

Program 8089 – Metro WRRF Asset Renewal



Metropolitan Water Resource Recovery Facility (WRRF)

Description

This program provides funding for planning and implementation of projects to continue renewal for liquids processing and plant-wide systems at the Metropolitan Water Resource Recovery Facility (Metro WRRF), which was initiated under Program 8059 Metro Rehabilitation and Facilities Improvements. Planning work is documented in the Metropolitan Wastewater Treatment Plant Asset Renewal Facility Plan (December 2015).

Purpose and justification

Projects in this program address renewal needs for continued, reliable, and sustainable wastewater service at the Metro WRRF through the year 2040.

Program location

The active projects within this program are in the following Council District: 13

Active projects in program

Project Number	Project Title
808915	Metro WRRF Electrical Distribution Renewal Phase 2
808916	Metro WRRF Electrical Distribution Renewal Phase 3
808918	Metro WRRF Flood Control Improvements
808919	Metro WRRF 408 and F&I #2 Building Envelope Rehabilitation
808925	Metro WRRF PLC Renewal
808927	Metro WRRF Steam System Improvements and Turbine Rehabilitation
808928	Metro WRRF Effluent Pump Station Rehabilitation and West Secondary Improvements
808929	Metro WRRF Solids Control Room Improvements
808930	Metro WRRF Secondary Improvements Phase 1

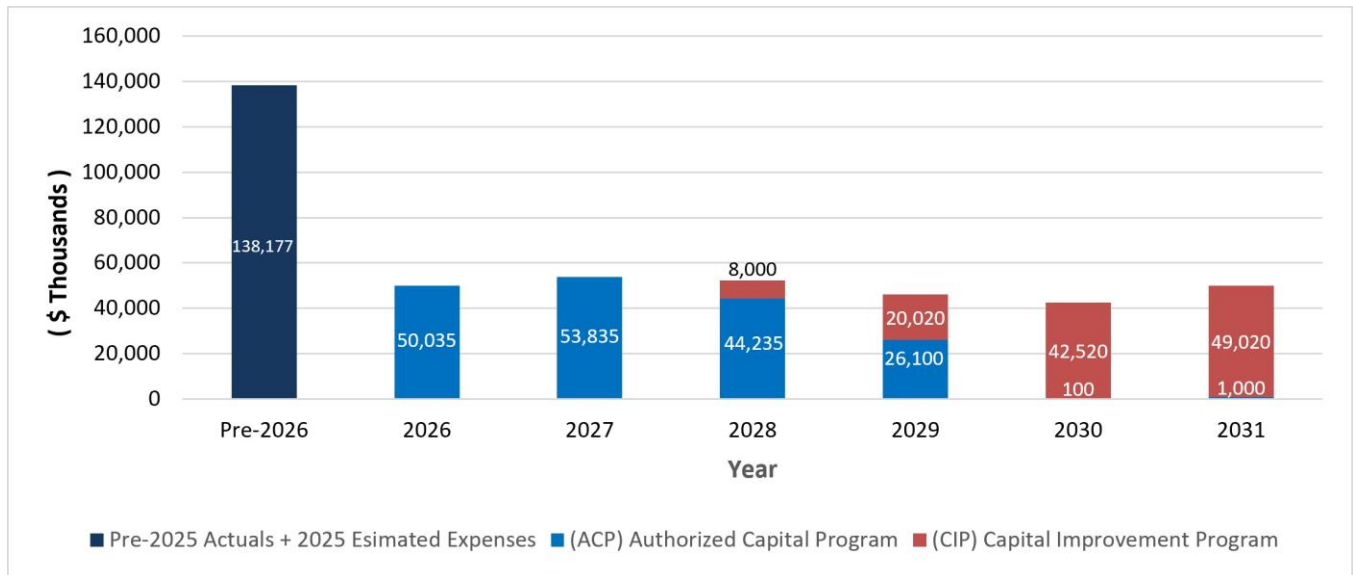
Project Number	Project Title
808933	Metro WRRF Electrical Distribution Renewal Phase 4
808935	Metro WRRF Primary and Secondary Renewal Phase 1
808963	Metro WRRF Water Systems Renewal and Improvements Phase 1: Distribution System Renewal
8089XX	Metro WRRF Primary and Secondary Renewal Phase 2

Environmental Services 2026 through 2031 Capital Program

- Authorized Capital Program (ACP): \$313,482,469
- Capital Improvement Plan (CIP): \$119,560,000

Estimated program cash flow from 2026 through 2031

Note: the ACP is the total amount of all past and present authorizations including pre-2026 expenses.



Project location: Council District #13, City of Saint Paul, Metro WRRF



Aeration Compressor

Project type

Facility

Objectives

Asset Preservation

Scope

Maintenance staff will coordinate the rehabilitation of seven compressor motors through specialty contracted services and install temperature and vibration monitoring for the motors.

Project need

The aeration compressors are critical to the continued performance of the aeration process and inspections by Maintenance staff indicate the compressor motors need to be replaced or rehabilitated to extend service life.

Project schedule:



Planning: 2010 through 2015



Design: 2018 through 2020



Construction: 2020 through 2027

Financial analysis

2026 cash flow:	\$15,000
Current ACP:	\$6,150,000
2026 through 2031 cash flow:	\$45,000
Total project cost:	\$4,208,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



New unit substations to be installed

Project type
Facility

Objectives
Asset Preservation, System Expansion,
and Quality Improvements

Scope
Replace electrical distribution equipment (unit substations, switchgear, and motor control centers) with new equipment. Upgrade and expand the existing Main Substation Building to provide space for new equipment and to improve worker safety during maintenance.

Project need
Condition assessments determined that electrical equipment in the Main Substation Building and at various buildings throughout the facility are nearing the end of useful service life and need to be replaced.

Project schedule:



Planning: 2010 through 2015



Design: 2018 through 2021



Construction: 2022 through 2026

Financial analysis

2026 cash flow:	\$6,000,000
Current ACP:	\$59,518,000
2026 through 2031 cash flow:	\$6,000,000
Total project cost:	\$56,923,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Location of the flood control measure at the Metro WRRF

Project type

Facility

Objectives

Asset Preservation

Scope

Increase the road elevation at the intersection of Pig's Eye Lake Road and 5th Avenue to the existing levee height.

Project need

There is a need to install an additional flood control measure to address a 500-year flood event.

Project schedule:



Planning: 2010 through 2015



Design: 2023 through 2026



Construction: 2027

Financial analysis

2026 cash flow:	\$500,000
Current ACP:	\$400,000
2026 through 2031 cash flow:	\$1,100,000
Total project cost:	\$1,100,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Left: 408 Building looking west.

Right: F&I #2 building looking east.

Project type
Facility

Objectives
Asset Preservation

Scope
This project rehabilitates or demolishes portions of the 408 and Filtration & Incineration (F&I) #2 buildings based on condition assessments and a business case evaluation.

Project need
The 408 and F&I #2 buildings are over 45 years old and need to be rehabilitated or demolished.

Project schedule:



Planning: 2010 through 2015



Design: 2022 through 2027



Construction: 2024 through 2028

Financial analysis	
2026 cash flow:	\$2,500,000
Current ACP:	\$4,100,000
2026 through 2031 cash flow:	\$5,000,000
Total project cost:	\$15,010,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Photo taken inside a typical Programmable Logic Controller (PLC)

Project type
Facility

Objectives
Asset Preservation

Scope
Replace out-of-date process control systems at the Metropolitan Water Resource Recovery Facility (Metro WRRF).

Project need
Key elements in the process control system for the Metro WRRF are out of date and in need of replacement to continue to provide reliable treatment process control at this facility.

Project schedule:



Planning: 2010 through 2015



Design: 2023 through 2027



Construction: 2024 through 2027

Financial analysis

2026 cash flow:	\$1,600,000
Current ACP:	\$5,500,000
2026 through 2031 cash flow:	\$4,800,000
Total project cost:	\$9,559,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Metro Facility staff performing maintenance on the G7 steam turbine generator

Project type
Facility

Objectives
Asset Preservation

Scope
This project will rehabilitate the existing steam turbine generator and make improvements to boiler feedwater chemistry, instrumentation and controls, moisture mitigation, steam traps, and structural modifications to get an additional 7 to 10 years of service from G7 steam turbine generator.

Project need
Rehabilitation and improvements to the G7 steam turbine generator system is needed since G7 can save the Metro Facility roughly \$1,000,000 per year in purchased electricity.

Project schedule:



Design: 2023 through 2025

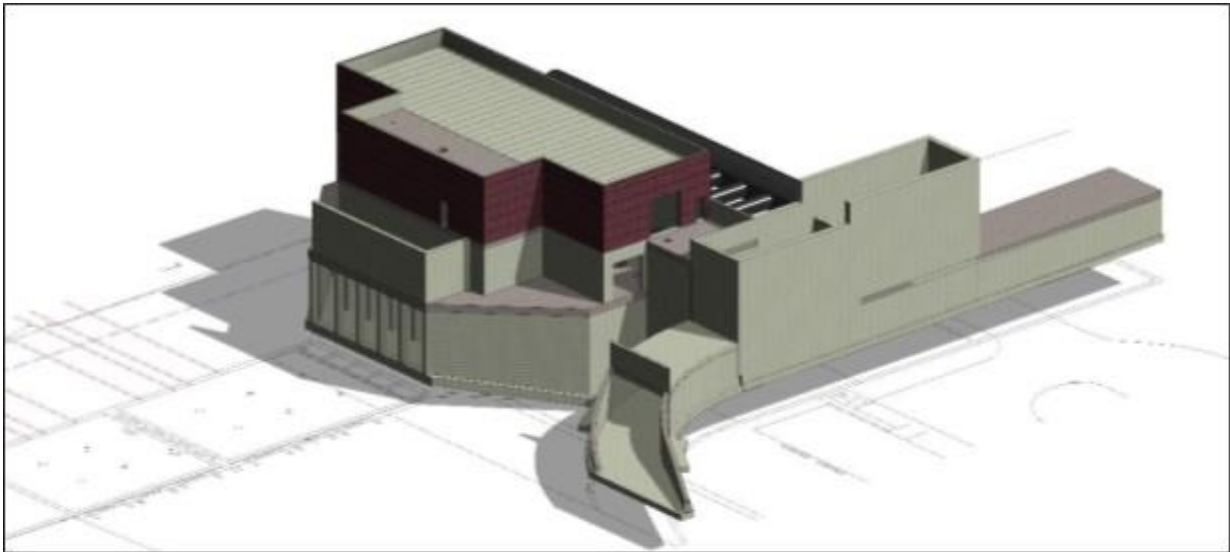


Construction: 2025 through 2026

Financial analysis

2026 cash flow:	\$4,000,000
Current ACP:	\$10,800,000
2026 through 2031 cash flow:	\$10,000,000
Total project cost:	\$12,423,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Effluent Pump Station 3-Dimensional Model

Project type
Facility

Objectives
Asset Preservation

Scope
This project rehabilitates the effluent pump station (EPS), including pump renewal, concrete repairs, pipe repairs, HVAC improvements, rehabilitation of the building envelope, replacement of switchgear, transformers, MCCs, and other electrical equipment. This project includes limited demolition of unused structures and decommissioned processes.

This project provides upgrades for the West Secondary Building (WSE2), including HVAC replacement, rehabilitation of the building envelope, and fiber optic network replacement.

Project need
The EPS has experienced problems with service availability and needs to be renewed to recover system reliability. There is a need to rehabilitate the EPS and WSE2 buildings to preserve infrastructure.

Project schedule:

		
Planning: 2010 through 2015	Design: 2021 through 2026	Construction: 2026 through 2029

Financial analysis	
2026 cash flow:	\$7,000,000
Current ACP:	\$35,790,000
2026 through 2031 cash flow:	\$40,000,000
Total project cost:	\$40,331,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Existing Metro WRRF Solids Management Building Control Room Built in 2004

Project type
Facility

Objectives
Quality Improvement

Scope
This project replaces the solids management building control room, conference room, and sludge storage operator control area. The project also includes ergonomic improvements to the centrifuge operator control area, ash loadout operator control area, business unit coordinator’s office, and other offices in the Solids Management Building.

Project need
The Metro WRRF solids management building control room, conference room, offices, and operator control areas are almost 20 years old and in need of ergonomic, performance monitoring, and work environment improvements.

Project schedule:



Design: 2023 through 2024



Construction: 2025 through 2026

Financial analysis

2026 cash flow:	\$1,000,000
Current ACP:	\$2,185,000
2026 through 2031 cash flow:	\$1,500,000
Total project cost:	\$1,981,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Left: Demolition of diffusers - Metro Facility’s secondary treatment. Right: Installation of diffusers - Metro Facility’s secondary treatment.

Project type
Facility

Objectives
Asset Preservation

Scope
This project replaces the aeration tank diffusers, installs aeration control upgrades, rehabilitates underdrains and meter pits, and installs final settling tank backfill gates and air header leak assemblies.

Project need
The aeration system equipment has been in place since the early 2000s and needs to be replaced. The new aeration equipment will result in significant energy savings due to improvements in air transfer efficiency.

Project schedule:



Planning: 2010 through 2015



Design: 2020 through 2021



Construction: 2021 through 2026

Financial analysis

2026 cash flow:	\$500,000
Current ACP:	\$36,340,000
2026 through 2031 cash flow:	\$500,000
Total project cost:	\$35,437,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Motor control center

Project type

Facility

Objectives

Preservation, System Expansion, and Quality Improvements

Scope

This project replaces electrical distribution equipment (unit substations, switchgear, and motor control centers) with new equipment and installs a generator “common bus” to create a looped distribution system that shares availability of diesel generator power. This project could include installation of new generators and/or the decommission of existing generators.

Project need

Condition assessment determined that electrical equipment in various buildings throughout the facility is near the end of useful service life and needs to be replaced. There are no means to share emergency power between process areas. Each generator is local to the equipment.



Planning: 2010 through 2015



Design: 2026 through 2028



Construction: 2028 through 2030

Financial analysis

2026 cash flow:	\$0
Current ACP:	\$0
2026 through 2031 cash flow:	\$35,000,000
Total project cost:	\$45,000,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Rendition of EPT addition

Project type

Facility

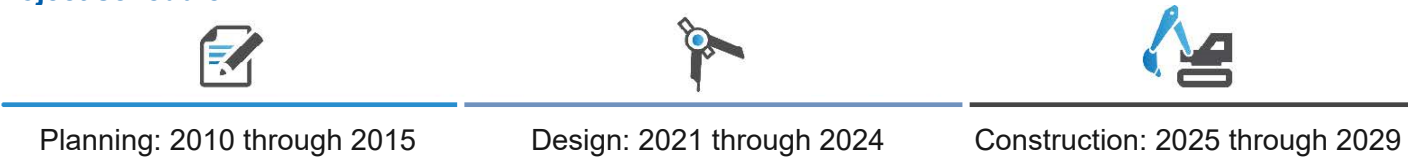
Objectives

Asset Preservation

Scope
The following improvements are included: East Pretreatment (EPT) Improvements and building expansion, sluice gate replacements, road improvements, East Primary and Compressor building and equipment improvements, concrete repairs, and PLC replacements.

Project need
Primary and Secondary equipment and infrastructure are approaching 40 years old and need replacement. Condition assessment determined that roofs and roads are at or nearing the end of useful service life and need to be replaced.

Project schedule:



Financial analysis	
2026 cash flow:	\$10,000,000
Current ACP:	\$46,839,000
2026 through 2031 cash flow:	\$37,000,000
Total project cost:	\$40,552,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Left: Deteriorated service water piping to be renewed/replaced. Center: Aeration tank spray water piping to be repurposed. Right: Abandoned/obsolete process piping to be removed.

Project type

Facility

Objectives

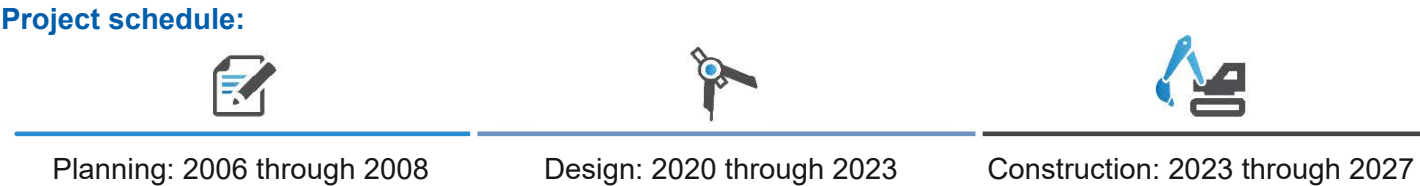
Asset Preservation

Scope

The project replaces the service water piping network throughout the facility with a new piping network in preparation for a future reclaimed water system.

Project need

Rehabilitate and repurpose Metro WRRF water systems and reduce withdrawal of water from the Prairie du Chien Aquifer.



Financial analysis

2026 cash flow:	\$11,000,000
Current ACP:	\$49,000,000
2026 through 2031 cash flow:	\$31,500,000
Total project cost:	\$45,507,000

Project location: Council District #13, City of Saint Paul, Metro WRRF



Existing East Pretreatment Biofilter

Project type

Facility

Objectives

Asset Preservation

Scope

The following improvements are planned: odor control improvements at East Pretreatment and Sludge Storage.

Project need

The odor control systems for pretreatment and sludge storage need to be rehabilitated to mitigate odors.

Project schedule:



Financial analysis		
2026 cash flow:		\$0
Current ACP:		\$0
2026 through 2031 cash flow:	\$21,000,000	
Total project cost:	\$21,000,00	