

Brightmoor Neighborhood

Stormwater Focus Group

June 29, 2023



Water & Sewerage
Department



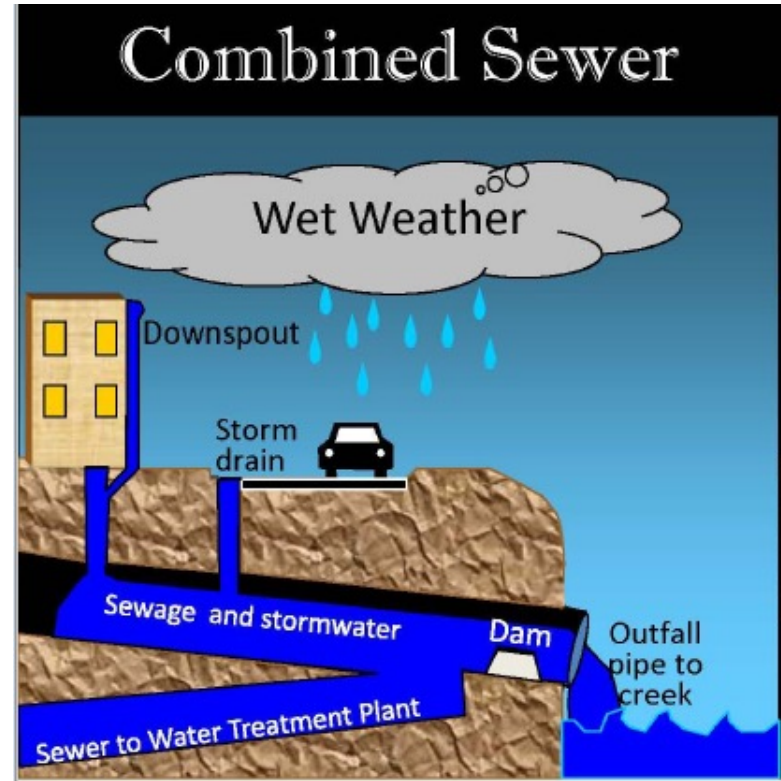
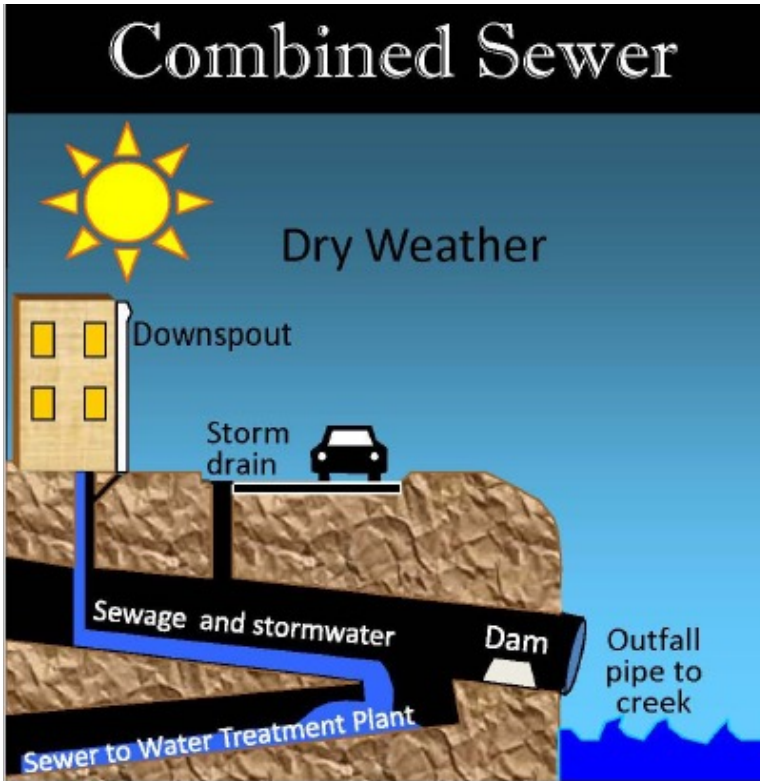
Goals of Presentation

- Discuss laws and permit requirements surrounding stormwater discharges
- Different methods to manage stormwater with infrastructure (grey vs. green)
- Costs associated with methods
- Examples of stormwater management
- DWSD's commitment to outreach
- Nationwide examples of GSI
- Brightmoor opportunities
- Community feedback

DWSD Permit Requirements



The problem with a combined sewer system: Rain storms overrun capacity of treatment plant



The Problem:

Federal Clean Water Act of 1972 Requires that no untreated sewage/storm water be discharged into the Detroit or Rouge Rivers

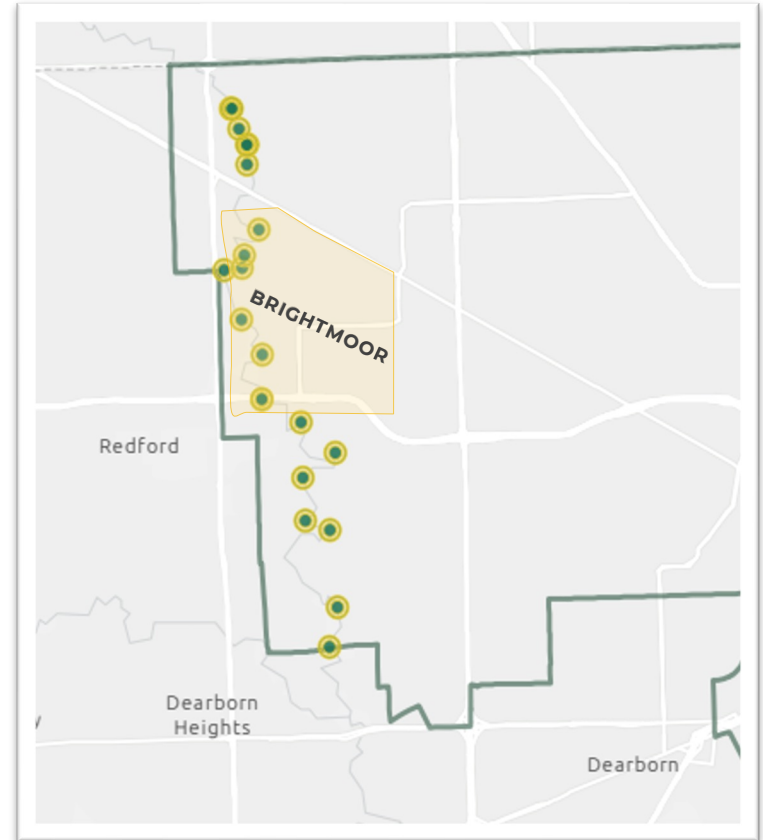


Detroit's History of Storm Water Drainage Improvements

- 1972 Clean Water Act Passed by EPA.
- 1975 City Charter authorizes DWSD to charge drainage rates.
- 1977 Detroit sued by the Federal Government for failure to comply with Clean Water Act - more than 20 billion gallons of untreated waste were dumped into Detroit River and Rouge River each year.
- 1977 Judge Feikens places wastewater treatment system in federal receivership.
- 1980-2012 Detroit spends \$1.5 billion building improvements to reduce illegal discharges.
- 2013 Detroit's federal discharge permit allowed delay until 2022 of expenditures needed to build an additional \$1 billion in new storm water management.
- 2019 Detroit's federal discharge permit allowed delay until 2037 to address all high priority outfalls.

DWSD Permit Requirements Related to Rouge River

- There are 17 Combined Sewer Overflow (CSOs) outfall locations on Detroit's West-side.
- The permit requires DWSD to address CSOs along the Rouge River by 2037.
- Currently funds are not allocated towards the Brightmoor neighborhood area.



CSOs and Brightmoor

Stormwater runoff from the Brightmoor Neighborhood is directed to the Rouge River. The neighborhood contributes to several untreated CSO's along the Rouge River Tributary.



Infrastructure Options to Meet Permit Requirements

Infrastructure Options to Meet Permit Requirements

Grey Infrastructure

Stormwater runoff is managed with **traditional structures** such as underground sewers, underground basins, or water treatment plants which require pumps, gates, concrete tanks, chemical treatment, odor control, etc.



Little land use required



High cost for rate-payers



Can be built to meet permit requirements



Does not include green spaces or visible community benefits



Source: <https://conseal.com/project-files/stormwater-detention-basin/>



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Infrastructure Options to Meet Permit Requirements

Small-Scale Green Infrastructure

Local stormwater runoff is managed with **small-scale natural systems**. Soils and plants soak up stormwater where it falls before it can enter and overwhelm the combined sewer system.



Little land use required



Can be cost prohibitive



Not large enough to meet permit requirements individually



Native plants and trees can improve air and water quality



Infrastructure Options to Meet Permit Requirements

Large-Scale Green Infrastructure

Large-scale GSI captures stormwater runoff from a much larger area and can benefit multiple tributaries along a river rather than just localized areas.



Requires more land



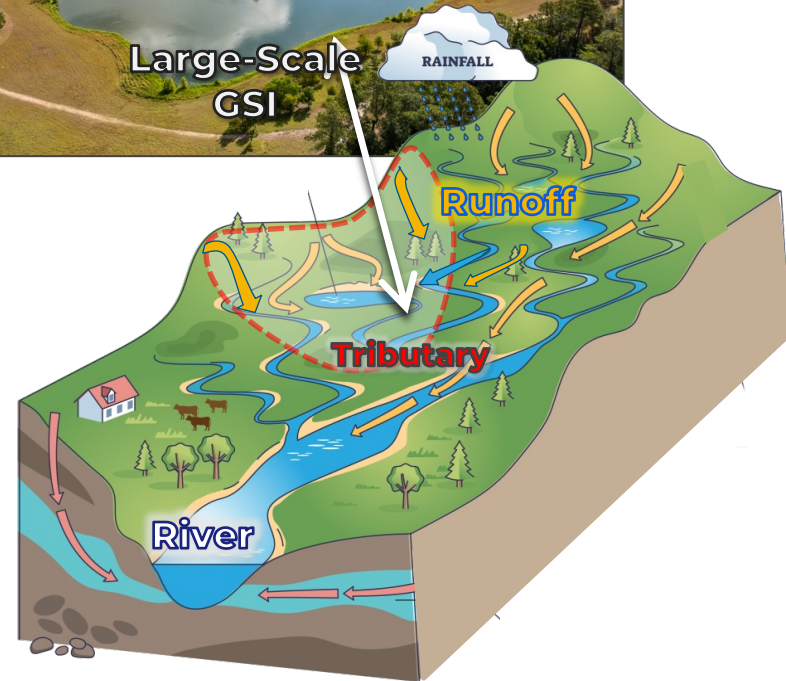
Cost effective















Large enough to gradually meet permit requirements



Options for green spaces and functional amenities



Comparison of Different Infrastructure Options

	Land Use	Cost*	Permit Requirements	Community Benefits
Grey Infrastructure				
Small-Scale Green Stormwater Infrastructure				
Large-Scale Green Stormwater Infrastructure				

*DWSD evaluates all options and works towards the most cost-effective option to reduce impacts on rate payers.

Examples of Infrastructure In Detroit

Examples of Grey Infrastructure in Detroit

Combined Sewer Overflow Facilities:

Puritan-Fenkell Facility



Conner Creek Facility



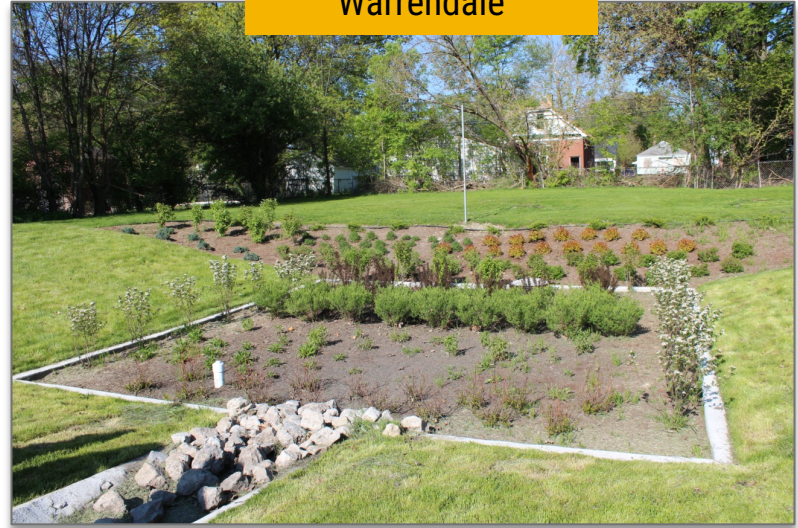
Examples of Small-Scale Green Infrastructure in Detroit

Bioretention in vacant parcels and gardens:

Viola Liuzzo Park



Warrendale



Example of Large-Scale Green Infrastructure in Detroit

Bioretention in median along approximately 1 mile of roadway:



Oakman Boulevard – Aviation Sub



Example of Large-Scale Green Infrastructure in Detroit

Stormwater Basins:

Far West Stormwater Project Renderings



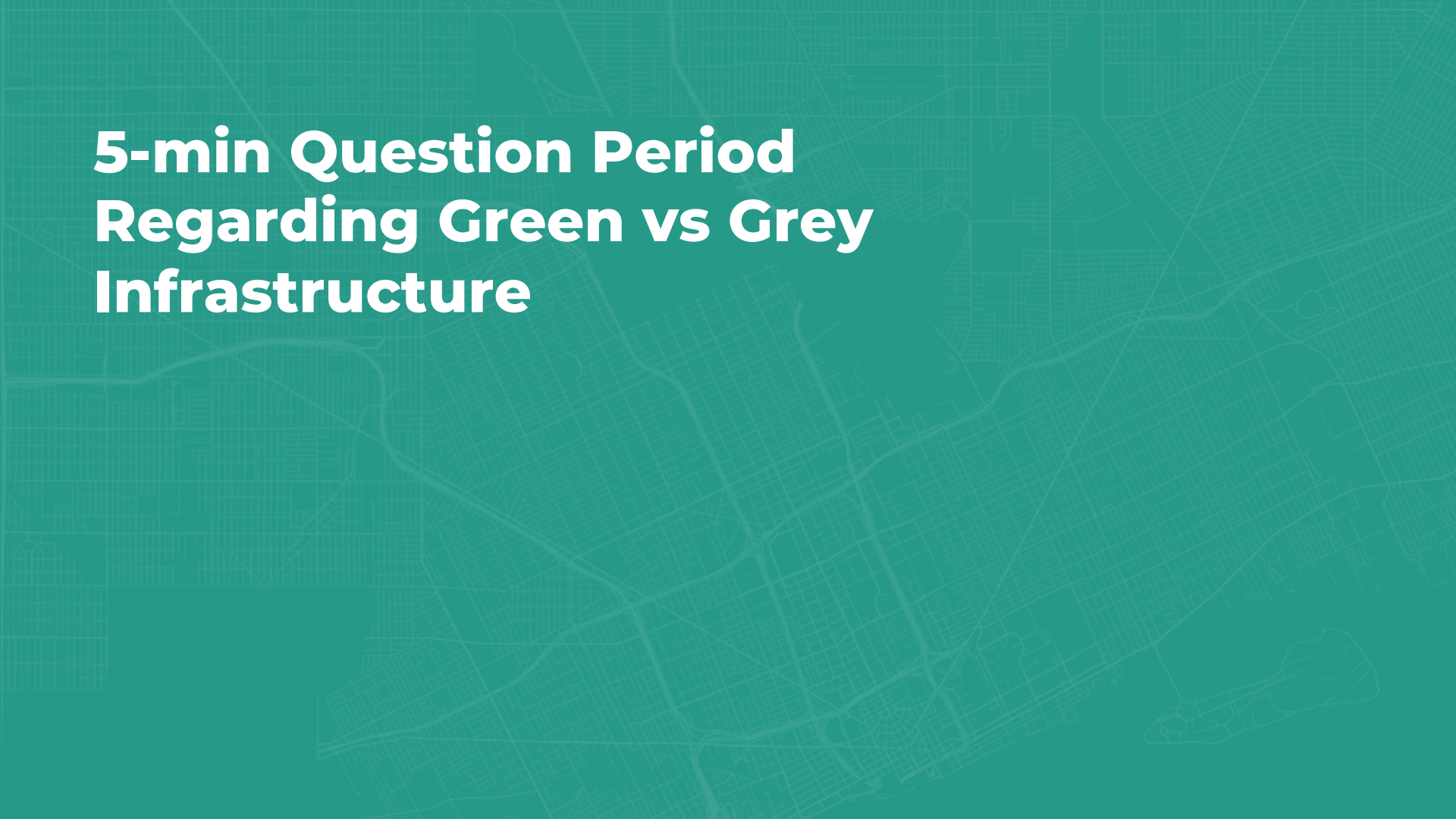
Far West Impacts on the Neighborhood

Far West Stormwater Project Rendering



- DWSD installs stormwater conveyance piping
- Surface restoration is typically in-kind replacement
- \$32M in stormwater improvements
- ~100 MG removed annually
- Creates available capacity in the combined sewer
- Highly-visible due to use of city-owned Rouge Park





5-min Question Period Regarding Green vs Grey Infrastructure

DWSD Community Outreach



DWSD Community Outreach

DWSD values the community's input on all DWSD infrastructure projects including water, stormwater, and sewer projects.

Engagement Process for GSI Projects:



Location

DWSD conducts engineering analysis to determine location for GSI Project. Location is fixed based on engineering requirements.



Community

DWSD engages the community throughout the design process to gain feedback.



Design

Feedback from the community shapes the look and feel of the GSI and aids in the design.



Example of DWSD Community Outreach

Oakman Boulevard Median

Design for bioretention areas on the median reflect what DWSD heard from the community:

- Manicured landscaping
- Vegetation with color and some ornamentals
- Mounded areas coupled with depressed areas
- No art features or promotion for active use



Types of Community Outreach

DWSD conducts the following types of community outreach to engage the community and illicit feedback:

- Community Meetings
- Surveys
- Flyers/Door Hangers
- In-person/Door-to-door
- Educational Signage

DWSD will conduct our own engagement strategy that is separate from the PDD framework plan before project implementation.



Educational Signage at Viola Liuzzo



Survey with Planting Options for Tireman Bioswales

Nationwide Examples

Nationwide Large-Scale Example

Natural Drainage Systems (Seattle, WA)

- Reconstruction of road right-of-way to incorporate cascading bioretention systems
- Project utilized the hills and natural slope in the landscape to create the cascading drainage system
- Collaborative approach used to design stormwater system with adjacent subsidized housing and community amenities



Source: https://2000willoughallans.org/wp-content/uploads/2019/11/Seattlema_1.jpg



Nationwide Large-Scale Example

Cook Park (Atlanta, GA)

- Dozens of community events, meetings, and in-depth conversations over 18 months, residents articulated their priorities for future public spending on flood prevention and identify locations for public green space that could double as stormwater management infrastructure.
- Vine City residential area was revitalized to become 16-acre Cook Park to mitigate toxic flooding events
- Two-acre pond is part of an engineered system that can store up to 10 million gallons of stormwater from 160 surrounding acres that would otherwise flood streets and overflow sewers.



BEFORE AFTER



Nationwide Large-Scale Example

North Carolina Museum of Art Stormwater Pond (Raleigh, NC)

- Bioretention and stormwater system was done as part of museum expansion
- Native plants and public pathways integrated into design
- Stormwater runoff is reused for irrigation



Photo: Aerial Photo by Peter J. North Carolina Museum of Art Park — Kevin Pugh Media



<https://surface678.com/project/north-carolina-museum-of-art-stormwater-pond/>



Comparison of Detroit vs National Examples

National Examples

Detroit

Topography

- Natural topography used to convey and store stormwater

- Limited hills and slope; Brightmoor has the most ideal topography (historic stream corridors)

Land Use

- Public land and ROW used for stormwater management
- Community amenities integrated into design

- The City of Detroit owns large amounts of vacant land which provides a unique opportunity for GSI

Social Benefits

- Parks and water re-use
- Cleaner, healthier environment
- Collaborative planning approach for community benefits

- Collaboration between DWSD, PDD, and DLBA to bring community benefits to in addition to stormwater management

Seattle



North Carolina



Atlanta



Previous U of M Studies

University of Michigan NEW-GI (Prof. Joan Nassauer)

- The Neighborhood, Environment and Water Collaborations for Green Infrastructure (NEW-GI) Research Group conducted the following studies:
 - Green Infrastructure on Vacant Land: Achieving Social and Environmental Benefits in Legacy Cities (2017)
 - Different Contexts, Different Designs for Green Stormwater Infrastructure (2018)
 - Green Infrastructure on Vacant Land: An Integrated Assessment with Implication for Detroit (2019)
- Brightmoor was the canvas for a University of Michigan graduate level design studio course
 - EAS 767 Environment & Sustainability

U of M NEW-GI Research Results

- Engineered rain gardens in Warrendale neighborhood were extremely efficient at managing stormwater for medium sized storms (2 inches)
- Care and management of rain gardens elicited stronger acceptance and enhanced well-being for neighborhood residents
- Mowing and barriers (concrete bollards) discouraged dumping and unwanted visitors
- Residents reported GSI would promote investment in occupied homes



U of M NEW-GI Research Group's Results

- GSI more effective and resilient when designed with context (soil, topography, land use, neighborhood, etc.)
- Brightmoor neighborhood lends itself to large stormwater management practices (more efficient than smaller practices)
- Distributed rain gardens allow access to green space, promote acceptance, and provide health benefits (rain garden within ~150 yards of every house)
- GSI was efficient at managing small storm events

U of M Graduate Design Studio



GREEN STORMWATER INFRASTRUCTURE IN ALTERNATIVE FUTURES FOR BRIGHTMOOR

DESIGN IN THE DYNAMICS OF
METROPOLITAN LANDSCAPES

Environment & Sustainability 787

Professor Joan Nassauer,
Graduate Student Instructor Yuanqiu
Feng

March 2018

 **SCHOOL FOR ENVIRONMENT
AND SUSTAINABILITY**
UNIVERSITY OF MICHIGAN

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Common Themes from U of M Graduate Student Work

- Large stormwater park was envisioned based on topography between Lyndon and Outer Drive & centered around Burgess/Bentler
- Effective and efficient way to manage stormwater for Brightmoor neighborhood
- Significant street decommissioning and/or modification
- GSI and park space seen as a catalyst for neighborhood stabilization and redevelopment





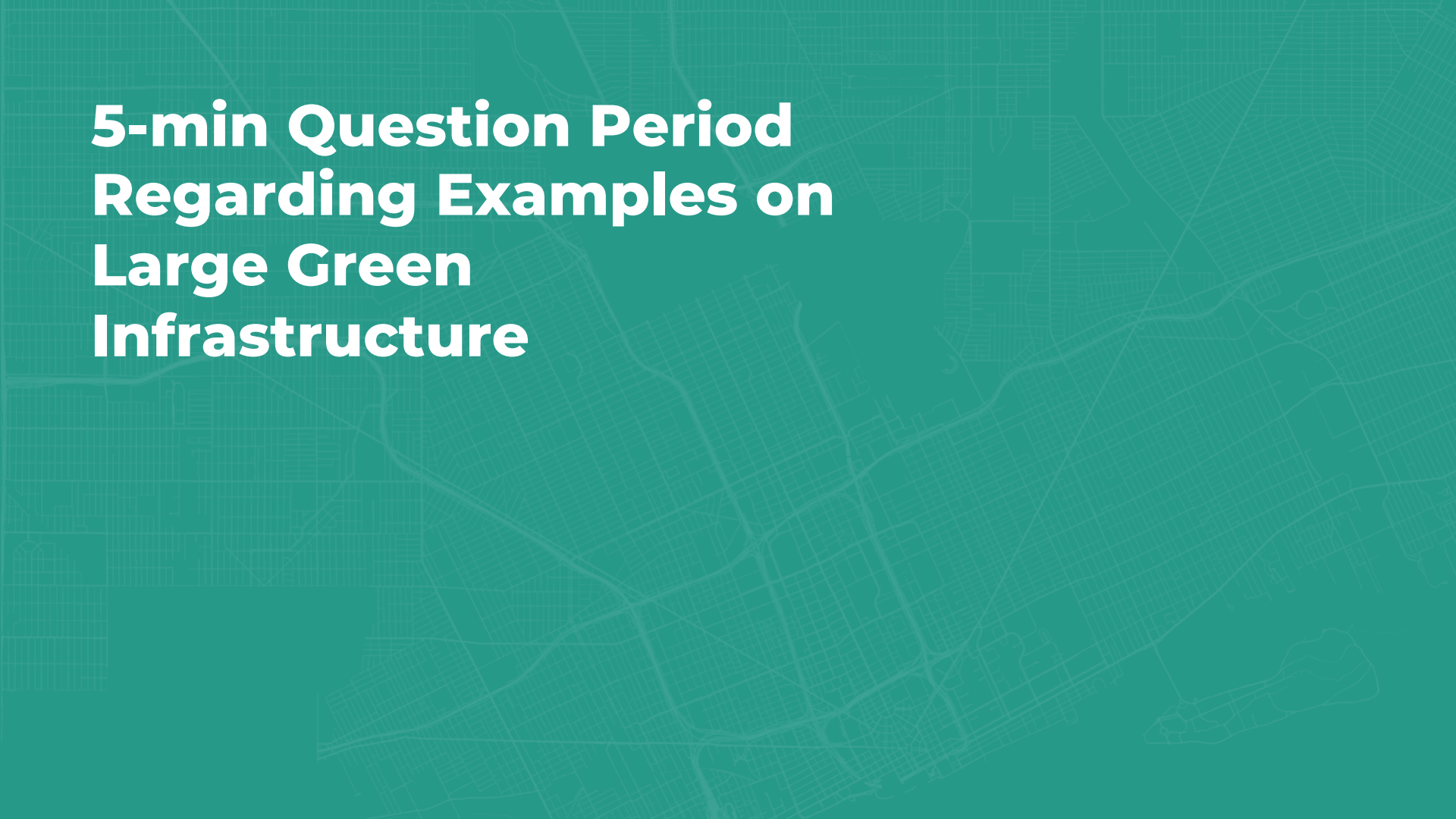
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**5-min Question Period
Regarding Examples on
Large Green
Infrastructure**

CSO Control Plan (DWSD) and Neighborhood Framework Plan (PDD)

PDD and DWSD Collaboration

DWSD and PDD are working to integrate DWSD's stormwater management plan for uncontrolled CSO's on the Rouge River within PDD's neighborhood framework plan.



PDD and DWSD Collaboration

DWSD roles and responsibilities:

- Responsible for locating, designing, constructing and maintaining large scale affordable stormwater management for regulatory compliance
- Coordinating with PDD consultants to ensure the vision for the neighborhood is unified



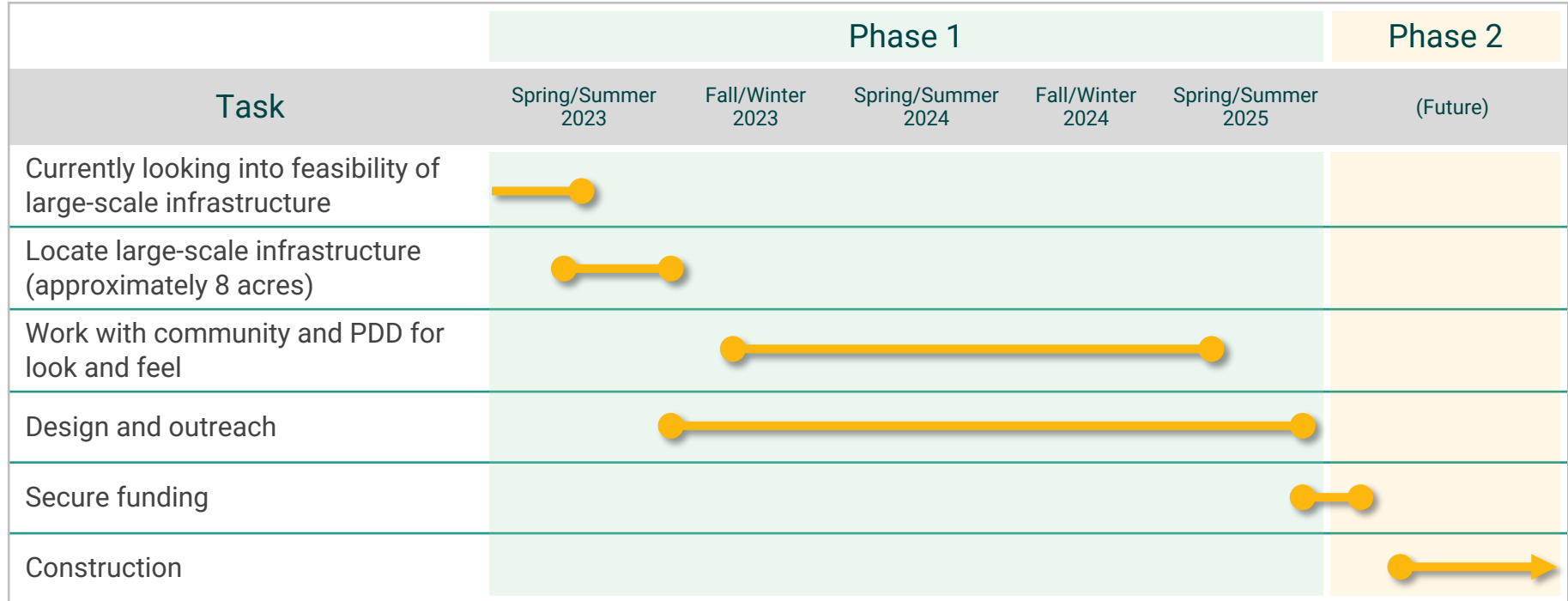
PDD and DWSD Collaboration

PDD roles and responsibilities:

- Work with community and DWSD to finalize the final look and feel of the DWSD infrastructure/stormwater management installation
- Work with community to determine what surrounds the DWSD infrastructure
- Work with the community to determine if additional stormwater features could feed into the DWSD infrastructure (to be designed/installed/maintained by others)



Schedule for Evaluating Large-Scale GSI in Brightmoor



Schedule Subject to Change

Community Feedback

- **Comments and input on large-scale GSI in Brightmoor**
- **Comments and input on National examples of large-scale GSI**
- **Thoughts on installing large-scale GSI using the existing topography within Brightmoor**



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Thank You

Questions/Comments?



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www.detroitmi.gov/DWSD



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