Green Infrastructure Progress Report
Upper Rouge Tributary Area

February 1, 2024 – January 31, 2025

NPDES Permit No. MI0022802

Detroit Water and Sewerage Department
735 Randolph
Detroit, MI 48226

April 1, 2025
Amended December 19, 2025

Green Infrastructure Program
Upper Rouge Tributary Area

Annual Progress Report

Portion of FY2024: February 1, 2024 – June 30, 2024
And
Portion of FY2025: July 1, 2024 – January 31, 2025

NPDES Permit No. MI0022802

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
BSEED	Buildings, Safety Engineering and Environmental Department
CSO	Combined Sewer Overflow
CIPMO	Capital Improvement Program Management Organization
DBA	Detroit Building Authority
DLBA	Detroit Land Bank Authority
DPSCD	Detroit Public Schools Community District
DPW	Department of Public Works
DWSD	Detroit Water and Sewerage Department
EGLE	Michigan Department of Environment, Great Lakes, & Energy
EPA	Environmental Protection Agency
FY	Fiscal Year
GLWA	Great Lakes Water Authority
GSI	Green Stormwater Infrastructure
HRD	Detroit Housing and Revitalization Department
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MG	Million Gallons
MOU	Memorandum of Understanding
NPDES	National Pollutant Discharge Elimination System
OPC	Opinion of Probable Cost
PCSWMO	Post-Construction Stormwater Management Ordinance
RPR	Resident Project Representative (for construction)
TAC	Technical Advisory Committee
URT	Upper Rouge Tributary Area/ Upper Rouge Tunnel

EXECUTIVE SUMMARY

This report provides an update on the status of green stormwater infrastructure (GSI) efforts by the Detroit Water and Sewerage Department (DWSD) through a portion of FY2024 (February 1, 2024 through June 30, 2024) and a portion of FY2025 (July 1, 2024 through January 31, 2025). It fulfills the annual regulatory reporting requirements associated with the National Pollutant Discharge Elimination System (NPDES) permit. The City's program focuses specifically on the Upper Rouge Tributary Area (URT).

DWSD continues to support its choice to use GSI both to aid in the control of combined sewer overflow (CSO) discharges and to improve the quality of life in the City, and strives to provide conscious and thoughtful investments in GSI in locations within the City where there is the potential to reduce basement backups and street flooding, beautify neighborhoods, as well as to reduce combined sewer overflows. DWSD's upcoming projects focus on specific neighborhoods where large-scale projects can reduce or eliminate CSO discharges at specific outfalls. DWSD's future large scale GSI projects will align with many key aspects of the recently published Great Lakes Water Authority's (GLWA) Wastewater Master Plan (WWMP).

This is an amended version of the report originally submitted to EGLE on April 1, 2025. As DWSD has met the $50M expenditure requirement in the NPDES permit with the construction of the Far West Detroit Stormwater Improvement Project (PC-808), all subsequent wet-weather projects and associated expenditures have been removed from this report, as per discussions with EGLE.

PROGRESS OF MAJOR INITIATIVES IN FY2024/FY2025

With the basic understanding that GSI programs are, by nature, a mix of actions from public and private entities, DWSD's efforts are intended to continue to create a policy and process framework that will drive the greatest possible implementation of GSI. These efforts have included the revamping and redevelopment of institutional structures (i.e. Ordinance and Design Manual) that change the way stormwater is managed on parcels, collaboration with other City of Detroit departments to encourage GSI as a component of each project, implementation of projects that support neighborhoods, and evaluation of those projects in coordination with research partners.

In FY2024/FY2025, DWSD continued design of future projects through its CS-1884A professional services consultant. Under CS-1884A, DWSD continued to execute and facilitate the major initiatives for compliance with the NPDES permit. DWSD has also utilized its sewer and water main rehabilitation efforts under the Capital Improvement Program to expand GSI implementation.

The four primary actions that have been undertaken by DWSD, the City of Detroit, and partner public agencies that will result in advancements in stormwater management are discussed below:

Post-Construction Stormwater Management Ordinance (PCSWMO)

As stated in the previous report, DWSD worked with other City departments on updates to the City's codes and ordinances with the intent of incentivizing stormwater management on new development and redevelopment. The PCSWMO was originally passed by City Council in November 2018, and there was ample feedback from the industry that revealed where updates and refinement to the ordinance needed to occur. Therefore, DWSD took steadfast efforts to amend the Stormwater Ordinance to support flexible stormwater management solutions for development within the City. December 9, 2020 marked the enactment of the amended ordinance as approved by City Council (FY2021). DWSD has found continued success over the past years enforcing the amended ordinance.

DWSD's approach, as embodied in the Post Construction Stormwater Management Ordinance (PCSWMO), meets and exceeds the permit requirement. Not only does the PCSWMO apply to projects that would require a Part 41 construction permit, it also applies to addition or replacement of impervious cover above an established threshold of ½ acre, across the entirety of the City of Detroit.

DWSD also continued collaboration and coordination with other departments such as City Planning Commission (CPC), Housing and Revitalization Department (HRD), Planning and Development Department (PDD), and Buildings, Safety Engineering, and Environmental Department (BSEED) to promote GSI during site plan reviews for redevelopment and development projects that are not necessarily required to comply with the ordinance. The

engagement of these critical entities is a catalyst for ensuring compliance with the ordinance and reinforcing the need for GSI implementation.

DWSD Implemented GSI Projects

During the course of FY2024/2025, DWSD continued construction of PC-808 Far West Detroit Stormwater Improvement Project.

The projects falling under DWSD's responsibility for maintenance include Artesian, Keeler Street pavers, Stoepel Park No. 1, Liuzzo Park, Crowell, Cornerstone Village, Charles Wright Academy, Oakman Boulevard, and Ecological Sites. In 2023, the Tireman bioswales were removed from this list, as Far West Detroit had progressed and impacted the project area; the bioswales are scheduled to be reconstructed in 2025 and incorporated into the Far West Detroit project.

DWSD has conducted softscape maintenance tasks, including weeding, watering, mulching, mowing, and pruning, at all sites with bioretention components through its active softscape maintenance contract, DWS-967, which was initiated in September 2023. DWSD has cleaned and maintained its hardscape infrastructure, including sumps, porous pavers, catch basins, trench drains, and underdrains, using its active hardscape maintenance contract, DWS-935B, which was initiated in July 2023. This contract is occasionally supplemented with assistance from DWSD Maintenance & Repair to televise underdrains and storm sewers.

DWSD's Capital Improvement Program (CIP) has assessed the water and sewer condition for neighborhoods. In areas where the CIP team calls for open-cut sewer intervention, GSI is being considered. One example of this is in Cornerstone Village. GSI was incorporated into a CIP project outside of the URT, in Cornerstone Village on Chandler Park Drive, demonstrating DWSD's commitment to implementation of GSI citywide when appropriate and effective. The Cornerstone Village GSI portions of this project have been completed as of March 2022.

Monitoring of existing projects has helped define the performance of constructed practices and provided a better understanding of the geotechnical limitations (i.e. clayey soils) in the City of Detroit. These results led DWSD to GSI shift emphasis to projects that would remove volume from the system by redirecting stormwater to the Rouge River or significantly reduce peak flows. Since FY2019/FY2020, DWSD has focused on neighborhood-scale GSI projects. In FY2021/2022 DWSD completed design of the Far West Detroit project, incorporating suggestions from GLWA's WWMP. This project involves the installation of new storm sewer leading to GSI practices within Rouge Park that ultimately discharge to the Rouge River. The project began construction in July 2022. DWSD is monitoring flows in the project area to establish a baseline to allow future assessments of the performance of the completed project. DWSD has also installed flow monitors at Oakman to evaluate the project's performance over time.

Drainage Charge Credit System

DWSD continued to promote the drainage charge credit program as an institutional measure that provides an incentive for customers to implement GSI practices. The Capital Partnership Program (CPP) has awarded funding over the years, but funding has been paused since FY2020 due to the impact of Covid-19. When active, the budgeted monies may only be solicited for sites that propose a retrofit project for stormwater management. Any development that is required to comply with the ordinance is not eligible for CPP funding. Upon request, non-residential property owners have been able to receive a site assessment that summarizes opportunities for implementation of stormwater management that would also achieve a credit towards their drainage charge. Due to the CoVid-19 impacts, site assessments have been temporarily placed on hold. Typically, site assessments include inspection and assessment of the property, and provide a report to the property owner explaining what can be done through implementation of GSI to reduce the drainage charge through green credits.

DWSD regularly participates in preliminary plan review (PPR) meetings, which are held by BSEED to connect developers and site owners to City contacts early in the project development process, to provide technical information and guidance on the drainage charge program and green credits. DWSD drainage engineers are also available through PSMG's office hours to meet with residents, property owners, developers, and any other parties that have questions about the drainage charge program. DWSD's outreach efforts regarding the drainage charge credit program will continue in FY24/25 as DWSD seeks to support Detroiters looking to implement GSI on their properties.

Demolition Program

The demolition program continues in FY2024/2025 and includes efforts by the Detroit Land Bank Authority (DLBA) and the Detroit Building Authority (DBA). This work has largely been performed by other City of Detroit departments or agencies, specifically BSEED from 2010 – 2013 and DLBA from 2014 onward. DLBA has adopted standards of site restoration from DWSD to promote the reduction of runoff upon restoring the demolition site. The consistent removal of impervious cover and restoration, according to DWSD recommendations, decreases runoff into the combined sewer system.

NPDES METRICS

DWSD's NPDES permit requires certain reporting and expenditure metrics. DWSD's NPDES permit was last updated July 1, 2019 with EGLE. Since the new permit has been issued, DWSD has commenced operating under the requirements and conditions as permitted by EGLE. The progress reporting requirement of this permit is fulfilled by this annual report. This April 1, 2025 report encompasses a portion of FY2024 as well as FY2025 through January 31, 2025, unless otherwise noted.

The NPDES permit established an expenditure timeline for DWSD to adhere to. DWSD has shifted from small-scale GSI to large-scale neighborhood projects, as outlined in the Wastewater Master Plan, and has continued designing projects with the CS-1884A contract consultant. In FY2020/2021, DWSD completed a transition from CS-1522 to CS-1884A; following this transition, DWSD and the CS-1884A consultant performed value engineering to enhance project outcomes and maximize CSO reduction. An updated expenditure timeline was needed in order to reflect DWSD's revised approach. DWSD proposed a revised expenditure schedule to EGLE to demonstrate that DWSD shall realign with the initial NPDES schedule for expenditures and maintain permit compliance. The proposed expenditure schedule was accepted by EGLE. EGLE and DWSD had established quarterly meetings to provide updates, assess past quarterly performance, and address new events that may affect projected expenditures.

As of September 20, 2023, DWSD had returned to compliance with the NPDES permit expenditure schedule, with this return to compliance acknowledged by EGLE. As of this report, DWSD has now met and exceeded the permit expenditure requirement of $50M. With PC-808 currently under construction, and monitoring, administration, and outreach efforts ongoing, DWSD continues to monitor expenditures. DWSD also continues to collaborate with EGLE on a quarterly basis to discuss updates on ongoing and planned projects.

DWSD staff, CS-1884A consultants, and EGLE representatives have continued meeting virtually and have taken key measures to streamline the design and construction phases that will be a catalyst for achieving permit compliance. DWSD has also continued with its design efforts serving customers and constituents for the furtherance of GSI implementation and has instituted open office hours to meet with engineers, developers, and property owners seeking assistance with ordinance compliance.

FY2024/2025 EXPENDITURES

In the reporting period February 1, 2024 to January 31, 2025 (in FY2024/2025), DWSD's Green Stormwater Infrastructure program expended funds for awarded projects as shown in Table 1 below. A more detailed description of expenditures is included in Section 5.0, Investment in Green Infrastructure.

Table 1 FY2024/FY2025 Expenditure Summary

Effort	Reporting Period Expenditures Feb 1, 2024 – Jan 31, 2025	Cumulative Expenditures FY2010 - Jan 31, 2025	Comments
Code and Ordinance Efforts	$964	$195,864	Work for ordinance development and implementation, prorated to URT share (27.1%) * Includes Outreach spend.
Project Management and Planning[1]	$244,653	$4,297,293	DWSD staff and consultant services
Outreach	$-	$546,519	**General outreach efforts for this report are included as Codes and Ordinance due to change in billing methodology for CS-1884A.
Tracking Impervious Cover Analysis	$167,400	$627,208	Impervious cover, prorated to URT share (27.1%); GIS data management
Project Implementation[2,3]	$13,458,843	$55,621,740	Planning, Design, and Construction of GSI. *Includes Outreach expenditures.
Maintenance[4]	$283,775	$653,528	Includes GSI maintenance under DWS-904
Total Expenditures	$14,150,636	$61,942,152	Includes CS-1522, CS-1884A, PC-801A, PC-806, PC-808, PC-814, DWS-904, DWS-967, DWS-935B, DWSD staff time
Projected Upcoming Construction Project Expenditures[2]		$5,955,176	Based on most recent updated values: Remaining construction budget for Far West GSI. Projection only includes construction dollars and does not include other eligible expenditures.
Total with Projected Upcoming Construction		**$67,897,328**	

1. Project Management and Planning expenditures were increased by $11,473.28 to include additional eligible expenditures from the 2024-25 reporting period.
2. Expenditures and projections for wet-weather infrastructure projects that progressed to construction after the Far West Detroit Stormwater Improvement Project has been removed.
3. Project Implementation expenditures were decreased by $4,942.25.
4. Maintenance expenditures were decreased by $341.25.

1.0 INTRODUCTION

The Detroit Water and Sewerage Department (DWSD) and the Great Lakes Water Authority (GLWA) are jointly responsible for developing and implementing the Alternative Rouge River Combined Sewer Overflow (CSO) Control Program. This CSO Control Program is designed to restore water quality and protect public health while staying within the City's financial means to pay for new projects. The program encompasses a 25-year phased plan that focuses on green stormwater infrastructure (GSI) solutions along with conventional CSO control facilities. DWSD is responsible for the implementation of the GSI program.

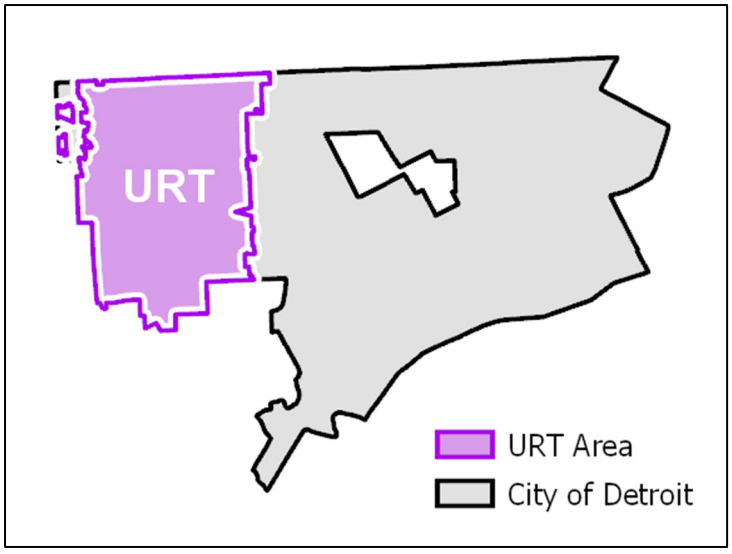
This document is the Green Stormwater Infrastructure Annual Progress Report for the time period of February 1, 2024, to January 31, 2025, which spans portions of FY2024 and FY2025. An annual progress report is required according to the permit (NPDES MI0022802 Part I.A.15.d.5.a) that:

1) *Summarizes the GSI implementation work during the preceding DWSD fiscal year that has been undertaken and completed as part of the Green Infrastructure program.*
2) *Contains a work plan for GSI implementation projects for the next DWSD fiscal year.*
3) *Documents the annual expenditure for the preceding DWSD fiscal year.*
4) *Documents a cumulative total-spent-to-date on the GSI program.*

PROGRAM GEOGRAPHY AND BACKGROUND

The Green Stormwater Infrastructure Program is focused on a 37.5-square-mile portion of the City of Detroit where CSO discharges are tributary to the Upper Rouge River. This portion of the City, alternately referred to as the Upper Rouge Tunnel area and the Upper Rouge Tributary (URT) area, comprises approximately 27.1% of the City of Detroit and is illustrated in purple in Figure 1. This area was identified for a program of both traditional CSO controls and green stormwater infrastructure in 2010, following the cancellation of the Rouge River CSO tunnel project due to escalating costs and financial challenges. The URT includes a complex network of combined sewers. Combined sewage flows in the URT that exceed the capacity of the interceptor system are either discharged from uncontrolled outfalls or treated at the Hubbell-Southfield, Seven Mile, or Puritan-Fenkell CSO Facilities. The area includes a variety of residential, industrial, and commercial neighborhoods which are in varying states of stability. The potential of stormwater to be converted to CSO discharges is a factor in prioritizing implementation efforts and locations, while the local socio-economic conditions are a determinant in the type of project implemented.

Figure 1: Upper Rouge Tributary Area



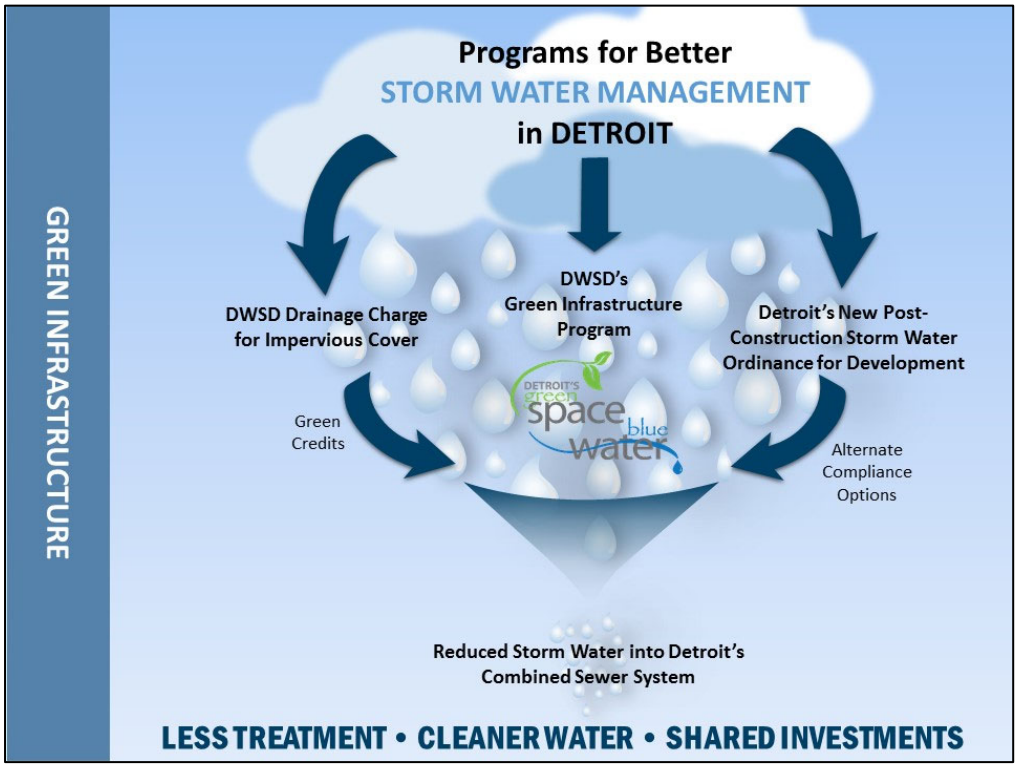
Within the City's approximate 138 square miles of land, GSI opportunities are abundant. DWSD's executive management team continues to emphasize the potential for Detroit to be a national leader in green stormwater infrastructure. The working relationships between the DWSD GSI Program, City of Detroit departments, and other authorities and groups continue to be cooperative and positive.

In FY2024/FY2025, DWSD has continued to focus on GSI project implementation, identification and development of future projects, the drainage charge program and credit system, and continued building of institutional structures to support internal and external project coordination. Long-term planning within the URT has also been a major priority throughout this time frame. DWSD has also continued to host and maintain the Stormwater Hub website, which the department hopes will spark interest in GSI amongst Detroiters and promote GSI installations by the private sector.

PROGRAM OVERVIEW

The ultimate regulatory goal of GSI implementation is a reduction in stormwater entering the combined sewer system, which, in turn, will help to reduce untreated combined sewer overflows. DWSD recognizes that its direct spending on project implementation represents only a portion of the overall actions that result in a change in flow to the combined sewer system. Many of the actions that will impact the quantity of flow entering the sewer system will be a result of activities such as redevelopment or demolition and stormwater management retrofits by private property owners seeking to reduce their drainage charges. As a result, DWSD has implemented a three-pronged approach for better stormwater management. The three approaches, as illustrated in Figure 2, are code modifications and ordinance enactment, implementation of a drainage charge and green credit program, and project implementation in coordination with other activities and partners.

Figure 2: DWSD's Approach to Stormwater Management



2.0 PLAN IMPLEMENTATION – FY2024/FY2025

The Green Stormwater Infrastructure Plan was first a requirement for DWSD under the NPDES permit (Permit No. MI0022802), issued by MDEQ (State of Michigan Department of Environmental Quality, 2013). The permit required DWSD to develop and implement a plan for locating, designing, constructing, operating, and evaluating GSI in the sewer sheds for 17 CSO outfalls to the Rouge River. The permit identified specific elements that should be included in the Plan including downspout disconnection, demolitions, tree planting, vacant lot greening, bioswales along roadways and parking lots, rain barrels, and rain gardens at properties per the May 2013 permit and programmatic and policy type elements. The 2014 GI Plan was submitted to MDEQ on August 1, 2014, and was conditionally approved by MDEQ on May 8, 2016. The Green Stormwater Infrastructure Plan was also included in the new NPDES permit (Permit No. MI0022802) issued by EGLE (formerly MDEQ) on June 28, 2019 with an effective date of July 1, 2019. The new permit has updated language that refers to GSI best management practices (BMPs).

The GSI-related requirements from the May 2013 permit and the July 2019 permit essentially remained the same, stating the provisions (downspouts, demolition, GSI/BMPs, outreach, etc.) that shall be established and implemented by DWSD. The Upper Rouge Tributary area and outfalls are still the primary target areas to address. The new expenditure requirement allows for 1/3 of the total expenditure to be utilized for projects constructed outside of the URT in areas tributary to an untreated CSO. A new NPDES permit is expected later in 2025. DWSD is pleased to note that the original permit expenditure requirement of $50,000,000 was met and exceeded this reporting period.

DWSD envisions its Green Stormwater Infrastructure Program as a continually evolving effort to identify and implement projects and programs that will reduce CSO discharges while benefiting the community. It is and will continue to be coordinated with other activities in the City that impact stormwater runoff. Program activities fall into two primary groups:

- **Institutional**: Efforts associated with codes and ordinances, drainage charge and other department/ agency interactions.
- **GSI Implementation**: Direct spending by DWSD on GSI projects. These activities include planning, design, construction, and public outreach.

A summary of Green Stormwater Infrastructure Program activities in FY2024/FY2025 is described in this section.

INSTITUTIONAL EFFORTS

Each year, the annual report highlights the various institutional changes and activities that impact the City of Detroit's GSI Program. As in prior years, the City of Detroit continues to work toward policies and processes that include GSI as the standard approach for project implementation. Internal to DWSD, in collaboration with the GSI community in Detroit and in partnership with the Great Lakes Water Authority (GLWA), structures are gradually being established to facilitate project implementation.

Citywide Collaboration and Commitment

The momentum realized on the GSI program is credited to the highly collaborative effort of entities such as the Detroit General Services Department (GSD), Detroit Land Bank Authority (DLBA), the Building, Safety and Environmental and Engineering Department (BSEED), the Planning and Development Department (PDD), the Department of Public Works (DPW), the University of Michigan Water Center, and many community groups including Grandmont Rosedale Development Corporation, Friends of Rouge Park, Cody Rouge Community Action Alliance, Warrendale Community Organization, the Viola Liuzzo Park Association, the Far West Detroit Civic Association, Neighbors Building Brightmoor, and the Brightmoor Artisans Collective.

Significant DWSD events include:

- Continued enforcement of the amended Post-Construction Stormwater Management Ordinance (PCSWMO), which was developed from the assessment of the initial ordinance implementation/roll-out to establish more cohesive parameters for green infrastructure implementation; this was passed by City Council in December of 2020.
- Continued oversight and review of stormwater projects for new development and redevelopment within the City.

- Augmented PSMG by hiring multiple staff with a focus on long-term implementation and management of DWSD's stormwater programs and policies.
- Continuation of maintenance contracts (DWS-967 and DWS-935B) for DWSD GSI practices, and continuation of training for DWSD Maintenance and Repair crews and PSMG inspectors on the use of permeable pavement cleaning equipment and other project hardscape for continued functionality of green stormwater infrastructure projects.
- Preparation of updates to the Municipal Stormwater Maintenance Manual for use by the DWSD maintenance personnel responsible for maintaining DWSD practices, including addition of Far West Detroit and minor clarifications to best practices.
- Continuation of the Stormwater Hub and other efforts to encourage engagement with GSI within the City of Detroit.
- Nearing completion of construction for PC-808 Far West Detroit Stormwater Improvements Project, DWSD's largest green stormwater infrastructure project to date. All stormwater pipes have now been installed & basins have been excavated and seeded. All roads are restored with the exception of Dolphin and Rockdale which will be restored Spring 2025. Maintenance of basins continues.
- Attainment of permit-mandated $50M expenditure on the GSI Program.

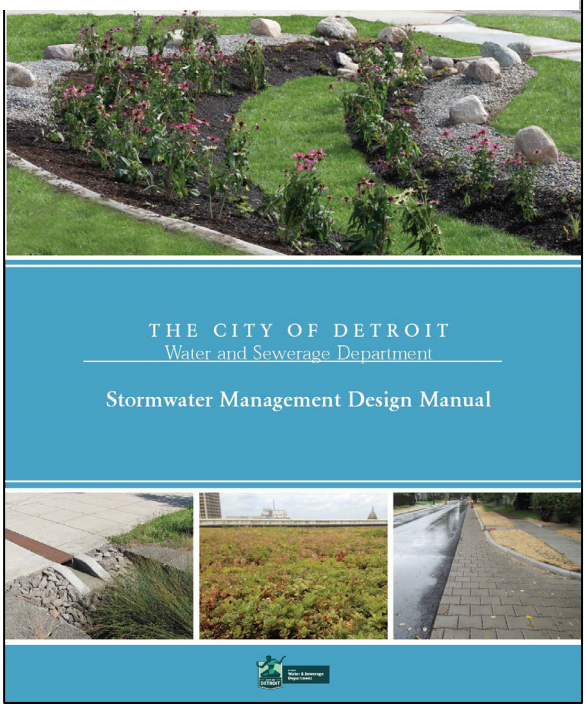
Stormwater Ordinance and Design Manual

Stormwater Ordinance

The Post-Construction Stormwater Management Ordinance (PCSWMO) was passed in November of 2018 by City Council. DWSD has revised the ordinance based upon the lessons learned since its enactment in 2018. Feedback from developers and consultants along with the plan review process has allowed DWSD staff to work with its Legal department to remove barriers that make compliance too difficult while still exceeding the goals established by the NPDES permit. The revised ordinance is enacted as of December 2020.

In FY2024/2025, DWSD has continued to find great success with the amended PCSWMO. The December 2020 amendment and accompanying updated Design Manual has encouraged designers to choose GSI when planning new site developments and has made it easier for those designers to meet the performance standards on their site. In October 2022, in response to knowledge gained from continued oversight and review of stormwater projects, DWSD published an updated version of the Design Manual which clarified performance standards for manufactured treatment devices, added standard details for various stormwater management structures, and revised porosity standards for consistency. DWSD continues to evaluate the Design Manual and Stormwater Ordinance annually to consider revisions and improvements. DWSD is considering releasing a revision of the Design Manual and Stormwater Ordinance during the 2025/2026 reporting period.

Figure 3: Stormwater Management Design Manual Cover



Design Manual

The Stormwater Management Design Manual was developed as a collaborative effort between City departments and is a technical manual intended to accompany the requirements in the PCSWMO. As part of the manual's development, technical experts in other City Departments and committees reviewed the document and provided comments which were incorporated by DWSD.

This manual serves as a resource for both applicants and City personnel to ensure developments are compliant with the PCSWMO. The manual also addresses the permit requirements (Part I.A.15.f.c.2) pertaining to stormwater controls for projects requiring a Part 41 construction permit issued by EGLE. In addition to general green stormwater infrastructure design guidance, the manual provides information on the following:

- Applicability of the requirements for new development and redevelopment.
- Design criteria for site drainage, roadway and parking lots, and flow conveyance of sewers, culverts, and open channels that will address water quantity and quality considerations.
- Overview of drainage design methodologies and acceptable practices.
- Stormwater control measure design considerations for systems such as green roofs, water harvesting, bioretention, tree plantings, porous pavements, and detention and retention basins.

The manual was updated and republished in December 2020 in coordination with the amended ordinance that took effect December 9th, 2020. The manual was then updated and republished a second time in October 2022. The manual is divided into the following chapters and located on the City of Detroit website for public access and use. Many of the December 2020 updates, as well as the October 2022 updates, were clarifications to content already in the manual. The format and much of the overall chapter content did not change. Updates are described below.

The descriptions below provide an overview of each chapter in the Design Manual.

Chapter 1 – Introduction

Chapter 2 – Regulatory Requirements

This chapter describes the regulatory requirements and other programmatic drivers for stormwater management in Detroit, with emphasis on the PCSWMO requirements related to water quality, channel protection, and flood control.

December 2020 Updates

- Added detail for the required elements of a Post-Construction Stormwater Management Plan
- Updated definitions for development site, construction area, and impervious surface.
- Provided clarifications on exemptions to the Stormwater Ordinance.
- Added an option for onsite alternative compliance (Extended Detention) under extraordinarily difficult site conditions.
- Added a cutoff value for measured in-situ infiltration (0.20 inches/hour) that would establish an extraordinarily difficult site condition.
- Provided more detail on performance standards.
- Updated hyperlinks to external resources.
- Updated the application forms for Alternative Compliance Requests and the Post-Construction Stormwater Management Plan.
- Added a requirement to include Drainage Fee Credit calculations in the site plan submittal.
- Added a Certification Statement for the construction and perpetual maintenance of the proposed Stormwater Control Measures.
- Added two site plan examples with step-by-step calculations.

October 2022 Updates

- Added another site plan example with step-by-step calculations for extended detention.

Chapter 3 – Site Design and Stormwater Management

This chapter presents guidelines and considerations for designing site development projects including site assessment, site and landscape design principles, and preliminary concept development. The chapter also illustrates how to integrate stormwater management components into site designs for a variety of building sites, open spaces, and building types.

Chapter 4 – Hydrologic Procedures

This chapter provides sources to precipitation data, as well as acceptable methods and modeling software for calculating runoff volumes and peak discharge rates.

December 2020 Updates

- Added statement encouraging (but not requiring) design consideration for climate change impacts on rainfall intensities.
- Provided additional references to acceptable hydrologic/hydraulic model platforms.
- Simplified the equation for required Retention Volume.

- Included an equation for Extended Detention Volume (onsite Alternative Compliance).
- Added a site area cutoff (<20 acres) for the use of the Modified Rational Method for detention pond volume determination.
- Added clarifications for time of concentration calculations.
- Added runoff coefficients for open water and additional guidance on the use of runoff coefficients.

Chapter 5 – Drainage Conveyance

This chapter provides standards and requirements for the design of storm sewer systems to ensure consistency with the current requirements for the City's public roadways and ensure the safe and effective flow of stormwater through conveyance systems that are part of the site design.

December 2020 Updates

- Added a clarification for energy dissipation design.
- Added a clarification for the use of underdrains based on in-situ infiltration rates.
- Edited the details on requirements for safety grates on culverts and outlets.
- Edited the design criteria on inlet spacing.

Chapter 6 – Soil, Aggregates and Water

This chapter contains general information on the physical properties of soil and aggregates, with a focus on how water moves through these materials and the need for geotechnical information to support the design and construction of stormwater control measures, particularly GSI practices intended to promote infiltration.

Chapter 7 – Detention Practices

This chapter discusses the different types of surface and subsurface detention practices, including basic detention basins, extended dry detention, and extended wet detention, and summarizes technical information necessary to design, construct, and maintain these stormwater control measures.

December 2020 Updates

- Added a statement clarifying parking lot detention; prohibiting the practice for parking areas used by passenger vehicles and allowing it only on industrial lots with only truck/trailer traffic.
- Added a statement clarifying the dewatering period for sediment forebays, setting this at 24 hours.
- Corrected an error on the freeboard elevation for stormwater practices; set the maximum surface ponding elevation to be one foot below basement floor elevations (previous standard had the freeboard elevation at one foot above basement floor elevations.
- Added a design requirement for a backup power source for pumped stormwater facilities.

Chapter 8 – Bioretention

This chapter introduces bioretention practices, including bioswales and tree box filters, and summarizes the technical information for design, construction, and maintenance. Bioretention is a very flexible practice that can be used in a variety of settings and is the most common GSI practice.

Chapter 9 – Infiltration Practices

This chapter covers the technical information for designing, constructing, and maintaining infiltration basins and trenches. Infiltration basins and trenches are designed to encourage percolation and ground water recharge of stormwater runoff. Infiltration basins are typically larger shallow surface impoundments used to manage stormwater runoff from areas between 5-50 acres while infiltration trenches are narrow, linear practices that are used to manage stormwater runoff from areas less than 5 acres, like along a roadway or parking lot.

Chapter 10 – Permeable Pavement

This chapter summarizes the information for designing, constructing, and maintaining several types of permeable pavement, including porous asphalt, pervious concrete, pervious pavers, and grid pavement systems. Permeable pavement allows streets, parking lots, sidewalks and other impervious covers to retain the infiltration capacity of underlying soils while maintaining the structural and functional integrity of traditional pavements.

Chapter 11 – Rainwater Harvesting

This chapter summarizes the information for designing, constructing, and maintaining water harvesting practices such as cisterns. Water harvesting is a practice that captures stormwater runoff often from rooftops for later use as irrigation or alternative grey water uses between storms, providing a potential water bill savings. Cisterns are larger systems (up to 10,000 gallons or even larger) that are more often used on commercial or industrial sites and can be placed above ground or below ground.

Chapter 12 – Green Roofs and Walls

This chapter summarizes the information for designing, constructing, and maintaining green roofs and walls that capture rainfall in a layer of vegetation and growing media, with excess rainwater directed to roof drains and downspouts.

Chapter 13 – Stormwater Wetlands

This chapter summarizes the information for designing, constructing, and maintaining stormwater wetlands, shallow-water ecosystems designed to treat stormwater runoff in low-lying areas or along river corridors where water tables are high.

Chapter 14 – Manufactured Treatment Systems

This chapter describes the DWSD review and approval process for proprietary manufactured treatment systems. Manufactured treatment relies on a variety of mechanisms to remove pollutants such as sediment, trash, and floatable debris, from stormwater runoff. Two common types of manufactured treatment devices include hydrodynamic separators which use chambers to trap sediment and filtering systems which use a settling chamber then filter to remove specific pollutants.

October 2022 Updates

- Streamlined text for improved clarity.
- Updated peak flow criteria for unit selection and site design.
- Changed TSS removal performance standard based on peak flow criteria to be event-based rather than based on average annual performance. Manufactured treatment devices should be sized for a 1-year storm, or a design rainfall intensity of approximately 2.0 inches per hour.
- Added clarification that systems need to be installed under configurations for which they were designed/tested. Manufactured treatment devices must have a closed cover, allow for maintenance access, and have only one inlet and one outlet (unless acceptable testing shows that an alternate configuration is permissible).

Stormwater Standard Details

In October 2022, DWSD added 21 standard detail sheets to the end of the manual (following the glossary). These details depict various structures and practices commonly included in GSI and/or conventional stormwater management systems.

Maintenance of GSI Practices

Regular care and maintenance of the GSI practices is crucial to support the practices' efficacy at managing stormwater. In order to ensure that proper and timely maintenance is being performed, DWSD has developed a Municipal Stormwater Maintenance Manual and adopted the software Cityworks, a GIS based tracking program. These two tools will be used together to identify the necessary maintenance tasks and the frequency of conducting these maintenance tasks for the DWSD constructed GSI practices.

The Municipal Stormwater Maintenance Manual (MSMM) was developed in FY2018 to identify specific methods and approaches to maintaining the structures constructed for each GSI practice. The MSMM was updated in FY2019 and portions of FY2020 to include completed GSI projects, O'Shea Playground, Crowell Recreation Center, and Ecosite Retrofits. It was updated again in FY2022 to include the substantially complete GSI projects PC-801A Oakman Boulevard and PC-806 Charles Wright. Further updates will follow as additional projects are completed;

there is currently an update in development to accommodate Far West and to refine maintenance procedures for some previously added projects.

Each GSI practice component has a standard operating procedure (SOP) outlining the required maintenance tasks and the inspection frequency. Site-specific information packets detailing the site location and SOPs needed during inspections at each site have also been developed. All structural tasks, including trench drains, catch basins, inlet structures, outlet structures and underground pipes, are currently maintained under DWSD's contract DWS-935B. Maintenance of the vegetation components is currently conducted under DWSD's contract DWS-967.

In FY2020/2021, DWSD implemented Cityworks, a GIS-based asset management program, to perform and track GSI practice inspections such as DWS-904 tasks and Maintenance & Repair staff as noted above. Use of this program has continued through FY2024/2025. The content developed in the maintenance manual was imported into a Cityworks workflow that automatically flags when inspections need to be performed for each asset within a GSI practice. Cityworks also allows field crews to fill out maintenance forms digitally, track when inspections have been completed and by whom, track the costs associated with the maintenance of each asset, and provide a history of all inspections performed at that asset. When construction of GSI projects is completed, the new projects are added to the maintenance manual, and analogous updates are made to GIS and the Cityworks workflow to include new GSI practices and their assets. DWSD continues to conduct regular inspections for each constructed site to determine if maintenance is necessary or any other corrective action needs to be taken.

Impervious Cover Reduction

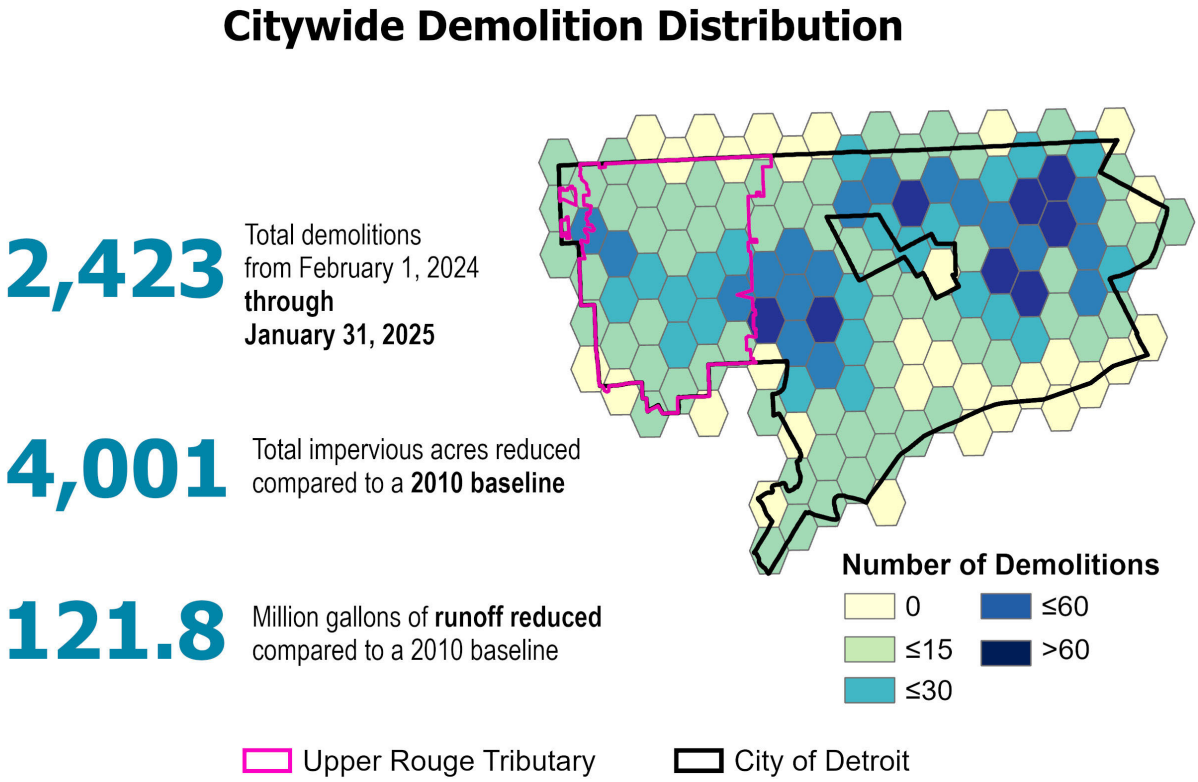
DWSD has tracked impervious cover in the City of Detroit for stormwater management and drainage charge related purposes. Demolitions have historically resulted in significant removal of impervious cover. DWSD has tracked the overall impervious cover change as a result of demolitions since 2010. Calculations reported in this report are based on the 2010 impervious cover layer, the 2015 and 2019 impervious cover layers and the demolition tracking that is in the City's "demolition tracker". Future efforts will continue to focus on runoff reduction through GSI projects and management of stormwater from new and redevelopment projects. This is validated by DWSD's ordinance compliance efforts and large-scale projects consisting of storm sewers and green stormwater infrastructure with direct discharge to the Rouge River.

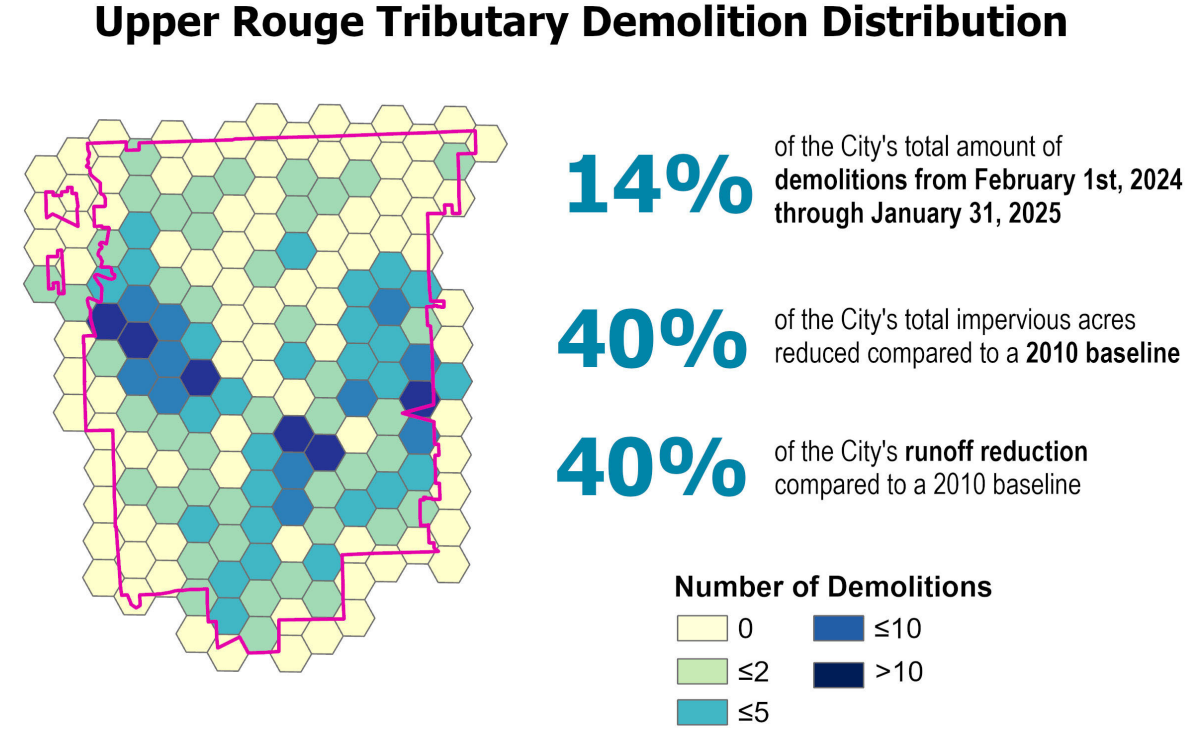
The estimated recent and cumulative impact of demolitions is summarized in Table 2. Locations of URT demolitions that occurred in FY2024/2025 are shown in Figure 4. There were 2,423 total demolitions within the City and 350 documented demolitions in the URT between February 1, 2024 and January 31, 2025, reducing impervious area by 135.8 acres citywide and 28.72 acres within the URT.

Table 2 Impervious Acreage Removal Summary

Statistic	URT (acres)	Citywide (acres)
Impervious acres in 2010	13,016	48,581
Impervious acres as of April 2015	11,667	45,639
Subtotal Change in IA	**1,349**	**2,942**
Demolitions (Acres) for 2016	50	199
Demolitions (Acres) for 2017	34	148
Demolitions (Acres) for 2018	29	104
Demolitions (Acres) for 2019	40	152
Demolitions (Acres) for 2020	22	83
Demolitions (Acres) for 2021	4	16
Demolitions (Acres) for 2/1/21 - 1/31/22	6.8	57
Demolitions (Acres) for 2/1/22 – 1/31/23	11.5	85.6
Demolitions (Acres) for 2/1/23 – 1/31/24	6	77.9
Demolitions (Acres) for 2/1/24 – 1/31/25	28.72	135.8
Demolitions (Acres) since April 2015 flyover	**232.02**	**1058.3**
Total Demolition Acres	**1,581**	**4,000**
Estimated Runoff Reduction (MG)	**48.12**	**121.76**

Figure 4: URT Area Demolitions, February 1, 2024 – January 31, 2025





Tracking System

DWSD is developing a tracking and performance assessment database for green stormwater infrastructure implementation activities. The objective of this database is to define, at a minimum, the location, ownership, financial investment, performance, and installation date of the green stormwater infrastructure practices. Three primary types of data are maintained by DWSD:

- DWSD-constructed or directly funded green stormwater infrastructure practices.
- Parcels that directly discharge to the Detroit or Rouge Rivers and privately owned green stormwater infrastructure practices that qualify for drainage charge credits.
- General land use cover change over time.

Activities executed for FY2024/2025 include:

- Acquired April 2024 aerial imagery through the Michigan Statewide Authoritative Imagery & LiDAR, which has been used to update impervious areas within the City.
- Impervious surface analysis update
- Continued to improve upon the implementation of Cityworks, a GIS-based asset management program, to track status and maintenance requirements of DWSD and customer-implemented green stormwater infrastructure.

PROJECT IMPLEMENTATION EFFORTS

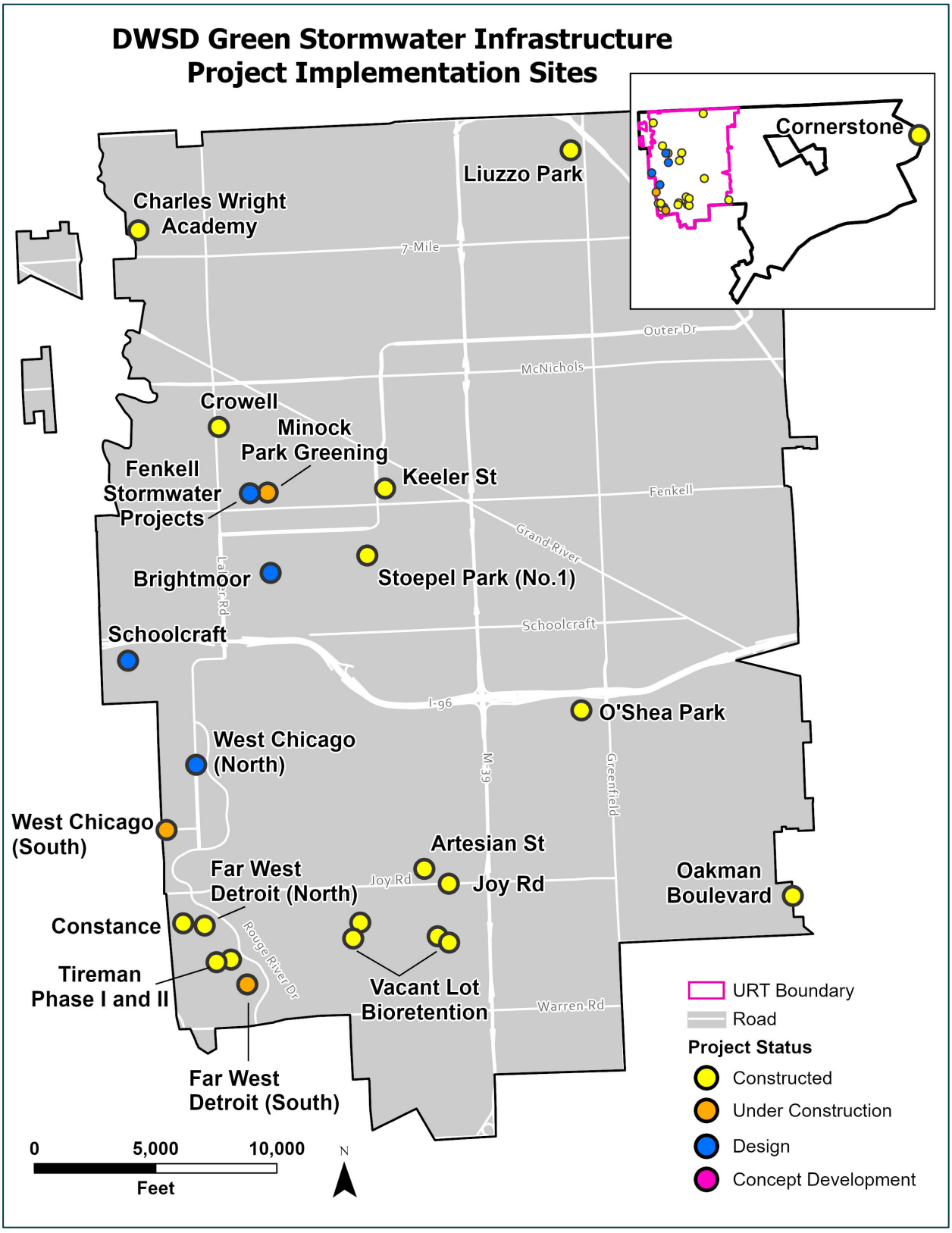
DWSD began implementation of GSI projects in 2015 and has completed the construction of several GSI projects since that time. Additional projects are currently in various phases of construction, design, or development. Table 3 provides a summary of DWSD's GSI projects, and Figure 5 shows the locations of these projects.

Table 3 Implementation Activities

Activities	Anticipated Status (as of April 2024 Report)	Actual Status (FY24/25)
Project Implementation Action Plan		
PW6968 (Transportation Projects Artesian, Keeler, Constance, Tireman Residential)	Construction complete.	Complete. Maintenance ongoing.
Stoepel Park No. 1	Construction complete.	Complete. Maintenance ongoing.
Liuzzo Park	Construction complete.	Complete. Maintenance ongoing.
Tireman Phase II (Bioswales in Rouge Park)	Construction complete. Impacts from Far West ongoing.	Modifications underway as part of construction of Far West. Maintenance will resume following completion of work.
Crowell Recreation Center	Construction complete	Complete. Maintenance ongoing.
Ecological Sites (Greenview, Evergreen, Vaughan & Stahelin)	Construction complete.	Complete. Maintenance ongoing.
O'Shea Park	Construction complete.	Complete. Maintenance ongoing.
Oakman Blvd	Construction complete. Warranty and maintenance ongoing.	Complete. Maintenance transferred to DWSD.

Far West Detroit Project (Formerly West Warren - Constance Phase II and Tireman Phase III)	Construction ongoing, starting in Spring 2022. Substantial completion October 2026.	Construction began Spring 2022 and is in progress.
Rogell	No action – project found to be cost-prohibitive.	Project found to be cost prohibitive.
Charles Wright Academy	Construction complete. Warranty and maintenance ongoing.	Construction complete. Punchlist items completed. Maintenance transferred to DWSD.
Additional GSI Projects (outside of URT)	DWSD considers additional opportunistic projects in collaboration with CIPMO, GSD, PDD, and DPSCD. Cornerstone Village maintenance ongoing.	Coordination ongoing. Maintenance of Cornerstone Village ongoing.
Edinborough Street (CIPMO)	Designed GSI for CIPMO Project during FY2019. Project is within the URT. Project awarded.	GSI was removed from project due to utility conflicts
Ordinance Compliance	Review and approval of stormwater management practices as part of development compliance with stormwater regulations.	Ongoing. Minor revisions to the Design Manual expected mid-2024.
Activity 3 – Distributed GSI Implementation		
Downspout Disconnection – Homes	DWSD determined that downspout disconnection programs in conjunction with drainage charge credit system was unfeasible in FY2019. DWSD continues to coordinate outreach and downspout disconnection coordination opportunities with nonprofit groups	DWSD Service Credit Program was determined to be infeasible; however, coordination continues for downspout disconnections. Downspout disconnections as part of ongoing and future construction projects will be coordinated with residents.
Downspout Disconnection - Multi-Family Residential, Commercial, and Industrial	Non-residential outreach to stimulate private investment	Ongoing efforts coordinated through the drainage charge credit program
Demolitions and Site Restoration	Coordination with DLBA and DBA is ongoing	DLBA continues demolitions
Tree Plantings	No additional plantings planned unless incorporated into DWSD Construction Projects	Tree planting as part of ongoing and future construction projects will be coordinated with GSD and other stakeholders.

Figure 5: Project Implementation Status in URT and Citywide



Completed Projects

Several GSI projects have been completed in vacant lots, public parks, and along City roadways as part of the DWSD GSI Program. Early projects served as prototypes to illustrate the stormwater management and educational benefits accomplished by implementing innovative best management practices in public spaces. As DWSD's GSI program progressed, later projects provided neighborhood-wide stormwater management, managing tens to hundreds of acres of drainage area through detention, retention, and direct discharge. Brief overviews of each project are provided in the following sections.

Ecological Restoration of Demolition Sites

The Ecological Restoration of Demolition Sites ("Ecological Sites") project was completed in the fall of 2015 on the City's west side. Each of the four bioretention sites were constructed on a two-parcel vacant lot and serve a drainage area of approximately 0.5 – 1 acres for each site. An example of one of these sites can be seen in Figure 6. Flow monitoring was conducted at the sites in summer of 2017. See Section 4.0, GSI Performance Monitoring, for more information on the flow performance monitoring at the Vaughan and Evergreen sites. Modifications to Vaughan & Stahelin were constructed in FY2019. See Ecosite Retrofits for information about these sites and their modifications.

Figure 6: Evergreen Vacant Lot Bioretention

Stoepel Park No. 1

Stoepel Park No. 1 is approximately 30 acres in size and is located at Evergreen Road & Outer Drive in Detroit's Brightmoor Neighborhood within the designated URT priority area (Figure 5). The park provides baseball/softball amenities to the Rosedale Grandmont Little League nonprofit organization which serves roughly 400-800 youth participants annually.

This green stormwater infrastructure project includes two bioretention practices that manage the stormwater runoff generated from tributary areas along Westwood Street. The project also included removal of the existing paved parking lot and replacement with a permeable parking lot constructed of open-graded aggregate to reduce runoff from the parking area (Figure 7). The project was completed on November 1, 2016. The contractor completed the three-year maintenance and plant establishment period in FY2019. Maintenance continues under DWS-967 and DWS-935B. In November 2021, to ensure proper drainage, portions of the permeable parking lot were excavated and replaced with new aggregate in areas where runoff sediment had accumulated.

Figure 7: Stoepel Park Bioretention and Parking Area

Liuzzo Park

In cooperation with the Office of the Mayor, the General Services Department, and the Viola Liuzzo Park Association, DWSD began construction in July 2016 of the three bioretention practices in Liuzzo Park to incorporate green stormwater infrastructure into the planned park improvements (Figure 8). The three bioretention practices capture stormwater runoff from the existing roads on the north and east sides of the park, as well as runoff from within the park. The construction project is substantially complete as of December 1, 2016. The contractor completed the three-year maintenance and plant establishment period in FY2019/FY2020. Maintenance continues under DWS-967 and DWS-935B.

Figure 8: Liuzzo Park Bioretention Improvements

DPW 6968

To capitalize on cost-sharing efforts and promote coordination with other City departments, DWSD completed several GSI projects (Tireman Phase I, Constance, Artesian, and Keeler) in conjunction with the City's Department of Public Works (DPW). These projects included bioswales and permeable pavement as well as traditional storm sewer construction at four different locations within the URT. This contract was completed in FY2018.

Tireman Bioswales

The Tireman Bioswales Phase I (Figure 9a) are small bioswales located on private residential properties along Tireman Avenue from Chatham to Parkland, installed in 2016. These bioswales manage street drainage from Tireman Avenue. These bioswales have been maintained by both DWSD and the residents on Tireman.

Tireman Phase II includes two separate bioswales in Rouge Park on the north and south sides of Tireman Avenue between Parkland Street and Outer Drive . This practice captures sheet flow runoff from the adjacent roadway as well as road runoff conveyed to the bioswales from catch basins capturing drainage from the intersection of Parkland Street and Tireman Avenue (Figure 9b). The overflow for the bioswales in the park is currently connected back into the combined sewer system at Parkland Street. This is a temporary measure while the design and construction of Phase III, deemed PC-808 Far West Detroit, is in progress. PC-808 Far West Detroit is a storm sewer/GSI project that will manage approximately 218 acres in the Far West Detroit neighborhood. Once the project is constructed, the overflow from the larger bioswale in Tireman Phase II, as well as Tireman Phase I, will be routed to the newly designed PC-808 Far West Detroit GSI practice and ultimately discharge to the Rouge River.

As noted in the previous report, the construction of PC-808 Far West Detroit is currently underway, and as part of this project, modifications to Tireman II are in progress. Maintenance is currently on hold due to construction impacts to the area. As previous reports have noted, Tireman II will still manage the same volume and will function properly following the completion of these modifications. Per conversations with EGLE, these modifications will not be counted towards DWSD annual expenditures.

Figure 9: Tireman Bioswales – Completed Modifications

a) Tireman Phase I

b) Tireman Phase II

Figure 10: Tireman Bioswales – Drainage Areas

Crowell Recreation Center

Crowell Recreation Center and its surrounding park, Hope Playground, sits in the center of the Riverdale neighborhood and is surrounded primarily by single-family residential properties.

The GSI project includes the removal of two existing paved parking lots (Figure 11) and replacement of the center section of parking stalls with permeable block pavement and bioretention islands. Conventional HMA pavement was placed for the remaining portions of the parking lot, and new curb was installed around the perimeter of the parking lot. Both parking lots were regraded to route stormwater from the parking lots' tributary areas to the permeable block pavement in the center of each parking lot. Additionally, each parking lot has two endcap bioretention islands designed to overflow to the permeable block pavement. Stormwater enters the islands through curb cuts designed to capture roughly one quarter of the parking lot's tributary area per island.

A notice to proceed was awarded in October 2017 and substantial completion was achieved in Spring 2019 (FY2019). The PC-799 contract Warranty and Maintenance periods concluded in FY22. Maintenance continues under DWS-967 and DWS-935B.

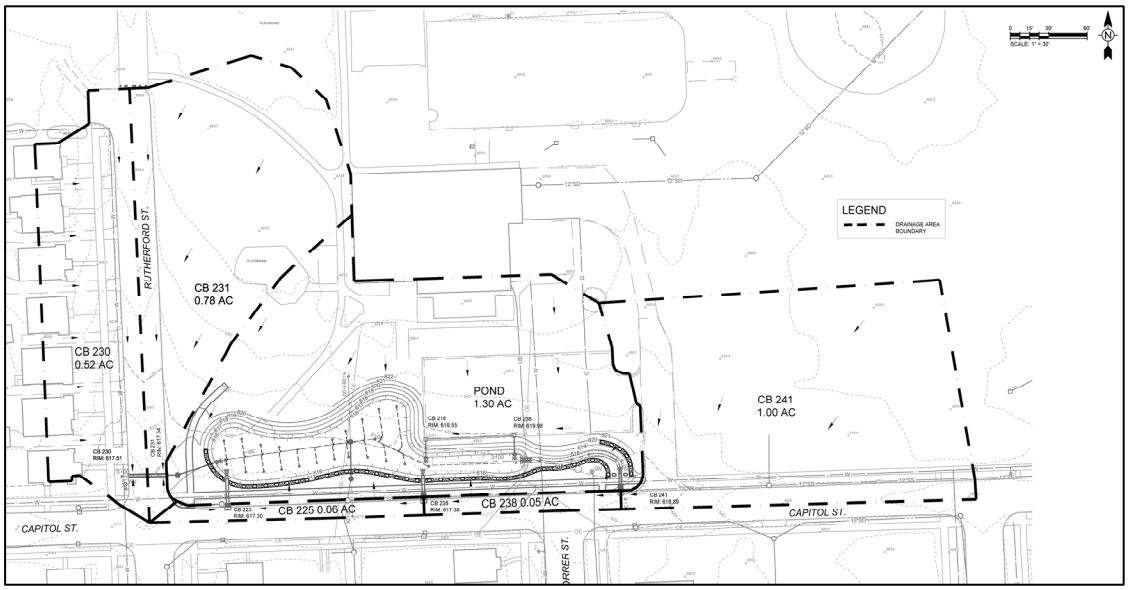
Figure 11: Crowell Recreation Center Parking Lots

O'Shea Park

O'Shea Park is a 20-acre park located just south of I-96 and east of M-39 (Figure 5). A complete park renovation was completed through the collective efforts of PDD, DWSD, GSD, and DTE. The park renovation included demolition of the abandoned recreation center on site and construction of a 9-acre solar array, an open park space, a basketball court, walking paths, and an overlook for the solar array. DWSD collaborated with GSD and PDD to incorporate a stormwater management feature into the overall park improvements.

The GSI practice (Figure 12) consists of a surface bioretention practice at the corner of Rutherford Street and Capitol Street. Road runoff from portions of Rutherford Street, Capitol Street, and park areas including the parking lot is conveyed to the bioretention practice via inlets along the parking lot curb, along the southern edge of the bioretention practice, and a trench drain inlet on the west side of the bioretention practice.

Figure 12: O'Shea Park Drainage Areas



The practice was constructed with underdrains that dewater the system and discharge back to the combined sewer at a reduced/throttled rate (Figure 12). As part of the GSI monitoring effort, cameras were installed at this location to generate time lapse footage of construction activities (Figure 13). This allowed designers to observe construction activities (e.g., sequencing, logistics) while providing residents with informational media that can be used in future outreach activities.

This project began in early May 2018 and reached substantial completion in November 2018 (FY2019). Maintenance and replanting efforts have continued in FY2024/2025.

Figure 13: O'Shea Park Construction

Ecosite Retrofits (Vaughan & Stahelin)

Two of the initial ecological restoration sites, Vaughan and Stahelin, underwent additional construction in FY2019. Work included installation of a trench drain that allows for the capture of stormwater runoff from the opposite side of the road, as well as the installation of anti-seep collars (Figure 14). The anti-seep collars will help prevent indirect dewatering back into the combined sewer system. This project was bid along with Crowell Recreation Center. Construction began in April 2018, and the retrofit portion of the project achieved substantial completion in late summer 2018 (FY2019). As noted in Table 7, additional acreage and volume is now managed by Vaughan (0.21 acres and 0.64 MG) and Stahelin (0.41 acres and 0.62 MG) following the completion of the retrofits.

Figure 14: Ecosite Retrofits

Joy Road

This project consists of GSI practices within the URT along Joy Road's intersections with Westwood Street, Faust Avenue, and Artesian Street. It consists of permeable brick pavers for the sidewalks and bioretention with curb cuts at intersections along Joy Road. The project was constructed under a Wayne County contract, providing an opportunity to partner with Wayne County; therefore, DWSD provided funding for the GSI portions of the project. DWSD disbursed funds for $225,000 for the construction of the Joy Road streetscape and drainage improvement project. The Intergovernmental Agreement (IGA) was signed on July 2, 2018 (FY2019). DWSD, through the GSI program, transmitted funds to Wayne County in Spring 2019 (FY2019). The project was completed during FY2019.

Oakman Boulevard

The Oakman Boulevard green stormwater infrastructure project is located in the southeast corner of the URT (Figure 5). The project area experienced significant residential basement backups during the 2014 flooding event.

The project was designed to manage stormwater through both underground detention and surface bioretention practices and to reduce the runoff entering local combined sewers. Oakman Boulevard's existing roadway medians, with a consistent width of approximately 50 feet, are large enough to accommodate both surface and subsurface stormwater management practices; thus, both practice types were planned and constructed within the medians. The project included landscaped swales on the surface of each median to provide bioretention and aesthetic appeal, subsurface storage practices to provide detention and gradually release runoff to two primary combined trunk sewers, and new storm sewers. The volume of each individual practice was maximized based on space available for its specific tributary area. The system has reduced the volume and flow rate of runoff entering the combined sewer system. It may also help protect basements by rerouting storm flows away from small diameter easement sewers. Overall, the system has the capacity to store approximately 1.75 MG.

The design was finalized in FY2019 with bid advertisement in Spring 2019 (FY2019). The project construction commenced in FY2020 and achieved substantial completion in November 2020 (FY2021). Warranty and Maintenance periods ended in Fall 2023, and maintenance has now been transferred to DWSD.

The landscape design of the medians was coordinated with the local residents to update the local aesthetic condition of these medians. Meetings were held in July and September of 2017 and February 2018 with local community members to gather input on visual appearance and provide updates on project progress. Follow-up meetings were held with key residents and District 7 Council leaders on July 11, 2019 (FY2020) at the Detroit Association of Black Organizations (DABO) Center and the main project kick-off meeting for all residents was held on February 20, 2020 (FY2020) at Rippling Hope. The contract included water main replacement to limit disruption to the residents.

In 2024, after the construction of the Oakman Blvd project, recurring localized flooding was observed at the intersection of Sorrento Street and Mackenzie Street. Investigative analysis revealed two contributing causes to the flooding issue – a portion of the system was modified during construction to accommodate traffic loading, which was determined to reduce system capacity, and the model underestimated the runoff volume. In response, the construction modification was rerouted to allow for extra capacity and a bypass was constructed along Sorrento Street which reduced the drainage area by 17%, to mitigate flooding and restore the system's intended function. The model was updated to support the bypass design and reflect the as-built condition. Expenditures associated with this project update have not been included in reported expenditures.

Figure 15 Oakman Boulevard Conceptual Landscape Rendering

Charles Wright Academy

Charles Wright Academy is in the northwest portion of the URT immediately adjacent to the Rouge River at 19299 Berg Road. The school is immediately adjacent to Ludington Magnet Middle School and bounded by Seven Mile Road on the south, Berg Road on the east, Pembroke Avenue on the north and the Rouge River on the west.

The combined school property of Ludington Magnet Middle School and Charles Wright Academy consists of approximately 43 acres, of which 14 acres are impervious. Some of the site's runoff currently discharges to the river through a CSO outfall downstream of the regulator. Stormwater management of Ludington Magnet Middle School was excluded from the design since the vast majority of the runoff is currently conveyed to the CSO outfall downstream of the regulator.

This project has been designed and constructed to completely remove all of Charles Wright Academy's stormwater runoff from the combined sewer system. Two large GSI practices collect and manage roof and site drainage from Charles Wright Academy. Overflow from the GSI practices is conveyed to the Rouge River via an overflow weir.

Both practices receive flow from new storm sewers installed on site. Approximately 5 acres of impervious cover has been removed from the system as a result of the project.

Construction started in FY2021 and reached substantial completion in FY2022. Maintenance of the project was transferred from the contractor to DWSD at the end of 2023.

The concept for this project is shown in Figure 16. Photographs of the established plantings in the north and south basins, taken in August 2022, are shown in Figure 17.

Figure 16: Charles Wright Academy Design

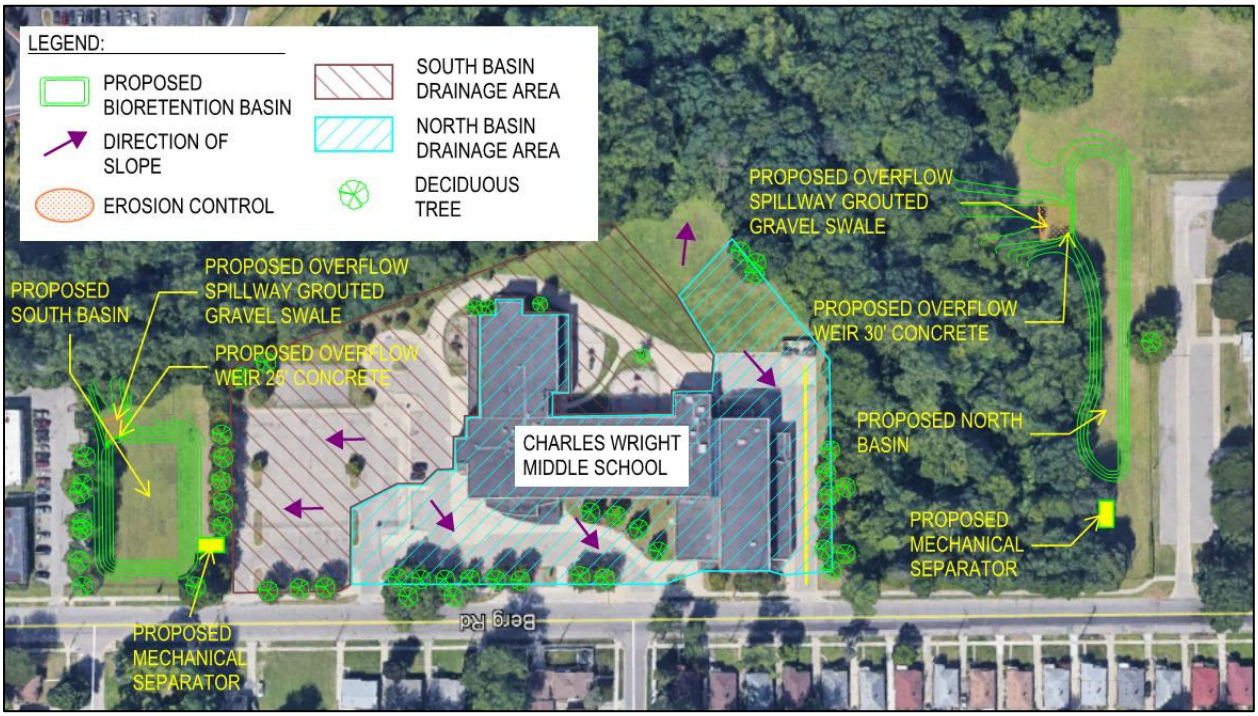


Figure 17: Charles Wright GSI

Cornerstone Village GSI

This GSI project was implemented as part of a larger DWSD project in the Cornerstone Village neighborhood. It is located within the right-of-way of Chandler Park Drive, between Canyon Street and Gateshead Street. This work took place outside of the URT, highlighting DWSD's commitment to green stormwater management citywide.

The Cornerstone Village GSI project was designed to help reduce street flooding in the area. As part of this project, DWSD constructed shallow grass swales between the sidewalk and road on each side of Chandler Park Drive, with trench inlets installed to route runoff from the street into the swales. New street trees were also planted to provide bioretention and visual appeal. Construction took place in 2019. DWSD now maintains this site's GSI practices.

Figure 18: Cornerstone GSI

FY2024/2025 Construction

DWSD completed the design and development phase of PC-808 Far West Detroit in FY22, and construction began in Spring 2022. The project is expected to reach substantial completion in October 2026 and final completion in February 2027. The Far West Detroit project's large-scale GSI practices have specifically been designed to reduce flooding and basement backups, carrying the potential to dramatically improve wet weather resiliency in the Far West neighborhood.

PC-808 Far West Detroit

The PC-808 Far West Detroit project has been designed to manage approximately 218 acres of drainage area tributary to the Rouge River. The project capitalizes on prior work performed on Constance (Constance Phase I) and Tireman Residential Bioswales (Tireman Phase I) as part of PW-6968 and the Tireman Phase II bioswale.

Through FY2019, DWSD performed field survey, geotechnical investigation, and preliminary design of the opportunistic stormwater treatment project. This project was transitioned from CS-1522 to CS-1884A in FY2020 at the 60% design phase and reached 100% design completion in FY2021. The project was put out to bid in FY2021. Construction began in Spring 2022, with Notice to Proceed issued on February 7, 2022.

The project's finalized design consists of two large bioretention treatment basins for TSS removal and peak flow storage, which both outlet directly to the Rouge River. The North Basin utilizes the prior work performed on

Constance Phase I, including an existing outfall to the Rouge River, while the South Basin utilizes a new outfall created as part of the project. The project also includes the installation of new storm sewer within much of the neighborhood.

As of March 2025, both the North Basin and South Basin have been fully excavated, graded, and seeded, with some tree and shrub planting completed in the areas around the basins. Restoration of the area within the park impacted by hauling and other construction activities is in progress, with most of the haul route seeded. Installation of all storm sewer within the neighborhood and park is completed. All roads have been fully restored with the exception of Dolphin and Rockdale, which are currently undergoing hardscape restoration, and Tireman from Parkland to Outer Drive, which will be restored this year following the restoration of the Tireman bioswales. Downspout disconnections within the neighborhood have been completed. Monitoring of flows is also ongoing within the project area.

Figure 19: Far West Detroit South Basin GSI

3.0 GSI PERFORMANCE MONITORING

GSI monitoring equipment has been installed at the Oakman Boulevard site, as well as at the Far West Detroit project site. DWSD has installed 26 flow/depth sensors located at various points in the Aviation Sub neighborhood to monitor the Oakman Blvd GSI project. At the Far West site, a flow monitor has been placed in the downstream combined sewer to collect baseline flow data, which will be compared to flows after the project is constructed. A rain gauge was also placed on the roof of Ann Arbor Trail Magnet School, located in the middle of the project area. DWSD is also coordinating with GLWA for large-scale monitoring at the B54 outfall to monitor the PC-808 Far West Detroit project impact.

Table 4 Long Term Performance Activities

Activities	Planned Activities and Schedule	Actual Activities and Status
Activity 4 - Long Term Performance		
Green Stormwater Infrastructure Performance Planning	Ecological site monitoring post retrofit installation at Vaughan and Stahelin.	Ecological site monitoring performed FY2018
Green Stormwater Infrastructure Benefits Evaluation	Coordination with the University of Michigan Water Center	Completed Publication
Agreements for long-term sustainability	Ongoing activity	Ongoing activity
Far West Detroit	Monitoring CSO discharge and flows from Neighborhood	Ongoing activity
Oakman Boulevard	Monitoring flow depth levels throughout the GSI system	Ongoing activity

GSI BENEFITS EVALUATION

Broader objectives of the GSI Program include reducing CSO discharge, basement backups, street flooding, and improving Detroiters' quality of life. The Long-Term Performance effort encompasses a wide variety of activities that align with these objectives; it includes endeavors to improve understanding of GSI performance, approaches to make GSI practices more impactful and affordable, and coordination with a multitude of organizations to develop and install GSI projects that provide a range of benefits.

Ongoing coordination with other research and study efforts from University of Michigan School of Environment and Sustainability are being performed to assess the potential for GSI to strengthen the social stability of neighborhoods and to identify the characteristics that are most socially impactful.

Ongoing efforts are in place to define vision, mission, and metrics of GIS implementation with the GSI interdepartmental working group and General Services Department (leading efforts formerly led by the Office of Sustainability).

4.0 STAKEHOLDER AND COMMUNITY ENGAGEMENT

DWSD continued a wide range of internal and external stakeholder engagement and outreach activities during FY2024/FY2025. GSI engagement and outreach efforts occurred primarily through project implementation, project correspondence and ordinance-related activities. DWSD continues to explore processes and institutional structures for a coordinated, collaborative citywide green stormwater infrastructure outreach and engagement, including working with key City GSI partners such as Detroit Future City, Greening of Detroit, the Sierra Club, and The Nature Conservancy. The frequency of outreach is dependent upon the level of criticality and complexity of the project or task.

A summary of DWSD's new and ongoing stakeholder and community engagement activities in FY2024/FY2025 follows.

COORDINATION

DWSD's Permitting and Stormwater Management Group (PSMG) is responsible for all stormwater related activities, including the drainage charge program, the enacted amended Post-Construction Stormwater Management Ordinance (December 2020), and DWSD-funded GSI projects through the GSI Program. DWSD has coordinated with numerous departments, agencies, and groups on GSI-related issues. A list of the internal and external stakeholders that DWSD has engaged on GSI activities to date is provided below.

Internal DWSD Groups

- DWSD Customer Service
- DWSD Finance Asset Management
- DWSD GIS Group
- DWSD Water Supply Operations
- DWSD Public Affairs
- DWSD Billing Department

City Government

- Buildings, Safety, Engineering and Environment (BSEED)
- Planning and Development (PDD)
- Department of Public Works (DPW)
- Housing and Revitalization (HRD)
- Public Health
- District Managers
- General Services
- General Services – buildings
- Department of Neighborhoods
- City Planning Commission
- Sustainability Office
- Mayor's Office (Planning, Housing, and Development Team (PHD))
- City Council

Agencies

- Detroit Land Bank Authority
- Wayne County Road Commission
- Michigan Department of Transportation (MDOT)
- Detroit Economic Growth Corporation (DEGC)
- Great Lakes Water Authority (GLWA)
- Michigan Department of Environment, Great Lakes, and Energy (EGLE)
- United States Environmental Protection Agency (US EPA), Region V
- Detroit Public Community School District
- Detroit Housing Commission
- DTE Energy

Organizations

- Detroit Future City
- Sierra Club
- Erb Family Foundation
- Brightmoor Alliance
- Grandmont Rosedale Development Corporation
- The Nature Conservancy
- Bloomberg Associates
- The Moross Greenway Association
- The Cornerstone Village Neighborhood Association
- Friends of the Rouge
- Neighbors Building Brightmoor
- Brightmoor Artisans Collective
- Friends of Rouge Park
- Far West Detroit Civic Association
- Cody Rouge Neighborhood Partnership
- Cody Rouge Community Action Alliance
- Warrendale Community Organization
- Viola Liuzzo Park Association
- GFFD Community Center
- The North Rosedale Neighborhood Association
- East Side Community Network
- Detroit Collaborative Design Center
- West Outer Drive Civic Association

Institutions

- University of Michigan
- Wayne State University
- Lawrence Tech University
- Wayne County Community College District
- University of Detroit Mercy

Groups

- City Council Green Infrastructure Task Force Blue/Green Subcommittee
- Erb Family Foundation Blue Green Infrastructure Workgroup
- The Nature Conservancy/Greening of Detroit/Erb Family Foundation GSI Mapping and Knowledgebase Project Team
- GSI Coordination Group (formerly a subcommittee of the Sustainability Office)

2024/2025 OUTREACH ACTIVITIES

DWSD's green stormwater infrastructure stakeholder outreach is comprised of four components:

- Green stormwater infrastructure project-specific outreach.
- Overarching, collaborative green stormwater infrastructure public education campaign.
- Drainage charge reduction through green stormwater infrastructure implementation.
- Post-Construction Stormwater Management Ordinance Outreach

Green Stormwater Infrastructure Project-Specific Outreach

Project-specific outreach includes coordination with neighborhood groups and key stakeholders, such as Department of Neighborhood district managers, the City's council members, and project partners. For each project, DWSD creates a project fact sheet (which is updated throughout the life of the project), plans and facilitates public meetings to inform stakeholders and solicit early feedback on project concepts, coordinates informational mailings that include project facts and engagement opportunities, places temporary and permanent project signage, and conducts engagement events that are both educational and celebratory. DWSD creates tailored outreach and engagement strategies for each project and documents ongoing outreach efforts and needs. DWSD also conducts additional outreach for certain projects that experience shifts in construction schedules to keep local stakeholders aware of progress.

Specific activities related to project outreach in FY2024/FY2025 are summarized below.

Far West Detroit

During FY2024/2025, DWSD continued its focus on engaging in outreach with key stakeholders and impacted residents with the construction of the Far West Detroit project. DWSD held public meetings in May and October to update residents and stakeholders of the project schedule and status, discuss expected impacts to the residents and park, and answer questions regarding the project. As active construction comes to an end, DWSD expects to have a final public meeting at the end of the project and send out post-construction surveys collecting feedback and informing the development of the construction closeout punchlist.

DWSD representatives also attended several meetings held by the Far West Detroit Civic Association to strengthen connections with the neighborhood and provide project updates. DWSD has also been working closely with GSD and Friends of Rouge Park to coordinate on park restoration efforts.

DWSD will continue to coordinate with the Friends of Rouge Park and Far West Detroit Civic Association to provide updates of the phased GSI project. As with other outreach efforts, DWSD provides regular progress updates to appropriate District Council leaders, neighborhood managers and associations with the progress of the project and construction schedules. DWSD also sends regular construction updates to a mailing list open to the public. DWSD has set up a public website for the project, which can be found at the following link: Far West Stormwater Project Website.

Overarching, Collaborative Green Infrastructure Public Education Campaign

During FY2024/2025, DWSD has continued to host and maintain the Detroit Stormwater Hub (www.detroitstormwater.org) which includes a centralized database of GSI projects within the City limits and a collection of tools and educational resources pertaining to GSI. DWSD has also continued to lead the Detroit Stormwater Hub advisory group made up of academia staff, non-profits, and local engineering firms. This group first was set up to create the website, and has met quarterly to provide updates and discuss potential improvements to the Stormwater Hub.

The Stormwater Hub's interface allows anyone to submit a GSI project for potential addition to the site. DWSD verifies each project's existence and capacity before publishing it to the site. All projects are added to a GIS map and color-coded by type, vividly illustrating the breadth of public, private, and community GSI projects Detroiters have created. A project page is also generated for each project, and a featured project is selected each quarter to exemplify GSI in Detroit.

All of the data collected by the Stormwater Hub is available for public download. Data reported on the Hub includes estimated values for projects that promote green stormwater infrastructure but are not credit-eligible. Therefore, these numbers are not reportable and should not be used to estimate CSO reduction.

DWSD Website - Green Infrastructure Page

DWSD's website provides material for GSI guidance and implementation. The PCSWMO and design manual (last updated in October 2022) are posted on the website and available for public download. The website also provides information about planned, ongoing, and completed DWSD GSI projects within the City. DWSD continuously updates the website to improve communication and promote the installation of GSI.

Drainage Charge and Credit Outreach and Engagement

DWSD has continued outreach and engagement with the support of their public affairs team, including production of videos and public service announcements to ensure the public remains engaged in DWSD's drainage charge program efforts. DWSD continues to present to non-profit ambassadors for GSI on the drainage program and ordinance compliance. Outreach efforts have been conducted virtually and on site. DWSD will continue participation in tours and workshops hosted by funders and non-profits to explain the drainage charge and credits in order to strengthen the community's understanding of the drainage charge program.

Post-Construction Stormwater Management Ordinance Outreach

In FY2021, DWSD created weekly office hours designed specifically for Permitting and Stormwater Customers to ask questions and get input from DWSD PSMG engineers. DWSD has continued this program through FY24/FY25. Customers are able to sign up for a 30-minute time slot up to 2 days in advance. This has allowed DWSD to eliminate the administrative need to find a suitable date and time for any party requesting a meeting with PSMG and also allows PSMG to keep track of the customers and projects PSMG meets with. PSMG has received positive feedback from customers on the accessibility to our team and the ease of requesting an appointment with this new system.

DWSD has also been an active participant in Preliminary Plan Review meetings held by BSEED, which allow developers to meet with representatives from various City departments early in the design process to ask questions and collect feedback on their proposed projects. DWSD representatives at these meetings provide both general information about ordinance compliance and project-specific requirements and considerations. Whether through the BSEED submission process or simply direct interaction with DWSD's PSMG staff, DWSD has made themselves available for questions as developers design projects to comply with the PCSWMO.

EFFORTS PLANNED IN FY2025/FY2026

In FY2025/2026, as PC-808 Far West Detroit reaches substantial completion, DWSD will continue to keep all pertinent stakeholders updated on the construction through outreach and engagement, and to coordinate with stakeholders whenever possible. As-needed efforts for outreach shall continue for GSI maintenance, the Drainage Charge Green Credit Program, and the post-construction stormwater ordinance and associated design manual.

DWSD will continue to collaborate with key partners on GSI stakeholder involvement and educational activities to achieve stakeholder insight, implementation support, and balanced public policy. DWSD will also continue to promote implementation of green stormwater infrastructure on privately-owned parcels. DWSD will continue to support and collaborate on the development and implementation of the Sustainability Action Agenda as it embodies GSI goals and actions.

Although DWSD has fulfilled its NPDES Permit GSI expenditure requirements, DWSD remains fully committed to further reducing CSOs and exploring multiple cost-effective wet-weather stormwater management strategies. DWSD will coordinate with departments such as DPW, GSD, and the Department of Neighborhoods.

Overarching, Collaborative Green Stormwater Infrastructure Public Education Campaign

GSI has gained momentum in Detroit through DWSD's stormwater management programs, initiatives, and projects implemented by key partners in Detroit. In FY2025/2026, DWSD will continue its commitment to working with key partners to amplify public education and outreach focused on the myriad benefits of GSI for Detroit. The overarching, collaborative GSI public education campaign will aggregate past GSI education efforts, including

videos, tours, speaking engagements, and GSI tool development (such as continued maintenance and support of the Stormwater Hub online tool).

In creating and managing the Detroit Stormwater Hub, DWSD has strengthened its relationships with many nonprofits and companies involved with GSI across Detroit. The group of professionals that serve as the Stormwater Hub's advisory group are great resources for spreading information and education. In FY2025/2026, DWSD plans to continue working with the advisory group to engage and educate the public about GSI.

5.0 INVESTMENT IN GREEN INFRASTRUCTURE

Since the inception of DWSD's Green Stormwater Infrastructure Program, a variety of implementation projects and coordination efforts have occurred.

The costs included in this report include the following:

- Efforts implemented through Contracts CS-1522, CS-1812 (CIPMO), and CS-1884A, which include professional services and construction.
    - Professional services items include the following: project selection, survey, geotechnical, field investigations, neighborhood characterizations, project conceptual and detailed design, project specific outreach and stakeholder engagement, interagency coordination, bid administration, monitoring efforts and maintenance manuals and support.
    - Construction includes earned contract value (including unpaid retainage) and contract markup on contractors. Construction also includes CS-1884A construction administration and resident project representative (RPR) services. (CS-1522 construction administration and RPR services were billed under professional services.)

The costs in this report do not include the following:

- Efforts associated with the drainage charge program.
- Efforts associated with locations outside of the URT (Exception: Cornerstone Village GSI efforts).
- Efforts associated with the preparation of regulatory required reports.
- Efforts associated with wet-weather projects to be constructed subsequent to PC-808 Far West; these include but are not limited to Schoolcraft North and South, West Chicago North and South, Brightmoor, and the Fenkell projects

The following costs have been prorated or adjusted:

- Codes and ordinance efforts were prorated as 27.1% of the total investment. This was based on the URT, which makes up 27.1% of the City by land area.
- Work associated with the impervious cover analysis citywide was prorated to 27.1% as described for the codes and ordinance effort.

DWSD's permit required $15 million in GSI program expenditures by June 30, 2017, and $50 million in GSI program expenditures by 2029. DWSD has met and exceeded the permit expenditure requirement. The net reported expenditures during FY2024/FY2025 through January 31, 2025 and the cumulative costs for DWSD's implementation of GSI are identified in Table 5 and Table 6 and displayed in Figure 20. Updated values are highlighted in yellow within this amended report.

Table 5 DWSD Green Infrastructure Program Expenditures Summary

Report Year	Expenditures	Adjustments	Revised Expenditures	Cumulative
2010-2013	$1,029,137		$1,029,137	$1,029,137
2014	$1,238,864		$1,238,864	$2,268,002
2015	$4,413,070		$4,413,070	$6,681,072
2016	$3,121,040	($225,724)	$2,895,317	$9,576,389
2017	$4,687,432		$4,687,432	$14,263,821
2018	$2,845,516	($249,800)	$2,595,716	$16,859,537
2019	$3,194,420		$3,194,420	$20,053,957
2020	$2,997,992		$2,997,992	$23,051,949
2021	$5,459,221		$5,459,221	$28,511,170
2022	$2,669,761	$4,375	$2,674,136	$31,185,306
2023	$2,401,916		$2,401,916	$33,587,222
2024	$14,204,294		$14,204,294	$47,791,516
2025	$15,398,105	($1,247,469)[1,2,3]	$14,150,636	$61,942,152

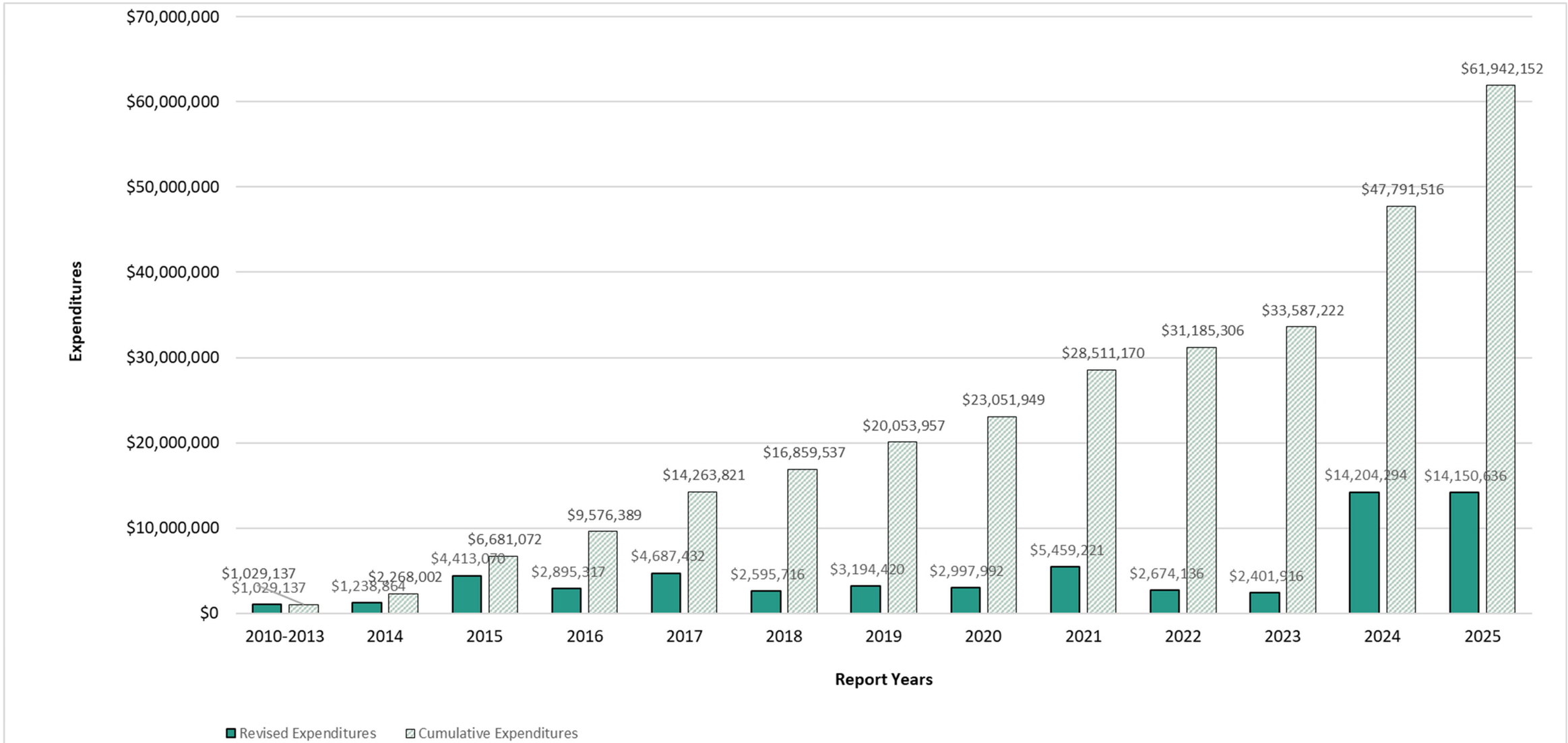
1. An adjustment of -$48,719 was made to correct an error in the Neighborhood Projects - Construction expenditure for 2/1/24 - 1/31/25. This was due to the inclusion of the full value of common-to-all costs (mobilization, traffic control, etc.) for the Far West Detroit Stormwater Improvement Project in the original report; these costs are actually distributed across GSI, water, and sewer budgets, and thus, the portion of the costs covered by the water and sewer budgets should not have been included. Additionally, $9,406 in common-to-all costs for January 2024 was included in the total expenditures for the 2025 Annual Report in error; this has also been removed from the total expenditures. Note: the correct value was included in the 2024 annual report and therefore did not require any adjustments.
2. An adjustment of - $1,204,940 was made to remove all expenditures associated with wet-weather projects, including Brightmoor-Minock Park and the Fenkell Stormwater Projects (Bentler-Westbrook Stormwater Project, Brightmoor Green Infrastructure Project, Minock Park Greening Project, and Minock Park GSI), following discussions with EGLE. As the $50M expenditure requirement under the NPDES permit has been achieved with the progression of the Far West Detroit Stormwater Improvement Project, all expenditures on projects progressing to construction after this project will no longer be included in the Green Infrastructure Annual Reports.
3. An adjustment of $6,189.78 was made after an internal audit of reporting periods from 2023-2025. $11,473.28 was added to include staff training and community development unaccounted in project management and planning expenditures. $4,942.25 was removed from park facilities and park design expenditures due to a calculation error. $341.25 was duplicated in maintenance expenditures in 2025, which were already accounted for in 2024.

Table 6 Green Stormwater Infrastructure Program Cumulative Expenditures

Activity	Prior Years Through 2024			February 1, 2024 – January 31, 2025 Annual Report			Totals			Notes
	FY2010 – 1/31/24 DWSD & Professional Services	FY2010 – 1/31/24 Construction	FY2010 – 1/31/24 Cumulative Expenditures	2/1/24 – 1/31/25 DWSD & Professional Services	2/1/24 – 1/31/25 Construction	2/1/24 – 1/31/25 Cumulative Expenditures	FY2010 – 1/31/25 DWSD & Professional Services	FY2010 – 1/31/25 Construction	FY2010 – 1/31/25 Cumulative Expenditures	
General Project Management	$1,097,901	$0	$1,097,901	$44,653[1]	$0	$44,653	$1,142,554	$0	$1,142,554	SEMCOG 2010-2013; CS-1522 FY2014-2019; CS-188A FY2020-2025
Activity 1 – Policies, Procedures and Standards										
Codes and Ordinance Development (prorated)	$194,900	$0	$194,900	$964	$0	$964	$195,865	$0	$195,865	Prorated relative to URT as share of City as a whole (27.1%). Includes only consultant work on the greening of the code & post-construction stormwater management ordinance.
1-8 Tracking System	$459,808	$0	$459,808	$167,400	$0	$167,400	$627,208	$0	$627,208	GIS and data management; aerial for updated impervious cover (flight).
Activity 2 - Prototype Projects										
Small Scale Greening (site scale bioretention/vacant lots)	$1,304,944	$795,315	$2,100,259	$0	$0	$0	$1,304,944	$795,315	$2,100,259	Includes greening of vacant lots 2013; design and implementation of ecosites project; selection of additional sites and template designs; flow monitoring evaluations 2016 - 2018; CIPMO sites; Joy Road
Neighborhood Projects (previously "Large Scale Greening")	$5,385,065	$21,255,259	$26,640,323	($798,950)[2]	$14,221,351[3]	$13,422,401	$4,586,115	$35,476,609	$40,062,724	Includes survey, geotech, planning, concept, detailed design and project specific outreach for large scale projects: Orange Lawn; Oakman; Far West Detroit
Public Facilities and Parks	$2,295,847	$4,826,251	$7,122,098	$0	$31,442[4]	$31,442	$2,295,847	$4,857,693	$7,153,540	Projects include Stoepel, Liuzzo, Crowell (also includes ecosite modifications), O'Shea, Charles Wright. Professional services include planning, survey, design, construction administration, RPR, maintenance support
Transportation Corridor Projects	$727,032	$2,870,875	$3,597,907	$0	$0	$0	$727,032	$2,870,875	$3,597,907	Projects include PW-6968; Tireman Bioswale. Professional services include survey, design, construction administration, RPR and maintenance support
Activity 3 - Continued Implementation										
Downspout Disconnection	$38,788	$151,846	$190,634	$0	$0	$0	$38,788	$151,846	$190,634	Costs after FY2015 are not included
Demolitions and Site Restoration	$83,246	$579,334	$662,580	$0	$0	$0	$83,246	$579,334	$662,580	DWSD's share of demolition costs
Tree Plantings	$37,321	$1,405,082	$1,442,403	$0	$0	$0	$37,321	$1,405,082	$1,442,403	
Activity 4 - Long Term Performance										
2014 GI Plan	$498,374	$0	$498,374	$0	$0	$0	$498,374	$0	$498,374	
Annual Reports	$160,459	$0	$160,459	$0	$0	$0	$160,459	$0	$160,459	
Ongoing Planning and Coordination	$725,597	$0	$725,597	$0[5]	$0	$0	$725,597	$0	$725,597	Development of future projects continued to focus on large scale projects
Practice Maintenance	$369,753	$0	$369,753	$283,775[6]	$0	$283,775	$653,528	$0	$653,528	Contract expenditures for DWS-935B, DWS-967, & consultant support for maintenance contracts
Activity 5 - Stakeholder and Community Engagement										
Outreach activities and stakeholder coordination	$546,519	$0	$546,519	$0	$0	$0	$546,519	$0	$546,519	Outreach efforts for this report period are included in the codes and ordinance and project activities.
DWSD Staff	$1,982,001	$0	$1,982,001	$200,000	$0	$200,000	$2,182,001	$0	$2,182,001	
Total	**$15,907,554**	**$31,883,962**	**$47,791,516**	**($102,157)**	**$14,252,793**	**$14,150,636**	**$15,805,397**	**$46,136,755**	**$61,942,152**	

1. $11,473.28 associated with staff training and community development has been included.
2. $125,864 in eligible expenditures for this category was incurred, and a deduction of $924,813 was made to remove expenditures associated with Brightmoor-Minock Park and the Fenkell Stormwater Projects.
3. $48,719 has been deducted to correct Far West common-to-all expenditures.
4. $4,942.25 associated with park facilities and park design has been removed.
5. $113,603 associated with various wet-weather infrastructure planning efforts has been removed.
6. $341.25 associated with construction which was incurred in 2024 has been removed from 2025.

Figure 20: DWSD GSI Program Expenditures



6.0 VOLUMETRIC REDUCTIONS

QUANTIFICATION

As stated in previous reports, monitoring data will be used to calculate volumes managed, if such data is available. If there is insufficient monitoring data, then model-generated calculations of volumes managed will be used if a model has been created for a project. If neither monitoring data nor a model is available, EWD and the modified rational method will be used to calculate volumes managed. DWSD may revise estimates of volumes managed as data becomes available (i.e. revising estimates previously based on modeling as monitoring data is collected).

The Far West Detroit project, Charles Wright GSI, Cornerstone, and Joy Rd annual volumes have been calculated using the Equivalent Water Depth (EWD) method, as outlined in DWSD's Drainage Program Guide. The 2-year volumes managed for the Far West Detroit project, Charles Wright GSI, Cornerstone, and Joy Rd projects are calculated using the modified rational method.

Annual and 2-year volumes managed for all completed projects, as last updated in the FY2020/FY2021 Annual Report will not be revised unless reliable modeling or monitoring data becomes available. The annual volumes and 2-year volumes managed by VLB: Vaughan, VLB: Stahelin, and VLB: Evergreen have been calculated using previous monitoring data. The annual volumes and 2-year volumes managed by Stoepel Park, Liuzzo Park, Crowell Recreation Center, VLB: Stahelin (retrofit), VLB: Vaughan (retrofit), and VLB: Greenview have been calculated using Tetra Tech's Site Development Stormwater Tool (SDST). The SDST is based on the NRCS Curve Number method for computing storm runoff. The annual volume managed by O'Shea Park has been calculated using the EWD method, and the 2-year volume managed has been calculated using the SDST. The annual volumes managed by Artesian Porous Asphalt, Keeler Pave Drain, and Tireman I and II have been calculated using the EWD method; the 2-year volumes managed for these projects have been calculated using the Curve Number method.

No new projects have been added to Table 7 this reporting period. Performance metrics for the Oakman Blvd project were revised as described below.

Oakman Revisions

After the construction of the Oakman Blvd project, recurring localized flooding was observed at the intersection of Sorrento Street and Mackenzie Street. Investigative analysis revealed two contributing causes to the flooding issue – a portion of the system was modified during construction to accommodate traffic loading, which was determined to reduce system capacity, and the model underestimated the runoff volume. In response, the construction modification was rerouted to allow for extra capacity and a bypass was constructed along Sorrento Street which reduced the drainage area by 17%, to mitigate flooding and restore the system's intended function. The model was updated to support the bypass design and reflect the as-built condition.

Updates to the model resulted in increased runoff values reported, which aligned with field observations. The model update also reduced the reported retention due to decreased infiltration and modification of the practices based on final as-built conditions. Overall, while the system is expected to treat more stormwater than reported in 2023, a lower percentage of the treated stormwater is retained.

Table 7 GSI Project Summary

	Project Name	Acres Managed	Estimated Construction Costs	2-yr 24-hr Cost Effectiveness[1]	2-yr Volume Managed	2-year, 24-hr Design Storm Performance – Retained[2]	2-year, 24-hr Design Storm Performance - Detained	Annual Volume Removed - Retained & Direct Discharge[3]
		Acres		($/gal)	(MG)	(MG)	(MG)	(MG)
COMPLETED	VLB: Vaughan	0.79	$125,636	$2.37	0.053	0.05	0.003	0.66
	VLB: Evergreen	0.7	$154,225	$3.43	0.045	0.044	0.001	0.58
	VLB: Stahelin	0.71	$139,744	$2.59	0.054	0.046	0.008	0.59
	VLB: Greenview	0.58	$125,713	$6.57	0.019	0.005	0.014	0.48
	Stoepel Park	6.45	$652,672	$4.22	0.155	0.063	0.092	5.31
	Liuzzo Park	3.1	$488,625	$6.40	0.076	0.031	0.046	2.59
	Keeler Pave Drain	1	$289,162	$7.40	0.04	0.005	0.034	0.833
	Artesian Porous Asphalt	5.3	$457,161	$4.35	0.105	0.016	0.089	4.238
	Constance	NA	$497,162	NA	NA	NA	NA	NA
	Tireman Bioswale	NA	$1,217,960	$71.41	0.017	0.001	0.016	1.946
	Tireman Large Bioretention	NA	$457,680	NA	NA	NA	NA	NA
	Crowell Recreation Center [4]	2.48	$820,887	$8.76	0.094	0.09	0	2.07
	O'Shea Park	3.72	$550,617	$6.97	0.079	0.034	0.045	3.11
	VLB: Vaughan (Retrofit)	0.21	$57,641	$7.84	0.007	0	0.007	0.18
	VLB: Stahelin (Retrofit)	0.41	$57,641	$5.96	0.01	0	0.01	0.34
	Joy Rd[5]	3	$225,000	$2.08	0.108	0.108	0	0.108
	Oakman[6]	52.18	$5,400,000	$3.21	1.683	0.462	1.221	35.00
	Charles Wright[7]	7.3	$1,737,738	$12.97	0.134	0.11	0.024	5.68
	Cornerstone	1.18	$299,860	$7.69	0.039	0.015	0.024	0.89
	Subtotals[7,8]	**89.06**	**$13,755,124**	**N/A**	**2.99**	**1.11**	**1.87**	**67.16**
FY2022-2027	Far West Detroit[9,10]	218.00	$32,307,553	$4.83	6.690	0.090	NA	100.59
	Subtotals[12]	**218.00**	**$32,307,553**	N/A	6.690	0.090	NA	100.59
	Total		**$46,062,677**		**9.681**	**1.203**	**1.87**	**167.745**

1 - The 2-yr 24-hr Cost Effectiveness column is a result of the Estimated Construction Costs column divided by 2-yr Volume Managed.
2 - Based on retained volume of 2-year design event
3 - Annual volume removed may be refined as projects progress.
4 - For Crowell, amount in table includes $76K paid by others.
5 - Joy Road project only shows DWSD's portion of funding. Total expenditures for GSI on this specific project is not reflected as Wayne County funded remainder.
6 – See quantification section on pg 41 for information concerning Oakman revisions.
7 - For demolitions, refer to Table 16, DWSD Green Stormwater Infrastructure Program Progress Report, 2017.
8 - For trees, based on a total of 7,117 trees planted in the URT since FY2011. There have been no targeted tree plantings since. Refer to Table 11 and Table 16, DWSD Green Stormwater Infrastructure Program Progress Report, 2017.2 – Annual runoff to the practice is currently approximate for annual volume detention. Estimates may be refined in the future.
9 - Far West includes green infrastructure costs only and 68% share of common costs based on pro rate share.
10 - Far West acres managed includes 6.48 acres from Tireman Bioswale, 3.05 acres from Tireman Large Bioretention, and 15 acres from Constance.

7.0 ACTION PLAN FOR FY2025/2026

Table 8 provides an overview of the action items planned for FY2025/2026.

Table 8 Proposed FY2025/2026 Activities

Activities	Proposed Activities and Schedule
Institutional Efforts	
Codes and Ordinances	Updates by DWSD and City. MS4 update to be reviewed by City Council/BOWC
Stormwater Design Manual (for Stormwater Ordinance)	Evaluation of current manual and implementation of any needed updates. Possible outreach to manual users
Drainage Charge Credit System	Rate adjustment annually
Tracking System	Tracking systems ongoing
Project Implementation/Maintenance	
Stoepel Park No. 1	Maintenance continues
Liuzzo Park	Maintenance continues
Crowell Recreation Center	Maintenance continues
Ecosites Retrofits	Maintenance continues
O'Shea Park	Maintenance continues
Oakman Blvd	Maintenance continues
Far West Detroit	Under construction
Charles Wright Academy	Maintenance continues
Additional GSI Projects	DWSD will consider additional opportunistic projects in collaboration with parks, facilities and DPSCD in alignment with GLWA's WWMP
Distributed GSI Implementation	
Downspout Disconnection - Homes	Coordination with nonprofit groups for downspout disconnection programs in conjunction with drainage charge credit system and outreach
Downspout Disconnection - Multi-Family Residential, Commercial, and Industrial	Non-residential outreach to stimulate private investment
Demolitions and Site Restoration	Coordination with DLBA and DBA is ongoing
Tree Plantings	No additional plantings planned outside of active construction projects
Monitoring and Maintenance of Projects	
Green Stormwater Infrastructure Performance Planning	Oakman and Far West monitoring ongoing.
Green Stormwater Infrastructure Benefits Evaluation	Ongoing coordination with the University of Michigan Water Center
Legal agreements for long-term sustainability	Ongoing activity
Stakeholder and Community Engagement	
Project Related Outreach	Ongoing updates
Overarching, Collaborative Green Infrastructure Public Education Campaign	Ongoing activity
Drainage Charge and Credit Outreach and Engagement	Ongoing activity
Post-Construction Ordinance Outreach	Ongoing activity

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