Can Urban Redevelopment Restore Aquatic Resources with Standards for Stormwater Retention and Landscape Performance?

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Industry, Agriculture, Urbanization = Degradation
Black and Blue Reality...

- 43% of the District’s land area is impervious.
- A single 1.2 inch storm falling on this area produces about 525 million gallons of stormwater runoff.
Federal Requirement EISA 95th Percentile Event = 1.7”
MS4 Requirement 90th Percentile Event = 1.2”
District Proposed Revision based on AWDZ = 1.0”

Precipitation Data, NOAA, Reagan National Airport, Arlington VA
Percentage (%) of Surface Runoff on a Variety of Surfaces

- **Good Ground Cover**: 2%
- **Fair Ground Cover**: 14%
- **Poor Ground Cover**: 73%
- **Bare Ground Cover**: 85%
- **Concrete/Bitumen Surface/Impervious**: 98-100%
History of Stormwater Management

• Get rid of it!
• Hold on to it
  – for a little while
• Hold on to it and filter it
• Remove small events, hold on to the moderate events, and filter in some cases
  – evapotranspiration
  – infiltration
  – harvesting for non-potable uses
  – extended detention
Decentralized Distributed Practices
Regulatory Triggers

• **Major land-disturbing activity**
  - Land disturbance ≥ 5,000 square feet

• **Major substantial improvement activity**
  - Renovation or addition to a structure that exceeds the following cost and size thresholds
    - Cost of project ≥ 50% of pre-project assessed value of structure
    - Combined footprint of structure(s) exceeding cost threshold and any land disturbance ≥ 5,000 square feet
<table>
<thead>
<tr>
<th>New Additions</th>
<th>Existing BMPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Roof</td>
<td>Filters</td>
</tr>
<tr>
<td>Rainwater Harvesting</td>
<td>Infiltration</td>
</tr>
<tr>
<td>Disconnection</td>
<td>Open Channels</td>
</tr>
<tr>
<td>Permeable Pavement</td>
<td>Storage Practices</td>
</tr>
<tr>
<td>Bioretention</td>
<td>Stormwater Ponds</td>
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<tr>
<td>Proprietary Practices</td>
<td>Wetlands</td>
</tr>
<tr>
<td>Tree Planting/Preservation</td>
<td></td>
</tr>
</tbody>
</table>
Green Roofs
Permeable Unit Pavers

Pervious Concrete

Porous Asphalt

Porous Rubber

Permeable Surface

Choker Layer

Bedding

Reservoir

Underdrain

Uncompacted Subgrade
Bioretention
New Tree Box Designs
Rainwater Harvesting for Non-potable Uses
Curbside bioretention, Enhanced tree boxes, Water art/fountains...
Green Area Ratio

What is it?
• A flexible green site design requirement that varies by zone.

How Achieve?
• Choose from a range of environmental landscaping practices each of which have been assigned an environmental performance ranking.
GAR: How Does it Work?

How to calculate:

• Add up landscape elements by number or size
  – # trees
  – Size of green roof
  – Size of rain garden
  – # of plants
  – Soil depths

• Divide by lot area

• = GAR score

\[
GAR = \frac{\text{area of landscape element 1 x multiplier} + \text{area of landscape element 2 x multiplier} + \ldots}{\text{Lot Area}}
\]
GAR & Stormwater Overlap

Green Area Ratio Rule
• DCMR Chapter 34
• Requires a C of O
• No Maintenance Covenant
• Interior Renovations:
  • 100% construction cost trigger
• Area Calculations
• Design constraints maximizes healthy vegetation

Stormwater Rule
• DCMR Chapter 21
• Includes Public Right of Way
• Unrelated to C of O
• Maintenance Covenant Required
• Interior Renovations:
  • 50% construction cost trigger
• Volume Calculations
• Contributing Drainage Area
• Design constraints maximizes stormwater retention

Overlap: to achieve stormwater environmental benefits
Landscape Elements often the same practices as LID BMPs
Retention achieved based on six months of Regulatory approvals

- 124 project approved
- 63 projects retention
- 85 acres disturbed
- 47 under pre 2013 regulation
- 16 under new 2013 regulation
- 1.1 million gallons retention
Development happens along commercial corridors
Development happens in emerging neighborhoods
# Stormwater Approvals

January 15, 2014 through July 15, 2014

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Disturbance</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>sf</td>
</tr>
<tr>
<td>NW</td>
<td>36</td>
<td>2,057,254</td>
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<tr>
<td>NE</td>
<td>13</td>
<td>556,960</td>
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<tr>
<td>SE</td>
<td>11</td>
<td>864,316</td>
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<tr>
<td>SW</td>
<td>3</td>
<td>215,414</td>
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<tr>
<td>Total</td>
<td>63</td>
<td>3,693,944</td>
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</tbody>
</table>

One million gallons of retention based on six months of approvals
<table>
<thead>
<tr>
<th>SW Rule</th>
<th>Project</th>
<th>Disturbance</th>
<th>Retention</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>sf</td>
<td>acres</td>
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<tr>
<td>pre 2013</td>
<td>47</td>
<td>2,952,126</td>
<td>67.8</td>
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<tr>
<td>post 2013</td>
<td>16</td>
<td>741,818</td>
<td>17.0</td>
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</table>

New regulation accounts for 25 percent of these approvals

New regulation accounts for 46 percent of the retention
# Who is Developing?

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Disturbance</th>
<th>Retention</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>sf</td>
<td>acres</td>
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<tr>
<td>commercial</td>
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<tr>
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<td>hospital</td>
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<tr>
<td>university</td>
<td>4</td>
<td>412,317</td>
</tr>
</tbody>
</table>

Local Government responsible for half the regulated work.
37 acres of commercial development proposed

Possible to achieve 1.2 million gallons of retention

National Arboretum

<2 miles

Hickey Run Example
Online Information

• Stormwater Regulation
  – http://ddoe.dc.gov/swregs

• Technical Compliance
  – http://ddoe.dc.gov/swguidebook

• Stormwater Retention Credit Trading
  – http://ddoe.dc.gov/src

• Green Area Ratio
  – http://ddoe.dc.gov/gar