District of Columbia Water and Sewer Authority
George S. Hawkins, General Manager

January 8, 2015

Briefing on:

Green Infrastructure in Action at DC Water

Briefing for:

Reinvesting in Urban Water Infrastructure
Combined Sewer Overflow Long Term Control Plans
NJ Department of Environmental Protection

January 8, 2015
Agenda

- DC Water and DC Clean Rivers Project
- Long Term Control Plan Modification
- DC Water’s Green Infrastructure
DC WATER AND DC CLEAN RIVERS PROJECT (DCCR)
Background: Comparing Natural vs. Built Environment

Natural Environment:
0% Impervious Surface

Built Environment:
75-100% Impervious Surface
Background: Separate and Combined Sewer Systems

100% of suburbs
67% of D.C.

0% of suburbs
33% of D.C.
Background:
Where are Combined Sewers Located?

- 1/3 area is combined (12,478 acres)

- 53 CSO outfalls
  - 15 to Anacostia
  - 10 to Potomac
  - 28 to Rock Creek

- Three receiving waters
  - Anacostia River
  - Potomac River
  - Rock Creek
DC Water and DCCR:
How was the Long Term Control Plan Developed?

1998 - LTCP Started
2002 - Final LTCP
2003 - LTCP Meets WOS (EPA/DC)
2005 - Consent Decree Signed
2007 - New Nitrogen limits require changing LTCP
2011 - DC Water begins evaluating GI for Potomac and Rock Creek
2014 - DC Water proposes changing LTCP to include Green Infrastructure

Public Participation

Total Nitrogen implementation

LTCP implementation
DC Water and DCCCR: DC Clean Rivers Project and Nitrogen Removal Programs

**LEGEND**
- Anacostia River Tunnel System
- Potomac River Tunnel
- Piney Branch Tunnel
- Pumping Station Rehabilitation
- Known Flood Area

**DC CLEAN RIVERS PROJECT AND NITROGEN REMOVAL PROGRAMS**
- DC Clean Rivers Project: $2.6 Billion
- Nitrogen Removal: $950 Million
- Total > $ 3.5 Billion
- 20 yr implementation (2005 – 2025)
- 96% reduction in CSOs & flood relief in Northeast Boundary
- Approx 1 million lbs/yr nitrogen reduction predicted
DC Water and DCCR: DC Clean Rivers Project has let more than $1.2 Billion in Construction & Engineering Contracts

See the ‘First Lady of Clean Rivers’ at http://www.youtube.com/watch?v=se5Ye9fWfkw
DC Water and DCCR: Progress to Date Controlling CSOs

Anacostia River | Potomac River | Rock Creek | Total System
---|---|---|---
2142 | 1063 | 49 | 3254
1282 | 638 | 43 | 1963
54 | 79 | 5 | 138

CSO Overflow (mg/avg year)

(DC Water Formed)

1996 | 2013 | LTCP Completed
---|---|---
2142 | 1063 | 49
1282 | 638 | 43
54 | 79 | 5
1963 | 138 |
LONG TERM CONTROL PLAN MODIFICATION

Bioretention Installation at Irving ST NW

Green Roof Installation at East Side Pumping Station
Proposed GI Plan: DC Water’s Approach to CSO Control

- DC Water is implementing tunnels
- Most severely impacted by CSOs
- GI will provide additional control

Anacostia River Projects

- There is time to consider new approaches

Potomac & Rock Creek Projects

Potomac and Rock Creek Drainage Areas (tunnel system underway)
Proposed GI Plan:
What is Proposed for Potomac and Rock Creek?

$60 M of Green Infrastructure in Piney Branch

$30 M of Green Infrastructure in CSO 027, 028 and 029

Separate CSO 025 and 026 ($10 M)
Proposed GI Plan: Predicted CSO Performance is Comparable to LTCP

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1996 (DC Water Formed)</th>
<th>LTCP</th>
<th>Hybrid GI Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potomac River</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Overflows (#/avg yr)</td>
<td>74</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Overflow Volume (mg/avg yr)</td>
<td>1063</td>
<td>79</td>
<td>59</td>
</tr>
<tr>
<td>% Reduction from Before LTCP</td>
<td>--</td>
<td>92%</td>
<td>≥92%</td>
</tr>
<tr>
<td>Rock Creek (Piney Branch CSO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. Overflows (#/avg yr)</td>
<td>25</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Overflow Volume (mg/avg yr)</td>
<td>49</td>
<td>5</td>
<td>0.6</td>
</tr>
<tr>
<td>% Reduction from Before LTCP</td>
<td>--</td>
<td>90%</td>
<td>&gt;90%</td>
</tr>
</tbody>
</table>

Additional improvements being undertaken by DC Water exceed the schedule and water quality goals of the LTCP

- Early completion of the Northeast Boundary Tunnel (2022)
- Early completion of the First Street Tunnel (2016)
- McMillan Stormwater Storage project (2014)
- Irving Street GI project (2014)
Proposed GI Plan: Added Environmental, Social, and Economic Benefits

**Environmental**
- Reduce runoff
- Improve air quality
- Reduce summer temperatures
- Reduce energy usage
- Offset climate change
- Habitat improvement

**Social**
- Enhance aesthetics
- Improve liveability through green space
- Reduce scope and duration of disruption during construction

**Economic**
- Create green jobs
- Enhance property values
- Improve quality of life
Proposed GI Plan: Benefits

- Added environmental, social and economic benefits
- Timing of CSO reduction
- Reduced financial impact on ratepayers by spreading out construction
- Supports Mayor’s Sustainable DC Plan
- Opportunity for local, green jobs
Proposed GI Plan:
Green Infrastructure for CSO Control is a Proven Technology

<table>
<thead>
<tr>
<th>City</th>
<th>LTCP Time Frame (years)</th>
<th>Consent Decree w/ Green?</th>
<th>Annual Overflow Volume (Million Gallons)</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Before LTCP</td>
<td>After LTCP</td>
</tr>
<tr>
<td>Kansas City (WSD)</td>
<td>25</td>
<td>Yes; 2010</td>
<td>6,400</td>
<td>768</td>
</tr>
<tr>
<td>Cleveland (NEORSD)</td>
<td>25</td>
<td>Yes; 2010</td>
<td>4,500</td>
<td>500</td>
</tr>
<tr>
<td>New York (DEP)</td>
<td>25</td>
<td>State approved; 2012</td>
<td>TBD – City wide LTCP due 2017</td>
<td>TBD – City wide LTCP due 2017</td>
</tr>
<tr>
<td>Philadelphia (PWD)</td>
<td>25</td>
<td>State approved (State – 2011) (EPA Admin order – 2012)</td>
<td>10,307 to 15,873</td>
<td>5,100 to 7,900</td>
</tr>
</tbody>
</table>

Other cities with Consent Decrees that include Green Infrastructure:
Atlanta  St. Louis  Louisville  Cincinnati  Onondaga County, NY
PROGRESS TO DATE
Progress to Date:
DC Water has Invested more than $12.5 M in GI

- Planted more than 5500 trees via UFA, rain garden at Irving & North Capitol St.
  - $1.7 M
- Green Roofs, Pervious Pavement, and Bioretention at Three DC Water Facilities
  - $3.5 M
- Funded RiverSmart Washington Demonstration Project
  - $1 M
- GI Challenge, LTCP Modification, and Early Action Projects
  - $4 M
- Irving Street Bioretention
  - $2.75 M
Progress to Date: Low Impact Development Retrofit at DC Water Facilities

- **Goal:**
  - Demonstrate green infrastructure implementation at DC Water Facilities

- **Scope:**
  - East Side Pumping Station
    - 6,570 sf Green Roof
  - Fort Reno Reservoir
    - 42,400 sf Green Roof
    - 8,400 sf of Pervious Pavement
  - Anacostia Water Pumping Station
    - 1,000 sf of Pervious Pavement
    - 1,500 sf bioretention area

- **Status:**
  - Projects completed
  - 1 year of post-construction monitoring underway
  - 5 year initial maintenance (contractor-performed) underway

For more information please visit: [http://www.dcwater.com/giatdcwater](http://www.dcwater.com/giatdcwater)
Progress to Date: Irving Street Green Infrastructure Project

- **Goal:**
  - Built for flood mitigation as part of Mayor’s Task Force on the Prevention of Flooding in Bloomingdale and LeDroit Park

- **Scope:**
  - 14 bioretention areas to capture runoff from roads and sidewalks

- **Status:**
  - Bioretention completed in 2014
  - 1 year initial maintenance period (contractor-performed) underway

For more information please visit: [http://dcwater.com/irvingstreet](http://dcwater.com/irvingstreet)
Progress to Date: GI Challenge

- **Goals:**
  - Advance innovative technologies
  - Demonstrate cost effective solutions
  - Propose practical and implementable solutions that can be constructed

- **Status:**
  - Seven Planning Phase winning designs awarded in January 2014
    - 2 GI Streetscape Projects
    - 2 GI Park Projects
    - 3 GI Focus Projects
  - Final Design Phase winners to be announced early 2015

For additional information visit: [http://www.dcwater.com/greenchallenge](http://www.dcwater.com/greenchallenge)
Progress to Date: Green Jobs

- **Goal:**
  - Protect DC Water’s proposed $90M investment in GI by ensuring trained maintenance staff have skill sets required and are available

- **2014 Pilot Program Scope**
  - Green Roof Focus
  - Program ran in summer 2014
  - Recruited 10 underemployed candidates from soft skills training programs (Sasha Bruce Youthwork, Jubilee Jobs, and AFL-CIO)
  - 4 in-class technical sessions led by DCG and UDC
  - 4 in-field sessions: DC Water Ft. Reno green roof and in-field “job shadowing” with Furbish and Capital Greenroofs
  - Online trainee database accessible to local green roof installation and maintenance companies at training completion (forthcoming)

For additional Information visit:
- [http://www.dcwater.com/giatdcwater](http://www.dcwater.com/giatdcwater)