



MSD Project Clear's Rainscaping Program - Neighborhood Scale Rain Gardens



Outline

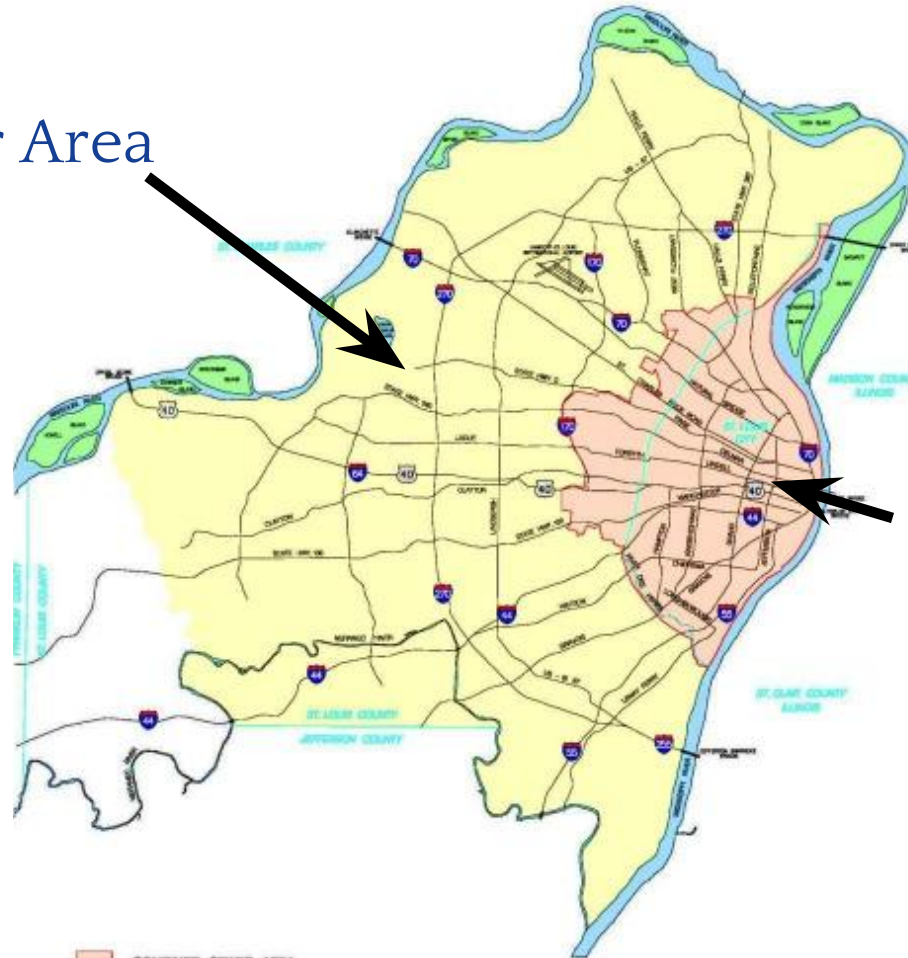
- MSD Project Clear
- Rainscaping Program Overview
- Pilot Program Overview
- Neighborhood Scale Raingardens
 - Siting
 - Design
 - Construction
 - Maintenance
 - Monitoring



Susan McCrary, P.E., St. Louis MSD
Matthew Koesterer, P.E., St. Louis MSD

MSD System Overview & Details

Separate Sewer Area



Combined Sewer Area



Example of Overflow in Combined Sewer System

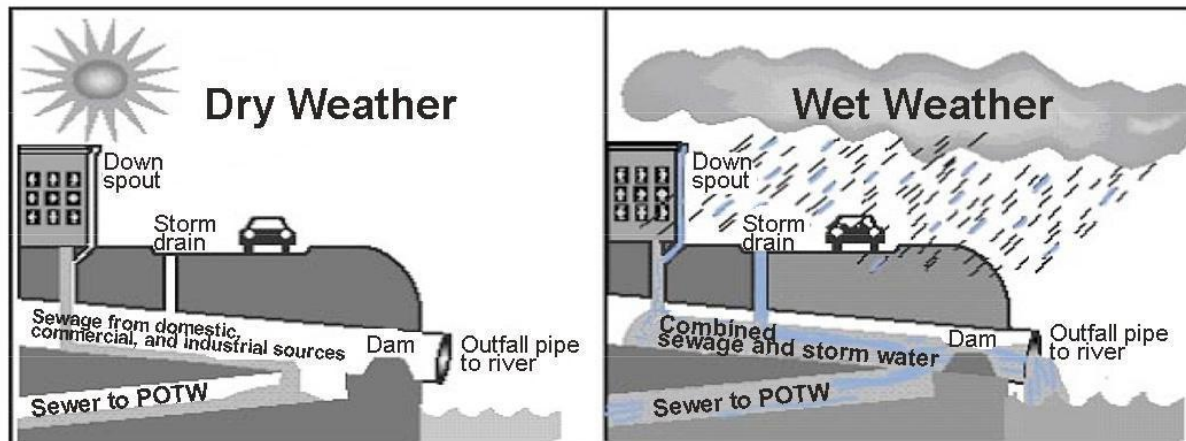
Background

Combined sewers were built in the mid-19th century, before MSD's inception, to carry rainwater and sewage away from people's homes.

Reasons Combined Sewers Overflow

- In dry weather sewers work fine. Sewage is treated at a treatment plant before being released back into the environment.
- During heavy rainstorms, combined rainwater and sewage exceed capacity of sewer system and overflow into local waterways.

• Overflow from basem



Get the Rain Out

- Stormwater Disconnections**
- Rainscaping*
- CitySheds Program*
- Combined Sewer Separations*

Repair & Maintain

- System Maintenance
- System Inspection
- System Rehabilitation and Replacement
- Fats, Oil and Grease Control Program
- Emergency Response

Build System Improvements

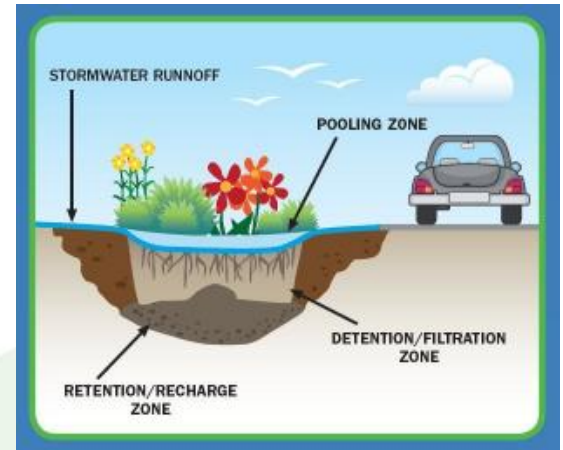
- Tunnels
- Storage Tanks
- Relief Sewers
- High-Rate Treatment*

**Combined sewer area only activities*

***Separate sewer area only activities*

Rainscaping Program

- Green Infrastructure = Rainscaping
- Combination of plantings, water features, catch basins, permeable pavements, and other activities that *manage stormwater as close as possible to where it falls, rather than moving it someplace else.*



Rainscaping Program Overview

- \$100 Million
- Area that flows to CSO's along the Mississippi River
- Bissell Point service area
- Mostly within the City of St. Louis



MSD Project Clear Rainscaping Programs (so far)

PILOT

- \$3 million
- 2011-2015
- Demonstration projects
- Monitoring
- Education/Outreach
- Plan for FULL program
- Final report due 12/31/2015

EARLY ACTION GRANTS

- Before end of Pilot
- Larger, regional projects
- Full MSD Plan Review required
- EPA approves each
- Budgeting \$5 million each year
- Some MSD projects, Some grants

SMALL GRANTS

- Smaller projects
- Individual landowners
- Approved by EPA as an “Early Action” Project
- Budget: \$150,000 for Model Round plus 1st Round
- Future Rounds? We hope so!

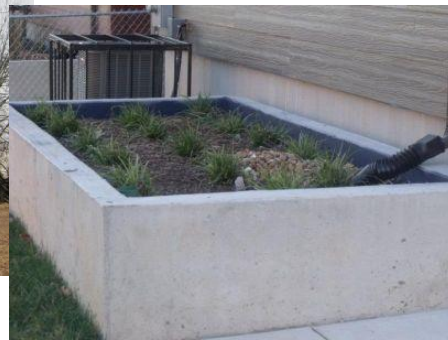
Pilot Program Overview

- First \$3 Million
- First 5 years (2011-2015)
- Partnership with LRA
- Demonstration Projects
- Monitoring
- Education/Outreach
- Develop plan for Full GI Program
- Final Report – DUE DECEMBER 31, 2015 (look for it on our webpage)



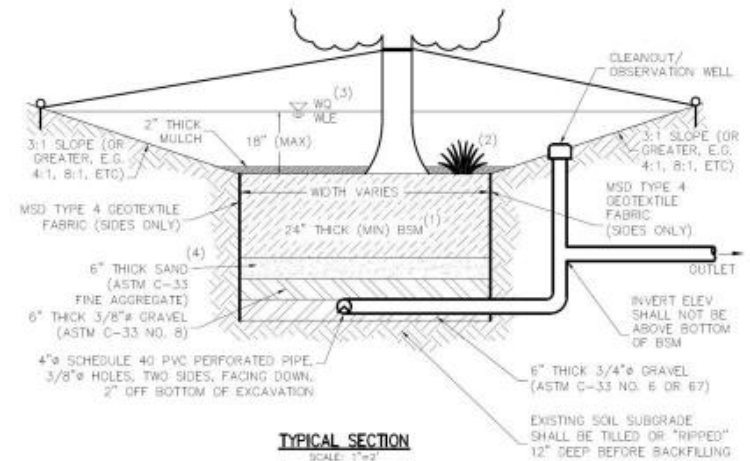
Pilot Program Progress

- 221 Building Demolished (10 acres impervious removed + 175 Development Agreements)
- 13 Planter Boxes (Habitat for Humanity)
- 3 Site Scale Rain Gardens
- 13 Demo Lots Amended Soil Tests



6 Neighborhood Scale Projects

Clinton St. Rain Garden in Old North



Site Selection



Geraldine Ave. Rain Garden in Mark Twain Neighborhood – Curb bumpout forebay

- Opportunity Study
- GIS block study
- Desktop review around demolitions
- Field visits
- Project ID
- Ranking
- Coordination with City

Site Selection Lessons



- LRA partnership
- Topography
- Development Agreements
- Sewer capacity
- Environmental concerns
- Politics and community

Design – Neighborhood-scale

- Phase 1 ESA & geotechnical investigation
- All bioretention with IWS
- Forebays
- Some work in ROW
- Pervious overlook (Clinton)
- Detention (stacked & separate)
- Watering hydrant (+\$10k)
- Aesthetics matter!



Construction



Beacon Ave. Rain Garden in Walnut Park East Neighborhood

- Phase II Stormwater BMP regulator review since 2006
- MSD had never built our own rain garden
- MSD “master” specification changes
- No pay items – lump sum per site with SOV
- Availability of materials not a problem

Subsurface conditions



- Abandoned foundations and walls
- Building rubble = higher excavation cost
- Over-excavate 2' and geotextile fabric where rubble encountered

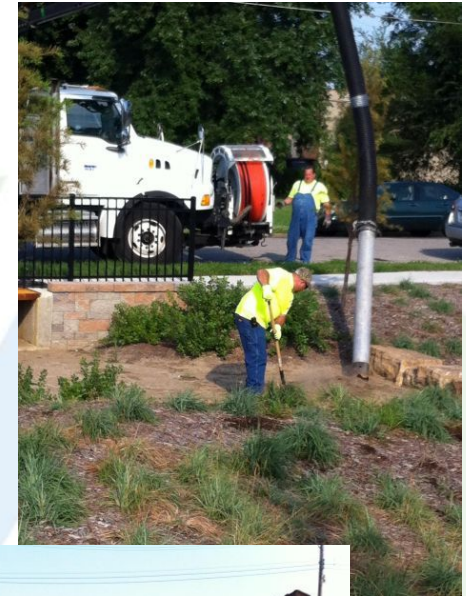
Construction Lessons

- Coordination with plant designer
- Inspector experience
- Performance testing



Design for Maintenance

- Trash
- Forebay
- Appropriate plants for wet AND DRY
- Know who will maintain and skill level – routine vs. intensive
- Groupings of same plant easier to know what to weed
- Maintenance crews are important ambassadors!

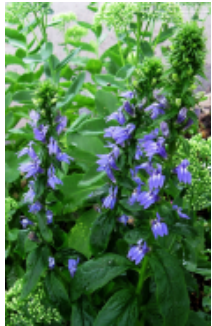


Monitoring

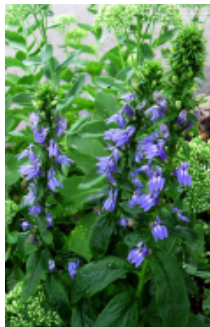


- Plan for during design
- Difficult to get an “ideal” situation
- Allow more time than you need (weather, equipment failures)
- You need A LOT of data to establish relationships
- Have a backup plan

Geraldine Ave. Rain Garden in Mark Twain



Beacon Ave. Rain Garden in Walnut Park East



Warne Ave. Rain Garden in O'Fallon



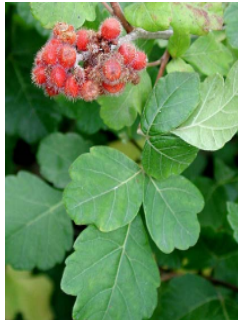
N. Vandeventer Ave. Rain Garden in JeffVanderLou



N. Sarah St. Rain Garden in The Ville



Clinton St. Rain Garden in Old North



Questions?

- smccrary@stlmsd.com
- mrkoesterer@stlmsd.com

