What you are about to hear..

- How SEH converted an engineering based master drainage plan concept to a “classroom” for future stormwater projects
- How successful green projects are really about generating EXCITEMENT!
- How you can “cram” several BMP/Green Solution concepts into one project
- How use of a Multi-discipline approach is the key to successful green solution projects
- How going above the base project can make a BMP project a learning tool and community asset
Plan showed proposed conditions

Southland Lane and 12th Street South Detention

124 acres of drainage from shopping area

Plan said what to do

Approximately 123.96 acres are tributary to this study area with drainage reaching this location via overland and pipe flow. SWMM results indicate inflows to the area of 226-cfs and 442-cfs for the 5-year and the 100-year storms respectively. A grass swale, responsible for carrying this flow, currently exists in this area and outlets to a 48" RCP.

- Possible Solutions - 5-year storm
  - Detention

This area will be designed as a retention detention area. Based on available information, this detention pond would lessen the outflow from 226-cfs to 114-cfs with a 48" RCP outlet with a 3 x 3.6' orifice. The smaller opening is required to ensure the pond is maximizing its storage and releasing the lowest rate possible. This indicates that the existing 48" RCP does not require sizing. However, the entire downstream system was not modeled and it is recommended that a more detailed analysis is completed to determine any improvements that may be required.

Plan provides for more work!

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Step 1 – Get EXCITED!

INFLOW

OUTFLOW

Recommended that a more detailed analysis is completed to determine any improvements that may be required.
Step 2 – Throw out the your T-square and triangle!

Step 3 – Work as multi-discipline teams

Project input from:
City Engineering
City Parks
Project Landscape Architect
SEH Civil Engineering
SEH Water Resources
Public

How many “BMP” demonstrative components can you fit in one site?

Planned Sediment Deposition/Movement

- Larger Storm event flow
- Pond shelf to promote vegetation to filter flow
- First Flush flow & Sediment
- Outlet
First Flush Structure

How “First Flush” Inlet worked

Natural safety buffer at edge of water

Variable depth water promotes various vegetation growth improves BMP
Planned outflows

<table>
<thead>
<tr>
<th>Description</th>
<th>Invert</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-inch storm sewer inlet pipe to outlet structure from the pond</td>
<td></td>
<td>Controls flow rate for about 1 foot of depth until orifice in structure becomes the control. Purpose is to provide a better slope transition from the pond to the outlet structure.</td>
</tr>
<tr>
<td>Orifice in Structure (3 feet wide by variable height)</td>
<td>1635.0</td>
<td>Controls pond elevation and also major control structure for rate control via stop log structure. Overflow at top of structure.</td>
</tr>
<tr>
<td>Overflow at top of structure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48-inch storm sewer from outlet structure</td>
<td>1634.9</td>
<td>Once flow from the orifice and overflow at top of structure reach around 140 cfs and the pond is near elevation 1643, the downstream storm sewer has less capacity then the outlet structure and thus is the control.</td>
</tr>
<tr>
<td>Primary sidewalk emergency overflow</td>
<td>1642.0</td>
<td>First emergency overflow to provide significant flow to downstream outlet pipe. Size may need to be adjusted if flows surcharge downstream system.</td>
</tr>
<tr>
<td>Secondary sidewalk and berm overflow</td>
<td>1643.0 (assumed some grass height)</td>
<td>380 foot section of the berm with potential for some erosion of the downstream side of the berm if used for a long period of time. This scenario is however unlikely and thus there is no special downstream armoring is recommended.</td>
</tr>
<tr>
<td>Final pond overflow</td>
<td>1643.8</td>
<td>60 foot section of the berm at the outlet section of the pond. Flow rates would need to exceed the 100-year event for this overflow to operate.</td>
</tr>
</tbody>
</table>

Outlet allows “adaptive management”

Low Maintenance Restoration

Native Grass
Native Wildflower Plugs
Existing Trees

Planting Plan

Rain Garden added as demonstration project

Layout of drain system

Curb cut on 12th Street

Location
Site can be used for Educational Opportunities/Community Asset

Don’t’ Hide it, Emphasis it!

Look for opportunities to turn an eyesore to an asset

Success – Eyes of the Client

“The City has been able to observe the detention pond’s performance during a heavy rain storm this spring [2011], and the pond managed the storm water flows very well. The pond is also very aesthetic and fits in well with the surrounding neighborhood convention center. Boys and girls Club and apartment complex. The City of Brookings uses this project as a showcase for developers on how storm water management facilities can be both functional and aesthetic. We support this outstanding project for the ACEC Engineer Excellence Award.”*

*From ACEC award submission client support letter, September 29, 2011.
Success – Eyes of ACEC*

2011 South Dakota ACEC GRAND Award winner and 2012 ACEC National Recognition Award winner

Mike Kuno, SEH
Project Manager

Rocky Keehn, SEH
Lead WR Engineer

*ACEC – American Council of Engineering Companies

Accepting the ACEC SD Grand Award

Success! - Hearsay

Keith Rounds of Rounds Construction (contractor for the project) has been heard saying and doing …..

Conclusions

• GET EXCITED ABOUT YOUR PROJECT AND GOOD THINGS WILL HAPPEN
• LOOK FOR OPPORTUNITES TO EXPAND YOUR PROJECT…MAKE IT MORE THAN IT NEEDS TO BE
• DON’T HIDE YOUR PROJECT…BE PROUD OF IT
• MULTI-DISCIPLINE IS THE KEY TO SUCCESS…BETTER PROJECTS RESULT WHEN WE ALL WORK TOGETHER.

In our stormwater “classroom”

• Planned Sediment Deposition/Movement
• First Flush Structure
• Natural Safety buffer at edge of water
• Variable depth water promotes various vegetation growth improves BMP
• Planned outflows
• Outlet allows “adaptive management”
• Low Maintenance Restoration (i.e. native grasses)
• Rain Garden
• Educational Opportunities/Community Asset
• Look for opportunities to turn an eyesore into an asset
• Don’t Hide it, Emphasize it (add picnic areas, trails, boardwalks, nature areas, kiosks, etc.)