2020 State of Good Repair Report

San Francisco Municipal Transportation Agency

SFMTA

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Executive Summary

The San Francisco Municipal Transportation Agency's (SFMTA) 2020 State of Good Repair Report provides an overview of the Agency's rehabilitation and replacement needs and investments. It also outlines the Agency's project prioritization, planning, and delivery practices related to maintaining a State of Good Repair and institutionalizing the practice of asset management.

This is the eighth comprehensive annual State of Good Repair Report published by the SFMTA. The Agency is committed to issuing this Report annually as a matter of best practices shared by transit agencies across the region, country, and world. The Report aims to track the progress of State of Good Repair investments and asset management practices compared to previous reporting periods. This document builds on previous State of Good Repair Reports and contains financial data and condition scores from the past few years.

Achieving a State of Good Repair requires an understanding of the desired performance of an asset and timely investment to maximize that performance over its useful life. The SFMTA owns and maintains an estimated $15.6 billion of capital assets in FY2019-20; including motor coaches, trolley buses, light rail vehicles, historic streetcars, cable cars, maintenance and administrative facilities, parking garages, active transportation infrastructure, and street signs and paint. With an annual budget of nearly $1.3 billion, the SFMTA must balance the needs of the transportation system between expanding capacity and reinvesting in existing infrastructure. The SFMTA has committed to investing an average of $250 million annually in State of Good Repair. This is a commitment made to the Federal Transit Agency (FTA) in 2010. In FY2019-20, the SFMTA spent $232 million on State of Good Repair investments that maintain or renew the Agency's assets. This brought the Agency's annual average investment since FY 2010 to $234 million per year continuing progress towards Agency's $250 million minimum goal and commitment to the FTA.

This report also provides data on the condition of the SFMTA's capital assets based on an FTA standard. The FTA's Transit Economic Requirements Model Lite ("TERM Lite") calculates a condition score on a scale of 1 (poor) to 5 (excellent). For FY2019-20, the value weighted condition scores for all Agency assets averaged 3.07. A score of at least 2.5 is required for the FTA to recognize a transportation system as being in a State of Good Repair. This score represents a decline of 0.11 from the reported value of 3.18 in the 2019 State of Good Repair Report. The model calculated these scores based only on the age of the assets reported, excluding other factors such as specific operating conditions and level of use that impact the assets' condition. The Agency will continue its condition assessment program across all asset classes. As this data is collected, condition scores will be updated in our TERM Lite model to reflect the true condition of the assets more accurately.

Previous State of Good Repair reports have highlighted the need for the SFMTA to increase state of good repair investment, to prioritize investment in existing infrastructure, and to improve condition assessment activities and information sharing so all staff have a better understanding of our system's condition and performance. Since the last State of Good Repair report was published, the Agency has taken steps to address our system's urgent needs by creating an interdivisional Asset Management Working Group, initiated traffic signal and transit station condition assessments, and embedded state of good repair considerations into our budget process. However, the SFMTA still has work to be done to reach full asset management maturity and must continue to build asset management capacity while maintaining assets that are essential to delivering the services the public expects of the SFMTA.

I. Introduction

Agency Overview

We operate today's transportation system and work with our partners to plan the transportation system of tomorrow.

Who We Are

San Francisco voters established the San Francisco Municipal Railway (Muni) in 1912, creating the nation's first publicly owned transit system. In 1999, voters created the San Francisco Municipal Transportation Agency (SFMTA) by passing Proposition E, which merged Muni with the Department of Parking and Traffic to form an integrated Agency to manage city streets more effectively and advance the city's Transit First policy. In 2009, the SFMTA merged with the Taxi Commission to further streamline transportation management in San Francisco. A department of the City and County of San Francisco, the SFMTA currently manages all ground transportation in the city.

A Board of Directors governs the Agency, providing policy oversight and ensuring the public interest is represented. The Board's duties include approving the Agency's budget and contracts and authorizing proposed changes to fares, fees and fines. Its seven members are appointed by the Mayor and confirmed by the Board of Supervisors.

What We Do

The SFMTA plans, designs, builds, operates, regulates and maintains one of the most comprehensive transportation networks in the world. Directly managing five types of public transit in San Francisco (motor coach, trolley coach, light rail, historic streetcar and cable car), the Agency has kept people moving with Muni, the nation's eighth largest public transit system. The Agency also manages on- and off-street public parking, facilitates bicycling and walking, regulates taxis, and manages paratransit services for those unable to use fixed-route services.

Guided by its Strategic Plan, the Agency strives to deliver on priorities defined by the four goals of Safety, Travel Choices, Livability, and Service. The city's streets are made safer as the Agency implements a Vision Zero initiative that includes quickly building critical safety improvements to eliminate traffic deaths. The Agency moves "Muni Forward" with new trains and buses, and improvements to its Transportation Management Center to ensure consistent delivery of its scheduled service hours. The SFMTA's Bike Program is considered one of the best in the world; and advancing electric vehicle use, ongoing conservation efforts, and implementation of sustainable transportation and land use polices help improve the quality of life and environment in San Francisco. The Agency provides an outstanding workplace for staff who in turn strive to provide outstanding service to the community.

Vision

Excellent transportation choices for San Francisco

Mission

We connect San Francisco through a safe, equitable, and sustainable transportation system

Asset Management Unit

The SFMTA's Transportation Asset Management Unit advances efforts to continuously improve the way the Agency procures, operates, maintains, rehabilitates and replaces transportation assets, including fleet and infrastructure, to create a culture of data-driven decision-making and analysis that is timely, accurate, and actionable.

The Asset Management Unit manages the program to define, build and lead the support, policies, processes, documentation, and tools to optimize the performance and cost effectiveness of San Francisco's transportation infrastructure. This team prepares required plans and documents including the Transit Asset Management Plan (TAM), City and County of San Francisco 10-Year Capital Plan, SFMTA State of Good Repair Report and supports the development of the SFMTA 20-Year Capital Plan; oversees the development and administration of the SFMTA's capital asset inventory; manages the implementation of the SFMTA 10-Year Asset Management Strategy; leads the planning, design and implementation of condition assessments in partnership with SFMTA divisions and sections; and analyzes the impacts of and makes recommendations for investments to improve the transportation system.

State of Good Repair Policies

The SFMTA has specific policies related to the State of Good Repair of the transportation system. These policies are integrated into the Agency's Capital Plan and Program Policies.

The Agency's documentation of State of Good Repair Policies is a key element in laying the foundation for a successful Asset Management Program. These policies were integrated into the SFMTA's Capital Plan and Program Policies in 2018, tying asset management into the Agency's capital planning process, the development of the 5-Year Capital Improvement Program and 2-Year Capital Budget.

State of Good Repair Policies:

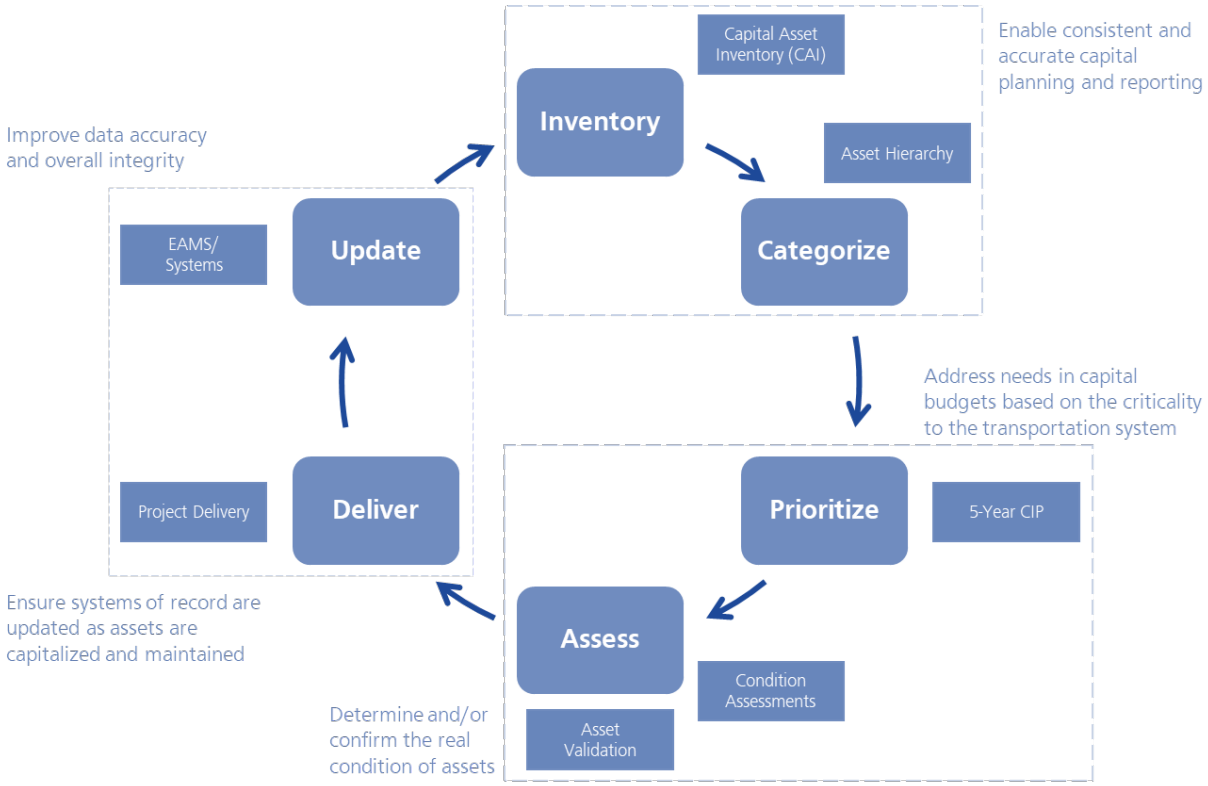
- State of Good Repair is when an asset's condition results in the operation of that asset at a full level of performance.
- The Asset Management Program shall set the framework for asset condition standards and reporting methods that classify the level of performance of Asset Classes within the Agency's Asset Hierarchy.
- Each Asset Class will have defined metrics for evaluating State of Good Repair based on condition, safety, reliability, or other defined data metric.
- State of Good Repair metrics will be reviewed and approved by the Asset Management Steering Committee.
- Divisions, through their respective Subject Matter Experts, will regularly evaluate the State of Good Repair by identifying investment levels required in the appropriate Asset Classes in the Capital Improvement Program.
- The Asset Management Unit of the Finance and Information Technology Division shall prepare an annual State of Good Repair Report detailing capital investment impacts on SFMTA Asset Classes.

10-Year Asset Management Strategy

A complete performance model that includes asset life cycle management and capital planning for sustained success.

The 10-Year Asset Management Strategy (see Figure 1) is a blueprint and process that builds upon existing work that will result in lower costs, improved infrastructure management and greater efficiencies when fully implemented Agency-wide. The goal is more than a collection of data and reporting, but actively using this data in the prioritization of investment choices and the development of capital projects.

FIGURE 1: 10-YEAR ASSET MANAGEMENT STRATEGY



Each of the elements of the cycle above is defined as follows:

- Inventory – The complete, detailed listing of the Agency's asset portfolio, that incorporates age, useful life, value, maintenance activities, and other key elements to accurately track the status of each asset and the portfolio as a whole.
- Categorize – The manner in which the inventory is broken into distinct groups for the sake of sorting, management, and consistent reporting activities.
- Prioritize – Based on the state of elements in the inventory, the Agency will develop an order in which SFMTA's requirements and needs will be met.
- Assess – All elements of the inventory are both continuously and periodically assessed for their condition to determine the state of repair of each individual asset and the inventory as a whole; these are completed on a 1-5 scale (with 5 being the highest).

- Deliver – Based on the condition assessment and prioritization of the inventory, the Agency will perform various activities to improve the state of its assets; this will be accomplished via Capital Projects implementation, preventive maintenance and/or as-needed repair.
- Update – Following the delivery of improvement activities, the details of each asset will be updated to reflect key elements, including age, new useful life, value, and other relevant information to accurately track and manage the asset.

In FY2020, Asset Management Unit began the procurement process for a software to store and organize the Capital Asset Inventory, initiated the signals and stations condition assessment projects, and incorporated asset information into key decision points in the budget development process.

The 10-Year Asset Management Strategy follows an annual cycle of continuous improvement that addresses processes, tools, and people related to Asset Management practice at SFMTA. The Asset Management Unit is dedicated to implementing the year-round strategy and aims to improve performance after each cycle.

FIGURE 2: A COMPLETE ASSET MANAGEMENT MODEL

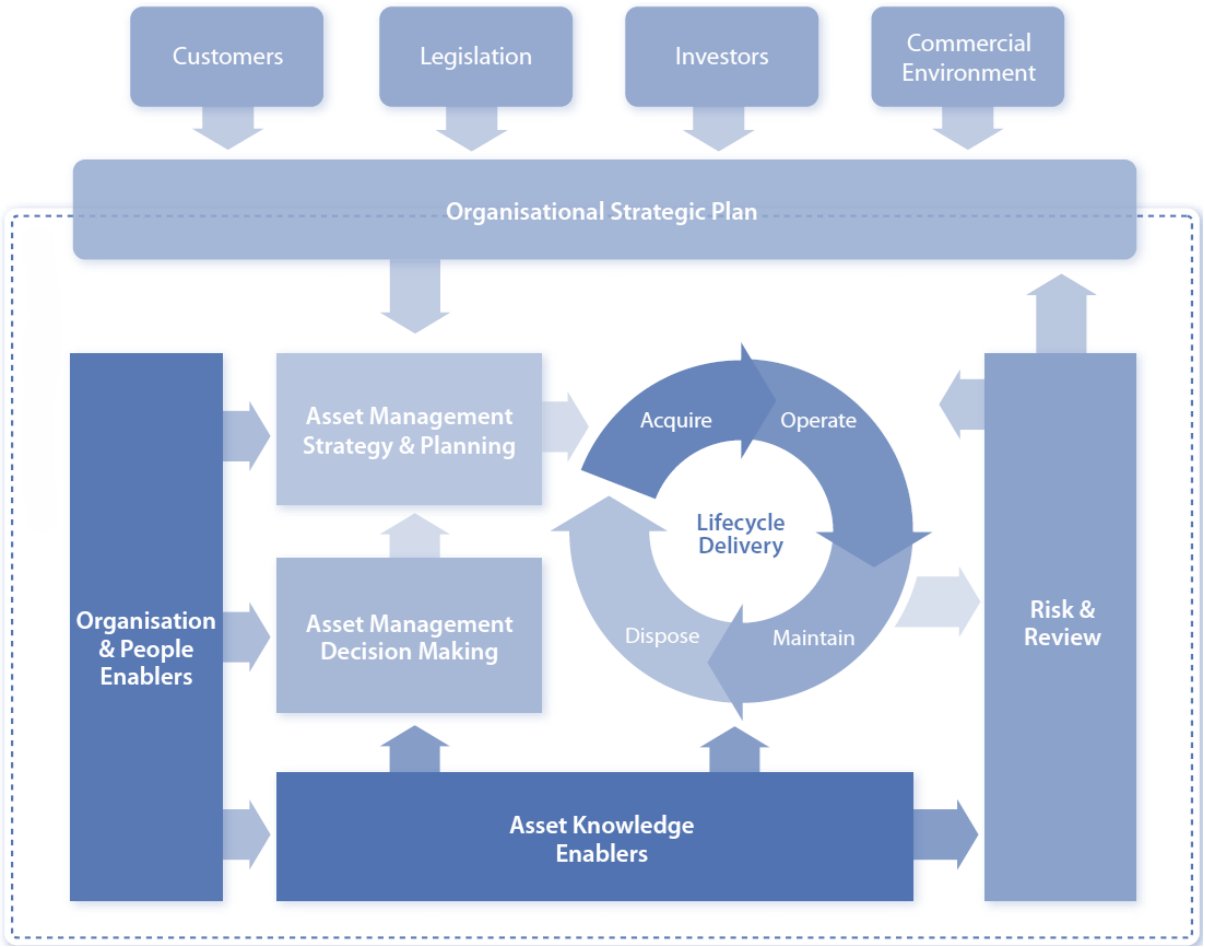
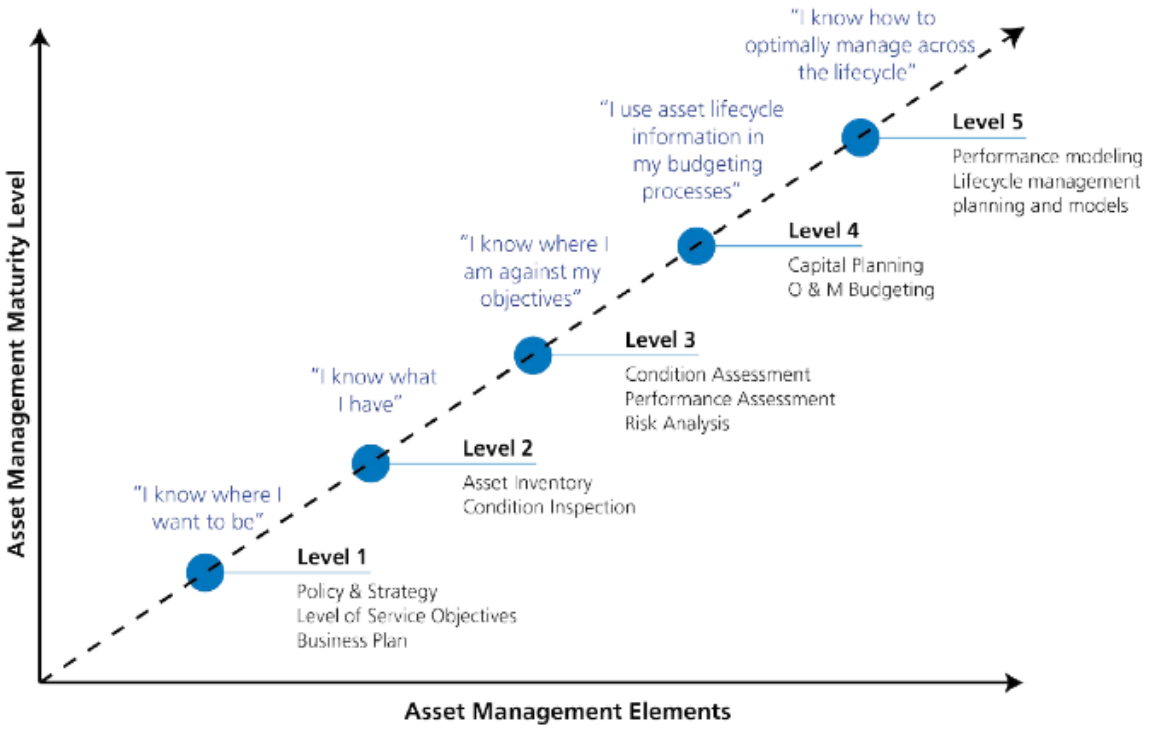


Figure 2 represents the Institute of Asset Management's Conceptual Asset Management model. This model comprises a suite of six subject groups which represent processes, people, and tools that contribute to functional asset management practice within an organization. The focus of the 10 – Year Strategy is in the center of this model, highlighting actions to align Strategy & Planning, Lifecycle Delivery, Asset Knowledge, and Asset Decision Making. It's the responsibility of the Asset Management Unit to work with stakeholders to enhance these subject groups to implement a robust asset management program at SFMTA.

The advancement of the Strategy is measured by the Agency's Asset Management Maturity level. The asset management maturity level can be applied at difference scales across the Agency from the division down to the individual business unit and represents the level at which asset management practice is integrated into existing business processes. Asset management maturity advances at different rates depending on the state of existing processes, staff awareness, and capacities.

As the 10 Year Asset Management Strategy advances, the Agency overall moves up levels in Asset Management Maturity (see Figure 3). The goal is to reach level 5, a state of practice where asset information is so integrated into the organization's functions that it optimizes each asset to extract the most value over its entire lifecycle with minimal waste. Performance against the 10-Year Strategy can be measured by the maturity of asset management across the Agency. The Asset Management Unit will conduct reviews of the Agency's asset management maturity and incorporate those results into future versions of the State of Good Repair report.

FIGURE 3: ASSET MANAGEMENT MATURITY SCALE



2018 Transit Asset Management Plan

TAM Plans must include at a minimum an asset inventory, condition assessments of inventoried assets and a prioritized list of investments to improve the State of Good Repair of capital assets.

The 2018 Transit Asset Management Plan satisfies the FTA's requirement and serves as the implementation plan for the SFMTA's 10-Year Asset Management Strategy.

In July 2016, the Federal Transit Administration (FTA) published a Final Rule for Transit Asset Management. The Transit Asset Management Rule (49 CFR part 625) is a set of federal regulations that sets out minimum asset management practices for transit providers. The FTA's Rule for Transit Asset Management requires every transit provider that receives federal financial assistance under 49 U.S.C. Chapter 53 to develop a Transit Asset Management (TAM) Plan. According to the FTA, the TAM Plan is a tool that will aid transit providers in assessing the current condition of their capital assets, determining what the condition and performance of its assets should be, identifying the acceptable risks in continuing the use of an asset that is not in a State of Good Repair, and deciding how best to balance and prioritize funding to improve an asset's condition.

In October 2018, the SFMTA completed its inaugural TAM Plan, detailing the Agency's policy, approach, and implementation process to improve its asset management practices over the next four years. The 2018 SFMTA TAM Plan employed an action-oriented framework that aimed to improve the maturity of asset management at the SFMTA. The TAM Plan documents the SFMTA's asset management policy and presents the SFMTA's overall asset management improvement program. Additionally, the TAM Plan includes the ongoing governance and system of accountability for managing implementation of an asset management program.

The 2018 TAM Plan includes an ambitious set of goals to advance the nine FTA required asset management elements. The Agency established the Asset Management Unit in January of 2019 to meet these goals within the 4-year TAM Plan period. The next update of the SFMTA's TAM Plan will be completed in October of 2022.

The TAM Plan's development process was designed to:

- Communicate the SFMTA's commitment to asset management practice.
- Facilitate the establishment of a culture that values and prioritizes asset management.
- Embed asset management responsibilities and accountabilities into strategic planning activities.
- Build on existing asset management strengths and best practices.
- Provide leadership and direction in establishing asset management into capital, operating and maintenance activities.

SFMTA TAM Plan Elements and Implementation Progress

FIGURE 4: TRANSPORTATION ASSET MANAGEMENT PLAN PROGRESS

TAM Element	SFMTA Approach	TAM Implementation Progress
Asset Inventory All capital assets a transit provider owns, operates, or manages	The SFMTA keeps an inventory of all its assets within a database	SFMTA Capital Asset Inventory is updated annually. In FY20, AMU staff have been reviewing alternative systems to store and maintain the SFMTA's capital asset inventory.
Asset Condition Assessment Ratings of inventoried assets that generate information to monitor and predict the performance of assets and inform investment prioritization	The SFMTA uses TERM to determine the condition of its assets with an on-going program to update this data and further refine it.	AMU staff have continued the Asset Condition Assessment Program scoping and initiating an assessment of traffic signals and stations. AMU staff have created a dashboard to map the state of inspections across key asset classes and types.
Analytical Process or Decision-Support Tool Tool used to analyze capital investment needs over time and develop investment prioritization	The SFMTA uses its Capital Plan, Capital Improvement Program, and Capital Budget process to determine capital investment needs over time.	Condition scores and asset class trends from the State of Good Repair Report are used by Capital Program managers to support resource requests and justify decisions related to capital project prioritization during the Capital Planning process.
Investment Prioritization Ranked list of a provider's programs and projects to improve or manage over the TAM plan horizon period in order of priority and anticipated year	The SFMTA has created a Capital Improvement Program that is a list of projects with a full funding plan prioritized from the Capital Plan.	SFMTA is committed to a minimum level of State of Good Repair investment which the Asset Management Unit monitors each budget cycle. Projects which support the SGR investment goal are typically given more support during the Capital Improvement Program development process.
Transit Asset Management and State of Good Repair Policy Provider's goals and objectives in creating TAM Plan and SGR Report	The SFMTA has established Asset Management and State of Good Repair policies.	AMU staff will evaluate the Asset Management Program goals and objectives every four years during the Transportation Asset Management Plan update cycle.
Implementation Strategy Operation process designed to implement TAM plan	The SFMTA has created the Asset Management Unit to implement the TAM Plan and the 10-Year Asset Management Strategy.	AMU staff workplans are driven by the 15 Action Items outlined in the Asset Management Strategy and TAM Plan. Action Items are reviewed and updated as part of SFMTA's annual performance plan and evaluation process.
Key Activities Description of activities that a provider intends to engage in over the TAM plan horizon period	The SFMTA Asset Management Plan has mapped out a set of 15 phased action plans to advance asset management practice at the Agency	The Asset Management Unit made progress on Phase I action plans, namely: Condition Assessment Methods (1), Asset Classification Hierarchy (3), Link TAM Priorities to 20-year Capital Plan and 5-year Capital Improvement Program (8).

TAM Element	SFMTA Approach	TAM Implementation Progress
Resources Summary or list or resources need to develop and carry out TAM plan	The Asset Management Unit has met and partnered with several other SFMTA business units to learn about and develop required asset management resources	SFMTA's Asset Management Working Group is a monthly forum with participants across the organizational chart to set policy, discuss best practice, and advance asset management practice at the Agency.
Monitoring, Updating, and Evaluating Strategy A strategy that will outline how a provider will monitor, update, and evaluate its TAM plan to ensure continuous improvement	The SFMTA 10 Year Asset Management Strategy defines annual cycles related to monitoring, updating, and evaluating the actions to advance asset management, state of good repair activities, and the implementation of the TAM plan.	In FY2020, the AMU developed dashboards to track the status of the Agency's condition monitoring across primary asset types. AMU staff are setting up a major update of the 2018 Transportation Asset Management Plan to comply with FTA's 2022 deadline.

Capital Planning Process

Provides foundational structure for the SFMTA's capital investments involving replacement, renewal, improvement, expansion, and acquisition of capital assets.

Several documents describe the Agency's need for capital investments, most notably the 20-Year Capital Plan and the 5-Year Capital Improvement Program (CIP). These planning documents support the Agency's overarching strategic goals:

- Create a safer transportation experience for everyone.
- Make transit and other sustainable modes of transportation the most attractive and preferred means of travel.
- Improve the quality of life and environment in San Francisco and the region.
- Create a workplace that delivers outstanding service.

Formally updated every two years, the most recent 20-Year Capital Plan was updated in September 2019. The purpose of the Capital Plan is to identify and characterize all the Agency's potential capital investments needed to achieve the City's transportation goals. It is a financially unconstrained document, meaning that it includes capital needs for which funding has not yet been identified or committed. It also provides the foundation for developing the fiscally constrained 5-Year CIP and the 2-Year Budget. A capital project must be included in the 20-Year Capital Plan to be eligible for inclusion in the 5-Year CIP. The 2019 Capital Plan identifies over $30.7 billion in potential SFMTA capital investments over the next 20 years.

Like the 20-Year Capital Plan, the 5-Year CIP is formally updated every two years. In FY 2020, the SFMTA was operating off the FY2019-23 CIP that was adopted by the SFMTA Board in December 2018. The Agency's 5-Year CIP is a fiscally constrained program of capital projects that is organized into 10 Capital Programs: Communications/IT, Facility, Fleet, Parking, Security, Traffic Signals, Streets, Taxi & Accessible Services, Transit Fixed Guideway, Transit Optimization & Expansion.

The FY2019-23 CIP includes 266 projects for a total investment of $3 billion, including infrastructure investments, capital procurements, area plans, and one-time initiatives such as educational programs. Of this $3 billion, approximately $1.6 billion was dedicated to State of Good Repair investments.

The Asset Management Unit supports the capital planning process by incorporating asset data at key steps along the process based on lifecycle analysis of our capital asset inventory. In coordination with Capital Program Managers and Asset Maintainers, AMU staff identifies long range capital replacement needs, supports investment allocations in existing infrastructure, and tracks infrastructure condition, planned and actual investment trends. The Asset Management Unit anticipates playing a prominent role in future budget cycles to facilitate decision-making for capital investments, helping to ensure that funding is provided for critical deferred maintenance and replacement needs.

II. State of Good Repair

State of Good Repair Defined

State of Good Repair is the condition in which a capital asset can operate at a full level of performance.

The SFMTA defines an asset as being in a State of Good Repair if the asset can function at a full level of performance. Investments that contribute to realizing a full performance from an asset are qualified as State of Good Repair investments. This definition excludes projects or capital investments in which the primary purpose is to enhance or expand the transportation system. However, new assets that are introduced to the transportation system through enhancement or expansion projects are added to the Capital Asset Inventory upon substantial completion. This ensures that the project's assets will be included in future assessments of the transportation system's long-term rehabilitation and replacement needs.

The SFMTA currently evaluates whether an asset or asset class is in a State of Good Repair using the TERM Lite tool developed by the Federal Transit Administration. The TERM Lite model produces a "condition score" for all assets in the Capital Asset Inventory on a scale of one (Poor) to five (Excellent). The cumulative, value-weighted average of all asset condition scores in the Capital Asset Inventory determines the Agency's overall condition score. The FTA defines a transportation system in which assets receive an overall condition score of 2.5 or better as being maintained in a State of Good Repair.

Currently, the SFMTA generates this score based solely from asset age, which shows an asset's condition score deteriorating as it reaches the end of its scheduled useful life. It does not reflect specific operating conditions, level of use, or other factors that impact the performance and operating life of an individual asset. A key component of the 10-Year Asset Management Strategy is to incorporate additional factors into condition scoring, such as an inspected operating condition. Accordingly, the Agency will start to incorporate use-based condition data to better model the condition of its assets. So far, this type of data has been provided through the following condition assessments:

- ongoing traffic signal condition assessment.
- upcoming condition assessment of all Muni Metro stations
- upcoming street curb and facilities assessment of Sustainable Streets related assets
- upcoming overhead line pole inventory update

This refined condition scoring will support more precise State of Good Repair assessments and more data-driven investment decision and project development.

The key elements of State of Good Repair include:

Function

The transportation asset can fully perform its designed function.

Safety

The transportation asset does not pose any safety risk to employees or the public.

Value

The transportation asset performed within its useful life at its planned cost.

Capital Asset Inventory

The Capital Asset Inventory is a registry of the Agency's physical infrastructure that contains critical information about each asset such as in-service date, estimated useful life, and replacement value. The SFMTA can use this information to understand future needs of the Agency by modeling replacement and rehabilitation cycles.

Currently, the Capital Asset Inventory represents a point in time snapshot of capital assets which is updated annually, but the goal is to connect the inventory to active data systems and business processes to provide a more real time picture. Linking the Capital Asset inventory to active data systems, including both maintenance and accounting systems, is also key for measuring the success of our capital investment strategy as documented in the Agency's Capital Improvement Programs (CIPs).

Beginning in 2014, the Agency has updated the CAI on an annual basis. These annual revisions include updating changes to capital assets, refining asset models, and ensuring the asset registry accurately reflects current state of the transportation infrastructure. Today, the CAI includes nearly 5,000 individual entries, categorized to differentiate between various CIP Programs, as well as "Transit Service Critical" or "Other State of Good Repair" assets. These categorizations provide further insight to the SFMTA when prioritizing State of Good Repair investments.

Agency assets can be categorized from the Capital Asset Inventory into a variety of hierarchies and attributes depending on the type of analysis that is required of the data. The Asset Management Unit is responsible for structuring the data so it can serve various reporting and analysis needs, such as supporting the FTA's NTD report and the Metropolitan Transportation Commission's RTCI database.

Categorizing Assets

Assets are categorized into Asset Classes which were developed in 2009 to align with the FTA's asset reporting categories. Since SFMTA functions also as a DOT, new asset classes were added to reflect non-transit infrastructure. Investments in these assets occur via capital projects which are sorted by SFMTA Capital Program to link with the capital planning process. This report uses both Asset Classes and Capital Programs to report upon State of Good Repair needs and investments. To facilitate trend comparison, the 2020 Report will continue to use the original 2009 Asset Classes.

The SFMTA categorizes State of Good Repair needs as either "Transit Service Critical" or "Other State of Good Repair". Transit Service Critical investments are made in Asset Classes and Capital Programs that are essential to ensuring the safe and reliable functioning of the transit system, such as maintaining or replacing overhead wires, rail track, or transit vehicles. Other State of Good Repair signifies areas of investment that help to make transit service comfortable and efficient for riders, along with maintenance of non-transit assets related to pedestrian, bicycle, enforcement, and administration infrastructure. Figure 3 outlines the Asset Classes as either Transit Service Critical or Other State of Good Repair.

FIGURE 5: STATE OF GOOD REPAIR CATEGORIZATION

	Asset Class	**Capital Program**	**Example Assets**
Transit Service Critical	Light Rail Vehicles	Fleet	LRVs, Historic Streetcars
	Motor Coach Vehicles	Fleet	Motor Coaches
	Overhead Catenary System	Fixed Guideway	Trolley Wire, Electrification Infrastructure
	Track	Fixed Guideway	Switches, Rail
	Train Control & Communications	Communications / IT, Fixed Guideway	Automatic Train Control System, Radio
	Other Systems / Vehicles	Fleet, Communications / IT	Cable Cars,
Other State of Good Repair Assets	Facilities	Facility	Administrative Buildings, Maintenance Buildings
	Parking & Traffic	Parking, Signals, Streets	Parking Garages, Traffic Signals, Parking Meters
	Stations	Facility	Muni Metro Stations
	Other Systems / Vehicles	Communications / IT	CCTV, Non-revenue vehicles

2020 Capital Asset Inventory Update

The FY2020 State of Good Repair Report is based on an updated Capital Asset Inventory registry that was used in subsequent reports. As per the 10-Year Asset Management Strategy, the data in this inventory has been reviewed – to true-up entries from FY2019 – as well as built upon with significant FY2020 capital project investments.

The AMU strives to ensure the asset registry reflects the reality of the Agency's infrastructure; however, some asset classes have better quality data than others and some asset types are not fully reflected in the inventory. Asset classes that are more regulated such as revenue vehicles, track, and overhead lines have the highest quality data. Asset classes related to our Sustainable Streets Division such as bike lanes, soft hit posts, and street paint; and our IT Division such as computer systems, phone systems, and data networks are either not represented in the inventory or are roughly modeled based on available information. Some assets are in the middle, such as facilities, subway stations, and tunnels are included in the inventory but need additional work to refine their lifecycle models by further breaking down these large assets into more discrete sub-systems to refine replacement costs and estimated useful life.

In the FY2020 update, the Capital Asset Inventory was aligned with the SFMTA's submission for the FTA's National Transit Database report for facilities, revenue, and non-revenue vehicles. This reduced the reporting burden for staff while ensuring a level of consistency across reports. This year facility and station asset models were updated which resulted in slightly higher replacement values within those asset categories.

While reviewing and updating the CAI are key steps in the 10-Year Asset Management Strategy, there remains work to be done to further increase the usefulness of the inventory. Future steps include obtaining cost and date-built information for all assets not in the inventory such as overhead lines poles, bike lanes, painted bus bulbs, bike racks, parking meters, soft hit barriers and bus stops. Additionally, refining the format of the capital asset inventory to link with the Agency's Enterprise Asset Management System (EAMS) – the primary database developed to keep track of the Agency's work orders – would enhance the level of detail of the data and make the inventory data more accessible and useful. Finally, performing and incorporating condition assessments of all assets would make inventory analysis more accurate and credible, particularly in informing the asset condition scores in a State of Good Repair analysis.

TERM Lite Modeling Tool

Assists in evaluating the SFMTA's current State of Good Repair asset backlog, future investment needs, and different funding and prioritization scenarios.

The FTA's Transit Economic Requirements Model Lite (TERM Lite) is a computer application designed to simulate an agency's transit capital investment needs over an extended time horizon. The model estimates the total amount of annual capital expenditures required up to a 30-year period to maintain or improve the physical condition and performance of an agency's transit infrastructure. Specifically, the TERM Lite tool determines levels of investment required to maintain or improve asset condition, assesses the impact of investment scenarios on asset conditions, and simulates future needs with age-based asset decay formulas. The tool produces Asset Condition Scores, projects Future Investment Needs, and provides a reported Asset Backlog.

Condition scores are based on the estimated useful life of each asset; they do not reflect specific operating conditions, level of use, or other factors that impact the performance and operating life of individual assets. The TERM Lite condition scores use a scale of 1 (poor) to 5 (excellent), with assets approaching zero as they reach the end of their scheduled useful life. In their 2010 National State of Good Repair Assessment, the FTA defines State of Good Repair as maintaining a transportation system in which assets receive a score of 2.5 or better based on these classification rankings.

The SFMTA's reported Asset Backlog is calculated based on scheduled useful life and replacement value of an asset. When an asset is first capitalized and entered into the CAI, it is given an estimated useful life approximating the

number of years the asset will be operable in a State of Good Repair. Useful life estimates are based on several factors including manufacturer recommendations, FTA guidelines, and subject matter expert input. When an asset comes to the end of its estimated useful life, TERM Lite reports the asset is in a status called backlog. An asset reported in backlog is measured by its full replacement value. As with the condition score, the reported Asset Backlog does not account for specific conditions of operation, level of use, or other factors that would adjust the anticipated useful life of an asset.

The FY2020 State of Good Repair analysis is based on a 20 year simulation that projects out asset replacement cycles, condition decay, and costs. The 20 year model projection aligns with the Agency's 20 year capital plan. It also ensures that the results are as accurate and useful as possible. As the time horizon moves farther out from the present, it becomes exponentially harder to accurately forecast State of Good Repair needs, replacement schedules, and asset condition scores.

The FY2020 State of Good Repair analysis is also based on assumptions of unconstrained spending and 3.5% escalation, unless otherwise noted. Performing a simulation based on unconstrained resources provides a best case scenario for asset replacement cycles. With this data, investment priorities and trade-offs can more easily be communicated based on available funding. The escalation rate aligns with the capital construction escalation rate determined by the City and County of San Francisco.

III. 2020 State of Good Repair Analysis

Asset Replacement Value

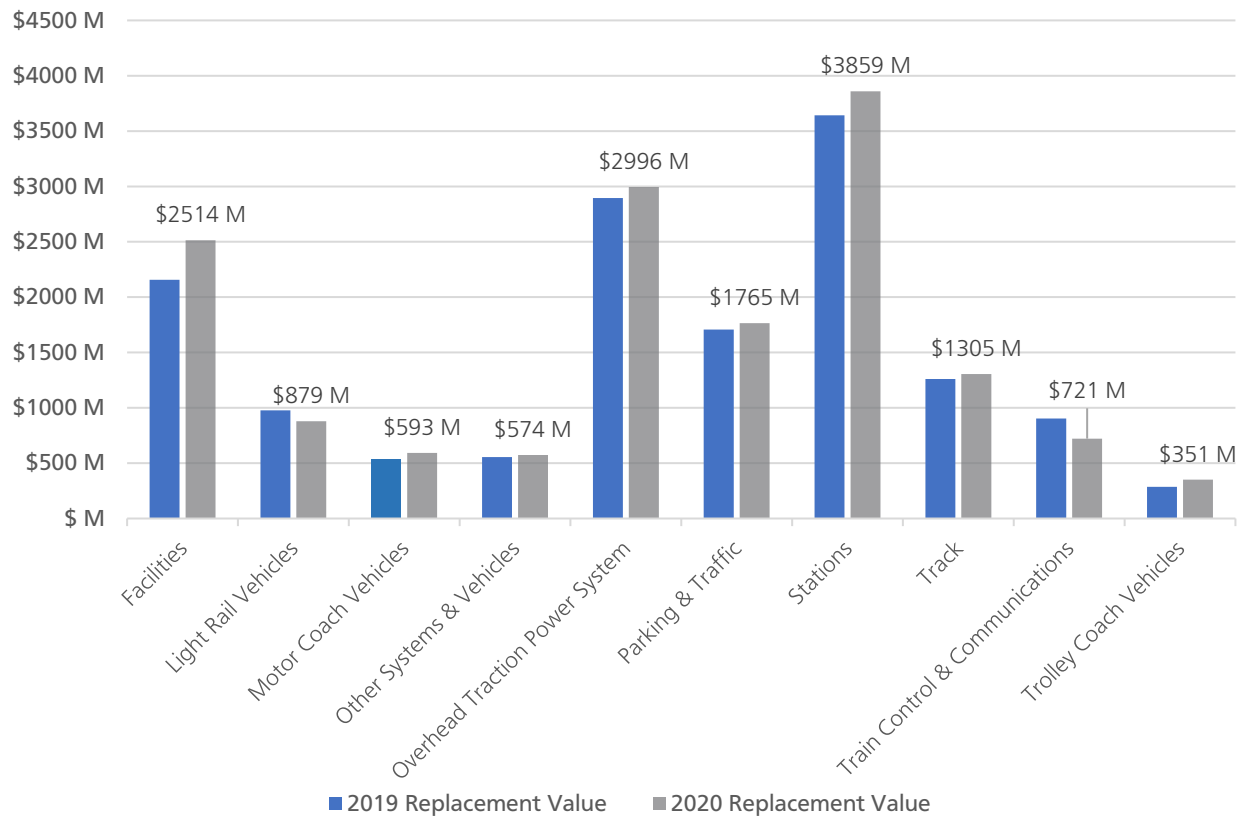
The term "replacement value" refers to the amount that the SFMTA would have to pay to replace an asset at the present time. This value helps estimate the future need that the Agency is responsible for to keep up with the regular cycle of rehabilitation and replacement of its capital assets.

The FY2020 State of Good Repair analysis calculates a total replacement value of $15.56 billion for the Agency's assets. Figure 6 shows total reported replacement value for all recorded assets by asset class compared with the previous year. There are two factors that impact the asset replacement value; adding or removing assets to the capital asset inventory and updating the estimated replacement cost of an existing asset.

The key takeaway of asset replacement value is the distribution of asset value across the different categories to identify where the risks, liabilities and needs for capital resources exist across the Agency's infrastructure portfolio. Asset replacement value is also used to validate the accuracy of items represented in the Agency's capital asset registry; based on a review of recent capital projects; the replacement value for assets within the Train Control and Communications category is undervalued and does not fully represent the physical reality of the system. .

The increase in asset replacement value for FY2020 is due to updating the cost model for our facilities and station assets to match replacement costs more accurately. The data model for facilities and stations assets has not changed since 2012, this year's update aligns the CAI with the Agency's annual FTA National Transit Database reports.

FIGURE 6: TOTAL REPLACEMENT VALUE BY ASSET CLASS



Reported Asset Backlog

The reported asset backlog is the replacement value of assets older than their estimated useful life. In FY2020, the Agency's reported asset backlog is $3.83 billion.

All assets in the Capital Asset Inventory contain data about their estimated useful life. Estimated Useful Life is defined as the maximum period during which an asset will serve its intended use. This estimated useful life is based on manufacturer recommendations, FTA guidelines, and subject matter expert input. When an asset comes to the end of its estimated useful life and is not replaced it is considered in the backlog. An asset reported in backlog is measured by its full replacement value. As the number of assets reported in backlog grows, the total amount of investment needed to replace those assets grows as well.

The SFMTA's FY2020 reported asset backlog has a total value of $3.83 billion. Figure 7 shows that the Agency's reported asset backlog rose from $3.24 billion in FY2019 to $3.83 billion in FY2020. The 2020 reported asset backlog is comprised of $1.14 billion in Transit Service Critical assets and $2.69 billion in Other State of Good Repair assets.

The reported asset backlog growth is partially due to the revised replacement value model for facilities and stations, but also shows the need for State of Good Repair investment across all its assets, particularly Other State of Good Repair assets that have increased $536 million or 25% since FY2020. The backlog for Transit Service Critical assets has also increased by $105 million or 10% in the past fiscal year. Figure 8 details the reported asset backlog by Asset Class, showing that the Agency's Parking & Traffic assets have the highest reported backlog at $1.10 billion.

FIGURE 7: REPORTED ASSET BACKLOG

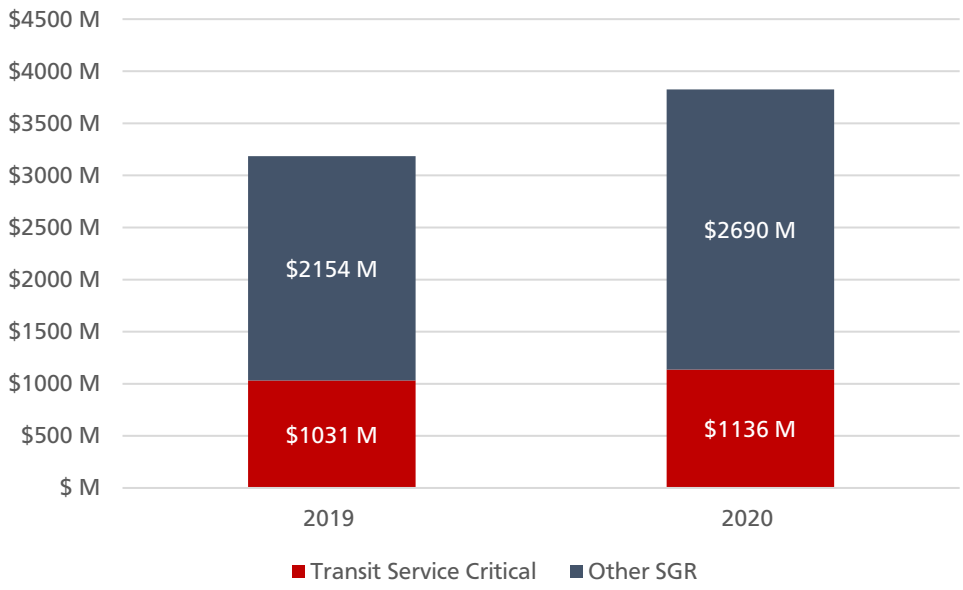
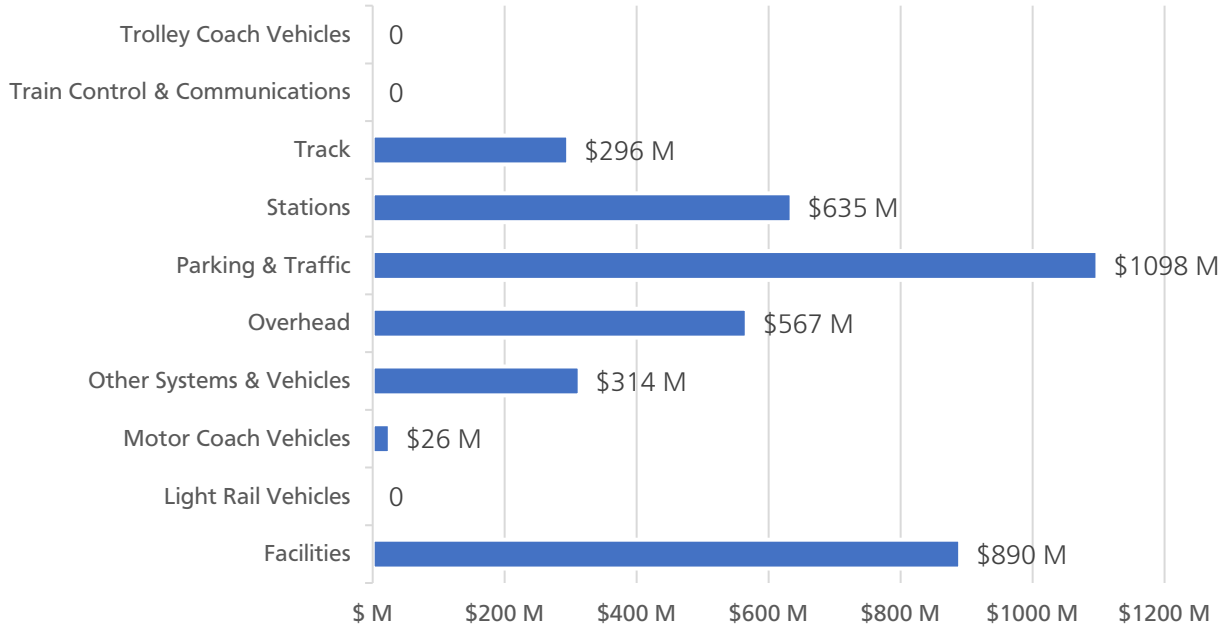


FIGURE 8: REPORTED ASSET BACKLOG BY ASSET CLASS



While the reported backlog value is a useful goalpost to measure the Agency's progress in maintaining a State of Good Repair, it is one of many data points to consider when informing future investment decisions. Here are key considerations when reviewing the backlog.

- It is possible for an asset in the backlog to perform as intended beyond its estimated useful life with increased inspection and maintenance, but at increased risk.

- Not all assets represented in the backlog require full replacement. The backlog represents assets where an end of life decision needs to be made; either these assets will be retired due to future service needs, replaced in-kind, or upgraded with new technology or systems.

- Asset classes reporting no backlog may still require high levels of investment in future years. Investment decisions need to consider both the backlog and the projected replacement needs represented later in this report. For example, the Agency is facing a high investment need required to replace the Train Control System within the next decade.

To adjust for these discrepancies, the Agency will continue to verify asset dates and place a strong emphasis on condition assessments moving forward. By ensuring asset information us current in the CAI and incorporating condition assessments to better inform the TERM Lite model, the Agency will have a more accurate reported asset backlog and clearer understanding of the deferred replacement need.

Asset Condition Scores

Asset Condition Scores are based on the age of an asset and use a scale of 1 to 5. The weighted average condition score for all SFMTA assets in FY2020 is 3.07.

The TERM Lite model produces a "condition score" for each asset in the capital asset inventory. These condition scores are based only on the estimated useful life of each asset; they do not reflect specific operating conditions, level of use, or other factors that impact the performance and operating life of individual assets. Part of the Condition Assessment Program is to conduct condition assessments of the Agency's assets and generate usable metrics to gain a better understanding of each asset's actual useful life.

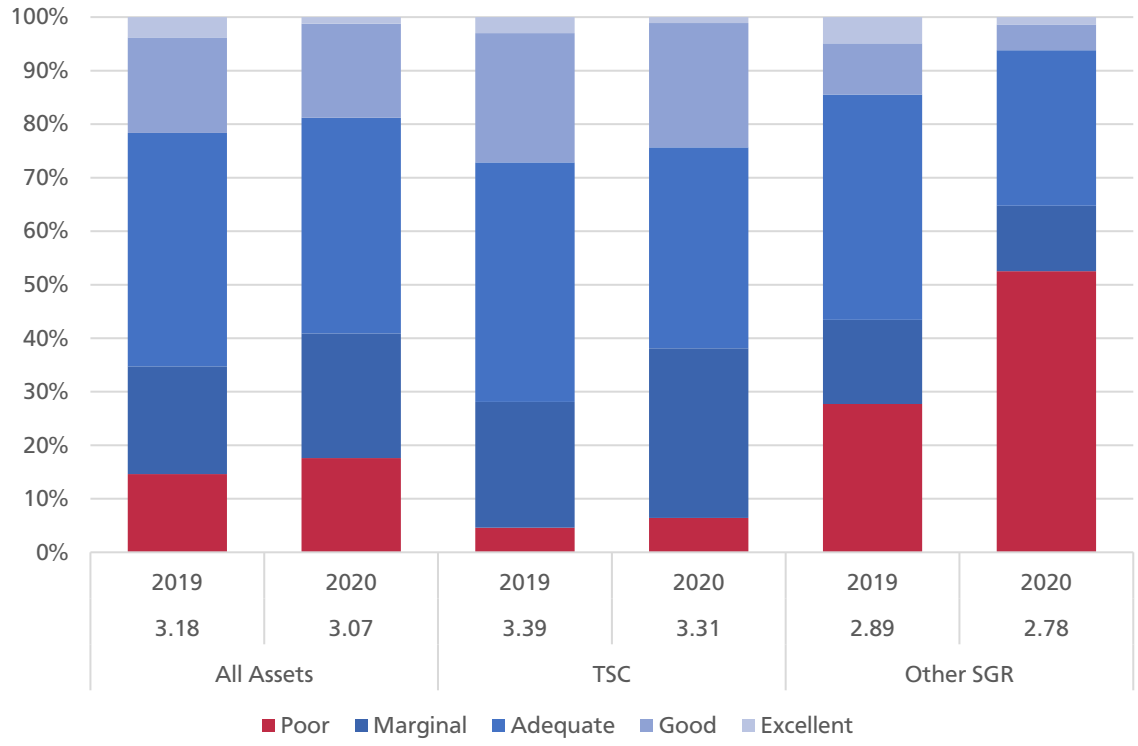
The TERM Lite condition scores use a scale of 1 (poor) to 5 (excellent) with scores for assets declining as they age. Asset with a score 2.5 or higher are within a State of Good Repair.

2020 Asset Condition Score

As shown in Figure 9, the average condition score for all SFMTA's assets is 3.07 in FY2020. The SFMTA incorporates a weighted average based on total replacement cost. This creates a more accurate representation of the State of Good Repair of Agency assets. For example, it is more detrimental if a high-value asset has a low condition score than a low-value asset.

Figure 9 displays asset condition score by Transit Service Critical and Other State of Good Repair assets. Transit Service Critical assets have a substantially higher average condition score than Other State of Good Repair assets. TSC assets score a weighted 3.31 on the scale which translates to an Adequate condition category. OSGR assets are scored at 2.78, labeling these assets as Marginal in their condition category. These scores are a direct result of a policy decision to prioritize investments in TSC assets over Other SGR assets.

FIGURE 9: COMPARISON OF CONDITION SCORES, 2019 VS. 2020



Figures 10 and 11 provide detailed breakdowns of average condition scores by Capital Program and Asset Class, respectively. The data affirms that the Agency's State of Good Repair efforts have had positive results on the condition scores of Transit Service Critical assets such as the revenue fleet; but that other State of Good Repair assets, including non-revenue vehicles (Other Systems and Vehicles) and parking assets (Parking & Traffic), have received reduced investment amounts.

FIGURE 10: AGE-BASED CONDITION SCORE BY CAPITAL PROGRAM

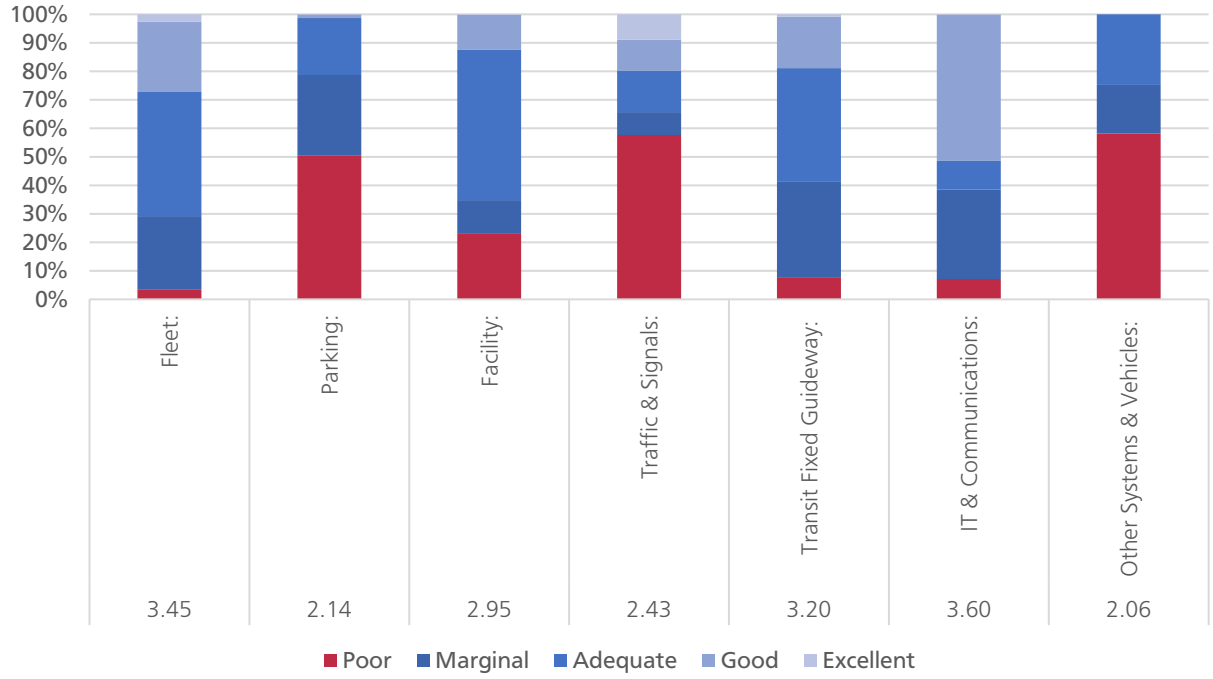
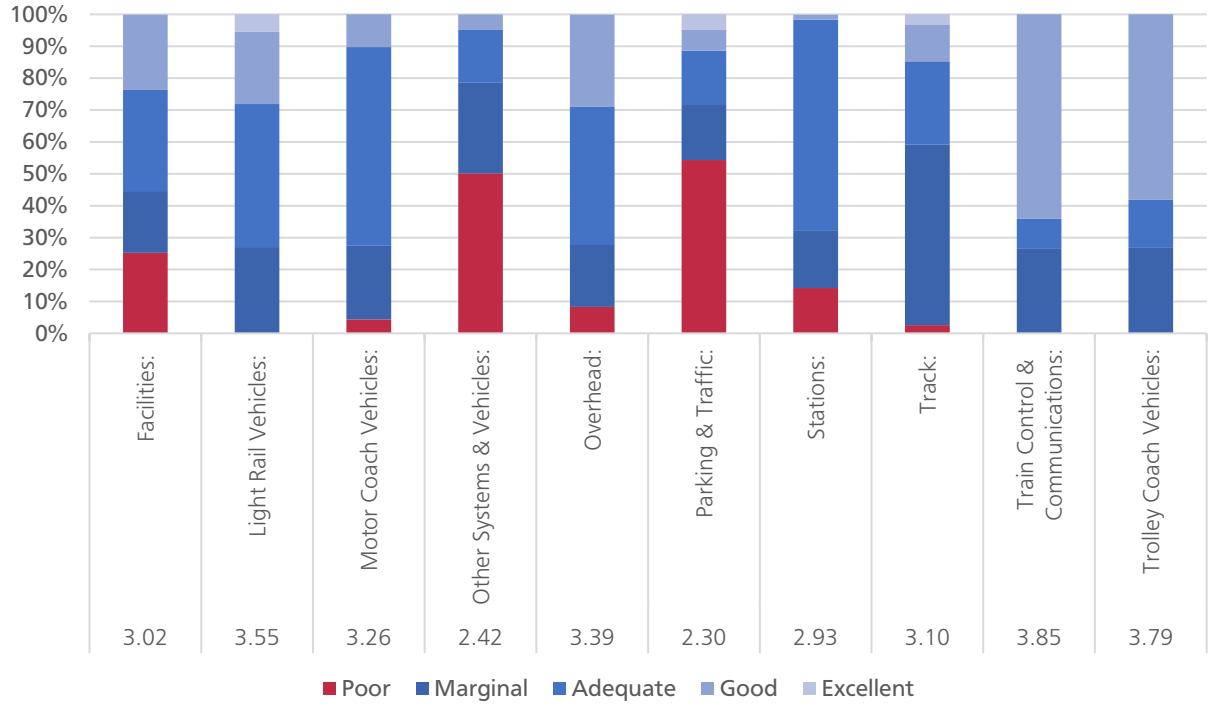


FIGURE 11: AGE-BASED CONDITION SCORE BY ASSET CLASS



Asset Condition Score Trends

Figure 13 provides a breakdown of average condition scores by Asset Class over time. The following notes explain the trend in condition scores for each Asset Class. Although the TERM Lite data is only based on the useful life of the assets and does not incorporate the actual operating condition of the assets, it provides a general indicator of the state of the Asset Class across the entire portfolio. Like the backlog data, the age-based condition score is one factor to consider when making investment decisions. Understanding the performance and failure risks associated with the relative age of the infrastructure also guides investment allocations.

FIGURE 12: ASSET CLASS CONDITION SCORES FROM 2015 - 2020

Asset Class	Age Based Condition Score					
	2015	**2016**	**2017**	**2018**	**2019**	**2020**
Facilities	3.2	3.2	3.3	3.3	3.2	3.0
Light Rail Vehicles	3.8	3.8	3.7	3.8	3.8	3.6
Motor Coach Vehicles	3.7	3.5	3.7	3.6	3.4	3.3
Other Systems & Vehicles	3.0	3.1	3.1	2.6	2.6	2.4
Overhead Traction Power System	3.7	3.7	3.6	3.5	3.4	3.4
Parking & Traffic	2.8	3.0	2.9	2.4	2.4	2.3
Stations	3.1	3.1	3.1	3.0	3.0	2.9
Track	3.3	3.2	3.2	3.1	3.2	3.1
Train Control & Communications	3.7	3.6	3.5	3.4	3.8	3.8
Trolley Coach Vehicles	3.4	3.3	3.2	3.6	4.2	3.8
Total Condition Score	**3.33**	**3.32**	**3.30**	**3.19**	**3.18**	**3.07**

Notes on Condition Score

- Condition score is weighed by asset value. The impact of an asset classes score on the Agency aggregate score is a direct function of the proportion of the replacement value of a class to the total agency replacement value.
- Facilities assets typically have high replacement values and long estimated useful lives which is reflected in the slow and consistently declining score. Upcoming investments in SFMTA's oldest facilities as identified in the Building Progress facilities renewal program will raise this score in subsequent reports and the overall agency score.
- Revenue vehicles in the Light Rail, Motor Coach, and Trolley Coach asset class categories are routinely replaced. Procurement years are identified by years with score increases.
- Other Systems and Vehicles asset class is primarily composed of non-revenue service vehicles; these represent a relatively small proportion of the Agency's total assets. Improving the value weighted score would require a comparatively small investment but also have the smallest impact on overall Agency score.
- Parking and Traffic represents the Agency's parking garages and traffic signals which have received less investment compared with Transit Service Critical asset classes.

Overhead Lines & Electric Substations

Overhead lines are used to transmit power to support electrically powered trolley coaches, light rail vehicles, and historic streetcars. *Electric substations* are the facilities that control and distribute electrical power across the network.

Asset Replacement Value
These assets represent 20% of all SFMTA Assets

$3 B | Overhead Lines
$218 M | Electric Substations

Condition Scores
3.4 | Overhead Lines
2.3 | Electric Substations

Backlog
$567 M | Overhead Lines
$135 M | Electric Substations

Did you know....

The electrification system is also referred to as the traction power network.

When Streetcar No. 33 was converted in 1935, it became the first "trackless trolley" to operate in the State of California. Today, the 33-Stanyan still operates on parts of the original route.

SFMTA is responsible for over 10,000 poles with an estimated replacement cost between $40-60k making up nearly 20% of the total replacement value of the overhead line system. We are pursuing an inventorying project which will give us a better sense of this asset class. These poles can be used to generate revenue by leasing to third-party communications and telecom providers.

For the last five years, this asset class maintained condition scores ranging from 3.5 to 3.7. In FY2019, the SFMTA replaced significant portions of M-line and T-line OCS. It is important to note that sections of the overhead line system are regularly replaced through ongoing maintenance activities. This analysis primarily captures major capital projects that replace large sections of the network.

The 27 Electric Substations, while less visible to the public, are an essential part of the overall power system. These facilities are supported by a network of underground network of duct banks, manholes, and switches. The SFMTA will continue to invest in maintaining this critical asset in a State of Good Repair.

Highlights and achievements from FY2020

King Street Substation Upgrade – Update of King Street Substation added capacity to accommodate three-car LRV's.

Tree Maintenance Overhead Line Maintenance – Initiated $700,000 tree contract with Public Works to address overgrown trees adjacent to the overhead line network. Overgrown trees contribute to service delays on the network, increased de-coupling of vehicles to the power source and fire risk.

SCADA Upgrade – The SCADA system allows to monitor substations and equipment remotely reducing the need to travel in the field to assess status of infrastructure.

FY21-25 Capital Improvement Program Planned Investment

The adopted FY21-25 Capital Improvement Program highlights Overhead Line and Substation capital investments planned for next five years.

Overhead Line / Substation Condition Assessment - Approximately $23M is dedicated to addressing chronic repairs and replacement of key infrastructure.

Islais Creek Bridge Rebuild – Approximately $4M is dedicated to rebuilding overhead line infrastructure across the Islais Creek Bridge.

San Jose Substation upgrade – Approximately $1M is dedicated to upgrading the San Jose Substation to increase capacity and replace core electrical components.

N-Judah Track Rebuild – 3.5 miles of overhead wire, poles and support infrastructure will be replaced as part of the N-Judah Track Rebuild project.

Long range outlook for Overhead Lines and Electric Substations

Electrical Capacity for Increased Service - Support of 3-car trains will require upgrades to the remaining electric substations to handle the additional load.

Electrification of Fuel Fleet - Electrification of the motorcoach fleet will put additional demands on the system. Infrastructure near storage yards will need to be upgraded to accommodate additional loads for vehicle charging.

Central Subway – Central Subway will add approximately 1.7 miles of overhead wire and supporting infrastructure to the network; increasing future capital and operating needs.

Cable Car Vehicles, Barn, and Guideway Assets

San Francisco's iconic cable cars are part of a unique and historic set of assets including vehicles, cable car specific guideway and track assets, and a barn that provides power to the system.

Asset Replacement Value
These assets represent 5% of all SFMTA Assets

$31.5 M | Cable Car Vehicles
$450 M | Cable Car Trackwork
$358.2 M | Cable Car Barn / Facilities

Condition Scores
2.03 | Cable Car Vehicles
2.63 | Cable Car Trackwork
3.12 | Cable Car Barn / Facilities

Backlog
$22.8 M | Cable Car Vehicles
$186.3 M | Cable Car Trackwork
$90.4 M | Cable Car Barn / Facilities

Did you know....

Cables run at 9.5 MPH and can move 26 cable cars at once which each car carrying up to 60 people.

The cable cars are the only moving National Historic Landmark.

San Francisco is home to the world's last manually operated cable car system. The system is made up of historic cable cars, special guideway components that support the underground cable and the cable car barn and powerhouse facility that drives the system. These assets not only provide an important transportation service to San Francisco but are also part of the cultural heritage and history of the City.

Highlights and achievements from FY2020

Hyde Street Gearbox Replacement Project – Replacement of the Hyde Line gearbox was completed. The gearbox is basically the transmission that transfers power from the 600 volt DC motor to pulleys that carry the cable.

Additional State of Good Repair maintenance – As service was shut down due to the gearbox replacement, staff rebuilt switches, replaced pulleys, conducted spot track repair, and cleaning and rebuilding of various components that support the system.

FY21-25 Capital Improvement Program Planned Investment

The adopted FY21-25 Capital Improvement Program includes Cable Car asset capital investments planned for next five years.

Cable Car State of Good Repair – Approximately $16M dedicated to rehabilitating the historic cable car fleet vehicles.

Curve Track Replacement – Replacement of sections of curved track that are meeting the end of their 30-40 year useful life.

Surface Guideway Assessment Study – Full inventory and condition assessment of underground guideway infrastructure; including sheaves, drains, pulleys, and cable guides.

Turntable Repair Program – Approximately $11M dedicated to the replacement of the turntable in the cable car barn and maintenance on existing turntables on the network.

Long range outlook for Cable Car Infrastructure

Cable Car Barn Upgrades - The Cable Car Barn houses the propulsion system for the network and the facilities where individual cable car vehicles are rebuilt and repaired requires significant upgrades to meet service demands.

Surface Guideway Replacements – An outcome of the surface guideway assessment study, listed above, will be a prioritized and defined list of cable car related guideway projects which will be incorporated into future Capital Improvement Programs.

Facilities

SFMTA's facility campus includes a varied group of buildings, grounds and bus yards. These facilities support the SFMTA's ability to provide reliable transit service, maintain street infrastructure, and store, protect and maintain its diverse transit fleet.

Asset Replacement Value
These assets represent 14% of all SFMTA Assets

$138 M | Administrative Facilities
$1.9 B | Maintenance Facilities
$18 M | All Other Facilities

Condition Scores
2.99 | All Facilities
2.35 | Administrative Facilities
3.06 | Maintenance Facilities
3.43 | All Other Facilities

Backlog
$833.6 M | All Facilities
$1.8 B | Administrative Facilities
$358 M | Maintenance Facilities
$18 M | All Other Facilities

Oldest Asset in System
The Potrero Bus Yard opened in 1914

Did you know....

The Potrero Yard Modernization Project is also a housing project.

The new facility will have three main levels for bus maintenance and storage that will measure up to 75 feet in height from the corner of Mariposa and Bryant streets. The modern yard will be able to store 213 buses or approximately 50 percent increase in capacity. But the City and SFMTA are also proposing approximately 560 residential units that include seven (7) additional floors above the bus facility. Developers will submit proposals that must include 50% affordable units, but are challenged to maximize the number of affordable units, up to 100%

The average condition score for all SFMTA facilities has held steady in recent years and is currently 2.99, fair condition. Facility assets account for nearly a fifth of the value of all SFMTA assets. This class also includes some of the Agency's oldest assets including Potrero Bus Yard (1912) and Presidio Bus Yard (1914). Maintaining the condition of the SFMTA's yards and buildings requires consistent annual investment. The 2017 SFMTA Facilities Framework helped identify deficiencies, associated costs and prioritized improvements for 20 SFMTA facilities. The result was $60.4 million in repairs and a Building Progress program of $140.2 million to keep these facilities in a State of Good Repair.

Highlights and achievements from the past year

Bancroft Facility Renovation – Upgraded a storage and maintenance facility to meet current energy efficiency standards

Flynn Lifts Upgrade - Replaced Muni vehicle lifts at the Flynn maintenance facility to enable maintenance staff to maintain the transit fleet in good working order

Muni Metro East Rail 5-track Extension - Enhanced and expanded Muni Metro East (MME) facility to improve operational efficiency and to accommodate the expanded Light Rail Vehicle fleet. Included expanding five tracks at the southwest corner of the existing MME site

FY21-25 Capital Improvement Program Planned Investment

The adopted FY21-25 Capital Improvement Program highlights facilities assets capital investments planned for next five years.

Facility Condition Assessment Implementation Phase 1 $8.2M Address backlogged State of Good Repair Projects

Woods Facility Upgrades $4M Includes new bus washers and installing infrastructure to support future battery electric bus charging.

Potrero Yard Modernization Project $35M Initial phase for the rebuild of the Potrero Yard facility.

Muni Metro East Phase 2 $120M Develop temporary Trolley Bus Yard to house buses during Potrero Modernization Project

Long range outlook for Facilities

The **Potrero Yard Modernization Project** will replace the obsolete two-story maintenance building and bus yard located at Bryant and Mariposa streets with a modern, three-story, efficient bus maintenance and storage garage, equipped to serve the SFMTA's growing fleet as it transitions to battery electric vehicles. Construction is expected to begin in 2023. The Presidio Yard Modernization Project will replace the obsolete two-story maintenance building and bus yard located at Geary Boulevard and Presidio Avenue.

Light Rail Vehicle / Historic Streetcar

The Muni light rail vehicles operate 21 hours per day, 365 days per year to provide vital transit service for 49 million riders annually. The light rail vehicle fleet consists of LRV2, LRV3, and the newest, LRV4 model vehicles. Additionally, Muni operates three types of Historic Streetcars: President's Conference Cars (PCCs), Milan Cars, and Antique Streetcars.

Asset Replacement Value
These assets represent 6% of all SFMTA assets.

$765 M | Light Rail Vehicle
$114 M | Historic Streetcar

Condition Scores
3.56 l All light rail vehicles
3.63 | Light Rail Vehicle
3.05 | Historic Streetcar

Backlog
$0 M l All light rail vehicles
$0 M | Light Rail Vehicle
$0 M | Historic Streetcar

Did you know....

SFMTA maintains a fleet of trolleys, trams, and streetcars from cities around the world, Zurich, Milan, Melbourne, Osaka, and Blackpool.

While light rail vehicles are replaced with a newer model after their 25-year useful lives expire, Historic Streetcars have to be completely rebuilt by SFMTA staff after their 100-year useful lives end.

For the last five years, light rail (LRV) and historic vehicles were maintained in adequate condition. Light rail vehicles are procured periodically in large batches resulting in extreme highs and lows in condition scores that correspond to asset useful life. The light rail vehicle fleet currently consists of 68 LRV4 vehicles and 151 LRV2 and LRV3 vehicles. The 68 newer vehicles were procured to expand the LRV fleet during Phase I of the LRV Expansion and Replacement project. Phase II of this project will replace the 151 older vehicles with new, LRV4 vehicles.

Transit Division staff are working to smooth out the fluctuations in condition by doing smaller, more routine vehicle procurements. The SFMTA will continue investing in regular maintenance and mid-life overhauls to preserve these assets in a State of Good Repair

Highlights and achievements from the past year

Light Rail Vehicle Maintenance- Began conducting reliability demonstration tests and processing warranty improvements for the 68 Phase I or expansion light rail vehicles.

Light Rail Vehicle Overhauls - Overhauled specific components of the 151 LRV2s and LRV3s. This targeted work will improve vehicle reliability and reduce the amount of maintenance required throughout the rest of the vehicle useful lives.

Light Rail Vehicle Fleet Replacement & Expansion - Initiated production of Phase II LRV4 vehicles to replace the 151 LRV2 and LRV3 model light rail vehicles.

Streetcar Overhauls - Rehabilitated and formally accepted four PCC streetcars.

FY21-25 Capital Improvement Program Planned Investment

Light Rail Vehicle Fleet Replacement & Expansion - Invest **$1B** in the procurement of 151 replacement in LRV4 model light rail vehicles as part of Light Rail Fleet Replacement & Expansion Phase 2.

Paratransit Fleet Expansion – Invest **$11M** to procure 20 cutaway vehicles to expand the paratransit fleet and paratransit service in San Francisco.

PCC Streetcar Rehabilitations - Invest **$34M** in rehabilitation of several PCC and vintage streetcars to support delivery of E and F line service.

Long range outlook for Light Rail Vehicles

Light Rail Vehicle Overhauls - Conduct midlife overhauls on LRV4 model light rail vehicles.

Light Rail Vehicle Fleet Expansion - Expand the light rail vehicle fleet to expand and improve light rail vehicle service.

Increase Maintenance Capacity – Historic vehicles require specialized knowledge and tools to maintain. Contractors have been used to perform the rehabilitation work, but SFMTA is pursuing a program to develop SFMTA staff and provide the capacity to do this work within the organization.

Motor Coach / Trolley Coach

The motor coach fleet consists of low emissions electric hybrid motor coaches that run on battery as well as renewable diesel. The fleet consists of 30 30-foot, 364 40-foot, and 224 60-foot vehicles. The trolley coach fleet runs on 100 percent greenhouse gas-free Hetch Hetchy electricity via overhead wires. The fleet is made up of 93 60-foot vehicles and 185 40-foot vehicles.

Asset Replacement Value
These assets represent 6% of all SFMTA assets

$593 M| Motor Coach
$351 M| Trolley Coach

Condition Scores

3.46 | All vehicles
3.26 | Motor Coach
3.79 | Trolley Coach

Backlog
$25 M | All vehicles
$25 M | Motor Coach
$0 M | Trolley Coach

Did you know....

Muni has the largest trolley bus fleet of any transit agency in the United States and Canada.

Muni's trolley coaches (as well as its streetcars and cable cars) are almost entirely pollution-free because their electric power comes from the city's hydroelectric Hetch Hetchy Water and Power System.

As of FY20, the SFMTA was operating the Green Zones program along the 2, 12, 19, 28, 28R, 43, & 47 routes. A Green Zone is a significant portion of a route where a hybrid electric bus operates on battery power alone.

Oldest Asset in System

29 40-foot Motor Coaches in operation since 1999. These vehicles comprise the operator training fleet and are not used in revenue service.

Motor and trolley Coaches were maintained in adequate condition over the last five years. These vehicles are procured periodically in large batches resulting in extreme highs and lows in condition scores that correspond to asset useful life. Transit Division staff are working to smooth out the fluctuations in condition by doing smaller, more routine vehicle procurements. The SFMTA will continue investing in regular maintenance and mid-life overhauls to preserve these assets in a State of Good Repair.

Highlights and achievements from the past year

Motor Coach Fleet Replacement Project - As of FY20, 206 40-foot Neoplan,124 60-foot Neoplan, 45 40-foot NABI, and 56 40-foot Orion vehicles have been replaced.

40 and 60-foot Trolley Coach Fleet Replacement Project - As of FY20, all ETI trolley coaches have been replaced with 278 New Flyer trolley coaches.

FY21-25 Year Capital Improvement Program Planned Investment

Motor Coach Replacement – Invest **$58M** to replace the thirty 30-foot motor coaches that have surpassed their useful life.

Electric Bus Procurement - Invest **$15M** to procure and pilot three 40-foot battery-electric buses each from four vendors.

40' & 60' Motor Coach & Trolley Coach Midlife Overhauls - Invest **$165M** to perform scheduled mid-life overhauls on the New Flyer motor and trolley coach fleets. Explore the feasibility of upgrading the on-board energy storage system on the trolley buses to improve the off-wire capabilities.

Long range outlook for Trolley and Motorcoach

Battery Electric Bus Procurement - Continue advancing efforts to procure zero emission battery buses that will replace electric hybrid vehicles as per SFMTA's Zero Emission Bus Rollout Plan.

Stabilize Average Fleet Age - Plan vehicle procurements to stabilize the average age of the fleet within a 5 to 8-year window and avoid major fluctuations in vehicle reliability and maintenance resource demands.

Stations

The Muni Metro system includes three tunnels, nine subway stations, and 142 surface platforms and boarding islands.

Asset Replacement Value

These assets represent 23% of all SFMTA assets.

$2 B | Stations
$629 M | Boarding islands
$1.2 B | Tunnels

Condition Scores

2.93 l All stations
2.74 | Stations
3.33 | Boarding islands
3.03 | Tunnels

Backlog

$672 M l All stations
$635 M | Stations
$37 M | Boarding islands
$0 | Tunnels

Oldest Asset in System

The Twin Peaks Tunnel built in 1918.

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Did you know....

BART has primary capital responsibility for the Market Street stations.

Embarcadero Station has no stairs, only escalators.

The Forest Hill Station is the oldest station west of Chicago.

For the last five years, station assets remained in adequate condition. The Muni metro stations are over fifty years old and little is known about the condition of their comprising assets. The condition of all SFMTA stations will be assessed in FY2022 as part of the agency's Condition Assessment Program.

Highlights and achievements from the past year

Pump Replacement - Completed pump replacement projects at Embarcadero and Church stations, these assets pump groundwater from Muni subway stations.

HVAC Replacement - Replaced and upgraded three HVAC fan motors located at the Muni Metro Turnaround complex.

Church Station Safety Improvements - Complete safety modernization for the three elevators at Church station.

FY21-25 Capital Improvement Program Planned Investment

Facility Condition Assessment Phase II - Invest **$16M** to evaluate the condition of all Muni Metro Stations.

Upgrading Market Street Station Canopies - In partnership with BART, additional station entrances on Market Street will be upgraded with new canopies and covers.

Castro Station Elevator – New four stop elevator will service the Castro Station concourse, platform, Market Street, and Harvey Milk Plaza.

Long range outlook for Stations

Station Upgrades and Maintenance - The condition of all SFMTA stations will be assess in FY2022. The assessment deliverable will guide future investments in Muni Metro stations

Central Subway Stations– Central Subway will add three subway stations and one surface station to the Muni network. These assets will add to future replacement and rehabilitation needs which will impact future capital and operating resource planning.

Track

With over 90 miles of track and nearly 300,000 daily trips, the vehicles on SFTMA's fixed guideway routes carry half of its daily ridership. This asset class includes rail, tie and ballast, switches, and other special work.

Asset Replacement Value
These assets represent 9% of all SFMTA's assets

$910 M | Track

Condition Scores
3.27 | Track

Backlog
$153 M | Track

Did you know....

Key Fixed Guideway projects include substantial investment in a systematic replacement of segments of the rail system.

These projects will help to make the Fixed Guideway system more reliable, safe, and comfortable for the passengers who currently rely on fixed guideway routes.

For the last five years, the track system has remained in adequate condition. Track and guideway related assets are some of the most resource intensive assets for the Agency to maintain and replace.

Highlights and achievements from the past year

Extended Subway Shutdown - Due to the pandemic in Spring/Summer 2020, there became an opportunity to accelerate upgrades and necessary maintenance work.

Maintenance of Way Track Work – Track maintenance staff performed focused work included potholing intersections, replacing ties and ballasts, grinding, welding and profiling rails, and procuring equipment such as a low-profile excavator and a low-profile loader.

Ultrasonic Rail Testing Phase I - Project conducted ultrasonic rail testing services for over 9 miles of trackway to establish and evaluate State of Good Repair for the light rail system.

FY21-25 Capital Improvement Program Planned Investment

Surface Trackway Pavement SGR Program – This project will address the deteriorating track pavement condition on the rail network and improve safety and reliability

Subway Special Trackwork Replacement – This project will replace special trackwork such as switches and crossovers in the subway at Castro, Duboce, Van Ness, and Embarcadero Stations.

Subway Trackwork Replacement – This project will focus on tangent and curve spans of rail between Embarcadero Station and Castro Station.

N-Judah Surface Trackwork Replacement – This investment will focus on approximately 3.5 miles of worn track, special trackwork, and supporting infrastructure on the N-Judah line between Carl Street and La Playa Street.

Long range outlook for Track

10 Year Investment Strategy - Transit is developing a 10 year investment strategy for the subway, this will define a prioritized set of projects to address asset replacement and rehabilitation which will impact the state of good repair of the Agency's rail assets.

Additional Surface Rail Replacement – Additional surface rail tangent and special work will need to be addressed in the long term including the M Ocean View, K Ingleside, and the F – Market and Wharves line.

Central Subway – Central Subway will add approximately 1.7 miles of rail and related special trackwork to the system increasing future operating and capital needs.

Parking / Traffic Signals

The SFMTA's street and parking assets include all the City owned parking lots and garages, traffic and pedestrian signals, and thermoplastic paint that indicate bike lanes, bus priority lanes, and pedestrian cross walks.

Asset Replacement Value
These assets represent 11% of all SFMTA assets

$875 M | Traffic Signals
$797 M | Parking Lots and Garages
$93 M | Street Assets & Thermoplastic Paint

Condition Scores
2.30 | All Parking & Traffic
2.32 | Traffic Signals
2.14 | Parking Lots and Garages
3.46 | Street Assets & Thermoplastic Paint

Backlog
$1.1 B | All Parking & Traffic
$558 M | Traffic Signals
$524 M | Parking Lots and Garages
$16 M | Street Assets & Thermoplastic Paint

Did you know....

The SFMTA is the City and County of San Francisco' Department of Transportation. This makes the SFMTA responsible for all the City's bike lanes, crosswalks and street signs, in addition to the traffic and pedestrian signals described in this section.

The Asset Management Unit and Signs Shop are working on a methodology to identify and inventory the street signs throughout the City so we can monitor their condition and better plan for their replacement cycle.

Parking and Traffic Signal assets make up the bulk of the SFMTA's assets on the streets. The most visible assets are traffic signal hardware such as signal heads, pedestrian countdown signals, accessible pedestrian signals, poles, and controller cabinets throughout the City which are maintained by the SFMTA Signal Shop. Hundreds of thousands of square feet of thermoplastic green, red and white paint indicate bike lanes, bus priority lanes, and pedestrian crosswalks and are maintained by the SFMTA Paint Shop. Parking assets including lots, garages, and automatic payment infrastructure are operated and maintained by the Parking Office.

Investment in SFMTA parking and traffic signal infrastructure has waned in recent years, as indicated by the 2.30 condition score, which is below the level needed for a state of good repair. Parking infrastructure, which the Agency relies on for revenue, has a condition score of 2.14. Traffic signals are also aging beyond their useful life. As indicated by a $1.1 billion backlog, significant investments in these assets are needed in future Capital Improvement Programs.

Highlights and achievements from the past year

Streets CIP and Quick-Build Projects:
Many Bike and Pedestrian safety improvement projects throughout the city included:
- Installation or upgrades to pedestrian signals
- Sidewalk safety improvements like bulb outs and crosswalk paint
- Green thermoplastic paint for protected bike lanes

Elevator Modernization: Upgrade and modernize parking garage elevators to improve downtime and improve customer service

FY21-25 Capital Improvement Program Planned Investment

The adopted FY21-25 Capital Improvement Program highlights Parking and Signals capital investments planned for next five years

Western Addition Traffic Signal Upgrade $27M Construct or improve signals at 24 intersections and install flashing beacons at 9 intersections in the Western Addition area
Contract 66 New Traffic Signals $10M Install new traffic signals and/or flashing signal systems at up to six locations citywide
Tenderloin Signal Upgrade $16.8M Install signal improvements at 30 locations in the Tenderloin to address safety or operational concerns
Parking Meter Replacement $22M Replacement of the City's 29,000+ parking meters with updated equipment based on end-of-life issues and the use current wireless technology.
Elevator Modernization Phase 2 $.5M Full modernization of 17 elevator cabs at six garages

Long range outlook for Parking and Traffic Signals

Traffic Signal Condition Assessment will inform targeted replacement of intersections in the worst condition. Continue to improve or replace pedestrian signals and refresh thermoplastic paint in support of the SFMTA's Vision Zero initiative. Parking garages and lots need condition assessments to identify highest risk assets for replacement.

Non-Revenue Vehicles

The non-revenue fleet is vital to agency operations, as these vehicles are used for everything ranging from roadway striping, train, bus, overhead line, track, and facilities maintenance, to traffic sign and signal installation and repairs.

Asset Replacement Value
These assets represent less than 1% of all SFMTA assets

$41 M | Non-Revenue Vehicles

Condition Scores
2.11 | Non-Revenue Vehicles

Backlog
$31 M | Non-Revenue Vehicles

Oldest Asset in System
The oldest utility vehicle dates back to 1979.

Most Expensive Asset in System
$4.7 M

Did you know...

Other vehicles or equipment that make up the non-revenue fleet: Forklifts, tow tractor pushers, trailers, scissor and man lifts, welders, compressors, generators, light bars, arrow boards, cranes, tampers, backhoes, skid steerers, and speed swings.

The most unique vehicle is a Geismar Ultrasonic Rail Fault Self-Propelled, which is driven on the rail and has sensors that send ultrasonic waves into the track.

The largest non-revenue passenger vehicles can carry up to 12 staff members.

The Fleet Capital Program oversees the purchase, maintenance, compliance, decommissioning, and disposal of the non-revenue fleet (including sedans, trucks, and special vehicles and equipment,) to meet transit needs. Muni currently operates over 1,100 service vehicles across 75 transit lines.

Replacing these vehicles at the end of their useful lives will help reduce overall maintenance costs, improve operations response times, and reduce carbon emissions.

Highlights and achievements from the past year

Non-Revenue Fleet Management Program - The Agency replaced outdated non-revenue fleet that consists of light vehicles, medium and heavy trucks, and specialized vehicles and equipment that have reached the end of their useful lives.

In 2020, 172 vehicles were replaced, including 54 forklifts, 37 GO-4s, and 95 trucks and vans. In the same period, more than 40 vehicles were sent to auction.

FY21-25 Capital Improvement Program Planned Investment

Non-Revenue Fleet Management Program - More than 300 vehicles are slated for replacement in the

Fleet Capital Program Asset Assessment - This includes facilities upgrades, such as charging stations, needed for electric vehicles and equipment

Long range outlook for Non-Revenue Vehicles

Electrification of Fleet - With technology advancing, the Agency is learning about battery powered non-revenue vehicle options, including full-electric trucks and mild hybrid models that reduce idling time. Transition to electric will require facilities modifications for charging.

Essential assets – While the non-revenue fleet makes up a relatively small percentage of the overall Agency's assets, this asset class is essential to the daily operations and function of the transportation system.

State of Good Repair Investments

Since 2010, the SFMTA has made a commitment to spend an average $250 million per year on State of Good Repair investments.

Because the SFMTA operates in a fiscally constrained environment, the Agency must balance State of Good Repair needs with operations, enhancement, and expansion priorities. In 2010, the SFMTA committed to spend an average of $250 million annually on State of Good Repair over the next 20 years. This was a condition of the full funding grant agreement with the Federal Transit Administration for the Central Subway project. This goal is intended to ensure that the SFMTA balances its resources effectively between maintaining a State of Good Repair and enhancing and expanding the transportation system.

Of the $250 million per year, the SFMTA has made it a policy priority to direct these resources primarily towards "Transit Service Critical" asset classes and projects. This spending has resulted in positive results across the asset condition scores of those assets.

In calculating yearly State of Good Repair expenditures, the SFMTA analyzes expenditures at both a project-level and Capital Program-level. Some Capital Programs such as Transit Fixed Guideway are entirely comprised of State of Good Repair investments so that 100% of that Capital Program is counted towards the SFMTA's $250 million annual commitment. Other Capital Programs like Transit Optimization are only partly comprised of State of Good Repair projects and programmatic expenditures so that the SFMTA must consider such programs on a project-by-project basis to determine the amount of State of Good Repair expenditures. At a granular level, some individual projects may contain both State of Good Repair and non-State of Good Repair components. For example, the Van Ness Improvement Project currently under construction combines the expansion and enhancement element of the added Bus Rapid Transit system with the rehabilitation of existing assets including replacement of essential utilities, namely sewer and water. The Agency categorized this project as an improvement and applied 70% of its spending towards State of Good Repair.

Expenditure Average:

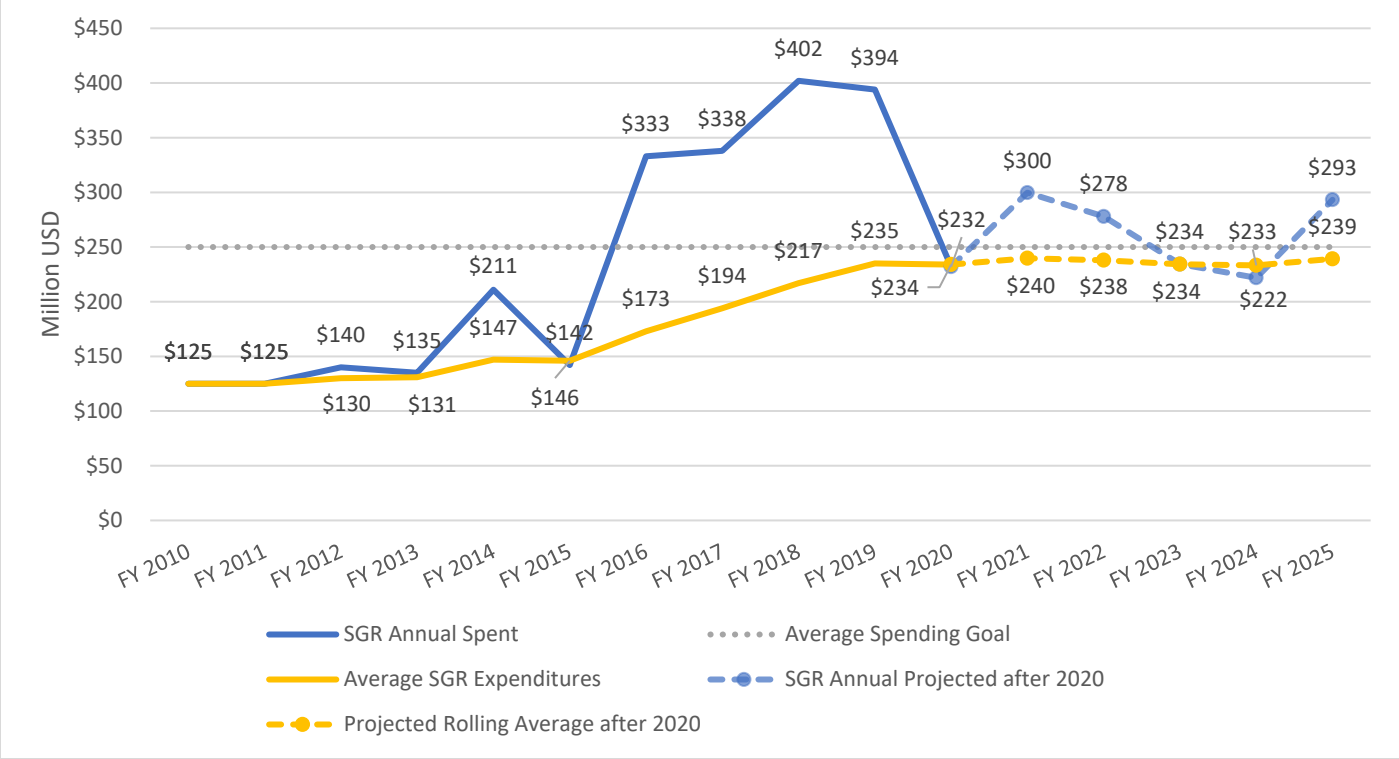
From FY 2010 through FY2020, the Agency averaged $234 million per year on State of Good Repair spending.

Actual Expenditures:

The SFMTA has increased its State of Good Repair expenditures nearly every year since FY2015. In FY 2016, the total expenditures for State of Good Repair was $333 million, a 135% increase from the $141 million spent in FY2015; another significant jump was in FY2018 during which $402 million was spent on State of Good Repair, an increase of 19% from the previous year. FY2020 has shown a significant drop of 41% from FY2019.

State of Good Repair funding in the next CIP reflects the realities of the current fiscal landscape. The FY2021-25 CIP budget is approximately $2.4 billion dollars, down $3.4 billion from the previous FY2017-21 CIP, which means that funding available for State of Good Repair investments is reduced proportionally. The FY2021-25 CIP estimates $1.3 billion in State of Good Repair spending over the 5 years of the program.

FIGURE 13: STATE OF GOOD REPAIR INVESTMENTS (FY2010-20 ACTUALS; FY2021-25 PLANNED)



2020 State of Good Repair Spending

$232 M

Average State of Good Repair Spending

$234 M

Long-Term Investment Needs

The SFMTA must continue investing in State of Good Repair at or above the current rate over the next 20 years, or aging assets will cause the reported backlog to grow.

Based on the 2020 TERM Lite analysis, it is not enough for the Agency to simply aim to meet its $250 million per year planned State of Good Repair investment goal. Figures 15 and 16 show State of Good Repair annual investment levels and their impact on the reported asset backlog, including an annual 3.5% escalation. Without accounting for escalation, the SFMTA will need to invest $13.18 billion over the next 20 years to keep its assets in a State of Good Repair. To do this and maintain the reported asset backlog at the same level, the Agency needs to invest an average of $467 million per year for 20 years in State of Good Repair assets. In order to eliminate the entire reported asset backlog, the Agency would need to invest an average of $659 million per year for 20 years on State of Good Repair needs.

When accounting for a 3.5% per year escalation rate, the 20-year investment needs rise to $17.86 billion. To fully eliminate the reported asset backlog and meet all State of Good Repair investment needs, the Agency would need to invest $893 million per year for 20 years.

FIGURE 14: STATE OF GOOD REPAIR REQUIRED INVESTMENT LEVELS (0% ESCALATION)

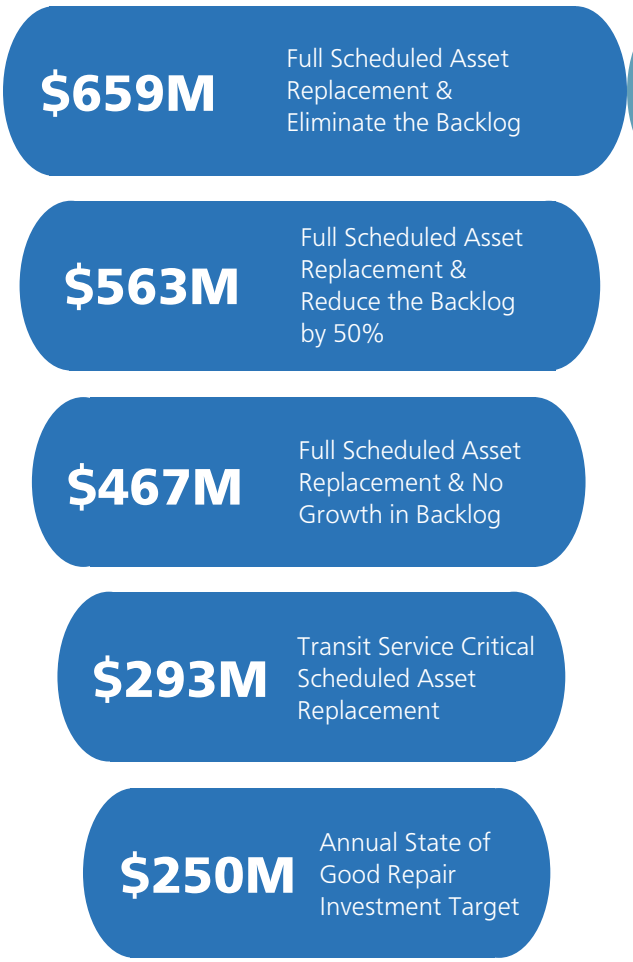
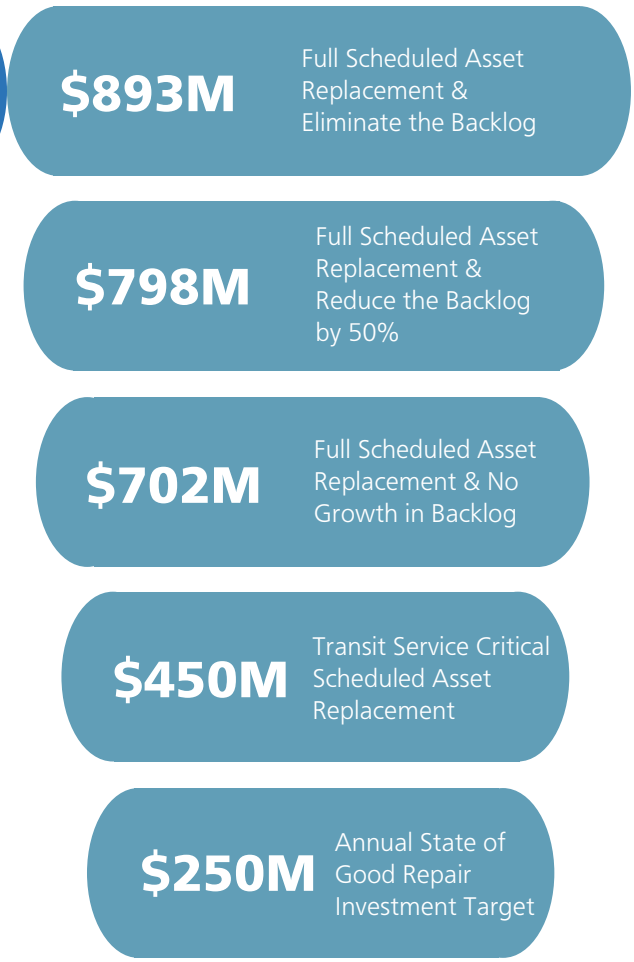


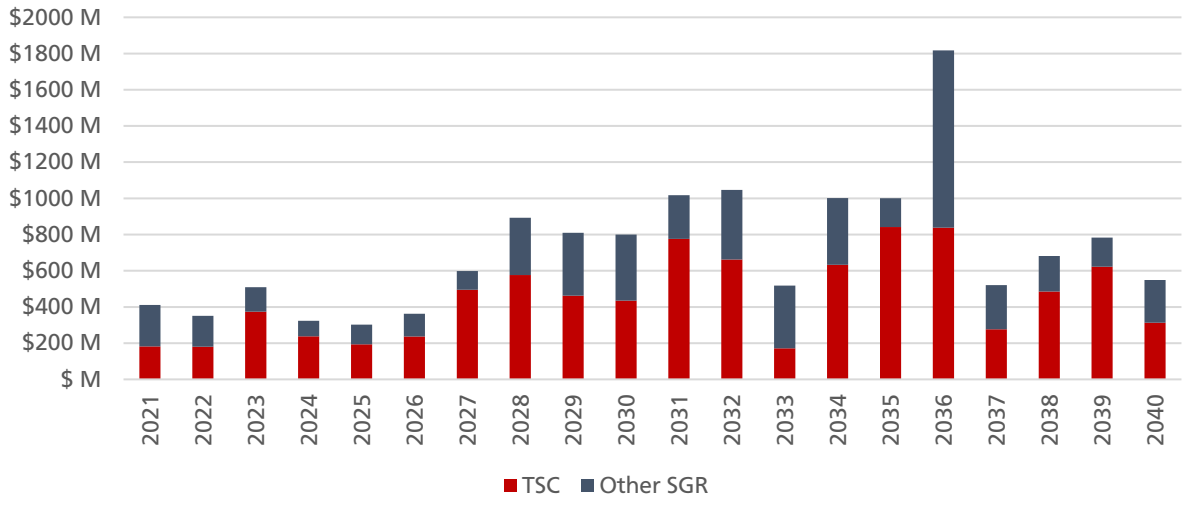
FIGURE 15: STATE OF GOOD REPAIR REQUIRED INVESTMENT LEVELS (3.5% ESCALATION)



This analysis shows that the SFMTA still has significant work to do to fully meet recommended State of Good Repair investment levels over the next 20 years. However, the Agency's proactive State of Good Repair spending over the past few years has helped to improve the future State of Good Repair outlook.

Figure 17 shows the $14.03 billion in investment needs by year through FY2040. This excludes the existing $3.83 billion reported backlog. While the model shows a relative steady rise and fall in investment need over the years, it does show a spike in investment need in 2036. The TERM Model output breaks down the FY2036 needs as 30% for overhead and track assets, 26% for facilities assets, 13% for station assets, and 12% related to transit only lane replacement. The 20 year analysis allows SFMTA to start planning projects and resources early to meet the upcoming replacement needs.

FIGURE 16: UPCOMING 20 YEAR INVESTMENT NEED



Annual spending needed to meet 20 year need and eliminate the backlog

$659 M

Annual spending needed to meet 20 year need and eliminate the backlog (3.5% inflation)

$893 M

IV. Conclusions and Next Steps

Conclusion

Overall, the 2020 State of Good Repair Report reflects the SFMTA's continuous efforts to update and refine its Capital Asset Inventory, its measurements of condition of the transportation system, and process to prioritize and deliver capital improvements that will have the greatest operational impact and value to San Francisco's transportation system.

In 2020, San Francisco's transportation system is generally in a State of Good Repair, with a TERM Lite score of 3.07. Investments in transit service critical assets have resulted in the score of these assets rising since reporting began in 2014. Non-transit service critical assets, however, continue to decline in condition score and increase the overall backlog. The SFMTA will begin to refocus its efforts on supportive infrastructure such as facilities, stations, and technology including modernization of transit yards and investment in new systems such as the Advanced Train Control System and advanced Traffic Signals.

The COVID-19 health emergency will have long term effects on the ability to invest in State of Good Repair projects. While the total available funding will be limited in future years, the emphasis on austerity in transportation spending will mean that new projects must demonstrate additional benefits to the overall transportation system. Projects that emphasize state of good repair and illustrate clear links to improvement in asset condition and performance will be prioritized in future capital improvement programs. As the Agency builds its asset management capacity, it will be in a better position to make these choices and ensure a high level of service in a heavily constrained fiscal environment.

Facilities, stations, rail, parking and traffic are some of the classes with the largest backlogs and worse age based condition ratings in the whole portfolio. SFMTA's Building Progress Program is implementing a plan to renew, rehabilitate, and replace many of the Agency's aging facilities. Subway stations and critical segments of the overhead power system and rail network are being addressed by the Agency's Subway Renewal effort. This program was initiated during the pandemic-related shutdown of the rail system and impacts of this program will be reflected in the next State of Good Repair Report. Parking and traffic signal assets represent an area of focus for future investment decisions; this requires a right-sizing of our investment in non-transit street infrastructure and a rethinking of our parking garage to minimize operating expenses and maximize revenue generating potential for the Agency.

This report continues to emphasize a trend of insufficient investment levels to fully address the Agency's aging assets; the backlog increases each year and the condition trends are declining. The SFMTA has demonstrated the ability to reverse these trends in focused areas with positive results; however, the overall system continues to decline. The SFMTA can address this through prioritizing capital investments to maximize asset condition, performance and meet replacement and rehabilitation cycles. Additionally, the Agency can address this through operating investments, to ensure sufficient workforce capacity to inspect, monitor, and maintain the condition of its assets to meet performance standards and deliver service. As the Agency develops future budgets; the true lifecycle costs need to be considered when designing and implementing capital improvements, investments must address critical customer needs, and the benefits of proposed investments must measurable.

Next Steps

The SFMTA will continue to build and mature its Asset Management Program by establishing and implementing tasks, strategies, and processes to enable efficient asset life cycle management. Future activities include:

Data Refinement and improving Street Division representation

The Asset Management Unit will continue to refine its Capital Asset Inventory data by: adding operational condition data, continuing to develop and detail an Agency-wide asset hierarchy to meet additional reporting requirements, and adding data source and personnel data to assets to support the maturation of the people and processes responsible for asset management practices at the Agency.

Station and Subway Tunnel Condition Assessment Programs

The Agency anticipates completing a condition assessment of 20% of its 1,240 individual traffic signals in FY 2022. This representative sample will allow the SFMTA to extrapolate the condition of the city's traffic signals. The assessment will include a prioritized review of deficiencies, estimates of repair options, and projected scheduled maintenance needs. The Traffic Signals Condition Assessment will result in a new inventory with more accurate condition scores and operational condition data.

SFMTA In-reach and Education

The Asset Management Unit will be conducting a comprehensive and sustained in-reach campaign to build asset management understanding and capacity across the Agency. This campaign will include making the Capital Asset Inventory easily accessible and transparent, reconvening the asset management working group, developing resources for asset maintainers and data owners, and connecting with other asset management units in other departments.

Minimum $250 Million State of Good Repair Investment

The Agency will continue to meet the minimum investment goal of $250 million per year in State of Good Repair needs pursuant to its commitment to the FTA. However, based on the analysis of the past few State of Good Repair reports, it is not enough for the Agency to simply invest in this amount per year. The Agency will need to reevaluate the minimum investment target moving forward, prioritize the funding of projects that support meeting the goal, and identify new sources of revenue to fund State of Good Repair projects.

Enterprise Asset Management System (EAMS)

As the Enterprise Asset Management System (EAMS) continues to be developed across the SFMTA, the Asset Management Unit will continue to connect the disparate data sources across the Agency and integrate these into a meaningful way in the Capital Planning process. The goal is to link up data sources across the Agency to simplify reporting processes, establish a shared understanding of the Agency's assets, and support decision making across the Agency to promote State of Good Repair.

2022 Transit Asset Management (TAM) Plan Follow-Up

The Asset Management Unit has been implementing the 15 Action Plans identified in the 2018 Transit Asset Management Plan. A priority for the next year is to use asset data to better inform the capital planning process and support cost benefit analysis for new project requests. The Agency will also start conducting bi-annual Asset Management Maturity assessments to measure asset management capacity and ensure the Agency is on track to support increased State of Good Repair decision making in the future.

SFMTA

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