RUTGERS
New Jersey Agricultural
Experiment Station

Draft

Impervious Cover Reduction Action Plan for Green Brook Township, Somerset County, New Jersey

Prepared for Green Brook Township by the Rutgers Cooperative Extension Water Resources Program

October 6, 2015

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Introduction

Located in Somerset County in central New Jersey, Green Brook Township covers approximately 4.41 square miles east of Warren Township. Figures 1 and 2 illustrate that Green Brook Township is dominated by urban land uses. A total of 59.3% of the municipality's land use is classified as urban. Of the urban land in Green Brook Township, low density and medium density residential are the dominant land uses (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Green Brook 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 Green Brook Township. Based upon the 2007 NJDEP land use/land cover data, approximately 21.1% of Green Brook Township has impervious cover. This level of impervious cover suggests that the streams in Green Brook Township are likely impacted.[1]

Methodology

Green Brook Township 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

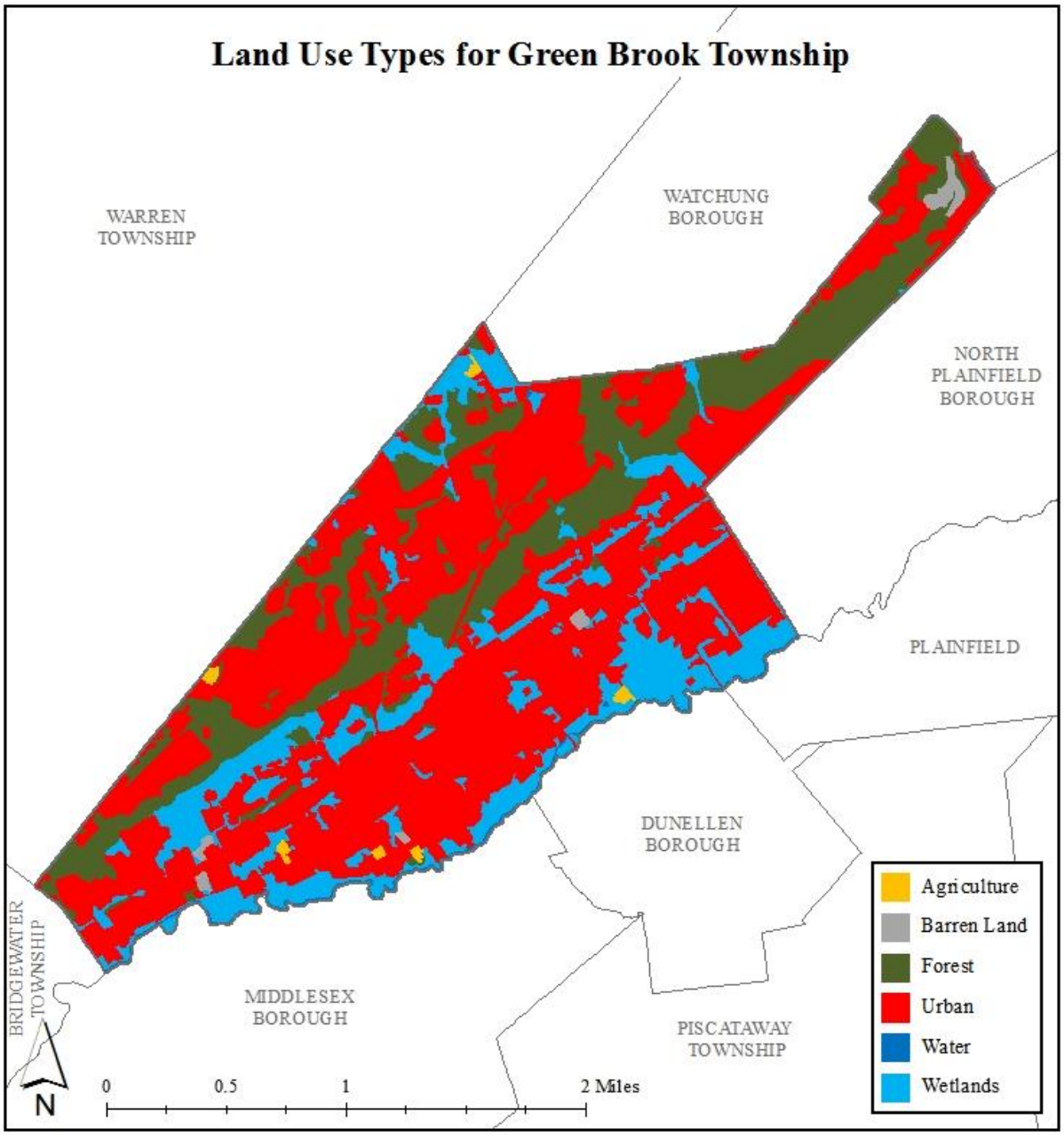


Figure 1: Map illustrating the land use in Green Brook Township

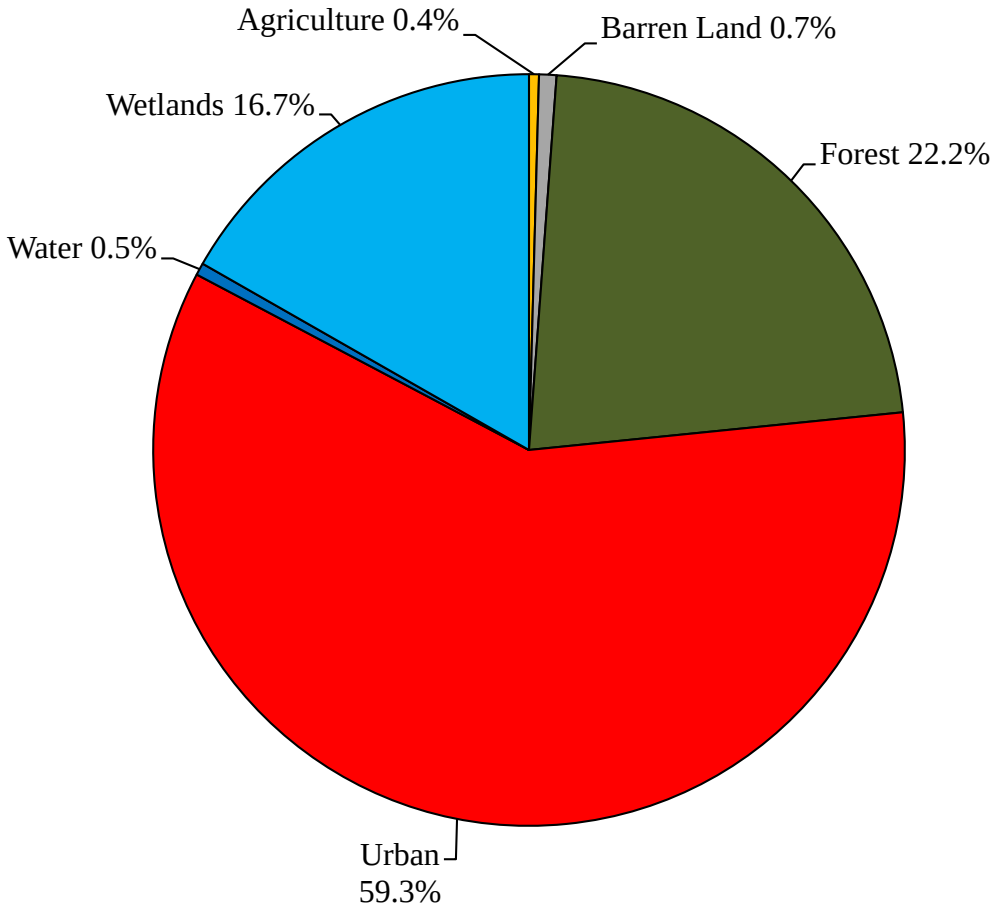


Figure 2: Pie chart illustrating the land use in Green Brook Township

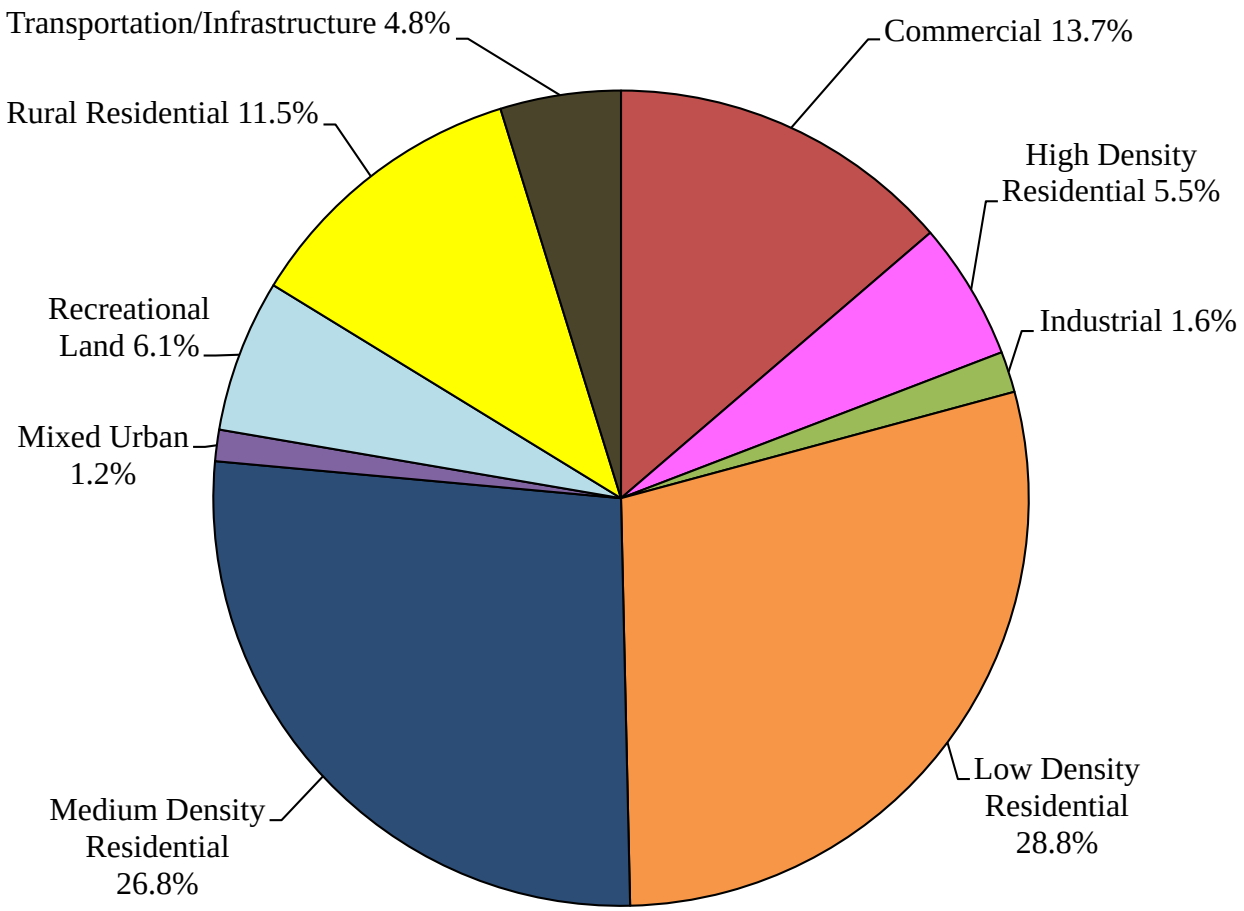


Figure 3: Pie chart illustrating the various types of urban land use in Green Brook Township

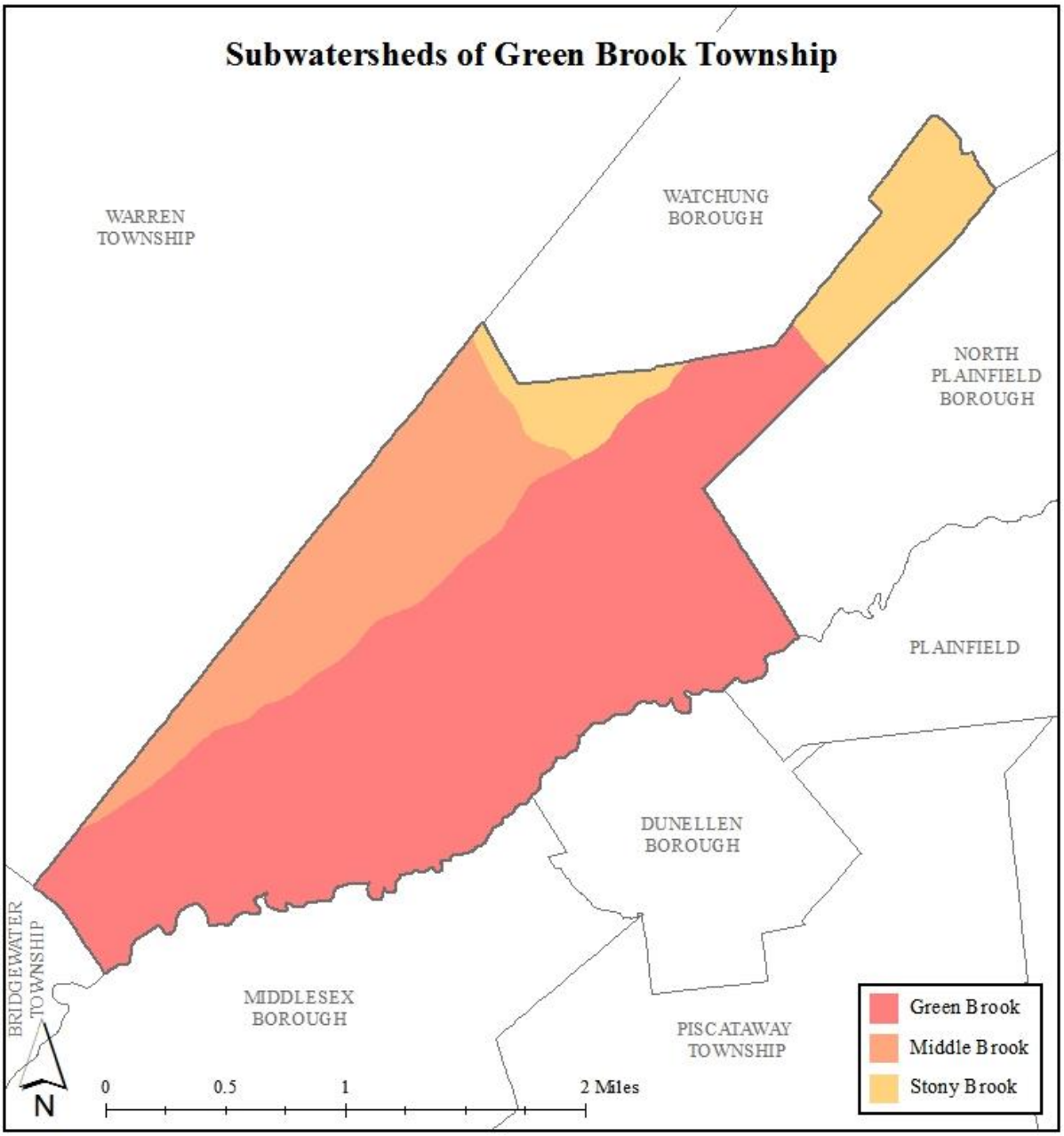


Figure 4: Map of the subwatersheds in Green Brook Township

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

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

Table 1: Aerial Loading Coefficients[2]

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

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

Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general principal, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these practices can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits[3]. A wide range of green infrastructure practices have been evaluated for the potential project sites in Green Brook 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

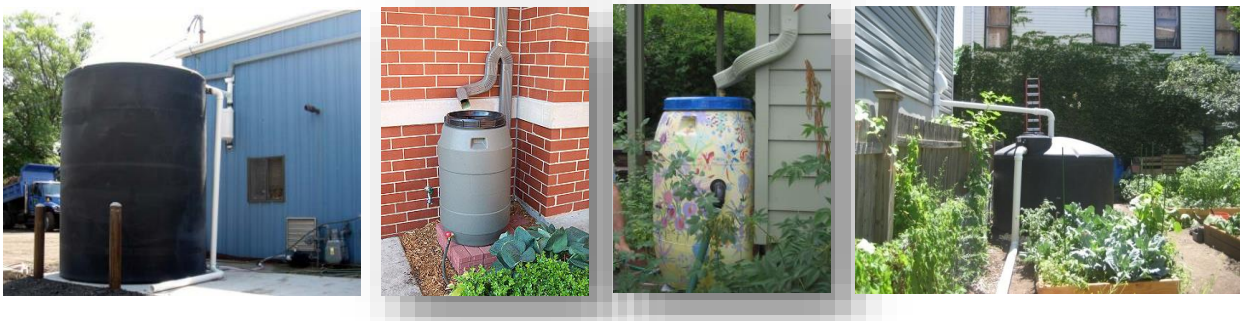
These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating a wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils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

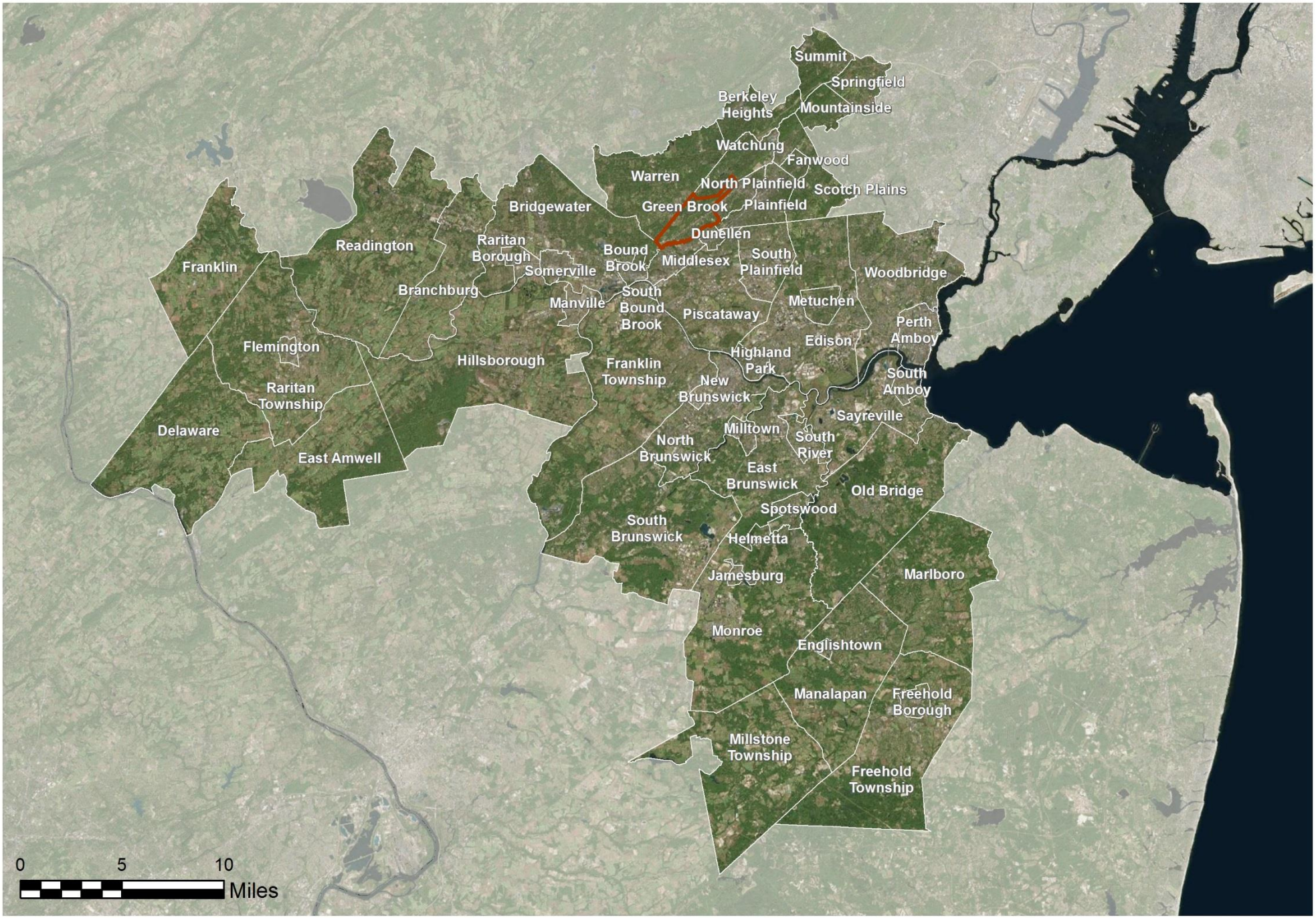
Conclusion

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 or ordinance.

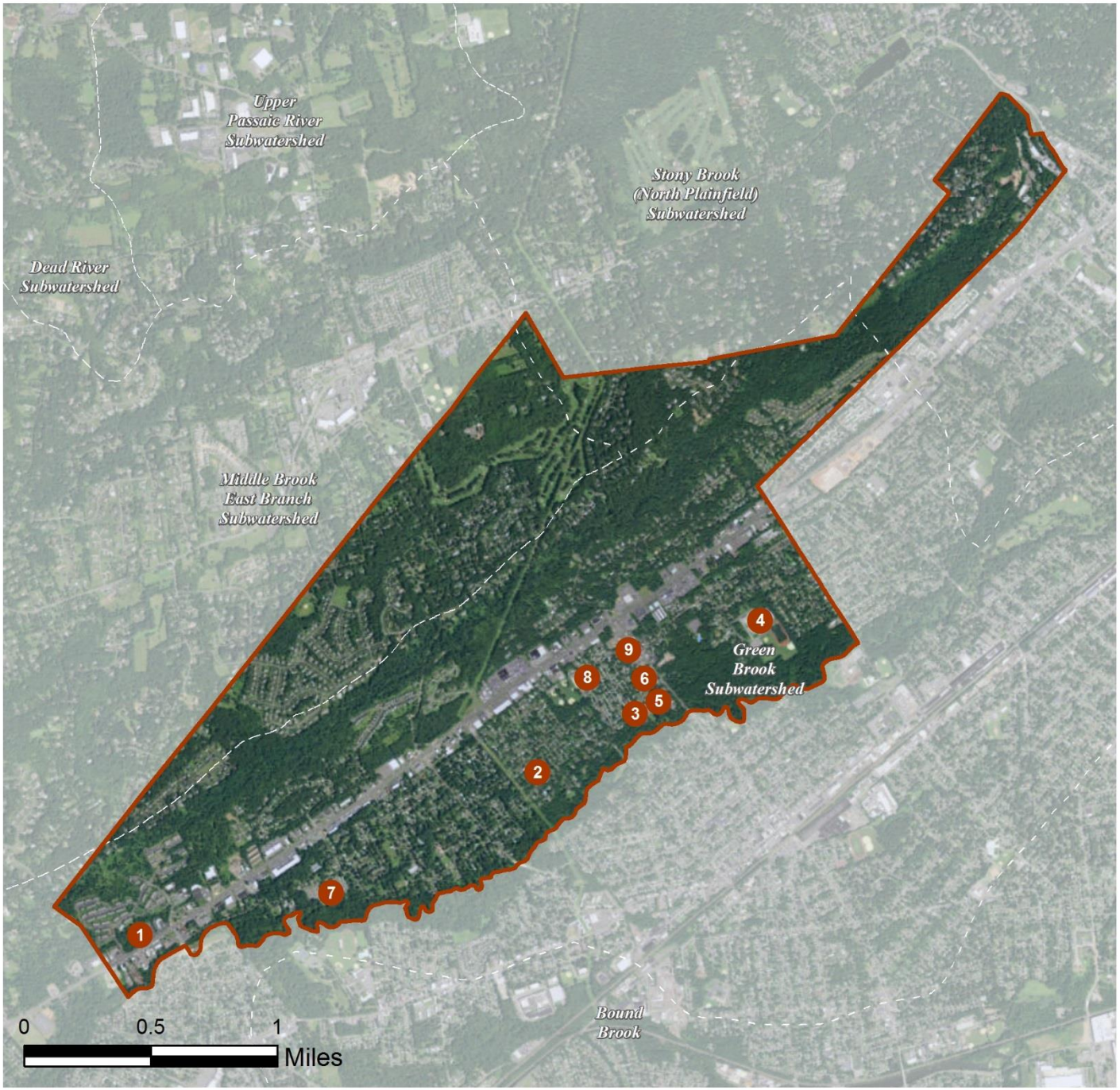
a. Overview Map of the Project

GREEN BROOK TOWNSHIP: CLIMATE RESILIENT GREEN INFRASTRUCTURE FOR THE RARITAN BASIN



b. Green Infrastructure Sites

GREEN BROOK TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE GREEN BROOK SUBWATERSHED:

1. Bowlmor Lanes
2. Green Brook Baptist Church
3. Green Brook Fire-EMS
4. Green Brook Middle School
5. Green Brook Municipal Building
6. Green Brook Police Department
7. Green Brook Regional Center
8. Irene E. Feldkirchner Elementary School
9. US Post Office: Medemerge

c. Proposed Green Infrastructure Concepts

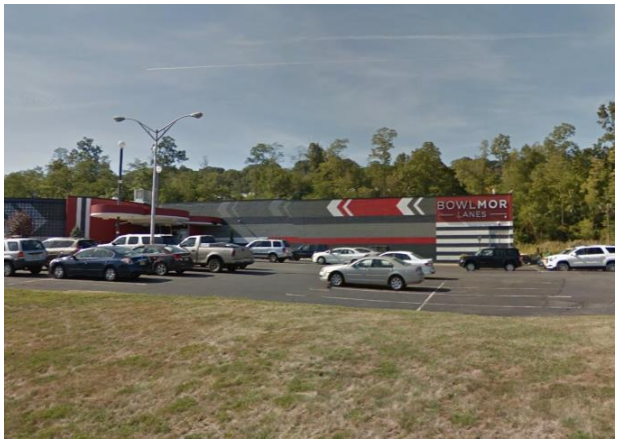
BOWLMOR LANES

Subwatershed: Green Brook

Site Area: 270,223 sq. ft.

Address: 380 US 22
Green Brook, NJ 08812

Block and Lot: Block 1, Lot 3;4

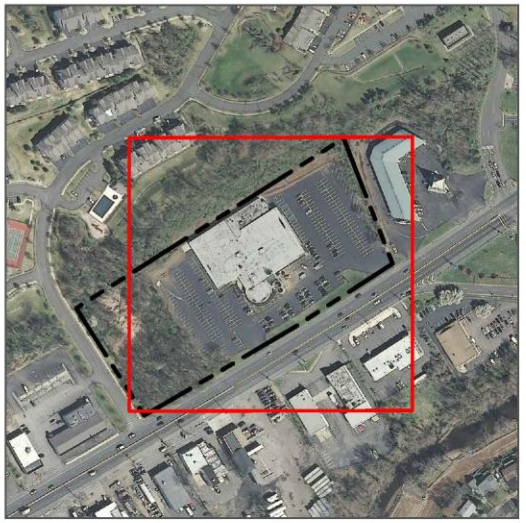


Water from the parking lot drains toward the highway. Several parking areas can be replaced with porous asphalt to capture stormwater. Rain gardens can be installed in the turf grass between the parking lot and the highway to capture, treat, and infiltrate runoff. A preliminary soil assessment suggests 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"
67	180,299	8.7	91.1	827.8	0.140	4.95

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	0.647	108	47,453	1.79	6,210	$31,048
Pervious pavements	1.168	196	85,668	3.22	8,673	$216,828

GREEN INFRASTRUCTURE RECOMMENDATIONS



Bowlmor Lanes

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

0 50' 100'

GREEN BROOK BAPTIST CHURCH

Subwatershed: Green Brook

Site Area: 134,457 sq. ft.

Address: 170 Greenbrook Road
Green Brook, NJ 08812

Block and Lot: Block 43, Lot 10

Runoff from the parking lot behind the church drains towards the building. Parking spaces behind the building can be replaced with porous asphalt to capture runoff. Rain gardens can be installed beside the church 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"
33	44,164	2.1	22.3	202.8	0.034	1.21

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
Bioretention systems	0.138	23	10,091	0.38	1,330	$6,648
Pervious pavements	0.268	45	19,687	0.74	2,574	$64,353

GREEN INFRASTRUCTURE RECOMMENDATIONS

Green Brook Baptist Church

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

0 20' 40'

GREEN BROOK FIRE-EMS

Subwatershed: Green Brook

Site Area: 28,997 sq. ft.

Address: 111 Greenbrook Road, Green Brook, NJ 08812

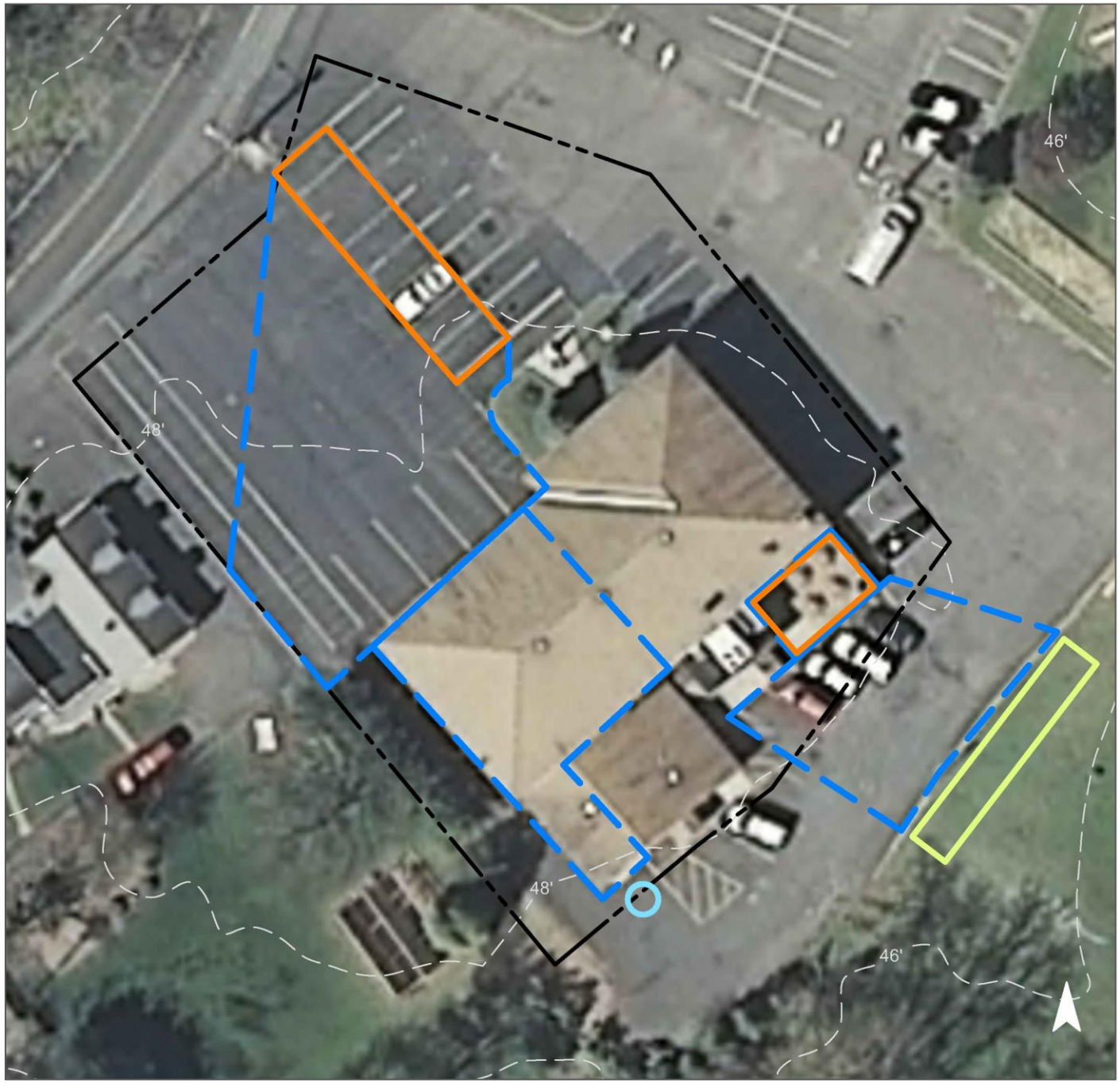
Block and Lot: Block 52, Lot 5.02

The parking lot in front of the building drains toward the road. Parking spaces can be replaced with porous asphalt to capture runoff. The parking lot behind the building drains towards a lawn area, where a rain garden can be installed to infiltrate and treat runoff. The picnic area behind the building can be replaced with permeable pavers. A cistern can be set up to collect rainwater to be reused for watering the vegetable garden adjacent to the building, or to clean the fire trucks. 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"
95	27,484	1.3	13.9	126.2	0.021	0.75

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	0.074	12	5,423	0.20	709	$3,545
Pervious pavements	0.200	33	14,676	0.55	1,781	$44,533
Rainwater harvesting systems	0.093	16	3,000	0.26	3,000 (gal)	$6,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Green Brook Fire - EMS

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

0 20' 40'

GREEN BROOK MIDDLE SCHOOL

Subwatershed: Green Brook

Site Area: 1,318,505 sq. ft.

Address: 132 Jefferson Avenue
Green Brook, NJ 08812

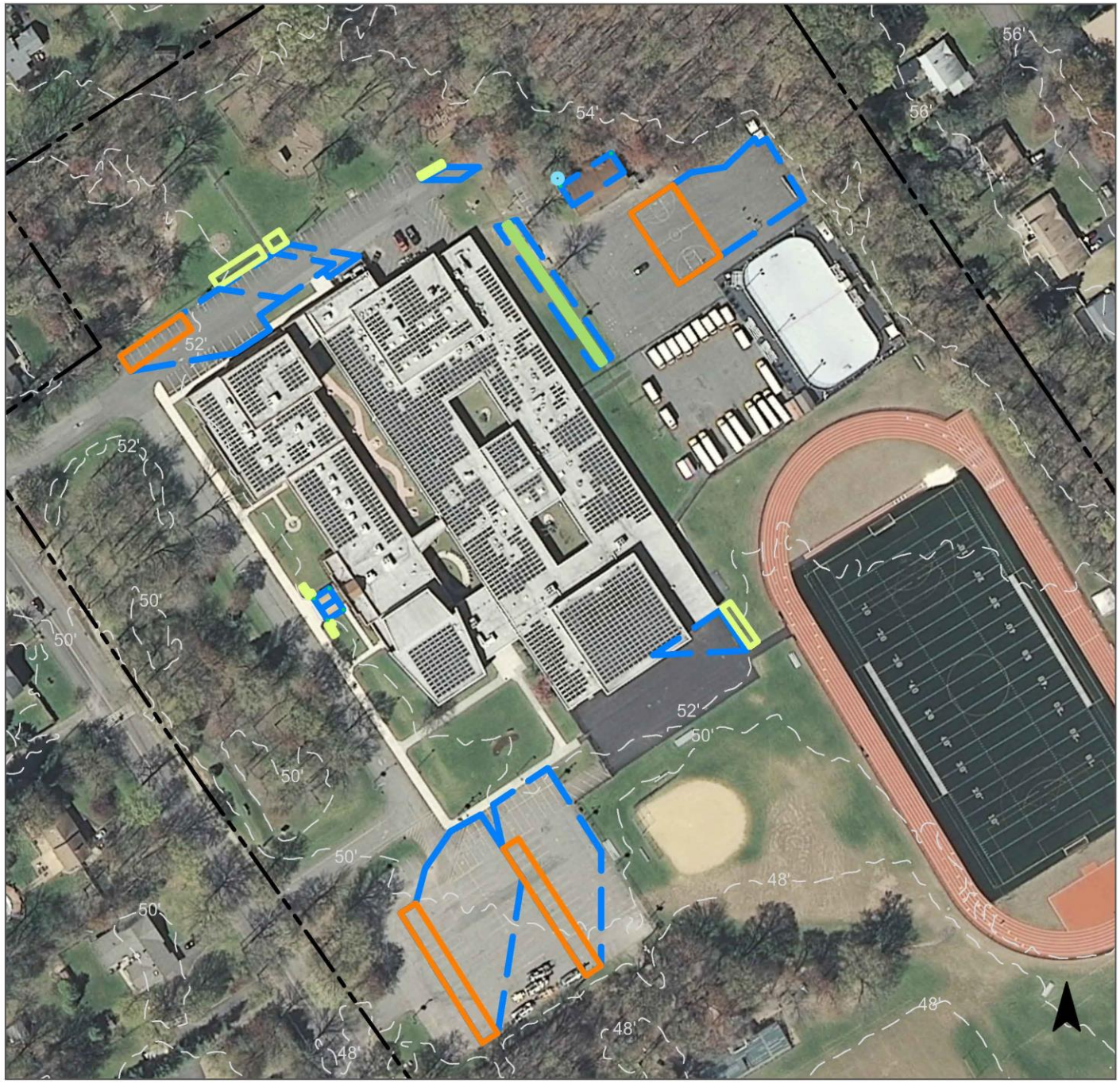
Block and Lot: Block 92, Lot 3

Paved areas surrounding the school are heavily eroded. Parking spaces and the basketball court on the site can be replaced with porous asphalt to capture runoff. Rain gardens can be installed around the building to infiltrate roof and parking lot runoff. A cistern can be set up to harvest rainwater from the roof of a building north of the school. An existing swale behind the school can be retrofitted to be a bioswale to help infiltrate 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"
29	380,368	18.3	192.1	1,746.4	0.296	10.43

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	0.165	28	12,118	0.46	1,592	$7,960
Bioswales	0.087	15	6,388	0.24	833	$4,164
Pervious pavements	1.189	199	87,247	3.28	10,926	$273,143
Rainwater harvesting systems	0.035	6	1,000	0.10	1,000 (gal)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Green Brook Middle School

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

0 75' 150'

GREEN BROOK MUNICIPAL BUILDING

Subwatershed: Green Brook

Site Area: 256,249 sq. ft.

Address: 109 Greenbrook Road
Green Brook, NJ 08812

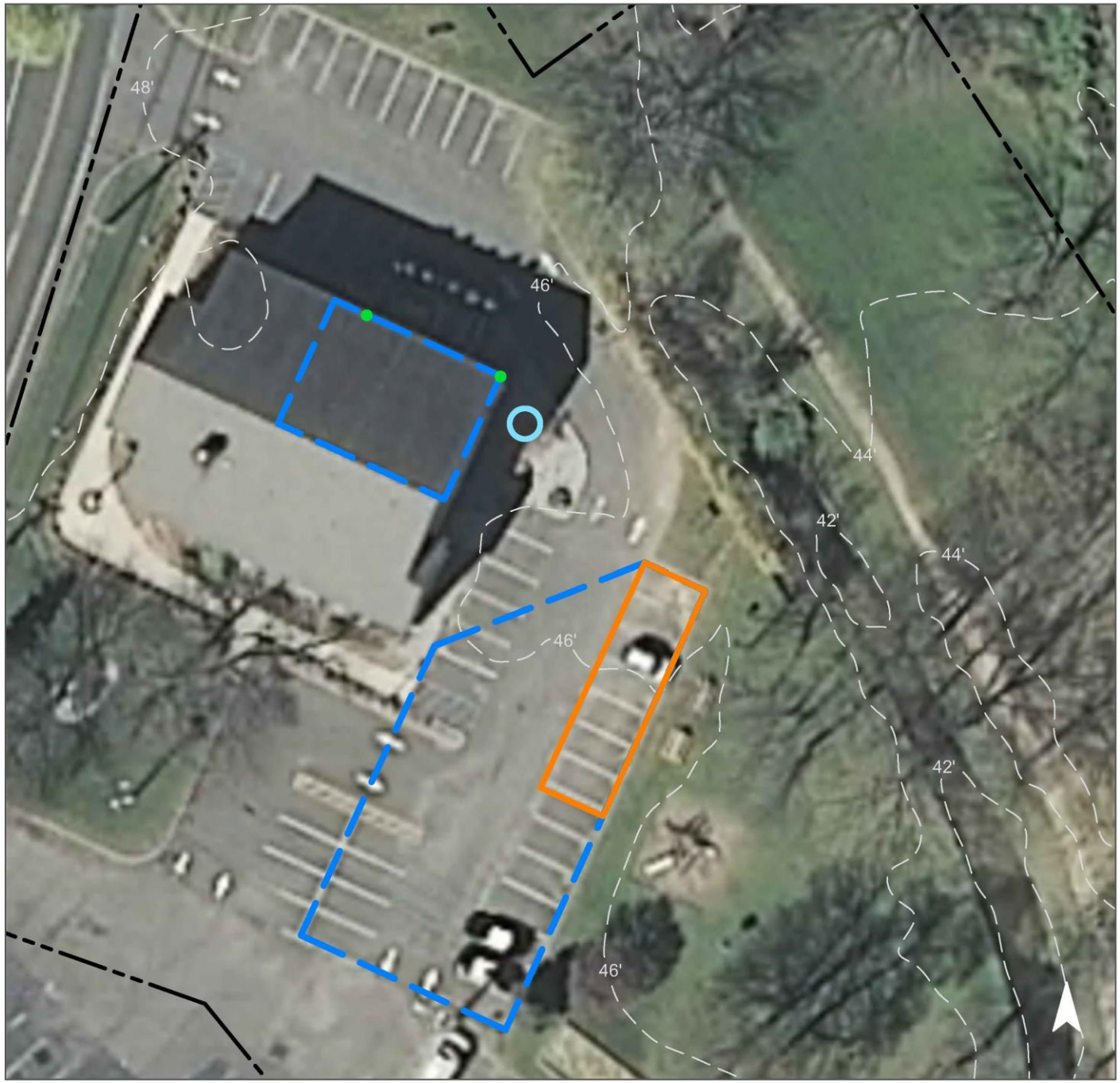
Block and Lot: Block 52, Lot 5.01

Water from the parking lot drains towards the turf grass behind the building. Parking spaces can be replaced with porous asphalt to capture runoff. Additionally, a cistern can be installed to harvest rainwater. The water can be used to water the existing landscaping on the site. 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"
22	55,503	2.7	28.0	254.8	0.043	1.52

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	0.171	29	12,536	0.47	1,153	$28,835
Rainwater harvesting systems	0.044	7	1,500	0.12	1,500 (gal)	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Green Brook Municipal Building

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

0 20' 40'

GREEN BROOK POLICE DEPARTMENT

Subwatershed: Green Brook

Site Area: 63,839 sq. ft.

Address: 96 Greenbrook Road
Green Brook, NJ 08812

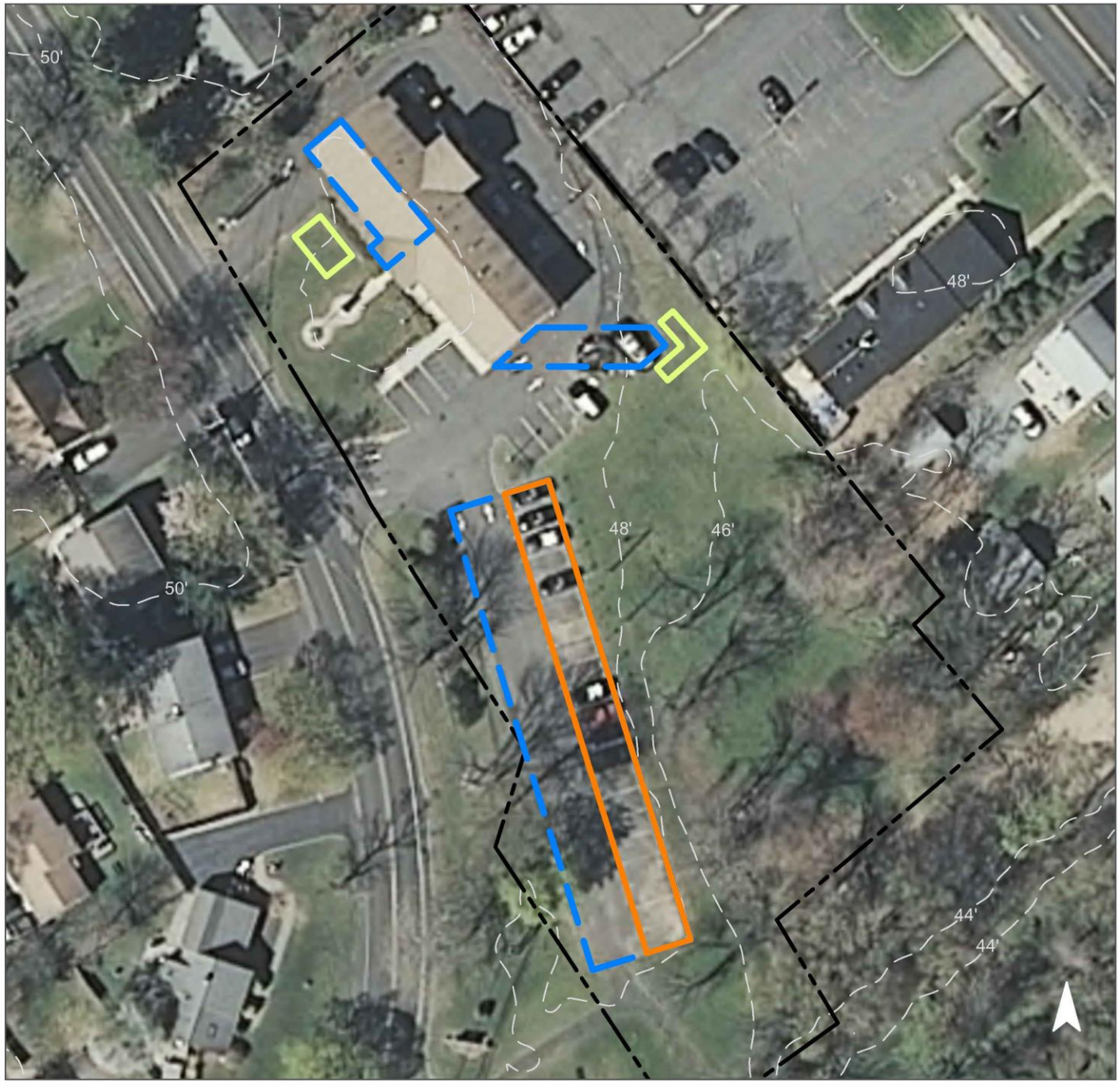
Block and Lot: Block 55, Lot 4.02

Water from the parking lots adjacent to the building drain toward lawn areas. Parking spaces can be replaced with porous asphalt and a rain garden can be constructed to help capture and infiltrate parking lot stormwater runoff. A rain garden could also be installed in front of the building to capture 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"
50	32,201	1.6	16.3	147.8	0.025	0.88

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	0.050	8	3,650	0.14	471	$2,355
Pervious pavements	0.199	33	14,579	0.55	3,401	$85,028

GREEN INFRASTRUCTURE RECOMMENDATIONS



Green Brook Police Department

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

0 30' 60'

GREEN BROOK REGIONAL CENTER

Subwatershed: Green Brook

Site Area: 990,999 sq. ft.

Address: 275 Greenbrook Road
Green Brook, NJ 08812

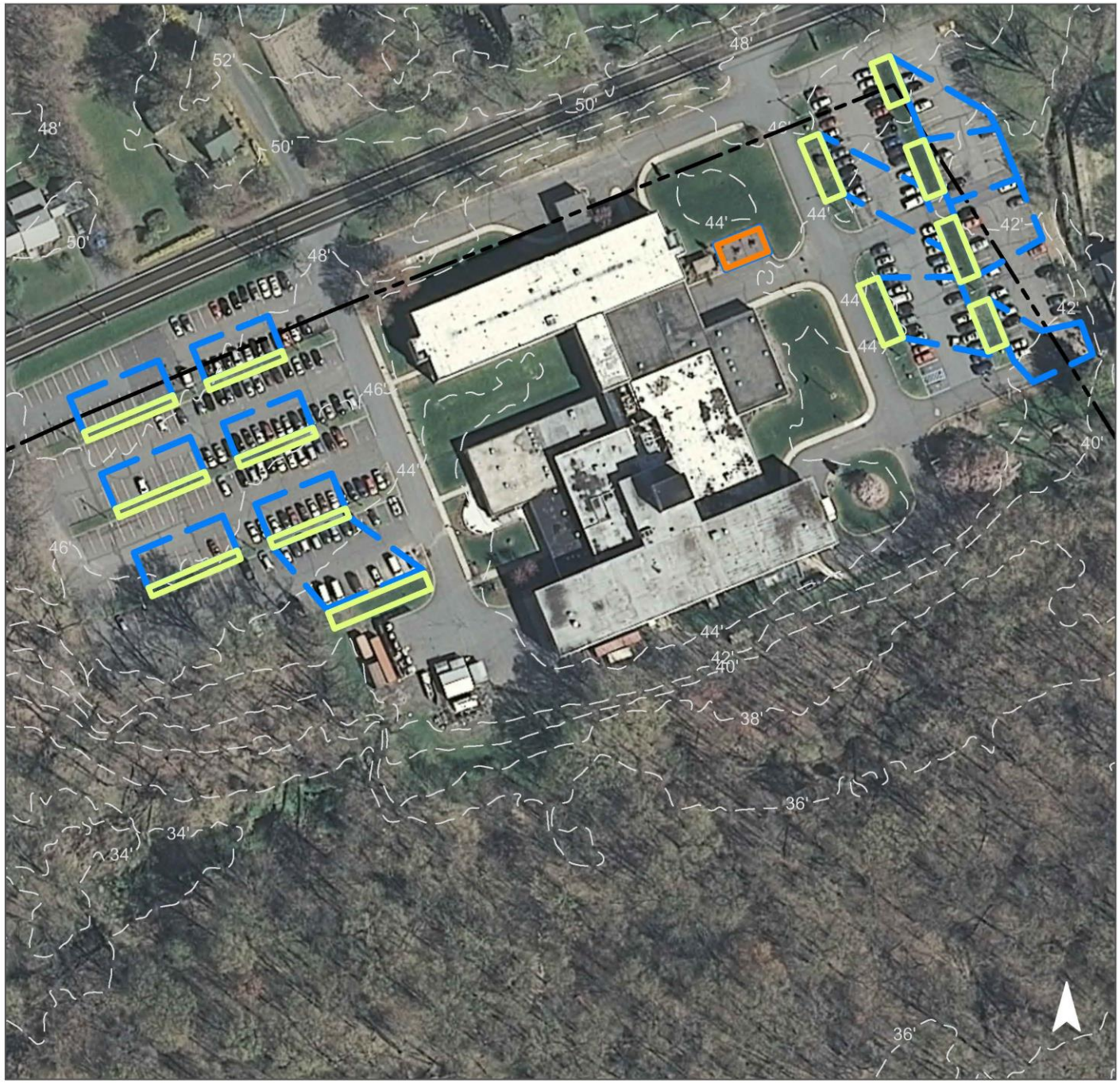
Block and Lot: Block 6, Lot 1,2,3

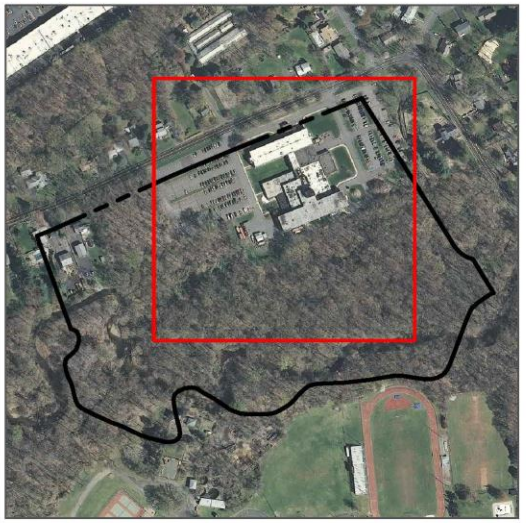
Rainwater from the parking lots surrounding the building drain toward the grass islands. Rain gardens can be installed in these areas to capture, treat, and infiltrate runoff. The picnic area near the entrance of the building can be replaced with permeable pavers to allow stormwater to infiltrate. A 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"
24	237,178	11.4	119.8	1,089.0	0.185	6.51

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	1.040	174	76,333	2.87	9,055	$45,273
Pervious pavements	0.022	4	1,578	0.06	827	$20,668

GREEN INFRASTRUCTURE RECOMMENDATIONS





Green Brook Regional Center

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

0 65' 130'

IRENE E. FELDKIRCHNER ELEMENTARY SCHOOL

Subwatershed: Green Brook

Site Area: 188,747 sq. ft.

Address: 105 Andrew Street
Green Brook, NJ 08812

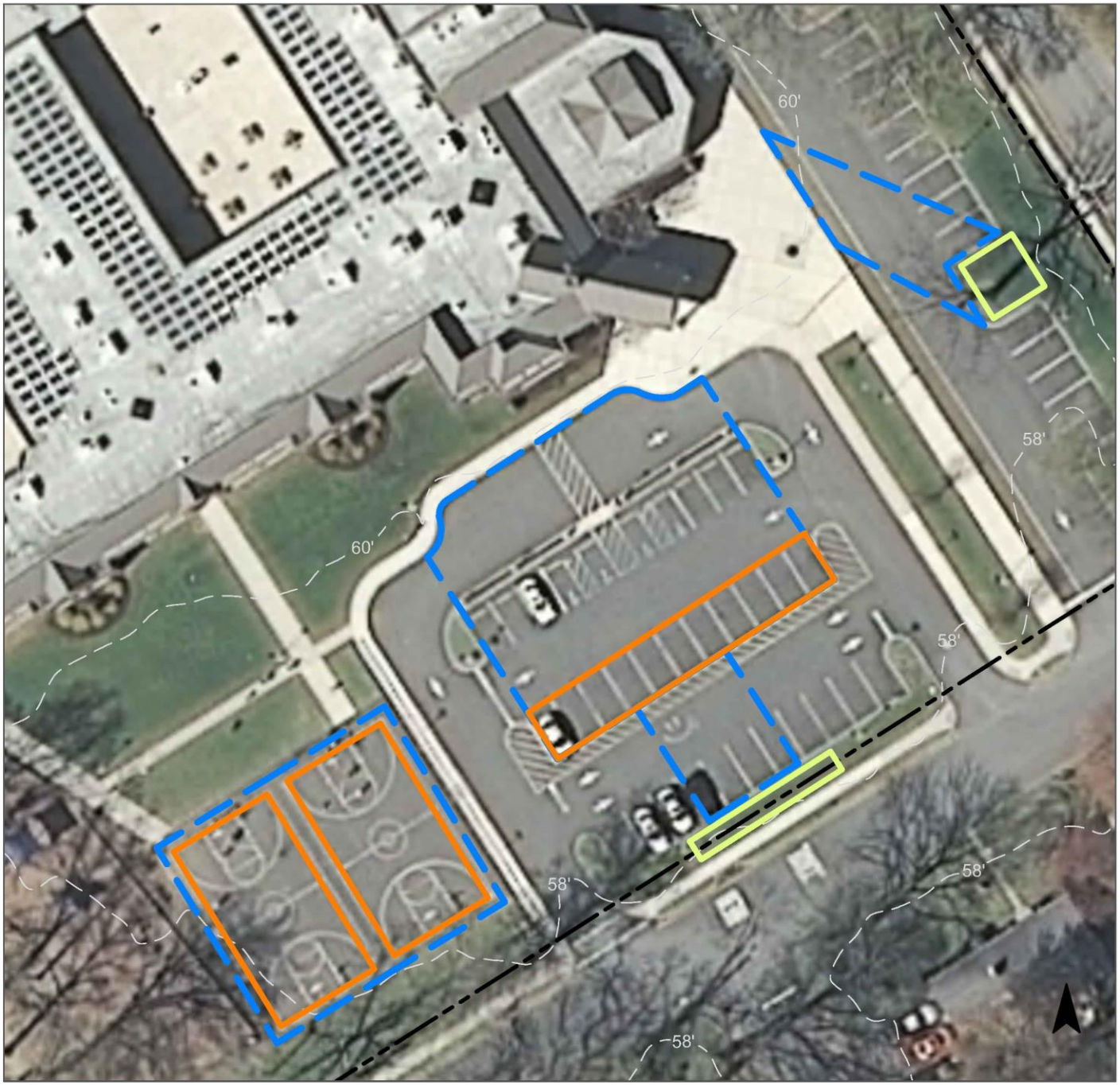
Block and Lot: Block 34,2, Lot 3,1

The parking lots, and the front entrance of the elementary school all drain toward the road. Parking spaces can be replaced with porous asphalt, and rain gardens can be installed in the turf grass areas adjacent to the parking lots to capture stormwater. The basketball courts can be replaced with pervious pavement to allow runoff to infiltrate. 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"
78	147,391	7.1	74.4	676.7	0.115	4.04

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.081	14	5,962	0.22	781	$3,905
Pervious pavements	0.417	70	30,608	1.15	6,756	$168,892

GREEN INFRASTRUCTURE RECOMMENDATIONS



Irene E. Feldkirchner Elementary School

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

0 25' 50'

US POST OFFICE: MEDEMERGE

Subwatershed: Green Brook

Site Area: 77,239 sq. ft.

Address: 1003 N Washington Ave, Green Brook, NJ 08812

Block and Lot: Block 65;66
Lot 1,3,5,9,35; 1,9

The parking lots adjacent to and behind the building drain toward lawn areas. Rain gardens can be installed in these locations to help capture, treat, and infiltrate runoff. Additional rain gardens can be built in the turf grass in front of the building to 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"
74	57,084	2.8	28.8	262.1	0.044	1.57

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	0.250	42	18,378	0.69	2,549	$12,746

GREEN INFRASTRUCTURE RECOMMENDATIONS

US Post Office: Medemerge

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

0 30' 60'

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)
GREEN BROOK SUBWATERSHED	**76.43**	**3,329,255**			**56.0**	**586.7**	**5,333.7**		**26.67**	**1,161,672**	**0.905**	**31.86**
Bowlmor Lanes												
Total Site Info	6.20	270,223	1	3,4	8.7	91.1	827.8	67	4.14	180,299	0.140	4.95
Green Brook Baptist Church												
Total Site Info	3.09	134,457	43	10	2.1	22.3	202.8	33	1.01	44,164	0.034	1.21
Green Brook Fire-EMS												
Total Site Info	0.67	28,997	52	5.02	1.3	13.9	126.2	95	0.63	27,484	0.021	0.75
Green Brook Middle School												
Total Site Info	30.27	1,318,505	92	3	18.3	192.1	1,746.4	29	8.73	380,368	0.296	10.43
Green Brook Municipal Building												
Total Site Info	5.88	256,249	52	5.01	2.7	28.0	254.8	22	1.27	55,503	0.043	1.52
Green Brook Police Department												
Total Site Info	1.47	63,839	55	4.02	1.6	16.3	147.8	50	0.74	32,201	0.025	0.88
Green Brook Regional Center												
Total Site Info	22.75	990,999	6	1,2,3	11.4	119.8	1,089.0	24	5.44	237,178	0.185	6.51
Irene E. Feldkirchner Elementary School												
Total Site Info	4.33	188,747	34,2	3,1	7.1	74.4	676.7	78	3.38	147,391	0.115	4.04
US Post Office: Medemerge												
Total Site Info	1.77	77,239	65; 66	1,3,5,9,35; 1,9	2.8	28.8	262.1	74	1.31	57,084	0.044	1.57

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	TSS Removal Potential	Max Volume Reduction Potential	Peak Discharge Reduction Potential	Size of BMP	Unit Cost	Unit	Total Cost	I.C. Treated
		Area (SF)	Area (ac)	(Mgal/yr)	(lbs/yr)	(gal/storm)	(cfs)	(SF)	($)		($)	%
	GREEN BROOK SUBWATERSHED	**243,298**	**5.59**	**6.339**	**1,061**	**457,875**	**17.49**	**65,120**			**$1,030,921**	**20.9%**
1	**Bowlmor Lanes**											
	Bioretention systems/rain gardens	24,838	0.57	0.647	108	47,453	1.79	6,210	5	SF	$31,048	13.8%
	Pervious pavements	44,839	1.03	1.168	196	85,668	3.22	8,673	25	SF	$216,828	24.9%
	Total Site Info	**69,676**	**1.60**	**1.815**	**304**	**133,121**	**5.01**	**14,883**			**$247,876**	**38.6%**
2	**Green Brook Baptist Church**											
	Bioretention systems/rain gardens	5,280	0.12	0.138	23	10,091	0.38	1,330	5	SF	$6,648	12.0%
	Pervious pavements	10,297	0.24	0.268	45	19,687	0.74	2,574	25	SF	$64,353	23.3%
	Total Site Info	**15,577**	**0.36**	**0.406**	**68**	**29,778**	**1.12**	**3,904**			**$71,001**	**35.3%**
3	**Green Brook Fire-EMS**											
	Bioretention systems/rain gardens	2,837	0.07	0.074	12	5,423	0.20	709	5	SF	$3,545	10.3%
	Pervious pavements	7,676	0.18	0.200	33	14,676	0.55	1,781	25	SF	$44,533	27.9%
	Rainwater harvesting systems	3,573	0.08	0.093	16	3,000	0.26	3,000	2	gal	$6,000	13.0%
	Total Site Info	**14,087**	**0.32**	**0.367**	**61**	**23,099**	**1.01**	**5,490**			**$54,078**	**51.3%**
4	**Green Brook Middle School**											
	Bioretention systems/rain gardens	6,339	0.15	0.165	28	12,118	0.46	1,592	5	SF	$7,960	1.7%
	Bioswales	3,342	0.08	0.087	15	6,388	0.24	833	5	SF	$4,164	0.9%
	Pervious pavements	45,635	1.05	1.189	199	87,247	3.28	10,926	25	SF	$273,143	12.0%
	Rainwater harvesting systems	1,347	0.03	0.035	6	1,000	0.10	1,000	2	gal	$2,000	0.4%
	Total Site Info	**56,664**	**1.30**	**1.476**	**247**	**106,753**	**4.08**	**14,350**			**$287,266**	**14.9%**
5	**Green Brook Municipal Building**											
	Pervious pavements	6,559	0.15	0.171	29	12,536	0.47	1,153	25	SF	$28,835	11.8%
	Rainwater harvesting systems	1,706	0.04	0.044	7	1,500	0.12	1,500	2	gal	$3,000	3.1%
	Total Site Info	**8,265**	**0.19**	**0.215**	**36**	**14,036**	**0.59**	**2,653**			**$31,835**	**14.9%**
6	**Green Brook Police Department**											
	Bioretention systems/rain gardens	1,909	0.04	0.050	8	3,650	0.14	471	5	SF	$2,355	5.9%
	Pervious pavements	7,626	0.18	0.199	33	14,579	0.55	3,401	25	SF	$85,028	23.7%
	Total Site Info	**9,535**	**0.22**	**0.248**	**42**	**18,229**	**0.69**	**3,872**			**$87,383**	**29.6%**

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 %
7	**Green Brook Regional Center**											
	Bioretention systems/rain gardens	39,925	0.92	1.040	174	76,333	2.87	9,055	5	SF	$45,273	16.8%
	Pervious pavements	827	0.02	0.022	4	1,578	0.06	827	25	SF	$20,668	0.3%
	Total Site Info	**40,752**	**0.94**	**1.062**	**178**	**77,911**	**2.93**	**9,881**			**$65,940**	**17.2%**
8	**Irene E. Feldkirchner Elementary School**											
	Bioretention systems/rain gardens	3,119	0.07	0.081	14	5,962	0.22	781	5	SF	$3,905	2.1%
	Pervious pavements	16,011	0.37	0.417	70	30,608	1.15	6,756	25	SF	$168,892	10.9%
	Total Site Info	**19,130**	**0.44**	**0.498**	**83**	**36,570**	**1.37**	**7,537**			**$172,797**	**13.0%**
9	**US Post Office: Medemerge**											
	Bioretention systems/rain gardens	9,614	0.22	0.250	42	18,378	0.69	2,549	5	SF	$12,746	16.8%
	Total Site Info	**9,614**	**0.22**	**0.250**	**42**	**18,378**	**0.69**	**2,549**			**$12,746**	**16.8%**