Kenilworth Green Streets Initiative
Modeling, Design and Construction

Kenilworth Overview

• Residential basement
• Intersection/street
• Overflow of Skokie Ditch

Existing Conditions – Skokie Ditch

Kenilworth 2023

• 10-yr capital improvement program aimed at improving Village’s infrastructure
  • Reduce surcharge or sanitary sewers into basements, streets and Lake Michigan due to flooding
  • Improve waters distribution system
• 2010 Study by HLR recommends green infrastructure to decrease surcharging of interceptor and set the stage for an eventual outfall.

HLR Study Original Design
Design Objectives

- Allow surcharge, but no flooding for the 10-year storm
- Contain runoff inside the curb line for the 100-year storm
- Allow for potential future permitting of outfall into Lake Michigan
- Analyze cost and feasibility of sustainable design features, including coordination with permitting agencies
- Attempt to reduce pipe size by incorporating green infrastructure

BMP Report

- Open Source
- Runoff hydrology
- Limited display capabilities
- Built-in LID controls

Model Selection

EPA SWMM

- Proprietary
- Multiple hydrology options
- Robust graphic displays
- Buildable BMP treatment processes
Problems

- Wasn’t giving us the kind of reduction we would expect to see for smaller storm events.
- Could not separate underdrain flow from overflow.
- Realized that some LID controls were filling up completely, while some were half empty.
- Needed to find a way to provide more connectivity throughout the model.
Green Infrastructure
Storage
Underdrain
Storm Sewer

Proposed Pipes for 2023 Infrastructure Program

Results

Discharge Volume Reduction
(traditional design vs. Best Management Practices)

Existing – 14.4 inches
Proposed – 6.4 inches

100-Year Storm Model Results

Existing – 16.1 inches
Proposed – 6.0 inches

Existing – 27.1 inches
Proposed – 1.1 inches

Flow Rate Reduction
(traditional design vs. Best Management Practices)

Existing – 16.1 inches
Proposed – 6.0 inches

Existing – 27.1 inches
Proposed – 1.1 inches

Flow Rate (cfs)

Time (hr)

0:00 2:00 4:00 6:00
Resident Concerns

- Aesthetics
- Tree Preservation
- Depth of swales
- Inundation Duration

November 2012 – Nov 2015

Outreach Results, design selection May 2015

- Pavers
- Porous Concrete
- Permeable Asphalt
- Rain Gardens – Bio Swales (native grasses)
- Porous Parkways (turf grass)
Timing

- Bid Opening 1/18/16 (0.86 mi project length)
- Awarded Contract to Berger $5.8 (MWRD Grant $1.2)
- Start of Construction 4/1/16
- Phase 1 Paving 7/8/16
- Phase 2 Paving 9/19/16
- Phase 3 Paving 11/21/16

Install Fabric

Permeable subbase (multiple lifts)
Lessons Learned

- Utility Conflicts
- Paving Equipment

Lessons Learned

- Sand Seams
Lessons Learned

• Stone type
• Weather / Temperature
• Base Course vs. Curb
• Mix Design
• Moisture Content

Lessons Learned

• Extent of amended soil

Lessons Learned

• Ongoing Education Required

Lessons Learned

• Resident Involvement / Support Critical

Lessons Learned

• Intersections - raffling
• Continue Observation
Questions?