Transit Asset Management Plan

HAMPTON ROADS TRANSIT

2023

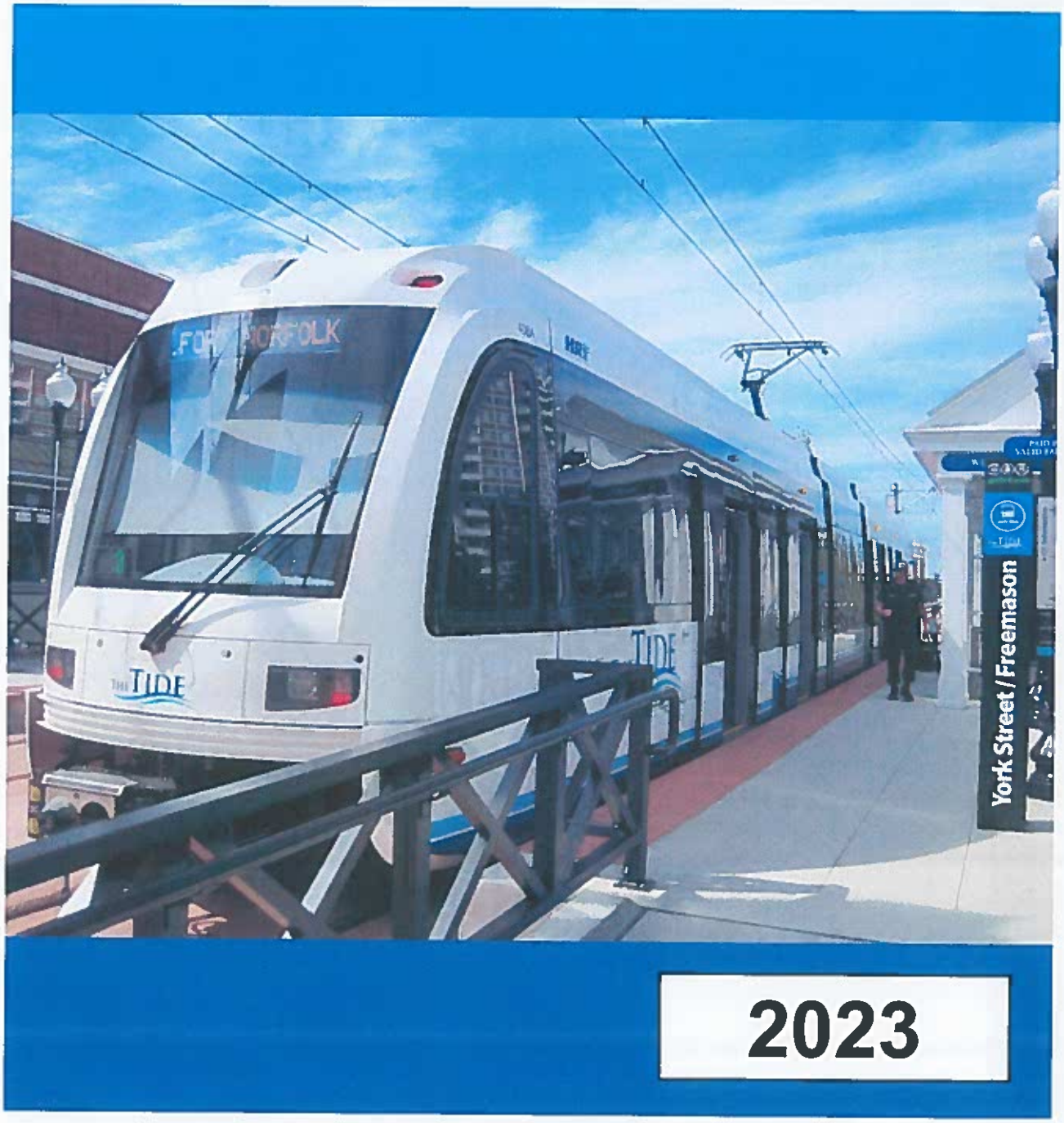
HAMPTON ROADS TRANSIT	NUMBER	EFF. DATE
	EF200	08/15/23
POLICY AND PROCEDURES MANUAL	SUPERSEDES EF200 09/27/22	
RESPONSIBLE DEPARTMENT **Engineering & Facilities**	KEY SUBJECT **2023 TAM Plan Update**	
TITLE **Transit Asset Management Plan**		
APPLIES TO **All Hampton Roads Transit Employees**	APPROVAL(S) **Harrell, Pappas, Demharter**	

Review / Revision History

REVIEW / REVISION	DATE	SECTION	DESCRIPTION	AUTHORITY
Revision	09/27/22	All	Required 4 Year Update	S. Pappas S. Demharter
Revision	08/15/23	All	Updated Performance Measures and Improvement Activities	S. Pappas S. Demharter

SOURCE / NETWORK PATH

Transit Asset Management Plan



2023

Approvals

The individuals below, submitting and signing this Transit Asset Management Plan verify that it was prepared in accordance with the requirements set forth by all applicable federal, state, and local laws and regulations identified herein; that they are authorized representatives of the Transportation District Commission of Hampton Roads; that their signatures attest that all items and conditions contained in this document are understood, accepted and approved; and that they are committed to following the policy and plan contained herein.

APPROVED BY:

William E. Harrell, President/CEO, Hampton Roads Transit — Date: 8/29/23

RECOMMENDED BY:

Sibyl Pappas, Chief Engineering & Facilities Officer, Hampton Roads Transit — Date: 8/15/23

Scott Demharter, Director of Facilities, Hampton Roads Transit — Date: 8/15/2023

0. Executive Summary

Since the first generation Transit Asset Management (TAM) Plan in 2018, Hampton Roads Transit (HRT) has implemented an enterprise asset management (EAM) system to better understand and track the lifecycles of its assets. HRT has also incorporated TAM data and priorities into the Capital Improvement Plan (CIP) process and aligned the TAM and State of Good Repair (SGR) Policy with the agency's strategic plan.

Asset Management Policy

HRT is committed to achieving and maintaining HRT-owned assets in a SGR and to fostering a culture of continual improvement in asset management planning and performance in order to provide safe, reliable, efficient and sustainable transit services.

Combined, HRT provides more than 10 million passenger trips each year, connecting the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach. HRT provides services that connect the region through multiple modes of transit, including bus, ferry, light rail, demand response, and vanpool (i.e., TRAFFIX). *HRT currently operates and maintains a large base of transit assets across these five modes valued at approximately $809.5 million in 2021 dollars.*

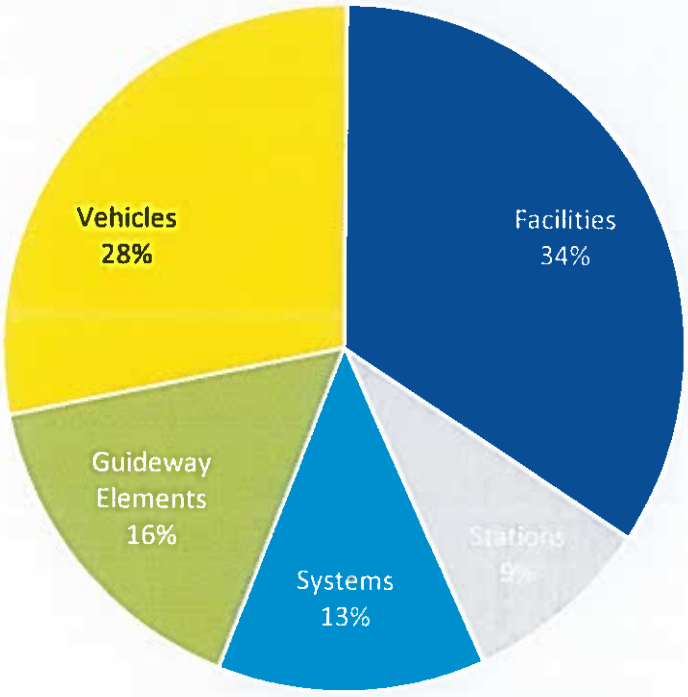


Figure 0-1: HRT's Existing Asset Base by Category

Facility buildings represent the largest share of all HRT assets by replacement value, as shown in **Figure 0-1**. This large share reflects the nature of HRT's transit services – a mid-size, multimodal operation with several sites containing maintenance and administrative buildings and associated on-site equipment and technology. Revenue vehicles – including buses, light rail vehicles, ferries, and paratransit vehicles – constitute the second largest share of HRT's asset holdings (roughly 28 percent of assets by value). The remaining 38 percent of assets include The Tide light rail guideway, stations, and support systems.

Based on HRT's inventory and the agency's defined asset lifecycles, HRT's current SGR backlog is estimated to be $115.2 million in 2021 dollars. In other words, it would cost approximately $115.2 million to replace all assets that exceed their useful life and to address all outstanding rehabilitation activities. The SGR backlog is equivalent to 14.2 percent of all HRT assets (by value).

While only two facilities score below a 3.0 condition overall, the Virginia Beach Trolley Base and the Northside Daily Services Building, HRT has multiple facility components that are reaching or beyond their useful life. Facilities make up the largest portion of the backlog at 54 percent. The overall condition and performance of critical HRT assets are shown below in **Table 0-1**, including the percentage of vehicles at, or beyond, their useful life benchmark (ULB).

Table 0-1: HRT Asset Condition and Performance Results FY23

Asset Type	FY23 Performance	FY24 Target
Facilities		**% below 3.0 condition**
Administrative/Maintenance	20%	20%
Passenger/Parking	0%	0%
Revenue Vehicles		**% at/or beyond ULB**
Bus	24%	15%
Cutaway	19%	13%
Van	0%	0%
Light Rail Vehicle	0%	0%
Ferry Boat	33%	0%
Non-Revenue Vehicles (Equipment)		**% at/or beyond ULB**
Automobiles	100%	17%
Trucks and Other Rubber Vehicles	91%	23%
Infrastructure		**% Directional Route Miles (DRM) under speed restriction**
Light Rail	0.05%	0%

HRT prioritizes SGR needs in the agency's annual CIP process and has incorporated asset criticality, based on asset type, into the prioritization process. For example, the current CIP will address the rehabilitation of the Virginia Beach Trolley Base over the next few years. The CIP is published annually and constrains needs based on planned funding availability and eligibility. The FY24-33 CIP programs $591.8 million over the next 10 years, including some expansion and enhancement needs. *HRT's total unconstrained SGR needs are estimated to be approximately $416.6 million over 10 years.*

To ensure prioritization and resourcing for TAM improvements, HRT's TAM Action Committee will meet quarterly to evaluate the progress of HRT's program. This cross-functional committee will support continuous improvement in the TAM program and work together to further align HRT's decision-making and plans with TAM practices.

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Acronyms and Abbreviations

ADKAR	Awareness, Desire, Knowledge, Ability, and Reinforcement
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
DRM	Directional Route Miles
DRPT	Virginia Department of Rail and Public Transportation
EAM	Enterprise Asset Management
FTA	Federal Transit Administration
FY	fiscal year
HRT	Hampton Roads Transit
HRTPO	Hampton Roads Transportation Planning Organization
KFA	key focus area
KPI	key performance indicator
LOS	level of service
MAP-21	Moving Ahead for Progress in the 21st Century Act
MAX	Metro Area Express
MERIT	Making Efficient and Responsible Investment in Transit
MPO	Metropolitan Planning Organization
NTD	National Transit Database
NTF	Norfolk Tide Facility
O&M	operation and maintenance
PCS	Peninsula Commuter Service
PPI	Producer Price Index
PTASP	public transit agency safety plan
ROW	right-of-way

SGR	State of Good Repair
SOP	standard operating procedure
SOR	system of record
TAM	Transit Asset Management
TDM	Transportation Demand Management
TERM	Transit Economic Requirements Model
TSP	Transit Strategic Plan
ULB	useful life benchmark
YOE	year of expenditure
ZEV	zero-emissions vehicle

1. Introduction

This Transit Asset Management (TAM) Plan is Hampton Roads Transit's (HRT's) update to its 2022 TAM Plan. The document provides an update on the status of HRT's asset management activities and guidance on the agency's future path to continue to improve its asset management practices including improvements to maintenance planning, enterprise asset management (EAM) software, and capital program prioritization. This TAM Plan aims to support an organization-wide culture to achieve and maintain SGR and improved performance of agency assets with a data driven approach that aligns and supports HRT's core values of safety, customer service, workforce success, and fiscal responsibility in the provision of transit service and day-to-day operations.

This plan also maintains compliance with the Federal Transit Administration (FTA) TAM Rule, 49 Code of Federal Regulations (CFR) Parts 625 and 630.

1.1 Overview of Hampton Roads Transit

HRT was founded in 1999 with the voluntary merger of Peninsula Transportation District Commission and Tidewater Regional Transit and is driven by its mission: "to connect Hampton Roads with transportation solutions that are reliable, safe, efficient, and sustainable (HRT Transit Strategic Plan [TSP] FY2023-2032)." HRT serves an area of approximately 432 square miles and connects six of Virginia's 10 largest cities: Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach (**Figure 1-1**). The service area has a combined population of approximately 1.35 million residents.

Figure 1-1: HRT Service Area Map

1.1.1 Modes/Services

HRT provides services that connect the region through multiple modes of transit, including bus, ferry, light rail, demand response, and vanpool (i.e., TRAFFIX). Combined HRT provided 7.1 million passenger trips in FY23. As of 2020, a majority (about 84 percent) of these trips occurred within the bus system. About 10 percent of trips are on The Tide light rail system (**Figure 1-2**).

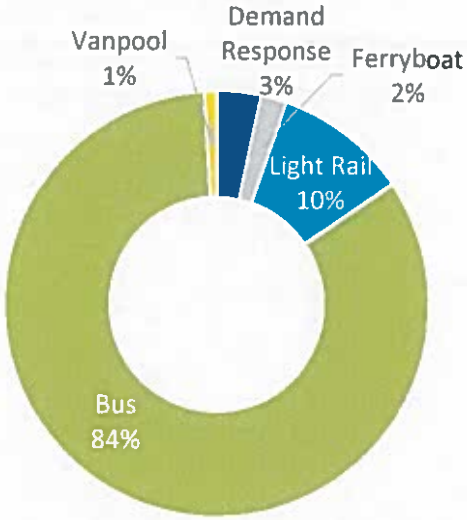


Figure 1-2: Distribution of Annual Unlinked Passenger Trips by Mode, 2020 National Transit Database (NTD)

HRT's bus service is comprised of 51 local bus fixed-routes – 34 routes on the Southside and 17 routes on the Peninsula. In addition, HRT operates Peninsula Commuter Service (PCS), a limited stop bus service that provides service to major employers on the Peninsula across five different routes. HRT also offers Metro Area Express (MAX) service MAX, which is being rebranded as part of the 757 Express program, is a regional express bus service with ten routes traveling across jurisdictions, connecting major employment destinations. HRT operates the distinctly branded Virginia Beach (VB) Wave bus "trolley" service, which is a seasonal service that includes four routes in the Virginia Beach resort area.

The Tide, Virginia's only light rail system operates in the City of Norfolk, traversing 7.4 miles of light rail track. The Tide opened for service in August 2011.

HRT contracts to provide daily passenger ferry service on the Elizabeth River between Downtown Norfolk and Downtown Portsmouth, stopping at High Street, North Landing, and Waterside. Ferry service is also provided to the Harbor Park baseball stadium between April and September when the Norfolk Tides (minor league baseball team) play home games.

HRT administers the region's Transportation Demand Management Program, TRAFFIX. Through this program, commuters can learn about ways to commute, including the use of transit, active transportation, and ridesharing. In FY23 there were 14,734 commuters enrolled in the program, reducing single occupancy vehicles miles traveled by 4.7 million.

HRT contracts with a private vendor to provide demand response paratransit service for persons with disabilities. This service is offered within three-quarters of a mile of any fixed-route bus service during HRT's regular operating hours.

HRT also operates a fleet of nonrevenue vehicles to meet HRT's operation and maintenance (O&M) needs.

As Hampton Roads recovers from the socioeconomic impacts of COVID-19, HRT will be faced with the challenge of providing transit services that match the growth and dynamic needs of the region and foster improved quality of life and economic vitality. To achieve this, HRT will have to plan and provide services that not only tackle traditional challenges like congestion but also respond to new challenges like the provision of safe and resilient transit for essential services in the face of future uncertain events.

This document represents HRT's plan to manage and maintain its assets in SGR to facilitate the provision of safe and reliable transit for customers. This plan also reflects HRT's commitment towards efficient investment and continuous improvements of its assets, which provide the foundation for HRT's vision of being a progressive mobility agency that promotes prosperity across Hampton Roads.

1.2 Background: Transit Asset Management (TAM)

As required by the Moving Ahead for Progress in the 21st Century Act (MAP-21), the FTA published the TAM Final Rule on July 26, 2016 (49 CFR 625), which went into effect October 1, 2016. This rule was established to help transit agencies achieve and maintain SGR for capital assets through TAM. FTA defines TAM as "a strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively through the lifecycle of such assets (49 CFR 625)."

TAM Final Rule is comprised of the following five pillars:

1) The definition of SGR.
2) A requirement that recipients and subrecipients develop TAM Plans.
3) SGR performance measures, and a requirement that recipients and subrecipients set performance targets based on the measures.
4) Annual reporting requirements for recipients and subrecipients.
5) Technical assistance from FTA.

FTA's definition of SGR captures the TAM Final Rule's objective to help transit agencies improve safety, reliability, and performance.

SGR is defined as: *the condition in which a capital asset can operate at a full level of performance.*

A capital asset is in a SGR when that asset:

1) Can perform its designed function.
2) Does not pose a known unacceptable safety risk.
3) Has lifecycle investments that have been met or recovered.

As a recipient of federal financial assistance under 49 U.S.C. Chapter 53, and owner and operator of "transit capital assets used in the provision of public transportation," HRT is required to comply with the FTA's MAP-21 TAM regulations. As a Tier I rail operator, HRT is improving asset management best practices and will exceed the MAP-21 TAM requirements to capture the benefits for its public stakeholders and customers.

1.3 What is a TAM Plan?

This TAM Plan is an update to HRT's 2022 TAM Plan and provides an update on the status of asset management activities at the agency and guidance on future asset management efforts. The TAM Plan illustrates HRT's ongoing processes to achieve SGR with a data-driven approach to maintaining, rehabilitating,

enhancing, and replacing assets in an efficient, financially responsible, and sustainable way. The plan also demonstrates compliance with the FTA's associated reporting requirements, including requirements set by the FTA TAM Rule, 49 CFR Parts 625 and 630.

HRT's TAM Plan encompasses the following initiatives and actions that form HRT's comprehensive asset management practice:

1) Building an inventory of capital assets with up-to-date asset conditions.
2) Setting condition and performance targets for major asset classes and allocating resources to meet these targets.
3) Developing prioritization criteria and methods for smart investments through the Capital Improvement Plan (CIP) process.
4) Implementing specific asset maintenance, rehabilitation, enhancement, and retirement actions.
5) Evaluating and reporting agency performance against targets.

Along with executing the annual activities associated with the TAM program, HRT will review and update this plan at least every four years to ensure continual improvement and a relevant strategy for achieving SGR and providing a performance commensurate with the needs of HRT's customers. More frequent updates of this plan may occur based on the process for evaluation described in **Section 6**.

1.3.1 HRT's TAM Plan Contents and Relationship with FTA TAM Requirements

As a Tier I service provider, HRT has developed a TAM Plan that addresses the nine required elements. **Table 1-1** outlines each element and the associated section of this TAM Plan.

Table 1-1: TAM Plan Elements

	TAM Plan Elements	Description	TAM Plan Section
1	Asset Inventory	A register of capital assets and information about those assets.	Section 3
2	Condition Assessment	A rating of the assets' physical state; to be completed for assets for which an agency has direct capital responsibility; should be at a level of detail sufficient to monitor and predict performance of inventoried assets	Section 3
3	Decision Support Tools	Analytic processes or tools that (1) assist in capital asset investment prioritization and/or (2) estimate capital needs over time *This does not necessarily mean software*	Section 4
4	Prioritization	A prioritized list of projects or programs to manage or improve the SGR of capital assets	Section 4
5	TAM and SGR Policy	Executive-level direction regarding expectations for TAM; a TAM strategy consists of the actions that support the implementation of the TAM policy	Section 2
6	Implementation Plan	A series of action steps for an agency to take in order to obtain and maintain a SGR. Addresses not only capital projects but also process and program capability improvements	Section 5
7	List of Annual Activities	The actions needed to implement a TAM Plan for each year of the plan's horizon	Section 5
8	Resources	A summary or list of the resources, including personnel, that a provider needs to develop and execute the TAM Plan	Section 5
9	Monitor, Evaluate, and Update	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	Section 6

Sources: 49 CFR 625.25 Parts C and D

2. Transit Asset Management Policy

The contents of this section address FTA TAM Element 5 and present HRT's **Asset Management Policy**:

HRT is committed to achieving and maintaining HRT-owned assets in a SGR and to fostering a culture of continual improvement in asset management planning and performance in order to provide safe, reliable, efficient and sustainable transit services.

This policy sets organization-wide direction, leadership, and responsibility for managing HRT's assets through Guiding Principles consistent with the agency's mission, vision, core values, and strategic goals. This policy also establishes HRT's asset management objectives for achieving and maintaining capital assets in SGR with the roles and responsibilities defined below.

2.1 Guiding Principles: HRT's Vision, Mission, Core Values, and Agency Goals

The HRT TAM Policy is driven by the agency's overarching vision, mission, core values, and strategic goals as currently identified in HRT's Transit Strategic Plan (TSP).

As the agency continues to mature in strategic planning these guiding principles will be reviewed and revised accordingly.

Vision	A progressive mobility agency that promotes prosperity across Hampton Roads through collaboration and teamwork
Mission	To connect Hampton Roads with transportation solutions that are reliable, safe, efficient, and sustainable
Values	Safety, customer service, workforce success, and fiscal responsibility
Agency Goals	+ Provide a high-quality service that is easy to use and enhances people's lives + Foster regional quality of life and economic vitality + Ensure financial stewardship and cost-effective operations + Build a culture for innovation and workforce success to ensure HRT remains relevant to the dynamic needs of the region

2.2 Roles and Responsibilities

2.2.1 Roles and Responsibilities

The HRT **CEO**, as the Accountable Executive for asset management as defined by MAP-21, has the overall responsibility (in cooperation with the department and the TAM Action Committee) for overseeing the development of asset management plans and procedures, enforcing the overall policy, approving SGR performance targets, and reporting to the agency's governing board on the status of asset management for the agency.

All departments will support HRT's Asset Management Policy with senior executives and additional representatives as needed. Key asset management staff participate on the TAM Action Committee, led by the Director of Facilities (within the Engineering & Facilities Department).

2.2.2 Lead Department

Management Services has the lead responsibility for coordinating asset management implementation at HRT, in conjunction with the Director of Facilities. This includes facilitating the TAM Action Committee meetings and integrating TAM Plan actions and outcomes with the annual CIP process and other plan development (e.g., TSP), and leading the development, maintenance, and dissemination of the TAM Plan, as well as the tabulation and reporting of results against stated objectives.

2.2.3 Support Departments

Engineering and Facilities is responsible for all assets in the Facilities and Stations asset categories, which includes updating facility asset inventories and condition assessments and maintaining those assets. In addition, Engineering and Facilities is responsible for planning and scoping all Facilities-related capital purchases and projects.

Transit Operations will provide asset data and analytic support for SGR performance measures and will implement TAM Plan actions through maintenance and replacement or rehabilitation of fleet vehicles and equipment. These may include asset condition assessments, development and maintenance of risk registers, providing effective preventive and corrective maintenance, development and implementation of improved maintenance practices, and other asset management activities related to Operations.

Finance will provide financial asset management data and analytic support and implement TAM Plan actions. These may include adding detail to financial data to facilitate linkages within financial asset data and the EAM, providing maintenance costs, establishing and supporting linkages between asset management and budgeting and financial management processes, as well as other related activities.

Technology will implement assigned TAM Plan actions, support continued implementation and use of HRT's EAM system, and integrate HRT's hardware and software applications to ensure efficiency and efficacy of asset management data flow, data retrievability, and overall data management. In addition, as an asset owner, Technology will provide periodic updates to relevant capital inventory for TAM Plan and CIP analysis.

Marketing and Communications will communicate the intent, progress, and outcomes of TAM Plan actions. These may include disseminating and communicating TAM Policy, the overall TAM Plan, and asset management activities consistently and clearly throughout the organization.

Planning and Development will identify new or expansion assets implemented for the agency. This information will include locations and lifecycle management and planning information of the new assets.

Safety will be chiefly responsible for implementing the agency's public transit agency safety plan (PTASP), which must be in alignment with the TAM Plan and its activities. Overlapping activities include supporting development of risk registers and addressing hazards, improving asset designs, and facilitating improved maintenance practices related to safety and security.

3. Asset Inventory and Conditions Assessment

HRT currently operates and maintains a large base of transit assets across five modes valued at approximately $809.5 million.

This investment represents HRT's significant commitment to the region's transit services. A comprehensive understanding of assets is essential to assuring long-term preservation and continued delivery of safe, reliable, and efficient services to the region's transit riders. Therefore, HRT is continually working towards building a more complete inventory of physical assets through improving entry into the new EAM system and implementing asset information templates for project close-out.

This section documents a full range of HRT's transit assets, including the types of assets used to support transit services, as well as the quantities, estimated replacement values, and lifecycle needs of those assets. It also details the condition assessment results and the processes used to develop and maintain the inventory and condition data. The contents of this section address FTA TAM Elements 1 and 2.

3.1 HRT's Asset Inventory

HRT's asset inventory provides a detailed list of the existing asset holdings as of June 30, 2022. The inventory documents all major depreciable capital assets used to support HRT transit services, including each asset's type, quantity, estimated replacement cost, date entered service (if known), location, expected useful life, and asset identification. Depending on asset type, the inventory also documents additional attributes including current asset condition (observed), make and model, location, mode supported, and asset status.

The current asset inventory documents more than 7,020 individual transit assets. In compliance with FTA guidance and HRT's objectives to document and track all transit assets, these individual asset records meet or exceed the following minimum requirements that a capital asset must be either:

- A revenue vehicle
- A non-revenue or support vehicle
- Worth $50,000 or more in acquisition value
- A component of a facility, as seen in FTA's guidance on Condition Assessment Calculation Guidebook, including a roof, plumbing, an elevator.
- A piece of facility equipment worth $10,000 or more or which is integral to the function of the facility

The depth and fidelity of HRT's asset inventory exceeds the minimum requirements as set forth by FTA guidelines and documents many assets that are below the dollar thresholds. These assets are still integral to HRT's functions as a transit agency, including passenger amenity assets at bus, light rail, and ferry stops such as shelters, benches, trash cans, and signs. This capital planning inventory is distinct from the inventory required for financial auditing purposes, which is maintained in HRT's fixed asset ledger. However, there is overlap in asset records and data sources between financial inventory in fixed assets and the TAM inventory.

3.1.1 Replacement Value of HRT's Asset Inventory

The current estimated replacement cost of HRT's existing transit assets is approximately $809.5 million in 2021 dollars. The distribution of this value across key asset types is shown in **Table 3-1** and **Figure 3-1.**

Facility buildings represent the largest share (around 34 percent) of all HRT assets (by replacement value). This large share reflects the nature of HRT's transit services – a mid-size, multimodal operation with several maintenance and administrative buildings with associated on-site equipment and technology. Revenue vehicles – including buses, light rail vehicles, ferries, and paratransit vehicles – constitute the second largest share of HRT's asset holdings (roughly 28 percent of assets by value). The remaining 38 percent of assets include light rail guideway, stations, and support systems.

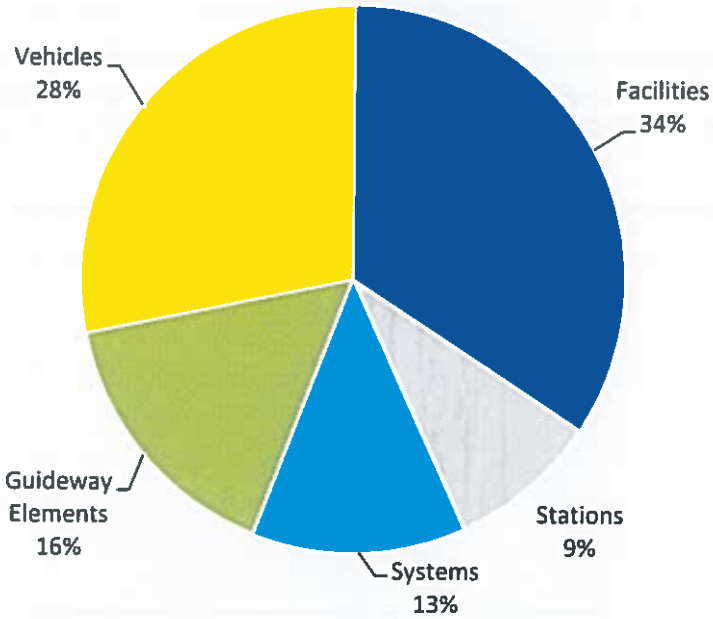


Figure 3-1: HRT's Existing Asset Base by Category

Table 3-1: HRT's Existing Asset Replacement Values

Asset Category	Asset Sub-Category	Replacement Value Thousands 2021 Dollars	Share of Total Asset Base*
Facilities	Equipment	$63,765	7.88%
	Buildings	$211,964	26.19%
Guideway Elements	Special Structures	$5,994	0.74%
	Guideway	$83,522	10.32%
	Trackwork	$38,760	4.79%
Stations	Building	$5,575	0.69%
	Access	$19,154	2.37%
	Complete Station	$33,352	4.12%
	Signage & Graphics	$4,793	0.59%
	Ferry	$8,751	1.08%
	Platform	$1,116	0.14%
Systems	Communications	$36,043	4.45%
	Train Control	$27,333	3.38%
	Electrification	$27,767	3.43%

Asset Category	Asset Sub-Category	Replacement Value Thousands 2021 Dollars	Share of Total Asset Base*
	Uninterruptable Power Supply	$413	0.05%
	Revenue Collection	$7,604	0.94%
	Roadway Traffic Signals	$3,051	0.38%
	Intelligent Transportation Systems	$2,609	0.32%
	Utilities	$5	0.00%
Vehicles	Revenue Vehicles	$219,164	27.07%
	Non-Revenue Vehicles	$8,740	1.08%
Total Existing Assets		$809,474	100%

**Sum of percentage share of total asset base may not add up to 100 due to rounding*

3.1.2 Replacement Cycles of Key Assets

Table 3-2 presents the expected replacement (useful life) and rehabilitation plans for a sample of HRT asset types. These lifecycle inputs are used to assess the size of the current level of deferred investment (SGR backlog) and to project future reinvestment needs (Section 4).

Table 3-2: Sample HRT Lifecycle Inputs

Asset Category	Type	Replacement Value (Millions of $2021)	Useful Life (Years)	Rehabilitations
Vehicles	Bus (40 feet)	$81.7	14	Mid-life
	Bus (35 feet)	$31.2	14	Mid-life
	Light Rail Vehicle	$52.9	30	Mid-Life
Stations	Station Access Roadway	$8.5	20	Mid-life (resurface)

3.1.3 Asset Inventory Development and Improvement

HRT's current asset inventory was developed from multiple data sources. The facilities and stations inventory has already been incorporated into the EAM system as part of Phase 1 deployment. Fleet records are provided by Operations based on their most recent master inventory, while IT hardware and software assets are provided by Technology. Guideway and Systems inventory is based primarily on lifecycle analysis of The Tide system and historic records of construction.

As part of the 2022 TAM Plan update, the inventory was improved using cost benchmarking from across the transit industry and construction costing from The Tide system to accurately reflect replacement values. As the EAM system is implemented fully across HRT's departments, see **Section 5**, this data will be consolidated into a system of record (SOR) and maintained by HRT staff and vendors.

3.1.4 Changing Technologies

HRT is currently planning to transition the bus and non-revenue fleets towards zero-emission vehicles (ZEV). The timing of the fleet transition will be based, in part, on the availability of funding in the CIP to replace vehicles with a higher-cost ZEV when they achieve their useful life and the future installation of charging infrastructure at bus maintenance facilities. As there is uncertainty regarding funding availability for the transition at this time, particularly from competitive discretionary programs the TAM Plan does not include the purchase of ZEV vehicles in the unconstrained needs estimates in **Section 4**.

3.2 Condition Assessment Methodologies

Condition assessments are split into Facility Inspections, Updating Useful Life Benchmarks for Vehicles, and Calculating Slow Zones for Fixed Guideways. These three processes are scheduled as part of HRT's TAM Annual Activities detailed in **Section 5**. The current methods to update these assessments are detailed in this section for inclusion in other regularly completed agency plans and reports, as relevant. In the future, as HRT's EAM system continues to mature, the available condition data will improve, and the condition assessment methodology will continue to be refined to leverage reports from the EAM.

3.2.1 Facility Condition Assessment Methodology

As part of the condition assessment process, facilities must be assessed at least every four years. Currently, HRT exceeds this requirement by completing onsite physical condition assessments for most facilities annually. All condition data for inventoried assets is updated in the EAM system.

Onsite condition data provide a detailed snapshot of the current physical condition (observed) of HRT facility assets. These data are extremely valuable for the assessment of near- to medium-term maintenance and facility reinvestment needs and priorities and are used in developing and justifying projects in the CIP.

The general approach to conducting facilities condition assessment is illustrated in **Figure 3-2.**

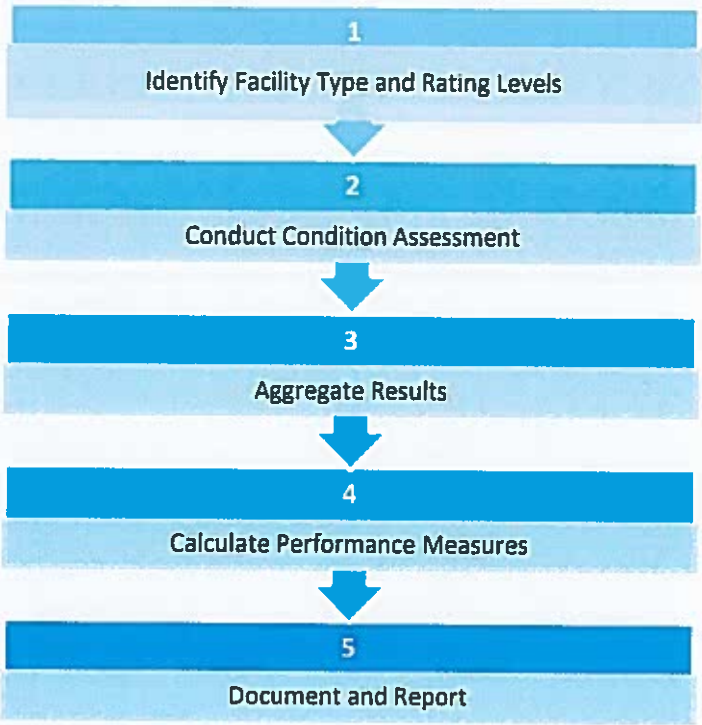


Figure 3-2: HRT Facilities Condition Assessment Process

3.2.2 HRT Facility Types

As part of the NTD requirement, HRT must submit overall facility condition ratings for each facility in its asset inventory for which it has capital responsibility, such as:

- Any facility that HRT owns or partially owns
- Any facility where HRT has capital maintenance responsibility
- Any facility that is currently included in HRT's program of capital projects or a facility that HRT can reasonably anticipate it will include in its program of capital projects over the next four years

For administrative and maintenance facilities, the transit use of the facility should also be more than incidental (i.e., greater than 50 percent of the activities or 50 percent of the fleet maintenance is for transit vehicles, including both revenue and non-revenue transit vehicles).

A facility is defined as an individual "building" for the purposes of assessment, unless they are less than 100 square feet (e.g., security guard or other shacks, stand-alone restroom, storage shelter in which no work is performed). Trailers are considered temporary structures and do not qualify for inspections. The application of the 100 square foot minimum to HRT's facilities removed a few smaller structures from reporting, including a guard shack and two operator restrooms.

Facilities are defined into four FTA categories:

- Administrative
- Maintenance

- Passenger
- Parking

The condition is reported for an individual facility based on inspection; however, performance measures (Step 4 in **Figure 3-2**) are reported by two groupings:

- Administrative/Maintenance:
  - All maintenance and administrative facilities used to support revenue services
- Passenger/Parking Facilities:
  - All passenger stations and facilities including rail stations on right-of-way, ferry docks, bus transit centers, and bus transfer stations
  - All passenger parking lots and parking garages

While HRT inventories standard bus stops (with signs only) and passenger amenity bus stops (with shelters, benches, and/or trash cans) for internal maintenance and capital planning purposes, these are not included in the condition assessment results for FTA reporting below. HRT does operate multiple "Transfer Stations" that qualify as passenger facilities due to the segregated bus right-of-way that HRT maintains along with the on-site passenger amenities.

The onsite condition observations are rated based on FTA's five-point condition rating scale shown in **Table 3-3** and utilize templates in the EAM that follow the FTA guidebook's process for secondary level ratings and subsequent aggregation. Aggregation uses weighted averages based on both risk and criticality of the facility components.

Table 3-3: FTA's 5-point Condition Scale

Rating	Condition	Description
5	Excellent	No visible defects, near new condition
4	Good	Some (slightly) defective or deteriorated component(s)
3	Adequate	Moderately defective or deteriorated component(s)
2	Marginal	Defective or deteriorated component(s) in need of replacement Note: Condition 2 indicates an asset (or significant portion of an asset) is close to, or in need of, rehab/replacement and should be considered a pending investment need. An asset at 2.5 is at the end of useful life.
1	Poor	Asset is past its useful life and needs prioritized repair or replacement

3.2.3 Useful Life Benchmark for Vehicles

While facilities are inspected to determine condition, vehicle conditions are assessed based on their age compared to their ULB. Therefore, the critical activity for understanding vehicle condition is determining an accurate ULB.

Useful Life Benchmark (from FTA): The expected lifecycle of a capital asset for a particular transit provider's operating environment, or the acceptable period of use in service for a particular transit provider's operating environment. Note: ULB is distinct from the minimum useful life definition used in FTA's grant programs.

The appropriate ULB for an agency's fleet should consider:

- The physical environment (gravel or paved roads, snow/salt in winter, saltwater/air, etc.)

- The service area (hilly or flat, route distances, etc.)
- The make, model, and manufacturer performance
- The realistic/expected maintenance regime (overhauls, rebuilds, preventive maintenance only, etc.)

The ULB standards for HRT's fleet were updated based on HRT's accumulation of mileage and age of each vehicle type. Asset owners adjusted ULBs to reflect current estimates on the reasonable replacement timing for vehicles once minimum thresholds for replacement are met, which considers not only current fleet performance but also current timing and duration of HRT's vehicle procurement process.

3.2.4 Calculating Fixed Guideways under Performance Restrictions

For rail fixed guideway infrastructure, the performance measure reported to NTD to assess the condition of the infrastructure is the annual average of the percentage of track segments under performance restrictions (i.e., slow zones) as measured at 9 am the first Wednesday of each month.

Currently, FTA defines a performance restriction as segment(s) of the rail fixed guideway where the maximum permissible speed of the 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.

The FTA TAM final rule defines the performance measure of rail fixed guideway as the percentage of segments under performance restriction. It is suggested that agencies consider one segment to be defined to one one-hundredth of a mile (0.01 mi), and miles of track is measured as the number of tracks per one-mile segment of right-of-way (ROW) without regard to whether or not rail traffic can flow in only one direction on the track.

The general approach to conducting performance assessment for rail fixed guideway is illustrated in **Figure 3-3**.

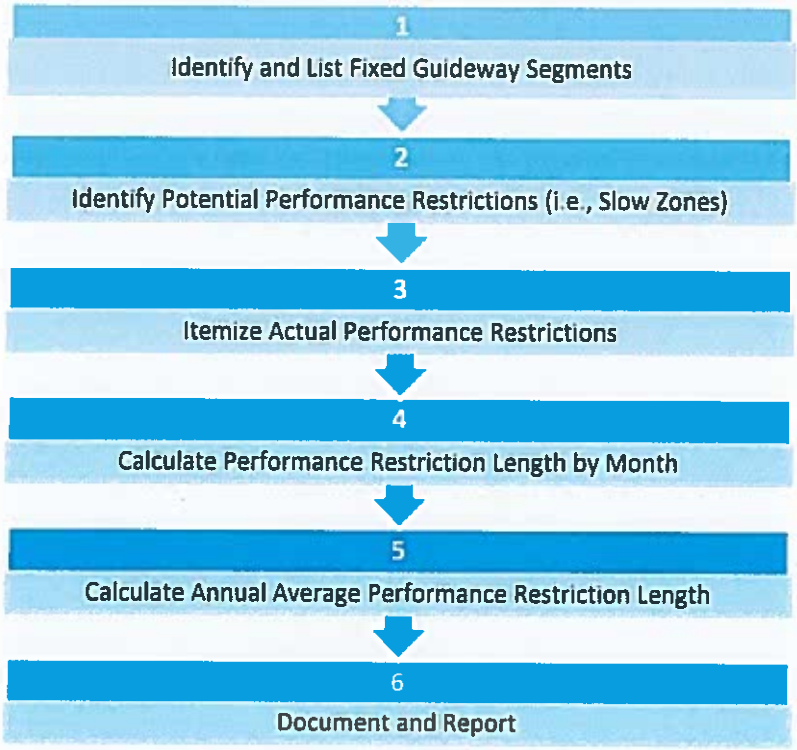


Figure 3-3: HRT Fixed Guideway Performance Assessment Process

3.2.5 Condition Results and SGR Performance Measures

HRT has direct capital responsibility for 44 facilities, which includes 10 Administrative/Maintenance facilities and 34 Passenger/Parking facilities as defined in Section 3.2.1.1. HRT has improved the capture of facility data over time and adjusted the facilities being reported to FTA by reassessing and applying NTD guidance and definitions. In addition, HRT has stopped occupying the Mangrove Warehouse facility.

The results of the facilities condition assessment conducted for HRT in 2023 are presented in **Table 3-4.** *The analysis suggests that the Virginia Beach Trolley Base and the Northside Daily Services Building are the only HRT facilities that are not in SGR and require significant near-term reinvestment.* The remaining 43 out of the 44 HRT facilities are in adequate condition or better (implying significant remaining useful life for these assets). This does not mean that all facility components and equipment are in adequate or better condition, as individual assets at a facility can require reinvestment while the overall score is still above a 3.0. For example, the overall condition rating for the Newport News Transit Center is a 3 but some components of the facility like the electrical panelboards have a condition rating of 2, which indicates need for future reinvestment.

Table 3-4: HRT Facilities Condition Assessment Results FY23

Facility by Location	Type	Weighted Average Condition Value
Southside Administrative Facility, Building 4	Administrative Facility	4
Southside Complex Blacksmith	Administrative Facility	4
Southside Complex Radio Tower	Administrative Facility	3

Facility by Location	Type	Weighted Average Condition Value
Southside O&M/Admin Facility	Maintenance Facility	4
Southside Daily Services Building 2	Maintenance Facility	4
Southside Parking Deck Building 3	Maintenance Facility	4
Northside O&M/Admin Facility	Maintenance Facility	4
Northside Daily Services Building	Maintenance Facility	2
Virginia Beach Trolley Base	Maintenance Facility	2
Norfolk Tide Facility	Maintenance Facility	4
Administrative and Maintenance Facilities		**20% below 3**
Harbor Park Light Rail Station	Passenger Facility – Light Rail Station	4
Monticello Light Rail Station	Passenger Facility – Light Rail Station	4
Civic Plaza Light Rail Station	Passenger Facility – Light Rail Station	4
Macarthur Light Rail Station	Passenger Facility – Light Rail Station	4
Newton Road Light Rail Station	Passenger Facility – Light Rail Station	4
Ballentine/Broadcreek Light Rail Station	Passenger Facility – Light Rail Station	4
Ingleside Road Light Rail Station	Passenger Facility – Light Rail Station	4
NSU Light Rail Station	Passenger Facility – Light Rail Station	4
EVMC/Fort Norfolk Light Rail Station	Passenger Facility – Light Rail Station	4
Military Highway Light Rail Station	Passenger Facility – Light Rail Station	4
York Street/Freemason Light Rail Station	Passenger Facility – Light Rail Station	4
Downtown Norfolk Transit Center	Passenger Facility – Transit Center	4
Newport News Transit Center	Passenger Facility – Transit Center	3
Silverleaf Transit Center	Passenger Facility – Transit Center	3
Hampton Transit Center	Passenger Facility – Transit Center	3
Artic & 19th	Passenger Facility – Transfer Station	4
Corporation & Constitution	Passenger Facility – Transfer Station	4
Wards Corner	Passenger Facility – Transfer Station	4
Duffys & Granby	Passenger Facility – Transfer Station	3
Military Circle Mall	Passenger Facility – Transfer Station	3
Liberty & Seaboard	Passenger Facility – Transfer Station	5
Victory Crossing	Passenger Facility – Transfer Station	5

Facility by Location	Type	Weighted Average Condition Value
County & Court	Passenger Facility – Transfer Station	4
Patrick Henry Mall	Passenger Facility – Transfer Station	4
Thomas Nelson Community College	Passenger Facility – Transfer Station	4
Boulevard Park	Passenger Facility – Transfer Station	4
Newton Road Station	Passenger Facility – Transfer Station	4
Waterside Ferry Dock	Passenger Facility – Ferry Docks	5
Harbor Park Ferry Dock	Passenger Facility – Ferry Docks	5
High Street Ferry Dock	Passenger Facility – Ferry Docks	5
North Landing Ferry Dock	Passenger Facility – Ferry Docks	5
Newton Road Park & Ride	Parking Facility	4
Ballentine/Broadcreek Park & Ride	Parking Facility	4
Military Highway Park & Ride	Parking Facility	3
Passenger and Parking Facilities		**0% below 3**

Table 3-5 summarizes the condition of HRT revenue and non-revenue vehicles as of August 2023. Planned replacements in FY2024 will improve the conditions of the ferry boat and non-revenue fleets, while light rail vehicles continue to undergo their scheduled rehabilitations. In addition, the bus feet will be expanded in the next fiscal year with replacements transitioning to ZEB vehicles in future years.

Table 3-5: HRT Revenue and Non-Revenue Vehicles SGR Performance Measures FY23

Fleet Type	ULB	% at/or Beyond ULB
Revenue Vehicles		
Bus Measure	14	24%
Cutaway Measure	6	19%
Van Measure	6	0%
Light Rail Measure	30	0%
Ferry Boat Measure	30	33%
Non-Revenue Vehicles		
Automobiles Measure	8	100%
Trucks and Other Rubber Vehicles Measure	8	91%

Table 3-6 presents the current performance of the HRT light rail infrastructure, showing significant improvement after FY2021 when some long-standing performance restrictions were able to be lifted. As part of the development of this TAM Plan, HRT will be implementing an improved process for incorporating known capital

project work affecting the ROW into the outage and slow zone planning process. It is expected that fewer restrictions will impact the system over time as work on ROW is more closely coordinated.

Table 3-6: HRT Annual Average Miles under Performance Restriction

Year	Annual Average Guideway Miles under Performance Restriction	Percentage of Total
FY2023	0.00773	0.05%
FY2022	0.00663	0.04%
FY2021	0.51335	3.47%

4. Prioritization and Reinvestment

This section provides a description of HRT's process and tools used to support the development of the TAM Plan and summarizes HRT's capital investment prioritization process that generates the 10-year CIP. This section also provides an analysis of HRT's SGR backlog and its 10-year unconstrained reinvestment needs. The contents of this section address FTA TAM Elements 3 and 4.

4.1 Decision Support Tool

HRT developed a Microsoft Excel based tool that utilizes HRT's asset inventory and lifecycle plans (e.g., useful life and rehabilitation plans) to determine unconstrained SGR needs and current SGR backlog. In the future, the EAM system may be able to provide similar functionality as future phases of implementation go live.

There are two types of reinvestment needs calculated by the tool:

- **Replacement** based on an asset's age compared to useful life. Some asset types are not replaceable (such as tunnels and bridges) and are kept in perpetuity.
- **Rehabilitation,** the number and cost of which are determined by HRT inputs, including the *30-Year Capital and O&M Needs Assessment Technical Memo* for light rail calculations provided in prior analysis. Rehabilitation is used primarily for light rail assets with mid-life overhauls or regular component replacements. Bus revenue vehicles also go through a mid-life repowering, with the exception of the historic replica trolleys.

While the Microsoft Excel based tool is used to project the unconstrained capital reinvestment needs for HRT, the agency's annual CIP process supports the determination of which assets receive reinvestment under constrained funding using a prioritization methodology (detailed below) and which assets enter/leave the SGR backlog based on funding allocation. This analysis is repeated each year to prioritize needs and guide investment decisions.

4.2 Investment Prioritization

HRT's annual CIP process establishes an approach for the agency to update its capital investment prioritizations collaboratively with input from all HRT departments. Up-to-date capital needs are evaluated annually and prioritized based on a range of criteria that align with the agency's strategic goals and objectives. Furthermore, the CIP not only outlines how HRT plans to fund the replacement or SGR needs but also considers planned expansion needs of agency infrastructure.

As the main output, the CIP process generates a full list of capital needs that are financially constrained to match anticipated capital revenue over the next ten years. The CIP is a "living document", which allows HRT to adapt its capital investment strategy throughout the year to account for changes in asset conditions or respond to external influences on the agency or program like changes in funding, extreme events, changing policies/rules or standards, and other social or economic disruptors (e.g., pandemics).

4.2.1 Methodology Overview

The development and implementation of the CIP approach is led by Management Services (within the Executive Department) in collaboration with managers of departments across the agency. **Figure 4-1** provides a general outline of the main steps of the FY2023-FY2032 CIP approach.

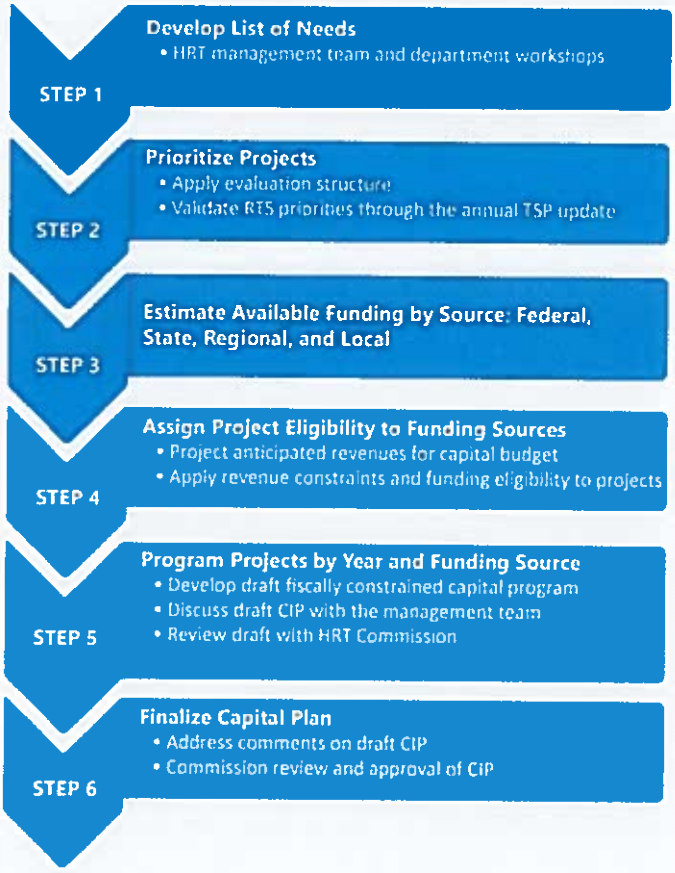


Figure 4-1: HRT CIP Development Approach (Source: HRT FY23-FY32 Capital Improvement Plan)

4.2.2 Prioritizing Needs: Alignment with HRT Goals

Through agency-wide collaboration, HRT has identified a set of criteria or metrics that support HRT's mission, goals, and objectives to guide the prioritization of the capital needs identified across the organization. To facilitate an approach that supports HRT's strategic goals, the investment prioritization process considers the following guidelines:

- Focus on achieving and maintaining State of Good Repair (e.g., fleet, facilities).
- Maximize the effect of regional funding to support phased implementation of the Regional Transit System (RTS) and related capital investments.
- Ensure linkages back to HRT's 10-year Transit Strategic Plan (TSP) and other major initiatives.
- Focus on new technology, adding passenger shelters, and other projects improving the customer experience.

Through development of this TAM Plan, HRT also updated CIP projects scoring measure for SGR to align with evaluation criteria of the Virginia Department of Rail and Public Transportation's (DRPT's) Making Efficient and Responsible Investment in Transit (MERIT) grant program. The SGR measure now includes the criticality of the asset type being addressed which aligns with the MERIT program approach. MERIT is a significant source of funding in HRT's CIP. Coordination and alignment of the HRT prioritization process with the MERIT criteria enhances for HRT's case for obtaining State matching funds.

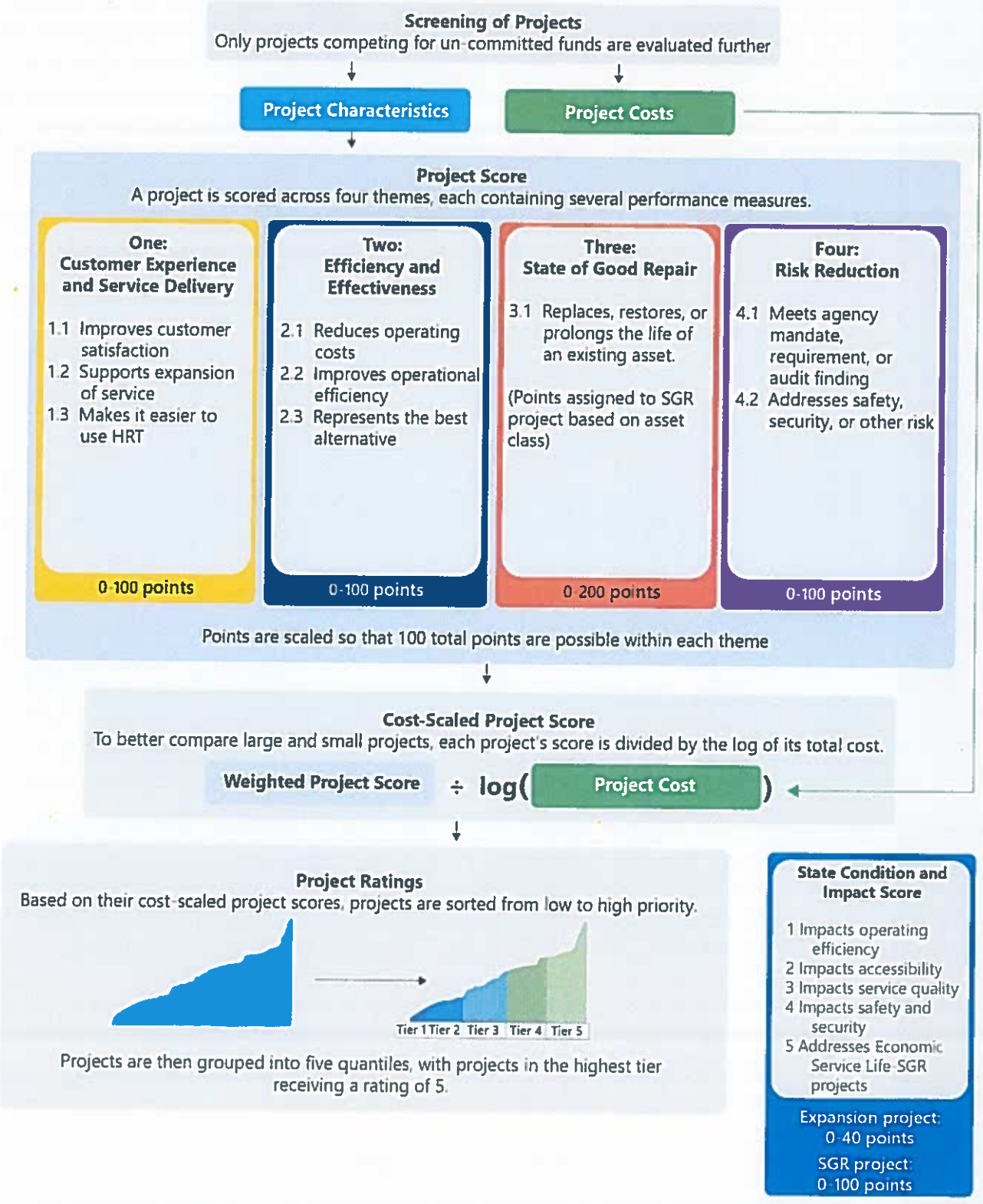


Figure 4-2: Overview of CIP Project Selection, Evaluation, and Prioritization Process

4.3 SGR Backlog

To quantify the SGR backlog, HRT built a Microsoft Excel-based tool to estimate which capital assets exceed their expected useful lives or have deferred capital maintenance needs. These calculations are based solely on HRT's asset inventory data and agency input assumptions regarding assets' useful life and replacement costs. In the future, when all assets are maintained in the EAM system the estimate of backlog may be available from that system.

Based on this analysis, HRT's current SGR backlog is estimated to be approximately $115.2 million in 2021 dollars. In other words, it would cost approximately $115.2 million to replace all assets that exceed their useful life and to address all outstanding rehabilitation activities. Given that HRT's transit assets are currently estimated to have a total replacement value of $809.5 million in 2021 dollars, the SGR backlog is equivalent to roughly 14.2 percent of all HRT assets (by value).

The breakdown of HRT's SGR backlog by asset category is presented in **Figure 4-3**. Facilities comprises the largest portion of the backlog at 54 percent. Vehicles are the second largest group at 24 percent of the backlog followed by Systems at 14 percent.

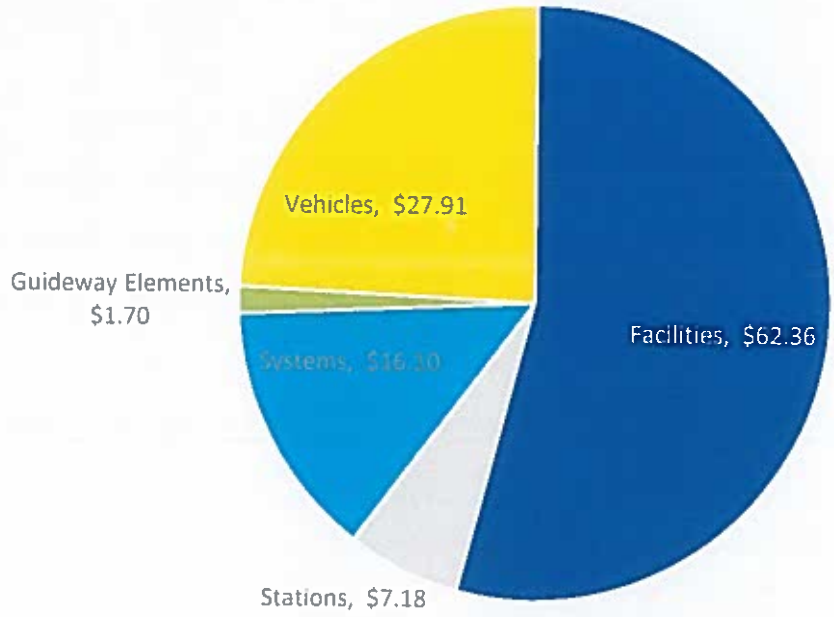


Figure 4-3: Estimated SGR Backlog by Asset Category, Millions of $2021

4.4 10-Year Unconstrained Reinvestment Needs

HRT's unconstrained SGR needs analysis is conducted to help estimate the level of capital investment required to address HRT's total reinvestment needs for the upcoming 10-year period. This analysis assumes that HRT has unlimited access to reinvestment funding and has the planning and project management capacity to address each reinvestment need within a one-year period. While unattainable, this analysis is helpful to identify all existing and upcoming SGR capital needs as well as a method to assess the gap between total needs and expected funding capacity.

To assess HRT's unconstrained reinvestment needs, HRT used a Microsoft Excel-based tool to predict needs over a ten-year time span, assuming no funding constraint and three percent cost inflation annually. This inflation rate is roughly based on historic producer price index (PPI) values for the transportation industry over the years. Therefore, all needs are in year of expenditure (YOE) dollars. While cost inflation is currently higher than historic averages, the historic indices are used for long-term planning purposes. If current trends continue however, the projected future costs in this TAM Plan will be too low. In addition, the unconstrained needs do not include the purchase of ZEV fleet nor the build out of necessary charging. When ZEV plans are finalized, the TAM Plan should be updated to include those needs.

HRT's total SGR needs are approximately $416.6 million over 10 years.

The resulting unconstrained ten-year needs are shown in **Table 4-1**, grouped into five-year increments by asset type. The average annual needs amount provides a sense of the typical level of funding required to attain and maintain full SGR throughout the five-year periods. Over the ten-year period of analysis, annual average SGR needs are about $41.7 million.

Table 4-1: HRT 10-Year Unconstrained Reinvestment Needs: 2022-2031 (Millions of $YOE)

Asset Category	*2022-2026*	*2027-2031*	*10-Year Total*
Facilities	$63.12	$67.15	$130.27
Stations	$10.90	$53.62	$64.52
Systems	$13.83	$53.62	$40.17
Guideway Elements	$15.08	$0.00	$15.08
Vehicles	$70.53	$96.01	$166.53
Subtotal	**$173.46**	**$243.11**	**$416.57**
Annual Average	**$34.69**	**$48.62**	**$41.66**

It should be noted that these figures maintain full SGR for existing assets only, and do not address any planned enhancements or expansions.

Figure 4-4 presents the annual unconstrained reinvestment needs for the full 10 years, segmented by asset category. Generally, the unconstrained reinvestment needs are dominated by the rehabilitation and replacement needs for vehicles and facilities, apart from a spike in reinvestment needs for Stations in 2031.

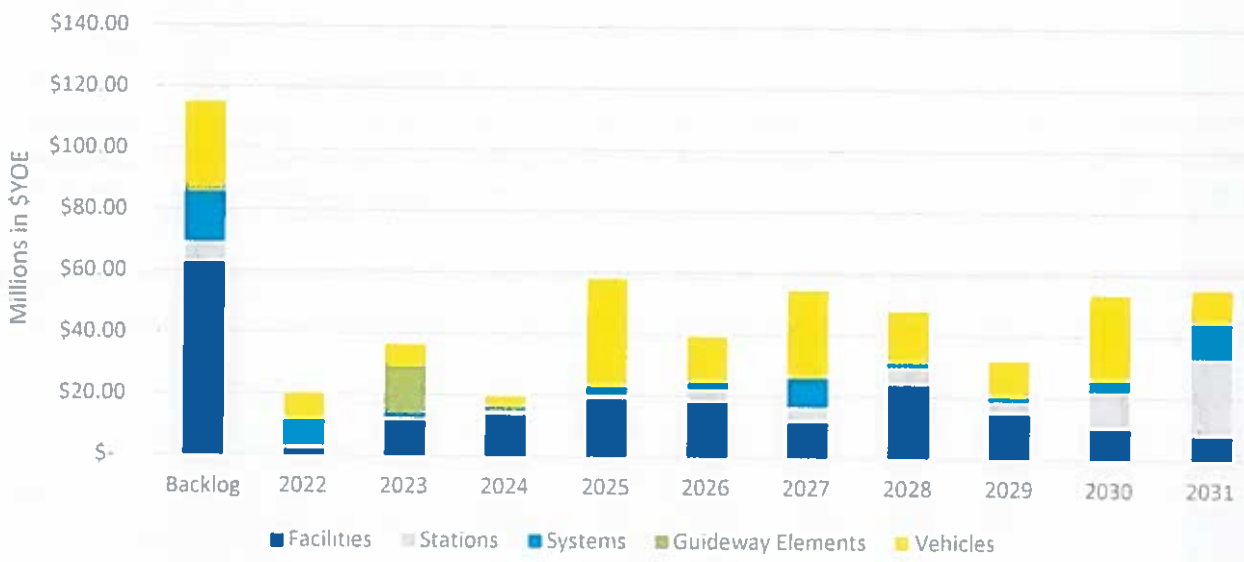


Figure 4-4: 10-Year Unconstrained Capital Needs, Millions in $YOE

4.5 10-Year Constrained Reinvestment Needs

HRT does not expect to receive the level of capital funding required to meet the total reinvestment needs as identified by the unconstrained reinvestment needs analysis. For this reason, HRT employs the prioritization process as part of the annual CIP development, described in **Section 4.2**. The constrained CIP update for FY24-33 addresses $591.8 million in needs over the next 10 years.

4.6 Capital Project Prioritization

The projects planned to be funded in the *HRT Capital Improvement Plan* are prioritized based on the methodology described in **Section 4.2.2**, with higher weight given to SGR projects in alignment with HRT's TAM Policy. Projects are scored in five tiers, with Tier 5 being the highest score. The CIP is approved by HRT's Board of Commissioners and published annually to reflect the prioritized list of projects and funding allocation.

HRT's current CIP with prioritized projects can be found on the agency's website under "Plans and Studies" at: https://gohrt.com/agency/planning-development/ .

5. Implementation Plan

This section describes the actions, activities, and resources required to maintain and continue to improve HRT's TAM program. HRT identified improvements opportunities through conducting a maturity assessment of HRT's TAM program based on the Institute of Asset Management (IAM) anatomy and ISO 55000 standard for asset management. This section addresses FTA TAM Elements 6, 7, and 8.

5.1 HRT TAM Program Status

In September of 2021, HRT conducted an updated maturity assessment of the TAM program to determine the status of work and provide internal stakeholders the opportunity to share their perspectives and experience. This assessment followed a similar structure and evaluated the same topic areas (derived from ISO 55000 standards) as the maturity assessment conducted for the 2018 TAM Plan to help assess HRT's progress over the past four years and chart TAM improvement opportunities moving forward.

The maturity assessment involved two parts: 1) a maturity assessment questionnaire/survey for key HRT staff representing TAM accountable departments and 2) a workshop to review the aggregate outcomes of the survey and validate the maturity level of the agency by focus and theme areas.

While HRT has implemented Trapeze EAM and improved asset condition reporting, **Table 5-1** summarizes the priority areas that were identified for further improvement in the TAM program. Each of these areas is addressed in either an Annual Activity or Improvement Action in the following sections.

Table 5-1: Maturity Assessment – TAM Program Priority Areas for Improvement

Focus	Theme	Opportunity for Improvement
Organizational Strategic Plan	Strategic Plan and Organizational Objectives	Improve communication and visibility of vision, goals, and objectives across agency
	Performance Measurement and Reporting	Facilitate a more comprehensive understanding of metrics and targets to evaluate success and identify accountable departments
Strategy and Planning	Asset Management Policy	Align original TAM policy with current strategic plan
Organization and People	Asset Management Leadership and Governance	Complete assignment and communication of roles and responsibilities for TAM activities
	Asset Management Skills and Competencies	Improve understanding of skills and training necessary to fulfill roles and responsibilities
	Knowledge Retention and Succession Planning	Mitigate loss of asset management related knowledge through staff turnover
	Change Management	Create an agency-wide mechanism to track, implement, and communicate necessary changes for an effective asset management program
	Communication and Information sharing	Create an agency-wide mechanism to disseminate key asset management information or resources

Focus	Theme	Opportunity for Improvement
Asset Information	Asset Inventory	Consolidate agency assets from current fragmented structure and definitions into EAM for monitoring
	Asset Information	Standardize minimum asset data or information to be tracked and monitored by each department
Asset Management Decision-Making	CIP Development	Incorporate more asset information into CIP process for needs identification and scoring
Lifecycle Delivery	Shutdown and Outage Management	Coordinate CIP project implementation and timing of system shutdown or outage schedule with regular maintenance scheduling
Risk and Review	Risk Framework – Asset Level	Incorporate consideration of risk from an asset management perspective

5.2 Annual Activities

This section summarizes the key annual activities HRT should undertake to ensure compliance with FTA TAM planning requirements and maintain internal documentation of assets and their conditions. The section includes descriptions of the key annual activities, and a recommended schedule (see **Figure 5-1**).

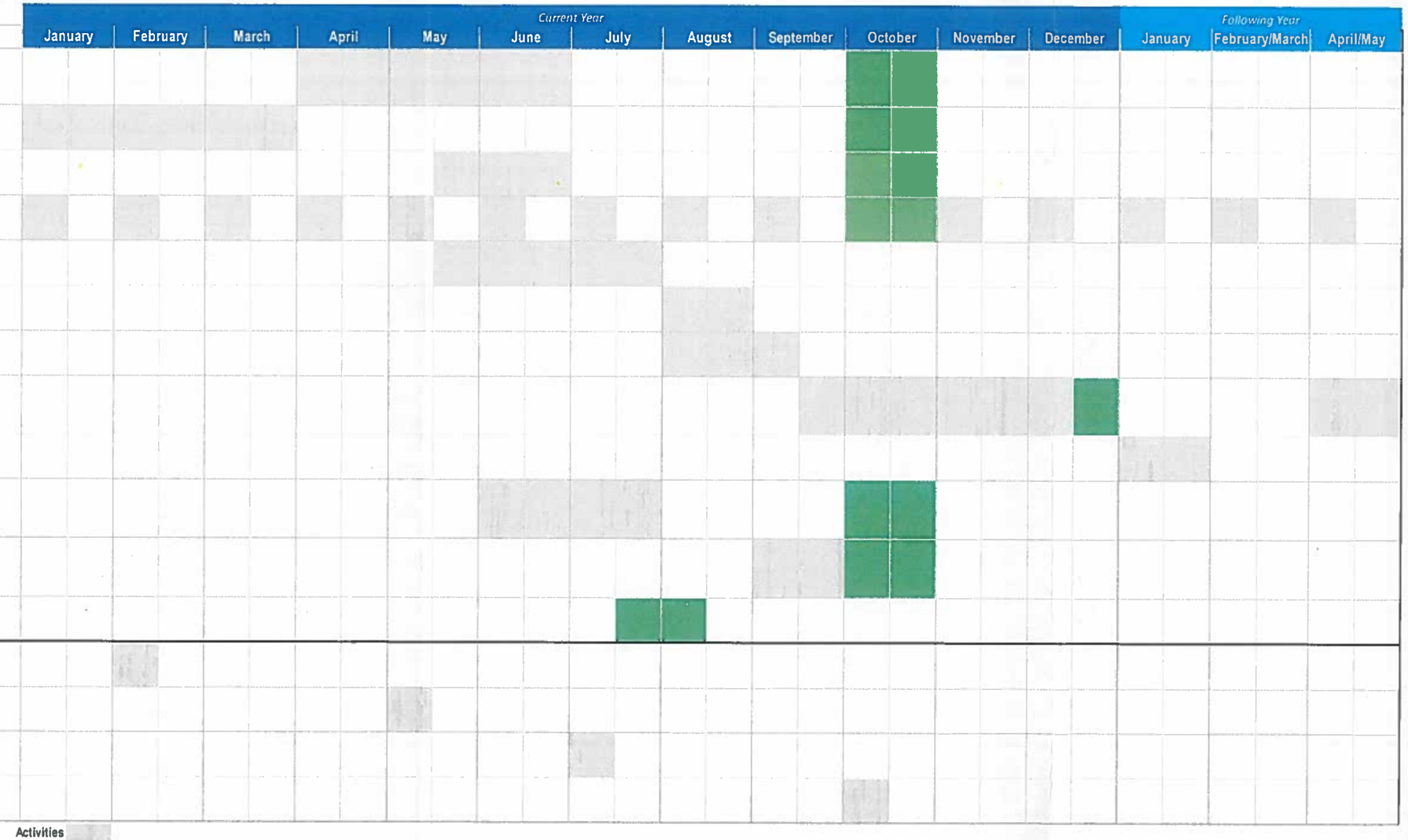
The timing of the annual activities is based on existing FTA requirements for agencies on a July to June fiscal year and HRT's existing internal processes for CIP development, grant applications, and budgeting.

HRT's TAM Annual Activities include:

- NTD - Asset Inventory Update and A-Forms
- Condition Assessment
  - Facilities (Inspections and Aggregation)
  - Vehicles (Mileage and Useful Life Analysis)
  - Rail Fixed Guideway (Performance Restricted Mileage and Aggregation)
- Capital Programming
  - Needs Forecast
  - Investment Prioritization
  - Revenue Forecasting
  - Develop and Budget
  - DRPT Grant Application Process
- Performance Targets Update
- Narrative Report on Performance Targets
- Metropolitan Planning Organization (MPO) Coordination

HRT will continue to assess the TAM program annually to monitor implementation of and improvement activities and key agency stakeholders are engaged in continuing the process. Further, HRT also plans to update the TAM Plan every four years at minimum.

Schedule of TAM Annual Activities	Approximate Start and End Dates
Asset Inventory Update	April 1 to June 30 (current year) *Reporting: October (current year)*
Condition Assessment - Facilities	January 1 to March 30 (current year)
Condition Assessment - Vehicles	May 15 to June 30 (current year)
Condition Assessment - Fixed Guideway	First Wednesday of every month (current year)
Capital Programming - Gather Needs*	May 15 to August 1 (current year)
Capital Programming - Prioritize Needs	August 1 to September 1 (current year)
Capital Programming - Revenue Forecasting	August 1 to September 15 (current year)
Capital Programming - Develop Plan and Budget	September 15 to December 1 (current year) *Adjustment and Pre-work to Next CIP Update: April 1 to May 30 (following year)*
Capital Programming - DRPT Grant Application Process	January 1 to February 1 (following year)
Performance Targets Update	June 30 to July 31 (current year) *Reporting: October (current year)*
Narrative Report on Performance Targets	September 1 to September 31 (current year) *Reporting: October (current year)*
MPO Coordination	*Reporting: July/August*
Assess TAM Program** - Annual Kick-off	February 1 to February 15 (current year)
Assess TAM Program** - Inventory Updates	May 1 to May 15 (currenty year)
Assess TAM Program** - Performance Targets & Capital Needs	July 1 to July 15 (current year)
Assess TAM Program** - NTD Reporting	October 1 to October 15 (current year)



*From Project Charter submissions

**Held as Quarterly TAM Action Committee Meetings

Figure 5-1: Calendar of TAM Annual Activities

5.3 Improvement Activities

In addition to the Annual Activities and the update of the TAM Plan every four years, HRT has identified specific Improvement Activities to address HRT's current and desired levels of maturity identified through the TAM program maturity assessment. **Table 5-2** summarizes the Improvement Activities by priority tier and theme.

Table 5-2: Proposed Improvement Activities for HRT TAM Program

Identified Themes for Improvement	*Action #*	*Proposed Action*	*Responsible and/or Accountable Individual(s)/Department(s)*	*Implementation Timeframe (from October 2022)*
Tier 1 Priority				
Strategic Plan and Organizational Objectives	1	Update the transit strategic plan (TSP) and communicate the vision, goals, and objectives to departments throughout the agency.	Management Services	Completed as part of HRT annual Strategic Planning Process (SPP)
Asset Management Policy	2	Update and align policy to the current TSP.	Engineering and Facilities	Completed as part of 2022 TAM Plan
Asset Inventory	3	Once EAM system is live, complete the asset register with critical assets. Data can be taken from the inventory compiled for this TAMP.	Transit Operations, Technology, Engineering and Facilities	Completed as part of EAM implementation
Tier 2				
Asset Management Leadership and Governance	4	Develop and agree to staffing (RACI) matrix for key TAM activities.	TAM Action Committee	Completed as part of 2022 TAM Plan
Asset Management Skills and Competencies	5	Identify appropriate trainings to meet necessary roles and responsibilities for asset management lead staff.	TAM Action Committee	Ongoing
Change Management	6	Establish and convene TAM Action Committee on a quarterly basis. *Proposed participants and initial agendas aligned to Annual Activities follow this table.*	TAM Action Committee	Ongoing
Asset Information	7	To stay up to date, develop and implement asset data templates to be completed by vendors/HRT staff for facilities asset data.	Engineering and Facilities	Ongoing
Capital Investment Plan (CIP) Development	8	Continue to progress alignment of CIP project scoping and scoring with TAM practices.	Management Services/All Departments	Completed for FY24-33 CIP Update, and ongoing

5.4 Governance and Accountability

5.4.1 TAM Action Committee

The TAM Action Committee (previously the TAM Steering Committee) will be restructured and reestablished on a permanent basis and will receive and review progress on the TAM Plan actions through regular meetings. The participants of the restructured TAM Action Committee will include:

- Director of Facilities, TAM Action Committee Coordinator
- Management Analyst
- Director of Capital Programs
- Director of Transit Development
- Operations Project & Contract Administrator
- Director of Contracted Services and Operational Analytics
- Director of Bus Maintenance
- Director of Rail and Facilities Maintenance
- Sr. Director of Technology Services
- Director, Technology Project Management Office
- Digital Services & Web Development Manager
- Safety Manager
- Risk Manager
- Sr. Manager, Security & Emergency Preparedness
- Director of Finance

The TAM Action Committee will, at a minimum, meet quarterly, around milestones that align with key decision points of HRT's TAM Annual Activities.

- Annual Kick-off (February)
  - Review CIP (constrained and unconstrained) – *Management Services (Foursquare consulting support)*
  - Review asset conditions and unconstrained SGR needs – *data from Transit Operations, Technology, Engineering and Facilities*
  - Determine if additional capital needs should be submitted the following year and data needed to support those needs – *data from Transit Operations, Technology, Engineering and Facilities*
  - Support any follow-up data needs to satisfy DRPT grant applications – *Management Services, Planning and Development*
  - Review major improvement actions from the TAM Plan, have responsible/accountable departments or individuals report progress and/impediments toward accomplishing improvement actions, and discuss any additional tasks or resources needed – *Whole Committee*
- Start Inventory Update (May)
  - Compile asset inventory from EAM and other sources – *data from Transit Operations, Technology, Engineering and Facilities*

- Review current inventory for gaps or inaccuracy – *Transit Operations, Technology, Engineering and Facilities*
- Determine major changes to inventory for the year – to ensure it is captured in update – *Transit Operations, Technology, Engineering and Facilities*
- Support inventory gathering/coordination efforts with departments (task out updates and actions) – *Planning and Development*
- Determine replacement costing approaches for critical assets based on current policies and procurements (e.g., fuel types for vehicles or technology changes) – *Transit Operations, Technology, Engineering and Facilities (Consulting Support as needed)*
- Ensure departments' engagement in capital programming inputs (i.e., Project Initiation Forms) – *Management Services (Foursquare consulting support)*
- Review major improvement actions from the TAM Plan, have responsible/accountable departments or individuals report progress and/impediments toward accomplishing improvement actions, and discuss any additional tasks or resources needed – *Whole Committee*

- Review Performance Targets and Capital Needs (August)
  - Review baseline performance results for prior fiscal year: facilities, vehicles, equipment, and infrastructure – *Transit Operations, Engineering and Facilities*
  - Confirm vehicle types, ULBs, and counts (align to NTD requirements) – *Transit Operations*
  - Review and confirm replacement and expansion plans for fleets and impact on next fiscal year targets – *Transit Operations*
  - Review and confirm facility renovation/rehab and expansion plans and impact on next fiscal year targets – *Engineering and Facilities*
  - Review and confirm infrastructure plans, including CIP-related shutdowns, and impact on next fiscal year targets – *Transit Operations*
  - Align upcoming capital needs submissions to asset condition and performance outcomes – *Planning and Development, Transit Operations, Engineering and Facilities*
  - Approve targets for MPO and FTA reporting – *Senior Executive Team (SET) and CEO*
  - Reminder of NTD reporting requirements to relevant departments and upcoming coordination – *Planning and Development*
  - Review major improvement actions from the TAM Plan, have responsible/accountable departments or individuals report progress and/impediments toward accomplishing improvement actions, and discuss any additional tasks or resources needed – *Whole Committee*
- Streamline NTD Reporting (October)
  - Prior to meeting – submit all A form data to Planning & Development – *Transit Operations, Engineering and Facilities*
  - Review compiled A form data, performance targets, and narrative report – *Planning and Development, Transit Operations, Engineering and Facilities*
  - Update/modify A form data as needed – *Planning and Development*
  - Discuss prior FTA comments/issues to ensure they will not be repeated in the current year's submission – *Planning and Development*
  - Review major improvement actions from the TAM Plan, have responsible/accountable departments or individuals report progress and/impediments toward accomplishing improvement actions, and discuss any additional tasks or resources needed – *Whole Committee*

The TAM Action Committee will use these meetings to track the progress made (or not yet made) against each of the TAM Annual and Improvement Activities established in the updated TAM Plan and make any adjustments as necessary. The quarterly meetings will also ensure that TAM program is being provided the adequate resources to succeed, which will allow HRT to address changing responsibilities for reporting and coordination and applying any new or updated information technology to existing asset datasets. The committee can address the resources needed to implement each action and supply additional resources as needs are identified.

5.4.2 Resource Plan: Capital

The FY2023-FY2032 CIP lays out the capital expenditures HRT will make to prioritize SGR needs over the next 10 years (see **Section 4.4**). Critical items in the CIP address the replacement of ferry and non-revenue vehicles, replacement construction of the new Virginia Beach Maintenance Facility, and the continuing implementation of the Trapeze EAM system.

5.4.3 Resource Plan: Staffing

HRT should have a clear understanding of the staff responsibilities for carrying out the Annual and Improvement Activities planned for the TAM program. To facilitate and support the communication of these responsibilities, HRT has developed a Responsible, Accountable, Consulted, and Informed (RACI) matrix, which establishes and assigns the necessary level of involvement from staff members for each of the TAM Activities. A RACI matrix denotes the level of involvement using letter codes, defined as:

- **R = Responsible** – This staff member does the work to complete the task. Every task needs at least one Responsible party, but it's okay to assign more.
- **A = Accountable** – This staff member delegates work and is the last one to review the task or deliverable before it's deemed complete. On some tasks, the Responsible party also may serve as the Accountable one.
- **C = Consulted** – Every deliverable is strengthened by review and consultation from more than one staff member. Consulted parties are typically the people who provide input based on either how it will impact their future project work or their domain of expertise on the deliverable itself.
- **I = Informed** – These staff members simply need to be kept in the loop on project progress, rather than roped into the details of every deliverable.

Table 5-3 presents the roles and responsibilities to support implementing the TAM Plan. This updated approach to resourcing the TAM program expands the number of HRT staff consulted or informed about various activities to gain input from asset owners and key stakeholders. Asset owners include Engineering & Facilities, Transit Operations, and Technology.

Table 5-3: Proposed RACI Matrix for HRT's TAM Activities by Organizational Unit

	Executive			Planning and Development		Finance			Operations					Engineering and Facilities			Information and Technology			Safety	TRAFFIX
	Deputy Chief Executive Officer	Management Analyst, TAM Action Committee Coordinator	Director of Capital Programs	Chief Planning and Development Officer	Director of Transit Development	Chief Financial Officer	Director of Finance	Director of Budget and Financial Analysis	Chief Transit Operations Officer	Operations, Project, and Contract Administrator	Senior Manager of Materials and Rail Vehicles Maintenance	Director of Maintenance	Operations Data Analyst	Chief Engineering and Facilities Officer	Director of Facilities	Executive Assistant Engineering and Facilities	Chief of Information and Technology Officer	Manager, Technology Project Management Office	Director of Technology Services	Chief Safety Officer	TTRAFFIX Program Specialist
Asset Inventory Update																					
Inventory		I			R/A				C	R	R	C	R	C	R	R		C			R
AIM Reporting		I			R/A				C	R	R	C	R	C	R	R		C			R
Condition Assessment																					
Facilities		I													R/A			I		C	
Vehicles		I								R/A	R/A							I		C	
Fixed Guideway		I													R/A			I		C	
Capital Programming																					
Needs Forecasting	A	I	R	C	C	I	I	I		C	C	C		C	C		C	C	C	C	
Investment Prioritization	A	I	R	C	I	C	I	I	C	I	I	I		C	I		C	I	I	C	
Revenue Forecasting	C	I	R	I	I	C	C	R/A						I			I			I	
Budget Development	R/A	I	R	C	I	C	C	R	C	I	I	I		C	I		C	I	I	C	
DRPT Grant Application	A	I	R	C		C	C	C	C					C			C			C	
Performance Targets Update		I			A					R	R				R					I	
Narrative Report on Performance Targets		I			R/A					C	C	C			C	C					
MPO TAM Coordination		I			C										R/A						
Assess TAM Program	A	R	C		C		C			C	C	C			C			C			
TAMP Update		R	C		C			C		C	C	C			R			C	C	C	

6. Evaluation and Continual Improvement

This section summarizes the Evaluation Plan, which is a management tool for HRT to continue to monitor, evaluate, and update the TAM program. The plan outlines and guides how HRT will continue to maintain the TAM activities and evaluate the progress of achieved based on the updated TAM Plan. This section also identifies and describes the performance metrics and processes to be used to document progress and/or completion of an activity, including those required by FTA. The contents of this section address FTA TAM Element 9.

HRT will conduct an annual review of performance measures and progress against Annual and Improvement Actions to track the successful implementation of the TAM Plan and consequently, advance the maturity of the agency's TAM program. Necessary review and update to the TAM documents and/or the performance measures will follow the continual improvement approach of:

Plan – plan for improvement activities and set performance targets (such as this TAM Plan)
Do – execute the annual TAM activities
Check – review the outcomes of the TAM activities to determine their impacts; reviews could include gap assessments (to determine what was missed), performance modeling, or lessons learned from project improvements
Act – capture improvements and document the new baselines for these activities; leverage lessons learned in the TAM Plan for the next four years

Figure 6-1: Plan-Do-Check-Act Process

To some extent, HRT has begun implementing continual improvement processes based on the PDCA approach by establishing annual activities and processes design to meet the NTD requirements to monitor performance and set targets. In addition, the annual CIP development process continues to evolve over time to more closely align with HRT's strategic planning and TAM policies.

HRT executives and senior management continue to play key roles in shaping the goals and objectives of the TAM Plan and set performance targets to help evaluate the agency's progress. In future revisions to this TAM Plan, HRT staff and leadership will continue to review, evaluate, and approve changes to ensure that the TAM Plan aligns with key changes to HRT's organizational strategies, strategic plans, and significant new initiatives.

As required by the FTA, HRT will continue to review and revise the TAM Plan at least every four years. The updates will require input from various internal and external stakeholders (e.g., staff and funding partners, respectively). Internal input will be sought out and reviewed by the TAM Action Committee, and external stakeholder involvement will be sought out and coordinated through a variety of means. HRT will strive to move toward better asset performance, risk reduction, and agency cost savings with each revision of the TAM Plan.

6.1 Communications and Change Management

The successful implementation of asset management activities and processes requires effective communication that allow people to clearly understand and adopt changing processes and help bridge the gaps that exist among the many departments and offices in HRT's organization. This effort should encourage ongoing dialogue, implement frequent evaluation and monitoring of progress, and facilitate effective change management.

Change management is an active process used to build awareness, enlist participation of key stakeholders, implement necessary changes, and sustain the change over time to achieve asset management goals. When specifically dealing with business process change, it is important for the responsible parties to identify and agree to the change to be implemented.

A common approach for change management is represented by the Awareness, Desire, Knowledge, Ability, and Reinforcement (ADKAR) acronym, which is a useful aid for understanding and promoting organizational change.

Figure 6-2: ADKAR Approach to Change Management

As change management requires first communication, particularly across organizational silos, the most important action in this TAM Plan is the regular meeting of the TAM Action Committee. This forum will facilitate the Evaluation Plan activities and also reinforce the clear communication of roles and responsibilities across the organization (based on the RACI matrix in **Section 5**). This feedback loop will be an essential part of how the successes and challenges of the plan will be monitored and evaluated going forward.

6.2 Stakeholder Involvement

Efficient management of HRT's transit assets depends on not only HRT employees, but also on a variety of external stakeholders, partner jurisdictions, elected/appointed officials, customers/community, regulators, and vendors all have their own expectations from the system.

- Customers/community: HRT's values its customers who use its service. HRT customers depend on transit to access employment, education, healthcare, shopping, and entertainment. In addition, HRT customers need to trust that the equipment and operators will get them to their destinations safely. When a customer is injured due to infrastructure or equipment failure, HRT risks losing its most important stakeholder.
- Partner jurisdictions: HRT depends to a large degree on its federal, state, and local partners for funding. As such, it must collaborate very closely with these partner jurisdictions, especially with respect to communicating current and future reinvestment needs.
- Planning Partner: The Hampton Roads Transportation Planning Organization (HRTPO) is the regional planning organization for transportation. HRTPO is legislatively empowered to authorize the use of federal funds on transit projects and since the institution of MAP-21 is also required to coordinate its SGR performance measures with HRT and all other local operators in the region.
- Regulators: Through rulemaking and oversight, the FTA, U.S. Environmental Protection Agency, Virginia Department of Environmental Quality, Hampton Roads Sanitation District, Occupational Safety and Health Administration, and other agencies all directly influence how HRT's transit assets are managed.
- Vendors: The performance and pricing of service providers, contractors, consultants, material suppliers, and other vendors directly affect HRT's ability to deliver projects on-time and on-budget. Issues with vendor performance and/or pricing may have a profound impact on the performance of the transit system at large.

6.3 Performance Monitoring

As part of the annual review process, HRT will review associated performance reporting and measures to identify progress against the plan's key activities. This review should also deliver insight into possible improvements for objectives, strategies, and projects/actions for future iterations of this TAM Plan. Monitoring activities to be carried out on a regular basis include the following:

TAM Action Committee: As described in **Section 5**, the executive- and management-level asset management oversight committee will be reestablished and maintained on a permanent basis. Leveraging the planned quarterly meetings as the primary platform, this committee shall review and monitor the completion of the required TAM Annual Activities, receive and review progress reports regarding the plan, and make recommendations for any change in course. The TAM Action Committee will also assign or execute relevant Improvement Activities following and implementing the PDCA approach to facilitate the continual improvement and progress of the agency's TAM program.

Performance measures: For the SGR performance measures detailed in **Section 3**, HRT will review annual performance, evaluate baseline conditions, and set targets based on available resources. This process will be captured in the annual Narrative Report submitted to NTD.

HRT also collects operational data to measure and improve performance. Many of these measures touch on asset management issues, either directly or indirectly. The following are performance measures that HRT tracks and reports on as part of its ongoing performance management process, each measure is aligned with HRT's strategic goals:

- Ridership by mode
- Preventable accidents per 100,000 miles
- Valid complaints per 100,000 passenger trips

- Farebox recovery percent
- Mean distance between service interruptions
- On-time performance (bus)

HRT reviews these performance outcomes regularly and makes results available publicly on the agency website.

6.4 Training

Integrating asset management principles into the larger culture of HRT requires training staff in multiple roles and at many levels in different aspects of asset management to provide them with the Ability (the second A in ADKAR) to deliver change. As part of its commitment to accomplishing the actions detailed in this plan, and to continually improving its asset management implementation, HRT will provide training resources to the appropriate personnel in the necessary aspects of asset management, including the theory behind it, creation of asset management plans, and use of the asset management software applications.

To obtain these resources, it will be recommended that key staff from HRT asset owner departments attend the National Transit Institute's (NTI's) Transit Asset Management courses including NTI TAM 101 (Introduction to Transit Asset Management) and/or NTI TAM 201 (Enhancing Your Transit Asset Management Program with Lifecycle Management).

Engagement in peer forums, such as the biennial Transportation Research Board (TRB) Transportation Asset Management Conference and the FTA's TAM Roundtable also would benefit HRT's staff in learning from peer agencies and industry best practices.

Last but not least, HRT is implementing and launching a new Trapeze EAM system. The successful implementation and use of the EAM system across the agency will improve the quality of asset data and information, which will further improve the effectiveness of HRT's TAM Program. As such, training of HRT staff in the effective use and implementation of the EAM system will be an important resource for the continual improvement of HRT's TAM Program.

6.5 Future TAM Plan Revisions

While the TAM Plan must be revised every four years at a minimum, certain actions [such as, the opening of a new facility that was not addressed in the plan, a natural disaster that significantly affects the agency's assets, a significant adoption of new technology (e.g., Zero Emission Bus fleet transition), or a major increase/decrease in the agency's funding levels] may justify a revision prior to the 4-year deadline. In the event of an early revision, TAM Action Committee will submit a revision to the CEO for their approval.

6.6 Conclusion

In this updated TAM Plan, HRT has further defined its Asset Management Policy, detailed the current assets of the agency and their condition, outlined steps to improve the maturity of asset management throughout the agency, and committed to continually evaluating HRT's progress with the goal of improving performance over time. As projects are implemented and evaluations take place, this plan will be adjusted and revised to reflect lessons learned and progress made. Ultimately, HRT's progress with asset management will be realized through cost savings and greater reliability from focusing on a lifecycle planning curve and an asset inventory maintained in a better condition each year.