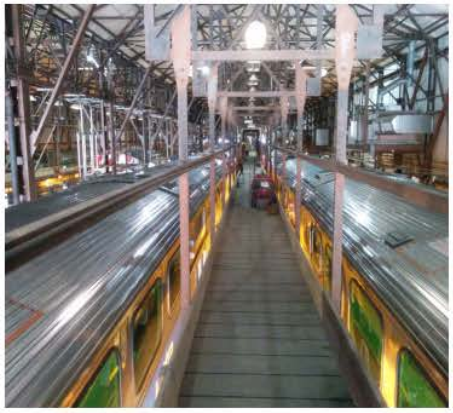


TRANSIT ASSET MANAGEMENT PLAN







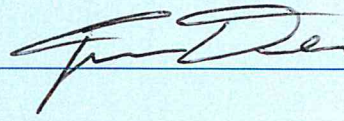

Metra®

TRANSIT ASSET MANAGEMENT PLAN

SEPTEMBER 2018

Prepared with support from:

APPROVAL

ACCOUNTABLE EXECUTIVE	SIGNATURE
James Derwinski, Executive Director and Chief Executive Officer, Metra	

REVISION HISTORY

VERSION NO.	DATE	COMMENTS
1	October 1, 2018	Issued in compliance with FTA TAM Final Rule, 49 CFR 625

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EXECUTIVE SUMMARY

This Transit Asset Management (TAM) Plan provides an organization-wide view of the asset management work necessary for Metra to deliver transit services across its service area in Northeastern Illinois. The TAM Plan was created in compliance with the requirements set out in the Moving Ahead for Progress in the 21st Century Act (MAP-21,49 USC 5326) and the Federal Transit Administration's (FTA) subsequent TAM Final Rule: 49 CFR 625.

This document represents Metra's first TAM Plan, and will be revised and improved upon as required.

TAM PLAN PURPOSE

This is Metra's first TAM Plan. Its purpose is to:

- Document the asset portfolio – including nature, extent, age, and condition of Metra's physical assets.
- Identify existing and proposed levels of service to be achieved with these assets.
- Document the key processes, organization and technology tools that enable effective asset management.
- Identify the lifecycle management strategies of each asset class, including inspection, maintenance, rehabilitation, and replacement.
- Assess the capital and operating budgets necessary to support safe and reliable transit services.
- Establish plans for reviewing and improving Metra's approach to asset management activities.

ASSET MANAGEMENT POLICY

Metra's first Asset Management Policy was developed in 2018 in accordance with Metra's existing policies. The policy lays out seven asset management guiding principles that will guide Metra's asset management decisions to ensure the successful operations of its passenger rail network:

1. The **safety of Metra's system** is paramount. All asset management decisions will be made in accordance with Metra's safety policy and procedures.
2. **Sustainability** of assets is crucial. Managing tasks, costs, and risks throughout the assets' lives will enable Metra to achieve lower lifecycle cost per asset.
3. Metra will **standardize and document** its asset management processes to achieve consistency and improved reliability; to institutionalize knowledge of asset management procedures for the benefit of all of Metra's asset custodians; and, to provide a basis against which Metra can measure its performance.
4. In developing and implementing its asset management policies, processes, and procedures, Metra will **comply with all applicable and mandated requirements**.
5. Metra will **continuously improve** its policies, processes, and procedures related to the conception, acquisition, repair, renewal and replacement of assets.
6. Metra will further develop and integrate its asset related **information systems** to better manage work on its assets. Integration will create efficiencies across the organization and provide data needed to make more informed asset management decisions.
7. Metra will invest in and **develop its workforce's** asset management capabilities to ensure incorporation of Metra's asset management guiding principles throughout the organization.

METRA'S ASSETS AND THEIR CONDITION

The first step to improving the condition of Metra's assets is to identify and document the portfolio of assets under Metra control. Though Metra owns the infrastructure for only four of its eleven rail lines (the rest are owned by private railroads) it is at least partially responsible for capital improvements on all rail lines.

This TAM Plan brings together inventory information from numerous sources and documents the various rolling stock, facilities, equipment, and infrastructure assets that allow Metra to serve its customers. At a high-level, Metra's assets include:

- 848 commuter coach cars
- 148 active commuter rail locomotives
- 186 electric multiple units (EMU)
- 89 pieces of steel-wheel equipment
- 53 pieces of rubber-tire equipment
- 721 non-revenue vehicles
- 24 maintenance and storage yards
- 12 substations and 3 tie stations
- 14 control towers
- 1 administrative headquarters building
- 242 passenger stations
- 209 passenger parking lots/garages
- 1,155 miles of track
- 1,955 turnouts
- 847 bridges
- Approximately 900 signal locations (Metra owned lines)
- 2,045 switch machines
- 740 Roadway Crossings
- 440 miles of catenary
- Approximately 1,500 catenary structures
- GPS equipment
- 45 ticket vending machines
- Voice of Metra system
- Passenger information system
- 8 microwave towers
- Fiber optic cable transmission system
- Radios
- Phone system

The second step to improving the condition of Metra's assets is to understand their current condition. Reliable knowledge of asset condition will enable Metra to justify capital programs and more knowledgably prioritize investments across multiple divisions and asset classes. Metra has processes in place to assess condition for facilities and rolling stock, and is developing more robust processes for assessment of other assets' condition. This TAM plan provides preliminary condition information for all asset classes, which will be revised in future iterations of the plan.

Preliminary condition information reveals that many of Metra's assets are in need of significant investment. Metra's maintenance and rehabilitation practices enable these assets to function safely and meet service objectives despite their age, but additional resources would improve reliability and performance, and reduce the state of good repair backlog.

ASSET MANAGEMENT ENABLERS AND LIFECYCLE MANAGEMENT STRATEGIES

Asset Management activities at Metra, including the development of this plan, are led by Metra's Asset Management Analyst and an interdepartmental working group including representatives from the Engineering, Mechanical, Strategic Capital Planning, Finance, and Grant Management departments.

Organization-wide processes and technologies enable Metra to deliver its asset management objectives and make decisions about asset investments. Metra stores information on its rolling stock, substations, bridges, and some types of equipment within Maximo, an Enterprise Asset Management (EAM) system. Metra intends to add additional asset types, and additional information on existing asset types, to Maximo in the coming years. In the meantime, Metra uses a variety of other technologies to store information, including GE RailDOCS, and Microsoft Access and Excel.

During the development of this TAM Plan, the lifecycle strategies for all major assets were reviewed. A shift to more advanced asset management principles and whole lifecycle thinking has begun at Metra.

With the oldest commuter rail fleet in the country, Metra relies heavily on regular preventive maintenance and rehabilitation of its rolling stock to extend its life, and has developed a plan to significantly improve the state of good repair of its rolling stock over the next ten years through a combination of rehabilitations and new vehicle purchases. To maintain most other assets in safe and reliable condition, Metra utilizes routine inspections, preventive maintenance, and speedy correction of significant defects identified.

INVESTMENT PRIORITIZATION

For fiscal year (FY) 2019, Metra's Strategic Capital Planning (SCP) Department issued a call for new projects to which user departments responded. User departments submit capital budget requests and project funding justifications based on expert experience with the assets and recent funding availability. The costs of projects that user departments would like to undertake typically exceeds the available funding, requiring SCP, in coordination with the user departments and senior leadership, to prioritize the projects that will receive funding, and how much funding each project will receive.

Metra has identified three criteria (criticality, condition, and service delivery) and four indicators (safety risk, mandate, condition, and accessibility) that are evaluated for each project, resulting in a composite score. Lower scores are the highest priority, therefore projects with the lowest scores are prioritized, and put into the constrained capital program.

For the preliminary FY 2019 – FY 2023 Capital Program, Metra estimates having approximately $1.2 billion available for capital investments from federal funds, Regional Transportation Authority (RTA) appropriations, and Metra sources. The amount of capital funding available from Metra sources is subject to change and to Board approval, which is expected in mid-November 2018. This funding will be invested in projects ranging from replacing and rehabilitating rolling stock, to upgrading bridges, track, and signals, to improving rail yards and stations.

ASSET MANAGEMENT IMPLEMENTATION

At a minimum, this Plan will undergo a comprehensive update and review every four years. Certain aspects of the Plan will be reviewed more frequently. This includes a review of asset condition, performance targets (as part of annual submissions to the National Transit Database), and progress against asset management objectives.

Since embarking on the development of this TAM plan, Metra has made significant strides toward improving its asset management practices. Metra has written and approved an asset management policy and its first asset management plan (this document), and is in the process of bringing these materials and others related to asset management into a central repository on its intranet for all employees to access. Metra has also developed guidelines for assessing the condition of rolling stock, and is working toward similar guidelines for other asset classes. Finally, Metra has created a process for prioritizing capital projects, relying on defined criteria approved by senior leadership.

Metra looks forward to building on these first steps to grow a mature asset management system that will enable improvement of Metra's state of good repair and ensure the successful operations of its passenger rail network for many years to come.

INTRODUCTION

This Transit Asset Management (TAM) Plan sets out Metra's approach to managing the assets that deliver public transportation services in Northeastern Illinois.

OVERVIEW

In operation since the early 1980s, and formed from several bankrupted railroads that have operated in the region since the late 1800s, Metra is one of the largest and most complex commuter rail systems in the United States, providing nearly 290,000 weekday trips across six counties in northeastern Illinois.

Metra is dedicated to providing safe and reliable service, and consistently achieves a greater than 95 percent on-time performance rating. However, shrinking funding sources and aging infrastructure make it increasingly difficult for Metra to run the quality service its customers have come to expect. Metra receives a fraction of the capital funding needed annually to achieve and maintain a state-of-good repair on its existing system – never mind system expansion. As a result, Metra has fallen behind on its capital investments, and risks falling further behind without additional support.

Because capital funding has been inadequate, Metra now has one of the oldest commuter fleets in the nation. Approximately 40 percent of Metra's assets are classified as in marginal or worn condition. Half of the approximately 800 bridges in Metra's system are 100 years old or older. These assets, while safe, have exceeded their useful lives. Metra will always run a safe railroad, but continued use will result in higher operating costs and degraded on-time performance.

The aging of Metra's assets combined with tight funding years on the horizon underscore the importance of maximizing the value added for every dollar invested in Metra's assets. Through cross-discipline cooperation and coordination, formalized processes, and use of technology, Metra will make prudent, data driven decisions related to the effective management of assets. Metra's efforts to improve asset management are driven by the potential savings and efficiencies that can be gained, as well as compliance to FTA requirements. By following this TAM Plan, Metra aims to optimize the use of its assets, allowing them to continue functioning safely, and enabling Metra to provide reliable service for customers.

What is an Asset Management Plan?

An asset management plan provides an organization-wide view of the work necessary to deliver the organization's goals and objectives.

How will this plan be used?

In striving to achieve a state-of-good-repair, this plan provides Metra with:

- A consolidated set of current practices and policies
- A consolidated set of lifecycle strategies
- Consolidated technical and financial information about Metra's assets
- An understanding of Metra's challenges, and present and future demands
- A current estimate of the long-term financial commitment necessary to maintain assets in a state of good repair
- Clearly established links between organizational goals and asset management initiatives

ACCOUNTABLE EXECUTIVE

625.25 (a)(3) A provider's Accountable Executive is ultimately responsible for ensuring a TAM Plan is developed and carried out in accordance with this part.

The Accountable Executive with responsibility for carrying out asset management practices is Metra's Executive Director and Chief Executive Officer, **James Derwinski**.

SCOPE OF THE TAM PLAN

This TAM Plan covers the following asset types across Metra's 11 rail lines:

- Rolling stock
- Non-revenue vehicles and work equipment
- Maintenance and administrative facilities
- Passenger stations and parking facilities
- Track
- Bridges
- Electric traction power
- Signals
- Telecommunications

METRA SERVICES

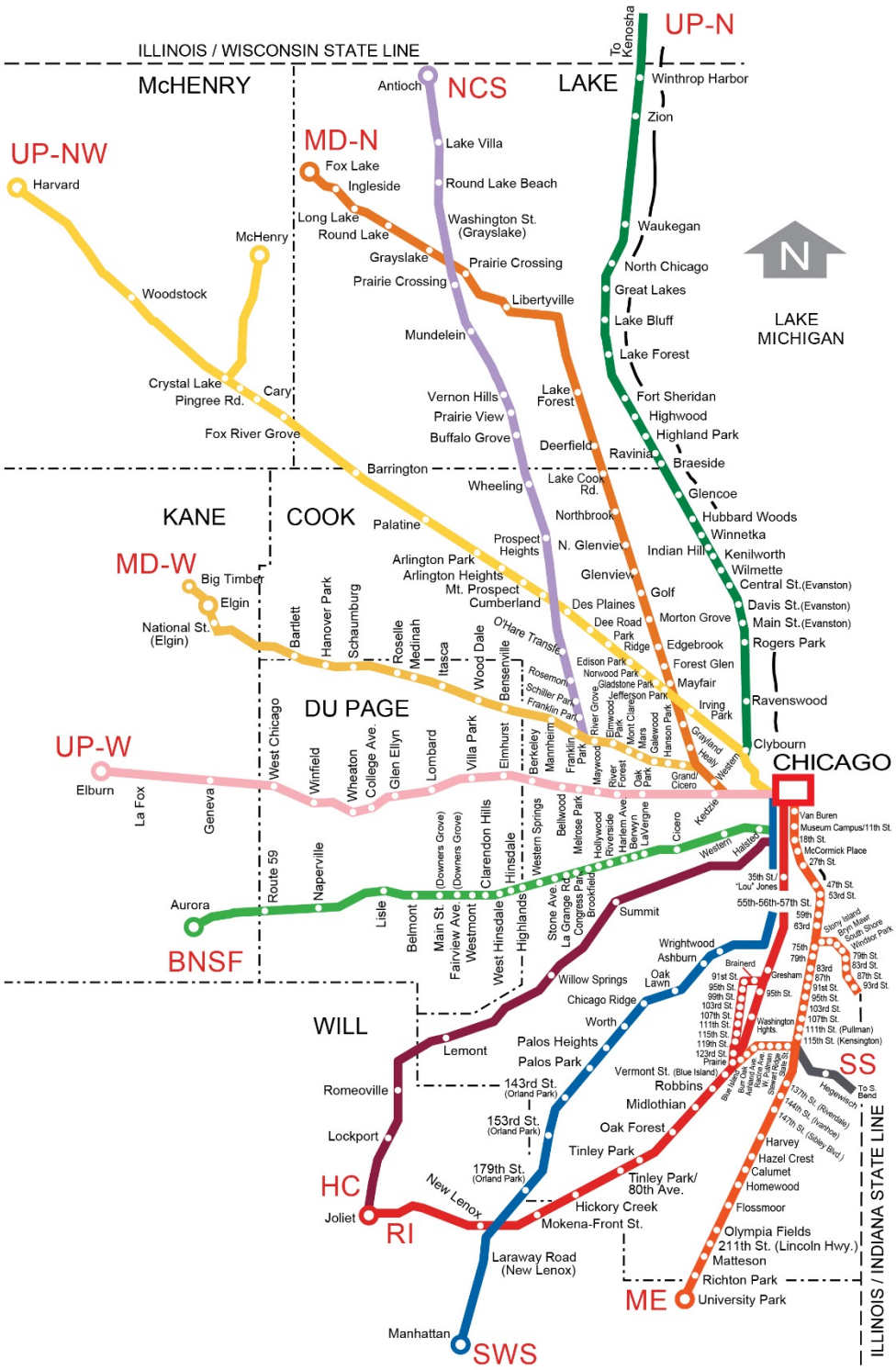
Metra owns and operates four of its rail lines (Rock Island, Metra Electric, Milwaukee North and Milwaukee West). Service on three Metra lines is operated by Metra employees over freight railroad-owned track through trackage rights or lease agreements (Heritage Corridor, North Central Service and SouthWest Service). Service on four additional Metra lines are operated directly by freight railroads through purchase-of-service agreements (BNSF, Union Pacific North, Union Pacific Northwest and Union Pacific West lines), using Metra-owned rolling stock. Finally, Metra has a purchase of service agreement with the Northern Indiana Commuter Transportation District (NICTD) for one station (Hegewisch) that is owned by Metra, but is only used by NICTD's South Shore Line. Metra is responsible for capital improvements on all lines. The extent of responsibility is based upon many factors, such as gross tonnage and train counts. Metra is also responsible for stations – especially the platforms – and parking facilities, with additional support coming from municipalities.

Table 1 illustrates the varying ownership and responsibility over Metra's rail lines. All of these assets, whether owned by Metra or not, contribute to Metra's ability to serve its customers. Thus, all are included in the scope of this TAM Plan. However, detailed information on lifecycle strategies for infrastructure owned by other railroads is not included.

Table 1. Responsibility for Metra's Assets by Rail Line

LINE	INFRASTRUCTURE		ROLLING STOCK		OPERATIONS
	Ownership	*Maintenance Responsibility*	*Ownership*	*Maintenance Responsibility*	*Service Responsibility*
BNSF Railway (BNSF)	BNSF	BNSF	Metra	BNSF	BNSF
Heritage Corridor (HC)	CN	CN	Metra	Metra – MD (Day) Metra – RID (Night)	Metra
Metra Electric District (MED)	Metra	Metra – MED	Metra	Metra – MED	Metra
Milwaukee District North (MD-N)	Metra	Metra – MD	Metra	Metra – MD	Metra
Milwaukee District West (MD-W)	Metra	Metra – MD	Metra	Metra – MD	Metra
North Central Service (NCS)	CN/ Metra	Metra – MD/CN	Metra	Metra – MD	Metra
Rock Island District (RID)	Metra	Metra – RID	Metra	Metra - RID	Metra
SouthWest Service (SWS)	NS / Metra	Metra – RID	Metra	BNSF (Day) Metra – RID (Night)	Metra
Union Pacific North (UP-N)	UP	UP	Metra	UP	UP
Union Pacific Northwest (UP-NW)	UP	UP	Metra	UP	UP
Union Pacific West (UP-W)	UP	UP	Metra	UP	UP

Figure 1. Map of Metra Lines and Stations



OBJECTIVES

This is Metra's first TAM Plan. Its purpose is to:

- Document the asset portfolio – including nature, extent, age, and condition of Metra's physical assets.
- Identify existing and proposed levels of service to be achieved with these assets.
- Document the key processes, organization and technology tools that enable effective asset management.
- Identify the lifecycle management strategies of each asset class, including inspection maintenance, rehabilitation, and replacement.
- Assess the capital and operating budgets necessary to support safe and reliable transit services.
- Establish plans for reviewing and improving Metra's approach to asset management activities.

This initial TAM plan provides a baseline from which Metra will continue to build and improve its asset management practices.

RELATIONSHIP TO OTHER DOCUMENTS

Metra's TAM Plan is informed by and aligned with several other Metra documents, including:

- 2018-2022 Strategic Plan: On Track to Excellence sets forth the goals and objectives around which this TAM Plan is aligned.
- 2018 Operating and Capital Program and Budget Book provides an overview of Metra's system, describes the funding challenges it faces, and outlines the capital and operating budget projections, including the five-year capital program.
- 2016 Rail Fleet Management Plan describes how Metra maintains its fleet of rolling stock, and its fleet requirements over the next decade to meet ridership projections.
- Metra 2016 Title VI Program & Policy documents how Metra complies with Title VI of the Civil Rights Act of 1964 and Federal Transit Administration Circular 4702.1B, Title VI Requirements and Guidelines for Federal Transit Administration Recipients
- Miscellaneous policies, procedures, standards, and plans, which document how Metra operates, providing information used within this TAM Plan.

TAM PLAN PERIOD

625.29 Transit Asset Management plan: horizon period, amendments and updates. (a) *Horizon period.* A TAM Plan must cover a horizon period of at least four (4) years. (b) *Amendments.* A provider should amend its TAM Plan whenever there is a significant change to the asset inventory, condition assessments, or investment prioritization that the provider did not reasonably anticipate during the development of the TAM Plan. (c) *Updates.* A provider must update its entire TAM plan at least once every four (4) years. A provider's TAM plan update should coincide with the planning cycle for the relevant Transportation Improvement Program or Statewide Transportation Improvement Program.

This TAM Plan covers a five-year time horizon. While this is one year longer than the FTA mandated four-year time horizon, and is also longer than Metra's three-year operating cost plan, it is consistent with Metra's Strategic Plan, Capital Program, and other Federal planning cycles, such as the region's 2014-19 Transportation Improvement Program (TIP) developed by the Chicago Metropolitan Agency for Planning (CMAP), the region's federally designated Metropolitan Planning Organization (MPO). In addition, the Regional Transportation Authority (RTA), which is charged with financial oversight, funding, and regional transit planning for Metra and the region's other two transit operators, Chicago Transit Authority and Pace, is required to prepare and adopt a Strategic Plan every five years, as mandated by the 2008 RTA Act. The RTA has also just released Invest in Transit: the 2018-2023 Regional Transit Strategic Plan. Future updates to this TAM Plan will be made at least every four years, or as needed when any major

changes to the asset inventory, updated condition assessments, major investments, or revisions to the prioritization processes occur.

TAM PLAN REQUIREMENTS

In July 2012, the U.S. Government enacted the Moving Ahead for Progress in the 21st Century (MAP-21) Act, a funding and authorization bill that places specific asset management requirements on transit operators across the U.S. MAP-21 required all transit agencies to develop and update an Asset Management Plan.

The Federal Transit Administration (FTA) released the TAM Final Rule in July 2016, under 625 of Title 49 Code of Federal Regulations. Table 2 lists the requirements of FTA's TAM Final Rule and describes how the contents of this document relate to these requirements.

Table 2: TAM Plan Requirements and Section Correspondence

REF#	49 CFR PART 625	PAGE NUMBER (STARTING)
1	625.25 (a)(1) Each tier I provider must develop and carry out a TAM Plan that includes each element under paragraph (b) of this section. (2) Each tier II provider must develop its own TAM Plan or participate in a group TAM Plan. A tier II provider's TAM Plan and a group TAM Plan only must include elements under paragraphs (b)(1) through (4) of this section.	Entire document
2	625.25 (a)(3) A provider's Accountable Executive.	4
3	625.25 (b) A TAM Plan must include (1) An inventory of the number and type of capital assets.	13 and appendices
4	(2) A condition assessment of those inventoried assets for which a provider has direct capital responsibility.	15 and appendices
5	(3) A description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization;	26
6	(4) A provider's project-based prioritization of investments,	27 and Appendix A
7	(5) A provider's TAM and SGR policy;	10
8	(6) A provider's TAM Plan implementation strategy;	19, 23, 31
9	(7) A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period;	20, 23 and appendices
10	(8) A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM Plan; and	19
11	(9) An outline of how a provider will monitor, update, and evaluate, as needed, its TAM Plan and related business practices, to ensure the continuous improvement of its TAM practices.	31
12	625.33 Investment prioritization. (a) A TAM Plan must include an investment prioritization that identifies a provider's programs and projects to improve or manage over the TAM Plan horizon period the state of good repair of capital assets for which the provider has direct capital responsibility. (b) A provider must rank projects to improve or manage the state of good repair of capital assets in order of priority and anticipated project year. (c) A provider's project rankings must be consistent with its TAM policy and strategies. (d) When developing an investment prioritization, a provider must give due consideration to those state of good repair projects to improve that pose an identified unacceptable safety risk when developing its investment prioritization. (e) When developing an investment prioritization, a provider must take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM Plan horizon period. (f) When developing its investment prioritization, a provider must take into consideration requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities.	26
13	625.45 Setting performance targets for capital assets. (a) *General.* (1) A provider must set one or more performance targets for each applicable performance measure. (2) A provider must set a performance target based on realistic expectations, and both the most recent data available and the financial resources from all sources that the provider reasonably expects will be available during the TAM Plan horizon period.	17

TAM PLAN STRUCTURE

The plan format shown below outlines the sections contained in this Transit Asset Management Plan.

Executive Summary	Summarizes the core components of all sections below, and could be suitable for separate publication, as required
Introduction	Provides an overview of organization, objectives of this TAMP and Requirements for Asset Management
Asset Management Policy	States the guiding principles by which Metra is developing its Asset Management capability
Levels of Service	Links Customer Levels of Service to technical requirements for the assets
Asset Portfolio	Defines the current asset portfolio and its assessed condition
Asset Management Enablers	States the current asset management enablers including organization, core business processes, and technology
Lifecycle Management Strategies	Identifies key asset management approaches across the lifecycle, including maintenance, overhaul and replacement
Investment Prioritization	Describes Metra's processes for developing investment priorities, and lists currently planned projects
Asset Management Implementation	Identifies update and implementation actions to support continuous improvement
Appendices	Provides further information on each asset class, including specific strategies and work plans

ASSET MANAGEMENT POLICY

The Asset Management Policy defines the guiding principles by which Metra will manage the assets it owns and maintains. The policy establishes the direction and objectives for developing asset management capability and implementing an asset management plan.

625.25 (b) A TAM Plan must include (5) A provider's TAM and SGR policy;

Metra's first Asset Management Policy was developed in 2018 in accordance with Metra's policy on policies, AD-00-01, which requires periodic review and approval of policies. It is included below.

METRA POLICY

AG-00.01
REFERENCE NUMBER

Asset Management Policy

POLICY STATEMENT

Metra has to make daily asset management decisions to ensure the successful operations of its passenger rail network. These decisions will be guided by a single, coherent policy. Under this policy, Metra's asset management plans and compliance under Moving Ahead for Progress in the 21st Century (MAP-21) and Federal Regulations 49 USC 5326, will be based on the following seven asset management guiding principles:

1. The **safety of Metra's system** is paramount. All asset management decisions will be made in accordance with Metra's safety policy and procedures.
2. **Sustainability** of assets is crucial. Managing tasks, costs, and risks throughout the assets' lives will enable Metra to achieve lower lifecycle cost per asset.
3. Metra will **standardize and document** its asset management processes to achieve consistency and improved reliability; to institutionalize knowledge of asset management procedures for the benefit of all of Metra's asset custodians; and, to provide a basis against which Metra can measure its performance.
4. In developing and implementing its asset management policies, processes, and procedures, Metra will **comply with all applicable and mandated requirements**.
5. Metra will **continuously improve** its policies, processes, and procedures related to the conception, acquisition, repair, renewal, and replacement of assets.
6. Metra will further develop and integrate its asset related **information systems** to better manage work on its assets. Integration will create efficiencies across the organization and provide data needed to make more informed asset management decisions.
7. Metra will invest in and **develop its workforce's** asset management capabilities to ensure incorporation of Metra's asset management guiding principles throughout the organization.

APPLICABILITY

This policy applies to all capital assets as well as to the staff that manages and is engaged across the entire lifecycle management of the assets.

ADOPTED: CEO/Executive Director

8-8-18
Effective Date

LEVELS OF SERVICE

This section of the 2018 TAMP establishes the relationship between Metra's strategic goals, the level of service provided, and the required technical performance of Metra's assets.

OVERVIEW

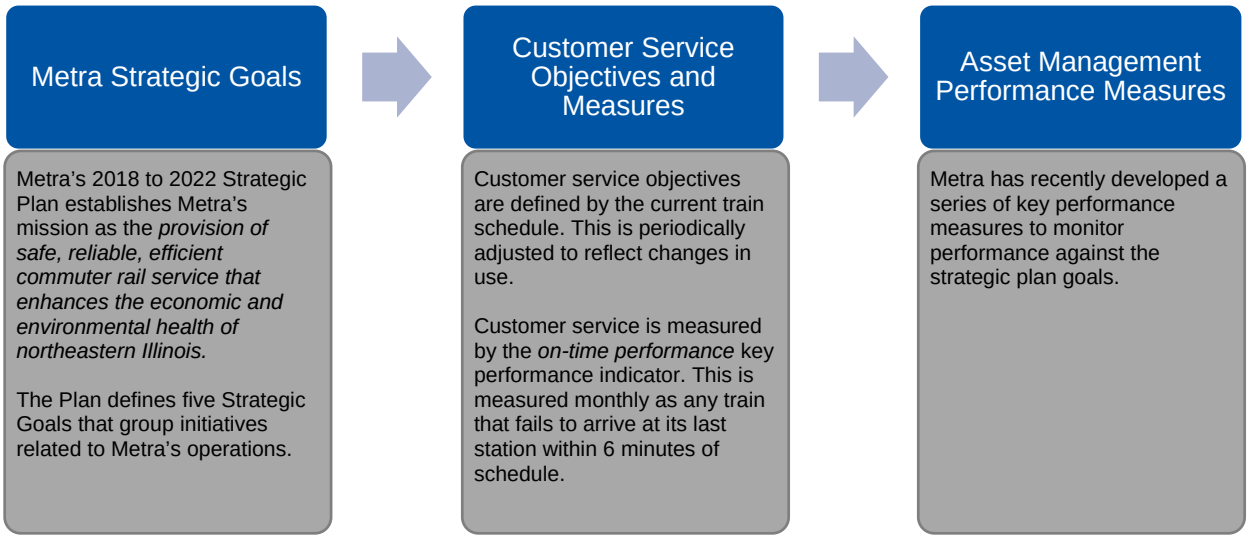
One of the basic cornerstones of good asset management practice is to align asset management activities with an agency's corporate objectives and levels of service, thereby ensuring that assets deliver the required levels of service efficiently and economically. This alignment enables the relationship to be determined between levels of service and the cost of service delivery. In turn, this relationship can be evaluated to:

- Determine the affordability of an assets operating and capital need to meet the customer service levels
- Develop asset management strategies and plans to meet required performance targets
- Monitor asset performance to ensure Metra continues to meet defined levels of service.
- Where necessary, justify additional funding requirements or justify service reduction requirements

LEVEL OF SERVICE DEVELOPMENT

Following the publication of the Metra Strategic Plan (November 2017), this is the first time Metra has taken steps to align asset and asset management performance targets to customer levels of service and corporate strategic goals. Metra is currently in the process of developing and introducing a range of performance measures aligned to the strategic plan, several of which are shown in Table 3 as Asset and Asset Management Performance Measures. The relationship between Metra's Strategic Goals, Customer Objectives and Asset and Asset Management Performance Measures is highlighted in Figure 2 and detailed in Table 3.

Figure 2. Alignment of Corporate Objectives, Customer Objectives, and Asset and Asset Management Performance Measures



This approach is consistent with best practices in national and international standards on Asset Management. Objectives and measures at each of the three levels in Figure 2, and the connectivity between each, are shown in Table 3, below.

Table 3. Metra's Strategic Goals and Proposed Performance Measures

GOAL	DEFINITION (FROM THE 2018 TO 2022 STRATEGIC PLAN)	MEASURING SUCCESS	ASSET MANAGEMENT PERFORMANCE MEASURES
Goal 1: *Prioritize safety and security awareness*	The safety of Metra's customers and employees will always be the top priority. Metra ensures the system remains safe through compliance with federal, state and local regulations pertaining to the operation, inspection and maintenance of track and equipment, as well as regulations pertaining to the certification of railroad employees.	▪ Lower public and employee injury rates ▪ Install, test and deploy PTC ▪ Maintain high level of police visibility on board and at stations	▪ FRA reportable injury ratio ▪ # of employee injuries and lost work days ▪ % complete PTC
Goal 2: *Invest in workforce*	Metra's plans for the future rely upon being able to recruit, develop and retain a capable, talented workforce. To achieve this, Metra is investing in outreach to diversify its applicant pool and is enhancing its in-house development program for all employees.	▪ Improve retention of employees ▪ Increase participation in voluntary development programs ▪ Diversity goals ▪ Improve employee engagement and satisfaction ▪ Introduce technology improvements that result in employee efficiency	▪ Employee turn-over ▪ # of training programs and program participants ▪ % employees satisfied
Goal 3: *Deliver quality customer service*	Providing the safest, most efficient and most reliable service to its customers has long been Metra's goal. To ensure that services continue to meet expectations, Metra will monitor customer satisfaction. Metra will also work on low-cost opportunities for improvements to enhance the customer experience.	▪ Monitor trends on annual customer satisfaction surveys ▪ Review and respond to customer feedback ▪ Achieve 95% on-time performance ▪ Rehabilitate stations and facilities	▪ Customer satisfaction ratings ▪ On-time performance goals
Goal 4: *Optimize capital assets*	Reliable rail service depends on perpetual maintenance of capital assets. For many years, however, Metra has been falling behind on these investments due to funding constraints. Metra will continue to safely operate the aging system. However, the federal, state and local funding has not kept pace with its needs. Metra's implementation of TAM will support efforts to optimize its capital assets despite limited funding.	▪ Complete construction projects on time & budget ▪ Reduce average age of fleet ▪ Maintain favorable comparisons to its peers ▪ Complete initial TAM Plan ▪ Complete Station Optimization Study	▪ Operating cost per passenger mile
Goal 5: *Ensure financial stability*	As a public agency, Metra is dependent on funding sources for its operating and capital costs that are unpredictable and often insufficient. This business model is unsustainable. To reverse this course Metra and its Board of Directors are committed to exploring ways to change the status quo and provide stable and sustainable funding sources.	▪ Continue to balance the agency budget each year ▪ Implement cost-saving measures ▪ Leverage funding sources and financing ▪ Maintain and grow ridership ▪ Grow non-fare revenue ▪ Meet federal and non-federal DBE goals	▪ Percent favorable/ unfavorable to budget ▪ Discretionary grants obtained ▪ Value of backlog SGR ▪ Ridership by ticket sales

ASSET PORTFOLIO

Metra's robust portfolio of assets enables rail service across 1,155 miles of track, among the highest of any commuter railroad in the United States. Metra owns or has partial capital responsibility for nearly 1,200 railcars/locomotives, 847 bridges, 242 stations, 24 rail yards, 16 electrical substations/tie stations, and many other assets.

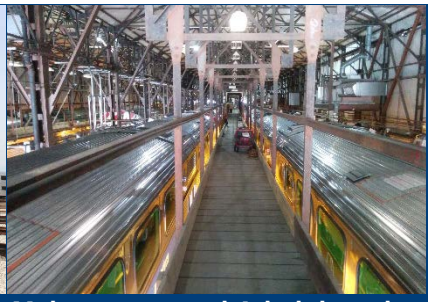
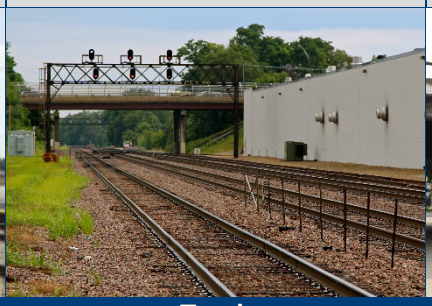
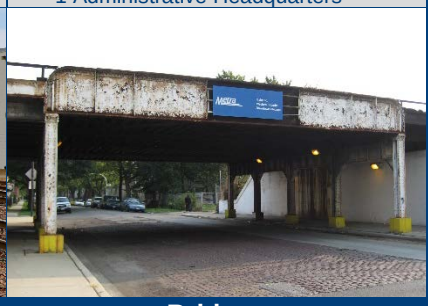
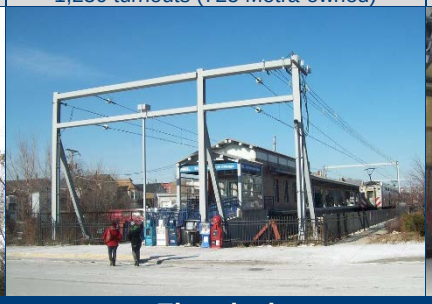
ASSET PORTFOLIO

625.25 (b) A TAM Plan must include (1) An inventory of the number and type of capital assets. The inventory must include all capital assets that a provider owns, except equipment with an acquisition value under $50,000 that is not a service vehicle. An inventory also must include third-party owned or jointly procured exclusive-use maintenance facilities, passenger station facilities, administrative facilities, rolling stock, and guideway infrastructure used by a provider in the provision of public transportation. The asset inventory must be organized at a level of detail commensurate with the level of detail in the provider's program of capital projects;

The ownership, capital (i.e. replacement) responsibility and maintenance responsibility of Metra's assets varies from line to line and from asset class to asset class. Table 1, on page 5, summarizes these varied responsibilities. In all cases, at least some responsibility rests with Metra for operations, maintenance, and capital investments in all assets needed for Metra commuter railroad operations.

In 2010-2015, Metra hired a consultant to develop a comprehensive inventory of assets, including development of an asset hierarchy with parent and child assets. This inventory is now the basis for Metra's SGR (State of Good Repair) database. A summary of Metra's asset inventory is provided in Table 4 below, by asset class. Metra's inventory is constantly evolving, and this table represents Metra's assets as of August 2018. It is intended as a starting point on which to build as Metra continues to improve its asset inventory collection mechanisms, and as such is subject to change. Additional information for each asset class can be found in the appendices.

Table 4: Metra Current Asset Portfolio

		
Rolling Stock (Revenue Vehicles)	**Non-Revenue Fleet and Equipment**	**Maintenance and Administrative Facilities**
▪ 848 Commuter Coach Cars ▪ 148 Active Commuter Rail Locomotives ▪ 2 Inactive Commuter Rail Locomotives ▪ 186 EMUs	▪ 89 Steel-wheel Equipment ▪ 53 Rubber-tire Equipment ▪ 51 Marked Police Automobiles ▪ 670 Rubber Tire Fleet Vehicles	▪ 24 Yards, including 75 buildings ▪ 8 Other Maintenance Buildings ▪ 12 Substations and 3 Tie Stations ▪ 14 Control Towers ▪ 1 Administrative Headquarters
		
Passenger Stations and Parking	**Track**	**Bridges**
▪ 242 Passenger Stations ▪ 209 Passenger Parking Lots/ Garages	▪ 1,155 miles of track, including 339 miles of Metra-owned tangent, and 76 miles of Metra-owned curve ▪ 1,230 turnouts (725 Metra-owned)	▪ 370 Metra-owned Bridges ▪ 477 Bridges owned by Contract Carriers
		
Signals	**Electrical**	**Telecommunications**
▪ 900 Metra-owned signal locations, with approximately 1,800 pieces of wayside train control equipment, including signals, signal bridges, relay houses, relay cabinets, power supplies, and bonds ▪ 2,045 switch machines (817 Metra-owned) ▪ 740 Roadway Crossings	▪ 12 Substations and 4 Tie Stations ▪ 440 miles of catenary wire ▪ 1500 catenary structures	▪ GPS equipment ▪ 45 credit-based ticket vending machines ▪ Base station, portable, and vehicular radios ▪ Voice of Metra ▪ PA system, Variable Message Signs, Transit Passenger Info System ▪ Video Surveillance Cameras ▪ 8 Microwave towers ▪ Fiber optic cable transmission system ▪ Phone system ▪ PTC ETMS Backbone

ASSET CONDITION

625.25 (b) A TAM Plan must include: (2) A condition assessment of those inventoried assets for which a provider has direct capital responsibility. A condition assessment must generate information in a level of detail sufficient to monitor and predict the performance of the assets and to inform the investment prioritization;

It is critical that Metra has clear knowledge of the condition of its assets and their performance. This information enables justification of capital program funding requests and project prioritization across divisions and asset classes. In order to better communicate needs and the risks of underinvestment, Metra must have a good understanding of its state of good repair needs - informed by condition assessments. This condition data will be a key input of Metra's prioritization process to ensure efficient and effective use of public funding.

CONDITION RATING METHODOLOGY

Metra's methods for assessing asset condition vary across asset classes, as shown in Table 5. Some departments have already established regular, repeatable processes for assessing condition. For example, the Mechanical Department has developed a condition rating methodology that is based on asset age and years since the asset's last rehabilitation (see Appendix B for more detail). Metra-owned bridges are given condition ratings as part of routine inspections performed by the Engineering Department. Metra has also developed a new methodology for assessing facility condition, based on physical inspections conducted by the Engineering Department as well as Quality Control Inspectors from the Customer Services Department.[1] Assessment of stations has begun in 2018, and at least one-quarter of all facilities are expected to be evaluated by the end of the year. Condition ratings currently available for facilities reflect assessments conducted by a consultant in 2012-2013, and updated by subject matter experts in 2017.

The condition rating for other asset types is based on results from RTA's Capital Optimization Support Tool (COST), used to assess transit capital investment needs across the Chicago region (including for the Chicago Transit Authority and Pace). The COST condition rating process is based on the FTA's TERM-Lite software which uses an age/decay-curve based approach for asset condition estimation, and since 2014 has been supplemented by a small sample of actual asset condition observation-based ratings. Asset condition sampling forms were tailored to each asset type and used to gather information on the selected sample of assets. For many assets, the condition data were collected for individual components and scores were aggregated into a single, overall condition score for that asset. Moving forward, Metra's Asset Management working group will work with asset departments to develop a sustainable method for producing condition ratings over the long-term.

In accordance with the TAM Final Ruling, Metra has also begun utilizing the condition metrics that will be required reporting for the National Transit Database (NTD), and will be used to measure performance against targets.

Table 5 summarizes these various condition rating methods used by Metra, and any planned changes intended for future use.

[1] Despite the position title, the Quality Control Inspectors are not part of the quality assurance groups within the Engineering and Mechanical departments.

Table 5. Condition Rating Methods

ASSET CLASS	CONDITION RATING METHOD		
	Current	*TAM NTD*	*Future*
Rolling Stock	1-5 rating based on age and years since last major overhaul	Age-based, % of useful life	1-5 rating based on age and years since last major overhaul
Non-Revenue Vehicles + Equipment	1-5 rating based on age	Age-based, % of useful life	To be determined
Maintenance and Admin Facilities	2012-13 assessment by consultant, 1-5 rating based on inspection; updated based on SME knowledge	Quadrennial inspections, 1-5 rating	Quadrennial inspections, 1-5 rating, utilizing standard condition assessment forms
Stations and Parking	2012-13 assessment by consultant, 1-5 rating based on inspection; updated based on SME knowledge	Quadrennial inspections, 1-5 rating	Quadrennial inspections, 1-5 rating, utilizing standard condition assessment forms
Track	Age-based, 1-5 rating assigned via COST tool	% with performance restrictions	To be determined
Bridges	Inspection-based, 1-5 rating assigned by B&B inspectors	Age	To be determined
Signals	Age-based, 1-5 rating assigned via COST tool	Age	To be determined
Electrical	Age-based, 1-5 rating assigned via COST tool	Age	To be determined
Telecommunications	Age-based, 1-5 rating assigned via COST tool	N/A	To be determined

Across condition rating methods, the scores follow the FTA-defined condition ratings of one (poorest condition) to five (best condition), as shown in Table 6.

Table 6. Condition Rating Levels

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

CURRENT CONDITION INFORMATION

Table 7 provides a high-level summary of asset condition. A more detailed breakdown of condition by asset type is presented in the appendices. Condition information for many asset classes (all except rolling stock and bridges) is considered preliminary and subject to change as new assessments are undertaken.

Table 7: Summary Condition Information

ASSET CLASS	ASSET TYPE	QUANTITY	AVERAGE CONDITION RATING
Rolling Stock	Coaches	848	2.6
	Locomotives	148 Active, 2 Inactive	2.0
	EMUs	186	4.6
Equipment	Non-Revenue Fleet	721	3.0
	Steel-wheel Work Equipment	89	3.0
Facilities	Passenger Stations	242	3.4
	Passenger Parking	209	3.6
	Maintenance and Admin.	114	3.1
Track	Track	1155 miles	3.4
Bridges	Bridges	370 (Metra owned)	3.5
Signals	Wayside Train Control	1,800 (Metra owned)	2.3
	Switch Machines	2045	3.2
	Roadway Crossings	740	Pending review
Electrical	Substations/Tie Stations	12 / 4	3.1 (equipment); 3.3 (buildings, also included under facilities)
	Catenary Wire	440 miles	2.2
Telecommunications	GPS equipment	579	4.5

CHANGES TO CONDITION

Future versions of this TAM Plan will highlight any significant changes to condition and condition assessment methodology since the previous report.

TAM PERFORMANCE TARGETS

625.45 Setting performance targets for capital assets. (a) General. (1) A provider must set one or more performance targets for each applicable performance measure. (2) A provider must set a performance target based on realistic expectations, and both the most recent data available and the financial resources from all sources that the provider reasonably expects will be available during the TAM Plan horizon period.
625.55 Annual reporting for transit asset management. (a) Each provider must submit the following reports: (1) An annual data report to FTA's National Transit Database that reflects the SGR performance targets for the following year and condition information for the provider's public transportation system. (2) An annual narrative report to the National Transit Database that provides a description of any change in the condition of the provider's transit system from the previous year and describes the progress made during the year to meet the performance targets set in the previous reporting year.

In compliance with the TAM Final Ruling, Metra has identified its performance targets for 2018. Due to Metra's knowledge of expected investment this year, the 2018 targets are equivalent to 2017 performance. Information on 2017 performance and 2018 targets are shown in Table 8.

Future versions of this transit asset management plan, will include a one-year 'look-back' review with commentary on identified performance issues and proposed plans for addressing problems.

Table 8: 2017 Actual Performance and 2018 Targets

ASSET CLASS	ASSET TYPE	TOTAL QUANTITY	PERFORMANCE METRIC	2017 TARGET	2017 ACTUAL PERFORMANCE	2018 TARGET
Rolling Stock	Coaches	848	% exceeding ULB of 30 years	43%	44%	44%
	Locomotives	148 Active, 2 Inactive	% exceeding ULB of 30 years	51%	53%	53%
	EMUs	186	% exceeding ULB of 30 years	0%	0%	0%
Equipment	Non-Revenue Vehicles	721	% exceeding ULB (ULB varies by type)	32.2%	35%	35%
	Work Equipment	89	% exceeding ULB of 25 years	36.3%	33%	33%
Facilities	Passenger Stations	241*	% with condition < 3 on TERM scale	13%[2]	4%	4%
	Passenger Parking	191^	% with condition < 3 on TERM scale		3%	3%
	Maintenance and Administrative	266^	% with condition < 3 on TERM scale	6%	12%	12%
Infrastructure	Track	975	% of Direct Route Miles (DRM) under performance restrictions	< 1%	< 3%	3%

* Does not include new Romeoville station

^ Differs from quantity in asset portfolio section due to adjustment in counting methodology since the performance targets were developed.

[2] 2017 target for passenger stations and parking was a combined target of 13%, not separate targets for each component, as in 2018.

ASSET MANAGEMENT ENABLERS

Asset Management at Metra is carried out by numerous departments within the agency. Core business processes and support technologies enable asset management decisions and practices.

OVERVIEW

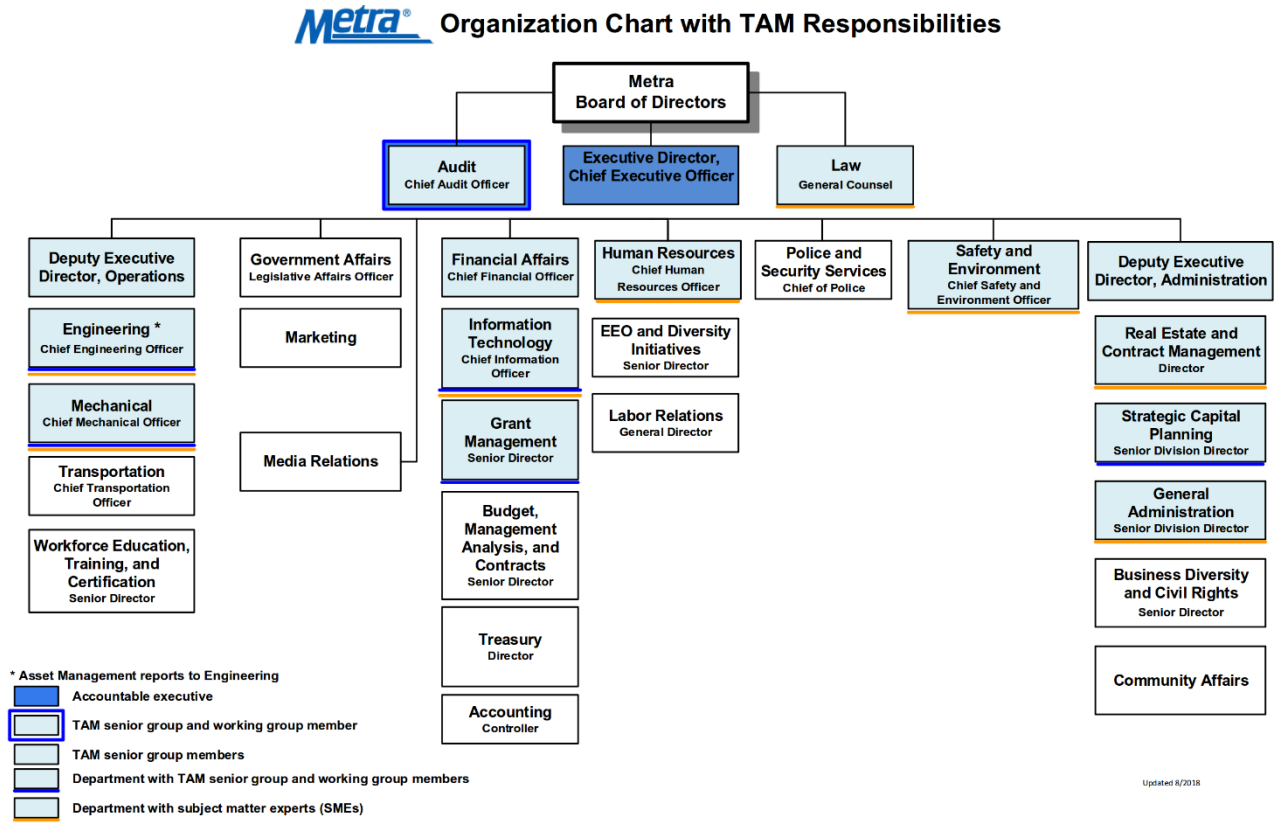
This section describes the organization of Metra, including the roles and responsibilities for asset management, and the resources that will be needed to carry out the activities outlined within this plan. It also covers the core business processes in place to assist and guide Metra in delivering Asset Management, and the information and technology systems that support asset management, work planning, and decision making.

ORGANIZATION AND RESOURCE PLAN

625.25 (b) A TAM Plan must include: (6) A provider's TAM Plan implementation strategy; (8) A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM Plan

Metra's Executive Director/Chief Executive Officer is the Accountable Executive for Asset Management, and is responsible for ensuring that this TAM Plan is developed and carried out. The creation of Metra's TAM Plan has been guided by an interdepartmental working group that includes staff from the Engineering, Mechanical, Strategic Capital Planning, Finance, and Grant Management departments, and is led by the Asset Management Analyst (currently situated within the Engineering Department) who is responsible for coordination of the asset management program at Metra. This group reports to the Senior Leadership Team which is comprised of management staff from across the organization. Figure 3 depicts asset management responsibilities at Metra.

Figure 3. Asset Management Organization



Moving forward, resources from across Metra will be required to implement elements of the TAM plan. The Asset Management Analyst will continue to develop performance targets and measure as required. The Asset Management Analyst will also consolidate inventory and condition data for NTD reporting, with support from asset owners. Asset user departments will undertake lifecycle management activities, and investment prioritization will be carried out by the Strategic Capital Planning Department. Finally, the Asset Management Analyst will update this TAM Plan when there is a significant change. Over the TAM horizon period, Metra may identify the need for additional resources.

CORE BUSINESS PROCESSES

625.25 (b) A TAM Plan must include: (6) A provider's TAM Plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period

Several core business processes enable Metra's ability to develop and implement TAM activities. Table 9 describes these key asset management processes at Metra. The processes are grouped according to eight asset management pathways used in related documentation.

Table 9: Core Business Processes

CORE BUSINESS PROCESS GROUPS	DESCRIPTION
Alignment to Organizational Goals	
Strategic Planning	Metra recently adopted a five-year strategic plan for 2018-2022, based around five strategic goals. These goals have been communicated across the organization, and are in the process of being more deeply embedded at the department level.
Service Planning	Metra monitors trends and conducts surveys of its riders in order to plan service levels.
Control of Assets	
Safety and Hazards Management	Safety is a priority at Metra, and is monitored closely via daily injury reports and reviewed during daily morning meetings. A safety hotline provides employees and the public with an easy way to report unsafe situations, and safety alerts and corrective action plans are communicated throughout the organization as needed.
Performance Management	At the enterprise-level, Metra has historically monitored on-time performance and safety metrics. A broader list of performance metrics has been developed as part of Metra's strategic planning and will soon be used for regular performance monitoring. Individual departments also review performance indicators independent of central oversight.
Audit and Assurance	Metra develops an audit plan annually, carried out by the internal Audit Department. In addition, quality assurance audits are undertaken by Quality Assurance (QA) staff embedded in departments (e.g. Mechanical and Engineering) or by Grants staff to validate that work is being undertaken according to standard work procedures.
Asset Management Decision Making	
Asset Management Plans	This document represents Metra's first Asset Management Plan, establishing a baseline on which future iterations will build. Processes for updating the plan are included in the TAM Plan Update and Evaluation section.
Asset Strategies	Lifecycle strategies for Metra's assets have been introduced as part of this plan, building on existing practices (see appendices for more detail by asset class).
Capital Planning and Delivery	
Capital Program Development + Evaluation	Metra's Strategic Capital Planning Department solicits capital budget requests from user departments to develop an unconstrained budget, and then works with organizational leadership to refine the list of projects to conform with budget constraints. Beginning with the development of the FY 2019 capital program, Metra is evaluating projects based on the criteria related to condition, criticality, and service delivery (see Investment Prioritization section of this plan for more detail) In order to develop a ranked list of projects.
Procurement	Procurement processes are well defined and in an effort to manage major projects, Quarterly Review meetings are held amongst User Departments, Grants, and Procurement to review project status.
Quality Management	Metra's documented quality management program guides contractor work to ensure successful project delivery.

CORE BUSINESS PROCESS GROUPS	DESCRIPTION
Asset Handover and Transitioning	Handover processes are established prior to procurement for large construction contracts and allow Metra to verify that the project has been completed as expected, and that relevant documents and information are captured.
Maintenance Planning and Delivery	
Inspections/ Condition Monitoring	Metra conducts regular inspections of critical assets, and documents defects in need of repair. More formal condition assessment and rating has been developed for some asset classes and will be developed for others in the coming years.
Maintenance Planning and Definition	Preventive maintenance is carried out for many assets, though documentation of policies/procedures varies. Maintenance plans do not currently define predicted work volumes and costs.
Inventory Management	Metra has processes in place to actively manage inventory stocks, including setting minimum and maximum levels and reviewing obsolescence.
Operations and Incident Management	
Operations Management	Prioritizing and scheduling access to track for maintenance takes place during weekly meetings between Metra's Transportation, Engineering, and Mechanical departments.
Incident Management	Metra investigates all serious incidents and develops corrective actions to prevent reoccurrence. Metra also captures incident-related costs for insurance claim purposes.
Close Call Reporting	Metra's Confidential Close Call Reporting System (C3RS) enables employees to report "close call" incidents without fear of retribution, allowing Metra to institute corrective measures before a more serious incident occurs.
Emergency Management/ Disaster Recovery	Metra has emergency response procedures and service disruption processes in place with the respective departmental roles and responsibilities delegated. These procedures cover natural disasters/severe weather events and other forms of emergency.
Informed Decisions	
Asset Cost Capture	Metra meets all legal and compliance financial reporting requirements and captures costs at a high level. Metra is reviewing ways to improve collection of more detailed operations, maintenance, and capital costs associated with assets, using Maximo.
Asset Information	Asset information at Metra is currently stored in a variety of different systems (see Core Asset Management Support Systems section). Efforts have begun to build a single source of truth in an EAM system.
Resource Capabilities	
Organization	An interdisciplinary team has been assembled to oversee asset management activities (see Organization and Resource Plan section).
Workforce Succession Planning	Metra is aware of challenges relating to high numbers of expected retirements, and has instituted succession planning, particularly among executive and management staff. Metra also has several apprentice programs to provide a pipeline of new talent as trade workers retire.

CORE ASSET MANAGEMENT SUPPORT SYSTEMS

625.25 (b) A TAM Plan must include: (8) A summary or list of the resources, including personnel, that a provider needs to develop and carry out the TAM Plan

Metra utilizes several support technologies/systems to store information about its assets, which are relied on to make informed decisions. These are important resources for carrying out this TAM plan. Table 10 describes Metra's core support systems, and the primary asset types / departments that use each system.

Table 10: Core Support Systems

SYSTEM	CURRENT STATUS	ASSET / DEPARTMENT
Maximo	Maximo is used by Metra's Mechanical and Engineering departments. The Mechanical Department has used Maximo since 2010 to program preventive maintenance, generate work orders and capture information on the location (by district), status, maintenance history, warranty eligibility, and more for each railcar, locomotive, and EMU. Rubber tire support vehicles are now in Maximo as well. The Engineering Department also uses Maximo, and is in the process of transitioning additional asset types into the system. Additional assets classes may be added in the future. Mobile interfaces with Maximo are under development to allow field workers to enter information directly into Maximo, rather than transferring information from paper forms. Currently, Mechanical has on site terminals used for entering data into Maximo.	• Rolling Stock • Electrical – Substations • Facilities equipment • Bridges • Rubber tire equipment • Under development o Telecommunications equipment o Work equipment
GE RailDOCS	RailDOCS is being used by Metra to track PTC-relevant assets, including signals and track, though not all assets have yet been added to the system. RailDOCS stores information on asset ID, asset type, location (milepost), and test type required.	Signals • Switches • Grade Crossings • Relay House
Google Earth	Metra's Track Department uses Google Earth and GIS data to monitor track information and defects.	• Track
CADD	Metra's Track Department uses CADD to create and update track charts that document speed restrictions, signal locations, bridge locations, grade crossing locations, mile posts, platform limits, etc.	• Track
Microsoft Access	Several departments use Access to store some asset information, including Telecommunications, Track, and Bridges and Buildings.	• Telecommunications • Track • Bridges
TOPS	TOPS provides Metra with coded delay reports that indicate the cause, location, and other characteristics of delays. These reports indicate which department, if any, bears responsibility for the delay, and are used to measure on-time performance.	All
Issuetrak	Customer Service and IT use Issuetrak to track and resolve complaints and other issues. The Safety Department is also considering using Issuetrak for SIMS issues.	IT and Customer Service
ArcGIS Online	ArcGIS Online is used to log ADA exceptions and life safety risks discovered at stations as part of quality control inspections. ArcGIS Online automatically transfers this information to Issuetrak.	Stations and Parking
SGR Database	Metra's SGR database was developed by a consultant in 2010-2015 and contains nearly 40,000 assets. The database contains information on asset classification, year built, condition, replacement cost, useful life, rail line, and more.	All
Microsoft AX	Metra recently transitioned to the Microsoft AX ERP system, moving away from several legacy mainframe-based systems for accounting, inventory, procurement, etc., into a unified software solution.	All fixed assets
Work Order System	Work Order System is an electronic timesheet program used by Metra's Engineering departments. It was developed in-house, and captures labor by project code, as well as data on equipment use.	Engineering (capital forces)

LIFECYCLE MANAGEMENT STRATEGIES

Lifecycle management strategies have been further developed as part of this TAM Plan to capture the baseline or steady state activities necessary to achieve and maintain a state of good repair, and to ensure Metra's assets are functional, reliable, and are able to continue to support a safe, efficient, and sustainable regional operation.

OVERVIEW

625.25 (b) A TAM Plan must include: (6) A provider's TAM Plan implementation strategy; (7) A description of key TAM activities that a provider intends to engage in over the TAM Plan horizon period;

During the development of this TAM Plan, the current lifecycle strategies for all major assets were reviewed. A shift to more advanced asset management principles and whole lifecycle thinking has begun at Metra. The purpose of this TAM Plan is to develop the long-term maintenance and improvement program to reach a state of good repair with available funding. Building on the work done by Metra in coordination with the Regional Transportation Authority, this represents the culmination of a years-long effort to define the capital investment needed to meet current and future demands.

The lifecycle management strategies laid out in the appendices to this document begin to define Metra's approach to asset management and how it will be implemented. Lifecycle strategies may be similar for asset classes where commonalities exist, such as rolling stock and non-revenue vehicles, however, the lifecycle management strategies for each asset class are unique. The current strategy for each asset class – including information on the specific inspection, maintenance and replacement activities to be undertaken – is presented in the appendices, and a general overview of lifecycle management practices is presented in this section.

CURRENT LIFECYCLE MANAGEMENT STRATEGIES

Metra's core objective is to provide a safe, reliable, efficient commuter rail service. Metra currently employs a variety of lifecycle management strategies to achieve this objective which are detailed in the asset plans in the appendices of this document. Metra's asset lifecycle management strategies fall into the following categories:

- ***Acquisition*** activities to procure, design, build, and transfer assets, taking into account long-term maintenance and operations.
- ***Maintenance*** activities including inspection/monitoring, preventive maintenance, and corrective maintenance.
    - ***Inspection/monitoring*** activities to confirm the asset is able to function in its required state and provide a safe operational environment.
    - ***Preventive maintenance*** activities to achieve a required level of asset performance and maintain a safe operational environment.
    - ***Corrective maintenance*** activities to return the asset to its required function and restore a safe operational environment.
- ***Overhaul/Rehabilitation*** to restore the asset to an operational design standard and maintain performance.
- ***Capital Replacement*** to renew/replace the asset.
- ***Disposal*** to ensure compliant, efficient, cost-effective retirement of assets.

ACQUISITION

For many years, Metra has focused on maintenance and improvement of existing assets, not on expansion or major acquisition. For example, there have not been expansions in service that would require additional rolling stock, stations, right-of-way infrastructure, or maintenance facilities in the past decade. As a result, new acquisitions, as opposed to replacements, are relatively rare for Metra.

Any consideration of expansion or acquisition of new assets occurs as part of the Metra-wide capital planning process.

MAINTENANCE

Maintenance and inspection regimens follow requirements of the FRA, EPA, ADA Act, and any other government regulations, as well as recommendations from the manufacturer, the American Public Transportation Association (APTA), and the Association of American Railroads (AAR). Where appropriate, manufacturer's technical manuals and OEM based instructions serve as standard operating procedures (SOPs) for many assets. Where comprehensive policies do not exist, such as for facilities, work equipment, and telecommunications, work order documentation often contains guidance on the frequency at which maintenance is to occur for select assets and includes a checklist detailing the specific maintenance activities required.

Inspection/Monitoring

Metra undertakes routine inspections of many critical assets to prevent unexpected failures, in line with government regulations and industry best practice. The frequency and depth of inspections varies by asset class. For example, locomotives and rail cars receive brief inspections twice daily, before morning and evening rush periods, as well as more detailed inspections as part of routine preventive maintenance as outlined in the appendices. Track is inspected twice per week by an inspector riding a Hirail vehicle, and receives more detailed inspections at monthly, quarterly, semiannual, and annual intervals. Other applicable assets also receive some form of inspection at least once per year.

In addition to human-based inspections, assets such as traction power, substations (15), 4,160V systems, and 2,300V systems are monitored constantly through a SCADA (supervisory control and data acquisition) system.

Preventive Maintenance

Preventive maintenance activities may include cleaning (for rolling stock and facilities), changing the oil and other fluids (for all revenue and non-revenue vehicles), testing and calibrating components, repairing or replacing damaged or worn components, etc. Non-revenue vehicle assets receive preventive maintenance at mileage-based intervals, while preventive maintenance schedules for other assets are time-based. Metra has checklists in place that indicate the specific preventive maintenance activities that are to occur at each interval for all applicable assets.

To supplement the planned maintenance activities, the Mechanical Department also engages in reliability-centered maintenance (RCM), conducting analyses of oil and fuel, as well as vibration tests to predict and eliminate engine failures. Knowledge learned from these RCM practices have been incorporated into standard preventive maintenance procedures.

Corrective Maintenance

Much maintenance at Metra is performed in response to defects identified during the course of routine inspection, preventive maintenance, or reported by field staff. Defects are generally recorded on a paper-based report for Engineering and in Maximo for Mechanical assets, then programmed for corrective maintenance by the appropriate department. Corrective maintenance on many assets is performed in-house by Metra employees, however, Metra has contracts with third party vendors for corrective maintenance as needed.

OVERHAUL/REHABILITATION

Metra operates many of its assets beyond their FTA-defined useful life (used for FTA grant eligibility) due to funding constraints and value for money assessments. For example, although the FTA-defined useful life for rolling stock is 25-years, Metra has set a goal of replacing its coach cars after 42 years and its locomotives and EMUs after 30 years. In order to meet this schedule, Metra must overhaul coach cars after approximately 14 years, and locomotives and EMUs after approximately 10 years. After another 14 or 10 years, respectively, the rolling stock is intended to be rebuilt again to extend its life.

As part of its modernization plan, Metra has expanded its capacity for in-house coach overhauls and accelerated the overhaul process by moving to an assembly-line style system in which each car moves through multiple rehabilitation “stations.” Overhaul/rebuild programs are designed specifically for each type of rolling stock, based on an assessment of the vehicles, and are included in the capital program. On the locomotive side, rebuilds may be contracted out or performed in house. Metra has two locomotive rehabilitation programs currently underway, one outsourced and one in-house.

Overhauls of other assets, such as bridges, stations, or other facilities, are based on criticality and need, which is determined by subject-matter experts and included in the Capital Program based on funding availability.

CAPITAL REPLACEMENT

Assets that have reached the end of their useful life and can no longer be rebuilt or maintained safely and cost-effectively are instead replaced. Though asset useful life is taken into account, replacements are typically undertaken based on condition, revealed through routine inspection, rather than on a set replacement schedule. Funding availability also plays a role in determining when an asset is replaced.

DISPOSAL

User departments have processes in place to determine which assets should be retired and replaced. These processes vary by department and are detailed in the asset plans in the appendices. User departments work with the Fixed Assets Department to ensure there is no remaining Funding Agency equity left before disposal of an asset. If there is no equity remaining, assets are auctioned off or scrapped in accordance with funding agency guidelines.

INVESTMENT PRIORITIZATION

For FY2019-FY2023, Metra has proposed a $1.2 billion capital investment program that prioritizes projects that will improve Metra's state of good repair, based on a newly developed analytical prioritization process. The program is subject to approval by the Board of Directors.

625.25 (b) A TAM Plan must include: (3) A description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization; (4) A provider's project-based prioritization of investments;
625.33 Investment prioritization. (a) A TAM Plan must include an investment prioritization that identifies a provider's programs and projects to improve or manage over the TAM Plan horizon period the state of good repair of capital assets for which the provider has direct capital responsibility. (b) A provider must rank projects to improve or manage the state of good repair of capital assets in order of priority and anticipated project year. (c) A provider's project rankings must be consistent with its TAM policy and strategies. (d) When developing an investment prioritization, a provider must give due consideration to those state of good repair projects to improve that pose an identified unacceptable safety risk when developing its investment prioritization. (e) When developing an investment prioritization, a provider must take into consideration its estimation of funding levels from all available sources that it reasonably expects will be available in each fiscal year during the TAM Plan horizon period. (f) When developing its investment prioritization, a provider must take into consideration requirements under 49 CFR 37.161 and 37.163 concerning maintenance of accessible features and the requirements under 49 CFR 37.43 concerning alteration of transportation facilities.

ANALYTICAL PROCESSES FOR INVESTMENT PRIORITIZATION

For fiscal year (FY) 2019, Metra's Strategic Capital Planning (SCP) Department issued a call for new projects to which user departments responded. User departments submit capital budget requests and project funding justifications based on expert experience with the assets and recent funding availability. User departments typically prioritize state of good repair projects that are critical to the health of the system. Some user departments, such as the Mechanical Department, have defined rules for identifying which assets are in most critical need for rehabilitation and replacement, based on the age of the asset and its most recent rehabilitation. More detail on Mechanical's prioritization process is available in Appendix B**.**

The total costs of projects that user departments would like to undertake typically exceeds the available funding, requiring the SCP Department, in coordination with the user departments and senior leadership, to prioritize the projects that will receive funding, and how much funding each project will receive. Many projects at Metra are "sliding-scale" projects that can be expanded or contracted depending on available funding. For example, Metra may have $10 million in annual rail replacement needs, but if only $5 million in funding is available for rail replacement, $5 million worth of rail will be replaced, and the other $5 million worth will be postponed for replacement in the future. User departments make the determination about which specific assets within each category are replaced at a given time, based on age and condition.

Metra has identified three criteria and four indicators for prioritization, shown in

Table **11** alongside their weighting and information on how scores are assigned. Projects with the lowest scores are considered higher priority for inclusion in the capital program.

Table 11: Investment Prioritization Criteria, Indicators, and Weights

CRITERIA	WEIGHT	INDICATOR	WEIGHT	SCORING
Criticality	0.5	Safety Risk	0.5	Score 5: Low Score 4: Medium-Low Score 3: Medium-High Score 2: Serious Score 1: High
		Mandate	0.5	Score 5: Not mandatory Score 4: Required in 4+ years Score 3: Required in 3-4 years Score 2: Required in 1-2 years Score 1: Required in less than 1 year
Condition	0.25	Condition	1.0	Score 5: No SGR backlog impact Score 4: Low SGR backlog impact Score 3: Medium SGR backlog impact Score 2: High SGR backlog impact Score 1: Extreme SGR backlog impact
Service Delivery	0.25	Accessibility	1.0	Score 5: No accessibility improvement impact Score 4: Low accessibility improvement impact Score 3: Medium accessibility improvement impact Score 2: High accessibility improvement impact Score 1: Extreme accessibility improvement impact

Metra has developed a decision support tool that will use information on the age and condition of its assets to identify which assets are in need of replacement or rehabilitation, and the total cost to bring its assets into a state of good repair. In the future, this information will be used to inform capital prioritization and the creation of projects. Additional criteria/indicators may also be added in future years.

Future versions of this TAM plan will include the results of the decision support tool as an estimate of total unconstrained capital needs.

PROJECT-BASED PRIORITIZATION OF CAPITAL INVESTMENTS

Table 12 summarizes Metra's five-year capital program priorities by asset class, as of August 24, 2018. **This proposed program has not yet been approved by the board, and is subject to change and amendment. Board approval is expected mid-November 2018.**

Appendix A contains a ranked list of capital projects, based on the prioritization methodology described in the previous section. Many projects received the same score, and thus have the same ranking. Furthermore, there is a subset of projects that receive a lower priority score but have been funded due to business and operations needs that are not currently reflected in the criteria. More detail on individual projects can also be found in appendices B through J.

Metra's capital program balances the needs of many different user groups and asset classes. Major projects funded over the coming five years include:

- the purchase of new locomotives and railcars, and the mid-life rehabilitation of existing rolling stock
- a bridge modernization program focused on the UP-North line
- replacement and capital maintenance of ties, ballasts, rail, and crossings
- upgrades to the signal system, interlockings, and electrical system, and completion of PTC work
- improvements to rail yards and non-revenue vehicles and equipment
- upgrade of Hubbard Woods and West Chicago stations and ADA and other improvements across multiple stations

Table 12: Draft 2019-2023 Capital Program Priorities ($000s)

ASSET CLASS	PROJECT	2019	2020	2021	2022	2023	TOTAL
Rolling Stock	Locomotive Improvements	$22,700	$24,150	$44,135	$20,050	$17,900	$128,935
	Car Rehabilitation	$11,100	$43,797	$29,788	$42,550	$37,850	$165,085
	New Locomotives	$11,800	$23,676	$56,000	$33,000	$35,380	$159,856
	New Rolling Stock	$2,700	$34,000	$3,000	$20,600	$64,000	$124,300
	Fleet Component Overhaul	$9,500	$9,500	$9,300	$8,800	$8,800	$45,900
	Subtotal	**$57,800**	**$135,123**	**$142,223**	**$125,000**	**$163,930**	**$624,076**
Track and Structure	Ties and Ballast	$11,500	$7,750	$8,750	$7,750	$8,750	$44,500
	Rail	$10,298	$16,928	$20,265	$8,211	$9,417	$65,119
	Crossings (Road and Track)	$4,750	$5,750	$6,000	$6,500	$6,500	$29,500
	Bridges	$26,650	$38,050	$9,650	$11,650	$28,357	$114,357
	Retaining Wall Rehabilitation	$2,500	$1,000	$1,000	$1,000	$1,000	$6,500
	Structural Upgrades	$850	$950	$850	$850	$850	$4,350
	Subtotal	**$56,548**	**$70,428**	**$46,515**	**$35,961**	**$54,874**	**$264,326**
Signal, Electrical and Communications	Signal System Upgrades	$350	$2,500	$5,650	$5,350	$5,500	$19,350
	Interlockings	$8,600	$17,100	$18,300	$4,300	$7,000	$55,300
	Electrical System Improvements	$6,910	$4,460	$5,040	$4,890	$4,760	$26,060
	Positive Train Control	$18,825	$0	$0	$0	$0	$18,825
	Subtotal	**$34,685**	**$24,060**	**$29,490**	**$14,540**	**$17,260**	**$120,035**
Facilities and Equipment	Yard Improvements	$16,000	$5,000	$5,500	$6,300	$6,100	$38,900
	Building Improvements	$2,070	$200	$250	$250	$250	$3,020
	Equipment and Vehicles	$12,639	$11,214	$3,775	$3,275	$3,775	$34,678
	Financial Systems Replacement	$950	$3,100	$4,176	$3,900	$3,000	$15,126
	Subtotal	**$31,659**	**$19,514**	**$13,701**	**$13,725**	**$13,125**	**$91,724**
Stations and Parking	Stations & Parking	$10,030	$15,200	$3,132	$2,500	$3,250	$34,112
	ADA Improvements	$3,000	$3,000	$3,000	$3,000	$3,000	$15,000
	Subtotal	**$13,030**	**$18,200**	**$6,132**	**$5,500**	**$6,250**	**$49,112**
Support Activities	Technical Studies	$8,500	$8,500	$9,000	$9,000	$9,500	$44,875
	Project Administration	$1,750	$2,100	$1,000	$1,000	$1,000	$7,350
	Metra Capital Funding	$2,400	$2,400	$2,400	$2,400	$2,400	$12,000
	Locally Funded Projects	$1,455	$1,000	$6,246	$1,789	$1,035	$11,490
	Contingencies	$1,900	$1,559	$2,955	$1,865	$1,915	$9,689
	Unanticipated Capital	$1,000	$888	$1,107	$800	$800	$5,395
	Subtotal	**$17,005**	**$16,447**	**$22,384**	**$16,854**	**$16,650**	**$89,341**
Total	**Grand Total**	**$210,728**	**$283,771**	**$259,945**	**$211,580**	**$272,090**	**$1,238,114**

ESTIMATE OF AVAILABLE CAPITAL FUNDING

In order to pay for its capital investments over the next five years, Metra will rely on funding from the sources described in Table 13.

Table 13: Capital Improvement Program Expected Funds ($000s), 2019-2023

PROJECT	2019	2020	2021	2022	2023	TOTAL
Federal State of Good Repair (5337)	$90,406	$91,323	$92,250	$93,187	$94,133	$461,299
Federal Formula (5307)	$83,180	$84,205	$85,243	$86,294	$87,357	$426,279
CMAQ	$0	$0	$45,106	$0	$0	$45,106
RTA Innovation, Coordination & Enhancement	$5,042	$5,143	$5,246	$0	$0	$15,430
RTA State of Good Repair Bonds	$0	$71,000	$0	$0	$58,500	$129,500
Metra Farebox Capital (Additional Requests)*	$32,100	$32,100	$32,100	$32,100	$32,100	$160,500
TOTAL FUNDING PROGRAM	$210,728	$283,771	$259,945	$211,580	$272,090	$1,238,114

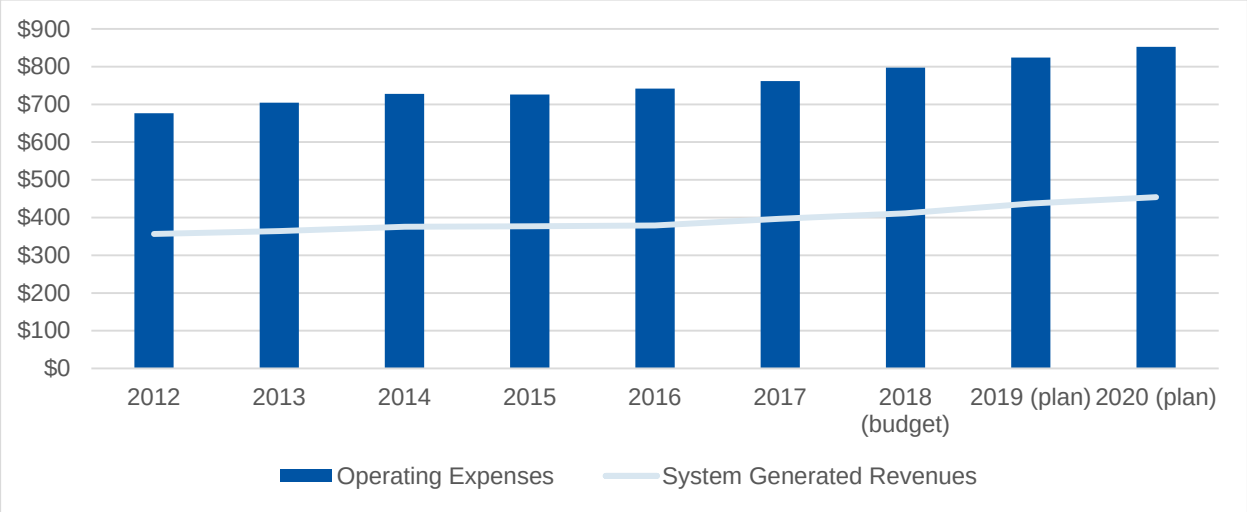
* Metra Farebox Capital is subject to approval by the Board of Directors.

OPERATING AND MAINTENANCE COSTS

Capital investments have an impact on operating and maintenance costs, which are typically higher for older, less fuel-efficient vehicles that are more prone to breakdowns, and for older infrastructure for which there is no longer adequate supplier support.

Metra's mandate, under the RTA Act, requires that fares cover approximately half of its operating costs. Metra is dependent on government funding, primarily a sales tax levied in the six-county region, for the remainder of its operating costs. Figure 4 shows the actual/expected system-generated revenues and total operating expenses from 2012 through 2020. In FY 2018, Metra identified a $45 million operating budget shortfall, which was addressed through cost and service reductions ($14 million); deferral of capital spending ($12 million); a revenue increase ($17 million); and a combination of other revenues and other funding ($2 million).

Figure 4: Operating and Maintenance Costs (Millions of USD), 2012-2020



Of Metra's total operating expenses, approximately 42 percent are for maintenance. Table 14 shows actual and expected operating expenses by type from 2012 to 2020.

Table 14. Operating Expenses (Millions of USD)

OPERATING EXPENSES	2012	2013	2014	2015	2016	2017	2018	2019	2020
Transportation	211.4	224.0	232.9	235.2	245.2	249.5	265.7	274.8	284.2
Fuel and motive power	83.5	83.7	85.5	77.8	54.9	49.5	54.7	56.4	58.6
Maintenance of way	124.1	127.5	134.6	129.8	135.2	149.8	154.2	159.4	164.8
Maintenance of equipment	147.8	150.5	160.3	158.5	174.6	174.3	185.0	191.3	197.8
Administration	50.0	62.7	82.6	94.4	100.8	98.8	108.3	112.0	115.8
Claims, insurance, and risk management	22.2	18.1	17.4	15.0	16.8	25.4	14.0	14.5	15.0
Regional services	23.3	23.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Downtown stations	14.2	14.0	14.6	15.3	14.3	14.3	15.3	15.8	16.4
Total expenses before depreciation	**676.5**	**704.4**	**727.9**	**726.0**	**741.8**	**761.6**	**797.2**	**824.2**	**852.6**

ASSET MANAGEMENT IMPLEMENTATION

Metra recognizes that this TAM Plan is only the first step in achieving the organization's asset management goals, and commits to review and revision over time in order to continuously enhance its asset management practices.

TAM PLAN UPDATE AND EVALUATION

625.25 (b) A TAM Plan must include (9) An outline of how a provider will monitor, update, and evaluate, as needed, its TAM Plan and related business practices, to ensure the continuous improvement of its TAM practices

This plan is a living document which is relevant and integral to daily activity, and Metra commits to carrying out the activities within this plan.

To ensure the plan remains useful and relevant, the following on-going monitoring and review activities have or will be undertaken:

- The Asset Management Policy contained within this plan has been formally adopted by Metra's top management and accountable executive and will direct the development of future asset management initiatives – including future versions of this asset management plan.
- This TAM Plan has been formally adopted by Metra and will be used to guide the delivery of maintenance and capital programs.
- The service measures defined on page 12 shall be monitored. Failure to meet targets will be reviewed by Metra's Asset Management working group and will result in recommendations for corrective action as appropriate, ensuring that Metra remains able to deliver the required level of service for each asset class.
- The asset portfolio and condition information shall be updated annually as part of NTD reporting.
- Metra's Fleet Management Plan, Bridge Management Program, and other guiding maintenance and management documents will be monitored and updated as needed, to ensure that the lifecycle management strategies contained therein continue to adequately address its assets' maintenance needs.
- Metra's five-year capital plan shall be updated annually, following the investment prioritization procedures laid out in this document.

At a minimum, this Plan will undergo a comprehensive update and review every four years. The plan will also be updated when major changes in Metra's assets occur, such as a new fleet, facility, or infrastructure acquisition worth more than $100 million. Certain aspects of the Plan will be reviewed more frequently, on an annual cycle (though not necessarily updated within the Plan). This includes a review of asset condition, performance targets (as part of annual submissions to the NTD), and progress against asset management objectives.

IMPLEMENTATION STRATEGY

625.25 (b) A TAM Plan must include: (6) A provider's TAM Plan implementation strategy

As part of the development of this TAM Plan, Metra underwent a gap analysis that identified recommended improvement/implementation actions to comply with 49 CFR 625 and asset management best practices. Since then, Metra has made significant strides toward improving its asset management practices. Table 15 shows the recommended implementation actions and Metra's current status with respect to each.

Table 15. Asset Management Implementation Actions

IMPLEMENTATION ACTION	STATUS AND NEXT STEPS
Develop an Asset Management Policy, Objectives, and Strategy that are aligned with overall strategic objectives, communicated widely and approved by the relevant agency stakeholders, and subject to regular revision.	Metra's first TAM Policy, which is aligned to overall strategic objectives, was signed on August 8, 2018. The policy must still be communicated throughout the agency, which will occur as part of a broader communication campaign (including as part of new-hire onboarding) that will last for the duration of the TAM horizon period, contributing to culture change around implementing asset management.
Complete development of the Asset Management System (AMS) as a comprehensive repository of all asset management-related policies, plans, and procedures; available online internally to all staff.	Metra's TAM Policy and Plan form the initial documents that will compose an AMS. More work is required to further build out the AMS, make it accessible, and promote awareness.
Develop an overarching TAM Plan, compliant with the FTA final ruling, and update the TAM Plan through the horizon period when a significant change occurs.	This document represents the first version of Metra's TAM plan, and was developed with input and buy-in from departments across the agency. It is expected to undergo substantial revision during the current horizon period as Metra continues to improve its asset management processes.
Develop a formal capital project prioritization methodology, defining the criteria for deciding which projects better justify funding than others, including alignment with Metra's strategic goals.	Metra has developed a capital project prioritization methodology for the FY2019-FY2023 capital program. Additional work is required to communicate the new methodology internally and to improve the data that informs the prioritization.
Define an asset condition assessment approach that describes how, when, and what is measured for facilities, rated using a 1 to 5 scale.	Metra is developing a condition assessment methodology for facilities to evaluate one-quarter of Metra's facilities this year. As the process is tested, it is expected to undergo revision.
Define an asset condition assessment approach that describes how, when, and what is measured across all asset classes. Condition rating parameters may differ across asset classes but the scoring scale, e.g., 1 to 5, should remain consistent to enable comparison.	In addition to the condition assessment methodology for facilities, an approach to assigning a reliable condition rating has also been developed for rolling stock assets. Development of assessment methodologies for other asset classes have not yet begun.
Craft and carry out a plan for improving inventory collection, storage, and update methods to support TAM.	Metra has created a plan for increasing the use of Maximo to store asset information in order to inform decision-making.

The implementation actions described above will require the full horizon period of this TAM Plan to achieve and to embed throughout Metra. Carrying out these activities will affect a range of business processes and may require cultural change.

Metra looks forward to building on the first steps taken in developing this TAM Plan, in order to grow a mature asset management system that will enable improvement of Metra's state of good repair and ensure the successful operations of its passenger rail network for many years to come.