Slide 1:

"What does a pipe think of a pond?"

SEH

"Best part about storms"

Slide 2:

Southland Lane Detention Pond Project is a "classroom" for future green infrastructure projects in the City of Brookings, South Dakota

Presented by Rocky J. Keehn, PE, D.WRE, CFM, LEED AP

rkeehn@sehinc.com

SEH

Presentation for
2012 Nebraska Post-Construction
Stormwater Management Workshop,
March 21, 2012

Slide 3:

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

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Slide 4:

Starting Point – Brookings Master Drainage Plan
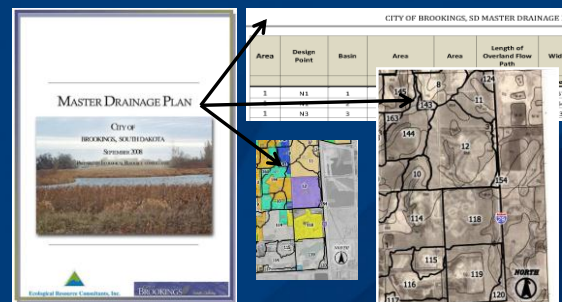
Plan showed proposed conditions

Southland Lane and 12th Street South Detention

124 acres of drainage from shopping area

Project Location

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 outfalls to a 48" RCP.

a) **Possible Solutions – 5-year storm**

- Detention

"detention pond approximately 6.85 ac-ft"

This area will be designated as a possible detention area if it is acquired by the City. Based on available information, a detention pond the size of approximately 6.85 ac-ft is feasible. This detention pond would lessen the outflow from 226-cfs to 81-cfs with a 48" RCP outlet with a 3'x3.6' 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 upsizing. 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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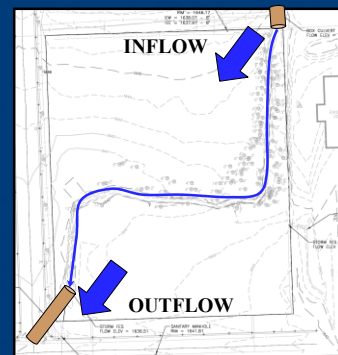
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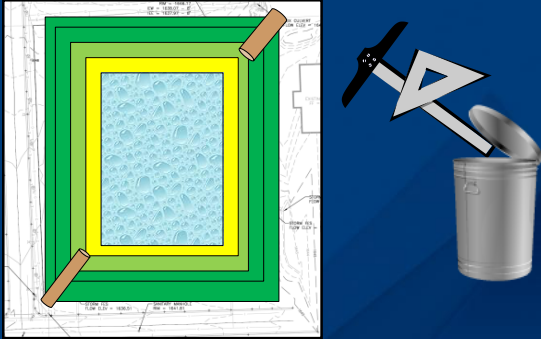This indicates that the existing 48" RCP does not requ

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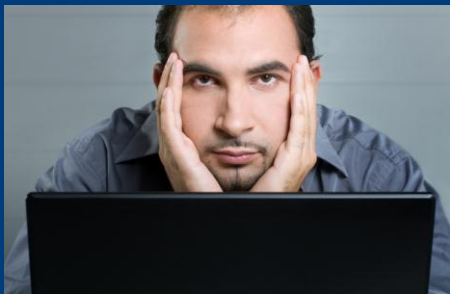

Step 1 – Get EXCITED !

INFLOW

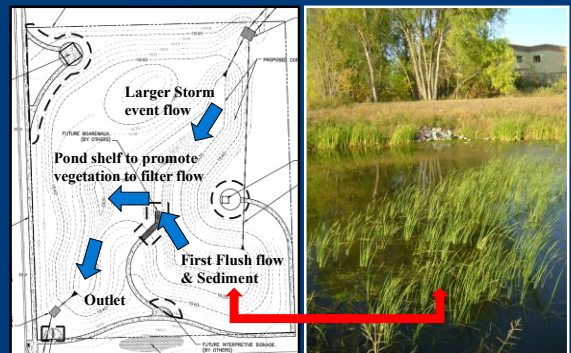OUTFLOW

Step 2 – Throw out the your T-square and triangle!

Step 3 – Work as multi-discipline teams

Concept 1   Concept2

Drawings by CONFLUENCE   524 N MAIN AVE.
SIOUX FALLS, SD 57104
PH: 605.339.1205
FAX: 605.339.1215

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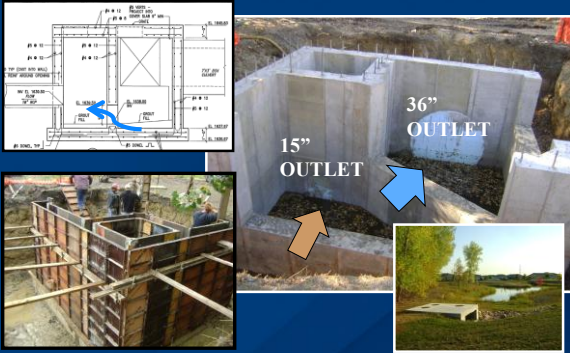

How many "BMP" demonstrative components can you fit in one site?

Planned Sediment Deposition/Movement

Larger Storm event flow

Pond shelf to promote vegetation to filter flow

First Flush flow & Sediment

Outlet

First Flush Structure

15" OUTLET

36" OUTLET

How "First Flush" Inlet worked

Larger Storm event flow

First Flush flow & Sediment

Natural safety buffer at edge of water

Normal Water

10 to 1 slope – first 1' of depth

3 to 1 slope to bottom of pond

Variable depth water promotes various vegetation growth improves BMP

Pond Bounce about 8 feet

1 foot

5 feet

1 foot

5 feet

5 feet

1 foot

1 foot
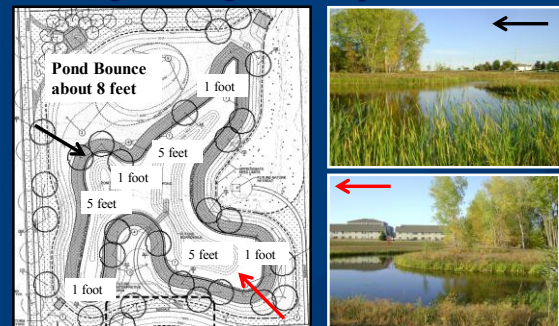
Planned outflows
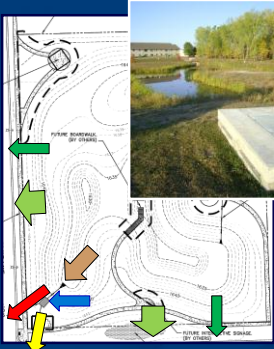
Outlet Control Type And When They Operate		
Description	Invert	Comments
48-inch storm sewer inlet pipe to outlet structure from the pond	1635.0 (in structure)	Controls flow rate for about 1 foot of depth until orifice in structure becomes the control. Purpose is to provide a better slope transition from the pond to the outlet structure.
Orifice in Structure (3 feet wide by variable height)		Controls pond elevation and also major control structure for rate control via stop log structure.
Overflow at top of structure.		First emergency overflow to provide significant flow to downstream outlet pipe. Size may need to be adjusted if flows surcharge downstream system.
48-inch storm sewer from outlet structure		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.
Primary sidewalk emergency overflow		Two 50 foot sections of the berm (one along Southland Lane and one along 12th Street) is at this elevation to act as the first emergency overflow and due to its location near the elevation of the adjacent street has limited erosion potential of downstream berm.
Secondary sidewalk and berm overflow	1643.5 for a (scale height)	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 no special downstream armoring is recommended.
Final pond overflow		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.

Outlet allows "adaptive management"

Low Maintenance Restoration

Native Wildflower Plugs

Native Grass

Existing Trees
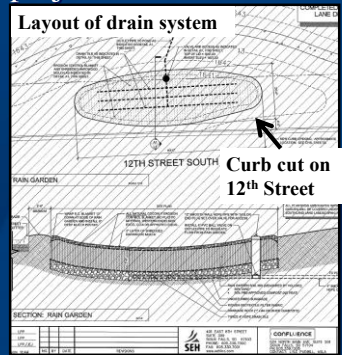
Native Grass

No-mow turf
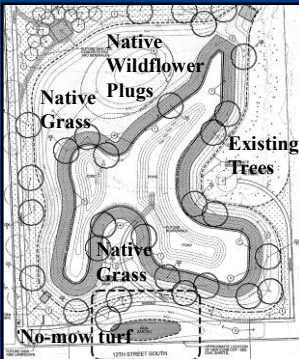
O KEYNOTES

1. TURF AREA - NOT IN CONTRACT. AREA WILL BE ALREADY SEEDED AS PART OF 2013 DETENTION POND PROJECT. REFER TO GENERAL NOTES ABOVE.
2. SEEDED NATIVE GRASS AREA, AS SPECIFIED (53,600 SQ FT). TILL, FINE GRADE, SEED, AND HYDROMULCH AS SPECIFIED. SEE ALSO GENERAL NOTES ABOVE.
3. SEEDED NO-MOW TURF AREA AS SPECIFIED (7,250 SQ FT). TILL, FINE GRADE, SEED, AND HYDROMULCH AS SPECIFIED. SEE ALSO GENERAL NOTES ABOVE
4. EROSION CONTROL BLANKET, AS SPECIFIED. INSTALL BLANKET TO ELEVATION 14'-0" ABOVE AND 2'-0" BELOW NORMAL POND WATER ELEVATION OF 1636.00 (1,950 SQ YD).
5. B&B TREE - TYP. DETAIL A/SHEET 3.
6. NATIVE WILDFLOWER PLUG AREA, AS SPECIFIED. PLUGS ARE TO BE CONTRACTOR SUPPLIED, OWNER INSTALLED (2,500 TOTAL PLUGS). CONTRACTOR IS RESPONSIBLE FOR DELIVERING PLUGS TO OWNER SPECIFIED LOCATION IN BROOKINGS, SD. ANTICIPATED DELIVERY DATE - JUNE 2011.
7. SEEDED SHORELINE GRASS MIX AT WATERS EDGE (2,100 SQ FT). CONTRACTOR SHOULD ASSUME SEEDING TO LEVEL 4'-0" ABOVE AND 2'-0" BELOW NORMAL POND WATER ELEVATION. CONTRACTOR WILL NOT BE REQUIRED TO PUMP THE POND LEVEL DOWN TO THIS LOWER ELEVATION BUT WILL BE EXPECTED TO SEED TO THIS LEVEL IF CURRENT WATER ELEVATION PERMITS.
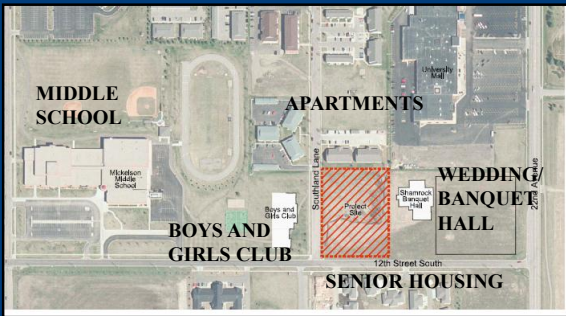
Drawings by

CONFLUENCE
524 N. MAIN AVE.
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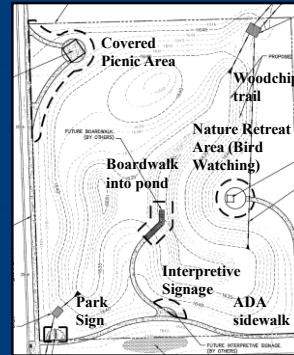PH: 605.339.1205
FAX: 605.339.1215

Rain Garden added as demonstration project

Location

Planting Plan

Layout of drain system

Curb cut on 12th Street

Site can be used for Educational Opportunities/Community Asset

MIDDLE SCHOOL

APARTMENTS

WEDDING/ BANQUET HALL

BOYS AND GIRLS CLUB

SENIOR HOUSING

Don't' Hide it, Emphasis it!

Covered Picnic Area

Woodchip trail

Nature Retreat Area (Bird Watching)

Boardwalk into pond

Interpretive Signage

Park Sign

ADA sidewalk

Look for opportunities to turn an eyesore to an asset

Post project ditch full of trees and junk

Ditch filled and now a woodchip walking trail

Success – Eyes of the Client

brookings
SOUTH DAKOTA

"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. "*
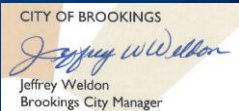
*From ACEC award submittal client support letter, September 29, 2011.

CITY OF BROOKINGS

Jeffrey Weldon
Brookings City Manager

Success – Eyes of ACEC*

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

Accepting the ACEC-SD Grand Award

*ACEC – American Council of Engineering Companies

Mike Kuno, SEH
Project Manager

Rocky Keehn, SEH
Lead WR Engineer

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 OPPURTUNITES TO EXPAND YOUR PROJECT…MAKE IT MORE THAN IT NEEDS TO BE

- DON'T HIDE YOUR PROJECT..BE PROUD OF IT

- MULTI-DISIPLINE 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, Emphasis it (add picnic areas, trails, boardwalks, nature areas, kiosks, etc.)