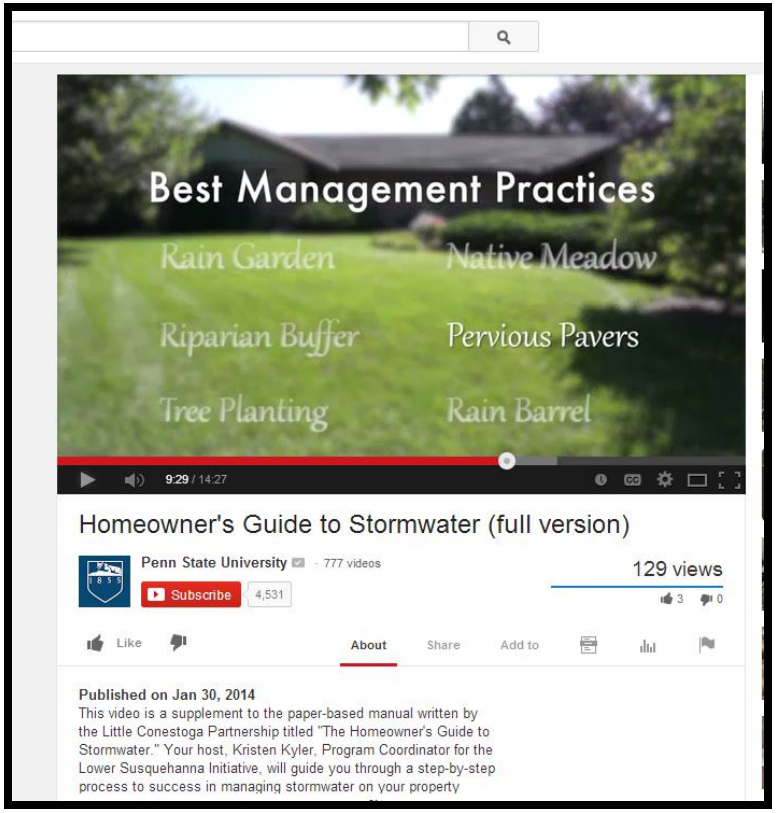
The Homeowner's Guide to Stormwater

Kristen Kyler

Project Coordinator, Lower Susquehanna Initiative

Penn State Agriculture and Environment Center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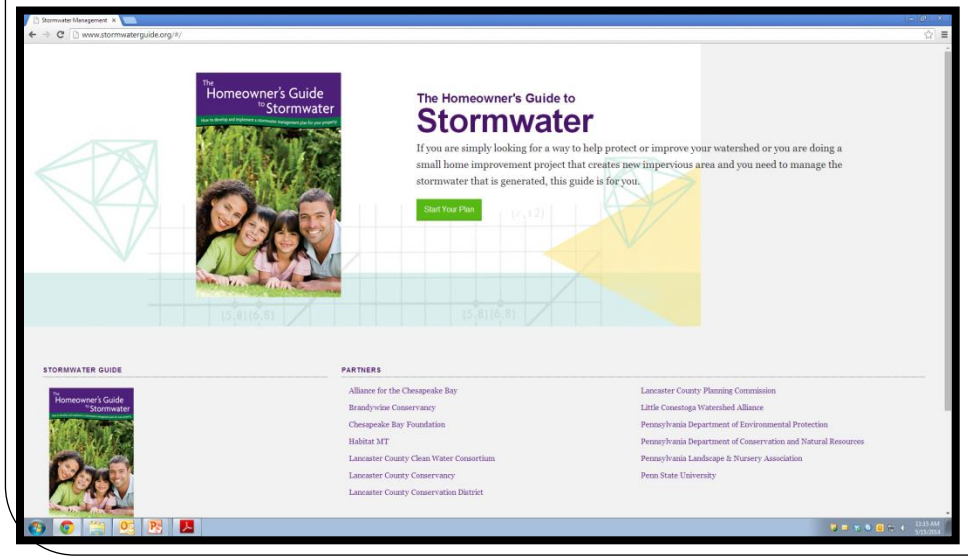
This video is a supplement to the paper-based manual written by the Little Conestoga Partnership titled "The Homeowner's Guide to Stormwater." Your host, Kristen Kyler, Program Coordinator for the Lower Susquehanna Initiative, will guide you through a step-by-step process to success in managing stormwater on your property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The Homeowner's Guide to Stormwater
The Homeowner's Guide to
Stormwater
If you are simply looking for a way to help protect or improve your watershed or you are doing a small home improvement project that creates new impervious area and you need to manage the stormwater that is generated, this guide is for you.
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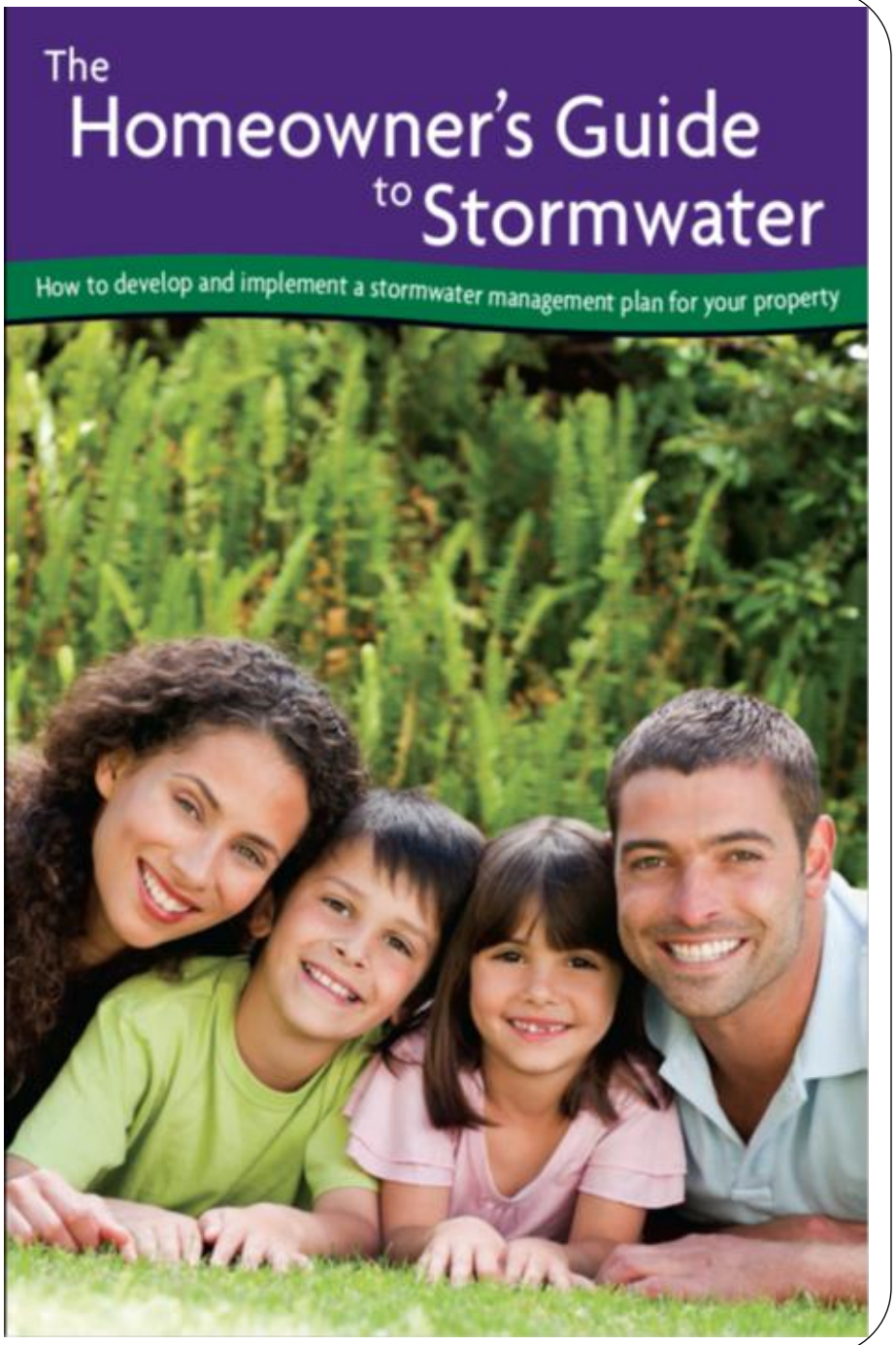

The
Homeowner's Guide
to Stormwater
How to develop and implement a stormwater management plan for your property

BACKGROUND

- Little Conestoga Partnership (Alliance for the Chesapeake Bay, Brandywine Conservancy, Pennsylvania Landscape and Nursery Association, Penn State, Chesapeake Bay Foundation, Lancaster County Conservancy, Habitat MT, Little Conestoga Watershed Alliance, PA DCNR, PA DEP, Lancaster County Planning Commission, Lancaster County Clean Water Consortium, Lancaster County Conservation District)
- National Fish and Wildlife Foundation grant
- Conewago Creek Initiative
- Incentives Programs

THE HOMEOWNER'S GUIDE TO STORMWATER

- What is stormwater and why it is a problem?
- How does stormwater flow on your property?
- How much stormwater is generated on your property?
- What can you do?

WHAT IS STORMWATER?

Stormwater runoff is simply rain or melting snow that "runs off" of the land and into storm drains and creeks.


Rainwater
Impervious Surface
Storm Drain
Stormwater in Rivers

FOREST vs. TURF GRASS vs. PAVEMENT

FOREST vs. TURF GRASS vs. PAVEMENT

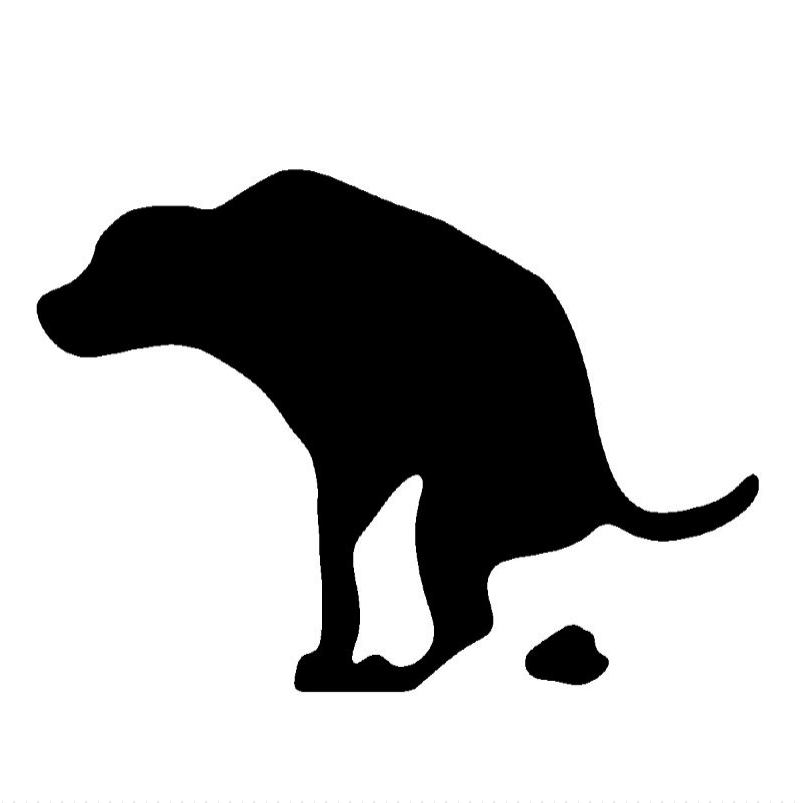
WHY IS STORMWATER A PROBLEM?

Flooding

Pollution

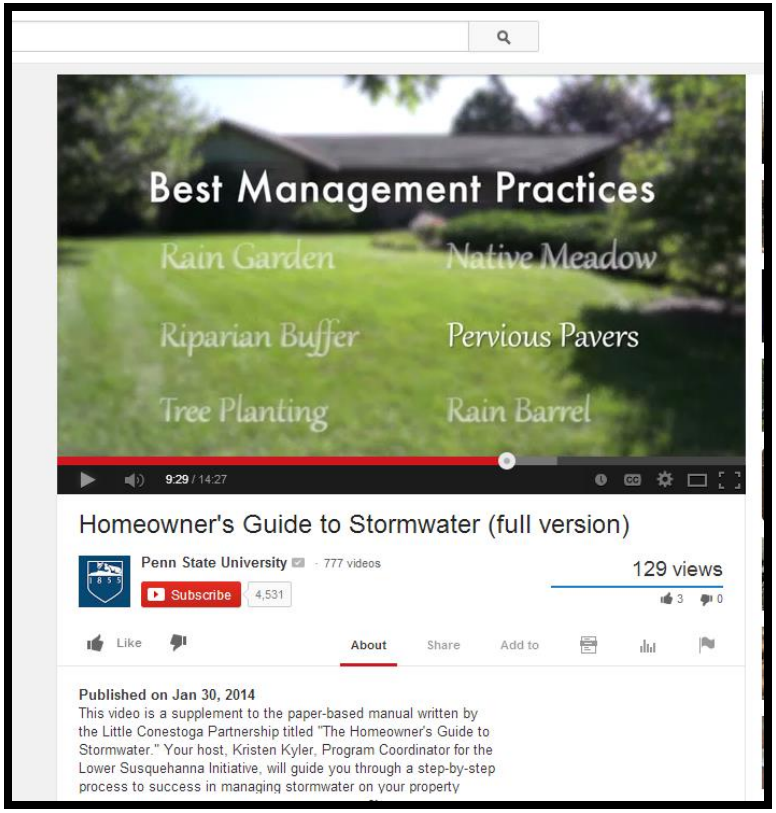
Streambank Erosion

Threats to Human Health



If you want to do something to help, the Homeowner's Guide to Stormwater is a good first step.

We all have an impact.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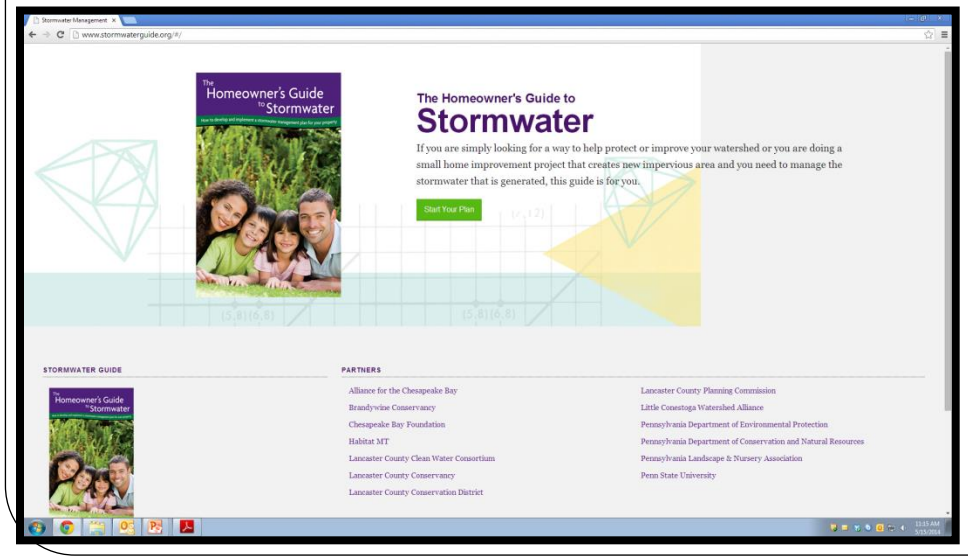
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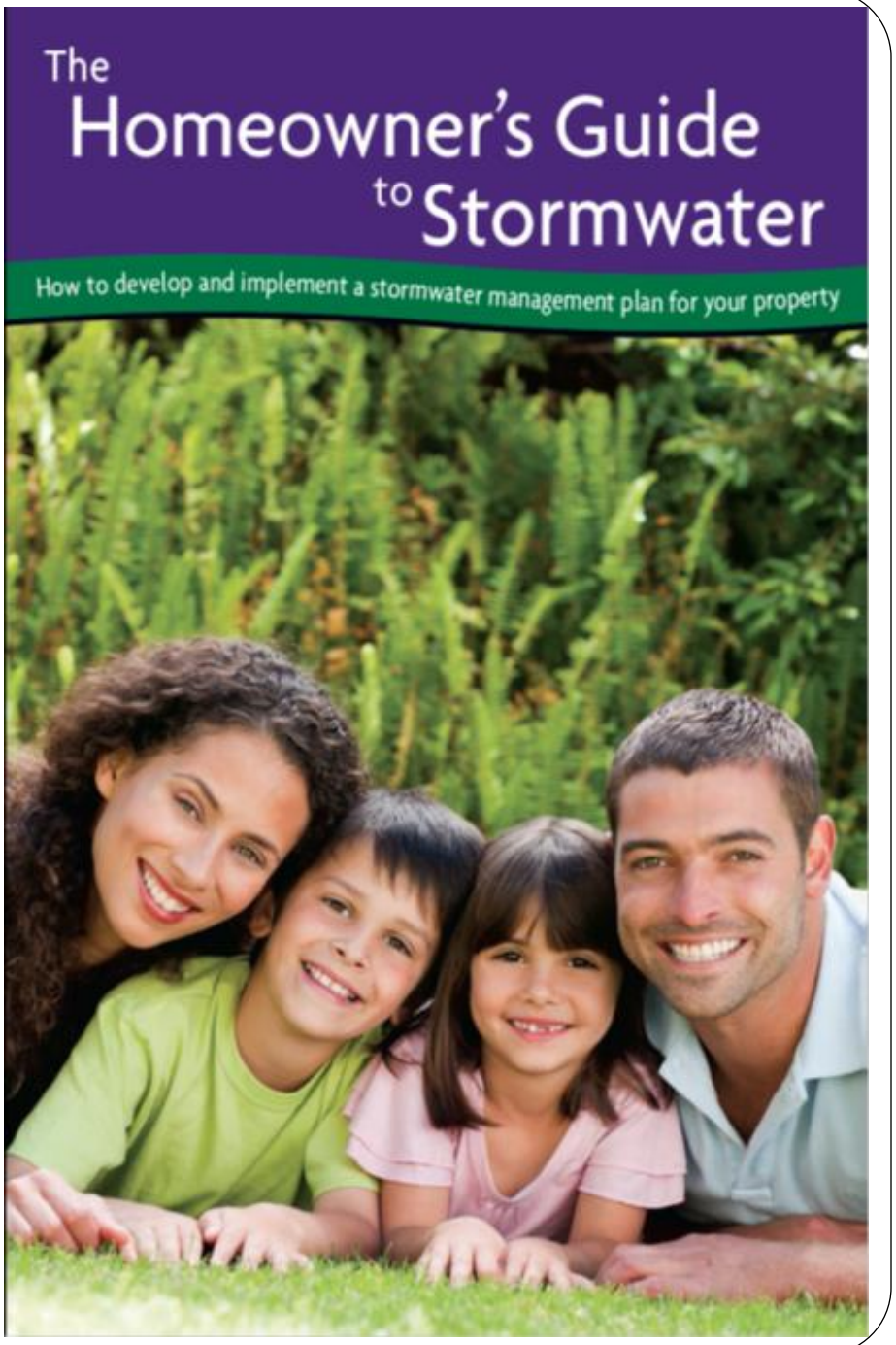
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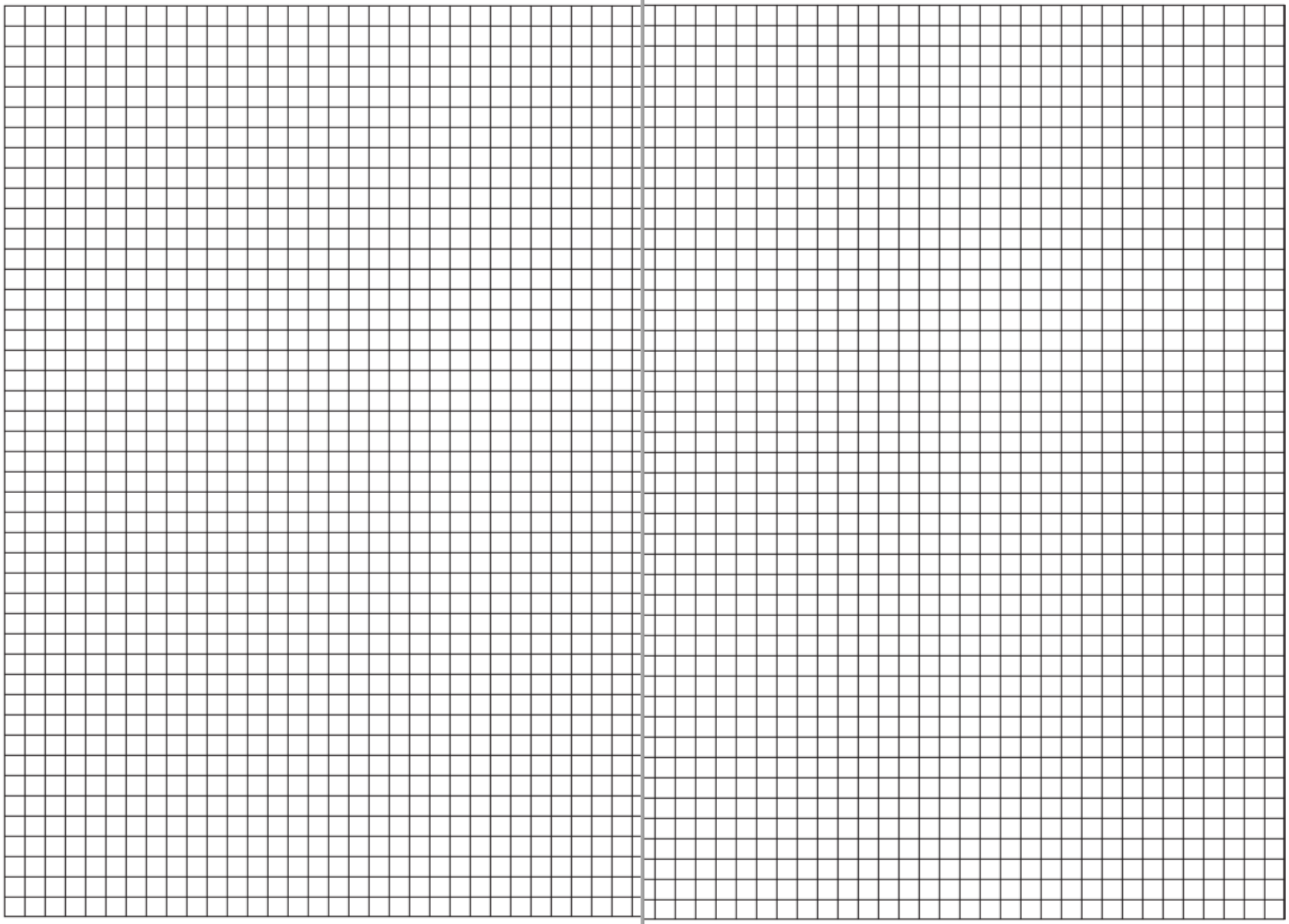
STEP 1: MAP YOUR PROPERTY

Include:

- Property Boundary
- Buildings
- Sidewalks/driveways and other impervious areas
- Lawn and maintained landscaping
- Natural areas
- Water

Stormwater Management Plan Map



Appendix A: Stormwater Management Plan Template

You can use this template to create your stormwater management plan.

Map

First, use the grid paper provided to hand draw your stormwater management plan map. Or, follow the tutorial provided in **Appendix B** to create a computer generated aerial map.

If you hand draw your map, it is suggested you use one ink color to draw existing conditions and a different color to draw your proposed stormwater management practices.

Plan Details

Second, fill in the template to create the details of your plan. For both existing conditions and proposed stormwater management practices, be sure to label all features on your map with numbers that correspond to the plan template.

Stormwater Management Plan

Property Owners Name: _____

Property Address: _____

Municipality: _____ County: _____

Watershed: _____ (example: Little Conestoga)

Name of stream into which stormwater flows: _____ (example: Swarr Run)

EXISTING CONDITIONS

IMPERVIOUS AREAS		
Buildings		
Number	Description (house, shed, etc)	Square Feet
Driveways and Walkways		
Number	Description (driveway, back walkway, front walkway, etc)	Square Feet
Other Hard Surfaces		
Number	Description (patio, deck, etc)	Square Feet
Total Impervious Area:		

LAWN AND LANDSCAPED AREAS		
Number	Description (front yard, back yard, flowerbed, etc)	Square Feet
Total Lawn and Landscape Area:		

NATURAL AREAS		
Woods		
Number	Description (back woodlot, side woods, etc)	Square Feet
Meadow		
Number	Description (back meadow, front meadow, etc)	Square Feet
Total Natural Area:		

Note any water features (streams, wetlands, ponds, etc) on your property:

_____

_____

_____

_____

_____

_____

_____

Total Stormwater Generated in a 1 inch rainstorm:
(Total Impervious Areas x 0.0833 x 7.48)

_____ ft^2 x 0.0833 ft x 7.48gal./ft^3 = _____ gallons

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www.stormwaterguide.org/property

Step 1: Find your property on the map

Let's begin by creating your stormwater management plan map. Provide the address of your property to get started.

Your Name

Your Email

This field is required. Your email will only be used to retrieve your stormwater plan.

Street Address

This field is required.

City

This field is required.

State

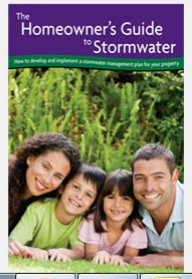
Pennsylvania

Zip Code

This field is required.

Next

STORMWATER GUIDE



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- Pennsylvania Landscape & Nursery Association
- Penn State University

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www.stormwaterguide.org/set-location

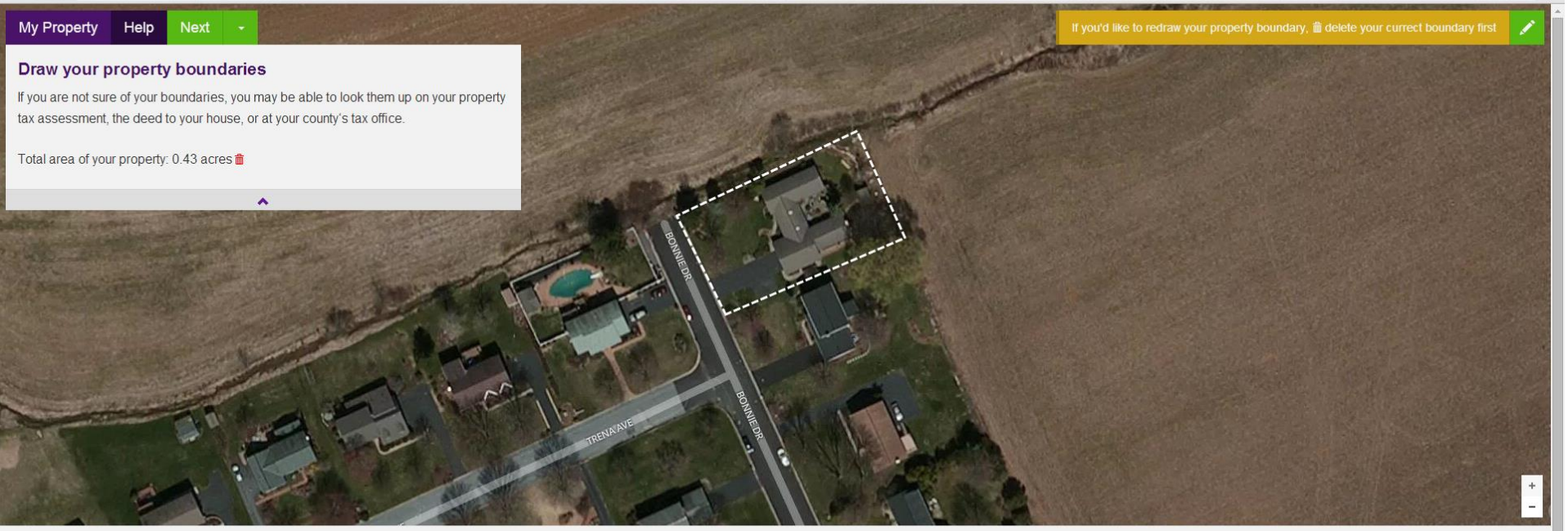
My Property | Help | Next

Draw your property boundaries

If you are not sure of your boundaries, you may be able to look them up on your property tax assessment, the deed to your house, or at your county's tax office.

Total area of your property: 0.43 acres

If you'd like to redraw your property boundary, delete your current boundary first



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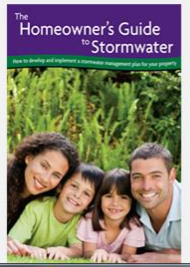

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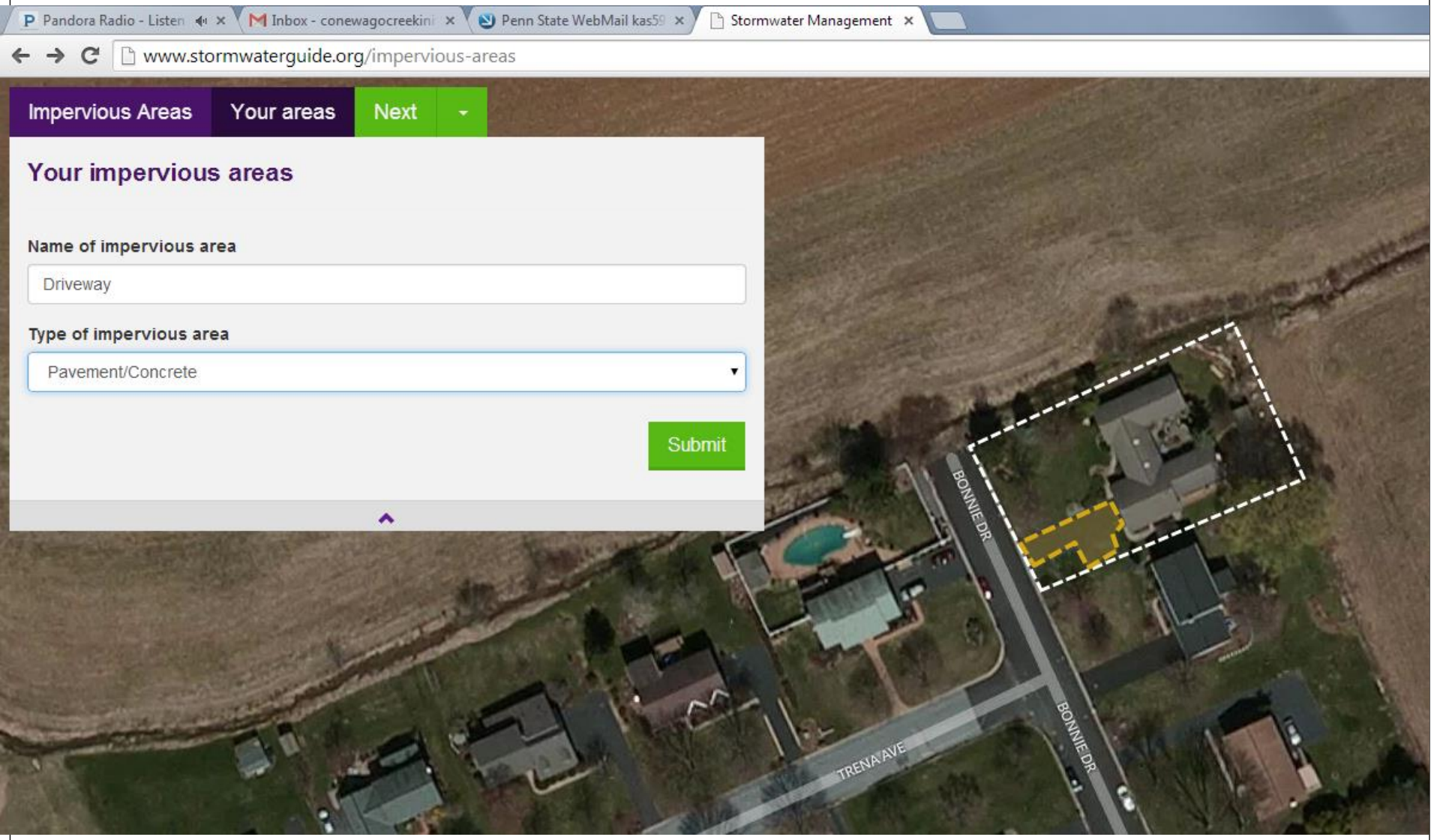
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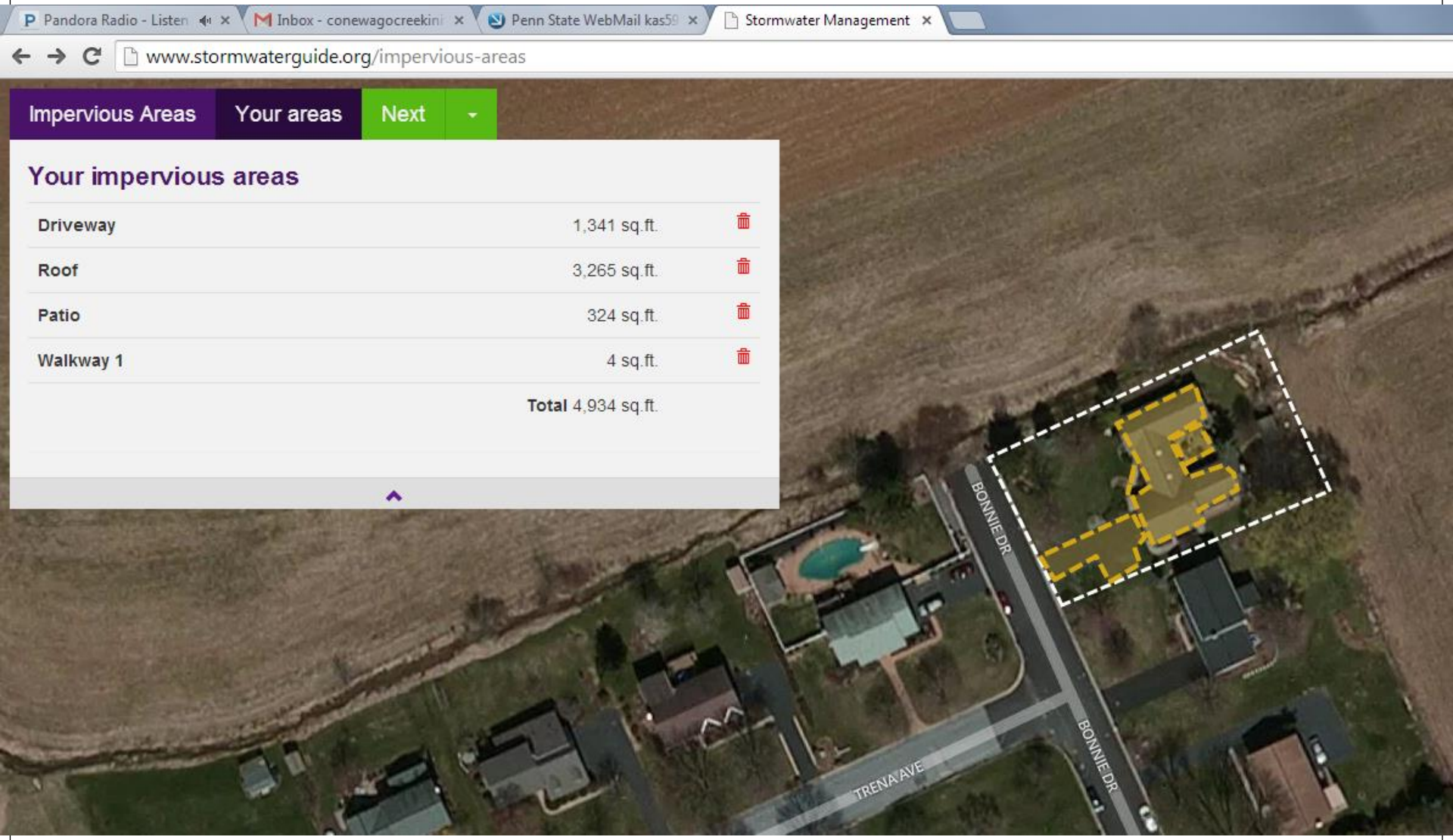
Penn State WebMail kas59
Stormwater Management
www.stormwaterguide.org/impervious-areas
Impervious Areas
Your areas
Next
Your impervious areas
Name of impervious area
Driveway
Type of impervious area
Pavement/Concrete
Submit
BONNIE DR
BONNIE DR
TRENA AVE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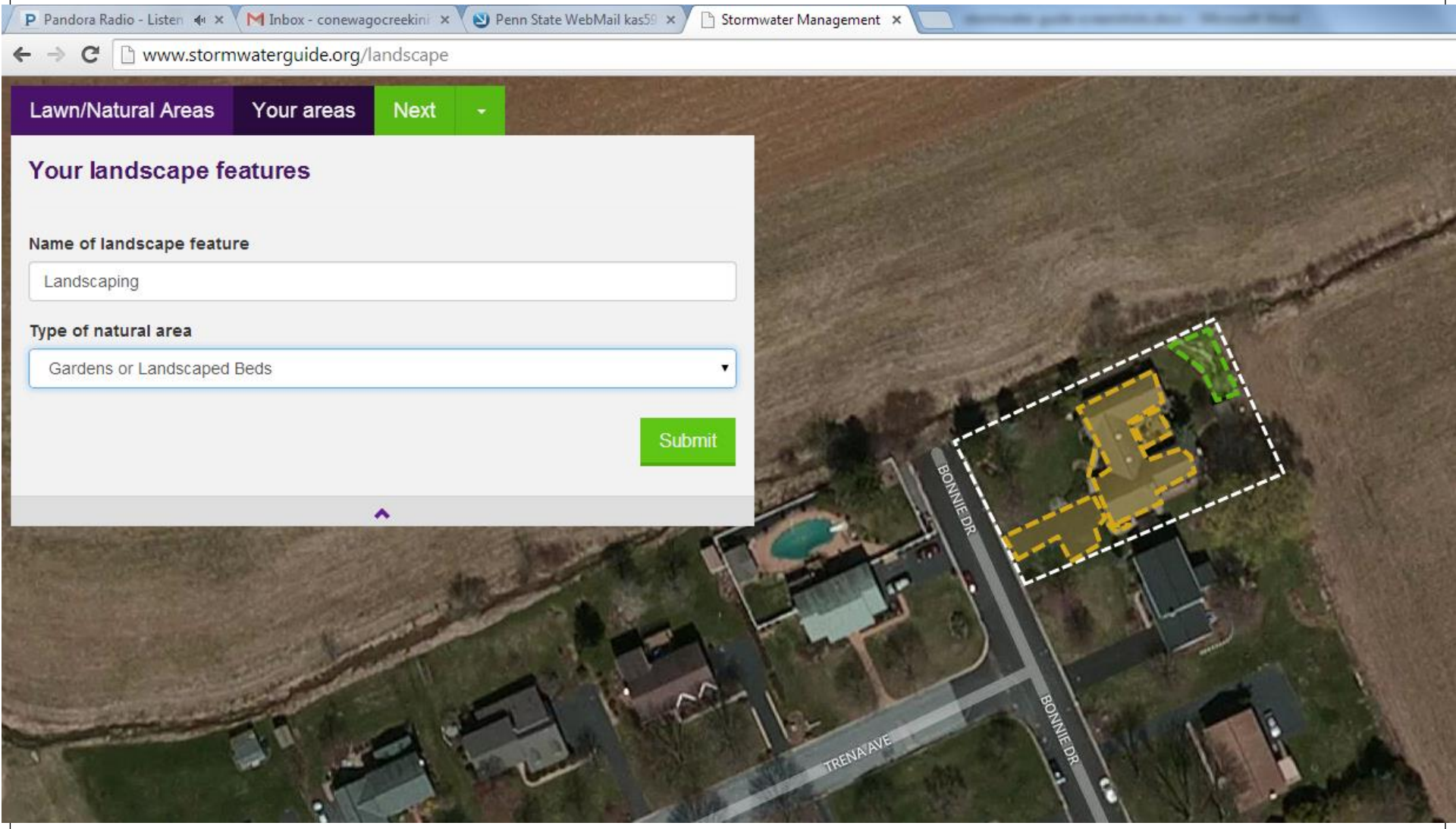
Penn State WebMail kas59
Stormwater Management
www.stormwaterguide.org/impervious-areas
Impervious Areas
Your areas
Next
Your impervious areas
Driveway 1,341 sq.ft.
Roof 3,265 sq.ft.
Patio 324 sq.ft.
Walkway 1 4 sq.ft.
Total 4,934 sq.ft.
BONNIE DR
BONNIE DR
TRENA AVE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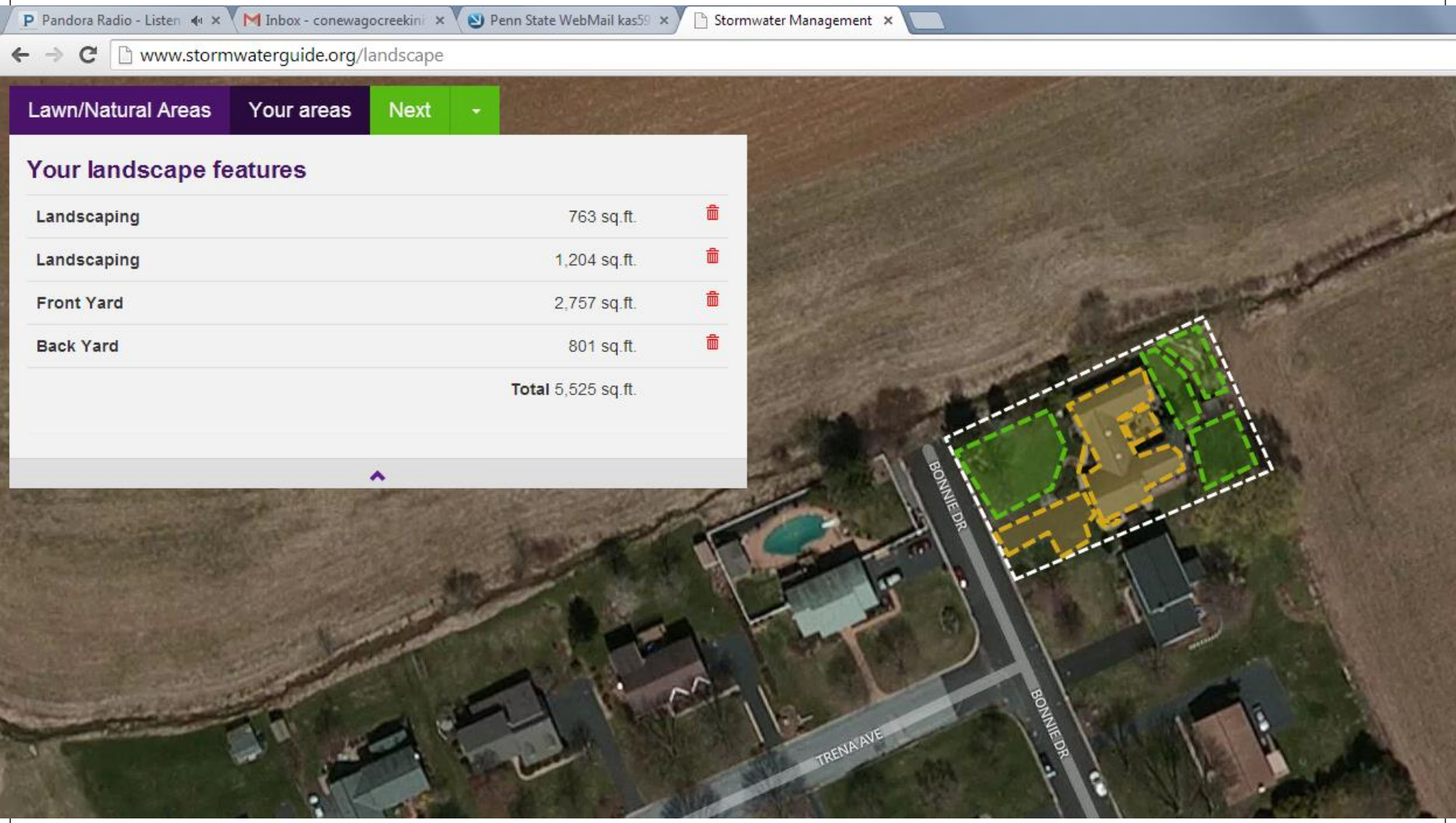
Stormwater Management
www.stormwaterguide.org/landscape
Lawn/Natural Areas
Your areas
Next
Your landscape features
Name of landscape feature
Landscaping
Type of natural area
Gardens or Landscaped Beds
Submit
BONNIE DR
BONNIE DR
TRENA AVE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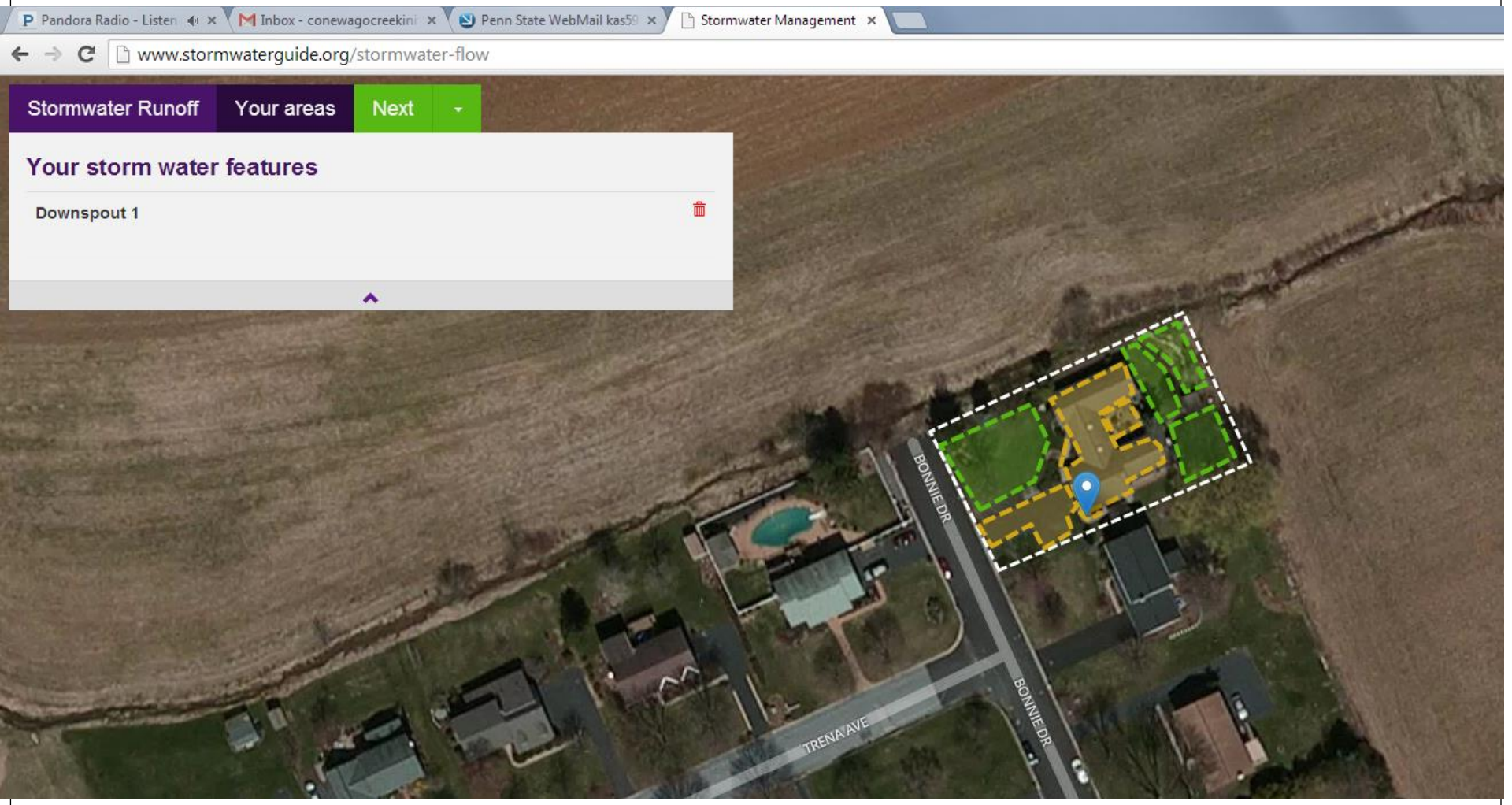
Stormwater Management
www.stormwaterguide.org/landscape
Lawn/Natural Areas
Your areas
Next
Your landscape features
Landscaping 763 sq.ft.
Landscaping 1,204 sq.ft.
Front Yard 2,757 sq.ft.
Back Yard 801 sq.ft.
Total 5,525 sq.ft.
BONNIE DR
TRENA AVE
BONNIE DR

STEP 2: MAP STORMWATER FLOW

Include:

- Downspouts
- Stormwater flow paths
- Areas of ponding
- Gullies and ditches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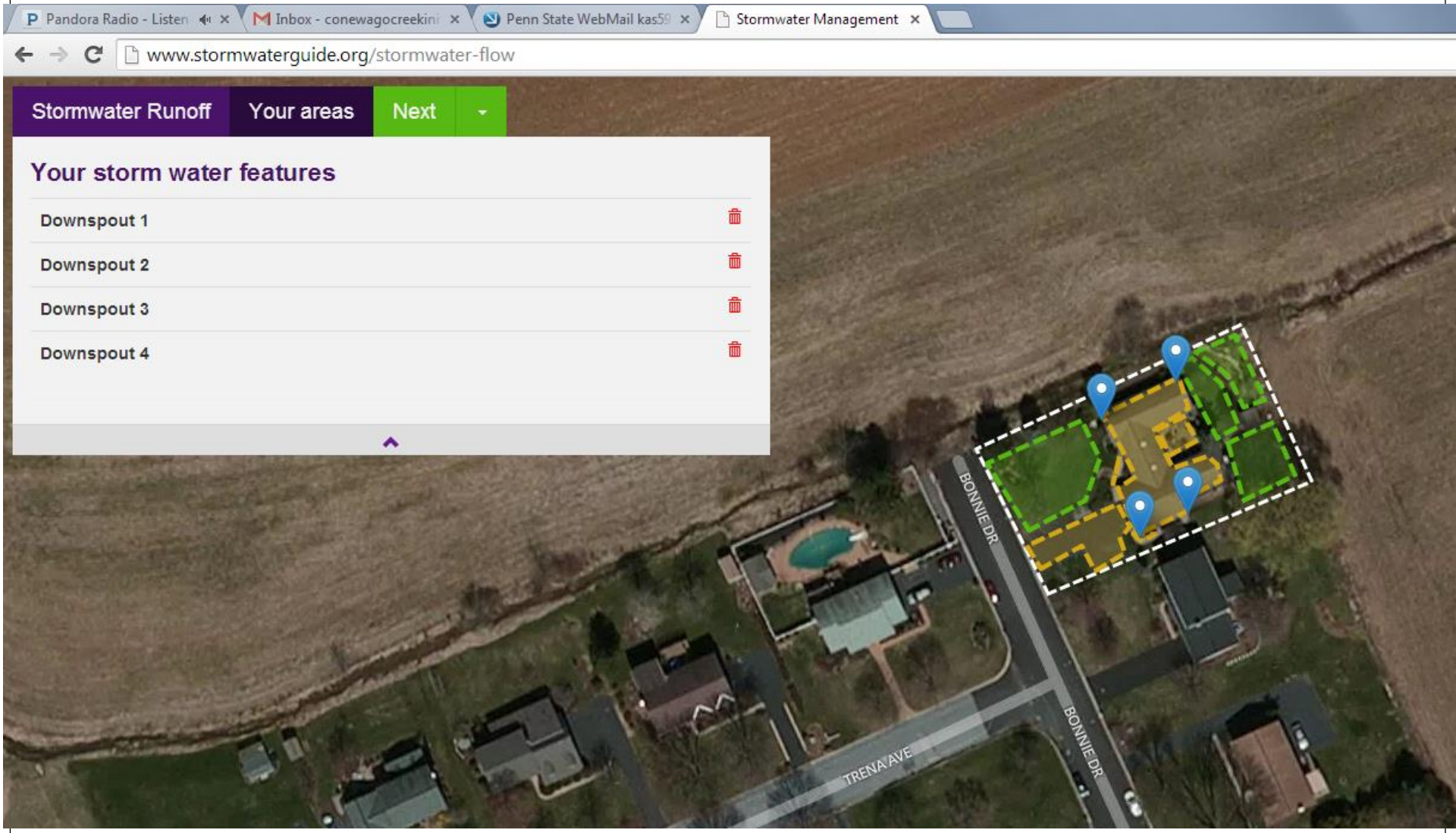
Penn State WebMail kas59
Stormwater Management
www.stormwaterguide.org/stormwater-flow
Stormwater Runoff
Your areas
Next
Your storm water features
Downspout 1
BONNIE DR
BONNIE DR
TRENA AVE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www.stormwaterguide.org/stormwater-flow
Stormwater Runoff
Your areas
Next
Your storm water features
Downspout 1
Downspout 2
Downspout 3
Downspout 4
BONNIE DR
BONNIE DR
TRENA AVE

STEP 3: ESTIMATE STORMWATER

Page 6:

Square Feet of Impervious Area	Gallons of Runoff to be Managed for 1 inch rain
500 or less	less than 312
501 – 1,000	312 – 624
1,001 – 2,000	624 – 1,246
2,001 – 3,000	1,246 – 1,869
3,001 – 4,000	1,869 – 2,492
4,001 – 5,000	2,492 – 3,115
5,001 – 10,000	3,115 – 6,231
10,001 – 20,000	6,231 – 12,462
20,001 – 43,000	12,462 – 26,793

(Total square feet of impervious area) x 0.0833 x 7.48 = _____ gallons of runoff

THE 6 PRACTICES

- Rain Garden
- Rain Barrel/cistern
- Pervious pavers
- Tree planting
- Riparian Buffer
- Native Meadow

RAIN BARREL

PERVIOUS PAVEMENT

TREE PLANTING

RIPARIAN BUFFER

NATIVE MEADOW

RAIN GARDEN

STEP 4: CHOOSE YOUR PRACTICES

Things to consider:

- How much space is available
- Wildlife and insects
- Beauty
- Water usage
- Shade
- Time/maintenance

www.stormwaterguide.org/developing-your-plan

Developing Your Stormwater Management Plan

Now that you know what areas of your property generate stormwater when it rains, how the runoff flows, and what areas generate the most amount of runoff, you can start thinking about adding stormwater management practices to your property to better manage runoff.

Add Management Solutions

What Are The Types of Stormwater Best Management Practices

Many management practices exist for handling stormwater runoff. This guide suggests six of the simpler, easier to implement practices. Each practice is introduced briefly in this section so you can consider which ones are right for you.

www.stormwaterguide.org/developing-your-plan

Rain Garden

What Is a Rain Garden?

A depressed garden that uses mulch, soil, and deep-rooted native plants to capture, absorb, and infiltrate stormwater.

Why Rain Garden?

If you would like to enhance your landscaping with flowers and other attractive plants consider a rain garden or a native meadow.

If you want to reduce the amount of time it takes to mow the lawn, a rain garden or native meadow would help accomplish this goal.

If you would like to see more butterflies, a rain garden or native meadow can provide excellent butterfly habitat.

Benefits

- Manages stormwater and filters pollutants
- Wildlife habitat
- Little maintenance
- Adds beauty

Negatives

- Plants can take 2-3 years to establish
- More maintenance required in first few years

Cost Estimate

- $$

Maintenance

- Low once plants established
- Weeding and watering in first two years
- Some thinning in later years

Aesthetic appeal

- Ranges from medium to high
- Can customize based on plant selection

Implementation Considerations

- Construct downslope of runoff to be captured
- Plant in spring or fall
- Locate at least 10 feet from building foundations

Where to Put a Rain Garden?

Space Required: Minimum Size: 50–200 ft surface area, 5 – 10 ft wide, 10 – 20 ft long, 3 – 8 inches

Slopes: Not usually a limitation, but a design consideration. Locate down slope of building foundations

Depth to Water Table: 1 – 4 ft clearance

Depth to Bedrock: 1 – 4 ft clearance

Building Foundations: Minimum 10 ft down slope from building foundations

Maintenance: Low: Weeding and watering in first 2 years. Some thinning in later years.

Riparian Buffer

What Is Riparian Buffer?

Planting native trees and shrubs along streams and wetlands to restore the streamside area to forested conditions. These "riparian buffers" filter runoff and have numerous water quality benefits.

Why Riparian Buffer?

If you would like to restore forested conditions on a portion of your property, consider tree planting (or forested riparian buffer if the area to be reforested is along a stream).

If a stream is running through your property, installing a riparian buffer would be very beneficial.

Benefits

- Increases infiltration and groundwater recharge
- Improves water quality

Maintenance

- Low once native plants are established
- Weeding and watering in first two years

Where To Put a Riparian Buffer?

Space Required: The wider the better for water quality benefits. Lot size and configuration will impact buffer width

Slopes: Not usually a limitation, but a design consideration

Depth to Water Table: Not a factor if correct species are planted

STEP 5: SELECT & MAP PRACTICES

Things to consider:

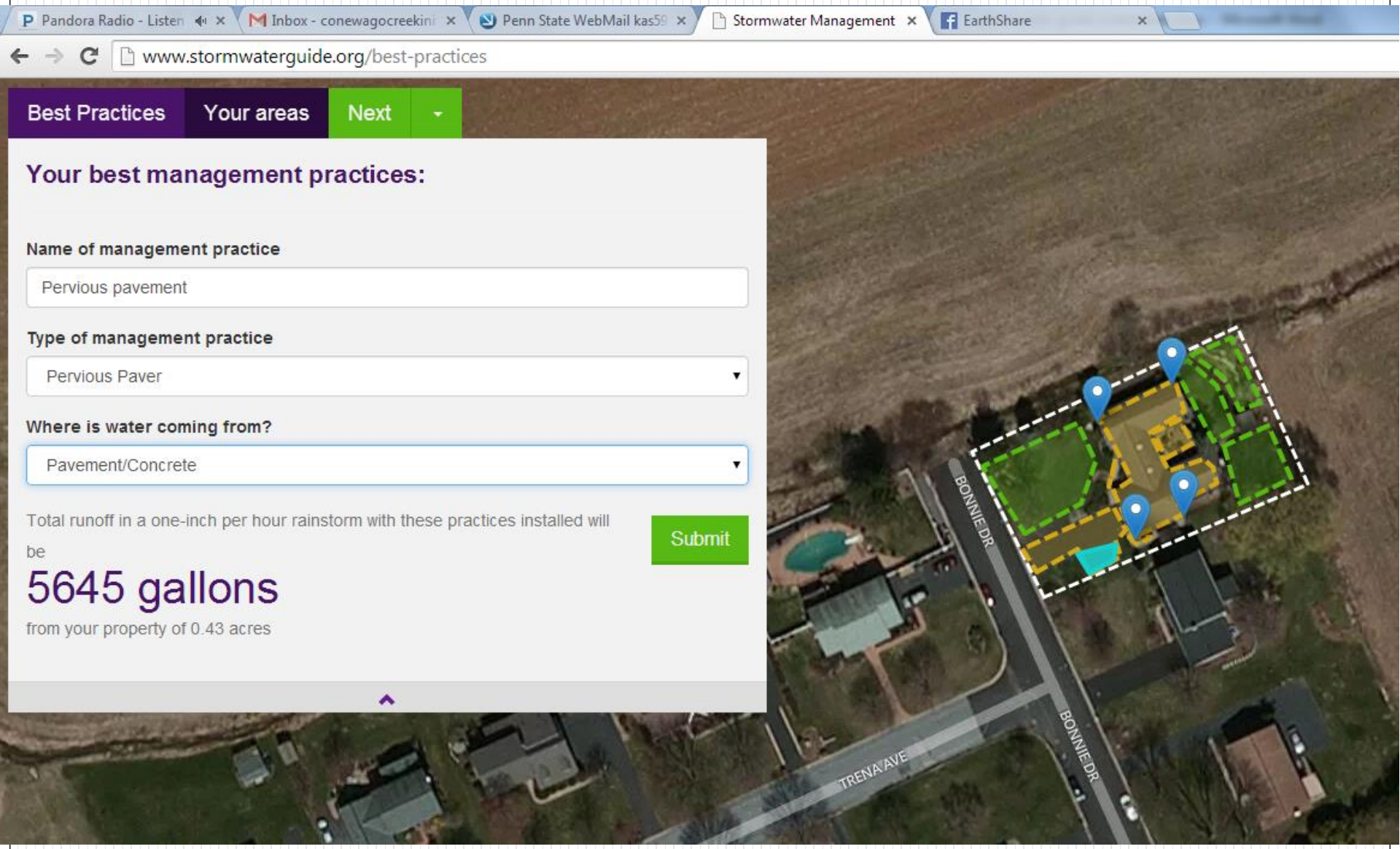
- Depth to bedrock
- Water ponding locations
- Proximity to foundation
- Wells and septic systems
- Slope
- Soil percolation

Use this summary chart to help you select one or more stormwater practices that are right for your property.

	Rain Garden	Riparian Buffer	Tree Planting	Native Meadow	Pervious Pavers	Rain Barrel/ Cistern
Space Required	Minimum Size: 50 – 200 ft² surface area 5 – 10 ft wide 10 – 20 ft long 3 – 8 inches deep	The wider the better for water quality benefits. Lot size and configuration will impact buffer width	Consider space needed for canopy spread	Not a factor	As needed to accommodate walkway, patio, or driveway	Not a factor
Slopes	Not usually a limitation, but a design consideration. Locate down slope of building foundations	Not usually a limitation, but a design consideration	Not usually a limitation, but a design consideration	5% or less	Not a factor	Not a factor
Depth to Water Table	1 – 4 ft clearance	Not a factor if correct species are planted			1 – 4 ft clearance	Not a factor
Depth to Bedrock	1 – 4 ft clearance	1 – 4 ft clearance	1 – 4 ft clearance	Not a factor	1 – 4 ft clearance	Not a factor
Building Foundations	Minimum 10 ft down slope from building foundations				Not a factor	Not a factor
Maintenance All practices should be inspected seasonally and after major storm events.	Low: Weeding and watering in first 2 years. Some thinning in later years.	Low to Moderate: Maintain tree tubes or cages. Spray and mow between trees for first 4-5 years. Control invasive plants. Water as needed.	Low to Moderate: Maintain tree tubes or cages. Spray and mow between trees for first 4-5 years. Control invasive plants. Water as needed.	Low to Moderate: Mow twice annually for first two years. Control invasive plants.	Moderate to High: Grass between pavers may have to be mowed. Inspect for signs of clogging. Pressure wash and replace pea stone as needed.	Low: Clean screen/ filter regularly. Clean gutters twice annually. Monitor during severe storms for overflow. Empty before winter months.

Chart adapted from the New Hampshire Homeowner's Guide to Stormwater Management Do-It-Yourself Stormwater Solutions. NH Department of Environmental Services (March 2011, revised February 2012).

Please remember to call PA ONE CALL before digging underground so you know where your underground utilities are located (ie electrical, sanitary sewer, water, etc.).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Stormwater Management
EarthShare
www.stormwaterguide.org/best-practices
Best Practices
Your areas
Next
Your best management practices:
Name of management practice
Pervious pavement
Type of management practice
Pervious Paver
Where is water coming from?
Pavement/Concrete
Total runoff in a one-inch per hour rainstorm with these practices installed will be
5645 gallons
from your property of 0.43 acres
Submit
BONNIE DR
BONNIE DR
TRENA AVE

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www.stormwaterguide.org/best-practices

Best Practices | Your areas | Next

Your best management practices:

Name of management practice

Rain barrel

Type of management practice

Rain Barrel

Where is water coming from?

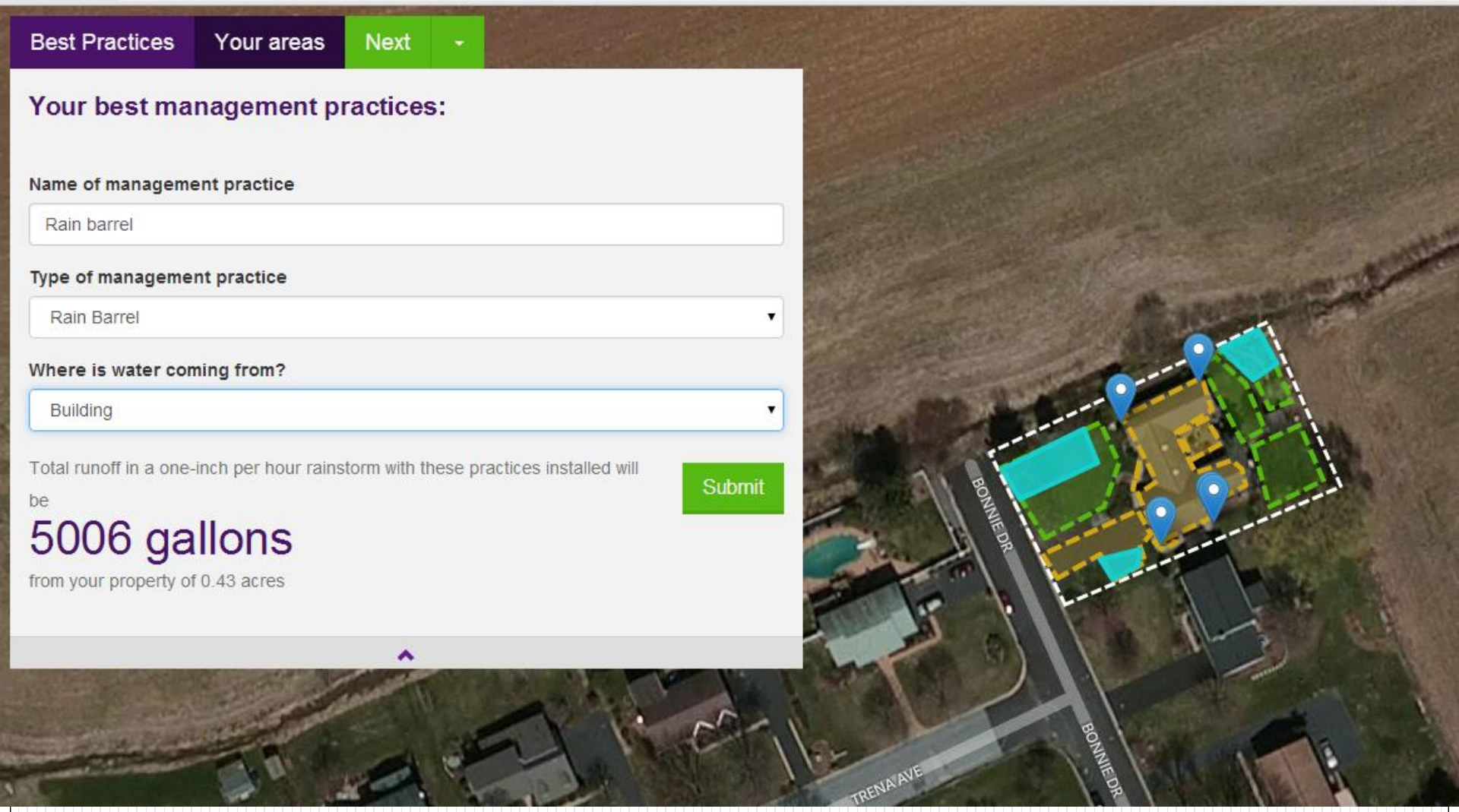
Building

Total runoff in a one-inch per hour rainstorm with these practices installed will be

Submit

5006 gallons

from your property of 0.43 acres



Your current stormwater runoff totals to approximately

5,645 gallons

You could reduce that to approximately

4,956 gallons

By installing these Best Management Practices and applying Healthy Lawn Care Practices

Pervious Pavement *Pervious Paver* - 233 sq.ft.

Native Meadow *Native Meadow* - 1,124 sq.ft.

Rain Garden *Rain Garden* - 519 sq.ft.

Rain Barrel *Rain Barrel*

PUTTING THE PLAN INTO ACTION

- Lots of resources available online
  - 50 websites listed
  - http://stormwater.allianceforthebay.org/
- Native plant nurseries
- Workshops

HEALTHY LAWN CARE PRACTICES

- Soil Test
- Dense vegetative cover
- Low fertilizer usage
- Mulch and retain clippings
- Proper fertilizer time
- Slow release N fertilizer
- 3 inches or taller
- Sweep fertilizer off hard surfaces
- 15-20 ft buffer

THE DIFFERENT VERSIONS

- Paper Copy
- YouTube Video
  - https://www.youtube.com/watch?v=4qIUcOUFchg
- Online Tool
  - www.stormwaterguide.org

Questions???

Kristen Kyler

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