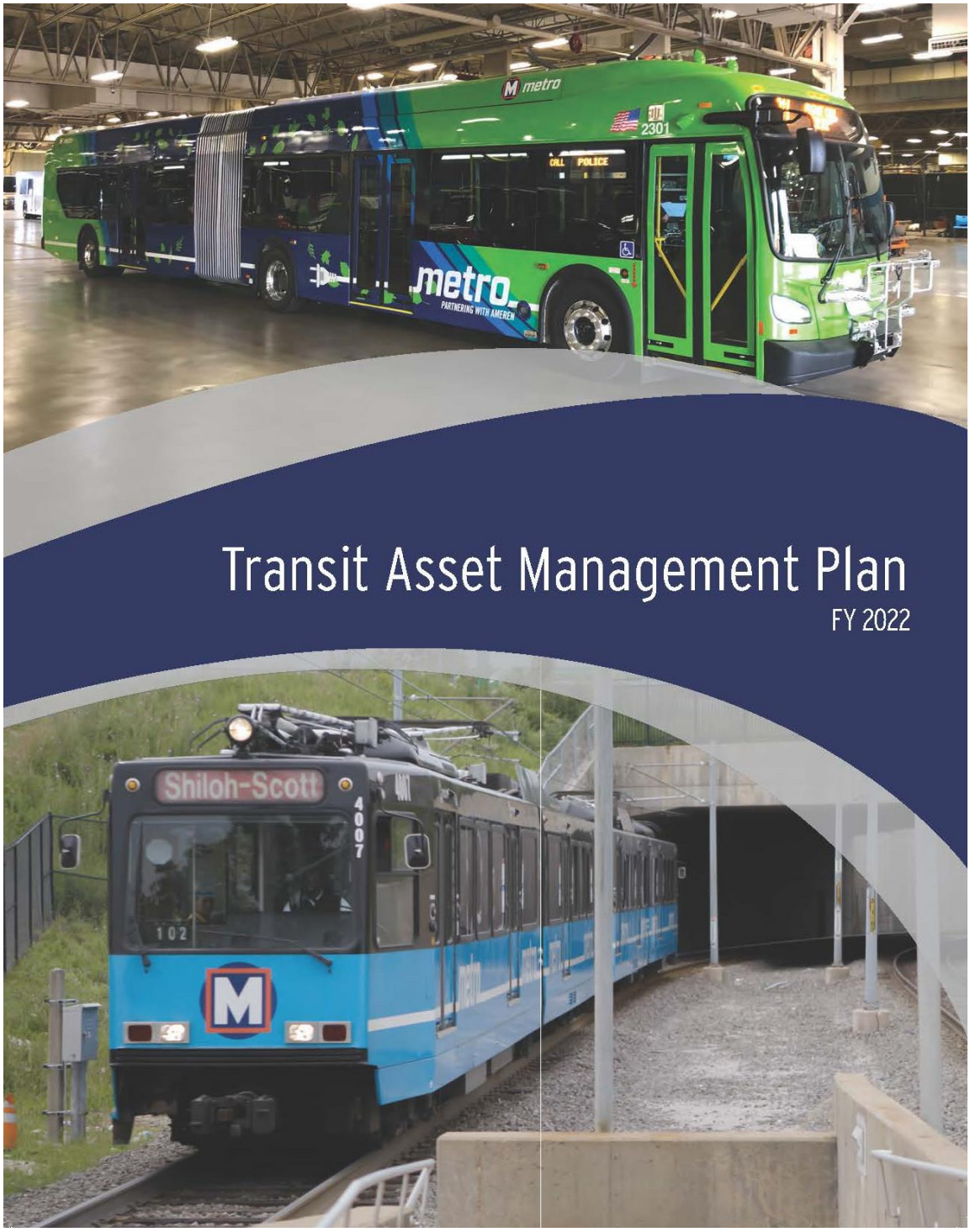

Transit Asset Management Plan

FY 2022

Policy Statement

To communicate Metro's commitment to improve asset management, senior leadership policy statement makes the link between asset management and the agency's core mission, and outlines the approach and expected outcomes. The Leadership Team developed the following **Asset Management Policy Statement**.

Metro is committed to implementing a strategic process for acquiring, operating, maintaining, upgrading, and replacing its transit assets to directly support the organization's mission of providing safe and reliable public transportation services to the St. Louis Metropolitan region.

Our policy is to continue a culture that supports asset management at all levels of the organization and the elimination of information silos within the agency. It is also our policy to employ effective asset management business practices and tools, and to ensure optimum asset performance through its useful life.

Metro's goal is to provide timely, quality data that is necessary to support a transparent and cost-effective decision-making model to obtain an optimal return on investment needed for resource allocation and asset preservation in order to operate in a maximum state of good repair.

Metro is committed to enhancing the capabilities of our exceptional personnel by providing coaching, training, innovative state-of-the-art technology, and improved business processes. Metro will ensure our workforce's ability to identify and meet Metro's asset management needs, incorporate sustainability and accessibility into our business practices. In addition, Metro will deliver to its customers a safe, valuable and reliable service for all communities for tax dollars and funding sources.

DocuSigned by:
Charles Stewart 9/21/2022
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Charles A. Stewart, Jr.
Executive Director Metro Transit
September, 2022

Approval

Transit Asset Management Plans are mandatory for all Federal Transit Administration **(FTA)** grantees per Moving Ahead for Progress in the 21st Century **(MAP-21)** legislation in 2012. Asset Management was also supported in the Fixing America's Surface Transportation **(FAST)** Act of 2015. Section 20019 of MAP-21 amended federal transit law by adding a new section codified under 49 United States Code **(USC)** 5326. 49 Code of Federal Registers **(CFR)**, Part 625 and 630 are final rule of the "Transit Asset Management". This rule implements the statutory requirements of 49 USC 5326 (b) and (c).

Furthermore, development of this Transit Asset Management Plan **(TAM Plan)** supports Metro's strategic objectives, ensuring Metro's and the St. Louis Regional Long-Range Transit Plan's goals are met. The benefits from enhanced asset management practice include improved system safety and reliability, reduced costs, better customer service, and optimized resource allocation. With aging infrastructure, limited funding, and a growing demand for service, Metro desires to find ways to better manage and extend the life of existing critical assets, while optimizing its investment in new capital projects. This TAM Plan outlines Metro's strategic approach and specific actions to improve its asset management practices going forward.

The following signatories agree to support the TAM Plan.

Transit Asset Management Plan Final Revision September 2022
Concurrence (By Executive Sponsors):

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TAM Program Manager

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Sr Director Capital Planning

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Sr Director Maintenance of Way

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Sr Director Bus & Rail Facility Maintenance & Support Services

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Director Quality Assurance and Training

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Superintendent LRV Maintenance

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General Manager MetroBus

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Jeffery Butler
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Date 9/20/2022

General Manager Call-A-Ride

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Amy Parker
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Date 9/19/2022

ADA Coordinator

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Martin Gulley
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Date 9/9/2022

General Manager MetroLink

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Date 9/19/2022

Chief Mechanical Officer

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Tom White
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Date 9/9/2022

Sr Director Grants & Project Control

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Date 9/20/2022

Assistant Executive Director Planning & Systems

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Date 9/12/2022

Vice President-Chief Information Officer

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Thomas Curran
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Date 9/9/2022

Executive Vice President Administration

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Executive Vice President Financial Officer

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_____ Date 9/12/2022

General Counsel

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General Manager Safety/Chief Safety Officer

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Kevin Scott
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General Manager Security

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Christopher Poehler
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Assistant Executive Director Engineering Systems

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Vice President Procurement & Inventory Management

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John Langa
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Vice President Economic Development

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Darren Curry
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_____ Date 9/21/2022

Assistant Executive Director Transit Asset

DocuSigned by:
Charles Stewart
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_____ Date 9/21/2022

Executive Director Metro Transit

I, Taulby A. Roach Metro President, CEO and responsible executive, do fully authorize and endorse Metro's Transit Asset Management Plan dated September 2022.

President and CEO DocuSigned by:
B6A70916C82F498...
_____ Date 9/21/2022

1. INTRODUCTION

Bi-State Development **(BSD)**, doing business as Metro, was created through an interstate compact between the states of Missouri and Illinois, ratified by the United States Congress in 1949. Metro is the largest provider of public transportation services in the St. Louis Metropolitan area. The agency oversees the operations of MetroLink, MetroBus, and Metro Call-a-Ride services. Consequently, Metro is responsible for operating and maintaining a large and diverse array of valuable transportation assets in the greater St. Louis region and more importantly, for moving people safely and efficiently throughout Metropolitan area.

The FTA, in its role as a provider of financial and technical assistance to local transit agencies, is promoting asset management as a core business process to help transit agencies manage their valuable transportation assets.

In 2012, MAP-21 mandated FTA to develop a rule establishing a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their entire life cycle. In accordance with 49 USC § 5335, agencies are required to calculate and report new data elements to the National Transit Database **(NTD)**. The TAM Final Rule 49 USC §625 became effective Oct. 1, 2016, and established four performance measures. The performance management requirements outlined in 49 USC 625 Subpart D are a minimum standard for transit operators. The purpose of this plan is to document how the NTD and TAM requirements are met. The Trapeze Enterprise Asset Management **(EAM)** program is the program of record to meet 49 USC §625 requirements.

49 CFR § 625.25 (b) transit asset management plan elements include the following and are addressed in the listed sections.

Table 1.1 TAM Plan Elements

49 CFR § 625.25	As per 49 CFR § 625.25, TAM Plan requirements include:	See TAM Plan Sections
(b)(1)	An inventory of the number and type of capital assets. The inventory must include all capital assets that a provider owns, except equipment with an acquisition value under $50,000 that is not a service vehicle. An inventory also must include third-party owned or jointly procured exclusive-use maintenance facilities, passenger station facilities, administrative facilities, rolling stock, and guideway infrastructure used by a provider in the provision of public transportation. The asset inventory must be organized at a level of detail commensurate with the level of detail in the provider's program of capital projects.	Asset lists can be requested from the TAM Department. Section 3.0 Assets and Condition Assessments
(b)(2)	A condition assessment of those inventoried assets for which a provider has direct capital responsibility. A condition assessment must generate information in a level of detail sufficient to monitor and predict the performance of the assets and to inform the investment prioritization.	Section 3.0 Assets and Condition Assessments
(b)(3)	A description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization.	Lifecycle Management Decision Support Tools
(b)(4)	A provider's project-based prioritization of investments, developed in accordance with §625.33 of this part.	Backlog & Projects
(b)(5)	A provider's TAM and State of Good Repair **(SGR)** policy.	Policy Statement
(b)(6)	A provider's TAM Plan implementation strategy.	Introduction TAM Plan Implementation Strategy table
(b)(7)	A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period. (Horizon period is 4 years as per §625.29(a).)	Introduction TAM Plan Implementation Strategy table

49 CFR § 625.25	As per 49 CFR § 625.25, TAM Plan requirements include:	See TAM Plan Sections
(b)(8)	A summary or list of the resources, including personnel that a provider needs to develop and carry out the TAM Plan.	Introduction List of Personnel
(b)(9)	An outline of how a provider will monitor, update and evaluate, as needed, its TAM Plan and related business practices, to ensure the continuous improvement of its TAM practices.	Introduction TAM QA/QC
49 CFR 625.33	As per 49 CFR § 625.33, TAM Plan requirements include: See TAM Plan Sections	
(a)	A TAM Plan must include an investment prioritization that identifies a provider's programs and projects to improve or manage over the TAM Plan horizon period the state of good repair of capital assets for which the provider has direct capital responsibility.	Introduction Lifecycle Management Asset Investment Prioritization
(b)	A provider must rank projects to improve or manage the state of good repair of capital assets in order of priority and anticipated project year.	Backlog & Projects
(c)	A provider's project rankings must be consistent with its TAM policy and strategies.	Backlog & Projects
(d)	When developing an investment prioritization, a provider must give due consideration to those state of good repair projects to improve that pose an identified unacceptable safety risk when developing its investment prioritization.	Introduction Backlog & Projects
(e)	When developing an investment prioritization, a provider must take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM Plan horizon period.	4.0 Backlog & Projects
(f)	When developing its investment prioritization, a provider must take into consideration requirements under 49 CFR §37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR §37.43 concerning alteration of transportation facilities.	4.0 Backlog & Projects

TAM is the foundation by which Metro proposes to meet and continually improve system

safety, reliability, and availability of assets. It is also a means to reduce life-cycle costs, improve investment decisions, and provide excellent service to our customers. With an aging infrastructure, and limited funding, Metro must find ways of managing and extending the life of existing critical assets, while optimizing its investment in new capital projects. The TAM Plan outlines Metro's policy, approach, and specific actions of its asset management practices.

SGR means the condition in which a capital asset is able to operate at a full level of performance. Metro is committed to implementing a strategic process for acquiring, operating, maintaining, upgrading, and replacing its transit assets to directly support the organization's mission to improve the quality of life in the St. Louis region by delivering excellent public services and dynamic regional solutions.

The TAM Plan is organized to reflect the TAM process. Figure 1 presents the asset management model. The asset management model appears throughout the Plan. The blue circle highlights the process being discussed.

Figure 1 Asset Management Model

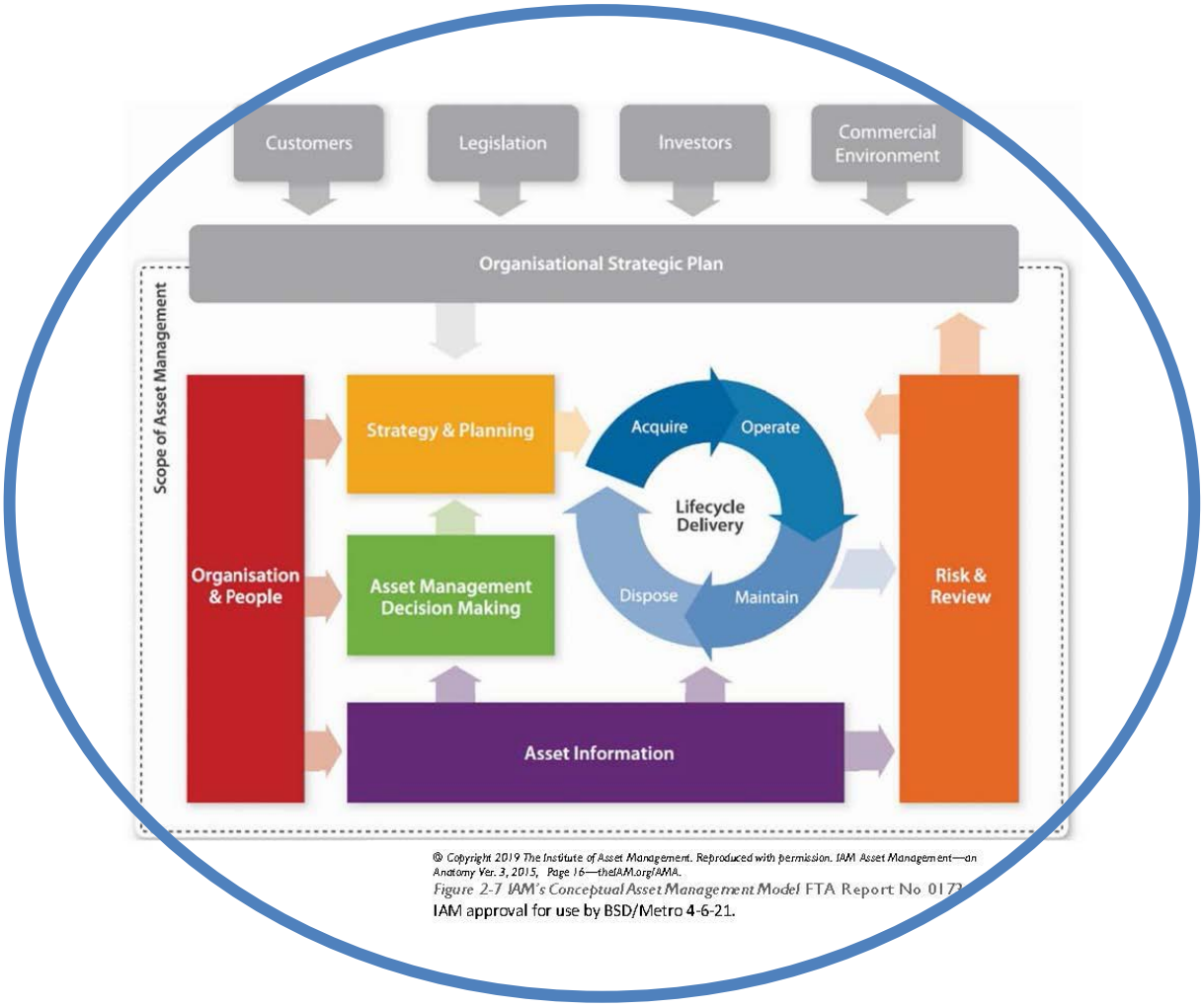


Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173

IAM approval for use by BSD/Metro 4-6-21.

In support of asset management and SGR policies, the TAM Plan includes specific goals, objectives, and implementation actions that support Metro's core values. Metro has identified four agency-wide asset management goals:

1. **Policy:** Provide agency-wide direction and leadership to ensure the implementation of asset management across the entire agency. In addition, policy is critical to establishing the vision and support for an asset management culture.

2. **People:** Identify Metro leadership positions to support asset management and support culture change throughout the organization.

   Improving skills and knowledge; and sharing within the agency enhances employees' lifecycle management competencies.

3. **Tools:** Provide infrastructure to support data-driven decision-making for asset management.

   This ensures that investment decisions are based on the assessment of organizational benefits, transparent and clearly communicated.

4. **Business Practices** Manage whole life cycle cost, risk and performance to achieve cost savings, improve service and reliability.

Metro is committed to enhancing our personnel by providing coaching, training, innovative state-of-the-art technology, and improved processes. Metro will ensure our workforce's ability to identify and meet Metro's asset management needs, incorporate sustainability, accessibility into our business practices, and deliver customer service and value for our community's tax dollars expended.

This TAM Plan focuses specifically on Metro Transit and Loop Trolley related assets. Assets that do not assist Metro with providing transit services (such as the Gateway Arch, St. Louis Downtown Airport, and other downtown attractions) are not included in this plan. Furthermore, this plan does not include financial assets or intangible assets commonly used in financial statements.

On July 21, 2022, the Loop Trolley Transportation Development District (TDD) and BSD signed a service agreement for BSD to plan, construct, operate and maintain passenger transportation facilities and rail terminal facilities. The Metro TAM department has included the Loop Trolley assets into the Enterprise Asset Management (EAM) program and TAM process. However, because BSD/Metro is a contractor to TDD, the Loop Trolley TAM Plan will be maintained as a separate document and found in Appendix A to this TAM Plan.

In support of the 49 CFR §625 and the agency-wide asset management goals, the following objectives were established to implement the Metro TAM program and to promote TAM activities. Each goal has been assigned key objectives that are intended to have positive business outcomes that will advance TAM goals. The TAM objectives will be evaluated on a four-year cycle as required by regulatory guidance.

Table 1.2 TAM Program Implementation Strategy		
Area	**BSD & Metro TAM Goals**	**Objective**
Policy	Top down commitment to TAM program and SGR.	Report on TAM program to all levels of BSD and Metro.
People and TAM culture	Promote asset management culture.	Advance awareness for TAM across all groups. Attend project management department meetings. Report changes in asset information. Develop and retain well trained TAM workforce.
Safety	Maintain all assets in SGR to support a safe operating environment.	All Metro to maintain equipment in SGR. Measure and manage TAM related risks. Cross-pollinate Safety Management System **(SMS)** with SGR and TAM program. Safety evaluates identified backlog assets (<2 ratings) and if the asset is safety or mission critical. Document root cause analysis for asset failures. Investigated by Safety Department. Asset failure documented in EAM.
Fiscal Responsibility	Build and promote financial sustainability through implementation of asset management best practices.	Establish linkage between multi-year SGR needs, annual budget, and capital planning. Develop objectives method to prioritize capital projects and assess trade-offs between competing investments. Implement life cycle cost policy.
Investing in assets/SGR	Invest in assets and SGR	Develop plan and policy consistent with MAP-21 requirements.

Table 1.2 TAM Program Implementation Strategy		
Area	**BSD & Metro TAM Goals**	**Objective**
		Establish clear capital replacement and rehabilitation plans, and monitor adherence. Develop, document and train asset management system approach with Metro Transit and Administration departments. Develop, document and train TAM and maintenance quality assurance/quality control process to Metro Transit.
Organizational efficiency	Demonstrate organizational efficiency for asset management processes and outreach to member agencies.	Build understanding and support for asset management at the executive level. Assess and implement tools to support data driven asset management decisions. Improve and expand communications with member agencies regarding well-documented SGR needs and priorities.

The objectives will be met through the TAM program. The TAM Plan is documentation of the TAM program. The TAM program is a dynamic process with continuous evaluation, revision, and change.

The TAM program and TAM Plan components will be reviewed and updated annually. The TAM Plan will be reviewed and signed off every 4 years. The current TAM Plan will be posted on the HUB in the Metro section titled Transit Asset.

1.1 Program/Plan Development & Support

Implementation of the policy and goals are a responsibility shared by all divisions within BSD and Metro. Identification of Metro personnel's roles and responsibilities in the plan development is the first step.

The ***Accountable Executive*** has overall responsibility for overseeing the development of asset management policies and procedures, in cooperation with the executive

leadership team, and reporting to the Board on the status of the asset management program. The **President and CEO** is the Accountable Executive.

The lead responsibility for asset management function rests with the ***TAM Program Manager*** serving directly under the Assistant Executive Director Transit Asset. All Divisions will support TAM policy by participating in technical working group discussions and strategy, providing asset management data and assumptions, developing and maintaining processes and procedures, developing asset management criteria, implementing TAM Plan actions, and other asset management related activities in cooperation with the TAM Team. The TAM Team works within all groups of Figure 2. The TAM Team is made up of the following divisions:

- **Maintenance Divisions –** The Maintenance Divisions will continue to provide updates of condition assessments, maintenance, rehabilitation, and replacement planning currently undertaken; and communicate data pertinent to asset management and state of good repair to EAM and the TAM Team. See Lifecycle Delivery in Figure 2.
- **Engineering Division –** The Engineering Division will provide EAM with changes to asset information and required documentation such as make, model, manufacturer, warranty, cost, expected life cycle, and original equipment manufacturer (**OEM**) manuals. See Lifecycle Delivery in Figure 2. Grants and project control are integral to the asset management decision making in Figure 2.
- **Finance, Budget, and Accounting –** Finance, Budget, and Accounting Division will provide the TAM Team access to necessary records, add detail to financial accounting data to facilitate a linkage of asset management to the budgeting process; project prioritization process, and collaborate on other asset management related activities, such as NTD reporting.
- **Business Services –** The Administration (Information Technology **(IT)** and Procurement/Contracts) will support and facilitate the implementation of asset management/decision-making support tools, other asset management information deliverables and contract specifications related activities; and ensure requirements are met prior to payment. TAM receives a copy of executed purchase requisitions to identify new assets. Include TAM and decommission sign-off for close out check list/punch out list for final payment. Business services is an important aspect of the Organization & People portion of Figure 2.
- **Safety Management Systems** – The executive team supports the formal implementation of SMS through all divisions. BSD and Metro have supported a robust safety program throughout all modes of transportation. Public Transportation Agency Safety Plan **(PTASP)** will be carried out by the Safety, Security Department. The System Safety, Security & Emergency Management Department and TAM program will be mutually supportive of the SMS and TAM process. Safety is part of the Risk & Review in Figure 2.
- **Support & Compliance –** Support and compliance of the policy will be the day-to-day responsibility of the TAM Team. Because the TAM Team does not control

day-to-day divisional operations, nor does the TAM Team have direct supervision of the divisional personnel, the superintendents are responsible for meeting required timelines, ensuring correct system data, and requesting updates to data, and inspection and other forms.

Figure 2 Asset Management Model illustrates how organization and people fit into the process.

Figure 2 Asset Management Model-Organization & People

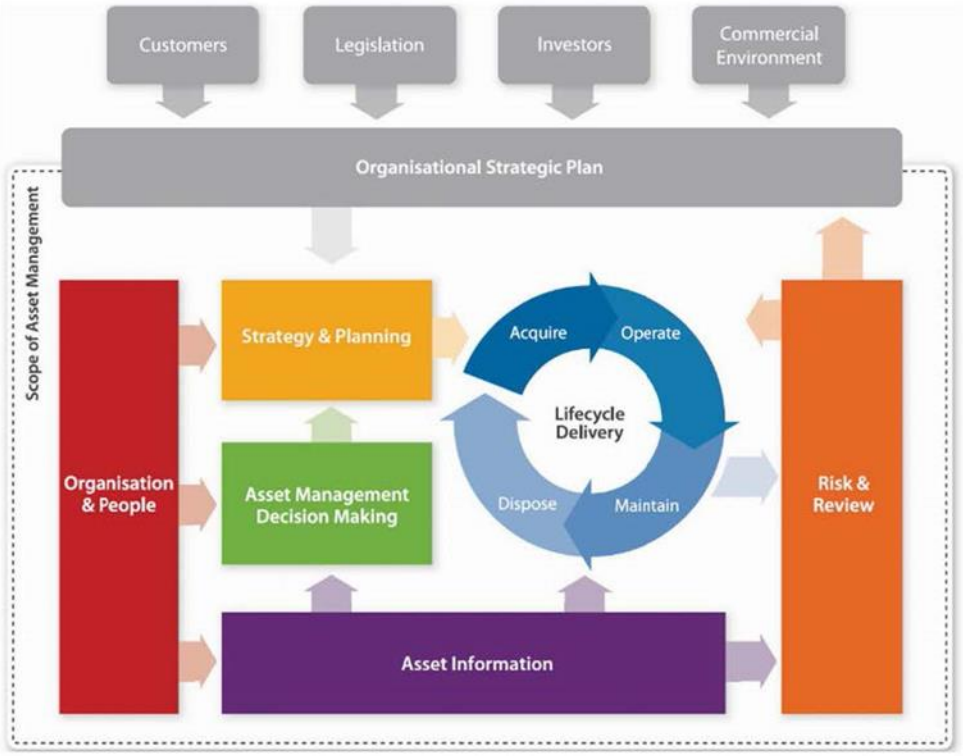


Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173

IAM approval for use by BSD/Metro 4-6-21.

The TAM Team is made up of the following personnel. The Loop Trolley asset groups are listed with some teams. Teams that support processes, will also be supporting the Loop Trolley.

Executive Team

President and CEO and TAM Accountable Executive - Taulby A. Roach
Executive Director Metro Transit – Charles A. Stewart, JR
Assistant Executive Director Transit Assets- Darren A. Curry
Executive Vice President Administration – Thomas P. Curran
General Counsel – Barbara A. Enneking
Executive Vice President Chief Financial Officer - Tamara L. Fulbright
General Manager Security – Kevin Scott
General Manager Safety/Chief Safety Officer – Andrew J. Ghiassi
Vice President Economic Development – John R. Langa
Assistant Executive Director Engineering Systems – Christopher C. Poehler
General Manager Call-A-Ride – Jeffrey S. Butler
American Disability Act Coordinator – Amy Parker
Assistant Executive Director Planning & Systems – Jessica Gershman
General Manager MetroLink - Martin Gulley
General Manager MetroBus – Trenise L. Winters
Chief Mechanical Officer – Dale L. Schaefer
Vice President Procurement & Inventory Mgt – William A. Dee
Vice President-Chief Information Officer - Kerry D. Kinkade

Asset Management Team

Sr Director Capital Planning – Kelly Hamm
- Program Manager TAM – Kristina Owen
- Vehicle Maintenance Computer System Administrator – Amanda A. Winters
- Facilities Maintenance Computer System Administrator – Lauren E. Becker
- TAM Asset (Facilities) Analyst - Sheila Hockel

Quality Assurance Team

Director Quality Assurance – Geoffrey M. Kehr
- Manager QA/QA & Product Development – Bret Klein
- Product Analyst – Jim Heidorn
- Rolling Stock TAM Analyst - Kendra M. Wilkins
- TAM Research Analyst – Theresa M. Jackson

Rolling Stock Team

Chief Mechanical Officer- Dale L. Schaefer

Bus & Paratransit – Geoffrey M. Kehr
Non-Revenue Vehicles – Tom Spurgeon
LRVs & Vintage Heritage Trolleys– Marc S. Cruz
Manager Vehicle Mechanic Training – Kyle A. Fuller

Facilities Team

Senior Director Bus & Rail Facilities Maintenance & Support Service – Enzo A. Stefano
Metro Maintenance Facilities – Brian M. O'Hara
Brentwood Bus Maintenance Facility – Kevin W. Coleman
Central Maintenance Facility, Ewing Yard and Shops – Dave S. Parker
DeBaliviere Bus Maintenance Facility – Darrel L Sterling
Loop Trolley Maintenance Facility – Darrel L. Sterling
Illinois Bus Maintenance Facility, St. Clair Yard & Shops – Duane C. Zurliene
Bus Transit Centers – Kent L. Adkins
Metro & Loop Trolley Rail Stations – Marvin E. Dixon

Rail System Team

Sr Dir Maintenance of Way – Jerry C. Bochantin

Track – Brian K. Sellers
Traction Power – Les R. Pinion
Signals – Geoff C. Bullock
Structures – Joni L. Korte
LRT Communications – Rick L. Chausse
SCADA Systems Specialist – Scott C. Streckfuss

Radio Communication Team
Manager Communications Maintenance Unit – Forrest R. Farthing

Operations Team
General Manager CAR – Jeffrey S. Butler
General Manager MetroLink – Martin Gulley
General Manger MetroBus – Trenise Winters
Superintendent of the Loop Trolley – Cynthia Scott
Planning & Systems – Jessica Gershman

Risk Management Team
Director Risk & Absence Management – Kathy L. Brittin
Insurance & Analysis – Daniel J. Frey

Safety and Security Team
GM Safety/Chief Safety Officer – Andrew J. Ghiassi
GM Security – Kevin Scott

Administration/Finance Team
Accounting – Vicki Potter
Director Financial Reporting – Craig M. Bilbrey
Accountant III – Brian K. Nichols

Revenue Team
Director Passenger Revenue – Linda Jones
Note: The Revenue Department does participate in the annual condition asset review, but does not utilize EAM in preventative maintenance or repair work order tracking.

Engineering & Grants Team
Asst Exec Dir Engineering Systems – Chris C. Poehler
Capital Projects – Tim F. Nittler
Grants & Project Control – Tom W. White
Grants & Project Control – Jackie Covington
Grants – Monica D. Smith
Grants – Jerry Taylor-Perkins

Business Services Team
Exec VP Administration – Thomas P. Curran
IT – Kerry D. Kinkade
VP Procurement & Inventory Mgt – William A. Dee

Corporate Compliance Team
Associate General Counsel - Dana W. Tucker-Redwing

1.2 TAM Program/Plan Development & Sustainment Approach

The addition of the TAM program is a driving force to many changes in the reporting functions, departmental requirements, and procedures. The process of determining best practices evolves as the TAM program is developed and utilized. Metro has had a long term vehicle preventative maintenance **(PM)** program supported with M5 and EAM. Guidelines, as directed by the FTA and NTD reporting, require reorganization of data and/or established new procedures. The TAM program is being built in phases with the end goal of a quality functioning asset and maintenance management system. Changes are in process and procedures are being implemented in order to fine tune processes, and produce quality data and functioning reporting platforms with effective forecasting of repair and forecasting the replacement of assets.

The TAM Plan and program were developed through a collaborative process that included structured involvement of key stakeholders, who continued to provide input throughout the plan's development. These stakeholders are involved in each of the three major steps of the TAM Plan and program development process, as summarized below:

1. **Baseline Assessment: Where Metro is Now?** All of the stakeholder team members participated in a baseline assessment of existing asset management practices and the maturity level in key areas. Initially, consultant staff reviewed documentation and interviewed stakeholder team members. The assessment evaluated the gap between the asset management baseline (i.e., what we do today) and best practices as outlined in FTA's Transit Asset Management Manual.

2. Definition **of Asset Management Goals and Objectives: Where Metro Wants to Be?** Through a series of briefings, workshops and breakout sessions, the TAM Team established an asset management policy and a series of goals and objectives for asset management improvement.

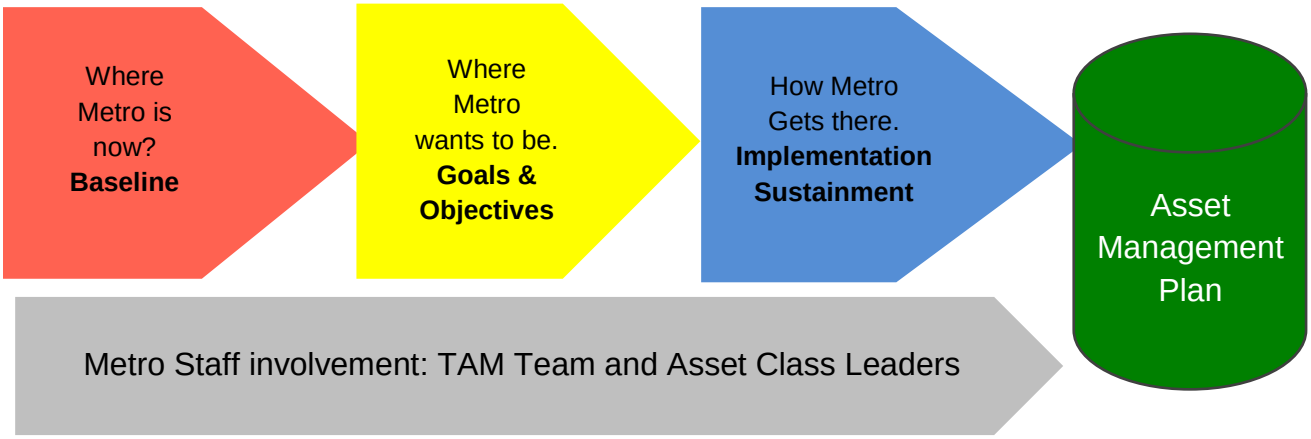
3. **Development of Asset Management Implementing Actions and Priorities: How Does Metro Get There?** Through regulatory guidance, the TAM program actions and priorities were developed.

As the implementation and data development process progresses, some of the TAM Plan elements have been implemented simultaneously. Metro was utilizing M5 as the maintenance management system. Metro has progressed to full, live use of the

maintenance management software, Trapeze EAM. The TAM program and EAM will grow concurrently.

The role of the Metro stakeholder team throughout the TAM program, development and sustainment process is illustrated in Figure 3.

Figure 3 TAM Program/Plan Development & Sustainment Process



As the TAM program has developed and gone to operating live in EAM, the process questions above are continually being asked and answered.

1.2.1 Link between State of Good Repair and Safety Programs

Metro recognizes the link between transit asset management and safety. While asset condition is not always a contributing factor in safety events, Metro believes that there is a relationship between the condition of an asset and safety performance. The FTA acknowledges that a transit asset that is in a state of good repair may be operated unsafely; conversely, a transit asset that is not in a state of good repair may be operated safely through appropriate safety risk mitigation strategies.

The TAM and Safety department's working relationship is tied together through the following participation:

1. A TAM representative attends the Safety department State Safety Oversight meeting and receives e-mail information.
2. Provide relevant asset and/or maintenance data as requested.
3. The Safety Department reviews and signs the TAM Plan.
4. Continuous communication.
5. A TAM representative participates in the Safety and Security Performance Indicators bi-weekly meeting.
6. When a report is made to the SMS Hazard Reporting process, TAM receives an email notice.
7. Safety Department personnel have been trained and are reporting to the EAM SR portal.

1.2.2 Safety and Security Program Objectives

The Safety department strives to accomplish objectives and implement activities to attain safety goals in accordance with the requirements of the PTASP and the TAM Plan and program. This includes conformance to applicable laws and meeting the needs of the affected transit mode by utilizing available resources. The following objectives are established for attaining the TAM program goals:

- Publish, revise and implement the PTASP, as well as any applicable policies and procedures, and ensure its implementation on an annual basis.
- Develop a safety-conscious culture by implanting SMS through employees, customers, and contractors.
- Identify, analyze, and resolve hazards in a timely and appropriate manner; including reporting to the State Safety Oversight Agency **(SSOA)** officials. Communicate the hazards to the TAM program.
- Determine the appropriate practices and processes to eliminate, control, or minimize hazards.
- Provide the actions and measures necessary to obtain safety-related agreements, permits and approvals from departments, agencies, or organizations having jurisdiction.
- Develop and maintain documentation of all activities related to the goals of the PTASP and its implementation.
- Share facilities and equipment inspection reports with TAM program.
- Implement Safety inspections as a regular, occurring preventative maintenance work order in EAM system. Defects would be tracked with service requests in EAM.
- TAM conducts an annual asset condition ratings review. The safety department will be provided with the completed review outcomes. Assets with ratings of 1 (Poor-Critically damaged or in need of immediate repair; well past useful life.) and 2 (Marginal-Defective or deteriorated in need of replacement; exceeded useful life.) are highlighted in red and bold font. Upon completion of asset condition review and sign off of asset review, the safety department will receive a carbon copy of the signed-off documents through DocuSign.

1.3 Data Collection, Uniformity and Relation to Data Capability

Data components are throughout the asset management framework. This section will address data on a broad concept. Data will vary between performance measure groups, however the data uniformity and requirements are the same throughout the TAM program.

Quality data produces a quality product and the ability to manipulate data filters to gain the desired results for reports and other information. Maintaining uniformity is the most challenging aspect of the data building process. The development of a naming convention must be universal and consistent. Different locations often use different terminology or names. Uniformity includes naming of units/items, standardization of processes and procedures, and standardized forms. Consistent, quality data drives everything.

1.3.1 Data Requirements

The following information is needed for each item entered in the EAM database to properly track an asset from cradle to grave. Assets are tracked through their lifecycles as required by transit asset management regulations. Transit asset management regulations include anything over $50,000, purchased with capital funds, and are critical or safety related. The data needs for rolling stock is slightly different than facilities or guideway equipment; however, the data collected includes the following:

- Sub-Class
- Department
- Location Address
- Series
- Manufacturer, Model
- Serial Number/VIN
- Expected Life
- Condition Code
- Date of Last Condition Assessment
- Maintenance Schedule
- Cost Center
- Owning Department
- In-service Date
- Purchase Price
- Funding source
- Warranty

1.3.2 Data Collection Schedule by Department

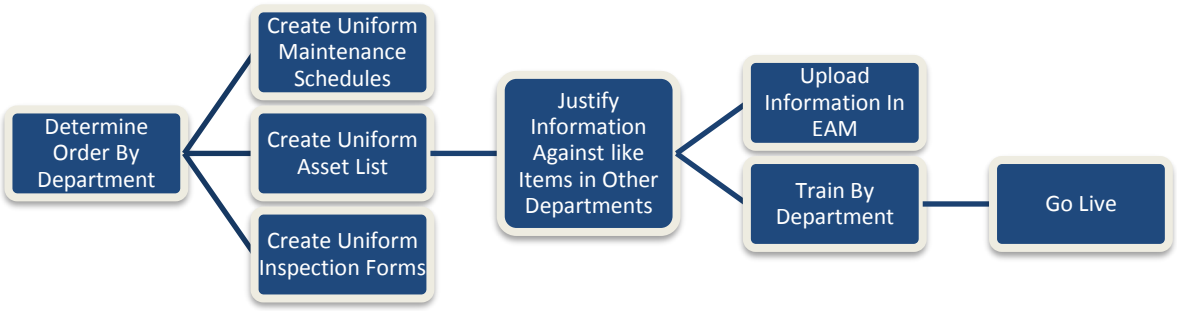
The initial inventory started in 2014 with the bus and van rolling stock. All other asset groups, non-revenue vehicles; facilities and stations; guideway and systems have been inventoried. Data collection status is as follows.

Asset	***Data Collection Target***	***Completed***	***EAM Status***
Rolling Stock	FY19	Yes	EAM Fully Operational
Non-revenue service vehicles	FY19	Yes	EAM Fully Operational
LRT Communications	FY19	Yes	Operational in EAM, but not being utilized
Structures	FY19	Yes	Operational in EAM, but not being utilized
Traction Power	FY19	Yes	EAM Fully Operational
Signals	FY19	Yes	EAM Fully Operational
Track Fixed Asset	FY19	Yes	EAM Fully Operational
Fare Collection	FY19	Yes	Operational in EAM, but not being utilized

Asset	***Data Collection Target***	***Completed***	***EAM Status***
Maintenance Facilities	FY19	Yes	EAM Fully Operational FY2020
Rail Stations	FY19	Yes	EAM Fully Operational FY2021
Transit Centers	FY19	Yes	EAM Fully Operational FY2021
RF Radio	FY20	Yes	EAM Fully Operational FY2021
Core Information Technology System, and Other "Clean Up"	As directed	No	End of FY2024
Public Safety	*As directed*	No	End of FY2024

The process of data development is illistrated in Figure 4. At the close of FY21 TAM Plan, all boxes of Figure 4 are active.

Figure 4 Data Development & Implementation Plan



1.3.3 Continual Improvement

An inventory that can be used to successfully support asset management relies upon established processes for maintaining inventory data. Metro employees have been trained in the use of the EAM program. EAM workflow, such as inspections and work orders, internal peer reviews, and percent of inspection work orders' completeness, information, notes, and accuracy will be reviewed by the TAM department and asset owners with the goal to devise a quality assurance/quality control **(QA/QC)** program for

process review. The FTA Quality Management System Guidelines 2019 is used as a resource during the process development.

The EAM System Administrator limits the access and ability to change asset data to ensure data is maintained in good quality and appropriately supports the asset management business processes. Additionally, the TAM Program Manager and the asset owners will be looking for opportunities to cost-effectively collect more data as the TAM program is utilized. To ensure this continual improvement, these processes have clear roles and responsibilities, schedules with milestones, a feedback loop, and quality assurance processes.

The inventory process organizes Metro assets into asset classes. Asset classes are then classified into maintainable units, which are organized into an asset hierarchy, thus supporting a maintainable unit that the lifecycle management procedures (for example, inspections, predictive and preventive maintenance procedures, and rehabilitation investments) are applied.

Continual improvement will also occur between the EAM data and the Metro engineering grants and capital projects team during the planning of asset replacement or refurbishment, while still in a state of good repair. By including assets still operating, the 5 and 10-year future outlook can be designed. Planning the replacement of an asset before the end of life, through the asset replacement in grants and capital projects, will enhance and support the lifecycle management.

1.4 Lifecycle Management

Metro continues the process of updating facility assets and preventative maintenance management in the EAM software as information becomes available. This system has broad implications on Metro's business processes and the interconnection with the TAM program and departments. The lifecycle management is illustrated in Figure 5 in the blue circle.

Figure 5 Asset Management Model-Lifecycle Management

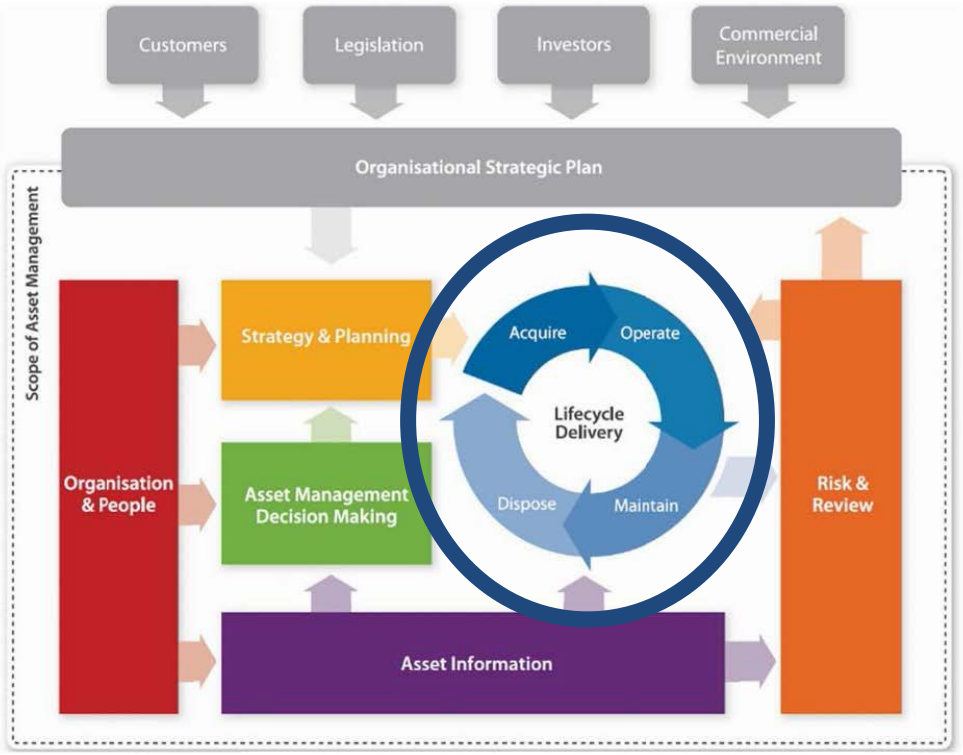


Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173
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The lifecycle management of individual assets involves a common set of activities. The EAM system tracks planned and unplanned work, lifecycle cost, condition, and performance of each class of assets and links lifecycle management expenditures, such as rehabilitation, preventative maintenance and unplanned maintenance to asset performance. The process is data-driven with the end goal of maximizing asset performance, minimizing the total cost of ownership, and managing risks. Lifecycle management adheres to the following principles:

- Consistent asset inventory with a hierarchical structure that represents management structure, departmental structure, and FTA reporting structure. It will provide accessible, consistent, and comprehensive information about that asset class. It is also intended to provide consistent information across all asset classes

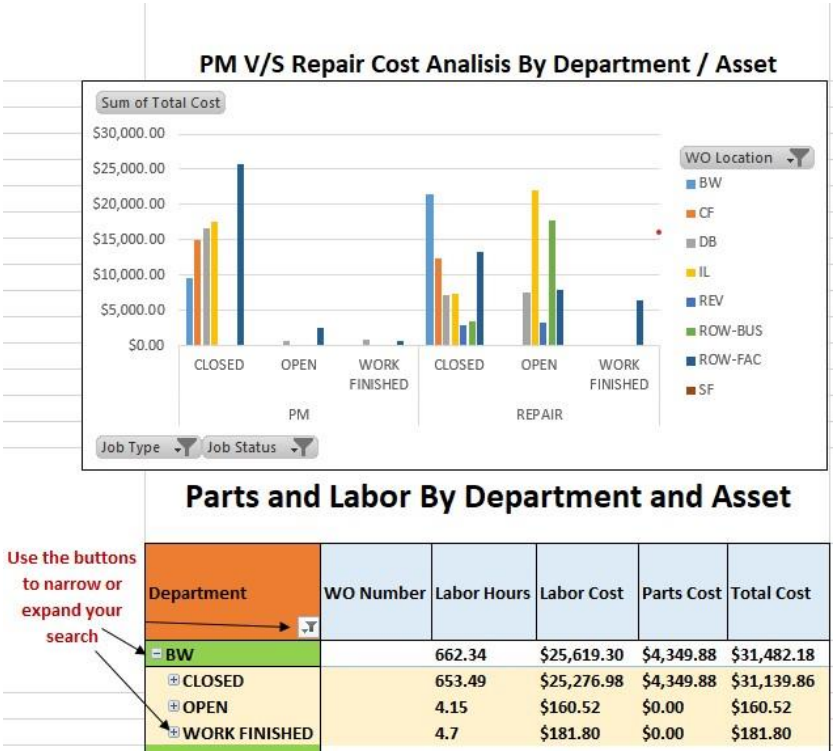
to support enterprise-level business processes, including capital programming and operations, and maintenance budgeting.

- Each asset class has different requirements for condition, inspection, and monitoring that depend on performance characteristics, risks, and impacts of failure.

- Performance Monitoring of assets will be used to improve reliability through an agency's ability to predict failure, address the root causes, and proactively plan, or the investments required to maintain good performance on the most critical assets. We will manage risk and determine needs and priorities.

- Performance Monitoring of other, such as work order open/closed, parts and labor will allow review of EAM process. Figure 6 is an example of EAM process monitoring.

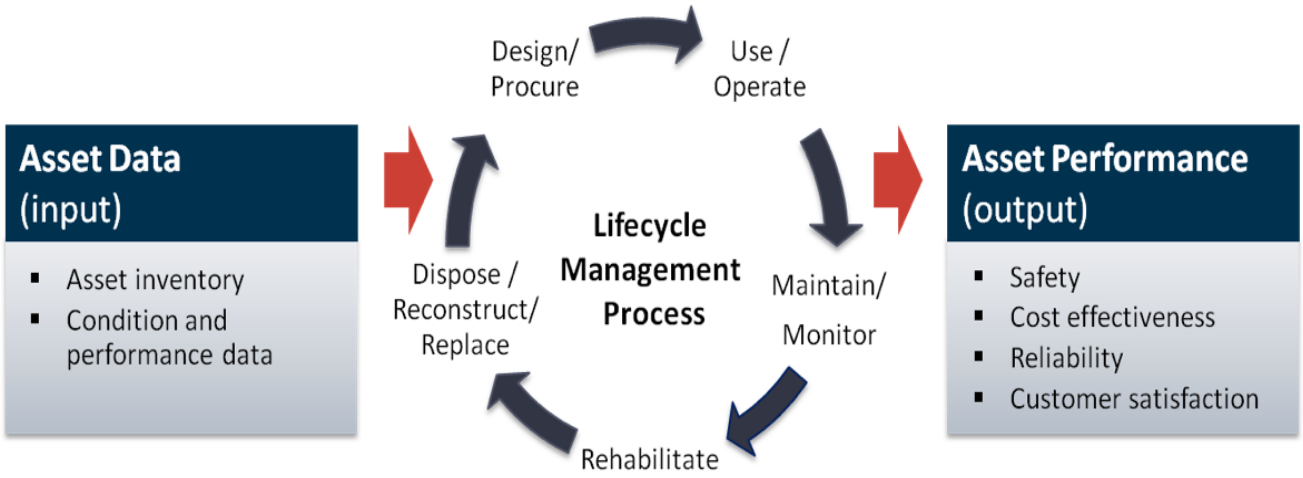
Figure 6 EAM Process Monitoring



- Lifecycle management takes into account the costs, performance, and risks associated with an asset class throughout its life. Lifecycle management is used to ensure that the performance expectations fit within the agency's broader goals and performance objectives. This will ensure all investment decisions are transparent, well-communicated, and support the agency's goals.

Figure 7 is an illustration of the lifecycle management process.

Figure 7 Lifecycle Management Process



For the lifecycle management process to be implemented as real world actions, the actions are documented and set to a time line. Table 4 illustrates the annual asset review process and NTD reporting.

Table 4 Annual Lifecycle Reporting Schedule

Month	**Annual Asset Review Process**
December	Distribute asset condition reports to asset owner.
January February	Asset condition rating review by owners.
March	March 1 asset condition review reports and next-fiscal-year target goal completed and returned to TAM.
April	Asset condition reviewed by TAM.
May	Conditions updated in EAM.
June	Incomplete reports returned to asset owner. Repeat until complete.
July *New Fiscal Year*	Assets with score change to 5 are checked against completed new equipment forms. Asset condition report returned to asset owner if new equipment form is not completed.
August	Identify <3 condition assets for short and long term refurbishment/replacement projects.
September	Completed reports signed-off through DocuSign.
	Prepare NTD data.
	Support Illinois Department of Transportation **(IDOT)** and St. Clair County Transportation District **(SCCTD)** asset management process.
October	Enter NTD data.
November	Address NTD comments.
	Run facility and rolling stock asset condition reports (88 tables for facility asset).

Disposition, addition of new assets, and updating of project status is not listed on Table 4, but is occurring continuously through the year. The new equipment form referenced above is completed by the asset owner or project manager replacing the asset.

Metro's vehicle maintenance department practice of Reliable Centered Maintenance is also a circular process. Figure 8 illustrates the RCM process.

Figure 8 Reliable Centered Maintenance

1.4.1 Lifecycle Forecasting

The end state goal is to be able to have lifecycle forecasting data available for 30 years for all assets. The EAM program will support Metro's decision-making process to predict failures and replace aged assets on a predictive schedule.

1.4.2 Asset Inventory

The asset inventory provides the data for the asset management business planning and performance reporting. Asset inventory and asset loading are an on-going process. Asset managers are required to provide a condition rating for each asset. This hierarchy provides the organization for the asset inventory and is the baseline for the data development.

1.4.3 Warranty Program

Vehicle warranties are tracked through the EAM program. Facilities and MOW warranty program will be implemented in EAM also.

1.4.4 Performance Measures

The TAM performance measure quantifies the asset performance**.** Performance measures are generated from the lifecycle process and asset information. The blue circle in Figure 9 highlights where this process occurs.

Figure 9 Asset Management Model-Performance Measures

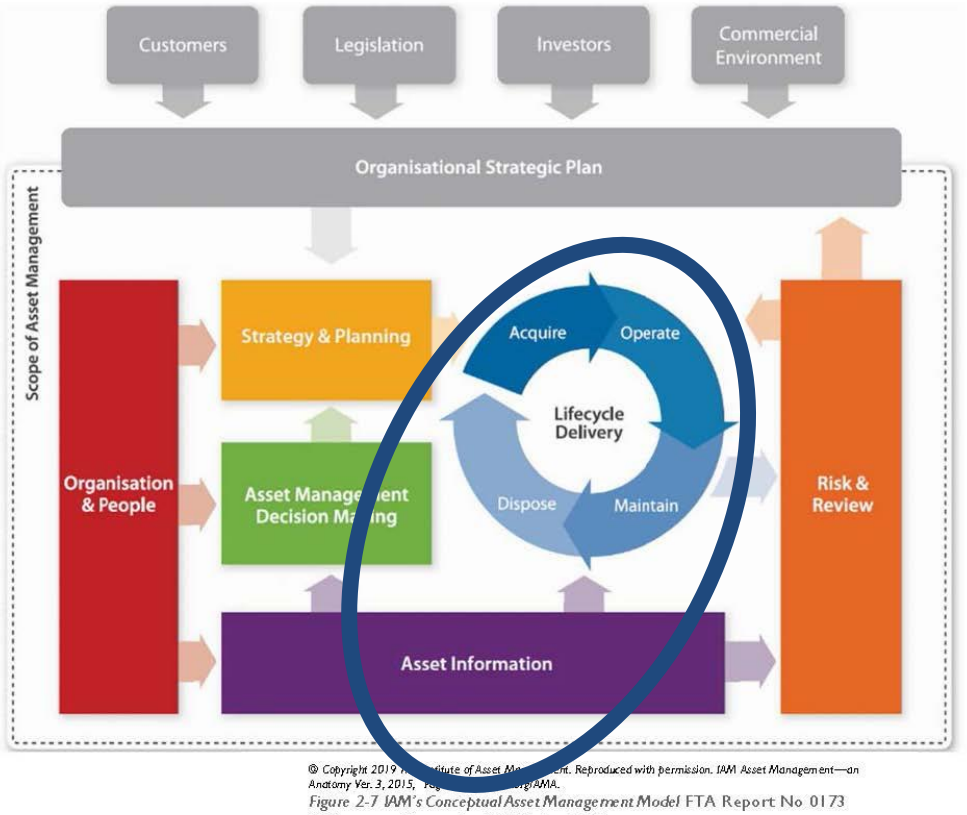


Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173

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Calculating performance measures facilitates setting targets that support local funding prioritization. Performance measure information is necessary in order to give key leadership a clear view of the organization's needs and to assess future financial needs and trends.

State of good repair is defined as the condition in which a capital asset is able to operate at a full level of performance. TAM measures performance toward SGR in three ways:

- Age - Rolling Stock, Equipment
- Performance Restriction - Infrastructure *
- TERM scale – Facilities, Infrastructure

*Performance restriction slow zone calculation based on TAM Infrastructure Performance Measure Reporting Guidebook: Performance Restriction (Slow Zone) Calculation FTA United States Department of Transportation **(USDOT)** April 2017.

Asset and performance measures are conducted in the following manner.

- **Rolling Stock***:* This includes passenger vehicles, e.g. buses, light rail vehicles **(LRVs)** and vans. The performance measurement is by useful life benchmark **(ULB)**. This is predetermined by FTA. Battery electric bus **(BEB)** is included. ULB is the expected lifecycle of a capital asset per FTA, as listed below.

Vehicle Type	FTA ULB Age
BEB Articulated Bus	14 Years
Bus	14 Years
BEB Bus	14 Years
Automobile	8 Years
LRV	31 Years
SUV	8 Years
Van	8 Years
Vintage Trolley	58 Years

Source: NTD Asset Inventory Module Reporting Guides.

- **Equipment:** This includes maintenance and service vehicles, e.g. non-revenue over and under 1-ton trucks, trailers, off-road equipment, forklifts, TUG/mule vehicles and snow removal equipment. The performance measurement is by ULB. This is determined by FTA.

Non-Revenue Service Vehicles	FTA ULB Age
Over 1 Ton	14
Under 1 Ton	8
Trailers	14
Off-Road Equipment	14
Forklift	14
TUG/Mule Vehicles	14
Snow Remove Equipment	14

- **Infrastructure**: This includes communication systems, and structures (bridges, tunnels and ancillary bridges/tunnels/culverts/retaining walls and radio towers) Performance targets are evaluated using the American Association of State Highway and Transportation Officials (**AASHTO**) manual. Traction power, signal, track, and fare collection are also infrastructure systems.

- **Fixed guideway:** Performance measured as performance restriction is defined to exist on a segment of rail fixed guideway when the maximum permissible speed of transit vehicles is set to a value that is below the guideway's full service speed. The performance restriction can be communicated through operating instructions, route signage, flaggers, or an agency's dispatch system. Performance restrictions may result from a variety of causes, including defects, signaling issues, construction zones, maintenance work, or other causes. Track segments are measured to the nearest 0.01 of a mile.

- **Facilities:** This includes maintenance, passenger, parking facilities and parking lots. The condition measure is a five-point Transit Economic Requirements Model **(TERM)** scale listed below.

TERM Rating	Condition	Description
Excellent	5	No visible defects; new or near new condition may still be under warranty if applicable.
Good	4	Good condition, but no longer new; may be slightly defective or deteriorated, but is overall functional.
Adequate	3	Moderately deteriorated or defective; but has not exceeded useful life.
Marginal	2	Defective or deteriorated; in need of replacement; exceeded useful life.
Poor	1	Critically damaged or in need of immediate repair; well past useful life.

FTA, "TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation", Version 1.2 March 2018, update Appendix B.

1.5 Performance Target Setting

A target is a goal associated with performance that is used to track the progress of capital assets towards achieving a state of good repair. Targets connect strategic goals to the actions that Metro will take to reach those goals. Performance target is a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period.

The TAM Final Rule does not require a specific process in setting performance targets. Metro's performance targets are set according to realistic expectations, available data,

expected financial, and human resources. Target setting will become more asset specific as the TAM program matures. Setting target goals is the responsibility of departmental managers or superintendents respectively. Asset performance targets are presented in the asset performance target tables of each respective asset section. **The TAM Final Rule does not lay out penalties for missing a target, nor are rewards issued for attainment**.

Performance targets are presented in the Section 3.0 Assets and Condition Assessments.

1.6 NTD Reporting

Metro annually reports to FTA's NTD. The submission includes:

- Asset inventory data
- Condition assessments and performance results
- Projected targets for the next fiscal year
- Narrative report

Metro fiscal year begins July 1st. Metro is required to complete full, NTD reporting and submit annually to FTA by October 31st.

The Loop Trolley fiscal year begins January 1st. Loop Trolley has been reporting as a reduced reporter on April 1st. Going forward as Metro reports, they will be a full reporter.

1.7 TAM QA/QC

The TAM Plan QA/QC is being developed concurrently with the EAM program. As EAM is being utilized, the TAM Department is implementing a QA/QC program. This includes regular inspection and issue resolution sessions. It is a working relationship between the asset owner and the TAM Department to ensure the accuracy of data. This will also include the following:

- TAM Team will randomly pull various inspections and work orders to ensure proper usage of EAM. This will include the following:
    - Once/year, TAM analyst will review three (3) closed annual substation preventative maintenance work order paper checklists from each MetroLink

section (phase 1, St. Clair County and Cross County) for no check-and-drag responses.
    - Twice/year, TAM analyst will review three (3) consecutive, closed preventative maintenance work order checklists from an asset group.
    - Once/quarter, TAM analyst will select 5% of a facility's assets for field check.
    - Once/quarter TAM analyst will audit one (1) QR code submitted to Facility Maintenance; and one outstanding issue identified in the MetroLink Incident Management System.
- The QA/QC will support SSOA audits through regular documentation of inspection oversight. Regular documentation will be through quarterly maintenance meetings.
- SSOA auditable path will also be supported through the inability to change the EAM database date of creation and notes.
- Compliance to processes and procedures.
- Data management and analysis.
- Review grants and project data in system.
- QA/QC program will monitor process.
- A random check of asset conditions will be established as the program matures.
- Revenue Department preventative maintenance and repair work orders will be audited.

2. DECISION SUPPORT TOOLS

Metro utilizes several tools in support of the asset management process, such as

- Oracle
- Fleet Focus cost base analysis of parts and labor
- EAM cost base analysis of parts and labor. Tracking overall condition and lifecycle analysis
- Structures ArcGIS database information interfaces with EAM
- Capital long range planning tools
- Tagetik Capital budget program and prioritization
- Safety management systems hazard analysis of EAM data
- Ridership data impact to customers and level of service analysis

As illustrated in Figure 10.

Figure 10 Asset Management Model-Asset Information

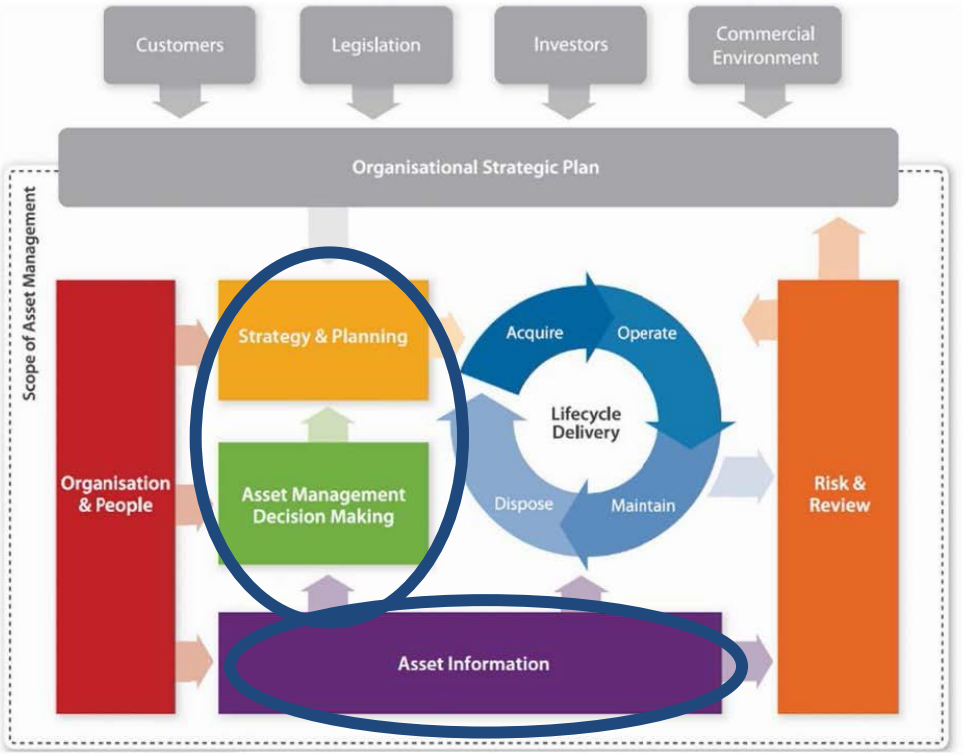

Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173

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2.1 Oracle Financial System

Metro has been using the Oracle Financial System since 2005. Oracle is the system of record for both, the fixed assets and materials management (inventory) data. The Fixed Assets Accountant and TAM Department share new and retired asset information to ensure the asset management process is working in the lifecycle process. Materials management and TAM Department work together through EAM and Oracle interfaces.

2.2 EAM Vehicle

The M5 Fleet Focus strategic plan vehicle maintenance system was implemented at Metro in 1999 as M4 and upgraded to the Web-based M5 version in 2005. In Q2 of FY 23 M5 was replaced by EAM software.

Currently, the system tracks rolling stock which includes buses, vans, LRVs, and approximately 300 vehicles and other support vehicles.

Since 2002, the agency's maintenance productivity has increased 100 percent. Without M5, Metro would have had great difficulty improving the agency vehicle reliability and reducing overall life cycle costs of its rail car and bus fleets. For buses, the agency has gone from an average breakdown after 6,000 miles to 20,000 miles between delays. In addition, Metro has been very successful in improving the reliability and integrating all of the preventive maintenance scheduling, predictive maintenance forecasting, parts data, and other maintenance performance metrics. In 2002, the agency established a preventive maintenance program for all vehicles. Key elements of this program include:

- Establishment of a set of standard operating procedures for maintaining vehicles, with schedules for key inspection and maintenance activities based on a combination of time and mileage interval.
- Development of maintenance plans describing Metro's schedules for maintaining existing assets consistent with its standards and a capital acquisition plan for the purchase of new assets
- Implementation of the M5 program to manage the fleet; the system is currently being implemented for managing facilities, ordering parts, and supporting other maintenance-related activities

Metro keeps track of maintenance requirements and needs for 30, 60, or 90 days into the future. It is one of the few transit agencies to implement an 18-month maintenance work outlook program.

M5 has added a fully integrated, automated fueling system option called Fuel Focus. This hardware and software system is unique because it manages fuel and fluid dispensing in the same database as the maintenance management application, rather than in two different programs. This system was also integrated into the EAM application that effectively replaced M5.

Software provides an intuitive, familiar Web-based user interface that Metro's senior management and bus and rail maintenance users find extremely helpful in reducing overall maintenance costs, while improving the reliability of both the rail and bus fleets. The software has assisted with Metro's reliability centered maintenance strategy that focuses on preventive maintenance, rather than the run-to-fail philosophy practiced in the past.

At a practical level, having detailed predictive maintenance data made possible by M5 and now EAM has been key to running a cost-effective maintenance operation. The improved fleet condition, original equipment maintenance recommendations and years of seamless operational effectiveness have enabled Metro to implement predictable component replacement instead of "time of failure" replacement. This enables Metro to combine some positions and eliminate others in the maintenance department. Better data, analysis, and control allow Metro to change inspection schedules to be more cost effective and efficient.

Metro has a planned maintenance schedule for its railcars, bus and van fleets from acquisition to retirement. This was designed to ensure that the highest maintenance dollars were spent at midlife, resulting in the greatest return on maintenance dollars invested. Metro also made another critical change, which was to schedule parts replacement before a part failure actually occurred. This strict predictive maintenance program and the planned preventive maintenance program were both enabled by the use of M5/EAM.

Vehicle Intelligence is a collection of computer data from transit buses. The data is utilized to predict future failures.

2.2.1 Type of Data

EAM data is focused on equipment classification, utilization, availability, assignment, accounting, life-cycle tracking and basic equipment information.

There are numerous pieces of information that impact whether an organization can successfully manage equipment throughout its known life. Cost, condition, usefulness, and classifications, as well as the need for the equipment, are all part of the picture. This pertinent information is needed in order to know that Metro has the right equipment in the right place at the right time to deliver revenue service to the public.

EAM also provides Metro with the ability to attach files, images, and links to a work order, asset primary records, parts records, etc. All of Metro's inspections consist of electronic and paper documents that are attached to standard jobs that a mechanic fills out. The mechanic then attaches the inspection form to the work order. Additionally, Metro attaches all title information, licensing information, sale/disposal information, recalls, and any other pertinent information to units within the EAM application.

2.3 Facilities Data

Facilities data has transitioned to the EAM program.

Each facility is broken down into primary categories: substructure, shell, interiors, conveyance, plumbing, heating, ventilating and air conditioning **(HVAC)**, fire protection, electrical, fare collection equipment, facility related equipment, parking lot, and site; as required by FTA. Assets within these categories are inspected on a regular basis (e.g., monthly or weekly). Information related to asset inspections is maintained in Trapeze EAM. In some cases, the inspection documentations are too large and complex to be effectively built within the system. In these cases, inspection documents are completed on paper, scanned and attached to the preventative maintenance work order.

Asset groups operating in EAM, conduct and finish facility inspections on either desktop or tablet checklists. EAM also has the ability to attach photos and pdf documents to the inspections.

Based on the inspection requirements (e.g., weekly or monthly) specified in the EAM system, the system automatically generates scheduled inspection requests. In addition to the scheduled inspection requests, there are other unscheduled repair work requests. These requests are also input into EAM and a work order is generated for each of them.

In the EAM system, cyclical maintenance schedules have been set up for maintenance of way, right of way, and facility maintenance. The inspection form is part of the EAM preventative maintenance checklist. In some cases, files are too large or too cumbersome to be a checklist in EAM.

2.4 Structure Assets – Inspection and Inventory

Metro has established a detailed engineering asset inspection and maintenance policy that covers all MetroLink structure assets. The scope of this standard includes all fixed structures that support or carry loads, including bridges, tunnels and associated ancillary structures, retaining walls, culverts, and other special structures such as parking garages, communication towers, and elevated station platform structures.

Metro's structure condition rating procedures are documented in the MetroLink Standard for Structures Inspection and Maintenance. Metro structure condition ratings are based on the existing condition of the structure as compared to its as-built condition. The determination of which ratings apply to each of the structure components are based on the evaluation of all relevant factors and information available. Condition rating values used are on a scale of 0 to 9, with 0 defined as "Failed Condition" and 9 defined as "Excellent Condition". This rating scale is based on AASHTO's Manual for Bridge Evaluation, which is referenced in the National Bridge Inspection Standards established for highway bridges in 23 CFR 650, Subpart C, and is in accordance with American Public Transportation Association **(APTA)**'s "Standard for Rail Transit Structure Inspection and Maintenance" (APTA RT-FS-S-001-02 Rev1) document. Metro's structures are routinely inspected on frequencies ranging from two to five years. Inspection reports provide condition ratings, noted deficiencies, recommended repairs, and photos for each inspected structure.

Metro has developed an electronic-based asset inventory and inspection database for MetroLink structures that utilizes ArcGIS. ArcGIS is a commercial software developed by ESRI, with features that have been customized to fit Metro's needs. This database tool was first developed for Metro in 2006, and has been expanded and upgraded continually.

The ArcGIS database combines the power of geographic information system **(GIS)** location capability with a detailed information database. The database provides Metro the ability to quickly access, identify, and track the condition of critical structure assets required for safe and reliable operations. Additionally, all available information including inspection reports, plans, design calculations, photographs, operational agreements (easements, snow removal, limits of responsibility), emergency operational risks (seismic, flood/scour, vehicle impact, barge impact), utility crossings, and repairs for any structures asset is compiled in one accessible location. This system allows for all of the information for a particular asset to be assembled and viewed across departments needing access to the information.

This type of total asset visibility allows different departments to gather current information without going through a gatekeeper or other departments that could delay a time-sensitive

response. This is particularly important in the cases of an emergency that occurs along the alignment. With complete access to all pertinent records of a particular asset, quick and competent decisions can be made. This system is particularly useful for identifying assets that are not in a state of good repair, documenting the deficiencies and justifying rehabilitation/replacement decisions.

2.5 Asset Investment Prioritization

Asset investment prioritization is conducted concurrently through two sources.

1. Capital budget request process. Assets closer to passing SGR requested for replacement consideration.
2. Capital project approved project. The asset replacement or rehabilitation has been approved and funding identified.

Metro has a thorough Capital Budget Request process for construction/rehabilitation, new equipment/replacement, and major computer software procurement/development. The prioritization of a request is a two-tiered process, based on the project's priority and its impact on the agency's strategic planning goals and objectives for the three-year budget cycle that is being developed. The primary tier is the priority assigned to the project. The second tier is the project's anticipated impact on the daily operation. The project ranking is a static rating, based on the project type. The impact of the project is presented in a composite score of several independent criteria that allows points based on the project's impact toward meeting the agency's strategic planning and objectives. The Capital Budget Request process is documented in the BSD Capital Budget Manual. The Capital Budget Manual is revised annually to reflect the current grant program requirements.

After the initial scoring by the Program Development and Grants Department, based on the input from the project manager's requests, senior management conducts an analysis of all projects and determines the project's prioritization within the capital budget process.

Capital projects must be approved by the Commissioners of the Bi-State Development (Metro) as a part of the annual Operating and Capital Budget approval process. The projects are then submitted to the EWGCOG for inclusion in the Transportation Improvement Program **(TIP)**. The TIP is a schedule of transportation improvements planned by various agencies in the bi-state area. The TIP is approved by the Board of Directors of the East-West Gateway Council of Governments. EWGCOC is the metropolitan planning organization **(MPO)** for the bi-state area which includes the City of St. Louis; Franklin, Jefferson, St. Charles, and St. Louis counties in Missouri; Madison, Monroe, and St. Clair counties in Illinois. The Board of Directors is made up of the locally elected officials of those areas. Following the approval of the TIP, the Statewide

Transportation Improvement Program (**STIP)** must be approved. The STIP is a federally required document that provides the Federal Highway Administration **(FHWA)** and the FTA a listing of all projects that are candidates for federal-aid or regionally significant projects that are not using federal aid. For the bi-state area, the STIP is submitted to both the State of Missouri and the State of Illinois for approval by the respective governors of each state.

In addition, Metro's sustainable asset life cycle for the bus fleet provides critical data for analyzing costs of operating a safe and reliable transit service, which benefits the customers at significant cost savings. This TAM program forms the basis for long-term financial planning (a projection of future expenditures) that reconciles both the objectives of operations and maintenance and capital budgeting, thus collectively contributing to extension of the useful life of all assets. It is essential that capital asset investments are systematic and data driven as well as it is necessary to conduct scheduled asset condition assessments and monitor performance metrics, so that Metro can continue to be a good steward of public funds.

The capital budget process includes input from the following departments to ensure inclusion and appropriate notification of scope of work during new, refurbished and retired assets projects.

- Americans with Disability Act **(ADA)** Services
- Risk Management and Claims
- Safety Department
- Public Safety Department

3. ASSETS AND CONDITION ASSESSMENTS

The following sections are the asset summaries. Asset classes are grouped as rolling stock, equipment, infrastructure or facilities. Each asset class is further broken down into sub-assets with related assets. The following plan sections are divided by asset class. This is the summary and big picture of the TAM program. Detailed asset list can be provided upon request. The asset class level is illustrated in Figure 11.

Figure 11 Asset Management Model-Asset Information

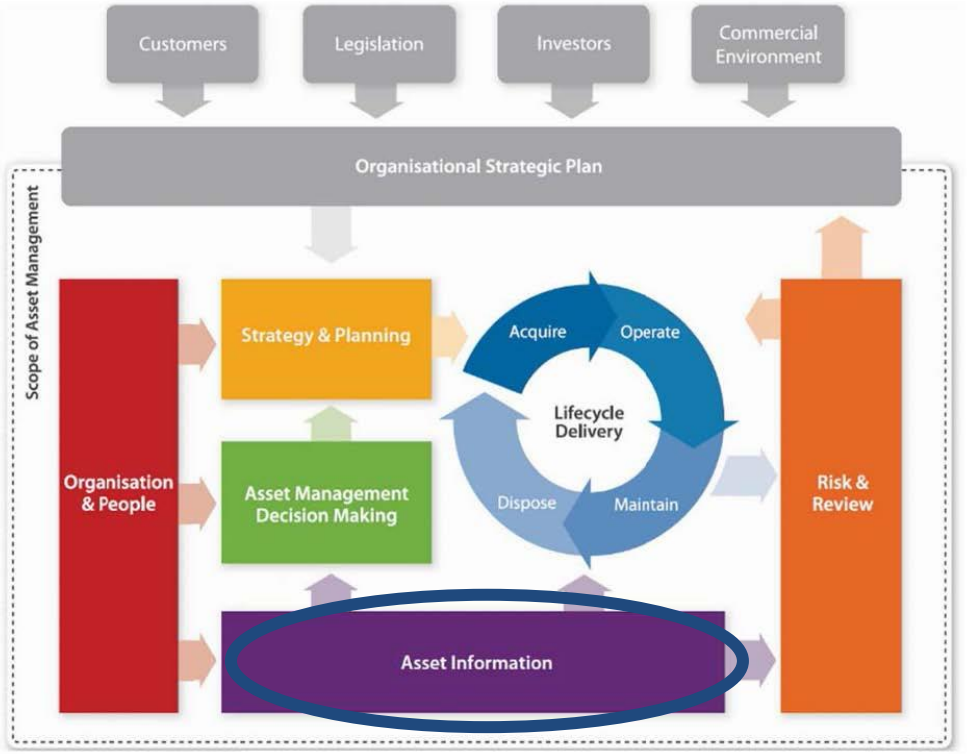

Figure 2-7 IAM's Conceptual Asset Management Model FTA Report No 0173

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The asset class break down is a challenge, in that there are many ways to group systems. Grouping could be by department or location. One way may work better than another for different data needs. The goal was to separate by departmental organizations and like equipment. However, these divisions must be functional in the new EAM system. Metro understands there will be changes to how the asset classes are grouped as the TAM program is used. At this time, Metro's asset categories are as follows:

ROLLING STOCK		INFRASTRUCTURE	FACILITIES
Passenger Vehicles • *Bus* • *Van* • *LRV* • *Vintage Heritage Trolley*	**Non-Revenue Service Vehicles** • *< 1 ton trucks* • *>1 ton trucks,* • *Trailers* • *Snow removal* • *Tugs & mules* • *Forklift* • *Off Road Vehicles*	**System Communication** • *Communication (SCADA, PA, CCTV)* • *RF Radio* • *Core IT Systems*	**Maintenance** • *Ewing Y&S* • *St. Clair Y&S* • *Central* • *BW garage* • *Il garage* • *DeB garage* • *DeB power house* • *Swansea* • *Sarah*
		Structures • *Bridges* • *Tunnels* • *Ancillary Bridges* • *Ancillary Tunnels* • *Ancillary Culverts* • *Ancillary Retaining walls* • *Select Radio* Tower Structures	**Parking** • *Parking lots* • *Parking garages*
		Systems Guideway • *Traction power* • *Signal* • *Track*	**Passenger** • *Rail Stations* • *Transit Centers*
		Systems • *Fare collection* • *Security*	

3.1 Rolling Stock-Passenger Vehicles Bus, Van, LRV & Vintage Heritage Trolley

Rolling stock includes Metro passenger vehicles. Passenger vehicles include 392 buses, 87 LRVs, 123 paratransit vans and 3 vintage heritage trolleys, totaling 605 passenger vehicles. A detailed list of vehicle assets can be provided upon request.

This multi-modal system serves a six county area in Missouri and Illinois. Metro operates buses throughout this region. Bus service operates 365 days per year from 4:00 AM through about 2:00 AM. Light rail service operates from the Scott Air Force Base in Illinois to the Lambert Airport in Missouri, with a southward eight-mile extension to Shrewsbury, Missouri. Light rail runs through a central corridor of the Metropolitan area and is well served by bus and van service. Call-A-Ride paratransit service, operates throughout the Missouri side of the Metropolitan region. This service exists to augment bus and rail service and mirrors their hours of operation.

The stability and uniformity of the revenue fleets have greatly enhanced Metro's Vehicle Maintenance Team's ability to plan and execute a traditional preventative maintenance plan.

The result has been exceptional equipment reliability, a high standard for safety and cost control. System on-time performance and customer satisfaction has been elevated over the last several years in recognition of equipment that is maintained as close to new standards as possible.

At the center of the great success that the Vehicle Maintenance Department **(VMD)** enjoys is a comprehensive predictive maintenance plan in conjunction with a vehicle replacement plan for all revenue equipment. This plan, conceived in 2002, recognizes a vehicle at the time a specification for the equipment is written all the way through the vehicles useful life to time of disposal. VMD utilizes the philosophy that when parts and labor costs equal the original purchase price, the equipment has met its useful life. Maintenance and preventative activities, as well as unit replacement and structural maintenance actions, are all predetermined, charted and planned for specific time points in the life of that vehicle.

Rolling stock is evaluated using by years ULB and the TAM ULB scale of evaluation. In addition, a non-TERM scale, also of 5 (excellent) to 0 (end of life), is utilized to evaluate vehicles. In addition, measures of performance adapted as performance indicators by the Metro Vehicle Maintenance Department are also:

- Inspection on time performance
- Mean distance between failures
- Worker Comp injuries
- Customer complaints for revenue equipment

Performance standards and indicators are measured and monitored on a monthly basis, reported to the Executive Director of Metro Transit quarterly, and adjusted annually to reflect operational considerations. Performance standards and goals are measured by division and mode of operation.

3.1.1 Bus

Metro VMD utilizes a calculated vehicle evaluation to determine bus or van decommissioning. Evaluation is based on performance, not just age. The cumulative fleet information table includes

- Cost life to date (**LTD**) parts and labor vs. purchase price in 20% increments
- Cost per mile based on fleet average in $.05 increments
- Performance considers mean distance between failure (**MDBF**)
- Safety is rated by bus safety features
- Reliability refers to work accomplished code (**WAC**) 62 vs fleet average
- Miles 500k x .20% increments
- Age 12 years 20%

Cumulative fleet information is listed in the following table.

UNIT_NO	Number of Vehicles	MILEAGE	$ per mile	Years in Service	Cost = (LTD P&L /purchase price)	Cost per Mile (lifetime)	Performance	Safety (ABS & ATC)	Reliability (Section Total)	Miles	AGE	Section Score	Condition Section 3	FTA Score
2001-2055	7	6,081,150	$ 0.84	22	1	2	3	5	3	1	1	1	1	1.94
2070-2079	9	2,380,137	$ 1.13	8	1	1	2	3	2	3	3	3	3	2.41
2080-2086	7	1,384,021	$ 0.94	6	3	2	2	5	3	4	4	4	4	3.49
3101-3194	7	6,005,021	$ 0.72	21	1	3	3	5	3	1	1	1	2	2.16
3227-3278	3	2,238,993	$ 0.69	20	1	3	3	5	3	1	1	1	2	2.15
3401-3412	4	2,505,710	$ 0.92	20	1	2	2	5	3	1	1	1	1	1.83
3501-3523	25	15,908,636	$ 0.81	14	1	2	3	5	3	1	1	1	1	2.03
3601-3604	4	3,394,258	$ 0.79	13	1	3	4	5	3	1	1	1	2	2.17
3801-3859	50	26,314,546	$ 0.78	11	1	3	4	5	3	2	2	2	2	2.51
6601-6658	43	22,551,318	$ 0.73	10	2	3	4	5	3	1	2	2	2	2.55
6701-6758	51	23,248,075	$ 0.64	9	3	4	5	5	4	2	3	2	3	3.36
6801-6854	51	20,722,902	$ 0.67	8	3	4	3	5	4	2	3	3	3	3.20
6901-6954	47	15,443,257	$ 0.67	7	3	4	4	5	4	3	3	3	3	3.53
7001-7054	30	7,378,674	$ 0.64	5	4	4	4	5	4	4	4	4	4	3.96
7101-7154	28	5,270,119	$ 0.53	4	5	4	4	5	4	4	4	4	4	4.24
7201-7253	20	3,166,128	$ 0.47	4	5	5	4	5	5	4	4	4	4	4.34
7301-7355	26	2,102,553	$ 0.37	3	5	5	4	5	5	5	4	5	5	4.64
2301-2314	14	132,644	$ 0.34	1	5	5	2	5	4	5	5	5	5	4.47
7401-7404	4	17,586	$ 0.91	1	5	2	2	5	3	5	5	5	5	4.11
7551-7577	27	942,674	$ 0.36	1	5	5	5	5	5	5	5	5	5	4.91
													Average	3

3.1.2 Van

Cumulative fleet information is listed in the following table.

UNIT_NO	Number of Vehicles	MILEAGE	$ per mile	Years in Service	Cost = (LTD P&L /purchase price)	Cost per Mile (lifetime)	Performance	Safety (ABS & ATC)	Reliability (Section Total)	Miles	AGE	Section Score	Condition Section 3	FTA Score
4330-4379	21	11,057,298	$ 0.44	14	1	2	2	5	3	1	1	1	1	1.96
4401-4425	17	9,397,374	$ 0.51	12	1	2	2	5	2	1	1	1	1	1.77
4430-4453	19	9,592,367	$ 0.52	12	1	1	2	5	2	1	1	1	1	1.72
4501-4537	37	12,761,698	$ 0.48	4	1	2	2	5	3	2	2	2	2	2.37
4601-4317	17	4,163,865	$ 0.47	6	3	2	2	5	3	3	2	3	3	2.78
4701-4722	22	690,769	$ 0.20	2	5	5	2	5	4	5	4	5	4	4.31
4801-4820	20	442,514	$ 0.24	1	5	5	2	5	4	5	5	5	5	4.57
													Average	2.78

3.1.3 LRV

Cumulative fleet information is listed in the following table.

LRV Series	Quantity	Year	Make	Model	FTA ULB Years	Age in Years	How Many Years left in Useful Live FTA	Calculated Remaining Life Cycle Percentage Remaining
LRV1	31	1992	Siemens	SD 400	31	30	1	3%
LRV2	10	1999	Siemens	SD 460	31	23	8	26%
LRV3	24	2000	Siemens	SD 460	31	22	9	29%
LRV4	22	2004	Siemens	SD 460	31	18	13	42%
TOTAL LRV - 87			**WEIGHTED AVERAGES**			**23.25**	**7.75**	**25%**

Metro completed an LRV Fleet Assessment and concluded that replacement of the LRV1 fleet was more cost effective than conducting a lifecycle extension. The LRV1 series is anticipated to surpass its useful lifecycle by the time replacement vehicles arrive. The LRV series 2 and 3 vehicles will soon require replacement shortly thereafter as their useful life should conclude in 2030. The LRV4 series are anticipated to operate slightly beyond their useful life to 2040 with some targeted subsystem upgrades of future obsolete equipment.

3.1.4 Vintage Heritage Trolley

The three vintage heritage trolleys are subdivided into 2 fleets. Trolleys 001 and 002 are restored replicas that previously operated in Portland, Oregon from 1992 through 2013. Key components were sourced from retired PCC cars that originally operated for the Chicago Transit Authority including:

- Trucks
- Wheels and axles
- Running gear
- Controllers
- Pneumatics
- Brake equipment

Trolley 003, also known as the W2 class tram, is a refurbished trolley that originally operated in Melbourne, Australia. Five W2s were subsequently sold to Seattle and operated until service was discontinued in 2005. Three of the five W2s were then sold to the Loop Trolley. Only Trolley 003 has been refurbished at this time. Nearly all of the equipment is of original vintage.

3.2 Rolling Stock Non-Revenue Service Vehicles

Non-revenue service vehicles includes the following.

Sub Class	Factored ULB	Quantity FY 2022	Quantity Past ULB FY 2022	FY 2022 Remaining Life Cycle (Years)
Over 1Ton	14 years	85	44	0.1
Under 1 Ton	8 Years	113	83	-1.3
Trailers	14 years	42	17	-0.6
Off-Road Equipment	14 years	54	22	-1.4
Forklifts	14 years	14	11	0.1
TUG/Mule Vehicles	14 years	4	3	-1.2
Snow Removal Equipment	14 years	38	20	-0.3
Total		**350**	**220**	**-4.6**

3.3 Infrastructure - Communication

The system communication group includes light rail train communication, and radio frequency **(RF)** radio. The radio system is maintained by four groups.

1. Light Rail Transit **(LRT)** Communications includes the light rail communication systems. Asset information presented in section 3.3.1.
2. RF radio communication equipment such as the bi-directional amplifier or Motorola Astro RF site. Asset information presented in section 3.3.2.
3. RF radio facility is the building the equipment is housed in Asset information presented in section 3.3.3; and
4. Radio tower structure. Asset information radio tower structures is discussed in Section 3.4.4.

3.3.1 LRT Communication

LRT Communication performance targets are listed below. The performance targets are TERM scale. As the TAM program develops, data history will be collected and trend analysis will be performed. This will apply to all assets.

Performance Targets LRT Com FY2022			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
Clocks	3	3	3
CTS	3	2	2
Fire Intrusion	1	1	1
IVS	2	1	1
CCTV	3	1	1
ROW Telephone	4	3	3
OSP (cable plant)	2	2	2
PA	3	2	2
PAT	3	3	3
SCADA	2	1	1
TVCS	3	3	4
TVM Network	3	3	3
UPS	2	1	1
Fiber Cable	3	2	2
Performance Target	3	2	2

The LRT communication FY 22 overall performance target goal was 3, 2 was achieved as of 4-18-22.

3.3.2 RF Radio Systems (Communication Equipment)

The RF Radio asset condition rating evaluation was conducted in FY22 5-20-22. Condition rating details can be provided upon request. Findings were as follows.

RF Radio (Communication Equipment) FY2022			
Parent Asset Name	**FY2022 Goal**	**FY2022 Achieved**	**FY2023 Goal**
St. Clair Yard	4	4	4
8th & Pine	4	4	4
Antire	4	4	4
Big Bend	4	4	4
MoDOT Ballas	4	4	4
Brentwood I-64	4	4	4
Brentwood Garage	3	3	4
Convention Center	4	4	4
CAR/Central Facility	4	4	4
St Charles Co	4	4	4
DeBaliviere	4	4	4
Emerson Park	4	4	4
Ewing Yard	4	4	4
Florissant	4	4	4
Forest Park	NP	3	4
Gray Summit	4	4	4
High Ridge	4	4	4
Harvester	4	4	4
Kirkwood	4	4	4
Meramec	4	4	4
Manchester	4	4	4
Memorial Hospital	4	4	4
Shiloh-Scott	4	4	4
Skinker	4	4	4
Stratman	4	4	4
SITCO	4	4	4
US Bank	4	4	4
Union Station North	3	3	4
UMSL North	3	3	4

NP-Not provided

RF communication facilities Brentwood Garage, UMSL North, and Union Station North did not reach the condition rating goal for FY2021 Radio Tower Sites.

3.3.3 Radio Tower Sites (Buildings)

The radio tower sites average asset condition rating evaluation was conducted in FY21 on 4-13-21. Condition rating details can be provided upon request. Findings were as follows.

Radio Tower Sites (Buildings) FY2022			
Parent Asset Name	**FY2022 Goal**	**FY2022 Achieved**	**FY2023 Goal**
Antire	4	4	4
Ballas	4	4	4
Emerson Park	4	4	4
Florissant	4	4	4
Gray Summit	4	4	4
Harvester	4	4	4
High Ridge	4	4	4
Kirkwood	4	4	4
Manchester	4	4	4
Meramec	4	4	4
Memorial Hospital	4	4	4
Stratman	4	4	4
St Charles Co	4	4	4
Shiloh-Scott	4	4	4
SITCO	4	4	4
Shrewsbury	4	4	4

All locations meet the FY2022 goals.

3.4 Infrastructure-Structures

Structures includes bridges, tunnels, ancillary bridges, ancillary tunnels, ancillary culverts, ancillary retaining walls and select radio tower structures. Condition rating details can be provided upon request.

Inspections of MetroLink controlled structures are conducted to determine the physical and functional condition of the structure, to provide a continuous record of their condition and rate of deterioration, to establish priorities for repair and rehabilitation, and to initiate maintenance actions.

The type of inspection required for each structure is determined by the MetroLink Standard for Structures Inspection and Maintenance from one of the seven types of inspections from AASHTO's Manual for Bridge Evaluation. The condition rating scale of 0 to 9 is based on AASHTO's Manual for Bridge Evaluation. The Minimum Target Performance Rating for MetroLink controlled structures is 6, (Satisfactory Condition).

No.	Inspection Type
1	Initial
2	Routine
3	Damage
4	In-Depth
5	Fracture Critical
6	Underwater
7	Special

3.4.1 Bridges

The condition ratings for MetroLink bridges are reported on a scale of 0 to 9, with 0 defined as "Failed Condition" and 9 defined as "Excellent Condition", in accordance with the MetroLink Standard for Structures Inspection and Maintenance. Bridges are rated using four separate categories, as applicable to each bridge, including Deck, Superstructure, Substructure, and Channel/Banks.

Sixty-two bridges with a total length of 27,542 feet are included in the asset inventory. The shortest bridge span length is 33.58 feet and the longest bridge is 4,514.75 feet. Due to the large variation in lengths across the bridge inventory, an average condition rating, or Achieved Performance Rating, was calculated by using a weighted average by bridge length. Therefore, the average Deck, Superstructure, Substructure, and Channel/Banks ratings provided take into account the relative size of the bridge.

The 2022 Target Performance Rating for bridges was calculated to take into account the current average age of the bridge inventory and the expected condition rating based on a 75 year service life. When a structure is new, it is expected to have a condition rating of 9 (Excellent Condition). At the end of a structure's service life of 75 years, it is assumed the structure is still in use, but is in need of immediate rehabilitation or replacement. This equates to a condition rating of 3 (Serious Condition). In 2022, the average age of the bridge inventory, weighted by bridge length, is 44 years. At 44 years into a bridge's service life, this results in a Target Performance Rating of 5.5 on a straight rating scale from 9 to 3. However, as the overall age of the bridge inventory increases, this Target Performance Rating decreases. Therefore, in order to regulate capital expenditures and avoid replacement of all same-aged structures at the same time in the future, a Minimum Target Performance Rating of 6 (Satisfactory Condition) has been established. This overall Minimum Target Performance Rating, at any point in time, should ensure that the entire system is maintained to a safe level.

While 95% of the MetroLink bridges are less than 37.5 years old, which equates to the Minimum Target Performance Rating of 6, it should be noted that two bridges included in the inventory have already exceeded their useful service life of 75 years. Skinker Boulevard Bridge is still in service at 82 years, and is currently being rehabilitated to extend its useful service life an additional 20 years. The historic Eads Bridge over the Mississippi River, at 4,514.75 feet, is still in service at 148 years, and will continue to be maintained to preserve its condition.

The Achieved Performance Rating of Deck, Superstructure, Substructure, and Channel/Banks in comparison to either the Target Performance Rating or the Minimum Target Performance Rating, indicate a rating in a positive state of good repair. These values are:

Infrastructures Bridges					
Total Number of Bridges =	62	Achieved Deck Rating =	6.8	Target Performance Rating (based on Inventory Age) =	5.5
Total Length of Bridges (ft.) =	27,542	Achieved Superstructure Rating =	6.7	FY22 Minimum Target Performance Rating =	6.0
Total Replacement Cost =	$1,283,388,000	Achieved Substructure Rating =	6.8		
		Achieved Channel/Banks Rating =	6.5		
		Weighted Average Inventory Age (yrs.) =	44		

3.4.2 Tunnels

The condition ratings for MetroLink tunnels are reported on a scale of 0 to 9, with 0 defined as “Failed Condition” and 9 defined as “Excellent Condition”, in accordance with the MetroLink Standard for Structures Inspection and Maintenance.

Seven tunnels with a total length of 12,568 feet are included in the asset inventory. The shortest tunnel length is 450 feet and the longest tunnel is 4,916 feet. Due to the large variation in lengths across the tunnel inventory, an average condition rating, or Achieved Performance Rating, was calculated by using a weighted average by tunnel length. Therefore, tunnel ratings provided take into account the relative size of the structures.

The Target Performance Rating for Tunnels was calculated to take into account the current average age of the tunnel inventory and the expected condition rating based on a 75 year service life. When a structure is new, it is expected to have a condition rating of 9 (Excellent Condition). At the end of a structure's service life of 75 years, it is assumed the structure is still in use, but is in need of immediate rehabilitation or replacement. This equates to a condition rating of 3 (Serious Condition). In 2022, the average age of the tunnel inventory, weighted by length, is 69 years. At 69 years into its service life, this results in a Target Performance Rating of 3.4 on a straight rating scale from 9 to 3. However, as the overall age of the tunnel inventory increases, this Target Performance Rating decreases. Therefore, in order to regulate capital expenditures and avoid replacement of all same-aged structures at the same time in the future, a Minimum Target Performance Rating of 6 (Satisfactory Condition) has been established. This overall Minimum Target Performance Rating, at any point in time, should ensure that the entire system is maintained to a safe level.

While five of the seven MetroLink tunnels are less than 37.5 years old, which equates to the minimum target rating of 6, it should be noted that two tunnels have already exceeded their useful service life of 75 years. Union Station Tunnel is still in service at 120 years. Structural repairs are to be started in 2022, with partial rehabilitation of this tunnel to be complete within 1-5 years following the repairs. The historic Downtown Tunnel, still in service at 146 years, is planned to be rehabilitated by 2023 to extend its service life. When these two projects are complete, it is expected that the current Achieved Performance Rating of 5.5 will increase to meet the Minimum Target Performance Rating of 6.

The condition ratings for two of the Cross-County tunnels and associated stations are tracking lower than expected based on their current age, due to water infiltration and premature aging. Metro plans to address the water infiltration issues with capital projects, to be completed over the next 5 to 10 years.

Summary of tunnels is listed below.

Tunnels			
Total Number of Tunnels =	7	Achieved Tunnel Rating =	5.5
Total Length of Tunnels (ft.) =	12,568	Weighted Average Inventory Age (yrs.) =	69
Total Replacement Cost =	$364,288,000	Target Performance Rating (based on Inventory Age) =	3.5
		FY22 Minimum Target Performance Rating =	6.0

3.4.3 Ancillary Structures

Metro's Ancillary Structures include nine pedestrian and off-system bridges, one pedestrian tunnel, eighty-five culverts, and three hundred ninety-two retaining walls. The condition ratings for these structures are reported on a scale of 0 to 9, with 0 defined as "Failed Condition" and 9 defined as "Excellent Condition", in accordance with the MetroLink Standard for Structures Inspection and Maintenance. Bridges are rated using four separate categories, as applicable to each bridge, including Deck, Superstructure, Substructure, and Channel/Banks. Culverts are rated using three separate categories, including Culvert, Channel, and Banks. All other structures have a single condition rating.

Due to the large variation in lengths across this ancillary structure inventory, an average condition rating, or Achieved Performance Rating, was calculated by using a weighted average by length. Similarly, a weighted average inventory age was calculated for each structure type to account for relative size.

The 2022 Target Performance Rating was calculated to take into account the current average age of the Ancillary Structure inventory and the expected condition rating based on a 50 year service life. When a structure is new, it is expected to have a condition rating of 9 (Excellent Condition). At the end of a structure's service life of 50 years, it is assumed the structure is still in use, but is in need of immediate rehabilitation or replacement. This equates to a condition rating of 3 (Serious Condition). However, as the overall age of the Ancillary Structures inventory increases, this Target Performance Rating decreases. Therefore, in order to regulate capital expenditures and avoid replacement of all same-aged structures at the same time in the future, a Minimum Target Performance rating of 6 (Satisfactory Condition) has been established. This overall Minimum Target Performance Rating, at any point in time, should ensure that the entire system is maintained to a safe level.

To summarize each structure type within the Ancillary Structure group:

	Pedestrian & Off-System Bridges	**Tunnels**	**Culverts**	**Retaining Walls**
Total Number	9	1	85	392
Total Length (ft.)	1,233	47	7160	121,139
Weighted Average Inventory Age (yrs.)	37	22	23	20
Achieved Bridge Deck /Tunnel/ Culvert/ Retaining Wall Rating	6.0	8.0	6.7	6.6
Achieved Bridge Superstructure Rating	6.5	N/A	N/A	N/A
Achieved Bridge Substructure Rating	6.7	N/A	N/A	N/A

	Pedestrian & Off-System Bridges	Tunnels	Culverts	Retaining Walls
Achieved Bridge Channel/Banks Rating	6.1	N/A	N/A	N/A
Achieved Culvert Channel Rating	N/A	N/A	6.9	N/A
Achieved Culvert Banks Rating	N/A	N/A	7.3	N/A
Target Performance Rating (based on Inventory Age)	4.6	6.4	6.2	6.6
FY22 Minimum Target Performance Rating	6.0	6.0	6.0	6.0

N/A not applicable

Regarding the Ancillary Bridge inventory, six of the bridges are pedestrian bridges and three are off-system bridges that are on Bi-State's property, but not on the MetroLink alignment. Of these three off-system bridges, two of them are not in service and one carries vehicle traffic on a utility access road. The DB-RDP Bridge is one of these out-of-service bridges, and is planned to be removed in in the next 1-5 years.

Regarding the Achieved Performance Ratings for Ancillary Structures, the weighted average condition ratings for bridges, tunnels, culverts, and retaining walls all meet or exceed the 2022 Target Performance Rating and Minimum Target Performance Rating.

3.4.4 Radio Towers Structure

There are five Radio Tower structures inspected as part of the MetroLink Structures Inspection Program. For asset information on all Radio Tower sites, see Section 3.3. The condition ratings for the Radio Tower Structures are reported on a scale of 1 to 5 with 1 being "Poor Condition" and 5 being "Excellent Condition" in accordance with FTA's TERM. The Radio Tower structures are rated using two categories, including the tower structure and the tower foundation. The Achieved Performance Rating for Radio Towers is 3.9, which exceeds the Target Performance Rating of 3.5.

This section is applicable to radio tower and tower foundation assets only.

3.5 Infrastructure-Systems Guideway

System guideway includes traction power, signal and track. The track and overhead catenary system **(OCS)** linear assets are accounted for in this TAM Plan. Linear asset accounting has been documented one year ahead of schedule.

All of the MetroLink alignment is on semi-exclusive right-of-way. Phase I consists of approximately three-quarters of a mile of elevated structure at Lambert Airport, a former baggage cart tunnel under Union Station, the Washington/8th Street Tunnel under

downtown St. Louis, and the lower deck of the Eads Bridge. In addition, nine miles of the Phase I alignment is on continuous former railroad right-of-way. With the exception of a one-third of a mile single-track section just east of the Lambert Terminal 1 Station, the existing MetroLink route is double tracked. The alignment contains several bridges, spanning highways, railroads, and the Mississippi River.

The Illinois Extension is a 20.9-mile addition to MetroLink, heading southeast and east from the former 5th and Missouri terminus to Shiloh-Scott Station, and serving much of St. Clair County, Illinois. Phase II links Phase I with various activity centers and includes nine stations. Phase II is also on exclusive right-of-way and is also double tracked. Approximately 14 miles is on former CSX System railroad alignment. Phase II has no tunnels but there are several bridge structures over major highways and railroads.

The Cross-County Extension (Phase III) is a 7.6-mile branch to MetroLink, first heading west from the Forest Park-DeBaliviere Station through Clayton and then south to Shrewsbury, serving a portion of southwest St. Louis City and County. It links Phase I and Phase II in Missouri and Illinois with various activity centers including Washington University, the St Louis County seat in Clayton, the Galleria Mall, and the Sunnen Industrial Park. Phase III is also on exclusive right-of-way, of which 4 miles is on former railroad alignment.

System guideway assets associated with traction power, signal and track are discussed in the following sections.

3.5.1 Traction Power

Traction power assets include stationary assets, such as substations; and overhead catenary wire linear assets.

The FY22 stationary traction power performance condition rated achieved was 4 as of 3-30-22. The FY22 performance goal is 3. The FY22 goal was met and exceeded. FY23 performance goal is 3. The following table lists each substation FY22 goal, achieved rating and FY23 goal.

Performance Targets			
Traction Power FY2022 Revision 0			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
Wire Run	3	4	4
IL OCS Poles	4	4	4
MO OCS Poles	4	4	4

Performance Targets			
Traction Power FY2022 Revision 0			
Parent Asset Name	FY22 Goal	FY22 Achieved	FY23 Goal
TP-IL1SUBSTATION	3	4	3
TP-IL2SUBSTATION	4	4	4
TP-IL3SUBSTATION	4	4	4
TP-IL4SUBSTATION	4	4	4
TP-IL5SUBSTATION	4	4	4
TP-IL6SUBSTATION	4	4	4
TP-IL7SUBSTATION	4	4	4
TP-IL8SUBSTATION	4	4	4
TP-IL9SUBSTATION	4	4	4
TP-IL10SUBSTATION	4	4	4
TP-IL11SUBSTATION	2	4	4
TP-IL12SUBSTATION	4	4	4
TP-IL13SUBSTATION	4	4	4
TP-IL14SUBSTATION	4	4	4
TP-MO1SUBSTATION	4	4	4
TP-MO2SUBSTATION	3	4	3
TP-MO3SUBSTATION	4	4	4
TP-MO4SUBSTATION	4	3	3
TP-MO5SUBSTATION	4	4	3
TP-MO6SUBSTATION	3	3	3
TP-MO7SUBSTATION	4	4	3
TP-MO8SUBSTATION	3	3	3
TP-MO9SUBSTATION	4	4	3
TP-MO10SUBSTATION	4	3	3
TP-MO11SUBSTATION	4	3	3
TP-MO12SUBSTATION	4	3	3
TP-MO21SUBSTATION	4	4	4
TP-MO22SUBSTATION	2	4	4
TP-MO23SUBSTATION	4	4	4
TP-MO24SUBSTATION	4	4	4
TP-MO25SUBSTATION	4	4	4

The FY22 linear traction power performance condition rated achieved was 4 as of 3-30-22. The FY22 performance goal is 3. The FY22 goal was met. FY23 performance goal is 3. Condition rating details can be provided upon request.

The FY22 Missouri and Illinois traction power poles performance condition rated achieved was both 4 as of 3-30-22. The FY22 performance goal is 4 for Missouri and Illinois. The FY22 goals were met. FY23 performance goal is 4 for both Missouri and Illinois. Condition rating details can be provided upon request.

FY22 wire runs performance condition rating achieved was 4 as of 3-30-22. The FY22 performance goal is 3. The FY22 goal was met. FY23 performance goal is 4. Condition rating details can be provided upon request.

3.5.2 Signal

The FY22 signal condition rating achieved was 3 as of 4-12-22 (the last date of review process). The FY22 performance target goal is 4. The FY22 performance goal was not met due to asset impacted with manufacture component replacement program. Condition rating details can be provided upon request.

Performance Targets			
Signal FY2022 Revision 0			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
AC track Circuits	5	3	5
AF track Circuits	5	3	5
B-Point	5	3	4
Electric Lock	4	3	4
Grade Crossing	4	2	4
Power Switch	4	4	4
SG House Generator	N/A	3	4
SG Portable Generator	3	3	4
Signal House	3	3	4
Solar Switch	N/A	3	4
Wayside Signals	4	3	4
TOTAL	4	3	4

3.5.3 Track

Track assets include stationary assets, such as bumping posts and lubricators; and linear assets, such as rail.

The FY22 stationary asset performance condition rated achieved was 3 as of 2-28-22. The FY22 performance goal is 3. The FY22 goal was met. FY23 performance goal is 3. The following table lists stationary asset FY22 goal, achieved rating and FY23 goal. The FY22 stationary asset condition rating is listed below.

Stationary Track (1, 2)			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Future Goal**
Switches	3	3	3
Crossings	4	4	4
Restraining Rail	**2**	**2**	**4**
Expansion Joint	4	4	4
Bumping Post	4	4	4
Lubricators	3	3	3
Spur Track	See note 1	See note 1	3
Pocket Track	See note 1	See note 1	3
Ewing Yard Track	See note 2	3	3
St. Clair Yard Track	See note 2	3	3
TOTAL AVERAGE	3	3	3

1. Specialty track incorporated in Rail in FY20.
2. Yard track added in FY22.

The FY22 linear track condition rated achieved was 4 as of 2-28-22. The FY22 performance goal is 3. The FY22 goal was met. FY23 performance goal is 3. The following table lists each substation FY22 goal, achieved rating and FY23 goal.

Linear Track FY2022			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Future Goal**
Track 1			
TR-AIRPORTWBMO	3	4	3
TR-AIRPORTWBIL	3	4	3
TR-XCOWB	3	4	3
Track 2			
TR-AIRPORTEBMO	3	3	3
TR-AIRPORTEBIL	3	3	3
TR-XCOEB	3	4	3

3.6 Guideway Performance Restriction Calculation

In an effort to evaluate how guideway restrictions impact the overall performance of the guideway system, a snapshot of restriction and work track length is added together on the first Wednesday at 9:00 AM of every month. A performance restriction is defined to exist on a segment of rail fixed guideway when the design speed of transit vehicles is set to a value that is below the guideway's full service speed.

Metro's FY2022 annual value for length of track miles under performance restrictions is 1.2%. FY2022 target goal was 1.5. The goal was met and exceeded. Other activities were regular and planned.

The monthly data is presented below.

GUIDEWAY PERFORMANCE RESTRICTION CALCULATION														
FY 2022	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	YTD (sum)	YTD (average)
COMMUNICATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
RAIL	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	3.2	0.27
ROW	0.6	1.1	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.3	0.0	2.5	0.21
SIGNALS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.0	5.0	0.42
STRUCTURES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.6	0.7	2.5	0.21
TRACTION POWER	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.02
CONSTRUCTION	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.03
OTHER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	0.7	1.1	0.2	0.1	0.0	0.2	0.0	1.0	1.4	4.5	2.9	1.7	13.8	1.2
Design speed of all segments listed in the Alignment Schematic														
Any speed restriction requiring a flag person is a maximum of 15 mph														
ROW=Clean up, mowing and Happy Tree activities, ADA tile work, chainlink fence repair, Killan Corp														
Structures=bridge inspection, Juneau, Modjeski & Masters														
Construction=Kiewit, St. Louis Bridge Co, David Mason & Associates, Farnsworth Group, Tarlton, Keely														
NTD calculation to % of track segments with performance restirction (total track 96.35 miles, no yard track.)	1.2/ 96.35=	1.2%												
Metro guideway performance FY2022 goal is 1.5%.														

3.7 Infrastructure-System Fare Collection

Fare collection includes ticket vending machines **(TVMs)** and Stand Alone Validators **(SAVs)**. All MetroLink stations have multiple TVMs and SAVs. Currently, Metro's asset inventory consists of 403 fareboxes, 11 cash receivers systems **(CRS)**, 4 garage data management systems, 125 ticket vending machines and 124 stand-alone validation machines 38 mobile vaults.

The Missouri TVM and SAV expected lifecycle is different from the Illinois equipment. Missouri is 12.08 years and Illinois is 5.91 years.

The FY22 condition rating achieved is listed below as of February 2021. The goals were met. Condition rating details can be provided upon request.

Fare Collection FY2022			
Parent Asset Name	**FY22 Goal**	**FY22 Achieved**	**FY23 Future Goal**
TVM (Missouri)	2	2	2
SAV (Missouri)	2	2	2
CRS (Missouri)	3	2	2
TVM (St. Clair)	3	3	3
SAV (St. Clair)	3	3	3
CRS (St. Clair)	3	3	3
Mobile Vault	3	3	3

Condition rating details can be provided upon request.

3.8 Facilities Maintenance

Currently, Metro's facility and station asset inventory consists of 9 maintenance facilities, 8 transit centers, 2 parking garages, and 38 rail stations. The maintenance, parking, rail passenger, and bus transit centers include the following.

Light rail is operated out of two locations on Ewing Street in St. Louis, Missouri and another location on St. Clair Avenue in East St. Louis, Illinois. Metro bus service operates out of three modern facilities: Brentwood and DeBaliviere in Missouri and East St. Louis in Illinois. All three facilities feature indoor parking for buses and indoor fueling facilities.

In addition, Metro operates a heavy repair facility providing engine, transmission, and body repairs for the various fleets at Central Bus Maintenance Facility. The paratransit van operation and non-revenue repair shops are based in the heavy repair facility at Central Bus Maintenance Facility.

The evaluation process continues to improve with each year. There is a more granular revision of asset conditions. The FY22 achieved TERM score reflects a better working understanding and more accurate score.

3.8.1 Ewing Rail Maintenance Facility

Ewing facility is located at 700 South Ewing Street, St. Louis MO 63103 and includes 12 acres of land. The facility was constructed in 1992 and also hosts Metro's Operation Control Center **(OCC)**. In addition, the Ewing facility has office space occupied by maintenance of way **(MOW)** senior management.

The FY22 average condition rating achieved for the Ewing Rail Maintenance Facility was 3 as of 3-29-2022. The TERM scale goal was 3. The goal was met. The FY23 goal is 3. Condition rating by asset can be provided upon request.

3.8.2 St. Clair Rail Maintenance Facility

St. Clair Rail Maintenance Facility is located at 2901 St. Clair Ave., E. St. Louis, 62205, IL and includes 51,800 sq. ft. of land. The facility was constructed in 2001. In addition, the St. Clair facility contains Metro's only paint facility supporting the LRV fleet.

The FY22 average condition rating achieved for the St. Clair Rail Maintenance Facility was 3 as of 3-30-2022. The FY22 goal was 3. The goal was met. The FY23 goal is 3. Condition rating by asset can be provided upon request.

3.8.3 Central Bus Maintenance Facility

Metro's Central bus maintenance facility is located at 3300 Spruce Street, St. Louis MO 63103. The facility was constructed in 1983. Currently, the facility has 321,000 sq. ft.

The FY22 average condition rating achieved was 3 as of 4-11-2022. TERM scale goal was 3.5 (4 in EAM no decimals). The goal was not met due to several projects on hold due to Covid issues. The FY23 goal is 3. Condition rating by asset can be provided upon request.

3.8.4 Brentwood Bus Facility

Brentwood facility is located at 3000 South Brentwood, St. Louis, MO 63144. The facility was constructed in 1983. Currently the facility has 281,066 sq. ft.

The FY22 average condition rating achieved was 4 as of 3-7-2022. TERM scale goal was 3. The goal was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.8.5 Illinois Bus Maintenance Facility

The Illinois Bus Maintenance Facility is located at 801 North 47th Street, East St. Louis, IL 62205. The facility was constructed in 1984. Currently the facility has 287, 255 sq. ft.

The FY22 average condition rating achieved was 4 as of 3-30-2022. TERM scale goal was 3.5 (4 in EAM no decimals). The goal was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.8.6 DeBaliviere Bus Facility

DeBaliviere facility is located at 585 DeBaliviere Ave, St. Louis, MO, 62112. The facility was opened in 1986. Currently the facility has 351,993sq. ft.

The FY22 average condition rating achieved was 3 as of 3-10-2022. The goal was 3. The goal was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.8.7 DeBaliviere Power House

The FY22 average condition rating achieved is 2 as of 3-10-22. The goal of 3, was not met due to the previous condition ratings being overly optimistic. The FY23 goal is 3. Condition rating by asset can be provided upon request.

3.8.8 Swansea Maintenance Facility

Swansea facility is located at 2208 North Illinois Street, Suite C, Swansea, IL 62226. It is unknown when the facility was constructed. Currently the facility has 16,690 sq. ft.

The FY22 TERM scale goal was 3. The TERM score achieved was 3 as of 4-19-2022. The goal of 3, was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.8.9 Sarah Maintenance Facility

Sarah maintenance facility is located at 327 South Sarah St, St. Louis MO 63110. The facility was constructed in 2002. Currently the facility has 2,000 sq. ft.

The FY22 average condition rating of 4 was achieved as of 4-22-2022. The goal of 4, was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.9 Parking Garages

The North Hanley Garage and Meridian Garage are owned by Metro. The North Hanley Garage structure FY22 average condition rating achieved an average score of 4 as of 7-8-2022. The goal of 4 was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

The Meridian Garage structure FY22 average condition rating of 4 was achieved as of 7-10-2022. The goal of 4, was met. The FY23 goal is 4. Condition rating by asset can be provided upon request.

3.10 Facilities-Passenger Stations

The passenger facilities (MetroLink station) average condition rating was achieved as of 4-1-22 is listed below

Passenger Facilities FY2022			
Location	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
Lambert Airport Terminal 1	4	3	4
Lambert Airport Terminal 2	4	3	4
North Hanley	4	4	4
UMSL North	4	3	3
UMSL South	4	3	3
Rock Road	4	3	3
Wellston	4	3	4
Delmar	4	3	4
Forest Park	4	4	4
Central West End	4	4	4
Cortex	5	5	4
Grand	4	4	4
Union Station	4	4	4
Civic Center	4	4	4
Stadium	4	4	4
8th and Pine	4	3	4
Convention Center	4	3	4
Laclede's Landing	4	4	4
East River Front	4	3	4
5th and Missouri	4	4	4
Emerson Park	4	3	4
Jackie Joyner Kersee	4	3	4
Washington Park	4	4	4
Fairview Heights	4	4	4
Memorial Hospital	4	4	4
Swansea	4	4	4
Belleville	4	4	4
College	4	4	4
Shiloh Scott	4	4	4
Skinker	4	4	4
University City / Big Bend	4	4	4
Forsyth	4	3	4

Passenger Facilities FY2022			
Location	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
Clayton	4	4	4
Richmond Heights	4	4	4
Brentwood	4	4	4
Maplewood	4	4	4
Sunnen	4	4	4
Shrewsbury	4	4	4
Parking Lots FY2022			
Location	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
North Hanley	3	3	3
UMSL South	3	3	3
Rock Road	2	2	2
Wellston	(1)	3	4
Delmar	(1)	3	4
Grand	4	4	4
5th and Missouri	4	4	4
Emerson Park	(1)	2	4
Washington Park	(1)	2	4
Fairview Heights	(1)	4	4
Memorial Hospital	(1)	4	4
Swansea	4	4	4
Belleville	(1)	4	4
College	(1)	3	4
Shiloh Scott	(1)	4	4
Richmond Heights	(1)	4	4
Shrewsbury	(1)	3	4

1. Parking lots were broken out from rail facilities in FY23. Therefore fiscal year goals had not been identified.

3.11 Facilities-Passenger Transit Centers

The TERM scale achieved was as follows. The transit centers average condition rating was achieved as of 2022, inspections covered multiple dates, is listed below.

Transit Center Facilities FY2022			
Location	**FY22 Goal**	**FY22 Achieved**	**FY23 Goal**
Ballas	4	4	4
Catalan Loop	4	4	4
Civic Center	5	5	5
Hampton Gravois	4	4	4
North Broadway	4	4	4
North County	5	5	5
Riverview	4	4	4
Rock Hill	4	4	4
Ballas	4	4	4
North County	4	5	4
Riverview	3	3	3

3.12 Subrecipient Assets

BSD is a primary grant fund recipient of 5311, 5310 and other grants funds. The BSD Grant Administrators in the Engineering System Department will report to the TAM Department when subrecipient funding is utilized for asset purchasing. A TAM department representative will attend the regular grant status meetings to monitor subrecipient activity.

The subrecipient name and TAM Plan they are participating in will be identified in the Metro TAM Plan. The subrecipient's TAM Plan will be requested, and their processes reviewed against 49 CFR Part 625 Transit Asset Management. Metro will review subrecipients':

1. TAM Plan
2. Maintenance Plan
3. Warranty claims

The 5310 and 5311 grant funds awarded through the Missouri Department of Transportation **(MoDOT)** and Illinois Department of Transportation **(IDOT)** to

subrecipients are encouraged to participate in that State's DOT TAM Plan. At this time, BSD has no subrecipients with assets tracked in BSD's TAM Plan.

4. BACKLOG & PROJECTS

The backlog and project section is TAM's effort to bring together known requested projects that have or haven't been funded; and start the further financial planning of assets still in a state of good repair.

A more complete picture of current projects will be added that corresponds with capital projects, as the TAM program is developing. The asset condition rating is formally reviewed at the beginning of the calendar year. Condition ratings are revised through the year as needed.

The revised and ordered condition rating, and response to target goal achievement is signed off by the superintendent of the asset group and the Assistant Executive Director Transit Assets. The following sections are the responses to the target goal questions.

4.1 ROLLING STOCK-PASSENGER VEHICLES BUS, VAN, LRVs & VINTAGE HERITAGE TROLLEYS

4.1.1 Bus

Metro has incorporated a long-range strategic replacement plan for its city transit buses. The plan calls for buses to be replaced at a 15-year interval. With current schedules, Metro should achieve that goal and replace 1/15 of the fleet each year, by the year 2024. This will establish a consistent fleet age of 7.5 years and stabilize procurement costs. By increasing bus replacement interval to 15 years, Metro reduces bus replacement capital costs by 20%. Articulated Buses are 2001-04 model year however, they were refurbished and delivered in July 2014

The target is to replace 1/15 of each heavy duty bus fleet yearly, with a goal of $12,566,400 each year every year split between rolling stock and specialty equipment. Current funding is nearly three years behind.

4.1.2 Van

Metro had a 5 year contract to replace the paratransit vans. Orders have been delayed by the manufacturer and the van fleet has far exceeded its life expectancy on 23 of the 123 revenue vehicles. Metro is currently working to procure replacement vehicles and stabilize the replacement schedule for the paratransit vans.

4.1.3 LRV

Metro is developing a long range strategic replacement plan to replace one-third of its fleet every ten years, which will meet the FTA useful life benchmark of 31 years and establish an average fleet age of not more than 19 years. The DC LRVs will be retired incrementally to make way for the next generation LRVs.

4.2 ROLLING STOCK NON-REVENUE SERVICE VEHICLES

BSD will sell 170 light duty trucks and sedans will be sold. The 170 vehicles will be replaced with leased vehicles. Leased vehicles will not tracked in the TAM program.

Equipment is Metro non-revenue service vehicles. The non-revenue fleet is dispersed throughout the working population and facilities. Equipment is Metro non-revenue service vehicles. The under-1 ton trucks and over-1 ton trucks are being replaced with Enterprise leased trucks. Replacement of the over-1 ton trucks will be conducted in a five year window, phasing out all Metro owned vehicles. Trailers, off-road equipment, forklifts, snow removal equipment, and TUG/mule vehicles fleets will remain static, no replacement is planned at this time.

4.3 INFRASTRUCTURE-SYSTEM - COMMUNICATION

4.3.1 LRT Communication

Did you achieve, or not achieve, your performance targets and why?

Leadership response:

See Score Table in Section 3.3.1 for performance targets.

How do you plan on achieving your new goal?

Leadership response:

Working on upgrading clocks at Compton main shop, optimistically FY22 or FY23. Project in progress to install upgraded XTRAN eqpt UMSL-N thru Delmar hopefully starting FY22. Currently upgrading failed (fire intrusion) units as required to newer Napco model. CCTV core Upgrade planned FY22, FY23. Airport T1, Airport T2, North Hanley CCTV Substantially completed (field end only), more planned UMSL-N thru Delmar soon. Not aware of upcoming upgrades (to ROW telephones). Project in progress to install upgraded/duplicate ROW FO cable, wayside bldg FO cable UMSL-N thru Delmar FY22, FY23. Project planned soon to start upgrading PACIS system wide. Optimistically will

start end of 2022 - start of 2023. Not aware of upcoming upgrades (to PATs). Future field end SCADA upgrades… likely several years off. Project completed this spring… upgraded touchscreens, ethernet nodes, PLC software …. RLC 6/13/2022. (NOTE: These notes added by Sheila Hockel from Score table. Items in () are added by Sheila Hockel to complete the sentence.)

See section 3.3.1 for rating condition goals and achieved ratings.

4.3.2 RF Radio (Communication Equipment)

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
All sites met or exceeded the condition rating goal for FY2022.

How do you plan on achieving your new goal?

Leadership response:
The overall plan to continue achieving the goal, is to perform proper maintenance.

See section 3.3.2 for rating condition goals and achieved ratings.

4.3.3 Radio Tower Sites (Buildings)

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
All sites met the condition rating goal for FY2022. Future project are included at the following locations.

At St. Charles radio tower, the UPS system was upgraded.

How do you plan on achieving your new goal?

Leadership response:
The new goal will be met by following the maintenance program.

See section 3.3.3 for rating condition goals and achieved ratings.

4.4 INFRASTRUCTURE STRUCTURES

Infrastructure structures includes bridges, tunnels, ancillary structures and radio tower structures.

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
The weighted average rating of bridges and ancillary structures in comparison to the Target Performance Rating, indicate a condition rating in a positive state of good repair. The condition ratings for two of the Cross-County tunnels and associated stations are tracking lower than expected based on their current age, due to water infiltrations and premature aging. In addition, two other lower-rated tunnels are still in service at 120 and 146 years, well past their expected service life of 75 years.

How do you plan on achieving your new goal?

Leadership response:
Metro's current capital project program includes rehabilitation projects to specifically address these tunnels over the next 5 to 10 years.

4.5 INFRASTRUCTURE-SYSTEM GUIDEWAY

4.5.1 Traction Power

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes, projects that were previously delayed have now been contracted out with construction to begin this spring / summer.

How do you plan on achieving your new goal?

Leadership response:
With the completion of the Track System Upgrades project, Skinker Bridge rehab and continued Maintenance work.

See section 3.5.1 for rating condition goals and achieved ratings.

4.5.2 Signal

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
COVID Impacted part of the FY2022 goals as well. We are still attempting to upgrade the track circuits, and this will be done by an outside contractor.

How do you plan on achieving your new goal?

Leadership response:
In addition to our previous goals, we also hope to upgrade the condition of the Signal house roofing, as we are being plagued with leakage. Signal equipment has not been damaged so far, but the work spaces have gotten considerable water inside. Have rated all signal houses as 2 or 3 for this reason. Will consider upgrading if roof rehabilitation is complete.

See section 3.5.2 for rating condition goals and achieved ratings.

4.5.3 Track

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
In addition to our previous goals, we also hope to upgrade the condition of the Signal house roofing, as we are being plagued with leakage. Signal equipment has not been damaged so far, but the work spaces have gotten considerable water inside. Have rated all signal houses as 2 or 3 for this reason. Will consider upgrading if roof rehabilitation is complete.

How do you plan on achieving your new goal?

Leadership response:
With the completion of the Track System Upgrades project, Skinker Bridge rehab and continued Maintenance work.

See section 3.5.3 for rating condition goals and achieved ratings.

4.6 INFRASTRUCTRE-SYSTEM FARE COLLECTION

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes, performance targets where achieved. The revenue maint department has increase its PM inspection interval to allow multiple PM on its TVM machines during the inspection

period. We have had 60 Bank Note Units overhauled in 2021 and we will continue this process into 2022. Please note RV Revoff 001 & 002 low score due to Vandalism, both TVMs are out of service for the long term.

How do you plan on achieving your new goal?

Leadership response:
The Revenue Maintenance team will continue to perform PM inspections. We are replacing the TVM display monitors to improve the customer viewing of the ticket screens and we are currently testing new TVM computers for replacement in the Missouri TVM's

See section 3.7 for rating condition goals and achieved ratings.

4.7 FACILITIES MAINTENANCE

4.7.1 Ewing Rail Maintenance Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes. Replaced water heater and storage tank, Remodel training room stairwells and Maintenance office.

How do you plan on achieving your new goal?

Leadership response:
Replacing lighting in pits with LED; repairing the parking lot and replacing fire system in OCC.

See section 3.8.1 for rating condition goals and achieved ratings.

4.7.2 St. Clair Rail Maintenance Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Achieved
All building lighting was converted to LED lighting.
Preventive maintenance on the building and equipment has been performed in at timely and efficient manner.

How do you plan on achieving your new goal?

Leadership response:
Continue to conduct preventive maintenance

See section 3.8.2 for rating condition goals and achieved ratings.

4.7.3 Central Bus Maintenance Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes, We did some improvements to the building. We had portion of the roof replaced and some hvac work. Replacing the exit gate with a updated swing gate

How do you plan on achieving your new goal?

Leadership response:
Plan on achieving the new goal on replacing an old steel door with new speed door New above ground diesel storage tanks. Replace two HVAC rooftop units. Repair concrete in truck shop and back flows throughout the building.

See section 3.8.3 for rating condition goals and achieved ratings.

4.7.4 Brentwood Bus Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes. Lift 13 project aborted after contractor reported that the cylinder needed was no longer being produced. This project is still awaiting approval and funding.
1. TSM restroom rehab project completed.
2. The north fire suppression line was repaired and a new wall mount fire hydrant was installed.
3. EV charging system installation was completed.

How do you plan on achieving your new goal?

Leadership response:
The following will be conducted to meet the FY2023 Term Goals.
1. Replacement of 3ea MAU's.
2. Replacement of upstairs boiler #2.

3. Replacement of downstairs boiler #3
4. Replacement of at least 1 garage door.
5. Rehab Maintenance office restroom.

See section 3.8.4 for rating condition goals and achieved ratings.

4.7.5 Illinois Bus Maintenance Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Achieved
The building exterior is presently being renovated.
Preventive maintenance on the building and equipment has been conducted in a timely and efficient manner.

How do you plan on achieving your new goal?

Leadership response:
The exterior of the Bus Garage is presently being tuck pointed and re-faced.
Plans are in the works to renovate the Wash Bay Skylight.
Windows on the front entrance second level have been re-sealed and slate window sills have been tuckpointed.
Replacement of several roof top exhaust fans are planned for this year.
Funding is available for replacement of the building emergency generator.

See section 3.8.5 for rating condition goals and achieved ratings.

4.7.6 DeBaliviere Bus Maintenance Facility

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Yes we achieved our goal.

How do you plan on achieving your new goal?
Leadership response:
By completing all the projects and bringing the building up to a higher standard.

See section 3.8.6 for rating condition goals and achieved ratings.

4.7.7 DeBaliviere Power House

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
The PH FY22 goal was not met due to previous condition ratings being overly optimistic. The assets were inspected and have been rated in-line with their true existence.

How do you plan on achieving your new goal?

Leadership response:
We are in the process of getting quotes for the renovation that is needed.

See section 3.8.7 for rating condition goals and achieved ratings.

4.8 PARKING GARAGES

Did you achieve, or not achieve, your performance targets and why?

Leadership response:
Both garages met the FY22 goals. At the North Hanley Garage, structural refurbishment including joint repair and power wash and sealing was conducted.

How do you plan on achieving your new goal?

Leadership response:
Continue regular preventative maintenance inspection.

4.9 PASSENGER FACILITIES-

The following table is the response to the questions.

Location	Did you achieve or not achieve you performance target and why?	How do you plan on achieving your new goal?
Lambert Airport Terminal 1	No. Convert Lighting to LED	In House Manpower when available or Contract out.
Lambert Airport Terminal 2	No. Convert Lighting to LED	In House Manpower when available or Contract out.
North Hanley	Yes, we made the necessary repairs.	We will stay on top of any issue that may come up.
UMSL North	The FY22 goal was not met due to previous condition	We will stay on top of any issue that may come up.

Location	Did you achieve or not achieve you performance target and why?	How do you plan on achieving your new goal?
	ratings being overly optimistic. The assets were inspected and have been rating in-line with their true existence.	
UMSL South	The FY22 goal was not met due to previous condition ratings being overly optimistic. The assets were inspected and have been rating in-line with their true existence.	We will stay on top of any issue that may come up.
Rock Road	The FY22 goal was not met due to previous condition ratings being overly optimistic. The assets were inspected and have been rating in-line with their true existence.	We will stay on top of any issue that may come up.
Wellston	No, not enough new items to merit a 4.	Prioritize station upgrades thus moving it higher on our list to modernize.
Delmar Loop	No. The Guard shacks were vandalized and damages are still being repaired but other items were updated thus improving us to not quite a 4 (my opinion)	Continue modernizing the stations assets and replace the guard shack.
Forest Park	Yes. Planned and preventative maintenance along with station upgrades.	Continue planned and preventive maintenance and station upgrades.
Central West End	Yes. Station rehab has been in progress and is very close to being complete.	Keep up on maintenance and cleaning to keep the station at the current score.
Cortex	Yes. Station has been maintained with minor issues being resolved throughout the year.	Keep up on maintenance and cleaning to keep the station at the current score.
Grand	Yes. LED lighting upgrades in progress and station painting of canopy and windscreens.	Keep up on maintenance and cleaning to keep the station at the current score.

Location	Did you achieve or not achieve you performance target and why?	How do you plan on achieving your new goal?
Union	Yes. LED lighting upgrades in progress and station painting of benches and windscreens.	Keep up on maintenance and cleaning to keep the station at the current score.
Civic	Yes. LED lighting upgrades in progress and station painting of canopy and windscreens.	Keep up on maintenance and cleaning to keep the station at the current score.
Stadium	Yes. LED lighting upgrades in progress and station painting of canopy and windscreens.	Keep up on maintenance and cleaning to keep the station at the current score.
8th & Pine	No. Lighting and station updates are needed in all areas	Downtown Station Enhancement Project will improve future score.
Convention Center	No. Lighting and station updates are needed in all areas.	Downtown Station Enhancement Project will improve future score.
Laclede Landing	Yes. LED lighting upgrades in progress and station painting of benches and windscreens	Keep up on maintenance and cleaning to keep the station at the current score.
East Riverfront	No, short manpower and material lead times were very long.	Order material in advance update signage and paint.
5th & Missouri	Yes. Some goals were not achieved due to lack of personnel and wait times for material.	Station lighting is scheduled along with painting, signage upgrades.
Emerson Park	No. Manpower issues and material shortages.	Station is slated to get rebuilt.
JJK	No. Lack of manpower and delays in material.	Refurbish bus loop, paint and continued maintenance.
Washington Park	Yes. No labor shortage and material delays.	New paint and continued maintenance.
Fairview Heights	Yes. Not completely parts shortages.	Continued maintenance and upgrade signage.
Memorial Hospital	Yes due to preventative maint.	Continued preventative maint.
Swansea	Yes preventative maintenance and upgrades were made.	Refurbish bus loop and continued maintenance.

Location	Did you achieve or not achieve you performance target and why?	How do you plan on achieving your new goal?
Belleville	Yes. No labor shortage and material shortages.	New station upgrades planned and continued maintenance.
College	Yes preventative maintenance.	Continued maintenance.
Shiloh-Scott	Yes with preventative maintenance.	Continued maintenance.
Skinker	Yes. Converting light over to LED in walkways and platform.	Will continue to work on station when manpower is available.
University City-Big Bend	Yes. Converting light over to LED in walkways and platform. This was not achieved in 2021 due to manpower.	Material is ordered and will continue to work on station when manpower is available.
Forsyth	No. Converting light over to LED in walkways and platform. Replacing the electrical trough with new and replace ptac with new mini-split unit.	Will continue to work on station when manpower is available. Electrical and HVAC will be contracted out.
Clayton	Yes. Converting light over to LED in walkways and platform.	Will continue to work on station when manpower is available.
Richmond Heights	Yes. Converting light over to LED in walkways and platform. Parking lot resurfacing and striping by contractor.	Will continue to work on station when manpower is available. Contractor will do parking lot resurfacing and striping.
Brentwood I-64	Yes. Converting light over to LED in walkways and platform.	Will continue to work on station when manpower is available.
Maplewood	Yes. Converting light over to LED in walkways and platform.	Will continue to work on station when manpower is available.
Sunnen	Yes. Converting light over to LED in walkways and platform.	Will continue to work on station when manpower is available.
Shrewsbury-Lansdowne I-44	Yes. Converting light over to LED in walkways and platform. Parking lot resurfacing and striping by contractor.	Will continue to work on station when manpower is available. Contractor will do parking lot resurfacing and striping.

4.10 FACILITIES-PASSENGER TRANSIT CENTERS

All eight transit centers achieved their goals. The FY2022 goal will be achieved with the following.

Location	Did you achieve or not achieve you performance target and why?	How do you plan on achieving your new goal?
Ballas	Yes. The operator restroom was rehab including epoxy flooring. The public restroom toilet was repaired after re leveling floor and installed epoxy.	With the support of capital funding this will enhance the bus turn around, irrigation system, parking lot. Emergency generator and the wood roofing.
Catalan Loop	No. Delay in bid proposals. Note: Score wise, did meet goal.	Get more bid proposals for shelter and install split unit in restrooms.
Civic Center	Yes bollards at curbing was painted. Waiting for capitol exhaust fan approval.	Install a second A/C for lower level at CCTC.
Hampton Gravois	Yes Shelter rehab, bollards painted. Still waiting for restroom capital funding approval.	Improve landscaping.
North Broadway	Yes painted with brand colors and new signs installed at transit center.	Restroom rehab.
North County	No still awaiting on capital funding for canopy, retrofit H-Vac and removal and replacement of pavers. Note: Score wise, did meet goal.	Work on getting capital funding.
Riverview	No still waiting for capital funding for sprinkler system and engineering to determine the process of installment of bollards at bus stall. Note: Score wise, did meet goal.	Repair bus loop pavement.
Rock Hill	Yes. Restroom rehab completed.	Repair and paint exterior restroom.

5. References and Appendices

APTA, Recommended Practice, SGR-TAM-RP-002-13, “Defining a Transit Asset Management Framework to Achieve a State of Good Repair,” August 2013. http://www.apta.com/gap/fedreg/Documents/Defining.a.transit.asset.management.framework.to.achieve.a.state.of.good.repair.pdf

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BSD of the Missouri-Illinois Metropolitan District, Metro Operating and Capital Budget, St. Louis, MO.

BSD Capital Budget Manual.

Federal Transit Administration (FTA), “Asset Management Guide.” http://www.fta.dot.gov/documents/FTA_Asset_Mgt_Guide_-_FINAL.pdf

FTA, “Fact Sheet, MAP-21, Section 5326 (TAM).” http://www.fta.dot.gov/documents/MAP-21_Fact_Sheet_-_Transit_Asset_Management.pdf

FTA, “Transit Asset Management Practices, A National and International Review,” June 2010. http://www.fta.dot.gov/documents/TAM_A_National_and_International_Review_-_6.10_FINAL.pdf

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FTA, “TAM Facility Performance Measure Reporting Guidebook: Condition Assessment Calculation”, Version 1.2 March 2018, update Appendix B. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/regulations-and-guidance/asset-management/60361/tam-facility-performance-measure-reporting-guidebook-v1-2.pdf

FTA, “Quality Management System Guidelines”, October 2019, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/funding/grant-programs/capital-investments/8536/final-qms-guidelines-2019_1.pdf

MAP-21 legislation (49 U.S.C., Section 5326, Transit Asset Management):
http://www.law.cornell.edu/uscode/text/49/5326

Metro's Public Transit Agency Safety Plan

MetroLink Right-of-Way Facilities Maintenance Plan

MetroLink Track and Rail Right-of-Way Maintenance Standards Manual

MetroLink Standard for Structures Inspection and Maintenance

NTD 2017-2018 Asset Inventory Module Reporting Guide.
https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/ntd/17691/report-year-17-18-asset-inventory-module-reporting-guide_0.pdf

Transit Cooperative Research Program **(TCRP)**, Report 157, "State of Good Repair: Prioritizing the Rehabilitation and Replacement of Existing Capital Assets and Evaluating the Implications for Transit," 2012.
http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_157.pdf

U.S. Department of Transportation, Federal Transit Administration, Transit Asset Management Manual, Focusing on the Management of our Transit Investments, (Washington, DC, 2012).

APTA Asset Management Plan Checklist (if it's approved in time)
Other APTA documents

6. Definitions

Key concepts and terms used throughout the TAM Plan are defined below to provide for a common understanding of the vocabulary.

Asset Management: Refers to the optimal lifecycle management of physical assets to sustainably achieve the stated business objectives.

Asset Hierarchy: Refers to segmenting assets into appropriate classifications. The asset hierarchy can be based on asset function or asset type or a combination of the two.

Asset Management Business Processes: Refers to the key processes that comprise the asset management framework. Business processes include: policy and strategy; inventory, condition assessment and performance monitoring, lifecycle management planning, capital planning and programming, operations & maintenance **(O&M)** budgeting, and performance modeling.

Asset Management Maturity: Refers to an agency's level of asset management practice. An agency's asset management maturity may be as basic as understanding the nature of all critical assets owned.

Fiscal Year BSD/Metro July 1 to June 30

Key asset management activities -- a list of the transit asset management activities that are critical to achieving a transit provider's transit asset management goals for a particular year.

Maintenance Management System: Refers to M5, the work order and maintenance tracking system used to manage, plan and track maintenance activities on all assets at Metro.

Physical Assets - Refers to an agency's facilities, stations and fixed guideways; as defined in the FTA Transit Asset Management Guide.

State of Good Repair: The condition in which a capital asset is able to operate at a full level of performance. An asset is considered to be in a state of good repair when that asset meets the following:

- Is able to perform its designed function
- Does not post a known unacceptable safety risk
- Its lifecycle investments have been met or recovered

Transit asset management (TAM) - the strategic and systematic practice of procuring, operating, inspecting, maintaining, rehabilitating, and replacing transit capital assets to manage their performance, risks, and costs over their life cycle in order to provide safe, cost-effective, and reliable service.

Transit Asset Management Plan (TAMP) – a plan developed for Metro pursuant to 49 CFR part 625 that includes, at minimum, capital asset inventories and condition assessments, decision support tools, and investment prioritization.

Transit asset management policy - a transit provider's documented commitment to achieving a state of good repair for all of its capital assets. The transit asset management policy defines the transit provider's transit asset management objectives and defines and assigns roles and responsibilities for meeting those objectives.

Transit asset management strategy- the approach a transit provider takes to affect its policy, including how it will meet objectives and state of good repair performance targets.

Transit asset management system - a strategic and systematic process of operating, maintaining, and improving public Transportation capital assets effectively, through the life cycles of those assets.

Acronyms

ADA	Americans with Disability Act
APTA	American Public Transportation Association
AASHTO	American Association of State Highway and Transportation Officials
BEB	Battery electric bus
BSD	Bi-State Development
CAP	Corrective Action Plan
CCTV	Closed Circuit Television
CFR	Code of Federal Registers
CRS	Cash Receivers System
CTS	Carrier Transmission System
EAM	Enterprise Asset Management
EWGCOG	East West Gateway Council of Governments
FAST	Fixing America's Surface Transportation
FHWA	Federal Highway Administration
FMS	Fuel Management System
FT	Feet
FTA	Federal Transit Administration
GIS	Geographic Information System
HVAC	Heating, Ventilating, and Air Conditioning
IDOT	Illinois Department of Transportation
IT	Information Technology
LTD	Life to Date
LRV	Light Rail Vehicle
LRT	Light Rail Transit (associated with LRT Communication)
M5	Computerized Maintenance Work Order Management System
MAP-21	Moving Ahead for Progress in the 21st Century
MAUs	Mass Air Units
MDBF	Mean Distance Between Failure
MoDOT	Missouri Department of Transportation
MOW	Maintenance of Way
MPO	Metropolitan Planning Organization
NTD	National Transit Database
OCC	Operation Control Center
OCS	Overhead Catenary System
OEM	Original Equipment Manu factor
O&M	Operations & Maintenance
OSP	Outside Cable Plant
PA	Public Address
PM	Preventive Maintenance

PTASP	Public Transportation Agency Safety Plan
QA	Quality Assurance
QC	Quality Control
RF	Radio Frequency
ROW	Right-of-Way
RTU	Roof Top Unit
SAV	Stand Alone Validators
SCCTD	St. Clair County Transit District
SCADA	Supervisory Control and Data Acquisition
SGR	State of Good Repair
SMS	Safety Management System
SSOA	State Safety Oversight Agency
STIP	State Transportation Improvement Plan
TAM	Transit Asset Management
TAM Plan	Transit Asset Management Plan
TCRP	Transit Cooperative Research Program
TERM	Transit Economic Requirements Model
TIP	Transportation Improvement Plan
TVM	Ticket Vending Machine
ULB	Useful Life Benchmark
UPS	Uninterrupted Power Source
USDOT	United States Department of Transportation
USC	United States Code
VMD	Vehicle Maintenance Department
WAC	Work Accomplished Code
YRS	Years

APPENDIX A LOOP TROLLEY TRANSIT ASSET MANAGEMENT PLAN

Transit Asset Management Plan

For

The Loop Trolley Transportation Development District
And
The Loop Trolley Company

Loop Trolley Rail Fixed Guideway System

March 2019
Revision 01

Table of Contents

Approvals

The individuals below, signing and submitting this Transit Asset Management Plan (TAM Plan), verify that it is prepared in accordance with requirements and guidelines set forth by the Federal Transit Administration in 49 CFR Part 625; that they are authorized representatives of the Loop Trolley Transportation Development District (LTTDD) and The Loop Trolley Company (LTC); that their signatures attest all items and conditions contained in this plan are understood, accepted and approved; and that they are committed to implementing the TAM Plan and achieving the vision, goals and objectives for asset management outlined.

APPROVED BY:

Craig Heller, LTTDD District Administrator — **Date** 5/3/19

CONCURRED BY:

Kevin Barbeau, LTC Executive Director — **Date** 5/3/19

Asset Management Overview

Introduction

The Loop Trolley system considers the condition of its capital assets - equipment, rolling stock, infrastructure, and facilities – as critical to the system's safety and performance. A focus on these elements also protects against safety risks, system reliability as a whole, and costs to operate and maintain the system.

This Loop Trolley Transit Asset Management Plan (TAM Plan) establishes our approach for assessment, strategic planning, investing, and managing the system's capital assets effectively through the life cycle of such assets to maintain the quality of the system.

This TAM Plan establishes a vision for the system's ongoing quality, the process to regularly iterate actionable, strategic investment and management plans, and the active plan being enacted to realize the vision in the near term.

System Background and Overview

The Loop Trolley system consists of a 2.2-mile-route (3.1 track miles) heritage streetcar line that connects Forest Park in St. Louis, MO to the West Delmar Loop in University City, MO (Saint Louis County). The primary capital and operating funding source for the Loop Trolley system is the Loop Trolley Transportation Development District (LTTDD) formed pursuant to the Missouri Transportation Development District Act§ 283.200 et seq ., RSMo (the "TDD Act"). By the terms of an Operations and Maintenance Agreement (the "Agreement") with the LTTDD, the LTC, a 501(c)(3) organization, has been tasked with general oversight over the streetcar system, including day-to-day operations and maintenance of the system. The LTTDD remains the owner of the system and all related infrastructure.

Capital largely comes from monthly Sales Taxes received by LTTDD and distributed to LTC. Additional funding sources for LTC include fare revenue, advertising, sponsorships, and fundraising. Capital requests related to the system's Transit Asset Management will be advanced in accordance with the existing Agreement, whereby the LTC makes an annual funding request (including operational and capital requests), which must be approved by the LTC Board before moving to the LTTDD Board for approval.

TAM Vision

Through deliberate and informed asset management and investment, the Loop Trolley system will provide safe, reliable, and publicly appealing transit services. The Loop Trolley system will serve as a model for effective resource management, maximizing investment and asset longevity, stewarding both preservation and expansion efforts.

TAM Policy

The process of Transit Asset Management planning, and the resulting capital investment actions, will be carried out to fulfill the system's TAM Vision and maintain *capital assets* in a state of good repair.

Investments will be made in alignment with the following priorities:

1. Ensure the safety and security of the system
2. Maintain reliability; mitigate operational disruptions and vulnerability of the system due to degradation or failure of critical assets, or promote increased service capability
3. Promote continued passenger comfort and convenience

Roles and Responsibilities

Loop Trolley Transportation Development District –

- Make cooperative decisions to fulfill the *Prioritize, Propose,* and *Action* steps of the Transit Asset Management planning process, as well as set Goals & Objectives and ask key analysis questions to drive the planning process.
- Maintain a Capital Asset Registry of system equipment, rolling stock, infrastructure, and facilities meeting the definitions and thresholds outlined by FTA
- Generate condition assessments annually using standards commensurate with FTA's TERM condition rating index. These condition assessments will be used as inputs into the *assess* step of the planning process - the values analyzed in decision support tools in order to *inform*
- Perform annual condition assessments for capital assets, completed by April each year
- Generate reporting and analysis to inform as to the condition of system assets, and to provide context for investment prioritization
- Provide detail of Transportation Development District capital resources available to the Loop Trolley system, to inform financial analysis
- Generate and submit annual reports as required per§ 625.55 Annual Reporting for Transit Asset Management, FTA's requirements for NTD reporting.
- Share data, performance targets, and plan goals & objectives with the Metropolitan Planning Organization (EWGCG), on an annual basis, in conjunction with NTD reporting.
- Ensure continued compliance of the system's TAM Plan with FTA regulations.
- Annually solicit public input regarding public satisfaction with trolley service (condition and appeal of vehicles, station stops, etc.) to serve as inputs into the *assess* and *inform* steps of planning - data should be gathered prior to the annual planning period
- Manage the timeline and execution of the TAM Planning Process, and annual updates of Performance Measures and Targets
- Manage the execution of the TAM Plan
- Advance capital funding requests, generated by the TAM Plan, in a manner consistent with the Agreement, with the intent of supporting capital outlay plans generated through TAM

Loop Trolley Company –

- Fully execute all plans and procedures for the responsible operation and maintenance of system assets (Facility Maintenance Plan, Rail Fleet Management Plan, Vehicle maintenance procedures, etc.)
- Provide feedback and qualitative assessment of system performance as solicited by LTTDD throughout the TAM planning process
- Manage an 'operational inventory' of system spare parts and components, not limited to those valued over $50,000 as is applicable of 'Capital Assets', for use in the effective operational management of the system. This level of inventory is necessary to fulfill maintenance of system components that, in aggregate, constitute Capital Assets.

State of Good Repair (SGR) Definition

State of good repair is defined as the system or asset's condition of being well maintained, safe, reliable, publicly appealing, and sustainable.

The Loop Trolley *system* is considered in a state of good repair when all of the following criteria are met:

1. LTTDD possesses and maintains a comprehensive registry of its capital assets and rolling stock
2. LTTDD possess an asset management plan which is integrated into the management processes and practices of system
3. 100% of operating assets (those assets in-use within the system) are in a state of good repair (see below) *or* are replaced before their condition deteriorates to the point of presenting a safety risk
4. Sufficient replacement or redundancy assets (capital or operational) are available such that the system is not at risk of an extended shutdown should critical assets fail
5. Infrastructure and vehicles meet customer expectations for comfort and reliability

Individual assets are considered to be in a state of good repair when the following criteria are met:

1. The asset is within its articulated useful life (begins when the asset's condition begins degrading)
2. The capital asset is able to perform its designed function
3. Use of the asset in its current condition does not pose an identified unacceptable safety risk
4. The asset is properly maintained in accordance with the system's approved O&M procedures and schedules (Facility Maintenance Plan, Rail Fleet Management Plan, etc.); The life-cycle investment needs of the asset have been met or recovered, including all scheduled maintenance, rehabilitation, and replacements.
5. Condition assessments rate the asset at TERM 3 or higher, based on LTC's regular maintenance and inspections

Structure of the Active Plan

The Loop Trolley Transit Asset Management Plan, in initial form and all ongoing updates, shall fulfill requirements of 49 CFR Part §625.25 - Transit Asset Management Plan requirements; or applicable revisions of the rule.

Each *Active Plan,* resulting from the annual planning process, will include the following information:

1. CONDITION REPORT: Answers key analysis-questions in order to provide context for decision making. Additionally, includes identified asset vulnerabilities and risks within the plan horizon.
    - What system assets are deteriorating rapidly, coming to the end of a life cycle, or are on the critical assets list - and how will this affect strategy for asset management in the current plan horizon?
    - Answer previously posed analysis-questions.
    - Fulfills requirements of 49 CFR §625.55, reporting requirements to NTD

2. INVESTMENT PRIORITIES: Developed collaboratively by LTTDD and LTC, by reviewing the condition report and exercising judgments regarding the most appropriate areas-of-focus for investment and strategy, in order to maintain system SGR and fulfill TAM Vision for the current plan horizon.

3. GOALS & OBJECTIVES: For the assigned plan horizon, in alignment with the developed priorities, to steer ongoing fulfillment of the TAM Vision.
    - What impacts in the areas-of-focus identified as priorities, does management hope to make in order to manage SGR and fulfill the TAM Vision?

4. PROPOSALS: Suggested capital investments designed to affect system condition and/or produce results toward outlined goals.
    - What projects/lines of effort can best achieve goals and objectives and/or maintain system SGR in the current planning horizon?

5. STRATEGY: Strategies, timelines, and/or decision triggers for executing accepted proposals.
    - When will these actions be taken, how, and why?

6. PERFORMANCE MEASURES & TARGETS: Fulfills 49 CFR §625.41 - Short term metrics for indicating system state of good repair, for one-year periods within the current planning horizon; and what is the System's expected level of fulfillment of each measure.
7. ANALYSIS-QUESTIONS: Analysis-questions and related data-inputs for the next active plan horizon.
    - What analysis-questions must be answered in order to properly strategize in the next planning horizon, and what data inputs must be gathered for such analysis?

Definitions

Asset category means a grouping of asset classes, including a grouping of equipment, a grouping of rolling stock, a grouping of infrastructure, and a grouping of facilities. See Appendix A to this part.

Asset class means a subgroup of capital assets within an asset category. For example, buses, trolleys, and cutaway vans are all asset classes within the rolling stock asset category. See Table 1 to this part.

Asset Registry means a list of capital assets, and information about those assets (see Appendix A).

Capital Asset means individual units of rolling stock, facilities, equipment critical to system reliability, or any elements of infrastructure used for the provision of public transportation; valued over $50,000; for which the LTTDD has direct capital responsibility; *and* assets owned by any party which are critical to system operation. Like capital assets will be tracked by type within each system (ex. OCS poles), assets with unique qualities will be tracked as a single unit (ex. vehicles, station stops).

Operational Assets are any in-use or spare whole-assets, parts, components, and/or consumables that contribute to the system's regular operation or are in reserves to replace in-use assets as necessary; and do not meet the $50,000 threshold for consideration in TAM. The LTC is responsible for maintaining an inventory of Operational Assets, and in conjunction with LTTDD, for re-stocking and maintaining sufficient quantity for the sustainable operation of the Loop Trolley system.

Trolley Management led by the LTTDD District Administrator, and generally includes LTTDD Governing Board, contracted Grants Administration Manager, and Operations and Maintenance Contractor Executive Director and support staff.

Useful Life Benchmark means the safe and reliable performance expectancy of a given asset class, in years, with proper maintenance. ULB is used to anticipate and schedule capital replacement costs, but may not reflect the actual useful life achieved for a given asset or class in the system - which may be affected by extenuating circumstances. ULB is the average age-based equivalent of a 2.5 rating on the FTA Transit Economic Requirements Model (TERM) scale. Maintenance and inspection results, based on the TERM scale, will help understand degradation trends and how assets are faring compared to the standard ULB. The useful life of an asset begins counting down when the asset is in use, or when it begins degrading.

Table 1. Asset Categories

Asset Category		Asset Class	Individual Asset
	Equipment	Maintenance	Pressure Washer 1 Ton Jib Crane Lifting Jacks (Metro)
	Rolling Stock	Revenue Vehicles	Council Crest Trolleys 001 002 Melbourne W2 Streetcars 003 (WFSC-518) (WFSC-482)
	Infrastructure	Fixed Guideway	Track Slab (Concrete) Track Rail Segments Track Switches (8)
		Systems	Preemptive Signals
		Power	Traction Power Substation Overhead Catenary System poles, wires, accessories
	Facilities	Support Facilities	Loop Trolley Maintenance & Storage Facility 5875 Delmar Blvd. | St. Louis, MO 63112

		Passenger Facilities	*Station Stops* University City Library Leland Avenue EB Leland Avenue WB Limit Avenue EB Limit Avenue WB The Pageant EB The Pageant WB Delmar Loop MetroLink Hamilton Avenue Delmar & DeBaliviere Crossroads College Prep Forest Park-DeBaliviere MetroLink Missouri History Museum - Forest Park

Planning Process

The TAM *Planning Process* outlines five steps to generating an actionable Transit Asset Management Plan, for a four-year time horizon. The following process description details the tasks, purpose, and product of each step that will aid the development of an updated plan - to be executed. The planning process is a cycle, with feedback loops, that Trolley Management will annually revisit to generate a new active plan, advances the four-year time-horizon one year further. The result of each planning process cycle is an updated *Active Plan.*

Assess – Generate & Gather Input

In order to answer important analysis-questions, create an accurate picture of system condition and trends, and ultimately inform decision making, data-inputs must be gathered and prepared for analysis. *Assess* is the process of generating and centralizing those inputs, in preparation for analysis and review in following steps; the *assess* step is both the first step of the process, as well as shaped by the final step in the process - *action* - in which Trolley Management identifies the inputs they desire to inform future decision-making.

These inputs can be various metrics including: conditions assessments of assets, specific measures of public opinion regarding the system, financial values of key capital funding sources, etc.

Task:
1. Generate inputs as prescribed by the active plan.
2. Centralize inputs and enter into tracking tool, in preparation for the *inform* step.

Purpose:
Support the decision-making process by providing fodder for analysis.

Product:
Input-data as prescribed by Trolley Management entered into tracking tool and prepared for analysis prior to the commencement of subsequent planning steps. The *assess* step will gather data annually and prepare it for the *inform* step in May of each planning cycle.

Assess Fulfills Reporting Requirements:

In addition to the planning process, the Assess step is executed in order to fulfill reporting requirements.

1. 49 CFR § 625.55 Annual Reporting for Transit Asset Management; FTA's requirement to report into the National Transit Database.
2. Sharing NTD reportable data, and TAM Plan goals & objectives, with the Metropolitan Planning Organization (EWGCG).

Reporting will be completed by October 1st **of each year.**

49 CFR § 625.55
(a) Each provider must submit the following reports:

(1) An annual data report to FTA's National Transit Database that reflects the SGR performance targets for the following year and condition information for the provider's public transportation system.

(2) An annual narrative report to the National Transit Database that provides a description of any change in the condition of the provider's transit system from the previous year and describes the progress made during the year to meet the performance targets set in the previous reporting year.

Inform

Analysis is performed in order to summarize asset conditions, identify trends, and project system and asset outlooks; *inform* answers key analysis-questions in order to provide context for decision-making.

The Loop Trolley will utilizeFTA's TERM Data Publisher as its tracking tool; the database for centralizing inputs, performing analysis, and generating the condition reports necessary to inform decision-making.

Task:
1. Perform all data analysis functions to best answer proposed analysis-questions
2. Qualify data and results as necessary to provide full context and clarity
3. Generate Condition Report; match format to that desired by Trolley Management for ease of integration into decision-making

Purpose:
Illustrate the system's current conditions and forecast future outlook, based on prescribed inputs and analysis via decision support tools. Provide the necessary context for Trolley Management to make responsible decisions in setting investment priorities and building asset management strategy.

Product:

Condition Report. This report will answer the key analysis-questions made by Trolley Management, and at a minimum provide analysis of asset degradation.

Prioritize

In June of the planning process, Trolley Management will hold a series of meetings to review the Condition Report and analysis and prioritize existing needs and ambitions for the system - advancing the four-year plan horizon.

Needs identified through the *Inform* step are discussed and prioritized, consistent with the TAM policy, for potential investment. Additionally, ambitions for expansion or new investment, are integrated with needs, and prioritized consistent with the TAM policy.

In addition to the TAM Policy, the following Federal guidelines apply to establishing investment priorities.

49 CFR §625.33 Investment prioritization.

(a) A TAM plan must include an investment prioritization that identifies a provider's programs and projects to improve or manage over the TAM plan horizon period the state of good repair of capital assets for which the provider has direct capital responsibility.
(b) A provider must rank projects to improve or manage the state of good repair of capital assets in order of priority and anticipated project year.
(c) A provider's project rankings must be consistent with its TAM policy and strategies.
(d) When developing an investment prioritization, a provider must give due consideration to those state of good repair projects to improve that pose an identified unacceptable safety risk when developing its investment prioritization.
(e) When developing an investment prioritization, a provider must take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM plan horizon period.
(f) When developing its investment prioritization, a provider must take into consideration requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities.

Task:
Conduct a series of meetings to review analysis of system conditions and discuss the merits of addressing each identified deficiency, or opportunity for improvement. Trolley Management should order the identified capital needs of the system in a manner consistent with the TAM Policy; and with a sense of the efficacy, of addressing each need, in impacting overall fulfillment of the TAM Vision.

Purpose:
Create priorities such that sparse capital can be applied to create maximum positive impacts on the system's quality, and in fulfillment of the TAM Vision.

Product:
Ranked list of system needs, ordered consistent with the TAM Policy, and in service of the TAM Vision. The documents should capture the narrative necessary to justify each need, and its position on the priorities list, as well as express the risks associated with taking no action to manage the asset.
This list will be used to drive the Capital Request process.

Propose

Task:
Identify and analyze potential courses of action to fulfill the needs identified in the *Prioritize* step. Summarize the cost-benefit proposition of each proposal for uniform comparison. This process may include comparison on various products, equipment, or materials available to maintain or replace assets; requests for proposals to provide solutions relating to asset management needs; comparison on contractual bids to provide services; etc.

Purpose:
To identify and compare the value-propositions of the courses-of-action available to address the needs identified in *Prioritize*.

Product:
Proposal Matrix, ordering the available proposals by merit and financial viability, for each of the identified priorities. This matrix becomes the basis for Capital Requests, providing the financial specificity necessary to request funds.

Action

Task:
1. Make capital requests in accordance with the existing Agreement, whereby the LTC may make an annual funding request (including operational and capital requests}, which must be approved by the LTC Board before moving to the TDD Board for approval. Capital requests will be made using the products from the Transit Asset Management process for justification.
2. Receive feedback from the capital request process and reshape requests and justifications accordingly to improve likelihood of receiving funds.
3. Following the finalization of the Trolley's annual capital request process, generate time lines, objectives, plans, and performance measures to implement the preferred proposals and utilize awarded capital in service of the TAM vision.

Purpose:
Supply the annual capital request process with the strategically identified needs, proposals, and supporting justifications necessary to secure funding needed to maintain Trolley assets and fulfill the TAM vision.

Create an actionable set of timelines, objectives, plans, and performance measures to carry-out investment actions in fulfillment of the TAM vision.

Product:
Approved capital request, implementation plans and strategies. This information constitutes the *Active Plan.*

TAM Plan Revision

The Active TAM Plan shall be updated, via the Planning Process, in its entirety every year as part of the

process for capital funding requests. An initial window of four (4) years, at the time of TAM Plan implementation, is established for asset management Performance Targets. Each year, the new version of the Active Plan will extend the time-horizon of the plan one year further.

Setting and Updating Performance Measures & Targets

In October each year after initial targets are set, the LTTDD District Administrator must set performance targets extending the window one (1) year further; and submit as part of the annual reporting requirements to NTD.

Active Plan (2019-2023)

1. Condition Report

100% of rolling stock, equipment, and facilities are within their ULB and remain in condition not less than 4.0 of the TERM condition assessment rating scale. Additionally, all assets are to remain within their ULB for the time horizon of the 2019-2023 Active Plan. Goals and Objectives for the 2019-2023 Active Plan will direct the implementation of complete conditions assessment procedures, leading to greater detail in future conditions reports.

2. Investment Priorities (2019-2023)

Refurbishment of 1-2 Melbourne W2 model streetcars, increasing fleet capacity and opportunity for extended operational hours and/or miles. Additional track and overhead components in Agency facility to store and maintain 1-2 Melbourne W2 model streetcards.

3. Goals & Objectives (2019-2023)

GOAL	OBJECTIVES
Implement Decision Support tools	• Create Asset Registry • Transpose Asset Registry data into TERM Lite decision support tool
Implement inspection procedures that generate regular TERM condition assessments	• Develop rating scale for discreet asset classes or individual assets, as appropriate, consistent with both the asset's qualities and the TERM scale • Develop a concise plan for the performance of conditions assessments on al TAM applicable assets, to be performed annually no later than April

Establish baseline condition ratings for assets	• Conduct baseline condition assessments for assets and input data into TERM Lite decision support tool
Identify the system's critical assets, to help steer the Prioritize step of the planning process	• Develop a critical asset list and identify strategies to mitigate related vulnerability, including minimum available replacement inventory, and replacement triggers

4. Investment Proposals (2019-2023)

Refurbish one Melbourne W2 model streetcar to increase fleet capacity. Estimated cost is $650,000.

5. Strategy (2019-2023)

For the 2019-2023 Active Plan, the Loop Trolley system's major Transit Asset Management actions will support uprighting of the newly-opened trolley system. In addition to activities relevant to the implementation of this TAM Plan, improving internal administrative and tracking systems to streamline all facets of system operations will be a focus.

6. Performance Measures & Targets (2019-2023)

The Loop Trolley system entered revenue service in November 2018. As of the first adoption of the Loop Trolley Transit Asset Management *Active Plan* (Federal FY 2019-2023), 100% of rolling stock, equipment, and facilities fell within their ULB and remain in condition not less than 4.0 of the TERM condition assessment rating scale. Additionally, all assets are to remain within their ULB for the time horizon of the 2019-2023 Active Plan. Because of the youth of the system and assets, performance targets have been set to reflect the 0% of assets which will be outside their ULB or below TERM rating 3.0 during the initial 4-year time horizon of the plan (see Table 2).

Asset Category		Asset Class	Individual Asset	ULB (Yrs)	Performance Measure	Target
	Equipment	Maintenance	Pressure Washer 1 Ton Jib Crane Lifting Jacks (Metro)	12	% Assets Operating Beyond ULB	0%

	Rolling Stock	Revenue Vehicles	*Council Crest Trolleys* 001 002 *Melbourne W2 Streetcars* 003 (WFSC-518) (WFSC-482)	31	% Assets Operating Beyond ULB	0%
	Infrastructure	Fixed Guideway	Track Slab (Concrete) Track Rail Segments Track Switches (8)	25 50 25	% Assets Operating Beyond ULB	0%
		Systems	Preemptive Signals	25	% Assets Operating Beyond ULB	0%
		Power	Traction Power Substation Overhead Catenary System poles, wires, accessories	30	% Assets Operating Beyond ULB	0%
	Facilities	Support Facilities	Loop Trolley Maint. & Storage Facility 5875 Delmar Blvd.	40	% Rated Below Condition 3 on the TERM Scale (per class)	0%
		Passenger Facilities	*Station Stops* University City Library Leland Avenue EB Leland Avenue WB Limit Avenue EB Limit Avenue WB The Pageant EB The Pageant WB Delmar Loop MetroLink Hamilton Avenue Delmar & DeBaliviere Crossroads College Prep Forest Park-DeBaliviere MetroLink Missouri History Museum	25	% Rated Below Condition 3 on the TERM Scale (per class)	0%

7. Analysis-Questions (2019-2023)

1. How are Loop Trolley asset conditions faring against the expected depreciation schedules?
    a. Are any assets outside their ULB, or rated below 3.0 condition assessment?
    b. Are any assets projected to fail before the anticipated ULB?

   i. Input: TERM Scale condition assessments for capital assets, generated annually through stand-alone inspection procedures related to TAM.
   ii. Input: Manufacturer or industry standard depreciation values, per asset category.
   iii. Input: # of Service failures, related to each vehicle, or asset.
2. Are Right-Of-Way conditions, other than Trolley Infrastructure, affecting system operation?
   i. Input: Road Condition Index data for alignment pavements.
3. What assets are the Public most interested in prioritizing for maintenance?
   i. Public Satisfaction Survey

Appendix A – Asset Registry

Asset Registry (Capital and Working) is available by permission via Loop Trolley's Box system.

Appendix B – Condition Assessments

100% of rolling stock, equipment, and facilities are within their ULB and remain in condition not less than 4.0 of the TERM condition assessment rating scale. Additionally, all assets are to remain within their ULB for the time horizon of the 2019-2023 Active Plan. Goals and Objectives for the 2019-2023 Active Plan will direct the implementation of complete conditions assessment procedures, leading to greater detail in future conditions reports.