



Washington Metropolitan Area Transit Authority

Project Prioritization at WMATA

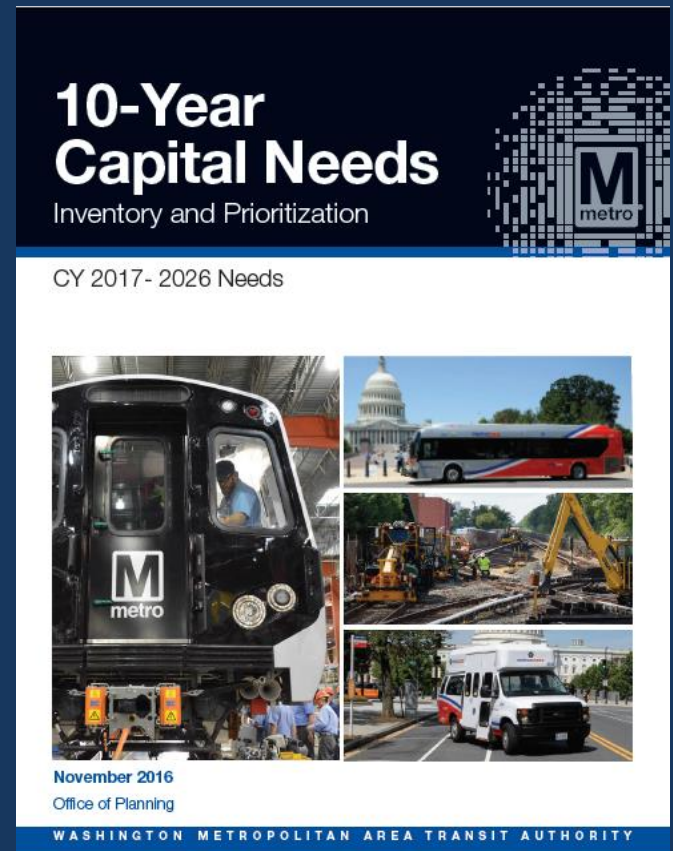
TPB Technical Committee

May 5, 2017



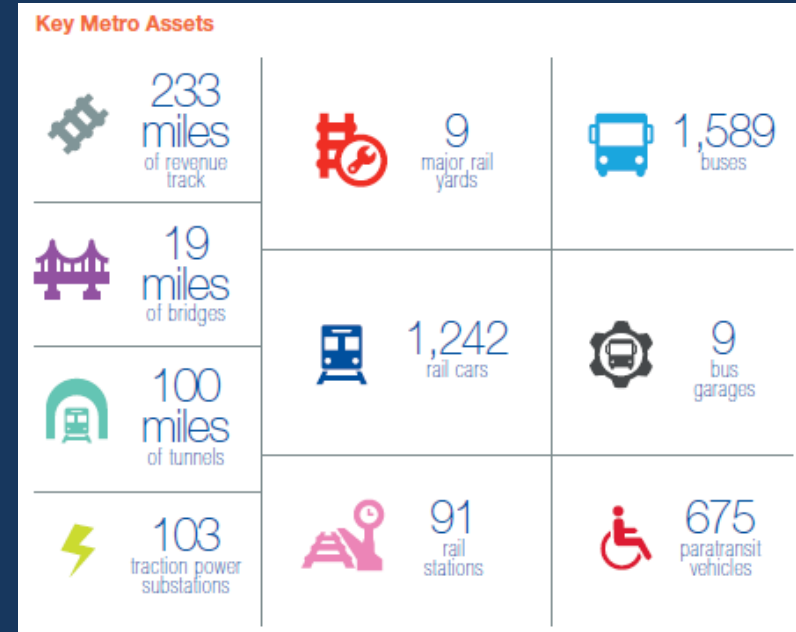
WMATA's Capital Needs Inventory

- A ten-year prioritized list of capital investment needs from calendar year 2017 through 2026
- Capital investments that renew and/or replace existing assets to achieve/maintain a State of Good Repair (SGR)
- New capital investments needed to
 - match capacity to near-term demand
 - address compliance needs (e.g., NTSB, FTA, etc.)



What did the CNI Achieve?

- Established a data-driven, risk-based evaluation framework, with simple and transparent prioritization criteria
- Built an asset inventory to quantify investment needs – from existing data sources*
- Identified critical safety or compliance needs and quantified their magnitude
- Delivered defensible high-level investment needs meant as input to funding discussions





What did We Learn from the Industry?

- Data-driven approaches provide support for informed funding needs discussions
- Simple criteria with transparent measures are needed for continuous use, annual update
 - Criteria which cannot be reliably measured generally receive low priority from agencies
 - Lesson – identify five to six measures for maximum usefulness
- Condition assessments should provide priority for near-term needs
- Asset-level priorities must be grouped to provide more information for capital planning purposes

Overall Approach





Prioritization Elements

Four Key Criteria for WMATA's Prioritization Tool

- Avoid collinearity to the fullest extent possible
- All assets scored on 1-5 scale in TERM Lite, using four criteria
- Criteria weighting:
 - CPAC determines weighting approach(es)
 - Up to three weighting scenarios for CNI

Asset Condition

Definition:

Investment's ability to improve **the asset's** physical condition.

A%

Ridership

Impacts

Definition:

Investment's impact on riders based on **the asset's location** and asset type.

B%

Service Delivery

Definition:

Investment's ability to reduce risk of service failures/ disruptions or increase reliability.

C%

Safety &

Security

Definition:

Investment's ability to reduce risk of safety or security incident.

D%

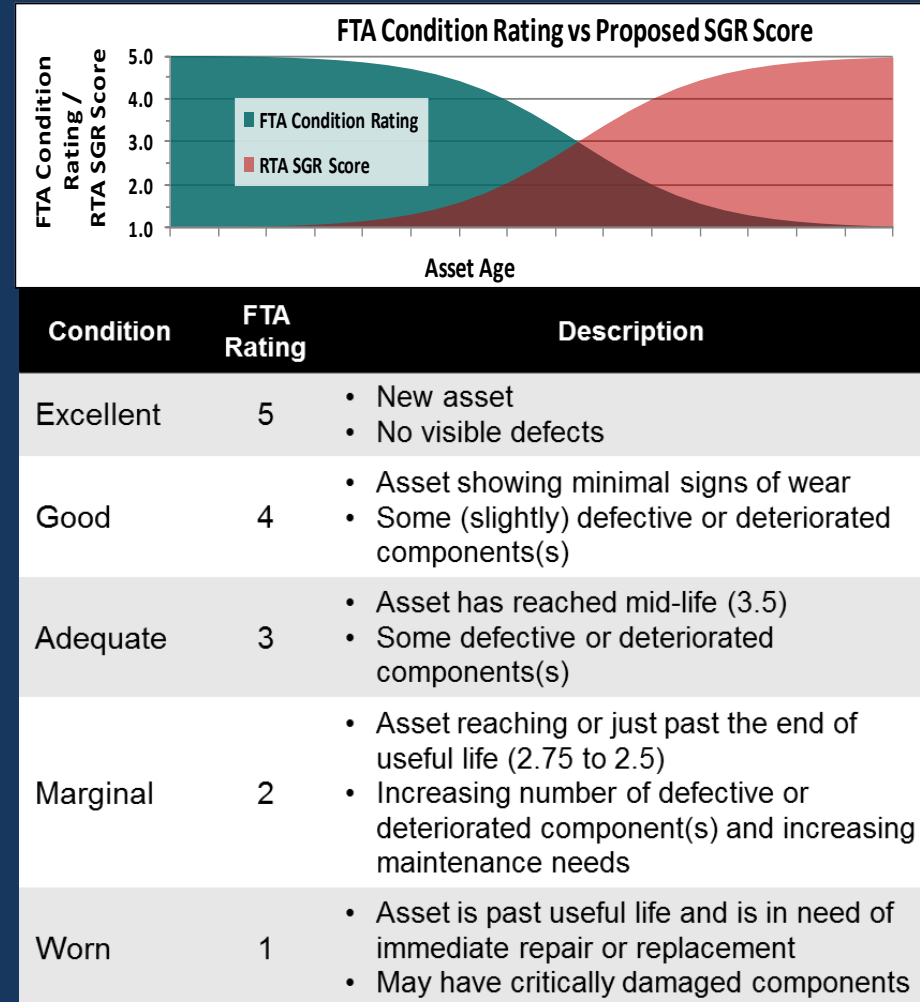
Weighted Average Total Investment Score:
(Converted to 100 Point Scale; High Score = High Priority)



Prioritization Criteria 1

Asset Condition

- Definition: The physical condition of an asset
- Measurement:
- Use FTA's 5 point rating scale (consistent w TAICA)
 - The lower the condition rating, the higher the prioritization score
 - Scoring is recalculated each year of analysis
 - Involves asset decay curves

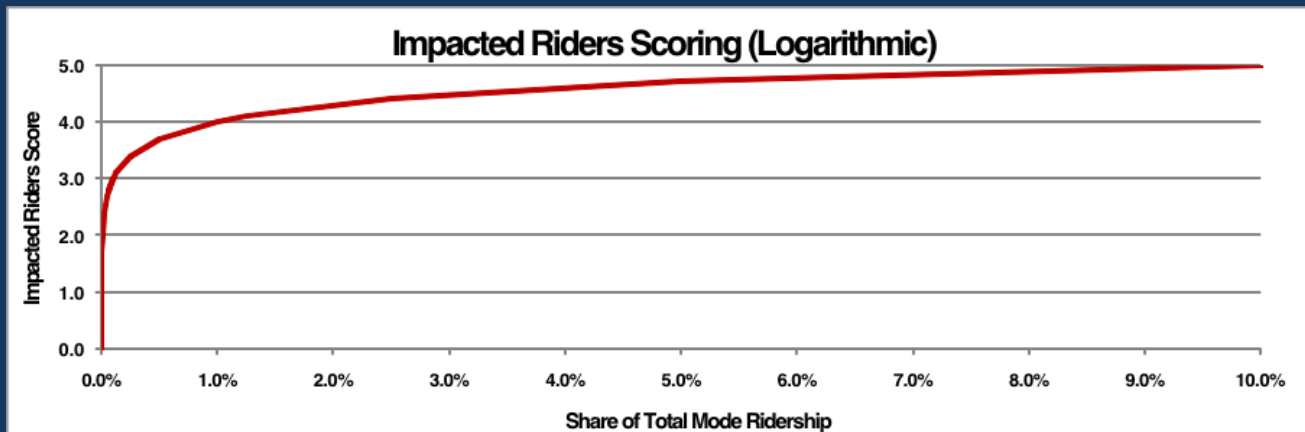




Prioritization Criteria 2

Ridership Impacts

- Definition: The relative number of riders impacted by asset reinvestment
- Measurement: Ridership from Metrorail, Metrobus, and MetroAccess
 - Scoring uses logarithmic scale based on riders served at a location
 - Scoring is not recalculated by the model and remains fixed throughout years of analysis





Prioritization Criteria 3

Service Delivery Measure

Basics:

- Primary - level of impact of an asset on customer satisfaction
- Secondary - mode-specific measure
 - Rail: minutes of delay
 - Bus: missed trips due to mechanical failure
 - Access: fleet failure rates

Scoring Guideline:

- Over 20% impact on customer satisfaction is given a score of 5
- Less than 5% impact on customer satisfaction is given a score of 1

Data and Methodology:

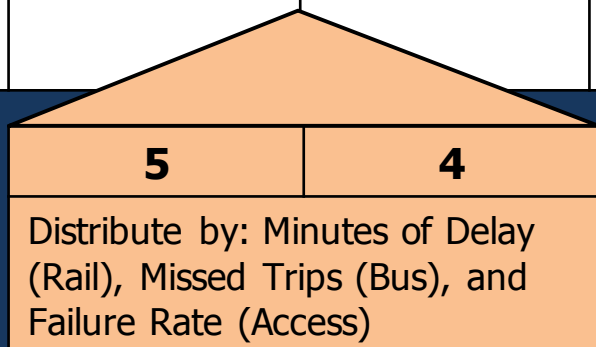
- CY Customer Satisfaction Survey for level of impact - divided in quintiles
- Assets causing delays or missed trips divided based on mode-specific data into top two scores
- Critical support infrastructure and equipment given the same score as the asset type they support



Prioritization Criteria 3

Service Delivery Methodology

Bus and Rail Score:	High impact on satisfaction 5	4	3	2	Low impact on satisfaction 1
Level of impact on satisfaction	>20%	20-15%	15-10%	10-5%	5-0%
Asset examples	Reliability for bus and rail	On-time Performance (OTP)	Rail signage & graphics, faregates, bus climate control	Train climate control, train cleanliness, station climate control, bus fareboxes, bus stop signage	Vertical transport (ELES), station lighting, paper signage, station/train & bus announcements



- Any asset that causes Missed Trips or Delays is assigned a 5 or 4 ranking.
- Other assets are assigned 1 to 3 rankings based on customer satisfaction impact (e.g. vertical assets, station chillers)



Prioritization Criteria 4

Safety and Security Measure

Basics

Measure:

- Risk-based approach that takes into account severity and probability by asset type
- Uses the MIL-STD-882E standard recommended by WMATA SAFE members

Scoring Guideline:

- High-risk for safety incident is a given a score of 5
- Low-risk for safety incident is given a score of 1

For Information

Data and Methodology:

- Initial risk-based scoring by WMATA experts
- Verification and adjustment of scores, as needed, with asset owner and specialist input

Progress:

- SAFE developed scoring based on MIL-STD-882E
- SAFE and PLAN identified assets relating to corrective actions

Risk-Based Weighting Methodology

- Risk-based scoring uses criteria to represent either the likelihood or consequence of asset failure
 - Asset Condition as likelihood and other criteria as consequence
- Pros: Captures risk of asset failure; recommended by FTA
- Cons: Use of condition for likelihood debatable; May be harder to link weights to goals

Risk-Based Weighting (Multiplicative)

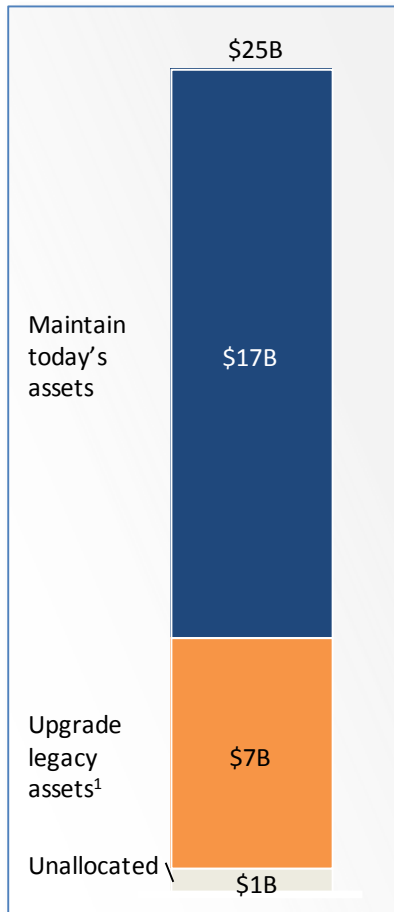




Well-funded Capital Investment Supports Safe, Reliable Service

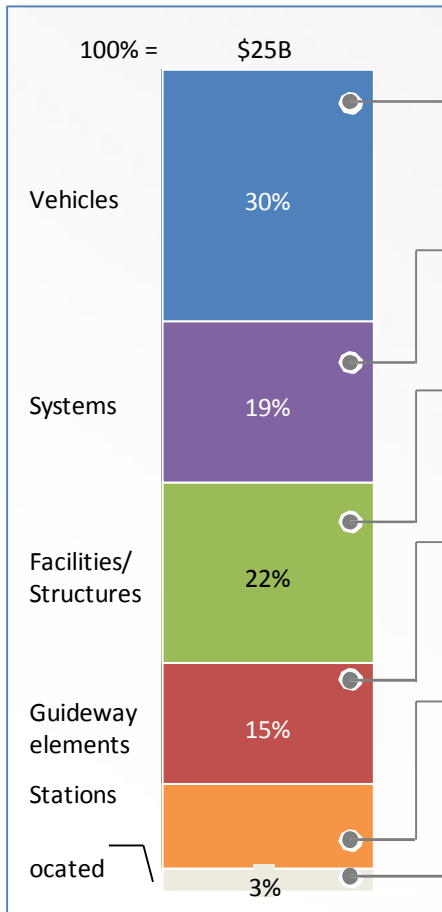
Ten-year capital needs focus on maintaining today's assets

Needs by category, \$B



Critical projects are unfunded

Needs by asset class, percent, \$B



Example projects requiring funding

New railcar fleet



- 748 new 7000 series cars
- Accelerated replacement of 2000 and 3000 legacy cars
- Enables all 8-car trains

Radio and wireless



Complete upgrades to radio system and underground wireless infrastructure

Andrews Bus Garage



New bus operations and maintenance facility, fuel and wash buildings, heavy repair & overhaul, and other structures

Track Rehab



Annual program to replace components (crossies, fasteners, switches, insulators), based on condition

Fare gates



Replace and modernize existing fare collection assets

Development

Planning, development, and evaluation for next

- Red Line Core Capacity
- Red Line Water Remediation

(D&E)

transformational projects

- Gallery Place, Union Station, etc
- Bladensburg Bus Garage

¹ In Metro's Capital Needs Inventory, "maintain today's assets" needs are labeled "State of Good Repair needs" and "upgrade legacy assets" are labeled "new needs"



Metro and Region will ensure a Safe, Reliable, and Effective System

Asset class Impact of investments

Asset class	Impact of investments
Vehicles	<ul style="list-style-type: none"> 748 new 7000 series railcars in service 2000-3000 series railcars replaced with 8000 Series 85% of railcar fleet will be new vehicles Modern & well maintained Metrobus & MetroAccess fleets
Systems	<ul style="list-style-type: none"> New radio and wireless system for customers, first responders & operations New wayside-worker protection, fire life safety, and train control signal systems Power system upgrades for safety, reliability and more 8-car trains Modernized fare collection and information technology infrastructure and applications
Facilities/ Structures	<ul style="list-style-type: none"> Complete Cinder Bed and Andrews Federal bus garages Complete rehabilitation of railcar maintenance facilities Complete rehabilitation of rail bridges and structures
Track	<ul style="list-style-type: none"> Address the remaining 80% of track not yet replaced in SafeTrack to ensure safety and reliability
Stations	<ul style="list-style-type: none"> Replace or rehabilitate escalators and elevators Rehabilitate station platforms and improve lighting New stations at Potomac Yard and Silver Line Phase 2
D&E	<ul style="list-style-type: none"> Develop the next generation of capital projects to improve safety, reliability, and capacity, such as Red Line water remediation, replacement bus garages, railcar overhaul facility, Rosslyn tunnel, and projects to resolve safety and circulation challenges in core stations including Gallery Place, Metro Center, & Union Station



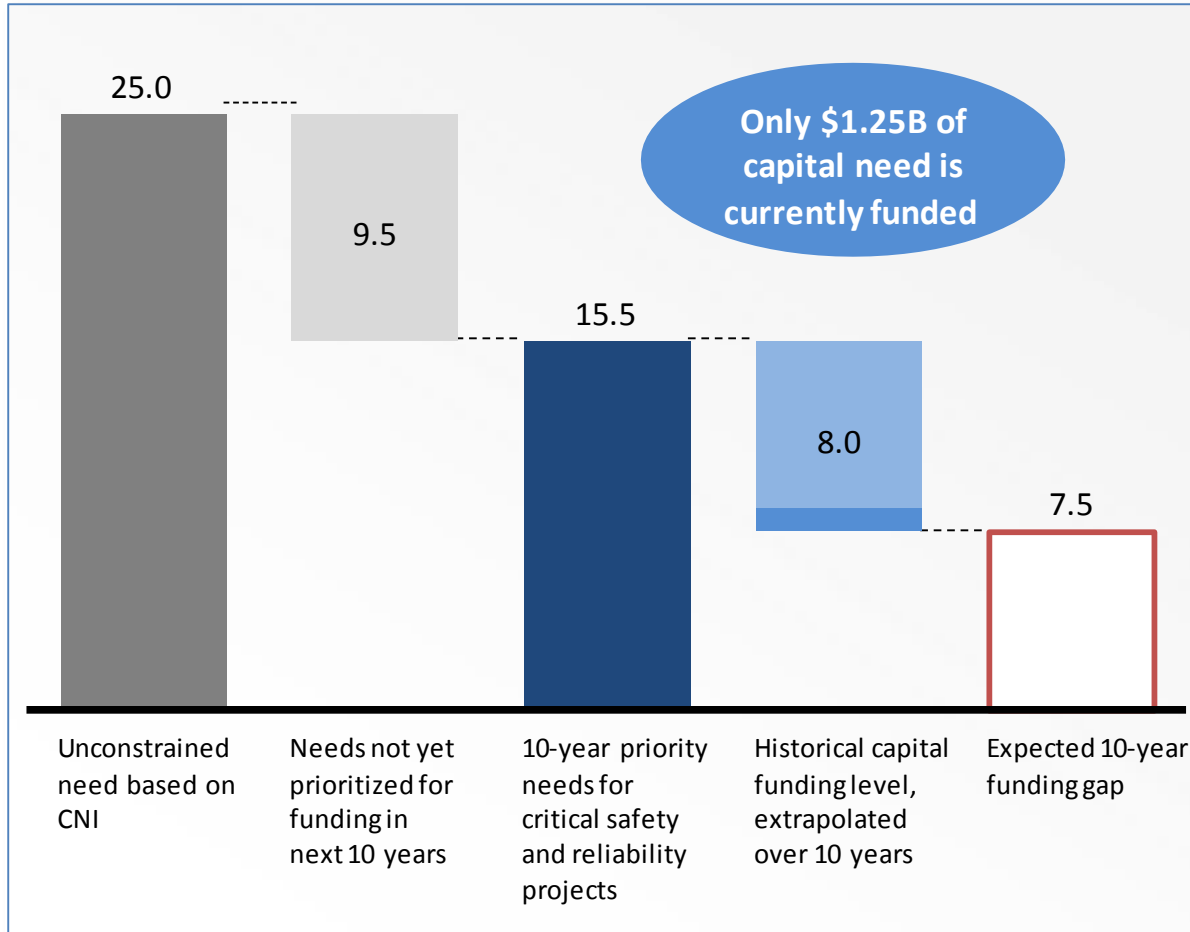
Metro will follow best practice in delivering the capital program

- Prioritize safety and reliability projects
- Deploy 95% of annual capital budget
- Implement cost-effective design and construction approaches
- Deliver projects on time and on budget
- Revamp capital process and implement D&E program
- Expand reliability-centered maintenance program, including asset-specific, data-driven maintenance



\$15.5B of Capital Investment is Required over next 10 years for Safety and Reliability

Ten year capital needs, by funding and priority status, \$B



- Metro has \$25B in capital needs over the next ten years. Capital needs were identified through a CNI process
- \$15.5B is required for **critical safety and reliability projects**
- **Currently, only the first year of the FY2018-23 capital program is funded, at \$1.25B**
- **Maintaining historic capital funding levels would leave an unfunded gap over 10 years that would:**
 - Keep Metro’s assets in a state of disrepair
 - Inhibit completion of safety, reliability, and compliance projects
 - Continue service disruptions and delays in the system



Even if FY18 Budget Levels were sustained beyond 6 years, WMATA does not achieve SGR

Amount of CNI State of Good Repair Funded in the FY18 6-Year CIP

