

WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements

- ☒ Innovation
- ☐ Conceptual WW MP
- ☐ Water MP Right Sizing
- ☒ Reliability/Redundancy
- ☐ NEWTP Repurposing

Project Status Active

CIP Type Project

☐ **Project New To CIP**

WRRF Pumping Station
2: Bar Racks and Grit
Collection System



Budget Wastewater

Project Engineer/Manager Jason Williams

Director Dan Alford

Managing Dept WW Design Eng

Date Original Business Case Prepared 10/12/2016

Year Project Added to CIP 2016

Class Lvl 1 Wastewater

Class Lvl 2 WRRF

Class Lvl 3 Primary Treatment

Location City of Detroit

Fund and Cost Center Wastewater - 5421-892211

Problem Statement

Replacement of all bar racks and associated equipment and addition of fine screens (1/4 inch) for more reliable and efficient screenings removal. Addition of screenings washing and compaction to reduce truck traffic and cost of disposal. Improvement of grit collection system with more efficient, state-of-the-art, grit collection and pumping system, and grit washing and classification to reduce truck traffic and cost of disposal. Improvements to the grit screenings and grit removal and handling systems will improve the performance of all downstream processes, reduce maintenance costs and increase life of downstream equipment.

Scope of Work / Project Alternatives

The work consists of evaluation, design and construction of the replacement of the existing bar racks and ancillary equipment and gates, addition of new fine screens (1/4 inch) downstream of the bar racks, addition of screenings washing and compaction, inclusion of stacked tray grit removal or other technology within the aerated grit tank and grit washing and/or classification. Work also includes the upgrade and expansion as necessary of the existing building that houses the screens and the screenings and grit handling and load out, including all lighting, HVAC, plumbing, electrical, and architectural work. New instrumentation and controls for operations and monitoring will also be provided. System shall be designed to meet long-term wet weather capacity requirements at PS2.

Other Important Info

*Innovation note: Include new grit removal equipment rather than replacement in kind (cyclonic). The CIP Project Proposal – CIP 1314 – “Replacement of Bar Racks at Pump Station No. 2” and CIP Project Proposal – CIP 1223 – “Rehabilitation of Grit and Screening System at PS-2 and Rehabilitation of Sampling Sites at WWTP” are combined into one project under CIP 1314. That combined new budget for CIP 1314 (CIP 1223 and 1314) has a total amount of \$11,617,000. The design of “Rehabilitation of Sampling Sites” is completed and will be bid separately for construction. The previous design for Bar Rack System by Sigma under As Needed Engineering

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	Services Contact task order will not proceed for construction as designed. An engineering decision to have a fresh look and start new study, design and construction project through this CIP project will proceed. The original budget for CIP-1314 is \$3.667M. The \$6.0M CIP budget transfer was made from CIP-1223. The new revised CIP-1314 budget is \$9.667 Challenges: Maintaining the MDEQ-NPDES required capacity during the construction phase of the project. Project History: The Pump Station No. 2 Rack and Grit Collection system have been in service for almost twenty years. The equipment are near the end of its useful life. Improper transport of collected screenings has been ongoing problem and rags and other floatable materials are not screened thoroughly. The condition and reliability of the Pump Station No. 2 Grit System was inspected and the grit crane was upgraded in 2002 by PC-744/DWP-1006. ☐ The HVAC system was found in good condition but needs some rehabilitation due to its ending life cycle. ☐ Modifications are needed to the existing Grit removal system because of the draining issues. Grit Chambers cannot be emptied due to clogged drains. ☐ Grit carry over cause deterioration of the downstream process and equipment ☐ Rehabilitation/Replacement of screening belt since the equipment is nearing to its useful life. ☐ Rehabilitation of Grit Channel Drain Gate stems. The bar screen foundations, screen frames, and conveyance chutes in PS-2 have been in service for approximately twenty years.
Related Project	PC-757: Rehabilitation of Primary Clarifiers & Pipe Gallery PC 789 – Pump Station No. 1 Rack and Grit Building, MPI and JSS Improvements PC 795 – Pump Station No. 2 Improvements
Primary Driver	2 - Performance
Driver Explanation	Plant operations report on the failure of shear pins and accelerated wearing and tearing of the bar racks causing downtime for the maintenance and violation of the permit

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**PM Weighted
Score**

73.4

Criteria	Score	Comment
Condition	4	Replacement or major rehab needed immediately
Performance (Service Level/Reliability)	4	Project will have a significant positive impact on
Regulatory (Environmental/Legal)	4	Relatively high, but not imminent risk
Operations and Maintenance	4	Project will have significant positive impact on
Public Health and Safety	3	Failure not catastrophic, moderate chance of
Public Benefit	2	Additional Savings in O&M
Financial	4	Project will likely result in avoidance of fines
Efficiency and Innovation	4	Project will have a positive impact on Wear &

**RC Weighted
Score**

65.2

Criteria	Score	Comment
Condition	3	
Performance (Service Level/Reliability)	4	
Regulatory (Environmental/Legal)	4	
Operations and Maintenance	4	
Public Health and Safety	3	
Public Benefit	3	
Financial	3	
Efficiency and Innovation	1	



WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements

Phase GLWA Employees Project management

Contract NA

Status Future Planned Start

Title GLWA Salaries

Phase Budget Wastewater

Cost Allocation CTA

Phase Status Future Planned Start

Funding Source Bond Proceeds

Start Date

Fund Construction Bond Fund

End Date

Useful Life >20Yrs? No

Cost Estimation Information

Tot. Federal Loan Amount

\$0

Cost Est. Class

4

Cost Est. Date

Cost Est. Source

Cost Est. Prepared By

Program/Allowance Task Information

Project Manager

CIP Number

Description

Cost Type	Fiscal Year	Expense	Fringe Benefit	NonPersonne	Comment
GLWA Salaries CIP2021	FY19-	\$1			2021CIP
GLWA Salaries CIP2021	FY20	\$86			2021CIP
GLWA Salaries CIP2021	FY21	\$86			2021CIP
GLWA Salaries CIP2021	FY22	\$86			2021CIP
GLWA Salaries CIP2021	FY23	\$96			2021CIP
GLWA Salaries CIP2021	FY24	\$120			2021CIP
GLWA Salaries CIP2021	FY25	\$121			2021CIP
GLWA Salaries CIP2021	FY26+	\$100			2021CIP

Phase Total Expenses By FY (All figures are in \$1,000's)

Prior Yr Actual	FY20	FY21	FY22	FY23	FY24	FY25	FY26+	Total	5-Yr Total
1	86	86	86	96	120	121	100	696	509

Phase Task Dates



WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements

Phase Study and Design and Construction Assistance
Title Replacement of Bar Racks at Pump Station No.2

Contract NA **Status** Future Planned Start

Phase Budget Wastewater

Phase Status Future Planned Start

Start Date12/8/2018

End Date1/14/2024

Cost AllocationCTA

Funding SourceBond Proceeds

FundConstruction Bond Fund

Useful Life >20Yrs?Yes

Tot. Federal Loan Amount

Cost Estimation Information

4Cost Est. Class

10/2/2017Cost Est. Date

Cost Est. Source

Ali KhraizatCost Est. Prepared By

Program/Allowance Task Information

Project Manager

CIP Number

Description

Cost Type	Fiscal Year	Expense	Fringe Benefit	NonPersonne	Comment
Engineering Services	FY20	\$170			2021CIP
Engineering Services	FY21	\$3,012			2021CIP
Engineering Services	FY22	\$7,460			2021CIP
Engineering Services	FY23	\$1,463			2021CIP
Engineering Services	FY24	\$1,202			2021CIP
Engineering Services	FY25	\$1,199			2021CIP
Engineering Services	FY26+	\$995			2021CIP

Phase Total Expenses By FY (All figures are in \$1,000's)

Prior Yr Actual	FY20	FY21	FY22	FY23	FY24	FY25	FY26+	Total	5-Yr Total
0	170	3,012	7,460	1,463	1,202	1,199	995	15,501	14,336

Phase Task Dates

Phase Task Name	Start Date	End Date	Duration
Pre-Procurement	4/1/2019	9/30/2019	182



GLWA FY 2021-2025 CIP

211007 CIP#

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Phase Task Name	Start Date	End Date	Duration
Procurement	10/1/2019	3/28/2020	179
Project Execution	3/29/2020	4/29/2026	2222



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Phase Construction

Contract NA

Status Future Planned Start

Title Replacement of Bar Racks at Pump Station No.2

Phase Budget Wastewater

Phase Status Future Planned Start

Start Date 1/29/2021

End Date 1/14/2024

Cost Allocation CTA

Funding Source Bond Proceeds

Fund Construction Bond Fund

Useful Life >20Yrs? Yes

Cost Estimation Information

4 Cost Est. Class

10/2/2017 Cost Est. Date

Cost Est. Source

Ali Khraizat Cost Est. Prepared By

Tot. Federal Loan Amount

Program/Allowance Task Information

Project Manager

CIP Number

Description

Cost Type	Fiscal Year	Expense	Fringe Benefit	NonPersonne	Comment
Construction	FY23	\$561			2021CIP
Construction	FY24	\$19,577			2021CIP
Construction	FY25	\$32,714			2021CIP
Construction	FY26+	\$7,547			2021CIP

Phase Total Expenses By FY (All figures are in \$1,000's)

Prior Yr Actual	FY20	FY21	FY22	FY23	FY24	FY25	FY26+	Total	5-Yr Total
0	0	0	0	561	19,577	32,714	7,547	60,399	52,852

Phase Task Dates

Phase Task Name	Start Date	End Date	Duration
Procurement	9/15/2022	3/14/2023	180
Project Execution	3/15/2023	2/27/2026	1080
Project Closeout	2/28/2026	4/29/2026	60



GLWA FY 2021-2025 CIP

211007 CIP#

WRRF PS #2 Bar Racks Replacements and Grit Collection System Improvements

Project Total Expenses By FY Compared to Prior CIPs (All figures are in \$1,000's)

CIP Alias	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	Total	5-Yr Total
2021	0	0	0	1	256	3,098	7,546	2,120	20,899	34,034	8,642	76,596	67,697
2020	0	0		6	269	1,329	2,039	6,306	7,838	49	0	17,836	17,781
2019	0			7	402	1,980	2,404	6,956	8,814	0	0	20,563	11,749
2018			650	2,900	3,300	2,817			0	0	0	9,667	9,667