Draft

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

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

December 17, 2018

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Introduction

Located in Salem County, New Jersey, Pittsgrove Township covers approximately 45.1 square miles. Figures 1 and 2 illustrate that Pittsgrove Township is dominated by forest. A total of 16.6% of the municipality's land use is classified as urban. Of the urban land in Pittsgrove 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 Pittsgrove 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 Pittsgrove Township. Based upon the 2012 NJDEP land use/land cover data, approximately 2.7% of Pittsgrove Township has impervious cover. This level of impervious cover suggests that the streams in Pittsgrove Township are sensitive streams. [1]

Methodology

Pittsgrove Township contains portions of seven 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.

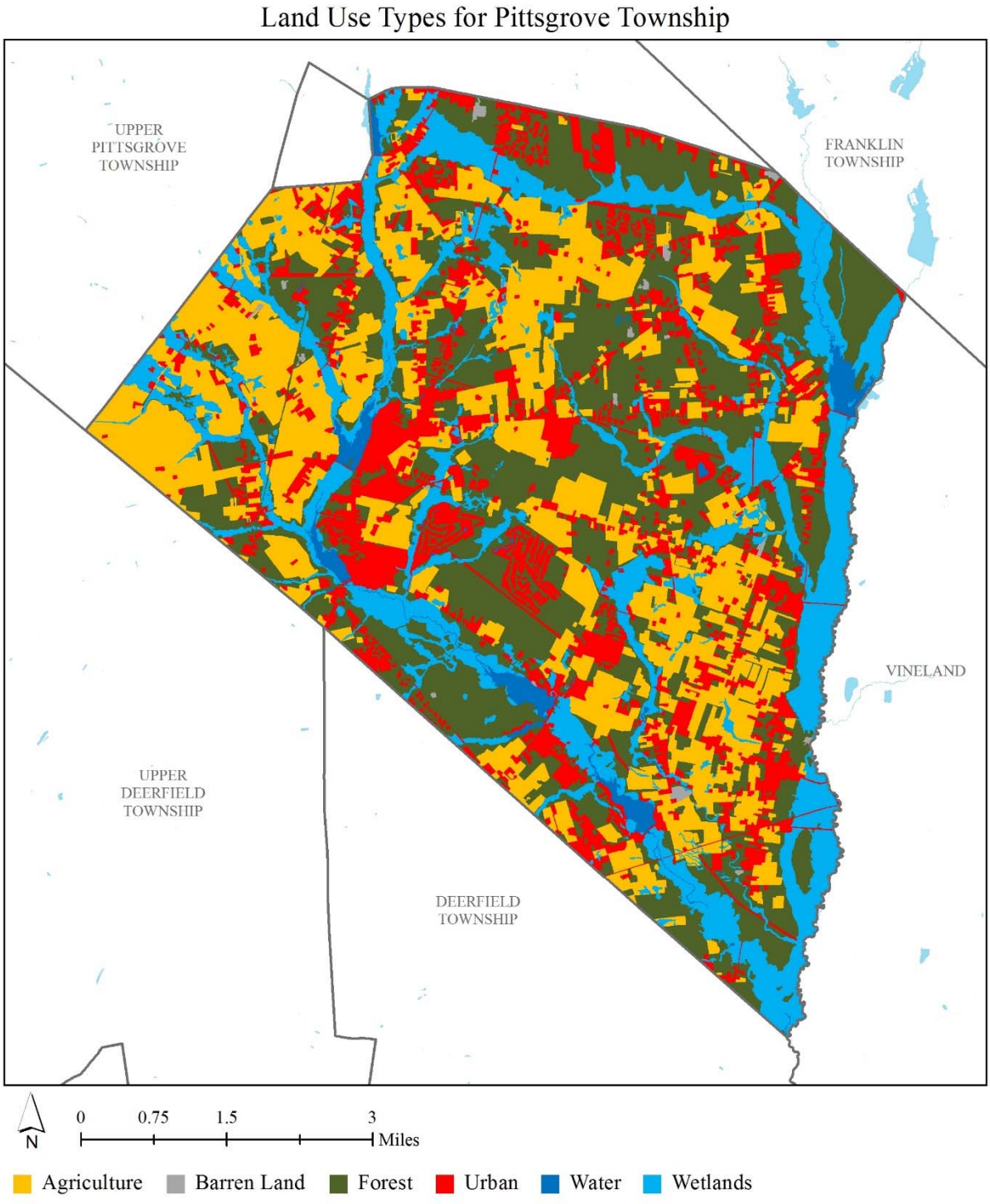


Figure 1: Map illustrating the land use in Pittsgrove Township

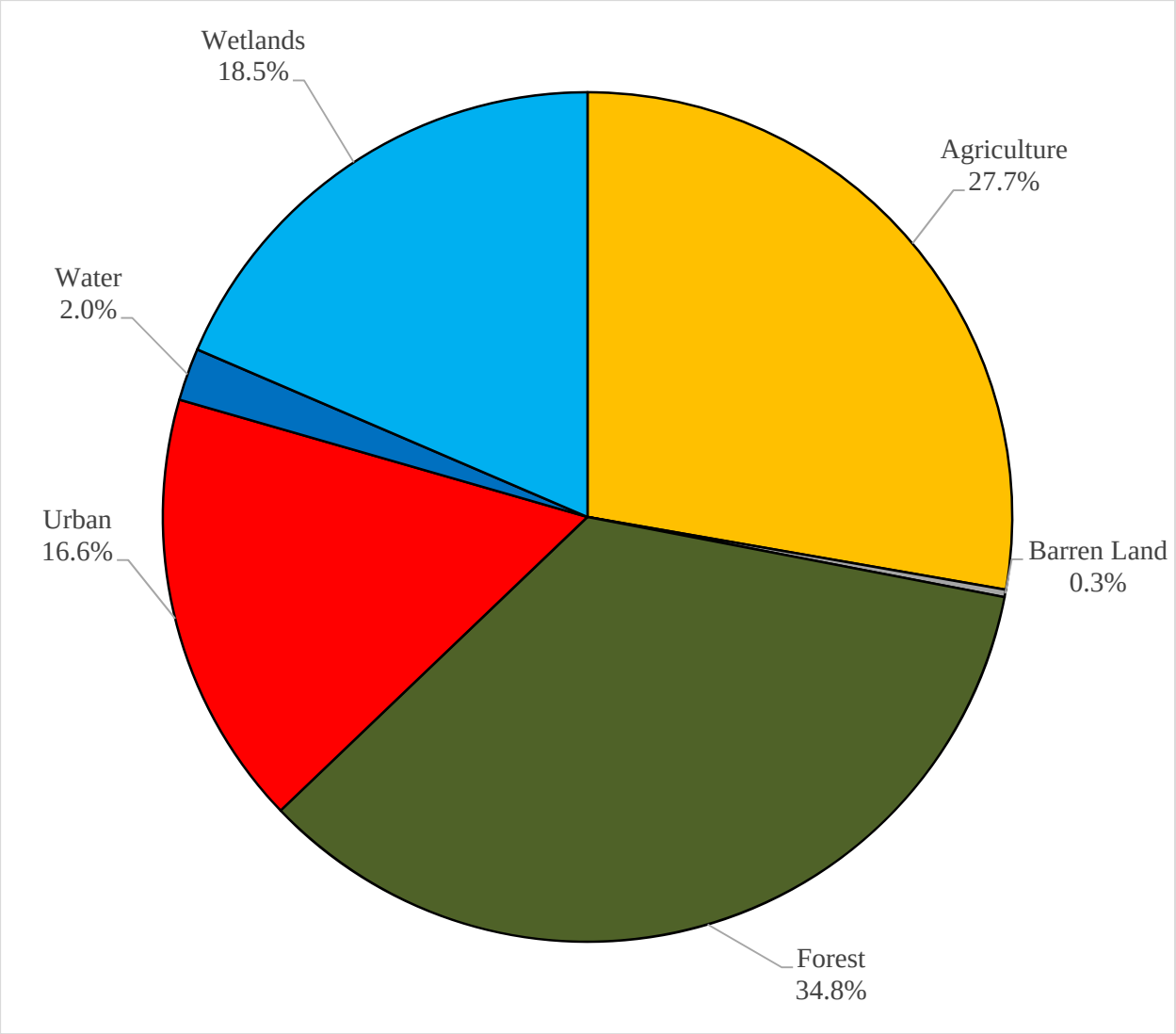


Figure 2: Pie chart illustrating the land use in Pittsgrove Township

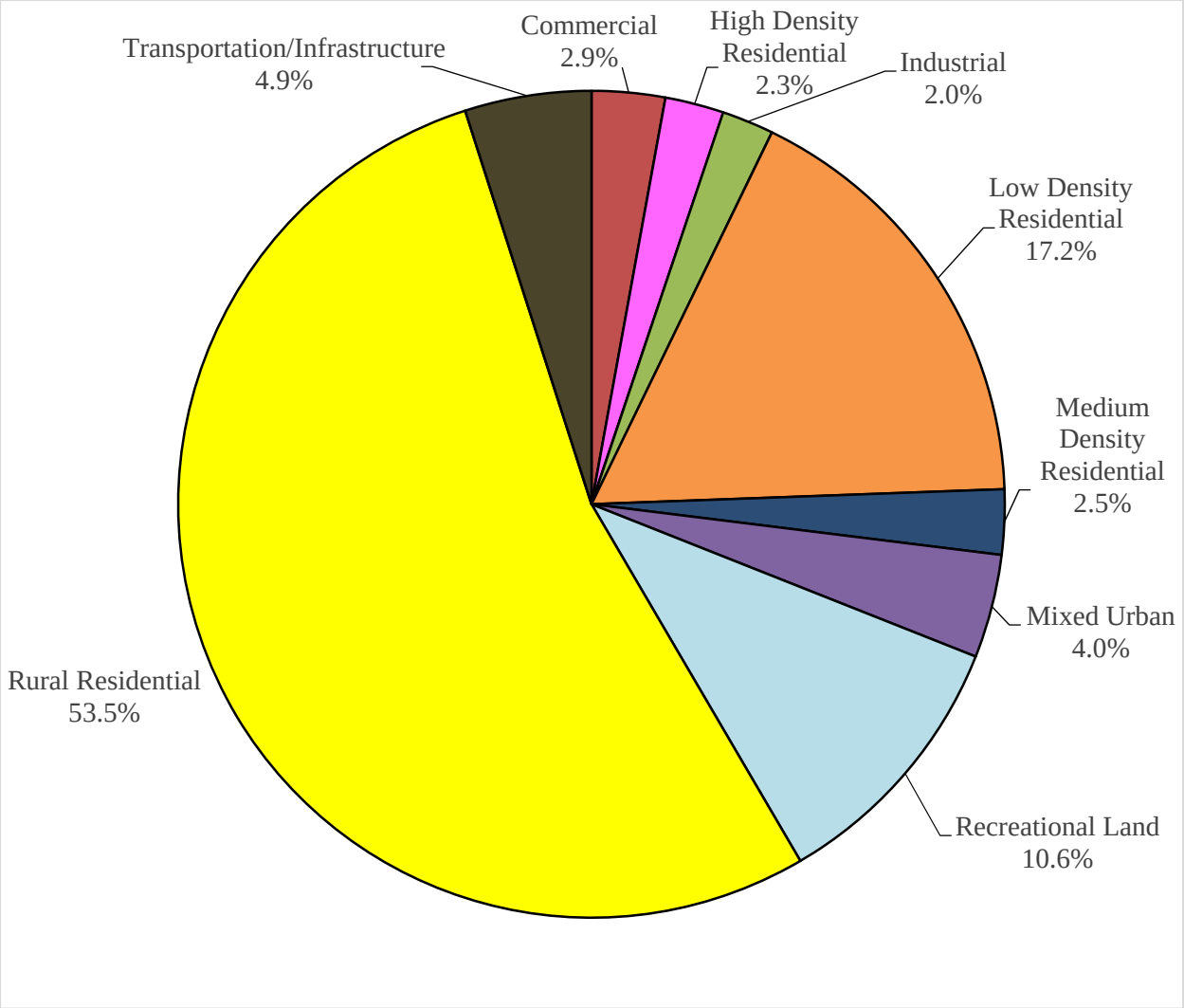


Figure 3: Pie chart illustrating the various types of urban land use in Pittsgrove Township

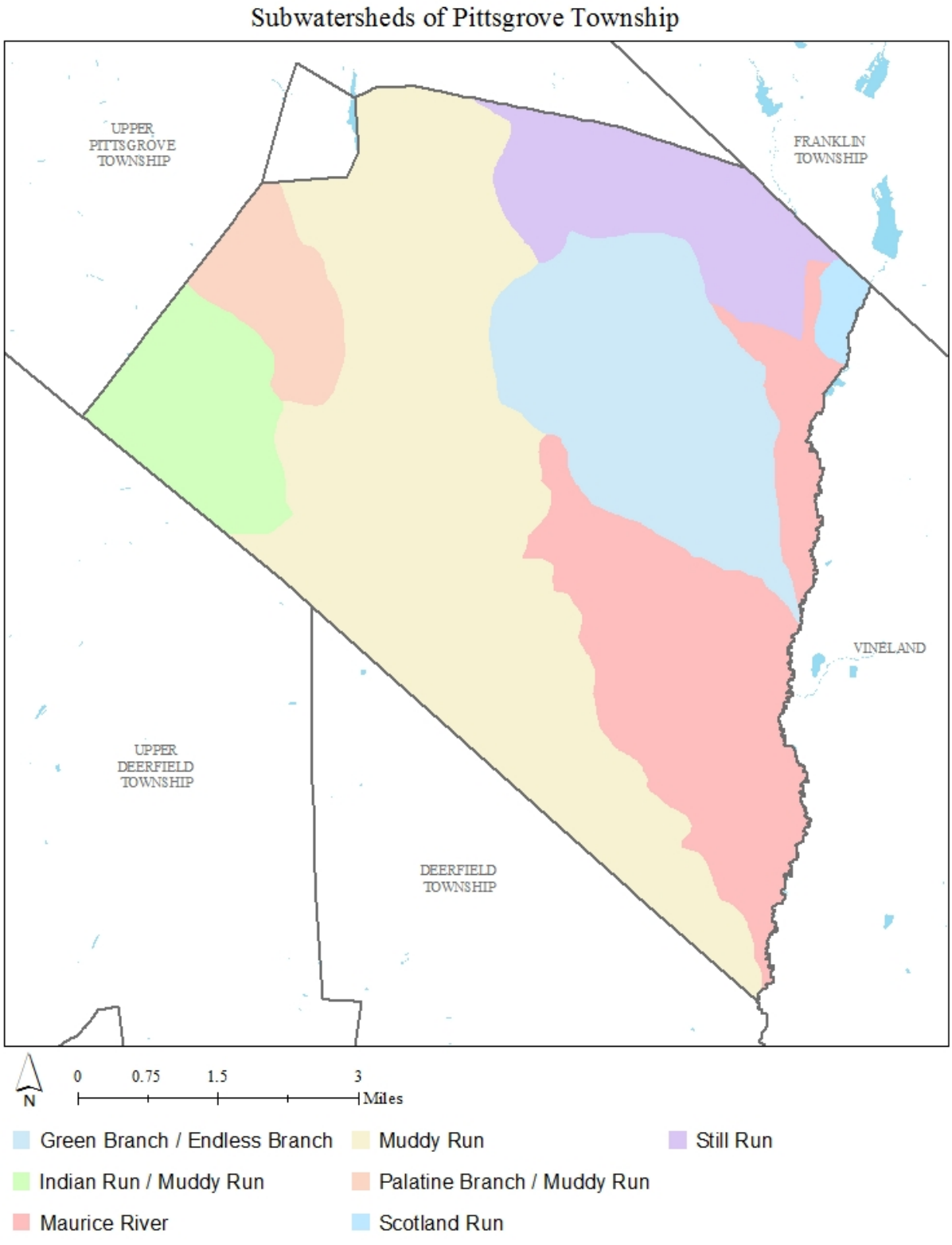


Figure 4: Map of the subwatersheds in Pittsgrove Township

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 Pittsgrove 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 Pittsgrove 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*.

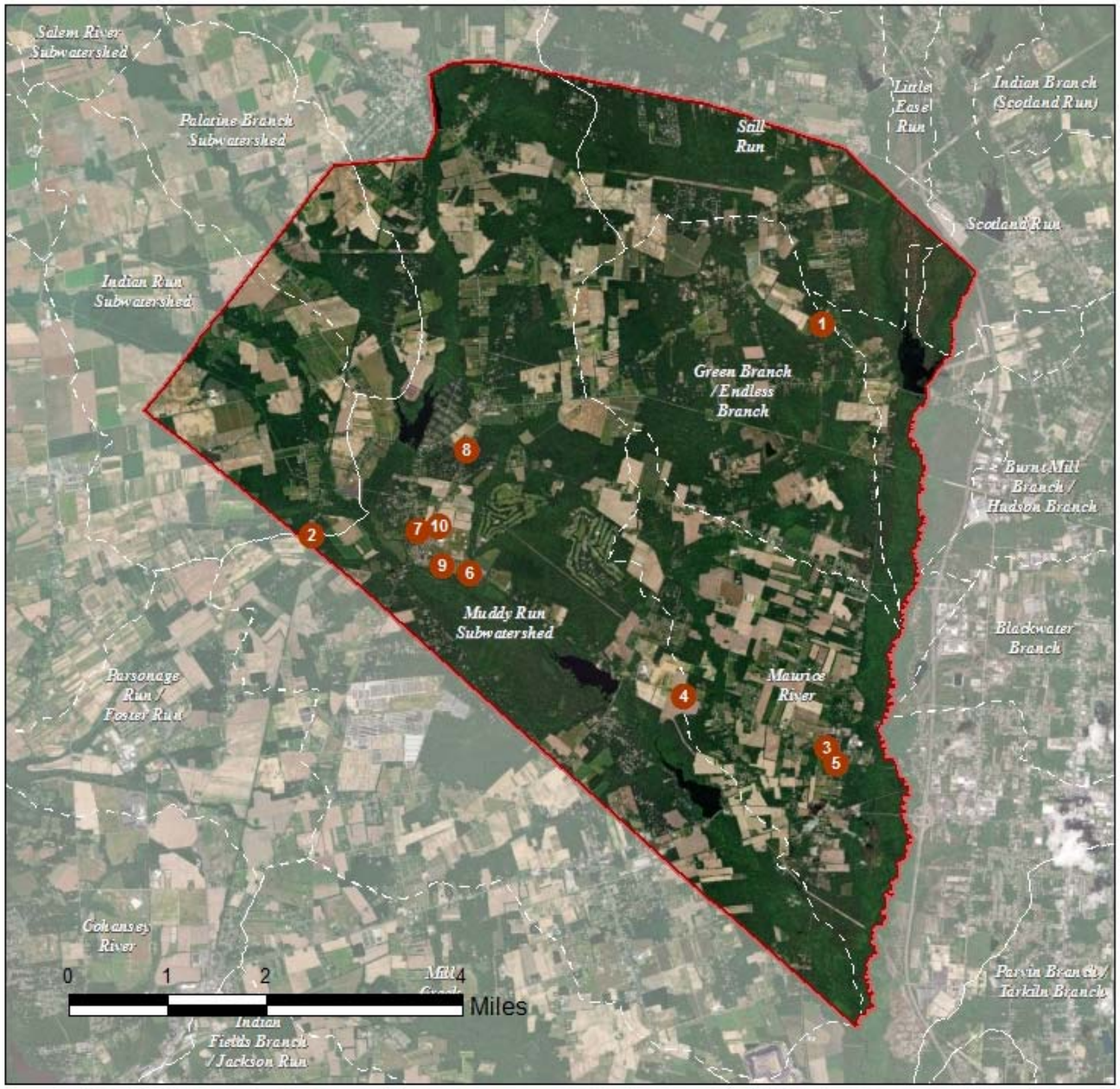
Conclusion

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

PITTSGROVE TOWNSHIP: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE GREEN BRANCH/ENDLESS BRANCH SUBWATERSHED

1. Willow Grove Fire Company Station 23

SITES WITHIN THE INDIAN RUN SUBWATERSHED

2. Country Road Bible Church

SITES WITHIN THE MAURICE RIVER SUBWATERSHED

3. Norma - Alliance Volunteer Fire Company

4. Union Grove United Methodist Church

5. United States Postal Office

SITES WITHIN THE MUDDY RUN SUBWATERSHED

6. Centerdon Country Club

7. Centerdon Fire Company

8. Olive United Methodist Church

9. Pittsgrove Township Middle School

10. Pittsgrove Township Senior Center

b. Proposed Green Infrastructure Concepts

WILLOW GROVE FIRE COMPANY STATION 23

Subwatershed: Green Branch/Endless Branch

Site Area: 64,673 sq. ft.

Address: 879 Willow Grove Road
Pittsgrove, NJ 08318

Block and Lot: Block 304, Lot 11

A rain garden can be installed on the west side of the building to manage stormwater runoff from the roof. A rainwater harvesting system can be installed at three corners of the shed to collect stormwater runoff from the roof. This can be used to clean fire trucks and for other non-potable purposes. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
30	19,402	0.9	9.8	89.1	0.015	0.53

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	0.089	15	6,500	0.24	850	$4,250
Rainwater harvesting	0.066	11	1,500	0.06	1,500 (gal)	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Willow Grove Fire Company Station 23

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

0 25' 50'

COUNTRY ROAD BIBLE CHURCH

Subwatershed: Indian Run

Site Area: 504,403 sq. ft.

Address: 188 Husted Station Road
Pittsgrove, NJ 08318

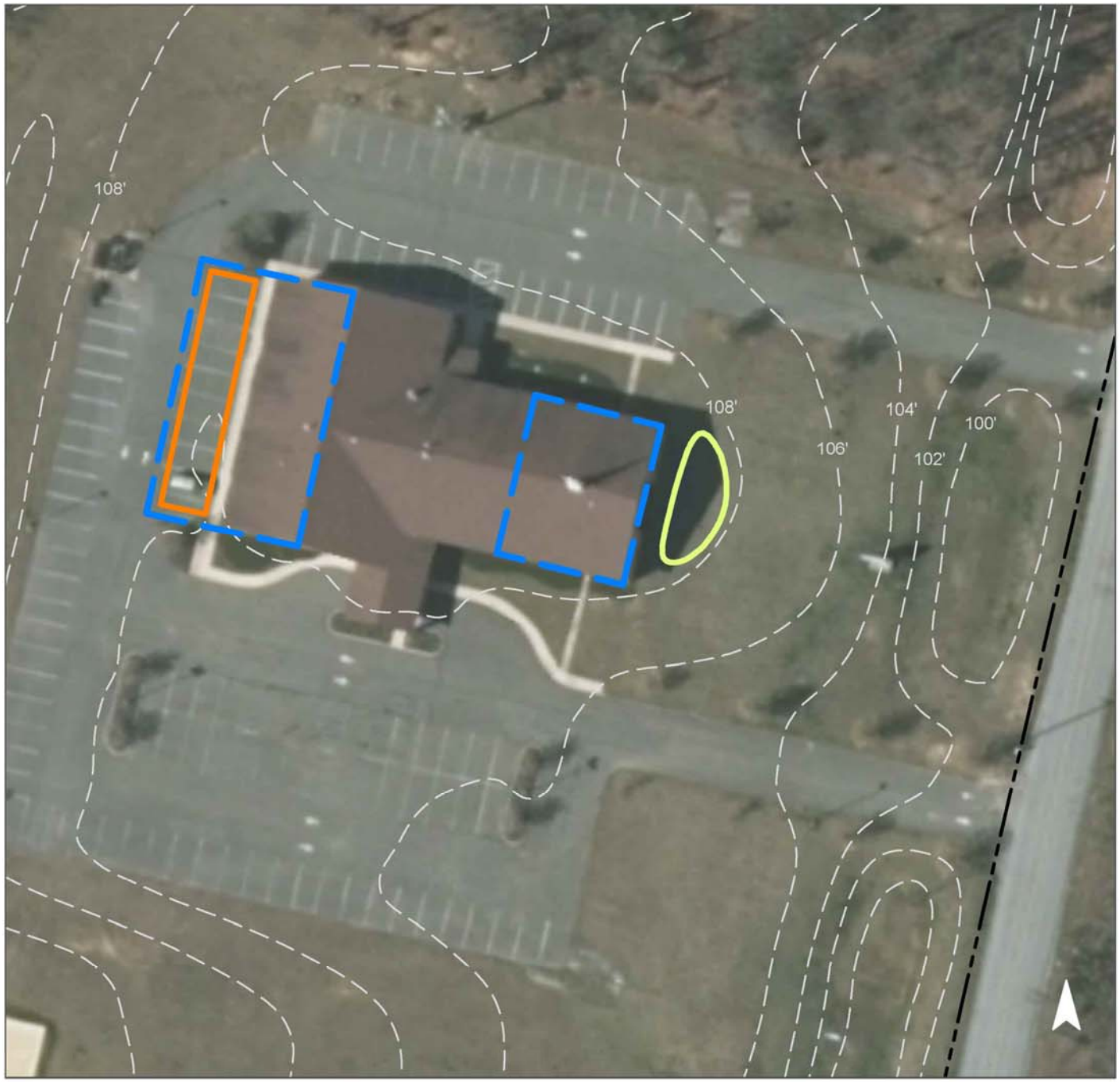
Block and Lot: Block 1405, Lot 16.01

A rain garden can be installed on the east side of the building to manage stormwater by collecting rainwater from the roof. Rain gardens also provide aesthetic value and create wildlife habitat while managing stormwater runoff. Porous pavement can be installed to collect and filter stormwater on the west side of the building. 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"
15	77,004	9.7	38.9	353.6	0.060	2.11

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	0.085	14	6,270	0.24	820	$4,100
Pervious pavement	0.163	27	11,970	0.45	1,700	$42,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



Country Road Bible Church

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

0 30' 60'

NORMA-ALLIANCE VOLUNTEER FIRE COMPANY

Subwatershed: Maurice River

Site Area: 66,595 sq. ft.

Address: 160 Almond Road
Pittsgrove, NJ 08318

Block and Lot: Block 2101, Lot 34.01

Two rain gardens can be installed in the front of the building to manage stormwater runoff from the front of the building and provide aesthetic value. A cistern can be installed in the back of the building to collect stormwater from the roof via 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"
46	30,473	1.5	15.4	139.9	0.024	0.84

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	11	4,630	0.17	610	$3,050
Rainwater harvesting	0.061	10	2,000	0.07	2,000 (gal)	$4,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Norma-Alliance Volunteer Fire Company

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

0 25' 50'

UNION GROVE UNITED METHODIST CHURCH

Subwatershed: Maurice River

Site Area: 177,896 sq. ft.

Address: 488 Almond Road
Pittsgrove, NJ 08318

Block and Lot: Block 2001, Lot 27

A rain garden can be installed at the front of the property to collect stormwater runoff from the building as well as from the pavement surrounding the turfgrass area. 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"
5	8,770	0.4	4.4	40.3	0.007	0.24

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	0.046	8	3,340	0.13	450	$2,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Union Grove Methodist Church

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

0 20' 40'

UNITED STATES POST OFFICE

Subwatershed: Maurice River

Site Area: 14,856 sq. ft.

Address: 809 Gershal Avenue
Pittsgrove, NJ 08347

Block and Lot: Block 2501, Lot 13

A rain garden can be installed at the front of the property to collect stormwater runoff from the building as well as from the road near the property. 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"
20	2,931	0.1	1.5	13.5	0.002	0.08

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	0.025	4	1,820	0.07	300	$1,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

United States Post Office

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

0 15' 30'

CENTERDON COUNTRY CLUB

Subwatershed: Muddy Run

Site Area: 420,449 sq. ft.

Address: 1022 Almond Road
Pittsgrove, NJ 08318

Block and Lot: Block 1801, Lot 25

A rain garden can be installed near the entrance to manage rooftop runoff and create wildlife habitat. Parking spaces near the entrance can be converted to porous pavement to collect and infiltrate stormwater runoff from the roof as well. 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	103,751	5.0	52.4	476.4	0.081	2.85

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	830	0.022	4	1,590	0.06	$1,050
Pervious pavement	8,170	0.213	36	15,620	0.59	$64,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Centerdon Country Club

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

0 25' 50'

CENTERDON FIRE COMPANY

Subwatershed: **Muddy Run**

Site Area: **51,775 sq. ft.**

Address: **64 Dealtown Road**
Pittsgrove, NJ 08318

Block and Lot: **Block 1601, Lot 8**

A rain garden can be installed along the north side of the building to manage rooftop runoff. A rainwater harvesting system can be installed at the northwest corner of the building to capture stormwater runoff from the roof as well. This can be used to clean fire trucks and for other non-potable purposes. 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"
56	29,190	1.4	14.7	134.0	0.023	0.80

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 system	0.040	7	2,910	0.11	380	$1,900
Rainwater harvesting	0.040	7	1,500	0.05	1,500 (gal)	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Centerdon Fire Company

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

0 20' 40'

OLIVE UNITED METHODIST CHURCH

Subwatershed: Muddy Run

Site Area: 502,081 sq. ft.

Address: 933 Centerton Road
Pittsgrove, NJ 08318

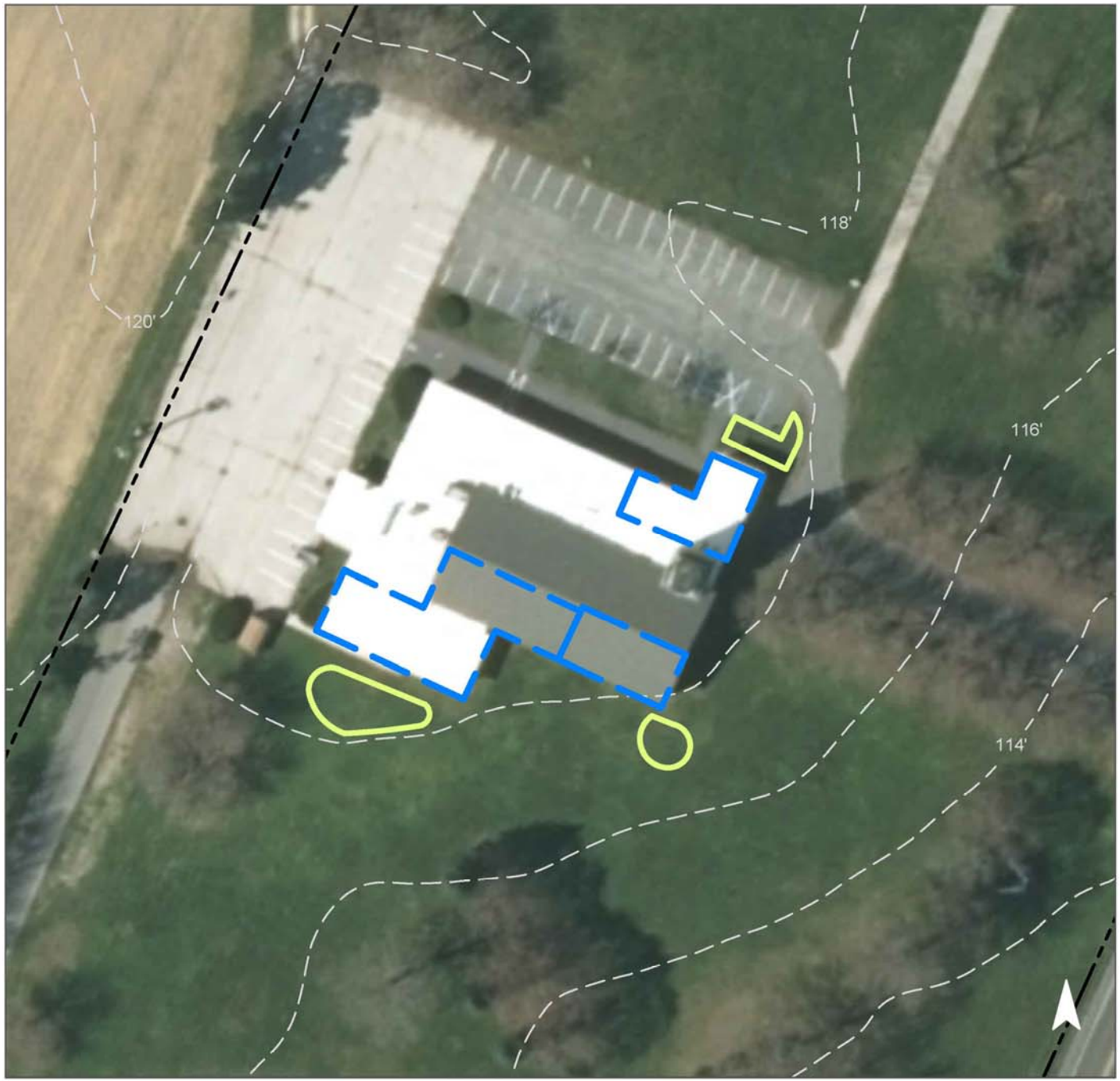
Block and Lot: Block 904, Lot 2

Three rain gardens can be installed around the building to capture, treat, and infiltrate stormwater runoff from the roof. Rain gardens also provide aesthetic value and create wildlife habitat while managing 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"
11	54,271	2.6	27.4	249.2	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	0.137	23	10,080	0.38	1,330	$6,650

GREEN INFRASTRUCTURE RECOMMENDATIONS



Olive United Methodist Church

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

0 30' 60'

PITTSGROVE TOWNSHIP MIDDLE SCHOOL

Subwatershed: Muddy Run

Site Area: 4,862,036 sq. ft.

Address: 1082 Almond Road
Pittsgrove, NJ 08318

Block and Lot: Block 1701, Lot 7

Two rain gardens can be installed at the east and west ends of the building to capture, treat, and infiltrate stormwater runoff from the roof. A section of parking spaces can be converted to porous pavement to collect and infiltrate stormwater 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"
13	612,672	29.5	309.4	2,813.0	0.477	16.80

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	0.117	20	8,600	0.32	1,125	$5,625
Pervious pavement	0.184	31	13,480	0.51	1,260	$31,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Pittsgrove Township Middle School

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

0 50' 100'

PITTSGROVE TOWNSHIP SENIOR CENTER

Subwatershed: Muddy Run

Site Area: 39,495 sq. ft.

Address: 743 Centerton Road
Pittsgrove, NJ 08318

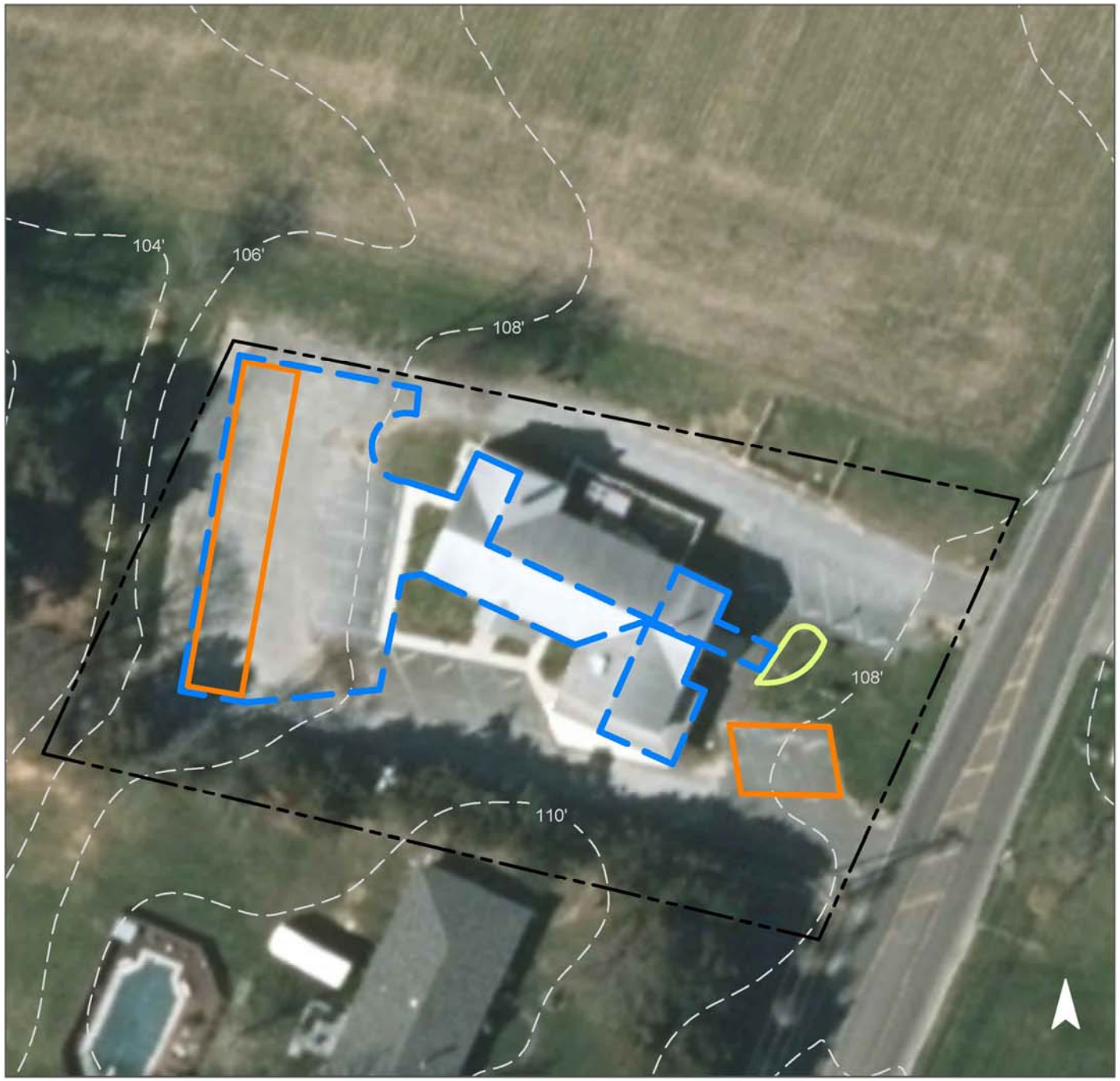
Block and Lot: Block 1601, Lot 12

A rain garden can be installed at the front of the building to capture, treat, and infiltrate rooftop runoff. Two sections of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the roof and 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"
57	22,699	1.1	11.5	104.2	0.018	0.62

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	0.014	2	1,050	0.04	210	$1,050
Pervious pavement	0.244	41	17,930	0.67	2,480	$62,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Pittsgrove Township Senior Center

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

0 25' 50'

c. Summary of Existing Conditions

Summary of Existing Site Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	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)
	GREEN BRANCH SUBWATERSHED	**1.48**	**64,673**				**19,402**	**0.9**	**9.8**	**89.1**	**0.015**	**0.53**
1	**Willow Grove Fire Company Station 23**											
	Total Site Info	1.48	64,673	304	11	30	19,402	0.9	9.8	89.1	0.015	0.53
	INDIAN RUN SUBWATERSHED	**11.58**	**504,403**				**77,004**	**3.7**	**38.9**	**353.6**	**0.060**	**2.11**
2	**Country Road Bible Church**											
	Total Site Info	11.58	504,403	1405	16.01	15	77,004	3.7	38.9	353.6	0.060	2.11
	MAURICE RIVER SUBWATERSHED	**5.95**	**259,347**				**42,174**	**2.0**	**21.3**	**193.6**	**0.033**	**1.16**
3	**Norma - Alliance Volunteer Fire Company**											
	Total Site Info	1.53	66,595	2101	34.01	46	30,473	1.5	15.4	139.9	0.024	0.84
4	**Union Grove United Methodist Church**											
	Total Site Info	4.08	177,896	2001	27	5	8,770	0.4	4.4	40.3	0.007	0.24
5	**United States Post Office**											
	Total Site Info	0.34	14,856	2501	13	20	2,931	0.1	1.5	13.5	0.002	0.08
	MUDDY RUN SUBWATERSHED	**134.89**	**5,875,835**				**822,583**	**39.7**	**415.4**	**3,776.8**	**0.641**	**22.56**
6	**Centerdon Country Club**											
	Total Site Info	9.65	420,449	1801	25	25	103,751	5.0	52.4	476.4	0.081	2.85
7	**Centerdon Fire Company**											
	Total Site Info	1.19	51,775	1601	8	56	29,190	1.4	14.7	134.0	0.023	0.80
8	**Olive United Methodist Church**											
	Total Site Info	11.53	502,081	904	2	11	54,271	2.6	27.4	249.2	0.042	1.49

Summary of Existing Site Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	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)
9	**Pittsgrove Township Middle School**											
	Total Site Info	111.62	4,862,036	1701	7	13	612,672	29.5	309.4	2,813.0	0.477	16.80
10	**Pittsgrove Township Senior Center**											
	Total Site Info	0.91	39,495	1601	12	57	22,699	1.1	11.5	104.2	0.018	0.62

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 %
	GREEN BRANCH/ENDLESS BRANCH SUBWATERSHED	**5,950**	**0.14**	**0.155**	**26**	**8,000**	**0.30**				**$7,250**	**30.7%**
1	**Willow Grove Fire Company Station 23**											
	Bioretention system	3,400	0.08	0.089	15	6,500	0.24	850	$5	SF	$4,250	17.5%
	Rainwater harvesting	2,550	0.06	0.066	11	1,500	0.06	1,500	$2	gal	$3,000	13.1%
	Total Site Info	**5,950**	**0.14**	**0.155**	**26**	**8,000**	**0.30**				**$7,250**	**30.7%**
	INDIAN RUN SUBWATERSHED	**9,540**	**0.22**	**0.249**	**42**	**18,240**	**0.69**				**$46,600**	**12.4%**
2	**Country Road Bible Church**											
	Bioretention system	3,280	0.08	0.085	14	6,270	0.24	820	$5	SF	$4,100	4.3%
	Pervious pavement	6,260	0.14	0.163	27	11,970	0.45	1,700	$25	SF	$42,500	8.1%
	Total Site Info	**9,540**	**0.22**	**0.249**	**42**	**18,240**	**0.69**				**$46,600**	**12.4%**
	MAURICE RIVER SUBWATERSHED	**7,470**	**0.17**	**0.195**	**33**	**11,790**	**0.44**				**$10,800**	**17.7%**
3	**Norma - Alliance Volunteer Fire Company**											
	Bioretention systems	2,420	0.06	0.063	11	4,630	0.17	610	$5	SF	$3,050	7.9%
	Rainwater harvesting	2,350	0.05	0.061	10	2,000	0.07	2,000	$2	gal	$4,000	7.7%
	Total Site Info	**4,770**	**0.11**	**0.124**	**21**	**6,630**	**0.24**				**$7,050**	**15.7%**
4	**Union Grove United Methodist Church**											
	Bioretention system	1,750	0.04	0.046	8	3,340	0.13	450	$5	SF	$2,250	20.0%
	Total Site Info	**1,750**	**0.04**	**0.046**	**8**	**3,340**	**0.13**				**$2,250**	**20.0%**
5	**United States Post Office**											
	Bioretention system	950	0.02	0.025	4	1,820	0.07	300	$5	SF	$1,500	32.4%
	Total Site Info	**950**	**0.02**	**0.025**	**4**	**1,820**	**0.07**				**$1,500**	**32.4%**

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 %
	MUDDY RUN SUBWATERSHED	**38,800**	**0.89**	**1.011**	**169**	**72,760**	**2.73**				**$176,775**	**4.7%**
6	**Centerdon Country Club**											
	Bioretention system	830	0.02	0.022	4	1,590	0.06	210	$5	SF	$1,050	0.8%
	Pervious pavement	8,170	0.19	0.213	36	15,620	0.59	2,560	$25	SF	$64,000	7.9%
	Total Site Info	**9,000**	**0.21**	**0.234**	**39**	**17,210**	**0.65**				**$65,050**	**8.7%**
7	**Centerdon Fire Company**											
	Bioretention system	1,520	0.03	0.040	7	2,910	0.11	380	$5	SF	$1,900	5.2%
	Rainwater harvesting	1,530	0.04	0.040	7	1,500	0.05	1,500	$2	gal	$3,000	5.2%
	Total Site Info	**3,050**	**0.07**	**0.079**	**13**	**4,410**	**0.16**				**$4,900**	**10.4%**
8	**Olive United Methodist Church**											
	Bioretention systems	5,270	0.12	0.137	23	10,080	0.38	1,330	$5	SF	$6,650	9.7%
	Total Site Info	**5,270**	**0.12**	**0.137**	**23**	**10,080**	**0.38**				**$6,650**	**9.7%**
9	**Pittsgrove Township Middle School**											
	Bioretention systems	4,500	0.10	0.117	20	8,600	0.32	1,125	$5	SF	$5,625	0.7%
	Pervious pavement	7,050	0.16	0.184	31	13,480	0.51	1,260	$25	SF	$31,500	1.2%
	Total Site Info	**11,550**	**0.27**	**0.301**	**50**	**22,080**	**0.83**				**$37,125**	**1.9%**
10	**Pittsgrove Township Senior Center**											
	Bioretention system	550	0.01	0.014	2	1,050	0.04	210	$5	SF	$1,050	2.4%
	Pervious pavement	9,380	0.22	0.244	41	17,930	0.67	2,480	$25	SF	$62,000	41.3%
	Total Site Info	**9,930**	**0.23**	**0.259**	**43**	**18,980**	**0.71**				**$63,050**	**43.7%**