"Keep the Rain from the Drain"
Green Infrastructure for New Jersey

Presented to Environmental Stewards of Hunterdon County
by Christopher C. Obropta, Ph.D., P.E.
on April 23, 2024

RUTGERS
New Jersey Agricultural
Experiment Station

Welcome and Introduction

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Water Resources Program

Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.

LET'S TALK POLLUTION

NONPOINT SOURCE POLLUTION (NPS)

- Associated with stormwater runoff
- Runoff collects pollutants on its way to a sewer system or water body
- It cannot be traced to a direct discharge point such as a wastewater treatment facility

EXAMPLES OF NPS

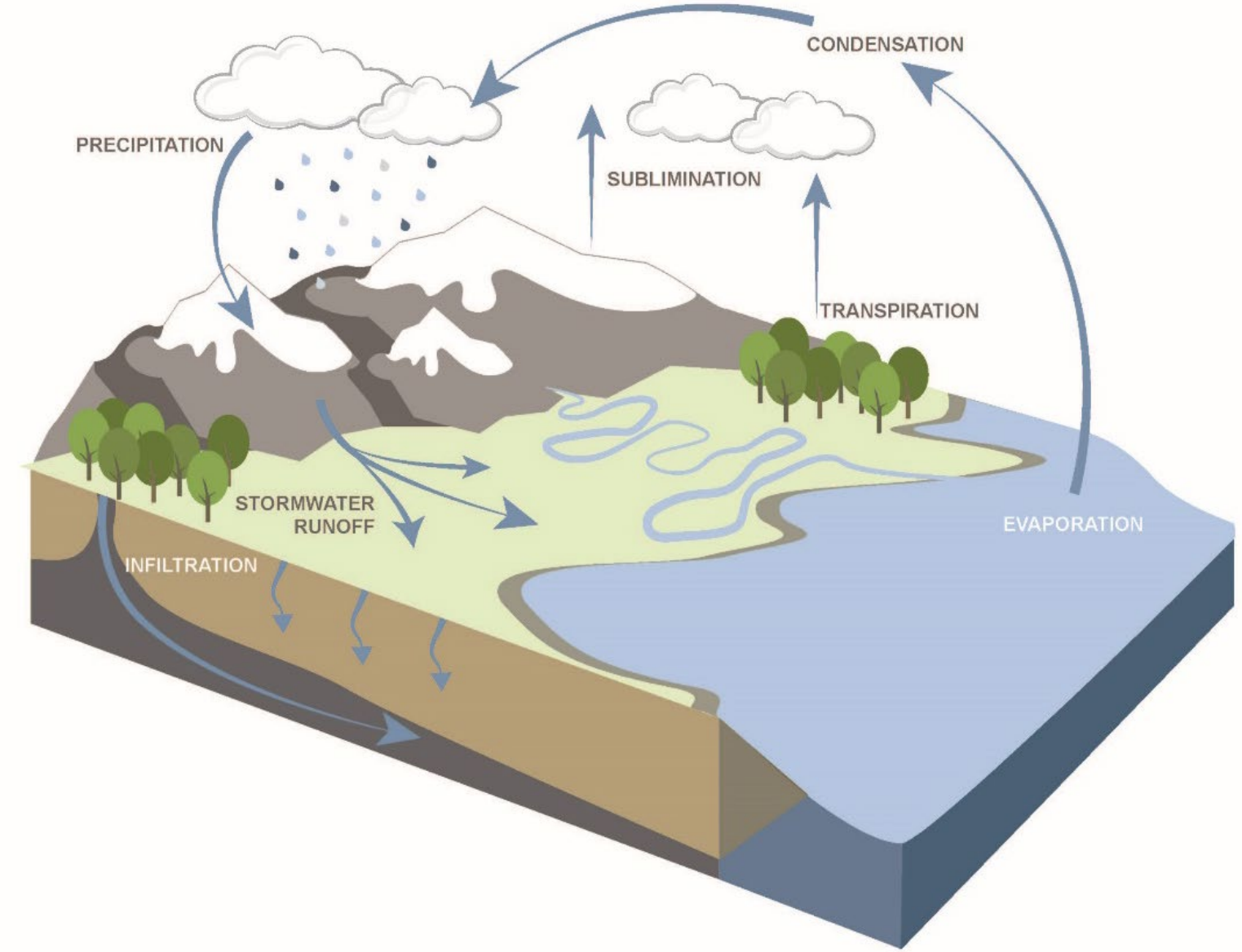
- Oil and grease from cars
- Fertilizers
- Animal waste
- Grass clippings
- Septic systems
- Sewage leaks
- Household cleaning products
- Litter
- Agriculture
- Sediment

STORMWATER BASICS

What is stormwater?

Stormwater is the water from rain or melting snows that can become “runoff,” flowing over the ground surface and returning to lakes and streams.

The Natural Hydrologic Cycle



WHERE DOES PRECIPITATION GO?

1. It can *run off*

Courtesy of Texas Watershed Stewards, Texas A&M AgriLife Extension

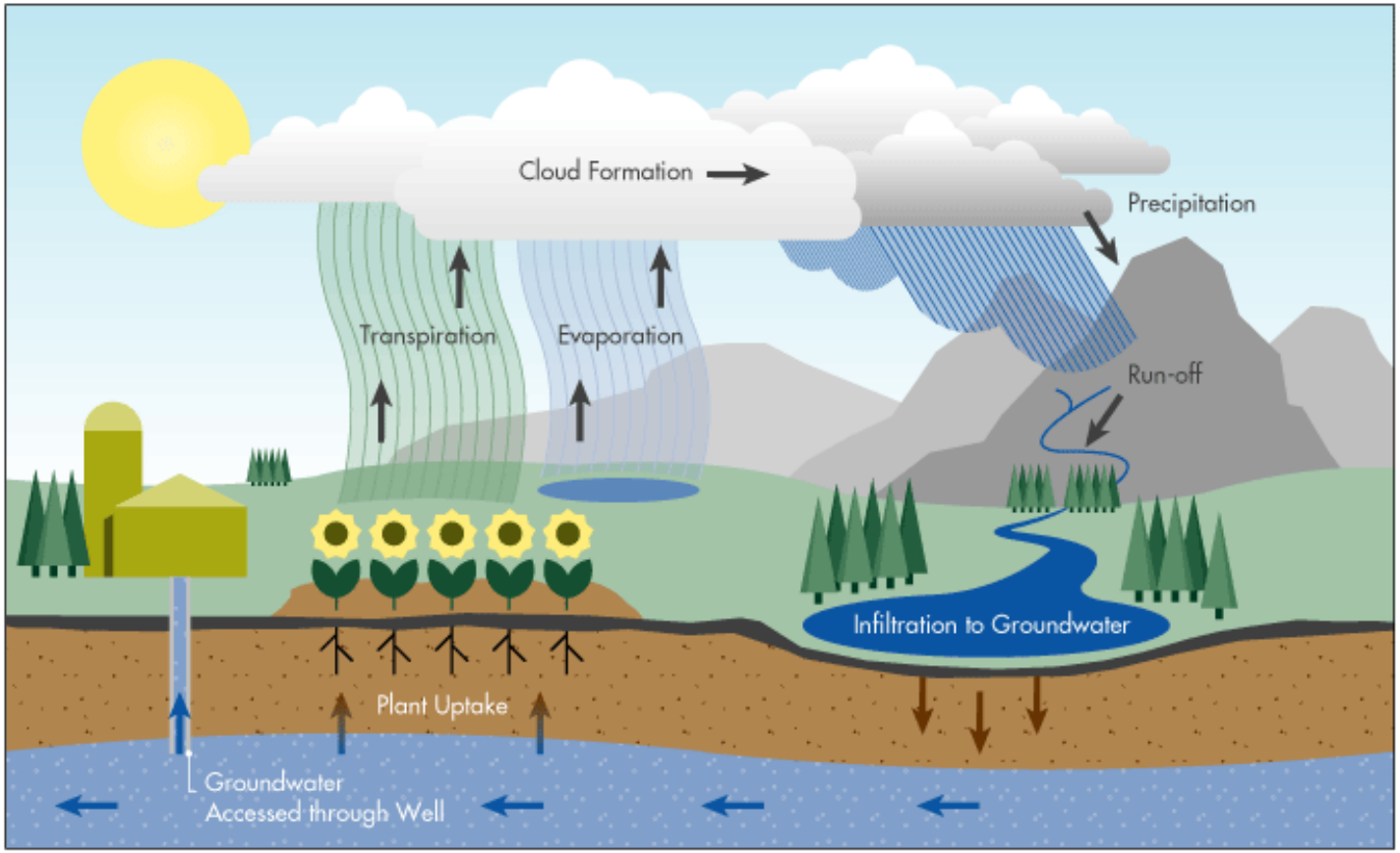
WHERE DOES PRECIPITATION GO?

2. It can be *absorbed* by plants and used for photosynthesis and other biological processes

Courtesy of Texas Watershed Stewards, Texas A&M AgriLife Extension

WHERE DOES PRECIPITATION GO?

3. It can *infiltrate* through the soil surface and percolate downward to groundwater *aquifers*



Courtesy of Texas Watershed Stewards, Texas A&M AgriLife Extension

WHERE DOES PRECIPITATION GO?

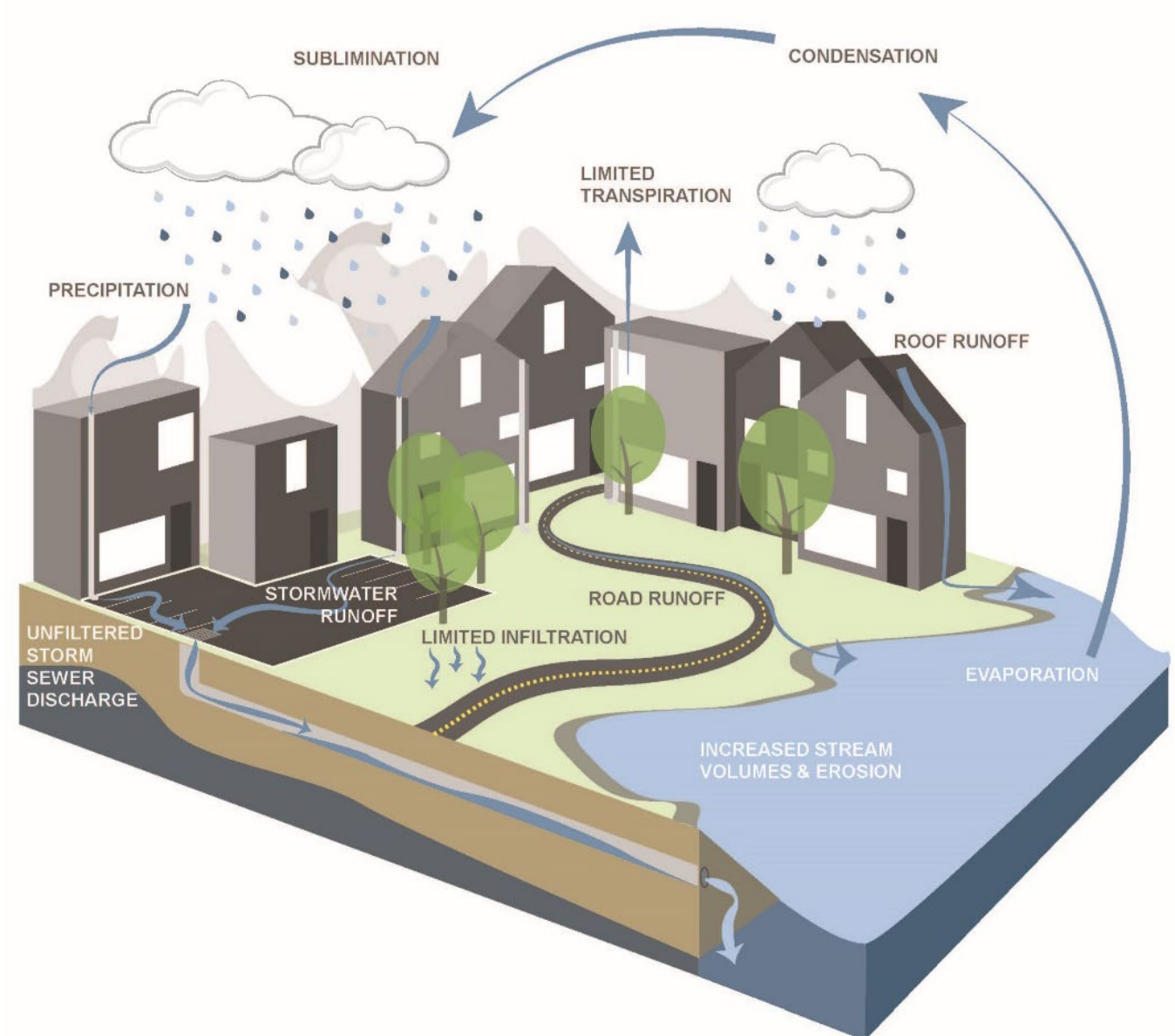
4. It can *evaporate*

Courtesy of Texas Watershed Stewards, Texas A&M AgriLife Extension

The Impact of Development on Stormwater Runoff

More development → *More impervious surfaces* → *More stormwater runoff*

The Urban Hydrologic Cycle



New Jersey

- Most densely populated state
- 21 counties, 565 municipalities
- 95% of our waterways are impaired
- Harmful Algal Blooms (HABS) in many of our lakes
- Hammered by Ida, Henri, Sandy, and a bunch of Nor'easters
- Climate change is real – more severe storms and sea level rise

Insight to current problem

- Stringent stormwater regulations on new development has not improved water quality
- We must retrofit existing older development with stormwater management to reduce impairments to our waterways
- Green infrastructure is a great tool to retrofit existing older development
- Local champions are needed to advocate for green infrastructure retrofits
- We need to create these champions where they don't already exist

GREEN INFRASTRUCTURE IN NEW JERSEY

Green infrastructure is ...

…an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly.

Green infrastructure projects:

- capture,
- filter,
- absorb, and
- reuse

stormwater to restore the natural water cycle.

Green Infrastructure Practices

Bioretention Systems

- Rain Gardens
- Bioswales
- Stormwater Planters
- Curb Extensions
- Tree Filter Boxes

Permeable Pavements

Rainwater Harvesting

- Rain Barrels
- Cisterns

Dry Wells

Rooftop Systems

- Green Roofs
- Blue Roofs








Role of Green Infrastructure in NJ

- New “major” development is required to use green infrastructure
- Communities with combined sewers are using green infrastructure
- On a voluntary basis, existing development, is being retrofitted with green infrastructure

History of Stormwater Management

1st Attempt at Stormwater Management

Capture all runoff, pipe it, and send it directly to the river . . .prior to mid 1970's

2nd Iteration of Stormwater Management

Capture runoff, detain it, release it slowly to the river…mid 1970's to 2004

- Detain peak flow during large storm events for 18 hours (residential) or 36 hours (commercial)
- Reduce downstream flooding during major storms
- Use concrete low flow channels to minimize erosion, reduce standing water, quickly discharge low flows
- Does not manage runoff from smaller storms allowing stormwater to pass through the system
- Directly discharges stormwater runoff to nearby stream, waterway, or municipal storm sewer system (at a controlled/managed rate)

3rd Generation of Stormwater Management

- Reduce stormwater runoff volume
- Reduce peak flows and flooding **…and….**
- Maintain infiltration and groundwater recharge
- Reduce pollution discharged to local waterways

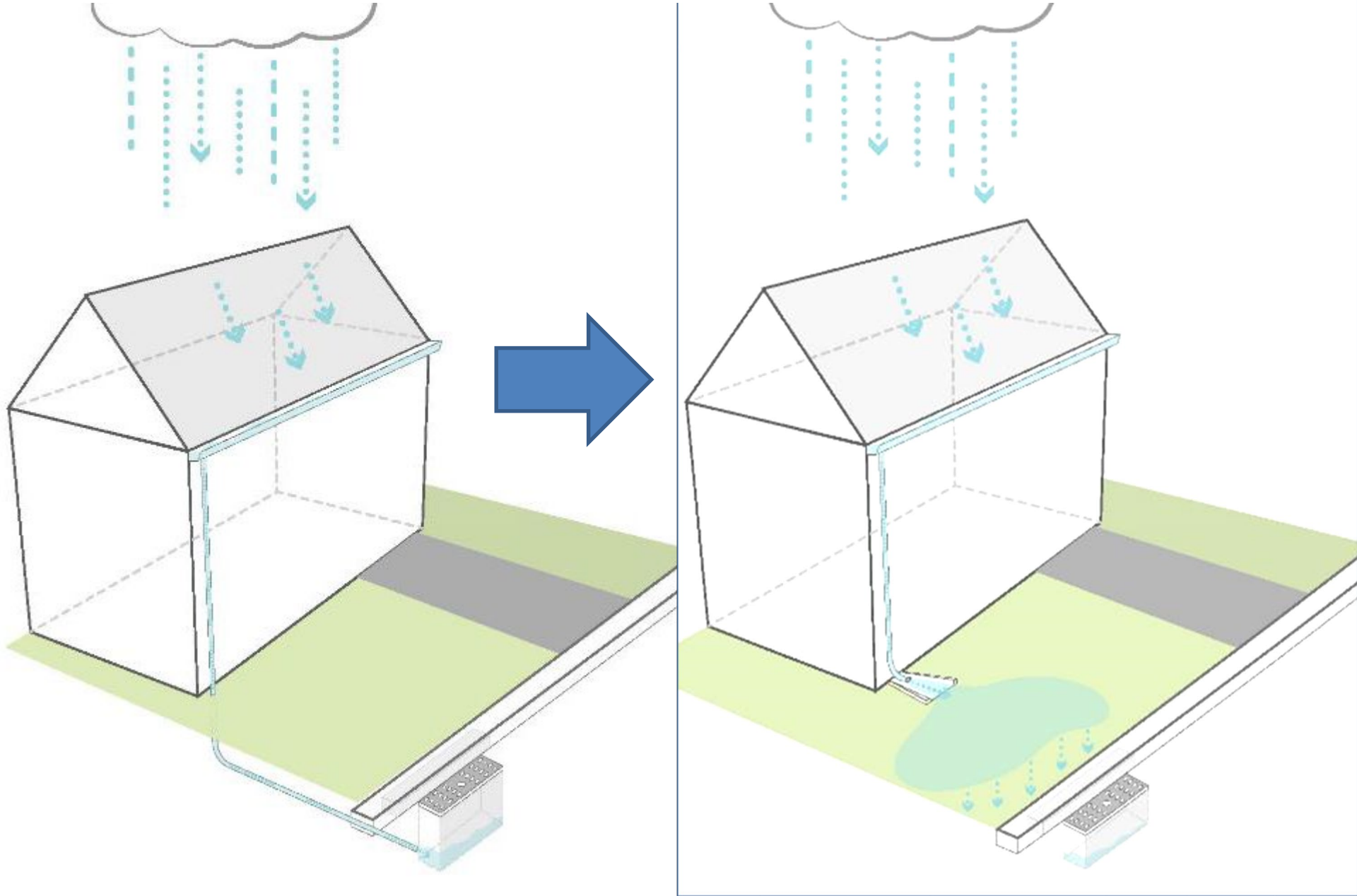
abc Action News, August 27, 2012

Stormwater Management

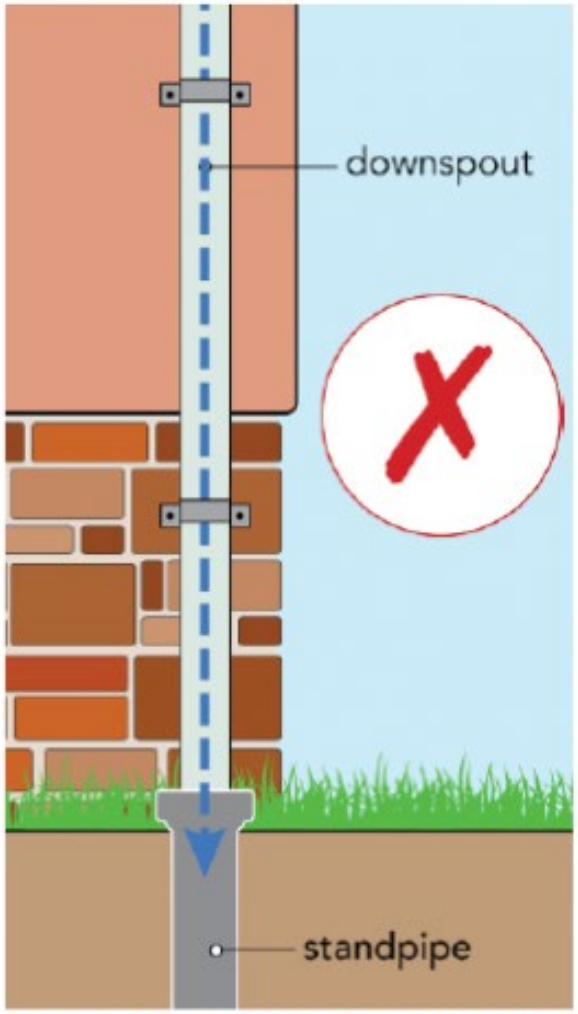
It is all about controlling runoff from impervious surfaces

Step 1: Depave

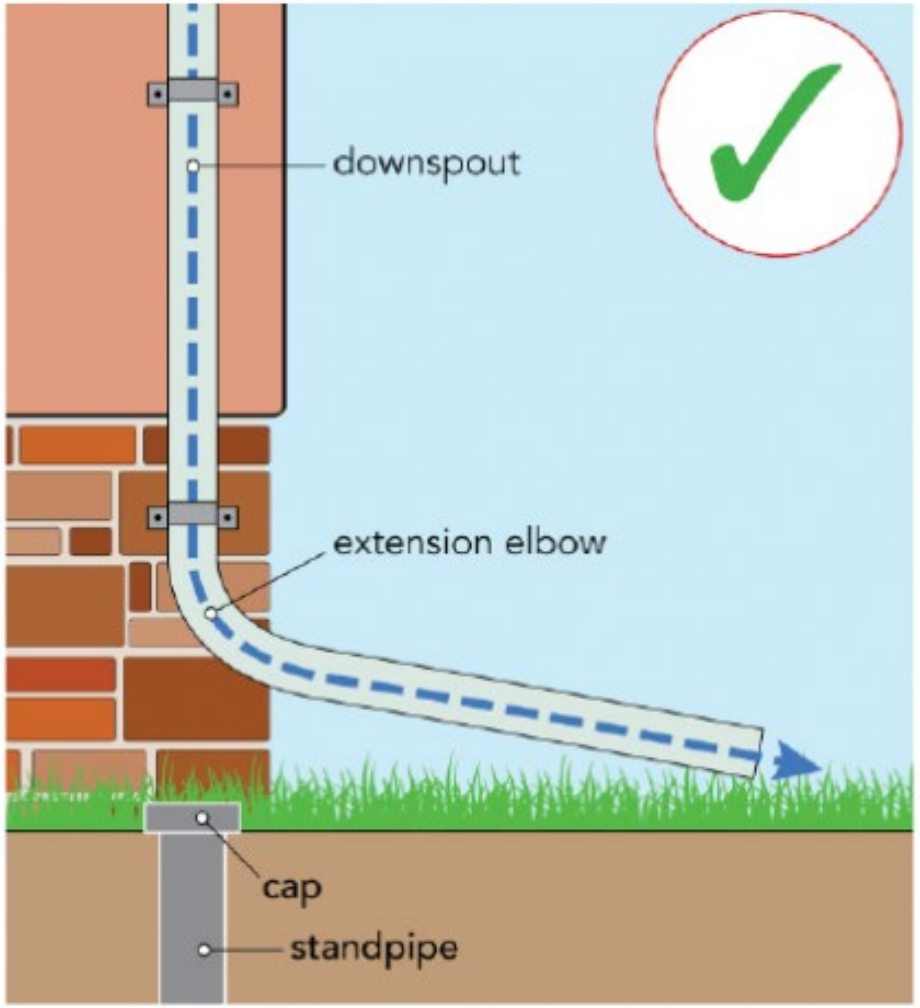
Step 2: Simple Disconnection



Downspout Disconnection



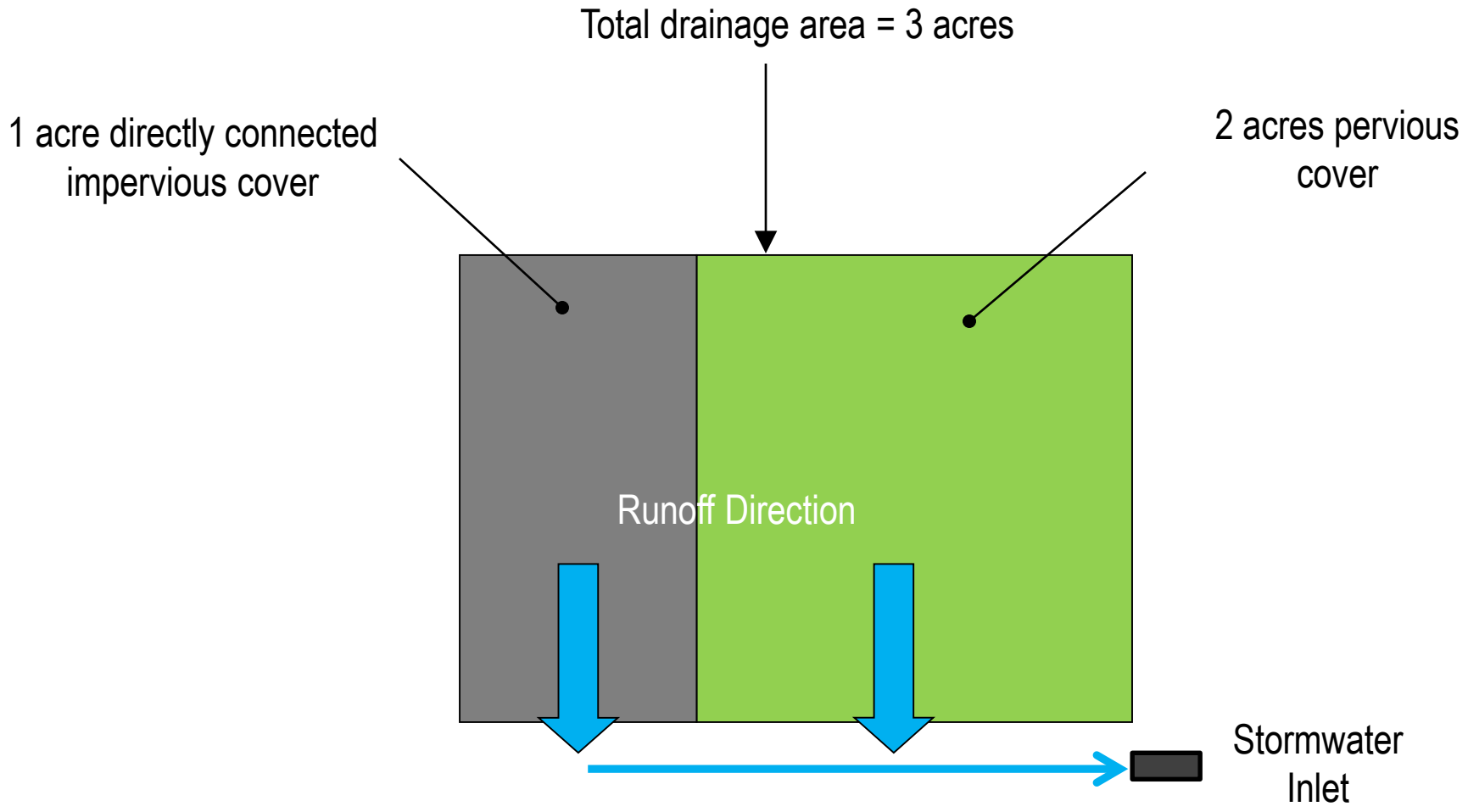
DOWNSPOUT CONNECTED TO SEWER SYSTEM



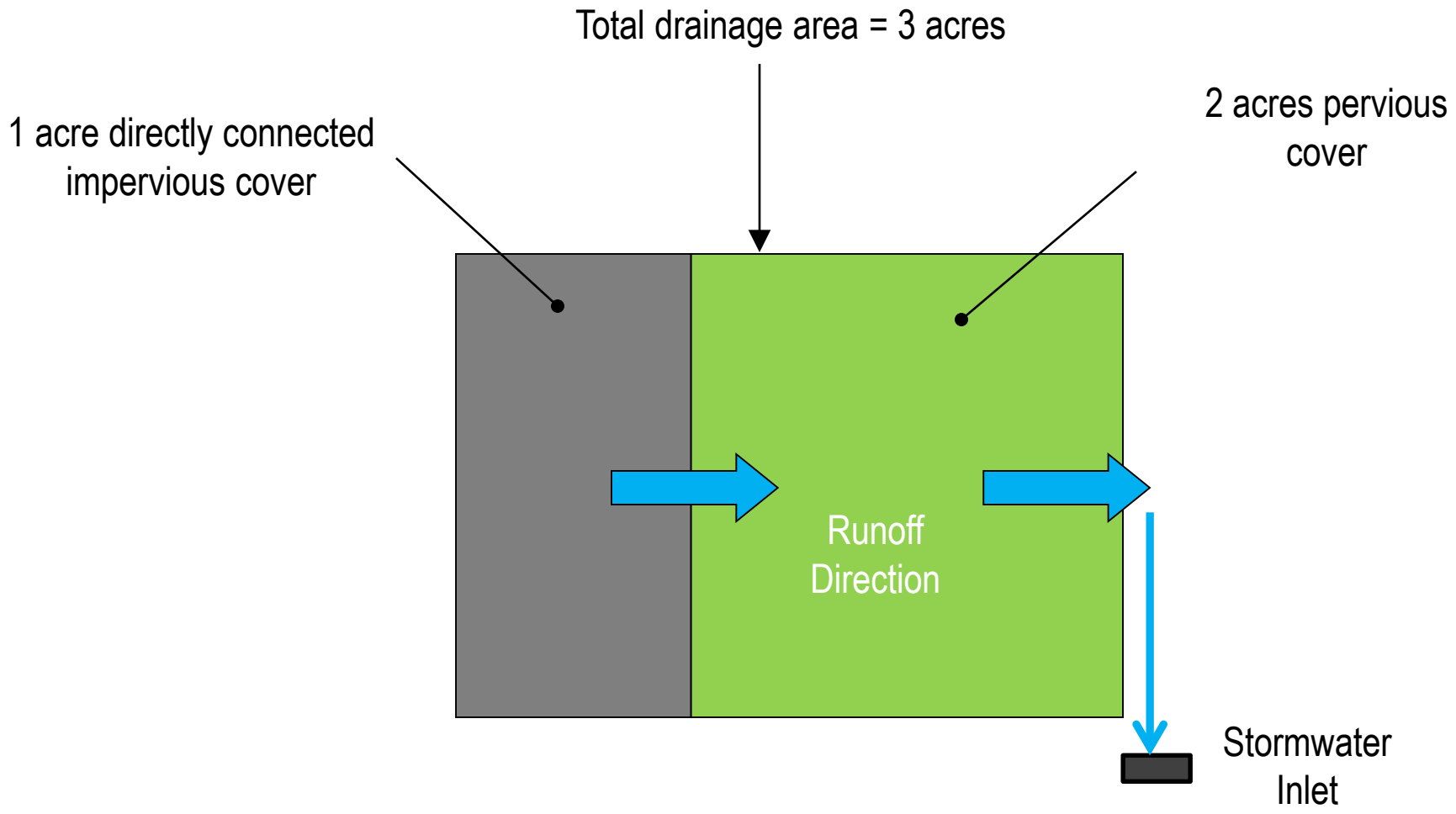
DOWNSPOUT DISCONNECTED FROM SEWER SYSTEM

Another Example of Simple Disconnection

For 1.25 inch storm, 3,811 cubic feet of runoff = **28,500 gallons**

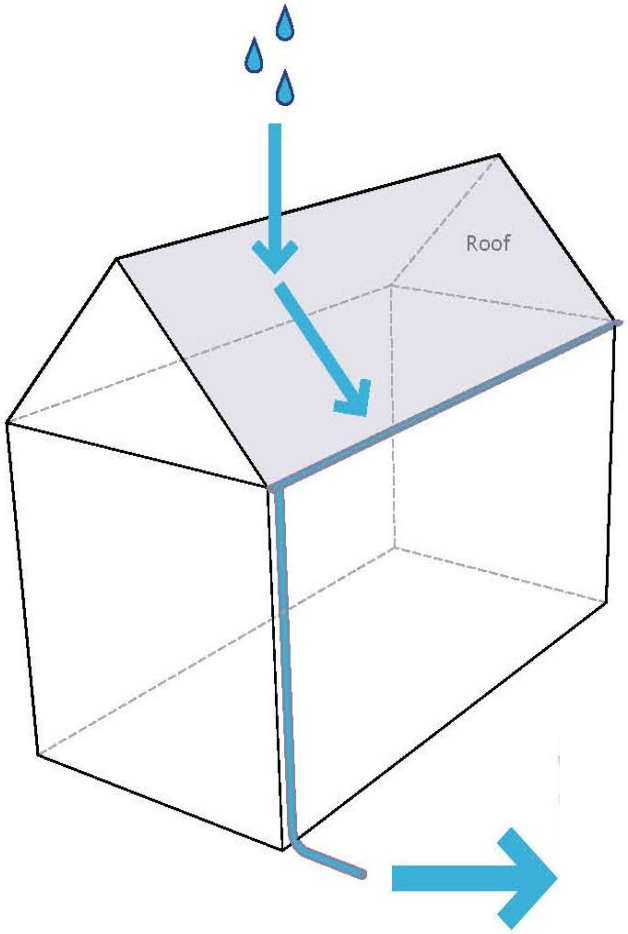


For 1.25 inch storm, 581 cubic feet of runoff = **4,360 gallons**



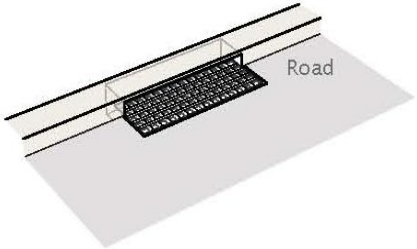
	Volume of Runoff		
Design Storm	**Connected (gallons)**	**Disconnected (gallons)**	**Percent Difference**
1.25 inches (water quality storm)	28,500	4,360	85%

Disconnect to a Rain Barrel or Cistern



Disconnect your downspout by installing a rain barrel

REDUCE THE AMOUNT OF RUNOFF ENTERING STORM SEWERS

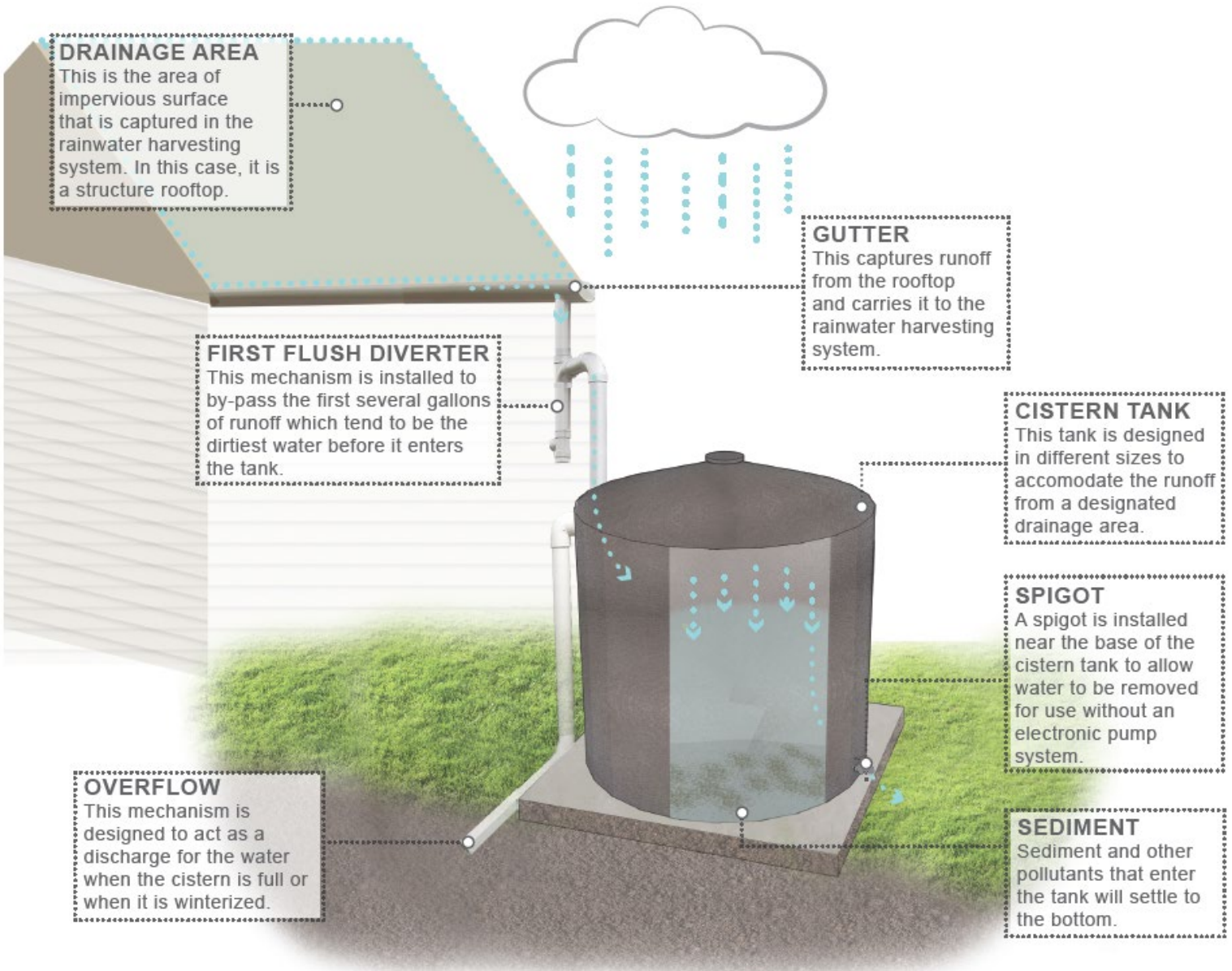


Impervious area is now ***"disconnected"*** from flowing directly into the storm sewer system

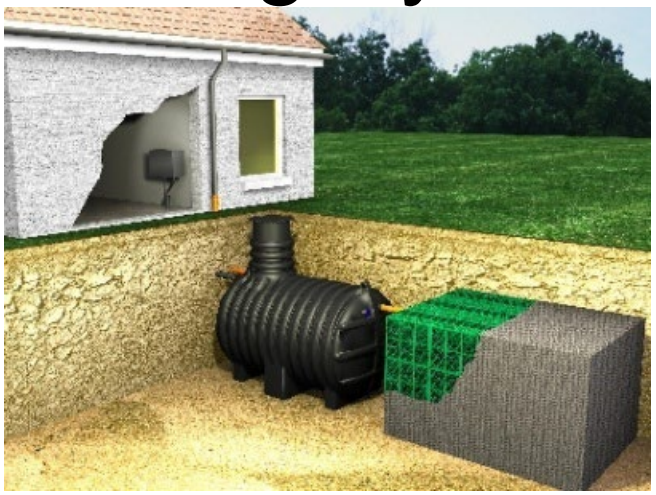
So Many Barrels to Choose From…


WARNING
NEIGHBORHOOD WATCH PROTECTED AREA
NO PARKING THIS SIDE

Rainwater Harvesting Systems

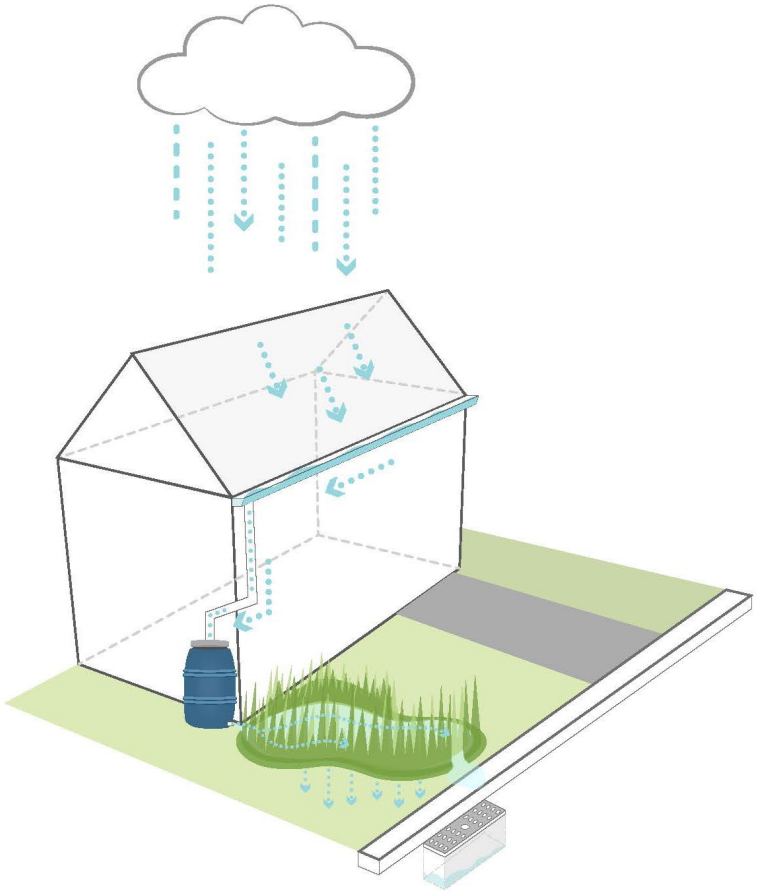


Or Larger Rainwater Harvesting Systems…

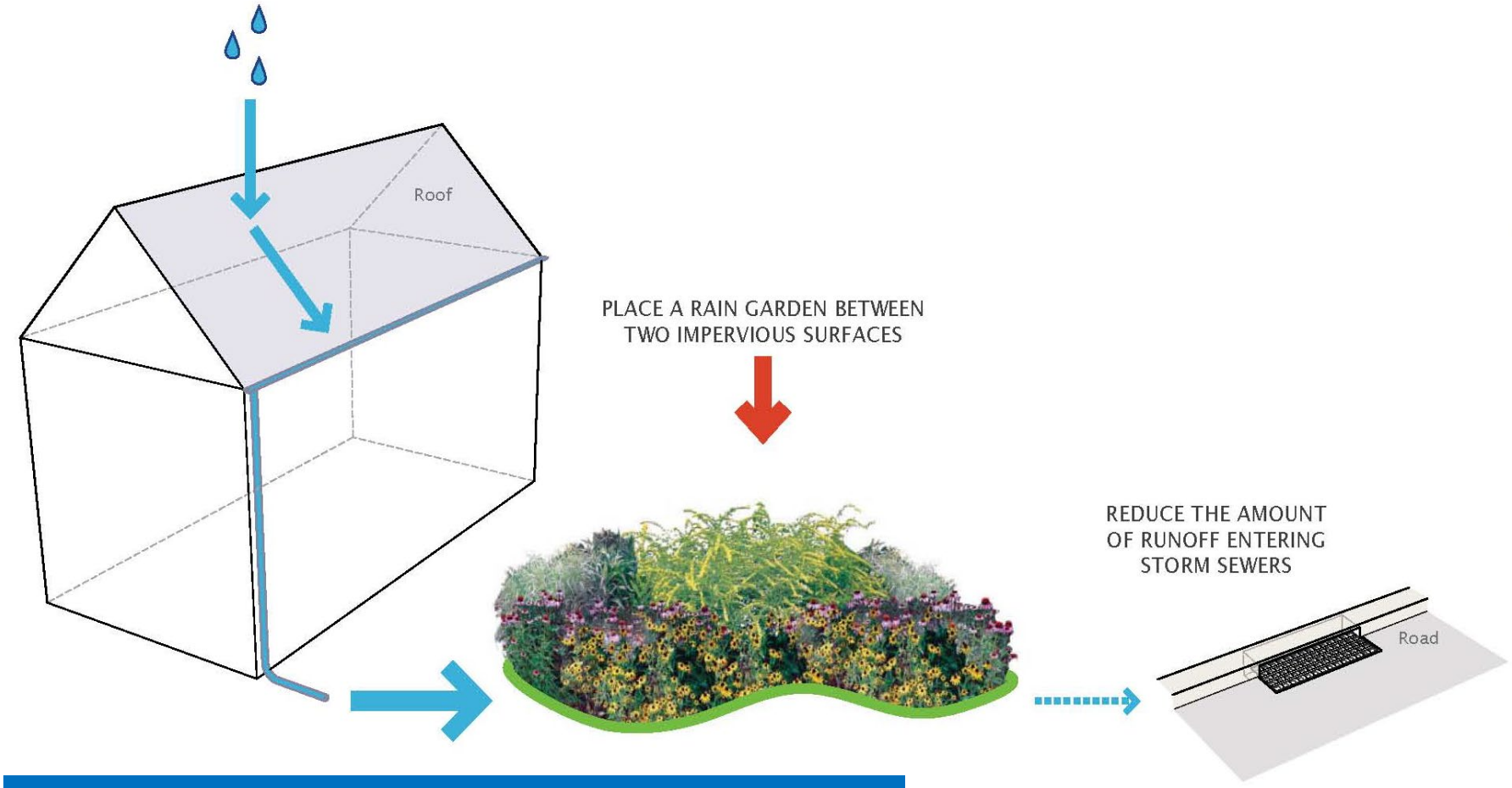


Rainwater Harvesting Systems

- These systems are often paired with other green infrastructure practices to increase their storage capacity or efficiency.
- Are commonly paired with a vegetative system to capture the overflow from the system once it has reached full capacity.

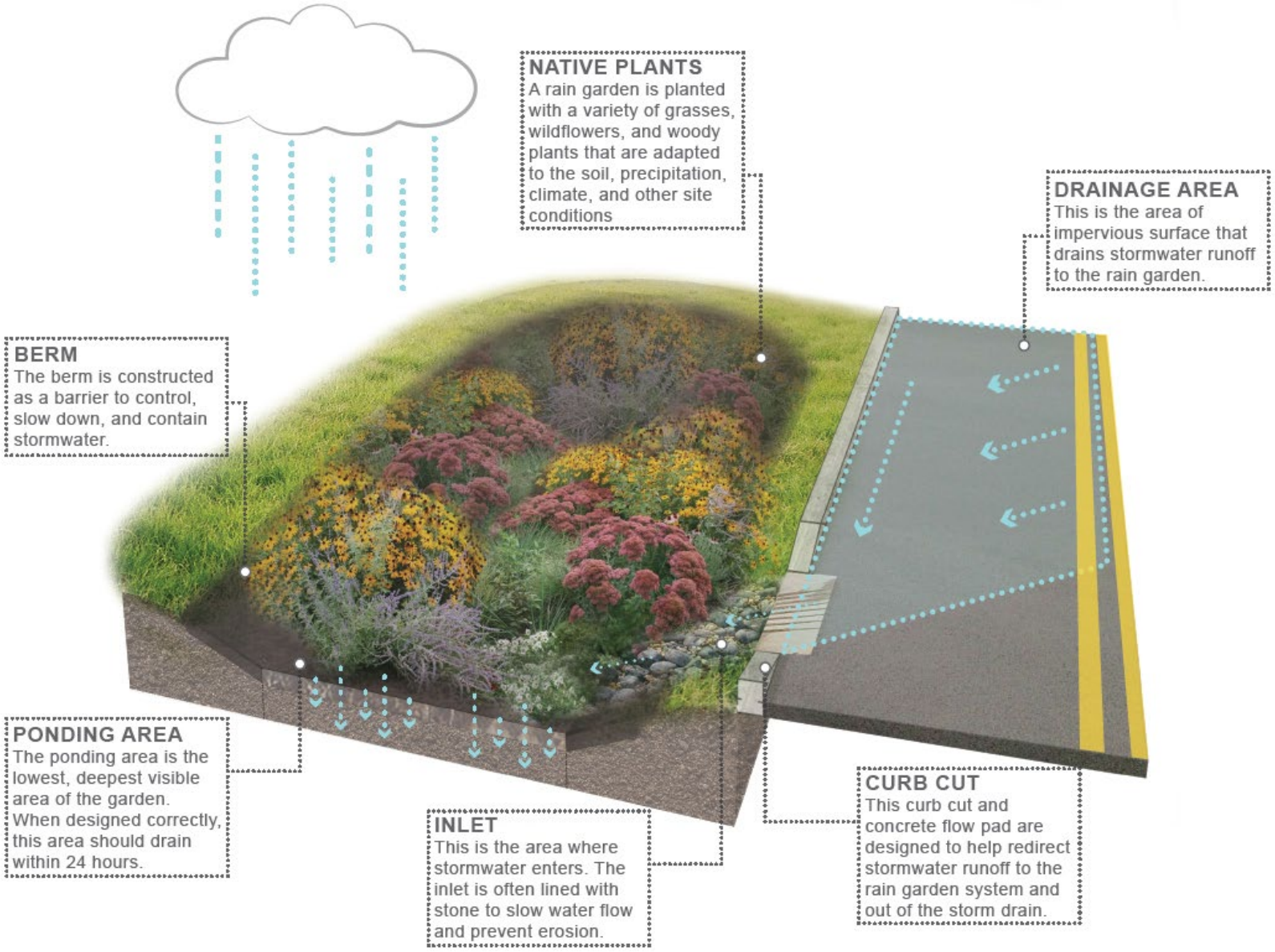


Disconnect to a Rain Garden



Rooftop runoff is now ***"disconnected"*** from flowing directly into the storm sewer system

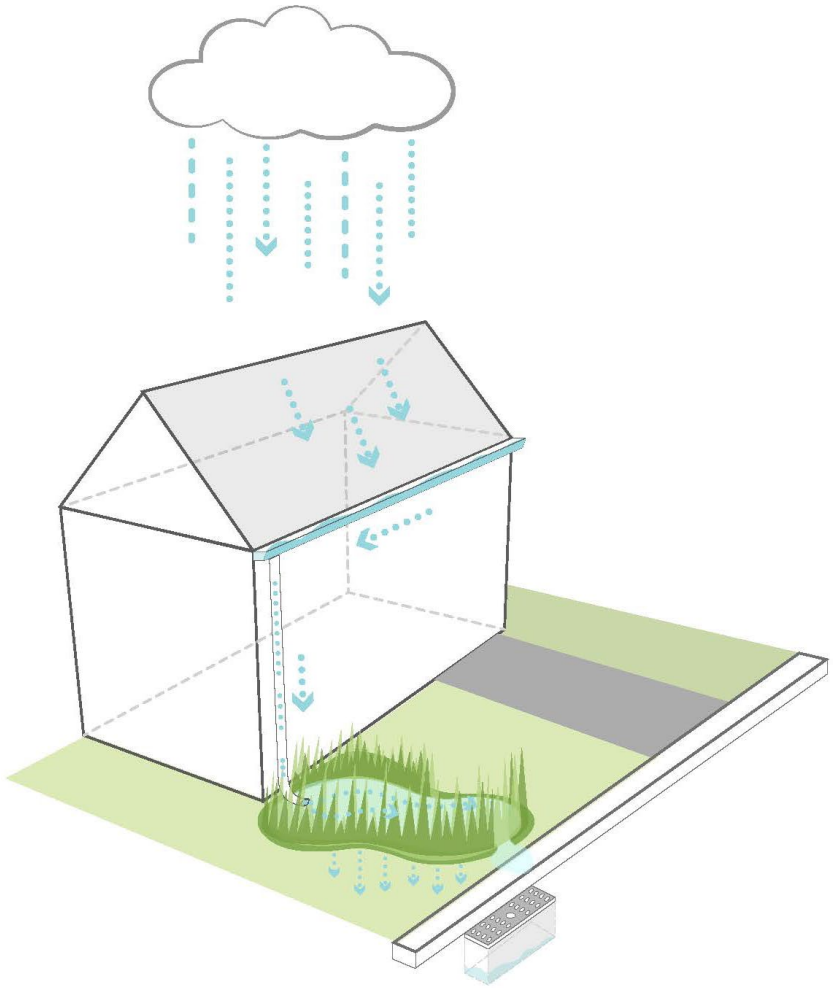
Bioretention Systems/Rain Gardens



Lots of Rain Gardens

Bioretention Systems/Rain Gardens

- Rain gardens can be implemented throughout communities to begin the process of re-establishing the natural function of land.
- They offer one of the quickest and easiest methods to reduce runoff and help protect our water resources.

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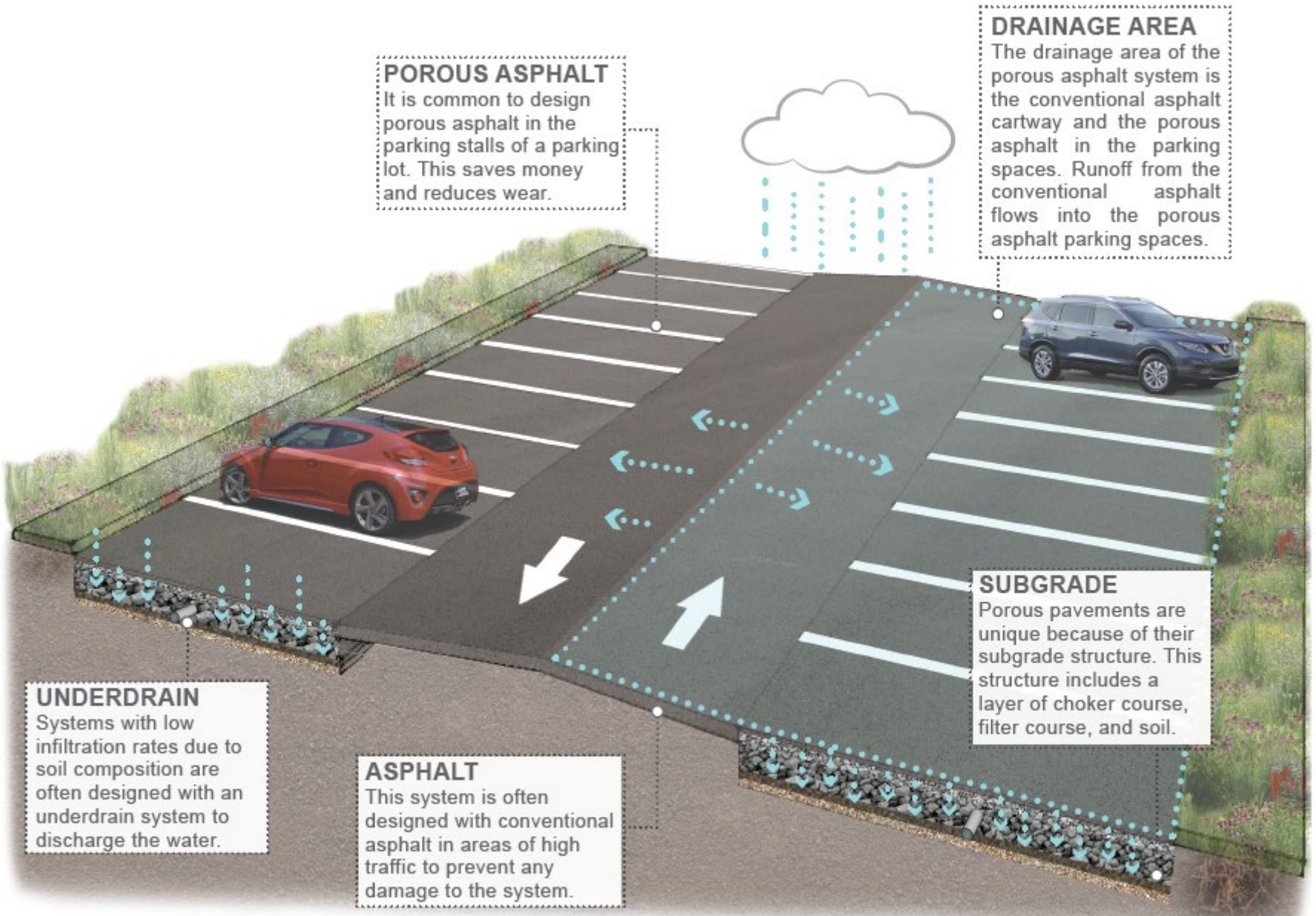
Step 3: Convert to Permeable Pavement



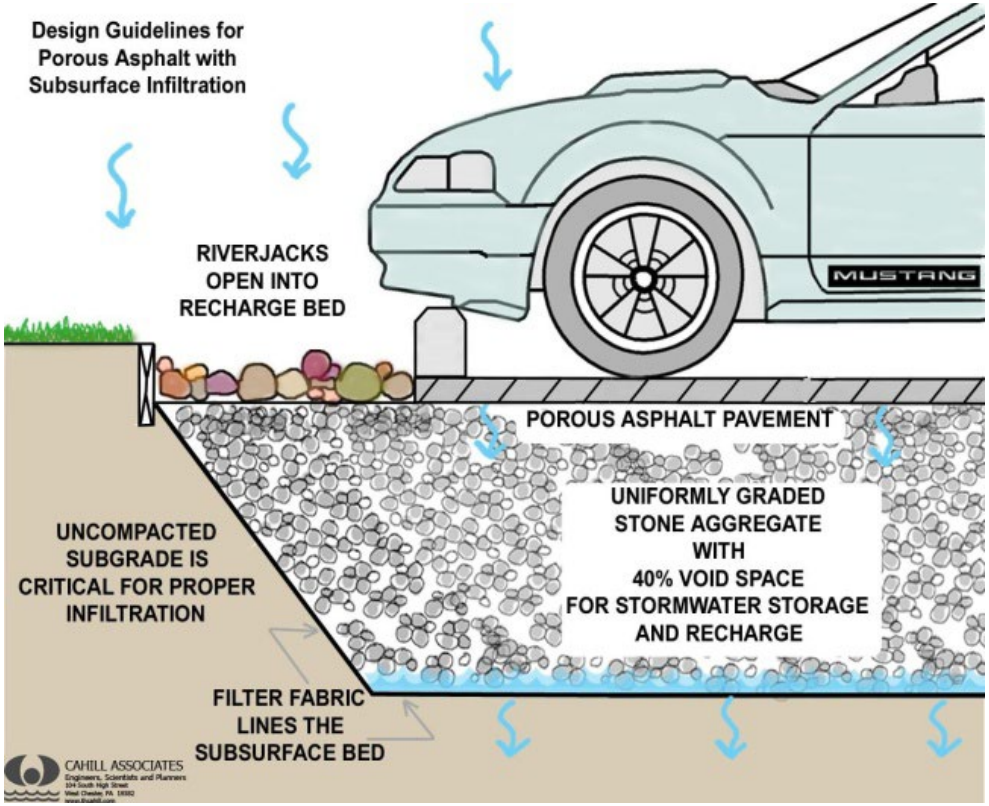
Permeable Pavements

- Underlying stone reservoir
- Porous asphalt and pervious concrete are manufactured without "fine" materials to allow infiltration
- Grass pavers are concrete interlocking blocks with open areas to allow grass to grow
- Ideal application for porous pavement is to treat a low traffic or overflow parking area

ADVANTAGES

- Manage stormwater runoff
- Minimize site disturbance
- Promote groundwater recharge
- Low life cycle costs, alternative to costly traditional stormwater management methods
- Mitigation of urban heat island effect
- Contaminant removal as water moves through layers of system

COMPONENTS



Porous Asphalt


82


Pervious Concrete

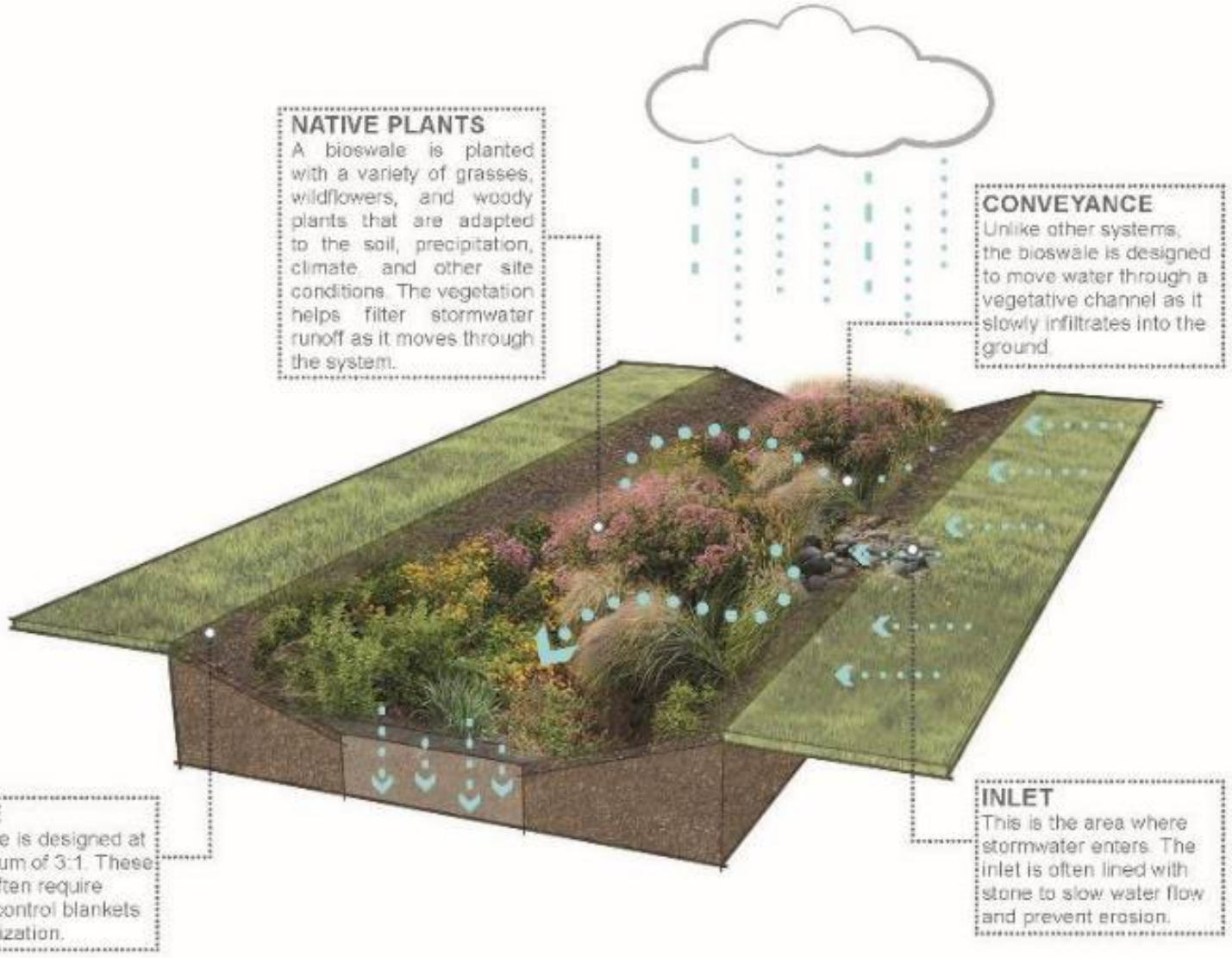

Permeable Pavers


Grass Pavers

Other Green Infrastructure Practices

- Bioswale
- Stormwater Planters
- Enhanced Tree Filters
- Downspout Planters
- Green Roofs

BIOSWALE


NATIVE PLANTS
A bioswale is planted with a variety of grasses, wildflowers, and woody plants that are adapted to the soil, precipitation, climate, and other site conditions. The vegetation helps filter stormwater runoff as it moves through the system.
CONVEYANCE
Unlike other systems, the bioswale is designed to move water through a vegetative channel as it slowly infiltrates into the ground.
SLOPE
The slope is designed at a maximum of 3:1. These slopes often require erosion control blankets for stabilization.
INLET
This is the area where stormwater enters. The inlet is often lined with stone to slow water flow and prevent erosion.

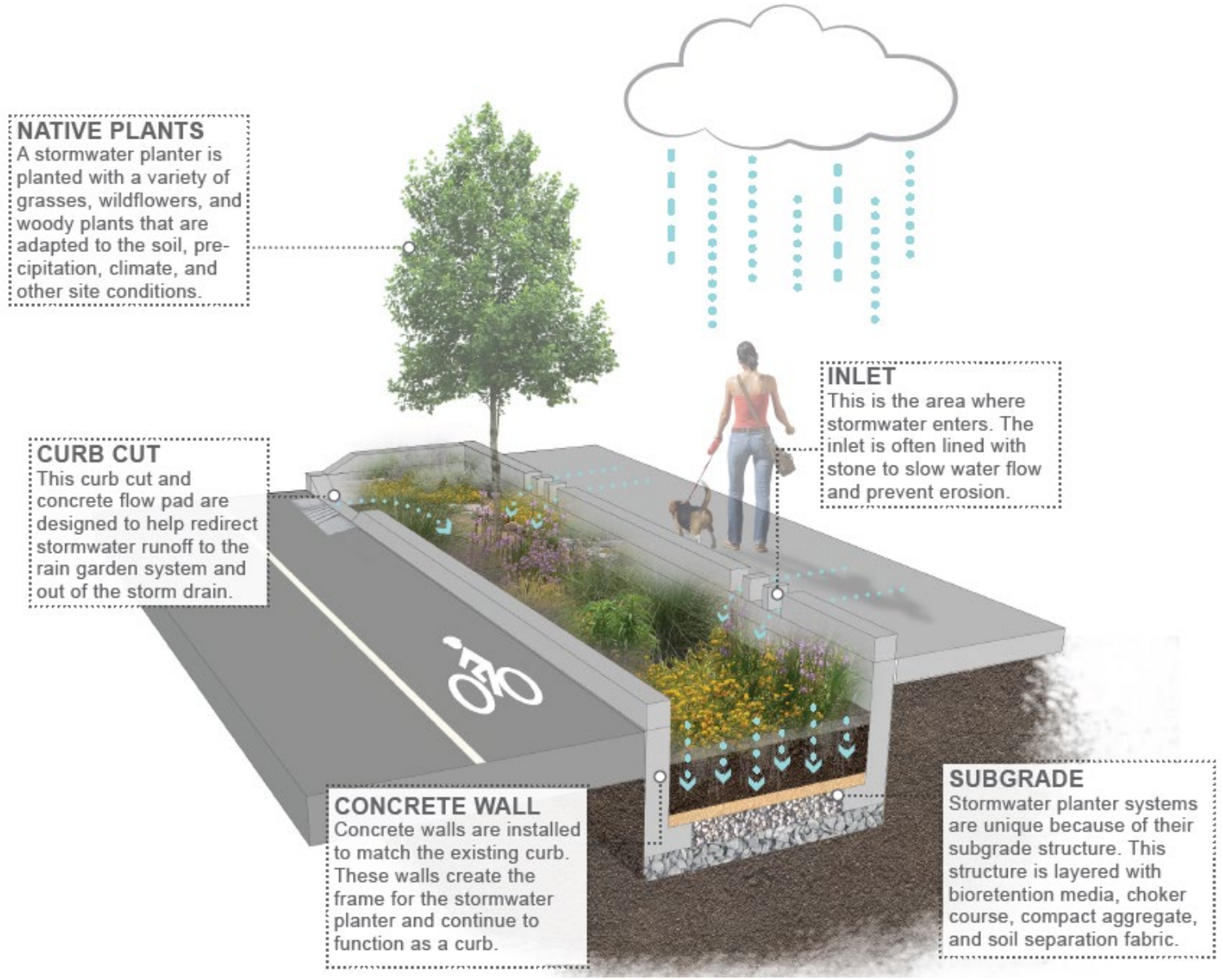
ADVANTAGES

- Transports stormwater
- Filters stormwater
- Infiltrates stormwater
- Aesthetically pleasing
- Creates wildlife habitat

DISADVANTAGES

- Maintenance including sediment and trash removal
- High flow can cause erosion
- Hazard for vehicles

STORMWATER PLANTERS



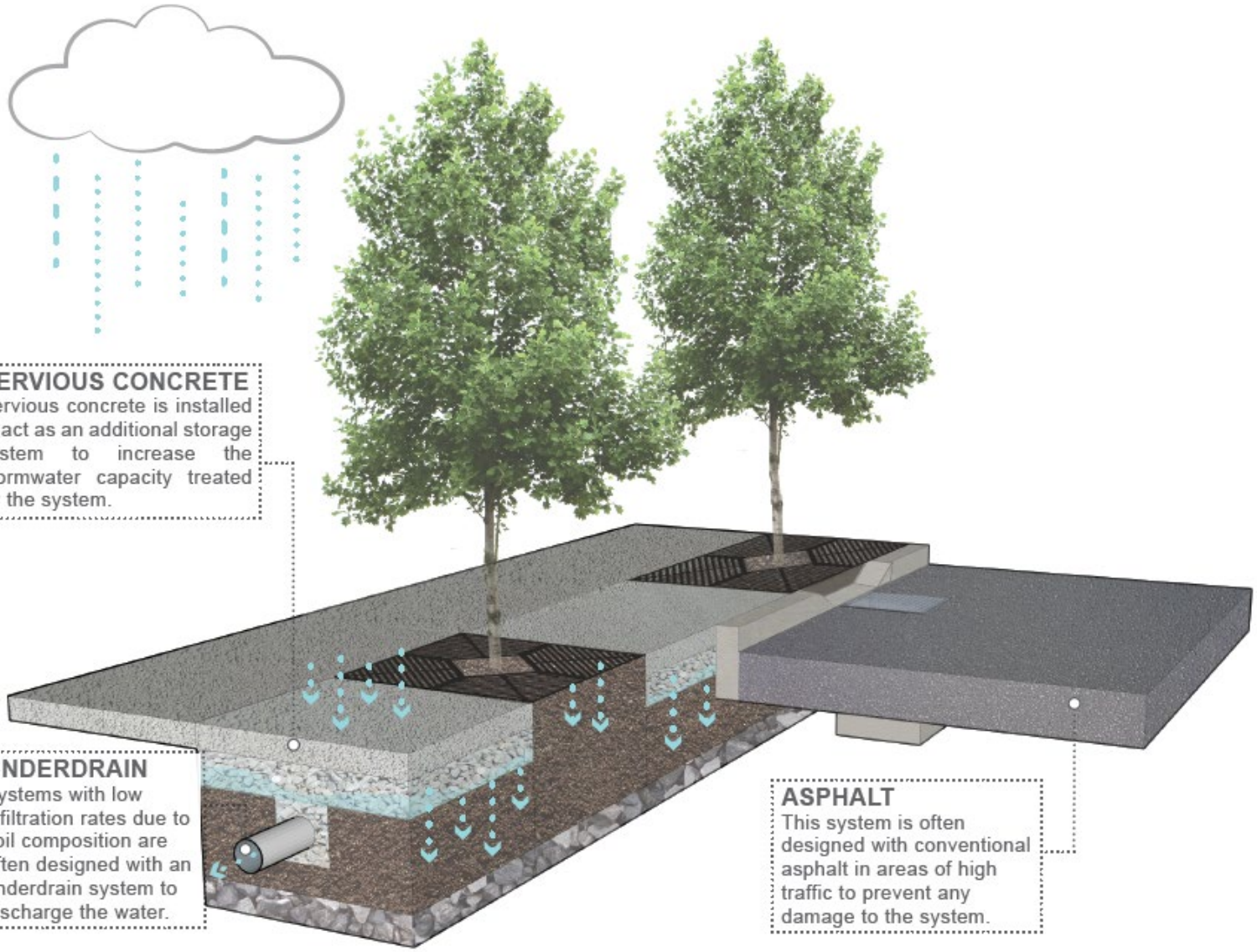
ADVANTAGES

- Combines settling with physical filtering and absorption processes
- Provides very high pollutant removal efficiencies
- More aesthetically pleasing and can be incorporated into the landscapes of most streetscapes
- Provided wildlife habitat
- Sequesters carbon
- Produces oxygen

DISADVANTAGES

- Requires maintenance (weeding, pruning, mulching)
- Collects trash
- Can release nutrients from bioretention soil mix
- May not be aesthetically appealing to everyone
- Can be expensive due to curbing and sidewalk removal
- Utilities can be a problem to work around
- Possible tripping hazard

TREE FILTER BOXES IN A STREETSCAPE



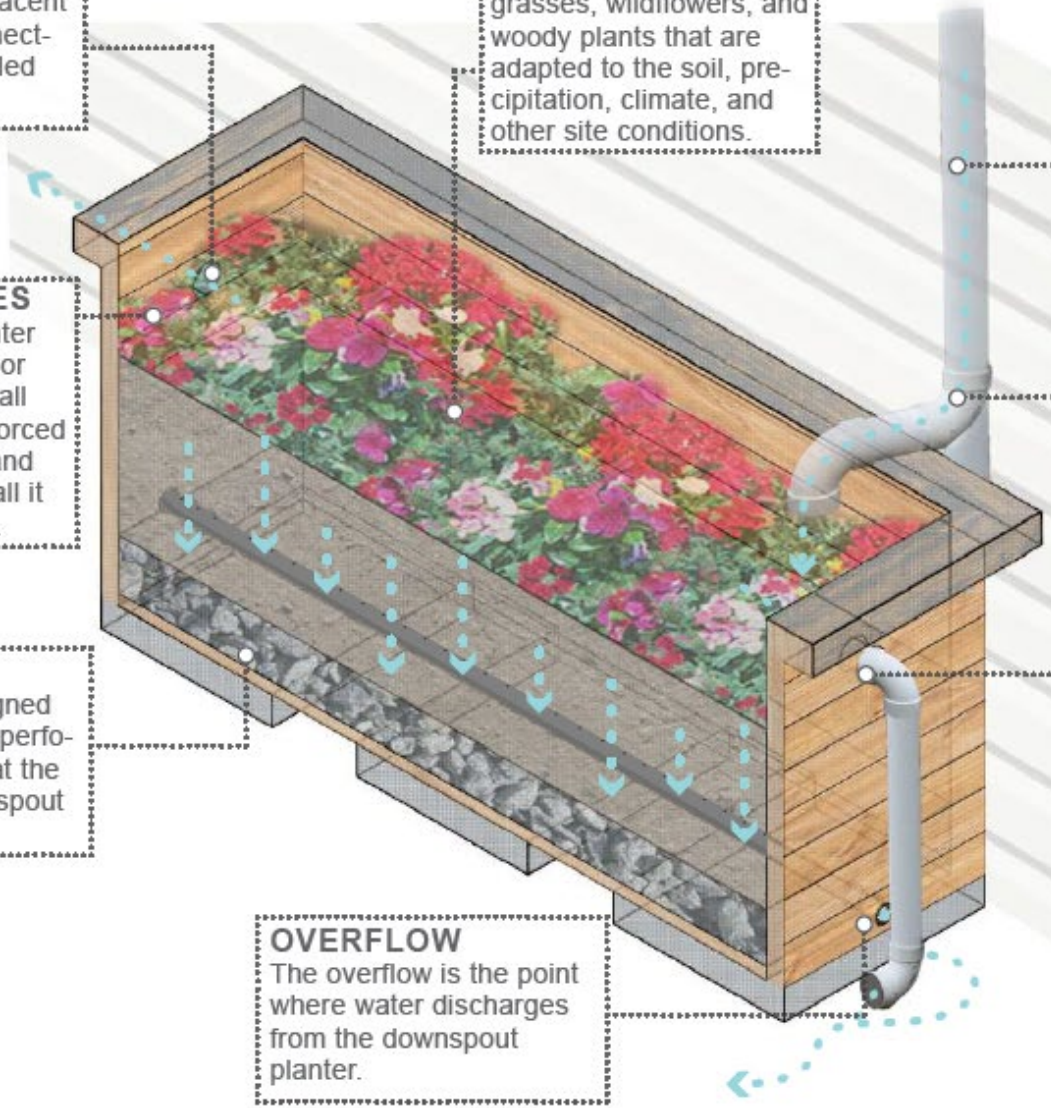
ADVANTAGES

- Easy to incorporate into streetscapes
- Provides shading and helps with heat island effect
- Enhance aesthetics
- Provided wildlife habitat
- Sequesters carbon
- Produces oxygen

DISADVANTAGES

- Can be expensive
- Tree filter box has little storage capacity unless incorporated into an enhanced tree pit system
- Maintenance – trees need pruning
- Wildlife habitat – too many birds; can stimulate local car wash business

Downspout Planters



CONNECTION
The system is designed to overflow into adjacent boxes using a connecting pipe that is sealed with silicon.

NATIVE PLANTS
A downspout planter is planted with a variety of grasses, wildflowers, and woody plants that are adapted to the soil, precipitation, climate, and other site conditions.

DOWNSPOUT
The downspout is the main source of water for the downspout planter.

PLANTER BOXES
The downspout planter box can be wooden or concrete. However, all boxes must be reinforced to hold soil, stone, and the quantity of rainfall it is designed to store.

DIVERTER
A downspout diverter is installed to prevent freezing during the winter months.

OVERFLOW
This mechanism is designed to act as a discharge for the water when the planter is full or saturated.

SUBGRADE
The system is designed to overflow using a perforated pipe located at the bottom of the downspout planter box.

OVERFLOW
The overflow is the point where water discharges from the downspout planter.


SCHOOL

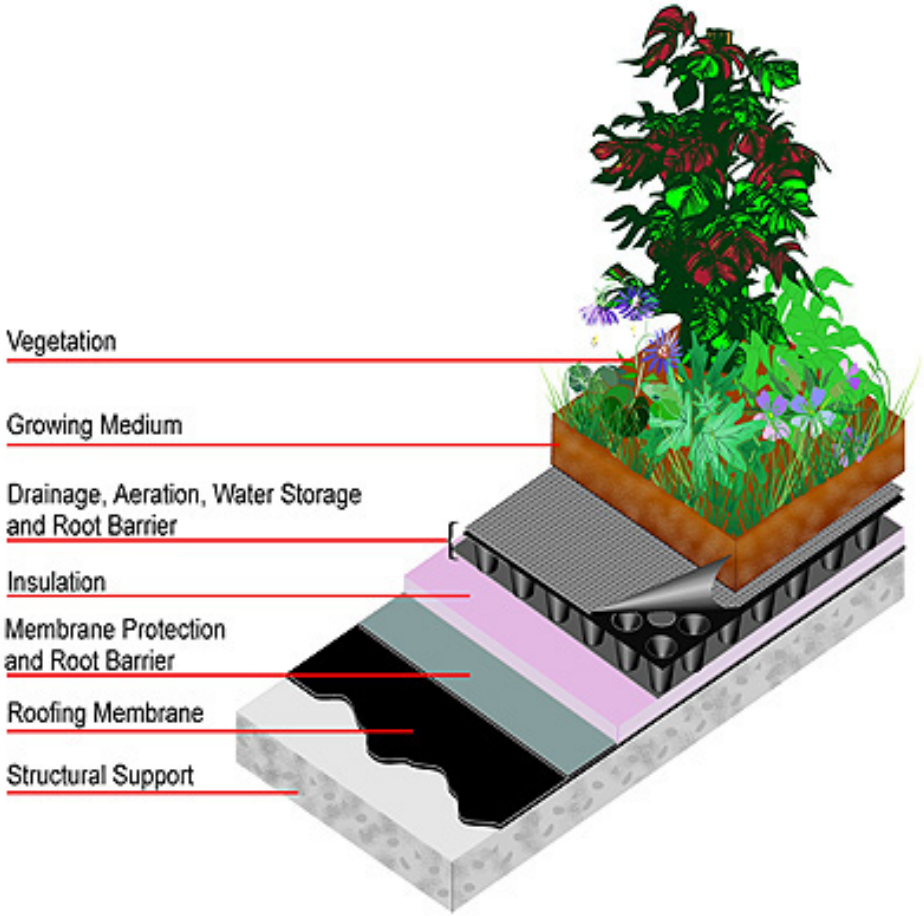

FERRY AVENUE
BRANCH LIBRARY

GREEN ROOFS

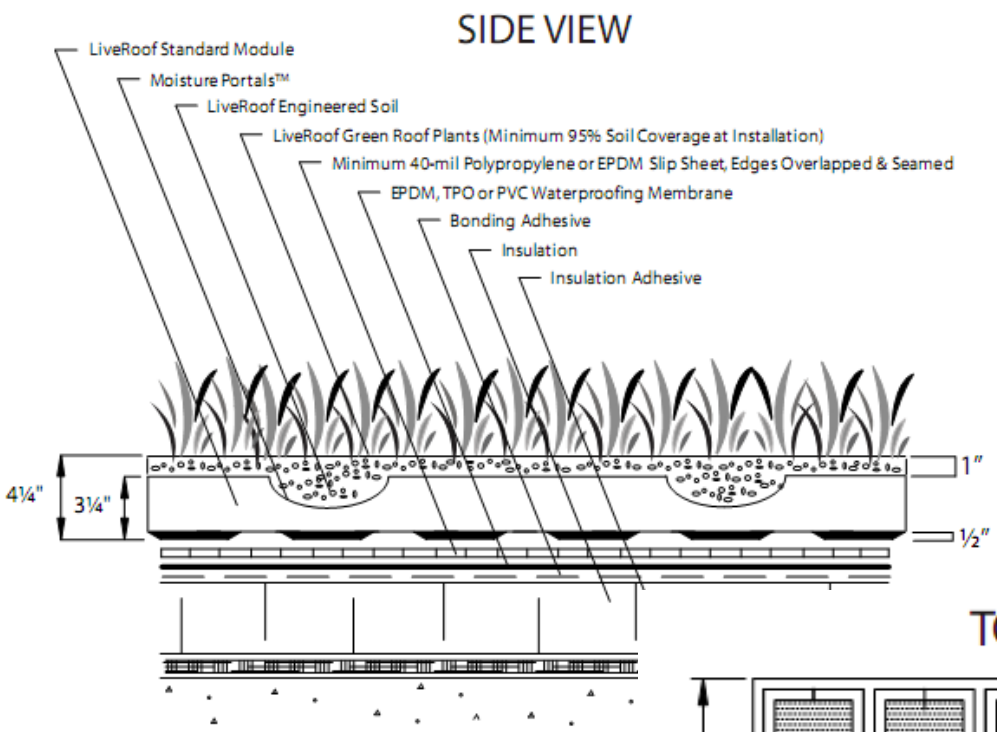
FUNCTIONS

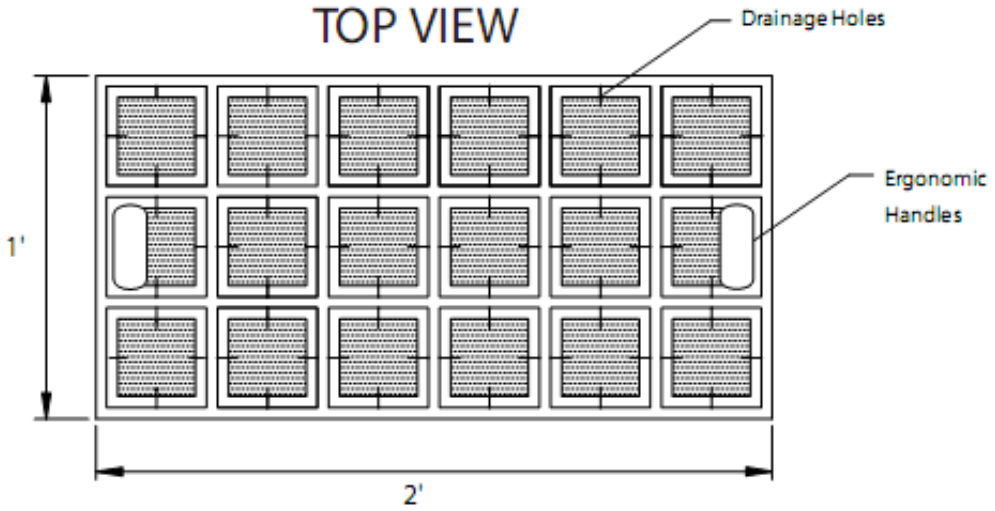
- Improves stormwater management
- Improves air quality
- Temperature regulation (moderation of Urban Heat Island Effect)
- Carbon dioxide/oxygen exchange
- Increased urban wildlife habitat
- Great for new construction

COMPONENTS



Modular System Specifications





DISADVANTAGES

- Very expensive
- Minimal stormwater management (up to ½ inch of rain)
- Very heavy and hard to retrofit on existing roof
- Facility managers tend to not be very supportive – “roof will leak”
- Did I mention – very expensive

DISADVANTAGES

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- Minimal stormwater management (up to ½ inch of rain)
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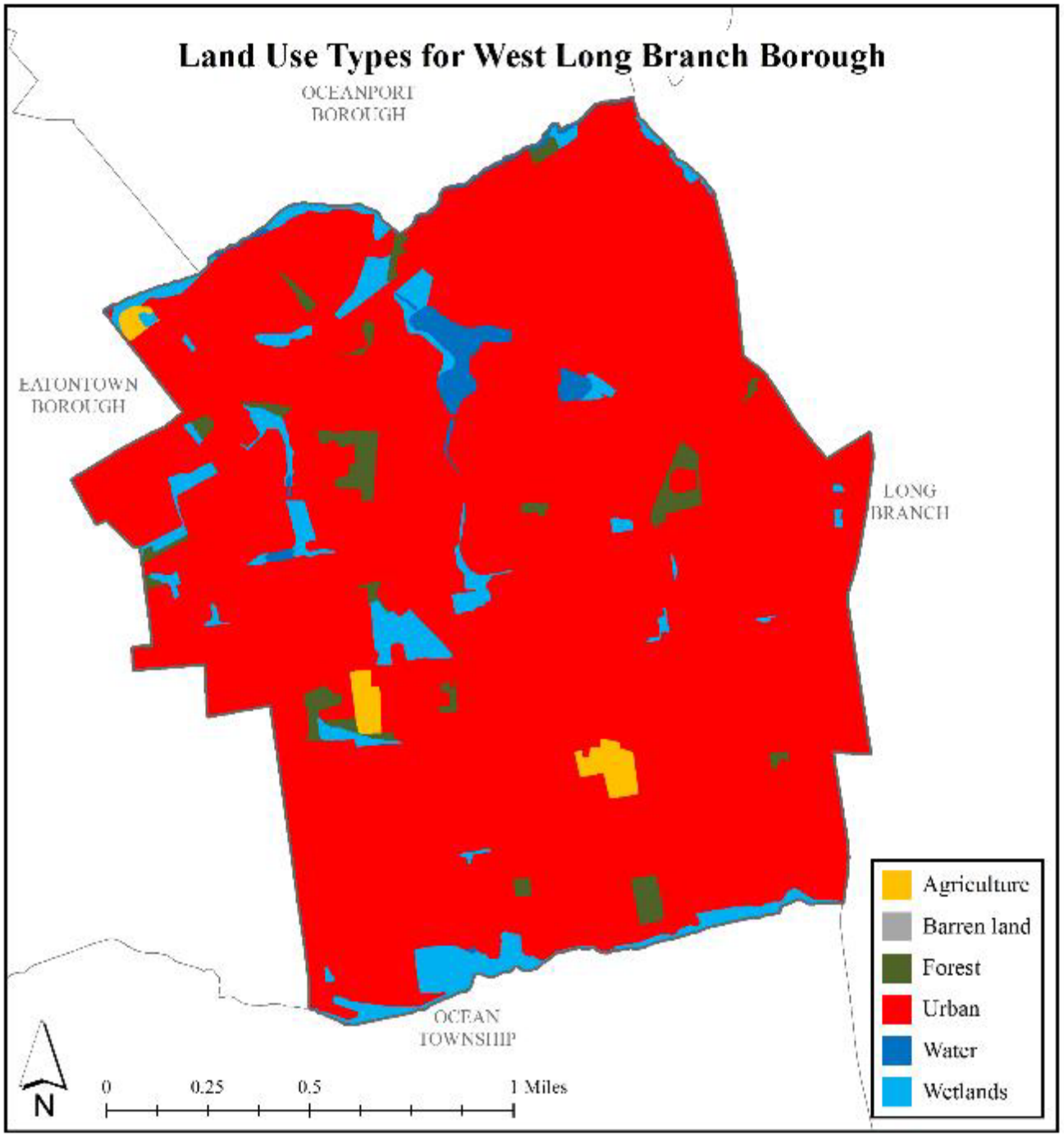
What can you do?

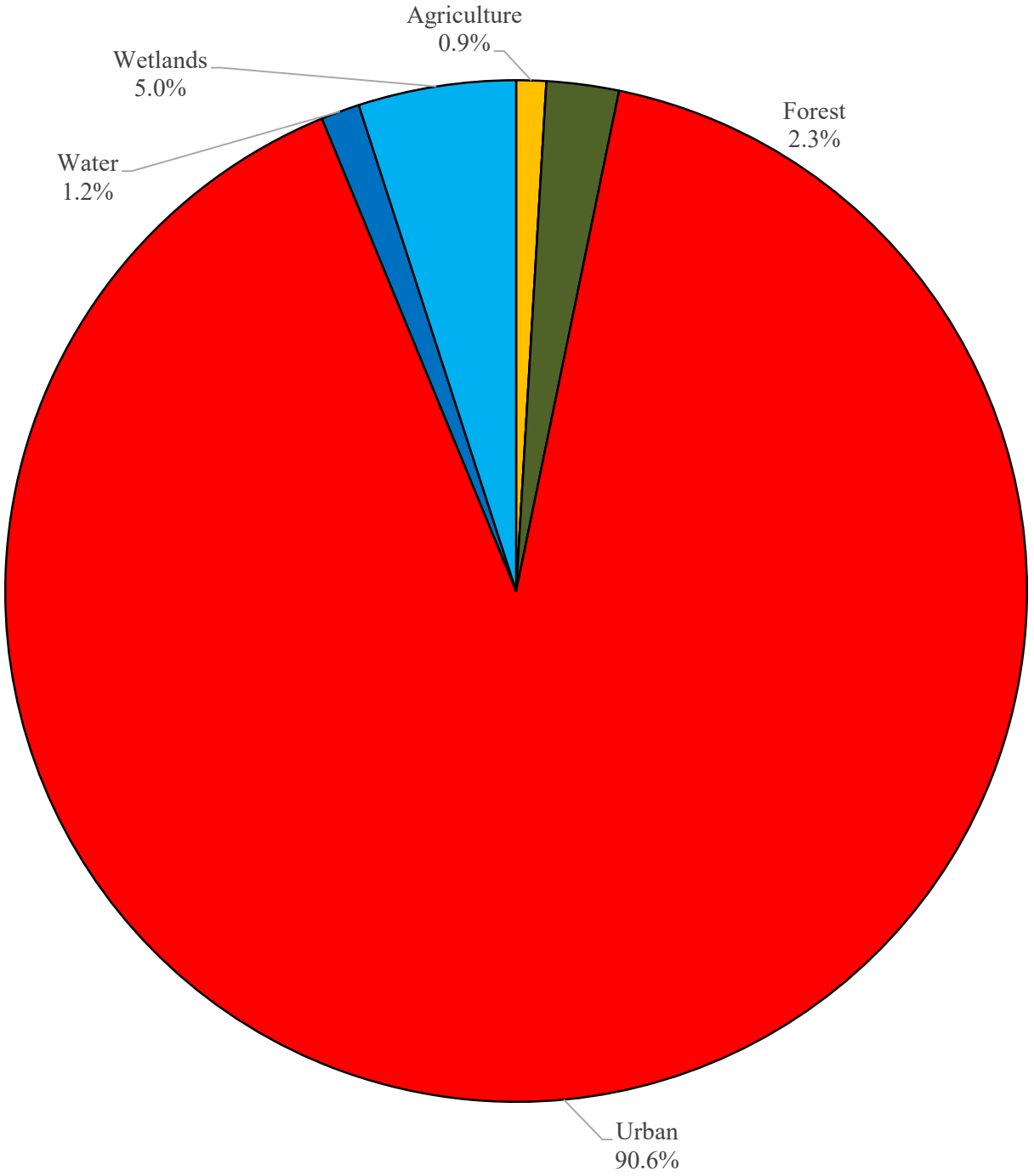
- Share the knowledge (youth, adults, businesses, municipalities)
- Implement existing plans to reduce impervious cover (Regional Stormwater Management Plans, Watershed Restoration Plans, Impervious Cover Reduction Action Plans, or Green Infrastructure Feasibility Studies)
- Enhance existing plans by adding new opportunities
- Construct demonstration projects
- Build partnerships

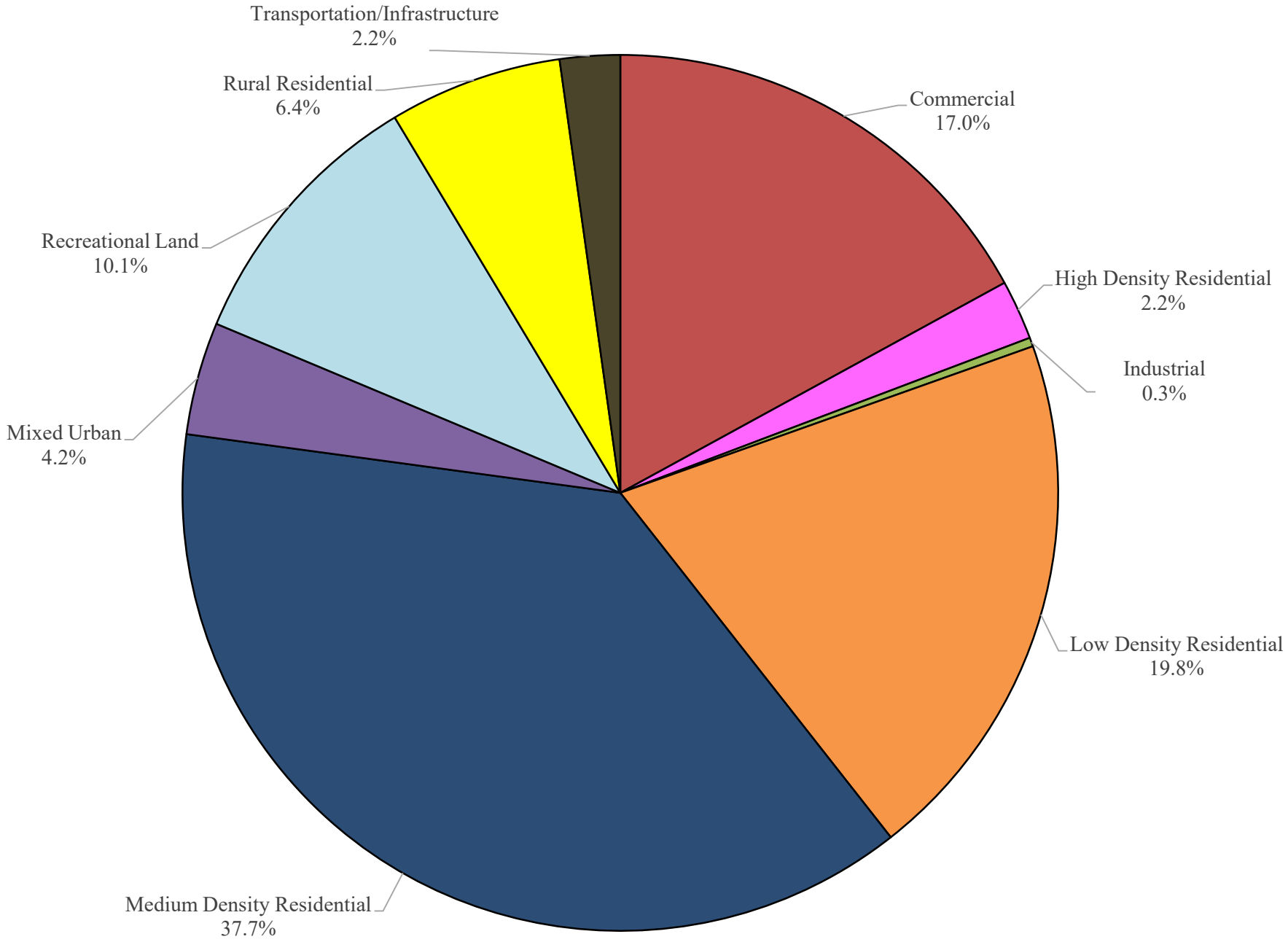
Impervious Cover Assessments (ICAs)

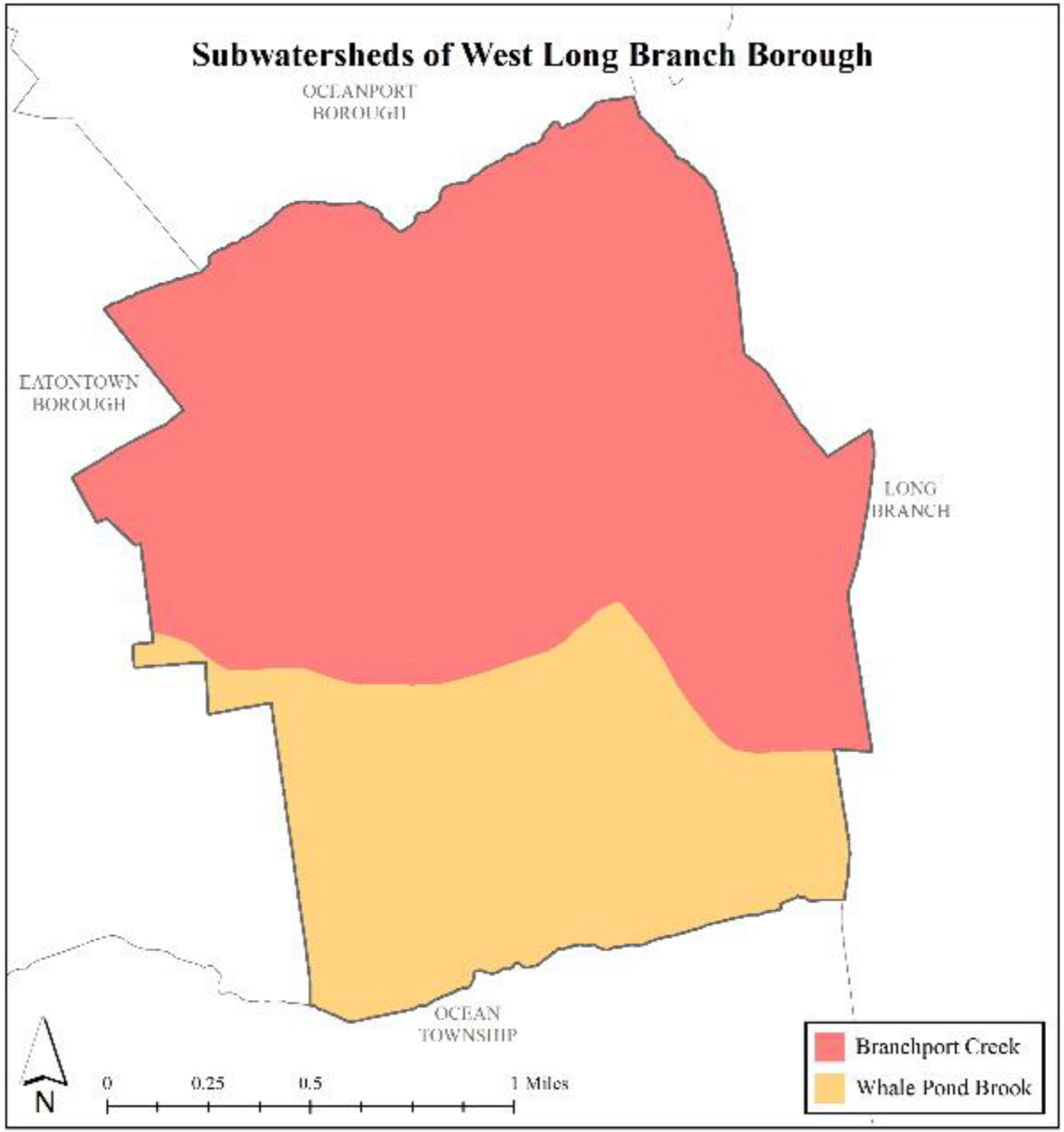
Impervious Cover Assessment

- Scare the hell out of the municipality
- Analysis completed by watershed and by municipality
- Use 2012 Land Use data to determine impervious cover
- Calculate runoff volumes for water quality, 2, 10 and 100 year design storm and annual rainfall
- Contain three concept designs


Land Use Types for West Long Branch Borough
OCEANPORT BOROUGH
EATONTOWN BOROUGH
LONG BRANCH
OCEAN TOWNSHIP
Agriculture
Barren land
Forest
Urban
Water
Wetlands
N
0
0.25
0.5
1 Miles


Agriculture
0.9%
Wetlands
5.0%
Forest
2.3%
Water
1.2%
Urban
90.6%


Transportation/Infrastructure
2.2%
Rural Residential
6.4%
Commercial
17.0%
Recreational Land
10.1%
High Density Residential
2.2%
Industrial
0.3%
Mixed Urban
4.2%
Low Density Residential
19.8%
Medium Density Residential
37.7%


Subwatersheds of West Long Branch Borough
OCEANPORT BOROUGH
EATONTOWN BOROUGH
LONG BRANCH
OCEAN TOWNSHIP
N
0
0.25
0.5
1 Miles
Branchport Creek
Whale Pond Brook

Watershed	Total Area (ac)	Impervious Cover (ac)	%
Branchport Creek	1,258	436	35.3%
Whale Pond Brook	596	156	26.2%
Total	1,854	592	32.3%

Subwatershed	NJ Water Quality Storm (MGal)	Annual Rainfall of 44" (MGal)	2-Year Design Storm (3.3”) (MGal)	10-Year Design Storm (5.0”) (MGal)	100-Year Design Storm (8.2”) (MGal)
Branchport Creek	15	521	40	62	105
Whale Pond Brook	5	186	14	22	38
Total	20	707	55	84	143

WE LOOK HERE FIRST:

- ✓Schools
- ✓Houses of Worship
- ✓Libraries
- ✓Municipal Building
- ✓Public Works
- ✓Firehouses
- ✓Post Offices
- ✓Elks or Moose Lodge
- ✓Parks/ Recreational Fields

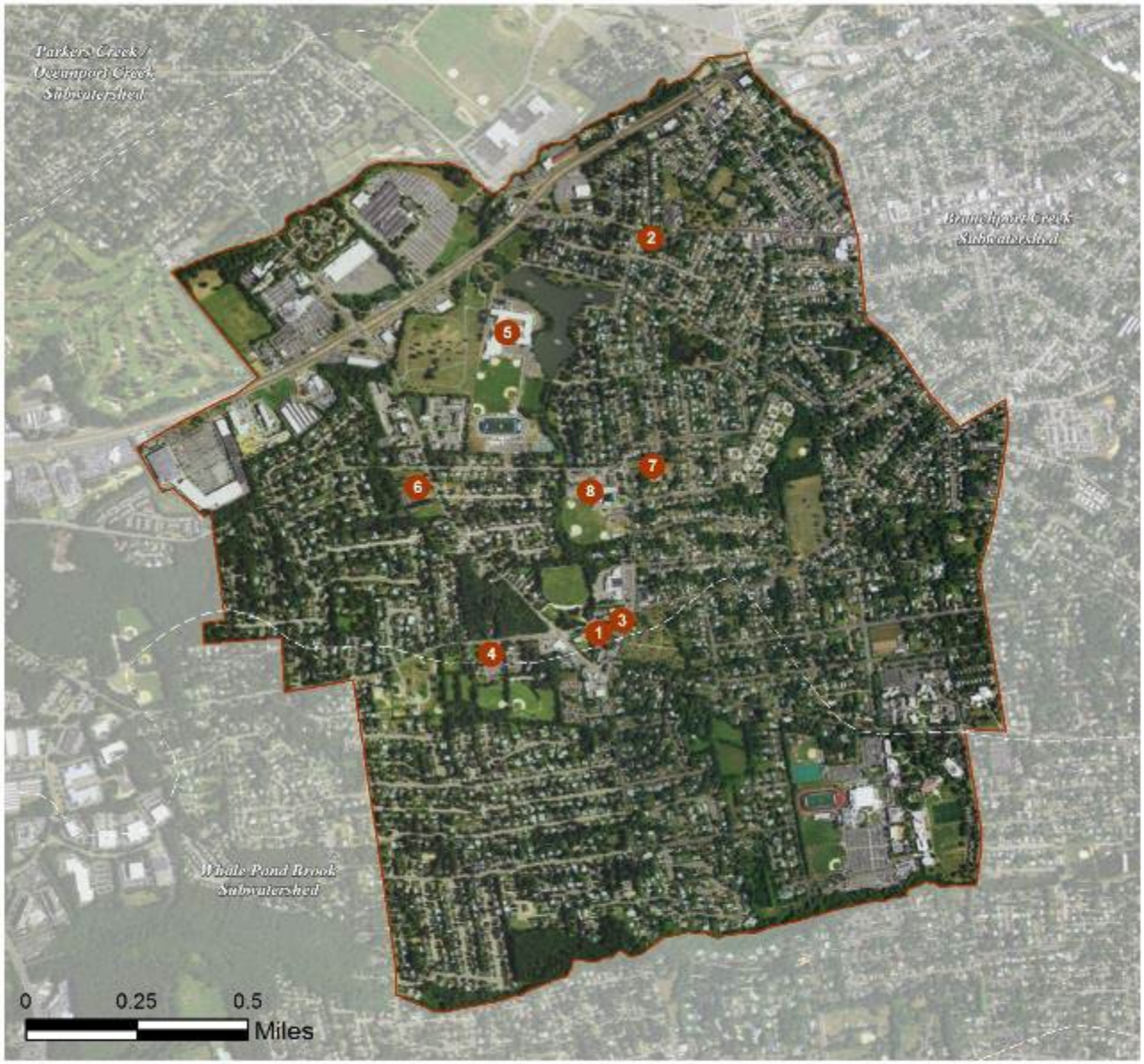
- 20 to 40 sites are entered into a PowerPoint
- Site visits are conducted

Impervious Cover Reduction Action Plan

Impervious Cover Reduction Action Plan

- A comprehensive document with many opportunities for green infrastructure
- A living document
- Shovel ready projects
- Projects for all ages (youth to seniors)
- Provides mitigation opportunities for developers
- Site level analysis

WEST LONG BRANCH BOROUGH: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BRNACHPORT CREEK SUBWATERSHED:

1. Frank Antonides Elementary School
2. Lutheran Church Reformation
3. Old First United Methodist Church
4. Saint Jerome's Catholic Church and School
5. Shore Regional High School
6. Sovereign Bank
7. West Long Branch Community Center
8. West Long Branch Public School

FRANK ANTONIDES ELEMENTARY SCHOOL

Subwatershed: Branchport Creek

Site Area: 107,870 sq. ft.

Address: 198-208 Wall Street
West Long Branch, NJ 07764

Block and Lot: Block 20, Lot 13, 15

Parking spots can be replaced with pervious pavement to capture and infiltrate parking lot and roof runoff. A cistern can be installed adjacent to the building to harvest rainwater that can be used to conduct car wash fundraisers A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
56	60,568	2.9	30.6	278.1	0.047	1.66

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavements	0.238	40	18,057	0.49	2,340	$58,500
Rainwater harvesting systems	0.036	6	1,000	0.08	1,000 (gal)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Frank Antonides Elementary School

- disconnected downspouts
- pervious pavements
- rainwater harvesting
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 25' 50'

West Long Branch Borough

RUTGERS
New Jersey Agricultural Experiment Station


1 Frank Antonides Elementary School


2 Lutheran Church Reformation

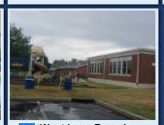

3 Old First United Methodist Church

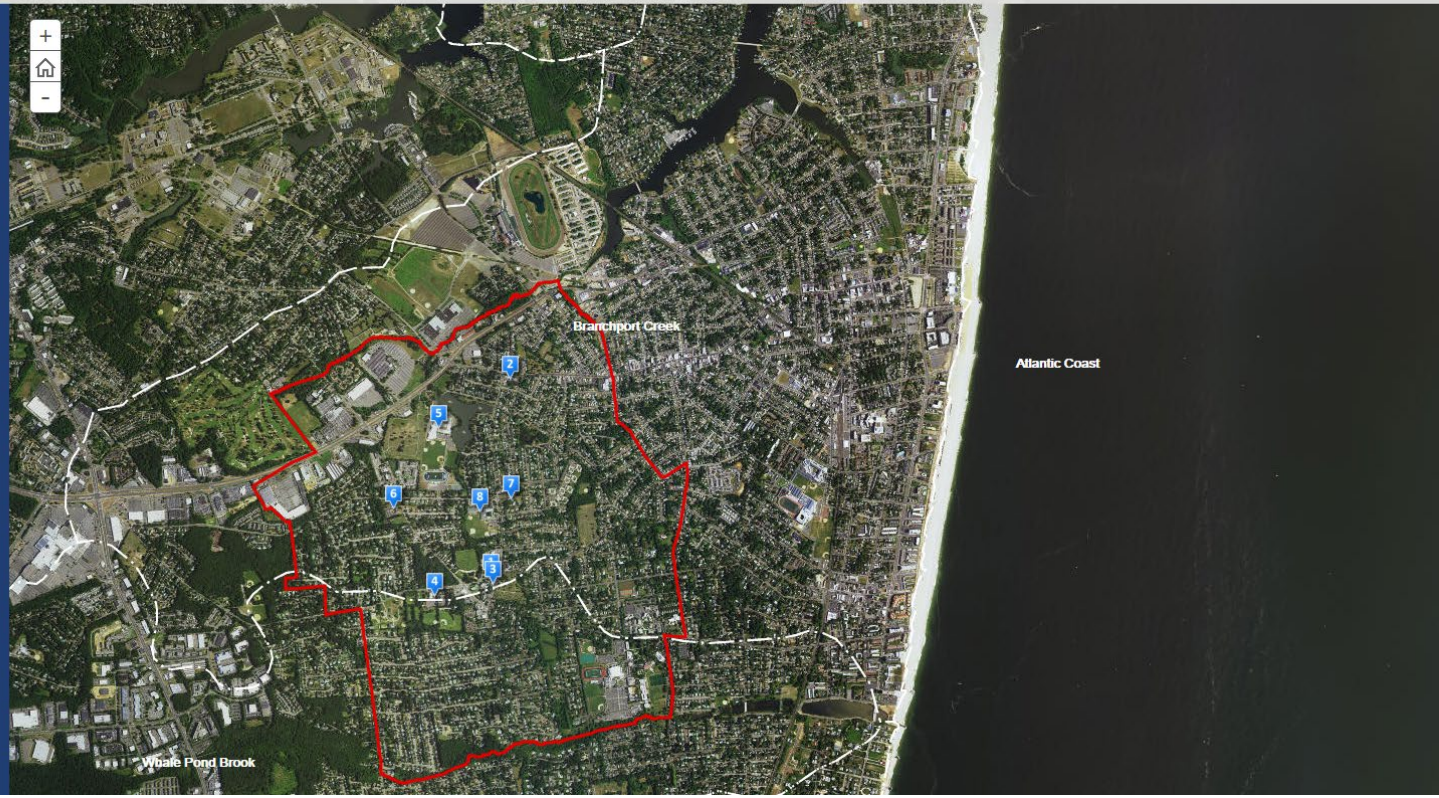

4 Saint Jerome's Catholic Church and School


5 Shore Regional High School


6 Sovereign Bank

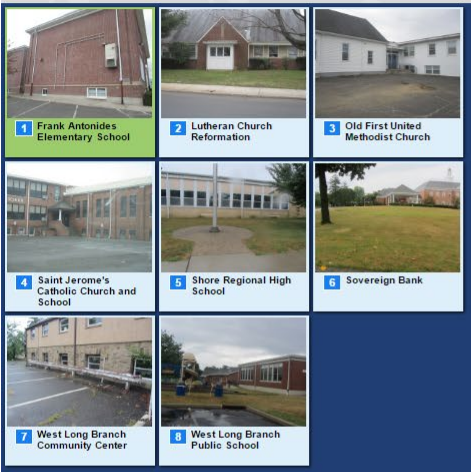

7 West Long Branch Community Center

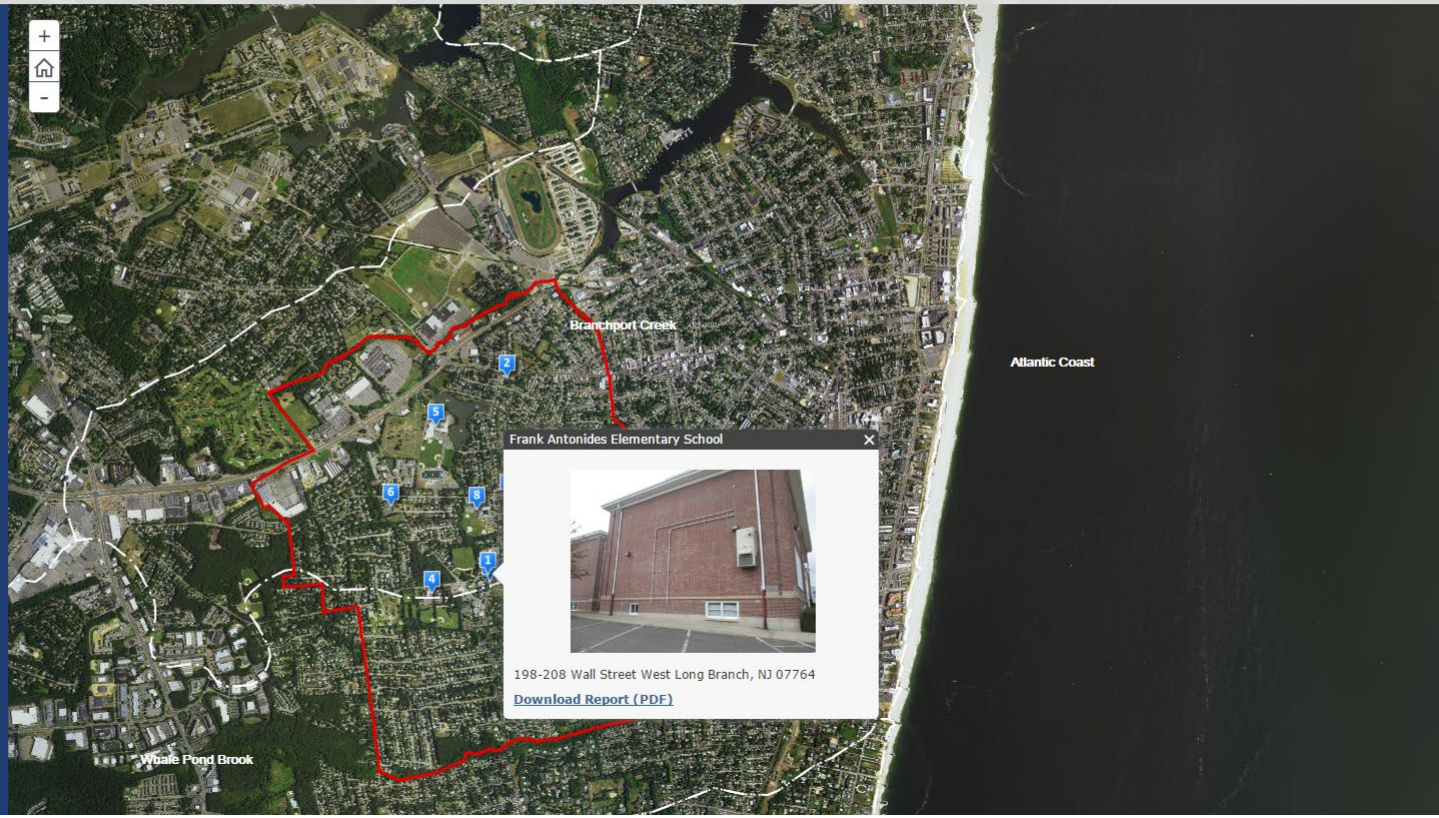

8 West Long Branch Public School



West Long Branch Borough

RUTGERS
New Jersey Agricultural Experiment Station

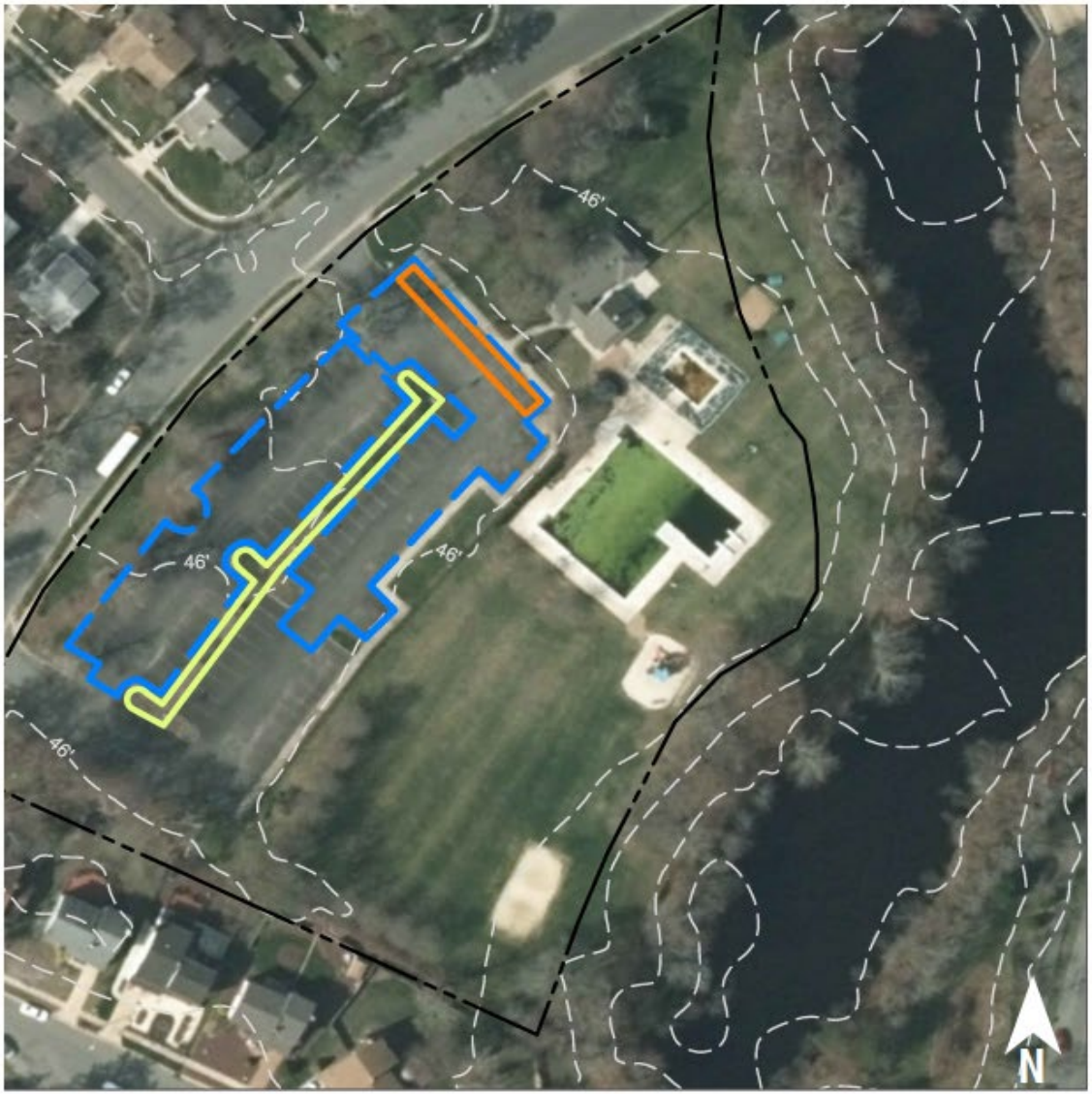




Green Infrastructure Feasibility Studies

Green Infrastructure Feasibility Study

- A high-end visual presentation of opportunities
- Provides green infrastructure overview
- Incorporates ICA and RAP information
- User-friendly format



bioretention system

pervious pavement

drainage area

property line

2015 Aerial: NJOIT, OGIS

0' 50' 100'

Stormwater is currently directed to an existing catch basin. Installing rain gardens in the parking lot islands can capture, treat, and infiltrate stormwater runoff from the parking lot. Replacing parking spaces with porous pavement can capture and infiltrate runoff from the other side of the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	From the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
30	51,770	2.5	26.1	237.7	0.040	1.42

Recommended Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.288	48	21,834	0.82	2,765	$13,825
Pervious pavement	0.352	59	26,651	1.00	2,410	$60,250

CURRENT CONDITION

CONCEPT DESIGN

How do You identify opportunities?

Help identify project sites but what makes a good site?

- Sites with impervious surfaces that are directly connected
- Sites with a lawn area that can be converts to accept stormwater runoff
- Sites with highly visibility – good educational opportunities
- Sites in impaired watersheds
- Sites on municipal owned land/public land
- Sites that provide partnership opportunities

Let's get started! Download aerial photograph of "Look Here First Sites"?

- Go to Google or Bing Maps
- Type in address
- Aerial or birds eye view
- "Snip It"
- Insert into Powerpoint
- "Crop It"

- Schools
- Churches
- Libraries
- Municipal Building
- Public Works
- Firehouses
- Post Offices
- Elks or Moose Lodge
- Parks/ Rec Fields

Other Questions

- Do the soils infiltrate?
- Who own the property? Will they be open to installing stormwater management measures?
- Are there potential partners to help with the project?
- Do we need permits for altering this site with stormwater best management practices?
- Does the building have a basement?
- Can we lose parking spaces?
- Who will maintain the BMPs?
- Is the project a high priority?

Site Visits

What are we looking for during our site visit?

1. What are sources of stormwater and where does it flow?
2. What is the direction and relative slope of site?
3. Where are impervious surfaces on the site?
4. What is the condition of the paved areas?
5. Are impervious surfaces directly connected?
6. Are there opportunities to disconnect?
7. Are there stormwater catch basins?

What are we looking for during our site visit (cont'd)?

9. Is there evidence of ponding water on site?
10. Where are the utilities on the site?
11. Are there pedestrian safety issues?

WHAT SHOULD YOU BRING:

Aerial photo

Pencil

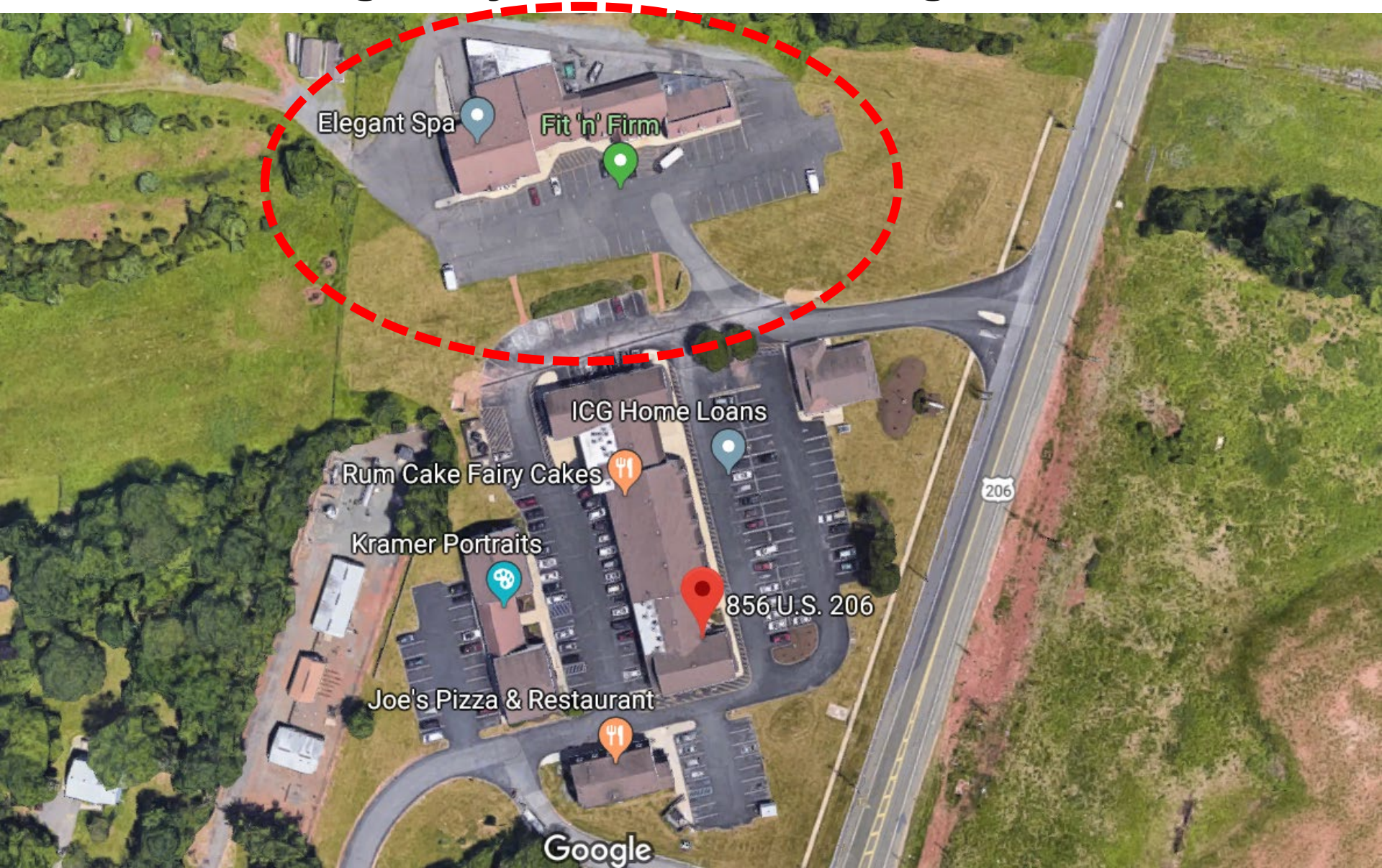
Tape measure/Wheel

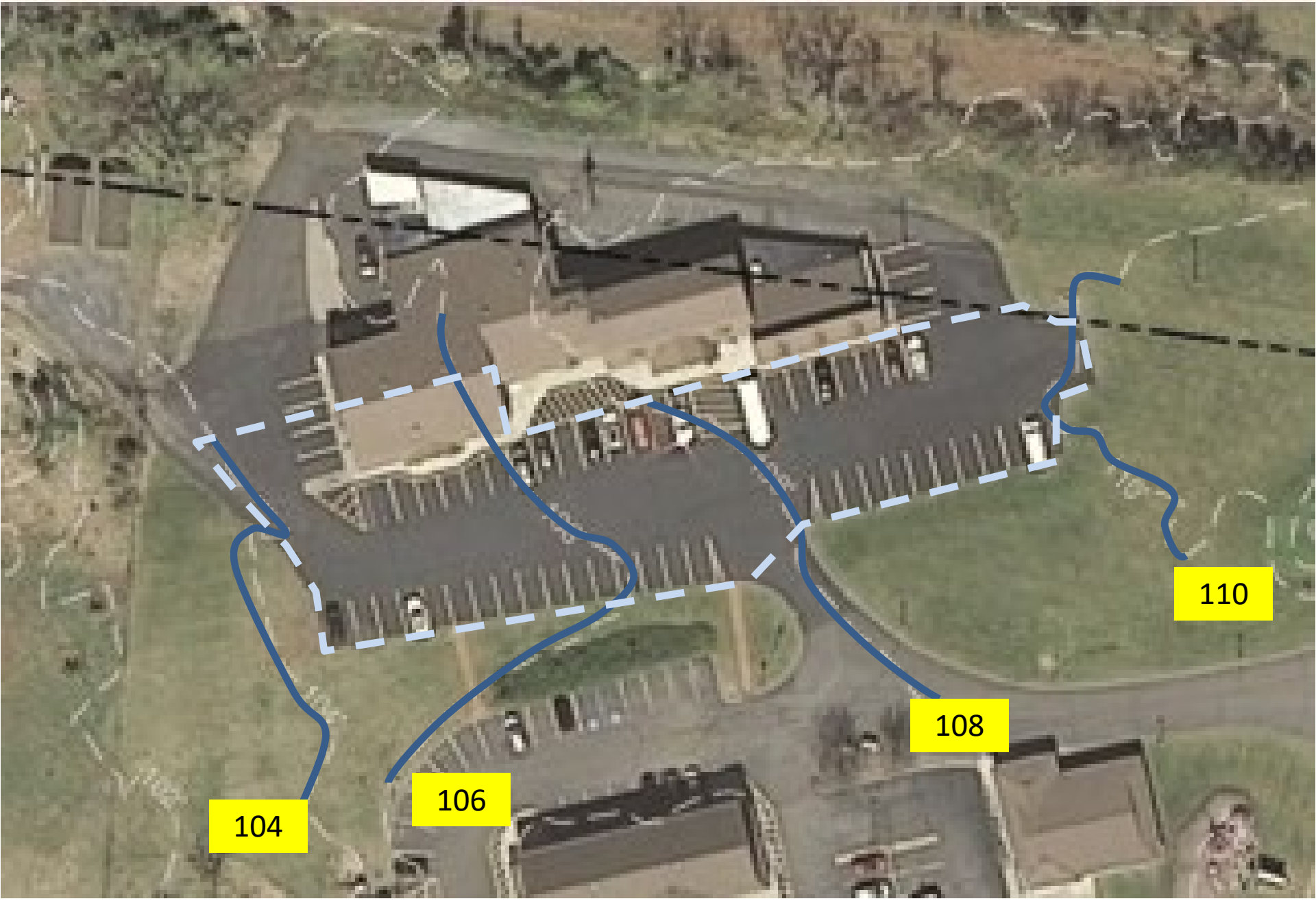
Camera

Green Infrastructure CHECKLIST
Green Infrastructure Manual
Green Infrastructure Brochure

Let's do an exercise

Mountain View Plaza
856 U.S. Highway 206, Hillsborough, NJ

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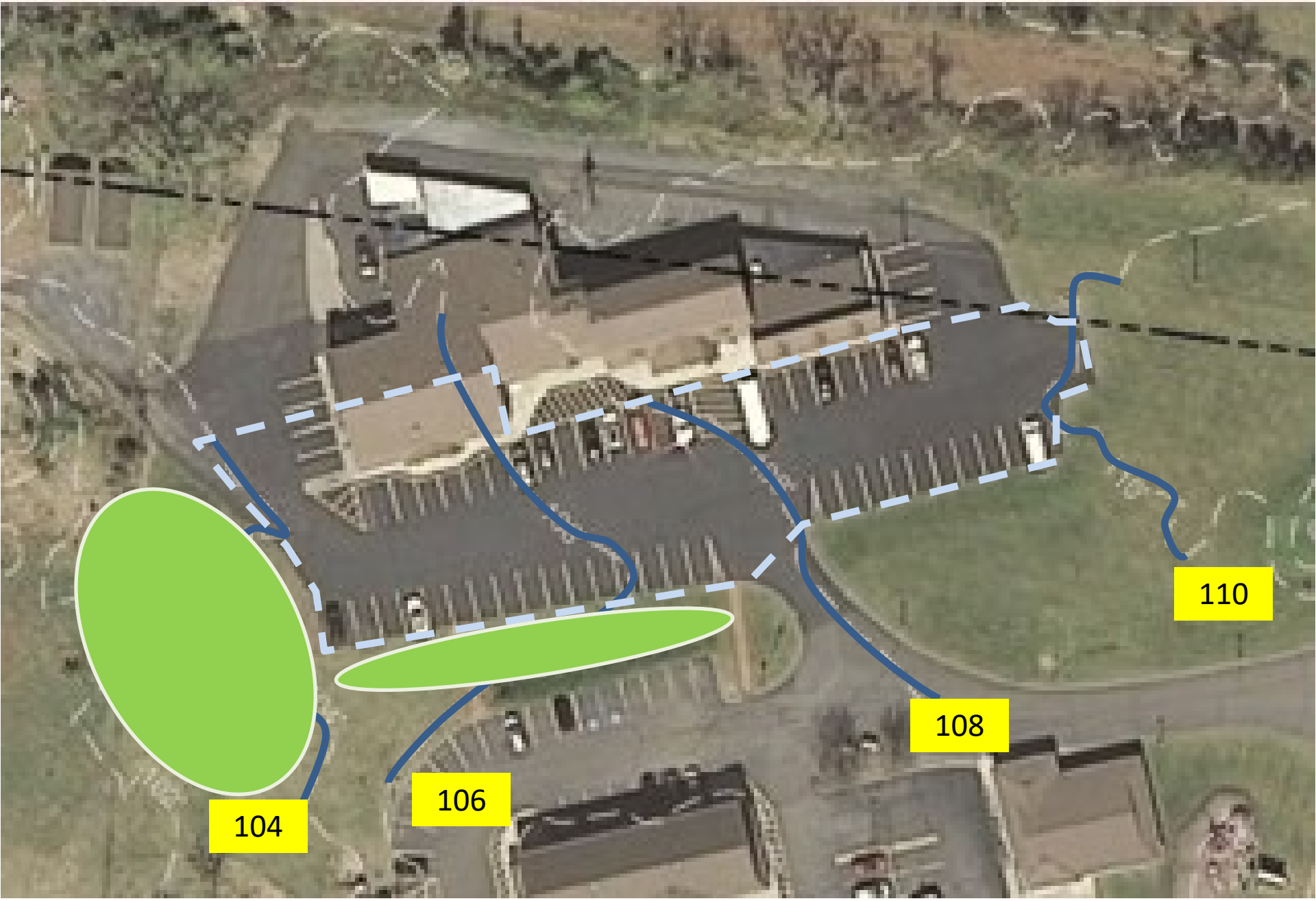
106
108
110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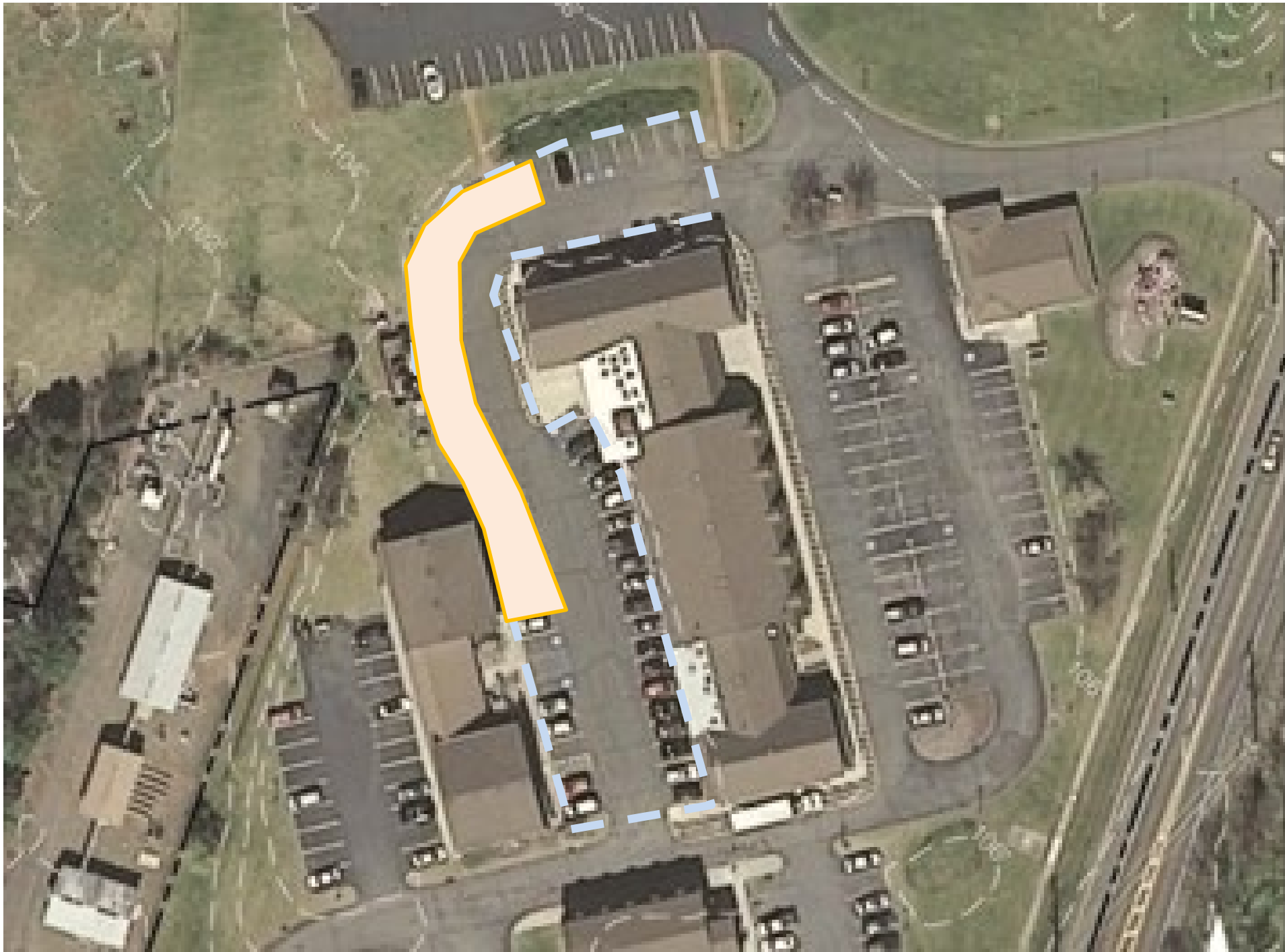
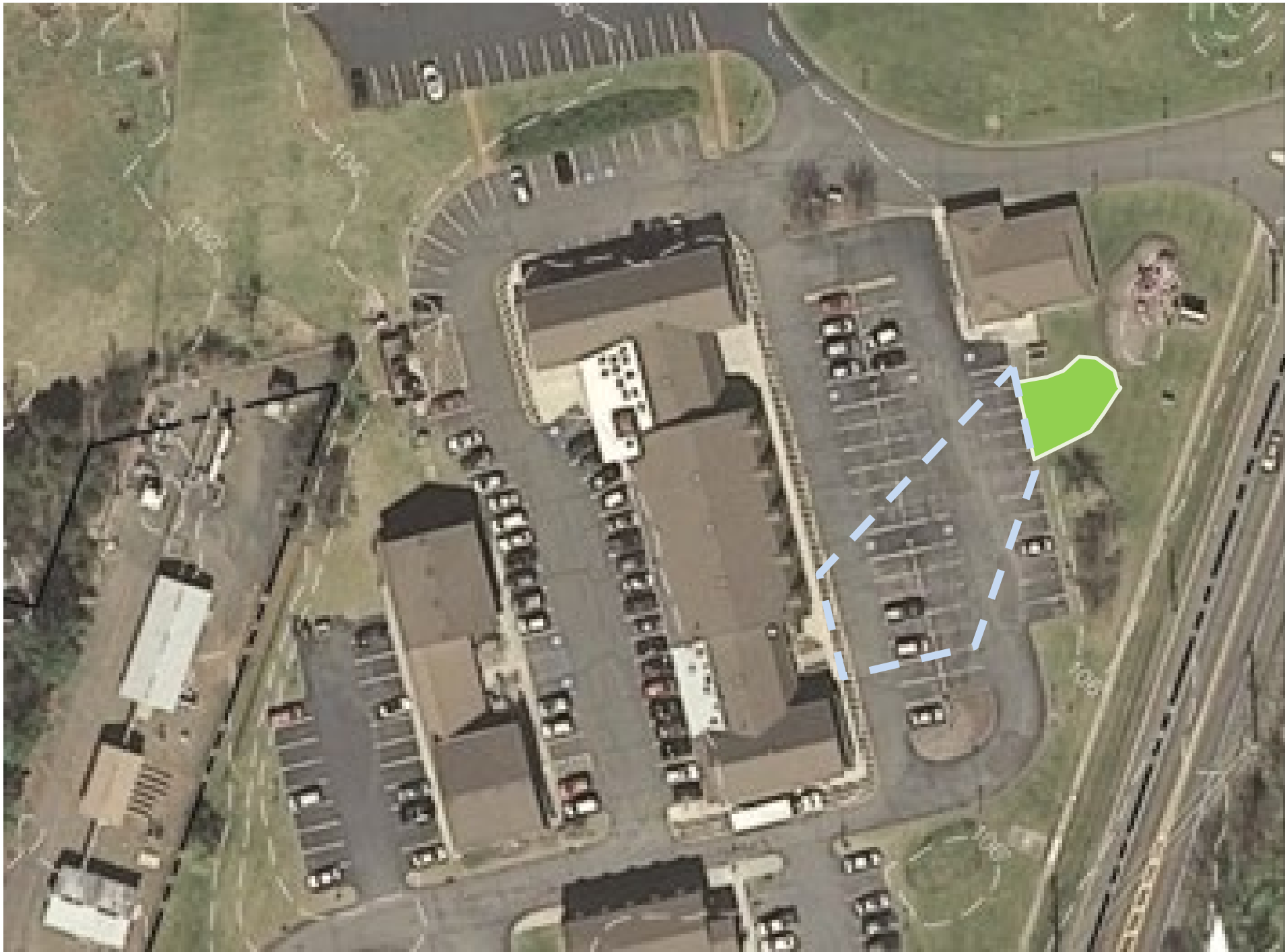
110

Mountain View Plaza
856 U.S. Highway 206, Hillsborough, NJ

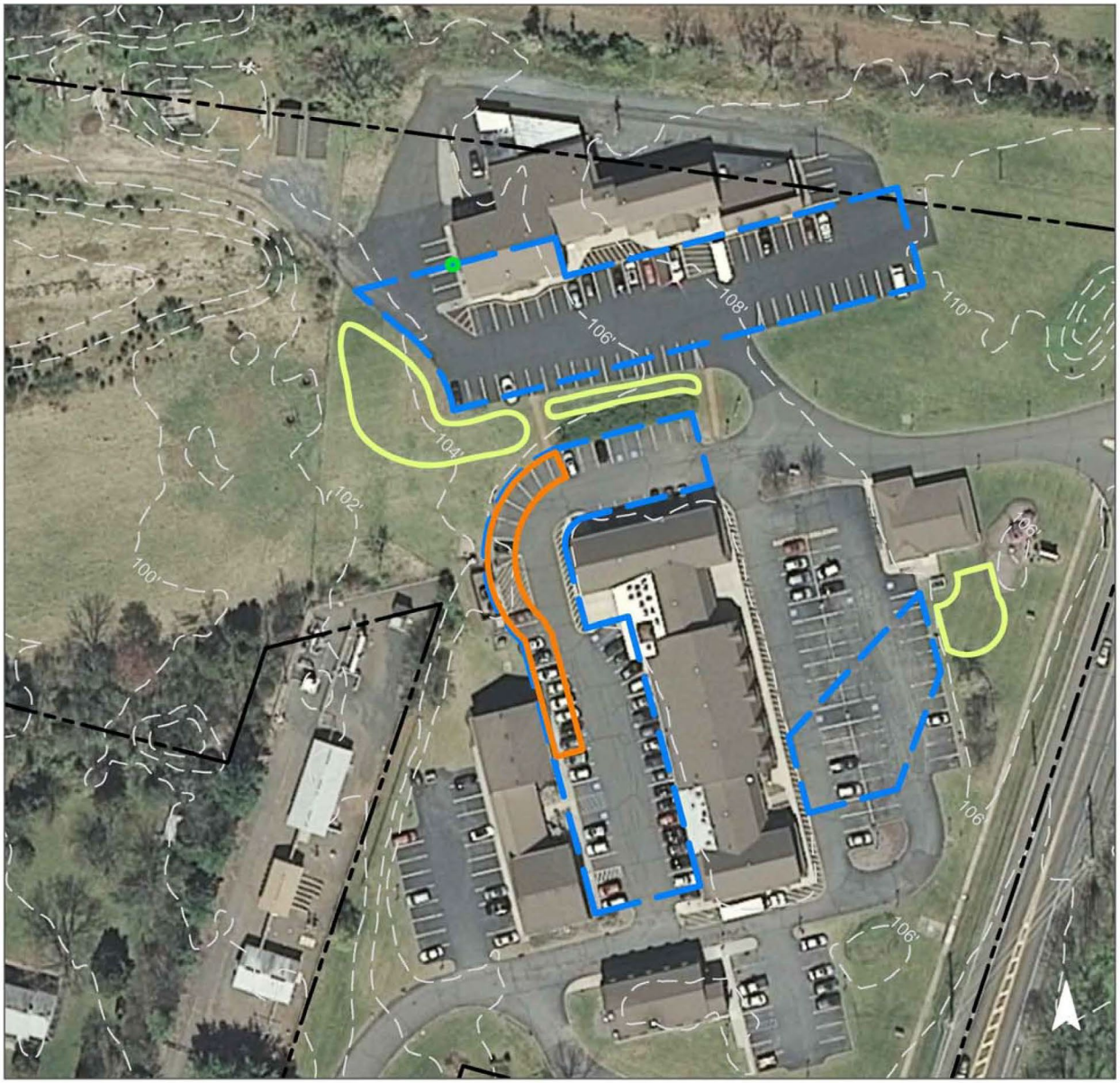


3

Mountain View Plaza
856 U.S. Highway 206, Hillsborough, NJ



GREEN INFRASTRUCTURE RECOMMENDATIONS



Mountain View Plaza

- disconnected downspouts
- pervious pavements
- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 50' 100'

MOUNTAIN VIEW PLAZA

Subwatershed: Pike Run

Site Area: 503,957 sq. ft.

Address: 856 US Highway 206
Hillsborough, NJ 08844

Block and Lot: Block 177, Lot 24.02

Several rain gardens can capture, treat, and infiltrate stormwater. Pervious pavement can infiltrate additional runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
38	190,333	9.2	96.1	873.9	0.148	5.22

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.845	141	62,570	2.35	8,065	$40,325
Pervious pavements	0.605	101	44,805	1.68	3,860	$96,500

PASSAIC VALLEY SEWERAGE COMMISSION

"Protecting Public Health and the Environment"

RUTGERS

New Jersey Agricultural Experiment Station

Resources for You!

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Projects & Programs
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Water Pages
Fact Sheets
E-learning Tools
Useful Links

Our green infrastructure initiative in urban centers focuses on capturing stormwater with cost-effective practices before it enters the combined sewer systems.

About Us

Rutgers Cooperative Extension
Water Resources Program

G.H. Cook Campus
14 College Farm Road
New Brunswick, NJ 08901

www.water.rutgers.edu

~Creating Solutions for
Water Resources Issues in New Jersey~

Our mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

News

- In the News - October 3, 2017
- SEBS/NJAES Newsroom

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Projects & Programs

Agricultural Watershed Planning & Implementation	Municipal/Community Training
Green Infrastructure Program	Rain Gardens & Rain Barrels
Keep the Rain from the Drain ~ Impervious Cover Reduction Program	Watershed Planning & Implementation
Municipal Stormwater Management	

Agricultural Watershed Planning & Implementation

- Watershed Restoration & Protection Plan for Assiscunk Creek, Burlington County, NJ
- Assiscunk Creek Watershed Agricultural Mini-Grant Program
- Biofilter Wetland at Harrow Run, Water Quality Evaluation of Pollutant Removal Efficiency from a Tailwater Recovery System
- Watershed Restoration Plan for the Upper Cohansey River Watershed
- Upper Cohansey River Watershed Agricultural Mini-Grant Program
- Watershed Restoration Plan for the Upper Salem River Watershed
- Upper Salem River Watershed Agricultural Mini-Grant Program

Top of Page

Green Infrastructure Program

- Camden Green Infrastructure Initiative
- Fixing Flooding: One Community at a Time
  Innovative Solutions using Green Infrastructure Conference
- Green Infrastructure Education and Implementation Program
- Green Infrastructure Guidance Manual for New Jersey
- Green Infrastructure Solutions for New Jersey Conference

Keep the Rain from the Drain ~ Impervious Cover Reduction Program

- Impervious Cover Assessments and Impervious Cover Reduction Action Plans for Coastal Communities
- National Fish and Wildlife Foundation ~ Incorporating Green Infrastructure Resiliency in the Raritan River Basin
- Impervious Cover Assessments, Impervious Cover Reduction Action Plans, and Green Infrastructure Reduction Action Plans for New Jersey Future's Mainstreaming Green Infrastructure Program
- Salem County and Cumberland County, NJ ~ Impervious Cover Assessments and Impervious Cover Reduction Action Plans
- William Penn Foundation - Technical Support Program for Municipalities and Watershed Partners

HUNTERDON COUNTY

Delaware Twp
- *ICA*
- *RAP*
- *RAP web map*

Franklin Twp
- *ICA*
- *RAP*
- *RAP web map*

East Amwell Twp
- *ICA*
- *RAP*
- *RAP web map*

Raritan Twp
- *ICA*
- *RAP*
- *RAP web map*

Flemington Boro
- *ICA*
- *RAP*
- *RAP web map*

Readington Twp
- *ICA*
- *RAP*
- *RAP web map*

MIDDLESEX COUNTY

Dunellen Boro
- *ICA*
- *RAP*
- *RAP web map*

North Brunswick Twp
- *ICA*
- *RAP*
- *RAP web map*

NEW JERSEY HIGHLANDS WATERSHED CLUSTER

Alpha
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*

Lopatcong
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*

Branchville
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*

Mount Arlington
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*

Greenwich
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*

Mount Olive
- *ICA*
- *RAP*
- *RAP web map*
- *Feasibility Study*


QUESTIONS?

The great aim of education is not knowledge but action.

- Herbert Spencer