But Stormwater Can Be A Resource

A Wonderful Resource
When rain is in the forecast, modern developer and architect Bob Pimeo listens for the sound of rain hitting the metal roof of his home next to Riverview Cemetery. For most of us, it means a soggy, gloomy day and a short-lived break in the humidity during summer, but for Pimeo and his family it means clean clothes, flushing toilets, and a lush garden when the soil starts to dry up again.

Both eco-minded architects, Pimeo and his wife Betty Roettger designed their home in 2006 with one of the most fundamental eco-friendly concepts in mind: rainwater harvesting. The Pimeos invested around $6,000 in the water system, plus the cost of excavating to install the 1,700-gallon tank. Now their efficient roof slope and gutter system does all the work. The water isn’t potable, the technical term for water that is safe to drink, but it’s perfect for all...
Virginia’s Stormwater Management Regulations Compliance:

RUNOFF REDUCTION METHOD

Ved P. Malhotra P.E.
Runoff Reduction (RR)

Runoff reduction is defined as the total volume reduced through canopy interception, soil infiltration, evaporation, rainfall harvesting, engineered infiltration, extended filtration or evapotranspiration at small sites.
RUNOFF REDUCTION METHOD

Runoff Removal more effective than Treatment of Runoff

Volume-based Hydrology now

Move away from peak flow
A New Stormwater Approach:

1. Site Load Standard – 0.28 pounds/acre/year for Total Phosphorus
2. More options for stormwater practices and overall site design
3. Treating impervious cover + managed turf to better control nutrients
4. Stormwater BMP planning & compliance spreadsheet
Stormwater BMP Choices

What we do now
- BMP options from Regulations & Blue Book

What is proposed
- Site design & conventional BMPs in Handbook & Clearinghouse, supported by spreadsheet
- BMP performance = Runoff reduction + Pollutant removal
- Use of “treatment train”
Treating Impervious Cover & Managed Turf Areas

- **What we do now**
  - Nutrient loads based on impervious cover

- **What is proposed**
  - Nutrient loads & treatment volume based on impervious cover + managed turf
  - Incentives to preserve forest cover
BMPs: Level 1 & 2 BMP Designs

- Level 1: good, standard design
- Level 2: enhanced design to boost nutrient removal
Water Quality Standard

- **What we do now**
  - Total phosphorus (TP) as keystone
  - Most sites meet average land cover condition (0.45 lbs/acre/year)
  - Redevelopment requires 10% phosphorus reduction

- **What was proposed**
  - TP basis for compliance
  - Load limit tied to Tributary Strategy goals = 0.28 lbs/acre/year (TP)
  - Redevelopment requires 20% phosphorus reduction compared to predevelopment
What is proposed

- TP basis for compliance
- 0.28 lbs/acre/year for Bay watershed
- 0.45 lbs/acre/year for non-Bay areas and sites <1 acre in Bay watershed
- Redevelopment 10% P reduction on sites <1 acre, 20% P reduction on sites > 1 acre
- UDA qualified local programs must establish standards between 0.28 and 0.45
Less of This
More of This
More of This
Parking Lot Rain Garden
Porous Pavement
Green Roof
Rain Barrel
Cistern
# DRAFT Virginia Runoff Reduction Method Worksheet -- Beta Version -- 03/04/08

## Site Data

**Site Name:**

<table>
<thead>
<tr>
<th>Site Data</th>
<th>Calculation Cells</th>
<th>Constant Values</th>
</tr>
</thead>
</table>

## 1. Post-Development Project & Land Cover Information

### Constants

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Rainfall (inches)</td>
<td>42</td>
</tr>
<tr>
<td>Target Runoff Event (inches)</td>
<td>0.75</td>
</tr>
<tr>
<td>Phosphorus EMC (mg/L)</td>
<td>0.20</td>
</tr>
<tr>
<td>Target Phosphorus Load (lb/year)</td>
<td>0.20</td>
</tr>
<tr>
<td>Fs</td>
<td>0.90</td>
</tr>
</tbody>
</table>

### Land Cover (Acres)

- Forestry/open space
- Managed turf
- Recreation/cover

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>A Soils</th>
<th>B Soils</th>
<th>C Soils</th>
<th>D Soils</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry/open space</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Managed turf</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Recreation/cover</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</tbody>
</table>

### Runoff Coefficients

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>A Soils</th>
<th>B Soils</th>
<th>C Soils</th>
<th>D Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry/open space</td>
<td>0.15</td>
<td>0.10</td>
<td>0.10</td>
<td>0.15</td>
</tr>
<tr>
<td>Managed turf</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Recreation/cover</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Land Cover Summary

<table>
<thead>
<tr>
<th>Land Cover</th>
<th>A Soils</th>
<th>B Soils</th>
<th>C Soils</th>
<th>D Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry/open space</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Managed turf</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Recreation/cover</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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</tbody>
</table>

### Site Flow

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total Site Area (acres)</td>
<td>0.00</td>
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<tr>
<td>Site Flow</td>
<td>0.00</td>
</tr>
</tbody>
</table>

### Post-Development Treatment Volume (acre-ft)

- Post-Development Treatment Volume (table) | 0.00 |
- Post-Development Treatment Volume (total) | 0.00 |
- Post-Development Load (TPR) (lb/mg) | 0.00 |

### Total Load (TP) Reduction Required (SMU)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>
Example: Residential

- Site Area: 20 Acres
- Impervious Area: 6 Acres
- Turf: 8 Acres
- Forest/Open Space: 6 Acres
Example: Residential

- Site Area: 20 Acres
- Impervious Area: 6 Acres
- Turf: 8 Acres
- Forest/Open Space: 6 Acres
- Rain garden: 2 Acres to Bioretention # 1
- Porous Pavement: 1 Acre to Bioretention # 1
- Bioretention # 1: 4 Acres
For More Info:

Visit the DCR website:
See the **Stormwater Parts 1,2,3, and 13** tab

or contact

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