3 – Planning Process

As stated in Chapter 1, the 2050 Facilities Plan (2050 FP) incorporates elements of an asset management approach that layer in triple bottom line goals and objectives into traditional facility planning to identify recommended projects. The goal of the 2050 FP planning process is to recommend projects to meet regulatory guidelines and permit requirements as well as to meet MMSD's 2035 Vision and 2050 Foundational Goals, which address non-permit requirements and include projects that address Commission policy and rules established by MMSD, projects that help to improve regional water quality and reduce energy usage, and projects that are designed to save MMSD money in the long term.

The 2050 FP is MMSD's first facilities plan that incorporates elements of an asset management approach to direct the efficient management of its infrastructure. As of 2020, MMSD is developing a separate Asset Management Plan (AMP), the initial efforts of which are documented in the 2050 FP. The AMP will be a 'living document' that will be updated regularly to reflect the changing asset management requirements at MMSD and outline the ongoing refinement of asset management practices, strategies, and tools.

This chapter describes the process that MMSD followed to evaluate its asset systems, identify system needs, and develop the alternative analyses and recommendations documented in the 2050 FP.

3.1 Planning Process Overview

The 2050 FP project team followed a planning process that used asset management planning tools in addition to more traditional facilities planning tools, some of which overlapped. Asset management tools were used to identify desired levels of service and associated targets and assess existing assets.[1] Traditional facilities planning tools were used to conduct alternative analyses and to identify recommended projects. The future demand projections presented in this report followed a process that both planning approaches traditionally use.

Table 3-1 outlines the steps that were followed during the development of the 2050 FP.

[1] *The term 'existing' varies by asset system and type of assessment. The definition of the term 'existing' is provided with each asset system assessment.*

TABLE 3-1: 2050 FACILITIES PLAN DEVELOPMENT METHODOLOGY

Step	Focus	Location
Identify Level of Service	Identify stakeholder needs and review expectations. Define level of service categories and align them with the triple bottom line measures. Identify performance indicators and key performance indicators.	Appendix 3A
Estimate Future Demand	Establish demand for each asset system under the following conditions: **Baseline Conditions:** most recent available data set used as a reference point to compare Future Conditions and Buildout Conditions projections. **Future Conditions:** established as the year 2040, which is assumed to be substantially equivalent to conditions in 2035 to align with the 2035 Vision and Strategic Objectives document developed by MMSD. **Buildout Conditions:** estimated future demand conditions when the 2050 FP planning area is built out.	Chapter 4
Assess Existing Facilities and Risks	Assess existing facilities' capacity, performance, and condition to identify risks that may impact MMSD's ability to meet its future goals. Risks are grouped into one of four failure modes: capacity, physical mortality (useful life), level of service, and economic efficiency.	Chapter 5
Conduct Alternative Analyses	Analyze alternatives to address risks for each asset system. These analyses are grouped into risks to meeting regulatory/permit requirements within the 2020 to 2040 time period and risks to meeting the 2050 Foundational Goals. Each alternative analysis results in a recommended project.	Chapter 6
Develop Recommended Plan to meet Regulatory Guidelines and Permit Requirements	Identify recommended projects to meet regulatory/permit requirements within the 2020 to 2040 regulatory planning period established for the 2050 FP.	Chapter 7
Develop Recommended Plan to Meet 2050 Foundational Goals	Identify recommended projects that address 2050 Foundational Goals and discuss additional Foundational Goal issues.	Chapter 8
Develop Implementation Plan	Develop implementation plan for all recommended projects and programs, which includes the implementation schedule, associated capital and annual operation and maintenance costs, and an estimate of the financial impact on ratepayers (if any).	Chapter 9

3.2 IDENTIFY LEVEL OF SERVICE

The levels of service that are used in the 2050 FP were identified during the development of MMSD's Asset Management Plan. This section provides an overview on how level of service measures were identified. See Appendix 3A for additional details on the level of service development process.

One of the key objectives of an asset management program is to manage infrastructure assets in a way that balances the organizational risk and cost of owning and operating these assets with delivery of desired level of service. Connection between performance of asset systems and achievement of level of service is made by identifying performance indicators (PIs) or key metrics of asset performance that relate directly to achievement of service targets.

Level of service categories offer a convenient way to group various performance indicators into broader service areas. To identify appropriate level of service categories for its asset systems, MMSD reviewed general asset management industry standards and then customized them as appropriate to meet the specific requirements of MMSD and its stakeholders.

MMSD follows a triple bottom line approach in the management and evaluation of its asset infrastructure. In the triple bottom line approach, an organization broadens its focus to consider not only its financial bottom line, but also the social and environmental aspects of any investment. Using this approach to evaluate investments allows MMSD to identify and implement the highest value option (not solely based on the lowest cost). To align measurements of organizational performance with the triple bottom line methodology, the level of service categories and associated performance indicators were grouped to fall under the triple bottom line measures of Environmental, Economic, or Social.

This development process resulted in the identification of seven level of service categories that align with the triple bottom line measures as follows:

TABLE 3-2: LEVEL OF SERVICE CATEGORIES

Triple Bottom Line Measures	Level of Service Category
Environmental	Permit Requirements Energy Environmental Improvements
Economic	Fiscal Responsibility Management Effectiveness
Social	Safety Customer Service, Communication and Employee Development

To identify relevant performance indicators, MMSD reviewed regulatory requirements as well as internal and external stakeholder goals that could be used to measure business activity (e.g., amount of energy usage from landfill gas.). Each performance indicator was then assigned to an applicable level of service category to enable analysis by broader service areas.

MMSD then narrowed down the list by identifying ***key*** performance indicators (KPIs), which are those metrics that demonstrate how effectively an organization is achieving key business objectives; in other words, those business performance metrics that are aligned with organizational strategies and measure performance against a goal. This alignment of key performance indicators with business objectives allows MMSD to monitor the relationship of an asset system's performance to the achievement of its organizational goals.

The result is a hierarchical structure from the triple bottom line measure down to the key performance indicator. This provides a "line of sight" to understand how the achievement of specific asset-level key performance indicator targets contribute to the achievement of organizational service goals and how those goals are grouped into triple bottom line measures.

The performance indicators that were identified during this process are outlined in the following tables:

- Table 3-3 lists the 10 KPIs
- Table 3-4 lists an additional 13 PIs that were identified during this process

The tables identify the following for each PIs/KPIs:

- **Triple Bottom Line Measure.** Each indicator fits into either an environmental, economic, or social triple bottom line measure.
- **Level of Service Category.** The applicable level of service category.
- **Permit Requirements/MMSD Targets.** Some PIs and KPIs have specific permit requirements; if so, those are listed. In addition, MMSD has defined its own targets. MMSD targets are often more stringent than any corresponding permit limits. Some targets are listed as TBD (to be determined) where MMSD has not yet officially determined a target.[2]
- **Source of Limits and Targets.** Indicates the source of the permit requirement or MMSD target.
- **Applicable Asset System.** Not all PIs/KPIs apply to each asset system. The applicable asset systems are identified.

Appendix 3A contains more details about the process that was used to develop level of service categories, PIs, and KPIs.

[2] *One of the PIs has a very lofty target: the goal of achieving zero combined sewer overflows (CSOs). MMSD recognizes that it also needs to establish an interim goal of maintaining the existing Baseline CSO frequency as part of its phased-in approach to achieving this goal. Baseline CSO frequency is established in Chapter 4.*

TABLE 3-3: KEY PERFORMANCE INDICATORS AND LEVEL OF SERVICE TARGETS

Key Performance Indicator (KPI)	Triple Bottom Line Measure	Level of Service (LOS) Category	Level of Service		KPI/LOS Target Source	Applicable Asset System			
			Permit Requirement	MMSD Target		CS[1]	WRF[1]	WCFM[1]	GI[1]
% of annual overall capture of flow into MMSD system	Environmental	Permit Requirements	85	100	WPDES Permit Section 4.3.4	X	X	X	X
		Environmental Improvements	--		2035 Vision				
Effluent permit violations/year (multiple parameters)	Environmental	Permit Requirements	0	0	WPDES Permit Section 6.3		X		
MG of permit qualifying green infrastructure retention capacity installed in planning area	Environmental	Permit Requirements	50 MG (20 MG in CSSA[2]) by March 31, 2024	740 MG by 2035	WPDES Permit Section 4.3.4.3.1	X		X	X
		Environmental Improvements	--		2035 Vision				
% of annual energy from renewable sources	Environmental	Energy	--	100	2035 Vision	X	X	X	X
% of annual energy from MMSD-generated renewable sources	Environmental	Energy	--	80	2035 Vision	X	X	X	X
% of annual total biosolids that are beneficially reused	Environmental	Environmental Improvements	--	100	Internal Goal		X		
Annual tax levy increase (%)	Economic	Fiscal Responsibility	--	0 - 4	Annual Budget	X	X	X	X
Annual user charge billing increase (%)	Economic	Fiscal Responsibility	--	0 - 2.5	Annual Budget	X	X	X	X
Total number of plumbed structures in 1% annual probability floodplain	Social	Safety	--	0	2050 FP Commission Direction/2035 Vision			X	
Count of odor issues/year (total count of complaints and notices of violation)	Social	Customer Service, Comm, Employee Development	0	0	CCO Reports/WPDES Permit	X	X		

1) Asset System Definitions:
CS – Conveyance and Storage
WRF – Water Reclamation Facilities and Biosolids
WCFM – Watercourse and Flood Management
GI – Green Infrastructure
2) CSSA – Combined Sewer Service Area

TABLE 3-4: PERFORMANCE INDICATORS AND LEVEL OF SERVICE TARGETS

Performance Indicator (PI)	Triple Bottom Line Measure	Level of Service (LOS) Category	Level of Service		PI/LOS Target Source	Applicable Asset System			
			Permit Requirement	MMSD Target		CS[1]	WRF[1]	WCFM[1]	GI[1]
SSO events/year	Environmental	Permit Requirements	0	0	WPDES Permit Section 9.3.1.1	X	X	X	X
CSO events/year	Environmental	Permit Requirements	6	0 [2]	WPDES Permit Section 4.3.4	X	X	X	X
		Environmental Improvements	--		2035 Vision				
Air operating and construction permit violations/year	Environmental	Permit Requirements	0	0	Construction Permit 10-POY-005; Operating Permits 241029250-P11 and 241228350-P11		X		
Biosolids permit violations/year	Environmental	Permit Requirements	0	0	WPDES Permit Section 8.2		X		
Effluent operating contract limits exceeded/year (multiple parameters)	Environmental	Environmental Improvements	--	Multiple	VWM 2008-2018 Operating Contract		X		
Reduction in annual MMSD GHG emissions from 2010 baseline (%)	Environmental	Energy	--	90	2035 Vision	X	X	X	X
Total acres of Greenseams/river buffers	Environmental	Environmental Improvements	--	Acquire 10,000 acres by 2035	2035 Vision			X	
% of annual N recovered	Environmental	Environmental Improvements	--	TBD	Stakeholder Expectations		X		X
% of annual P recovered	Environmental	Environmental Improvements	--	TBD	Stakeholder Expectations		X	X	X
Percent by count of assets with estimated cost of rehabilitation/replacement and estimated year of rehabilitation/replacement in Asset Information Management System	Economic	Management Effectiveness	--	100	Asset documentation gap identified in AM Strategy	X	X	X	X
Basement backups due to MIS capacity/year	Social	Safety	--	0	2035 Vision	X		X	
Annual MMSD employee safety severity rate	Social	Safety	--	0	Internal Goal	X	X	X	X
Annual VWM employee safety severity rate	Social	Safety	--	0	VWM 2008-2018 Operating Contract	X	X		

1) Asset System Definitions:
CS – Conveyance and Storage
WRF – Water Reclamation Facilities and Biosolids
WCFM – Watercourse and Flood Management
GI – Green Infrastructure
2) The interim goal is to maintain baseline CSO frequency, which is established in Chapter 4

3.3 ESTIMATE FUTURE DEMANDS

For the purposes of the 2050 FP, demand is defined as the required use of an asset or asset system. The capacity of an asset or asset system to meet existing or future demand projections has a direct impact on asset system performance. If the demands placed on an asset exceed the capacity of the asset, it will likely result in failure to meet a level of service expectation of the asset. Therefore, understanding both existing and future demand for asset systems is a necessary step to proactively meet demand needs and achieve level of service expectations, and is required by Wis. Admin. Code NR 110.09(j) and NR 110.10(1)(f). Demand is defined as follows for each of MMSD's major asset systems:

- Conveyance and Storage – flows from water users and rainfall that enters the system
- Water Reclamation Facilities (WRFs) and Biosolids – flows from the Conveyance and Storage Asset System to the WRFs, along with the associated wasteloads
- Watercourse and Flood Management (WCFM) – flows from rainfall runoff
- Green Infrastructure (GI) – storage goals established by permit and internal goals

Chapter 4 establishes the time periods for demand for existing (defined as Baseline), Future, and Buildout Conditions and defines how those demand projections were calculated.

3.4 ASSESS EXISTING FACILITIES

Existing facilities were then assessed to identify the risks that may impact MMSD's ability to meet its performance goals under future and buildout demand conditions. Chapter 5 describes the procedures that were undertaken to complete the facility assessments and provides a summary of the systemwide[3] assessments as well as the four failure mode assessments that were conducted for each asset system: capacity (demand), physical mortality, level of service, and economic efficiency. The level of service risks were, in part, identified and evaluated based on the level of service targets presented in Appendix 3A. The capacity (demand) risks were identified and assessed based on the future demands presented in Chapter 4. The identification and assessment of all these risk categories then sets the context for Chapter 6, which analyzes potential alternatives to address those risks.

3.5 CONDUCT ALTERNATIVE ANALYSES

Analyses were conducted to determine potential alternatives to mitigate the identified risks. Alternatives were scored using a scoring matrix that used analysis-specific performance factors for the seven level of service categories. The level of service categories were weighted based on a paired comparison approach with input from MMSD staff. Most alternative analyses resulted in a recommended project, although in some instances the analysis determined that no project was needed. Chapter 6 describes the process used to conduct the alternative analyses.

[3] *For purposes of the 2050 FP, systemwide is defined as a risk or project that applies to more than one asset system.*

3.6 DEVELOP RECOMMENDED PLAN TO MEET REGULATORY GUIDELINES/PERMIT REQUIREMENTS

After conducting the alternative analyses, the 2050 FP project team developed a recommended plan to address the regulatory guidelines and permit requirements through the regulatory period of 2020 to 2040, which are presented in Chapter 7. The recommended projects are organized by the four major asset system: Conveyance and Storage, WRFs and Biosolids, Watercourse and Flood Management, and GI. The recommend plan also identifies existing projects as of 2019 that help to support meeting regulatory guidelines and permit requirements.

3.7 DEVELOP RECOMMENDED PLAN TO MEET 2050 FOUNDATIONAL GOALS

The 2050 FP project team also identified developed the recommended plan to help meet MMSD's 2050 Foundational Goals, which are presented in Chapter 8. The recommended projects are also organized by the four major asset systems plus recommended projects to address systemwide risks. Chapter 8 also includes non-project recommendations to address other issues that may impact 2050 Foundational Goals.

3.8 DEVELOP IMPLEMENTATION PLAN

The 2050 FP project team developed the 2050 FP implementation plan, which presents the schedule for all new recommended projects, as well as the 2050 FP financing plan, which shows the financial impact to ratepayers. The 2050 FP financing plan was only developed through the year 2025, recognizing that the full estimated population and land use growth may not occur within the planning period. Finally, the 2050 FP project team developed the 2050 FP implementation plan for the recommended projects. Chapter 9 also includes the 2050 FP financing plan through the year 2025, recognizing that the population and land use growth may not occur to the full extent projected within the planning period and that the primary goal is to meet regulatory/permit requirements. The 2050 FP financing plan was developed so that 2050 FP recommendations for the 2021 to 2025 time period can be accomplished without changes to the total MMSD budget as presented in the 2020 Operations and Maintenance and Capital Budgets. [1]

3.9 APPENDICES

Appendix 3A – Level of Service

3.10 REFERENCES

[1] Milwaukee Metropolitan Sewerage District, "2020 Operations and Maintenance and Capital Budgets," MMSD, Milwaukee, WI, 2020.