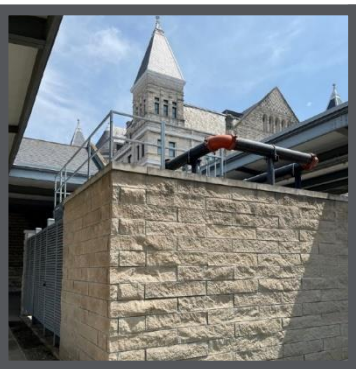
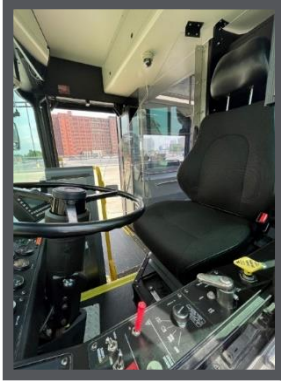
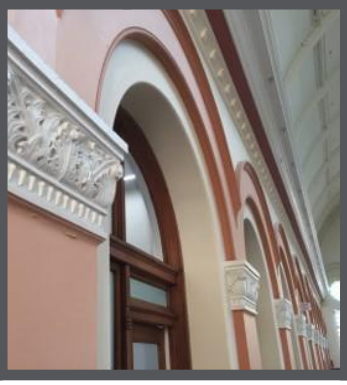
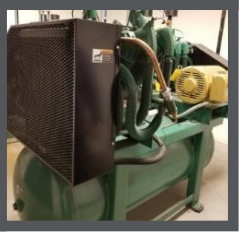
Transit Asset Management Plan









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Transit Authority of River City (TARC)	Person resp	Prepared by	Reviewed by	Approved by
	CW	CW	GfH	

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ID: AM0001 (Asset Management) Revision #2.0

DOCUMENT CONTROL HISTORY

Version	Document Title	Date	Comments
Draft	Transit Asset Management Plan	08/15/2018	ABB Initial Draft
1.3	Transit Asset Management Plan	09/06/2018	Client Review & Comments
1.4	Transit Asset Management Plan	09/07/2018	Additional Client input
1.5	Transit Asset Management Plan	09/08/2018	Consolidate Client input
1.5.1	Transit Asset Management Plan	09/09/2018	Incorporate Comments, compile all input
1.8	Transit Asset Management Plan	10/11/2018	Final draft for approval
1.9	Transit Asset Management Plan	7/17/2020	1st revision
1.9.1	Transit Asset Management Plan	3/23/2021	Accountable Exec change
2.0	Transit Asset Management Plan	9/20/2022	4-Year Update

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1. INTRODUCTION

OVERVIEW

As the Transit Authority of River City (TARC) approaches 50 years of operation, the next decade promises to be characterized by change. TARC's challenge will be to adapt to a revolution in energy supply, new regulations and incentives, and societal shifts, all while maintaining a state of good repair for aging assets.

This Transit Asset Management (TAM) plan presents TARC's approach to improving its capacity to accommodate change and thrive. This includes better understanding the costs of asset ownership, recognizing the impact of asset condition on safety and reliability, and aligning our systems and training practices with our aspirations.

This 4th-year update of the plan ensures compliance with requirements initially established by the Moving Ahead for Progress in the 21st Century (MAP21) Act of 2012 and further defined by the Federal Transit Administration's (FTA's) Final Rule on TAM (49 CFR 625 and 630). The Final Rule defines Transit Asset Management as, "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 cycles, for the purpose of providing safe, cost-effective, and reliable public transportation."

To that end, the plan will define implementation steps associated with those processes and with the commitments in TARC's TAM Policy. These implementation steps are spread over the 4-year horizon of the plan, and they are tied to specific strategies that designed to develop a more mature asset management system.

Where TARC's original TAM plan took a broad approach, this update is focused on organizational improvements at the asset and capital planning level. Specifically, training and performance evaluation are common threads throughout the planned implementation steps. The better we understand our abilities, expectations, and resources, the better we can allocate and optimize those resources to achieve our goals, even if they change.

1.1 IMPLEMENTATION STEPS

Below is a four-year schedule of TARC's anticipated implementation steps for four areas of organizational development. These steps are the key TAM activities that TARC will engage in over the TAM plan horizon period.

FIGURE 1-1 – TAM IMPLEMENTATION STEPS

	Year 5 (2023)	Year 6 (2024)	Year 7 (2025)	Year 8 (2026)
Asset Ownership	Develop asset management training for asset owning staff	Develop evaluation criteria for asset management skills and program maturity	Develop performance criteria for asset owning staff tied to condition, workforce development, and safety	
Lifecycle Management	Complete inventory of systems	Define and identify critical assets, performance criteria, and owners	Develop lifecycle management plans for fleet, facilities, and systems	
Capital Planning & Programming	Develop capital project performance measurement criteria	Develop process for budgeting personnel hours for capital projects	Extend project planning and prioritization horizon to 5 years	
Training & Professional Development	Develop agency-wide framework for professional development		Link asset management training to framework	Tie condition and safety standards to performance

1.1 FEDERAL TAM REQUIREMENTS

1.1.1 TIER 1 STATUS

The TAM Final Rule was published on July 26, 2016 and went into effect on October 1, 2016. The rule itself amended the United States (U.S.) Code of Federal Regulations (CFR) Title 49 Parts 625 and 630, which relate to TAM and the NTD respectively. Based on the criteria established in the TAM Final Rule, TARC is a Tier I agency.

Tier I provider:

- "Owns, operates, or manages either 101 or more vehicles in revenue service during peak regular service or in any one non-fixed route mode"

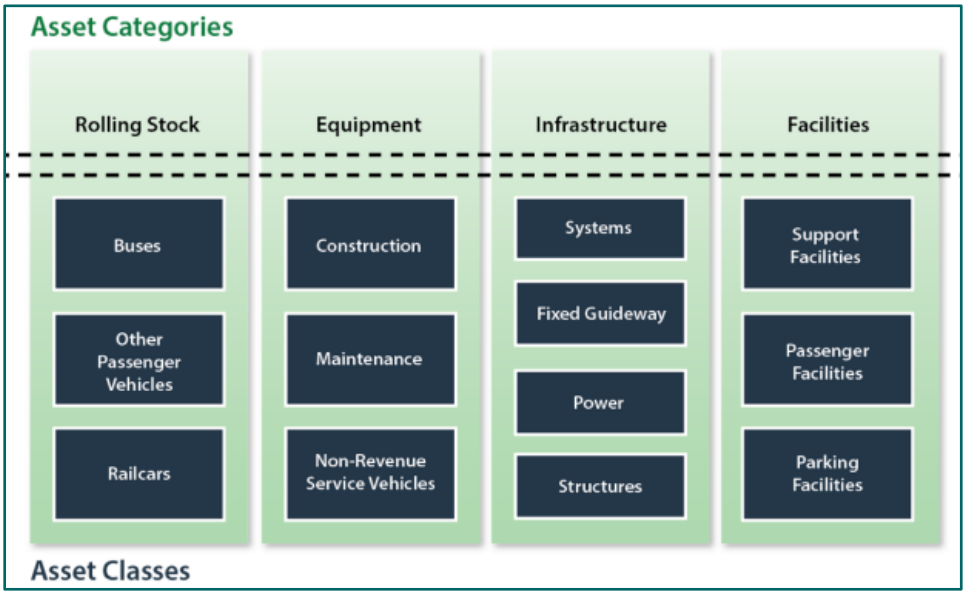
1.1.2 ASSET CLASSES

The TAM Rule requires that transit agencies establish state of good repair (SGR) performance measures and targets for each asset class. As a Tier I provider, TARC must report on the SGR measures for the following asset categories:

- Rolling stock (revenue vehicles): Percent of vehicles that have either met or exceeded their Useful Life Benchmark (ULB)
- Equipment (including non-revenue service vehicles): Percent of vehicles or other equipment that have either met or exceeded their ULB
- Facilities: Percent of facilities rated below condition 3 on the FTA TERM scale

TARC does not have assets that belong to the Infrastructure category. However, in this iteration of the TAM Plan, TARC will treat the Systems asset class as if it is included in each of the categories in Figure 1-2. Major systems components will be added to the equipment register in Ellipse and assigned criticality and condition ratings.

FIGURE 1-2 – ASSET INVENTORY CATEGORIES



FTA Transit Asset Management Guide (Report No. 0098), Figure 2-5

1.1.3 TAM PLAN REQUIREMENTS

As a Tier I provider, TARC must develop its own TAM Plan. This TAM Plan must include all nine elements of the Final Rule and must:

- Define the TAM and SGR policy;
- Include the capital asset inventory;
- Provide asset condition assessment information;
- Describe the decision support tools used to prioritize capital investment needs;

- Identify project-based prioritization of investments;
- Discuss the TAM Plan implementation strategy;
- Describe the key TAM activities to be undertaken within the Plan's four-year period;
- List resources needed to carry out the TAM Plan; and
- Outline how the TAM Plan will be monitored and updated to support continuous improvement.

To provide a visual reference for compliance, Table 1-1 below reflects the portions of the plan that TARC will be using to satisfy all requirements listed above. This table also lists the minimum requirements of the initial TAM Plan.

TABLE 1-1 – TARC's TAM PLAN AND U.S. 49 CFR COMPLIANCE MATRIX

TARC's Tier I TAM Plan includes the following elements:			
No:	**U.S.49CFR625:**	**Requirement**	**TAM Plan Compliance**
1	49CFR§625.25 (b)(1)	Inventory of the number and type of all capital assets a provider owns, except equipment with an acquisition value under $50,000 that is not a service vehicle.	Capital inventory for all asset-classes, including assets with an acquisition value greater than $50,000, is presented in Section 5.1 "Asset Inventory" of the TAM Plan. Changes to the inventory will be reported in Section 5 in future issues of the TAM Plan.
2	49CFR§625.25 (b)(1)	An inventory must also 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.	Ownership of inventory is included in Section 5.1 "Asset Inventory" of the TAM Plan, which captures TARC - owned inventory. TARC does not own any guideway infrastructure and, third party-owned assets are identified in the respective asset classes.
3	49CFR§625.25 (b)(2)	Condition assessment of those inventoried assets for which a provider has direct capital responsibility and to level of detail to monitor and predict performance of assets, and inform investment prioritization.	The assessed condition of the assets is included in Section 5.3 "Asset Condition" of the TAM Plan. Performance targets for future years are set out where appropriate in Section 5.2 "Asset Performance Measures" of the TAM Plan and reported through NTD.
4	49CFR§625.25 (b)(3)	Description of analytical processes or decision-support tools to estimate capital investment needs over time and develop its investment prioritization.	Use of tools, asset lifecycle strategies, and approaches to support decision making is described in Section 7 "Investment Prioritization and Funding" of the TAM Plan.

TARC's Tier I TAM Plan includes the following elements:			
No:	**U.S.49CFR625:**	**Requirement**	**TAM Plan Compliance**
5	49CFR§625.25 (b)(4)	Project-based prioritization of investments.	The prioritized list of investment projects is set out in Section 7 "Investment Prioritization and Funding" of the TAM Plan.
6	49CFR§625.25 (b)(5)	Provider's TAM and SGR policy.	TAM and SGR Policy is presented in TARC's Board of Directors approved "Asset Management Policy." This Policy is referenced in Section 2 "Goals and Objectives" and is included as Appendix A of the TAM Plan.
7	49CFR§625.25 (b)(6)	Provider's TAM Plan implementation strategy.	TAM Plan implementation strategy, including how the plan and associated business activities will be monitored, updated, and evaluated, and how continuous improvement will take place is set out in Section 4 "Enabling Asset Management" of this TAM Plan.
8	49CFR§625.25 (b)(7)	A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period.	Section 4 "Enabling Asset Management" describes TAM business process activities and TAM improvement activities over the 4-year plan horizon period.
9	49CFR§625.25 (b)(8)	A summary or list of the resources, including personnel that a provider needs to develop and carry out the TAM Plan.	Resources, including Roles and Responsibilities, are included in Section 2.3. Additionally, Asset Management resources and initiatives are defined in Section 4 "Enabling Asset Management".
10	49CFR§625.25 (b)(9)	An outline of how a provider will monitor, update, and evaluate, as needed, it's TAM Plan and related business practices, to ensure the continuous improvement of its TAM practices.	TAM business processes related to TAM Planning and continuous improvement are included in Section 4 "Enabling Asset Management" in the TAM Plan.
When developing its investment prioritization, TARC must:			
11	49CFR§625.33 (a)	Identify a program of projects to improve or manage the SGR of capital assets for which the provider has direct capital responsibility over the TAM Plan horizon period;	Prioritization of investments, work plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
12	49CFR§625.33 (b)	Rank projects to improve or manage the SGR of capital assets in order of priority and anticipated project year;	Prioritization of investments, work plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.

TARC's Tier I TAM Plan includes the following elements:			
No:	**U.S.49CFR625:**	**Requirement**	**TAM Plan Compliance**
13	49CFR§625.33 (c)	Ensure project rankings are consistent with its TAM policy and strategies;	The approach to prioritizing projects is presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
14	49 CFR § 625.33 (d)	Give due consideration to state of good repair projects to improve those that pose an identified unacceptable safety risk;	Practices for consideration of risk and prioritization of investments are set out in Section 7.2 "Capital Investment Prioritization" of the TAM Plan.
15	49 CFR § 625.33 (e)	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;	Prioritization of investments, work plans, cost and budget schedules by year are presented in Section 7 "Investment Prioritization and Funding" in the TAM Plan.
16	49 CFR § 625.33 (f)	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.	Strategies for maintaining assets are set out in Section 6 "Asset Lifecycle Management." Strategies will ensure compliance with maintenance of accessibility features and also include and alterations to facilities consider accessibility as well.

Each section of this TAM Plan contains references to the requirements of the Final Rule on Asset Management in the U.S. CFR. A glossary of key terms can be found in Appendix C: Key Definitions.

2. GOALS AND OBJECTIVES

This section addresses TAM and SGR policy consistent with current federal regulations (49 U.S.C. 5326) and sets the direction for transit asset management strategies.

2.1 GOALS AND OBJECTIVES

TARC has updated its TAM goals and objectives as part of revising its TAM plan. The following three goals were selected with the aim of promoting TAM activities in day-to-day operations and reaching a higher level of maturity in asset management.

TABLE 2-1: TARC GOALS AND OBJECTIVES

No:	Area	Proposed TAM Goal	TAM Plan Objectives
1	Safety	Minimize risk of unsafe operation	• Maintain assets (Rolling and non-rolling) in SGR • Reinforce customer confidence in TARC safety and reliability • Identify measures to reduce accident rates
2	State of Good Repair Investment	Bring all TARC assets into a State of Good Repair	• Develop multi-year SGR needs, linked to the annual budget and capital improvement program • Implement lifecycle cost process
3	Training & Professional Development	Establish a culture of ownership (pride, adoption, investment, etc.)	• Provide opportunities for increased investment in knowledge, skills, and abilities related to effective asset management • Implement tools to support data driven asset management decision-making

2.2 TAM POLICY

The intention of TARC's TAM Policy is to support the development and implementation of a TAM program which will realize long-term benefits related to effective asset management.

The policy has been developed to communicate to the Board of Directors, staff, and external stakeholders TARC's commitment to maintain its system in a State of Good Repair and foster a culture of continuous improvement.

TARC's TAM Policy complies with the Federal Requirements of MAP-21 law which reauthorized surface transportation programs and introduced new NTD reporting requirements.

A signed copy of Resolution 2021-33 and this Board of Directors approved Policy is attached as **Appendix A.**

Unique to TARC is the Every Commute Counts ridesharing program. This partnership between TARC and the Kentuckiana Regional Planning and Development Agency (KIPDA) provides vanpool services to anyone whose commute begins and/or ends in the KIPDA nine-county

region. The vanpool assets are included with TARC's inventory because they are owned by TARC. However, the monthly and annual NTD reporting is performed by KIPDA.

KIPDA has developed their own TAM Policy and TAM Plan that covers all 9 of the Tier I TAM requirements. The most recently updated KIPDA plan is entitled FY23 KIPDA TAM Plan.

2.3 ROLES AND RESPONSIBILITIES

TARC's TAM implementation is a shared responsibility across all divisions with the overall responsibility residing with Executive Director as laid out in Figure 4-1.

- Overall Responsibility

  The Executive Director has the overall responsibility for the development of asset management plans and procedures and reporting to the Board on the status of TAM implementation and achievements.

- Lead Responsibility

  The lead responsibility towards execution of TAM across the agency resides within TARC's Maintenance Department, specifically the Maintenance Asset Manager.

- TAM Implementation Team Responsibility (General)

  The TAM Implementation Team has the final responsibility of TAM plan development, implementation, and modification as required. This includes identifying gaps, developing plans to close the gaps, and defining accountabilities, governance, and associated resource requirements. Each department will support the policy by participating in Implementation Team discussions and providing asset management data and assumptions.

- TAM Implementation Team Responsibility (by Department)

  All departments across the agency will adopt and support the TAM policy, with particular support coming from the following departments through active participation in the TAM Implementation Team.

  - ❖ Maintenance

    The Maintenance Department will contribute data for assessing risk and prioritizing capital projects, pursue continuous improvement for preventative and corrective maintenance, provide operational costs of individual assets and facilities, and develop lifecycle cost of assets.

  - ❖ Finance

    The Finance Department will emphasize development and use of a decision support tool for capital budgeting, link financial accounting data to asset management data, advise on budgets related to asset management.

- Information Technology (IT)

  The IT Department will provide tools for managing asset data, including tools to collate, maintain, utilize and dispose of asset information in support of strategic planning and life cycle costing. Additionally, the IT Department will inventory IT assets and associate those assets with organizational goals where possible and identify resource needs associated with organizational development goals.

- Grants and Capital Programs

  The Grants and Capital Programs Department will lead in the prioritization of capital projects, identify capital resource needs associated with organizational development goals, and promote consideration of lifecycle costing in procurement of assets, asset costing, and valuation.

- Safety

  The Safety Department will provide risk assessment data for prioritization of capital projects and promote consideration of safety, accessibility, and risk in procurement of assets, asset costing, and valuation.

- Human Resources

  The Human Resources Department will determine staffing needs, identify necessary proficiencies and associated training resources, and ensure appropriate asset management training is maintained.

3. CHANGING CONDITIONS

Sections 1 and 2 established the framework of this document and TARC's approach to managing the plan moving forward. Before moving into the next sections that deal with the mechanics of asset management, this section will make note of recent and coming changes that have already altered the criteria used for prioritization. Specifically, these changes have encouraged additional emphasis on the flexibility and longevity of assets.

3.1 COVID-19 IMPACT

In addition to the immediate operational responses to the COVID-19 pandemic, there have been shifts in ridership and funding that will continue to affect asset management decisions over the next four years.

Ridership declined over 60% with the onset of the pandemic and there is no clear path to recovery to pre-pandemic levels. The federal response to reduced fare revenues nationally was an infusion of emergency funds to offset the cost of operations. The Coronavirus Aid, Relief, and Economic Security (CARES) Act, the American Rescue Plan Act of 2021, and the Coronavirus Response and Relief Supplemental Appropriations Act of 2021 (CRRSAA) have been vital to uninterrupted transit operations. They have also provided a window in which capital formula funds have been applied to rolling stock replacement and facilities improvements, and local

matching funds for the capital improvement program have been allowed to build. This build and the capital improvements are in contrast to the previous decade, in which capital formula funds were diverted to support operations, and local matching funds were insufficient to support competitive awards.

At the time of this update, fixed route ridership is still approximately 50% of pre-pandemic levels. The trend is positive, but growth in ridership is slow. If ridership does not return to previous levels within three years, TARC will face significant budgetary shortfalls that will require reductions in service and/or other cost-saving measures.

Conversely, should ridership rebound and continue to grow, even exceeding pre-pandemic levels, then it will be necessary to program and seek increased funding for asset replacement and maintenance.

3.2 ZERO EMISSION TRANSITION

Zero emission bus (ZEB) options do not yet offer the reliability or flexibility to replace diesel buses on a one-for-one basis. That fact, in addition to route requirements and federal limits on fleet size, limits TARC's ability to transition from diesel powered buses in the short term.

Using awards from the CMAQ and LowNo programs, TARC will order its first fourteen (14) extended-range battery-electric buses (BEB) for delivery late in 2023 or early in 2024. The new buses will require modifications to TARC facilities prior to arrival. Although TARC has operated short-range battery-electric buses since 2015, the arrival of extended-range buses will introduce depot charging to TARC for the first time. The power required to charge the 14 new buses, as much as 840 kW should all 14 charge at the same time, could significantly increase TARC's utility costs if not managed carefully.

Consideration of TARC's future with zero-emission buses is further complicated by the progress of hydrogen fuel cell powered bus technology, offering potential for greater flexibility and reliability than battery-electric technology. To navigate the complexity surrounding the competing emerging technologies, TARC is working with a consultant to develop a ZEB Fleet Transition Plan (August 2022) to guide our investments over the next 10 to 15 years.

Working to bridge multiple technologies will strain resources that are finite and generally fixed. In particular, space is limited. TARC's maintenance operations were already constrained by available space with a fully diesel fleet. Accommodating specialized charging and maintenance resources will add complexity within facilities built in 1979-80. Nonetheless, preparing infrastructure capable of supporting a larger zero emission fleet is the first step toward transition. Investment prioritization in the next four years will grapple with the question of whether to refurbish, replace, or reimagine existing facilities as a result of these considerations.

3.3 FEDERAL REQUIREMENTS

In 2022, TARC's original TAM plan was met with praise in its first Triennial Review. However, a more challenging test for TARC's plan and operational maturity will come in the form of future grant application requirements.

Recent grant applications have required inclusion of specific plans, such as a zero-emission fleet transition plan, as well as dedicated line items for specific purposes, such as workforce development. As they are completed, the plans that TARC develops for various new requirements or as the result of consultant led studies will be reflected in the TAM plan.

3.4 FARE COLLECTION

TARC has identified development of a cashless fare collection system as a tactic in the customer experience element of its strategic plan. The first step in this process is development of a much more robust network of retail outlets for cash reloading. The success of that first step will influence TARC's ability to eliminate reloading card value on-board without creating an obstacle to riding. In addition to increasing the availability of locations to preload fares, TARC must increase the options customers have to pay fare on-board. One such option is mobile ticketing.

A cashless system is a priority for several reasons, but one in particular will impact decision-making regarding facilities. Specifically, the handling of cash is cumbersome and expensive. Secure transport and cash handling services are limited in Louisville, and they are growing more expensive. Handling fares internally, however, would require investment in both facilities and staffing, and it would add a new safety and security consideration.

3.5 FACILITIES

There is currently a facilities planning effort underway aiming to make better use of existing space, especially on the Union Station campus. Limited space is not just relevant to discussions of energy alternatives; it is a factor in current daily operations. Additionally, age has become a factor in evaluating capital investment tradeoffs. Most of TARC's operating facilities were built or converted from existing buildings between 1976 and 1984. The cost of maintaining a state of good repair for these older buildings is increasingly in competition with emerging facility needs.

3.6 CAPACITY FOR CHANGE

Each of the areas discussed in this section will present new challenges that will be managed with limited resources. The action items in this TAM plan do not attempt to address the challenges directly. Instead, they address TARC's capacity to make use of data, assess and maximize existing resources, compare competing alternatives, meet emerging needs, and evaluate outcomes.

4. ENABLING ASSET MANAGEMENT

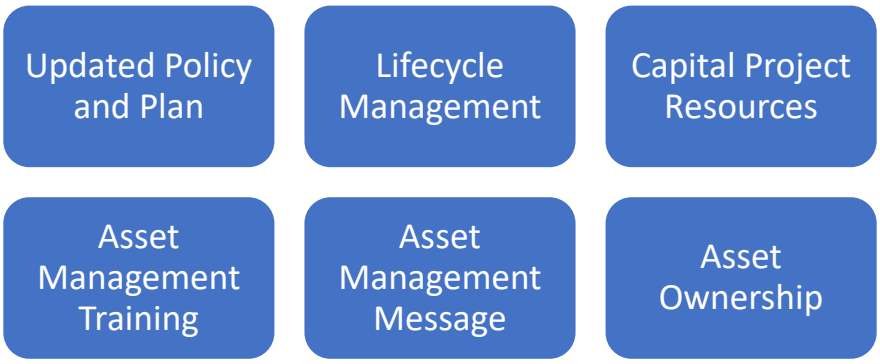
The TAM Rule requires that TAM Plan provide a description of key TAM activities.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (6) a provider's TAM plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM plan horizon period"; (8) "A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM plan"; (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."

The strategies in this section are spread over the 4-year horizon of the plan. Each of the TAM strategies identified are distilled into actions designed to develop a more mature asset management system. Each of the strategies identified are derived from the implementation steps in Section 1, and they are attainable measures that will lend to focused efforts.

4.1 STRATEGIES

In addition to honing the capital project prioritization process and mapping TARC's systems for the equipment register, TARC will employ six strategies over the plan's four-year horizon to address the following areas.



Implementation Strategy 1:

Asset Management Plan – Provide agency-wide direction to increase TARC's asset management maturity

Owner	Maintenance Asset Manager
Scope	• Maintain and advance an asset management plan that leads to asset management maturity and provides direction for improving asset management practices and outcomes
Outcome	• An updated Asset Management Plan that provides TARC with a "roadmap" for improved asset management practice.
Implementation Team Members	Maintenance Asset Manager, designees from Maintenance, Finance, Grants, HR, IT, and Safety (TAM Implementation Team)
Estimated Duration	• Annual update of the Plan will require on-going effort
Implementing Steps	• Identify gaps, develop plan to close the gaps, define governance, implementation accountabilities, and associated resource requirements • Oversee plan implementation and half-yearly implementation status update • Review and update TAM Plan as necessary
Resource Requirements	Resource requirements: • Leadership commitment • Coordination of the TAM Implementation Team • Core TAM members and supporting asset managers

Implementation Strategy 2:

Lifecycle Management Plan – Develop lifecycle management plan for all asset classes

Owner	**Director of Maintenance**
Scope	• Establish standard framework Fleet LMP and Facilities LMP. • Identify data, records and standards to track lifecycle costs across various asset classes • Identify key asset owners, their roles and responsibilities
Outcome	• Fleet and facilities maintenance will have lifecycle-based Reliability Centered Maintenance (RCM) programs in place with well-documented processes • All asset classes will have a well-defined and consistent approach for condition inspection and performance measurement
Implementation Team Members	Director of Maintenance, Assistant Director of Maintenance, Maintenance Supervisors, Maintenance Asset Manager
Estimated Duration	• Development of Fleet and Facilities LMPs will start year 2023 and complete by year 2025.
Implementing Steps	• Identify key asset owners and define their responsibilities for development of lifecycle management framework • Key asset owners job descriptions should be revised to include responsibilities for lifecycle management of assets • Identify critical asset classes and develop LMPs based on criticality • Develop overall Fleet LMP and Facilities LMP • Develop standard documentation to monitor LMP activities • Provide training in foundational and technical skills
Resource Requirements	• Time dedicated to lifecycle management planning detail • Core TAM members and supporting asset managers

Implementation Strategy 3:

Capital project resource planning – Develop means of setting expectations and evaluating performance

Owner	**Director Grants and Capital Projects**
Scope	• Develop process for budgeting personnel hours for capital projects • Develop project performance measurement criteria
Outcome	• Greater understanding of project costs and success • Accurate measures of consumption of finite resources • More accurate estimations of project timelines • Reduction of unplanned impacts on organizational resources
Implementation Team Members	Director of Grants and Capital Projects, Maintenance Asset Manager, Director of Human Resources
Estimated Duration	• Performance measurement criteria to be developed by 2024. • Process for budgeting personnel hours for capital projects to be developed by 2025
Implementing Steps	• Identify existing or potential software tools to provide most user-friendly means of planning and tracking project progress and resource consumption • Use HR software to support SOP and process training • Develop means of acknowledging and documenting project opportunity costs, including disruption to standard operations
Resource Requirements	• Core TAM Implementation Team and HR department • Time dedicated to resource planning and measurement detail

Implementation Strategy 4:

Asset Management Training – Develop asset management training as part of agency-wide training initiative

Owner	**Director of Training**
Scope	• Identify software functions that facilitate asset management • Develop training for software that facilitates asset management • Develop asset level approach to training for critical skills related to lifecycle management activities (plan, design/procurement, maintenance, rehabilitation, analysis, etc.)
Outcome	• Greater organizational understanding of asset management tools • Better informed expectations for long-term maintenance and capital works budgets • Reduction in asset failures and unplanned impacts for customers
Implementation Team Members	Director of Training, Maintenance Asset Manager
Estimated Duration	• Asset related curriculum to be complete by year 2024 • Performance evaluation criteria to be complete by year 2025
Implementing Steps	• Implement skills assessment measures for all relevant staff • Develop new or modify existing training programs to become more asset-specific to address critical skill gaps for critical maintenance skills, lifecycle activities • Develop an enterprise-level introductory training course on asset management for management team orientation • Link training and specific skill requirements to career development / advancement • Develop LMS structure and curriculum standards
Resource Requirements	Resource requirements and their time: • TAM Implementation Team, Training department • Trainee attendance

Implementation Strategy 5:

Asset Management Communication – Develop message that provides a ready understanding of TAM goals and benefits

Owner	**Maintenance Asset Manager**
Scope	• Develop a clear and inclusive message to engage and be used by the management team
Outcome	• Greater management team engagement with TAM Plan
Implementation Members	Maintenance Asset Manager, Director of Marketing, TAM Implementation Team
Estimated Duration	• Message development to be completed by October 2023
Implementing Steps	• Refocus messaging effort to provide a clear phrasing to associate with asset management efforts
Resource Requirements	• Core TAM members and supporting asset managers

Implementation Strategy 6:

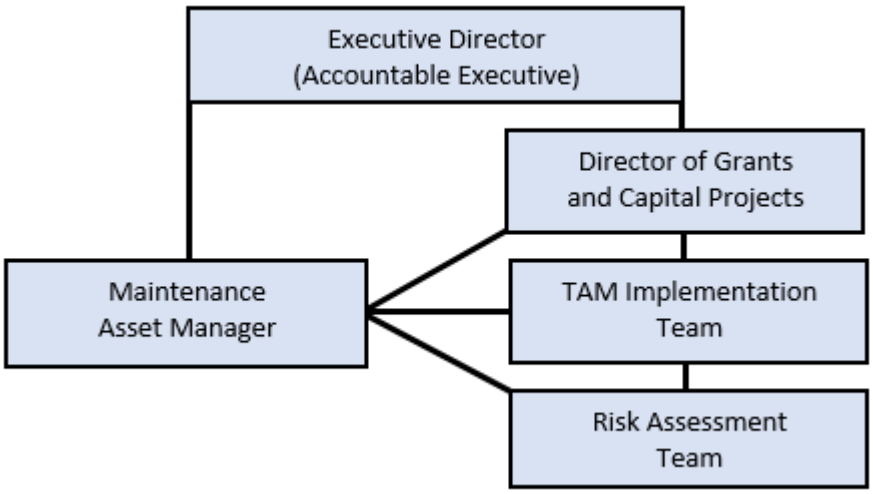
Asset Ownership – Develop performance criteria for asset owning staff tied to condition, workforce development, and safety

Owner	**Maintenance Asset Manager**
Scope	• Define successful asset ownership and responsibilities • Establish criteria and performance indicators to evaluate asset stewardship • Link ownership behaviors to condition and safety in training
Outcome	• A demonstrable improvement in general facility, vehicle, and equipment condition and appearance • Reduction in asset failures and unplanned impacts for customers
Implementation Team Members	Maintenance Asset Manager, TAM Implementation Team, supporting asset managers
Estimated Duration	• Linked to training framework and performance
Implementing Steps	• Develop training component for asset owning staff • Develop evaluation criteria for skills and program maturity
Resource Requirements	• Time for the TAM Implementation Team and supporting asset managers to develop creative and specific goals

4.2 ORGANIZATION & RESOURCE PLANNING

The organizational flow for the investment prioritization process is shown in Figure 4-1. It reflects both the stages of involvement for stakeholders and the progression of projects from proposal to funded project.

FIGURE 4-1 – PRIORITIZATION FLOW CHART



4.4 CONTINUAL IMPROVEMENT

The TAM Rule requires an outline for continual improvement.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b)(6) and (9) "Transit asset management plan elements must include … (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."

This TAM plan will be reviewed and revised, as necessary, on an annual basis. The revisions will come from the TAM Implementation Team with inputs from various internal and external stakeholders. TARC's leadership team will provide input for any changes or proposed federal legislation. All inputs will be coordinated annually through internal meetings. TARC will aim to improve asset performance, risk reduction, and agency cost savings with each revision of the TAM plan.

4.5 TECHNOLOGY

The TAM Rule requires that TAM Plans describe decision support tools.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (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"

Contemporary best practice in asset management, either at the enterprise level or during any aspect of lifecycle management for individual asset class, is data driven. TARC's Information Technology (IT) department provides and maintains technology tools that are used to collect, process, and manage critical information across the enterprise in support of TARC's business processes. The overall objective is to integrate the data from all sources and use that information to support TAM requirements. Table 8-2 describes TARC's main technology tools used and the primary users of these tools.

TARC will continue to use Hitachi's Ellipse® EAM system as the repository for Transit Asset Management inventory, including FTA mandated asset classes, to maintain its rolling stock asset inventories and associated procedures for inventory updates and quality assurance. This inventory is updated constantly, with efforts to continually improve the quality of data. Additionally, TARC uses FleetWatch (IT/Operations), Trapeze FX, PASS, OPS, CAD/AVL and Bonfire Solicitation Software for the organization.

There are two noteworthy additions to Table 8-2 in this update, namely the ADP and the FleetWatch systems. Both new systems are expected to offer new opportunities for TARC. The ADP system, in addition to improving payroll and human resource administration processes, offers a learning management system (LMS) that can provide and track employee training. This functionality will be vital to the success of planned TAM Implementation Steps and strategies.

The FleetWatch system will automate and improve data collection for bulk fluids dispensing in the fuel lane and in maintenance bays. The software will save hours of work every night and it will capture more information, providing a more accurate understanding of bus performance.

TABLE 8-2 – TECHNOLOGY PRODUCTS USED THROUGHOUT TARC

SOFTWARE	DESCRIPTION / CONFIGURATION	OWNER\USER(s)
Ellipse	Hitachi's Ellipse is an integrated Enterprise Asset Management (EAM); Enterprise Resource Planning (ERP); Asset Performance Management (APM) system. Ellipse is used for maintaining data on all fleet, facilities and equipment to manage all aspects of asset and works management. Ellipse is also used to manage inventory and procurement of parts and requisitions. Ellipse is the source repository and will play key roles in meeting TAM requirements as follows: • Asset Inventory • Asset Condition Assessment • Analytics and Decision Support • Investment Prioritization and O&M Budgeting • Implementation Strategy • Evaluation and Continuous Improvement	IT, Maintenance, Purchasing, Transportation, Finance, Grants, Safety, Human Resources
ADP	Human Resource Information System (HRIS), payroll Gross to Net processing, onboarding, applicant tracking, performance management	Human Resources, Training
TransTrack	TransTrack provides a web-based transit business analytics and data management system to aggregate data for performance monitoring and reporting. Also simplifies and assists with National Transit Database Reporting.	Transportation, Planning, Safety, Grants, Finance, Maintenance
FleetWatch (Late 2022)	S&A Systems, Inc.'s FleetWatch provides real-time control and data acquisition for mileage capture, fuel and other fluids management, tank monitoring systems, and fluids reconciliation.	Finance, Transportation, Maintenance, Grants, IT
Trapeze FX, PASS, OPS, COM, INFO	Trapeze FX is fixed-route scheduling software. PASS is paratransit scheduling and dispatching software. These products provide planning, scheduling, operations, passenger information and analysis.	IT, Planning, Transportation

Trapeze Novus CAD/AVL	Trapeze Group's Computer Aided Dispatch /Automated Vehicle Location system connects vehicles with the back-office scheduling and dispatching software. It collects vital data used by dispatchers such as bus GPS locations, schedule adherence status, breakdowns, and emergencies	IT, Transportation
Genfare	Fare Revenue Collection service as a solution for fare collection, fare products and smartcards, payment processing and ridership information.	Finance, Planning, Transportation, Grants
Bonfire	Contract solicitation/bidding, evaluation, award	Purchasing

5. ASSET INVENTORY, MONITORING, AND CONDITION

5.1 ASSET INVENTORY

TARC manages an asset portfolio estimated to be worth approximately $175,464,759 in 2022-2023 Cash Value. This does not include soft costs associated with asset replacement such as design and construction management costs. Soft costs could be estimated to be an additional 35% for major systems, and 10% for equipment and vehicles. These estimates do not reflect Replacement Asset Value (RAV). Additionally, cash value does not include contingency variables.

This asset portfolio is comprised of the Asset Categories Rolling Stock, Equipment, Facilities and System which are further broken down by Asset Class. A summary of the Inventory is shown on the following page in Table 5-1.

TABLE 5-1 – ASSET INVENTORY BY CATEGORY AND CLASS WITH VALUATION

Category	Class	Description	Qty	2022-2023 Cash Value [1]	Total Cash Value
Rolling Stock					
Revenue	Buses (BU)	Gillig BRT 40’	31	$4,940,021	$40,566,767
		Gillig Low Floor 40’	142	$26,684,041	
		Proterra Catalyst 40’	6	$2,319,024	
		Proterra Ecoliner 35’	9	$2,804,220	
		Gillig Low Floor 35’	6	$2,092,808	
		Gillig Low Floor 30’	17	$84,983	
		Gillig Hybrid-Electric	32	$1,461,670	
	Cutaways (CU)	7 + 3 Passenger	10	$942,001	
	Minivans (MV)	3 + 1 Passenger	4	$0	
	Van Pool (VN)	Ford 350 & Transit	105	$1,034,035	
Equipment					
Non-Revenue	Support Vehicles	Cars, SUVs and Trucks	49	$319,540	$319,540
Facilities					
Buildings	Administration and Maintenance *(including Envelope, Roofing, Windows and Systems)*	1000 W Broadway	8	$69,102,105	$111,166,910
		2903-23 W Broadway [2]		$32,211,965	
		908 W Broadway		$5,739,675	
		925 W Broadway		$1,171,990	
		2900 W Broadway [3]		$103,100	
		2901 W Broadway [4]		$2,838,075	
Others	On Route Bus Chargers	816 S Third St – Charger	2	$1,636,690	$1,636,690
		834 W Market St - Charger			
	USTA Emergency Power Station*	1000 W Broadway	1	510,230	510,230
Systems [5]					
Information and Communication	IT includes: Hardware such as workstations, SCADA, printers, copiers, routers, switches, etc.; Comms includes: Dispatch Consoles & Radios, Bus Equipment & Radios, Portable Radios, Software		1	$2,505,605 $3,370.890	$21,264,622
CAD-AVL Inventory	Includes all associated hardware and infrastructure equipment and software		1	$4,729,725	
Revenue Collection	Includes all revenue collection hardware and infrastructure equipment and software		1	$10,658,402	

[1] Cash Value: Straight line depreciation. Does not reflect actual Replacement Asset Value (RAV).

[2] Added new paint booths in the bus storage facility at 2903-23 W. Broadway. Total cost $1,641,435

[3] Nia Center owned by TARC, leased to City. Under terms of lease, City responsible for insuring building.

[4] Reoccupied 2901 W. Broadway as office space; 8,250 ft^2; 4.93 acres; actual depreciated construction and improvements costs

[5] Security and Software systems will be added to the TAM Plan as they are added to our EAM register.

*Useful life of emergency generators is 30 years (2010-2040)

TARC's detailed asset inventory with associated attributes and characteristics is maintained in Ellipse. During procurement and receipt, specific asset data such as cost, useful life, gross vehicle weight, fluid capacities, warranty information, and maintenance interval information is collected. This practice ensures the appropriate data and attributes are properly recorded into the system in support of asset lifecycle management practices. Figure 5-1 is an example of an Ellipse Asset Register Nameplate Screen for a single Revenue vehicle asset.

FIGURE 5-1 – ELLIPSE EQUIPMENT REGISTER NAMEPLATE EXAMPLE

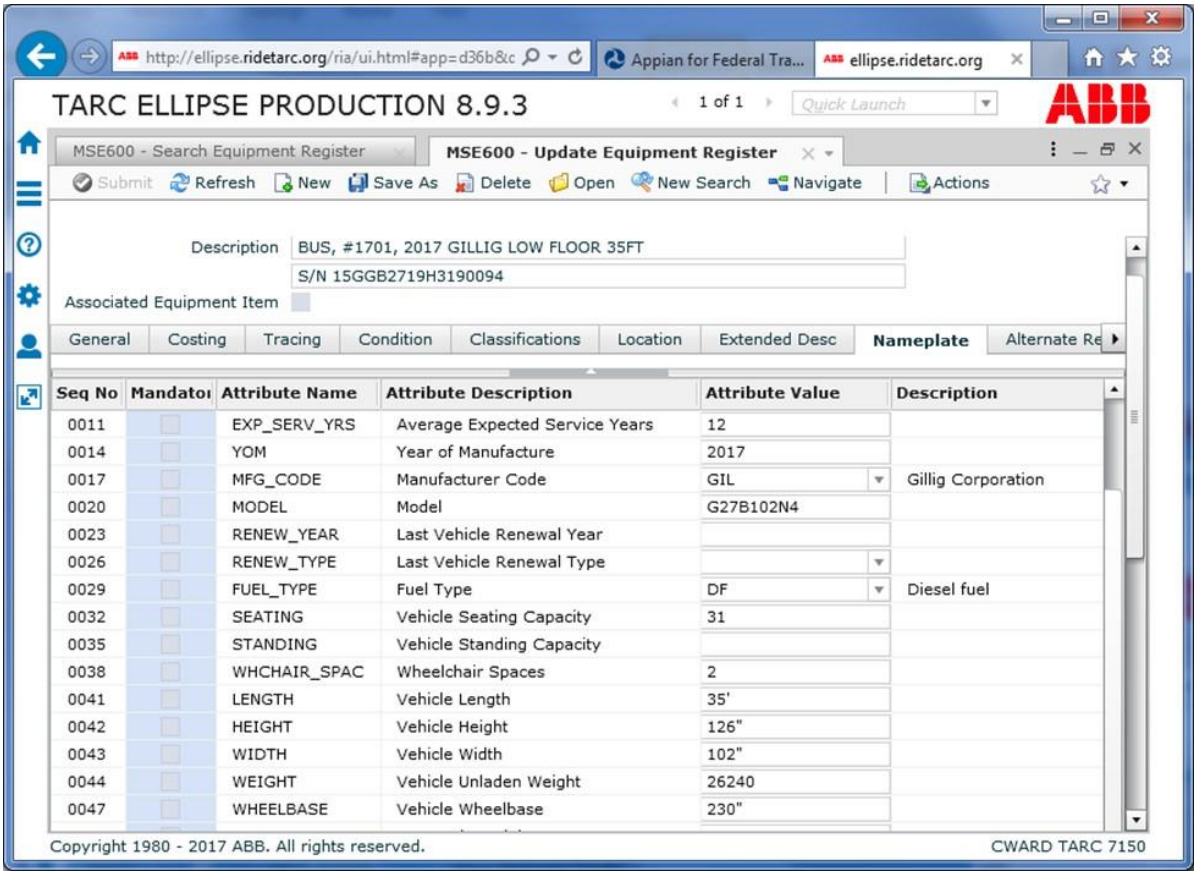
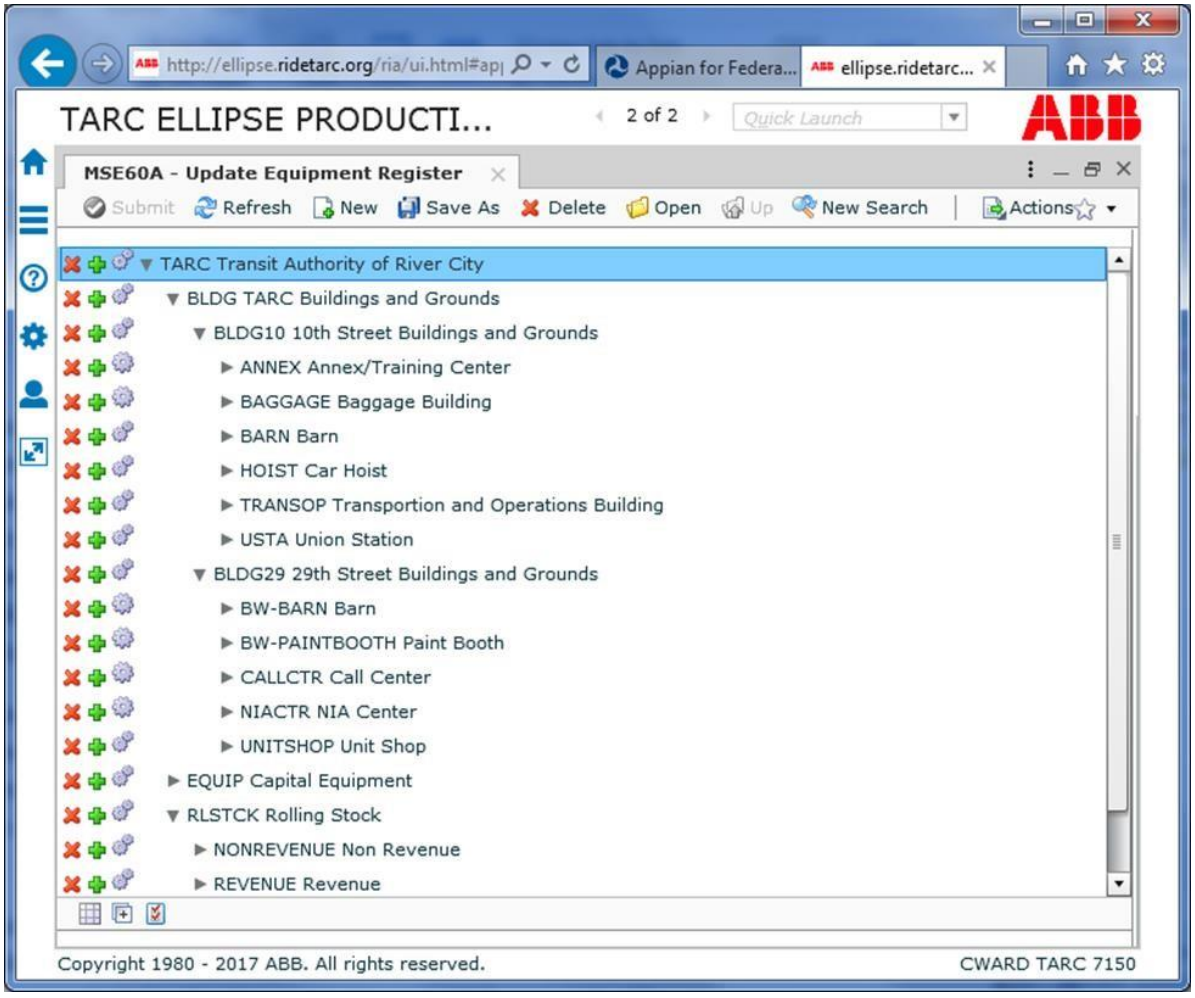


Figure 5-2 is an example of the Asset Hierarchy. In this example, the highlighted asset is the highest level of the register – TARC Transit Authority of River City.

FIGURE 5-2 – ASSET HIERARCHY EXAMPLE



In developing the asset hierarchy, TARC created a category to house technology systems. To date, systems have been treated as elements of the facilities or rolling stock that house them. In the next 4-year period, various systems will be identified and recorded under the "Systems" category and sorted according to their administrative or operational function.

5.2 ASSET PERFORMANCE MEASURES

To comply with the FTA requirements associated with SGR, performance measures for capital assets have been established for each asset class along with performance targets. The following is a summary of the FTA requirements:

The TAM Rule requires SGR performance measures for capital assets.

Reference: *49CFRPart625, Subpart D, Section 625.43 "SGR performance measures for capital assets. (a) Equipment: (non- revenue) service vehicles*. The performance measure for non-revenue, support-service and maintenance vehicles equipment is the percentage of those vehicles that have either met or exceeded their ULB. *(b) Rolling stock*. The performance

measure for rolling stock is the percentage of revenue vehicles within a particular asset class that have either met or exceeded their ULB. *(d) Facilities*. The performance measure for facilities is the percentage of facilities within an asset class, rated below condition 3 on the TERM scale.

The TAM Rule requires setting targets for performance measures.

Reference: *49CFRPart625 Subpart D, Section 625.45 "(a)(1)* A provider must set one or more performance targets for each applicable performance measure. *(a)(2)* A provider must set a performance target based on realistic expectations, and both the most recent data available and the financial resources from all sources that the provider reasonably expects will be available during the TAM Plan horizon period. *(b)(2)* At least once every fiscal year after initial targets are set, a provider must set performance targets for the following fiscal year.

Targets for vehicles are expressed in terms of percentage of assets that are at or beyond the Useful Life Benchmark (ULB). Targets for facilities and associated sub-systems are expressed in terms of the percentage of assets that are rated less than desirable (<3.0) according to the Transit Economic Requirements Model (TERM) Scale of 1 to 5. Current targets are shown below in Table 5-2.

TABLE 5-2 – FLEET AND FACILITIES TAM PERFORMANCE TARGETS

Asset Category	Asset Class	Performance Target
Rolling Stock	Buses (BU)	≤10% of fleet exceeds ULB of 15 Years
	Cutaway Buses (CU)	≤0% of fleet exceeds ULB of 10 Years
	Vans (VN)	≤0% of fleet exceeds ULB of 8 Years
Equipment	Automobile – Supervisor, Support, and Security	≤10% of non-revenue service vehicles exceeds ULB of 8 Years
	Trucks and Other Rubber Tire Vehicles	≤45% of trucks and other rubber tire vehicles exceed ULB of 10 years
Facilities	Admin / Maintenance Facility	=25% of Facilities rated under 3.0 on TERM scale
	USTA Emergency Power Station	>95% availability
	On-Route Bus Charging Stations	Each station >3.0 on TERM scale

Additionally, a number of operational metrics are monitored and used for National Transportation Database (NTD) reporting and internal purposes on a monthly basis. The Key Performance Indicators (KPIs) shown in Table 5-3 are some of those that are monitored for Revenue Fleet. These include Safety, Reliability, Level and Quality of Service and Financial Effectiveness.

TABLE 5-3 – OPERATIONAL KEY PERFORMANCE INDICATORS

Performance Measure	Indicators
Safety	Preventable Accidents / 100,000 Miles Non-Preventable Accidents / 100,000 Miles Injury Accidents / 1,000,000 Customers
Reliability	Vehicle Trips On-Time Vehicle Pull-outs Chargeable Roadcalls Miles Between Chargeable Roadcalls
Level of Service / Quality of Service	Revenue Vehicle Miles Revenue Vehicle Hours Customers / Revenue Vehicle Hour Average Weekday Customers Total Customers Customer Commendations / 100,000 Miles Customer Complaints / 100,000 Miles
Financial	Farebox Revenue Operating Cost = $ $ / Revenue Vehicle Mile $ / Revenue Vehicle Hours

5.3 ASSET CONDITION

The TAM Rule requires inclusion of condition assessments in an agency's TAM Plan. Condition assessments should collect sufficient information to inform asset replacement.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b)(2) "… a TAM Plan must include … (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."

Currently, condition assessments are maintained in an MS Excel spreadsheet. There are multiple software tools that could house this data in the near future, including Ellipse and TransTrack. A sample of the current condition assessments for Rolling Stock is shown below in Table 5-4.

TABLE 5-4 SAMPLE OF CONDITION ASSESSMENT RESULTS – ROLLING STOCK

Class	Quantity	Year	Asset	TAM	NTD	Remaining ULB	# Exceeding ULB
Buses	Performance Target	No more than 10% of fleet exceeds default ULB of 15 years					
	16	2005	Gillig Low-Floor 40'	Yes	Yes	-2	16
	4	2007	Gillig Hybrid-Electric 40'	Yes	Yes	0	0
	6	2007	Gillig Low-Floor 35'	Yes	Yes	0	0
	6	2008	Gillig Low-Floor 40'	Yes	Yes	1	0
	3	2009	Gillig Hybrid-Electric 40'	Yes	Yes	2	0
	17	2009	Gillig Low-Floor 40'	Yes	Yes	2	0
	3	2009	Gillig Low-Floor 30'	Yes	Yes	2	0
	9	2010	Gillig Hybrid-Electric 40'	Yes	Yes	3	0

The FTA's TERM Scale is being used to define facility conditions. The TERM scale condition rating ranges from (5) Excellent to (1) Poor. Per the FTA TAM Final Rule, assets with a condition rating score of 3.0 and above are in a state of good repair. Assets with a condition score lower than 2.9 are not, and may require prioritization during capital programing to ensure safe, efficient, and reliable transit service. This scale is shown below in Table 5-5.

TABLE 5-5 – FACILITY CONDITION ASSESSMENT RATING CRITERIA

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

For facilities assets, condition assessments are scheduled and completed using in-house staff. Table 5-6 provides a sample of the current facilities asset condition assessment summary report.

TABLE 5-6 – SAMPLE OF CONDITION ASSESSMENT RESULTS - FACILITIES

Class	Asset	TAM	NTD	Condition
Performance Target: ≤10% of facilities rated under 3.0 on Term scale				
Administrative / Maintenance Facility	Car Hoist Facility - 925 W. Broadway	Yes	Yes	2.5
	Union Station Facility - 1000 W. Broadway	Yes	Yes	3.4
	Union Station Baggage Building - 1000 W. Broadway	Yes	Yes	3
	Transportation and Operations Facility - 1000 W. Broadway	Yes	Yes	3.4
	Bus Storage Barn - 1000 W. Broadway	Yes	Yes	2.8
	Alyce French-Johnson Training and Education Center - 908 W. Broadway	Yes	Yes	4.4
	NIA Center Passenger Transfer Center - 2900 W. Broadway	Yes	Yes	5
	NIA Center Customer Service Kiosk - 2900 W. Broadway	Yes	Yes	5
	TARC Call Center - 2901 W. Broadway	Yes	Yes	3.4
	Unit Shop Maintenance Facility - 2905 W. Broadway	Yes	Yes	2.7
	Unit Shop Storage Facility - 2905 W. Broadway	Yes	Yes	4.1

6. ASSET LIFECYCLE MANAGEMENT

The TAM Rule requires that TAM Plans provide the implementation strategy.

Reference: 49 CFR Part 625 Subpart C Section 625.25(b) "Transit asset management plan elements … (6) a provider's TAM Plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period"

This section identifies TARC's key asset management practices across the fleet and facilities. The asset lifecycle management strategies will be captured in the Fleet and Facilities Lifecycle Maintenance Plan (LMP). As part of the TAM Continuous Improvement Plan (CIP), the updated LMP will capture and refine existing maintenance plan content and combine fleet and facilities activities.

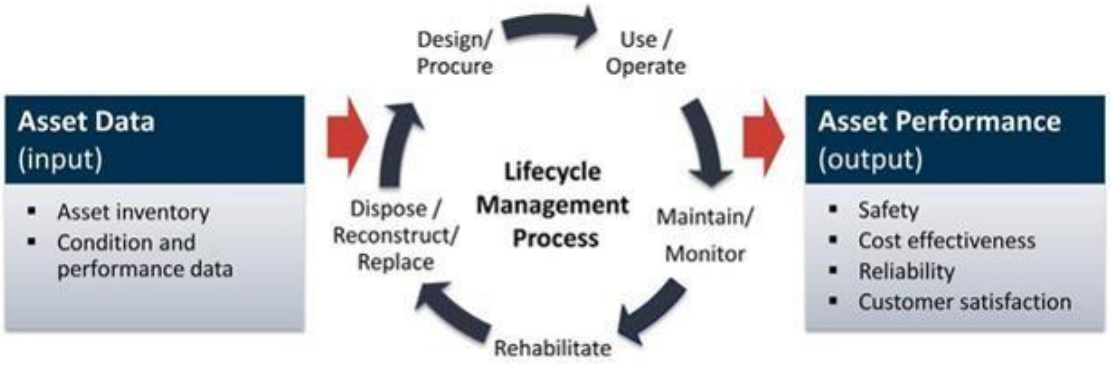
TARC uses Ellipse integrated EAM software to manage all of the lifecycle management activities that are currently scheduled electronically. These activities will make up much of the LMP and

will include all of the preventative maintenance tasks, standard operating procedures (SOPs), inspections and proactive maintenance activities performed to ensure consistent asset lifecycle management.

6.1 LIFECYCLE MANAGEMENT

Transit Asset Management is a strategic approach intended to optimize asset performance, extend useful life, and minimize the total cost of ownership. Figure 7-1 below describes the framework TARC uses to monitor and manage assets.

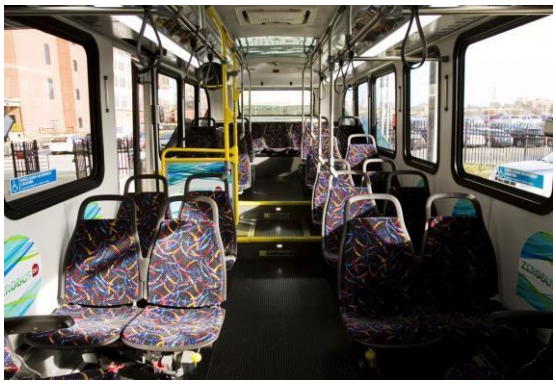
FIGURE 7-1 – ASSET LIFECYCLE MANAGEMENT FRAMEWORK



6.1.1 FLEET - LIFECYCLE MAINTENANCE PLAN (LMP)

For all operating revenue and non-revenue fleet assets, the Fleet LMP will address:

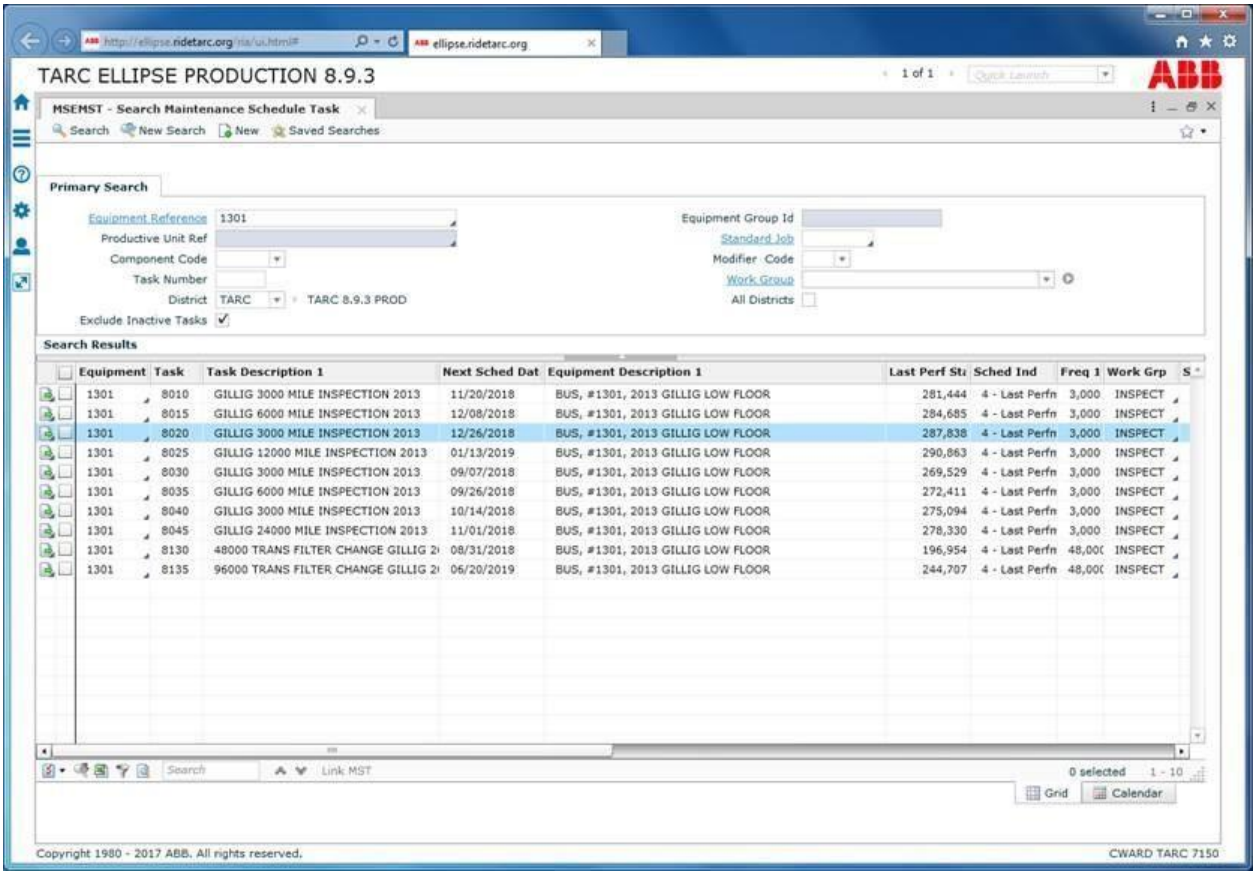
- Asset Inventory (A-00, A-30, R-20)
- Condition Assessment and Performance Measures
- Condition Reporting
- Organization Structure
- Replacement Schedule
- Maintenance Program Structure
- Training
- Vehicle Acceptance
- Decommissioning
- PM Tasks, Inspections and Cleanliness Activities
- EAM and Work Control
- Warranty Program



The existing activities that apply to the fleet are already captured in the Ellipse software. The scheduled preventative maintenance activities are based on OEM recommendations and

performance history of the assets. Figure 7-2 below is a sample of the Maintenance Scheduled Tasks (MSTs) for a single Bus.

FIGURE 7-2 MAINTENENACE SCHEDULE TASKS SAMPLE



6.1.2 FACILITIES - LIFECYCLE MAINTENANCE PLAN (LMP)

For all operations and support facilities, the facilities LMP will address:

- Asset Inventory (A-00, A-10, A-20) Condition Assessment and Performance Measures
- Condition Reporting
- Organization Structure
- Training
- Maintenance Program Structure
- PM Tasks, Inspections and Cleanliness Activities
- Regulatory Compliance and Cleanliness
- Critical Equipment Inventory
- EAM and Work Control
- Warranty Program
- State of Good Repair Needs

7. INVESTMENT PRIORITIZATION AND FUNDING

The TAM Rule describes the specific requirements for investment prioritization.

Reference: 49 CFR Part 625 Subpart C Section 625.33 "(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."

7.1 PROCESS OVERVIEW

As part of developing investment priorities, TARC accounts for factors that include revenue trends, federal and state law, level-of-service provided and public input. TARC's capital budget funds the planning, design, acquisition, maintenance and rehabilitation of all assets subject to this TAM Plan. Figure 7-1 below shows the current capital budget and projection.

FIGURE 7-1 – CAPITAL PROGRAM PROJECTED EXPENSES

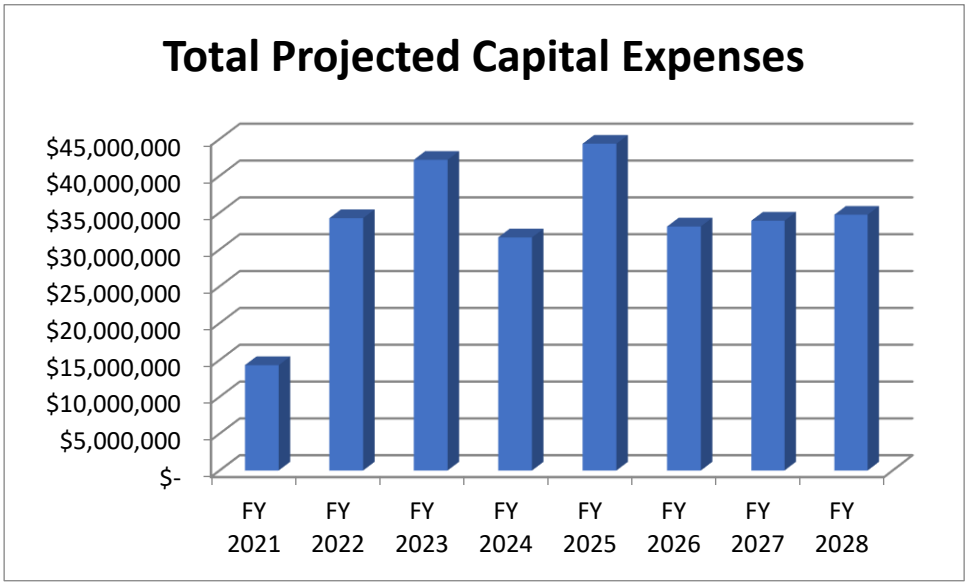
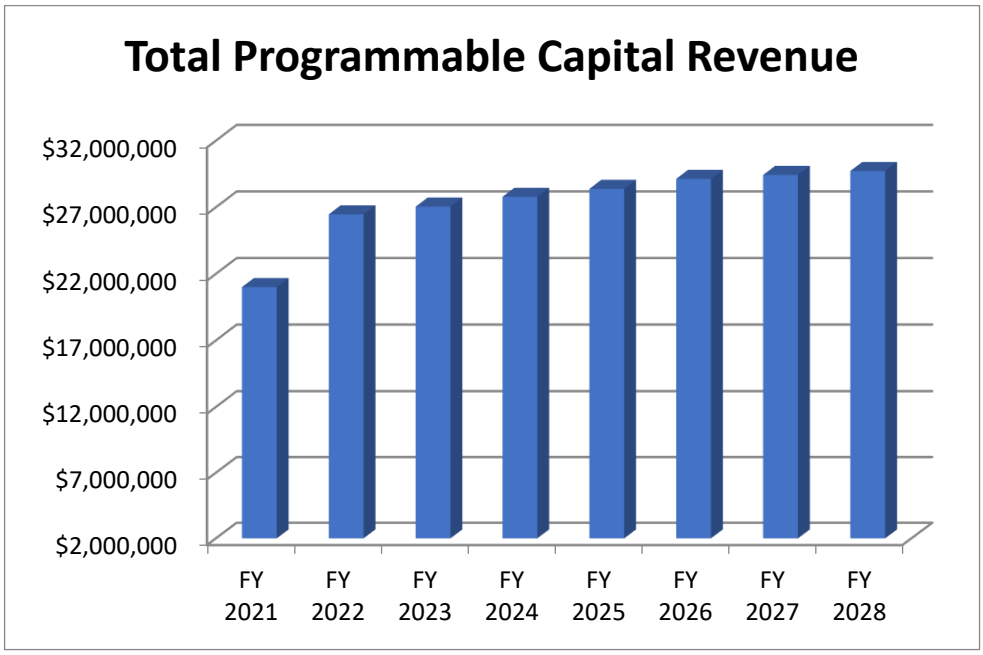


Figure 7-2 shows the programmable funding projected in the CIP.

FIGURE 7-2 – CAPITAL PROGRAM PROJECTED REVENUE

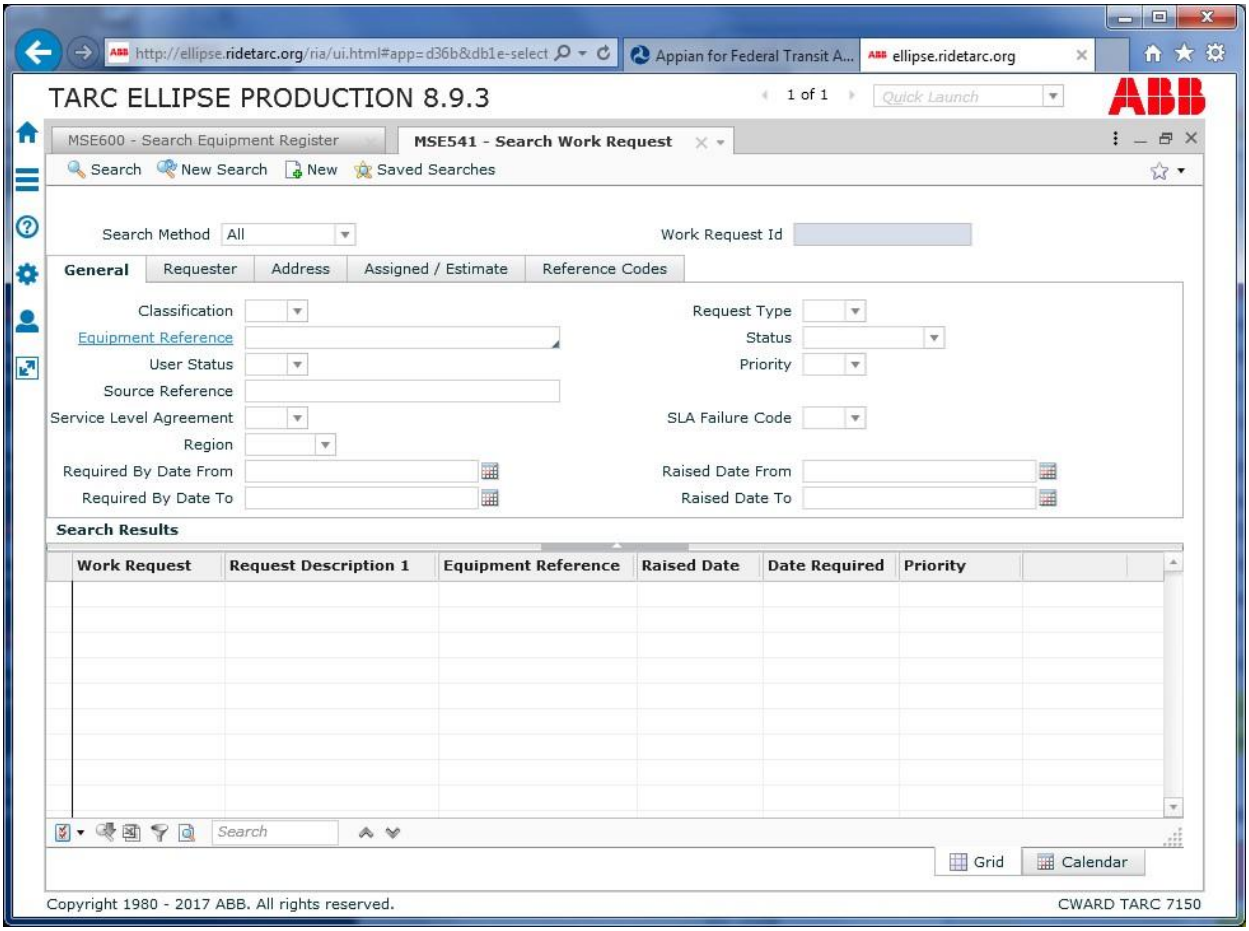


The CIP list is developed and presented to the Executive Director for finalization in the budget for the fiscal year. For the entire CIP, funding availability limits the requests than can be accommodated, and the scope of the various funding sources also limit the use of funds. The capital budget must be approved by the Executive Director, TARC's Board of Directors and finally, the Louisville Metro Council before it can be acted upon.

7.2 CAPITAL INVESTMENT PRIORITIZATION

Prior to consideration for inclusion in the annual budget, a proposed project is formally captured in the asset management system, and it goes through a two-stage prioritization process. New capital investment requests are entered into Ellipse screen MSE541. This screen functions as a capital project request register, and it assigns a permanent tracking number for use in the subsequent prioritization process. There is potential for a

FIGURE 7-3 – CAPITAL PROJECT REQUESTS



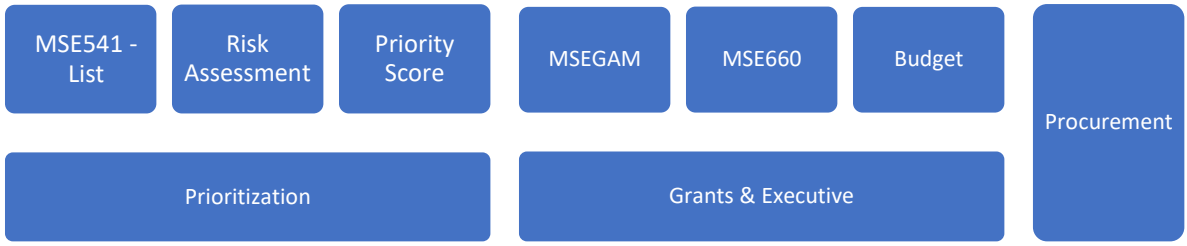
In late 2020, TARC began to use a prioritization scoring tool that includes a risk matrix, condition and criticality rating criteria, and four additional impact criteria scored by the TAM Implementation Team. The resulting scores provide executive leadership with insight into how the departments collectively view the projects. The risk matrix and criticality criteria are attached as Appendix B.

There are six impact categories considered in the risk matrix: Service Impact, Health and Safety, Environmental Impacts, Financial and Asset Loss, Reputational Damage, and Regulatory/Legal. A multi-departmental risk assessment team assigns a score (1-25) based on the potential impact and likelihood. Additionally, a criticality score (1-4) is assigned based on the status of the asset involved. The tiers are: Mission Critical, Business Critical, Business Operational, and Administrative. Once risk and criticality scores are generated, the Implementation Team assigns scores for four discretionary categories. The resulting score combines a great deal of information into a single number, so it is necessary to view the entire table when using the prioritization scores to compare projects.

7.3 CAPITAL INVESTMENT SELECTION PROCESS

TARC's prioritization process contains scoring criteria that are inclusive of the considerations listed in Table 7-1, which align with the goals and objectives from Section 2. However, a formula-based score cannot adequately represent all of these factors. There are two additional decision points that allow for consideration of these factors. In Figure 7-4, showing the stages in the selection process, these decision points are represented as "MSE541 – List" and "Budget".

FIGURE 7-4 – CAPITAL INVESTMENT SELECTION PROCESS



The initial inclusion of projects on the investment prioritization list is an important, but understated step that is informed by both asset condition and by criticality. Similarly, once scores are assigned for investment prioritization, they are ultimately subject to executive discretion and alignment with TARC's mission and vision.

TABLE 7-1 – CIP PRIORITIES

Priority	Description
Public and employee safety	Requests that impact the safe operation of critical assets.
Reliability	Requests that impact on-time performance and minimize equipment downtime.
Flexibility and longevity	Requests that maximize TARC's ability to adapt or improve the useful life of TARC assets.
Responsible stewardship	Requests that can show a quantifiable benefit, focus on mission critical assets, and align with long-range plan.

In 2022, the projects elevated for prioritization began to transition from being those that addressed immediate operational needs to projects more aligned with age and condition status. This change signaled a new stage of program maturity, as TARC feels out the appropriate balance between deferred maintenance and necessary new investments.

8. CONCLUSION

Under its initial four-year TAM implementation schedule, TARC made significant progress in establishing and making use of the asset register and new capital investment prioritization tools. This plan update establishes a new implementation schedule that sets the course for the next four years. This update comes at an opportune time, as TARC is demonstrating a commitment to training with a new Director of Training position and new human resource management software.

The plan emphasizes the need for flexibility and increased capacity for managing change. Training, resource planning, and performance evaluation are elemental to that meeting those needs. Amid work on the implementation steps, TARC will further define the link between asset maintenance and asset replacement by taking steps toward lifecycle management. The work that is planned for the next four-year window is achievable and important to meeting challenges that promise to be fluid.

APPENDIX A: RESOLUTION 2018-22 TRANSIT ASSET MANAGEMENT (TAM) POLICY

TARC Transit Asset Management (TAM) Policy

Adopted 7/25/2018, Revised 9/27/2021.
THIS POLICY SHALL BE REVIEWED ANNUALLY.

I. PURPOSE

In keeping with TARC's mission "to deliver transportation services that enhance the Greater Louisville community," TARC is committed to maintaining assets in a state of good repair to support safe, efficient, reliable public transportation.

This policy also expresses our intention to foster a culture of continuous improvement in asset management planning and performance.

This policy is specific to the management of TARC Assets that are included in TARC's Transit Asset Inventory.

This policy will be made accessible to all Board members, staff and members of the public.

This policy outlines TARC's overall asset management approach in a manner consistent with current federal regulations (49 U.S. Code § 5326) and sets the direction for establishing and following through with transit asset management strategies and plans that are achievable with available funds. This policy complies with the Federal Transit Administration (FTA) Transit Asset Management (TAM) Final Ruling on July 26, 2016.

II. POLICY

TARC's COMMITMENT

TARC is committed to

- The allocation of resources necessary to reach our asset management goals;
- Financial stewardship, transparency, and collaboration with our funding partners;
- Promoting a culture that supports optimal asset management across the organization;
- Focusing on high quality data-driven decision making to provide safe, reliable, sustainable service for the communities we serve;
- Supporting the timely implementation of projects and programs to maintain our assets in a State of Good Repair over their entire life; and
- Continually improving our asset management strategies and plans, including setting annual goals, objectives, and measures to monitor and improve performance.

TARC's TAM investment priorities are:

- Public and employee safety
- Reliable service delivery
- Sustainability
- Responsible stewardship of public funds

TARC Transit Asset Management (TAM) Policy

TARC's TAM PLAN ELEMENTS

The FTA regulation defines TARC as a Tier I agency and, as such, requires TARC to implement a TAM Plan that includes the nine TAM Elements listed below.

1. Inventory of assets – A register of capital assets and information about those assets
2. Condition assessment – A rating of the asset's physical state
3. Decision support tool – Analytic process or tool to assist in capital asset investment prioritization needs
4. Prioritized list of investments – A prioritized list of projects or programs to manage or improve the State of Good Repair (SGR) of capital assets
5. TAM and SGR policy – Executive-level direction regarding expectations for transit asset management
6. Implementation strategy – Operational actions to achieve District TAM goals and policies
7. Key annual activities – Those activities that are critical to achieving goals
8. Identification of resources – List resources needed to carry out the TAM Plan
9. Evaluation plan – Monitor and update to support continuous TAM improvement

IV. AUTHORITY

A. Board Authority

TARC's Board of Directors has the authority to approve and amend TARC's TAM Policy.

B. Executive Director Authority

TARC's Executive Director or designee will have overall responsibility for overseeing the development of asset management plans and procedures, in cooperation with the team, and reporting to the Board on the status of asset management for TARC.

In accordance with this policy, implementation of the TAM Plan will be a shared responsibility for all departments.

V. ATTACHMENTS

A. Definitions

TARC Transit Asset Management (TAM) Policy

ATTACHMENTS

I. DEFINITIONS

"Asset Management" is a strategic and systematic process through which an organization procures, operates, maintains, rehabilitates, disposes of and replaces assets to manage their performance, risks, and costs over their lifecycle.

"Transit Asset Management Plan (TAM Plan)" means the Plan through which TARC will document its asset base, asset conditions, and State of Good Repair, asset management policy, TAM goals and objectives, governance structure for asset management, strategy for capital asset funding and prioritization, and key priorities for asset management.

"Transit Asset" as defined by the FTA, means both fixed long-life infrastructure assets (for example, facilities and electric bus charge stations) and equipment (bus, paratransit and non-revenue vehicles).

"State of Good Repair (SGR)" means a condition in which a capital asset is able to operate at a full level of performance. A capital asset is in a state of good repair when that asset:

1. Is able to perform its designed function,
2. Does not pose a known safety risk, and
3. Its lifecycle investments have been met and/or recovered.

"TAM Final Ruling" means a set of federal regulations that sets out minimum asset management practices for transit providers to bring all of the nation's transit assets into a state of good repair.

"Capital Improvement Plan (CIP)" means a short-range plan, usually four to ten years, which identifies capital projects and equipment purchases given fiscal constraints, provides a planning schedule, and identifies options for funding the plan.

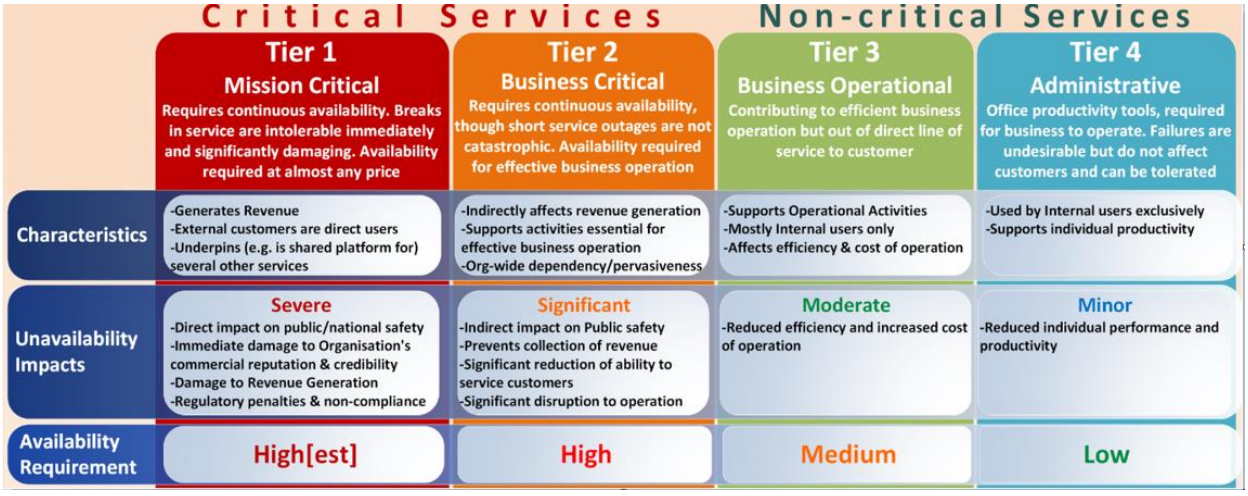
"Tier I Agency" as defined by the FTA, means agencies that own, operate or manage 101 or more vehicles in all fixed-route modes combined during peak operation.

APPENDIX B: INVESTMENT PRIORITIZATION CRITERIA: RISK & CRITICALITY TABLES

Asset Management System Risk Matrix

Asset Management System Risk Matrix								LIKELIHOOD				
								Improbable (1)	Not Likely to Occur (2)	Could Occur (3)	Known to Occur (4)	Common Occurrence (5)
		Service Impact	Health and Safety	Environmental Impacts	Financial and Asset Loss	Reputational Damage	Regulatory / Legal Impact	Likely to occur once in 10 or more years	Likely to occur once in 5 to 9 years	Likely to occur once in 2 to 4 years	Likely to occur once a year	Likely to occur more than once a year
IMPACT	Very High (5)	Complete loss of service	One or more fatalities. Irreversible health problems for employees and/or community.	A release to the environment with major (sub-surface) impacts; impacts non-agency property; requires regulatory reporting; extensive remediation required	Severe financial loss or asset replacement cost impact. (>$500,000)	National loss of reputation; damaging national exposure	Potential for significant, serious penalties and/or sanctions, etc. or multiple major litigations	Medium Risk Undesirable - Management Decision (5)	Medium Risk Undesirable - Management Decision (10)	High Risk Unacceptable - Action Required (15)	High Risk Unacceptable - Action Required (20)	High Risk Unacceptable - Action Required (25)
	High (4)	Partial loss of service	Partial or medium-term disabilities or major health problems for employees and/or customers.	A release to the environment with moderate (surficial) impacts; impacts non-agency property; requires regulatory reporting; limited remediation required	Major financial loss or asset cost impact. (>$200,000-$500,000)	Significant regional loss of reputation	Potential for penalties, fines or sanctions of a lesser but still material nature / single major litigation or multiple moderate litigations	Low Risk Acceptable with Review (4)	Medium Risk Undesirable - Management Decision (8)	Medium Risk Undesirable - Management Decision (12)	High Risk Unacceptable - Action Required (16)	High Risk Unacceptable - Action Required (20)
	Moderate (3)	Service delay of 1 hour or more	Lost-time Injuries or potential medium-term health problems for employees and/or community.	A release to the environment with minor (impervious surface) impacts; impacts non-agency property; requires regulatory reporting and/or site restoration	Moderate financial loss or asset cost impact. (>$75,000-$200,000)	Moderate loss of regional reputation	Potential for minor penalties or fines / Single moderate litigation or multiple minor litigations	Low Risk Acceptable with Review (3)	Medium Risk Undesirable - Management Decision (6)	Medium Risk Undesirable - Management Decision (9)	Medium Risk Undesirable - Management Decision (12)	High Risk Unacceptable - Action Required (15)
	Low (2)	Service delay of less than 1 hour	Minor, very short-term health concerns or Recordable Injury cases.	A release to the environment with minor impacts; contained to agency property; no regulatory notification required	Tolerable financial loss or asset cost impact. ($35,000-$75,000)	Light impact on reputation	Breach of company policy or single minor litigation	Low Risk Acceptable with Review (2)	Low Risk Acceptable with Review (4)	Medium Risk Undesirable - Management Decision (6)	Medium Risk Undesirable - Management Decision (8)	Medium Risk Undesirable - Management Decision (10)
	Minor (1)	Not likely to impact service	Inherently safe, Unlikely to cause health problems.	A contained release (e.g., a minor spill) with little to no environmental impact; no regulatory notification needed	Relatively low financial loss or asset cost impact. (<$35,000)	No impact on reputation	No impact to regulations or legal obligations	Low Risk Acceptable with Review (1)	Low Risk Acceptable with Review (2)	Low Risk Acceptable with Review (3)	Low Risk Acceptable with Review (4)	Medium Risk Undesirable - Management Decision (5)
								Low Risk		Medium Risk		High Risk

Asset Management Criticality Tiers



APPENDIX C: KEY DEFINITIONS

CIP: CAPITAL IMPROVEMENT PLAN

CAD/AVL: Computer Aided Dispatch (CAD) and Automated Vehicle Location (AVL)

EAMS: ENTERPRISE ASSET MANAGEMENT SYSTEM

FTA: FEDERAL TRANSIT ADMINISTRATION

NTD: NATIONAL TRANSIT DATABASE

PM: PREVENTATIVE MAINTENANCE

OEM: ORIGINAL EQUIPMENT MANUFACTURER

SOP: STANDARD OPERATING PROCEDURE

State of Good Repair (SGR): Defined by 49 U.S.C. Chapter 53 as the "condition in which a [transit asset or] capital asset is able to [safely] operate at a full level of performance." The State of Good Repair is further defined by an asset's Useful Life Benchmark (for rolling stock and equipment) or physical condition (for facilities). Assets are considered in a State of Good Repair when they do not meet or exceed their ULB or physical condition threshold. Vehicle and equipment assets, for example, are considered in a State of Good Repair, when rated as a 2.5 or above on AC Transit's TERM Lite scale, where 2.5 is equivalent to the ULB set for an asset class. Additionally, facilities, are considered in a State of Good Repair when rated as a 3 or above on FTA's TERM scale. *Also see definition for Useful Life Benchmark.*

TERM Scale: The five-category rating system used in the FTA's Transit Economic Requirements Model (TERM) to describe the condition of an asset, where 5 is excellent condition and 1 is poor condition.

Tier I Transit Provider: An entity that receives Federal financial assistance under 49 U.S.C. Chapter 53, either directly from FTA or as a subrecipient, that owns, operates, or manages either (1) one hundred and one (101) or more vehicles in revenue service during peak regular service across all fixed route modes or in any one non-fixed route mode, or (2) rail transit.

Transit Asset Management (TAM): Defined by 49 U.S.C. Chapter 53 as "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 cycles, for the purpose of providing safe, cost-effective, and reliable public transportation."

Transit Asset Management Plan (TAM Plan): This document, which describes: the capital asset inventory; condition of inventoried assets; TAM performance measures, targets, and prioritization of investments aligned with the agency's TAM and SGR policy, strategic goals and objectives; as well as the strategies, activities, and resources required for delivering this

Plan (including decision support tools and processes); and other agency-wide approaches to continually improve TAM practices. While this TAM Plan exists as a standalone document, LMPs may be considered an extension of the TAM Plan by reference.

Useful Life: Defined by 49 U.S.C. Chapter 53 as "either the expected life cycle of a capital asset or the acceptable period of use in service determined by FTA." It generally defines the minimum eligibility for retirement, replacement, or disposal of an asset.

Useful Life Benchmark (ULB): Defined by 49 U.S.C. Chapter 53 as "the expected life cycle or the acceptable period of use in service for a capital asset, as determined by a transit provider, or the default benchmark provided by FTA." The ULB is the realistic expectation for when an asset would be disposed or replaced based on operating environment and procurement timelines. It is not the same as "Useful Life" in FTA grant programs, is reported by age (in years), and usually only pertains to rolling stock or equipment. It is a single number shared for or within specified asset classes, although may vary across different asset classes and providers.

END