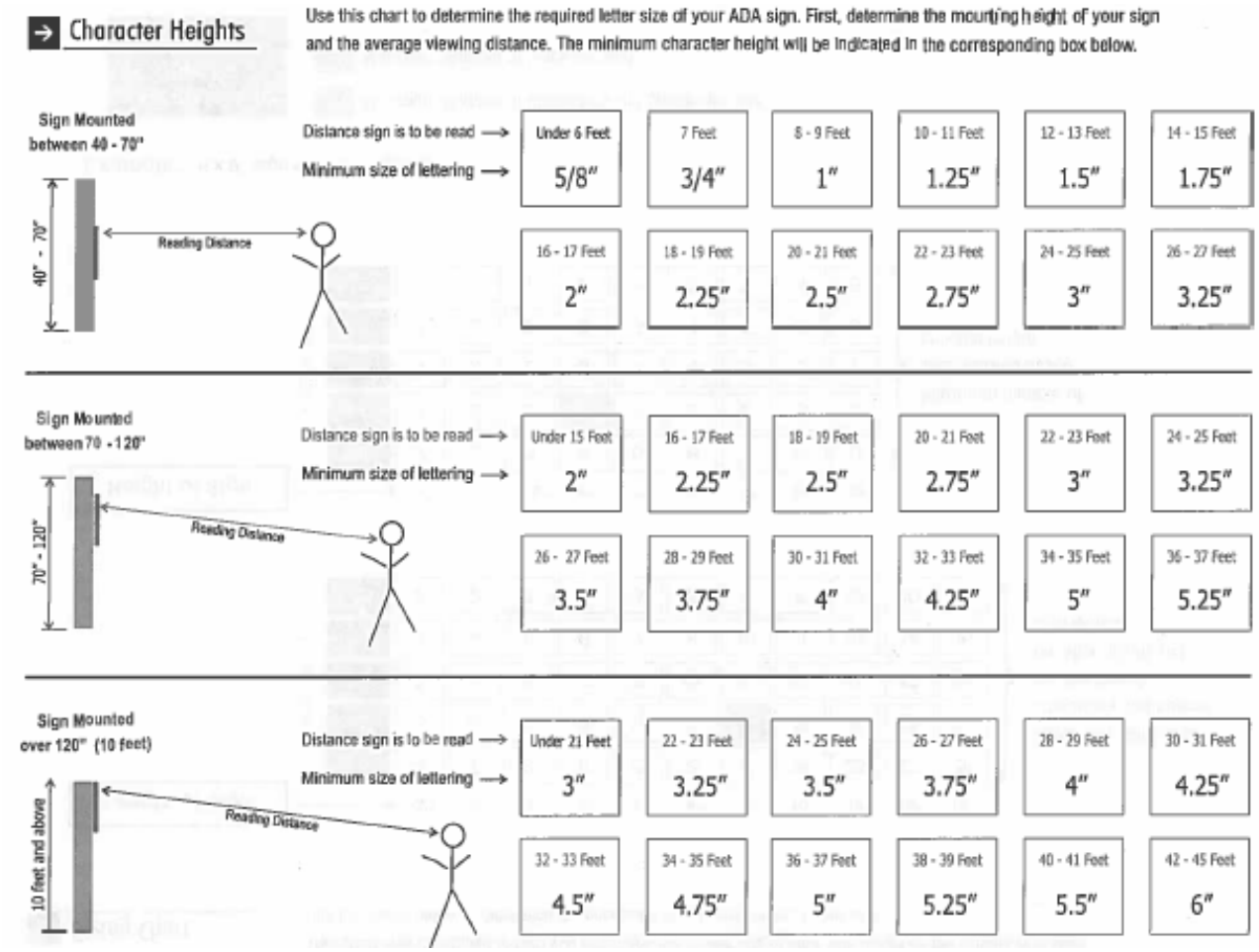

Figure 29: ADA Character Height Requirements

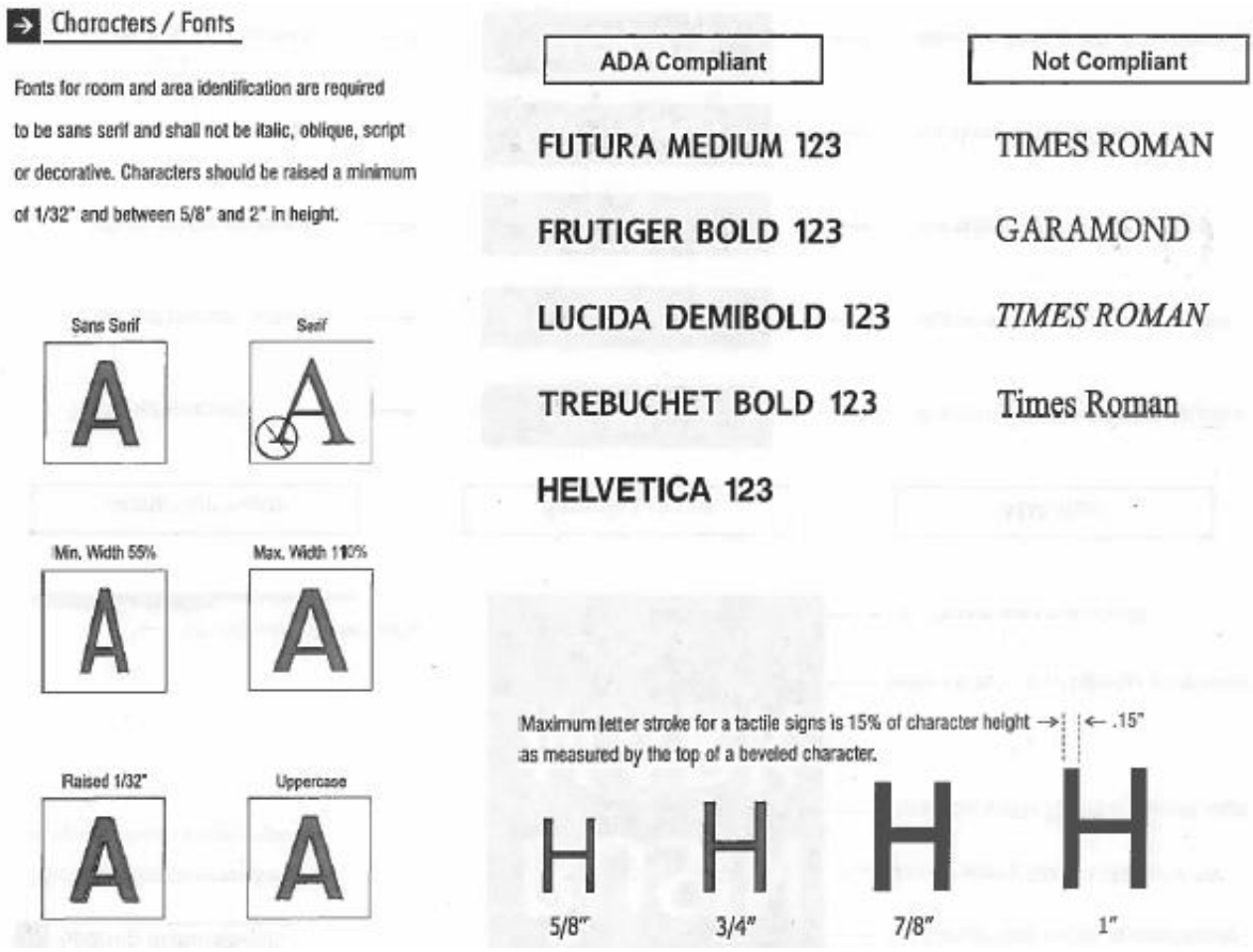

Figure 30: ADA Character Font Sizes

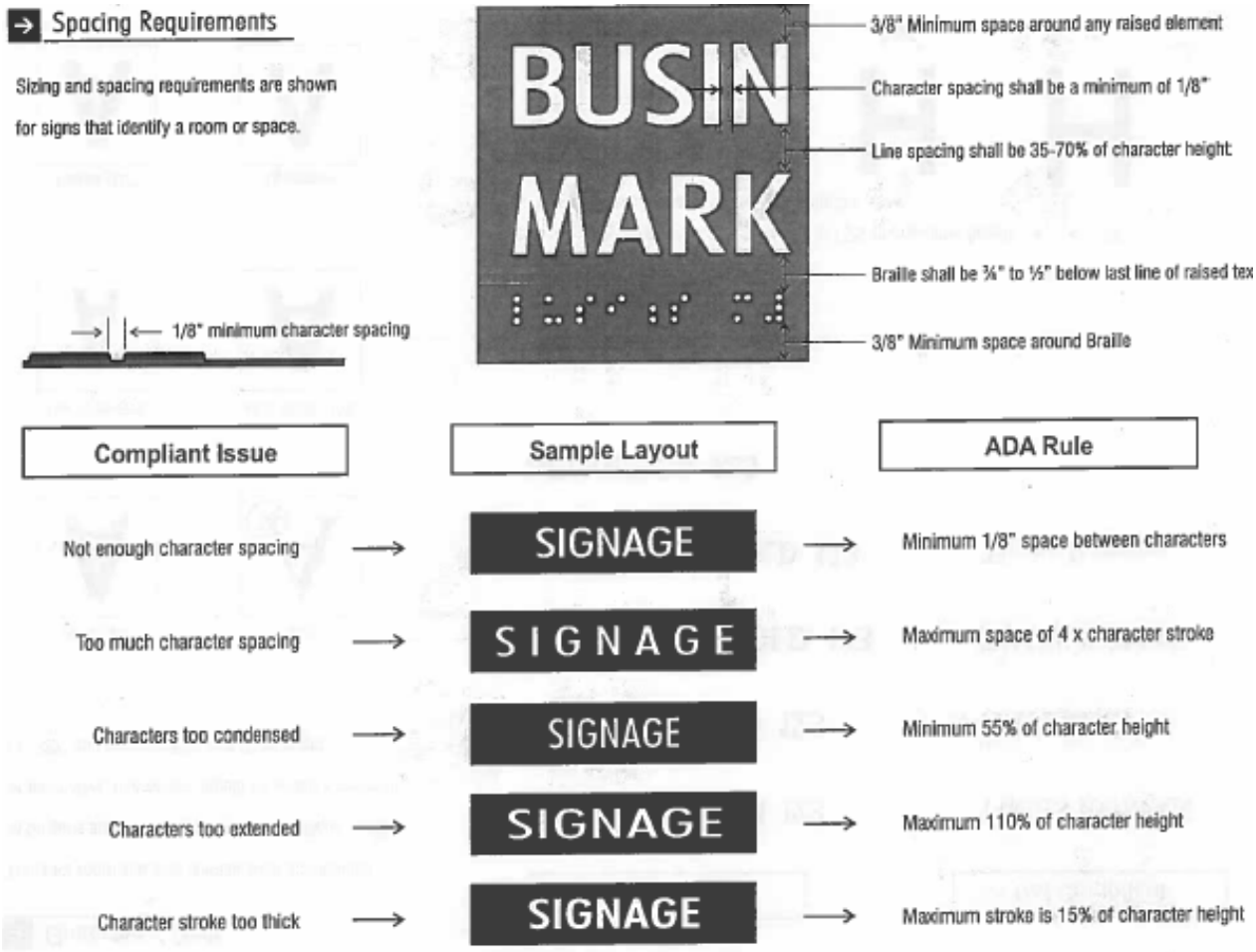

Figure 31: Spacing Requirements

3. Signage Sizing

The following guidelines pertain to character limits associated with different sign sizes.

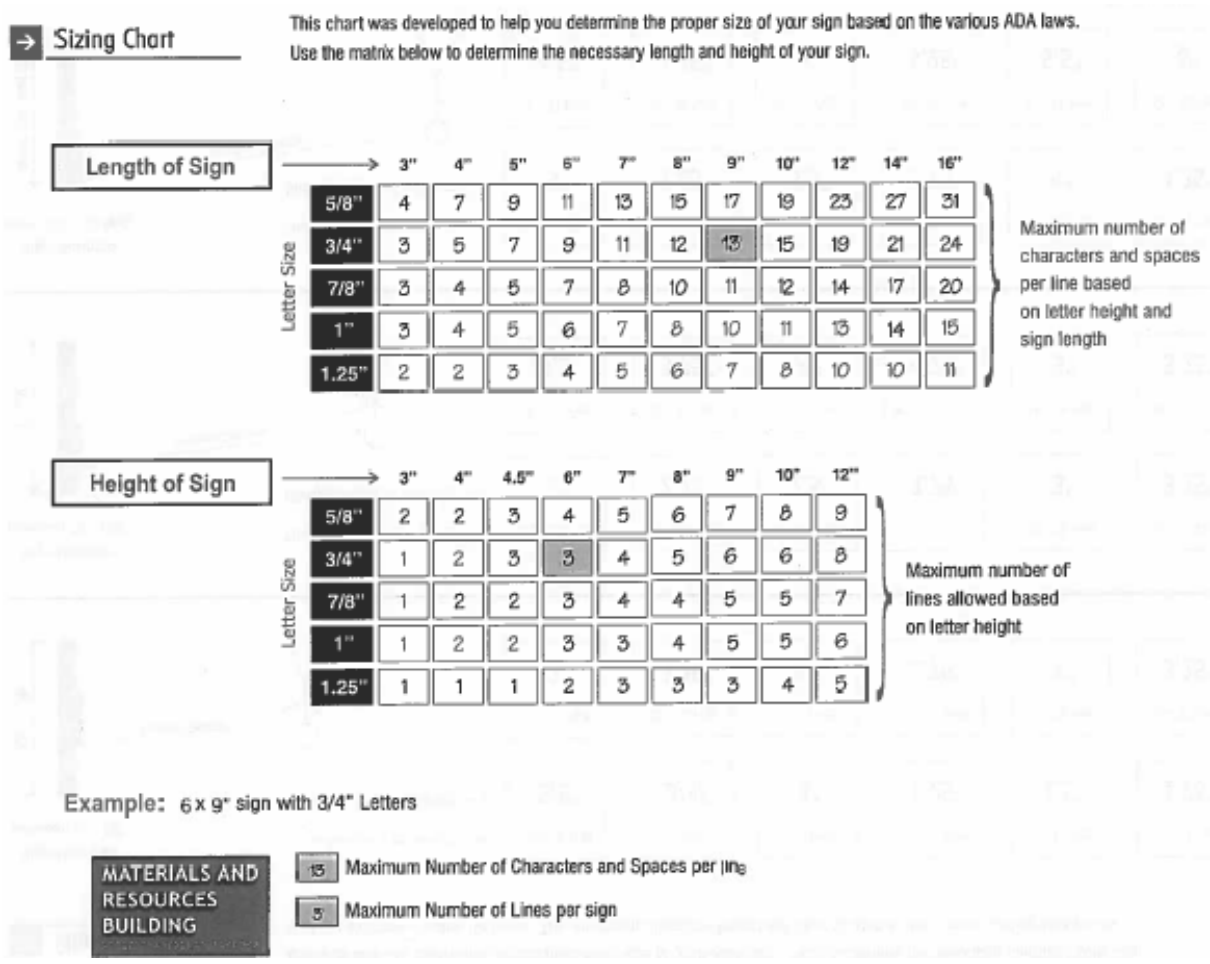

Figure 32: ADA Signage Sizing Chart

Appendix J: Guiding Principles for Management of Emerging Transportation Services and Technologies

Safety	Emerging Mobility Services and Technologies must be consistent with the City and County of San Francisco's goal for achieving Vision Zero, reducing conflicts, and ensuring public safety and security on roads, sidewalks and public rights of way.
Transit	Emerging Mobility Services and Technologies must support and account for, rather than compete with public transit and encourage use of high-occupancy modes.
Equitable Access	Emerging Mobility Services and Technologies must promote equitable access to services. All people, regardless of age, race, color, gender, sexual orientation and gender identity, national origin, religion, or any other protected category, should benefit from Emerging Mobility Services and Technologies, and groups who have historically lacked access to mobility benefits must be prioritized and should benefit most.
Disabled Access	Emerging Mobility Services and Technologies must be inclusive of persons with disabilities. Those who require accessible vehicles, physical access points, services, and technologies are entitled to receive the same or comparable level of access as persons without disabilities.
Sustainability	Emerging Mobility Services and Technologies must support sustainability, including helping to meet the city's greenhouse gas (GHG) emissions reduction goals, promote use of all non-auto modes, and support efforts to increase the resiliency of the transportation system.
Congestion	Emerging Mobility Services and Technologies must consider the effects on traffic congestion on roads, sidewalks and public rights of way, including the resulting impacts on road safety, modal choices, emergency vehicle response time, transit performance and reliability.
Accountability	Emerging Mobility Services and Technologies providers must share relevant data so that the City and the public can effectively evaluate the services' benefits to and impacts on the transportation system and determine whether the services reflect the goals of San Francisco.
Labor	Emerging Mobility Services and Technologies must ensure fairness in pay and labor policies and practices. Emerging Mobility Services and Technologies should support San Francisco's local hire principles, promote equitable job training opportunities, and maximize procurement of goods and services from disadvantaged business enterprises.
Financial Impact	Emerging Mobility Services and Technologies must promote a positive financial impact on the City's infrastructure investments and delivery of publicly-provided transportation services. Collaboration

Emerging Mobility Services and Technology providers and the City must engage and collaborate with each other and the community to improve the city and its transportation system.

Use of Guiding Principles: The San Francisco County Transportation Authority (SFCTA) and SFMTA will use these Guiding Principles to shape our approach to Emerging Mobility Services and Technologies. For the SFMTA, these Guiding Principles will serve as a framework for the consistent application of policies and programs. The SFCTA will use these Guiding Principles to evaluate these services and technologies; identify ways to meet city goals, and shape future areas of studies, policies and programs. Every Guiding Principle may not be relevant to every consideration associated with Emerging Mobility Services and Technologies, and in some cases a service may not meet all of the principles consistently. SFMTA and SFCTA Directors and staff will consider whether a service or technology is consistent with the Guiding Principles, on balance. If a service provider or technology does not support these Guiding Principles, SFMTA and SFCTA will work with the service provider to meet the principles, or may choose to limit their access to City resources.

Appendix K: Performance Requirements

Proposers shall review and complete the table below, which includes sample performance metrics with an emphasis of system accuracy and reliability. For these metrics, Proposers shall recommend standards **they commit to deliver** if awarded the contract; failure to meet these recommend standards could result in assessment of Liquidated Damages. The SFMTA and Contractor will negotiate a Service Level Agreement based on these standards.

Performance Requirements constitute 35 points of total project scoring. Evaluators will score Proposals based on how close Proposer's standards are to the SFMTA's desired goals and how the standards rank relative to those of other Proposers.

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
1	**System Software**			
1.4.1	Unscheduled Outages	Every 6 months, the SFMTA will use the Incident Ticketing and Tracking Log to determine the cumulative number of unscheduled offline hours for the System Software and compare it with the total number of possible hours. The percentage of unscheduled outages shall be calculated as follows: # of hours of unscheduled outages / total hours during the reporting period	≤0.1%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
1.4.2	Scheduled Downtime	Every 6 months, the SFMTA shall run a report using the System Administration Tool on the status of system software. Calculation of scheduled downtime shall be as follows: # hours of scheduled downtime/# total hours during the reporting period	≤1%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
1.4.3	General Prediction Accuracy	Every 6 months, the SFMTA will use the System Administration Tool to generate a report detailing actual arrival times after showing ""Arriving," "5 min," "10 min," "15 min," and "20 min" for each stop. The percentage of actual arrival times falling within the "Accuracy Interval" range specified in Table 4 in Section III.Submission Requirements shall be compared to the percentages to which Contractor has committed. The calculation shall exclude: (i) any records involving "Temporary Service Changes" or Switchbacks, in which predictions were generated prior to the system becoming aware of said "Temporary Service Changes" or Switchbacks, and (ii) any records in which vehicle location data is unavailable. Calculation of scheduled downtime shall be as follows: # of timepoint observations within Accuracy Interval Range /total timepoint observations	≥85%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
1.4.4	Terminal Departure Prediction Accuracy	Every 6 months, the SFMTA will use the System Administration Tool to generate a report detailing actual terminal departure times after showing "Departing," "5 min" and "10 min." for each route terminal. The percentage of actual terminal departures falling within the "Accuracy Interval" range specified in Table 5 in Section III. Submission Requirements shall be compared to the percentages to which Contractor has committed. Exclusions exist for any records involving "Temporary Service Changes" and/or any records in which vehicle location data is unavailable. Calculation of scheduled downtime shall be as follows: # of terminal departures within Accuracy Interval Range /total terminal departure observations	≥85%	
1.4.5	"Ghost" Bus/Train Incidence	Every 6 months, the SFMTA will run a report using the System Administration Tool on "ghost" bus or train events. Calculation of "ghost" bus/train incidence: # of "ghost" buses and trains/total revenue service trips Exclusions exist for any records involving "Temporary Service Changes" and/or any records in which vehicle location data is unavailable.	≤1%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
2	**Stationary Digital Signage**			
2.4.1	Availability*	To determine Availability, every six months, the SFMTA shall run a report using the System Administration Tool on signage status. Availability shall be calculated as follows: (# of hours signs are operational - Scheduled Downtime) - Exempted Hours / Total Hours During the Reporting Period - Exempted Hours The calculation shall exclude time elapsed when signs are unavailable due to an exemption ("Exempted Hours").	≥99.9%	
2.4.2	Signage Transition	On or after January 1, 2020, the SFMTA shall run a report using the System Administration Tool on signage status. The SFMTA will use this function to determine the number of signs that have been replaced with new signage or can communicate with Contractor's new back-end system. The SFMTA shall compare this total number with the number of all signs.	100%	
2.4.3	System Transition	On or after July 1, 2020, the SFMTA will calculate the percentage of installed new signs as follows: total # of signs - existing LED signs receiving Contractor's Feed / Total Number of Signs	100%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
2.4.4	Scheduled Downtime	Scheduled Downtime shall not exceed [Contractor's Proposed Standard] percent of the total number of hours in the reporting period. Every six months, the SFMTA will use the Incident Ticketing and Tracking Log to determine the cumulative number of unscheduled offline hours. The percentage of scheduled downtime shall be calculated as follows: # of hours of Scheduled Downtown / Total Hours During the Reporting Period	≤1%	
3	**On-Board Digital Signage**			

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
3.4.1	Information Accuracy	*Before On-Board Digital Signage hardware is installed:* Before On-Board Digital Signage hardware is installed, on a six-month basis, the SFMTA shall ride 10 randomly-selected trips end-to-end on 10 different routes. The SFMTA shall verify whether the mobile website showing what live on-board digital signage would look like (e.g. transfer connections and their arrival times) shows the appropriate information for each location as the vehicle approaches it. *After On-Board Digital Signage hardware is installed:* After On-Board Digital Signage hardware is installed, on a six-month basis, the SFMTA shall ride 10 randomly-selected trips end-to-end on 10 different routes. The SFMTA shall verify whether on-board digital signage information (e.g. transfer connections and their arrival times) displays the appropriate information as the vehicle approaches each stop. (The SFMTA will grant an exemption from this requirement if the On-Board Digital Signage hardware vendor has communications (or other) issues that prevent the proper display of information on the signs.)	≥95%	
4	**Mobile Platform & Website**			

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
4.4.1	Availability	Every 6 months, the SFMTA shall run a report using the System Administration Tool on Mobile Platform status. Availability shall be calculated as follows: # of hours Mobile Platform & Website are operational / total hours during the reporting period	≥99.9%	
4.4.2	Trip Planner Efficiency	SFMTA staff will generate 40 random itineraries every six months. The trip planner must identify each origin and destination correctly and provide a plausible, non-circuitous "efficient" route for customers based on mutually-agreed upon criteria.	≥95%	
4.4.3	Trip Planner Efficiency - Accessible Itineraries	SFMTA staff will generate 40 random itineraries every six months, some of which require accessible vehicles and/or stops. The trip planner must identify each origin and destination correctly and provide a plausible, non-circuitous "efficient" route that is accessible.	≥95%	
4.4.4	Trip Planner Response Time	Every 6 months, the SFMTA shall run a Response Time for Trip Planner Requests report using the System Administration Tool. The SFMTA will determine the percentage of requests that fall outside the agreed-upon standard established between the SFMTA and Contractor (which includes non-responsiveness).	≥98%	

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
4.4.5	Data Collection Travel Diaries	Every 6 months, SFMTA staff will use a mobile app on a non-anonymized account to make a minimum of 20 trips using a variety of transportation modes. The mobile app shall properly track those trips from end-to-end with the correct travel path, time and mode of transportation (transit, bicycling, walking and automobiles - preferably distinguishing between private vehicles and TNCs). The SFMTA will then determine the percentage of these trips properly assigned in the Travel Diary to determine the error rate.	≥95%	
5	**Analytics Platform**			
5.4.1	Availability	To determine Availability, on a quarterly basis, the SFMTA shall run a report using the System Administration Tool on Analytics Platform status. Availability shall be calculated as follows: # of Hours Platform is Operational / Total Hours During the Reporting Period	≥99.9%	
6	**Maintenance**			

RFP Section	Performance Metric	Measurement Methodology	Desired Standard	Contractor's Proposed Standard
6.4.1	Service Upkeep	Every 6 months, using the Incident Ticketing and Tracking Log, the SFMTA shall calculate Service Upkeep as follows: # of tickets responded to within the designated response time/ total number of tickets. Designated response time: High Severity - 15 min Medium Severity - 30 min Low Severity - 4 hours Service Request - 2 days	≥95%	

Appendix L: Technical Environment

1. Computer Aided Dispatch/Automatic Vehicle Location System (CAD/AVL)

SFMTA has commissioned a new Computer Aided Dispatch and Automatic Vehicle Location system (CAD/AVL) known as OrbCAD.

The system has on-board equipment in revenue vehicles that constantly collect GPS, Automatic Passenger Counter (APC), door openings and closings, and other data. It also compares location with fixed scheduling data imported from Trapeze scheduling in order to compute Route Schedule Adherence (RSA).

OrbCAD users can choose between headway-based control and schedule-based control. This information communicates with CAD/AVL server via a two-way radio system. Some information is event trigger-based communication while other information is time-based communication. Normally, GPS data and RSA are set at a 1-minute update rate; in the underground section of the Muni Metro rail system and the future Central Subway, they are at a 20-second update rate. When vehicles' emergency alarms are active, the update rate will be 15 seconds. SFMTA can provide a database dictionary per Contractor request.

The SFMTA also has a real-time prediction Web API called SmartTraveler Plus. For a description of how SmartTraveler Plus operates, please refer to Section 2.2.4 Existing Prediction Algorithms of Appendix H: Detailed Scope of Services.

2. Automatic Train Control System (ATCS)

For a detailed description of how the Automatic Train Control System operates, please refer to Section 2.2.2 Detection of Underground Light Rail Vehicle Locations of Appendix H: Detailed Scope of Services.

2.1 General Functionality

The purpose of the Advanced Train Control System (ATCS) is to provide improved throughput, increased safety for riders, command control and communication with wayside equipment, and to monitor and control train movements in the subway tunnel. SFMTA ATCS is an open system with trains entering and exiting from the streets. System uses moving block technology. ATCS provides information to external clients via telnet feeds and receives information from external server via XML query. ATCS also generates data logs for internal investigations. The ATCS interfaces with the prediction system by using the prediction web service to route trains in, out, and within the subway. This functionality must be maintained.

2,2 External Client Interfaces (Data Exchange and interfaces)

CAD/AVL – Uses ATCS-provided train location via telnet feed for location correction.

PAV – Uses ATCS-provided train location, platform approach messages, train entry into ATCS territory, arrival and exiting of platforms via Telnet feed for passenger information annunciation. The existing real-time information system provides arrival predictions for trains still outside the tunnel.

NextBus – Uses ATCS train location and status of trains in the subway via telnet feed to generate estimated time of arrival information and passenger map information. Provides to ATCS train routing and destination information every 20 seconds via XML query.

SFMTA generates custom agency performance metrics reports from ATCS SMC (System Management Center) SQL database and other sources.

ATCS is firewall protected from external clients thus the system is totally isolated.

2.3 Subsystems

Subsystem communicates via proprietary data protocol.

VCC (Vehicle Control Center) – vital subsystem controls wayside equipment, communicates with VOBC for train movements.

SMC (System Management Center) – supervisory subsystem to manage train routing with interactive display (line overview).

SCS (Station Controller Subsystem) – wayside equipment command and telemetry

VOBC (Vehicle On-board Computer)– vital on-board computer that drives the vehicle

Appendix M: Technology Security and Information Privacy Charter

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 our 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, end-pointe 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.

Appendix N: Technology Project Requirements

Security

All solutions should be designed and built using security best practices, including test, dev and production. We expect vendors to keep up with security best practices and to implement those practices in all of our environments but we also listed some specific below.

- User authentication should be handled by the SFMTA Active Directory. SAML authentication will also be supported for cloud solutions.
- Appliances or any embedded devices need to be hardened and must be fully patched. Patching should be automated or fully documented during implementation.
- All default passwords must be changed to adhere with the SFMTA Password Policy.
- Data transfers across the Intranet must be encrypted and ideally internal traffic should be encrypted if possible.
- Complete data flow diagrams must be provided showing all internal and external data transfers. Detailed diagrams must be provided for any firewall rules that include specific ports with destination IP addresses specified.
- SFMTA reserves the right to conduct security scans at any time and will prior to final acceptance.

Servers

- All server configurations shall be integrated into SFMTA IT's datacenter and must be reviewed by and approved by SFMTA IT to ensure proper integration.
- All server configurations shall be virtual. Application-specific physical hardware is not supported or permitted.
- Operating systems must be current and supportable for the anticipated life of the application. Windows 2016 and Red Hat 7.x are our preferred operation systems.
- Security best practices will be applied to all servers.
    - Patching will be performed automatically on a monthly basis.
    - SFMTA will install our standard antivirus software and endpoint security solution. Vendor is responsible for providing file/folder exclusion and or special requirements.
    - Remote control or remote access will only be permitted using SFMTA-approved methods that adhere to our policy.
    - Password complexity will be required and default passwords need to be reset. Accounts will be set up in Active Directory and local IDs will be discouraged and need to be approved by the SFMTA.

Databases

SFMTA IT operates a hybrid analytics and reporting repository consisting of an HDFS and Kudu storage layer in conjunction with an Oracle data store. Data integration is managed via Talend's data management platform.

All database configurations shall be integrated into SFMTA IT's database and must be reviewed by and approved by SFMTA IT to ensure proper integration. In order to ensure full access and understanding of data generated and housed by the CIS, SFMTA-IT expects vendors to provide the following items:

- A full and current data dictionary
- Full and current entity relationship diagrams
- Comprehensive data models and descriptions of data flow through the CIS

Preference will be given to proposals in which frequently modified elements are structured to ease change data capture.

Database-specific physical hardware is not supported or permitted.

Middleware and Data Integration

The SFMTA utilizes Oracle Fusion Middleware to ensure scalable and reusable data integrations between technology systems and to our data warehouse. Utilizing both restful services and messaging queues as appropriate for the project, the SFMTA IT expects integration points from vendors to REST APIs communicating over https with XML or JSON.

GIS and Spatial Data

Geospatial data provided by this system will be delivered in the geographic coordinate system WGS 1984 to maintain compatibility with web maps and third party apps. If as-built drawings of infrastructure or asset maps are required for this project they will be provided in the CCSF-13 geographic coordinate system.

Workstations

All workstations shall be leased or owned by SFMTA and purchased through SFMTA IT to leverage SFMTA's volume pricing agreements. SFMTA IT must review and approve all workstation software and hardware configurations.

All applications must be able to run on Windows 10 and Windows 7.

Physical infrastructure

Any installed cabling infrastructure must meet a minimum spec of Category-6 and installed Ethernet cabling shall be blue. Conduit or shielded cabling must be used in some areas to protect against environmental conditions. SFMTA IT will need to review all cabling projects.

Any installed cabling will be terminated into jacks at the remote/station end, and patch panels at the Network Wiring & Equipment Closet end. Male RJ-45 connectors shall not be crimped onto the ends of any cables.

IP Networking

Any device attached to the SFMTA Enterprise Network shall be configured for IPv4 via DHCP. Manually configured IPv4 addresses will not be permitted. IPv6 is not supported at this time.

Any reference to any SFMTA Enterprise Network-attached device shall be by hostname. Configuration of any and all software will refer to SFMTA Enterprise Network-attached devices by hostname. Reference to or use of IPv4 addresses will not be permitted.

Third-Party Networks

Third-party independent networks are not supported or permitted on the SFMTA Enterprise Network. Third-party routers or firewalls will not be supported or permitted.

All SFMTA devices utilizing IP over Ethernet technology shall be connected only to SFMTA owned and supported network equipment meeting the appropriate SFMTA IT hardware specification standards.

Appendix O: Future On-Board Digital Signage

Contractor will not be providing On-Board Digital Signage under this contract. Rather, Contractor shall provide the back-end support to ensure that the SFMTA can display applicable and correct real-time information. This Appendix contains technical specifications for future On-Board Digital Signage hardware aboard SFMTA vehicles. This information is intended to assist Proposers with integrating their back-end systems with said hardware and identifying partnerships with potential On-Board Digital Signage suppliers.

Electro-Magnetic Interference (EMI)

EMI requirements evaluation shall be performed to identify the following criteria:

Acceptable levels of radiated emissions from the Coach both in low frequency (30Hz-30kHz) and RF frequency (30kHz-100mHz) ranges shall be identified. A report shall be submitted to SFMTA utilizing the guidelines of MILSTD—461 and/or SAE-J551 that identifies known properties of existing SFMTA approved devices, such as: portable/mobile radios, PA systems, fare collection, multiplex and door control systems have been tested and approved.

RF susceptibility levels. Latest guidelines of MILSTD-461 and/or SAE-J551, as well as known properties of existing SFMTA devices, such as: radios, PA systems, fare collection, door control shall be included

Electromagnetic compatibility between the various electrical and electronic devices mounted on the hybrid or electric Coach shall be ensured by utilizing established EMC containment techniques, such as proper shielding, grounding, filtering, signal wiring separation, switching frequency management.

Adequate EMI/EMC testing shall be conducted by analysis only on the individual components and on the finished Coach to prove that design goals for EMI/EMC are met.

Electronic Components

Electrical subsystems shall consist of replaceable units so that each major component, apparatus panel, or wiring harness is easily repairable or replaceable with standard hand tools or by means of connectors. Contractors shall provide detailed drawings with part numbers and the latest revision number, detailing the manufacturer of electrical components, controls, in addition to testing and repair procedures. This should include but not be limited to schematics, PCB layout drawings, software listings, operation and maintenance (with detailed theory of operation) manuals.

The contractor shall include in the Vehicle maintenance manuals wiring diagrams clearly showing the interfacing Coach wiring for the system as well as individual maintenance manuals for each piece of supplied equipment. These manuals shall include schematic diagrams and maintenance procedures including but not limited to operation, preventive maintenance, and troubleshooting.

Wires and Cables

All wire sizes and insulation shall be based on the current carrying capability, voltage drop, mechanical strength, temperature and flexibility requirements, as well as fire resistance requirements for Vehicle applications in accordance with DriveCam specifications.

Wiring shall be uniformly color coded and tagged.

Wiring shall be prefabricated into standardized harnesses, wrapped and tied with "all weather UV type" nylon ties.

The power source wires must be sized appropriately to meet specified requirements for unit. Wherever there is a possibility of interference, wiring and interconnecting cables shall be properly shielded.

A protective plastic or rubber grommet must be installed in every hole that provides passage for conduit or wiring to avoid chaffing or cutting of the conduit or wiring.

Start up and normal operation should prevent unacceptable voltage drops.

Grounding

Redundant grounds shall be used for all electrical equipment, except where it can be demonstrated that redundant grounds are not feasible or practicable. One ground may be the Coach body and framing. Grounds shall not be carried through water piping, hinges, and bolted joints (except those specifically designed as electrical connectors). Electrical equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system. Major wiring harnesses shall not be located under the Coach floor, and under-floor wiring shall be eliminated to the extent practicable. Wiring and electrical equipment necessarily located under the Coach shall be insulated from water, heat, corrosion, and mechanical damage, and shall be contained in sealed conduit. Insulation of grounds shall in no way conflict with other vehicular operations.

Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution Coach bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that shall also be used as applicable. Note: A shield grounded at both ends forms a ground loop, which can cause intermittent control or faults. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

Wiring and Terminals

All lamp sockets shall be of two-wire design with Cannon-Shearson, Weather-Pak, Deutsch, or equal disconnects to eliminate corrosion or ground problems. To facilitate servicing, all lamp wires shall have leaders of at least six (6) inches.

All wiring between major electrical components and terminations, shall have double electrical insulation, shall be waterproof, and shall conform to specification requirements of SAE Recommended Practice J1127 and J1128. Except as interrupted by the master battery disconnect switch, battery and starter wiring shall be continuous cables grouped numbered and/or color-coded with connections secured by bolted terminals, and shall conform to specification

requirement of SAE Standard J1127-Type SGT or SGX and SAE recommended Practice J541. SFMTA prefers that a minimum of eight (8) colors be used and that no one color be repeated within a single harness. Wiring numbers shall be hot-stamped every six (6) inches. Installation shall permit ease of replacement. All wiring harnesses over five (5) feet long and containing at least five (5) wires shall include 15% excess wires for spares that are the same size as the largest wire in the harness, excluding the battery cables. Wiring harnesses shall not contain wires of different voltages unless all wires within the harness are sized to carry the current and insulated for the highest voltage wire in the harness. Ground harnesses, except for battery cables, shall be neutral or off-white in color.

Double insulation shall be maintained as close to the terminals as possible. The requirement for double insulation shall be met by sheathing all wires and harnesses with nonconductive rigid or flexible conduit. Strain-relief fittings shall be provided at points where wiring enters all electrical components. Grommets of elastomeric material shall be provided at points where wiring penetrates metal structure outside of electrical enclosures. Any clamps used throughout the electrical system shall be stainless steel and of aircraft-type quality and shall be "dipped". Wiring supports shall be nonconductive. Precautions shall be taken to avoid damage from heat, water, solvents, or chafing. Wiring length shall allow replacement of end terminals twice without pulling, stretching, or replacing the wire. Except for large wires such as battery cables, terminals shall be crimped to the wiring and may be soldered only if the wire is not stiffened above the terminal and no flux residue remains on the terminal. Terminals shall be corrosion-resistant full ring type or interlocking lugs with insulating ferrules. "T" splices may be used when there is less than 25,000 circular mills of copper in the cross-section, a mechanical clamp is used in addition to solder on the splice; the wire supports no mechanical load in the area of the splice, and the wire is supported to prevent flexing. Connectors shall be common, weather pack, AMP or Ameriline, aircraft quality, self-aligning, or approved equal.

Electrical

All electrical connections shall be of the locking type. All electrical wiring harnesses should be tie-wrapped and supported at regular intervals. When wires, cables, hoses or tubes go through walls or panels, the bulkhead holes shall have protective grommets/molding and the wires, cables, hoses or tubes shall be clamped on both sides of the bulkhead hold. A 1/4-inch minimum clearance is required. All electrical wires shall be installed to as not to have any chaffing or rubbing with other components.

Appendix P: Defined Terms

The list below includes capitalized, defined terms (and their corresponding definitions) used in this RFP.

Term	Definition
Agency	The SFMTA
Americans with Disabilities Act (ADA)	Established in 1990, a civil rights law 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.
Agreement	The awarded contract for the Next Generation System.
Analytics Platform	Sub-Element enabling enable the SFMTA to analyze and interpret system-generated data.
Application Programming Interface (API)	An application programming interface (API) is a set of subroutine definitions, protocols, and tools for building application software. An API allows two applications to talk to each other.
Automatic Train Control System	The SFMTA's existing Automatic Train Control System (ATCS), developed by Thales, monitors and controls train movements in the underground section of the Muni Metro light rail system.
Bay Area Rapid Transit (BART)	BART is the San Francisco Bay Area's Rapid Transit system. BART and the SFMTA's Muni Metro system share four stations in Downtown San Francisco (Embarcadero, Montgomery, Powell and Civic Center). BART also owns four Muni Metro stations (Van Ness, Church, Castro and West Portal) even though BART trains do not stop there.
Bid Addenda	Any changes to the RFP after it is issued by the SFMTA prior to the Proposal due date.
City	City and County of San Francisco
Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL)	The SFMTA has implemented a computer-aided dispatch and automatic vehicle location (CAD/AVL) system known as OrbCAD. When an operator logs into OrbCAD, the system is able to associate the operator with a vehicle and schedule block. Among other things, the OrbCAD system provides vehicle location information and passenger loads in real-time. Operators are able to communicate to controllers at the Transportation Management Center via a radio system. The CAD/AVL system enables controllers to communicate directly with vehicles and manage service.
Conceptual Design Document	Document produced by Proposer that describes the features and functionality of its proposed solution as well as its approach, and provides technical details that satisfy Scope of Services requirements.

Term	Definition
Content Management System	Sub-Element enabling the SFMTA to format content presented to the public.
Contractor	The successful Proposer.
Cost Proposal	An appendix to the Proposer's Proposal that includes information about the cost of Proposer's solution.
Customer Information	Sub-Element of the Next Generation System including vehicle arrival predictions, transfers, alternatives, itineraries and other information that the System will generate for display on customer-facing interfaces.
Customer-Facing Interfaces	Customer Information displays including Stationary Digital Signage, On-Board Digital Signage, and the Mobile Platform & Website.
Deliverable	A product or task that Contractor must complete in response to project requirements.
Disadvantaged Business Enterprise (DBE)	For-profit small businesses where socially and economically disadvantaged individuals own at least a 51% interest and also control management and daily business operations.
Element	A main component of the Next Generation System.
Existing System	The existing Customer Information System provided by NextBus.
Final Project Design Document	An SFMTA-approved design document that describes the finalized features and functionality of winning Contractor's solution as well as its approach, and provides technical details that satisfy Scope of Services requirements.
Ghost Bus / Ghost Train	An instance wherein a real-time information system displays a prediction for a transit vehicle that never arrives.
Global Positioning System (GPS)	GPS is a global navigation satellite system that provides geolocation and time information to a GPS receiver.
Implementation Plan	Document produced by Proposer containing a Preliminary Mobilization Plan, schedule narrative, Preliminary Schedule, Quality Assurance/Quality Control Plan, and Training Plan.
Job Assignment	Associating a vehicle with a schedule block and/or run number
Leader	The Transit Operator of the vehicle of the immediately preceding trip along the same transit route.
Linked Trip	An end-to-end journey that may involve 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.)
Liquidated Damages	Upon outset of an Agreement, damages commensurate to an amount the SFMTA and Contractor designate during the formation of said Agreement for the SFMTA to collect as compensation for specified breaches (e.g., poor Availability).

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Term	Definition
Local Business Enterprise (LBE)	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.
Loop Job	An unscheduled, pre-configured work assignment in which a light rail vehicle operates over a portion of the route using an existing route pattern. The existing real-time information system is able to generate predictions based on historical travel times for loop jobs.
Mobile Platform & Website	Sub-Element allowing customers to plan trips and view next vehicle arrivals through their mobile devices and online.
MuniMobile	The SFMTA's mobile application that currently offers mobile ticketing and trip-planning functionality and vehicle arrival predictions embedded from third-party sites.
Next Generation System	The Next Generation Customer Information System provided by Contractor.
Not Out	When the SFMTA takes a vehicle out of service or is not able to assign a Transit Operator to a work shift (Run).
Notice to Proceed	Letter from the SFMTA to Contractor stating the date that Contractor can begin work; marks the beginning of the Agreement.
On-Board Digital Signage	Sub-Element consisting of the back-end system to support future screens aboard rubber-tire vehicles (motor coaches and electric trolley coaches) and light rail vehicles.
Open Application Programming Interface (Open API)	An Open Application Programming Interface (open API) is an interface that has been 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.
Personally-Identifiable Information (PII)	Information that can be used on its own or with other information to identify, contact, or locate a single person, or to identify an individual in context.
Phase I	The implementation period for a 1-for-1 replacement of the Existing System and the installation of the Next Generation System at Central Subway stations.
Phase II	The implementation period for enhancements following the completion of Phase I.
Platform Audio Visual (PAV) Sign	PAV signs are located at underground Muni Metro stations. They show the predicted arrival times of each train route.
Preliminary Mobilization Plan	Document describing how Proposer would mobilize personnel, subcontractors, equipment, materials, and supplies for software development and hardware installation.

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Term	Definition
Preliminary Schedule	Document showing the tasks, subtasks, Deliverables, milestones, and completion dates required to complete Phase I and Phase II.
Pre-Proposal Conference	A conference to address finalist Proposer's questions and provide any new or additional information concerning the RFP or selection process.
Private Application Programming Interface (Private API)	A Private Application Programming Interface (Private API) is an interface that opens parts of an organization's backend data and application functionality for use by developers working within (or contractors working for) that organization.
Proposal	Multi-section document that Proposer will submit to bid on the Next Generation System.
Quality Assurance/Quality Control Plan	Document describing how Proposer's testing procedures, including the development of prototypes, for system implementation.
Resolution Time	The time elapsed between when a problem is communicated to the Contractor's designated personnel, irrespective of whether said personnel acknowledges receipt of the message, and when said problem is resolved.
Response Time	The time elapsed between when a problem is communicated to the Contractor's designated personnel, irrespective of whether said personnel acknowledges receipt of the message, and when Contractor responds to the problem.
Revenue Service	A transit vehicle traveling along its route capable of picking up and droping off customers.
Run	A "run" is a work shift for an operator for one day. On any given day, a run number is associated with a specific operator.
San Francisco Municipal Railway (Muni)	Muni is 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.
San Francisco Municipal Transportation Agency (SFMTA)	The agency of City with jurisdiction over all surface transportation in San Francisco, as provided under Article VIIIA of the City's Charter.
Scope of Services	The work required to implement the Next Generation Customer Information System, as defined in Appendix H: Detailed Scope of Services.
Spare Ratio	The amount of spare equipment available divided by the equipment required to provide full service.
Stationary Digital Signage	Sub-Element consisting of multiple types of screens located at underground rail stations, above-ground rail platforms and rail and bus stops, including stops with shelters lacking electrical power and those without shelters at all.
StopID	A unique number associated with each SFMTA stop or station.

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Term	Definition
Switchback	Trips that do not travel the full length of their scheduled route and turn around early.
System Administration Tool	Sub-Element enabling the SFMTA to configure and interface with the System Software of the Next Generation System.
System Software	Next Generation System Element including three sub-Elements: Customer Information, a System Administration Tool and a Content Management System.
Total Contract Price	An auto-generated hypothetical price for the Next Generation System based on Contractor's Cost Proposal.
Training Plan	Document describing Proposer's approach to training SFMTA staff to use the Next Generation System.
Transit Operator	Under general supervision, a Transit Operator operates a variety of transit vehicles such as diesel and electric coaches, cable cars, streetcars and light rail vehicles.
Transition Period	The period from Notice to Proceed to the end of Phase I.
Transportation Controller	Under direction of the Transportation Operations Specialist, the Transportation Controller 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.
Transportation Management Center (TMC)	SFMTA's Transportation Management Center is a facility located at 1455 Market Street in which Controllers are able to monitor and manage service.
Trip Planner	Proposer's trip planning solution.
Vehicle Block	A vehicle "block" is the schedule of travel of a vehicle for a given day, including: (1) a pull-out from a division, (2) revenue service trips, (3) any deadhead trips, and (4) a pull-in back to the division.
Vendor	A contractor providing services under an agreement with the SFMTA

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