

Case Study: Minneapolis

Green Stormwater Infrastructure in the Right-of-Way



QUICK MINNEAPOLIS STATISTICS

- **Population:** 425K in 2018
- **11% population increase since 2010**
- **Area:** 57 sq. mi.
- **Mostly separated sewer system**
- **Consent decree:** No
- **NPDES permit:** Yes
- **Stormwater fee credit program:** Yes
- **Post-construction stormwater ordinance:** Yes
- **Snow climate:** Yes



Photo by
Susan Lesch

MOTIVATIONS FOR ADVANCING GSI

Community Interest. Demand from the public and members of the Minneapolis City Council prompted the Department of Public Works to begin implementing green stormwater infrastructure (GSI) projects in various road projects.

Regulation. Minneapolis has a separated sewer system that is regulated through a Municipal Separate Storm Sewer System (MS4) National Pollution Discharge Elimination System (NPDES)

permit, which requires municipalities to use best management practices to reduce pollutants in stormwater runoff to the maximum extent possible and meet the standards of the Clean Water Act.

The City is also obligated to reduce specific pollutant load discharges to surface water bodies as assessed by a Total Maximum Daily Load (TMDL) study, which determines the reduction level necessary to meet water quality standards for identified pollutants.

Co-Benefits. The associated benefits of green streets infrastructure have provided motivation for the Department of Public Works to integrate various elements into transportation reconstruction and development projects.

IMPACT OF CLEAN WATER ACT REGULATION

The City of Minneapolis has a regulatory obligation to improve water quality by reducing the pollutants entering water bodies in stormwater runoff. This creates opportunities for GSI projects that provide treatment of right-of-way (ROW) runoff along with other types of infiltration practices.



Restoring Water Quality. Minneapolis was reissued its MS4 NPDES permit in 2018. The permit requires local authorities to reduce pollutants in stormwater runoff using best management practices like GSI for volume control and flood mitigation. The City and the Minneapolis Park & Recreation Board (MPRB) are co-permittees and created the Stormwater Management Program to achieve their long-term stewardship goals, including implementing GSI in capital projects.

The program also establishes a system to manage compliance with TMDL requirements. 19 of the 30 surface water bodies that receive stormwater runoff from City and MPRB lands are on the Minnesota Pollution Control Agency (MPCA) Section 303(d) Impaired Waters List, requiring a TMDL study.

Nearly all of the studies are completed or in progress. Water bodies with approved TMDLs will require implementation of stormwater management practices to meet water quality standards.

The Stormwater Management Program is created and managed by the City of Minneapolis Surface Water & Sewers Division and the Minneapolis Park & Recreation Board as a regulatory requirement of the NPDES permit with a focus on stormwater management practices. The 2019 revision of the program calls for development of a water resource capital improvement program which prioritizes stormwater infrastructure to address flooding and water quality while also coordinating with transportation projects.

POLICIES & PROGRAMS THAT PROMOTE GSI

Complete Streets Policy. The City of Minneapolis adopted a Complete Streets Policy in 2016. It is a companion item to Access Minneapolis, the City's transportation plan for 2007-2017. Although it does not specifically include green infrastructure, the policy will be institutionalized in the updated 2020 Minneapolis Transportation Action Plan and associated Street Design Guide, which will include stormwater management programs and practices for streets.

Stormwater Fee and Credit Program. Minneapolis Public Works charges a stormwater utility fee based on Equivalent Stormwater Units (ESUs) of 1,530 square feet. Single-family properties are charged based on the area of impervious surface on the property. All other properties are charged based on gross lot size multiplied by a runoff coefficient, which is based on land use class. Dividing by 1,530 square feet determines the number of ESUs the property will be billed for. The revenue from this fee helps fund municipal stormwater management projects. A credit program incentivizes property owners to install and maintain stormwater best management practices by offering credits that will reduce their monthly stormwater utility fees by up to 50% for practices that address water quality and up to 100% for practices that address water quantity.

GUIDING PLANS & STRATEGIES FOR GSI

Minneapolis Transportation Action Plan (TAP). This 10-year plan replaces its predecessor, Access Minneapolis, and will serve as a guide for future planning, design, and implementation of transportation projects for all users. The TAP calls for an update to the Complete Streets Policy to incorporate GSI, as well as the creation of a Street Design Guide. A key action identified in the plan is to green the streets by way of streetscape improvements and GSI including bioswales and native plants. A draft version of the plan was released in March 2020.

The Water Resource Management Plan was created by the City of Minneapolis as a state requirement related to watershed management. Updated in 2018 as part of the Minneapolis Comprehensive Plan, it inventories water resources and water resource management infrastructure, putting forth an implementation plan to guide infrastructure solutions over the 10-year planning period. It recommends green infrastructure as a stormwater management practice for capital improvements related to flood mitigation.

The 2040 Water Resources Policy Plan was created by the Metropolitan Council as a framework for building strategies to integrate management of water resources such as surface water, water supply, and wastewater in the Twin Cities metropolitan area. The plan seeks to address water pollution from point and nonpoint sources and promotes low-impact development, on-site stormwater treatment, and infiltration as strategies for achieving this goal.

GOALS & OUTCOMES

Goals:

- Capture 1.1" of rainfall over impervious areas using infiltration
- Prevent missed opportunities and take advantage of planned projects
- Learn how to implement GSI on road projects before it is required
- Identify the most urgent GSI program needs
- Develop GSI programs around funding, maintenance, and other priorities

Outcomes:

- Constructed the first combined programs GSI project in 2019
- Six new projects are scheduled for construction in 2020
- Developed a citywide water quality model and project prioritization tool which is used to evaluate every transportation project for inclusion of GSI
- Completed retrofits and new construction of stormwater ponds
- Developed new GSI maintenance approaches

ASSOCIATED BENEFITS OF GSI IN THE ROW IN MINNEAPOLIS

As identified by the Minneapolis Stormwater Management Plan, the draft Minneapolis Transportation Action Plan, and program staff.



Ecology

- Provide ecosystem benefits
- Recharge groundwater
- Increase biodiversity and habitat
- Improve water quality
- Sequester carbon



Public Health

- Mitigate and reduce flooding
- Reduce heat island effect
- Preserve recreational opportunities in our lake system



Urban Vitality

- Improve aesthetics
- Create sense of place
- Further promote excitement about pollinator habitat



Economy

- Improve and alleviate burden on water infrastructure system
- Build cost-effective urban retrofit projects
- Create green jobs in city employment and meaningful internships or green corps opportunities

GUIDELINES FOR DESIGNING GSI

The Street Design Guide is a document developed by Minneapolis Public Works and guided by the Minneapolis Transportation Action Plan. The guide will be finalized in 2020 and will be the starting point for designing all street reconstruction, repaving, and restriping projects, incorporating design elements for safety, multi-modality, greenhouse gas emission reduction,

and stormwater management. It will also provide guidance for collaborating on street projects under other jurisdictions.

The Minnesota Stormwater Manual, developed by the Minnesota Pollution Control Agency, includes design criteria and specifications for stormwater best management practices. The manual is used to inform some design elements of the Surface Water & Sewers Division's projects as well as the Stormwater Credit Program eligible practices for private property owners.

COLLABORATION & PARTNERSHIPS

The Green Infrastructure Coordinator, housed in Public Works between the Surface Water & Sewers Division and the Transportation Division, coordinates green infrastructure work between the two divisions and external partners.

LEAD AGENCIES

Surface Water & Sewers Division of Public Works.

Role: improve water infrastructure including GSI to meet water quality goals.

Transportation Planning and Programs Division of Public Works.

Role: improve transportation infrastructure to include elements of Complete Streets and GSI.

• **Transportation Engineering Design Group.**

Role: make GSI planning a reality.

SUPPORTING AGENCIES

Environmental Services, Minneapolis Health Department.

Role: involved with soil testing, erosion control, and use of new green technology like biochar.

Forestry, Environmental Stewardship Division of the Minneapolis Park and Recreation Board.

Role: fund and maintain trees.

EXTERNAL PARTNERS

Minneapolis Park & Recreation Board (MPRB).

Role: co-permittee on the MS4; does water sampling, street trees planting and maintenance, park land GSI construction and maintenance.

Minnehaha Creek Watershed District

Basset Creek Watershed Management Commission

Shingle Creek Watershed Management Commission

Hennepin County

Community groups

Mississippi Watershed Management Organization (MWMO).

Role: partners on and funds GSI projects to meet water quality goals.

FUNDING & FINANCING

The City of Minneapolis uses a combination of sources to fund Complete Streets and transportation projects that include GSI:

- Stormwater fee revenue (Surface Water & Sewers Division Enterprise Fund)
- General funds (used for transportation projects)
- Funds from partners (watershed management organizations)
- Specific grants and funds for state or county road projects
- Bonds

GSI MAINTENANCE RESPONSIBILITIES

Subsurface maintenance: Surface Water & Sewers Division of Public Works

Surface maintenance: Transportation Planning and Programs Division of Public Works

Vegetation maintenance: Parks Forestry staff maintains trees, Public Works holds a contract for vegetation management, and some adjacent property owners share responsibility for vegetation care, trash/debris removal, and clearing grates and curb cuts.

Photos courtesy of MWMO

PROJECT HIGHLIGHT

The Edison High School Green Campus project was led by MWMO and serves as a living lab for innovative stormwater management and monitoring. This project is a collaboration between MWMO, the Holland Neighborhood Improvement Association, the City of Minneapolis, Minneapolis Public Schools, and Spark-Y (a nonprofit for youth education around sustainability and entrepreneurship). As part of the project, Minneapolis Public Works installed stormwater planter bumpouts on the streets around the school as stormwater management practices and traffic calming measures.

- **Practice type:** Subsurface storage tanks, rain garden, permeable pavers, tree trench, bumpouts
- **Annual stormwater capture:** 1.5 million gallons
- **GI project cost:** MWMO contributed \$1.7 million



LESSONS LEARNED & KEYS TO SUCCESS

Lessons Learned:

- Identify all divisions involved and how to engage them
- Perfect is the enemy of functional
- Have a plan for failures
- Rely on experts in their field
- Individuals make a difference; they can progress or slow down the work
- Be flexible
- Develop tools staff can use
- Engaged Minneapolis residents love plants

Keys to Success:

- Get projects in the ground
- Monitor project pipeline for GSI integration
- Develop standards for transportation engineers
- Provide resources and technical expertise to staff
- Embed people into divisions and create shared positions to overcome silos

SPECIAL THANKS

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PROTECTING WATER, SUSTAINING LIFE

The Alliance for the Great Lakes is a nonpartisan nonprofit working across the region to protect our most precious resource: the fresh, clean, and natural waters of the Great Lakes. Learn more at greatlakes.org.