



Draft

**Impervious Cover Reduction Action Plan
for
Monroe Township, Middlesex County, New Jersey**

*Prepared for Monroe Township by the
Rutgers Cooperative Extension Water Resources Program*

November 16, 2015



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Introduction

Located in Middlesex County in central New Jersey, Monroe Township covers approximately 42.2 square miles. Figures 1 and 2 illustrate that Monroe Township is dominated by urban land uses. A total of 39.0% of the municipality's land use is classified as urban. Of the urban land in Monroe Township, low density residential is the dominant land use followed by medium density and rural residential (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Monroe 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 Monroe Township. Based upon the 2007 NJDEP land use/land cover data, approximately 11.7% of Monroe Township has impervious cover. This level of impervious cover suggests that the streams in Monroe Township are likely impacted.¹

Methodology

Monroe 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

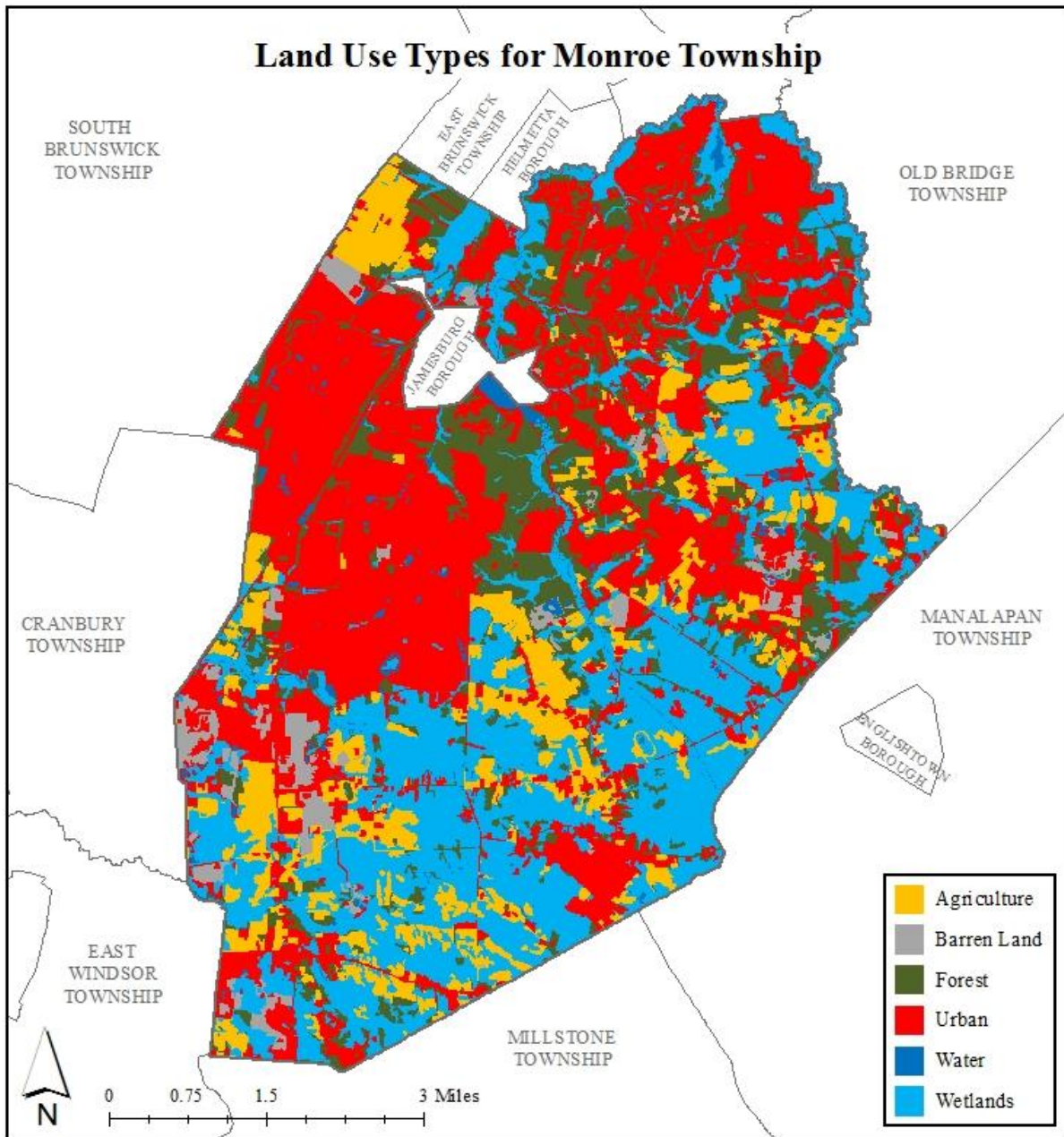


Figure 1: Map illustrating the land use in Monroe Township

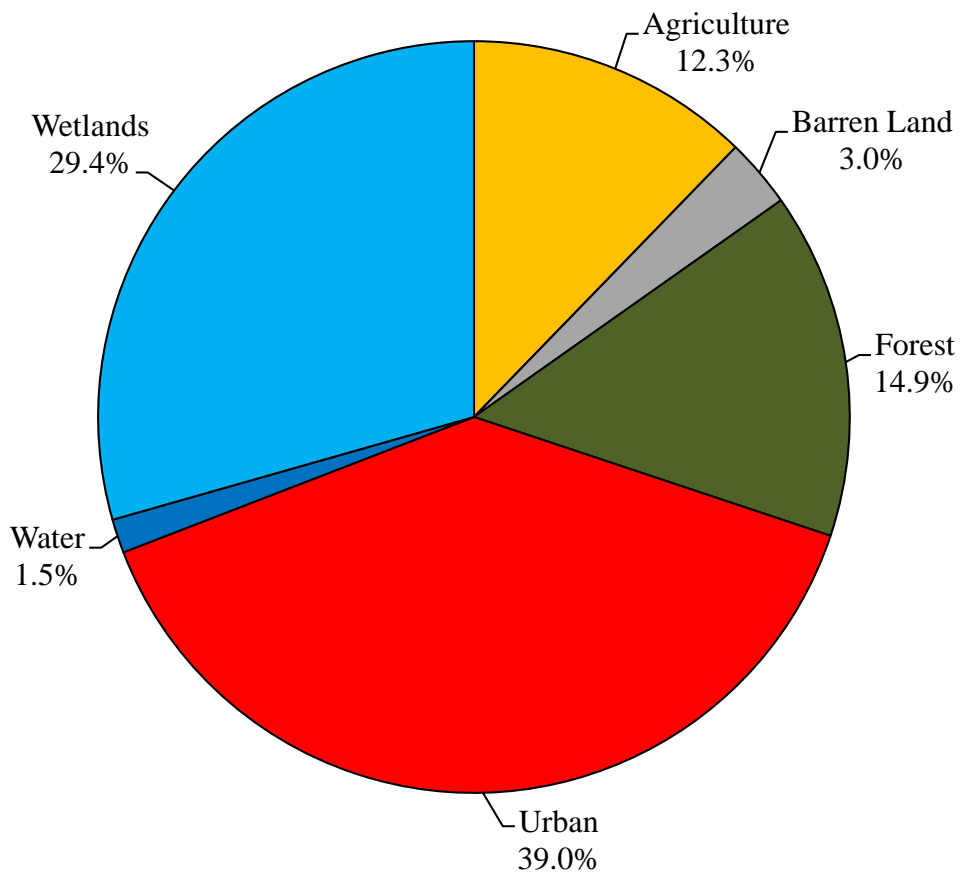


Figure 2: Pie chart illustrating the land use in Monroe Township

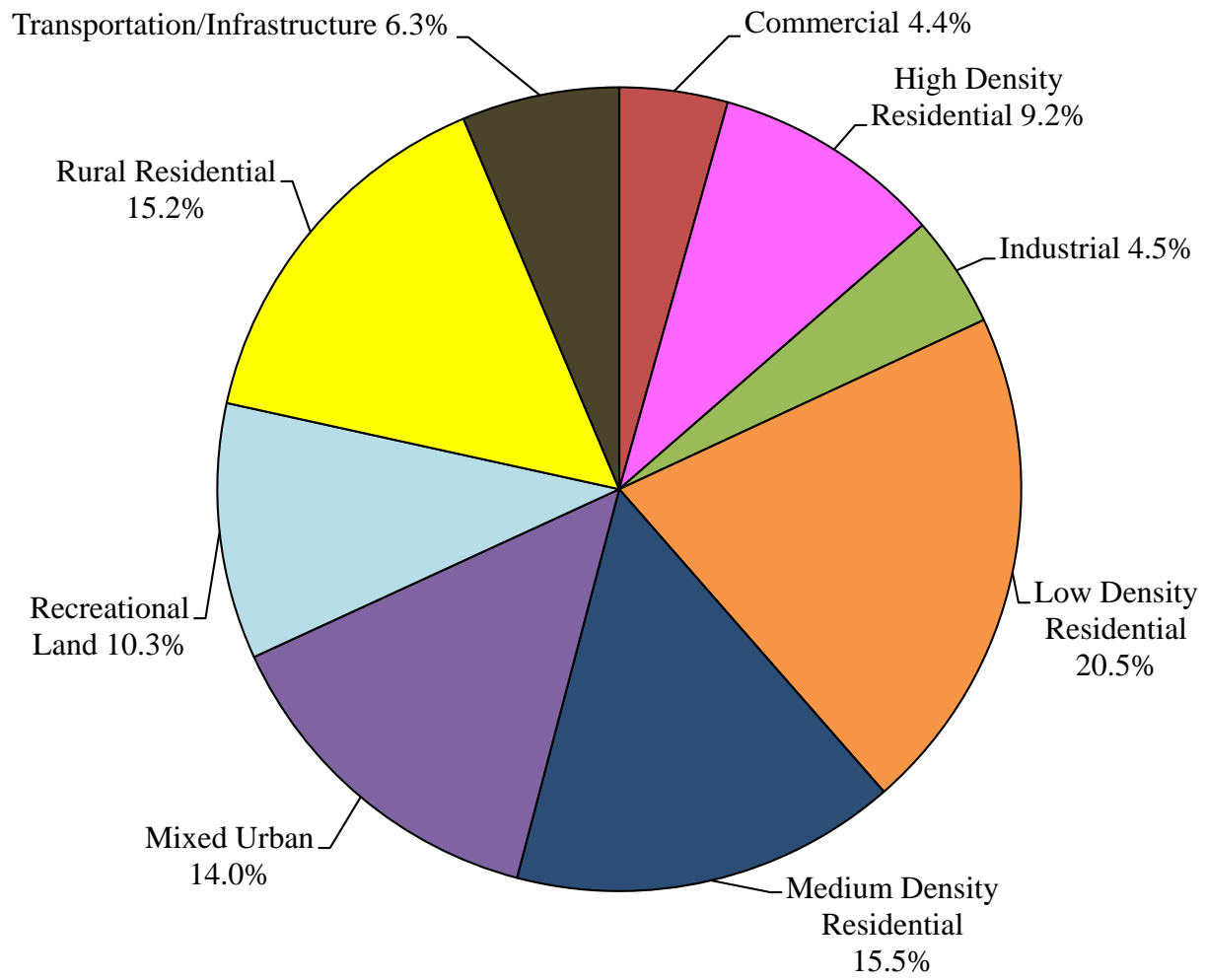


Figure 3: Pie chart illustrating the various types of urban land use in Monroe Township

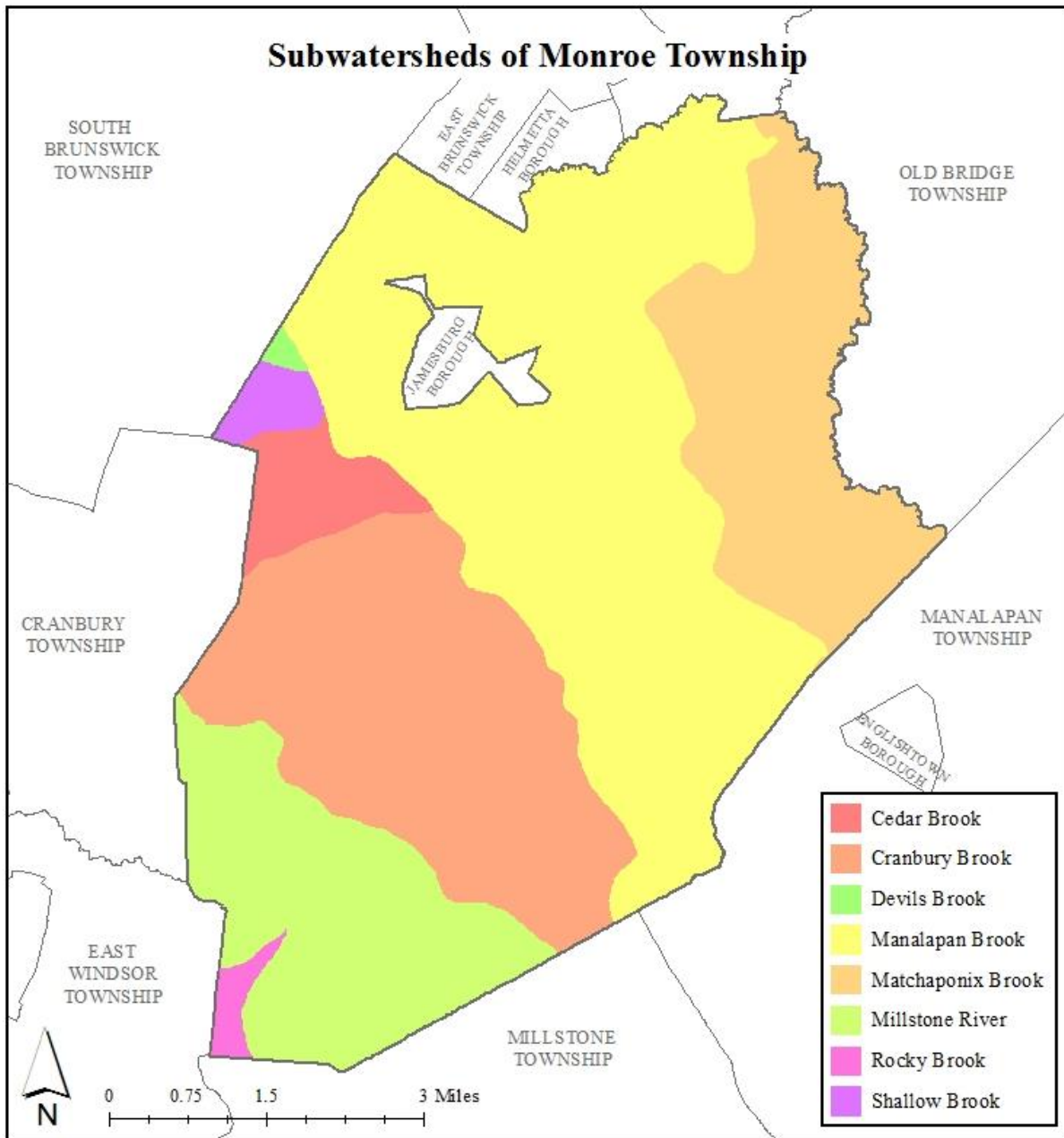


Figure 4: Map of the subwatersheds in Monroe Township

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 Monroe 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 Coefficients²

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 benefits³. A wide range of green infrastructure practices have been evaluated for the potential project sites in Monroe 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.*

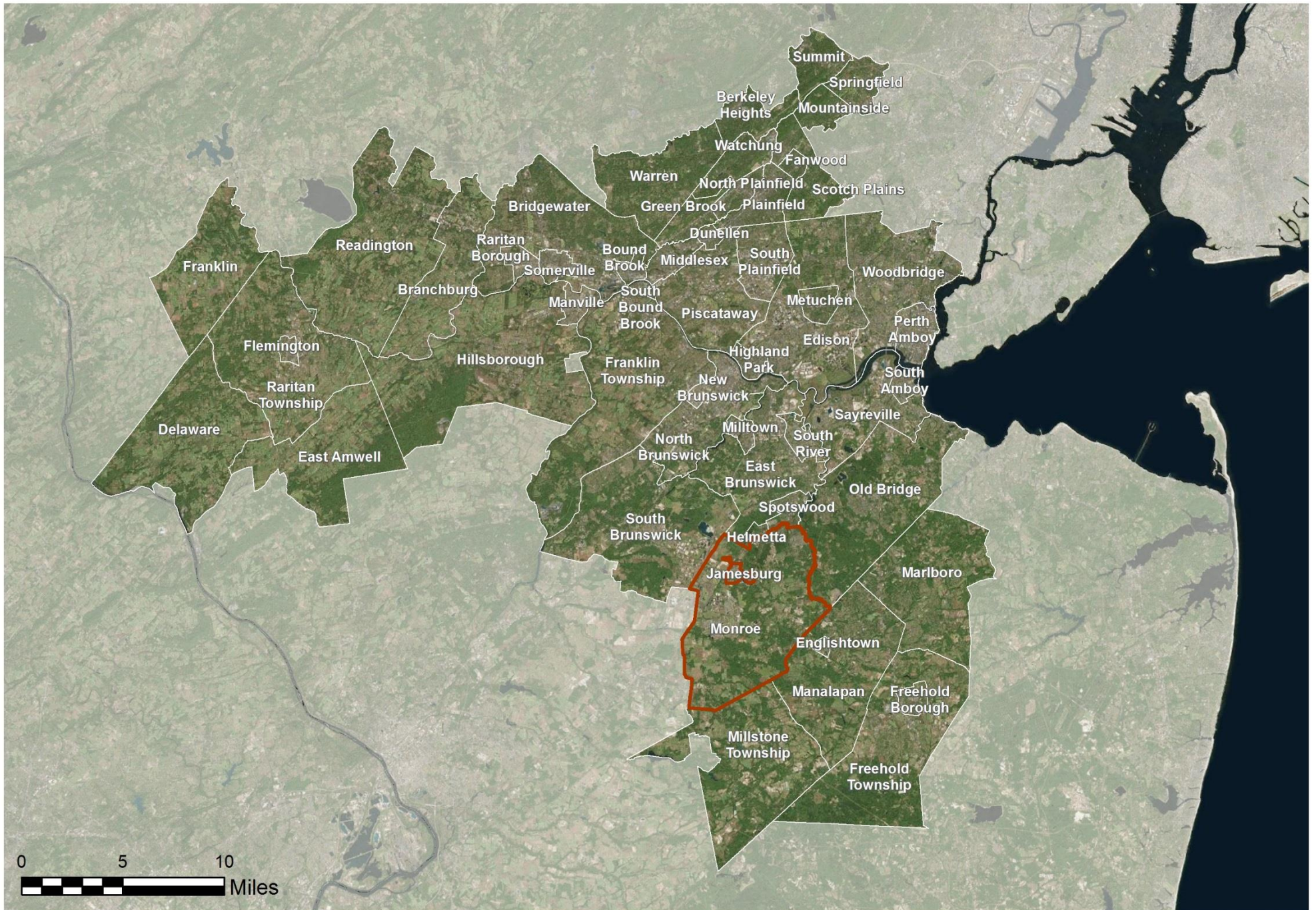
Conclusion

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.

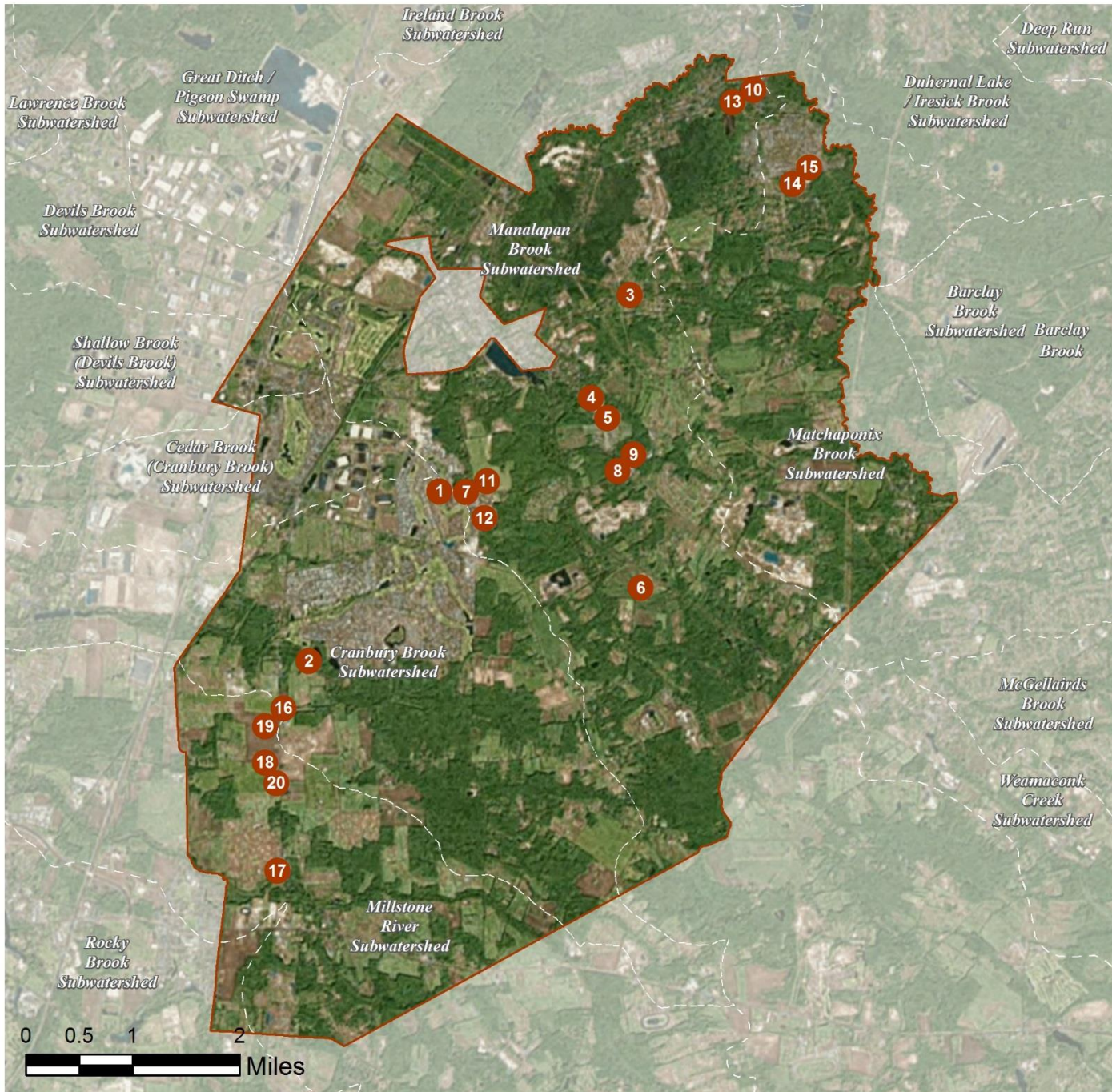
a. Overview Map of the Project

MONROE TOWNSHIP: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



b. Green Infrastructure Sites

MONROE TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE CRANBURY BROOK SUBWATERSHED:

1. Monroe Township Public Library
2. Monroe Township Utility Department

SITES WITHIN THE MANALAPAN BROOK SUBWATERSHED:

3. Academy Learning Center
4. Barclay Brook Elementary School
5. Brookside Elementary School
6. Monroe Public Works Facility
7. Monroe Township Administration Office and Police Department
8. Monroe Township Board of Education
9. Monroe Township Fire Department
10. Monroe Township Fire Prevention
11. Monroe Township High School
12. Monroe Township Middle School
13. Woodland Elementary School

SITES WITHIN THE MATCHAPONIX BROOK SUBWATERSHED:

14. Mill Lake Elementary School
15. Monroe Community Center

SITES WITHIN THE MILLSTONE RIVER SUBWATERSHED:

16. Applegarth Elementary School
17. Applegarth Volunteer Engine Company
18. Monroe Township Emergency Services
19. Oak Tree Elementary School
20. Office of Senior Services

c. Proposed Green Infrastructure Concepts

MONROE TOWNSHIP PUBLIC LIBRARY



Subwatershed: Cranbury Brook

Site Area: 190,455 sq. ft.

Address: 4 Municipal Plaza
Monroe, NJ 08831

Block and Lot: Block 48.4, Lot 14.01

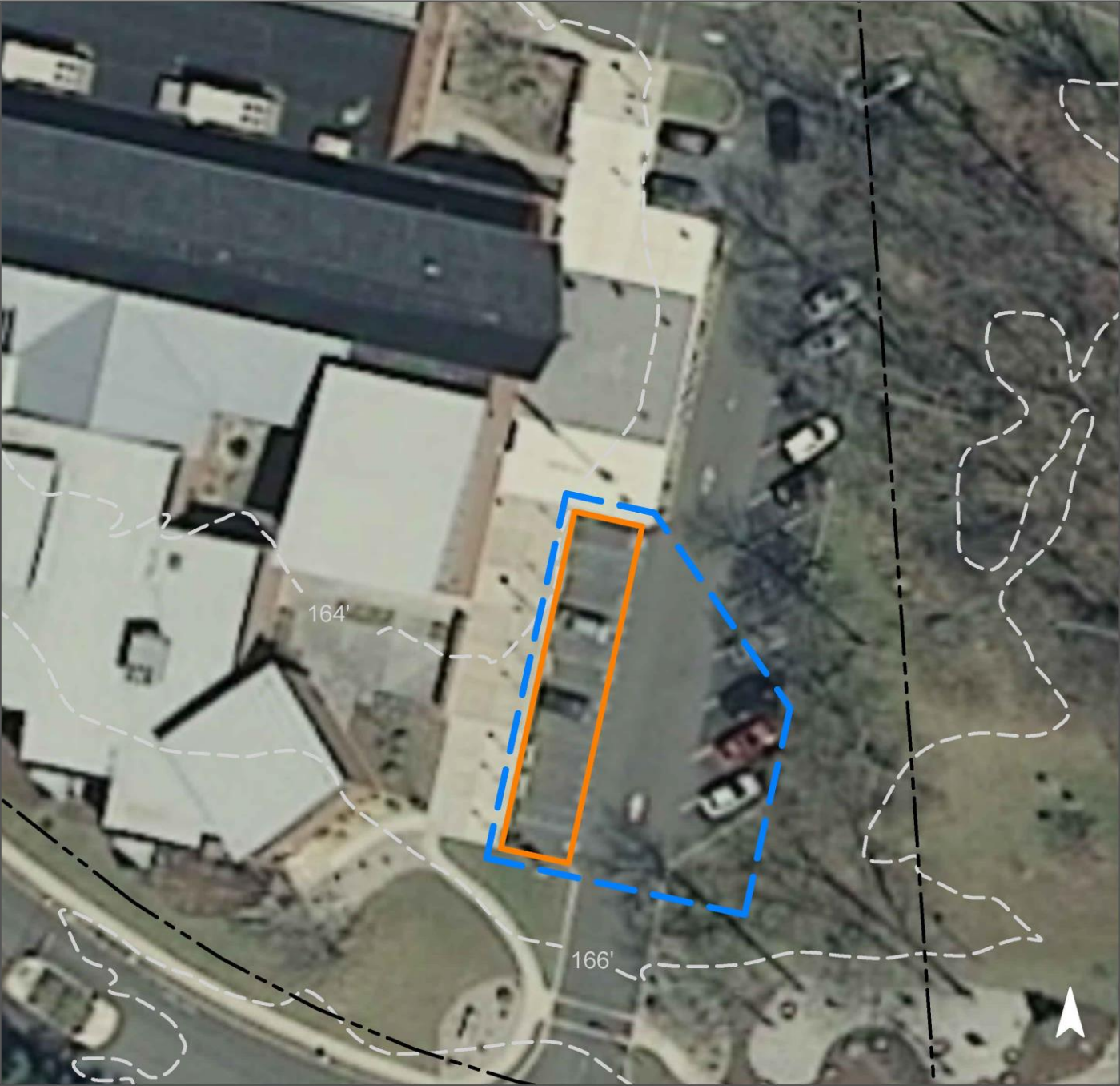


Parking spots east of the library can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
39	73,554	3.5	37.1	337.7	0.057	2.02

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	0.149	25	10,936	0.41	1,611	\$40,275

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Public Library

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MONROE TOWNSHIP UTILITY DEPARTMENT



Subwatershed: Cranbury Brook
Site Area: 1,251,912 sq. ft.
Address: 143 Union Valley Road
Monroe, NJ 08831
Block and Lot: Block 26, Lot 12.01

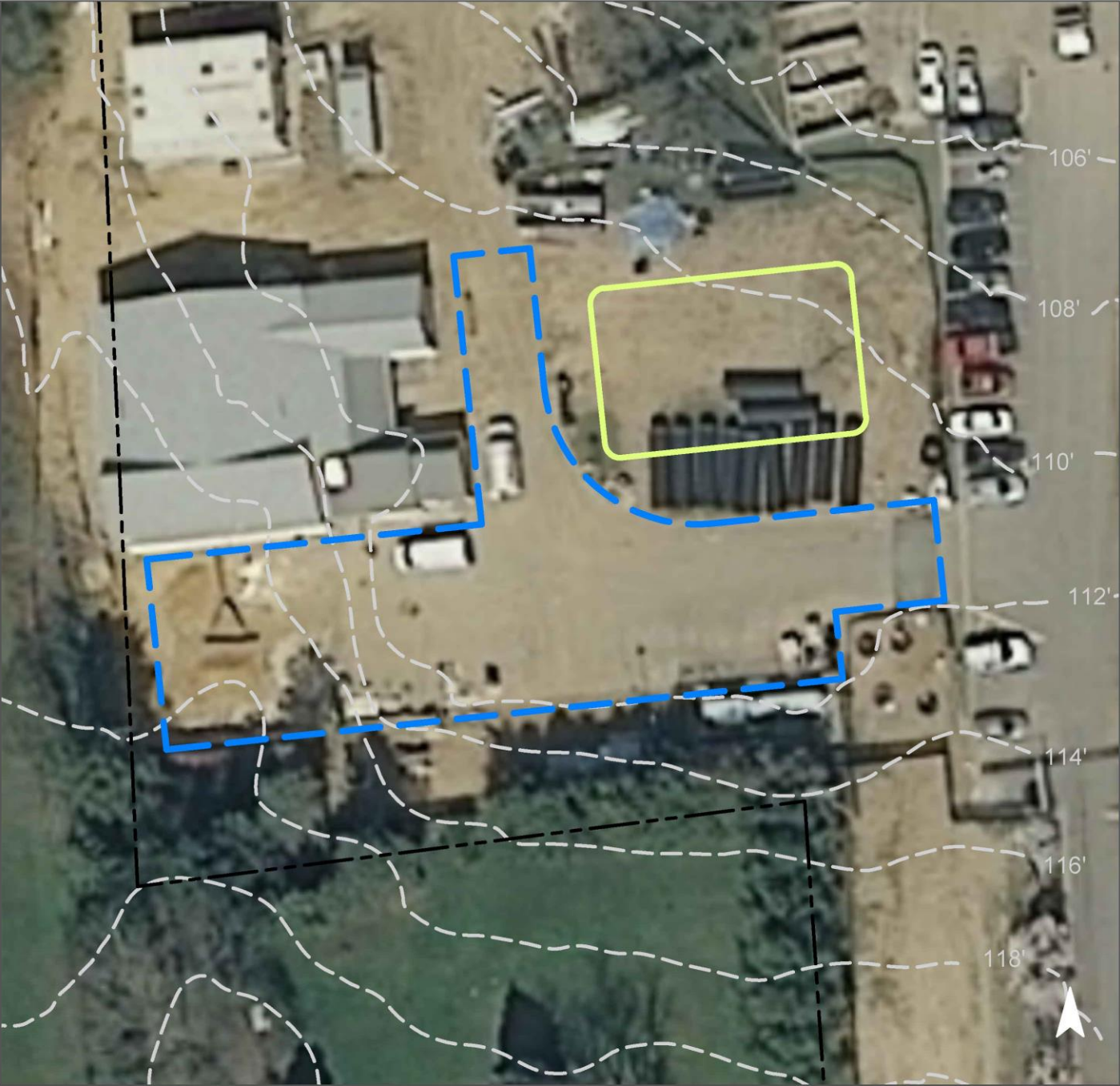


Installing a rain garden adjacent to the parking lot can capture, treat, and infiltrate stormwater runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
11	137,216	6.6	69.3	630.0	0.107	3.76

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	0.282	47	20,705	0.78	3,008	\$15,040

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Utility Department

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



ACADEMY LEARNING CENTER



Subwatershed: Manalapan Brook
Site Area: 446,909 sq. ft.
Address: 145 Pergola Avenue
Monroe, NJ 08831
Block and Lot: Block 75, Lot 6.09



Stormwater is currently directed to an existing detention basin. Parking spots can be replaced with porous asphalt to capture and infiltrate stormwater. Downspout planter boxes can be installed to allow roof runoff to be reused. 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"
49	220,217	10.6	111.2	1,011.1	0.172	6.04

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
Downspout planter boxes	0.011	2	NA	NA	24	\$2,000
Pervious pavements	1.115	187	81,831	3.08	11,754	\$295,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Academy Learning Center

-  pervious pavements
-  downspout planter boxes
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



BARCLAY BROOK ELEMENTARY SCHOOL



Subwatershed: Manalapan Brook

Site Area: 394,766 sq. ft.

Address: 358 Buckelew Avenue
Monroe, NJ 08831

Block and Lot: Block 62, Lot 14

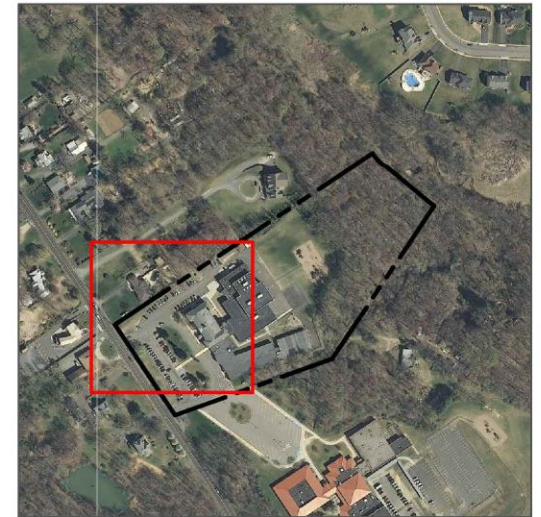
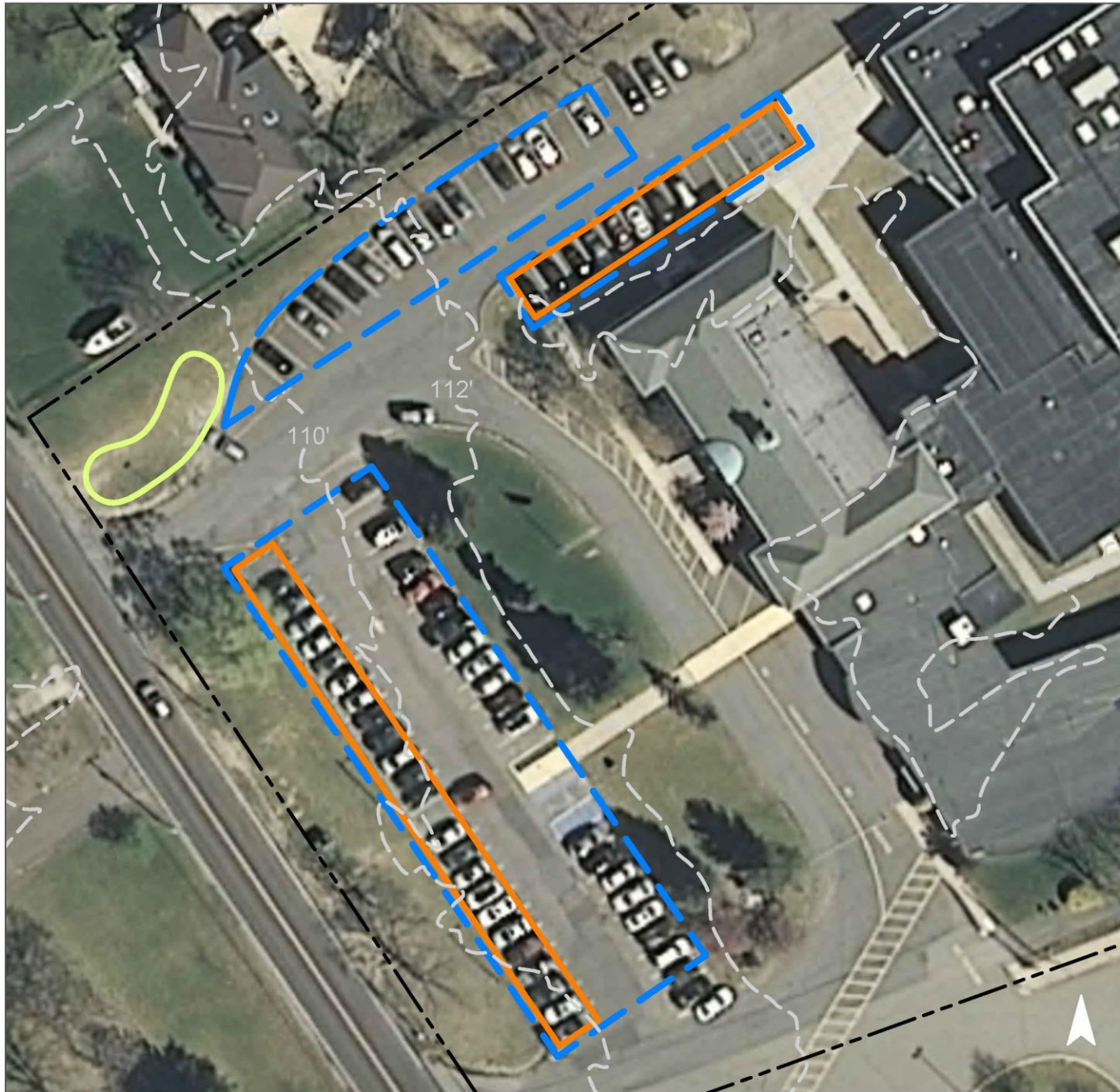


Parking spots can be replaced with porous asphalt to capture and infiltrate stormwater. Installing a rain garden adjacent to the parking lot can capture, treat, and infiltrate runoff being generated by it. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for 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	162,191	7.8	81.9	744.7	0.126	4.45

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	0.142	24	10,390	0.39	1,347	\$6,735
Pervious pavements	0.497	83	81,831	1.37	6,242	\$156,050

GREEN INFRASTRUCTURE RECOMMENDATIONS



Barclay Brook Elementary School

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



BROOKSIDE ELEMENTARY SCHOOL



Subwatershed: Manalapan Brook

Site Area: 917,448 sq. ft.

Address: 370 Buckelew Avenue
Monroe, NJ 08831

Block and Lot: Block 62, Lot 12.01

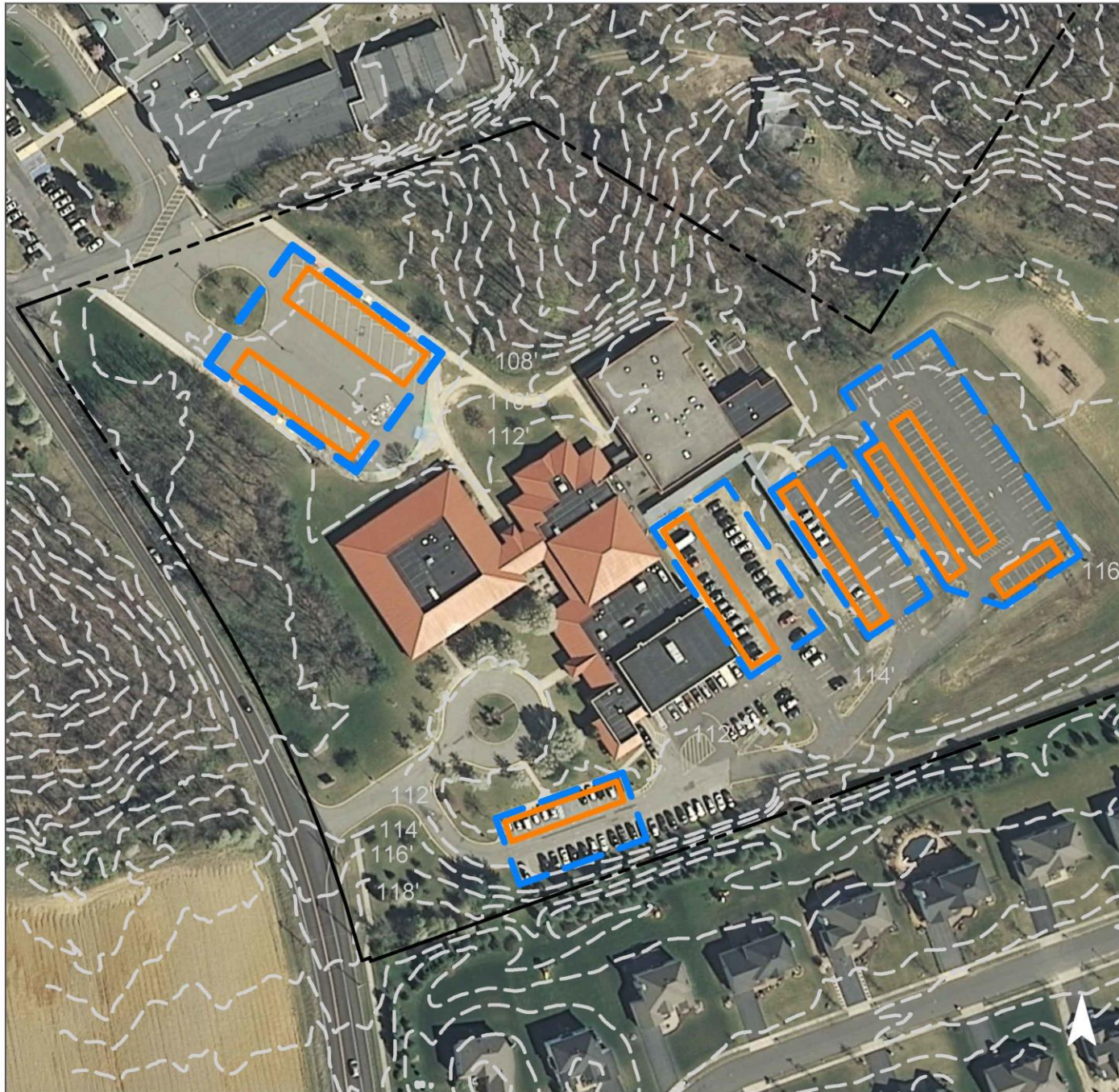


Stormwater is currently directed to an existing detention basin. Multiple rows of parking spots around the school can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
25	230,275	11.1	116.3	1,057.3	0.179	6.32

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	2.390	400	175,339	6.59	25,994	\$649,850

GREEN INFRASTRUCTURE RECOMMENDATIONS



Brookside Elementary School

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MONROE PUBLIC WORKS FACILITY



Subwatershed: Manalapan Brook

Site Area: 786,858 sq. ft.

Address: 76 Gravel Hill
Spotswood Road
Monroe, NJ 08831

Block and Lot: Block 31, Lot 15.02



Rainwater can be harvested by installing two cisterns at the building. The water can be used for cleaning department vehicles. 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"
13	100,482	4.8	50.7	461.3	0.078	2.76

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
Rainwater harvesting systems	0.268	45	10,000	0.74	10,000 (gal)	\$20,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Public Works Facility

-  rainwater harvesting
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MONROE TOWNSHIP ADMINISTRATION OFFICE & POLICE DEPARTMENT



Subwatershed: Manalapan Brook

Site Area: 798,166 sq. ft.

Address: 1-3 Municipal Plaza
Monroe, NJ 08831

Block and Lot: Block 48.4, Lot 10

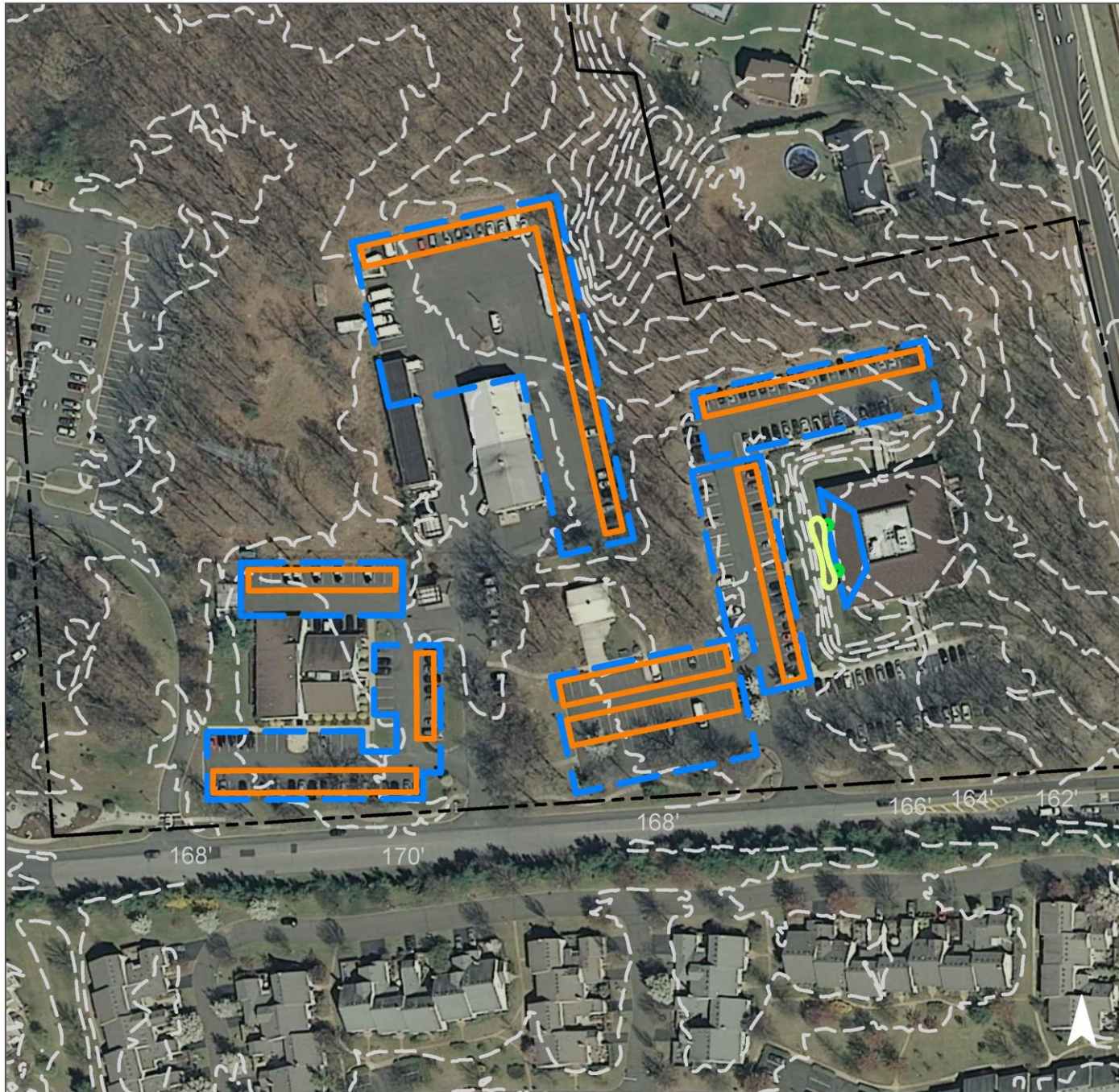


Parking spots around the complex can be replaced with porous asphalt to capture and infiltrate stormwater. Installing a rain garden adjacent to the Municipal Court building can capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics 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"
35	282,204	13.6	142.5	1,295.7	0.220	7.74

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	0.063	10	4,593	0.17	600	\$3,000
Pervious pavements	3.181	533	233,436	8.78	33,490	\$837,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Administration Office & Police Department

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



MONROE TOWNSHIP BOARD OF EDUCATION ADMINISTRATIVE OFFICES



Subwatershed: Manalapan Brook

Site Area: 200,642 sq. ft.

Address: 423 Buckelew Avenue
Monroe, NJ 08831

Block and Lot: Block 50, Lot 2.09

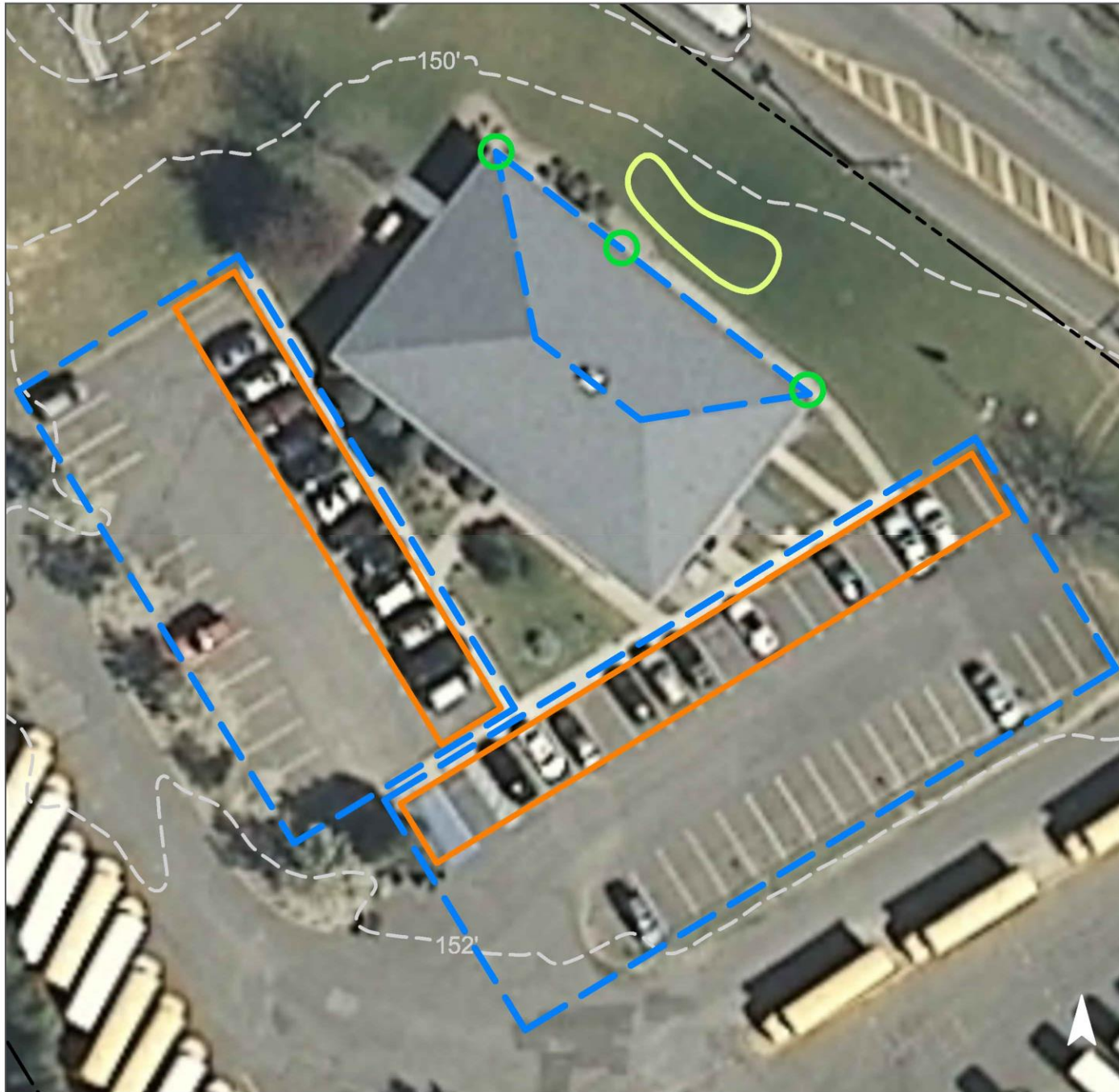


Stormwater is currently directed to an existing detention basin. Parking spots around the building can be replaced with porous asphalt to capture and infiltrate stormwater. A rain garden can be installed northeast of the building to capture, treat, and infiltrate roof runoff. A preliminary soil assessment 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"
71	142,820	6.9	72.1	655.7	0.111	3.92

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	0.057	10	4,174	0.16	570	\$2,850
Pervious pavements	0.564	94	41,387	1.56	5,494	\$137,350

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Board of Education and Administrative Offices

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



MONROE TOWNSHIP FIRE DEPARTMENT



Subwatershed: Manalapan Brook
Site Area: 37,263 sq. ft.
Address: 359 Schoolhouse Road
Monroe, NJ 08831
Block and Lot: Block 52, Lot 1.01



Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. The installation of a rain garden adjacent to the building can 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"
34	12,737	0.6	6.4	58.5	0.010	0.35

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	0.037	6	2,715	0.10	353	\$1,765
Pervious pavements	0.247	41	18,154	0.68	3,026	\$75,650

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Fire Department

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



MONROE TOWNSHIP FIRE PREVENTION



Subwatershed: Matchaponix Brook

Site Area: 19,706 sq. ft.

Address: 24 Harrison Avenue
Monroe, NJ 08831

Block and Lot: Block 152, Lots 4

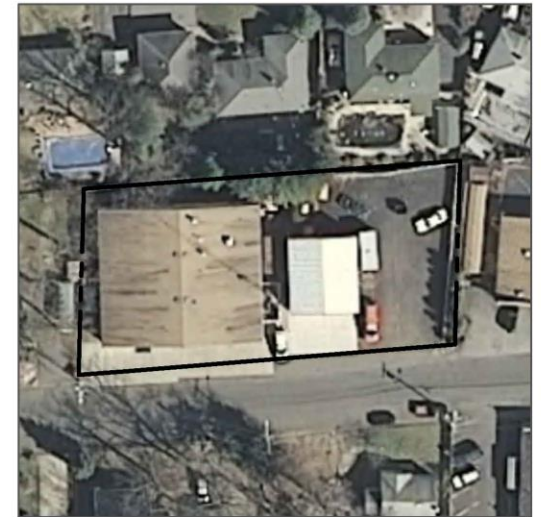


The building has internal drainage. Parking spots adjacent to the building can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
90	17,735	0.9	9.0	81.4	0.014	0.49

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	0.126	21	9,245	0.35	1,044	\$26,100

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Fire Prevention

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MONROE TOWNSHIP HIGH SCHOOL



Subwatershed: Manalapan Brook

Site Area: 1,309,462 sq. ft.

Address: 200 Schoolhouse Road
Monroe, NJ 08831

Block and Lot: Block 59, Lot 1.03

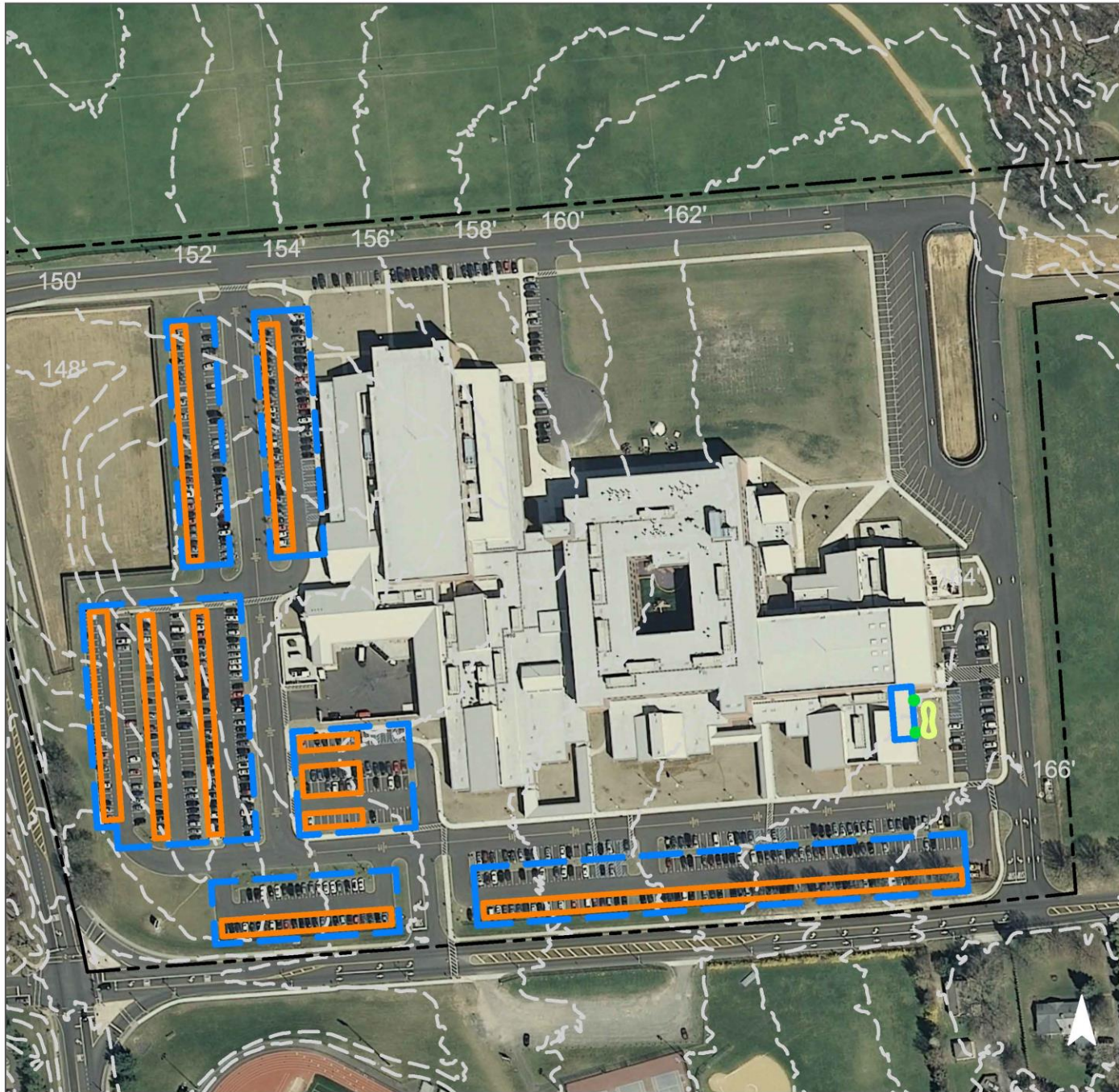


Multiple rows of parking spots around the school can be replaced with porous asphalt to capture and infiltrate stormwater. A rain garden can be installed off of the southeast corner of the school to capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have 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"
67	881,971	42.5	445.4	4,049.5	0.687	24.19

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	0.047	8	3,441	0.13	452	\$2,260
Pervious pavements	5.017	840	368,135	13.84	49,102	\$1,227,550

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township High School

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



MONROE TOWNSHIP MIDDLE SCHOOL



Subwatershed: Manalapan Brook
Site Area: 2,135,039 sq. ft.
Address: 1629 Perrineville Road
Monroe, NJ 08831
Block and Lot: Block 49, Lot 1.02

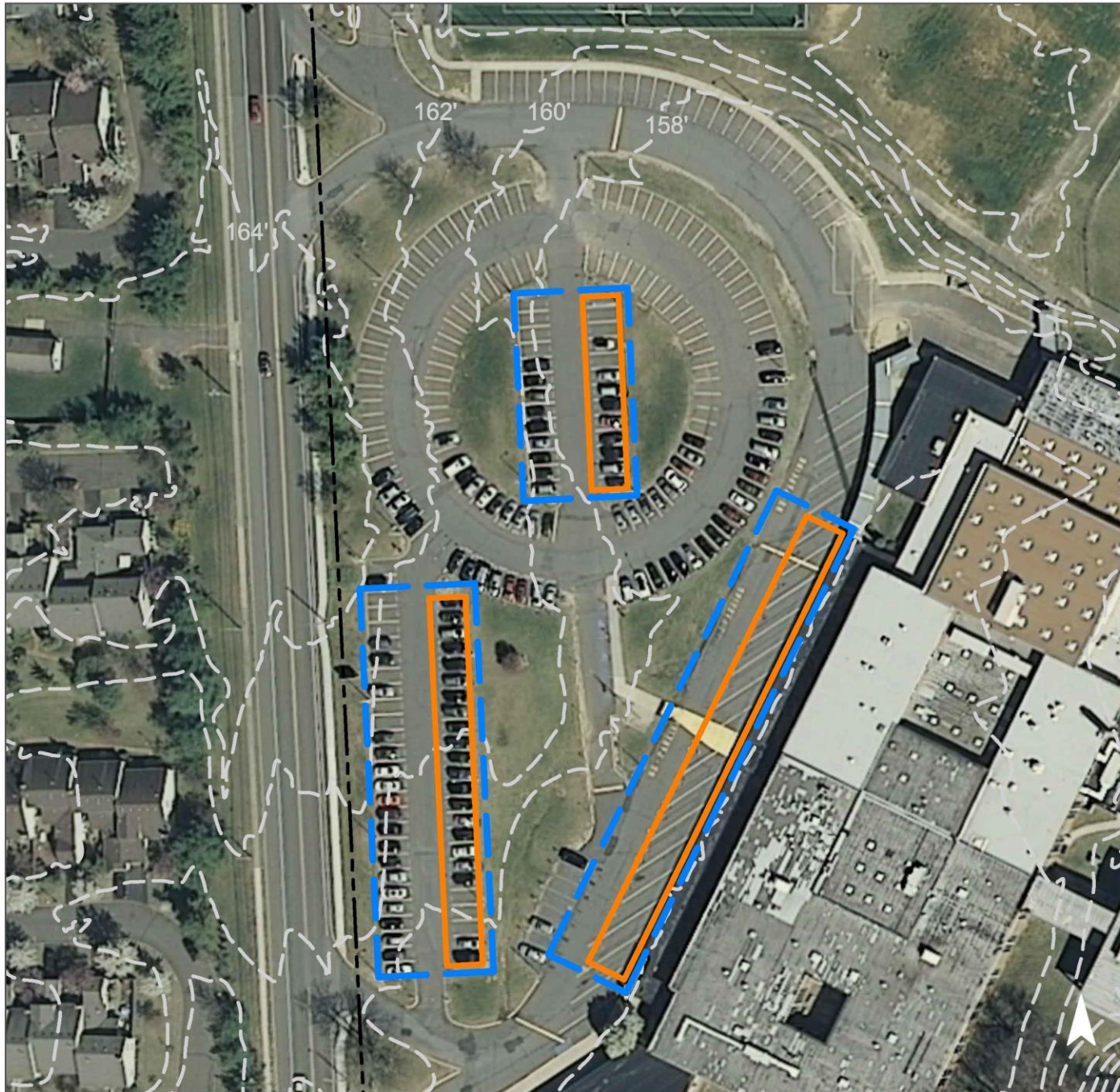


Water is flowing from west to east across this site. Rows of parking spots can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.





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"
29	627,562	30.3	317.0	2,881.4	0.489	17.21

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	1.231	206	90,328	3.40	16,828	\$420,700

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Middle School

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



WOODLAND ELEMENTARY SCHOOL



Subwatershed: Manalapan Brook

Site Area: 883,589 sq. ft.

Address: 42 Harrison Avenue
Monroe, NJ 08831

Block and Lot: Block 148.55, Lot 1.01

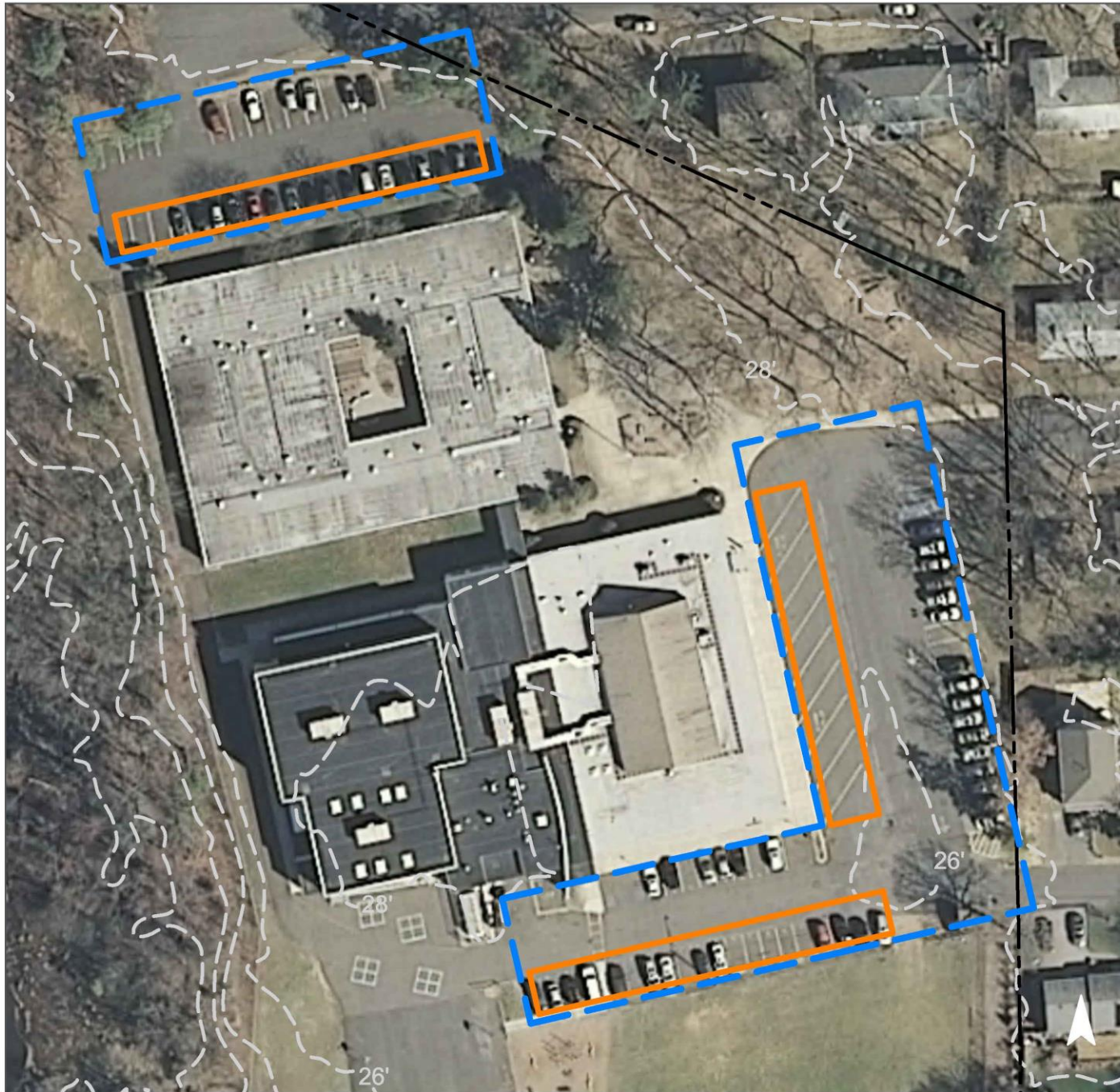


The building has internal drainage. Parking spots around the building can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
21	183,340	8.8	92.6	841.8	0.143	5.03

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	1.378	231	101,122	3.80	12,415	\$310,375

GREEN INFRASTRUCTURE RECOMMENDATIONS



Woodland Elementary School

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MILL LAKE ELEMENTARY SCHOOL



Subwatershed: Matchaponix Brook

Site Area: 877,601 sq. ft.

Address: 115 Monmouth Road
Monroe, NJ 08831

Block and Lot: Block 160, Lot 2

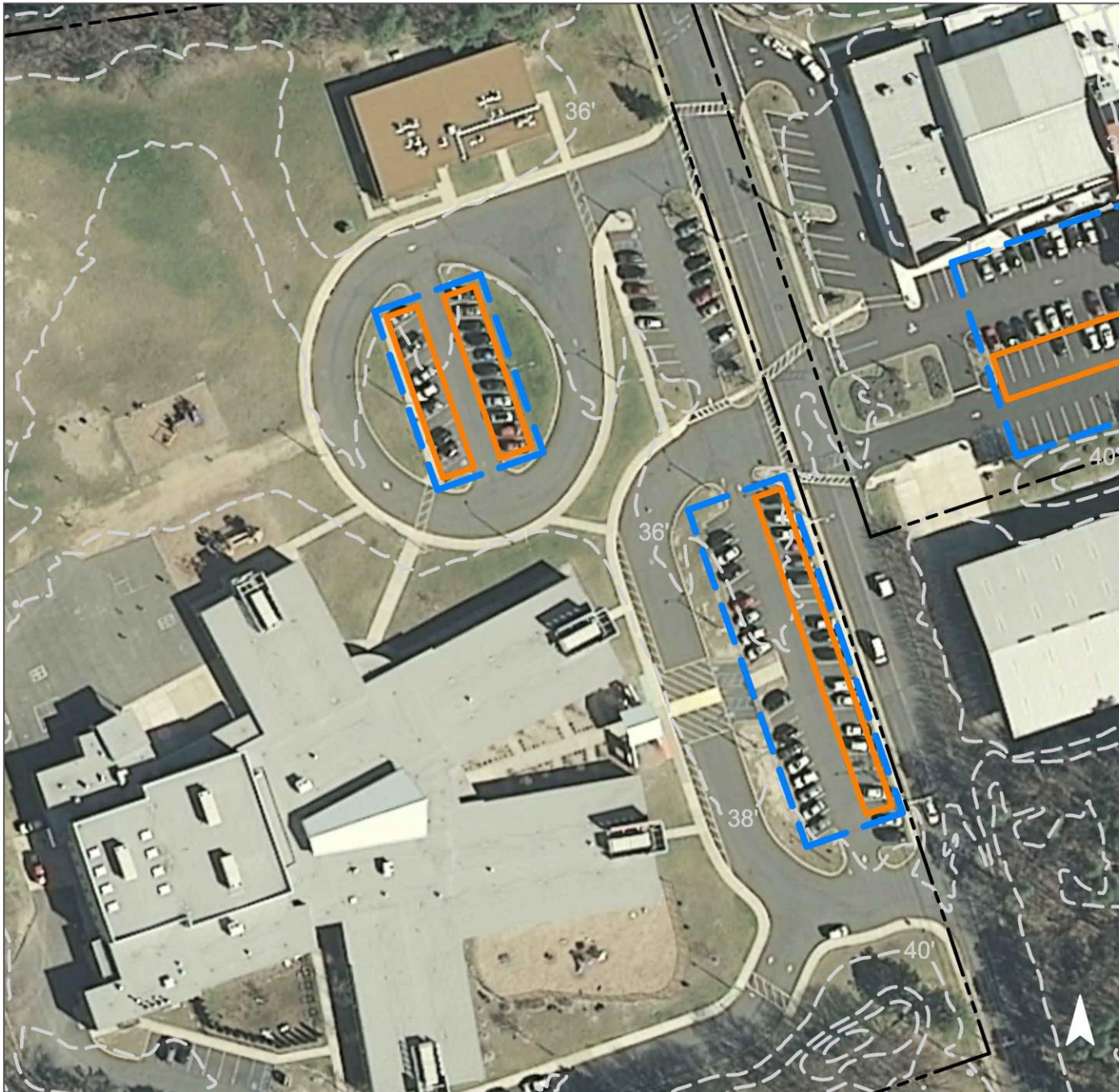


The school has an internal drainage system. Rows of parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.





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"
30	260,447	12.6	131.5	1,195.8	0.203	7.14

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	0.627	105	46,032	1.73	8,539	\$213,475

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mill Lake Elementary School

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



MONROE COMMUNITY CENTER



Subwatershed: Matchaponix Brook

Site Area: 190,199 sq. ft.

Address: 120 Monmouth Road
Monroe, NJ 08831

Block and Lot: Block 169, Lot 33



There is an detention basin at the center, and the building has internal drainage. A row of parking spots south of the building can 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"
51	96,879	4.7	48.9	444.8	0.075	2.66

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	0.731	122	53,654	2.02	5,849	\$146,225

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Community Center

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



APPLEGARTH ELEMENTARY SCHOOL



Subwatershed: Millstone River

Site Area: 688,683 sq. ft.

Address: 227 Applegarth Road
Monroe, NJ 08831

Block and Lot: Block 15.01, Lot 15

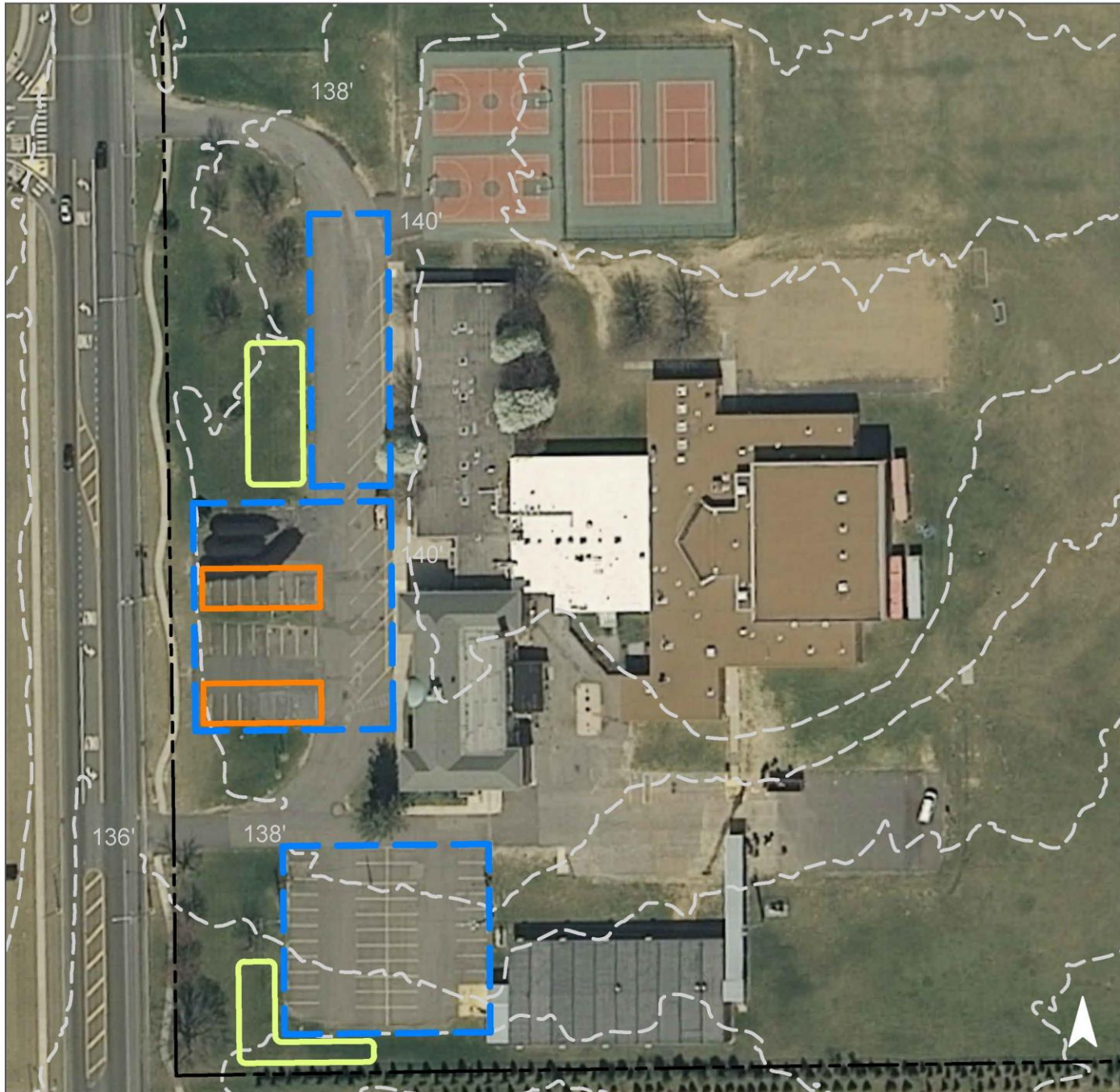


Parking spots in front of the building can be replaced with porous asphalt to capture and infiltrate stormwater. Installing rain gardens adjacent to the parking lots can capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics 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	179,965	8.7	90.9	826.3	0.140	4.94

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	0.653	109	47,939	1.80	5,624	\$28,120
Pervious pavements	0.488	82	35,829	1.35	3,914	\$97,850

GREEN INFRASTRUCTURE RECOMMENDATIONS



Applegarth Elementary School

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



APPLEGARTH VOLUNTEER ENGINE COMPANY



Subwatershed: Millstone River

Site Area: 92,173 sq. ft.

Address: 130 Applegarth Road
Monroe, NJ 08831

Block and Lot: Block 4, Lot 2.01



A rain garden can be built adjacent to the building to capture, treat, and infiltrate roof runoff. Rainwater can be harvested by installing a cistern at the fire company. The water can be used for cleaning emergency vehicles or for conducting car wash fundraisers. 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"
58	53,773	2.6	27.2	246.9	0.042	1.47

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	0.033	6	2,453	0.09	340	\$1,700
Rainwater harvesting systems	0.040	7	1,500	0.111	1,500 (gal)	\$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Applegarth Volunteer Engine Company

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



MONROE TOWNSHIP EMERGENCY SERVICES



Subwatershed: Millstone River

Site Area: 132,982 sq. ft.

Address: 10 Halsey Reed Road
Monroe, NJ 08831

Block and Lot: Block 13, Lot 82.01



Parking spots south and east of the building can be replaced with porous asphalt to capture and infiltrate stormwater. Building a rain garden adjacent to the building on the northwest corner can 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"
52	69,174	3.3	34.8	317.6	0.054	1.90

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	0.044	7	3,261	0.12	427	\$2,135
Pervious pavements	0.232	39	17,002	0.64	3,331	\$83,275

GREEN INFRASTRUCTURE RECOMMENDATIONS



Monroe Township Emergency Services

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



OAK TREE ELEMENTARY SCHOOL



Subwatershed: Millstone River
Site Area: 1,330,040 sq. ft.
Address: 226 Applegarth Road
Monroe, NJ 08831
Block and Lot: Block 14, Lot 10.69

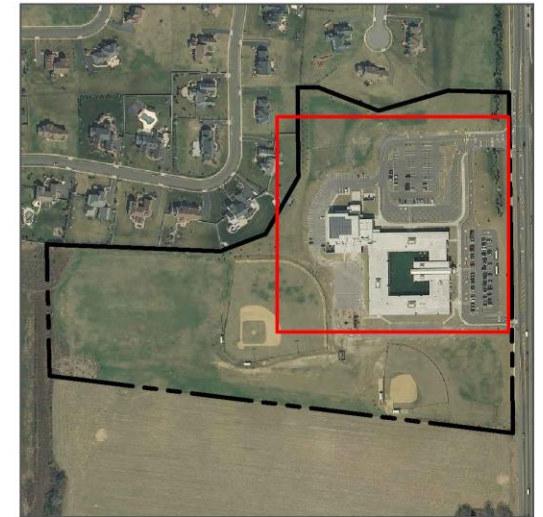
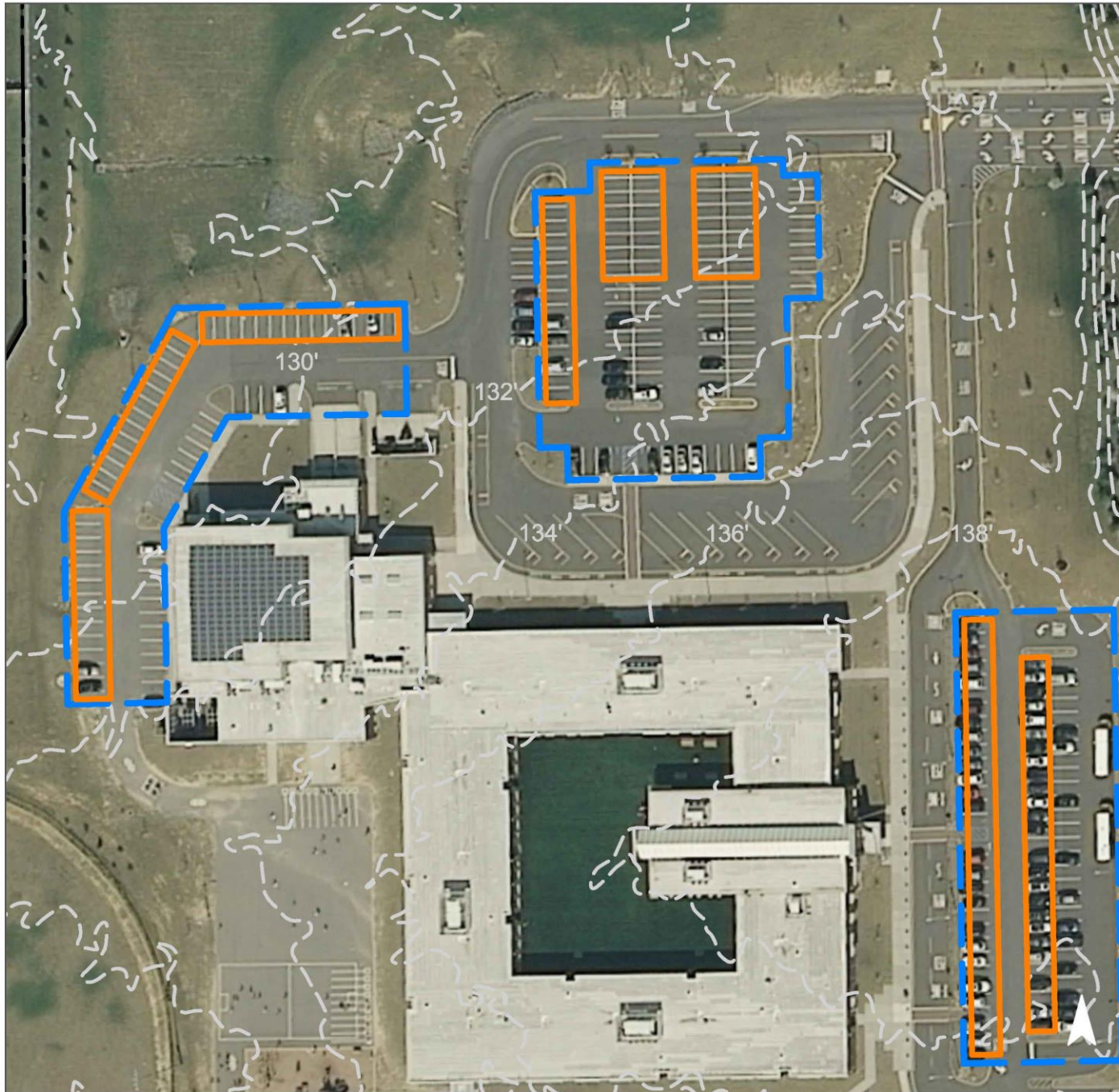


Stormwater is currently directed to an existing detention basin. Multiple rows of parking spots around the school can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that soils have suitable drainage characteristics for green infrastructure.





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"
5	60,511	2.9	30.6	277.8	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	2.276	381	166,976	6.28	24,603	\$615,075

GREEN INFRASTRUCTURE RECOMMENDATIONS



Oak Tree Elementary School

-  pervious pavements
-  drainage areas
-  property line
-  2012 Aerial: NJOIT, OGIS



OFFICE OF SENIOR SERVICES



Subwatershed: Millstone River

Site Area: 750,942 sq. ft.

Address: 12 Halsey Reed Road
Monroe, NJ 08831

Block and Lot: Block 13, Lot 82.02

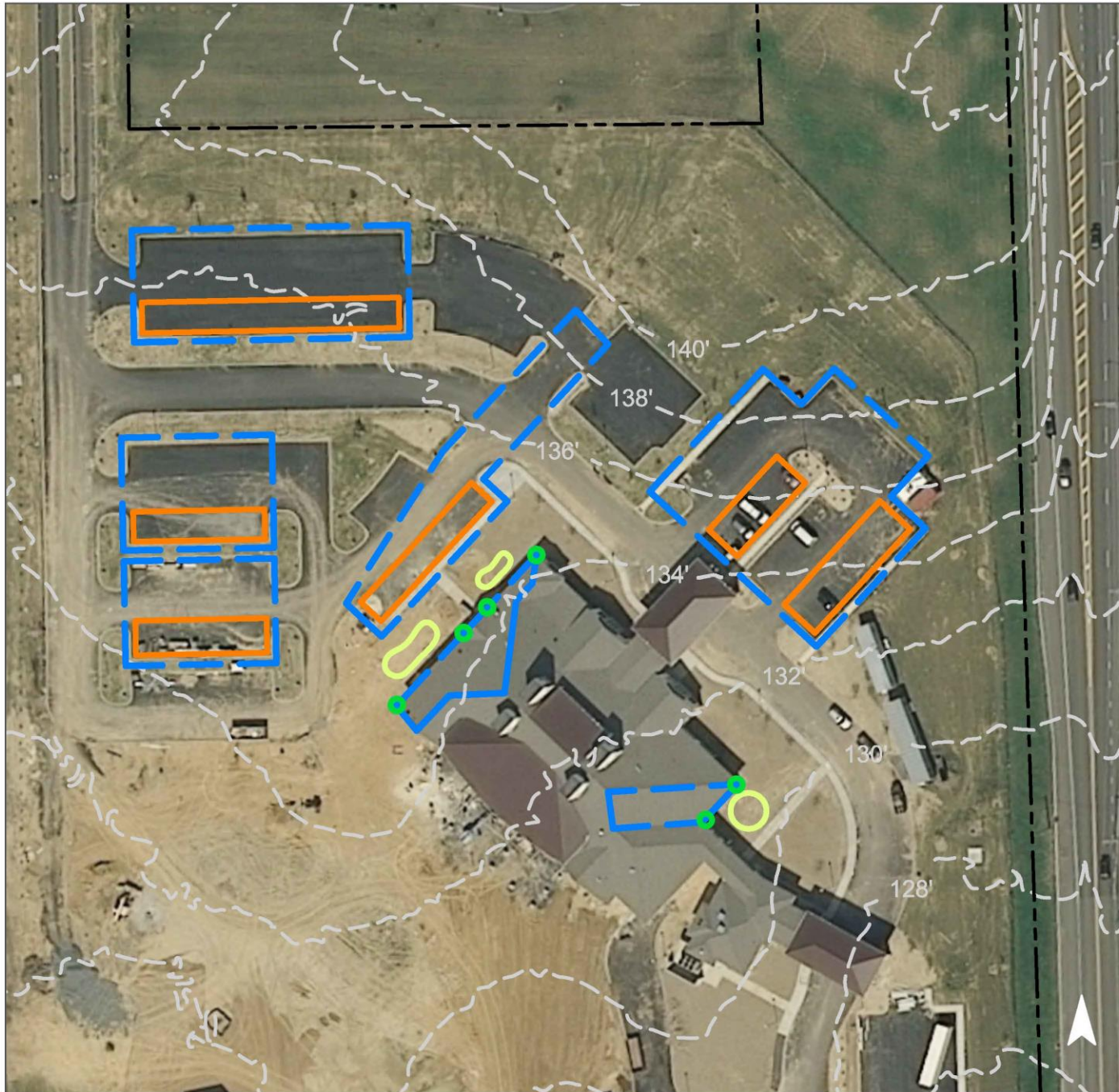


Stormwater is currently captured and directed into the pond. Parking spots can be replaced with porous asphalt to capture and infiltrate stormwater. Bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff. A preliminary soil assessment suggests that more soil testing would 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"
26	198,419	9.6	100.2	911.0	0.155	5.44

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	0.123	21	9,006	0.34	1,195	\$5,975
Pervious pavements	1.399	234	102,670	3.86	12,790	\$319,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Office of Senior Services

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



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			I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)				Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
					CRANBURY BROOK SUBWATERSHED	33.11	1,442,367					
Monroe Township Public Library Total Site Info	4.37	190,455	48.40	14.01	3.5	37.1	337.7	39	1.69	73,554	0.057	2.02
Monroe Township Utility Department Total Site Info	28.74	1,251,912	26	12.01	6.6	69.3	630.0	11	3.15	137,216	0.107	3.76
MANALAPAN SUBWATERSHED	182.04	7,929,848			138.0	1,445.2	13,138.4		65.69	2,861,534	2.230	78.48
Academy Learning Center Total Site Info	10.26	446,909	75	6.09	10.6	111.2	1,011.1	49	5.06	220,217	0.172	6.04
Barclay Brook Elementary School Total Site Info	9.06	394,766	62	14	7.8	81.9	744.7	41	3.72	162,191	0.126	4.45
Brookside Elementary School Total Site Info	21.06	917,448	62	12.01	11.1	116.3	1,057.3	25	5.29	230,275	0.179	6.32
Monroe Public Works Facility Total Site Info	18.06	786,858	31	15.02	4.8	50.7	461.3	13	2.31	100,482	0.078	2.76
Monroe Township Administration Office & Police Department Total Site Info	18.32	798,166	48.4	10	13.6	142.5	1,295.7	35	6.48	282,204	0.220	7.74
Monroe Township Board of Education Administrative Offices Total Site Info	4.61	200,642	50	2.09	6.9	72.1	655.7	71	3.28	142,820	0.111	3.92
Monroe Township Fire Department Total Site Info	0.86	37,263	52	1.01	0.6	6.4	58.5	34	0.29	12,737	0.010	0.35
Monroe Township Fire Prevention Total Site Info	0.45	19,706	152	4	0.9	9.0	81.4	90	0.41	17,735	0.014	0.49
Monroe Township High School Total Site Info	30.06	1,309,462	59	1.03	42.5	445.4	4,049.5	67	20.25	881,971	0.687	24.19

Summary of Existing Site Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads			I.C. %	I.C. Area (ac)	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)				Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
Monroe Township Middle School Total Site Info	49.01	2,135,039	49	1.02	30.3	317.0	2,881.4	29	14.41	627,562	0.489	17.21
Woodland Elementary School Total Site Info	20.28	883,589	148.55	1.01	8.8	92.6	841.8	21	4.21	183,340	0.143	5.03
MATCHAPONIX SUBWATERSHED	24.51	1,067,800			17.2	180.5	1,640.6		8.20	357,326	0.278	9.80
Mill Lake Elementary School Total Site Info	20.15	877,601	160	2	12.6	131.5	1,195.8	30	5.98	260,447	0.203	7.14
Monroe Community Center Total Site Info	4.37	190,199	169	33	4.7	48.9	444.8	51	2.22	96,879	0.075	2.66
MILLSTONE RIVER SUBWATERSHED	68.75	2,994,820			27.1	283.8	2,579.6	167	12.90	561,842	0.438	15.41
Applegarth Elementary School Total Site Info	15.81	688,683	15.01	15	8.7	90.9	826.3	26	4.13	179,965	0.140	4.94
Applegarth Volunteer Engine Company Total Site Info	2.12	92,173	4	2.01	2.6	27.2	246.9	58	1.23	53,773	0.042	1.47
Monroe Township Emergency Service Total Site Info	3.05	132,982	13	82.01	3.3	34.9	317.6	52	1.59	69,174	0.054	1.90
Oak Tree Elementary School Total Site Info	30.53	1,330,040	14	10.69	2.9	30.6	277.8	5	1.39	60,511	0.047	1.66
Office of Senior Services Total Site Info	17.24	750,942	13	82.02	9.6	100.2	911.0	26	4.56	198,419	0.155	5.44

e. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		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 %
	Area (SF)	Area (ac)									
CRANBURY BROOK SUBWATERSHED	16,549	0.38	0.431	72	31,641	1.19	4,619			\$55,315	7.9%
1 Monroe Township Public Library											
Pervious pavements	5,719	0.13	0.149	25	10,936	0.41	1,611	25	SF	\$40,275	7.8%
Total Site Info	5,719	0.13	0.149	25	10,936	0.41	1,611			\$40,275	7.8%
2 Monroe Township Utility Department											
Bioretention systems/rain gardens	10,830	0.25	0.282	47	20,705	0.78	3,008	5	SF	\$15,040	7.9%
Total Site Info	10,830	0.25	0.282	47	20,705	0.78	3,008			\$15,040	7.9%
MANALAPAN SUBWATERSHED	628,314	14.42	16.371	2,741	1,190,755	45.14	178,711			\$4,172,735	22.0%
3 Academy Learning Center											
Downspout planter boxes	430	0.01	0.011	2	NA	NA	24	1000	SF	\$2,000	0.2%
Pervious pavements	42,804	0.98	1.115	187	81,831	3.08	11,730	25	SF	\$293,250	19.4%
Total Site Info	43,234	0.99	1.126	189	81,831	3.08	11,754			\$295,250	19.6%
4 Barclay Brook Elementary School											
Bioretention systems/rain gardens	5,436	0.12	0.142	24	10,390	0.39	1,347	5	SF	\$6,735	3.4%
Pervious pavements	19,075	0.44	0.497	83	36,465	1.37	6,242	25	SF	\$156,050	11.8%
Total Site Info	24,511	0.56	0.639	107	46,855	1.76	7,589			\$162,785	15.1%
5 Brookside Elementary School											
Pervious pavements	91,713	2.11	2.390	400	175,339	6.59	25,994	25	SF	\$649,850	39.8%
Total Site Info	91,713	2.11	2.390	400	175,339	6.59	25,994			\$649,850	39.8%
6 Monroe Public Works Facility											
Rainwater harvesting systems	10,275	0.24	0.268	45	10,000	0.74	10,000	2	gal	\$20,000	10.2%
Total Site Info	10,275	0.24	0.268	45	10,000	0.74	10,000			\$20,000	10.2%
7 Monroe Township Administration Office & Police Department											
Bioretention systems/rain gardens	2,402	0.06	0.063	10	4,593	0.17	600	5	SF	\$3,000	0.9%
Pervious pavements	122,099	2.80	3.181	533	233,436	8.78	33,490	25	SF	\$837,250	43.3%
Total Site Info	124,501	2.86	3.244	543	238,029	8.95	34,090			\$840,250	44.1%

Summary of Proposed Green Infrastructure Practices

Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		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 %
	Area (SF)	Area (ac)									
8 Monroe Township Board of Education Administrative Offices											
Bioretention systems/rain gardens	2,183	0.05	0.057	10	4,174	0.16	570	5	SF	\$2,850	1.5%
Pervious pavements	21,647	0.50	0.564	94	41,387	1.56	5,494	25	SF	\$137,350	15.2%
Total Site Info	23,830	0.55	0.621	104	45,561	1.72	6,064			\$140,200	16.7%
9 Monroe Township Fire Department											
Bioretention systems/rain gardens	1,421	0.03	0.037	6	2,715	0.10	353	5	SF	\$1,765	11.2%
Pervious pavements	9,497	0.22	0.247	41	18,154	0.68	3,026	25	SF	\$75,650	74.6%
Total Site Info	10,918	0.25	0.284	48	20,869	0.78	3,379			\$77,415	85.7%
10 Monroe Township Fire Prevention											
Pervious pavements	4,836	0.11	0.126	21	9,245	0.35	1,044	25	SF	\$26,100	27.3%
Total Site Info	4,836	0.11	0.126	21	9,245	0.35	1,044			\$26,100	27.3%
11 Monroe Township High School											
Bioretention systems/rain gardens	1,800	0.04	0.047	8	3,441	0.13	452	5	SF	\$2,260	0.2%
Pervious pavements	192,557	4.42	5.017	840	368,135	13.84	49,102	25	SF	\$1,227,550	21.8%
Total Site Info	194,357	4.46	5.064	848	371,576	13.97	49,554			\$1,229,810	22.0%
12 Monroe Township Middle School											
Pervious pavements	47,246	1.08	1.231	206	90,328	3.40	16,828	25	SF	\$420,700	7.5%
Total Site Info	47,246	1.08	1.231	206	90,328	3.40	16,828			\$420,700	7.5%
13 Woodland Elementary School											
Pervious pavements	52,893	1.21	1.378	231	101,122	3.80	12,415	25	SF	\$310,375	28.8%
Total Site Info	52,893	1.21	1.378	231	101,122	3.80	12,415			\$310,375	28.8%
MATCHAPONIX SUBWATERSHED	52,130	1.20	1.358	227	99,686	3.75	14,388			\$359,700	14.6%
14 Mill Lake Elementary School											
Pervious pavements	24,065	0.55	0.627	105	46,032	1.73	8,539	25	SF	\$213,475	9.2%
Total Site Info	24,065	0.55	0.627	105	46,032	1.73	8,539			\$213,475	9.2%
15 Monroe Community Center											
Pervious pavements	28,065	0.64	0.731	122	53,654	2.02	5,849	25	SF	\$146,225	29.0%
Total Site Info	28,065	0.64	0.731	122	53,654	2.02	5,849			\$146,225	29.0%

Summary of Proposed Green Infrastructure Practices

Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area		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 %
	Area (SF)	Area (ac)									
MILLSTONE RIVER SUBWATERSHED	202,972	4.66	5.289	885	386,636	14.59	53,724			\$1,059,030	36.1%
16 Applegarth Elementary School											
Bioretention systems/rain gardens	25,074	0.58	0.653	109	47,939	1.80	5,624	5	SF	\$28,120	13.9%
Pervious pavements	18,739	0.43	0.488	82	35,829	1.35	3,914	25	SF	\$97,850	10.4%
Total Site Info	43,813	1.01	1.142	191	83,768	3.15	9,538			\$28,120	24.3%
17 Applegarth Volunteer Engine Company											
Bioretention systems/rain gardens	1,283	0.03	0.033	6	2,453	0.09	340	5	SF	\$1,700	2.4%
Rainwater harvesting systems	1,529	0.04	0.040	7	1,500	0.11	1,500	2	gal	\$3,000	2.8%
Total Site Info	2,812	0.06	0.073	12	3,953	0.20	1,840			\$4,700	5.2%
18 Monroe Township Emergency Service											
Bioretention systems/rain gardens	1,707	0.04	0.044	7	3,261	0.12	427	5	SF	\$2,135	2.5%
Pervious pavements	8,894	0.20	0.232	39	17,002	0.64	3,331	25	SF	\$83,275	12.9%
Total Site Info	10,601	0.24	0.276	46	20,263	0.76	3,758			\$85,410	15.3%
19 Oak Tree Elementary School											
Pervious pavements	87,336	2.00	2.276	381	166,976	6.28	24,603	25	SF	\$615,075	144.3%
Total Site Info	87,336	2.00	2.276	381	166,976	6.28	24,603			\$615,075	144.3%
20 Office of Senior Services											
Bioretention systems/rain gardens	4,709	0.11	0.123	21	9,006	0.34	1,195	5	SF	\$5,975	2.4%
Pervious pavements	53,701	1.23	1.399	234	102,670	3.86	12,790	25	SF	\$319,750	27.1%
Total Site Info	58,410	1.34	1.522	255	111,676	4.20	13,985			\$325,725	29.4%