Draft

Impervious Cover Reduction Action Plan for Mannington Township, Salem County, New Jersey

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

December 17, 2018

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Introduction

Located in Salem County in southern New Jersey, Mannington Township covers approximately 33.7 square miles. Figures 1 and 2 illustrate that Mannington Township is dominated by agriculture land uses. A total of 5.0% of the municipality's land use is classified as urban. Of the urban land in Mannington Township, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2012 land use/land cover geographical information system (GIS) data layer categorizes Mannington 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 Mannington Township. Based upon the 2012 NJDEP land use/land cover data, approximately 1.5% of Mannington Township has impervious cover. This level of impervious cover suggests that the streams in Mannington Township are sensitive streams. [1]

Methodology

Mannington Township contains portions of four 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.

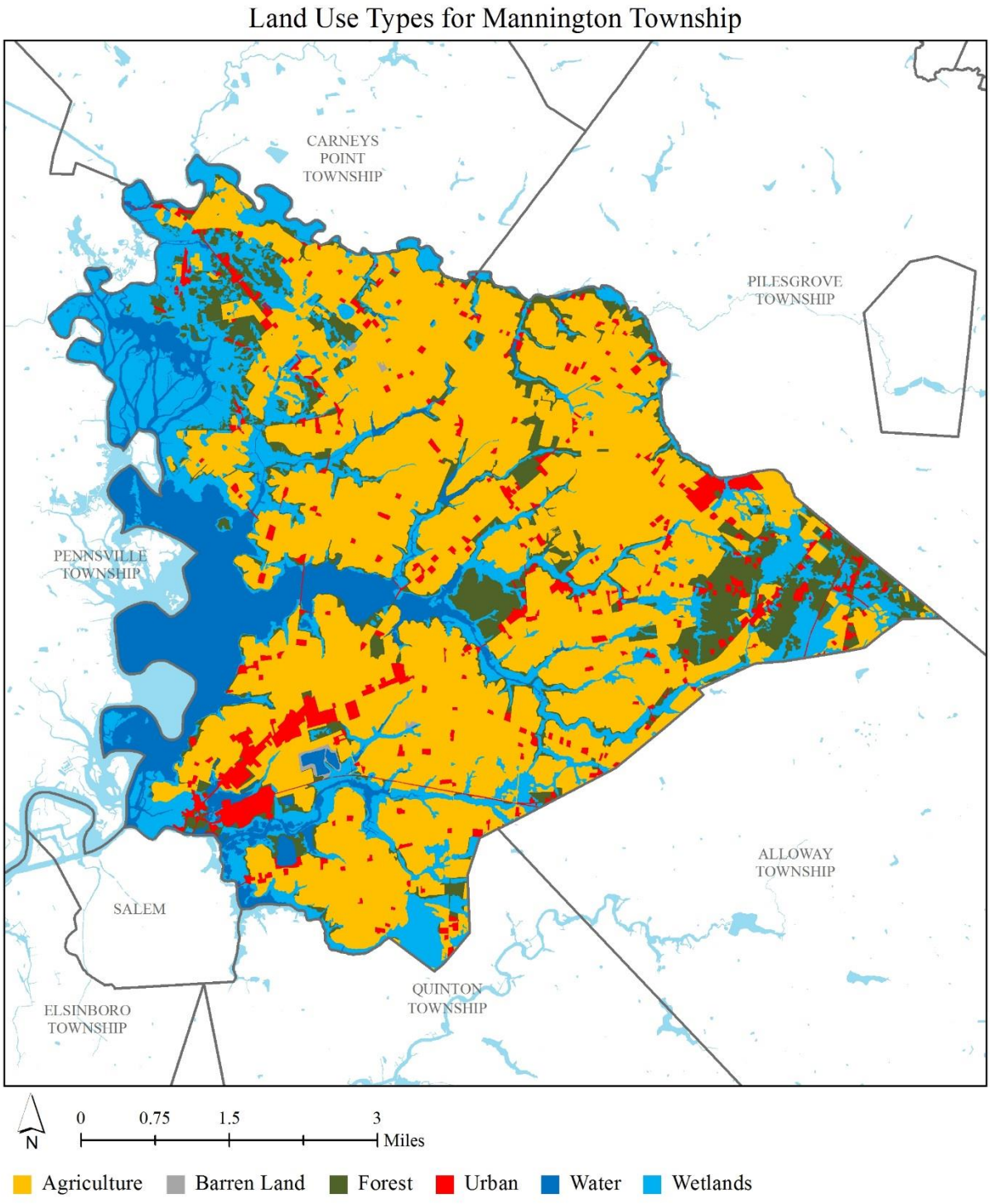


Figure 1: Map illustrating the land use in Mannington Township

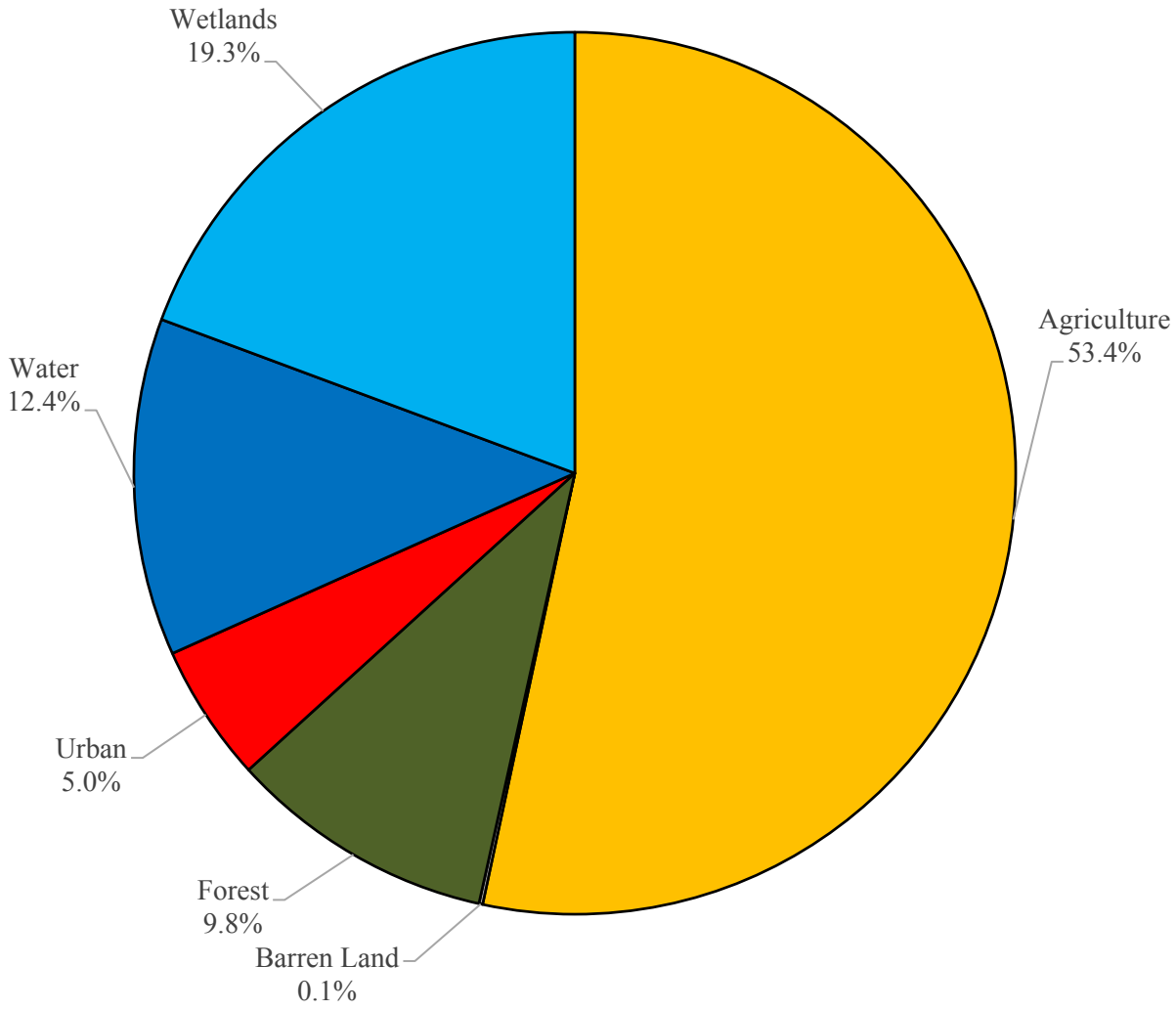


Figure 2: Pie chart illustrating the land use in Mannington Township

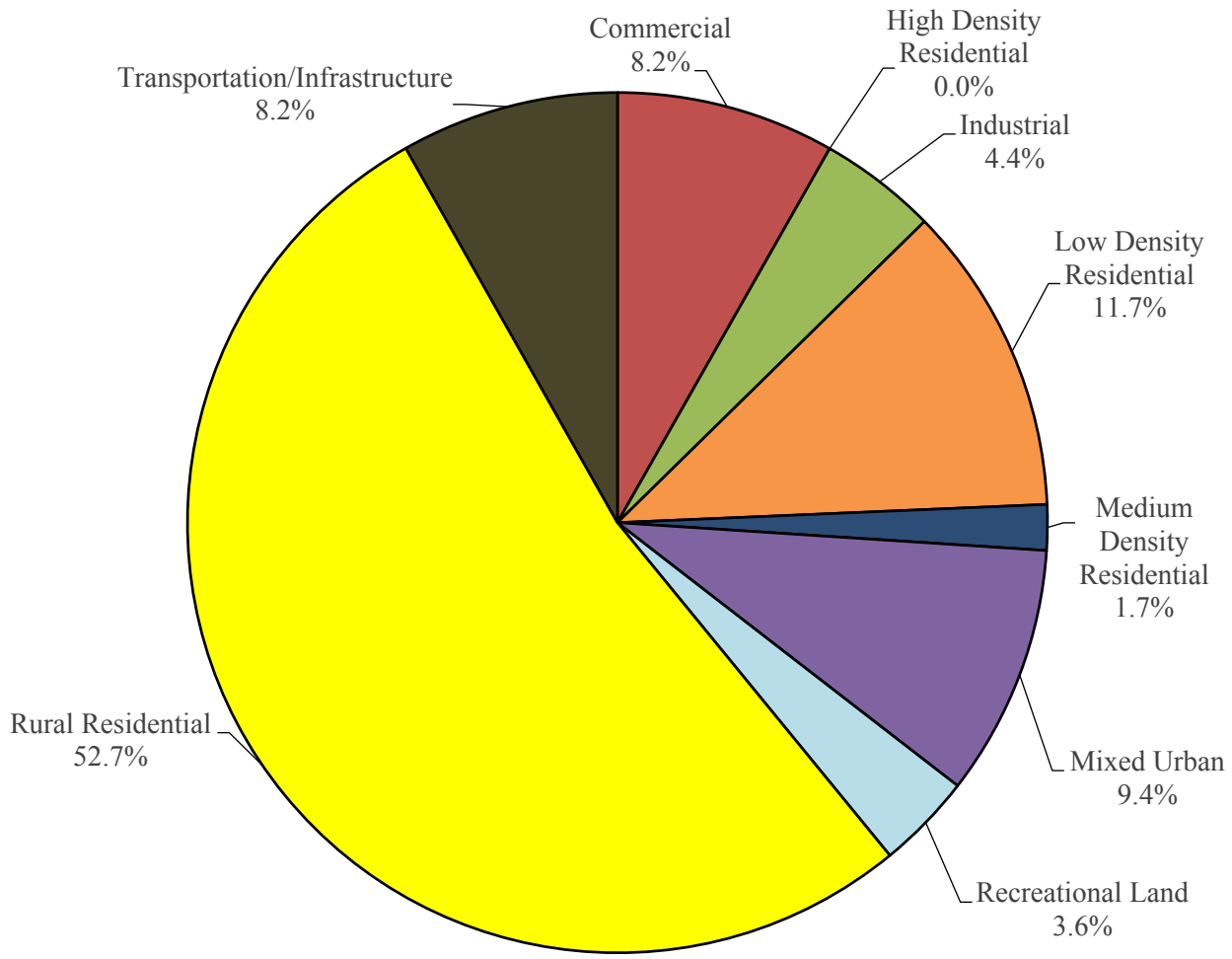


Figure 3: Pie chart illustrating the various types of urban land use in Mannington Township

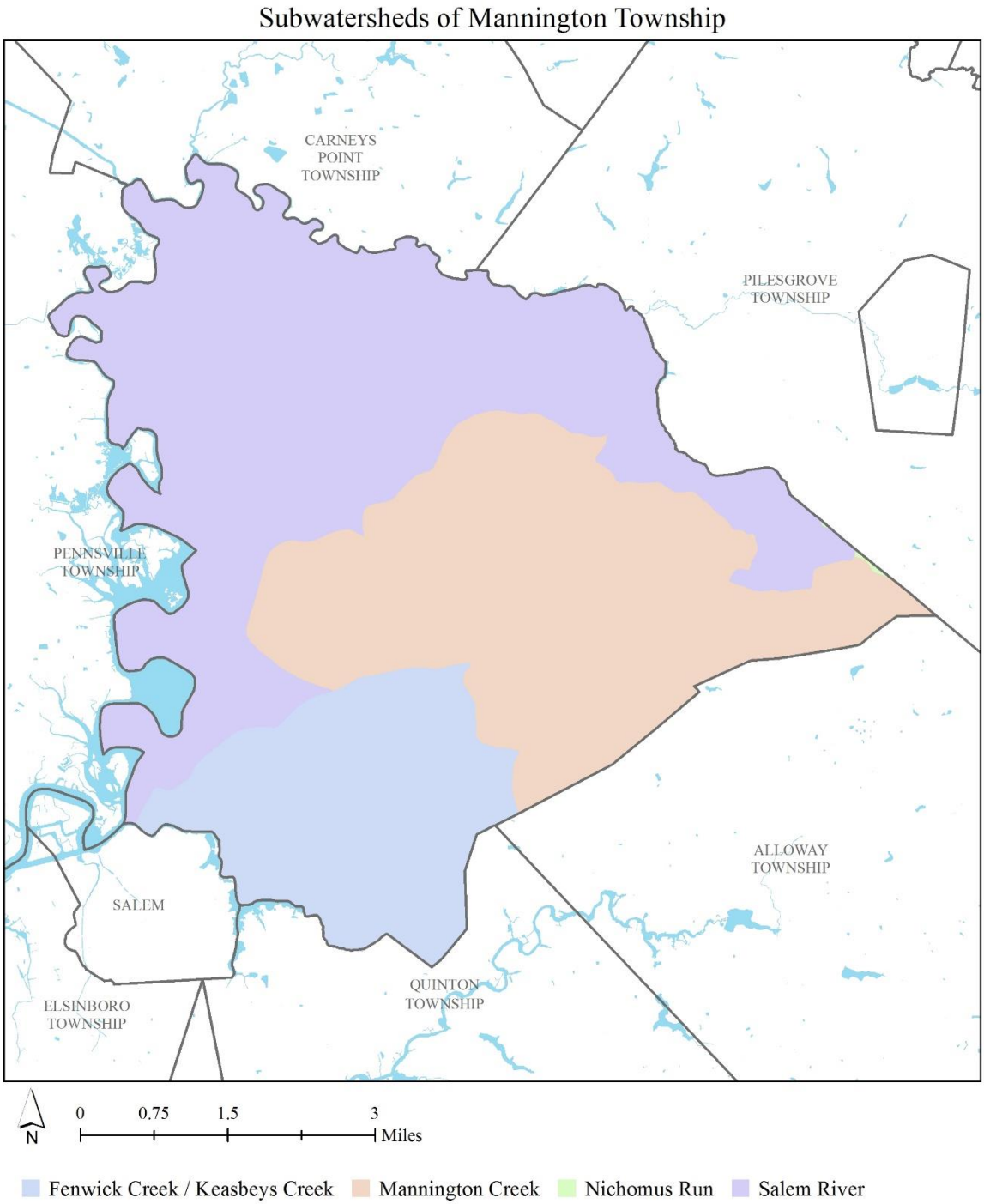


Figure 4: Map of the subwatersheds in Mannington Township

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 2012 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 Mannington 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 Mannington Township. 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 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

Appendix A contains information on potential project sites where green infrastructure practices could be installed as well as information on existing site conditions. The recommended green infrastructure practices and the drainage area that the green infrastructure practices can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, the peak reduction potential, and estimated costs 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*.

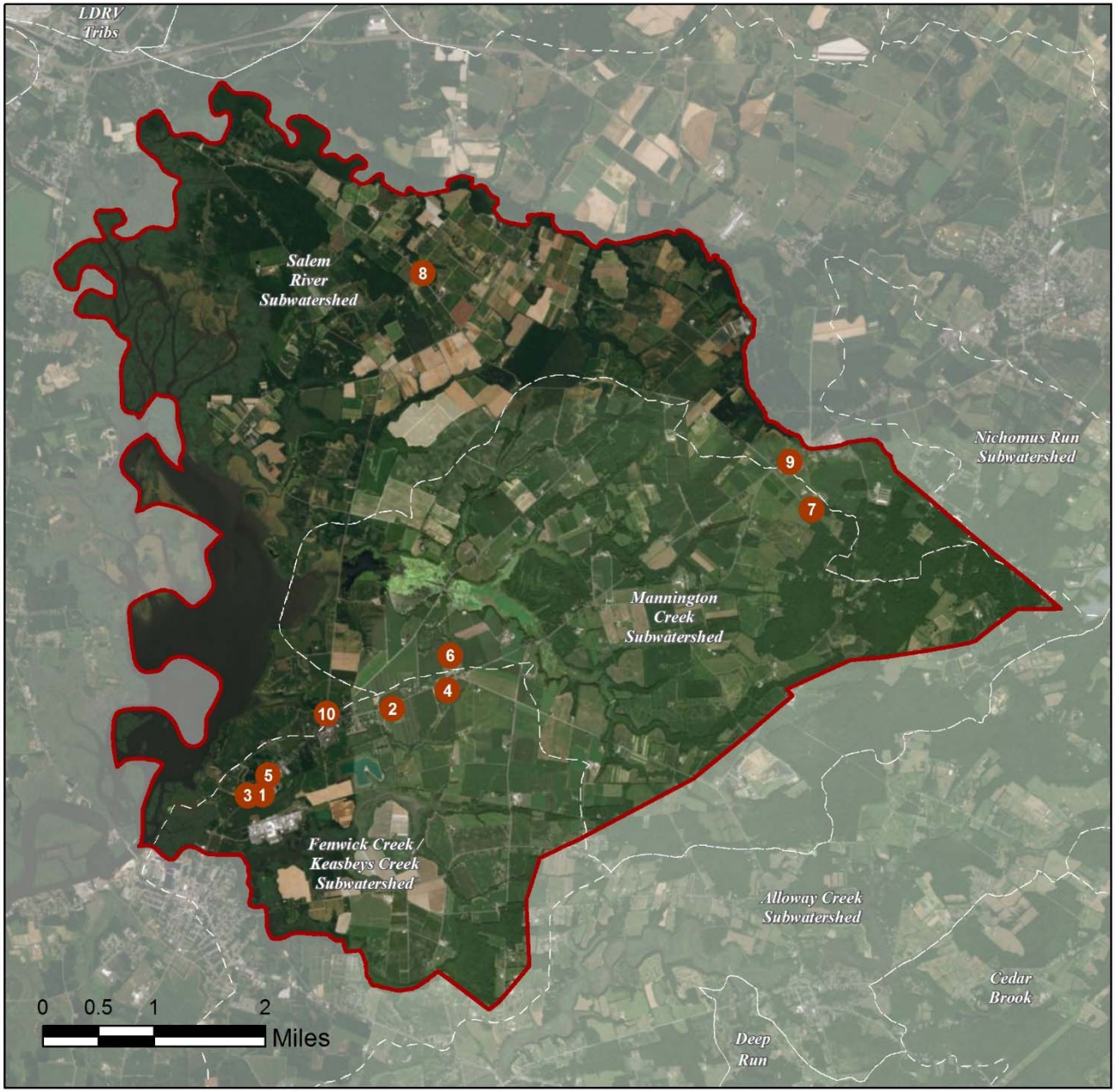
Conclusion

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. Green Infrastructure Sites

MANNINGTON TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE FENWICK CREEK / KEASBEYS CREEK SUBWATERSHED

1. Arc of Salem County
2. First Assembly of God of Salem
3. Fulton Bank of New Jersey
4. Mannington Township Clerk
5. Mannington Township Fire Company

SITES WITHIN THE MANNINGTON CREEK SUBWATERSHED

6. Mannington Township School District
7. Rutgers Cooperative Extension Salem County Office / Salem County Special Services

SITES WITHIN THE SALEM RIVER SUBWATERSHED

8. Haines Neck United Methodist Church
9. Salem County Vocational Technical School District
10. Salem Medical Group

b. Proposed Green Infrastructure Concepts

Arc of Salem County

Subwatershed: Fenwick Creek / Keasbeys Creek

Site Area: 283,116 sq. ft.

Address: 150 NJ-45
Salem, NJ 08079

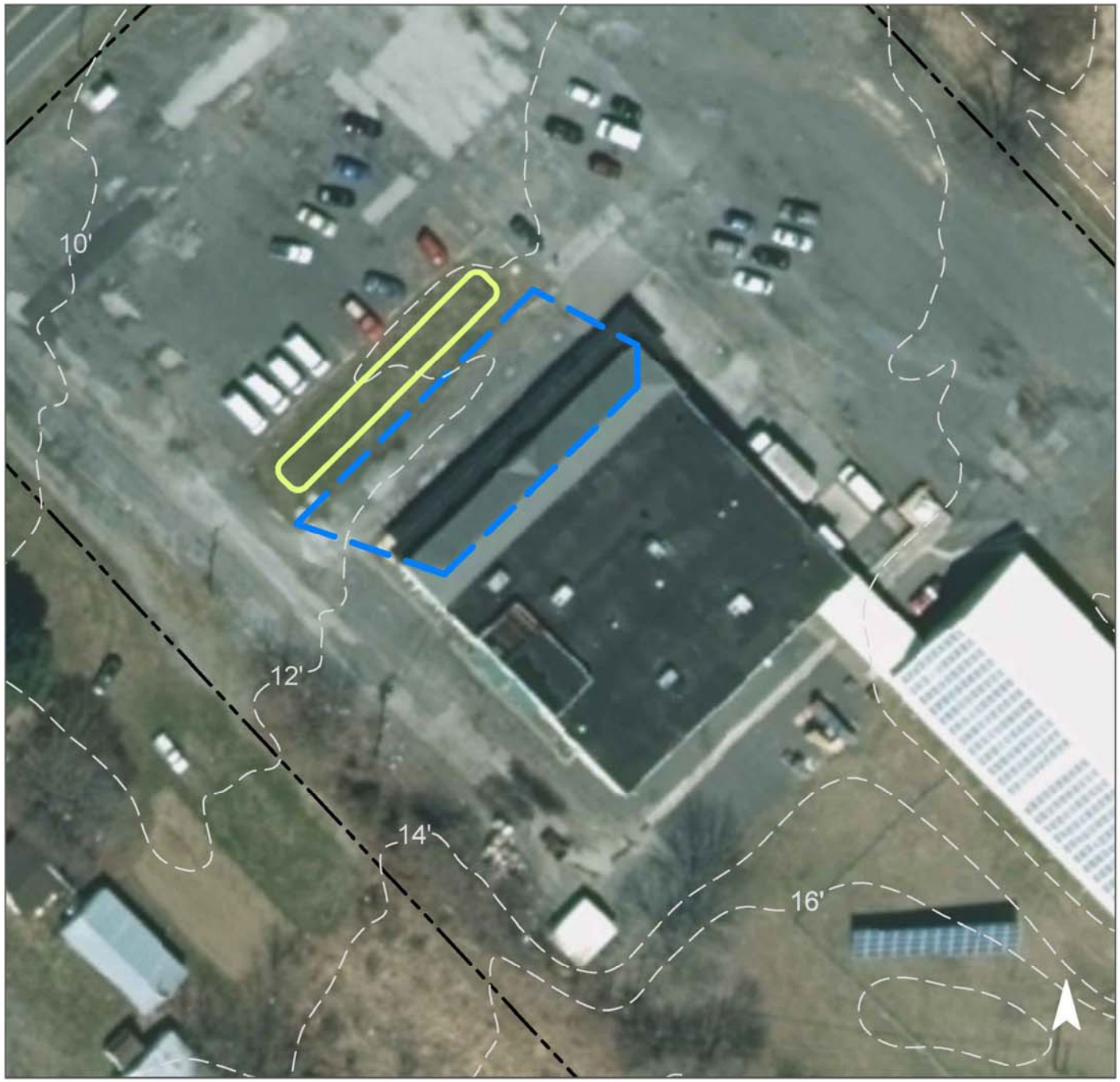
Block and Lot: Block 61, Lot 1

A rain garden can be installed in the island in the parking lot to capture, treat, and infiltrate stormwater runoff from the roof and parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
51	144,606	7	73	663.9	0.113	3.97

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 system	0.158	27	11,624	0.44	1,520	$7,600

GREEN INFRASTRUCTURE RECOMMENDATIONS



Arc of Salem County

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

First Assembly of God of Salem

Subwatershed: Fenwick Creek / Keasbeys Creek

Site Area: 265,152 sq. ft.

Address: 430 Salem Woodstown Road
Salem, NJ 08079

Block and Lot: Block 47, Lot 2

A rain garden can be installed in front of the building to capture, treat, and infiltrate stormwater runoff from the roof. 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"
23	61,216	3.0	30.9	281.1	0.048	1.68

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 system	0.131	22	9,597	0.36	1,275	$6,375

GREEN INFRASTRUCTURE RECOMMENDATIONS

First Assembly of God

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Fulton Bank of New Jersey

Subwatershed: Fenwick Creek / Keasbeys Creek

Site Area: 137,306 sq. ft.

Address: 125 Salem Woodstown Road
Salem, NJ 08079

Block and Lot: Block 63, Lot 26

A section of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot and part of the roof. 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"
27	37,334	1.8	18.9	171.4	0.029	1.02

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 pavement	0.338	57	24,819	0.93	2,750	$64,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Fulton Bank of New Jersey

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Mannington Township Clerk

Subwatershed: Fenwick Creek / Keasbeys Creek

Site Area: 42,882 sq. ft.

Address: 491 NJ-45
Salem, NJ 08079

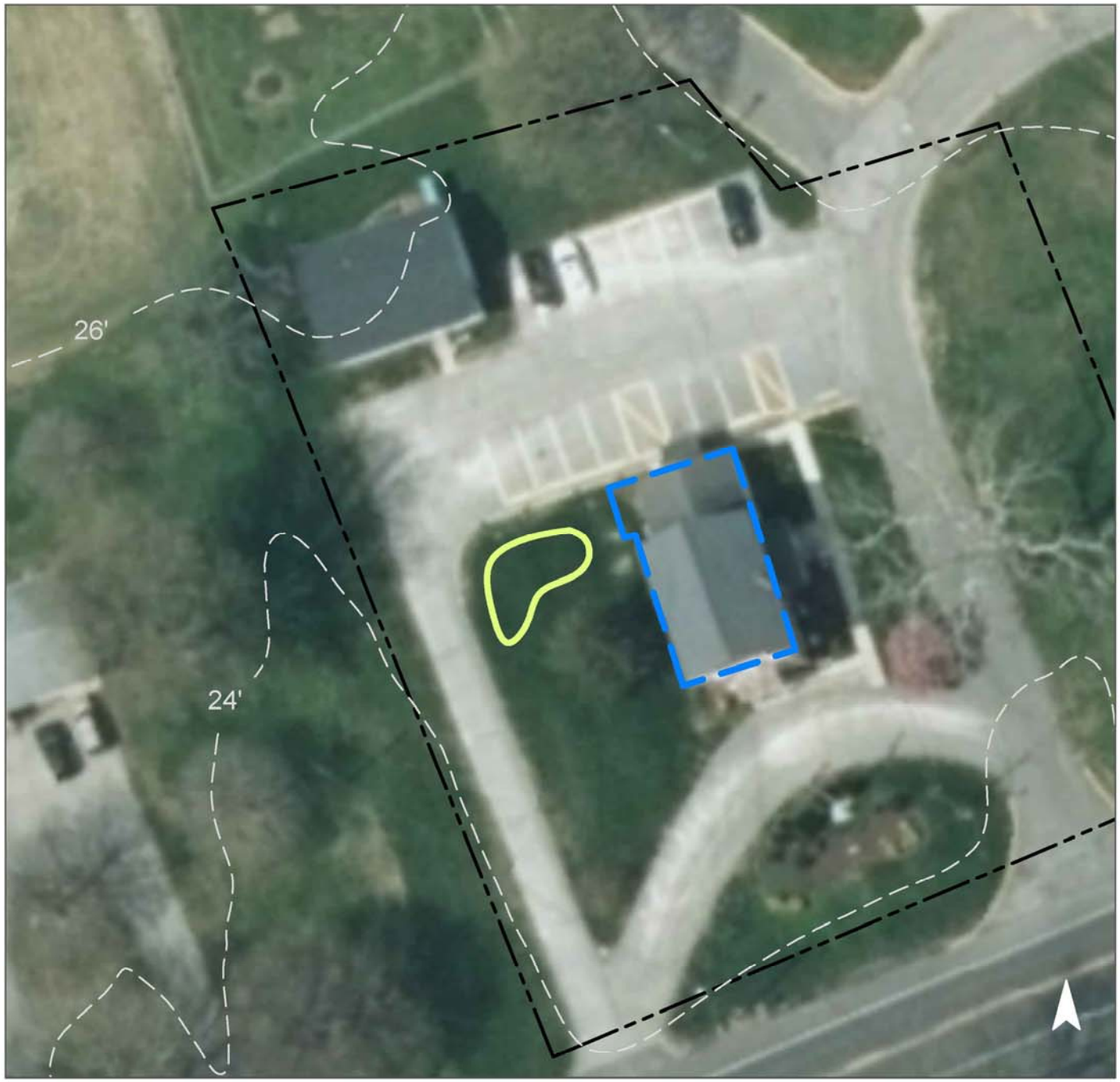
Block and Lot: Block 39, Lot 8

A rain garden can be installed in the turfgrass to capture, treat, and infiltrate stormwater runoff from the roof. The garden can also serve as a demonstration project in the municipality. 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"
49	21,203	1.0	10.7	97.4	0.017	0.58

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 system	0.045	8	3,329	0.13	435	$2,175

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mannington Township Clerk

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 20' 40'

Mannington Township Fire Company

Subwatershed: Fenwick Creek / Keasbeys Creek

Site Area: 18,887 sq. ft.

Address: 175 NJ-45
Mannington, NJ 08079

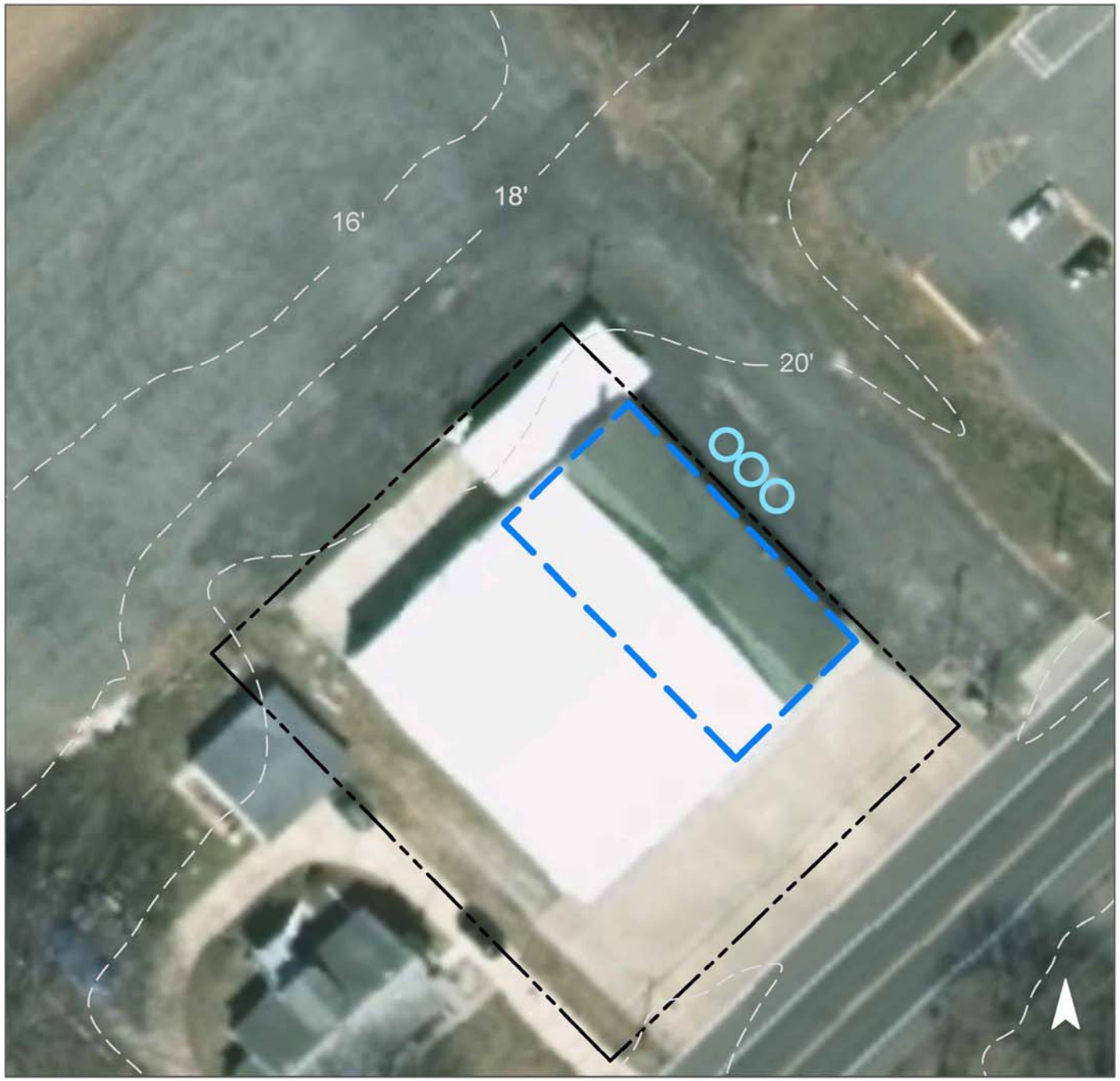
Block and Lot: Block 62, Lot 12

Three cisterns can be installed on the north side of the building to capture stormwater runoff from the roof. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses. 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	11,732	0.6	5.9	53.9	0.009	0.32

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
Rainwater harvesting	0.098	16	3,000	0.22	3,000 (gal)	$6,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mannington Township Fire Company

- rainwater harvesting
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 20' 40'

Mannington Township School District

Subwatershed: Mannington Creek

Site Area: 508,321 sq. ft.

Address: 495 NJ-45
Salem, NJ 08079

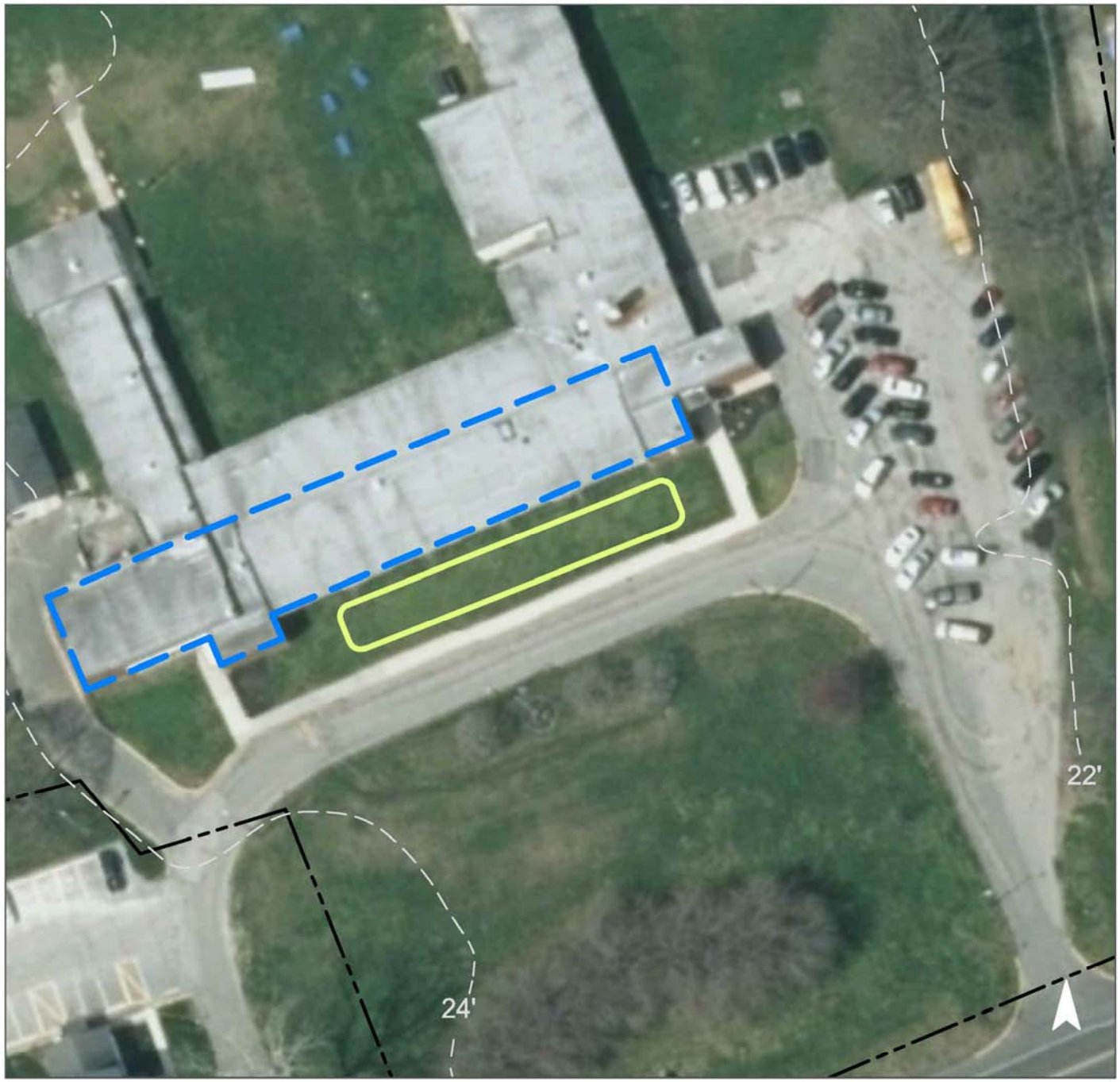
Block and Lot: Block 39, Lot 9

A rain garden can be installed in the turfgrass area at the front of the building to capture, treat, and infiltrate stormwater runoff from the roof. 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"
15	78,215	3.8	39.5	359.1	0.061	2.15

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 system	0.272	46	19,957	0.75	2,610	$13,050

GREEN INFRASTRUCTURE RECOMMENDATIONS



Mannington Township School District

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Rutgers Cooperative Extension Salem County Office / Salem County Special Services

Subwatershed: Mannington Creek

Site Area: 7,353,349 sq. ft.

Address: 51 Cheney Road
Woodstown, NJ 08098

Block and Lot: Block 6, Lot 2

At the Cooperative Extension building, the sidewalk at the entrance can be converted to porous pavement to capture and infiltrate stormwater runoff from the roof of the building. At the County Special Services building, a rain garden can be installed in the turfgrass island to capture, treat, and infiltrate stormwater runoff from the surrounding parking lot. 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"
9	634,696	30.6	320.6	2,914.1	0.495	17.41

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 system	0.037	6	8,542	0.41	5,640	$28,200
Pervious pavement	0.255	43	18,737	0.70	1,750	$43,750

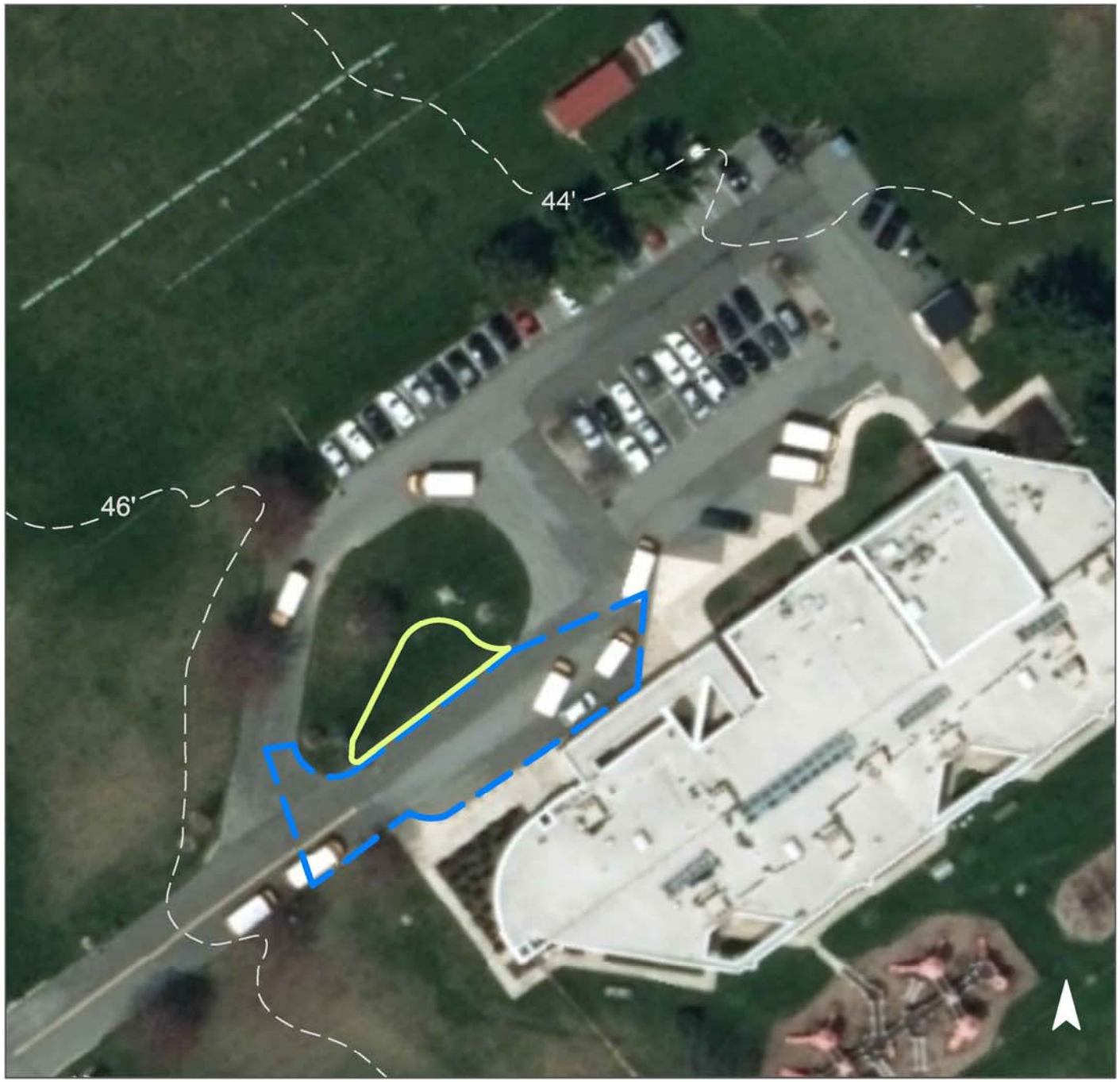
GREEN INFRASTRUCTURE RECOMMENDATIONS

Rutgers Cooperative Extension Salem County Office

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

GREEN INFRASTRUCTURE RECOMMENDATIONS



Salem County Special Services

- bioretention system
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Haines Neck United Methodist Church

Subwatershed: Salem River

Site Area: 85,047 sq. ft.

Address: 231 Haines Neck Road
Mannington, NJ 08079

Block and Lot: Block 2, Lot 9

A rain garden can be installed behind the entrance sign to capture, treat, and infiltrate stormwater runoff from the drop-off circle. A section of parking spaces can be converted to porous pavement to capture and infiltrate runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
45	38,269	1.8	19.3	175.7	0.030	1.05

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 system	0.04	0.043	7	3,134	0.12	$2,050
Pervious pavement	0.16	0.181	30	13,277	0.50	$31,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Haines Neck United Methodist Church

- bioretention system
- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

Salem County Vocational Technical School District

Subwatershed: Salem River

Site Area: 1,427,929 sq. ft.

Address: 880 NJ-45
Pilesgrove, NJ 08098

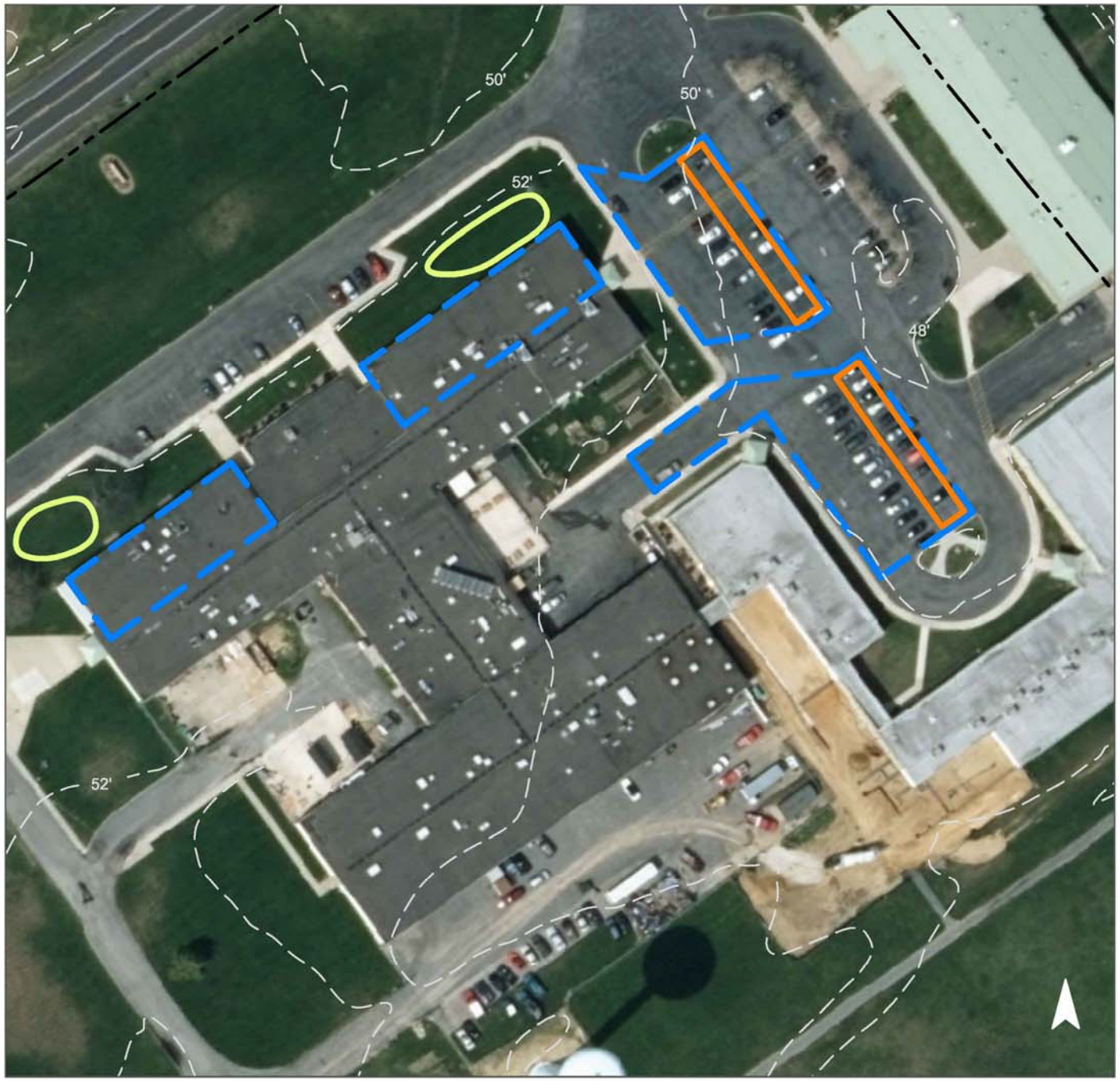
Block and Lot: Block 6, Lot 1

Rain gardens can be installed in the turfgrass near the road to capture, treat, and infiltrate stormwater runoff from the parking lot. Two sections of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. 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"
25	354,419	17.1	179	1,627.3	0.276	9.72

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	0.364	61	26,726	1.00	3,495	$17,475
Pervious pavement	0.617	103	44,424	1.67	4,805	$120,125

GREEN INFRASTRUCTURE RECOMMENDATIONS



Salem County Vocational Technical School District

- bioretention system
- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 50' 100'

Salem Medical Group

Subwatershed: Salem River

Site Area: 107,474 sq. ft.

Address: 8 Bypass Road
Salem, NJ 08079

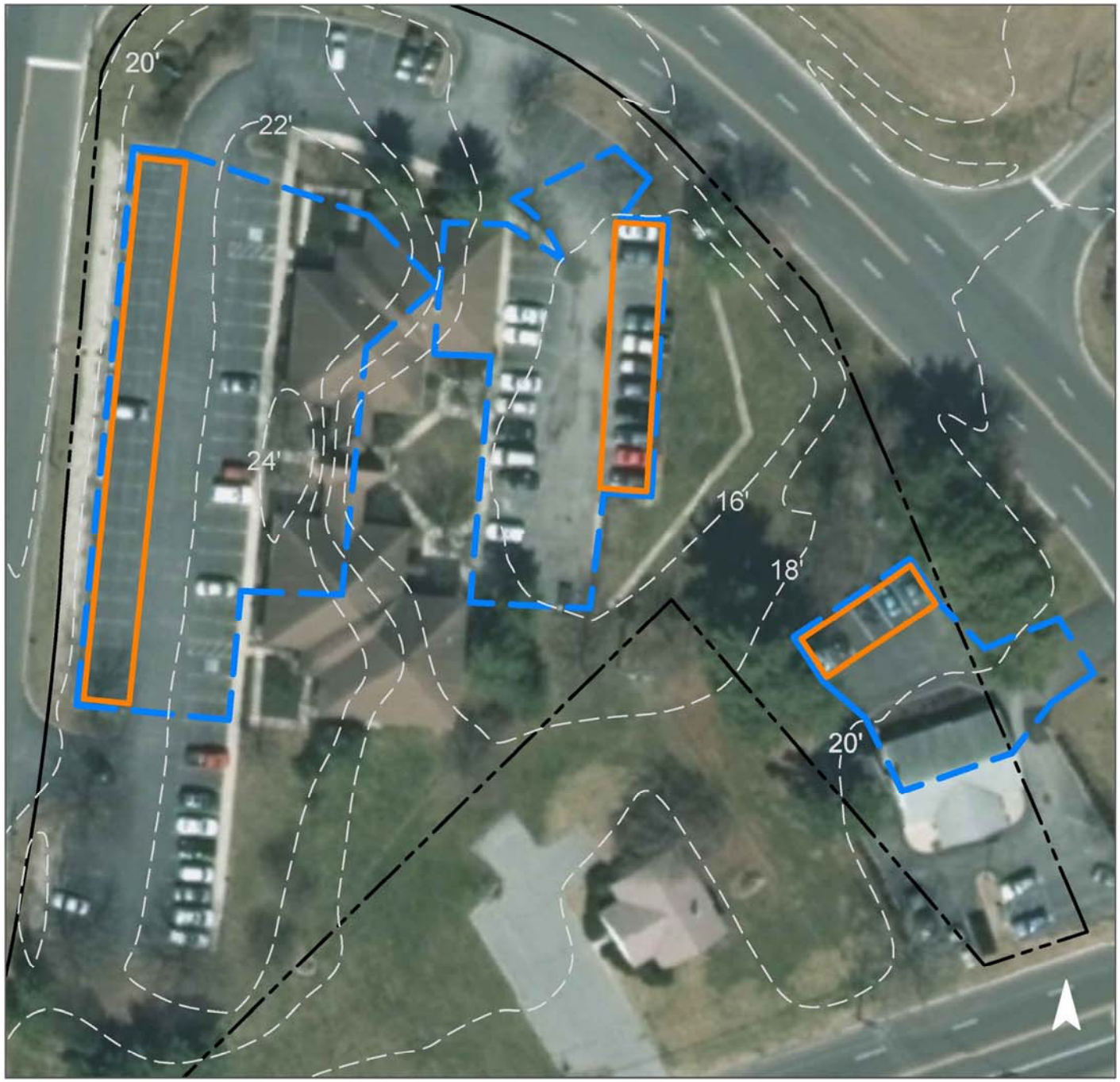
Block and Lot: Block 38.01; 49.01, Lots 1; 2

Three sections of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the various parking lot and roof areas on the property. 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	71,841	3.5	36.3	329.8	0.056	1.97

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 pavement	0.950	159	69,684	2.62	6,940	$173,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Salem Medical Group

- pervious pavement
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 30' 60'

c. Summary of Existing Conditions

Summary of Exsisting Site Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			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)
	FENWICK CREEK / KEASBEYS CREEK SUBWATERSHED	**28.62**	**1,246,730**				**8.12**	**353,753**	**17.1**	**178.7**	**1,624.2**	**0.276**	**9.70**
1	**Arc of Salem County**												
	Total Site Info	6.50	283,116	61	1	51	3.32	144,606	7.0	73.0	663.9	0.113	3.97
2	**First Assembly of God of Salem**												
	Total Site Info	6.09	265,152	47	2	23	1.41	61,216	3.0	30.9	281.1	0.048	1.68
3	**Fulton Bank of New Jersey**												
	Total Site Info	3.15	137,306	63	26	27	0.86	37,334	1.8	18.9	171.4	0.029	1.02
4	**Mannington Township Clerk**												
	Total Site Info	0.80	34,653	39	8	60	0.48	20,792	1.0	10.5	95.5	0.016	0.57
5	**Mannington Township Fire Company**												
	Total Site Info	0.43	18,887	62	12	62	0.27	11,732	0.6	5.9	53.9	0.009	0.32
6	**Mannington Township School District**												
	Total Site Info	11.65	507,615	39	9	15	1.79	78,074	3.8	39.4	358.5	0.061	2.14
	SALEM RIVER SUBWATERSHED	**209.70**	**9,134,410**				**27.10**	**1,180,407**	**56.9**	**596.2**	**5,419.7**	**0.920**	**32.37**
7	**Haines Neck United Methodist Chruch**												
	Total Site Info	1.95	85,047	2	9	45	0.88	38,269	1.8	19.3	175.7	0.030	1.05
8	**Salem Rutger COOP**												
	Total Site Info	3.73	162,366	6	2	50	1.86	81,183	3.9	41.0	372.7	0.063	2.23
9	**Salem County Special Services**												
	Total Site Info	168.77	7,351,595	6	2	9	14.57	634,696	30.6	320.6	2,914.1	0.495	17.41
10	**Salem County Vocational Technical School District**												
	Total Site Info	32.78	1,427,929	6	1	25	8.14	354,419	17.1	179.0	1,627.3	0.276	9.72
11	**Salem Medical Group**												
	Total Site Info	2.47	107,474	38.01	1	67	1.65	71,841	3.5	36.3	329.8	0.056	1.97

d. Summary of Proposed Green Infrastructure Practices

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	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	FENWICK CREEK / KEASBEYS CREEK SUBWATERSHED	**29,590**	**0.68**	**0.771**	**129**	**52,368**	**2.08**				**$86,400**	**10.7%**
1	**Arc of Salem County**											
	Bioretention system	6,080	0.14	0.158	27	11,624	0.44	1,520	$5	SF	$7,600	4.2%
	Total Site Info	**6,080**	**0.14**	**0.158**	**27**	**11,624**	**0.44**				**$7,600**	**4.2%**
2	**First Assembly of God of Salem**											
	Bioretention system	5,020	0.12	0.131	22	9,597	0.36	1,275	$5	SF	$6,375	8.2%
	Total Site Info	**5,020**	**0.12**	**0.131**	**22**	**9,597**	**0.36**				**$6,375**	**8.2%**
3	**Fulton Bank of New Jersey**											
	Pervious pavement	12,980	0.30	0.338	57	24,819	0.93	2,570	$25	SF	$64,250	34.8%
	Total Site Info	**12,980**	**0.30**	**0.338**	**57**	**24,819**	**0.93**				**$64,250**	**34.8%**
4	**Mannington Township Clerk**											
	Bioretention system	1,740	0.04	0.045	8	3,329	0.13	435	$5	SF	$2,175	8.2%
	Total Site Info	**1,740**	**0.04**	**0.045**	**8**	**3,329**	**0.13**				**$2,175**	**8.2%**
5	**Mannington Township Fire Company**											
	Rainwater harvesting	3,770	0.09	0.098	16	3,000	0.22	3,000	$2	gal	$6,000	32.1%
	Total Site Info	**3,770**	**0.09**	**0.098**	**16**	**3,000**	**0.22**				**$6,000**	**32.1%**
	MANNINGTON CREEK SUBWATERSHED	**11,850**	**0.27**	**0.309**	**52**	**28,499**	**1.16**				**$41,250**	**1.7%**
6	**Mannington Township School District**											
	Bioretention system	10,440	0.24	0.272	46	19,957	0.75	2,610	$5	SF	$13,050	13.3%
	Total Site Info	**10,440**	**0.24**	**0.272**	**46**	**19,957**	**0.75**				**$13,050**	**13.3%**
7	**Rutgers Cooperative Extension Salem County Office / Salem County Special Services**											
	Bioretention system	1,410	0.03	0.037	6	8,542	0.41	5,640	$5	SF	$28,200	0.2%
	Pervious pavement	9,800	0.22	0.255	43	18,737	0.70	1,750	$25	SF	$43,750	1.5%
	Total Site Info	**1,410**	**0.03**	**0.037**	**6**	**8,542**	**0.41**				**$28,200**	**0.2%**

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	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	SALEM RIVER SUBWATERSHED	**67,075**	**1.54**	**1.748**	**293**	**127,384**	**4.79**				**$324,625**	**14.4%**
8	**Haines Neck United Methodist Chruch**											
	Bioretention system	1,640	0.04	0.043	7	3,134	0.12	410	$5	SF	$2,050	4.3%
	Pervious pavement	6,945	0.16	0.181	30	13,277	0.50	1,240	$25	SF	$31,000	18.1%
	Total Site Info	**6,945**	**0.16**	**0.181**	**30**	**13,277**	**0.50**				**$31,000**	**18.1%**
9	**Salem County Vocational Technical School District**											
	Bioretention systems	13,980	0.32	0.364	61	26,726	1.00	3,495	$5	SF	$17,475	3.9%
	Pervious pavement	23,680	0.54	0.617	103	44,424	1.67	4,805	$25	SF	$120,125	6.7%
	Total Site Info	**23,680**	**0.54**	**0.617**	**103**	**44,424**	**1.67**				**$120,125**	**6.7%**
10	**Salem Medical Group**											
	Pervious pavement	36,450	0.84	0.950	159	69,684	2.62	6,940	$25	SF	$173,500	50.7%
	Total Site Info	**36,450**	**0.84**	**0.950**	**159**	**69,684**	**2.62**				**$173,500**	**50.7%**