RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Manalapan Township, Monmouth County, New Jersey

Prepared for Manalapan Township by the
Rutgers Cooperative Extension Water Resources Program

November 21, 2015

Table of Contents

Introduction …… 1

Methodology …….. 1

Green Infrastructure Practices …… 8

Potential Project Sites …….. 10

Conclusion ……... 11

Attachment: Climate Resilient Green Infrastructure

a. Overview Map of the Project

b. Green Infrastructure Sites

c. Proposed Green Infrastructure Concepts

d. Summary of Existing Conditions

e. Summary of Proposed Green Infrastructure Practices

Introduction

Located in Monmouth County in central New Jersey, Manalapan Township covers approximately 30.9 square miles. Figures 1 and 2 illustrate that Manalapan Township is dominated by urban land uses. A total of 50.2% of the municipality's land use is classified as urban. Of the urban land in Manalapan Township, low density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Manalapan Township 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 Manalapan Township. Based upon the 2007 NJDEP land use/land cover data, approximately 13.0% of Manalapan Township has impervious cover. This level of impervious cover suggests that the streams in Manalapan Township are likely impacted. [1]

Methodology

Manalapan Township contains portions of eight subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in each of these watersheds. Initially, aerial imagery was used to identify potential project sites that contain extensive impervious cover. Field visits were then conducted at each of these potential project sites to determine if a viable option exists to reduce impervious cover or to disconnect impervious surfaces from draining directly to the local waterway or storm sewer system. During the site visit, appropriate green infrastructure practices for the site were determined. Sites that already had stormwater management practices in place were not considered.

[1] Caraco, D., R. Claytor, P. Hinkle, H. Kwon, T. Schueler, C. Swann, S. Vysotsky, and J. Zielinski. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Prepared by Center For Watershed Protection, Ellicott City, MD. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds and Region V. October 1998

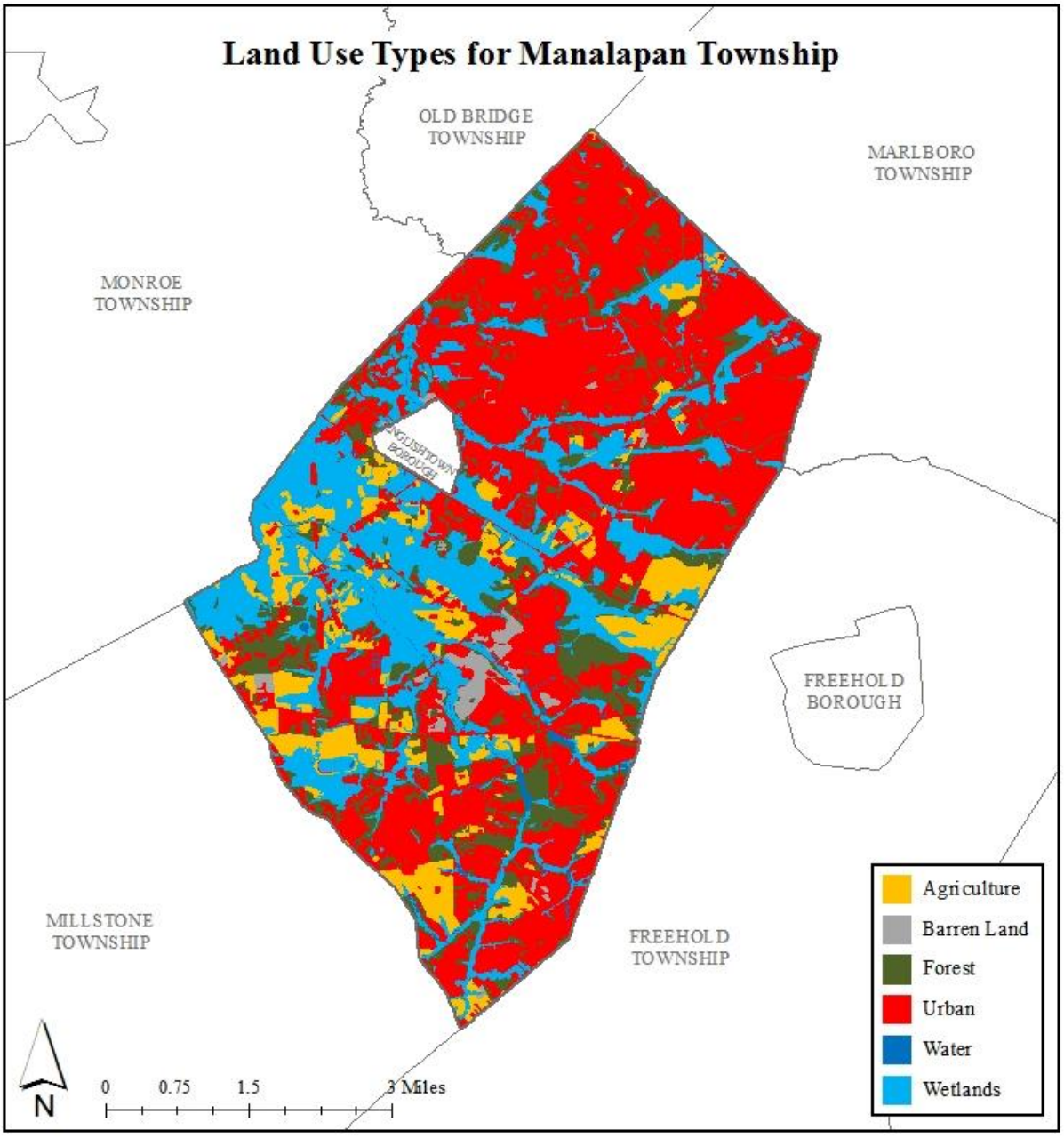


Figure 1: Map illustrating the land use in Manalapan Township

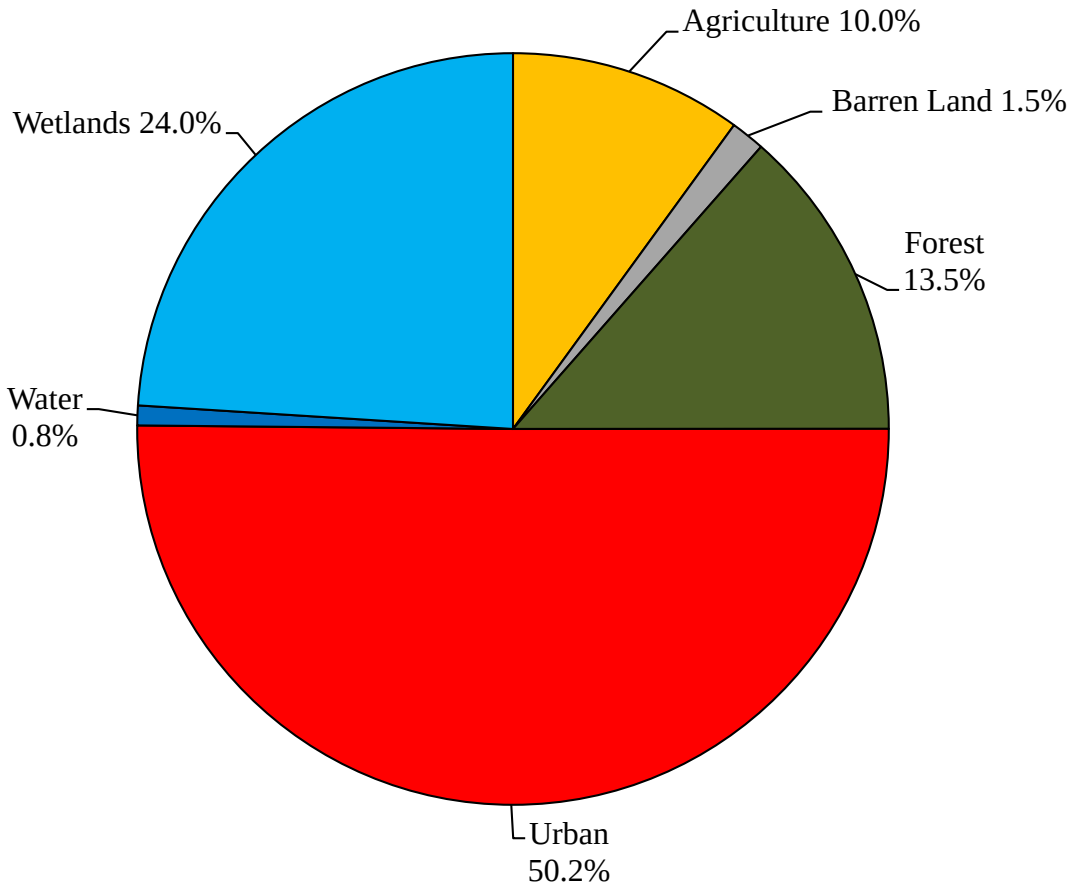


Figure 2: Pie chart illustrating the land use in Manalapan Township

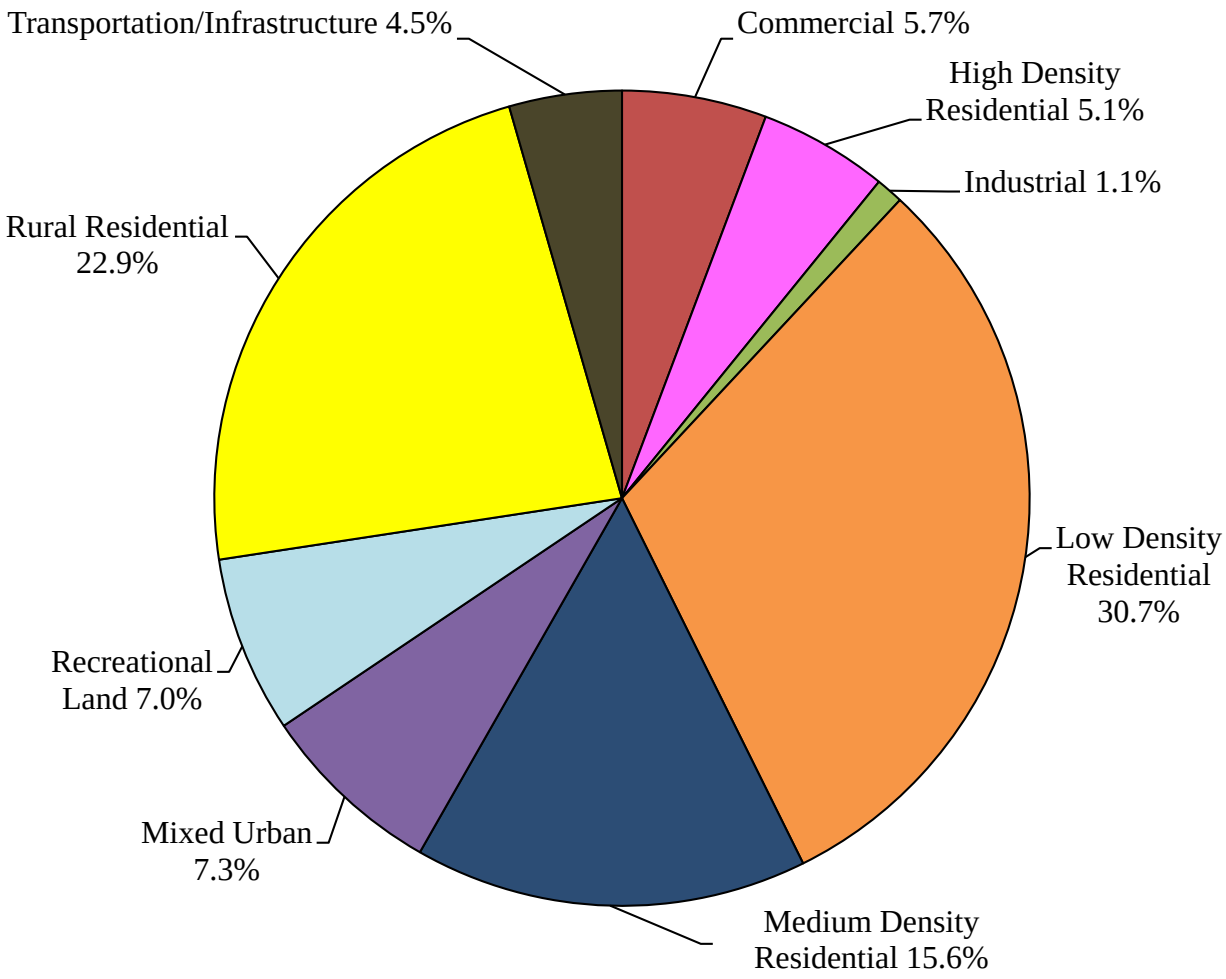


Figure 3: Pie chart illustrating the various types of urban land use in Manalapan Township

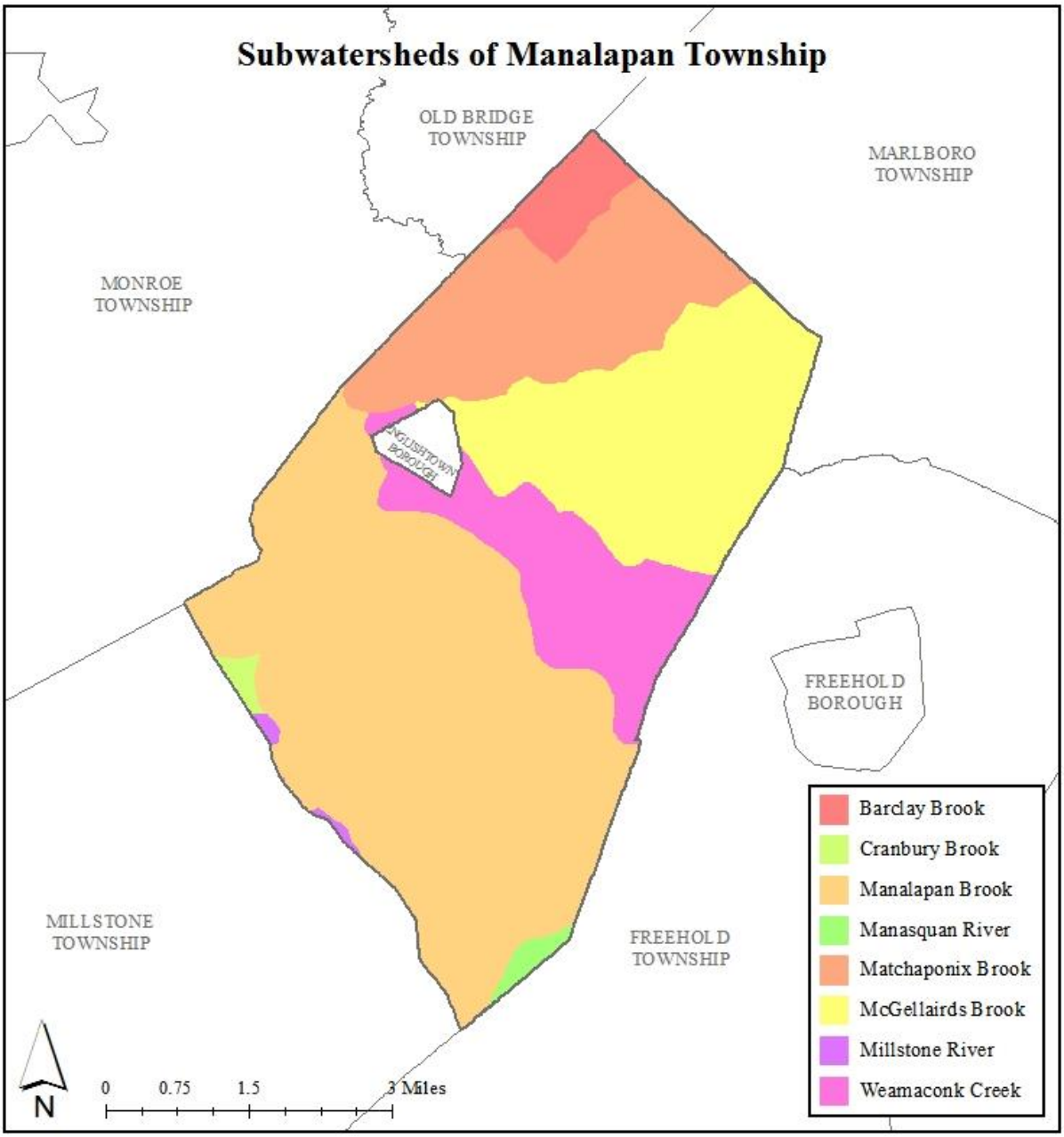


Figure 4: Map of the subwatersheds in Manalapan Township

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2007 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in Manalapan Township using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey, which utilizes regional and statewide soil data to predict soil types in an area. Several key soil parameters were examined (e.g., natural drainage class, saturated hydraulic conductivity of the most limiting soil layer (K_{sat}), depth to water table, and hydrologic soil group) to evaluate the suitability of each site's soil for green infrastructure practices. In cases where multiple soil types were encountered, the key soil parameters were examined for each soil type expected at a site.

For each potential project site, drainage areas were determined for each of the green infrastructure practices proposed at the site. These green infrastructure practices were designed to manage the 2-year design storm, enabling these practices to capture 95% of the annual rainfall. Runoff volumes were calculated for each proposed green infrastructure practice. The reduction in TSS loading was calculated for each drainage area for each proposed green infrastructure practice using the aerial loading coefficients in Table 1. The maximum volume reduction in stormwater runoff for each green infrastructure practice for a storm was determined by calculating the volume of runoff captured from the 2-year design storm. For each green infrastructure practice, peak discharge reduction potential was determined through hydrologic modeling in HydroCAD. For each green infrastructure practice, a cost estimate is provided. These costs are based upon the square footage of the green infrastructure practice and the real cost of green infrastructure practice implementation in New Jersey.

Table 1: Aerial Loading Coefficients[2]

Land Cover	TP load (lbs/acre/yr)	TN load (lbs/acre/yr)	TSS load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agriculture	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

[2] New Jersey Department of Environmental Protection (NJDEP), Stormwater Best Management Practice Manual, 2004.

Green Infrastructure Practices

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 practices 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[3]. A wide range of green infrastructure practices have been evaluated for the potential project sites in Manalapan Township. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, and prevented from draining directly to the roadway or storm sewer system, and directed to discharge water to a pervious area (i.e., lawn).

Pervious pavements

There are several types of permeable pavement systems including porous asphalt, pervious concrete, permeable pavers, and grass pavers. These surfaces are hard and support vehicle traffic but also allow water to infiltrate through the surface. They have an underlying stone layer to store stormwater runoff and allow it to slowly seep into the ground.




[3] United States Environmental Protection Agency (USEPA), 2013. Watershed Assessment, Tracking, and Environmental Results, New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ

Bioretention systems/rain gardens

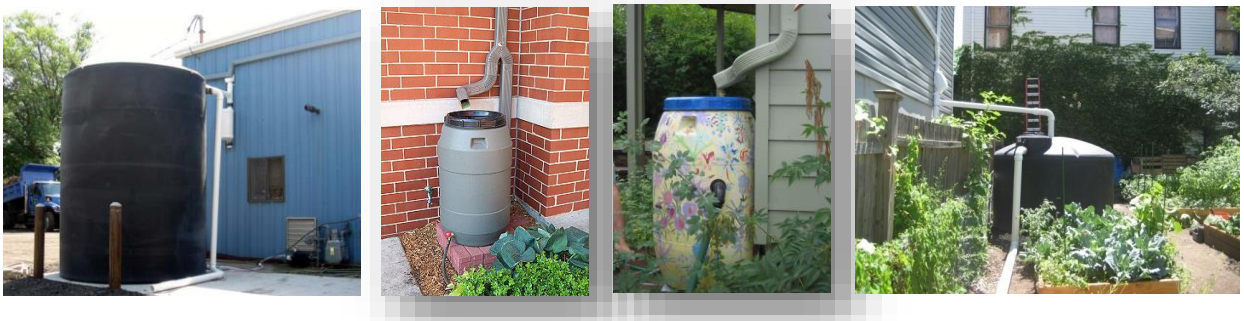
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

Downspout planter boxes

These are wooden boxes with plants installed at the base of a downspout that provide an opportunity to beneficially reuse rooftop runoff.

Rainwater harvesting systems (cistern or rain barrel)

These systems capture rainwater, mainly from rooftops, in cisterns or rain barrels. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses.



Bioswale

Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and providing water an opportunity to infiltrate.

Stormwater planters

Stormwater planters are vegetated structures that are built into the sidewalk to intercept stormwater runoff from the roadway or sidewalk. Many of these planters are designed to allow the water to infiltrate into the ground while others are designed simply to filter the water and convey it back into the stormwater sewer system.

Tree filter boxes

These are pre-manufactured concrete boxes that contain a special soil mix and are planted with a tree or shrub. They filter stormwater runoff but provide little storage capacity. They are typically designed to quickly filter stormwater and then discharge it to the local sewer system.

Potential Project Sites

Attachment 1 contains information on potential project sites where green infrastructure practices could be installed. The recommended green infrastructure practice and the drainage area that the green infrastructure practice can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

[4] New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, Statutory Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq., *Date last amended: April 19, 2010*.

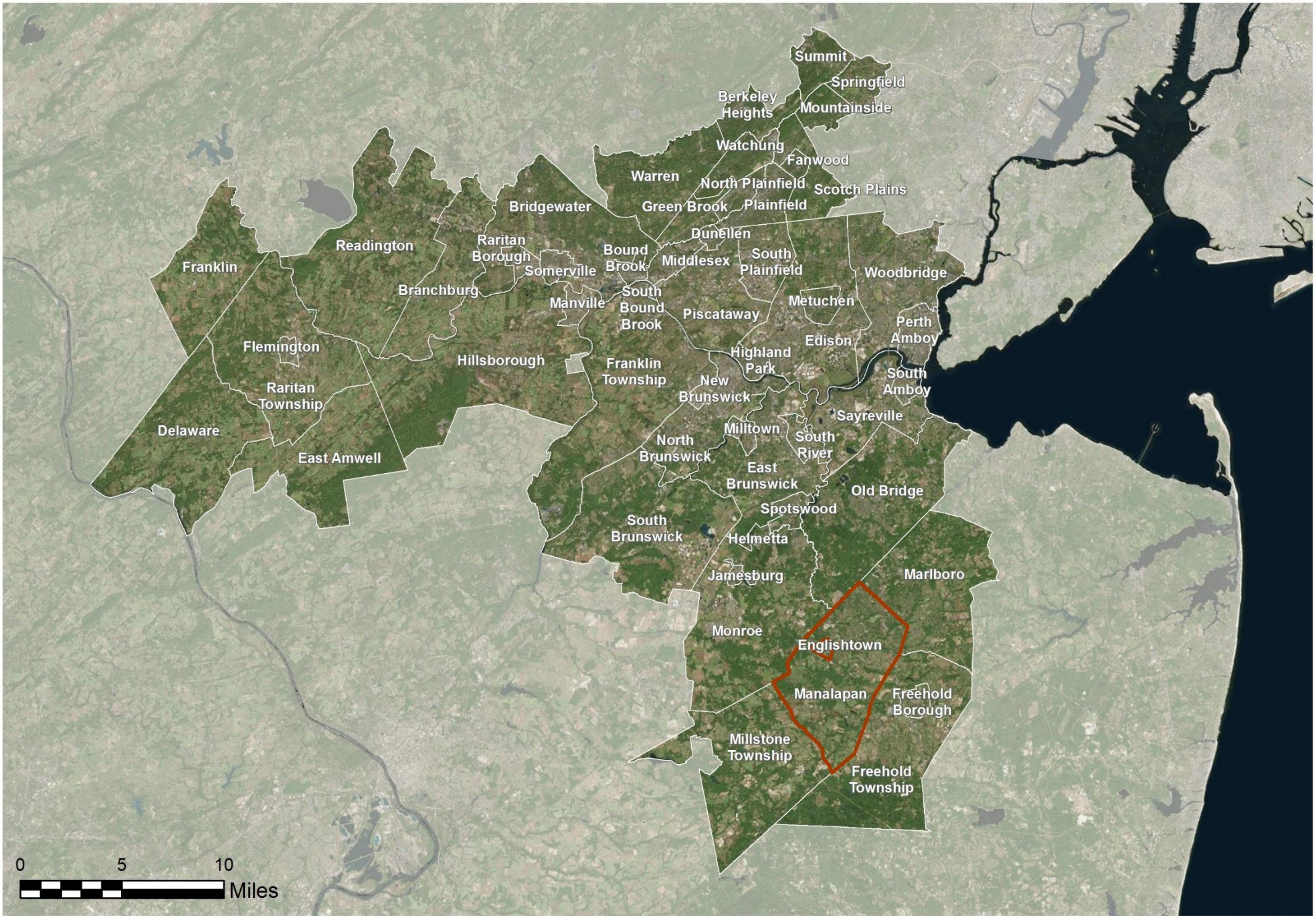
Conclusion

This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts, girl scouts, school groups, faith-based groups, social groups, watershed groups, and other community groups.

Additionally, development projects that are in need of providing off-site compensation for stormwater impacts can use the projects in this plan as a starting point. The municipality can quickly convert this impervious cover reduction action plan into a stormwater mitigation plan and incorporate it into the municipal stormwater control ordinance.

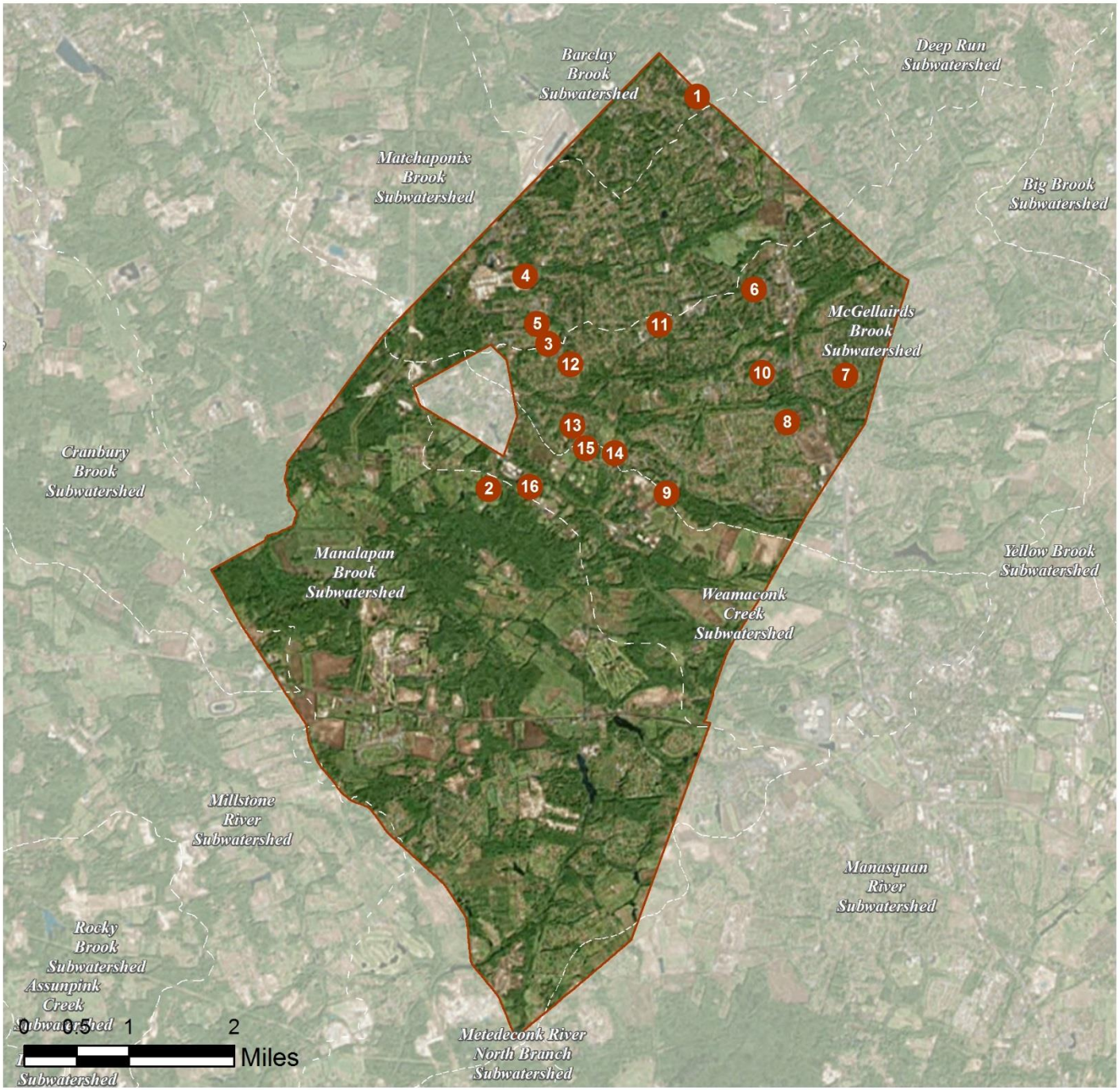
a. Overview Map of the Project

MANALAPAN: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



b. Green Infrastructure Sites

MANALAPAN: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BARCLAY BROOK SUBWATERSHED:

1. Manalapan Montessori

SITES WITHIN THE MANALAPAN BROOK SUBWATERSHED:

2. Manalapan-Englishtown Middle School

SITES WITHIN THE MATCHAPONIX BROOK SUBWATERSHED:

3. Clark Mills School
4. Community Refuge Church
5. Milford Brook Elementary School

SITES WITHIN THE MCGELLAIRDS BROOK SUBWATERSHED:

6. Church in Manalapan
7. Lafayette Mills School
8. Monmouth County Library
9. Old Tennent Presbyterian Church
10. Saint Thomas Lutheran Church
11. Saint Thomas More Church
12. Taylor Mills School
13. US Post Office

SITES WITHIN THE MCGELLAIRDS BROOK/WEAMACONK CREEK SUBWATERSHED:

14. Manalapan High School

SITES WITHIN THE WEAMACONK CREEK SUBWATERSHED:

15. Manalapan Township Municipal Building
16. Wemrock Brook School

c. Proposed Green Infrastructure Concepts

MANALAPAN MONTESSORI

Subwatershed: **Barclay Brook**

Site Area: **117,580 sq. ft.**

Address: **100 Bridge Plaza Drive**
Manalapan, NJ 07726

Block and Lot: **Block 3.03, Lot 8.02**

Parking spaces can be replaced with pervious pavement to infiltrate parking lot runoff. A rain garden can also capture, treat and infiltrate roof runoff. 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"
63	74,503	3.6	37.6	342.1	0.058	2.04

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	0.120	20	9,081	0.34	1,200	$6,000
Pervious pavements	0.349	58	26,449	0.99	5,600	$140,00

GREEN INFRASTRUCTURE RECOMMENDATIONS

Manalapan Montessori

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

0 30' 60'

MANALAPAN-ENGLISHTOWN MIDDLE SCHOOL

Subwatershed: **Manalapan Brook**

Site Area: **2,878,593 sq. ft.**

Address: **155 Millhurst Road**
Manalapan, NJ 07726

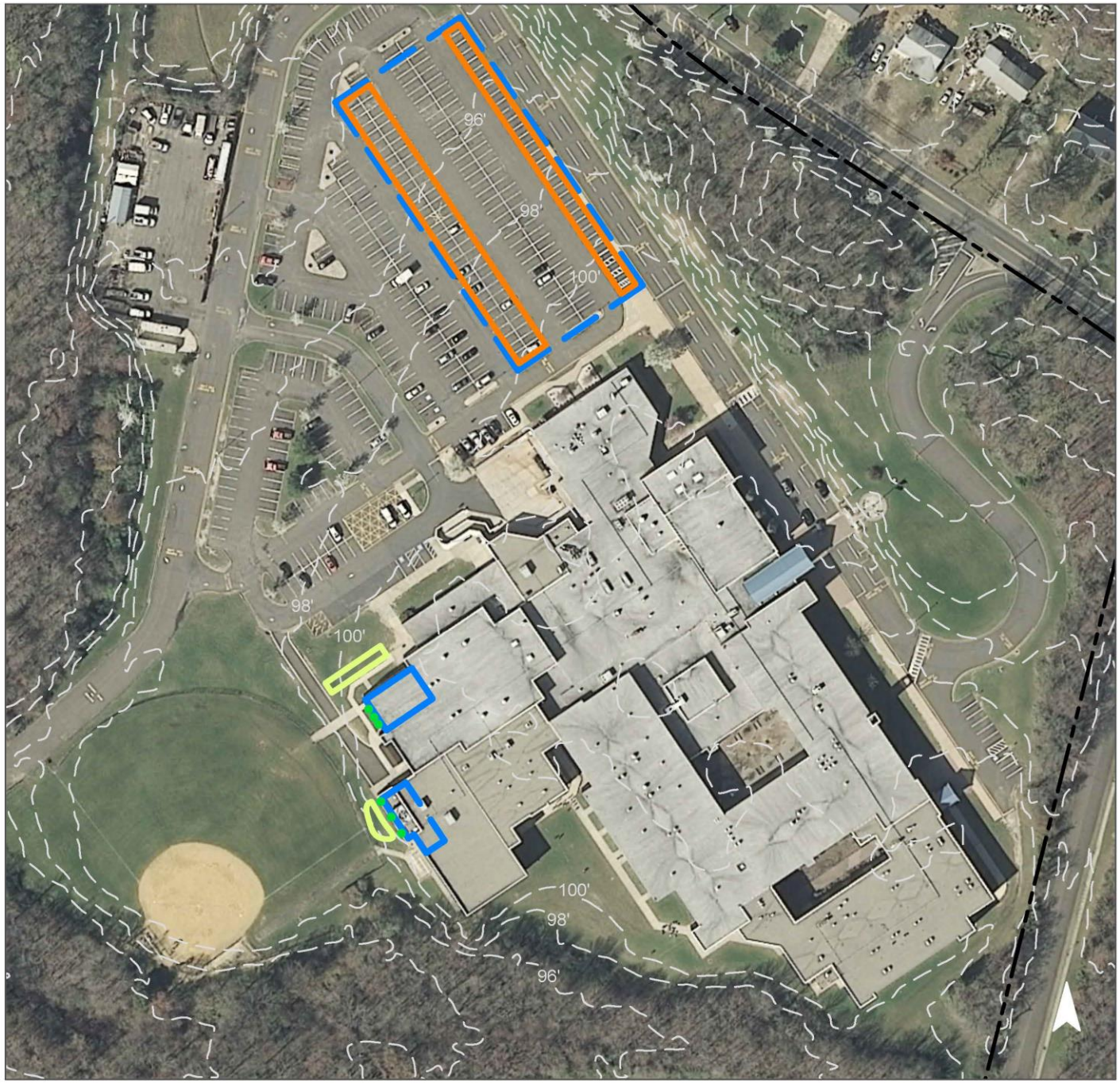
Block and Lot: **Block 67, Lot 14.02**

Parking spaces can be replaced with porous asphalt to capture and infiltrate runoff. Bioretention systems can also be installed to capture, treat, and infiltrate rooftop 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"
18	514,026	24.8	259.6	2,360.1	0.401	14.10

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	0.099	17	7,502	0.28	1,200	$6,000
Pervious pavements	1.235	207	93,567	3.51	15,200	$380,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Manalapan - Englishtown Middle School

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

0 75' 150'

CLARK MILLS SCHOOL

Subwatershed: **Matchaponix Brook**

Site Area: **1,205,246 sq. ft.**

Address: **34 Gordons Corner Road Manalapan, NJ 07726**

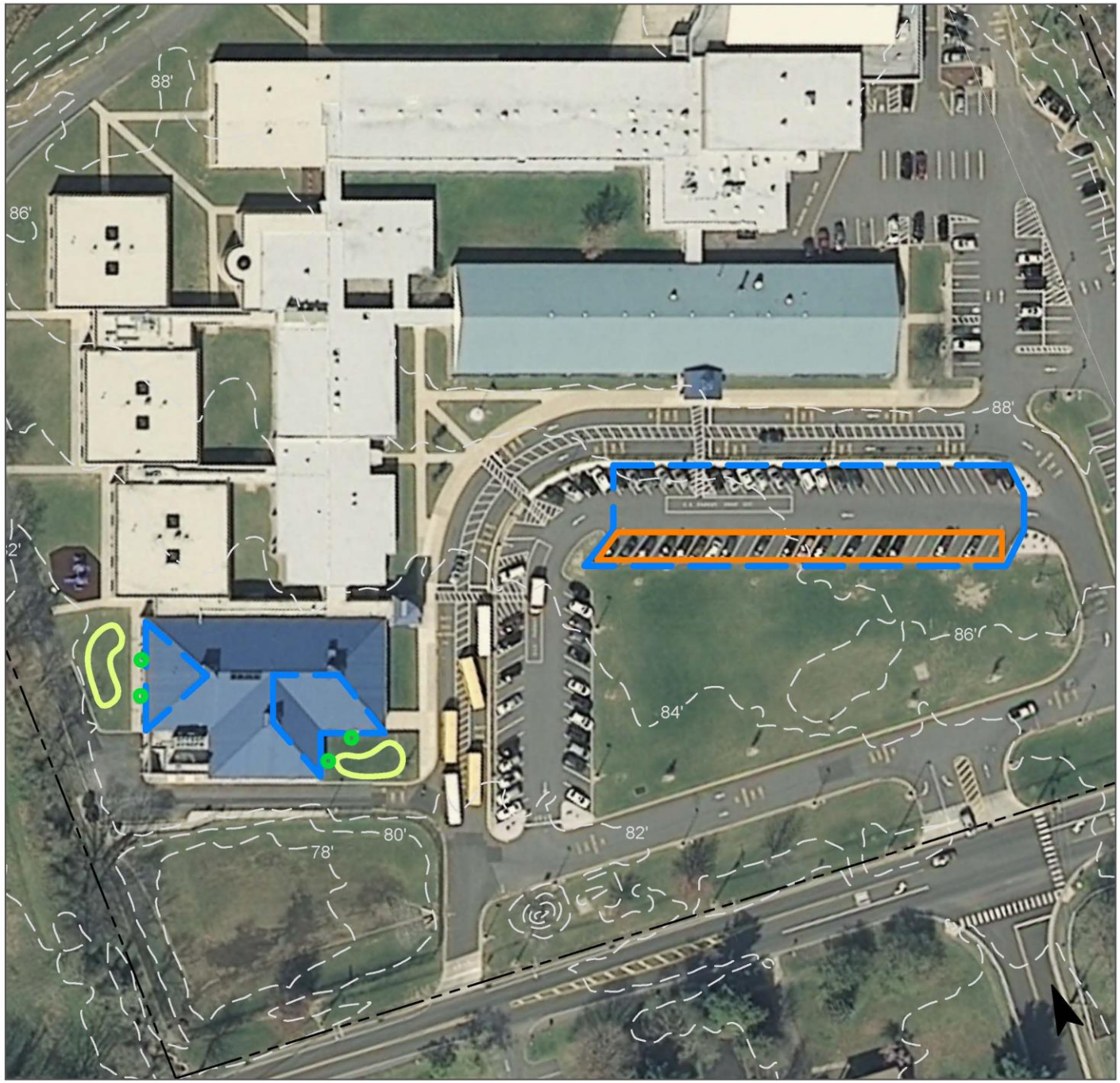
Block and Lot: **Block 14.02, Lot 24**

Bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff. Parking spaces can also be replaced with pervious pavement to infiltrate stormwater. 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"
28	337,824	16.3	170.6	1,551.1	0.263	9.27

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	0.104	17	7,899	0.30	1,400	$7,000
Pervious pavements	0.462	77	35,036	1.32	4,700	$117,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Clark Mills School

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

0 50' 100'

COMMUNITY REFUGE CHURCH

Subwatershed: **Matchaponix Brook**

Site Area: **64,463 sq. ft.**

Address: **4 Sobechko Road**
Manalapan, NJ 07726

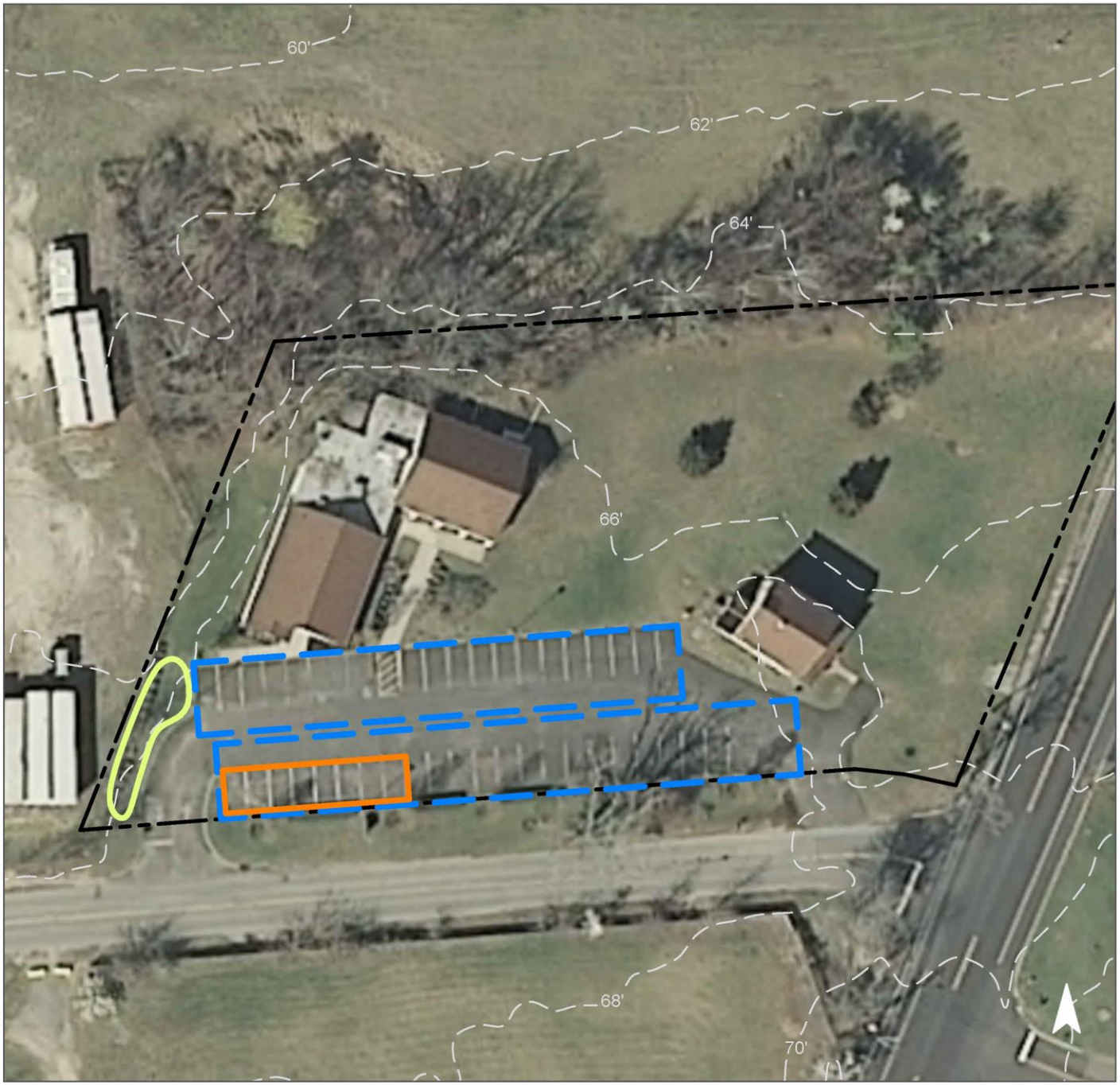
Block and Lot: **Block 29, Lot 10.04**

A rain garden can capture, treat, and infiltrate parking lot runoff. Parking spaces can also be replaced with porous asphalt to infiltrate stormwater. 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"
33	21,521	1.0	10.9	98.8	0.017	0.59

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	0.141	24	10,659	0.40	750	$3,750
Pervious pavements	0.175	29	13,225	0.50	1,200	$30,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Community Refuge Church

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

0 25' 50'

MILFORD BROOK ELEMENTARY SCHOOL

Subwatershed: Matchaponix Brook

Site Area: 688,213 sq. ft.

Address: 20 Globar Terrace
Manalapan, NJ 07726

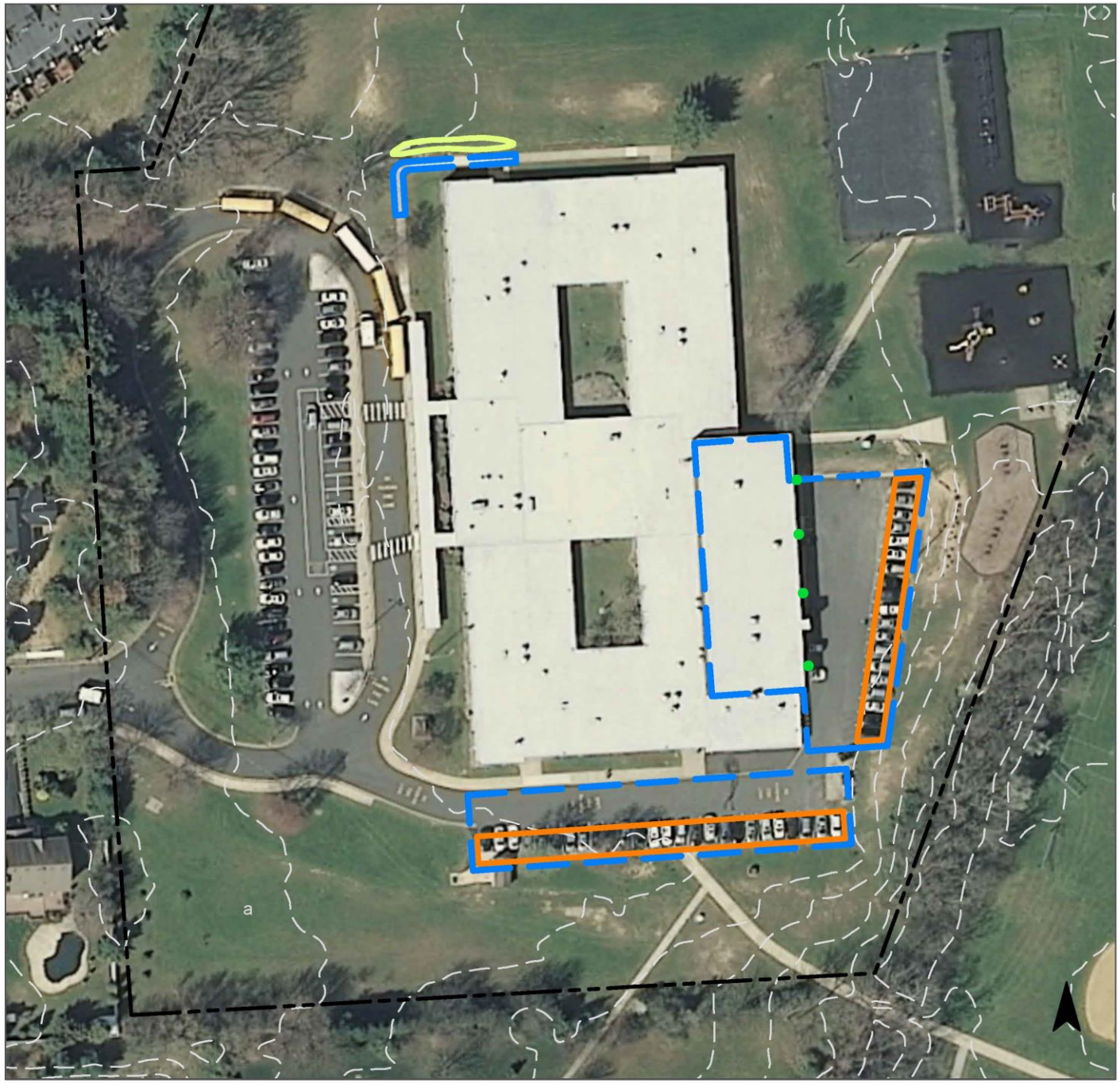
Block and Lot: Block 14.02, Lot 35.05

A rain garden can be installed on the north side of the building to capture, treat, and infiltrate rooftop runoff. Two sections of parking spaces can be replaced with porous asphalt in the back of the building to manage stormwater runoff. 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"
26	173,520	8.4	87.6	796.7	0.135	4.76

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	0.016	3	1,182	0.04	300	$1,500
Pervious pavements	0.912	153	69,085	2.59	7,150	$178,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Milford Brook Elementary School

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

0 50' 100'

CHURCH IN MANALAPAN

Subwatershed: McGellairds Brook

Site Area: 146,994 sq. ft.

Address: 667 Tennent Road
Manalapan, NJ 07726

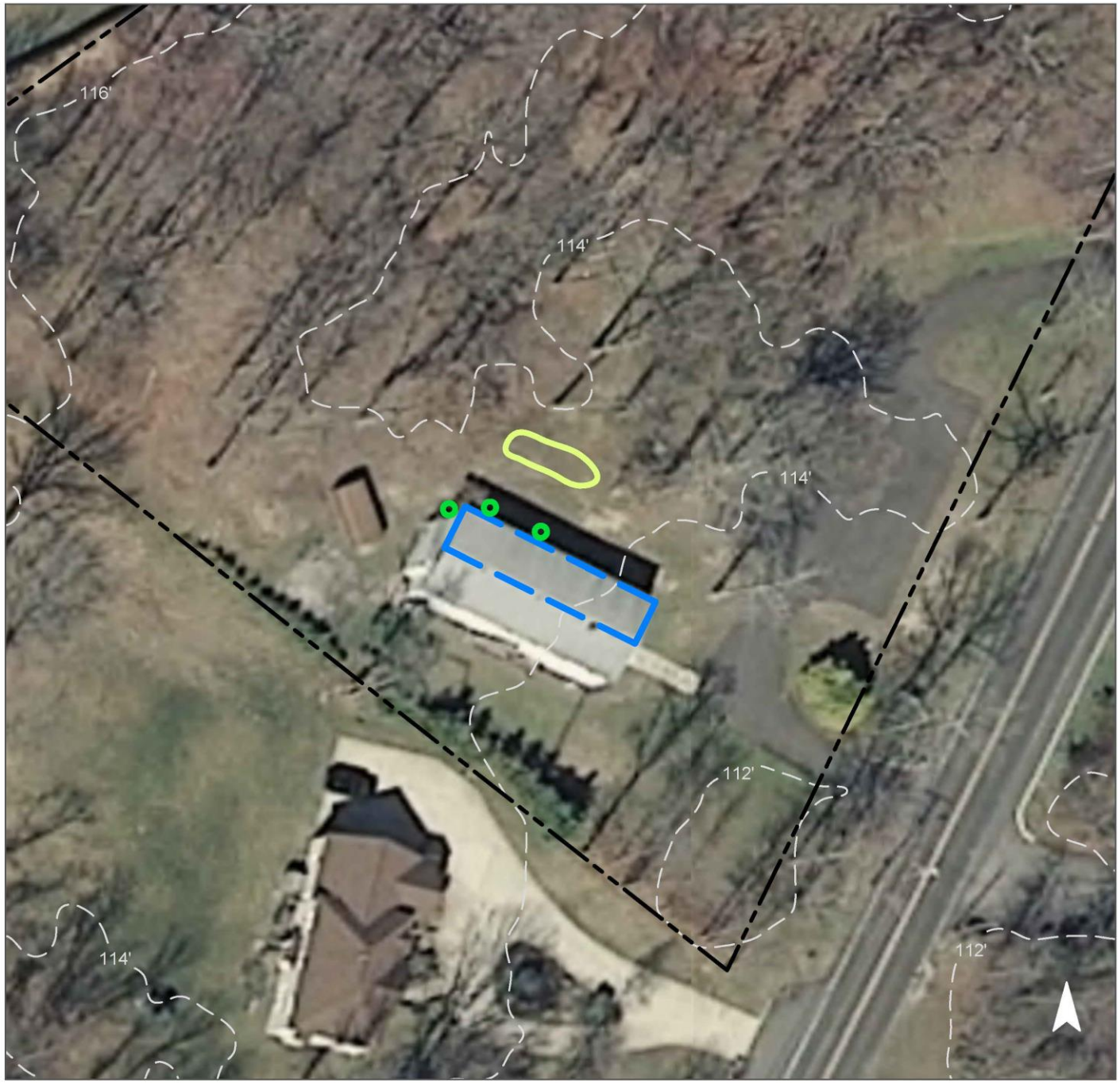
Block and Lot: Block 1102, Lot 32

Downspouts can be disconnected and redirected into a rain garden to capture, treat, and infiltrate rooftop 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"
10	15,416	0.7	7.8	70.8	0.012	0.42

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	0.027	5	2,072	0.08	270	$1,350

GREEN INFRASTRUCTURE RECOMMENDATIONS



Church in Manalapan

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

0 25' 50'

LAFAYETTE MILLS SCHOOL

Subwatershed: McGellairds Brook

Site Area: 699,243 sq. ft.

Address: 66 Maxwell Lane
Manalapan, NJ 07726

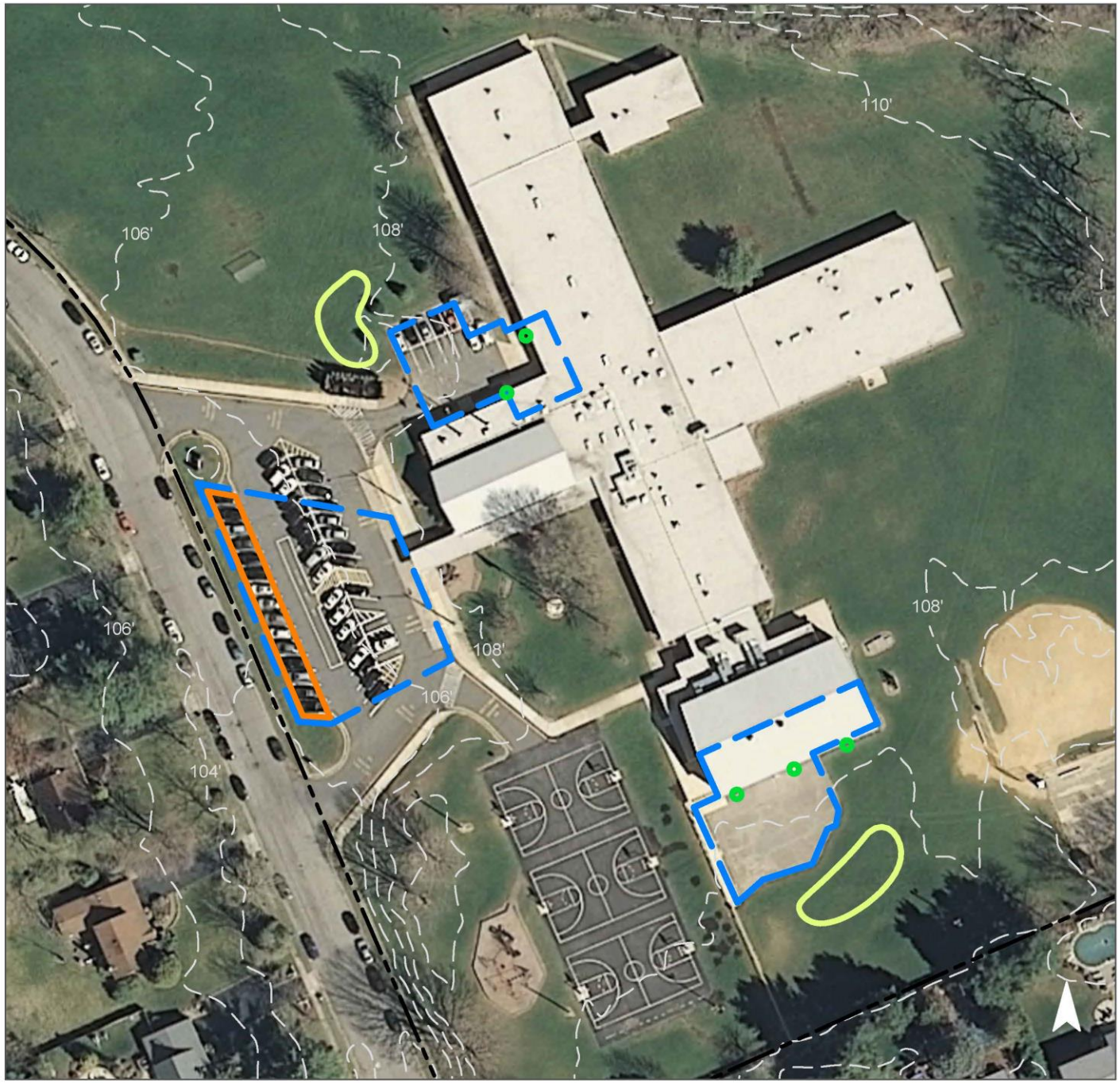
Block and Lot: Block 1707, Lot 28

Two bioretention systems can be installed to capture, treat, and infiltrate runoff. Parking spaces can also be replaced with porous asphalt to allow stormwater runoff an opportunity to infiltrate. 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"
25	174,798	8.4	88.3	802.6	0.136	4.79

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	0.380	64	28,820	1.08	3,660	$18,300
Pervious pavements	0.393	66	29,808	1.12	2,500	$62,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Lafayette Mills School

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

0 50' 100'

MONMOUTH COUNTY LIBRARY

Subwatershed: McGellairds Brook

Site Area: 797,709 sq. ft.

Address: 125 Symmes Road
Manalapan, NJ 07726

Block and Lot: Block 1806, Lot 61

Rain gardens can be installed to capture, treat, and infiltrate parking lot runoff. Parking spaces can also be replaced with porous asphalt to capture and infiltrate stormwater. 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"
41	327,640	15.8	165.5	1,504.3	0.255	8.99

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	0.149	25	11,250	0.42	2,000	$10,000
Pervious pavements	0.534	89	40,467	1.52	7,700	$192,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Monmouth County Library

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

0 75' 150'

OLD TENNENT PRESBYTERIAN CHURCH

Subwatershed: McGellairds Brook

Site Area: 1,283,553 sq. ft.

Address: 448 Tennent Road
Manalapan, NJ 07726

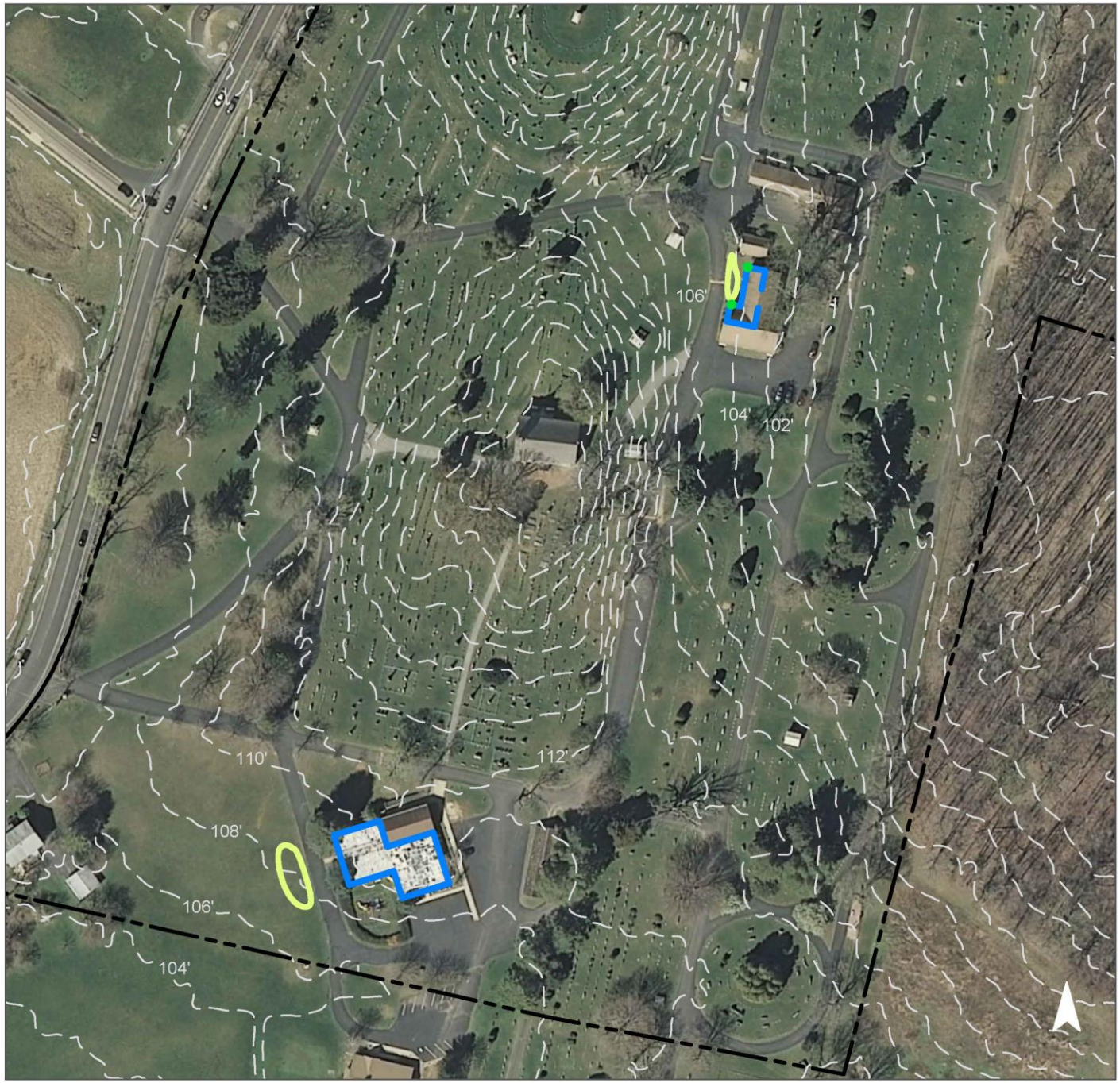
Block and Lot: Block 25, Lot 13

The existing detention basin appeared to be obstructed at the time of the assessment. Rain gardens can be built to capture, treat, and infiltrate runoff. 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"
10	129,834	6.3	65.6	596.1	0.101	3.56

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	0.156	26	11,841	0.44	1,500	$7,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Old Tennent Presbyterian Church

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

0 75' 150'

SAINT THOMAS LUTHERAN CHURCH

Subwatershed: McGellairds Brook

Site Area: 153,266 sq. ft.

Address: 203 Taylors Mills Road
Manalapan, NJ 07726

Block and Lot: Block 1801, Lot 38

The runoff from the parking lot can be captured, treated, and infiltrated by installing a rain garden in the lawn closest to the road. 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"
30	45,788	2.2	23.1	210.2	0.036	1.26

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	0.156	26	11,841	0.44	1,500	$7,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Saint Thomas Lutheran Church

- bioretention / rain gardens
- drainage areas
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

SAINT THOMAS MORE CHURCH

Subwatershed: McGellairds Brook

Site Area: 412,403 sq. ft.

Address: 186 Gordons Corner Road
Manalapan, NJ 07726

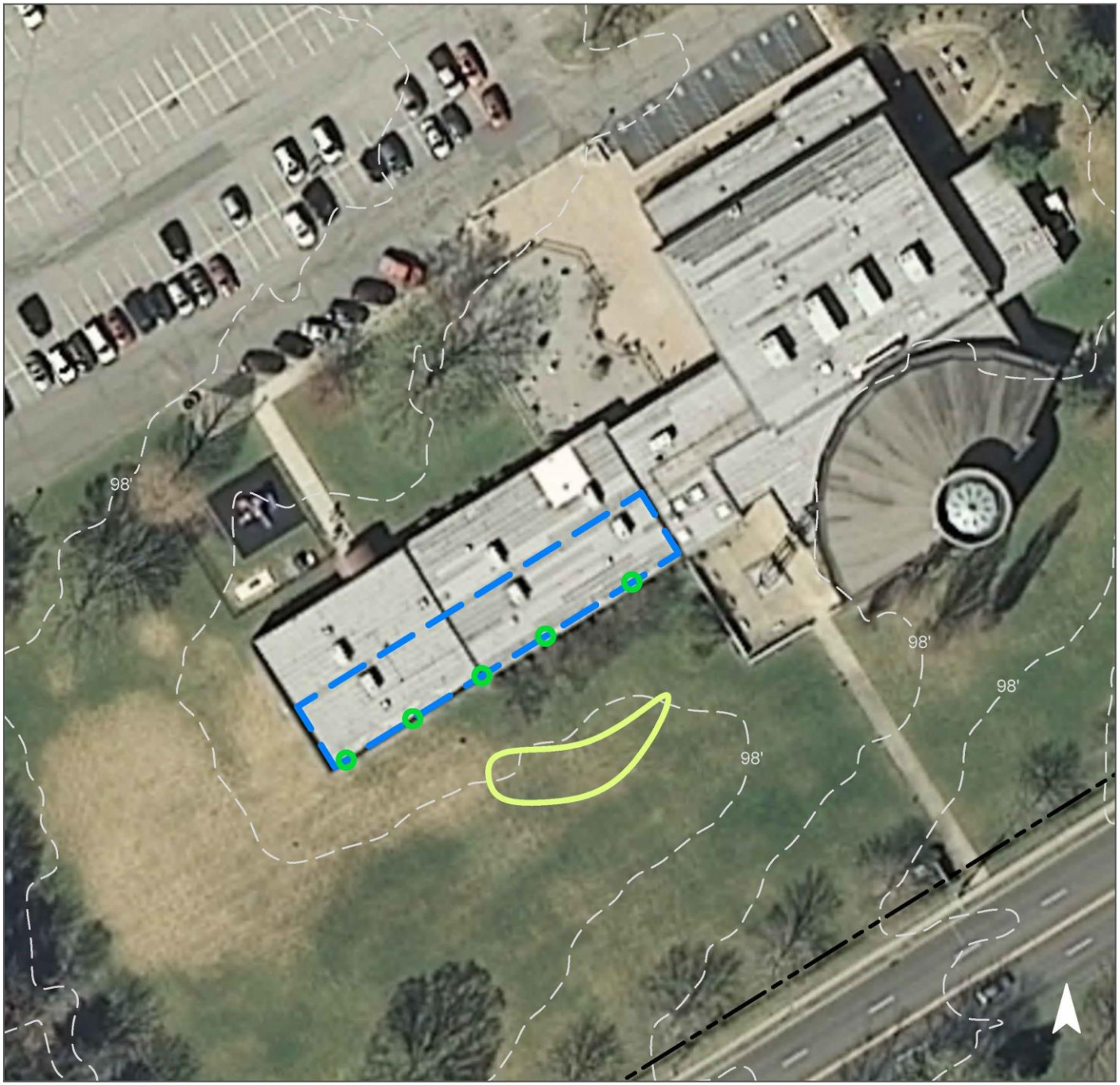
Block and Lot: Block 1408, Lot 55

A rain garden can be built in the front lawn to capture, treat, and infiltrate roof runoff by disconnecting and redirecting the downspouts into the rain garden. A downspout planter box can be installed in the patio area on the north side of the building to reuse rooftop runoff by disconnecting a downspout. 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"
48	196,555	9.5	99.3	902.5	0.153	5.39

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	0.116	19	8,782	0.33	1,300	$6,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint Thomas More Church

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

0 30' 60'

TAYLOR MILLS SCHOOL

Subwatershed: McGellairds Brook

Site Area: 743,732 sq. ft.

Address: 77 Gordons Corner Road
Manalapan, NJ 07726

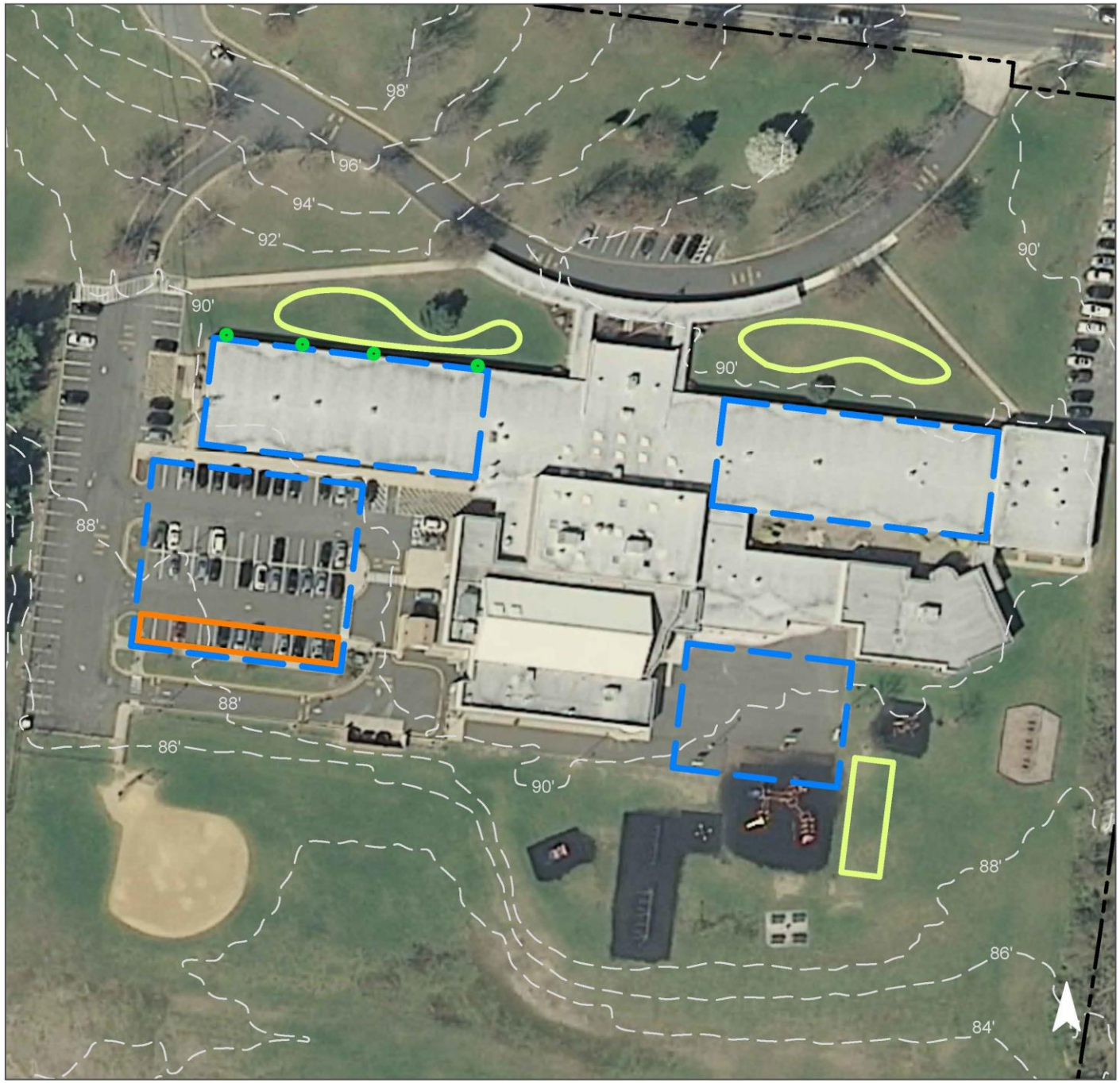
Block and Lot: Block 20.01, Lot 16.01

Parking spaces can be replaced with pervious pavement to infiltrate runoff. Rain gardens can also capture, treat, and infiltrate stormwater. 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"
26	195,591	9.4	98.8	898.0	0.152	5.36

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	0.894	150	67,709	2.54	8,300	$41,500
Pervious pavements	0.443	74	33,555	1.26	2,300	$57,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Taylor Mills School

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

0 50' 100'

US POST OFFICE

Subwatershed: McGellairds Brook

Site Area: 161,505 sq. ft.

Address: 9 Taylors Mill Road
Englishtown, NJ 07726

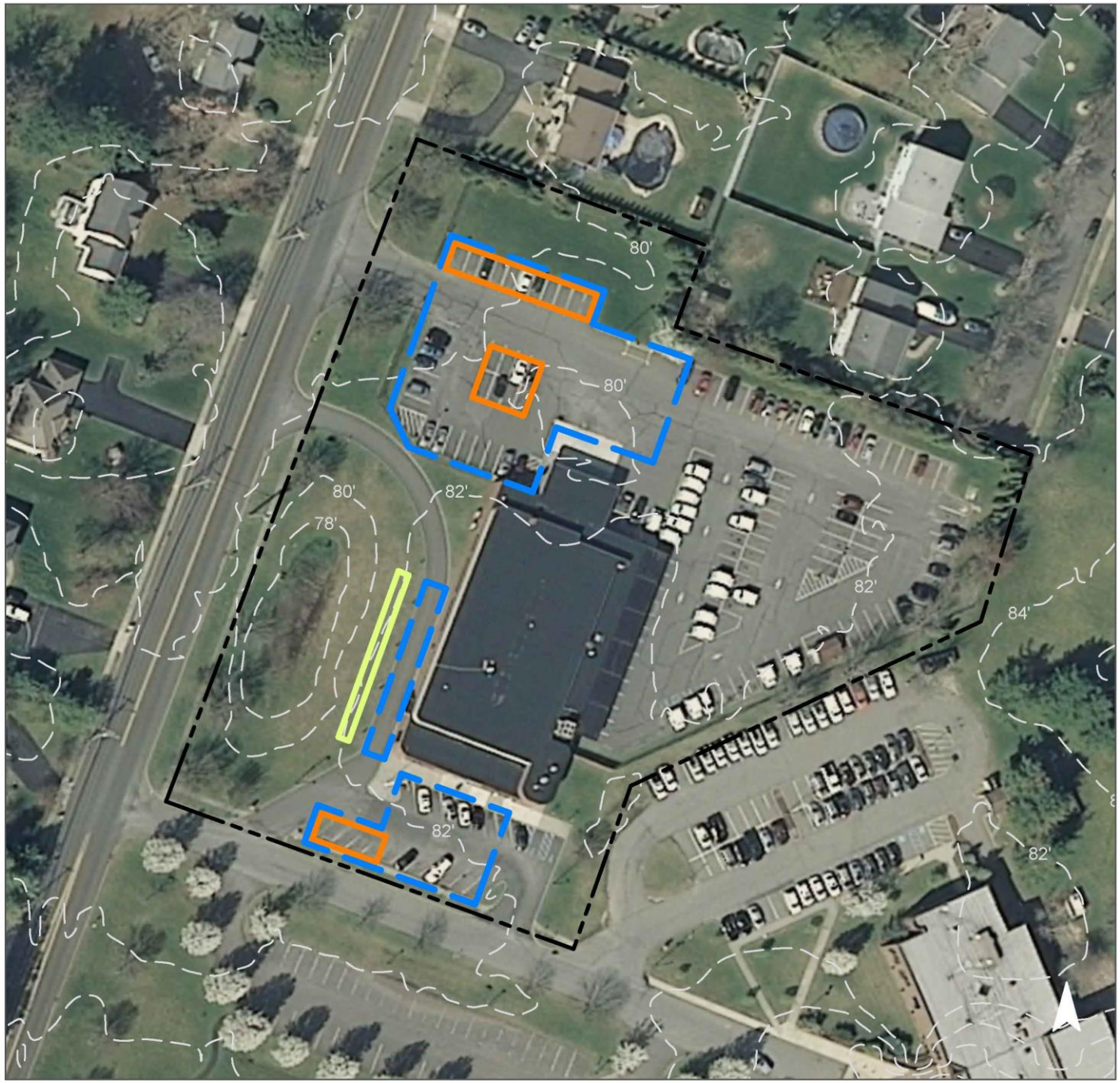
Block and Lot: Block 19, Lot 22.05

Parking spaces can be replaced with pervious pavement to capture, and infiltrate stormwater. A rain garden can also capture, treat and infiltrate runoff. 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"
83	134,768	6.5	68.1	618.8	0.105	3.70

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	0.043	7	3,254	0.12	850	$4,250
Pervious pavements	0.667	112	50,535	1.90	3,900	$97,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



US Post Office

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

0 50' 100'

MANALAPAN HIGH SCHOOL

Subwatershed: McGellairds Brook / Weamaconk Creek

Site Area: 1,217,517 sq. ft.

Address: 20 Church Lane
Manalapan, NJ 07726

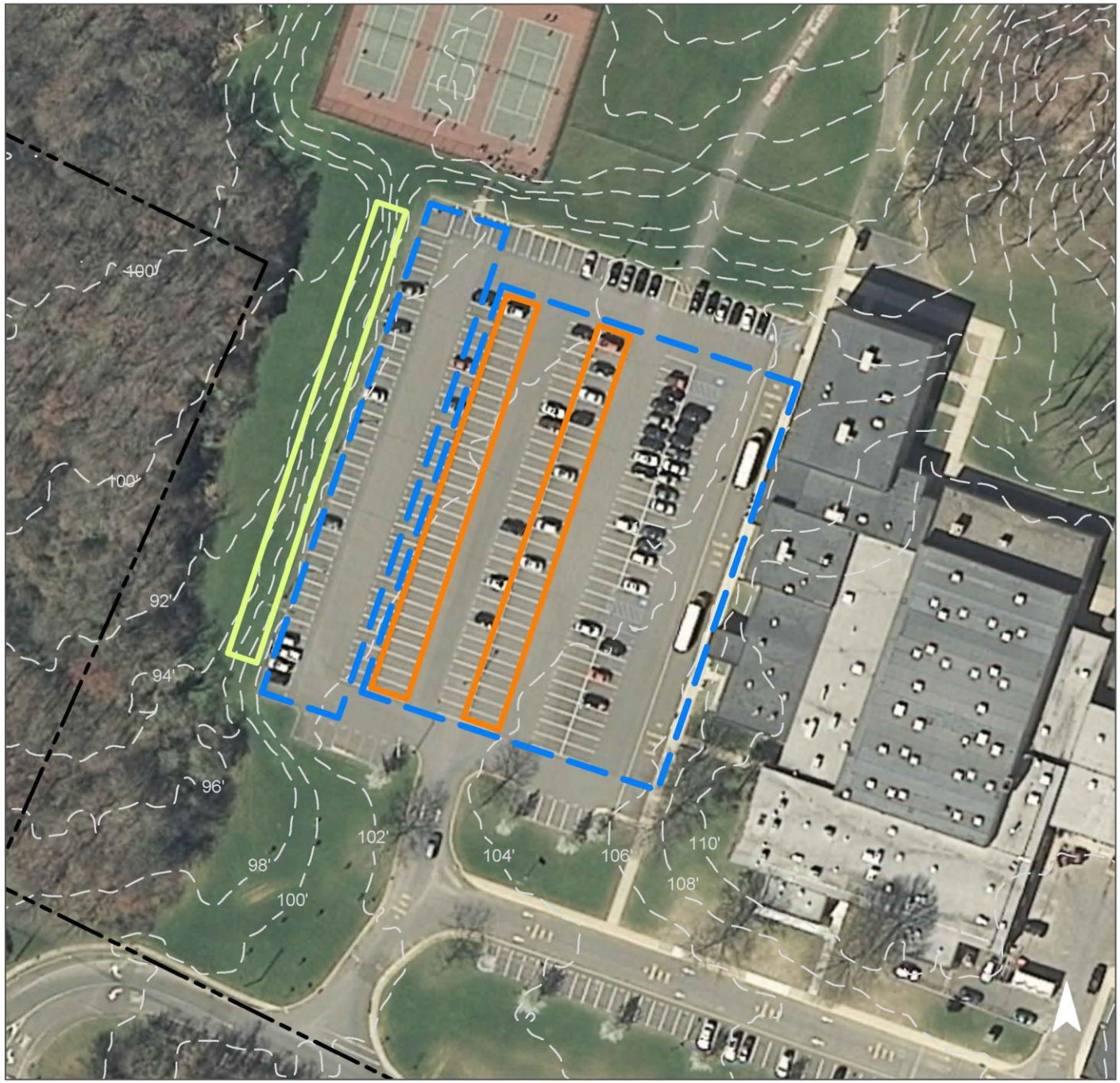
Block and Lot: Block 19, Lot 21.03

Parking spaces can be replaced with porous asphalt to infiltrate runoff. A rain garden can also be installed to capture, treat, and infiltrate stormwater runoff from the parking lot. 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"
44	530,826	25.6	268.1	2,437.2	0.414	14.56

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	0.466	78	35,336	1.33	6,200	$31,000
Pervious pavements	1.498	251	113,502	4.26	12,500	$312,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Manalapan High School

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

0 50' 100'

MANALAPAN TOWNSHIP MUNICIPAL BUILDING

Subwatershed: **Weamaconk Creek**

Site Area: **817,995 sq. ft.**

Address: **120 County Road 522**
Manalapan, NJ

Block and Lot: **Block 19, Lot 22.04**

The driveway in front of the building is currently not in use, and the asphalt is in poor condition. It can be replaced with pervious pavement to infiltrate stormwater. Parking spaces can also be replaced with porous asphalt. A cistern can be set up to harvest rainwater from the garage in the back parking lot, not visible in the 2012 aerial, and the water can be used to wash police cars. A rain garden can also capture, treat and infiltrate runoff. 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"
25	204,453	9.9	103.3	938.7	0.159	5.61

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	0.026	4	1,975	0.07	580	$2,900
Pervious pavements	0.306	51	23,195	0.87	1,325	$33,125
Rainwater harvesting systems	0.068	11	2,500	0.19	2,500 (gal)	$5,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Manalapan Township Municipal Building

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

0 50' 100'

WEMROCK BROOK SCHOOL

Subwatershed: **Weamaconk Creek**

Site Area: **1,346,156 sq. ft.**

Address: **118 Millhurst Road**
Manalapan, NJ 07726

Block and Lot: **Block 64, Lot 10.02**

Rain gardens can be installed on the front and east sides of the building to capture, treat, and infiltrate roof runoff. Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater runoff. A cistern can be set to harvest rainwater that can be used to wash buses, or conduct car wash fundraising events. 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"
33	446,802	21.5	225.7	2,051.4	0.348	12.25

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	0.357	60	27,040	1.02	3,500	$17,500
Pervious pavements	0.310	52	23,487	0.88	1,300	$32,500
Rainwater harvesting systems	0.060	10	2,200	0.17	2,200 (gal)	$4,400

GREEN INFRASTRUCTURE RECOMMENDATIONS

Wemrock Brook School

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

0 75' 150'

d. Summary of Existing Conditions

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads TP (lb/yr)	Existing Annual Loads TN (lb/yr)	Existing Annual Loads TSS (lb/yr)	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Runoff Volumes from I.C. Annual (Mgal)
BARCLAY BROOK SUBWATERSHED	**2.70**	**117,580**			**3.6**	**37.6**	**342.1**		**1.71**	**74,503**	**0.058**	**2.04**
Manalapan Montessori												
Total Site Info	2.70	117,580	3.03	8.02	3.6	37.6	342.1	63	1.71	74,503	0.058	2.04
MANALAPAN BROOK SUBWATERSHED	**66.08**	**2,878,593**			**24.8**	**259.6**	**2,360.1**		**11.80**	**514,026**	**0.401**	**14.10**
Manalapan-Englishtown Middle School												
Total Site Info	66.08	2,878,593	67	14.02	24.8	259.6	2,360.1	18	11.80	514,026	0.401	14.10
MATCHAPONIX BROOK SUBWATERSHED	**44.49**	**1,937,922**			**25.7**	**269.1**	**2,446.6**		**12.23**	**532,865**	**0.415**	**14.61**
Clark Mills School												
Total Site Info	27.67	1,205,246	14.02	24	16.3	170.6	1,551.1	28	7.76	337,824	0.263	9.27
Community Refuge Church												
Total Site Info	1.48	64,463	29	10.04	1.0	10.9	98.8	33	0.49	21,521	0.017	0.59
Milford Brook Elementary School												
Total Site Info	15.34	668,213	14.02	35.05	8.4	87.6	796.7	26	3.98	173,520	0.135	4.76
MCGELLAIRDS BROOK SUBWATERSHED	**100.97**	**4,398,405**			**58.8**	**616.4**	**5,603.3**		**28.02**	**1,220,390**	**0.951**	**33.47**
Church in Manalapan												
Total Site Info	3.37	146,994	1102	32	0.7	7.8	70.8	10	0.35	15,416	0.012	0.42
Lafayette Mills School												
Total Site Info	16.05	699,243	1707	28	8.4	88.3	802.6	25	4.01	174,798	0.136	4.79
Monmouth County Library												
Total Site Info	18.31	797,709	1806	61	15.8	165.5	1,504.3	41	7.52	327,640	0.255	8.99
Old Tennent Presbyterian Church												
Total Site Info	29.47	1,283,553	25	13	6.3	65.6	596.1	10	2.98	129,834	0.101	3.56

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads TP (lb/yr)	Existing Annual Loads TN (lb/yr)	Existing Annual Loads TSS (lb/yr)	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Runoff Volumes from I.C. Annual (Mgal)
Saint Thomas Lutheran Church												
Total Site Info	3.52	153,266	1801	38	2.2	23.1	210.2	30	1.05	45,788	0.036	1.26
Saint Thomas More Church												
Total Site Info	9.47	412,403	1408	55	9.5	99.3	902.5	48	4.51	196,555	0.153	5.39
Taylor Mills School												
Total Site Info	17.07	743,732	20.01	16.01	9.4	98.8	898.0	26	4.49	195,591	0.152	5.36
US Post Office												
Total Site Info	3.71	161,505	19	22.05	6.5	68.1	618.8	83	3.09	134,768	0.105	3.70
MCGELLAIRDS BROOK/WEAMACONK CREEK SUBWATERSHED	**27.95**	**1,217,517**			**25.6**	**268.1**	**2,437.2**		**12.19**	**530,826**	**0.414**	**14.56**
Manalapan High School												
Total Site Info	27.95	1,217,517	19	21.03	25.6	268.1	2,437.2	44	12.19	530,826	0.414	14.56
WEAMACONK CREEK SUBWATERSHED	**49.68**	**2,164,151**			**31.4**	**328.9**	**2,990.1**		**14.95**	**651,254**	**0.507**	**17.86**
Manalapan Township Municipal Building												
Total Site Info	18.78	817,995	19	22.04	9.9	103.3	938.7	25	4.69	204,453	0.159	5.61
Wemrock Brook School												
Total Site Info	30.90	1,346,156	64	10.02	21.5	225.7	2,051.4	33	10.26	446,802	0.348	12.25

e. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practies

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		Recharge Potential	TSS Removal Potential	Max Volume Reduction Potential	Peak Discharge Reduction Potential	Size of BMP	Unit Cost	Unit	Total Cost	I.C. Treated
		Area (SF)	Area (ac)	(Mgal/yr)	(lbs/yr)	(gal/storm)	(cfs)	(SF)	($)		($)	%
	BARCLAY BROOK SUBWATERSHED	**18,000**	**0.41**	**0.469**	**79**	**35,530**	**1.33**	**6,800**			**$146,000**	**24.2%**
1	**Manalapan Montessori**											
	Bioretention systems/rain gardens	4,600	0.11	0.120	20	9,081	0.34	1,200	5	SF	$6,000	6.2%
	Pervious pavements	13,400	0.31	0.349	58	26,449	0.99	5,600	25	SF	$140,000	18.0%
	Total Site Info	**18,000**	**0.41**	**0.469**	**79**	**35,530**	**1.33**	**6,800**			**$146,000**	**24.2%**
	MANALAPAN BROOK SUBWATERSHED	**51,200**	**1.18**	**1.334**	**223**	**101,070**	**3.79**	**16,400**			**$386,000**	**10.0%**
2	**Manalapan-Englishtown Middle School**											
	Bioretention systems/rain gardens	3,800	0.09	0.099	17	7,502	0.28	1,200	5	SF	$6,000	0.7%
	Pervious pavements	47,400	1.09	1.235	207	93,567	3.51	15,200	25	SF	$380,000	9.2%
	Total Site Info	**51,200**	**1.18**	**1.334**	**223**	**101,070**	**3.79**	**16,400**			**$386,000**	**10.0%**
	MATCHAPONIX BROOK SUBWATERSHED	**69,450**	**1.59**	**1.810**	**303**	**137,086**	**5.15**	**15,500**			**$338,500**	**13.0%**
3	**Clark Mills School**											
	Bioretention systems/rain gardens	4,000	0.09	0.104	17	7,899	0.30	1,400	5	SF	$7,000	1.2%
	Pervious pavements	17,750	0.41	0.462	77	35,036	1.32	4,700	25	SF	$117,500	5.3%
	Total Site Info	**21,750**	**0.50**	**0.567**	**95**	**42,935**	**1.62**	**6,100**			**$124,500**	**6.4%**
4	**Community Refuge Church**											
	Bioretention systems/rain gardens	5,400	0.12	0.141	24	10,659	0.40	750	5	SF	$3,750	25.1%
	Pervious pavements	6,700	0.15	0.175	29	13,225	0.50	1,200	25	SF	$30,000	31.1%
	Total Site Info	**12,100**	**0.28**	**0.315**	**53**	**23,884**	**0.90**	**1,950**			**$33,750**	**56.2%**
5	**Milford Brook Elementary School**											
	Bioretention systems/rain gardens	600	0.01	0.016	3	1,182	0.04	300	5	SF	$1,500	0.3%
	Pervious pavements	35,000	0.80	0.912	153	69,085	2.59	7,150	25	SF	$178,750	20.2%
	Total Site Info	**35,600**	**0.82**	**0.928**	**155**	**70,267**	**2.63**	**7,450**			**$180,250**	**20.5%**

Summary of Proposed Green Infrastructure Practies

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	MCGELLAIRDS BROOK SUBWATERSHED	**151,950**	**3.49**	**3.959**	**663**	**299,933**	**11.25**	**35,780**			**$506,900**	**12.5%**
6	**Church in Manalapan**											
	Bioretention systems/rain gardens	1,050	0.02	0.027	5	2,072	0.08	270	5	SF	$1,350	6.8%
	Total Site Info	**1,050**	**0.02**	**0.027**	**5**	**2,072**	**0.08**	**270**			**$1,350**	**6.8%**
7	**Lafayette Mills School**											
	Bioretention systems/rain gardens	14,600	0.34	0.380	64	28,820	1.08	3,660	5	SF	$18,300	8.4%
	Pervious pavements	15,100	0.35	0.393	66	29,808	1.12	2,500	25	SF	$62,500	8.6%
	Total Site Info	**29,700**	**0.68**	**0.774**	**130**	**58,628**	**2.20**	**6,160**			**$80,800**	**17.0%**
8	**Monmouth County Library**											
	Bioretention systems/rain gardens	5,700	0.13	0.149	25	11,250	0.42	2,000	5	SF	$10,000	1.7%
	Pervious pavements	20,500	0.47	0.534	89	40,467	1.52	7,700	25	SF	$192,500	6.3%
	Total Site Info	**26,200**	**0.60**	**0.683**	**114**	**51,717**	**1.94**	**9,700**			**$202,500**	**8.0%**
9	**Old Tennent Presbyterian Church**											
	Bioretention systems/rain gardens	6,000	0.14	0.156	26	11,841	0.44	1,500	5	SF	$7,500	4.6%
	Total Site Info	**6,000**	**0.14**	**0.156**	**26**	**11,841**	**0.44**	**1,500**			**$7,500**	**4.6%**
10	**Saint Thomas Lutheran Church**											
	Bioretention systems/rain gardens	6,000	0.14	0.156	26	11,841	0.44	1,500	5	SF	$7,500	13.1%
	Total Site Info	**6,000**	**0.14**	**0.156**	**26**	**11,841**	**0.44**	**1,500**			**$7,500**	**13.1%**
11	**Saint Thomas More Church**											
	Bioretention systems/rain gardens	4,450	0.10	0.116	19	8,782	0.33	1,300	5	SF	$6,500	2.3%
	Total Site Info	**4,450**	**0.10**	**0.116**	**19**	**8,782**	**0.33**	**1,300**			**$6,500**	**2.3%**
12	**Taylor Mills School**											
	Bioretention systems/rain gardens	34,300	0.79	0.894	150	67,709	2.54	8,300	5	SF	$41,500	17.5%
	Pervious pavements	17,000	0.39	0.443	74	33,555	1.26	2,300	25	SF	$57,500	8.7%
	Total Site Info	**51,300**	**1.18**	**1.337**	**224**	**101,264**	**3.80**	**10,600**			**$99,000**	**26.2%**
13	**US Post Office**											
	Bioretention systems/rain gardens	1,650	0.04	0.043	7	3,254	0.12	850	5	SF	$4,250	1.2%
	Pervious pavements	25,600	0.59	0.667	112	50,535	1.90	3,900	25	SF	$97,500	19.0%
	Total Site Info	**27,250**	**0.63**	**0.710**	**119**	**53,789**	**2.02**	**4,750**			**$101,750**	**20.2%**

Summary of Proposed Green Infrastructure Practies

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	MCGELLAIRDS BROOK/WEAMACONK CREEK SUBWATERSHED	**75,400**	**1.73**	**1.965**	**329**	**148,837**	**5.59**	**18,700**			**$343,500**	**14.2%**
14	**Manalapan High School**											
	Bioretention systems/rain gardens	17,900	0.41	0.466	78	35,336	1.33	6,200	5	SF	$31,000	3.4%
	Pervious pavements	57,500	1.32	1.498	251	113,502	4.26	12,500	25	SF	$312,500	10.8%
	Total Site Info	**75,400**	**1.73**	**1.965**	**329**	**148,837**	**5.59**	**18,700**			**$343,500**	**14.2%**
	WEAMACONK CREEK SUBWATERSHED	**43,250**	**0.99**	**1.127**	**189**	**80,398**	**3.20**	**11,405**			**$95,425**	**6.6%**
15	**Manalapan Township Municipal Building**											
	Bioretention systems/rain gardens	1,000	0.02	0.026	4	1,975	0.07	580	5	SF	$2,900	0.5%
	Pervious pavements	11,750	0.27	0.306	51	23,195	0.87	1,325	25	SF	$33,125	5.7%
	Rainwater harvesting systems	2,600	0.06	0.068	11	2,500	0.19	2,500	2	gal	$5,000	1.3%
	Total Site Info	**15,350**	**0.35**	**0.400**	**67**	**27,670**	**1.13**	**4,405**			**$41,025**	**7.5%**
16	**Wemrock Brook School**											
	Bioretention systems/rain gardens	13,700	0.31	0.357	60	27,040	1.02	3,500	5	SF	$17,500	3.1%
	Pervious pavements	11,900	0.27	0.310	52	23,487	0.88	1,300	25	SF	$32,500	2.7%
	Rainwater harvesting systems	2,300	0.05	0.060	10	2,200	0.17	2,200	2	gal	$4,400	0.5%
	Total Site Info	**27,900**	**0.64**	**0.727**	**122**	**52,727**	**2.07**	**7,000**			**$54,400**	**6.2%**