RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Assessment for Somerville Borough, Somerset County, New Jersey

Prepared for Somerville Borough by the
Rutgers Cooperative Extension Water Resources Program

February 4, 2015

Introduction

Pervious and impervious are terms that are used to describe the ability or inability of water to flow through a surface. When rainfall hits a surface, it can soak into the surface or flow off the surface. Pervious surfaces are those which allow stormwater to readily soak into the soil and recharge groundwater. When rainfall drains from a surface, it is called "stormwater" runoff (Figure 1). An impervious surface can be any material that has been placed over soil that prevents water from soaking into the ground. Impervious surfaces include paved roadways, parking lots, sidewalks, and rooftops. As impervious areas increase, so does the volume of stormwater runoff.

Figure 1: Stormwater draining from a parking lot

New Jersey has many problems due to stormwater runoff, including:

- Pollution: According to the 2010 New Jersey Water Quality Assessment Report, 90% of the assessed waters in New Jersey are impaired, with urban-related stormwater runoff listed as the most probable source of impairment (USEPA, 2013). As stormwater flows over the ground, it picks up pollutants including animal waste, excess fertilizers, pesticides, and other toxic substances. These pollutants are then able to enter waterways.

- Flooding: Over the past decade, the state has seen an increase in flooding. Communities around the state have been affected by these floods. The amount of damage caused also has increased greatly with this trend, costing billions of dollars over this time span.

- Erosion: Increased stormwater runoff causes an increase in the velocity of flows in our waterways. The increased velocity after storm events erodes stream banks and shorelines, degrading water quality. This erosion can damage local roads and bridges and cause harm to wildlife.

The primary cause of the pollution, flooding, and erosion problems is the quantity of impervious surfaces draining directly to local waterways. New Jersey is one of the most developed states in the country. Currently, the state has the highest percent of impervious cover in the country at 12.1% of its total area (Nowak & Greenfield, 2012). Many of these impervious surfaces are directly connected to local waterways (i.e., every drop of rain that lands on these impervious surfaces ends up in a local river, lake, or bay without any chance of being treated or soaking into the ground). To repair our waterways, reduce flooding, and stop erosion, stormwater runoff from impervious surfaces has to be better managed. Surfaces need to be disconnected with green infrastructure to prevent stormwater runoff from flowing directly into New Jersey's waterways. Disconnection redirects runoff from paving and rooftops to pervious areas in the landscape.

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 maintain or mimic natural systems and to treat runoff as a resource. As a general principal, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits (USEPA, 2013).

The first step to reducing the impacts from impervious surfaces is to conduct an impervious cover assessment. This assessment can be completed on different scales: individual lot, municipality, or watershed. Impervious surfaces need to be identified for stormwater management. Once impervious surfaces have been identified, there are three steps to better manage these surfaces.

1. ***Eliminate surfaces that are not necessary.*** For example, a paved courtyard at a public school could be converted to a grassed area.

2. ***Reduce or convert impervious surfaces.*** There may be surfaces that are required to be hardened, such as roadways or parking lots, but could be made smaller and still be functional. A parking lot that has two-way car ways could be converted to one-way car ways. There also are permeable paving materials such as porous asphalt, pervious concrete, or permeable paving stones that could be substituted for impermeable paving materials (Figure 2).

3. ***Disconnect impervious surfaces from flowing directly to local waterways.*** There are many ways to capture, treat, and infiltrate stormwater runoff from impervious surfaces. Opportunities may exist to reuse this captured water.

Figure 2: Rapid infiltration of water through porous pavement is demonstrated at the USEPA Edison New Jersey test site

Somerville Borough Impervious Cover Analysis

Located in Somerset County in central New Jersey, Somerville Borough covers approximately 2.3 square miles. Figures 3 and 4 illustrate that Somerville Borough is dominated by urban land uses. A total of 83.8% of the municipality's land use is classified as urban. Of the urban land in Somerville Borough, medium density residential is the dominant urban land use (Figure 5).

The literature suggests a link between impervious cover and stream ecosystem impairment starting at approximately 10% impervious surface cover (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on the scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams. Sensitive steams typically have a watershed impervious surface cover from 0 – 10%. Impacted streams have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. Non-supporting streams have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Somerville Borough into many unique land use areas, assigning a percent impervious cover for each delineated area. These impervious cover values were used to estimate the impervious coverage for Somerville Borough. Based upon the 2007 NJDEP land use/land cover data, approximately 40.1% of Somerville Borough has impervious cover. This level of impervious cover suggests that the streams in Somerville Borough are likely non-supporting streams.

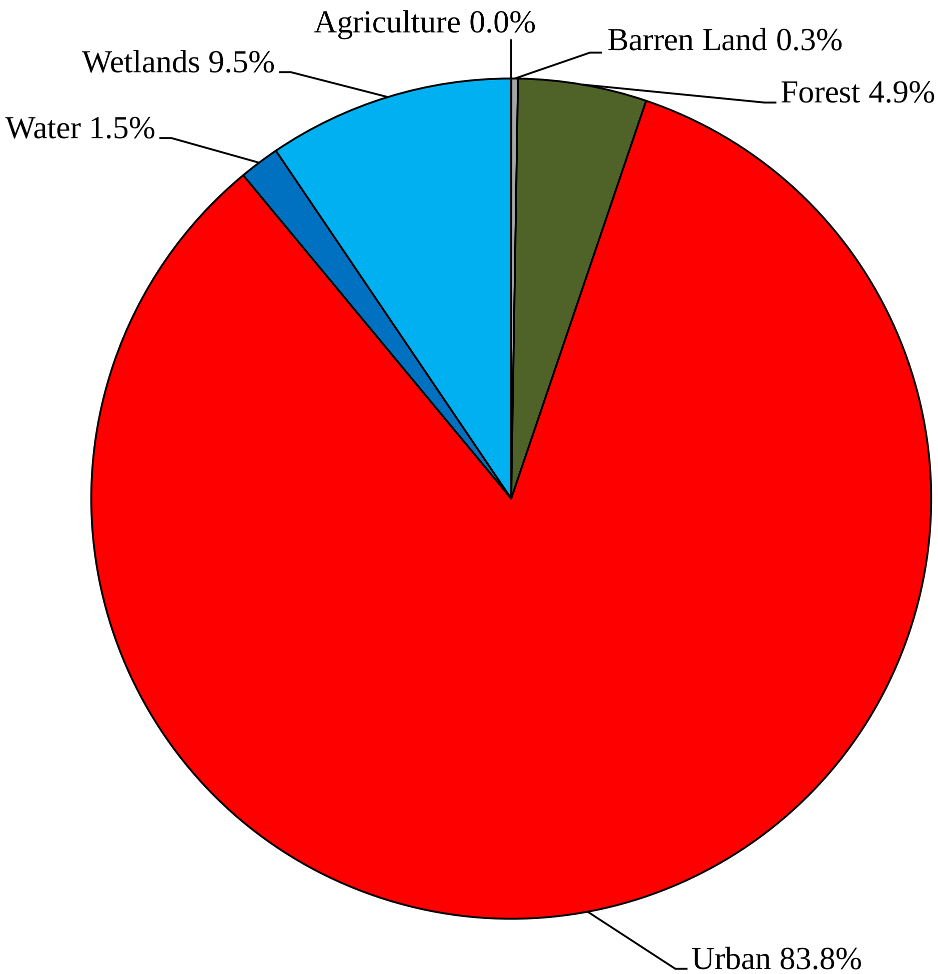


Figure 3: Pie chart illustrating the land use in Somerville Borough

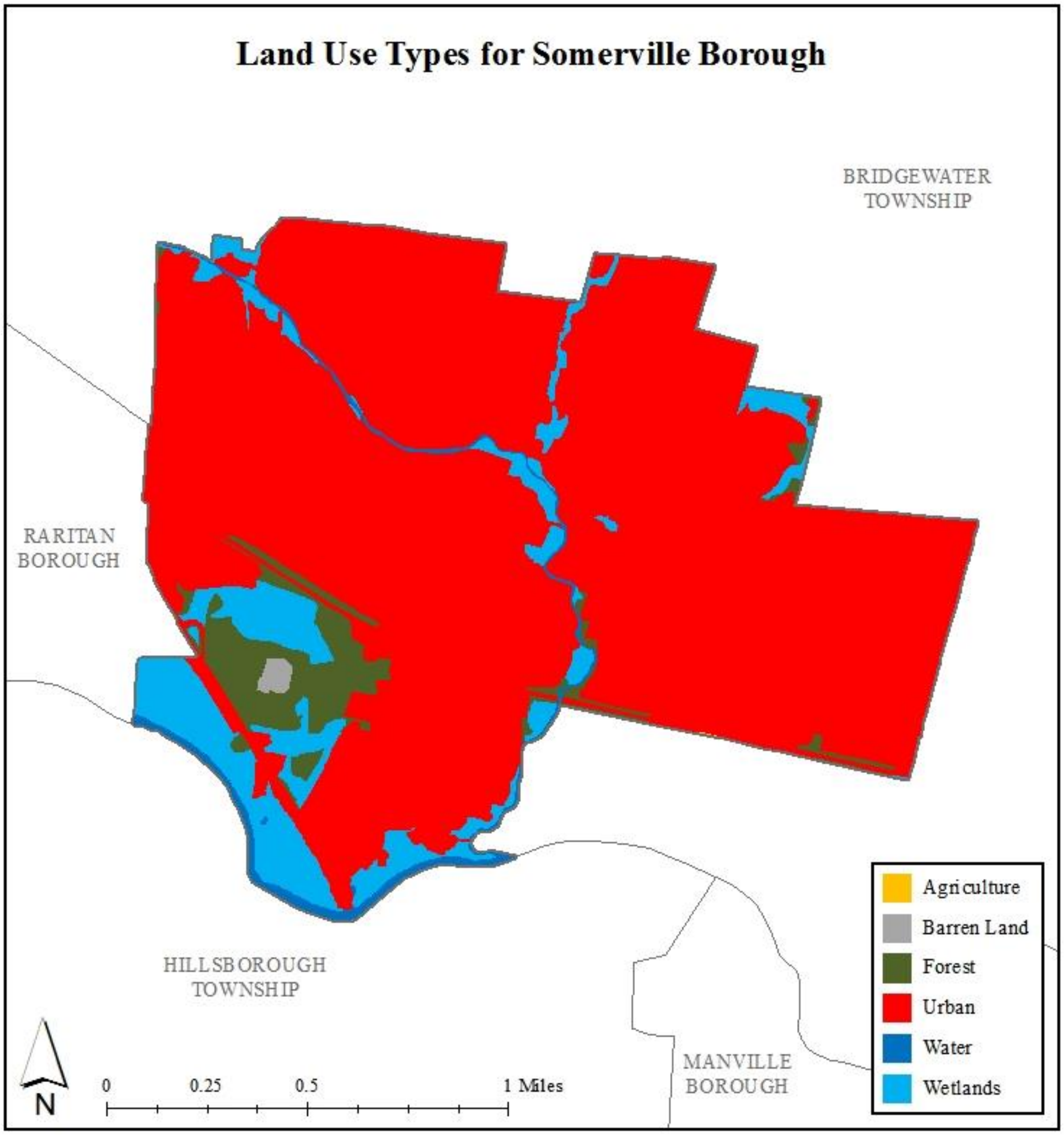


Figure 4: Map illustrating the land use in Somerville Borough

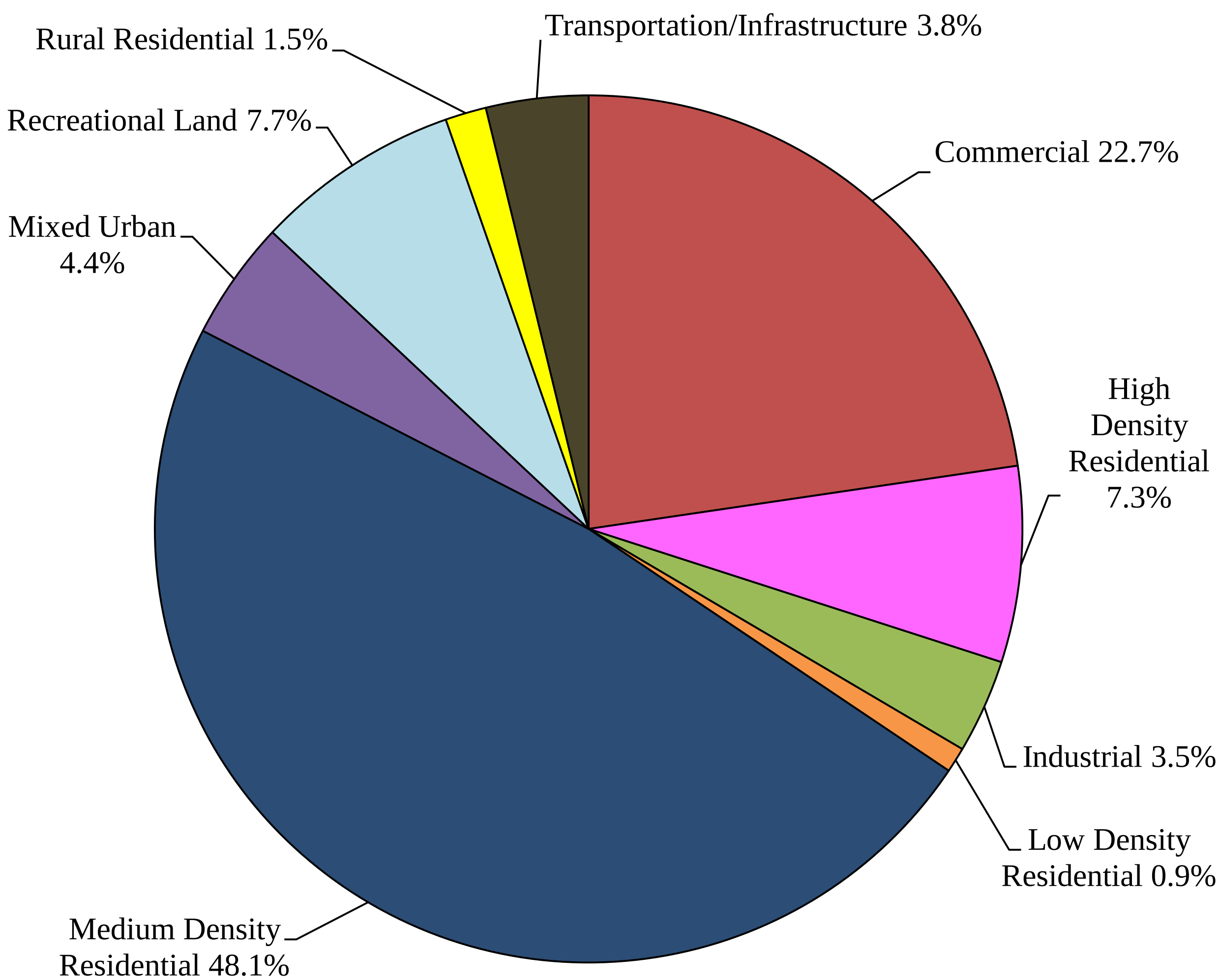


Figure 5: Pie chart illustrating the various types of urban land use in Somerville Borough

Water resources are typically managed on a watershed/subwatershed basis; therefore an impervious cover analysis was performed for each Raritan River subwatershed within Somerville Borough (Table 1 and Figure 6). On a subwatershed basis, impervious cover ranges from 36.4% in the Lower Raritan River subwatershed to 72.6% in Cuckels Brook subwatershed. Evaluating impervious cover on a subwatershed basis allows the municipality to focus impervious cover reduction or disconnection efforts in the subwatersheds where frequent flooding occurs.

In developed landscapes, stormwater runoff from parking lots, driveways, sidewalks, and rooftops flows to drainage pipes that feed the sewer system. The cumulative effect of these impervious surfaces and thousands of connected downspouts reduces the amount of water that can infiltrate into soils and greatly increases the volume and rate of runoff that flows to waterways. Stormwater runoff volumes (specific to Somerville Borough, Somerset County) associated with impervious surfaces were calculated for the following storms: the New Jersey water quality design storm of 1.25 inches of rain, an annual rainfall of 44 inches, the 2-year design storm (3.3 inches of rain), the 10-year design storm (5.0 inches of rain), and the 100-year design storm (8.2 inches of rain). These runoff volumes are summarized in Table 2. A substantial amount of rainwater drains from impervious surfaces in Somerville Borough. For example, if the stormwater runoff from one water quality storm (1.25 inches of rain) in the Peters Brook subwatershed was harvested and purified, it could supply water to 112 homes for one year[1].

[1] Assuming 300 gallons per day per home

Table 1: Impervious cover analysis by subwatershed for Somerville Borough

Subwatershed	Total Area		Land Use Area		Water Area		Impervious Cover		
	(ac)	(mi^2)	(ac)	(mi^2)	(ac)	(mi^2)	(ac)	(mi^2)	(%)
Cuckels Brook	2.37	0.00	2.37	0.00	0.00	0.00	1.72	0.00	72.6%
Peters Brook	857.1	1.34	847.7	1.32	9.50	0.01	362.4	0.57	42.8%
Lower Raritan River	641.4	1.00	627.6	0.98	13.8	0.02	228.4	0.36	36.4%
Total	1,500.9	2.35	1,477.7	2.31	23.3	0.04	592.5	0.93	40.1%

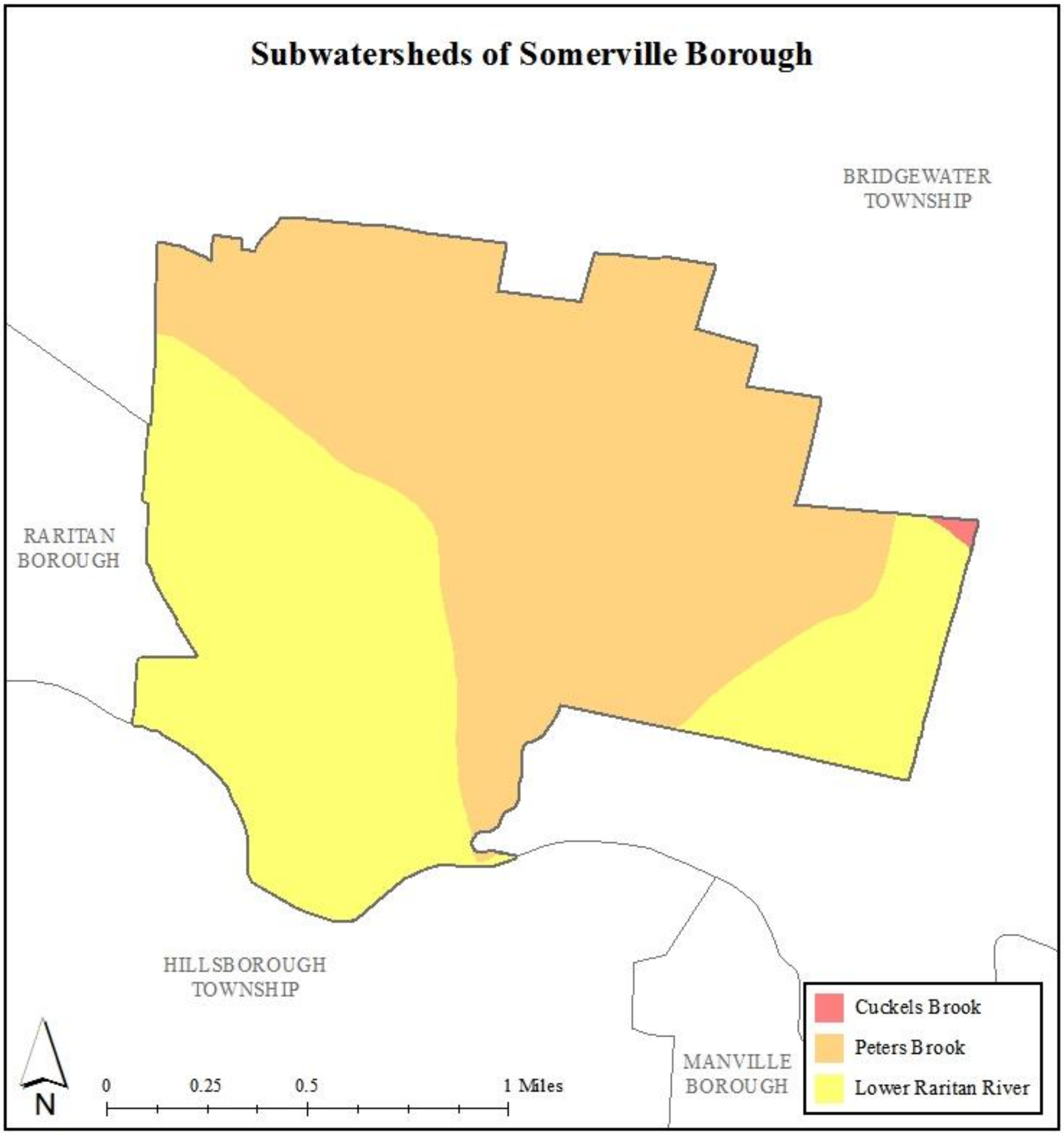


Figure 6: Map of the subwatersheds in Somerville Borough

Table 2: Stormwater runoff volumes from impervious surfaces by subwatershed in Somerville Borough

Subwatershed	**Total Runoff Volume for the 1.25" NJ Water Quality Storm (MGal)**	**Total Runoff Volume for the NJ Annual Rainfall of 44" (MGal)**	**Total Runoff Volume for the 2-Year Design Storm (3.3”) (MGal)**	**Total Runoff Volume for the 10-Year Design Storm (5.0”) (MGal)**	**Total Runoff Volume for the 100-Year Design Storm (8.2”) (MGal)**
Cuckels Brook	0.1	2.1	0.2	0.2	0.4
Peters Brook	12.3	433.0	32.5	49.2	80.7
Lower Raritan River	7.8	272.9	20.5	31.0	50.9
Total	20.1	708.0	53.1	80.4	131.9

The next step is to set a reduction goal for impervious area in each watershed. Based upon the Rutgers Cooperative Extension (RCE) Water Resources Program's experience, a 10% reduction would be a reasonably achievable reduction for these watersheds in Somerville Borough. While it may be difficult to eliminate paved areas or replace paved areas with permeable pavement, it is relatively easy to identify impervious surfaces that can be disconnected using green infrastructure practices. For all practical purposes, disconnecting an impervious surface from a storm sewer system or a water body is an "impervious area reduction." The RCE Water Resources Program recommends that all green infrastructure practices that are installed to disconnect impervious surfaces should be designed for the 2-year design storm (3.3 inches of rain over 24-hours). Although this results in management practices that are slightly over-designed by NJDEP standards, which require systems to be designed for the New Jersey water quality storm (1.25 inches of rain over 2-hours), these systems will be able to handle the increase in storm intensities that are expected to occur due to climate change. By designing these management practices for the 2-year design storm, these practices will be able to manage 95% of the annual rainfall volume. The recommended annual reductions in runoff volumes are shown in Table 3.

As previously mentioned, once impervious surfaces have been identified, the next steps for managing impervious surfaces are to 1) eliminate surfaces that are not necessary, 2) reduce or convert impervious surfaces to pervious surfaces, and 3) disconnect impervious surfaces from flowing directly to local waterways.

Elimination of Impervious Surfaces

One method to reduce impervious cover is to "depave." Depaving is the act of removing paved impervious surfaces and replacing them with pervious soil and vegetation that will allow for the infiltration of rainwater. Depaving leads to the re-creation of natural space that will help reduce flooding, increase wildlife habitat, and positively enhance water quality as well as beautify neighborhoods. Depaving also can bring communities together around a shared vision to work together to reconnect their neighborhood to the natural environment.

Table 3: Impervious cover reductions by subwatershed in Somerville Borough

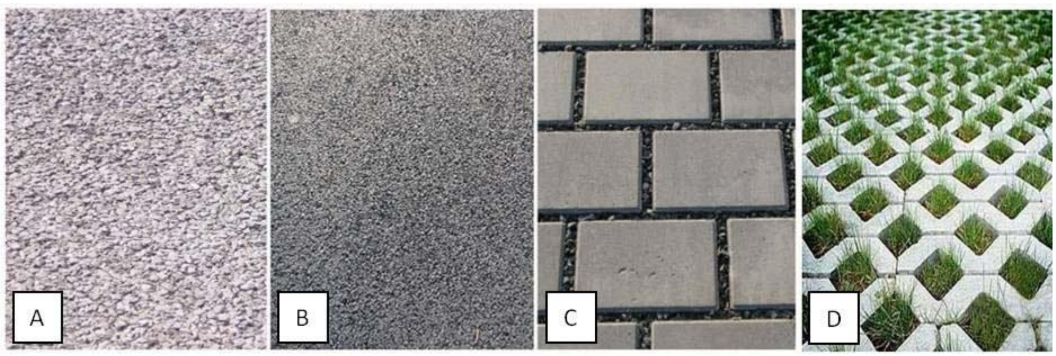
Subwatershed	Recommended Impervious Area Reduction (10%) (ac)	Annual Runoff Volume Reduction [2] (MGal)
Cuckels Brook	0.2	0.2
Peters Brook	36.2	41.1
Lower Raritan River	22.8	25.9
Total	59.3	67.2

[2] Annual Runoff Volume Reduction =
Acres of impervious cover x 43,560 ft^2/ac x 44 in x (1 ft/12 in) x 0.95 x (7.48 gal/ft^3) x (1 MGal/1,000,000 gal)
All green infrastructure should be designed to capture the first 3.3 inches of rain from each storm. This would allow the green infrastructure to capture 95% of the annual rainfall of 44 inches.

Pervious Pavement

There are four different types of permeable pavement systems that are commonly being used throughout the country to reduce the environmental impacts from impervious surfaces. These surfaces include pervious concrete, porous asphalt, interlocking concrete pavers, and grid pavers.

> "*Permeable pavement is a stormwater drainage system that allows rainwater and runoff to move through the pavement's surface to a storage layer below, with the water eventually seeping into the underlying soil. Permeable pavement is beneficial to the environment because it can reduce stormwater volume, treat stormwater water quality, replenish the groundwater supply, and lower air temperatures on hot days (Rowe, 2012).*"



Permeable surfaces: (A) pervious concrete, (B) porous asphalt, (C) interlocking concrete pavers, (D) grid pavers (Rowe, 2012)

Pervious concrete and porous asphalt are the most common of the permeable surfaces. They are similar to regular concrete and asphalt but without the fine materials. This allows water to quickly pass through the material into an underlying layered system of stone that holds the water allowing it to infiltrate into the underlying uncompacted soil.

Impervious Cover Disconnection Practices

By redirecting runoff from paving and rooftops to pervious areas in the landscape, the amount of directly connected impervious area in a drainage area can be greatly reduced. There are many cost-effective ways to disconnect impervious surfaces from local waterways.

- Simple Disconnection: This is the easiest and least costly method to reduce stormwater runoff for smaller storm events. Instead of piping rooftop runoff to the street where it enters the catch basin and is piped to the river, the rooftop runoff is released onto a grassed area to allow the water to be filtered by the grass and soak into the ground. A healthy lawn typically can absorb the first one to two inches of stormwater runoff from a rooftop. Simple disconnection also can be used to manage stormwater runoff from paved areas. Designing a parking lot or driveway to drain onto a grassed area, instead of the street, can dramatically reduce pollution and runoff volumes.

- <u>Rain Gardens</u>: Stormwater can be diverted into shallow landscaped depressed areas (i.e., rain gardens) where the vegetation filters the water, and it is allowed to soak into the ground. Rain gardens, also known as bioretention systems, come in all shapes and sizes and can be designed to disconnect a variety of impervious surfaces (Figure 7).

Figure 7: Rain garden outside the RCE of Gloucester County office which was designed to disconnect rooftop runoff from the local storm sewer system

- <u>Rainwater Harvesting</u>: Rainwater harvesting includes the use of rain barrels and cisterns (Figures 8a and 8b). These can be placed below downspouts to collect rooftop runoff. The collected water has a variety of uses including watering plants and washing cars. This practice also helps cut down on the use of potable water for nondrinking purposes. It is important to divert the overflow from the rainwater harvesting system to a pervious area.

Figure 8a: Rain barrel used to disconnect a downspout with the overflow going to a flower bed

Figure 8b: A 5,000 gallon cistern used to disconnect the rooftop of the Department of Public Works in Clark Township to harvest rainwater for nonprofit car wash events

Examples of Opportunities in Somerville Borough

To address the impact of stormwater runoff from impervious surfaces, the next step is to identify opportunities in the municipality for eliminating, reducing, or disconnecting directly connected impervious surfaces. To accomplish this task, an impervious cover reduction action plan should be prepared. Aerial photographs are used to identify sites with impervious surfaces in the municipality that may be suitable for inclusion in the action plan. After sites are identified, site visits are conducted to photo-document all opportunities and evaluate the feasibility of eliminating, reducing or disconnecting directly connected impervious surfaces. A brief description of each site discussing the existing conditions and recommendations for treatment of the impervious surfaces is developed. After a number of sites have been selected for inclusion in the action plan, concept plans and detailed green infrastructure information sheets are prepared for a selection of representative sites.

For Somerville Borough, three sites have been included in this assessment. Examples of concept plans and detailed green infrastructure information sheets are provided in Appendix A. The detailed green infrastructure information sheets describe existing conditions and issues, proposed solutions, anticipated benefits, possible funding sources, potential partners and stakeholders, and estimated costs. Additionally, each project has been classified as a mitigation opportunity for recharge potential, total suspended solids removal, and stormwater peak reduction. Finally, these detailed green infrastructure information sheets provide an estimate of gallons of stormwater captured and treated per year by each proposed green infrastructure practice. The concept plans provide an aerial photograph of the site and details of the proposed green infrastructure practices.

Conclusions

Somerville Borough can reduce flooding and improve its waterways by better managing stormwater runoff from impervious surfaces. This impervious cover assessment is the first step toward better managing stormwater runoff. The next step is to develop an action plan to eliminate, reduce, or disconnect impervious surfaces where possible and practical. Many of the highly effective disconnection practices are inexpensive. The entire community can be engaged in implementing these disconnection practices.

References

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Appendix A

Examples of Impervious Cover Reduction Action Plan Projects

Concept Plans and Detailed Green Infrastructure Information Sheets

Somerville Borough
Impervious Cover Assessment

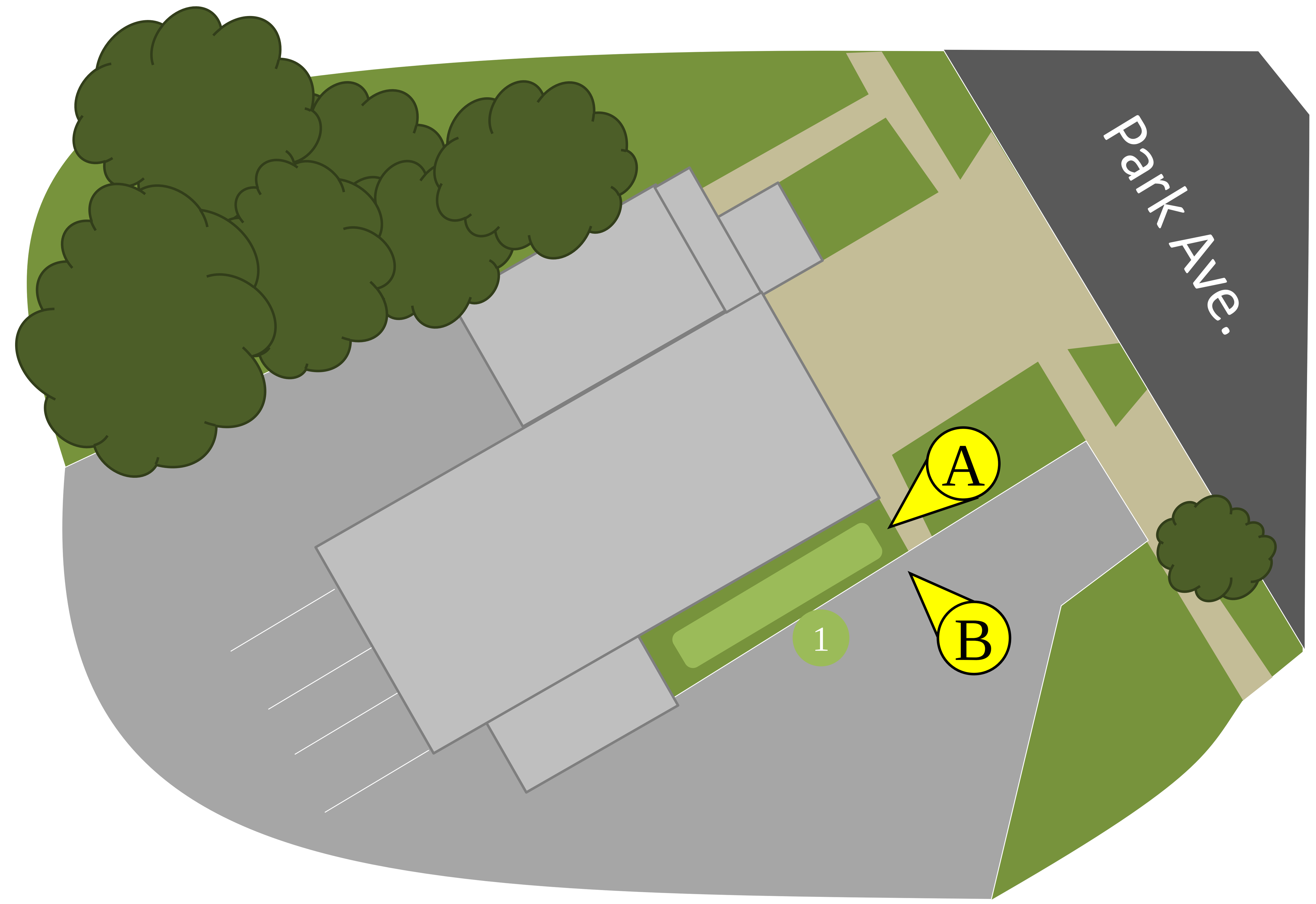
Somerville Rescue Squad, 21 Park Avenue

PROJECT LOCATION:

A

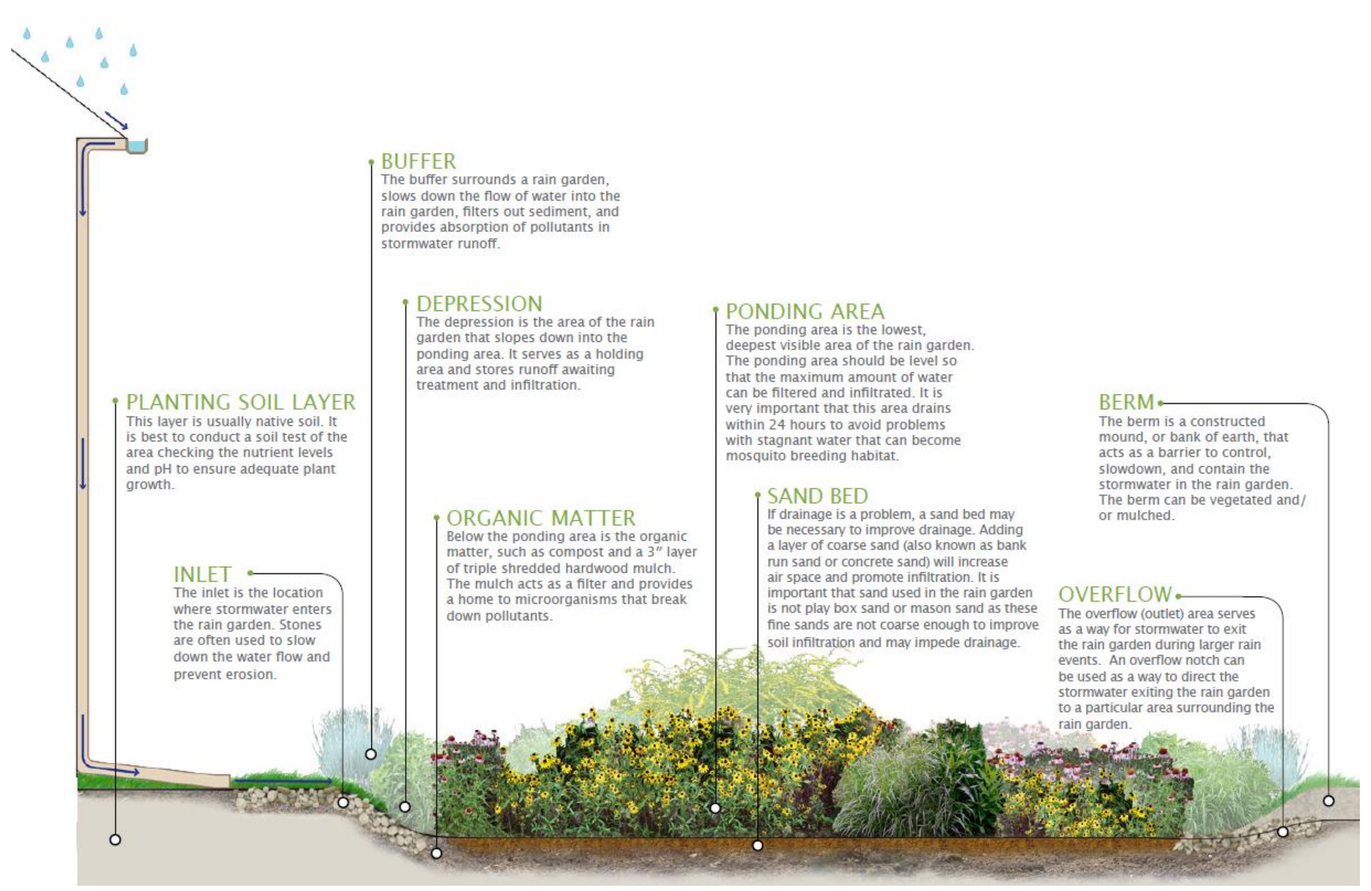
B

SITE PLAN:



1 **BIORETENTION SYSTEM:** A rain garden could be used to reduce sediment and nutrient loading to the local waterway and increase groundwater recharge. The rain garden could be installed on the turf grass area along the south face of the building, and the two nearby downspouts could be redirected to capture stormwater runoff from the roof.

1 BIORETENTION SYSTEM



Somerville Rescue Squad
Green Infrastructure Information Sheet

Location: 21 Park Avenue Somerville, NJ 08876	**Municipality:** Somerville Borough **Subwatershed:** Peters Brook
Green Infrastructure Description: bioretention system (rain garden)	**Targeted Pollutants:** total nitrogen (TN), total phosphorous (TP), and total suspended solids (TSS) in surface runoff
Mitigation Opportunities: recharge potential: yes stormwater peak reduction potential: yes TSS removal potential: yes	**Stormwater Captured and Treated Per Year:** bioretention system: 20,844 gal.

Existing Conditions and Issues:
The roof of the rescue squad contributes stormwater runoff volumes and nonpoint source pollution to local waterways. There is a turf grass area along the south face of the building with two disconnected downspouts.

Proposed Solution(s):
A bioretention system can be installed in the turf grass area on the south face of the building and the nearby downspouts cab be redirected into it. This will capture, treat, and allow infiltration of stormwater runoff from the roof.

Anticipated Benefits:
Since the bioretention systems would be designed to capture, treat, and infiltrate the entire 2-year design storm (3.3 inches of rain over 24 hours), these systems are estimated to achieve a 95% pollutant load reduction for TN, TP, and TSS. A bioretention system would also provide ancillary benefits such as enhanced wildlife habitat and aesthetic appeal.

Possible Funding Sources:
mitigation funds from local developers
NJDEP grant programs
Somerville Borough
local social and community groups

Partners/Stakeholders:
Somerville Borough
Somerville Rescue Squad
local community groups
Rutgers Cooperative Extension

Estimated Cost:
A rain garden to capture the roof runoff would need to be approximately 200 square feet. At $5 per square foot, the estimated cost of the rain garden is $1,000.

Somerville Borough
Impervious Cover Assessment

Somerville Unemployment Services, 75 Veterans Memorial Drive East

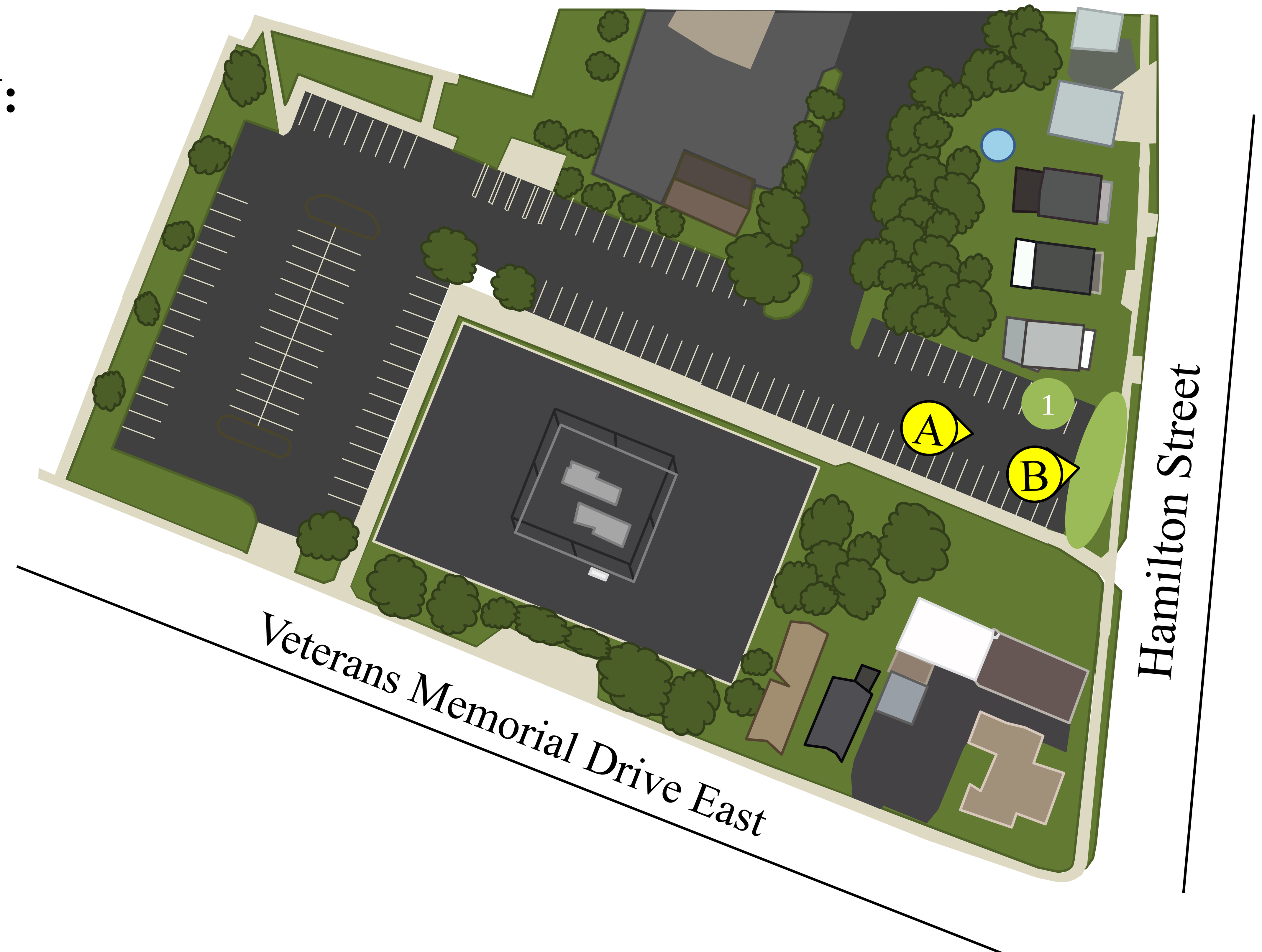
A

B

PROJECT LOCATION:

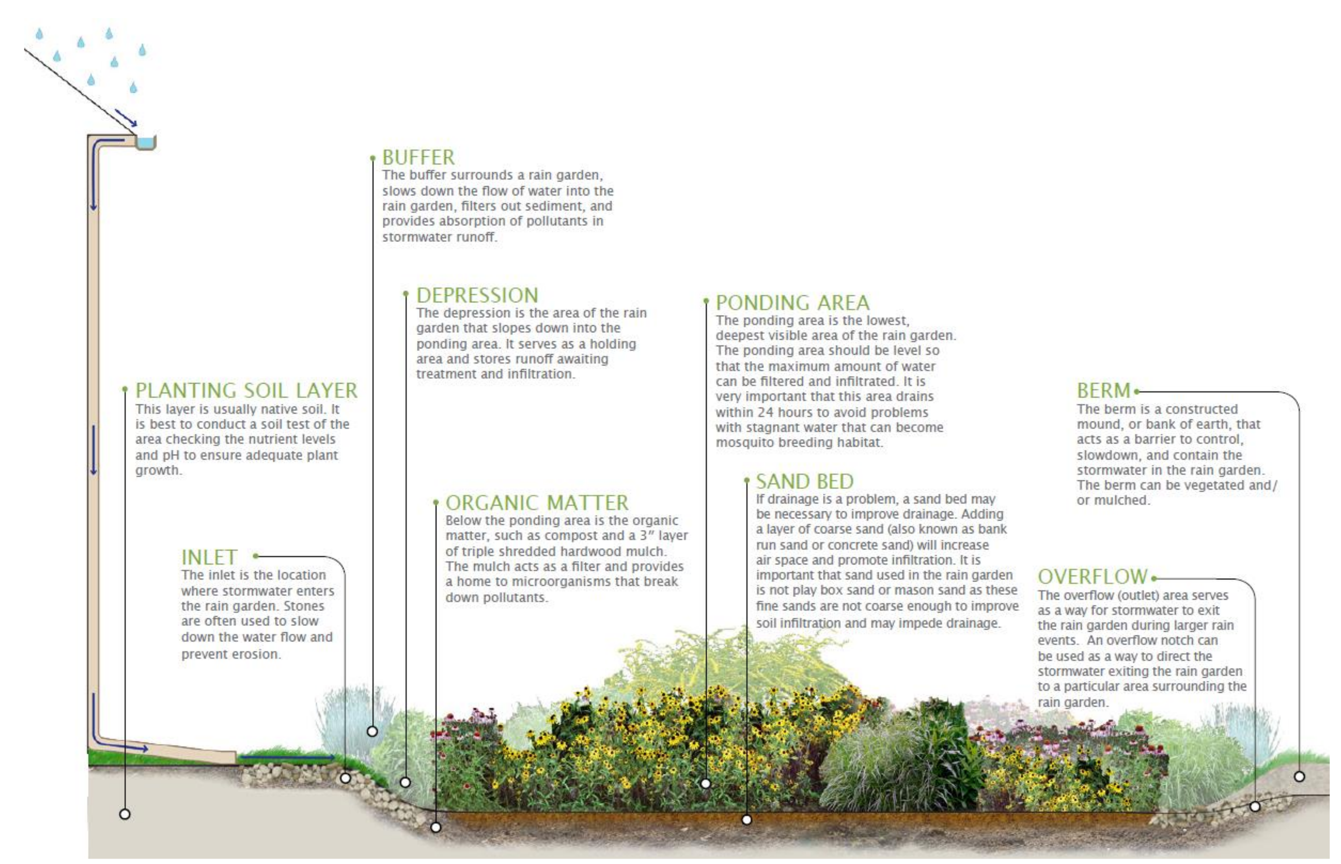
SITE PLAN:

N



1 **BIORETENTION SYSTEM:** A bioretention system could be installed at the western end of the parking lot. Curb cuts should be installed to allow the flow of runoff into the proposed bioretention system. A bioretention system can reduce runoff and allow stormwater infiltration, decreasing the amount of contaminants that reaches catch basins.

1 BIORETENTION SYSTEM



CURB CUTS

Location: 75 Veterans Memorial Drive East Somerville, NJ 08876	**Municipality:** Somerville Borough **Subwatershed:** Lower Raritan River
Green Infrastructure Description: bioretention system (rain garden)	**Targeted Pollutants:** total nitrogen (TN), total phosphorous (TP), and total suspended solids (TSS) in surface runoff
Mitigation Opportunities: recharge potential: yes stormwater peak reduction potential: yes TSS removal potential: yes	**Stormwater Captured and Treated Per Year:** bioretention system #1: 62,533 gal.

Existing Conditions and Issues:
This site is located off of Veterans Memorial Drive East. In the back parking lot, there is a section that slopes towards an inlet located in an island near the Battery & Electric Warehouse. Runoff is carrying nonpoint source pollution, such as sediments, nutrients, oil, and grease to local waterways. This nonpoint source pollution has also accumulated around the inlet and the nearest parking spot. The remaining part of the parking lot appears to slope toward the inlet located closest to Hamilton Street. When high volumes of rain hit the parking lot, runoff is carried toward this inlet that could contaminate local waterways and lead to flooding.

Proposed Solution(s):
To deal with the runoff and accumulation of debris around and in the inlet, curb cuts and a bioretention system could be installed. Curb cuts should be created at the western corner near the inlet closest to Hamilton Street. This would redirect the runoff away from the inlet and into the bioretention system which could be constructed on the turf grass.

Anticipated Benefits:
A bioretention system is estimated to achieve a 30% removal rate for TN and a 60% removal rate for TP (NJDEP BMP Manual). TSS loadings may be reduced by up to 80%. If these bioretention systems are designed to capture and infiltrate stormwater runoff from the 2-year design storm (3.3 inches of rain over 24 hours), this system will prevent approximately 95% of the TN, TP and TSS from flowing directly into local waterways. A bioretention system would also provide ancillary benefits such as enhanced wildlife habitat and aesthetic appeal. The curb cut would allow water to enter into the bioretention system instead of pooling in the parking lot and street or running directly into the local waterways.

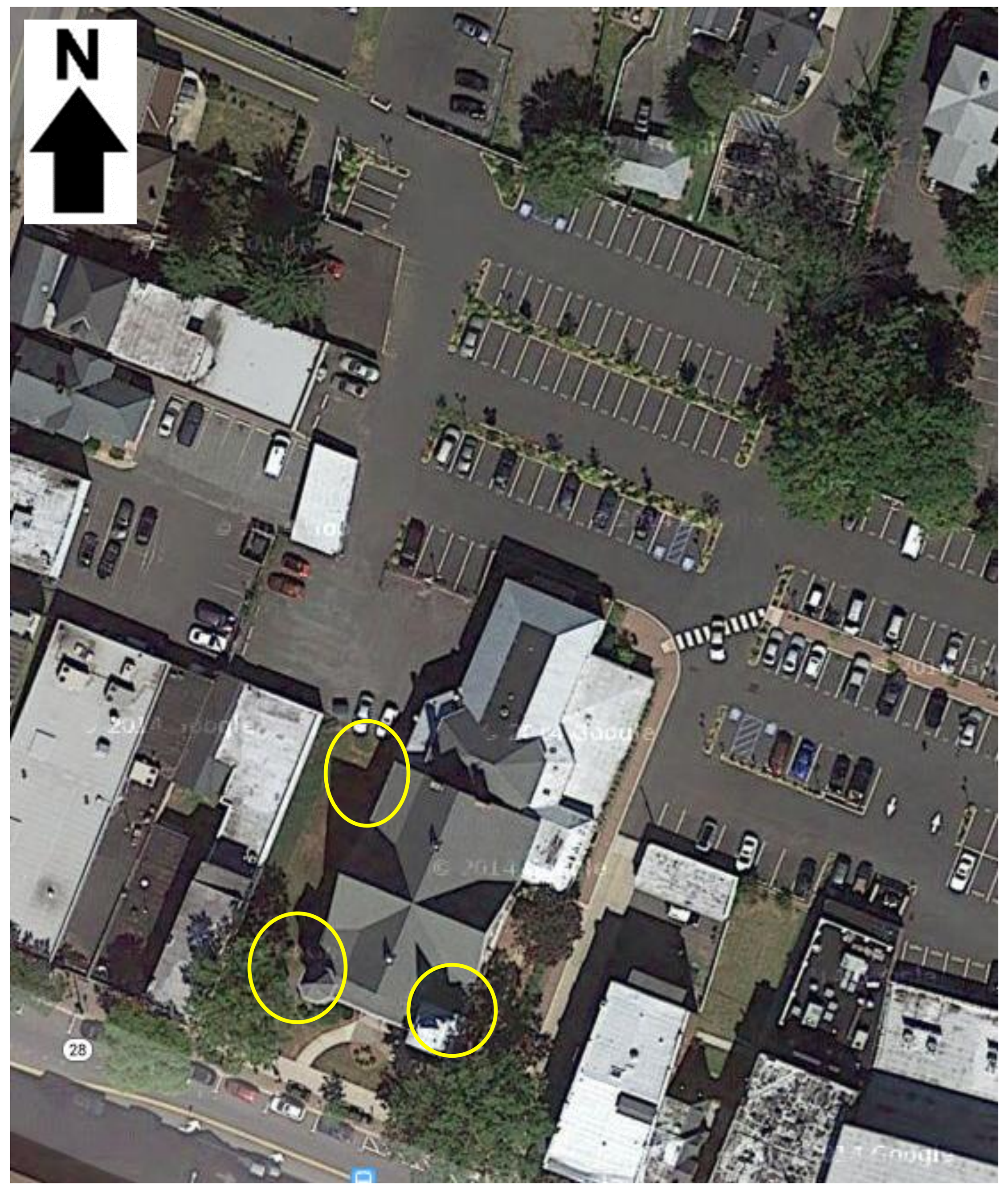
Possible Funding Sources:
mitigation funds from local developers
NJDEP grant programs
grants from foundations

Partners/Stakeholders:
Somerville Borough
local community groups (Boy Scouts, Girl Scouts, etc.)
NY/NJ Baykeeper
Raritan Riverkeeper
Rutgers Cooperative Extension

Estimated Cost:
The bioretention system would need to be approximately 600 square feet. At $5 per square foot, the estimated cost of the bioretention system is $3,000.

Somerville Borough
Impervious Cover Assessment
United Reformed Church, 100 West Main Street

PROJECT LOCATION:

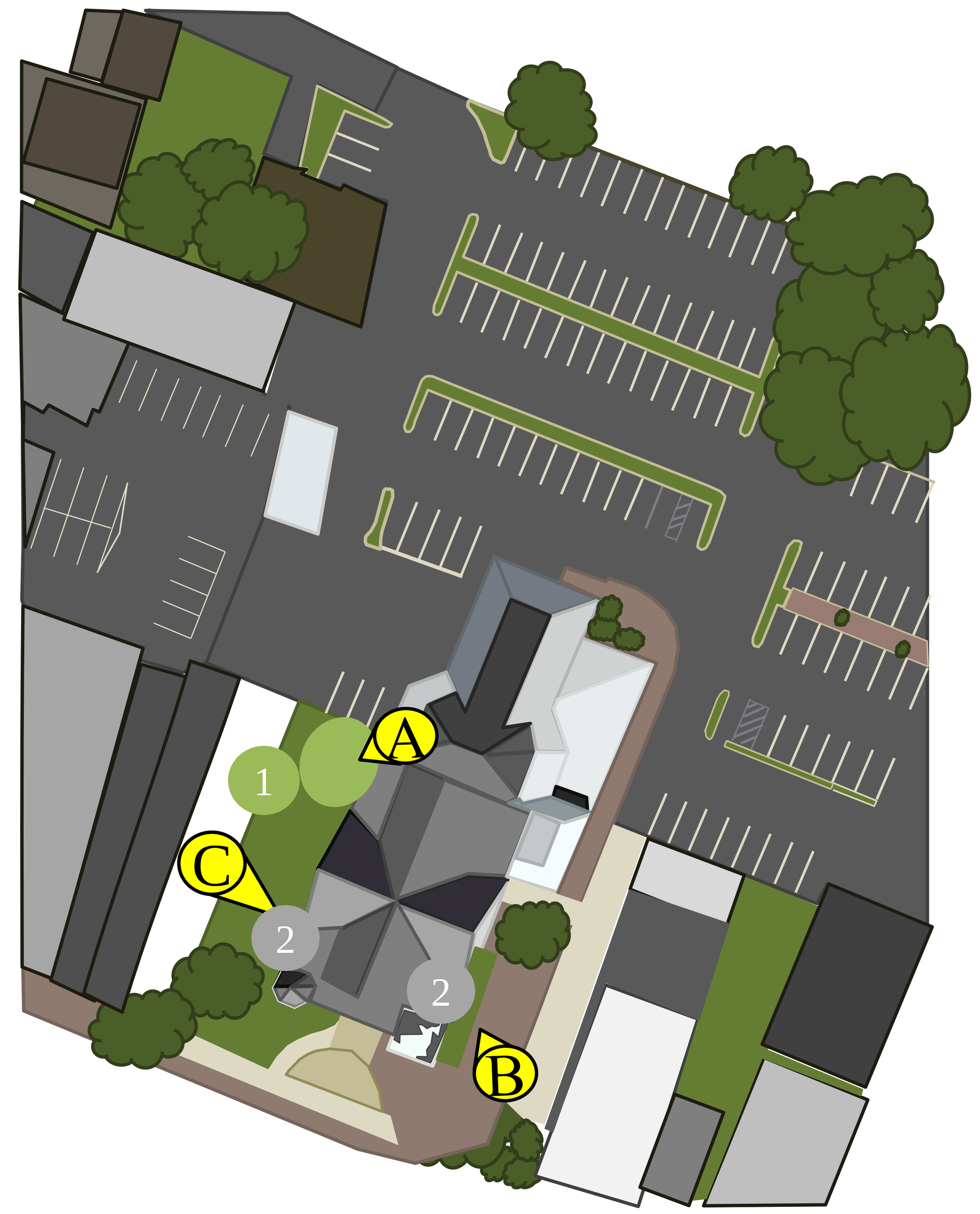


A

B

SITE PLAN:

N

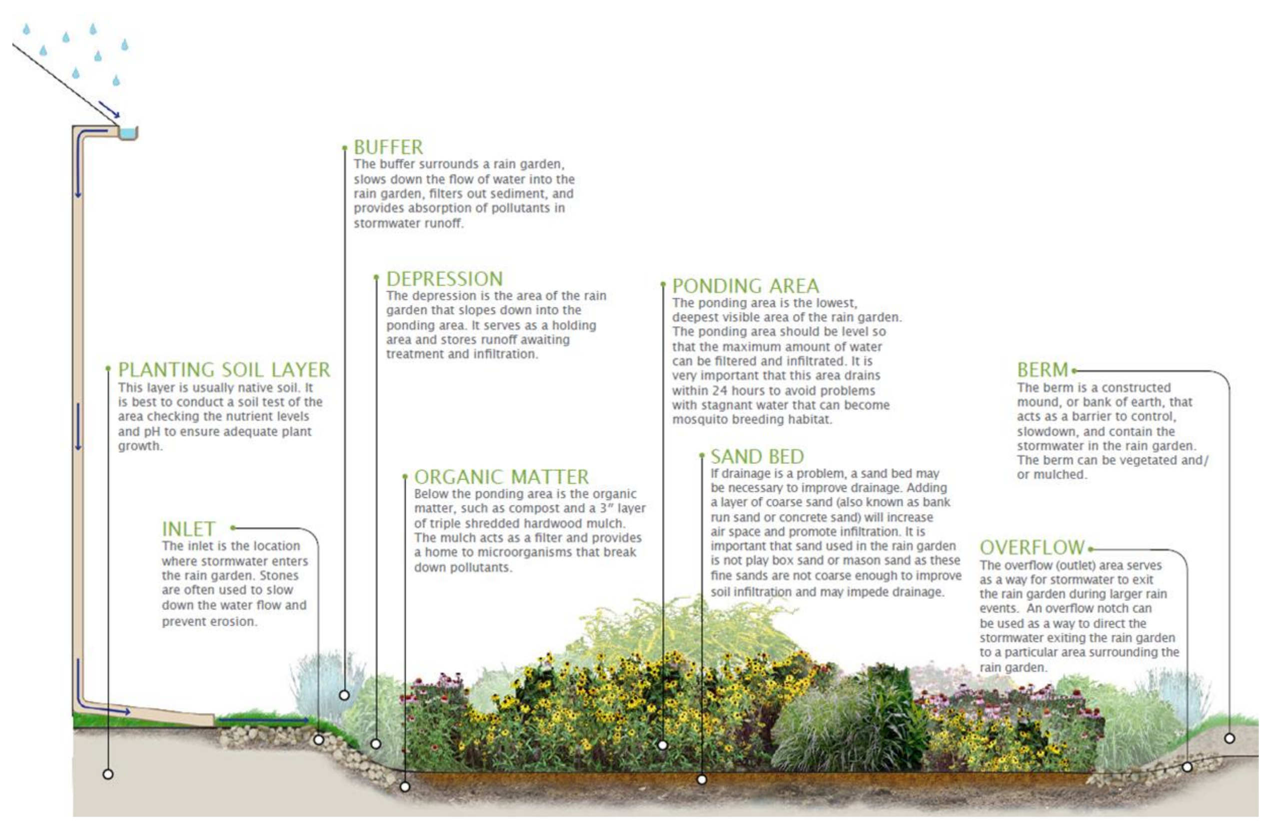


C

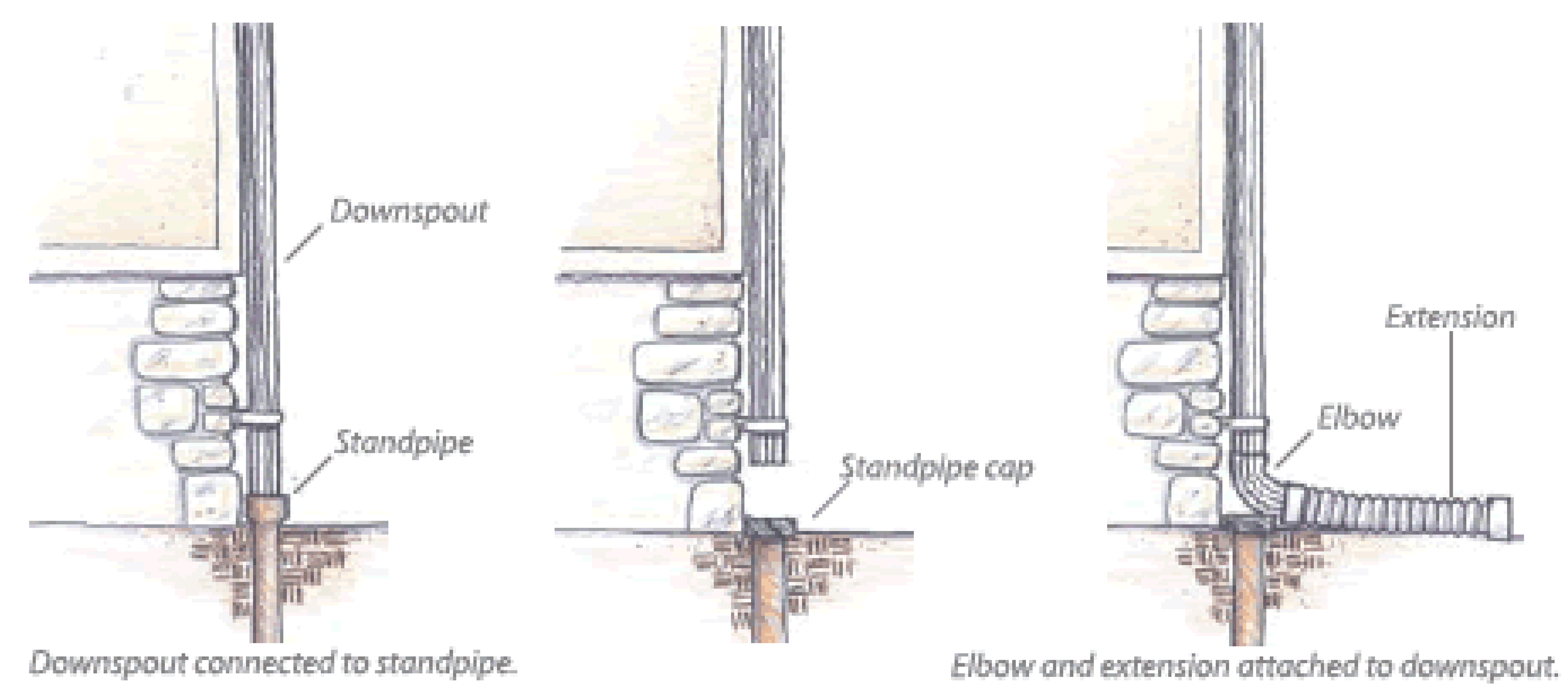
1 **BIORETENTION SYSTEM:** A bioretention system could be installed along the western side of the building in the turf grass area to capture and treat runoff from the parking lot. A bioretention system will reduce runoff and allow stormwater infiltration, decreasing the amount of contaminants that reach catch basins.

2 **DISCONNECTED DOWNSPOUTS:** Downspouts can be disconnected to allow rainwater to flow into the grassed areas which will help remove pollutants and allow for the stormwater to infiltrate into the ground.

1 BIORETENTION SYSTEM



2 DISCONNECTED DOWNSPOUTS



United Reformed Church
Green Infrastructure Information Sheet

Location: 100 West Main Street Somerville, NJ 08876	**Municipality:** Somerville Borough **Subwatershed:** Lower Raritan River
Green Infrastructure Description: bioretention system disconnecting/redirecting downspouts	**Targeted Pollutants:** total nitrogen (TN), total phosphorous (TP), and total suspended solids (TSS) in surface runoff
Mitigation Opportunities: recharge potential: yes stormwater peak reduction potential: yes TSS removal potential: yes	**Stormwater Captured and Treated Per Year:** bioretention system: 104,221 gal. simple disconnection #1: 37,275 gal. simple disconnection #2: 25,920 gal. simple disconnection #3: 37,275 gal.

Existing Conditions and Issues:
The parking lot is in good condition, as are the vegetated strips within the parking lot. In the turf grass area on the western side of the building, near the parking lot, there is gullying and erosion due to water accumulation or flooding. Stormwater runoff from a section of the parking lot drains into this turf grass area and is most likely the cause of the gullying. The building currently has connected downspouts, which collects water from the roof and brings it directly to the storm water system. This water carries nonpoint source pollution from the roof directly to the waterways.

Proposed Solution(s):
A bioretention system could be installed in the turf grass area along the western side of the building to capture and treat runoff from the parking lot. This bioretention system will infiltrate the stormwater runoff naturally, thereby reducing localized flooding and improving water quality. The connected downspouts can be disconnected and redirected into the vegetated areas to allow groundwater recharge.

Anticipated Benefits:
A bioretention system is estimated to achieve a 30% removal rate for TN and a 60% removal rate for TP (NJDEP BMP Manual). TSS loadings may be reduced by up to 80%. If these bioretention systems are designed to capture and infiltrate stormwater runoff from the 2-year design storm (3.3 inches of rain over 24 hours), this system can prevent approximately 95% of the TN, TP and TSS from flowing directly into local waterways. A bioretention system would also provide ancillary benefits such as enhanced wildlife habitat and aesthetic appeal.

Possible Funding Sources:
mitigation funds from local developers
NJDEP grant programs like 319(h) and 604(b)
United Reformed Church
Boy Scouts, Girl Scouts, or service project

Partners/Stakeholders:
Somerville Borough
residents and parishioners
United Reformed Church
Rutgers Cooperative Extension

Estimated Cost:
The bioretention system would need to be approximately 1,000 square feet. At $5 a square foot the approximate cost is $5,000. There are two downspouts on the southeast side of the building that could be disconnected and would cost about $500. The third simple disconnection would cost approximately $250. The total cost of this project is approximately $5,750.