Metropolitan Water Reclamation District of Greater Chicago

8 Years Greener: MWRD's Green Infrastructure Program

Calumet Stormwater Collaborative

February 4, 2022

OVERVIEW

- Types of GSI
- Background (2015-2016)
- Formal Program (2017 on)
- Current projects and status
- Lessons learned & passed on
- Future Project Example
- Project Impacts Over time

TYPES OF GREEN STORMWATER INFRASTRUCTURE

Categories:

1. **Rainwater Re-use: Rain Barrels, Cisterns**
2. **Permeable Hardscape: Permeable pavement**
3. **Plant/soil based: Rain gardens, bioswales, green roofs, green walls…**

PERMEABLE PAVERS

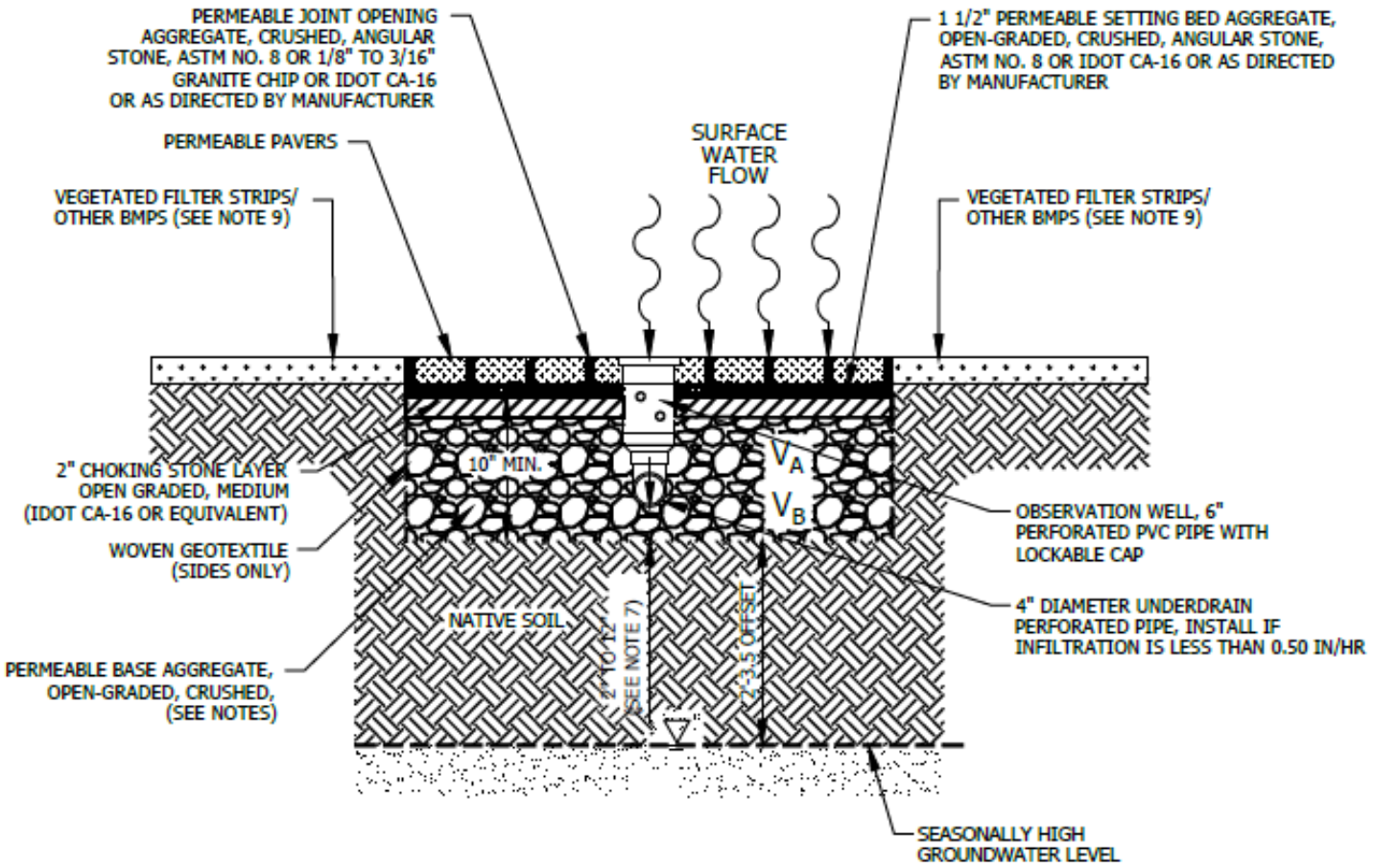
- Permeable paver bricks, concrete or asphalt

- An alternative to traditional asphalt and concrete parking lots, walkways, and low traffic roadways

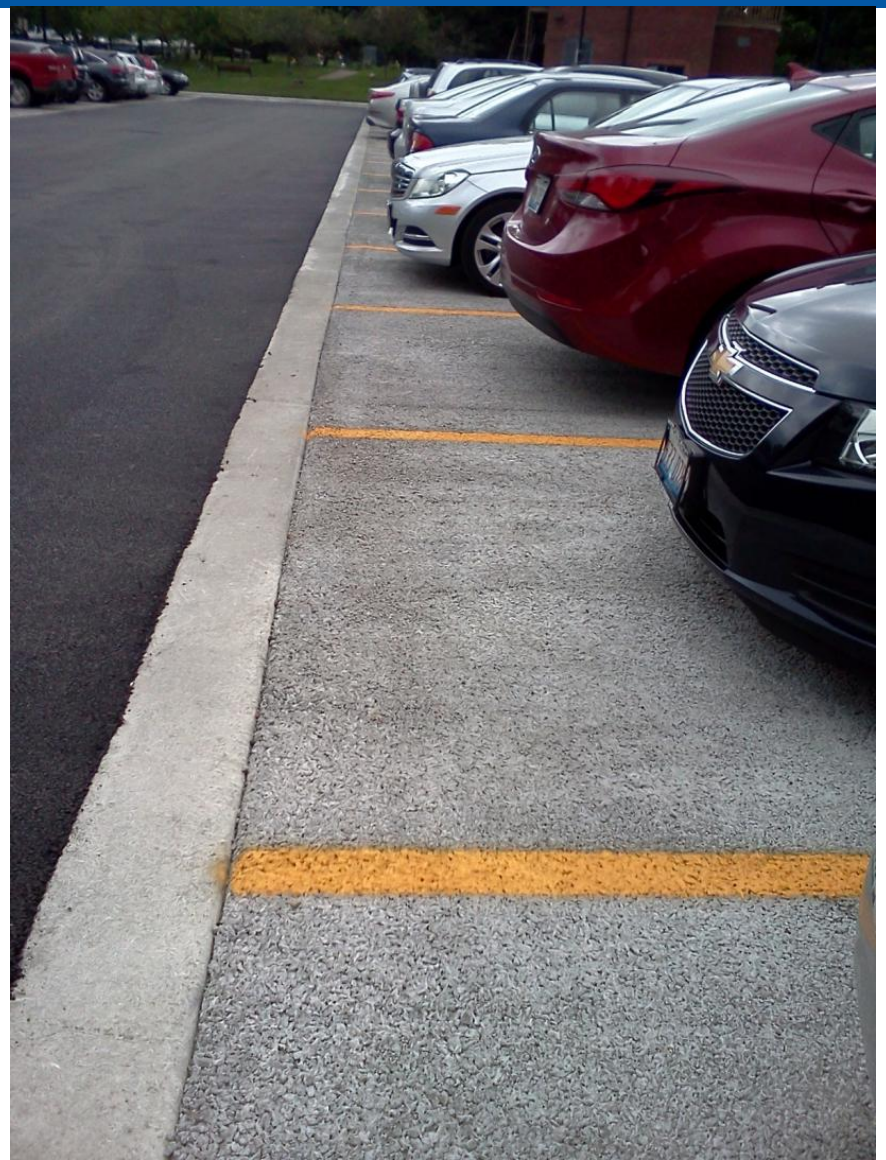
- Captures stormwater runoff and retains it within coarse aggregate void spaces long enough for the water to percolate through the underlying soils.

- Consists of three main components: a permeable surface pavement, base and subbase coarse aggregate layers below the permeable surface pavements, and a permeable soil subgrade

PERMEABLE PAVERS DETAIL



PERMEABLE CONCRETE



PERMEABLE PAVERS

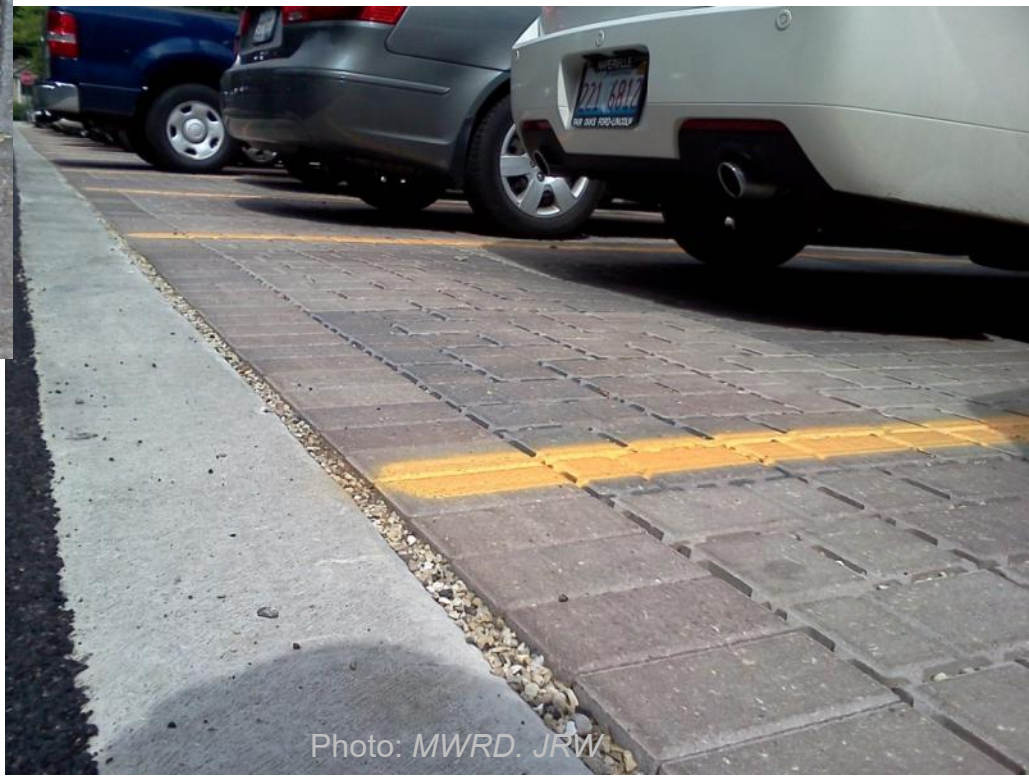


Photo: *MWRD. JRW*

PERMEABLE ASPHALT


Performance Comparison: Traditional vs Permeable

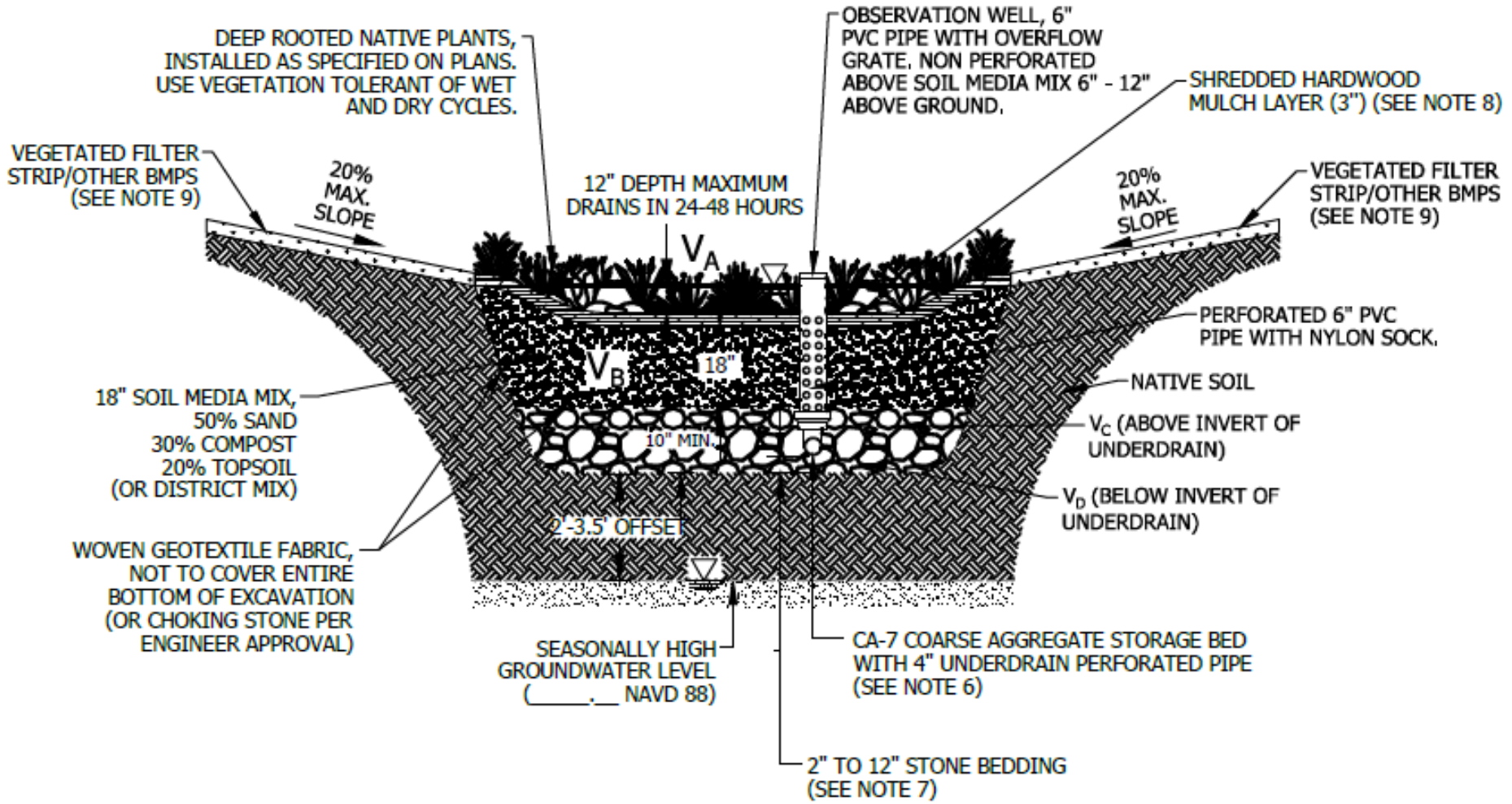
RAIN GARDEN

- Collect roof and surface runoff allowing the volume collected to infiltrate into the ground.
- The stored volume would otherwise flow immediately to storm sewers and streams.
- The plants, mulch, and soil help to trap, utilize, or degrade pollutants, such as, nutrients from lawns, bacteria from pet wastes, and oil from driveways.
- Together, many can make a cumulative impact for flooding

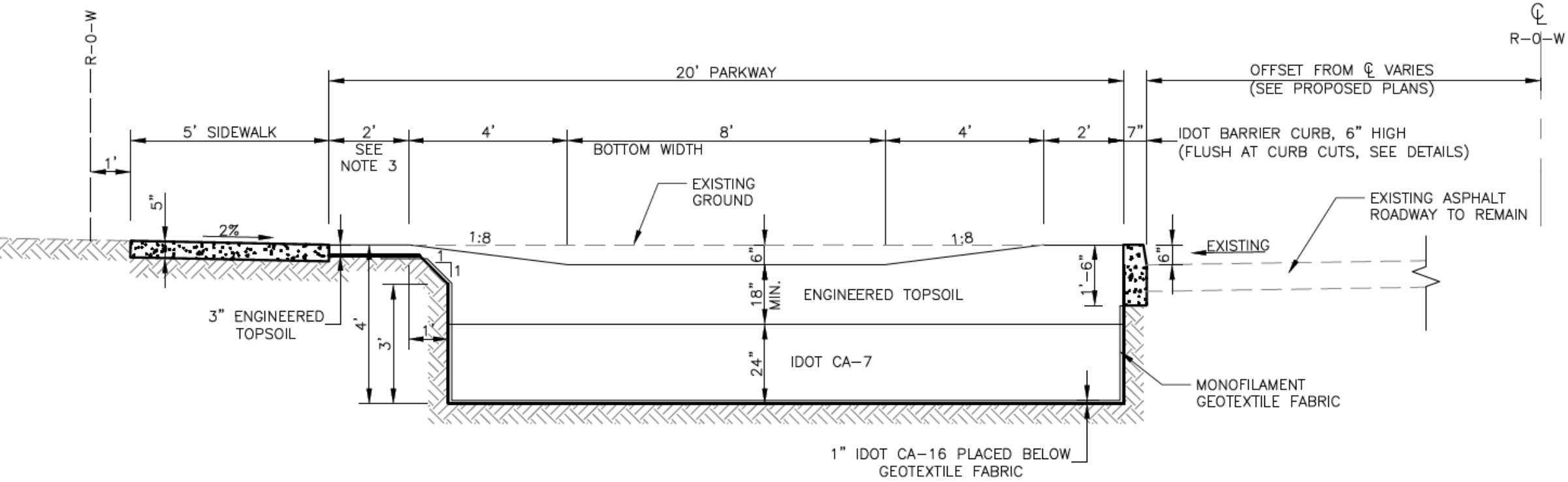
BIOSWALE

- Reduces stormwater runoff discharged from the site to receiving sewer systems and streams.
- Captures a portion of stormwater runoff and retains it long enough for the water to percolate through the underlying soils or evaporate and/or dissipate through evapotranspiration by plants.
- Fine sediment, nutrients, bacteria, and organic materials can be filtered, adsorbed by soil particles, or utilized by plants.
- Numerous bioswales throughout a watershed will help reduce the volume of stormwater runoff and improve water quality.

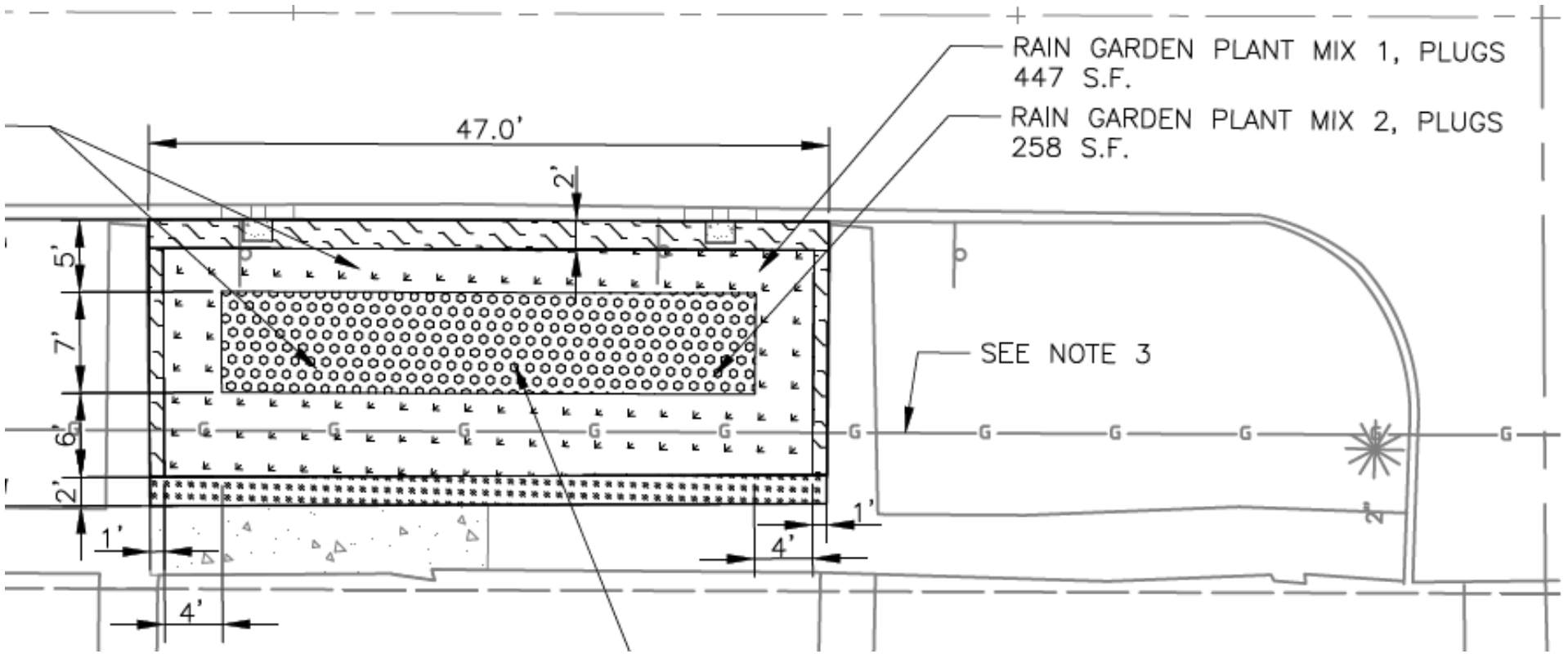
BIOSWALE SECTION/DETAIL



RAIN GARDEN: ALTERNATE DETAIL



EXAMPLE PLANTING PLAN



- **Different mix in bottom of rain garden of more inundation-tolerant plants**
- **Limit number of plant species & <u>grouping</u> to ease weeding**

APPLICATIONS

BACKGROUND

2013 & before

- Native planting areas at some of our Water Reclamation Plants
- Rain gardens and permeable pavement at plant parking lots
- Preliminary information gathering

2014-2016:

- CPS & Chicago-DWM partnership begins
- Pilot projects and knowledge building

2017-present: formalized program

- Annual call for projects
- Public agencies, through intergovernmental agreements
- Partnerships or conditional reimbursements (not grants): Diversity, Public Ed, Maintenance
- Reimbursed volume cannot be used to satisfy any stormwater permitting requirements

GI PROJECT PRIORITIZATION

- Primary Selection Criteria
  - $/gal captured
  - Structures benefitted
  - Project timeframe
- Other factors
  - Flooding frequency and severity
  - Combined sewer areas
  - Total cost of project
  - Median income of area
  - Maintenance resources and experience
  - Visibility/Educational opportunity
  - Past receipt of recent MWRD funding for similar projects

SUMMARY OF 2017-2020 GI CALL FOR PROJECTS

Applications Submitted
168

Projects Selected
76

Estimated Structures Benefitted
4315

Estimated Total Construction Costs
$41.2 million

Estimated Design Retention Capacity
8.0 million gallons

2021 GI CALL FOR PROJECTS

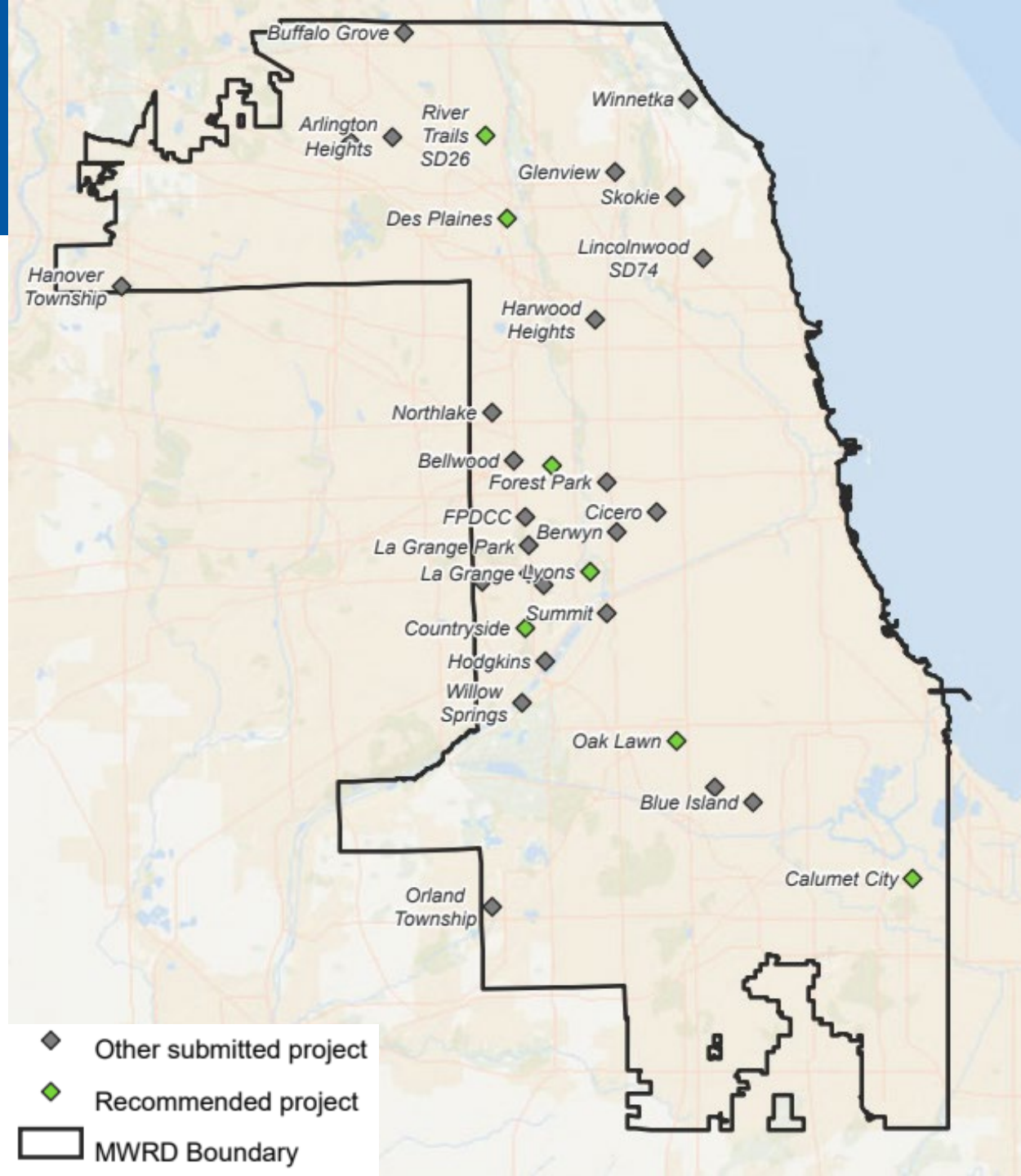
Applications Submitted
32

Projects Selected
7

Estimated Structures Benefitted
466

Estimated Total Construction Costs
$5.1M

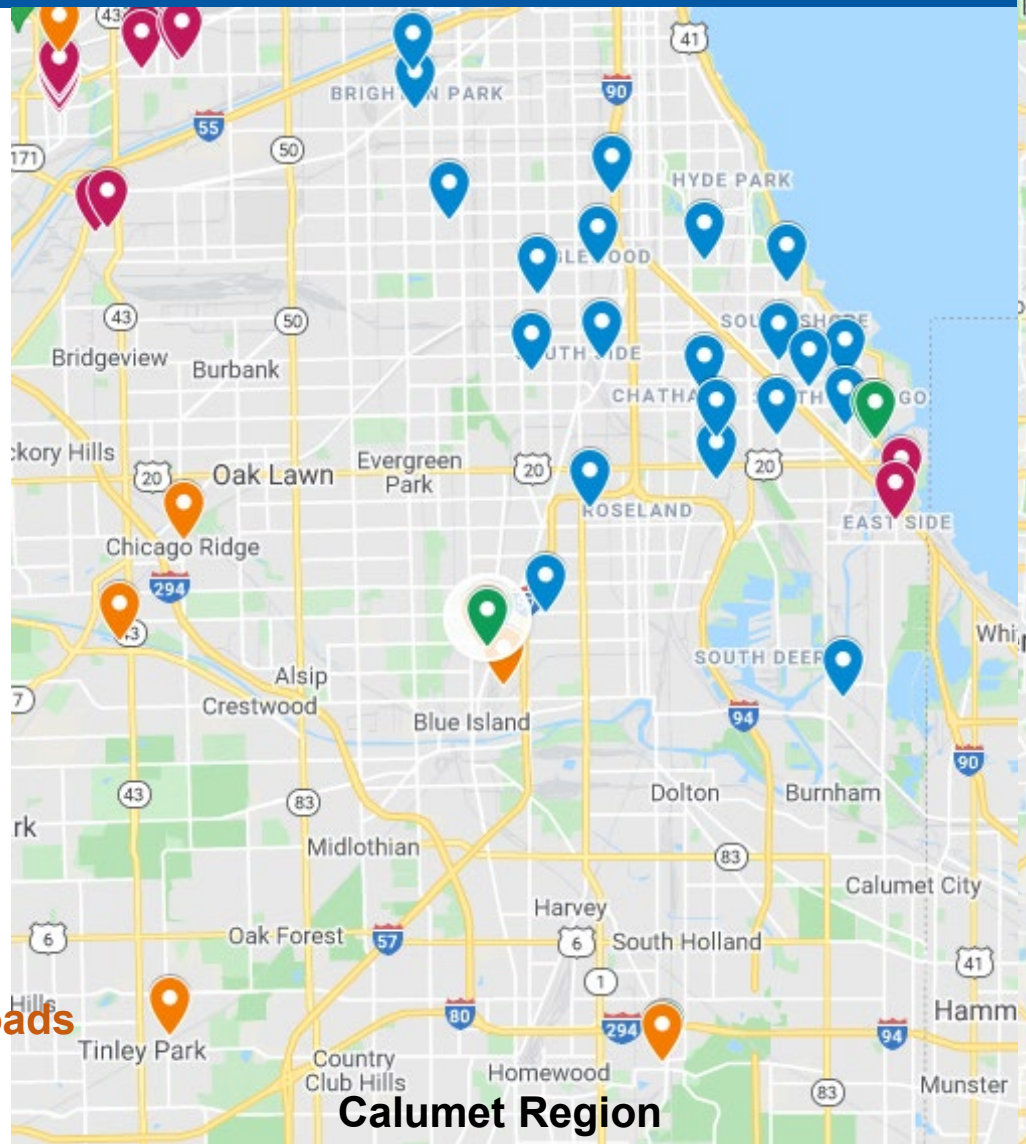
Estimated Design Retention Capacity
812,000 gallons



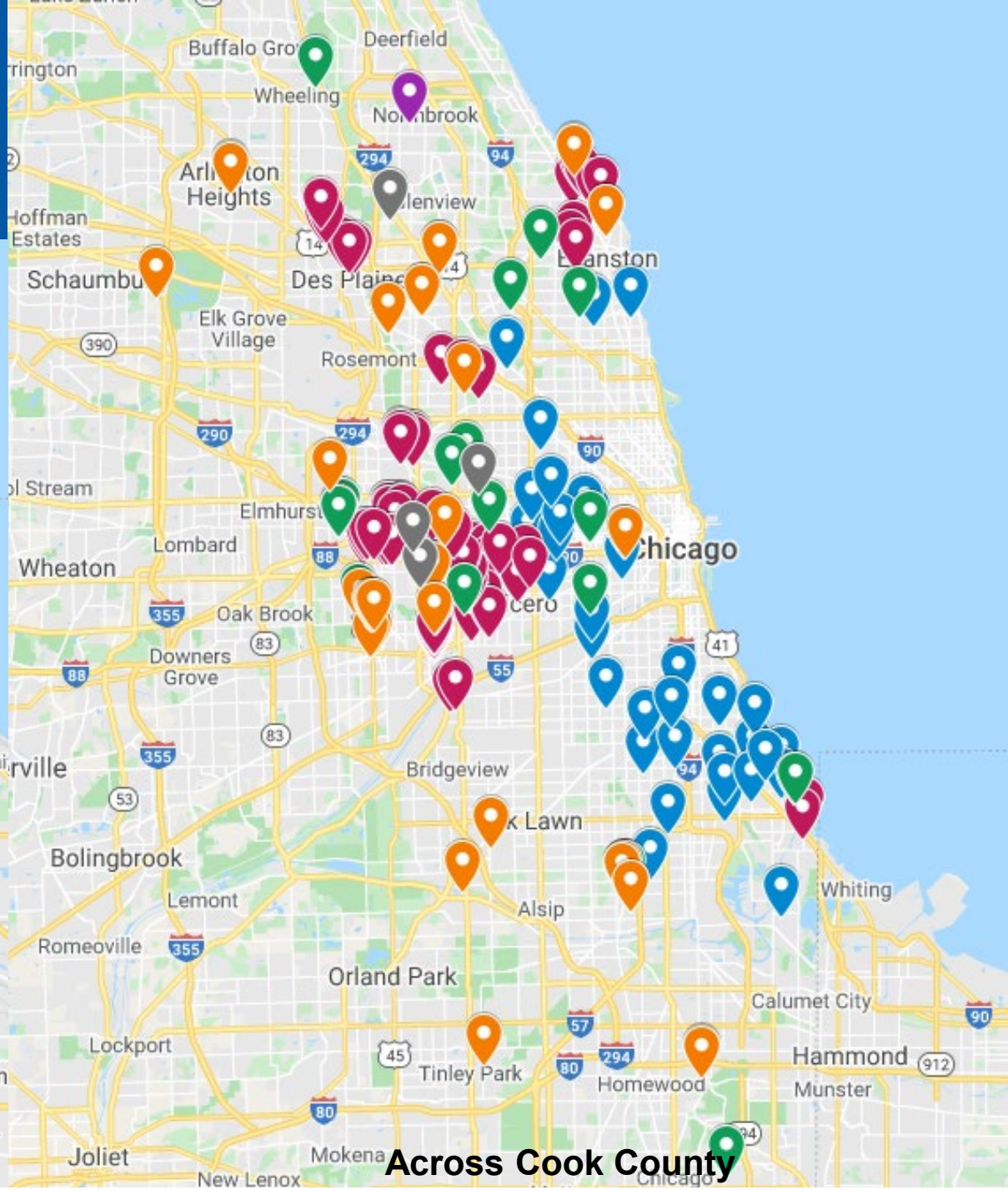
CUMULATIVE IMPACTS

Project Key:

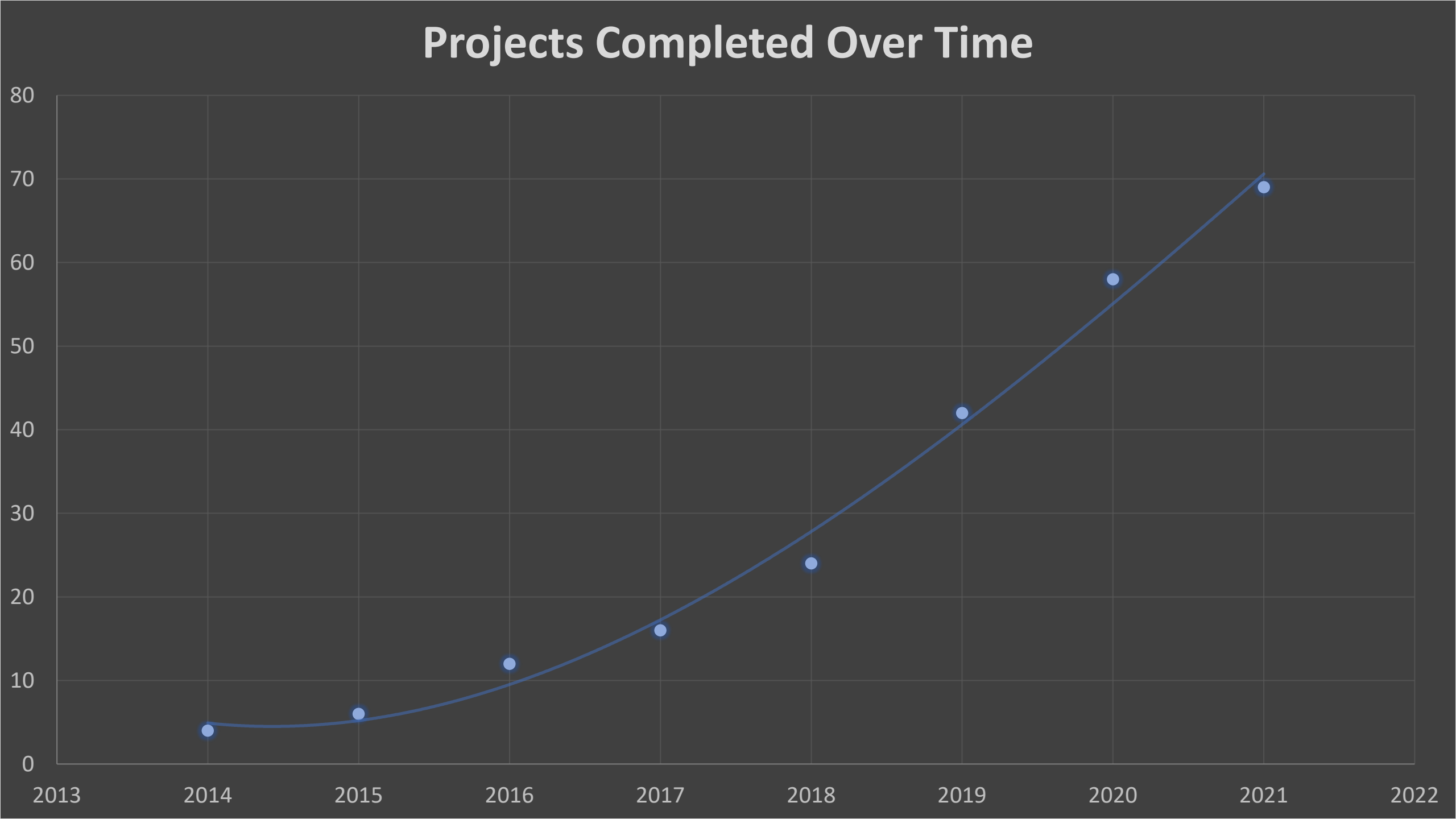
- Plant-Based
- Green Alleys
- CPS
- Parking Lots/Roads
- Other



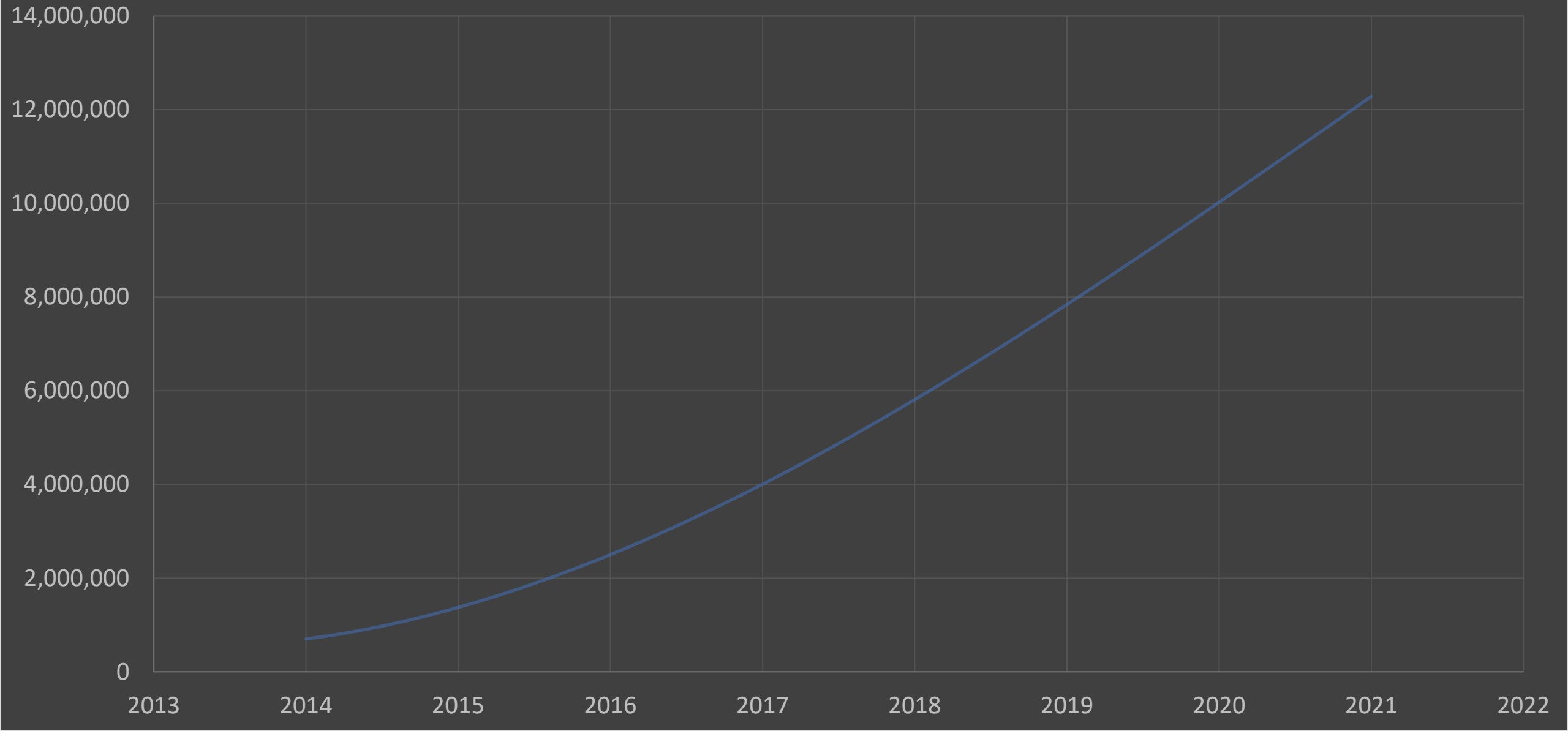
Calumet Region



Across Cook County


Projects Completed Over Time
80
70
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

Design Retention Capacity Built Over Time
[gallons of stormwater retained]



EXAMPLE PROJECTS

BLUE ISLAND RAIN GARDEN

BLUE ISLAND PERMEABLE PARKING LOT

SCHOOL DISTRICT 154 IN THORNTON, IL

Location
200 N Wolcott St, Thornton, IL

Description
Removed of asphalt playground surfaces and constructed permeable pavement playground surfaces and a bioswale at Wolcott Elementary School providing approx. 53,500 gallons of DRC.

Construction Cost
$282,000

MWRD Contribution
$143,500

Status
Project completed in October 2020

SCHOOL DISTRICT 154 IN THORNTON, IL

NORTH STREET IN TINLEY PARK

Location

North Street east of Oak Park Ave

Description

Converted existing asphalt on North Street to permeable pavers providing approx. 69,700 gallons of DRC.

Construction Cost

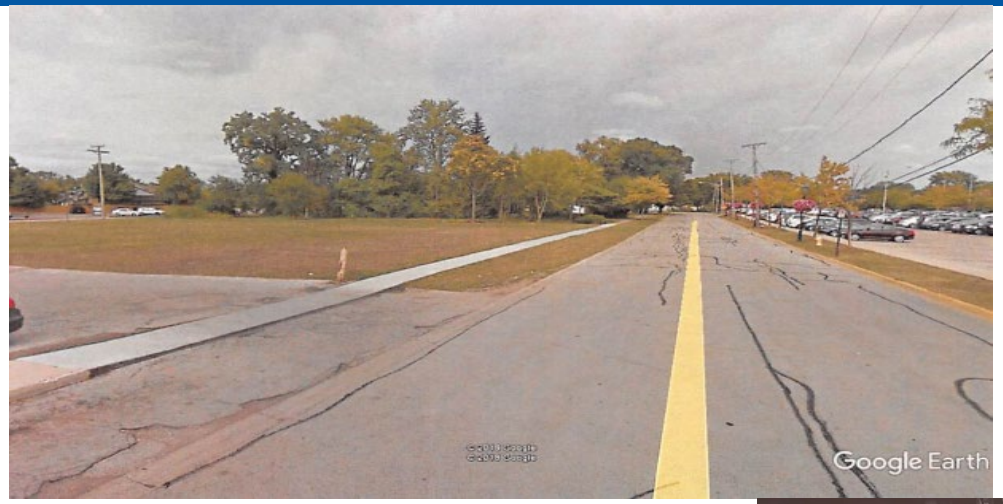
$400,000

MWRD Contribution

$200,000

Status

Project completed in October 2019



Virgil Grissom Elementary School
After

DETENTION BASIN ENHANCEMENTS IN OAK LAWN
(DEMONSTRATION PROJECT, PLANNED)

Location

Near S 52nd Ave and W 100th St, Oak Lawn

Description

Naturalize one existing grass-bottom detention basin with native plantings; Monitor of naturalized basin and a control basin for evaluation of stormwater benefits

Estimated Construction Cost :TBD

MWRD Contribution: TBD

Status

Construction anticipated in 2022

Note: Demonstration project only, isolating the effects of the native plants component

CALUMET RIVER GATEWAY GARDEN IN CHICAGO (PLANNED)

Location

S Harbor Ave & S Ewing Ave, Chicago
(South Chicago Community Area)

Description

USACE to construct the Calumet River Gateway Garden to manage stormwater on this site and from nearby impervious surfaces using a dry riverbed and green infrastructure

Estimated Construction Cost

TBD

MWRD Contribution

TBD

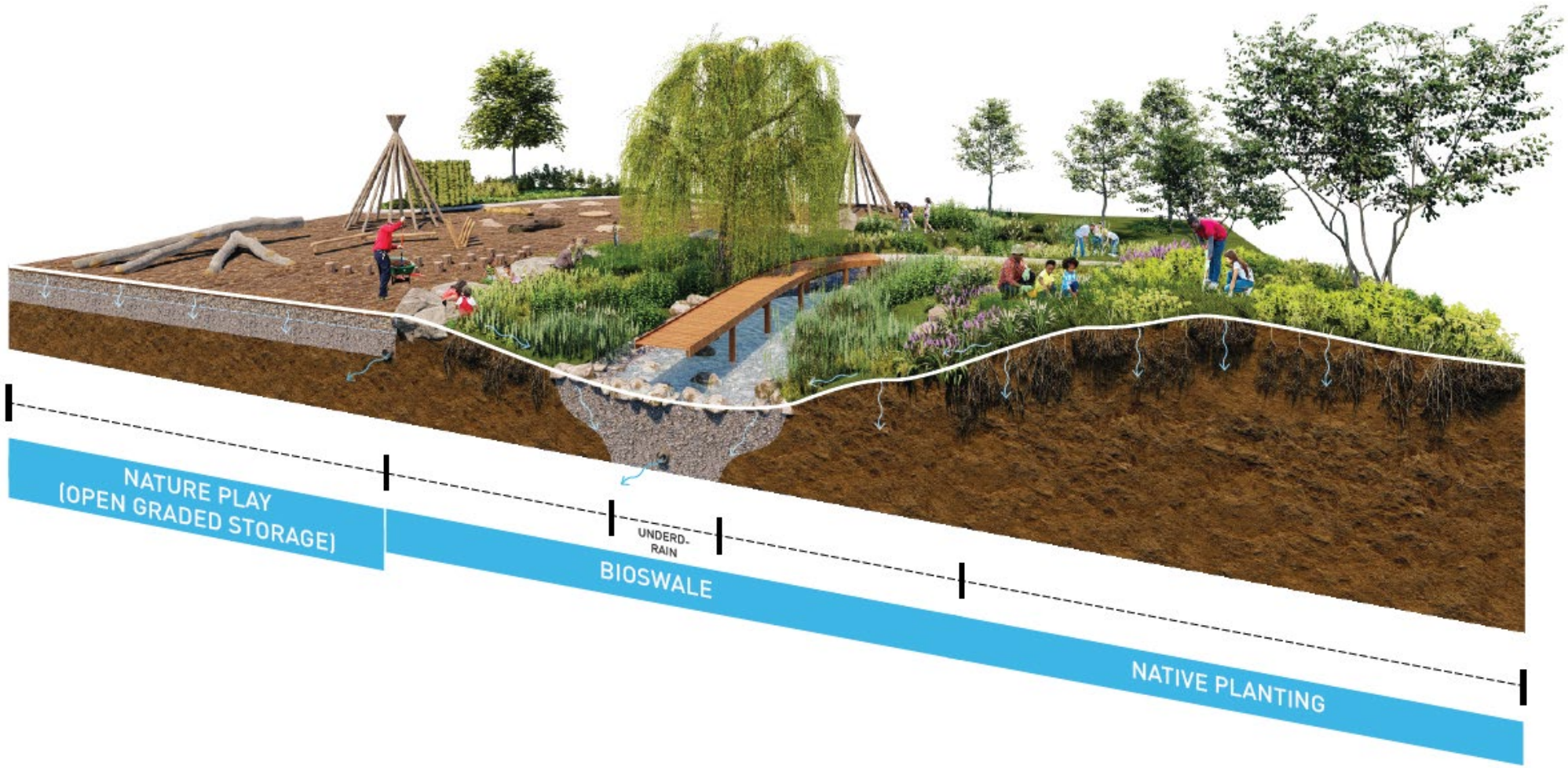
Status

Construction anticipated to start in 2022

SITE 1 PLAN ENLARGEMENT

0'-0" 20'-0" 40'-0" 80'-0"

CALUMET RIVER GATEWAY GARDEN IN CHICAGO (PLANNED)



LESSONS LEARNED & PASSED ON

- **Clearly outline responsibilities and expectations to make it easier for partner**
- **Get started on the Intergovernmental Agreement Early**
- **Partner involvement/buy-in is very important**
- **Operations and Maintenance responsibilities are that of the partner**
    - Keep joint gravel filled in permeable paver projects
    - Monitoring plants for the first 3 years ensures a greater success rate
    - Any roadside bioswales in residential areas need to have acceptance and backing of adjacent home/property owners
    - Inflow areas are important to keep clean so they are lower than the area draining into them
- **Pre-Application Informational Webinar**

For more information, see
mwrd.org/services/green-infrastructure

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