MANAGING RUNOFF & ADDRESSING EROSION

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Managing Runoff/Addressing Erosion

- WHAT CAUSES AN AREA TO BE OF CONCERN?
- WHAT IS RUNOFF?
- WHEN IS EROSION AN ISSUE?
- HOW DO YOU OR YOUR NEIGHBORS DO SOMETHING?
- HOW DO YOU PAY FOR THE PROJECTS?
- WHO MAKES SURE WHAT IS BEING DONE IS WORTH WHILE?
- HOW DO YOU MAKE SURE THE PROJECT TURNS OUT POSITIVE?

LANDSCAPE CHANGES (1938) – HARD SURFACES - EXAMPLE 1

LANDSCAPE CHANGES (1965) – HARD SURFACES - EXAMPLE 1

LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 1

LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 1

LANDSCAPE CHANGES (1938) – HARD SURFACES - EXAMPLE 2

LANDSCAPE CHANGES (1965) – HARD SURFACES - EXAMPLE 2

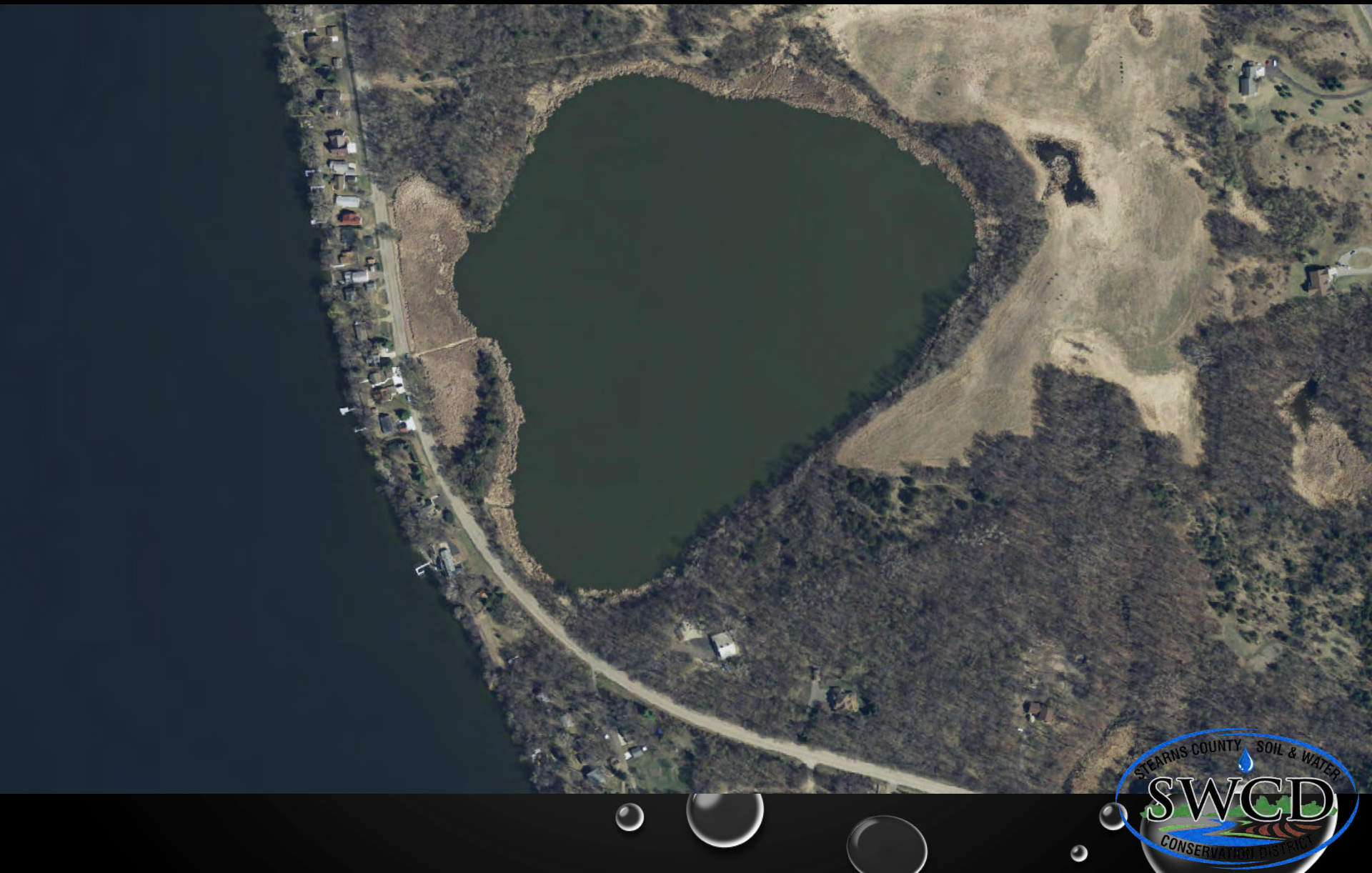
LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 2

LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 2

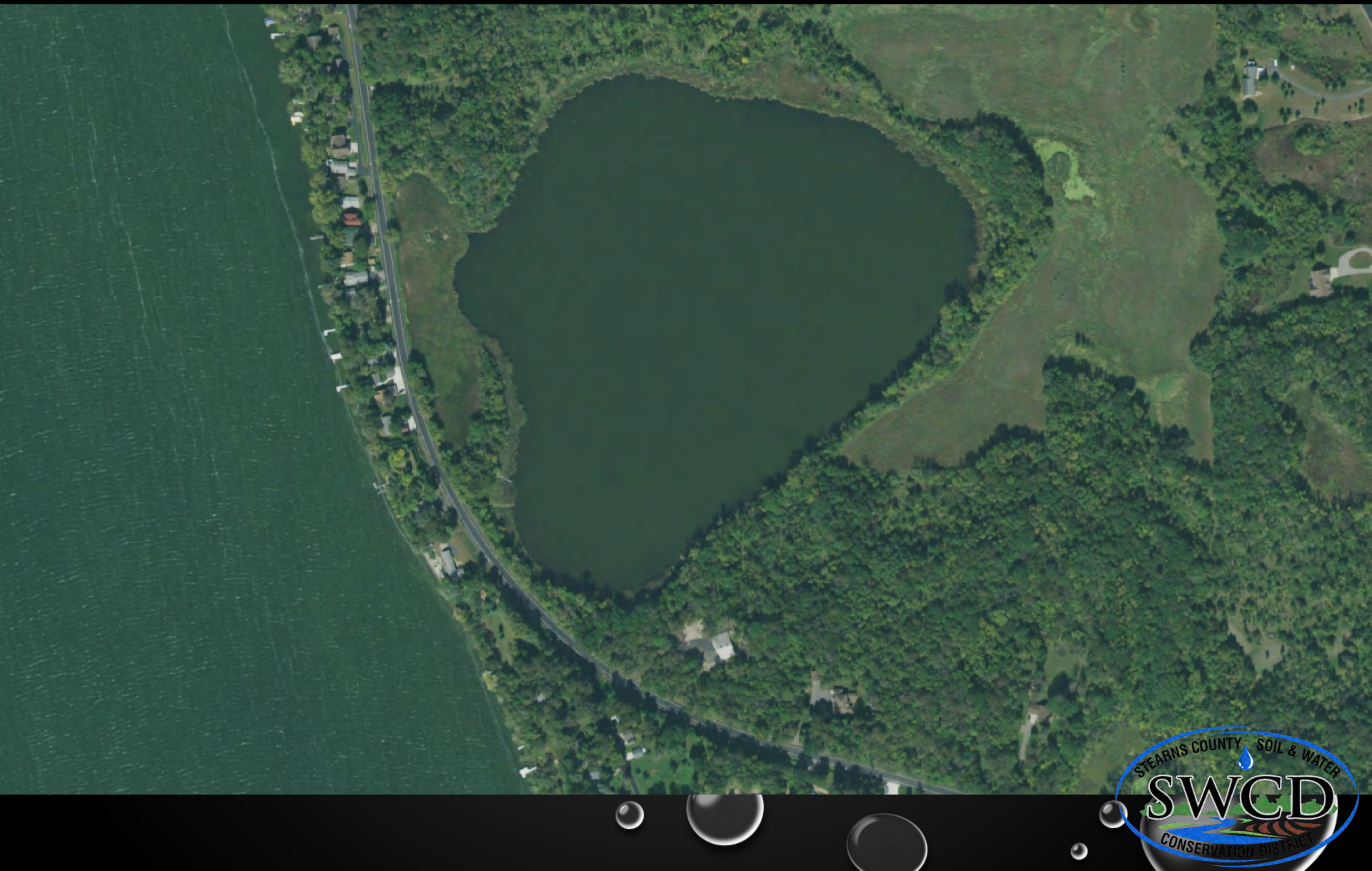
LANDSCAPE CHANGES (1938) – HARD SURFACES - EXAMPLE 4

LANDSCAPE CHANGES (1965) – HARD SURFACES - EXAMPLE 4

LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 4



LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 3



LANDSCAPE CHANGES (1938) – HARD SURFACES - EXAMPLE 3

LANDSCAPE CHANGES (1965) – HARD SURFACES - EXAMPLE 3

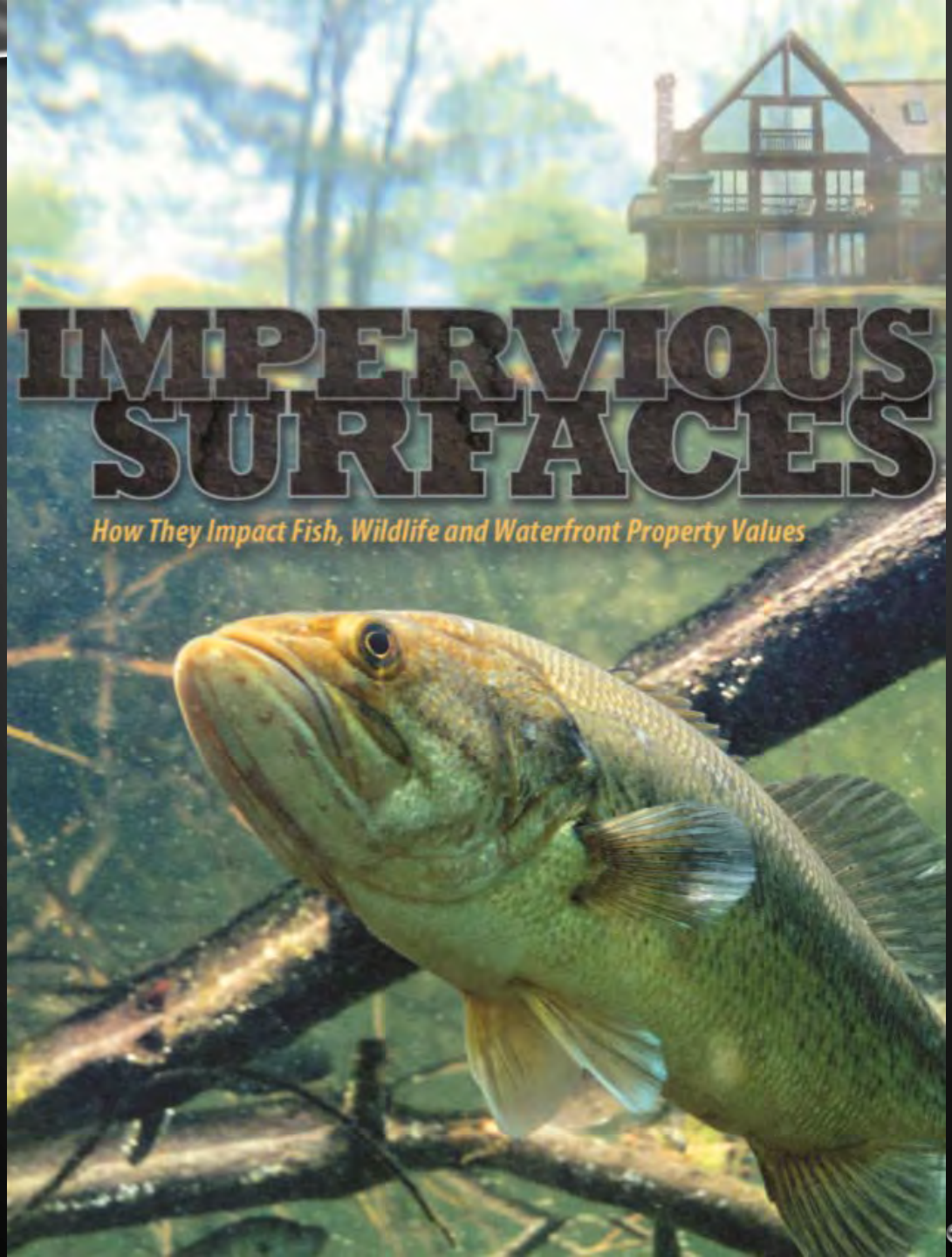
LANDSCAPE CHANGES (2015) – HARD SURFACES - EXAMPLE 3

SWCD
CONSERVATION DISTRICT

Outdoors: Want better fishing? Reduce water runoff

By Louie Stout Mar 25, 2018 (…)

Good fishing isn't entirely dependent on fish stockings or bag and size limits.


IMPERVIOUS SURFACES
How They Impact Fish, Wildlife and Waterfront Property Values

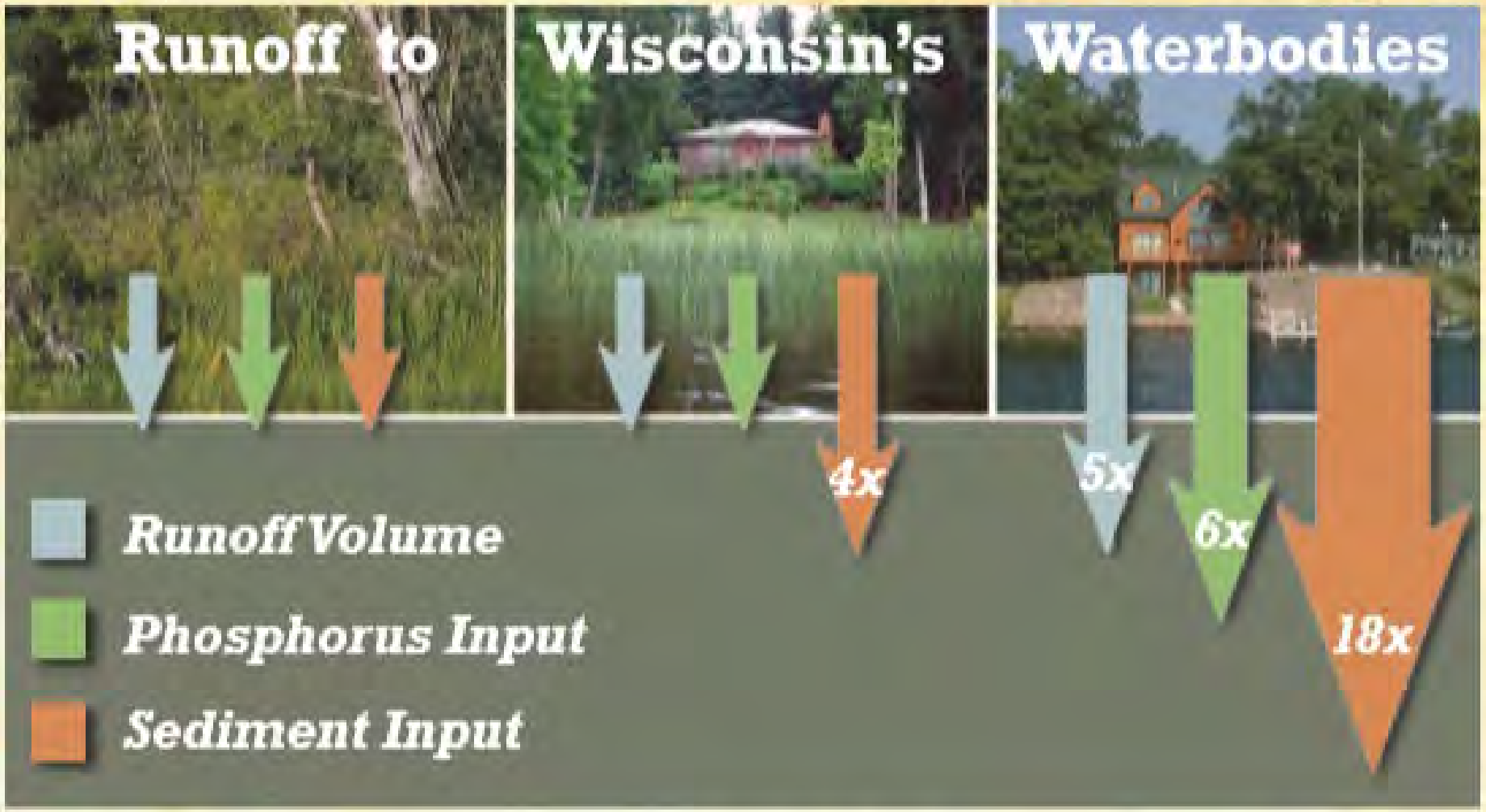
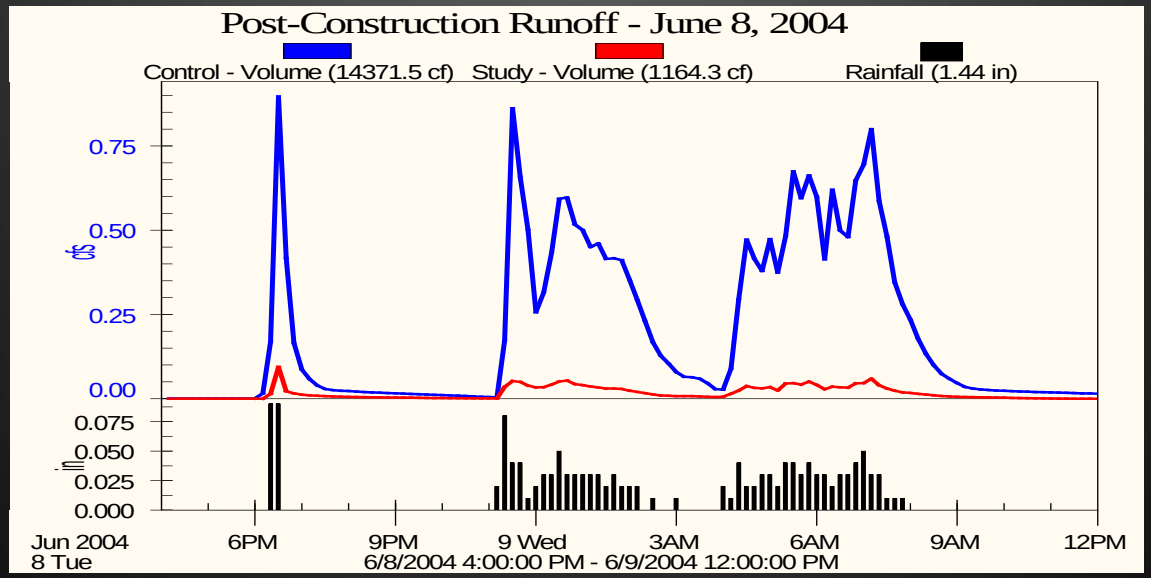


Figure 2: The far left picture indicates a half-acre undeveloped shoreland lot that causes minimal runoff, phosphorus and sediment inputs to the lake. The middle picture portrays a typical 1940s shoreland development with approximately 8% of its area covered by impervious surfaces. The picture to the right shows a shoreland lot with approximately 20% of its area covered by impervious surfaces. Notice how sediment inputs drastically increase as impervious surface coverage increases.[6]

POST-CONSTRUCTION RUNOFF 1.44 INCHES IN 9 HOURS



Source:
City of Burnsville
Barr Engineering

STEARNS COUNTY POLLUTANT LOADING MODEL, 15% IMPERVIOUS THRESHOLD

This model calculates the annual loading of Total Suspended Solids (TSS) and Total Phosphorus (TP) in pounds per year (lbs/yr) and pounds per acre (lbs/ac) that can be expected off of residential property within Stearns County, Minnesota

Date:	June	24	2014	*Use drop down menu for month and day.*
Site Name:	KENT J & SUSAN H ANDERSON			
Parcel Id. Number (PIN):	08.05180.0000			
Modeled By:	C. Teigland			

GENERAL LOT INFORMATION

Lot Area:	22,841	Square Feet *(2,180<=Lot Area<=87,120)*	0.524 Acres
Soil Map Symbol:	461B	*Select predominant lot soil map symbol from drop down menu.*	
Hydrologic Soil Group:	B		
Avg. Soil Slope:	3 %		
Are there known bluffs on the property?	No	*Select "Yes" or "No"*	

Proposed Lot Cover: *Enter the lot area that is covered by each cover type. Impervious coverage, including structures, driveways, sidewalks, and/or gravel areas, must be between a minimum of 5% and a maximum of 50% of the lot area. Sum of lot cover areas must equal the lot area AND impervious area must be entered for loading results:*

Min. Impervious (5%)	1,142	Square Feet
Max. Impervious (50%)	11,421	Square Feet

Impervious:	6,356	Sq. Ft.	28%	0.146	Acres
Woods:	5,710	Sq. Ft.	25%	0.131	Acres
Grass:	10,775	Sq. Ft.	47%	0.247	Acres
Total	22,841	Sq. Ft.	100%	0.524	Acres
	22,841	Sq. Ft.	0	Input Sq. Ft. Remaining	

Pervious Curve Number: 59 *(Calculated based on hydrologic soil group and pervious lot cover)*

STEARNS COUNTY SOIL & WATER SWCD

PROPOSED CONDITIONS LOADING

TSS:	**92.58**	**Lbs/Yr**
	176.57	**Lbs/Ac**
TP:	**0.31**	**Lbs/Yr**
	0.58	**Lbs/Ac**

THRESHOLD ANALYSIS

The site **WILL** exceed the threshold for development of 15% impervious loading values

Additional BMP treatment is required to meet presettlement loads

PRESETTLEMENT LOADING

TSS:	**0.13**	**Lbs/Yr**
	0.24	**Lbs/Ac**
TP:	**0.00**	**Lbs/Yr**
	0.000	**Lbs/Ac**

With typical sized BMPs, the site likely:

WILL NOT exceed presettlement loading values

BMP EVALUATION

Based on the entered information, incorporation of one of the following BMPs will aid in meeting the pollutant threshold with the sizing as shown below. Reduction in proposed impervious area will reduce the size of BMP required for treatment.

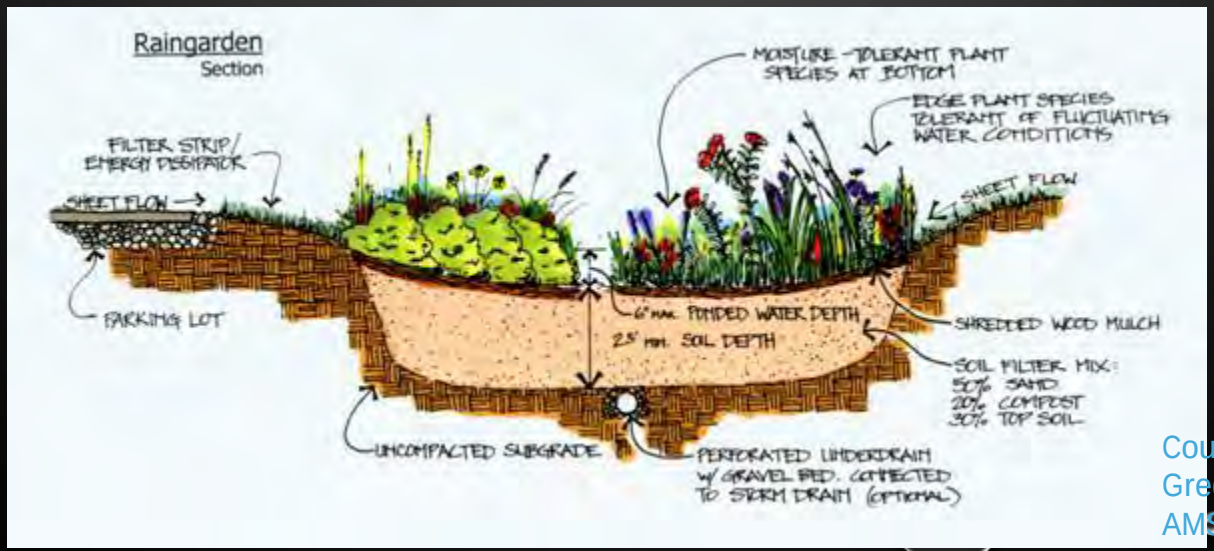
BMP Treatment Used	Approximate Total BMP Size Required		Assumptions
Bioretention Area	318	Square Feet (Bottom area)	18" deep, area=5% impervious area, 3:1 side slopes, native vegetation
Infiltration Trench	3051	Cubic Feet	8' deep, bottom area=6% impervious area
Buffer Strip	> MAX	Feet Wide	vegetation is mix of trees, shrubs, and groundcover

Maximum 200-foot wide buffer strip does not provide full treatment necessary-additional BMPs required

Buffer will not treat the runoff!

Raingardens
(Reduce Runoff through Stormwater Infiltration)

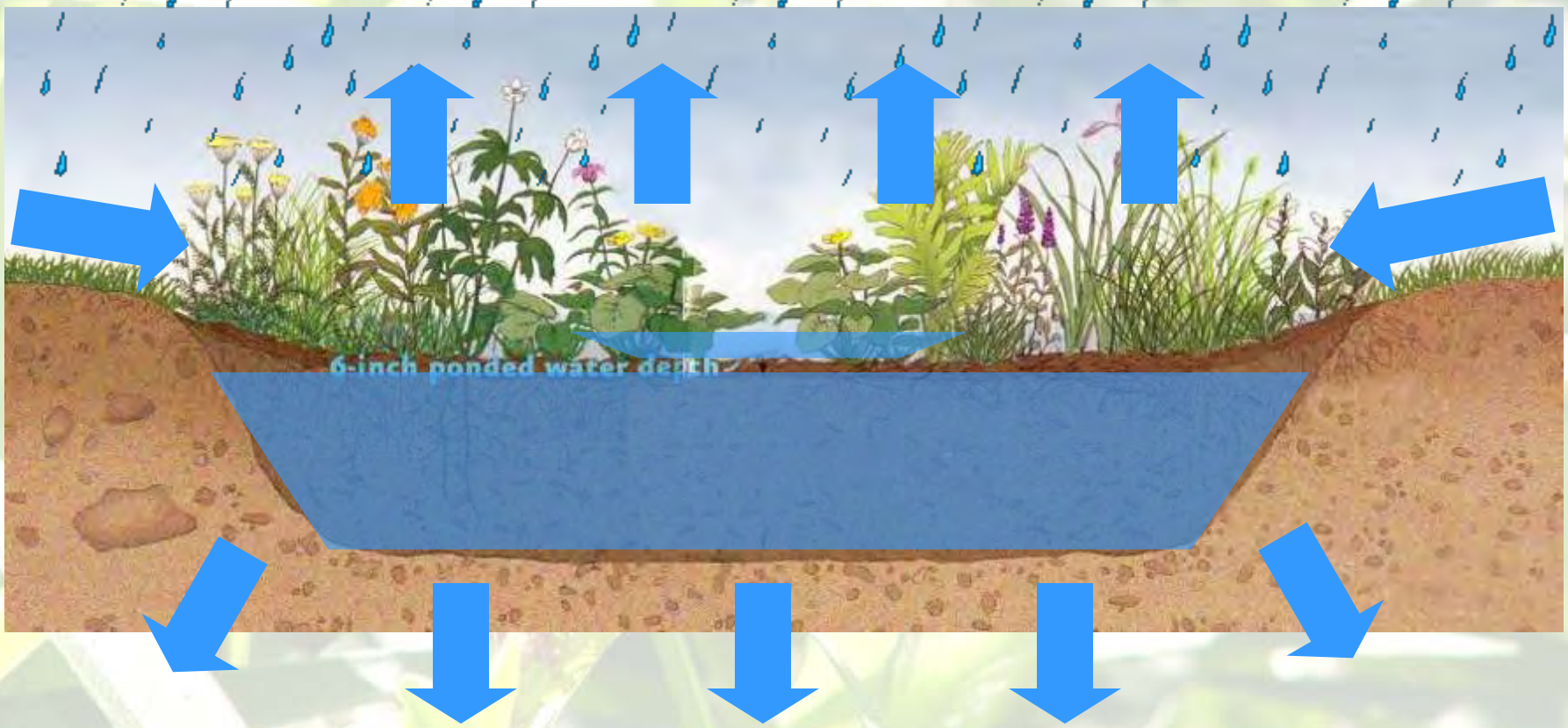
- SHALLOW (4" TO 12"MAX. DEEP) DEPRESSIONS
- SURFACE SHOULD BE DRY IN 48 HOURS (OR LESS)
- SOIL AMENDMENTS SOMETIMES NEEDED (COMPOST AND/OR SAND)
- PLANTED WITH DEEP-ROOTING PLANTS (NATIVES WORK WELL)
- DESIGN AS A LANDSCAPE FEATURE ("NATURAL", FORMAL, OR IN-BETWEEN)
- DESIGN TO INTEGRATE INTO LANDSCAPING
- SELECT PLANTS TO ATTRACT WILDLIFE (FOR MULTIPLE BENEFITS)



Courtesy:
Gregg Thompson –
AMSWCD

Raingardens

(Capturing Rainwater / Stormwater)



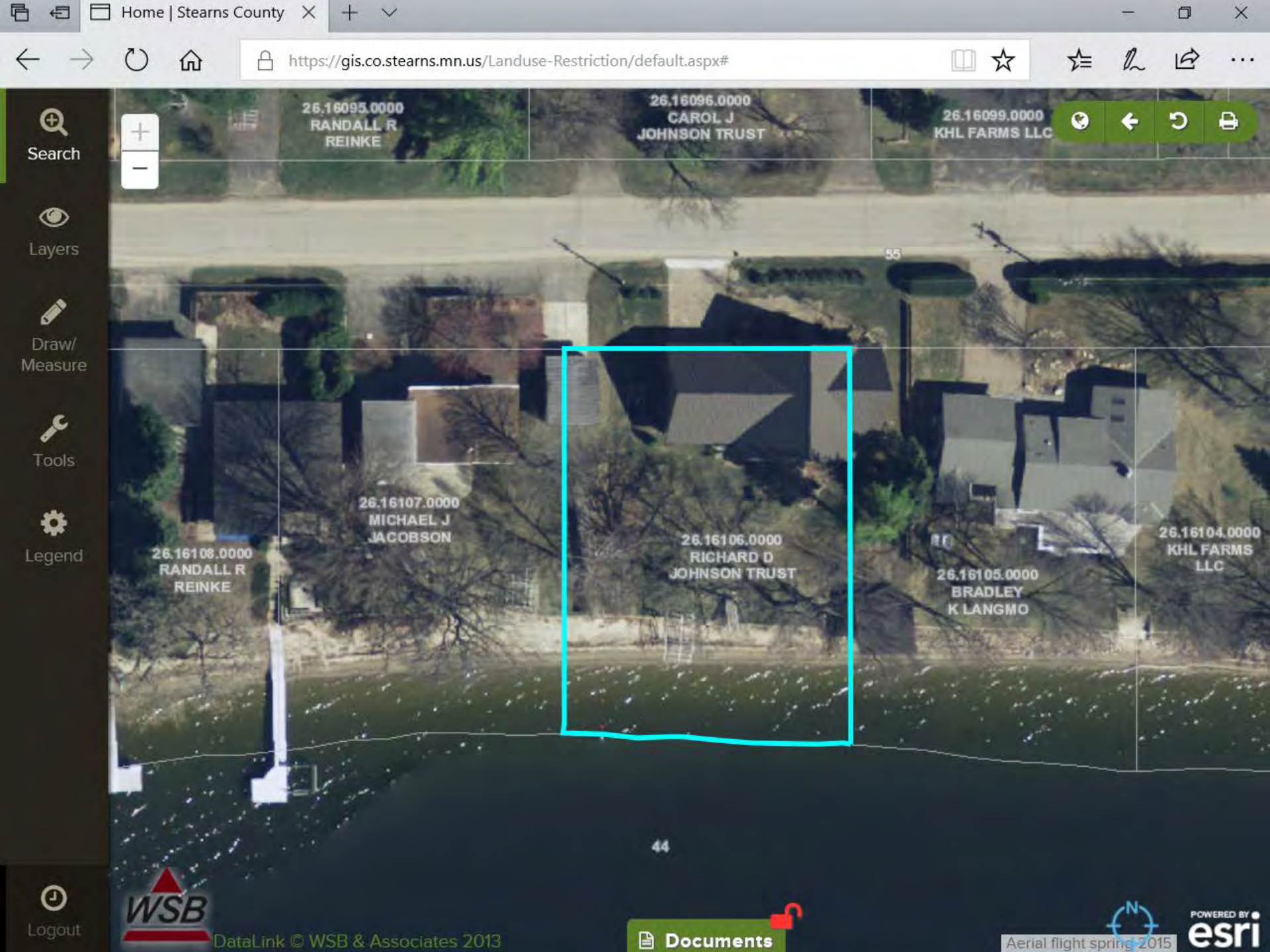
Just like a regular landscape planting, but designed primarily to absorb rainwater

Concept - Gregg Thompson, Illustration - Taina Litwak, Animation - Ron Struss

PROJECT EXAMPLE – LAKE KORONIS

BACKGROUND & DESIGN CONSIDERATIONS:

- ROAD, DRIVEWAYS, ROOFS, SIDEWALKS CONTRIBUTE TO THE SITE
- POOR SUB-SOIL DICTATED THE NEED FOR AN UNDER DRAIN IN THE BASIN AND OVERFLOW OUTLET
- CONSTRUCTED AN INFILTRATION SWALE LEADING TO THE BASIN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STORMWATER EXAMPLE – LAKE KORONIS

STORMWATER EXAMPLE – LAKE KORONIS

STORMWATER EXAMPLE – LAKE KORONIS (AFTER)

STORMWATER EXAMPLE – LAKE KORONIS (AFTER)

PROJECT EXAMPLE – LAKE KORONIS

- PROJECT FACTS:
  500 SQUARE FOOT BASIN
  550 SQUARE FOOT INFILTRATION SWALE
  $6,400 PROJECT

  40 CUBIC YARDS OF EXCAVATION FOR RAINGARDEN
  15 CUBIC YARDS OF COMPOST MIX FOR RAINGARDEN
  15 CUBIC YARDS OF WASHED SAND FOR RAINGARDEN
  1 OUTLET STRUCTURE WITH TILE
  300 NATIVE GRASS AND WILDFLOWER PLUGS
  4 TREES, SHRUBS, VINES
  16 TONS OF SEDIMENT LOSS A YEAR REDUCED
  .1 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

EROSION/STORMWATER PROJECT EXAMPLE – SRCL

BACKGROUND & DESIGN CONSIDERATIONS:

- SHORELINE SLOPE FAILURE DUE TO SURFACE RUNOFF
- SOILS AND SEEPS INDICTAED NEED FOR SUB-SURFACE DRAINS ON SLOPE AND OVERFLOW OUTLET
- IMPERVIOUS SURFACE RUNOFF CAPTURED TO DEAL WITH OVERLAND FLOW TO SHORELINE SLOPE

EROSION/STORMWATER PROJECT EXAMPLE – SRCL

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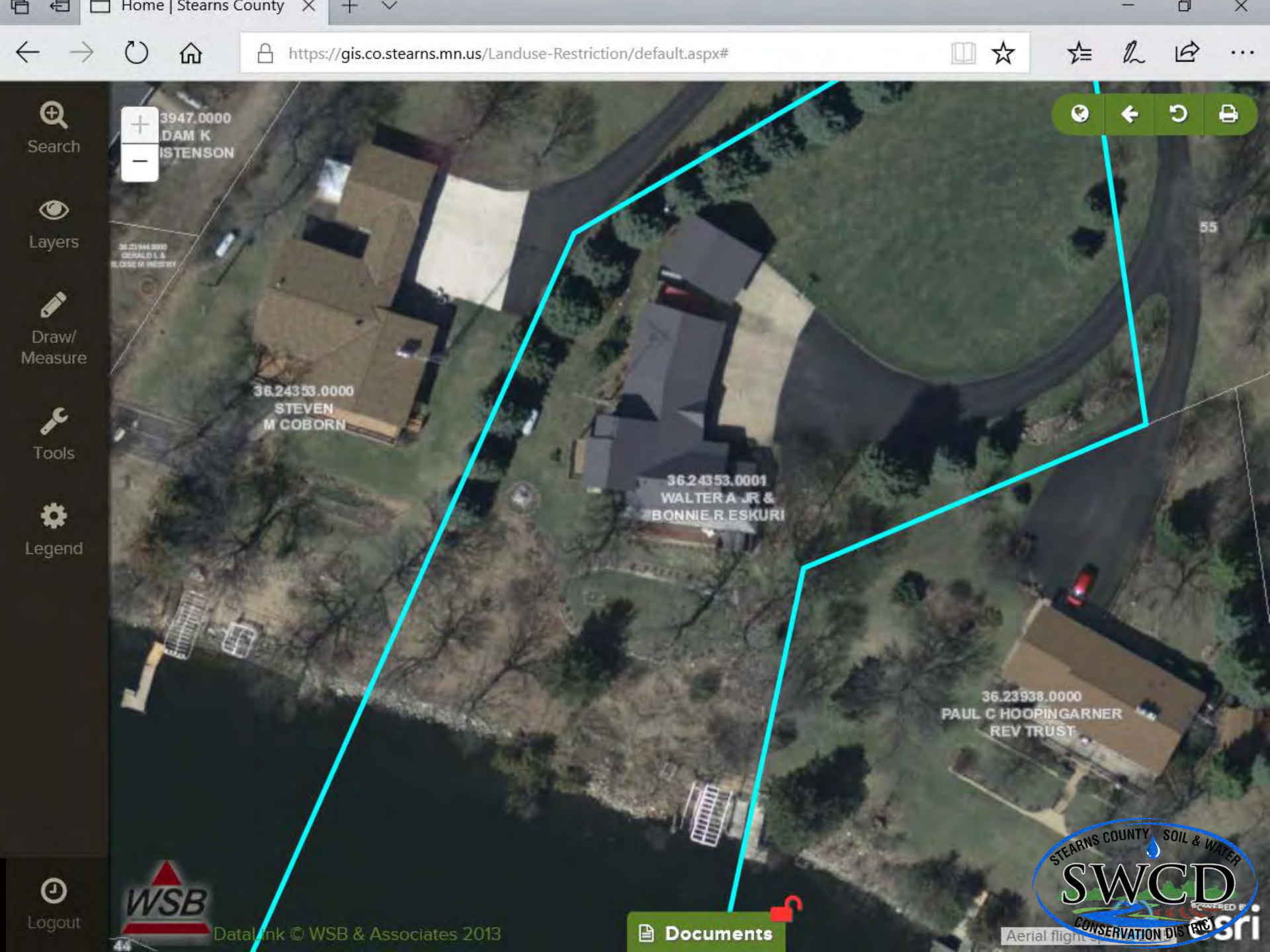
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EROSION/STORMWATER PROJECT EXAMPLE – SRCL

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EROSION/STORMWATER PROJECT EXAMPLE – SRCL

EROSION/STROMWATER PROJECT EXAMPLE – SRCL

- PROJECT FACTS:
  80 FOOT OF SHORELINE SLOPE FAILURE
  2,100 SQUARE FOOT AREA – SLOPE FAILURE
  $28,979 PROJECT

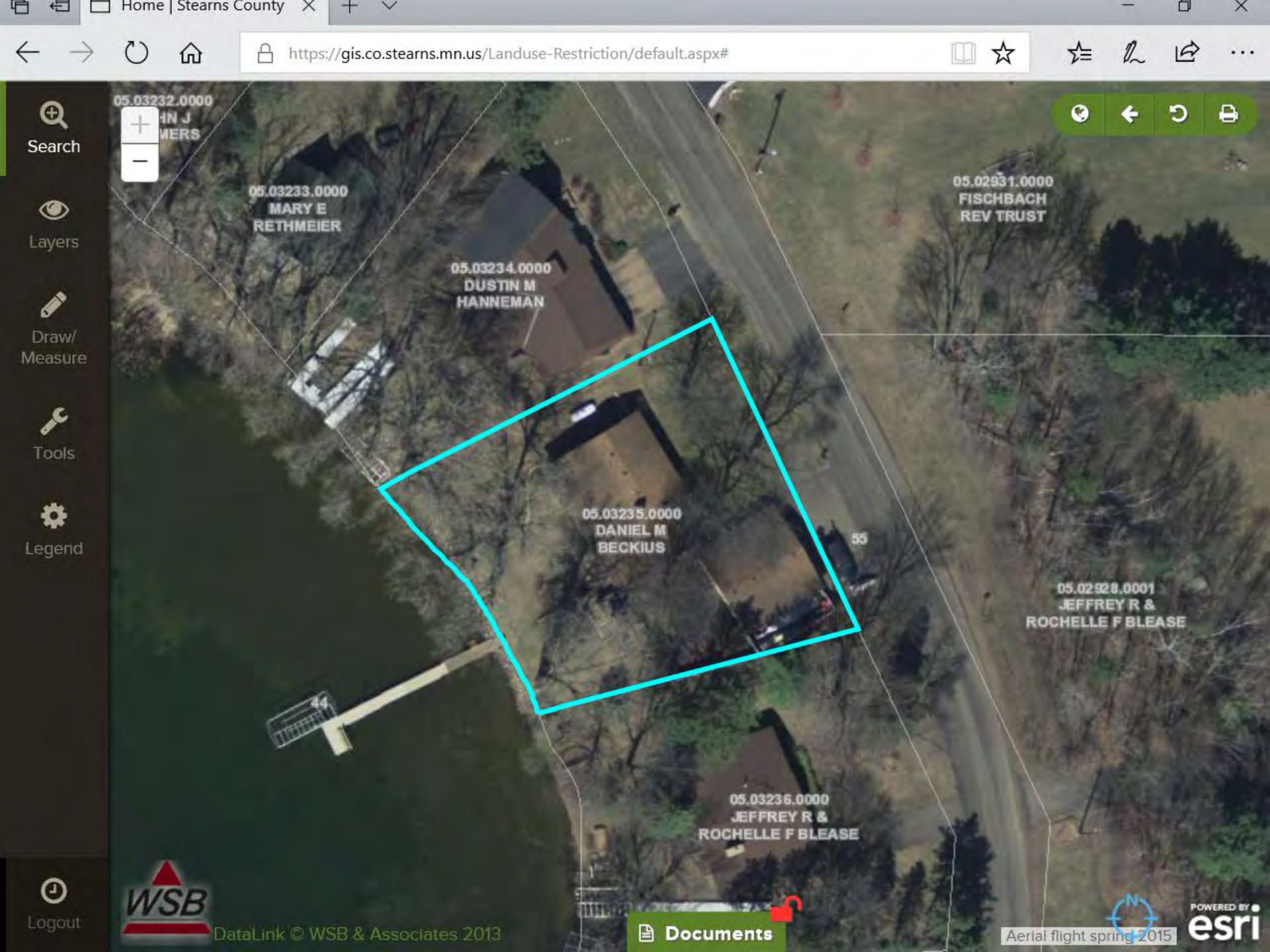
  168 CUBIC YARDS OF EXCAVATION, FILL AND TOPSOIL
  135 LINEAL FEET OF DRAIN TILE
  36 CUBIC YARDS DRAINFILL AROUND TILE
  180 SQUARE YARDS OF FILTER FABRIC AROUND TILE
  500 GALLON UNDERGROUND WATER TANK
  1,220 NATIVE GRASS AND WILDFLOWER PLUGS
  4.5 LBS. OF NATIVE GRASS AND WILDFLOWER SEED
  22 TREES AND SHRUBS
  473 TONS OF SEDIMENT LOSS A YEAR REDUCED
  544 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

DOOR COUNTY, WI
STORMWATER RUNOFF CONTROL

PROJECT EXAMPLE – BIG FISH LAKE

- BACKGROUND & DESIGN CONSIDERATIONS:

- ROAD, DRIVEWAY, ROOFS, SIDEWALKS CONTRIBUTE TO THE SITE
- POOR SUB-SOIL DICTATED THE NEED FOR AN UNDER DRAIN IN THE BASIN AND OVERFLOW OUTLET
- INSTALLED A TRENCH DRAIN ALONG THE DRIVEWAY TO ACCEPT THE WATER AND ROUTE IT TO THE BASIN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Aerial flight spring 2015
POWERED BY esri

STORMWATER EXAMPLE – BIG FISH LAKE

STORMWATER EXAMPLE – BIG FISH LAKE (AFTER)

STORMWATER EXAMPLE – BIG FISH LAKE (AFTER)

STORMWATER EXAMPLE – BIG FISH LAKE

STORMWATER EXAMPLE – BIG FISH LAKE

PROJECT EXAMPLE – BIG FISH LAKE

PROJECT FACTS:

425 SQUARE FOOT BASIN

$4,000 PROJECT

42 CUBIC YARDS OF EXCAVATION FOR RAINGARDEN

15 CUBIC YARDS OF COMPOST MIX FOR RAINGARDEN

15 CUBIC YARDS OF WASHED SAND FOR RAINGARDEN

1 OUTLET STRUCTURE WITH TILE

208 NATIVE GRASS AND WILDFLOWER PLUGS

4 TREES, SHRUBS, VINES

12 TONS OF SEDIMENT LOSS A YEAR REDUCED

.1 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

PROJECT EXAMPLE – LAKE LOUISA

BACKGROUND & DESIGN CONSIDERATIONS:

- APPROXIMATELY 1/2 MILE OF FETCH TO THE SITE
- RESERVOIR BASIN WITH MODERATE WATER FLUCTUATION (3 FEET)
- LARGE WATERSHED
- NO EROSION PROBLEM
- LANDOWNER DESIRED MINIMAL ACCESS WITH NATIVE PLANT RESTORATION
- USED STRICTLY PLANTING ON THE SHORELINE AND RAINGARDENS (3) FOR STORMWATER MANAGEMENT

SHORELINE/STORMWATER EXAMPLE – LAKE LOUISA

SHORELINE/STORMWATER EXAMPLE – LAKE LOUISA

SHORELINE/STORMWATER EXAMPLE – LAKE LOUISA

PROJECT EXAMPLE – LAKE LOUISA

- PROJECT FACTS:
- 90 FEET OF SHORELINE RESTORED
- $13,800 – TWO PROJECTS

- 79 CUBIC YARDS OF EXCAVATION FOR RAINGARDENS (3)
- 77 CUBIC YARDS OF COMPOST MIX FOR RAINGARDENS (3)
- 350 SQUARE YARDS OF EROSION CONTROL BLANKET
- 2.5 LBS. NATIVE GRASS AND WILDFLOWER SEED
- 1760 NATIVE GRASS AND WILDFLOWER PLUGS
- 26 TREES, SHRUBS, VINES
- 59.3 TONS OF SEDIMENT LOSS A YEAR REDUCED
- .69 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

Middle Spunk Lake

- PROJECT STARTED WITH CONCERN FROM AREA RESIDENTS AND AALA ABOUT DIRECT STORMWATER ENTERING MIDDLE SPUNK LAKE
- STEARNS COUNTY SWCD APPLIED FOR BWSR CLEAN WATER FUNDS
- TARGETED STRATFORD ADDITION AND IMMEDIATE WATERSHEDS
- ESTIMATED 30 BMP'S TO BE INSTALLED

AREAS OF CONCERN – MIDDLE SPUNK LAKE

PROJECT EXAMPLE – MIDDLE SPUNK LAKE

BACKGROUND & DESIGN CONSIDERATIONS:

- ROAD, DRIVEWAY, ROOFS, SIDEWALKS CONTRIBUTE TO THE SITES
- 92 LOT RESIDENTIAL DEVELOPMENT WITHOUT CURB AND GUTTER
- PRE-EXISTING STORM SEWER OUTLET DIRECTLY INTO THE LAKE WITHOUT TREATMENT
- INSTALLED 40 BASINS WITHIN THE DEVELOPMENT

AREAS OF CONCERN – MIDDLE SPUNK LAKE

Project Example - Middle Spunk Lake

You Can Help Improve Water Quality in Middle Spunk Lake.

PROJECT DESCRIPTION

The Stearns County Soil and Water Conservation District (SWCD) has been awarded grant money to install infiltration features, such as rain gardens, to improve the water quality of Middle Spunk Lake. Through this program, Stearns County SWCD is offering the exciting opportunity for residents in the Stratford Addition neighborhood to have an infiltration feature installed on their property or in a nearby location. These features have the opportunity to improve street drainage and prevent ponding in the street.

We invite you to learn more about this unique opportunity!

UPCOMING INFORMATIONAL MEETING

Date: **Monday, October 18, 2010**
Time: **7:00 p.m. – 8:30 p.m.**
Location: **Avon City Hall**

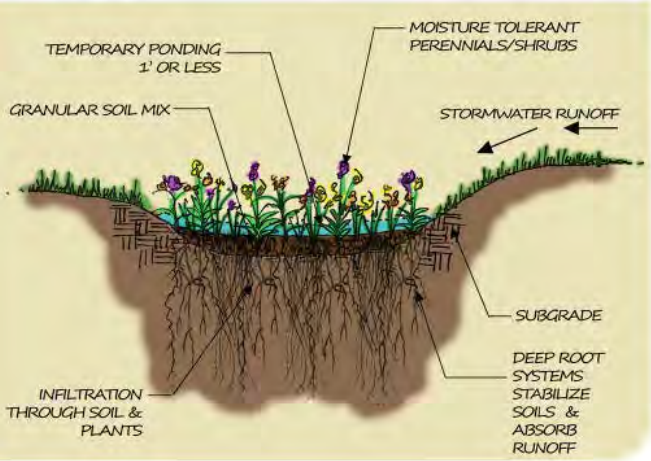
Even if you are unable to attend this meeting, we would like to know if you are interested in receiving an infiltration feature such as a rain garden.

CONTACTS

Stan Hanson, Project Manager
Bonestroo
320-529-4365
stan.hanson@bonestroo.com

Greg Berg, Shoreland Specialist
Stearns County SWCD
320-251-7800, ext. 143
greg.berg@mn.nacdnet.net

(Stearns County SWCD has selected Bonestroo to provide technical assistance on this project.)



STEARNS COUNTY SOIL & WATER SWCD CONSERVATION DISTRICT

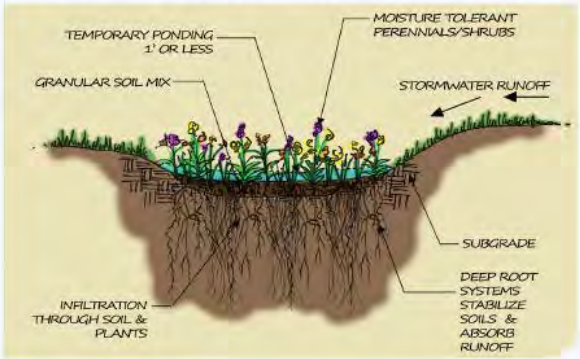
Bonestroo
Engineering Planning Science

STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

You Can Help Improve Water Quality in Middle Spunk Lake by Installing a Rain Garden.

WHAT IS A RAIN GARDEN?

Rain gardens are "strategically placed puddles" that are typically less than one foot in depth and planted with select native vegetation. These small depressions are designed to collect and treat stormwater runoff that contains harmful pollutants. Once the stormwater is collected in the rain garden it slowly drains through native plant roots, micro-organisms, and soil particles that absorb and treat pollutants. Rain gardens help purify stormwater runoff before it enters our valuable water system.



NEXT PUBLIC MEETING

The next meeting will be held for homeowners to select the rain garden's location, determine if the location is shady or sunny, select your preferred planting option, and garden shape. You will meet one on one with the project's staff for approximately 30 minutes who can answer any questions you may have.

Date: **Monday, December 6, 2010**
Time: **2:00 p.m. – 8:00 p.m. Open House**
Location: **Avon City Hall**

Even if you are unable to attend this meeting, contact us so we can coordinate your rain garden preferences.

CONTACTS

Stan Hanson, Project Manager
Bonestroo
320-529-4365
stan.hanson@bonestroo.com

Greg Berg, Shoreland Specialist
Stearns County SWCD
320-251-7800, ext. 143
greg.berg@mn.nacdnet.net

(Bonestroo is Stearns County SWCD's engineer on this project.)

STEARNS COUNTY SOIL & WATER SWCD CONSERVATION DISTRICT

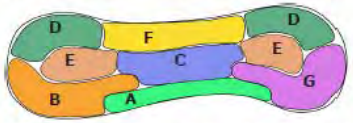
Bonestroo
Engineering Planning Science

SWCD CONSERVATION DISTRICT

PLANTING OPTIONS

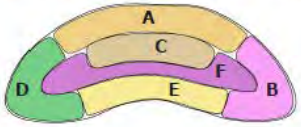
Project staff will work with each homeowner to select the most appropiate plant material for your site. Below are a variety of native garden options to choose from:

Planting Option #1: Full/Part Sun Perennial and Native Grass Garden



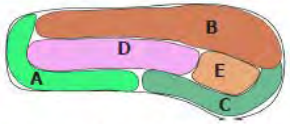
This garden option contains compact native grasses and perennials that are similar to non-native garden varieties. Plants range in height from 1.5' to 3' tall. Spring bloomers include Blue Flag Iris and New Jersey Tea. Summer to fall bloomers include Milkweed, Goldenrod and Coneflower.

Planting Option #2: Full/Part Sun Wildflower and Native Grass Garden



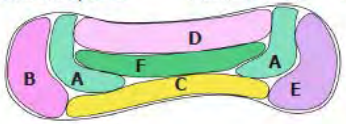
This garden option contains native grasses and perennials that are less compact in shape. Most plants range in height from 1.5' to 5' tall. Spring bloomers include Foxglove Beardtongue and Golden Alexanders. Summer to fall bloomers include Blazingstar, Aster, and Goldenrod.

Planting Option #3: Full/Part Sun Shrub and Native Grass Garden



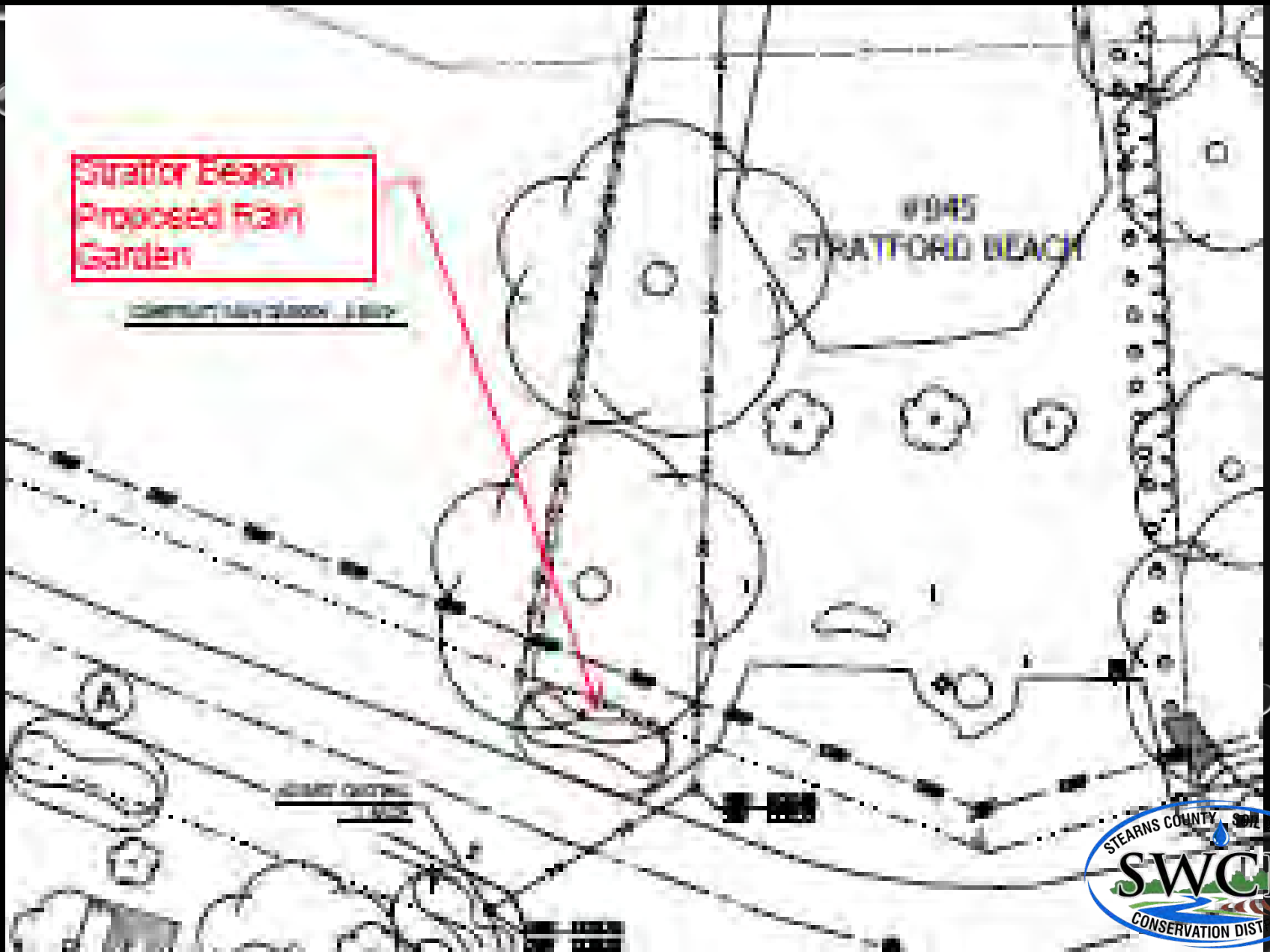
This garden option contains native grasses and shrubs that provide a fuller and larger planting option. Plants range in height from 2' to 6' tall. Less weeding will be required over time but pruning shrubs to the desired height will be required. Spring bloomers are Dogwood and New Jersey Tea. Grasses and shrubs provide excellent fall color.

Planting Option #4: Full/Mostly Shade Perennial and Native Grass Garden

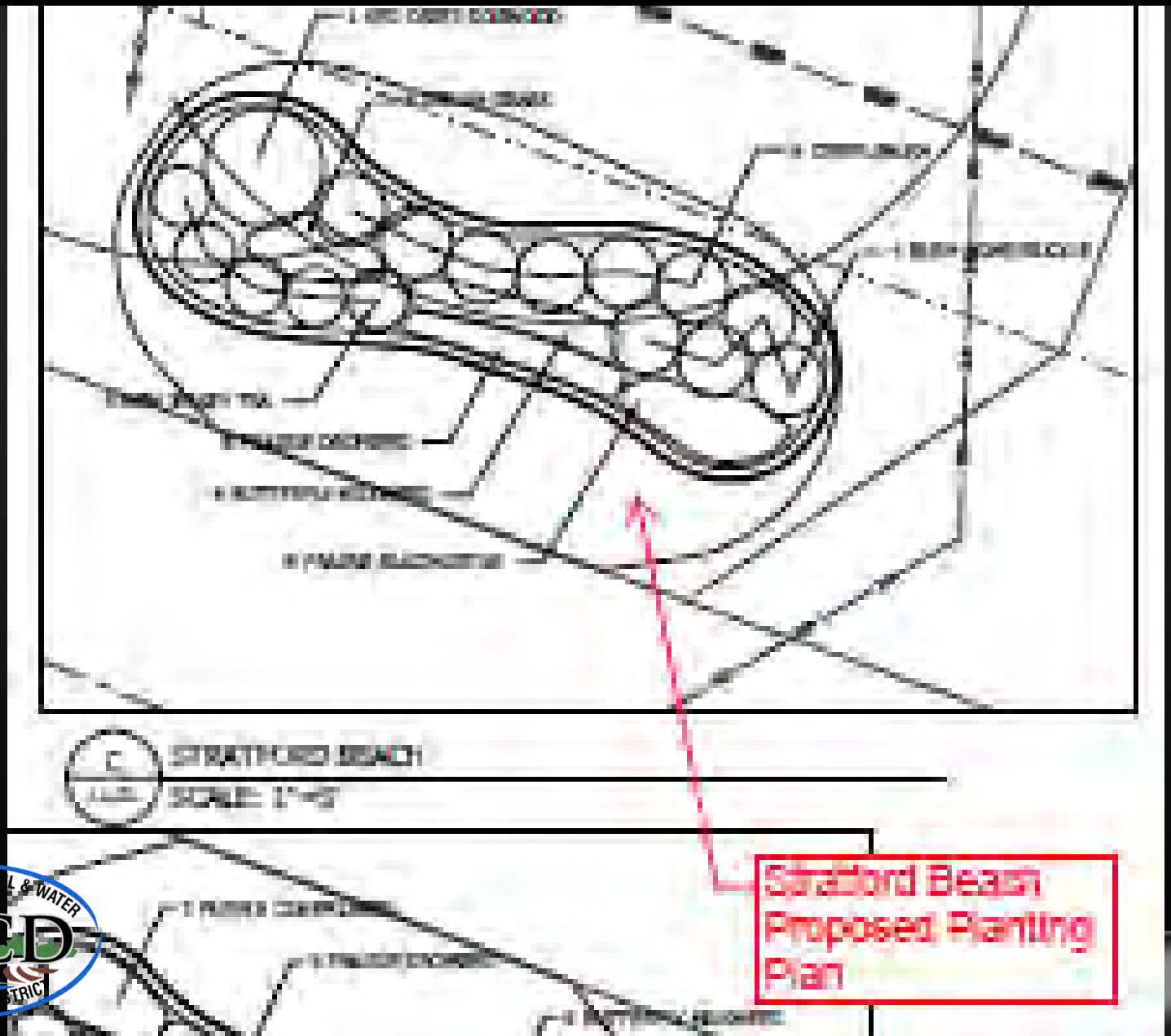


This garden option contains native grasses, shrubs, and perennials that provide a wide array of interest for a shady location. Plants range in height from 1' to 5' tall. Spring bloomers are Phlox, Geraniums, and Marigolds. Summer interest includes Meadow Rose and Bush Honeysuckle.

STORMWATER EXAMPLE – MIDDLE SPUNK LAKE



STORMWATER EXAMPLE – MIDDLE SPUNK LAKE



STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

- 30 HOMEOWNERS AND 2 PARKS OUT OF 92 LOTS SIGNED UP FOR RAINGARDENS
- A TOTAL OF 40 RAINGARDENS WERE IMPLEMENTED

STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

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STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

STEARNS COUNTY SOIL & WATER
SWCD
CONSERVATION DISTRICT

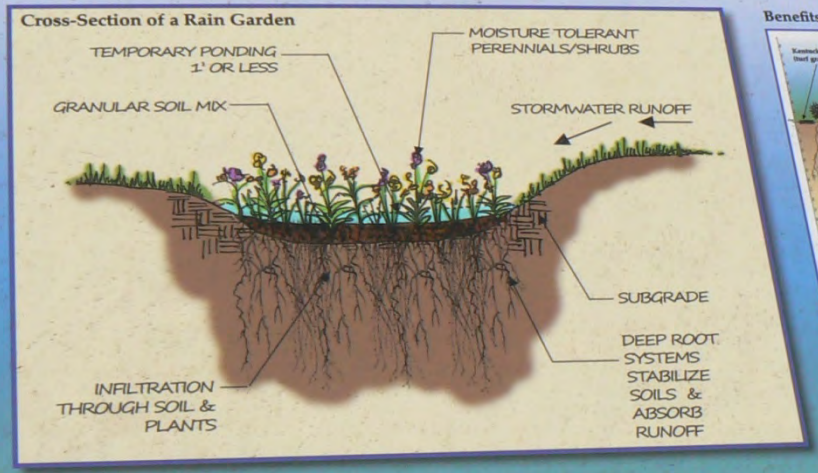
STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

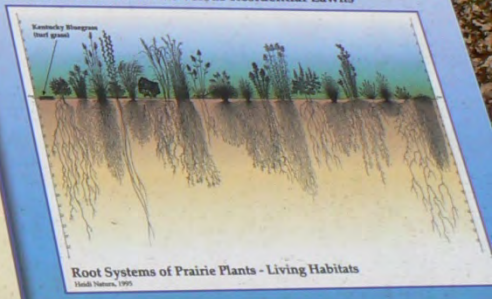
Rain Gardens - Improving the Water of Middle Spunk Lake

Next to this sign is one of 40 rain gardens that were constructed throughout the Stratford Addition to decrease the amount of rain water (stormwater) runoff and pollutants that were directly entering Middle Spunk Lake. While an individual rain garden may seem like a small thing, collectively they produce substantial neighborhood and community environmental benefits.

A rain garden is a shallow depression that is planted with native plants, and is constructed with a loose soil mixture designed to temporarily hold and absorb rain water runoff from impervious surfaces such as streets, driveways, and roof tops. Rain water is stored in these shallow depressions for a maximum of 24 - 48 hours, and slowly infiltrates into the ground.

Studies have shown that up to 70% of the pollution that enters our lakes, rivers, and streams is carried by rain water that runs off our landscape. Rain gardens capture excess water, reducing the amount of polluted water directly reaching our water bodies. This results in cleaner lakes, rivers, and streams.

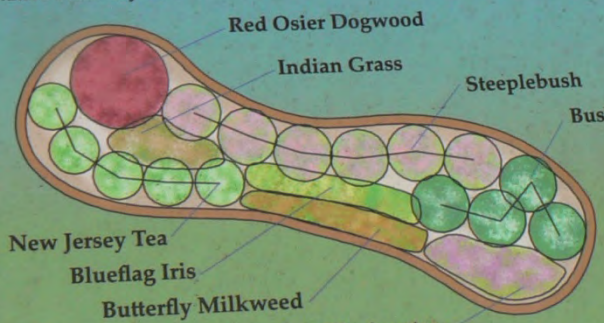




City of Avon Stratford Addition

The rain gardens in the Stratford Addition neighborhood contain native grasses and wildflowers. Native plants are those species that grow naturally, and historically occurred in the area. The image abo compares the root depth of native plant species to that of Kentucky Bluegrass, a non-native, otherwise known as "turf grass". Native p have roots that extend 5-15 feet deep, compared to those of Kentu Bluegrass, which extend only a few inches. Native vegetation is used in rain gardens due to these extensive root systems, which the soil's ability to absorb water and remove pollutants. In addi cleaner water and a beautiful neighborhood, native plants offe food, and shelter for birds, butterflies, and other beneficial ins

Typical Native Plant Layout




New Jersey Tea


Blueflag Iris


Butterfly Milkweed


Prairie Blazingstar

Find the native plant in the rain garden next to this sign.
Locations of plants in the rain garden are shown above and pictured on this sign.

Project made possible by:
Stratford Homeowner Association
Initiative Foundation
Avon Area Lakes Association
Minnesota Board of Water & Soil Resources
Stearns County Soil & Water Conservation District

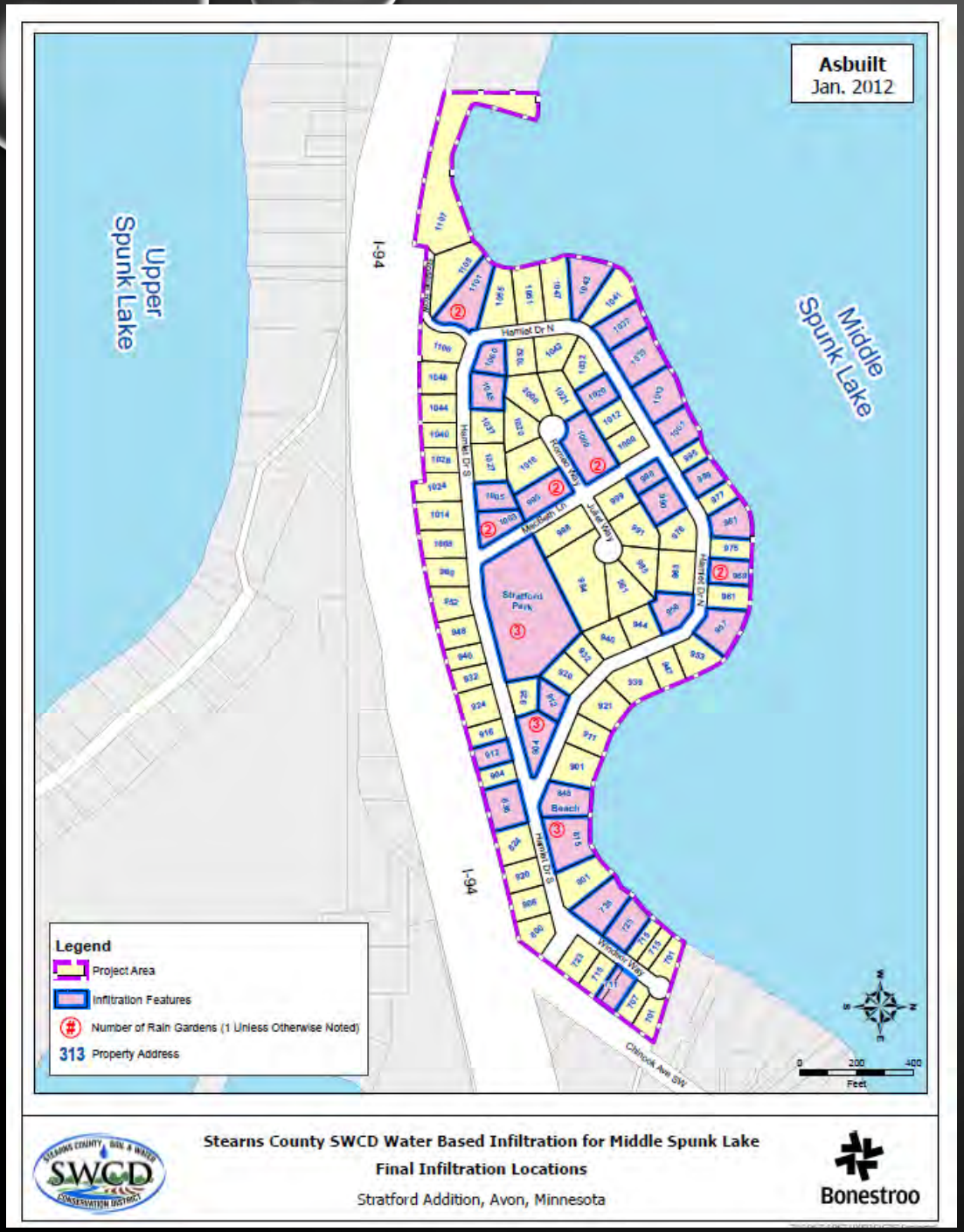

Steeplebush


Bush Honeysuckle


Red Osier Dogwood

STORMWATER EXAMPLE – MIDDLE SPUNK LAKE

Photo Courtesy of Stearns County SWCD/NRCS


Asbuilt
Jan. 2012
Upper Spunk Lake
Middle Spunk Lake
I-94
I-94
Hamlet Dr N
Hamlet Dr S
Hamlet Dr N
MacBeth Ln
Juliet Way
Romeo Way
Stratford Park
Beach
Wynder Way
Chinook Ave SW
Legend
Project Area
Infiltration Features
Number of Rain Gardens (1 Unless Otherwise Noted)
313 Property Address
0 200 400
Feet
Stearns County SWCD Water Based Infiltration for Middle Spunk Lake
Final Infiltration Locations
Stratford Addition, Avon, Minnesota
Bonestroo

Middle Spunk Lake

Total Project Cost: $186,359

BWSR CWF Grant: $149,704

SWCD In-Kind	$15,355
Avon Area Lakes Association	$ 5,000
City of Avon In-Kind	$ 900
City of Avon Cash	$ 1,000
Initiative Foundation (HLRP)	$ 5,000
Stearns County In-Kind	$ 800
Landowners In-Kind	$ 3,600
Stratford Addition (Owners)	$ 5,000

Middle Spunk Lake

- PROJECT COST COVERED BY THE GRANT
  - UP TO $44,700 FOR PRIVATE CONSULTANT
  - UP TO $67,500 FOR CONSTRUCTION OF PROJECT

PROJECT EXAMPLE - MIDDLE SPUNK LAKE

PROJECT FACTS:

40 BASINS

$150,00 PROJECT INCLUDING PROJECT DEVELOPMENT, DESIGN, IMPLEMENTATION AND MAINTENANCE

13 ACRE FEET OF VOLUME (WATER OUTFLOW) REDUCTION

16 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

By Installing a Rain Garden!

It feels like spring is in the air and I for one surely hope this weather continues to feel like spring! (Wishful thinking I know since it's only mid-February)!

As I anticipate spring it makes me think of the rain garden project my neighborhood will begin this spring/summer season.

We have 92 homes within our homeowner's association, a private beach and city park. Homeowner's have committed to about 40 different rain gardens in this unique area.These gardens will consist of various colorful native sun/shade perennials, wild flowers, native grasses and shrubs.

For those of you unfamiliar with rain gardens; they are strategically placed puddles. Typically they are less than one foot deep and planted with native plants. These small depressions are designed to collect stormwater runoff that contains harmful pollutants. Once stormwater is collected in the raingarden it slowly drains through the native plant roots and soil particles absorb the pollutants. After a rain, the designed rain garden will collect runoff from the surrounding area and store it for 24-48 hours until the water slowly filters into the ground. Rain gardens in my neighborhood will help purify stormwater runoff before it enters our valuable water system, a popular lake here in Stearns County.

I am excited to see more butterflies and birds as we beautify our neighborhood with colorful plants and diversify our current landscape.

If you are interested in learning more about raingardens contact Greg Berg at the Stearns County Soil and Water 320-251-7800 x143

By: Julie Jarnot

GRAND CANYON STORMWATER FEATURES

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SIMPLE RUNOFF CONTROL THAT MAKES A DIFFERENCE

SIMPLE RUNOFF CONTROL THAT MAKES A DIFFERENCE

PROJECT EXAMPLE – BIG BIRCH LAKE

BACKGROUND & DESIGN CONSIDERATIONS:

- APPROXIMATELY 1/4 MILE OF FETCH TO THE SITE
- NATURAL BASIN WITH MODERATE WATER FLUCTUATION (3FEET)
- MINIMAL EROSION PROBLEM ON SHORELINE
- LANDOWNER DESIRED MINIMAL ACCESS WITH NATIVE PLANT RESTORATION
- USED COIR LOG WITH PLANTING ON THE SHORELINE AND A RAINGARDEN FOR STORMWATER MANAGEMENT

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

SHORELINE/STORMWATER EXAMPLE – BIG BIRCH LAKE

PROJECT EXAMPLE – BIG BIRCH LAKE

- PROJECT FACTS:
  145 FEET OF SHORELINE RESTORED
  $11,000 PROJECT COST

  20 CUBIC YARDS OF EXCAVATION FOR RAINGARDEN
  19 CUBIC YARDS OF COMPOST MIX FOR RAINGARDEN
  110 SQUARE YARDS OF EROSION CONTROL BLANKET
  20 LINEAL FEET OF COIR LOG
  2.25 LBS. NATIVE GRASS AND WILDFLOWER SEED
  2,020 NATIVE GRASS AND WILDFLOWER PLUGS
  39 TREES, SHRUBS, VINES
  41.3 TONS OF SEDIMENT LOSS A YEAR REDUCED
  3.3 LBS. PER YEAR OF PHOSPHORUS A YEAR REDUCED

GULLY RESTORATION TURNS INTO A RAINGARDEN

- PROCESS STARTED BY APPLYING FOR A SHORELAND ALTERATION PERMIT TO FILL IN THE GULLY
- SHORELAND REVIEW PANEL CONDUCTED A SITE VISIT
- OPTIONS DISCUSSED, INCLUDED ASSISTANCE FROM THE STEARNS COUNTY SWCD TO CREATE AN INFILTRATION BASIN

STORMWATER EXAMPLE – SRCL

Staked house before starting

STORMWATER EXAMPLE – SRCL

Over-excavation

STEARNS COUNTY SOIL & WATER
SWCD
CONSERVATION DISTRICT

STORMWATER EXAMPLE – SRCL

STORMWATER EXAMPLE – SRCL

STORMWATER EXAMPLE – SRCL

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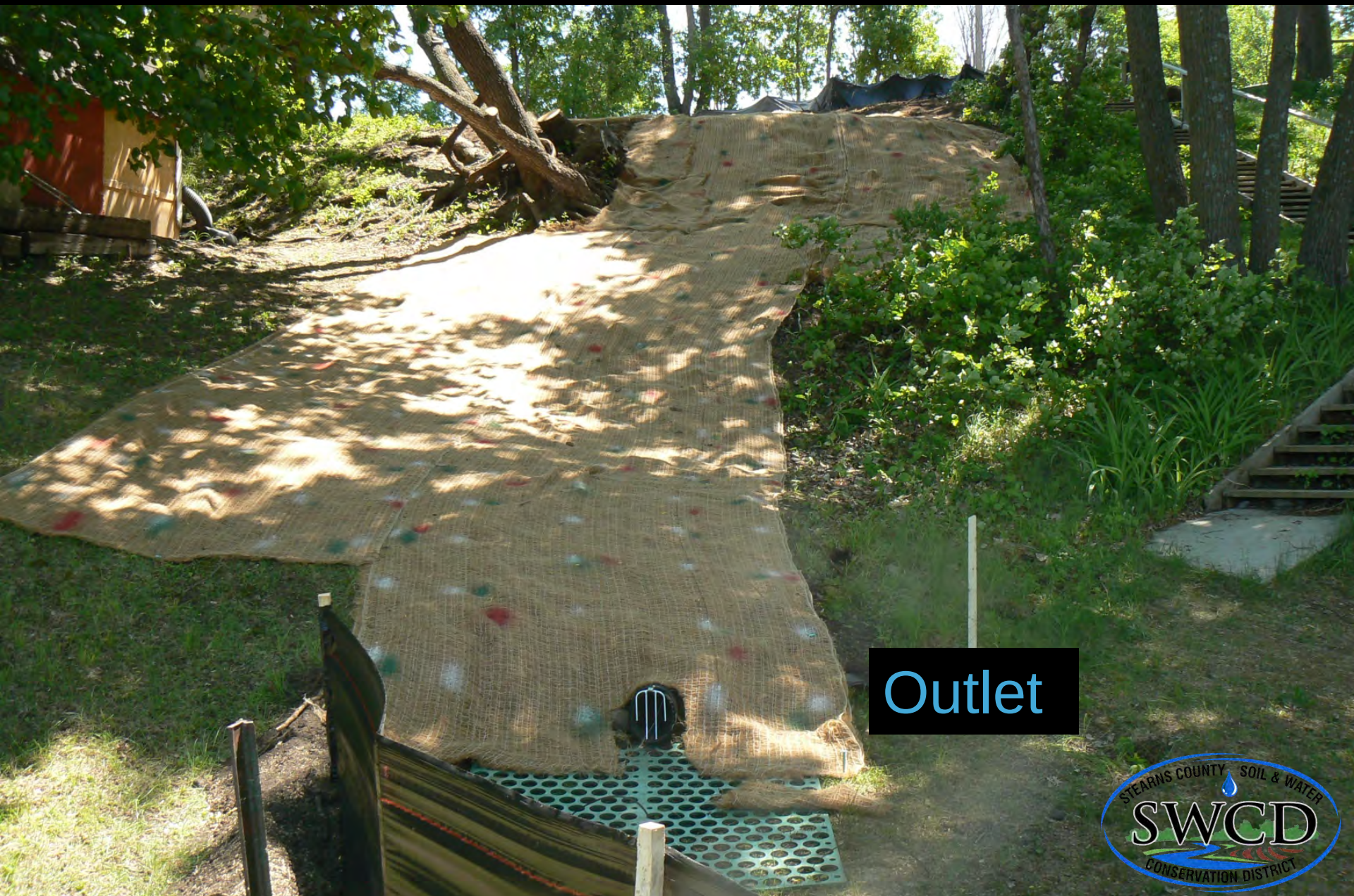

STORMWATER EXAMPLE – SRCL

STORMWATER EXAMPLE – SRCL

MANAGING RUNOFF & ADDRESSING EROSION

GREG BERG – STEARNS COUNTY SWCD

320/345-6479

GREG.BERG@MN.NACDNET.NET

WWW.STEARNSCOUNTYSWCD.NET