Developing Synergy by Combining Mitigation with Stewardship

Planning
Environmental Coordination
Avoidance & Minimization
Storm Water Management
Mitigation & Stewardship
$109M of Environmental Stewardship & Mitigation Contracts

47 Contracts ranging from $40K to $12M.

- Encompassing "off-site" projects including wetland restoration, stream enhancements, stormwater management, reforestation, new sidewalks, pedestrian/bicycle trails, historic building renovation, recreational facilities, wayfinding signage, etc.

<table>
<thead>
<tr>
<th>Year</th>
<th># to be Advertised</th>
<th>$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>2</td>
<td>$1M</td>
</tr>
<tr>
<td>2009</td>
<td>4</td>
<td>$25M</td>
</tr>
<tr>
<td>2010</td>
<td>16</td>
<td>$22M</td>
</tr>
<tr>
<td>2011</td>
<td>13</td>
<td>$3M</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>$4M</td>
</tr>
<tr>
<td>2013</td>
<td>4</td>
<td>$6M</td>
</tr>
<tr>
<td>2014</td>
<td>2</td>
<td>$6M</td>
</tr>
</tbody>
</table>


Dates and Estimates are Subject to Change
Project Basics

- Connects I-270 (N of DC) to I-95 (NE of DC)
- Major Interchanges at I-270/370, MD97, US29 and I-95
- 18.5 Miles
- 6 lanes, full shoulders (in & out), median
- 130’ Typical Section
- 1,500 acres of ROW through Suburban MD
- 49 bridges and 25 large culverts
- $2.5 Billion (15% Mitigation and Stewardship)
Planning

- Planning began: June 2003
- Purpose & Need: Nov 2003
- Permit Application: Oct 2004
- DEIS: Nov 2004
- FEIS: Jan 2006
- ROD: May 2006
- Permits: June 2006
Interagency Working Group (IAWG)

**Lead Agencies**
- Federal Highways (FHWA)
- Maryland State Highway Administration (SHA)
- Maryland Department of Transportation (MdTA)

**Permitting Agencies**
- US Army Corps of Engineers (USACE)
- Maryland Department of the Environment (MDE)

**Resource Agencies**
- National Park Service (NPS)
- US Environmental Protection Agency (EPA)
- US Fish and Wildlife Service (USFWS)
- Maryland Department of Planning (MDP)
- Maryland Department of Natural Resources (DNR)
- MD Historical Trust/MD Historic Preservation Office (MHT/MD SHPO)

**County Agencies**
- Maryland-National Capital Park and Planning Commission/Montgomery County (M-NCPPC/MC)
- Maryland-National Capital Park and Planning Commission/Prince George’s County (M-NCPPC/PGC)
- Montgomery County of Public Works and Transportation (MCDPWT)
- Prince George’s County Department of Public Works and Transportation (PGCDPWT)
Stewardship

• **Compensatory Mitigation (CM)**
  • Well defined. Can be straightforward.
  • Wetlands, Streams, Forests, Parks (4f) and Cultural Resources

• **Environmental Stewardship (ES) and Community Stewardship (CS)**
  • Never done as part of a project in MD before
  • Make the areas better than they are without the ICC
  • Watersheds, Community and Cultural Resources
Environmental Site Search

• Data collection
  – Data mining of watershed studies (Local, State and Federal)
  – Developed watershed needs
  – Developed a database of opportunities

• Preliminary site visits

• Developed evaluation metric

• 940 sites to 250+/-
IAWG Coordination

- Site Visits
- Watershed Goal development
- Site Goal development
- Prioritization
- Packaging and Selection to 67 projects
<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Impact</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands</td>
<td>47.79 Ac</td>
<td>83 Ac</td>
</tr>
<tr>
<td>Streams</td>
<td>38,088 LF</td>
<td>42,700 LF</td>
</tr>
<tr>
<td>Fish Passage</td>
<td></td>
<td>1,500 LF</td>
</tr>
<tr>
<td>SWM Retrofits</td>
<td></td>
<td>150 Ac</td>
</tr>
<tr>
<td>SWM WQ BMP’s</td>
<td></td>
<td>466 Ac</td>
</tr>
<tr>
<td>Forests</td>
<td>745.86 Ac</td>
<td>750 Ac</td>
</tr>
<tr>
<td>Parks</td>
<td>88.06 Ac</td>
<td>786 Ac</td>
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</tbody>
</table>
Avoidance and Minimization

• Wetlands reduced 44% ($150,000/Acre)
  – Permitted: 48.13 Acres
  – Projected: 27 Acres

• Streams reduced 13% ($150/Linear Foot)
  – Permitted: 38,088 LF
  – Projected: 33,140 LF

• Forests reduced 9% ($75,000/Acre)
  – Permitted: 745.86 Acres
  – Projected: 675.06 Acres
## Stewardship

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetlands</td>
<td>5 Ac</td>
</tr>
<tr>
<td>Streams</td>
<td>48,700 LF</td>
</tr>
<tr>
<td>SWM Retrofits</td>
<td>4,456 Ac</td>
</tr>
<tr>
<td>SWM WQ BMP’s</td>
<td>1,949 Ac</td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>$2,000,000 (Woodlawn Barn)</td>
</tr>
<tr>
<td>Community</td>
<td></td>
</tr>
<tr>
<td>Trails</td>
<td>24,000 LF</td>
</tr>
<tr>
<td>Wayfinding Signage</td>
<td>47 Sites</td>
</tr>
<tr>
<td>Dog Park</td>
<td>1 Ac</td>
</tr>
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</table>
SWM Monitoring
Contract B – Bridge 34 over PB & GS
SWM Monitoring
Contract B – Underground SWM PB
State of the Art Storm Water Management
Sand Filter Groundwater Recharge Facilities
Contract ‘B’

Linear Sand Filters
Drain to underground facility
East Conspan

August 20, 2012 Bridge 34 Temperature vs. Stream Depth

- Stream Temperature
- Inflow Temperature
- Outflow Temperature
- Roadway Temperature
- Stream Depth
Contract ‘A’

Sand Storage SWM Facility
CPV and Temperature treatment
ICC ES/CM/CS Sites
PB-C completed construction June 2009
Construction Status
ES/CM – SPA BMP’s
SPA BMP Monitoring 125-5 Ansted Rd
SPA BMP Monitoring
128-1 to 3
SPA BMP Monitoring

LENGTH VARIES

1/2 LENGTH

6" SOLID WALL PPWP CLEANOUT WITH 90° PIPE ELBOW (TYP.)

6" SOLID WALL PPWP CLEANOUT WITH 90° PIPE ELBOW (TYP.)

GROUNDWATER RECHARGE AREA

6" PERFORATED PPWP OBSERVATION WELL

6" PERFORATED PPWP

REBAR ANCHOR - 3' LONG

9" SQUARE STEEL FOOT PLATE

EX. CULVERT

EX. DRIVEWAY

EX. DRAINAGE STRUCTURE

OUTFALL PPWP OUTLET INTO EX. DRAINAGE STRUCTURE

6" SOLID WALL PPWP OUTLET
SPA BMP Monitoring

Biotrench Typical Section

Scale: 1" = 1'
<table>
<thead>
<tr>
<th>Bioswale Name</th>
<th>MDE required WQ(_v) (cubic feet)</th>
<th>Bioswale volume per design (cubic feet)</th>
<th>Recharge volume for approximate 1-year storm (cubic feet)</th>
<th>1-year Runoff Volume</th>
<th>% of 1-year volume captured</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB 125_5</td>
<td>1944</td>
<td>96</td>
<td>540</td>
<td>11242</td>
<td>5%</td>
</tr>
<tr>
<td>PB 128_1</td>
<td>208</td>
<td>205</td>
<td>1271</td>
<td>12782</td>
<td>10%</td>
</tr>
<tr>
<td>PB 128_2</td>
<td>147</td>
<td>144</td>
<td>905</td>
<td>8673</td>
<td>10%</td>
</tr>
<tr>
<td>PB 128_3</td>
<td>142</td>
<td>139</td>
<td>1494</td>
<td>8977</td>
<td>17%</td>
</tr>
<tr>
<td>Cumulative PB 128_1-3 Series</td>
<td>496</td>
<td>487</td>
<td>3669</td>
<td>30433</td>
<td>12%</td>
</tr>
</tbody>
</table>
Recharge rate (8-12-10) = 1.30 inches per hour

Recharge rate (8-13-10) = 1.05 inches per hour
PB 125-5 Temperature Data 8-13-10
Period: Precipitation - Exfiltration
PB 128-1 Bioswale Water Elevations 9-30-10 - 10-2-10

Recharge Rate = 1.58 inches per hour

128-1, 2, & 3
PB 128-2 Bioswale Water Elevations 9-30-10 - 10-2-10

Recharge Rate = 1.45 inches per hour

Water level (recharge)

Water level (recharge & exfiltration)

Precipitation

Elevation (ft.)

Precipitation (Inches)

Time

9/30/10 0:00 9/30/10 12:00 10/1/10 0:00 10/1/10 12:00 10/2/10 0:00

128-1, 2, & 3
Recharge rate = 2.00 inches per hour
Stewardship
Retrofitting Older Neighborhoods
ICC ES/CM/CS Sites

PB-B
83% Complete
ICC ES/CM/CS Sites

PB-G
85% Complete
ES/CM Reforestation

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