#### **IAFSM Annual Conference**

#### **Stormwater BMPs**

As Part of a Strategy to Reduce Private Property I/I

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March 10, 2016



#### Agenda

- Inflow/Infiltration Causes and Results
- Eliminating I/I Sources
- Private Property I/I Removal Case Study
- Stormwater BMPs





#### What is it?

# Clear water that enters the sanitary sewer system

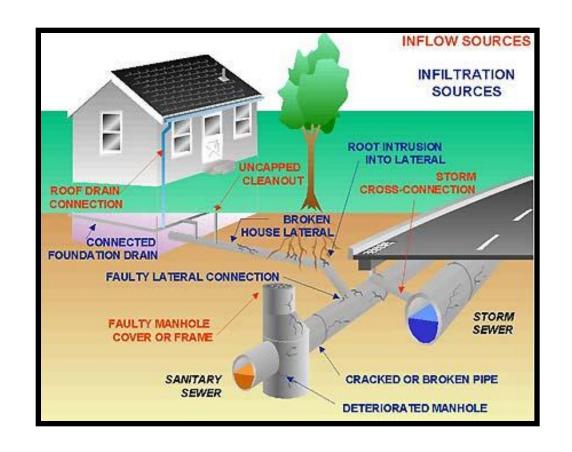
- Stormwater runoff
- Groundwater







#### Where does I/I get into the sanitary sewer system?

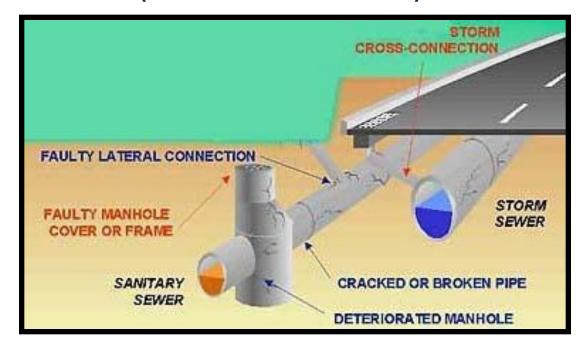






#### **Public Sources**

- Pipe defects and joints
- Manhole defects and lids
- Cross connections (direct connection)

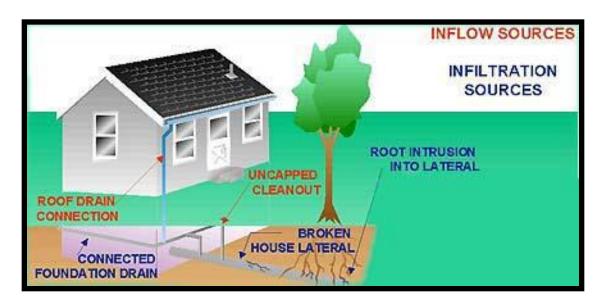






#### **Private Sources**

- Damaged service laterals
- Illegally connected sump pumps, foundation drains and downspouts (direct connections)
- Uncapped cleanouts





#### I/I Causes and Results



#### Results

- Basement Backups
- Sanitary Sewer Overflows
- Reduces Reserve Capacity

#### Regulations

- CMOM | NPDES
- MWRD | WMO





### Eliminating Sources of I/I on Public Property



- Find sources
  - Flow monitoring
  - Cleaning & Televising
  - Manhole inspections
  - Smoke testing
  - Dye testing

- Prioritize source removal
- Tools
  - -Sewer lining
  - -Manhole lining
  - -Point repair
  - -Grouting
  - -Disconnect Illicit Connections



#### Eliminating Sources of I/I on Private Property



- A typical 8 inch sanitary sewer, which can serve over 300 residences without overflows or basement back-ups, if only sewage is connected to the pipe, can serve only 10 residences without overflows or basement back-ups if sewage is combined with 10 sump pumps or foundation drains
- Removing 30 private sump pumps (~\$150K) has the same systemwide benefit as rehabilitating 40K ft of sanitary sewer (~\$2M)
- Require source removal
  - Increases sanitary sewer capacity
  - Causes local drainage problems



### Downers Grove Sanitary District Background

- Special unit of local government
- Responsible for wastewater collection and treatment
- Operates 237 miles of public sewers
- Operates 9 pumping stations
- Operates one WWTF rated at 11 MGD
- 20 square mile service area
- Western suburbs of Chicago, Illinois
- 21,062 building connections
- Serves approximately 62,000 people





#### I-H-9 Flow Basin

- 188 Building connections
- Approx. 8,300 LF of sewer and 32 manholes

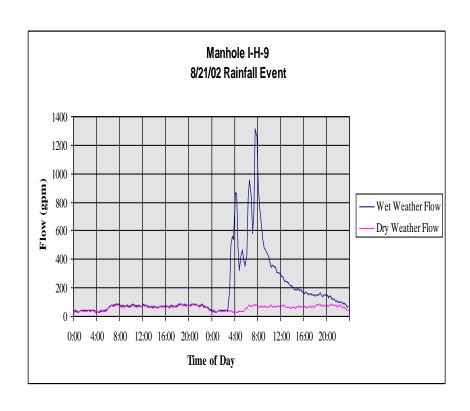
#### Flow Data

- 60 gpm ADF to 1,200 gpm peak

#### Preliminary SSES work and results

- Smoke testing
- Flood testing
- Small amount of I/I identified

Inadequate storm drainage





- I-H-9 Flow Basin
- Private Property I/I
- Notice to Homeowners
- Schedule inspection
- Identify defects in sanitary service
- Identify I/I sources
- Videos
- Inspection form

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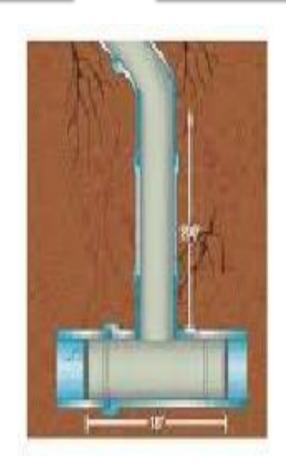
- I-H-9 Flow Basin
- Line all mains
- All liners passed an air-test before the laterals were reinstated
  - Steam cured liners failed airtest, had to be re-lined
  - Water cured liners passed the air test the first time







- I-H-9 Flow Basin
- Private Property Rehab
- Selection of service rehab process
  - Non-leaking connection at main
  - Minimize disruption
  - Ability to air test
  - Rehab from main to transition at the building
- Awarded to Performance Pipelining (T-liner)



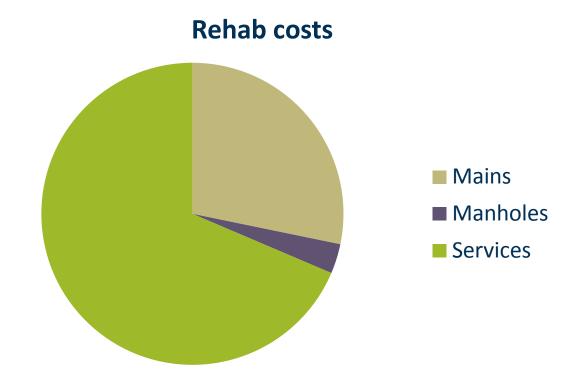




#### **I-H-9 Flow Basin**

Total Cost - *Approx.* \$1,500,000

- -Mains \$418,000
- -Manholes \$47,000
- -Services \$1,013,000

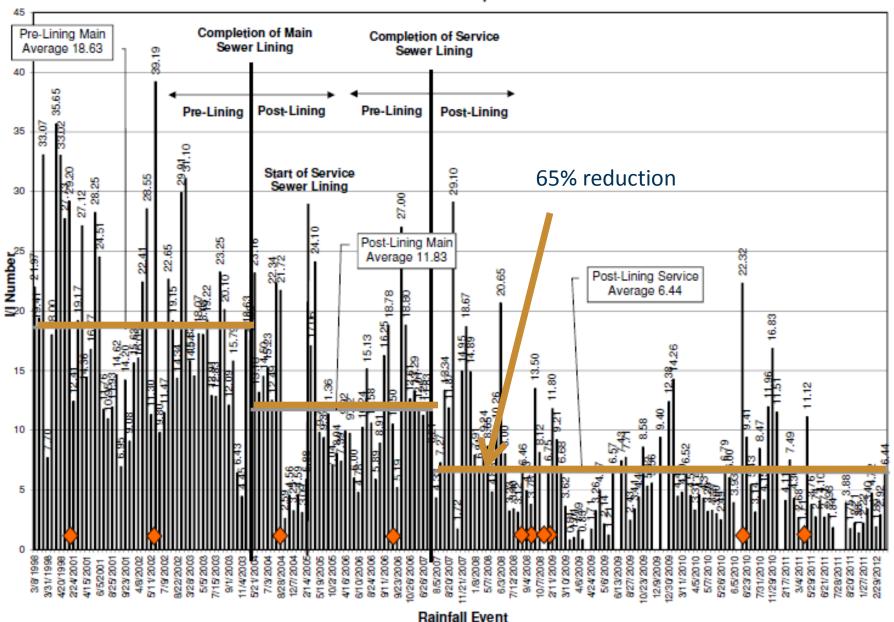




#### Downers Grove Sanitary District Flow Meter Data Summary - 1-H-9 Flow Basin I/I Comparison



#### Results





- I-H-9 Flow Basin
- 65% I/I Removal
- Reduce SSOs from 1.4/yr to 0.5/yr
- Reduce peak by 2,100 gpm -\$679/ gpm







Stormwater
Best Management
Practices (BMPs)



#### Stormwater BMPs for Private Property



Rain Gardens
Native Landscaping
Rain Barrels
Permeable Pavement









### Other Types of Stormwater BMPs



Infiltration Basins
Green Roofs
Stream Buffers
Manufactured Filters









### Types of BMP Incentive Programs



1. Financial Incentive

2. Distribution

3. Awards and Recognition

4. Regulatory



### 1. Financial Incentive Programs



#### Sustainable Backyards Program – City of Chicago

#### **Resident Rebates**

- Trees (≤\$100)
- Native Plants (≤\$60)
- Compost Bins (≤\$50)
- Rain Barrels (≤\$40)

**I&M Workshops** 





### 1. Financial Incentive Programs



#### Rain Garden Cost Share - Village of Glenview, IL

- Reimburse 50% (≤\$1000)
- Village Guidelines
- Drainage Benefit





### 1. Financial Incentive Programs



#### Local Drainage Inspections - Village of Glenview, IL

- Residents Pay 50% of \$800
- Engineer Site Visit
- Report
  - Recommendations
  - Cost Estimates
- List of Contractors
- Permit Voucher





### 2. Distribution Programs



#### Rain Barrel Program – MWRDGC

- Resident Cost = \$0-\$52
- Includes Delivery
- Available from MWRDGC or Participating Cities
- Installation Instructions on MWRDGC Website





### 2. Distribution Programs



#### Rain Garden Program – City of Woodstock, IL

- Installation Guidelines for Residents
- Demonstration Sites





#### 3. Awards and Recognition Programs



#### **Conservation@Home – The Conservation Foundation**

#### Free Site Specific Advice

- Native Landscaping
- Rain Barrels
- Organic Fertilizers
- Invasive Plants

Landscape Certification





### 4. Regulatory Programs



#### BMP Ordinance - Village of Lakewood, IL

- BMPs Required
  - R-2 Zoning District
  - ≥500 sf New Impervious Surface
- Hierarchy
- FAQ
- BMP Profiles
- Maintenance Agreements





### Questions?

Sean O'Dell, PE sodell@baxterwoodman.com

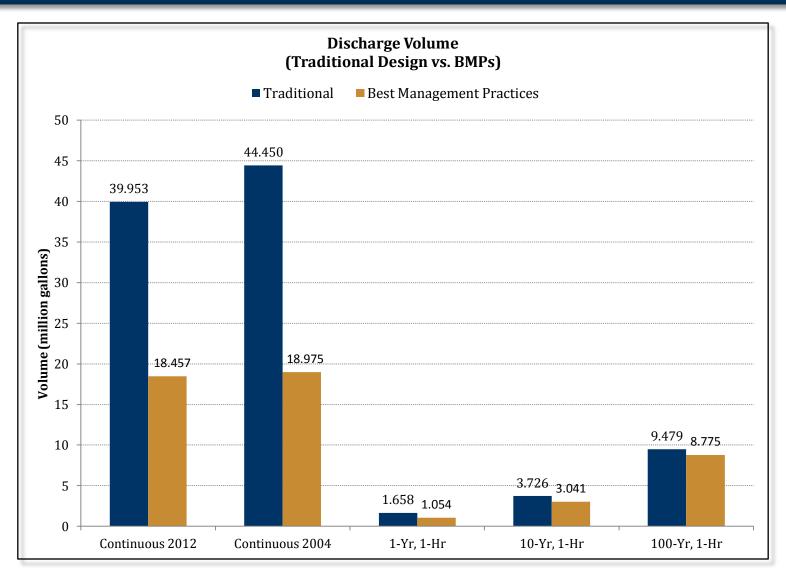
Mark Phipps, P.E., CFM, CPESC mphipps@baxterwoodman.com





### **Expected Benefits of BMPs**

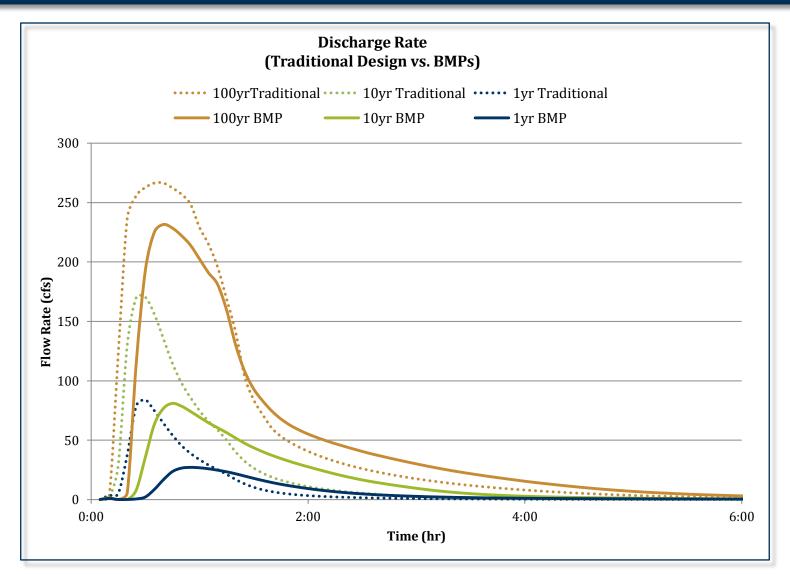






## **Expected Benefits of BMPs**

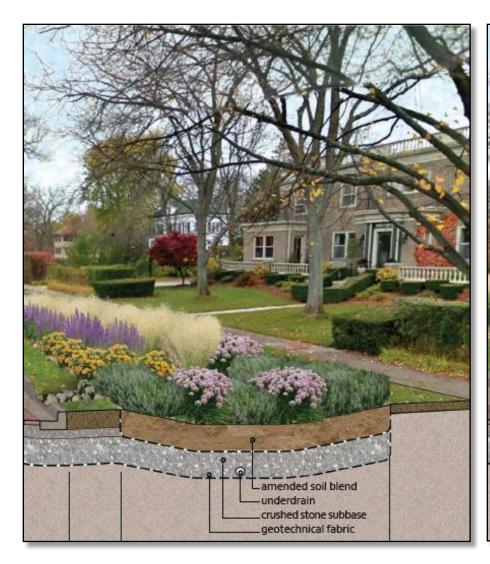


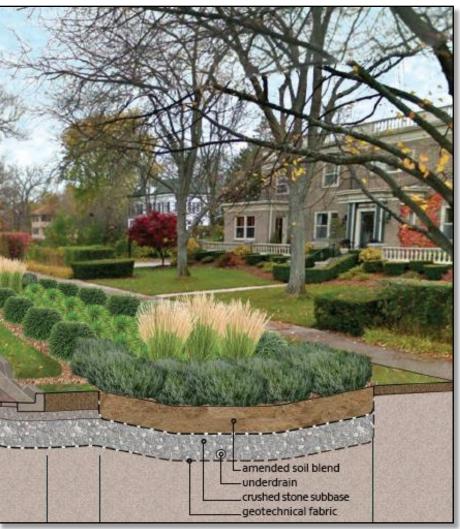




### Rain Gardens



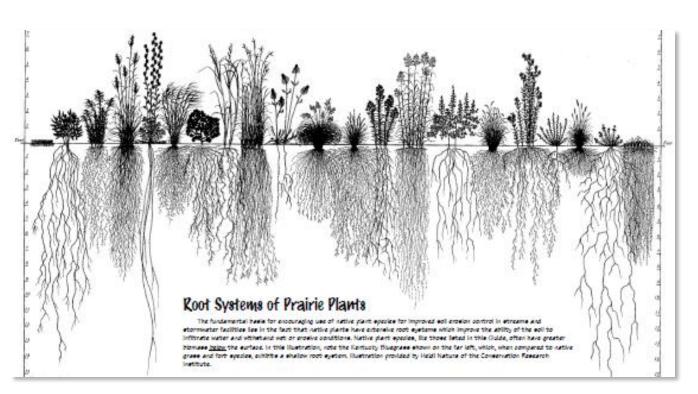






## Native Landscaping















## Permeable Pavement





