RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Plainfield, Union County, New Jersey

Prepared for Plainfield by the
Rutgers Cooperative Extension Water Resources Program

November 16, 2015

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Introduction

Located in Union County in central New Jersey, Plainfield covers approximately 6.0 square miles. Figures 1 and 2 illustrate that Plainfield is dominated by urban land uses. A total of 93.9% of the municipality's land use is classified as urban. Of the urban land in Plainfield, medium 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 Plainfield 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 Plainfield. Based upon the 2007 NJDEP land use/land cover data, approximately 40.0% of Plainfield has impervious cover. This level of impervious cover suggests that the streams in Plainfield are likely non-supporting streams.[1]

Methodology

Plainfield contains portions of three 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

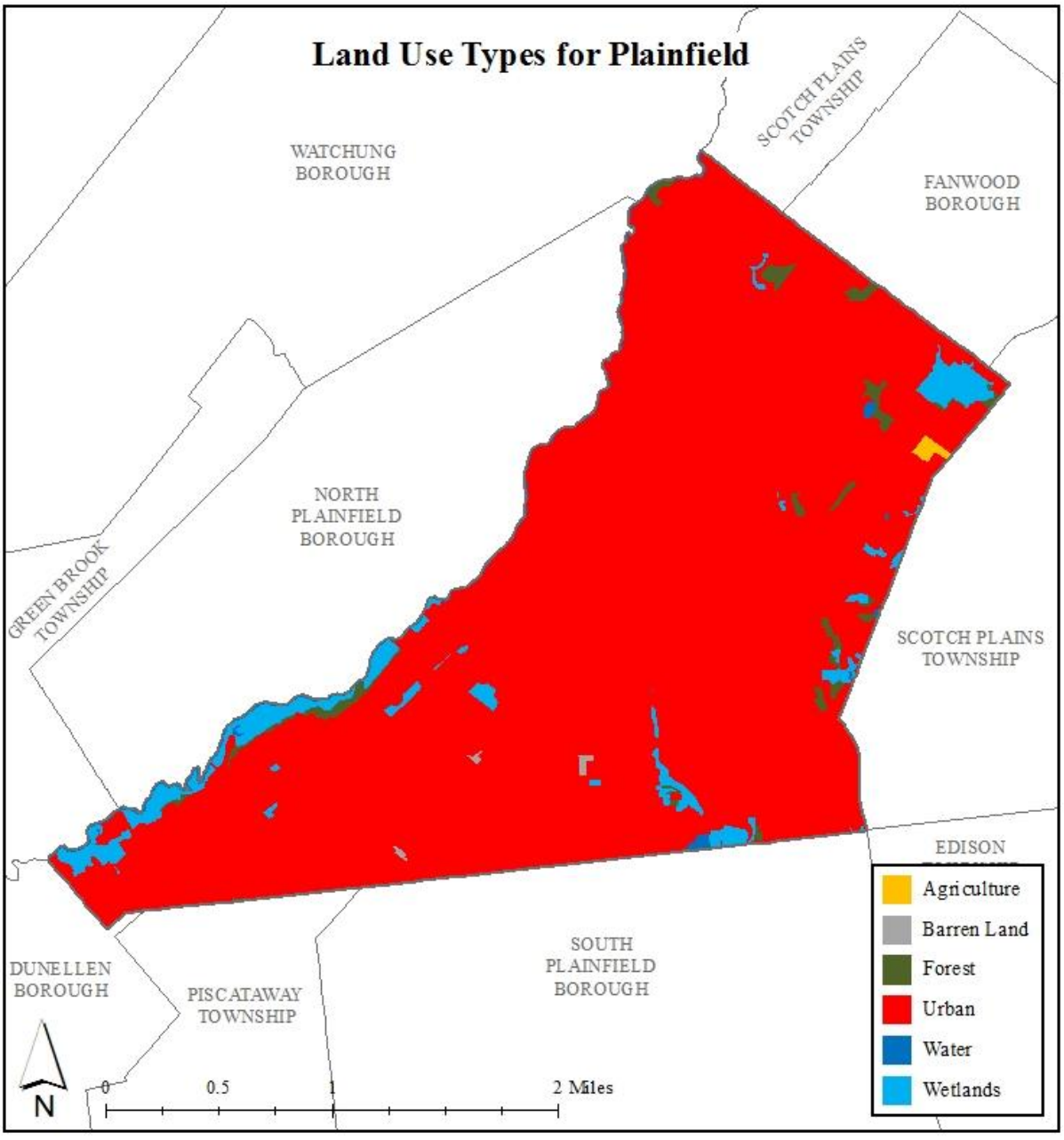


Figure 1: Map illustrating the land use in Plainfield

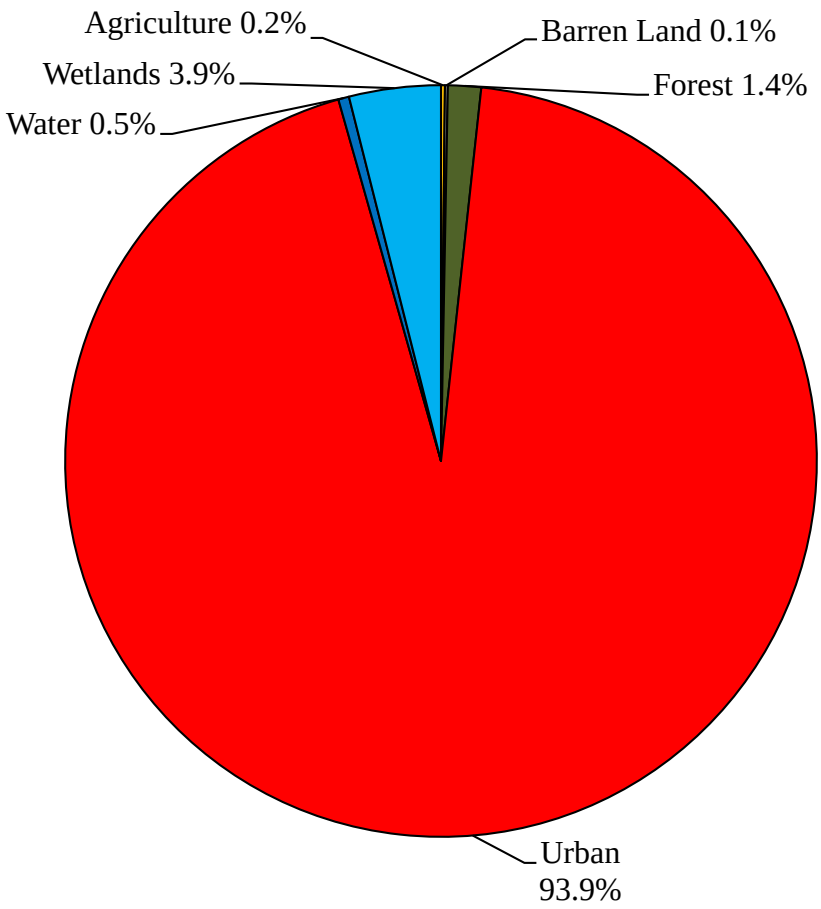


Figure 2: Pie chart illustrating the land use in Plainfield

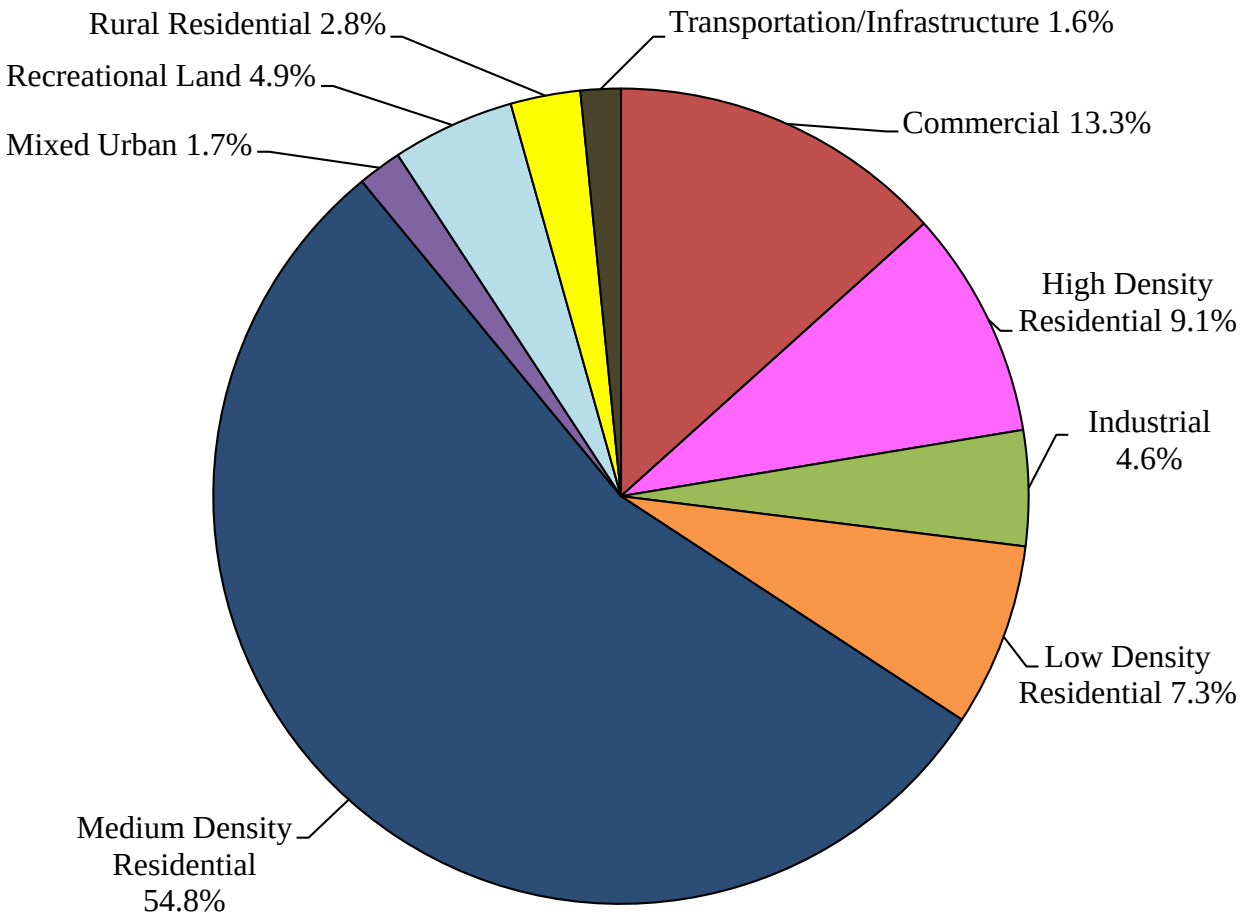


Figure 3: Pie chart illustrating the various types of urban land use in Plainfield

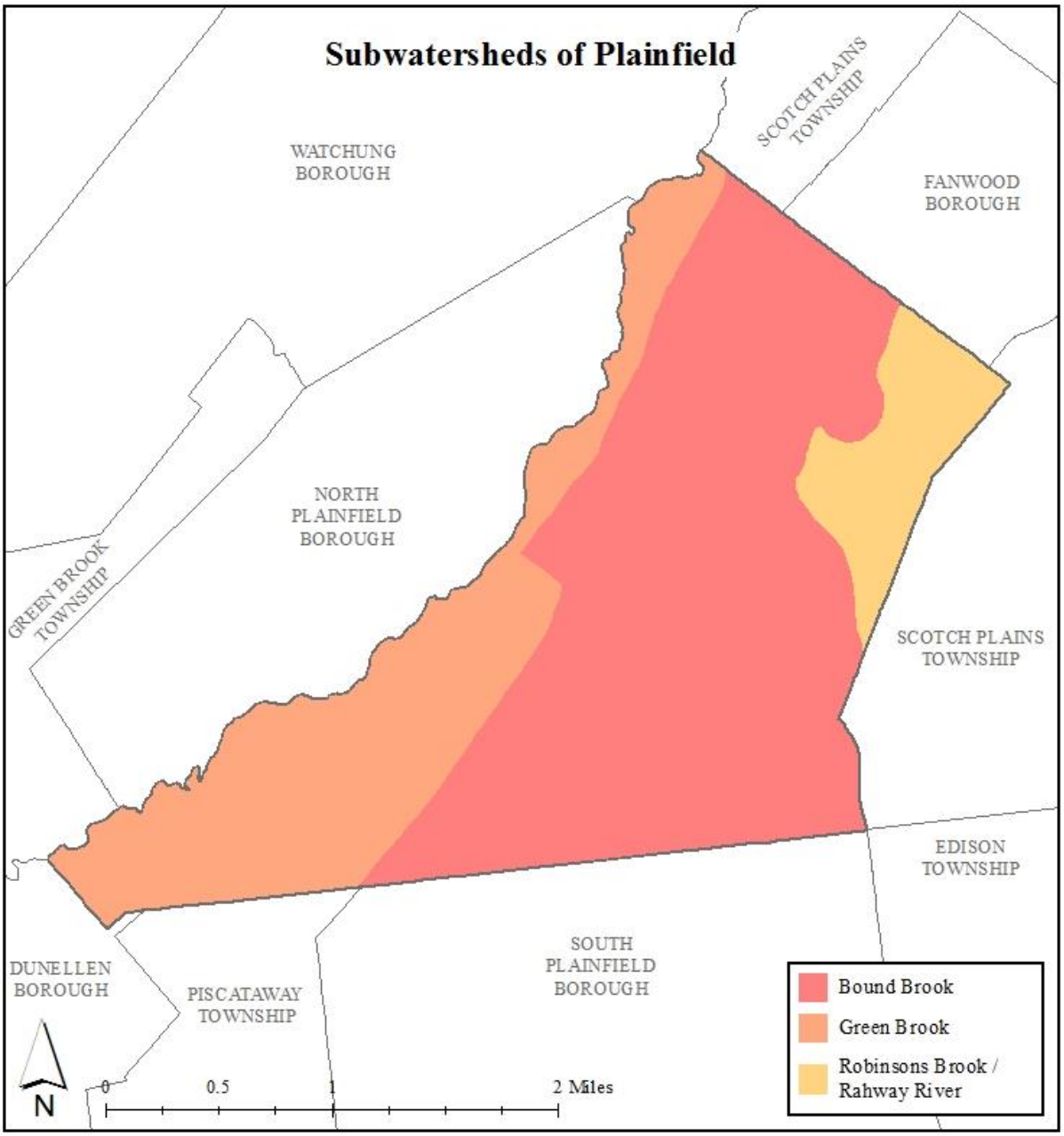


Figure 4: Map of the subwatersheds in Plainfield

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 Plainfield 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 Plainfield. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, 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

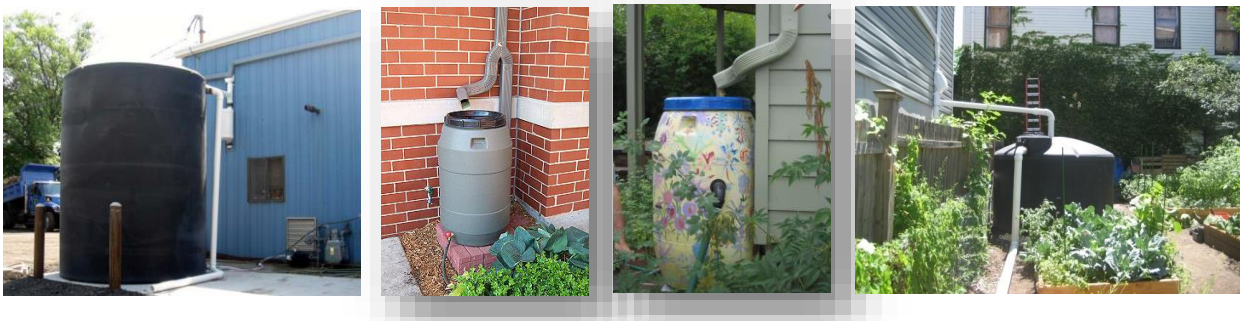
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils 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*.

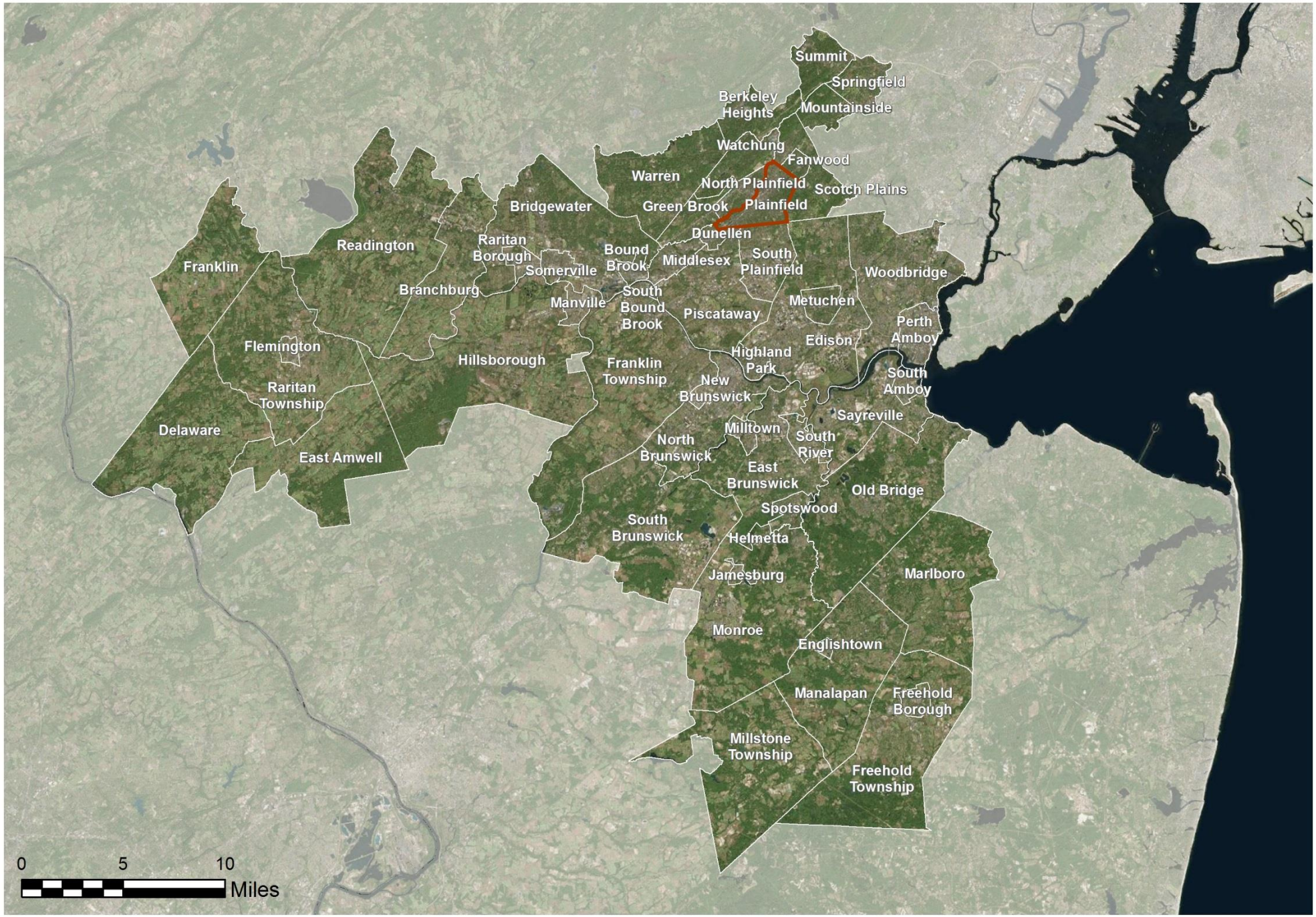
Conclusion

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.

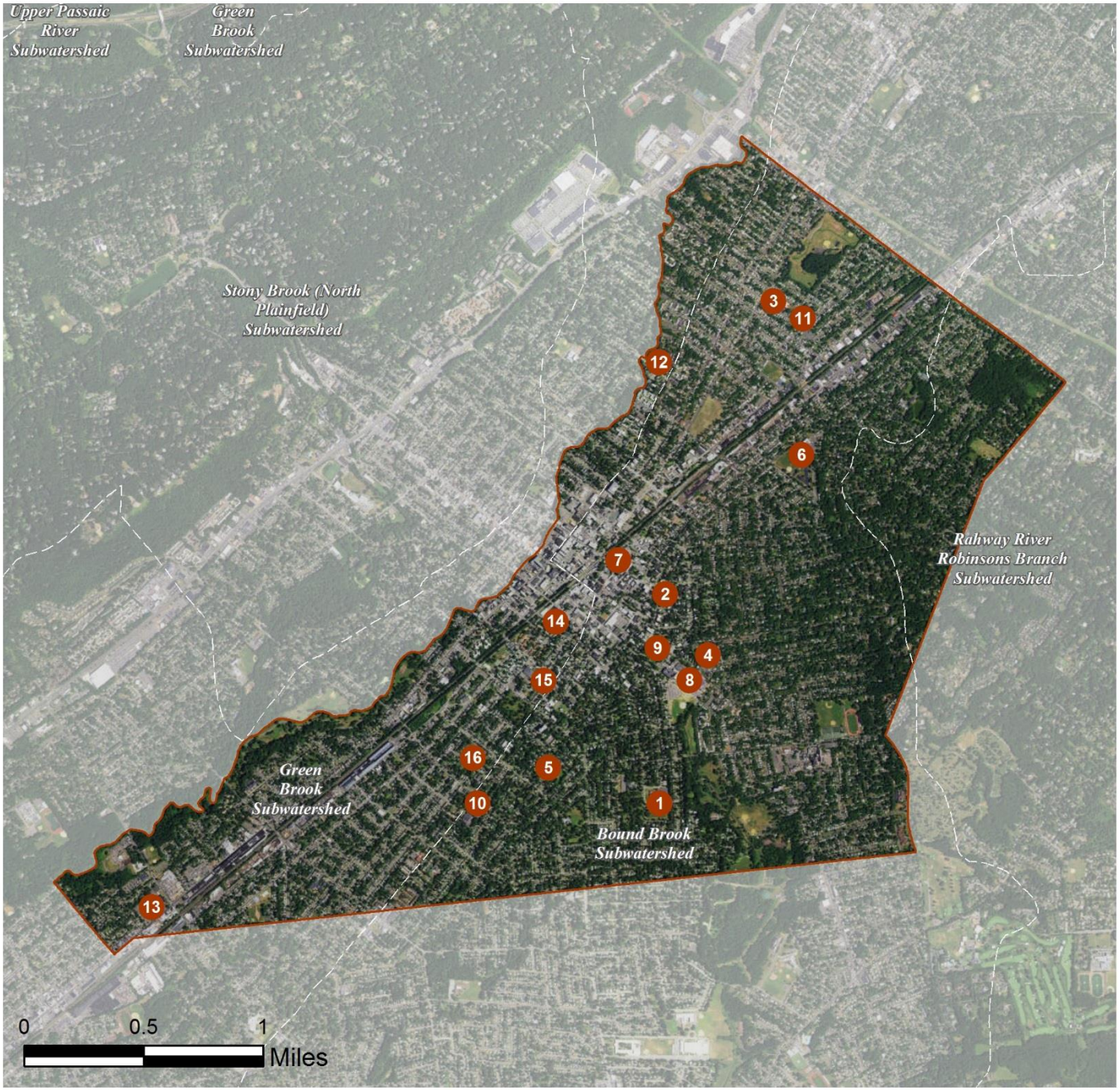
a. Overview Map of the Project

PLAINFIELD: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



b. Green Infrastructure Sites

PLAINFIELD: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE BOUND BROOK SUBWATERSHED:

1. Cedarbrook K-8 Center
2. Crescent Avenue Presbyterian
3. Emerson Community School
4. Evergreen Elementary School
5. Hubbard Middle School
6. Maxson Middle School
7. Municipal Court and Police Department
8. Plainfield High School
9. Plainfield Public Library
10. Queen City Academy Charter School
11. Saint Bernard of Clairvaux and Stanislaus Kostka

SITES WITHIN THE GREEN BROOK SUBWATERSHED:

12. Dewitt D. Barlow Elementary School

13 Jefferson Elementary School

14. Plainfield Fire Department
15. Saint Mary's Roman Catholic Church
16. Washington Community School

c. Proposed Green Infrastructure Concepts

CEDARBROOK K-8 CENTER

Subwatershed: **Bound Brook**

Site Area: **438,854 sq. ft.**

Address: **1049 Central Avenue**
Plainfield, NJ 07062

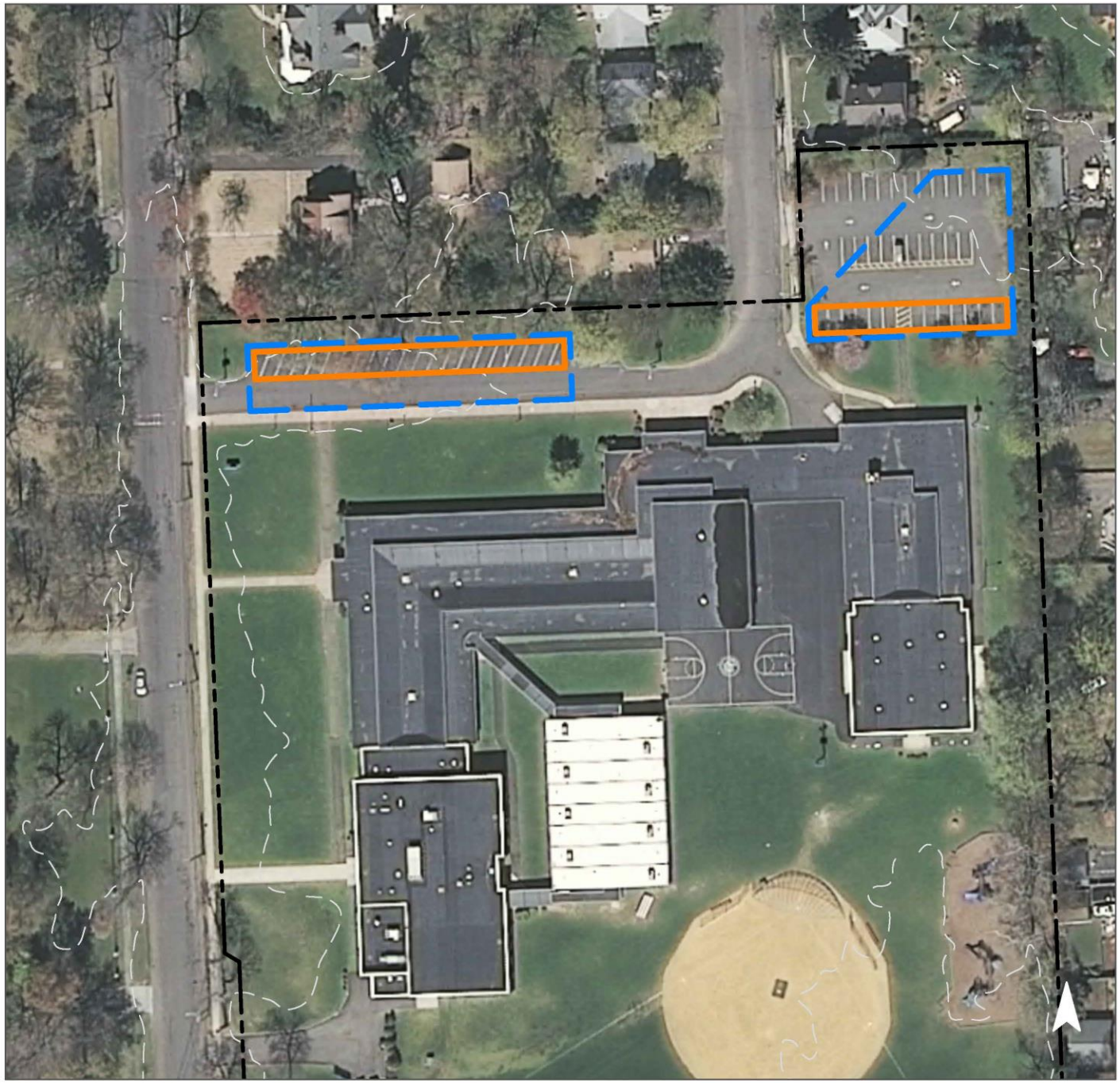
Block and Lot: **Block 743, Lot 36**

Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater 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"
32	138,728	6.7	70.1	637.0	0.108	3.80

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	0.513	86	38,889	1.46	5,800	$145,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Cedarbrook K-8 Center

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

0 50' 100'

CRESCENT AVENUE PRESBYTERIAN

Subwatershed: **Bound Brook**

Site Area: **67,791 sq. ft.**

Address: **716 Watchung Avenue**
Plainfield, NJ 07062

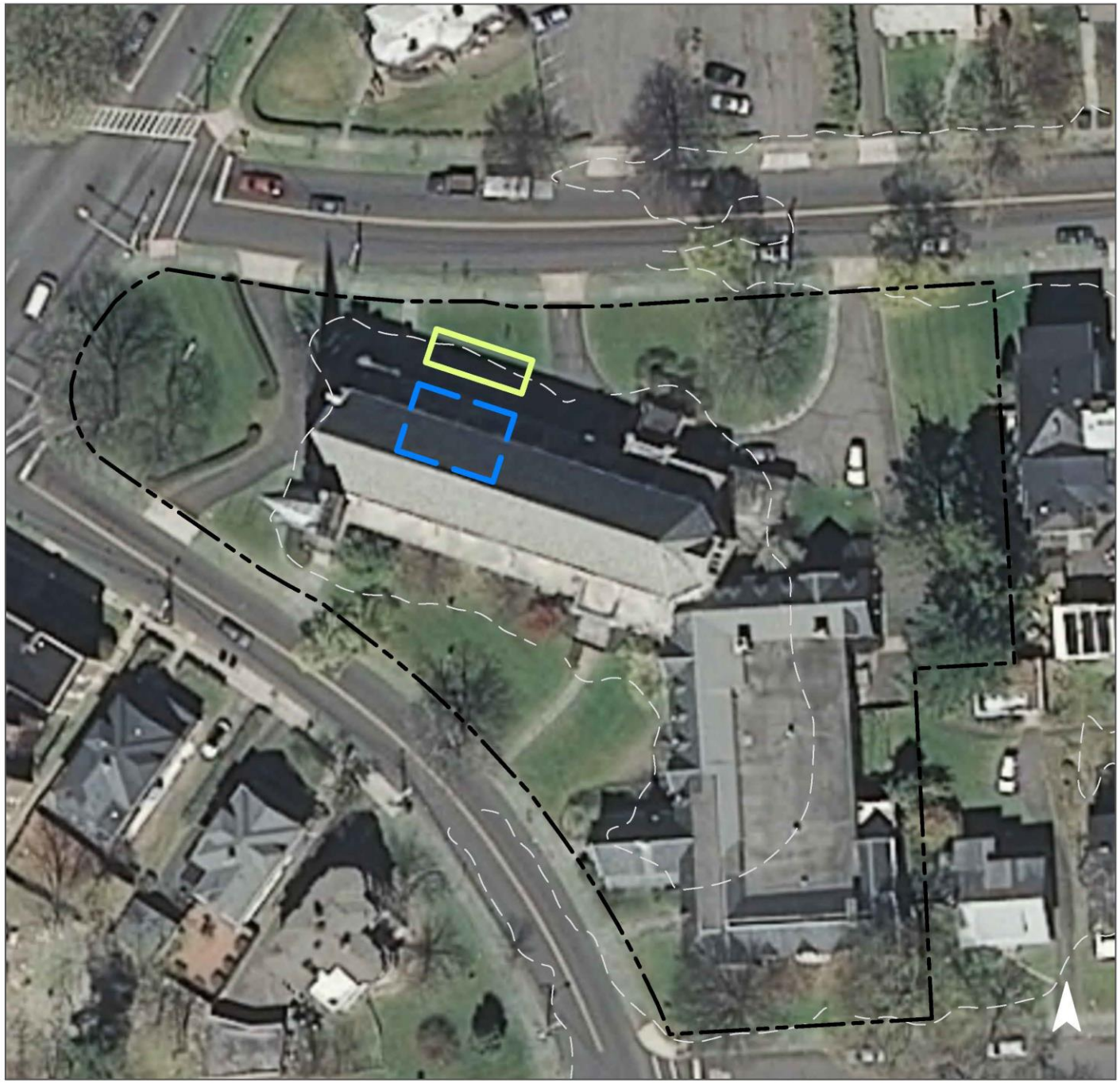
Block and Lot: **Block 831, Lot 1**

A rain garden can be installed to capture, treat, and infiltrate roof runoff by disconnecting and redirecting downspouts. 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"
80	54,233	2.6	27.4	249.0	0.042	1.49

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
Bioretention systems	0.026	4	1,975	0.07	500	$2,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Crescent Avenue Presbyterian

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

0 30' 60'

EMERSON COMMUNITY SCHOOL

Subwatershed: **Bound Brook**

Site Area: **125,037 sq. ft.**

Address: **305 Emerson Avenue**
Plainfield, NJ 07062

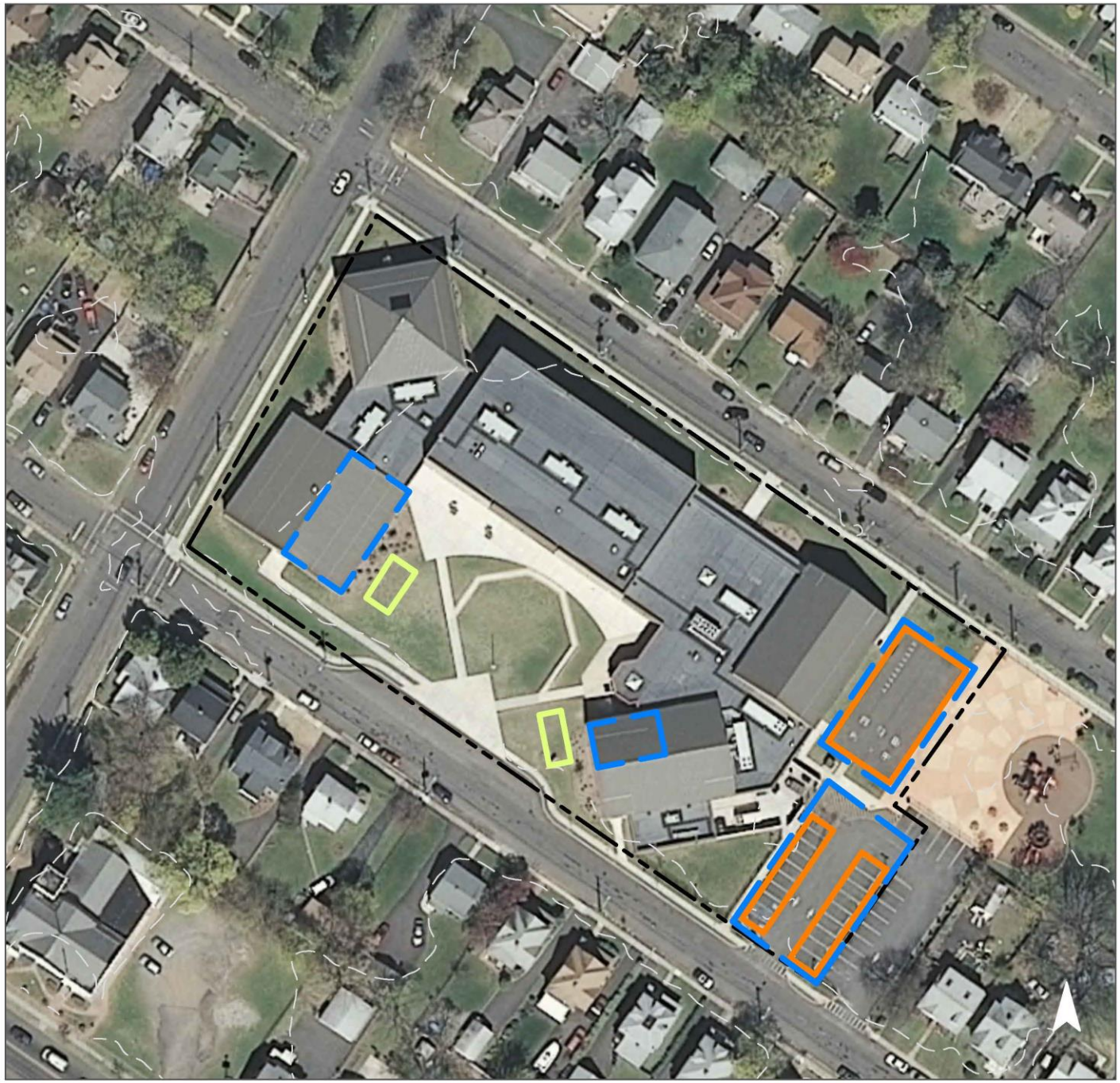
Block and Lot: **Block 413, Lot 1**

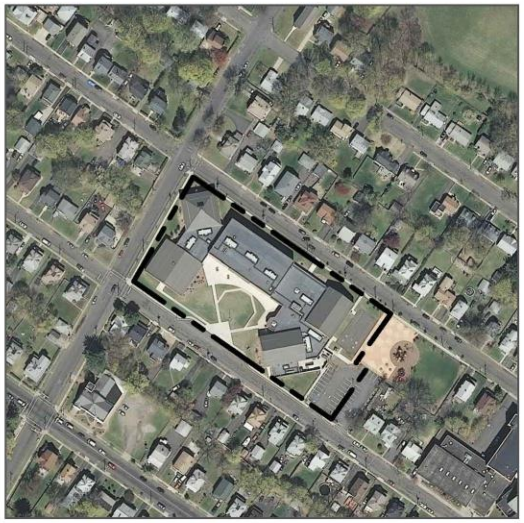
Bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff by disconnecting and redirecting downspouts. Parking spaces can be replaced with pervious pavement to capture and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be 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"
69	86,781	4.2	43.8	398.4	0.068	2.38

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	0.128	21	9,672	0.36	1,000	$5,000
Pervious pavements	0.339	57	25,664	0.96	7,400	$185,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Emerson Community School

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

0 50' 100'

EVERGREEN ELEMENTARY SCHOOL

Subwatershed: **Bound Brook**

Site Area: **143,235 sq. ft.**

Address: **1033 Evergreen Avenue**
Plainfield, NJ 07062

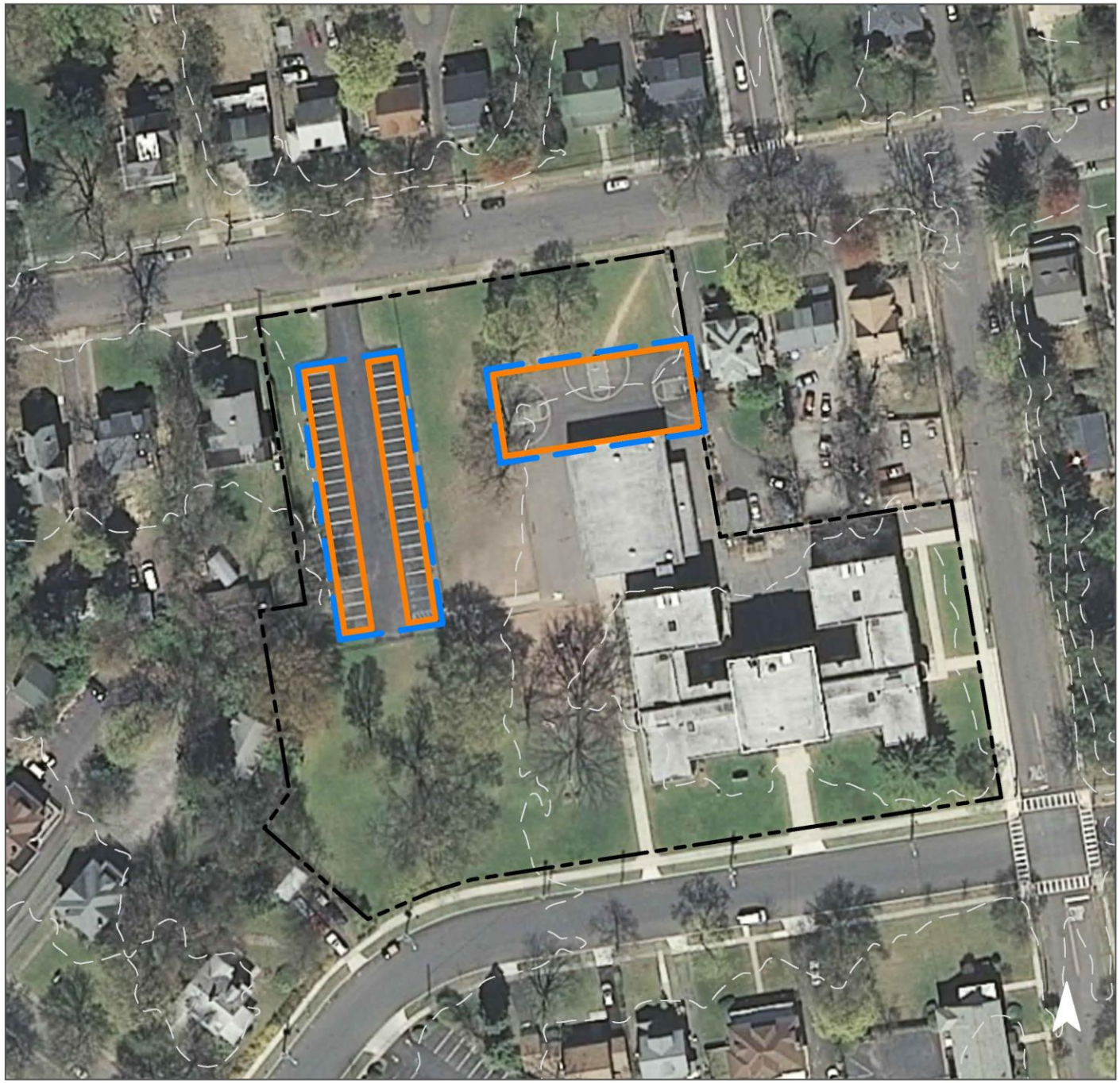
Block and Lot: **Block 826, Lot 9**

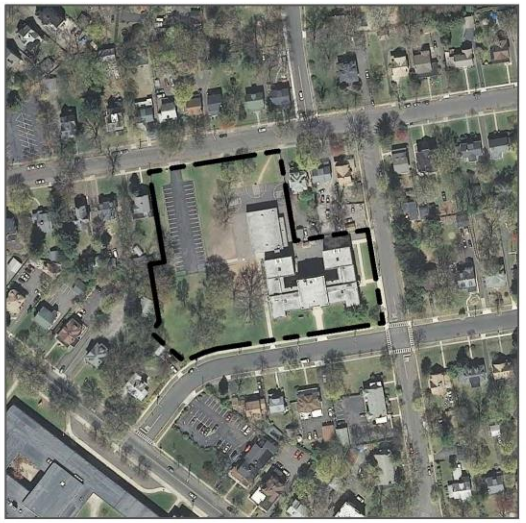
Parking spaces and the basketball court can be replaced with porous asphalt to capture and infiltrate stormwater runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
62	88,903	4.3	44.9	408.2	0.069	2.44

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
Pervious pavements	0.542	91	41,058	1.54	13,00	$325,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Evergreen Elementary School

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

0 30' 60'

HUBBARD MIDDLE SCHOOL

Subwatershed: **Bound Brook**

Site Area: **187,506 sq. ft.**

Address: **661 W 8TH Street**
Plainfield, NJ 07062

Block and Lot: **Block 506, Lot 4**

Rain gardens can be installed to capture, treat, and infiltrate roof runoff by disconnecting and redirecting downspouts. Parking spaces can also be replaced with porous asphalt to capture and infiltrate stormwater 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"
74	138,420	6.7	69.9	635.5	0.108	3.80

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	0.094	16	7,106	0.27	900	$4,500
Pervious pavements	0.190	32	14,406	0.54	2,000	$50,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Hubbard Middle School

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

0 50' 100'

MAXSON MIDDLE SCHOOL

Subwatershed: **Bound Brook**

Site Area: **620,664 sq. ft.**

Address: **920 E 7th Street**
Plainfield, NJ 07062

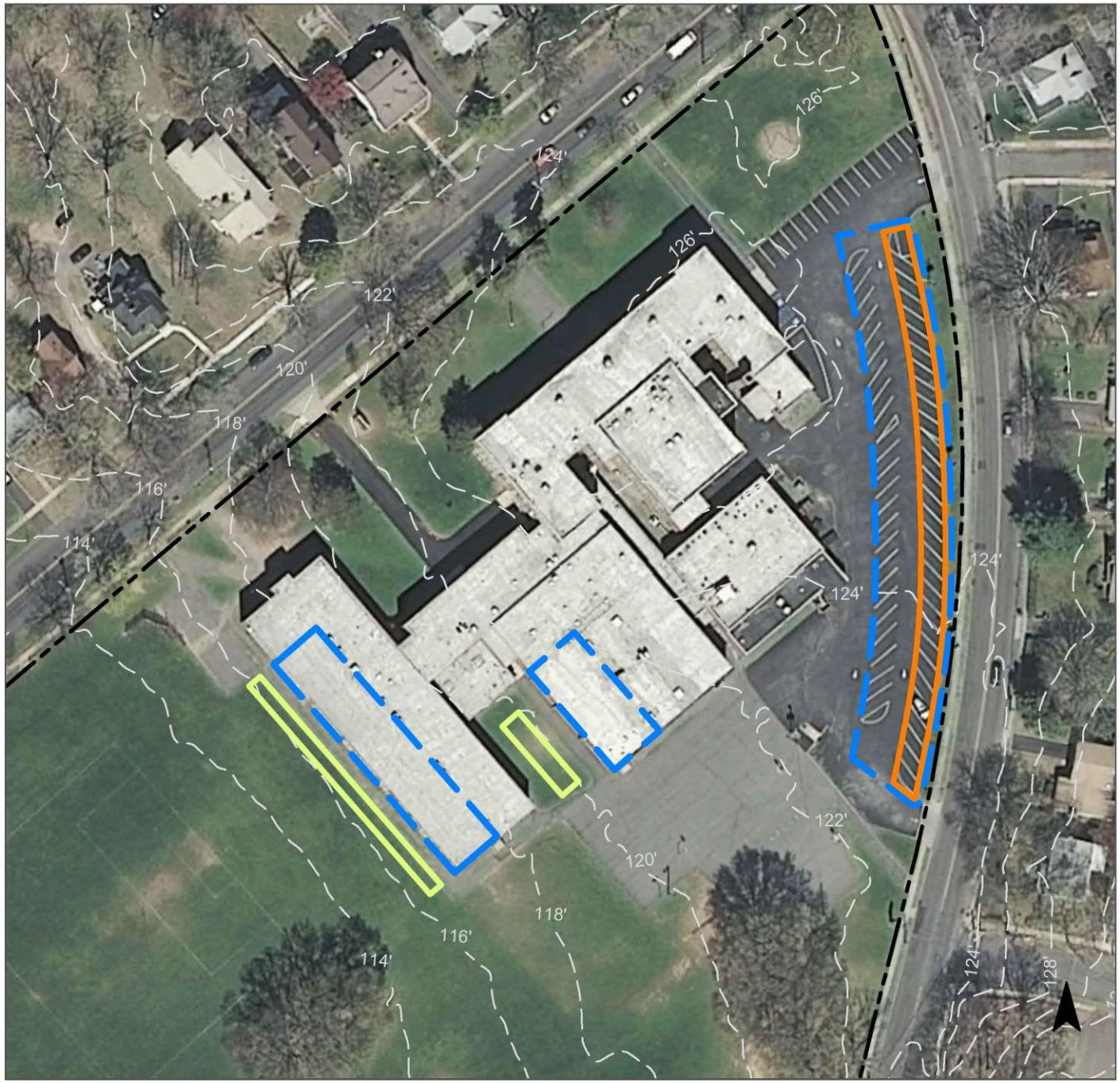
Block and Lot: **Block 626, Lot 1**

Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater runoff. Rain gardens can also capture, treat and infiltrate roof 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"
39	242,998	11.7	122.7	1,115.7	0.189	6.66

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
Bioretention systems	0.261	44	19,740	0.74	2,500	$12,500
Pervious pavements	0.490	82	37,108	1.39	6,000	$150,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Maxson Middle School

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

0 50' 100'

MUNICIPAL COURT AND POLICE DEPARTMENT

Subwatershed: Bound Brook

Site Area: 64,239 sq. ft.

Address: 200 E 4th Street Plainfield, NJ 07062

Block and Lot: Block 602, Lot 1

Rows of parking spaces can be replaced with pervious pavement 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"
90	57,815	2.8	29.2	265.4	0.045	1.59

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
Pervious pavements	0.558	93	42,240	1.59	4,600	$115,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Municipal Court and Police Department

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

0 30' 60'

PLAINFIELD HIGH SCHOOL

Subwatershed: **Bound Brook**

Site Area: **835,935 sq. ft.**

Address: **950 Park Avenue**
Plainfield, NJ 07062

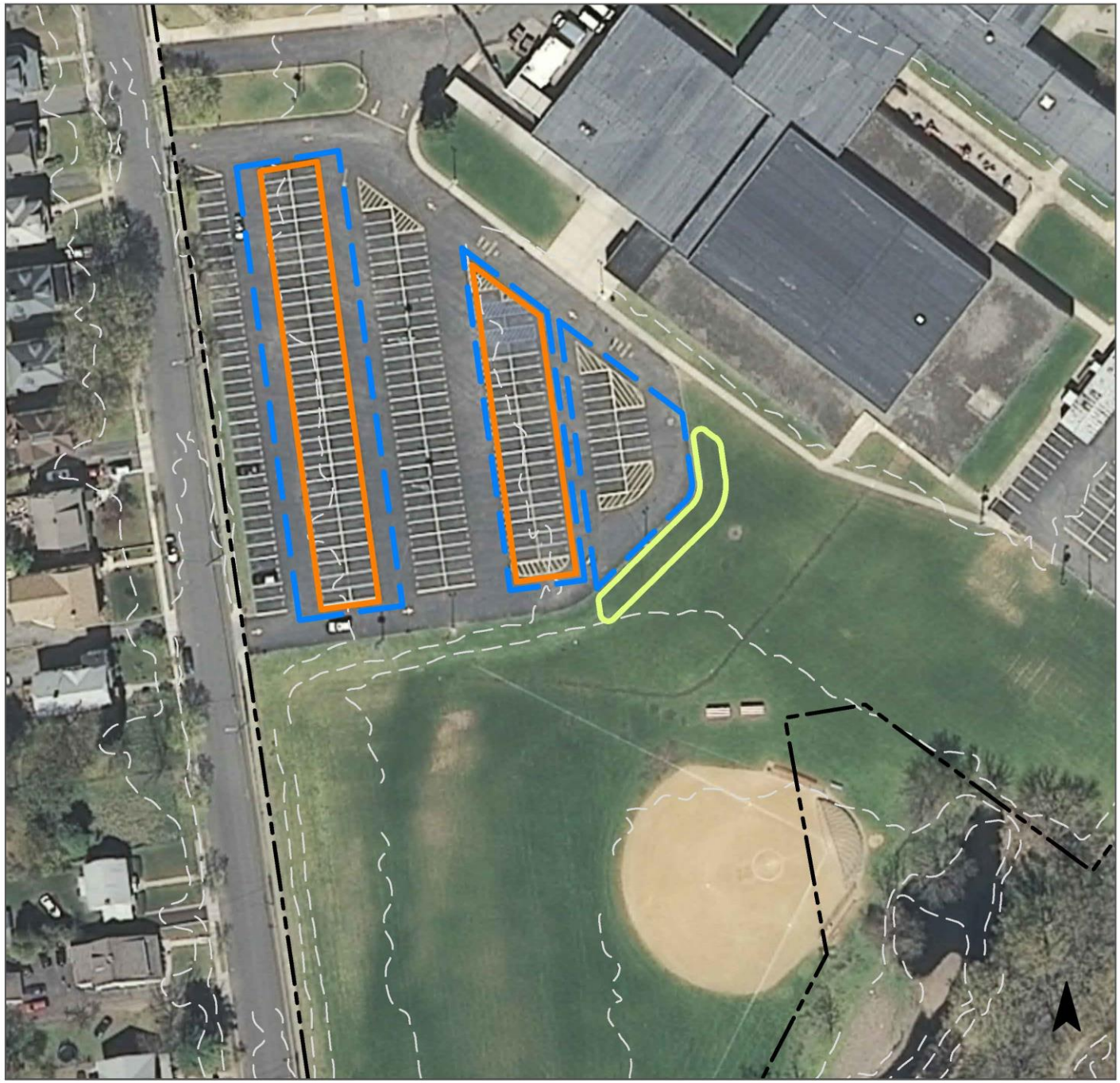
Block and Lot: **Block 720, Lot 2**

A rain garden can be installed to capture, treat, and infiltrate parking lot runoff. Parking spaces can also be repaved with porous asphalt to 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"
62	516,078	24.9	260.6	2,369.5	0.402	14.15

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	0.214	36	16,187	0.61	2,500	$12,500
Pervious pavements	0.789	132	59,810	2.25	18,500	$462,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Plainfield High School

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

0 50' 100'

PLAINFIELD PUBLIC LIBRARY

Subwatershed: **Bound Brook**

Site Area: **80,566 sq. ft.**

Address: **800 Park Avenue**
Plainfield, NJ 07062

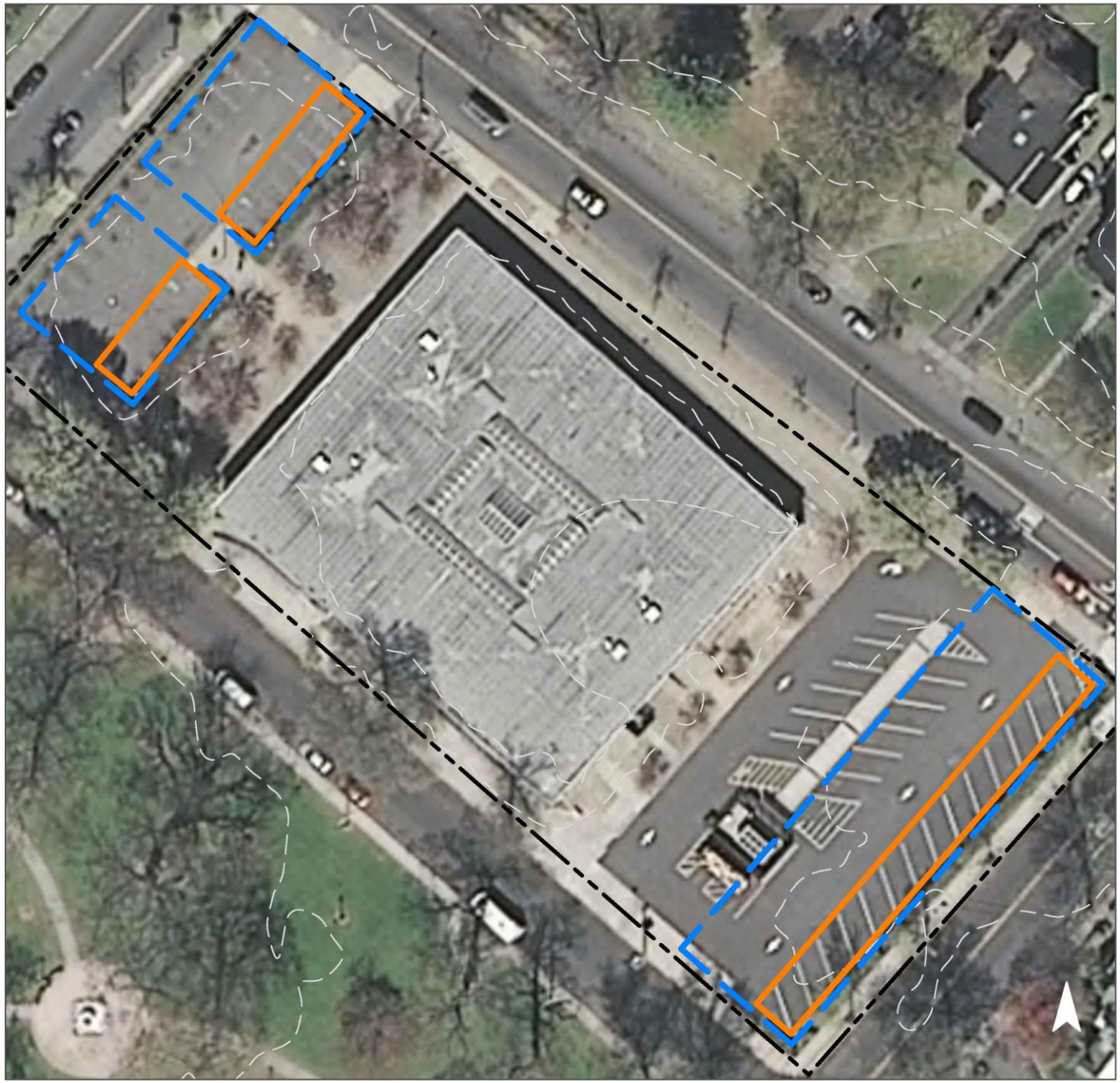
Block and Lot: **Block 719, Lot 1,2**

Rows of parking spaces can be replaced with pervious pavement 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"
80	64,454	3.1	32.6	295.9	0.050	1.77

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	0.469	79	35,530	1.33	5,400	$135,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Plainfield Public Library

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

0 30' 60'

QUEEN CITY ACADEMY CHARTER SCHOOL

Subwatershed: **Bound Brook**

Site Area: **95,120 sq. ft.**

Address: **815 W 7TH Street**
Plainfield, NJ 07062

Block and Lot: **Block 533, Lot 8**

A rain garden can be installed in the grass in the back of the school to capture, treat, and infiltrate roof runoff by disconnecting and redirecting downspouts. Parking spaces can also be replaced with porous asphalt to capture and infiltrate stormwater 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"
83	79,299	3.7	40.0	364.1	0.062	2.17

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	0.034	6	2,566	0.10	400	$2,000
Pervious pavements	0.227	38	17,174	0.64	3,000	$75,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Queen City Academy Charter School

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

0 30' 60'

SAINT BERNARD OF CLAIRVAUX AND STANISLUAS KOSTKA

Subwatershed: **Bound Brook**

Site Area: **86,340 sq. ft.**

Address: **368 Sumner Avenue**
Plainfield, NJ 07062

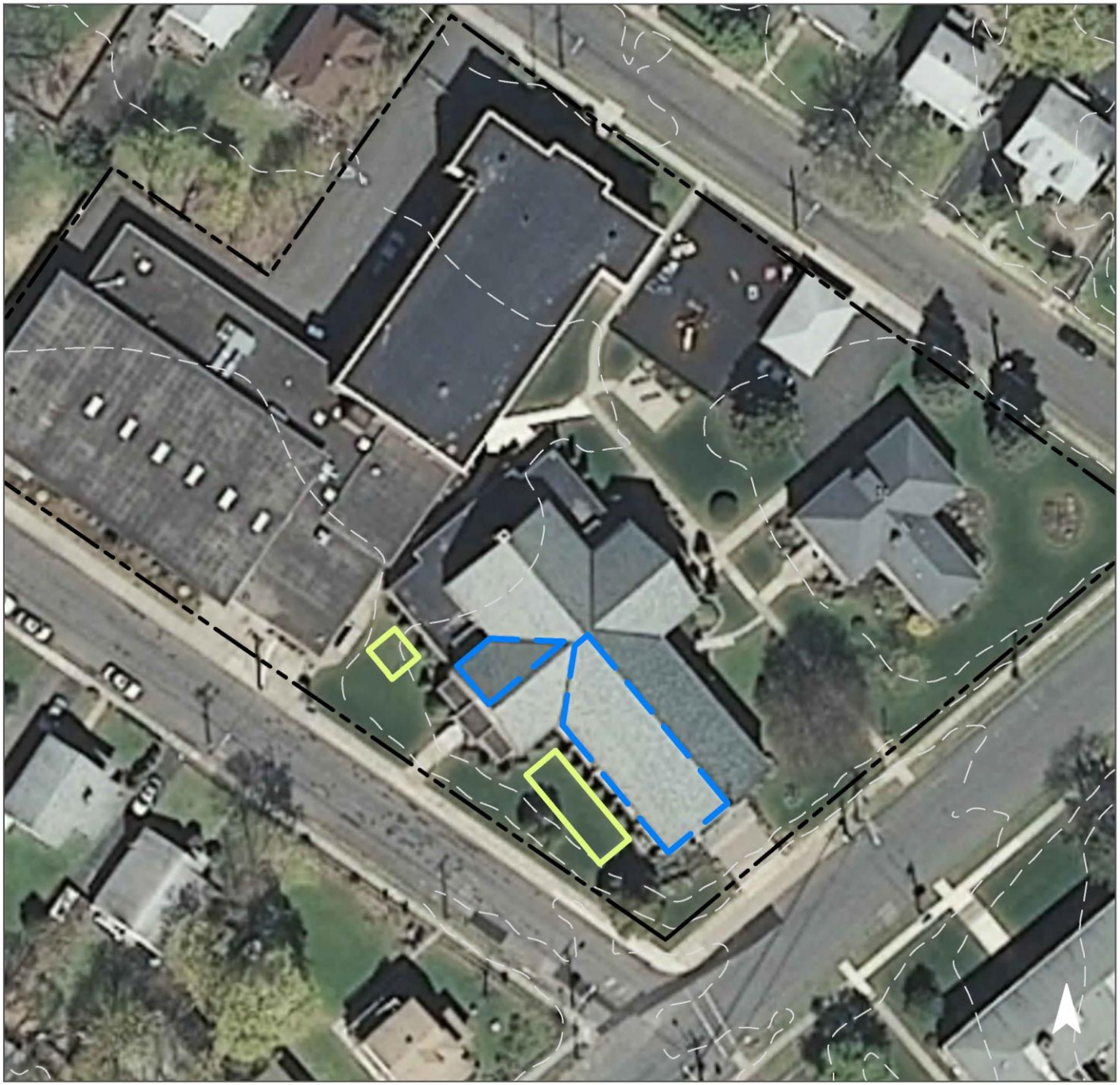
Block and Lot: **Block 413, Lot 8**

Rain gardens can be installed to capture, treat, and infiltrate roof runoff by disconnecting and redirecting downspouts. 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"
75	64,672	3.1	32.7	296.9	0.050	1.77

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	0.076	13	5,722	0.21	800	$4,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint Bernard of Clairvaux and Stanisluas Kostka

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

0 30' 60'

DEWITT D. BARLOW ELEMENTARY SCHOOL

Subwatershed: Green Brook

Site Area: 188,224 sq. ft.

Address: 2 Farragut Road
Plainfield, NJ 07062

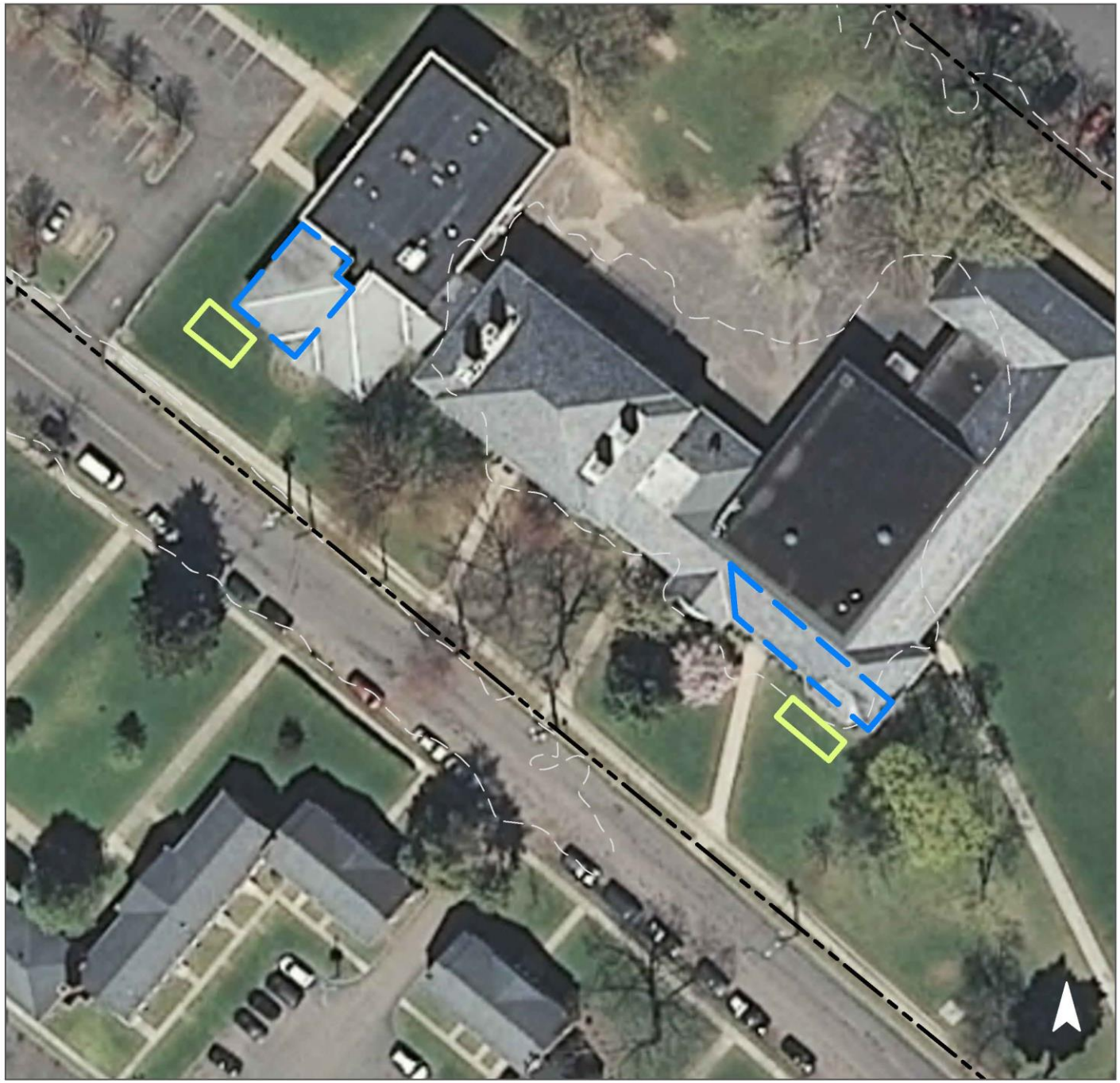
Block and Lot: Block 329, Lot 19

Rain gardens can be installed in the grass in front of the school on the western and eastern corners to capture, treat, and infiltrate roof runoff by disconnecting and redirecting downspouts. 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"
47	88,943	4.3	44.9	408.4	0.069	2.44

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	0.063	10	4,735	0.18	600	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Dewitt D. Barlow Elementary School

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

0 30' 60'

JEFFERSON ELEMENTARY SCHOOL

Subwatershed: Green Brook

Site Area: 362,980 sq. ft.

Address: 1750 W Front Street
Plainfield, NJ 07062

Block and Lot: Block 203, Lot 1

Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater 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"
74	269,634	13.0	136.2	1,238.0	0.210	7.40

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	0.711	119	53,886	2.02	9,400	$235,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Jefferson Elementary School

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

0 50' 100'

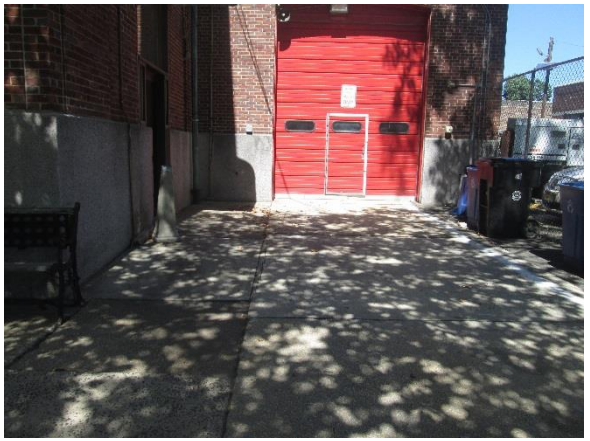
PLAINFIELD FIRE DEPARTMENT

Subwatershed: Green Brook

Site Area: 29,886 sq. ft.

Address: 315 Central Avenue
Plainfield, NJ 07062

Block and Lot: Block 103, Lot 2

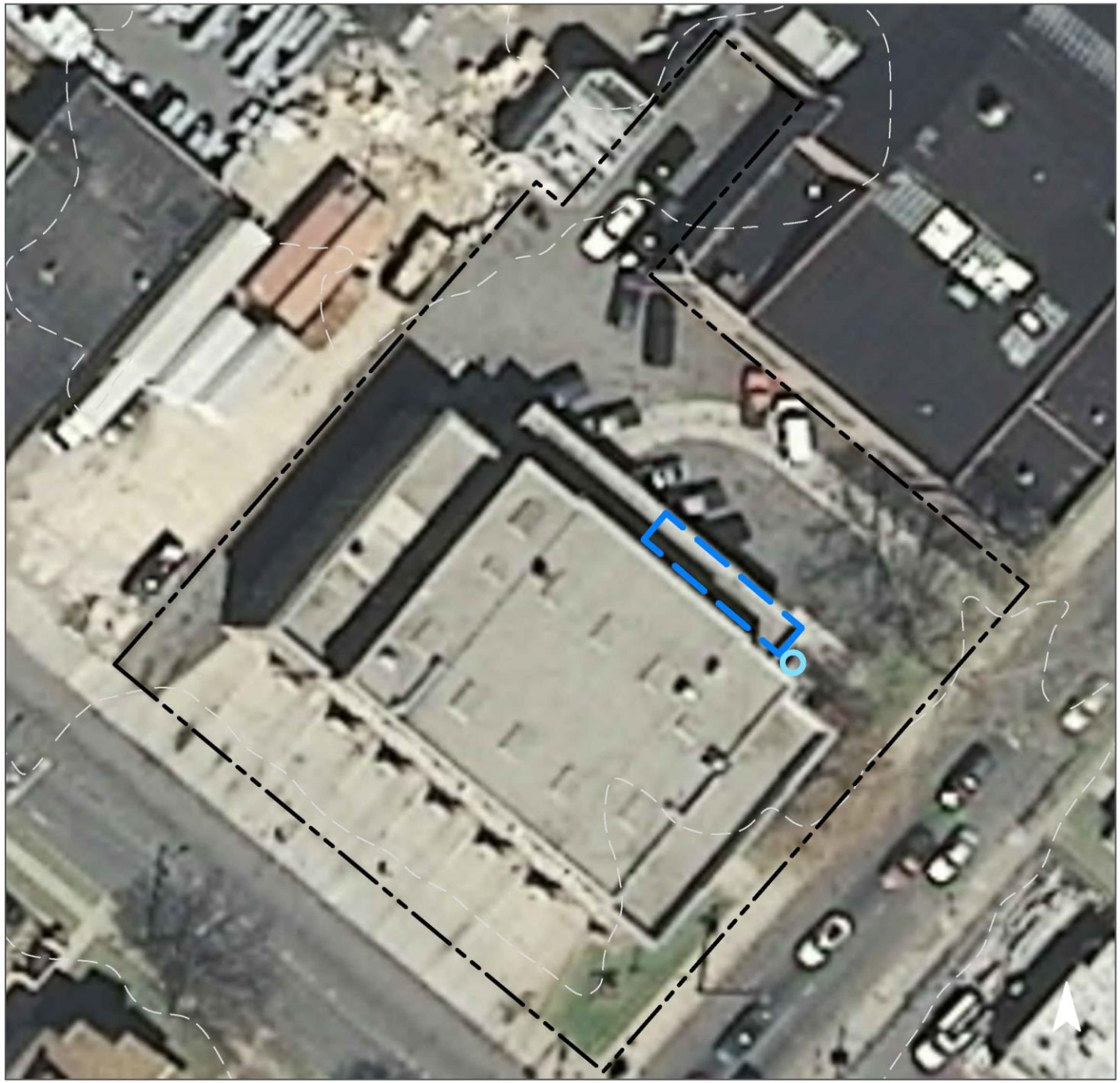


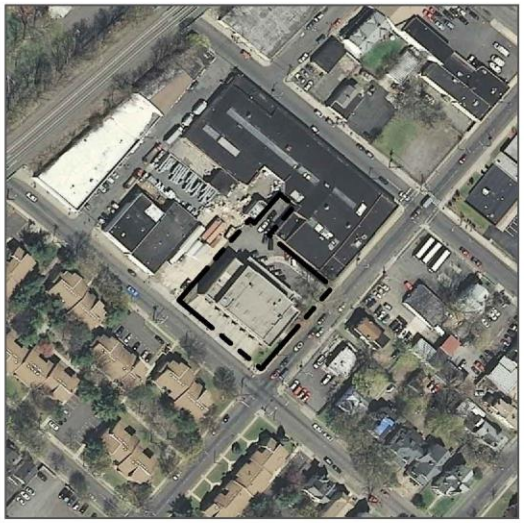
A cistern can be installed to harvest rainwater from the roof, which can then be used to wash firetrucks. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

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"
90	26,898	1.3	13.6	123.5	0.021	0.74

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
Rainwater harvesting systems	0.010	2	400	0.03	400 (gal)	$800

GREEN INFRASTRUCTURE RECOMMENDATIONS





Plainfield Fire Department

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

0 20' 40'

SAINT MARY'S ROMAN CATHOLIC CHURCH

Subwatershed: Green Brook

Site Area: 76,609 sq. ft.

Address: 516 W 6th Street
Plainfield, NJ 07062

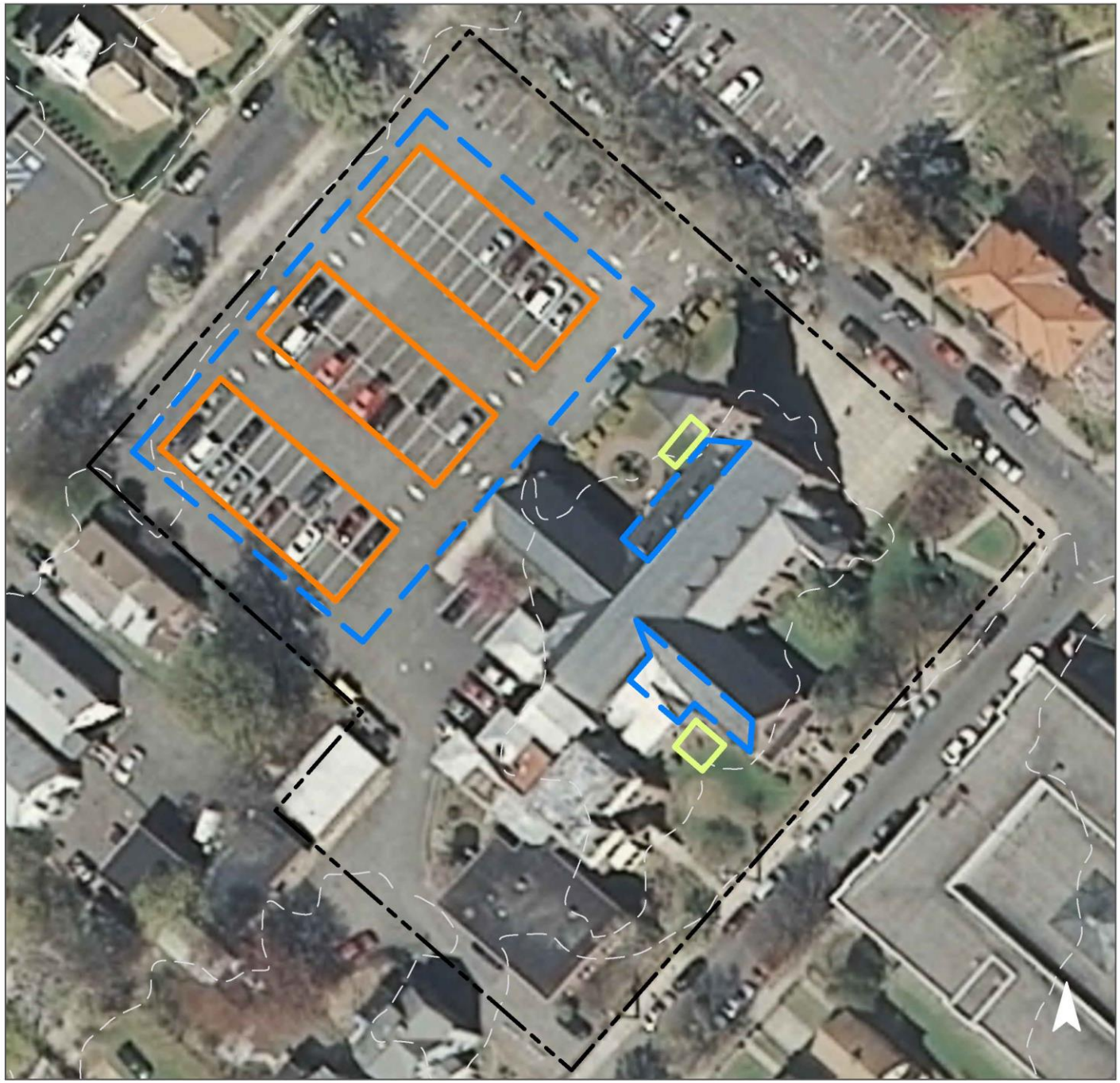
Block and Lot: Block 768, Lot 13

Bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff.by disconnecting and redirecting downspouts. Parking spaces can be replaced with pervious pavement 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"
90	68,933	3.3	34.8	316.5	0.054	1.89

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	0.039	7	2,962	0.11	350	$1,750
Pervious pavements	0.537	90	40,661	1.53	10,000	$250,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint Mary's Roman Catholic Church

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

0 30' 60'

WASHINGTON COMMUNITY SCHOOL

Subwatershed: Green Brook

Site Area: 169,528 sq. ft.

Address: 427 Darrow Avenue
Plainfield, NJ 07062

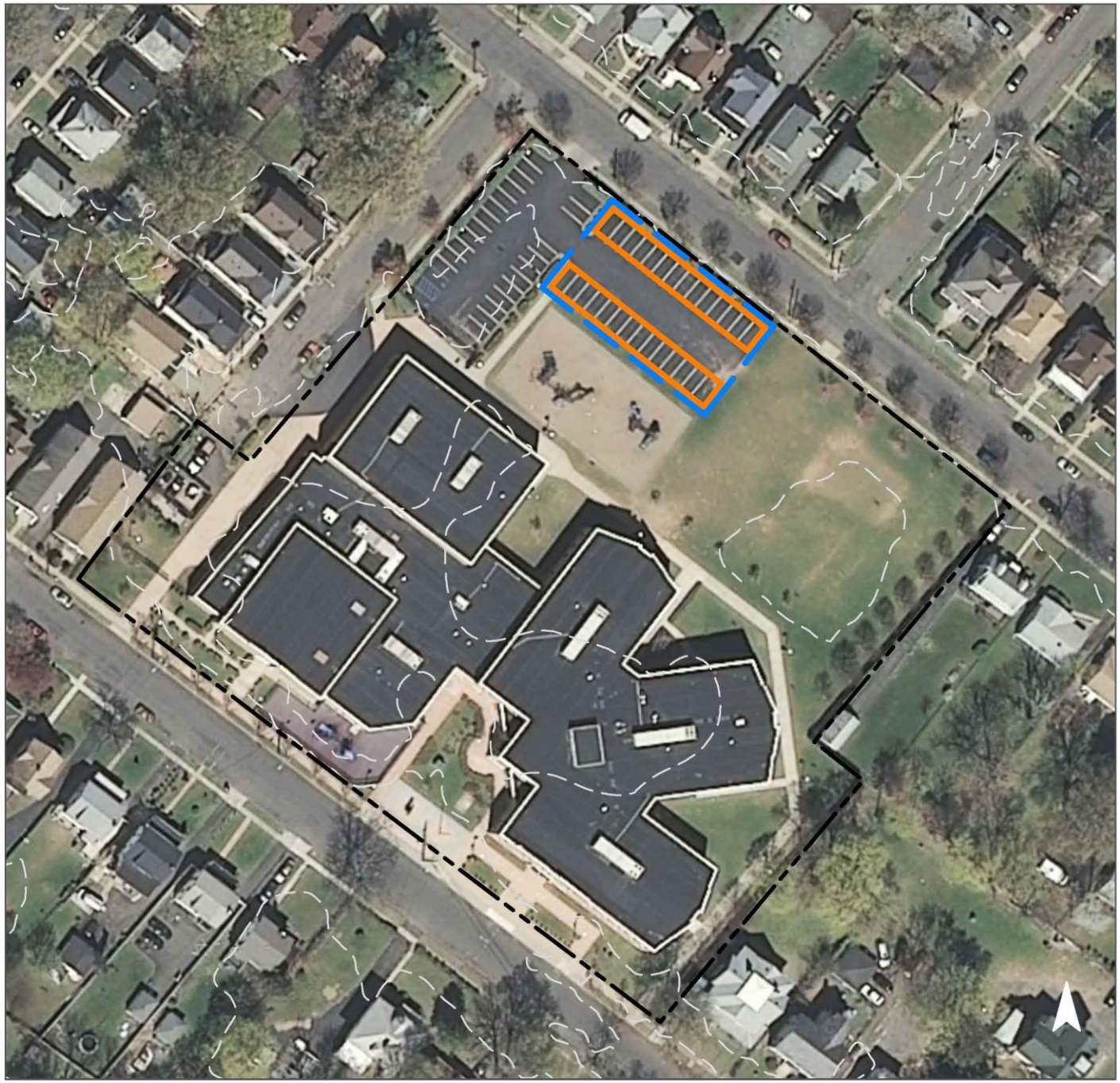
Block and Lot: Block 556, Lot 36

Parking spaces can be replaced with porous asphalt to capture and infiltrate stormwater 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"
69	116,257	5.6	58.7	533.8	0.091	3.19

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
Pervious pavements	0.258	43	19,545	0.73	4,800	$120,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Washington Community School

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

0 50' 100'

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)
BOUND BROOK SUBWATERSHED	**63.01**	**2,744,867**			**73.9**	**773.9**	**7,035.7**		**35.18**	**7,310,727**	**1.194**	**42.03**
Cedarbrook K-8 Center												
Total Site Info	10.07	438,854	743	36	6.7	70.1	637.0	32	3.18	138,728	0.108	3.80
Crescent Avenue Presbyterian												
Total Site Info	1.56	67,791	831	1	2.6	27.4	249.0	80	1.25	54,233	0.042	1.49
Emerson Community School												
Total Site Info	2.87	125,037	413	1	4.2	43.8	398.4	69	1.99	86,781	0.068	2.38
Evergreen Elementary School												
Total Site Info	3.29	143,235	826	9	4.3	44.9	408.2	62	2.04	88,903	0.069	2.44
Hubbard Middle School												
Total Site Info	4.29	187,085	506	4	6.7	69.9	635.5	74	3.18	138,420	0.108	3.80
Maxson Middle School												
Total Site Info	14.25	620,664	626	1	11.7	122.7	1,115.7	39	5.58	242,998	0.189	6.66
Municipal Court and Police Department												
Total Site Info	1.47	64,239	602	1	2.8	29.2	265.4	90	1.33	57,815	0.045	1.59
Plainfield High School												
Total Site Info	19.19	835,935	720	2	24.9	260.6	2,369.5	62	11.85	516,078	0.402	14.15
Plainfield Public Library												
Total Site Info	1.85	80,567	719	1,2	3.1	32.6	295.9	80	1.48	64,454	0.050	1.77
Queen City Academy Charter School												
Total Site Info	2.18	95,120	533	8	3.8	40.0	364.1	83	1.82	79,299	0.062	2.17
Saint Bernard of Clairvaux and Stanislaus Kostka												
Total Site Info	1.98	86,340	413	8	3.1	32.7	296.9	75	1.48	64,672	0.050	1.77

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)
GREEN BROOK SUBWATERSHED	**18.99**	**827,227**			**27.5**	**288.2**	**2,620.1**		**13.10**	**570,664**	**0.445**	**15.65**
Dewitt D. Barlow Elementary School												
Total Site Info	4.32	188,224	329	19	4.3	44.9	408.4	47	2.04	88,943	0.069	2.44
Jefferson Elementary School												
Total Site Info	8.33	362,980	203	1	13.0	136.2	1,238.0	74	6.19	269,634	0.210	7.40
Plainfield Fire Department												
Total Site Info	0.69	29,886	103	2	1.3	13.6	123.5	90	0.62	26,898	0.021	0.74
Saint Marys Roman Catholic Church												
Total Site Info	1.76	76,609	768	13	3.3	34.8	316.5	90	1.58	68,933	0.054	1.89
Washington Community School												
Total Site Info	3.89	169,528	556	36	5.6	58.7	533.8	69	2.67	116,257	0.091	3.19

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)									
	BOUND BROOK SUBWATERSHED	**189,900**	**4.36**	**4.948**	**828**	**374,845**	**14.06**	**74,300**			**$1,673,000**	**12.4%**
1	**Cedarbrook K-8 Center**											
	Pervious pavements	19,700	0.45	0.513	86	38,889	1.46	5,800	25	SF	$145,000	14.2%
	Total Site Info	**19,700**	**0.45**	**0.513**	**86**	**38,889**	**1.46**	**5,800**			**$145,000**	**14.2%**
2	**Crescent Avenue Presbyterian**											
	Bioretention systems/rain gardens	1,000	0.02	0.026	4	1,975	0.07	500	5	SF	$2,500	1.8%
	Total Site Info	**1,000**	**0.02**	**0.026**	**4**	**1,975**	**0.07**	**500**			**$2,500**	**1.8%**
3	**Emerson Community School**											
	Bioretention systems/rain gardens	4,900	0.11	0.128	21	9,672	0.36	1,000	5	SF	$5,000	5.6%
	Pervious pavements	13,000	0.30	0.339	57	25,664	0.96	7,400	25	SF	$185,000	15.0%
	Total Site Info	**17,900**	**0.41**	**0.466**	**78**	**35,336**	**1.32**	**8,400**			**$190,000**	**20.6%**
4	**Evergreen Elementary School**											
	Pervious pavements	20,800	0.48	0.542	91	41,058	1.54	13,000	25	SF	$325,000	23.4%
	Total Site Info	**20,800**	**0.48**	**0.542**	**91**	**41,058**	**1.54**	**13,000**			**$325,000**	**23.4%**
5	**Hubbard Middle School**											
	Bioretention systems/rain gardens	3,600	0.08	0.094	16	7,106	0.27	900	5	SF	$4,500	2.6%
	Pervious pavements	7,300	0.17	0.190	32	14,406	0.54	2,000	25	SF	$50,000	5.3%
	Total Site Info	**10,900**	**0.25**	**0.284**	**48**	**21,512**	**0.81**	**2,900**			**$54,500**	**7.9%**
6	**Maxson Middle School**											
	Bioretention systems/rain gardens	10,000	0.23	0.261	44	19,740	0.74	2,500	5	SF	$12,500	4.1%
	Pervious pavements	18,800	0.43	0.490	82	37,108	1.39	6,000	25	SF	$150,000	7.7%
	Total Site Info	**28,800**	**0.66**	**0.750**	**126**	**56,848**	**2.13**	**8,500**			**$150,000**	**11.9%**
7	**Municipal Court and Police Department**											
	Pervious pavements	21,400	0.49	0.558	93	42,240	1.59	4,600	25	SF	$115,000	37.0%
	Total Site Info	**21,400**	**0.49**	**0.558**	**93**	**42,240**	**1.59**	**4,600**			**$115,000**	**37.0%**
8	**Plainfield High School**											
	Bioretention systems/rain gardens	8,200	0.19	0.214	36	16,187	0.61	2,500	5	SF	$12,500	1.6%
	Pervious pavements	30,300	0.70	0.789	132	59,810	2.25	18,500	25	SF	$462,500	5.9%
	Total Site Info	**38,500**	**0.88**	**1.003**	**168**	**75,997**	**2.86**	**21,000**			**$475,000**	**7.5%**

Summary of Proposed Green Infrastructure Practices

	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 %
9	**Plainfield Public Library**											
	Pervious pavements	18,000	0.41	0.469	79	35,530	1.33	5,400	25	SF	$135,000	27.9%
	Total Site Info	**18,000**	**0.41**	**0.469**	**79**	**35,530**	**1.33**	**5,400**			**$135,000**	**27.9%**
10	**Queen City Academy Charter School**											
	Bioretention systems/rain gardens	1,300	0.03	0.034	6	2,566	0.10	400	5	SF	$2,000	1.6%
	Pervious pavements	8,700	0.20	0.227	38	17,174	0.64	3,000	25	SF	$75,000	11.0%
	Total Site Info	**10,000**	**0.23**	**0.261**	**44**	**19,740**	**0.74**	**3,400**			**$77,000**	**12.6%**
11	**Saint Bernard of Clairvaux and Stanislaus Kostka**											
	Bioretention systems/rain gardens	2,900	0.07	0.076	13	5,722	0.21	800	5	SF	$4,000	4.5%
	Total Site Info	**2,900**	**0.07**	**0.076**	**13**	**5,722**	**0.21**	**800**			**$4,000**	**4.5%**
	GREEN BROOK SUBWATERSHED	**62,100**	**1.43**	**1.618**	**271**	**122,189**	**4.60**	**25,550**			**$610,550**	**10.9%**
12	**Dewitt D. Barlow Elementary School**											
	Bioretention systems/rain gardens	2,400	0.06	0.063	10	4,735	0.18	600	5	SF	$3,000	2.7%
	Total Site Info	**2,400**	**0.06**	**0.063**	**10**	**4,735**	**0.18**	**600**			**$3,000**	**2.7%**
13	**Jefferson Elementary School**											
	Pervious pavements	27,300	0.63	0.711	119	53,886	2.02	9,400	25	SF	$235,000	10.1%
	Total Site Info	**27,300**	**0.63**	**0.711**	**119**	**53,886**	**2.02**	**9,400**			**$235,000**	**10.1%**
14	**Plainfield Fire Department**											
	Rainwater harvesting systems	400	0.01	0.010	2	400	0.03	400	2	gal	$800	1.5%
	Total Site Info	**400**	**0.01**	**0.010**	**2**	**400**	**0.03**	**400**			**$800**	**1.5%**
15	**Saint Marys Roman Catholic Church**											
	Bioretention systems/rain gardens	1,500	0.03	0.039	7	2,962	0.11	350	5	SF	$1,750	2.2%
	Pervious pavements	20,600	0.47	0.537	90	40,661	1.53	10,000	25	SF	$250,000	29.9%
	Total Site Info	**22,100**	**0.51**	**0.576**	**96**	**43,623**	**1.64**	**10,350**			**$251,750**	**32.1%**
16	**Washington Community School**											
	Pervious pavements	9,900	0.23	0.258	43	19,545	0.73	4,800	25	SF	$120,000	8.5%
	Total Site Info	**9,900**	**0.23**	**0.258**	**43**	**19,545**	**0.73**	**4,800**			**$120,000**	**8.5%**