

Capital Needs Inventory (CNI)

2023 Annual Report

(Transportation Article §7-309)

A Report to the Maryland General Assembly

Senate Budget and Taxation Committee, House

Appropriations Committee, and House Environment

and Transportation Committee

MSAR # 13865

January 2024

Maryland Department of Transportation

Maryland Transit Administration

Introduction

The Maryland Transit Administration (MTA) Capital Needs Inventory (CNI) was updated and published in July 2022 to assess MTA's ongoing unconstrained capital needs over a 10-year period, as required by §7-309 of the Transportation Article, Maryland Annotated Code. It presents a snapshot from MTA's ongoing transit asset management analyses and annual call for projects process and is intended to support improved decision-making regarding the maintenance and enhancement needs of MTA's transit assets over the long term. The 2022 CNI highlights MTA's progress in reducing its State of Good Repair backlog by prioritizing State of Good Repair investments since 2019.

Capital needs may include, but are not limited to, the costs to maintain assets in a state of good repair; meeting existing or new regulatory requirements; investing in transit infrastructure, assets, or service enhancements; and modernizing or adapting to new technologies or new mobility options.

By law, the CNI is updated at least once every three years and submitted to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee.

In addition, this CNI Annual Report was prepared to meet the requirements of §7-309 of the Transportation Article, Maryland Annotated Code, as amended under Chapter 11 of the 2021 Special Session. The language states:

On or before January 20, 2022, and on or before January 20 each year thereafter, the Administration shall, in accordance with § 2–1257 of the State Government Article, submit an accounting of the capital funds programmed, appropriated, and expended on each of the projects identified in the assessment required under subsection (A) of this section for the prior fiscal year to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee.

Further details of the CNI requirements are provided in the Appendix.

The 2022 CNI presented the conclusion that the availability of additional funding since 2019 had provided MTA the resources to reduce the backlog of State of Good Repair needs, as programmed at that time. Multiple state and federal funding sources continue to be programmed to help address State of Good Repair needs; however, a shortfall in Transportation Trust Fund (TTF) revenues has reduced funds programmed in the current draft FY 2024-2029 MDOT Consolidated Transportation Program (CTP) and therefore impacted the projected progress toward meeting CNI needs. MTA continues to invest available resources in alignment with CNI identified needs and prioritizing safety critical projects across modes through projects including:

- Eastern Bus Division reconstruction as a fully electric bus facility
- Metro fleet and train control replacement program
- Zero-emission bus (ZEB) infrastructure at Kirk and Northwest Bus Divisions
- Light rail vehicle mid-life overhaul
- Light Rail Traction Power substations and 5kV power system
- Metro station rehabilitation and lighting program
- Locally Operated Transit Systems (LOTS) program
- MARC passenger and locomotive overhauls

- Bush Division boiler replacement
- Wabash Shop equipment upgrades
- Elevators rehabilitation
- Bus shelters and transit priority treatments
- Agencywide rail maintenance of way improvements

MTA continues to aggressively apply for competitive grants to leverage available state funds and was awarded a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to fund improvements to the Mondawmin Transit Station and surrounding area including making station enhancements, reconstructing nearby intersections with complete streets enhancements, improving pedestrian facilities, upgrading ADA access, energy storage generation and stormwater management infrastructure improvements. Additionally, MTA is moving forward to execute its recent RAISE grant award for Baltimore Penn Station Connections which will improve multimodal access to the redesigned and soon to be expanded station and has advanced design on its RAISE East-West transit priority project.

MTA also secured grant funding for the Penn Camden Connector, to create a connection between the MARC Penn and Camden Lines, allowing additional flexibility for MARC operations, as rolling stock can access maintenance yards or be transferred between lines without having to go all the way to Washington Union Station. MTA and the City of Baltimore collaborated to pursue and win a Rail Crossing Replacement grant to study and recommend short term improvements to the Warner Street rail crossing.

Methodology

MTA's investment needs are organized into two major categories, State of Good repair needs and enhancement needs.

State of Good Repair needs are capital investment needs associated with existing assets and ongoing or periodic investment required to maintain or achieve a state of good repair. The Federal Transit Administration (FTA) defines State of Good Repair as "the 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 safely perform its designed function;
2. Does not pose a known unacceptable safety risk; and/or
3. Its lifecycle investments have been met or recovered.

Enhancement needs are new capital investments in transit infrastructure, assets, or service enhancements that support achievement of the agency's strategic priorities as well as current or future service demand. Enhancement needs may also include investments to upgrade, modernize, or adapt the system to new requirements, technologies, or new mobility options.

While investments on enhancement are often perceived as new assets, they also may include safety and environmental improvements or actions to protect existing assets. For example, new capital investments were needed to implement positive train control systems and meet the Positive Train Control Enforcement and Implementation Act requirements by December 31, 2018. Similarly, to meet the new Total Maximum Daily Load (TMDL) requirements from the Environmental

Protection Agency (EPA), new assets also will be needed to comply and realize environmental benefits.

MTA's 2022 CNI is organized by the following transit asset categories that align with FTA reporting requirements:

- Vehicles – including revenue (bus, railcar, and van) and non-revenue fleets (trucks, steel wheel vehicles, sedans, etc.)
- Guideway – including track and structures (e.g., bridges, tunnels, viaducts, fencing, retaining walls, etc.)
- Systems – including electrification (traction power and distribution), train control, utilities (drainage, lighting, and ventilation), fare collection, fire and life safety, communications, and security systems
- Facilities – including maintenance facilities (e.g., major shops, storage yards) and administrative facilities
- Stations – including passenger stations, parking lots and garages, and major transfer centers or bus loops

Programmed funds are detailed in the six-year CTP for MTA projects and devoted to a specific project.

Expended funds are the actual amounts spent on each project within a given fiscal year. Expenditures are adjusted throughout the course of a year as work progresses.

To compare the amount MTA programmed for FY 2023, the final CTP was categorized by State of Good Repair or Enhancement projects and by asset category for each fiscal year. Where a project impacts multiple asset categories, the amount programmed in the CTP for that fiscal year was divided among the relevant asset categories.

The CTP is a six-year program that is adjusted annually to reflect changes in project cash flows and new need. Future-year cash flows in the CTP also are adjusted to reflect more precise planning and procurement timelines as implementation of projects become more concrete. Project cash flows within the CTP are adjusted based on expected project progress and, therefore, the final CTP in each relevant year was used to calculate the programmed amounts.

Line items for Purple Line, Locally Operated Transit Systems (LOTS), and Freight are excluded from this analysis. These items in MTA's section of the CTP are not included in the needs required or reported through the 2022 CNI. Therefore, they do not align to MTA's capital needs in the context of this report.

Similarly, the total actual expenditures from fiscal year 2023 were used to determine the expenditures against projects in the CTP. Actual expenditures reflect a range of circumstances affecting project progress and cost, with some variation expected from projections. The actuals are categorized using the same classifications and methods noted above for programmed funds.

Overview of 2022 CNI Outcomes

All references in this document to CNI results are from the 2022 CNI report.

2022 CNI – 10-Year Capital Needs

Between 2022 and 2031, MTA’s total capital needs are expected to reach more than \$6.3 billion in year-of-expenditure (YOE) dollars, including an annual inflation rate of 3 percent. The largest category of total needs over the 10-year period is vehicles (34 percent). Systems comprise the next-largest category of total needs (20 percent), followed by guideway (18 percent), stations (15 percent), and facilities investments (13 percent). These asset categories follow the Federal Transit Administration’s (FTA) hierarchy for transit assets.

State of Good Repair needs for MTA’s current asset inventory drive 81 percent of total needs. Enhancement needs to meet system performance goals as well as current and future service demand make up 19 percent of total needs over the 10-year period (see **Figure 1**).

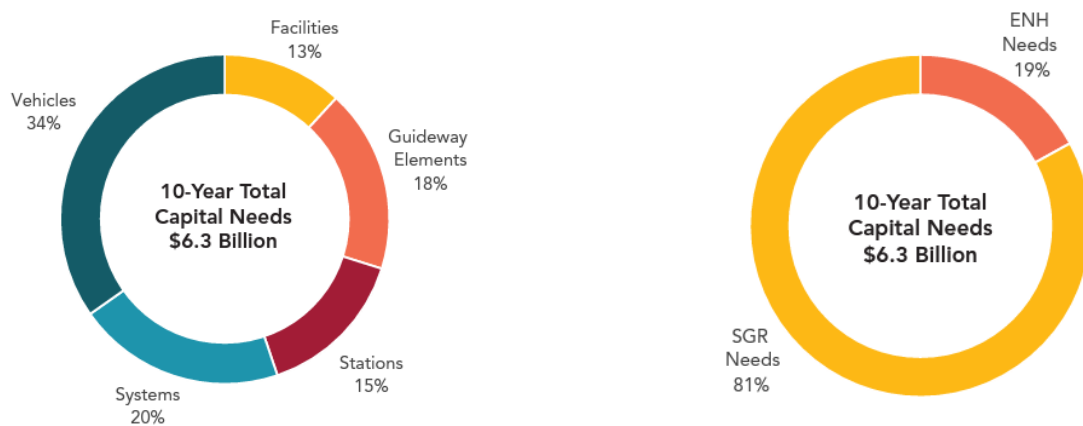


Figure 1: 2022 CNI Summary of Total 10-Year Capital Needs (Year of Expenditure \$)

State of Good Repair and Enhancement needs are further divided by asset category, as shown below in **Figure 2**.

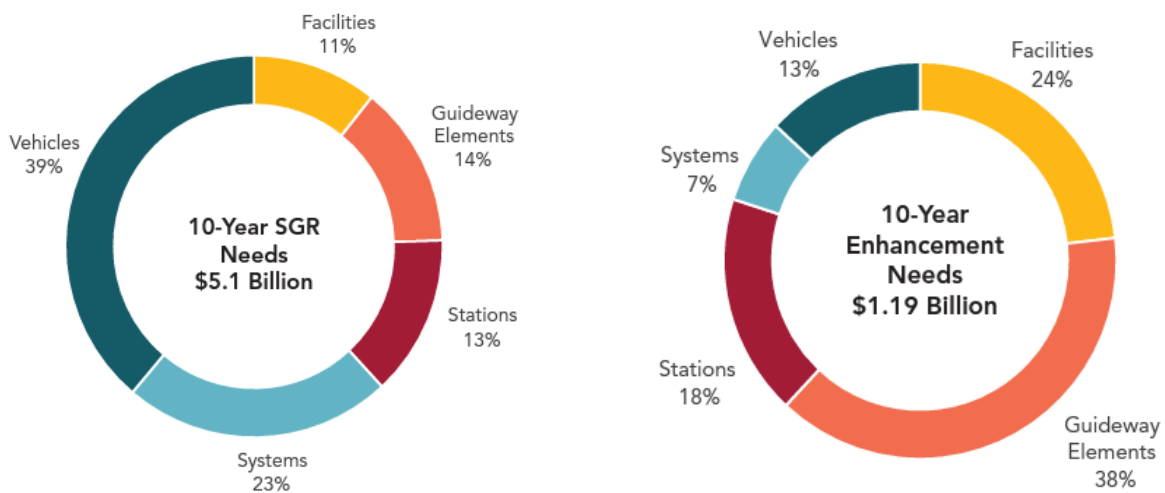


Figure 2: 2022 CNI State of Good Repair and Enhancement Needs by Asset Category

2022 CNI – State of Good Repair Backlog

The State of Good Repair backlog is the cumulative dollar value of deferred capital reinvestment and replacement needs, including for those assets that may have surpassed their expected useful life. The State of Good Repair backlog value represents the total amount of capital funding it will take at any given time to bring an agency’s assets into a state of good repair. Nationally, the State of Good Repair backlog for transit is estimated at nearly \$100 billion, a majority of which is associated with the legacy (aging) transit systems in the United States.

MTA’s State of Good Repair backlog from the 2022 CNI was estimated at \$1.8 billion in 2021 dollars. As shown in **Figure 3**, this backlog includes about \$311 million in facilities, \$163 million in guideway assets, \$526 million in systems assets, \$477 million in vehicles, and \$343 million in station assets.

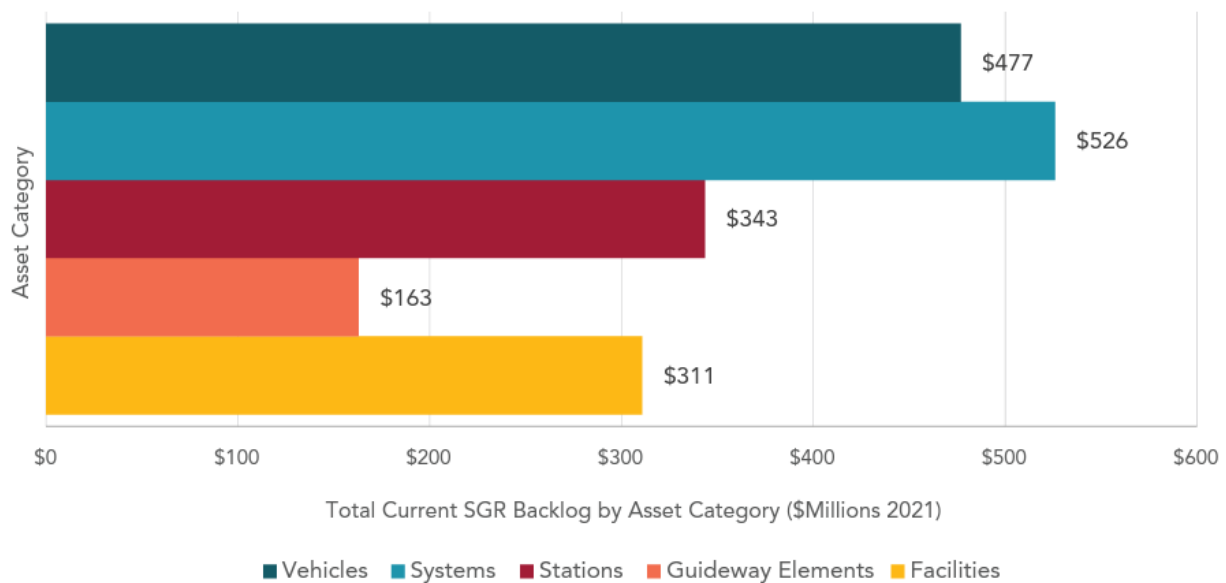


Figure 3: 2022 CNI State of Good Repair Backlog by Asset Category (\$2021)

2022 CNI – Funding Gap

The 2022 CNI report, covering 2022 to 2031, highlights MTA’s progress in reducing a State of Good Repair backlog from 16.2% percent of all assets to 14.4 percent over the past three years. Expected levels of state and federal funding were expected to reduce that number to 5.4 percent by 2027 and 1.3 percent by 2031 – meeting 98 percent of needs. The 2022 CNI analysis identified a shortfall in funding of about \$892 million over 10 years to address MTA’s needs (see **Figure 4**). MTA prioritizes safety-critical needs and leveraging technology, practical design, partnerships, shared mobility solutions, and discretionary grants to extend dollars and achieve enhancements.

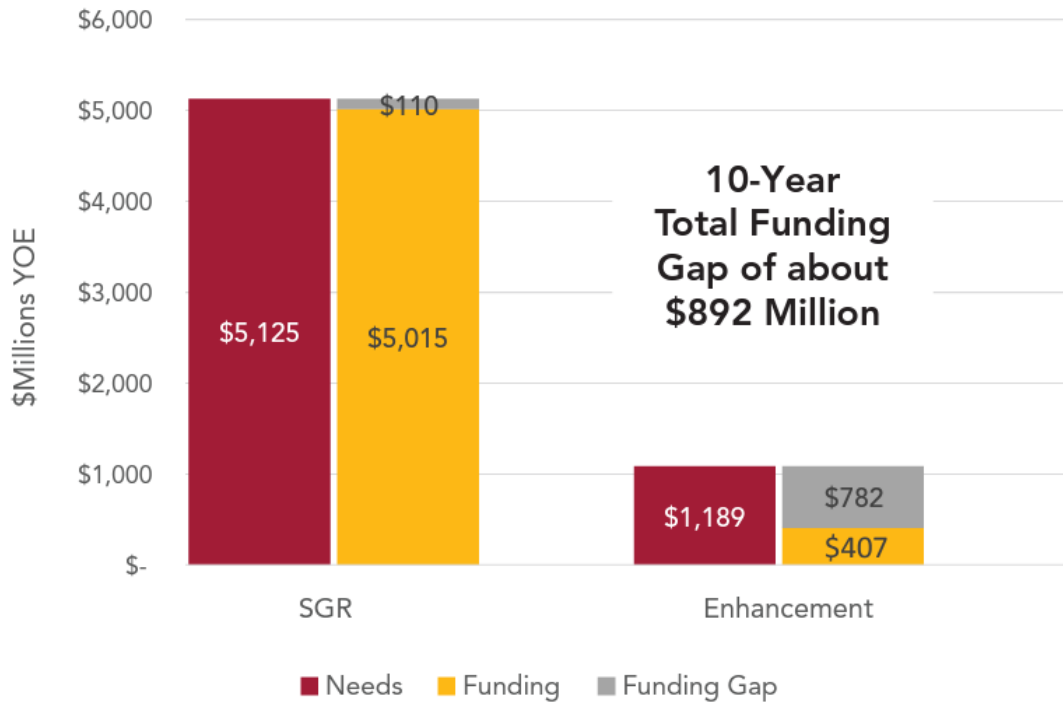


Figure 4: 2022 CNI 10-Year Total Capital Needs vs. Total Capital Funding Forecast (2022 to 2031, \$ Millions YOY)

Annual Results

2023 – SGR Backlog and Funding Gap

Since the publishing of the 2022 CNI Report, the forecast for the SGR backlog for MTA has changed. The forecast is heavily dependent on future year funding, which has been reduced in the current version of the FY 24 to FY 29 CTP, due to the Transportation Trust Fund (TTF) not generating as much revenue as previously anticipated and operating cost increases further reducing funding available for capital investments. In Figure 5 below, which shows the projection as of the 2022 CNI, the SGR backlog was projected to be fully eliminated by 2034. This would mean that with the previous funding projections, MTA expected to reach and maintain a state of good repair for all its assets by that year. However, as detailed in Figure 6 with current funding levels, the backlog will largely be held at steady levels through 2043, indicating no improvement in the agency’s overall state of good repair over the next 20 years. In addition to the reduced future funding projections, the current SGR backlog has increased significantly due to challenging industry conditions in the wake of the COVID-19 pandemic, which have slowed replacement of key assets and increased replacement costs due to high inflation. Between Q4 2020 and Q1 2023, the National Highway Construction Cost Index shows a 50% increase in construction costs.

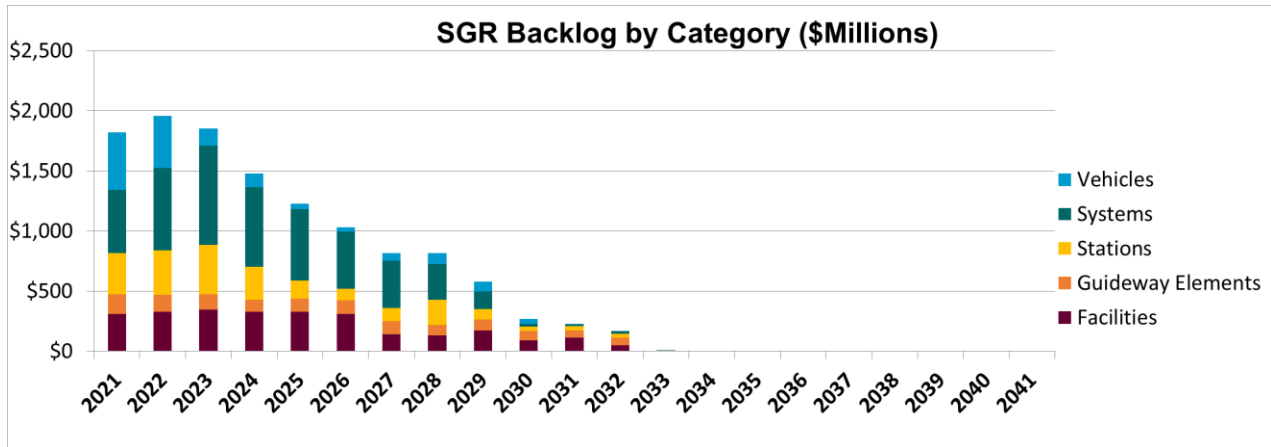


Figure 5: SGR Backlog Projections by Category (\$ Millions) as of 2022 CNI Publishing

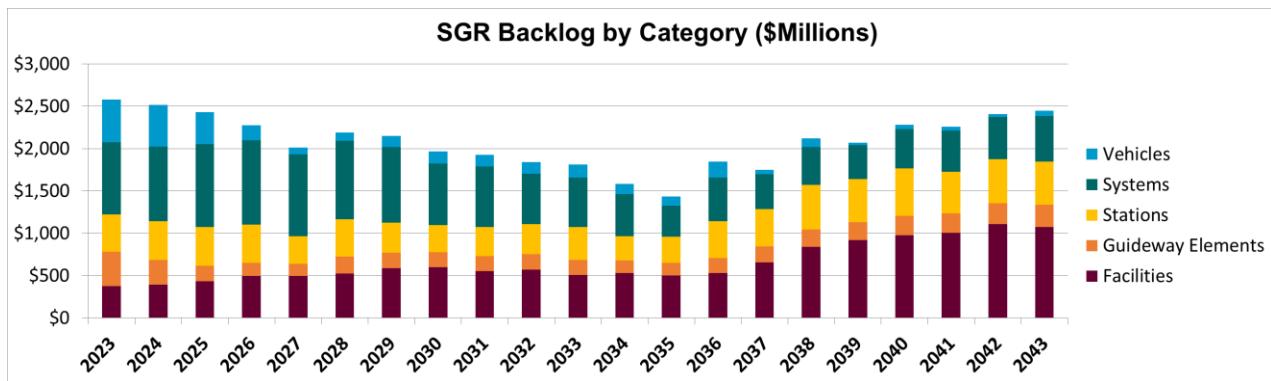


Figure 6: SGR Backlog Projection by Category (\$ Millions) as of December 2023

2023 – Programmed Projects and Expenditures

MTA’s focus on addressing the high-priority State of Good Repair backlog is reflected in the high percentage of programmed funds for State of Good Repair needs in the CTP, with a smaller proportion programmed for Enhancement needs. The funds programmed for Enhancement needs has increased slightly in 2023 due to the successful capture of competitive grants to support those projects. MTA always prioritizes funding and implementation of safety-critical projects and continues to program a majority of the CTP to prioritize State of Good Repair needs and the backlog of deferred maintenance.

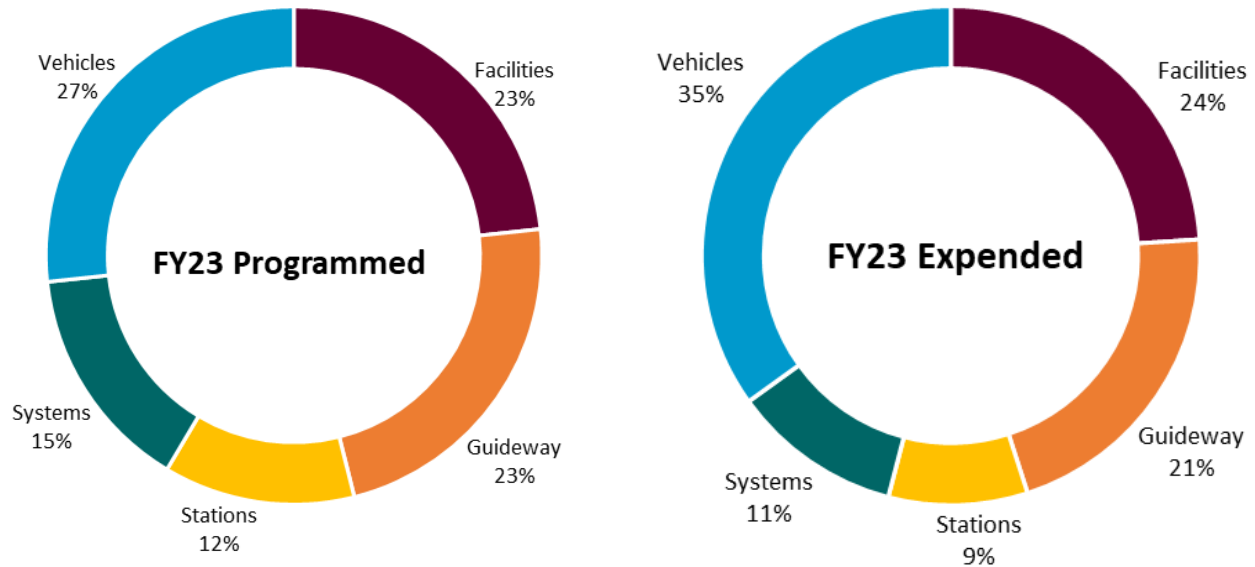


Figure 7: FY23 Programmed and Expended MTA funds by Asset Category

The total programmed and expended funds by asset category from FY 2023 are shown above in Error! Reference source not found.. These values show that MTA has been investing in line with the needs and priorities from the 2022 CNI report, where the highest-priority needs are in vehicles, guideway, and facilities. Addressing trackwork needs under Guideway has been a high-priority area of investment to ensure safe and efficient transit service.

Many of the needs identified in MTA’s State of Good Repair backlog in 2022 were funded partially funded in the CTP, including, but not limited to:

- Replacement of diesel buses with ZEB vehicles
- Multiple segments of Light Rail and Metro trackwork
- Light Rail revenue vehicle overhauls
- MARC III coach minor vehicle overhaul (63 railcars)
- MARC IV railcars and truck components overhaul
- MARC multilevel railcars overhaul or replacement (60 railcars)
- MARC GP39 locomotive overhaul (6 locomotives)
- Metro railcars and train control system
- Mobility revenue vehicle replacement
- Light Rail interlocking, train control, and catenary systems
- Agencywide radio system upgrades
- Light Rail traction power system upgrades
- Agencywide maintenance facility and station roof replacements
- Light Rail repair to bridge and warning signs structures

In addressing the backlog, MTA prioritizes safety-critical projects to ensure safe operation of the system (e.g., railcar, track, and signaling reinvestment needs are considered higher priority than farebox equipment replacement).

The detailed values in Error! Reference source not found. below summarize the programmed and expended values for State of Good Repair and Enhancement projects, respectively, for MTA

projects for FY 2023. Consistent with the entire report, these values exclude LOTS, Freight, and Purple Line values.

Table 1: FY2023 Programmed vs. Expenditures

Asset Category	FY23 SGR Programmed	FY23 SGR Expended	FY23 Enhancement Programmed	FY23 Enhancement Expended
All Categories	\$483,558,355	\$275,112,636	\$59,101,122	\$30,118,418
Facilities	\$98,600,589	\$52,723,210	\$27,842,989	\$20,417,559
Guideway	\$115,794,800	\$63,264,202	\$7,826,829	\$1,031,630
Stations	\$55,294,678	\$23,606,111	\$12,385,847	\$3,950,675
Systems	\$75,030,421	\$31,118,965	\$5,085,299	\$2,519,324
Vehicles	\$138,837,866	\$104,400,148	\$5,960,158	\$2,199,230

During the capital programming process, MTA has the flexibility to move funds between fiscal years within the CTP to address projects where expenditures are accelerating or lagging. Programmed funds can therefore be moved between years to adjust to the reality of project delivery and new needs as they arise or past needs that were deferred. Challenging industry conditions in the wake of the COVID-19 pandemic significantly delayed expenditures on multiple projects in FY23 through high and unpredictable inflation causing procurement delays, disrupted supply chains, staffing shortages, and price increases for materials.

MTA has also been working to improve organizational capacity to deliver an increased pipeline of project. This includes adding three new positions to the Office of Procurement and creating the Program Management Oversight Office that is responsible for bundling projects and identifying efficiencies. In Fall 2023, MTA began working with an external expert to review the project development process and make recommendations on additional organizational capacity improvements.

To reduce the impacts on customers, projects have been bundled together to create efficiencies and minimize or eliminate service disruptions. The process of efficiently scoping projects has been reinforced in the continuous improvement of the annual funding processes and establishment of MTA’s Program Management Oversight Office.

In FY23, many State of Good Repair and Enhancement needs have been met including replacing and modernizing stations and maintenance facilities and adding numerous new assets to benefit riders, such as additional shelters and real-time information technology. Key completed investments are detailed in **Table 2**.

Table 2: FY2023 Completed Investments

Project	Description
Fast Forward Customer Experience Enhancements	The Fast Forward program continued providing customers new shelters, wayfinding, ADA improvements, and a high-quality transit experience.
Bus Fleet Replacement	MTA onboarded an additional 70 buses in FY23, which allowed older buses to be retired, which in turn will increase reliability for the fleet. This will improve customer experience by ensuring more buses are available for revenue service.
MARC Train Riverside Heavy Maintenance Building	Construction of a new heavy maintenance facility at Riverside Yard was completed in January 2023. This facility gives MARC the ability to independently operate and perform heavy vehicle maintenance, allowing for increased flexibility and efficiency.
Metro and Light Rail Maintenance of Way	Various track segments of the Metro and Light Rail systems have been rehabilitated, including repairs of the Pepper Road and Timonium Business Park grade crossings.
Metro Railcar and Train Control System	MTA advanced the installation of a new state-of-the-art train control system for Metro and replacement of the railcar fleet. The first test railcar arrived in Baltimore in September 2023.
MARC Train Locomotive and Coach Overhauls	MARC Train is currently performing overhauls to 6 GP39 Locomotives and 63 MARC III Coach railcars to ensure reliable commuter rail service for customers.
Light Rail Vehicle Mid-Life Overhauls	The mid-life overhaul of light rail vehicles advanced significantly with 48 of 53 vehicles completing overhaul through December 2023. The overhaul includes rehabilitating or replacing many major systems and components of each rail vehicle in order to attain the full useful life of the vehicles.

Through these efforts, MTA will continue to sustain a safe and reliable transit service to Maryland’s communities. As additional funding opportunities become available, particularly through the federal Bipartisan Infrastructure Law, MTA will continue to address the funding gap to advance safe, reliable, easy to use transit.

Conclusion

Investment continues to be consistent with MTA’s asset management program and the needs identified in the 2022 CNI. However, reduced funding levels compared to 2022 CNI projections associated with the TTF shortfall will significantly slow progress in reducing SGR Backlog.

While MTA has made significant progress in reducing the SGR Backlog, additional organizational capacity is needed to grow the ability of the agency to deliver the size of capital program needed. MTA has engaged an external expert to assist with recommendations and future reports will include progress towards implementing those recommendations.

MTA has made significant investments in guideway, facilities, stations, and vehicles, addressing priority State of Good Repair needs including Light Rail and Metro trackwork, replacement of buses and Mobility vehicles, and MARC vehicles and maintenance facilities. MTA continues to progress the high-priority replacement of Metro railcars and the related signaling system through the current CTP. MTA also has worked collaboratively with funding partners and the industry to leverage new sources of funding and new technologies to improve the delivery of the capital program. Since 2019, MTA also has continually improved its transit asset management program, which has generated more accurate asset information and more closely aligned capital investments with the agency's strategic goals. Additionally, the Central Maryland Regional Transit Plan (RTP) and the MTA Strategic Plan: Rebuilding Better, have been adopted and are guiding the capital investment priorities.

Appendix

CNI Requirements

Table A outlines the requirements for preparing, maintaining, and monitoring the CNI, as defined in Maryland State Law, Chapter 352 (as amended under Chapter 11 of the 2021 Special Session). The requirements under Subsections 7-309(A)-(C) were met by the development of the *MTA CY2022-CY2031 10-Year Capital Needs Inventory & Prioritization* (2022 CNI), which drew upon MTA’s 2021 state of good repair analyses as part of its annual transit asset management planning process in addition to its 2021 call for projects results.

Subsection 7-309(D) was part of the 2021 amendment of Chapter 352 will be met by the development of this report.

Table A: Summary of 2019 Capital Needs Inventory Requirements

Chapter 352 Ref.	Requirement	Strategy for Compliance
7-309 (A)	The Administration shall, at least every 3 years, assess the ongoing, unconstrained capital needs of the Administration	MTA’s 10-Year CNI, established the CNI by July 1, 2022
7-309 (B)	In undertaking the assessment required under subsection (A) of this section, the Administration shall:	
7-309 (B)(1)	Compile and prioritize capital needs without regard to cost	2022 MTA’s 10-Year CNI Section 5.2, Prioritization
7-309 (B)(2)	Identify the backlog of repairs and replacements needed to achieve a state of good repair for all Administration assets, including a separate analysis of these needs over the following 10 years	2022 MTA’s 10-Year CNI Section 3, State of Good Repair needs, for forecasts over the next 10-year period; State of Good Repair needs are prioritized under Section 5.2
7-309 (B)(3)	Identify the needs to be met in order to enhance service and achieve system performance goals	2022 MTA’s 10-Year CNI Section 4, Enhancement Needs, for forecasts over the next 10-year period; Enhancement needs are prioritized under Section 5.2
7-309 (C)	On or before July 1, 2019, and on or before July 1 every 3 years thereafter, the Administration shall, in accordance with § 2-1246 of the State Government article, submit the assessment required under subsection (A) of this section to the Senate Budget and Taxation Committee, the House	2019 MTA’s 10-Year CNI Section 1.2 describes the purpose of the CNI and review cycle; refer to signature page for submission details

Chapter 352 Ref.	Requirement	Strategy for Compliance
	Appropriations Committee, and the House Environment and Transportation Committee.	
7-309(D)	<i>On or before January 20, 2022, and on or before January 20 each year thereafter, the administration shall, in accordance with § 2–1257 of the state government article, submit an accounting of the capital funds programmed, appropriated, and expended on each of the projects identified in the assessment required under subsection (A) of this section for the prior fiscal year to the Senate Budget and Taxation Committee, the House Appropriations Committee, and the House Environment and Transportation Committee.</i>	<i>Capital Needs Inventory (CNI) Annual Report, January 2022</i>