RUTGERS
New Jersey Agricultural
Experiment Station

Draft

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

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

April 30, 2015

Introduction

Located in Salem County New Jersey, Pilesgrove Township covers nearly 50 square miles. Figures 1 and 2 illustrate that Pilesgrove Township is dominated by agricultural land uses. Only 12.7% of the municipality's land use is classified as urban (Figure 2). Of the urban land in Pilesgrove Township, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Pilesgrove 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 Pilesgrove Township. Based upon the 2007 NJDEP land use/land cover data, approximately 2.2% of Pilesgrove Township has impervious cover. This level of impervious cover suggests that the streams in Pilesgrove Township are likely considered to be sensitive streams.[1]

Methodology

Pilesgrove Township contains portions of six watersheds (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

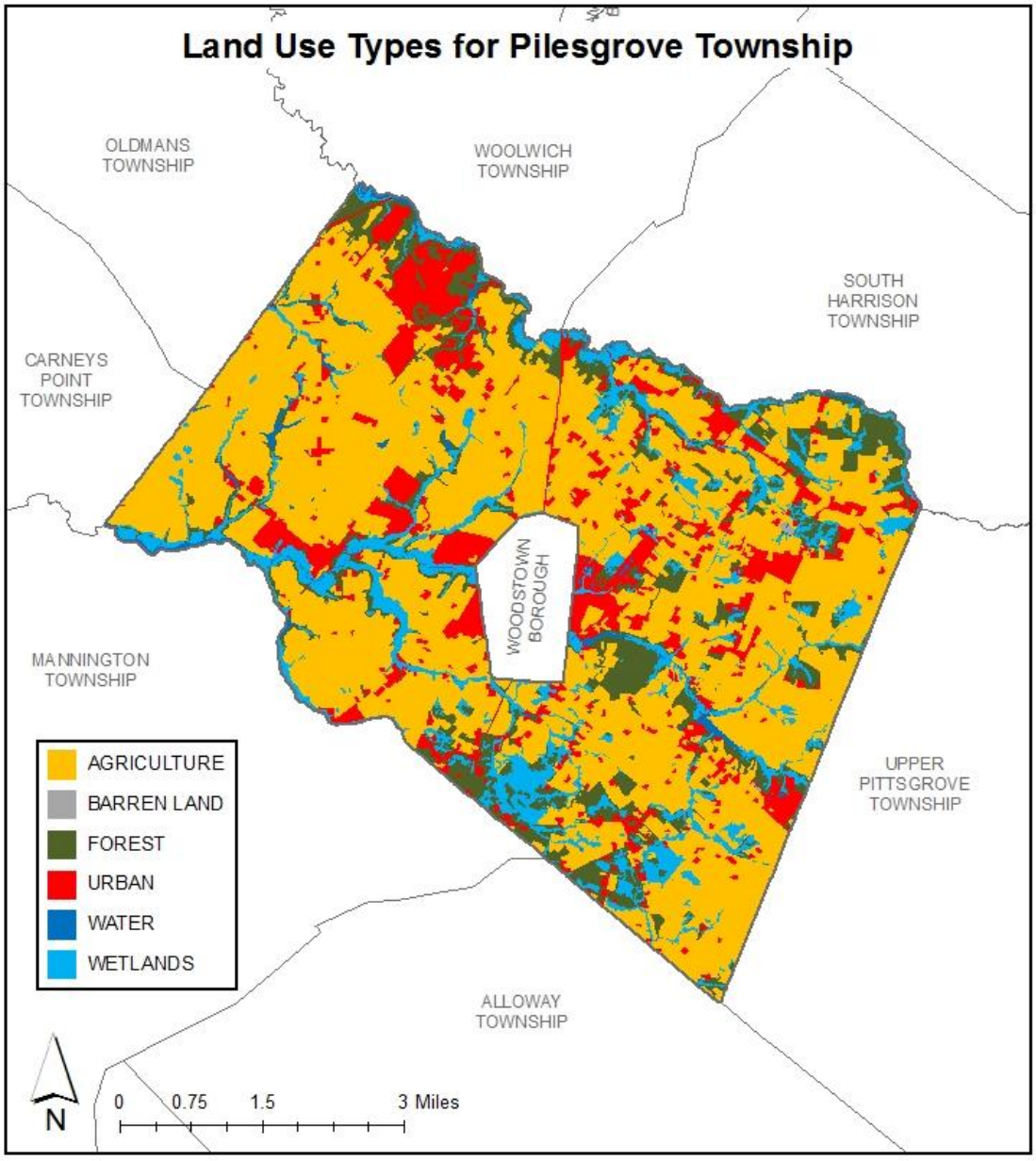

Figure 1: Map illustrating the land use in Pilesgrove Township

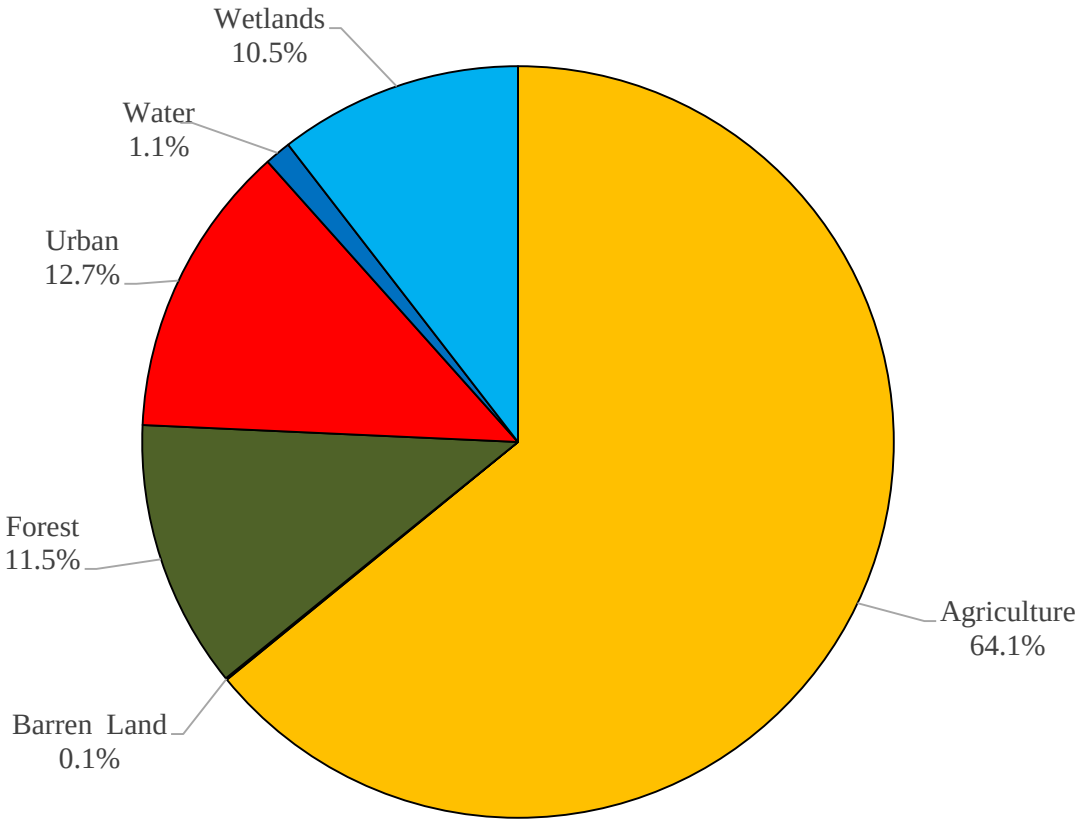

Figure 2: Pie chart illustrating the land use in Pilesgrove Township

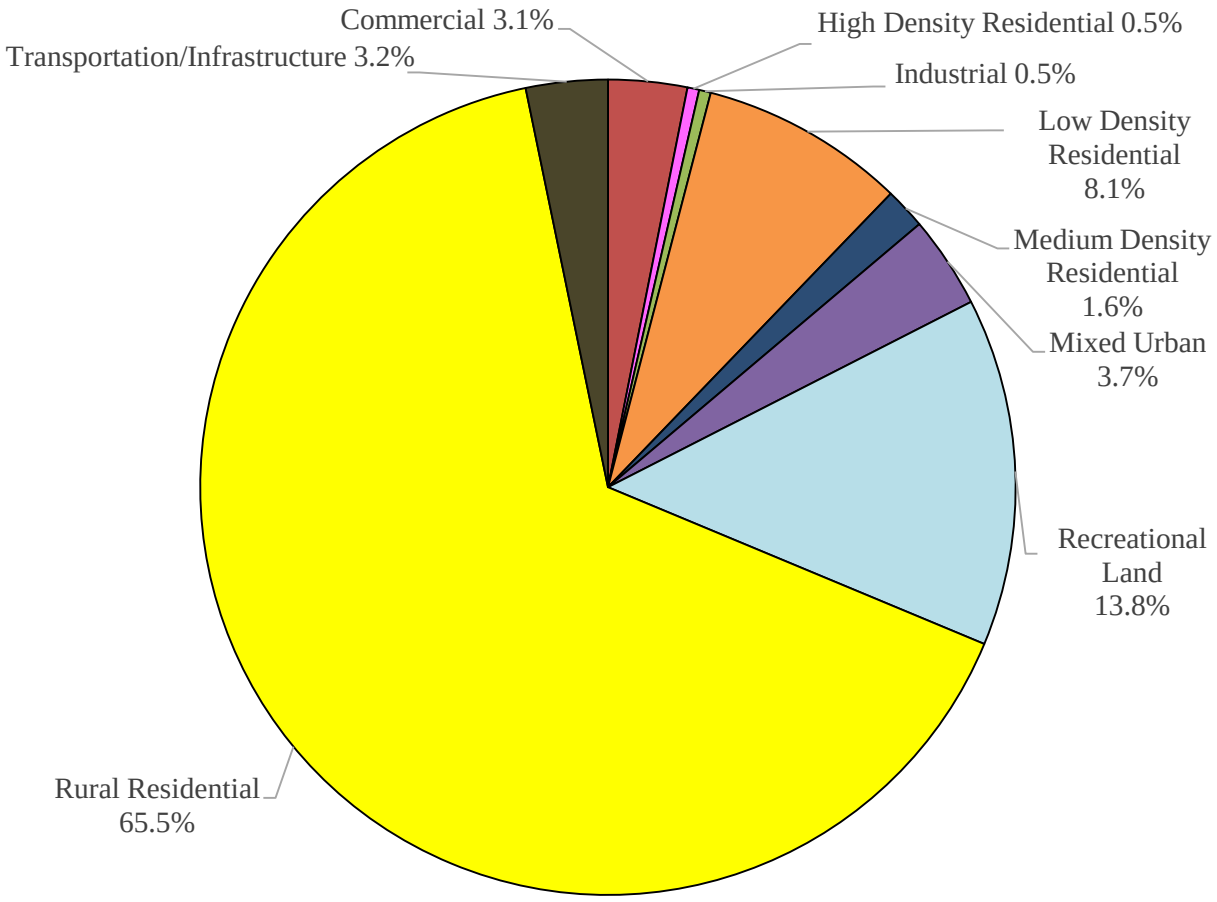

Figure 3: Pie chart illustrating the various types of urban land use in Pilesgrove Township

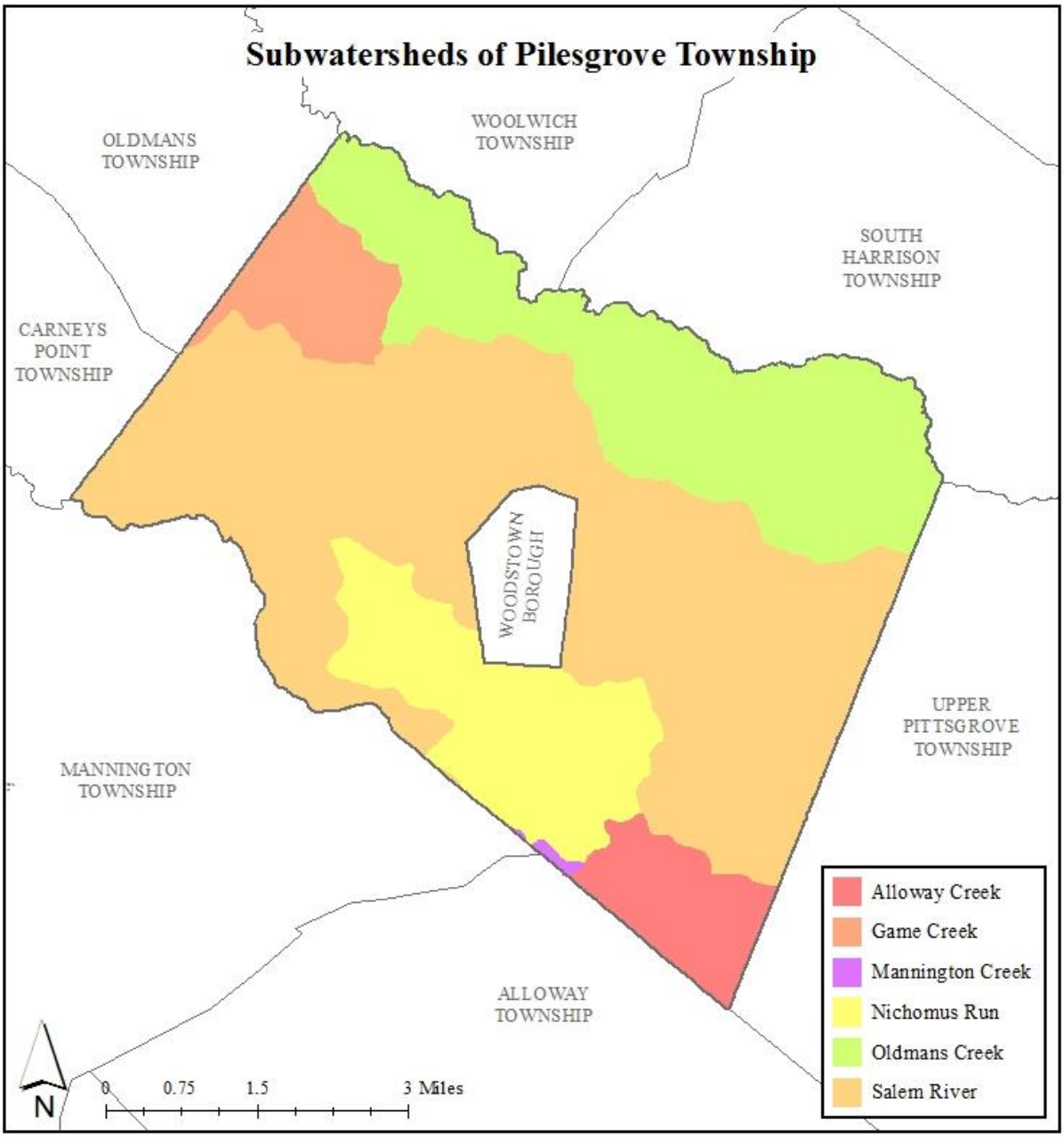

Figure 4: Map of the subwatersheds in Pilesgrove Township

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 Pilesgrove 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 Pilesgrove 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 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 a list of 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 is identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

[4] New Jersey Administrative Code, N.J.A.C. 7:8, Stormwater Management, Statutory Authority: N.J.S.A. 12:5-3, 13:1D-1 et seq., 13:9A-1 et seq., 13:19-1 et seq., 40:55D-93 to 99, 58:4-1 et seq., 58:10A-1 et seq., 58:11A-1 et seq. and 58:16A-50 et seq., *Date last amended: April 19, 2010*.

Conclusion

This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts, girl scouts, school groups, faith-based groups, social groups, watershed groups, and other community groups.

Additionally, development projects that are in need of providing off-site compensation for stormwater impacts can use the projects in this plan as a starting point. The municipality can quickly convert this impervious cover reduction action plan into a stormwater mitigation plan and incorporate it into the municipal stormwater control ordinance.

Attachment 1: Potential Project Sites

Salem River Watershed (West)

1. Woodstown NJ State Police Station
2. Sunoco Gas Station
3. Fulton Bank of New Jersey
4. Richmans Ice Cream
5. The Church of Jesus Christ of Latter-day Saints
6. Sharptown United Methodist Church
7. Dollar General
8. The Corner
9. Salem County Public Works

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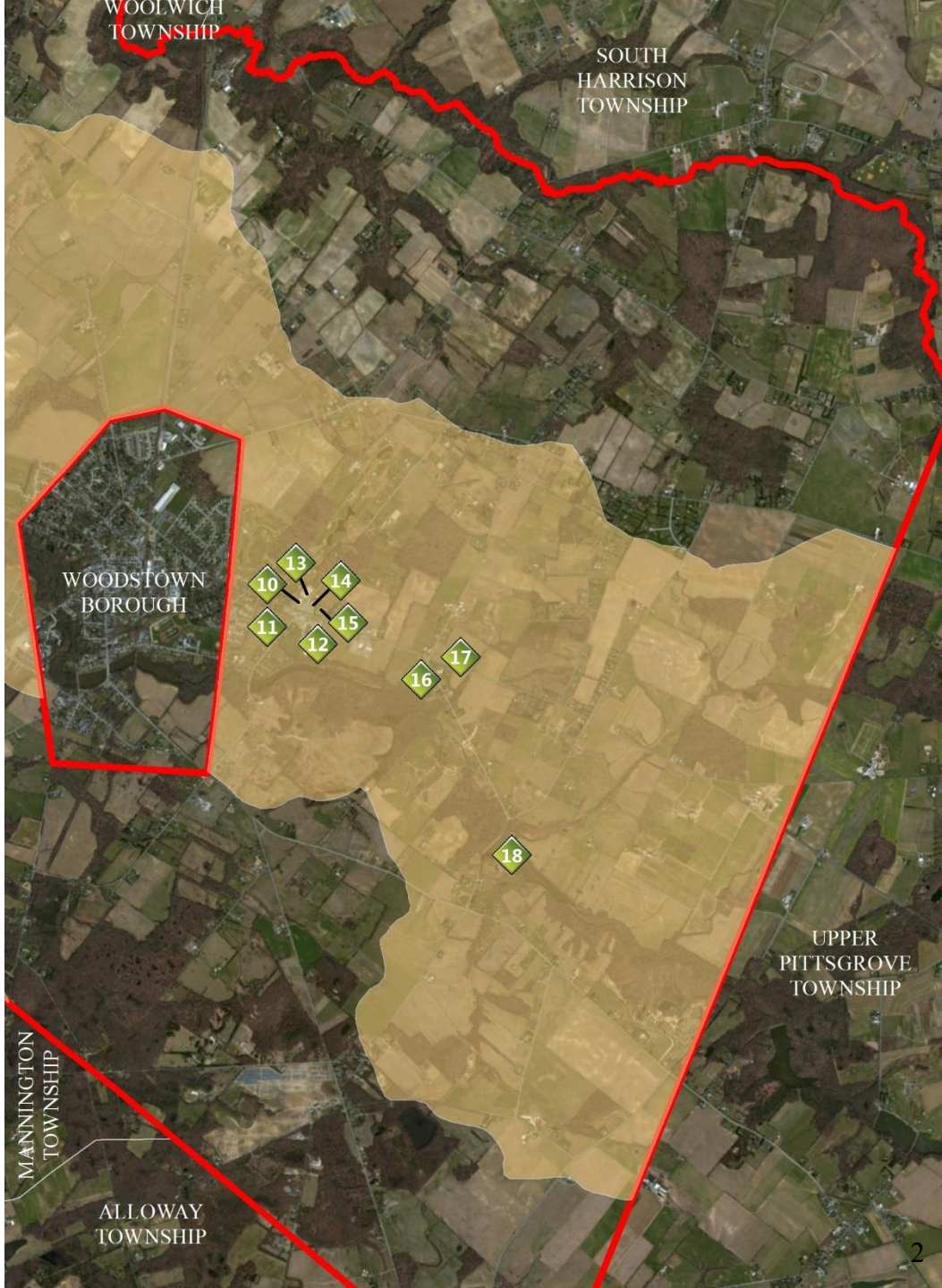
Salem River Watershed (East)

10. Now & Then Consignment and Antiques Mall
11. William Roper Early Childhood Learning Center
12. Pilesgrove Municipal Building
13. Woodstown Mini Storage
14. Wood Lanes
15. Franklin Bank
16. Lighthouse Christian Center
17. Woodstown Veterinary Hospital
18. Camp Crockett County Park



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1. Woodstown NJ State Police Station

769 US 40 Pilesgrove, NJ 08098
Block 24, Lot 11.01
120,550 sq. ft.
Salem River Watershed (west)

Bioretention systems installed in the grass would receive runoff from the roof and driveway via curb cuts. The rear parking lot could be retrofitted with pervious pavement. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing 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"
31	36,889	1.78	18.63	169.37	0.03	1.01

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	0.121	20	8,841	0.29	1,160	$5,800
Pervious pavement	0.211	35	15,469	0.52	1,270	$31,750

1. Woodstown NJ State Police Station

769 US 40 Pilesgrove, NJ 08098
Block 24, Lot 11.01
120,550 sq. ft.
Salem River Watershed (west)

2. Sunoco Gas Station

25 Robinson Rd. Pilesgrove, NJ 08098
Block 25, Lot 12
18,770 sq. ft.
Salem River Watershed (west)

Stormwater runoff from the entire roof can be captured in a bioretention system. A preliminary soil assessment for this site suggests that the site's existing 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"
80	15,016	0.72	7.58	68.94	0.01	0.41

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 systems	0.068	11	4,967	0.17	650	$3,250

2. Sunoco Gas Station

25 Robinson Rd. Pilesgrove, NJ 08098
Block 25, Lot 12
18,770 sq. ft.
Salem River Watershed (west)

3. Fulton Bank of New Jersey

843 US 40 Pilesgrove, NJ 08098
Block 25, Lot 11.01
110,387 sq. ft.
Salem River Watershed (west)

Stormwater runoff from the sidewalk and parking lot can be discharged to pervious pavement. A bioretention system can be installed to capture roof runoff. A preliminary soil assessment for this site suggests that the site's existing 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"
64	70,238	3.39	35.47	322.49	0.06	1.93

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	0.052	9	3,837	0.13	500	$2,500
Pervious pavement	0.325	54	23,786	0.79	1,950	$48,750

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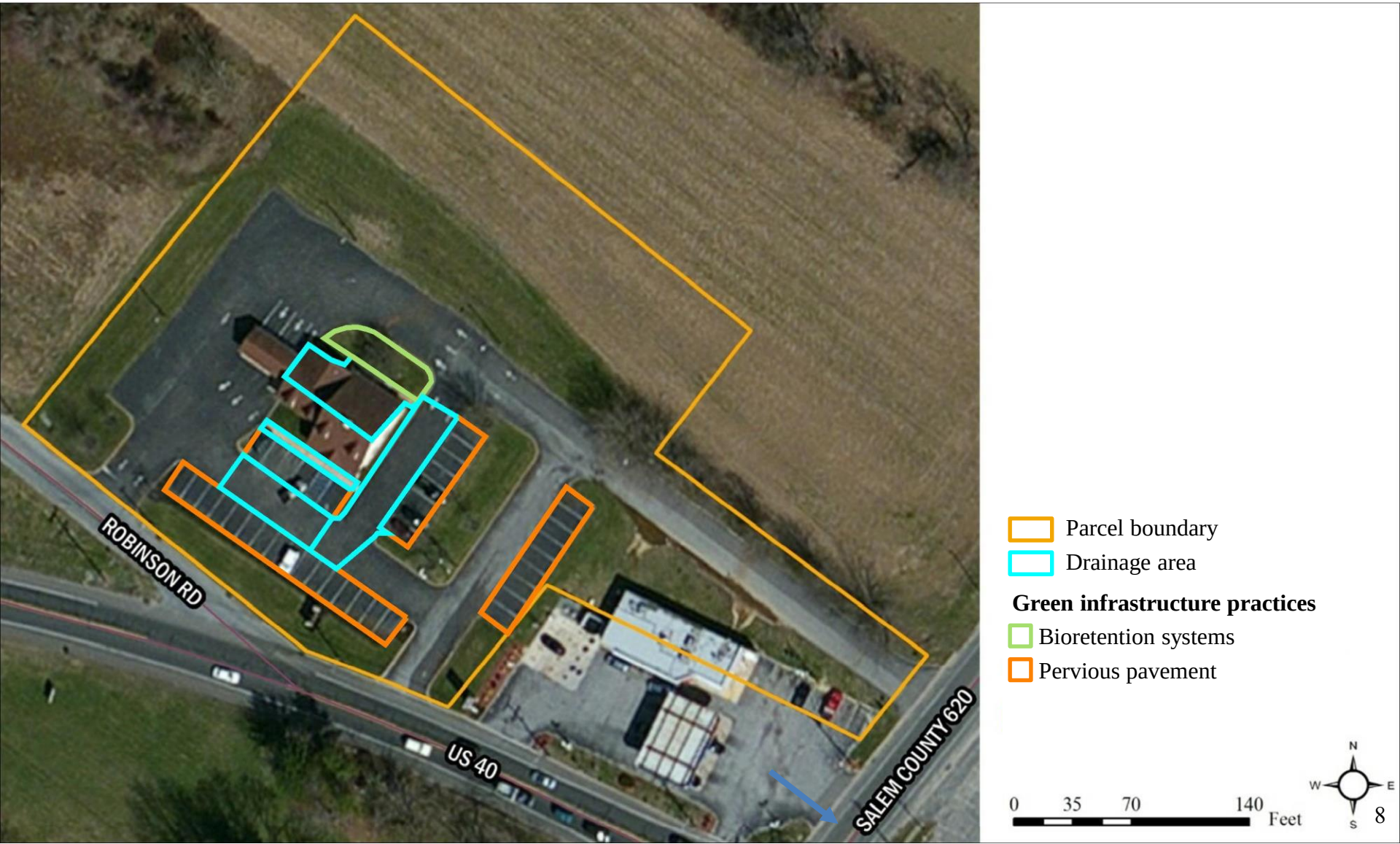
3. Fulton Bank of New Jersey

843 US 40 Pilesgrove, NJ 08098
Block 25, Lot 11.01
110,387 sq. ft.
Salem River Watershed (west)



4. Richmans Ice Cream

1106-1126 Kings Hwy. Pilesgrove, NJ 08098
Block 29, Lot 17
835,667 sq. ft.
Salem River Watershed (west)

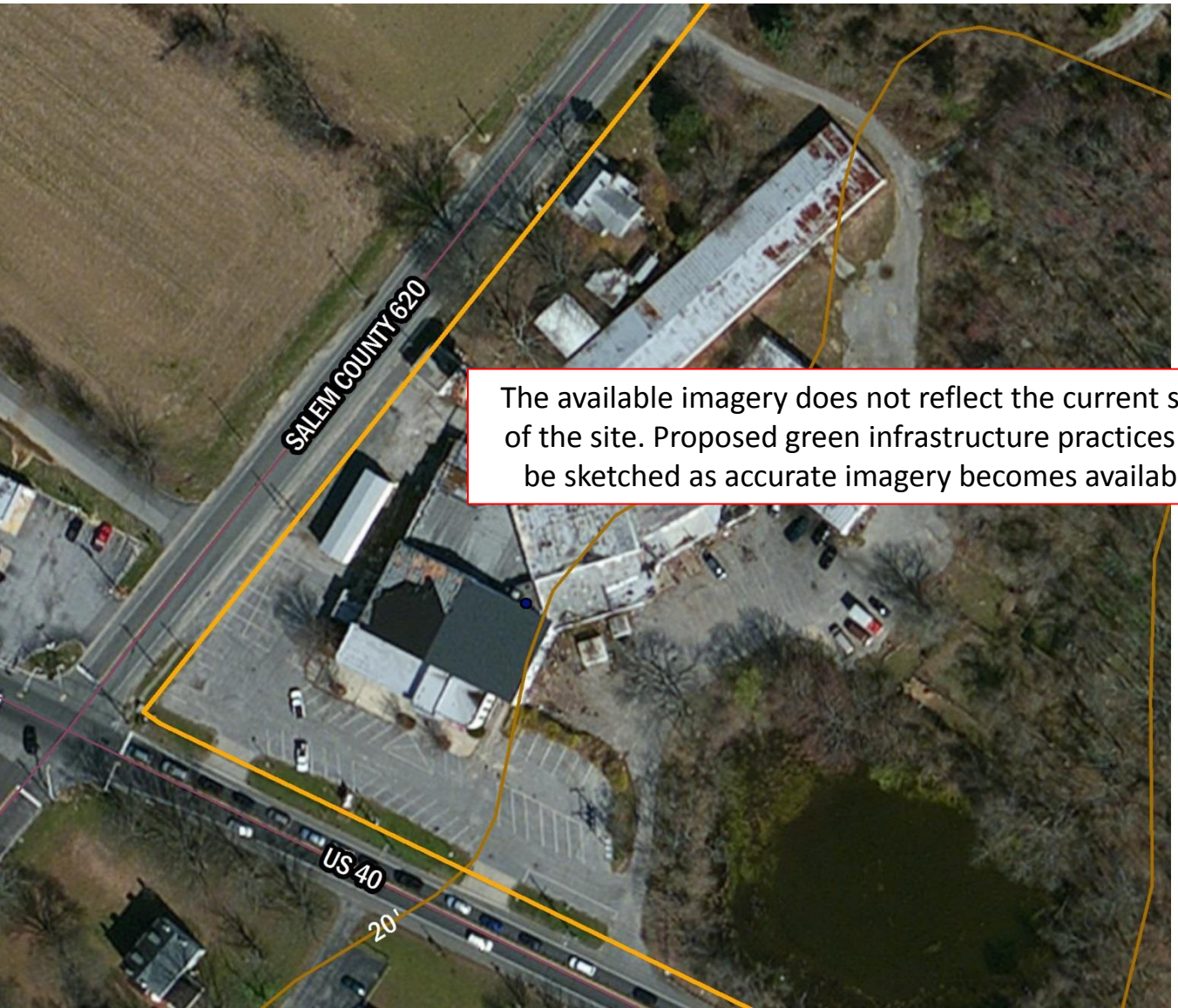
This site is currently abandoned. When redeveloped, there is potential for implementation of green infrastructure practices. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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	168,533	8.12	85.12	773.80	0.13	4.62

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
-	-	-	-	-	-	-

4. Richmans Ice Cream

1106-1126 Kings Hwy. Pilesgrove, NJ 08098
Block 29, Lot 17
835,667 sq. ft.
Salem River Watershed (west)



The available imagery does not reflect the current state of the site. Proposed green infrastructure practices will be sketched as accurate imagery becomes available.

Parcel Boundary

0 45 90 180 Feet

N
W E
S

5. The Church of Jesus Christ of Latter-day Saints

1194 Kings Hwy. Pilesgrove, NJ 08098
Block 30, Lot 10.03
361,643 sq. ft.
Salem River Watershed (west)

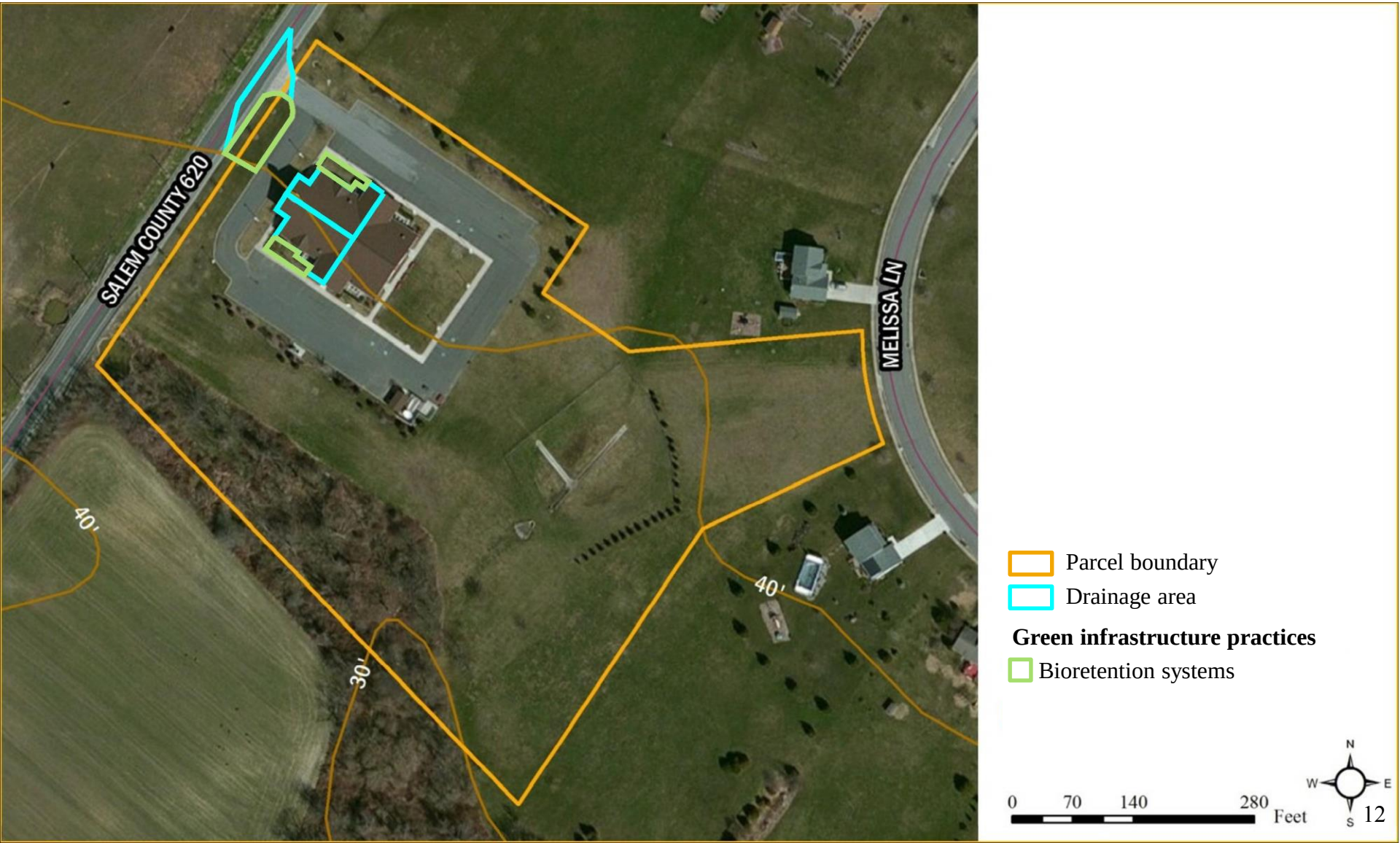
Stormwater runoff from the roof can be captured in bioretention systems. A bioretention system can be installed to intercept road runoff before it reaches the nearby river. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing soil's suitability 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	81,664	3.94	41.24	374.95	0.064	2.24

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 systems	0.310	52	22,739	0.76	2,980	$14,900

5. The Church of Jesus Christ of Latter-day Saints

1194 Kings Hwy. Pilesgrove, NJ 08098
Block 30, Lot 10.03
361,643 sq. ft.
Salem River Watershed (west)



6. Sharptown United Methodist Church

24 Church St. Pilesgrove, NJ 08098
Block 53, Lot 7
63,841 sq. ft.
Salem River Watershed (west)

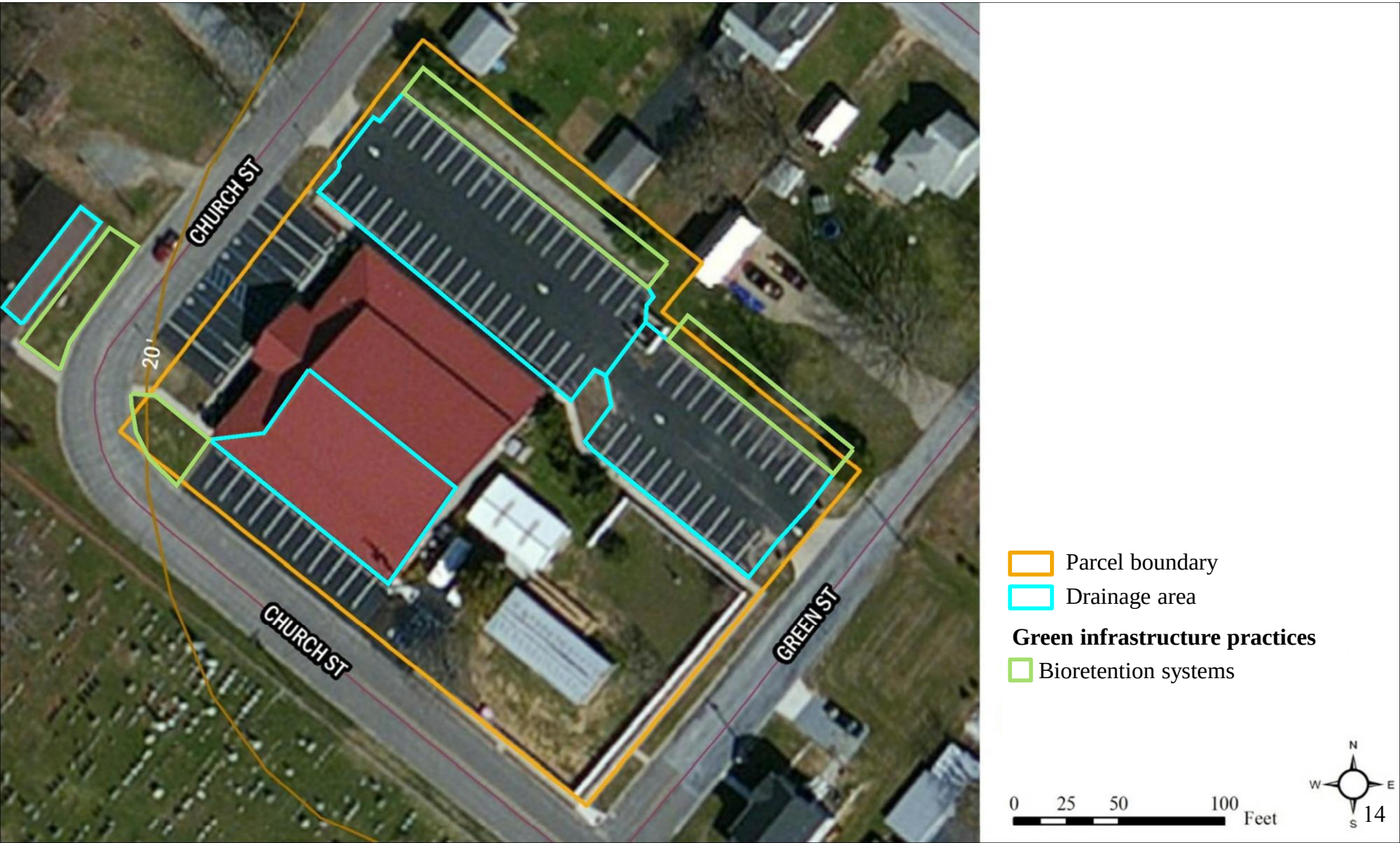
Much of the parking lot and rooftops can be discharged to bioretention systems. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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	47,360	2.28	23.92	217.45	0.04	1.30

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	0.458	77	33,548	1.12	4,390	$21,950

6. Sharptown United Methodist Church

24 Church St. Pilesgrove, NJ 08098
Block 53, Lot 7
63,841 sq. ft.
Salem River Watershed (west)



7. Dollar General

1016 US 40 Pilesgrove, NJ 08098
Block 63, Lot 1.04
43,628 sq. ft.
Salem River Watershed (west)

Stormwater runoff from the roof can be discharged to a section of pervious pavement with a two-foot stone reservoir under the pavement. A preliminary soil assessment for this site suggests that the site's existing 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"
95	41,269	2	20.84	189.48	0.03	1.13

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	0.077	13	5,655	0.19	460	$11,500

7. Dollar General

1016 US 40 Pilesgrove, NJ 08098
Block 63, Lot 1.04
43,628 sq. ft.
Salem River Watershed (west)

8. The Corner

1002 US 40 Pilesgrove, NJ 08098
Block 63, Lot 4
22,294 sq. ft.
Salem River Watershed (west)

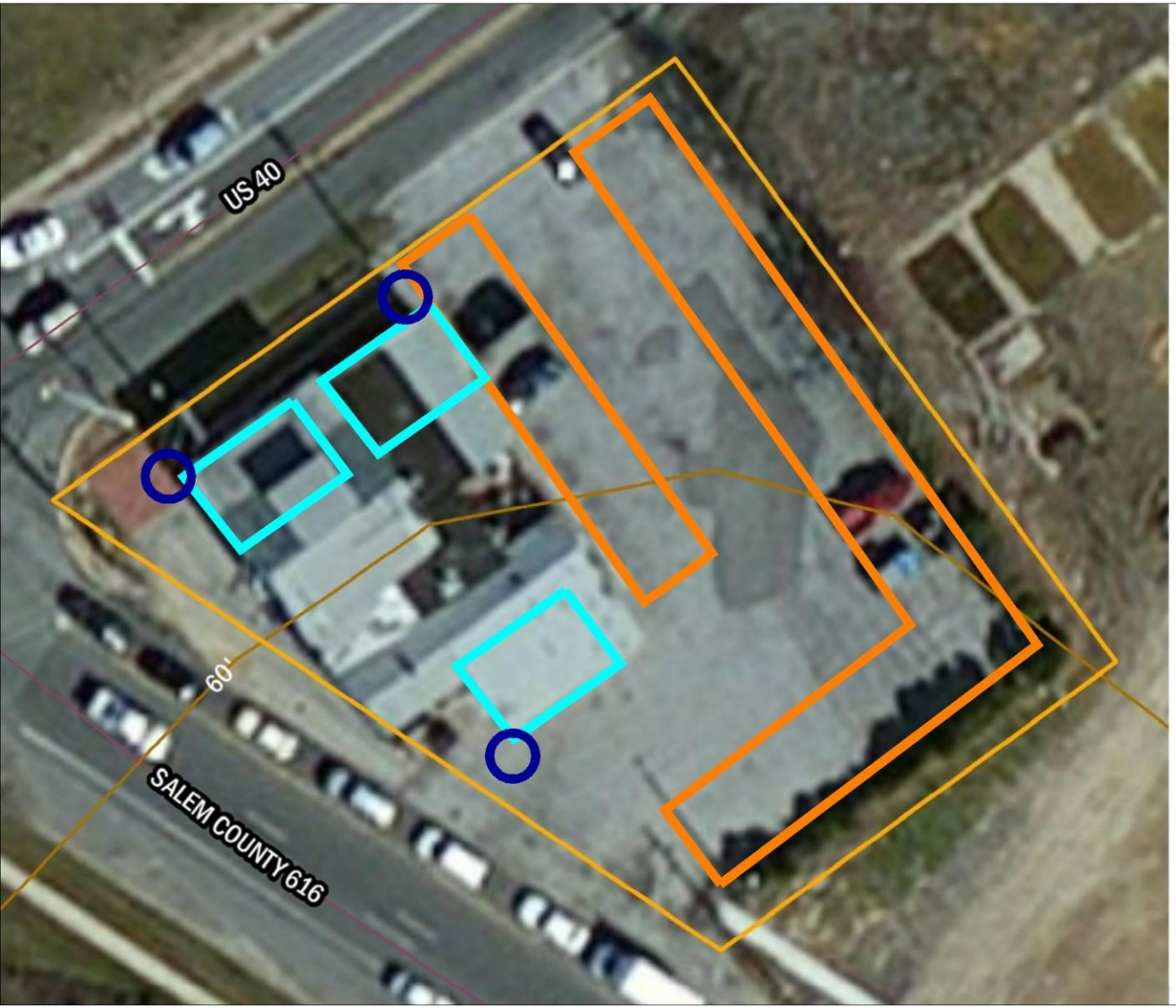
Much of the parking lot can be replaced with pervious pavement. Downspout planter boxes can be implemented to capture runoff from multiple rooftops. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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"
88	19,592	0.94	9.89	89.95	0.02	0.54

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Downspout planter boxes	0.009	2	658	0.02	90	$450
Pervious pavement	0.305	51	22,343	0.75	1,830	$45,750

8. The Corner

1002 US 40 Pilesgrove, NJ 08098
Block 63, Lot 4
22,294 sq. ft.
Salem River Watershed (west)



Parcel boundary
Drainage area

Green infrastructure practices

Pervious pavement
Downspout planter boxes

0 5 10 20 30 40 Feet

N
W E
S

9. Salem County Public Works

153 Cemetery Rd. Woodstown, NJ 08098
Block 67, Lot 1
942,413 sq. ft.
Salem River Watershed (west)

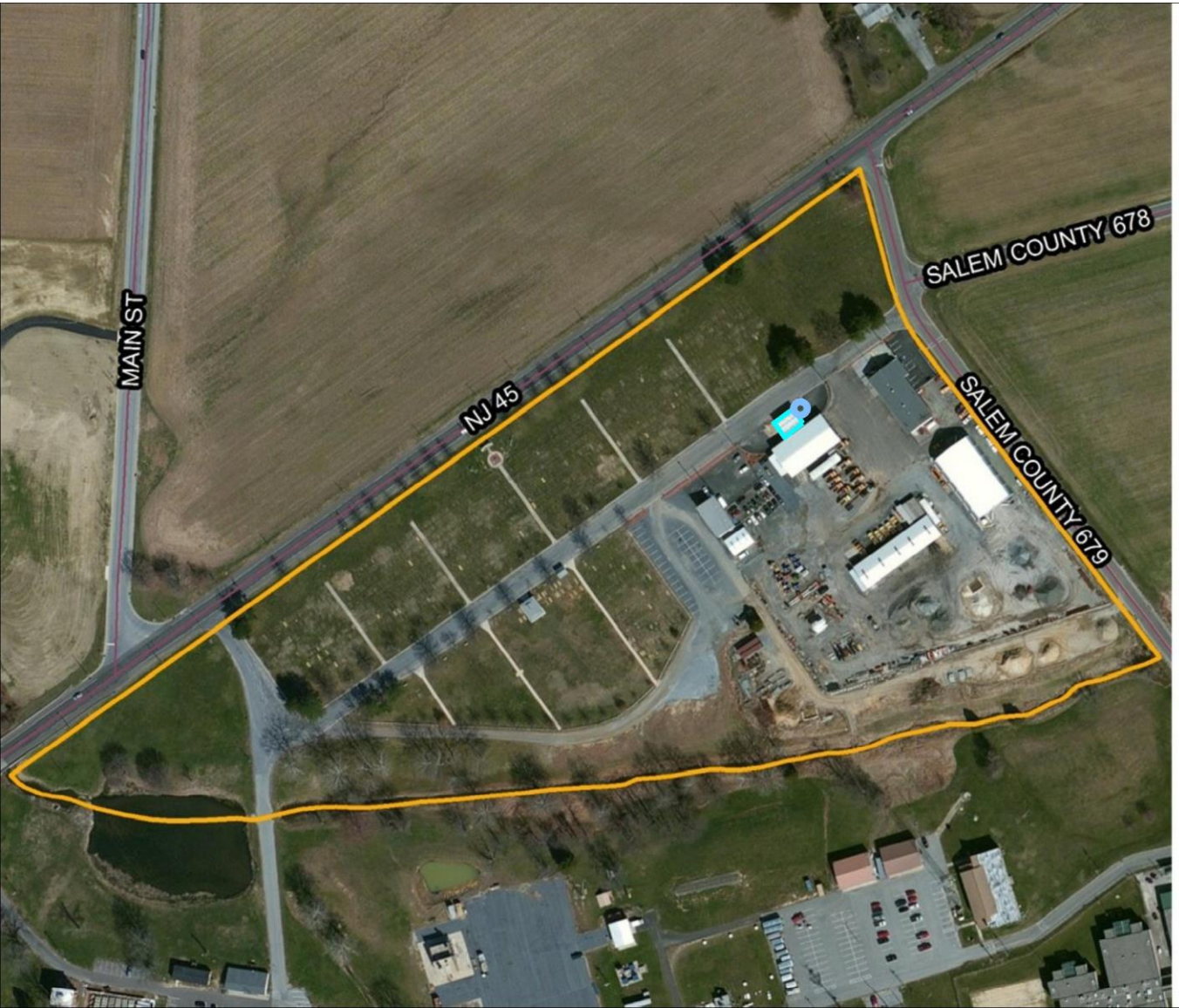
The downspout can be disconnected and routed to a rainwater harvesting system for washing trucks. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing soil's suitability for green infrastructure.

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"
20	190,705	9.19	96.32	875.6	0.15	5.23

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Rainwater harvesting systems	0	2	2,154	0.07	5,000	$10,000

9. Salem County Public Works

153 Cemetery Rd. Woodstown, NJ 08098
Block 67, Lot 1
942,413 sq. ft.
Salem River Watershed (west)



Parcel boundary
Drainage area

Green infrastructure practices

Rainwater harvesting systems

0 120 240 480 Feet

N
W E
S

10. Now & Then Consignment and Antique Mall

1167 US 40 Pilesgrove, NJ 08098
Block 35, Lot 11
108,738 sq. ft.
Salem River Watershed (east)

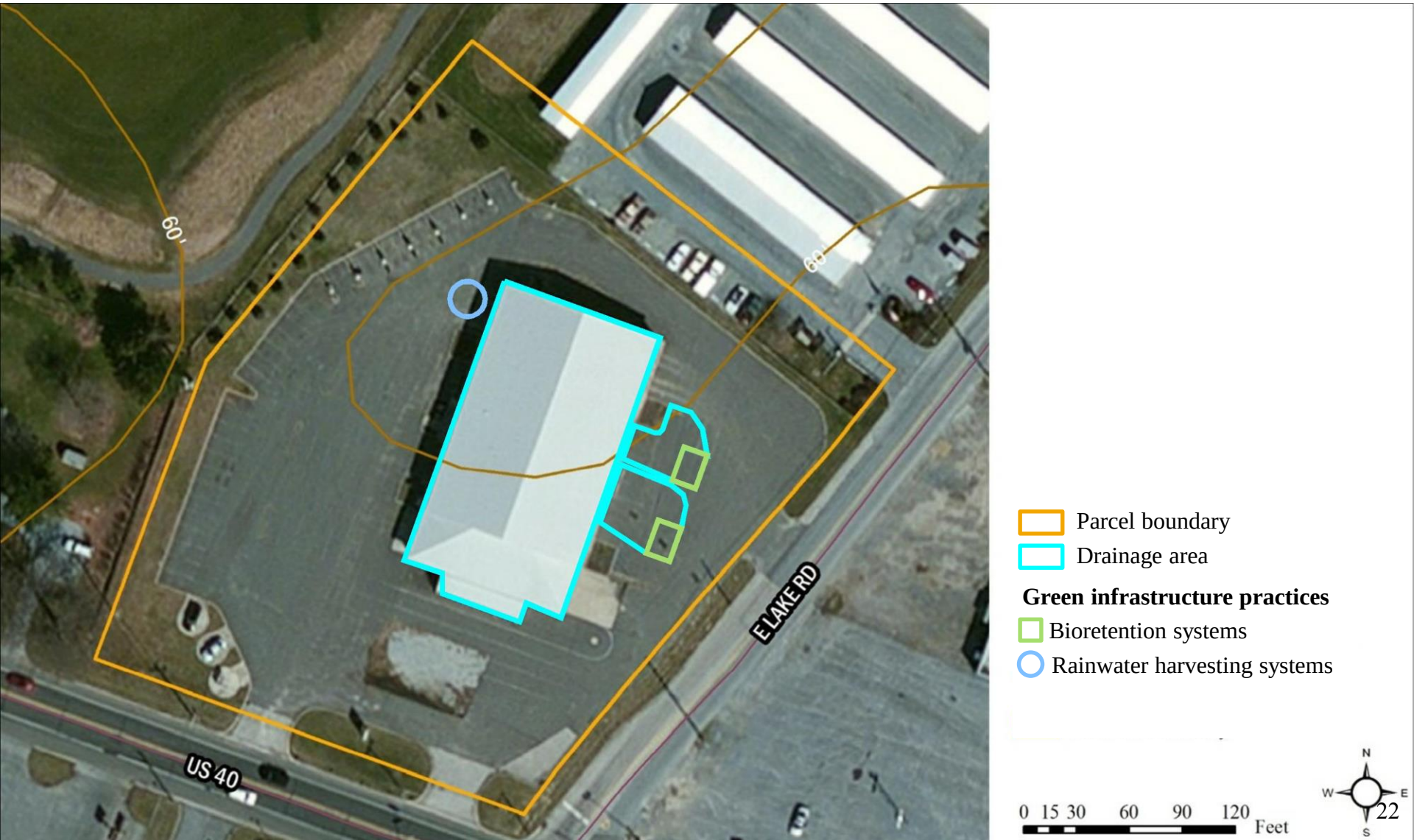
The entire roof of the building could be routed to a rainwater harvesting system. Bioretention systems could intercept runoff from the front driveway. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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"
79	86,271	4.16	43.57	396.10	0.07	2.37

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	0.064	11	4,660	0.16	610	$3,050
Rainwater harvesting systems	0	36	31,124	1.04	5,000	$10,000

10. Now & Then Consignment and Antique Mall

1167 US 40 Pilesgrove, NJ 08098
Block 35, Lot 11
108,738 sq. ft.
Salem River Watershed (east)



11. William Roper Early Childhood Learning Center

211 East Lake Ave. Pilesgrove, NJ 08098
Block 36, Lot *
* sq. ft.
Salem River Watershed (east)

Stormwater runoff from the rooftops and parking lots can be diverted to bioretention systems and pervious pavement. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing soil's suitability for green infrastructure. Aerial imagery is currently not available for this site, and proposed green infrastructure practices could not be calculated.

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"
-	-	-	-	-	-	-

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	-	-	-	-	-	-
Pervious pavement	-	-	-	-	-	-

* To be determined

RUTGERS New Jersey Agricultural Experiment Station

11. William Roper Early Childhood Learning Center

211 East Lake Ave. Pilesgrove, NJ 08098
Block 36, Lot *
* sq. ft.
Salem River Watershed (east)

* To be determined

12. Pilesgrove Municipal Building

1180 US 40 Pilesgrove, NJ 08098
Block 38, Lot 12
194,917 sq. ft.
Salem River Watershed (east)

Runoff from the parking lots could be collected in bioretention systems. Rainwater harvesting systems could collect the runoff from building rooftops. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
69	134,659	6.49	68.01	618.27	0.10	3.69

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	0.251	42	18,431	0.61	2,410	$12,050
Rainwater harvesting systems	0	23	3,837	0.13	5,000	$10,000

RUTGERS New Jersey Agricultural Experiment Station

12. Pilesgrove Municipal Building

1180 US 40 Pilesgrove, NJ 08098
Block 38, Lot 12
194,917 sq. ft.
Salem River Watershed (east)

13. Woodstown Mini Storage

231 East Lake Rd. Woodstown, NJ 08098
Block 39, Lot 18.03
142,440 sq. ft.
Salem River Watershed (east)

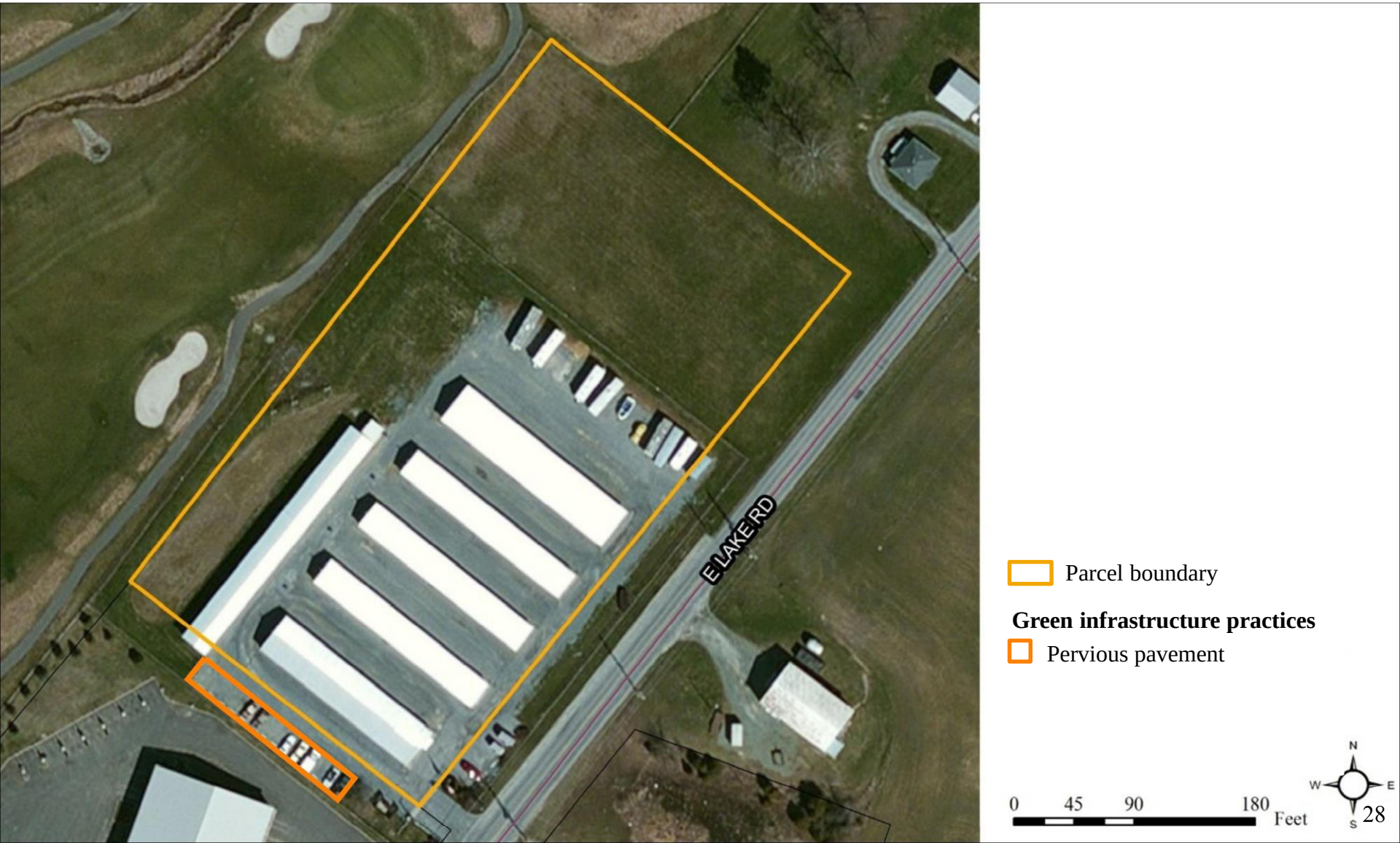
Portions of the paved driveway throughout this site could be repaved with pervious pavement to enhance stormwater infiltration. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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"
44	62,864	4.16	43.57	396.1	0.07	2.37

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	0.076	13	5,535	0.18	450	$11,250

13. Woodstown Mini Storage

231 East Lake Rd. Woodstown, NJ 08098
Block 39, Lot 18.03
142,440 sq. ft.
Salem River Watershed (east)



14. Wood Lanes

1173 US 40 Pilesgrove, NJ 08098
Block 40, Lot 12.05
118,567 sq. ft.
Salem River Watershed (east)

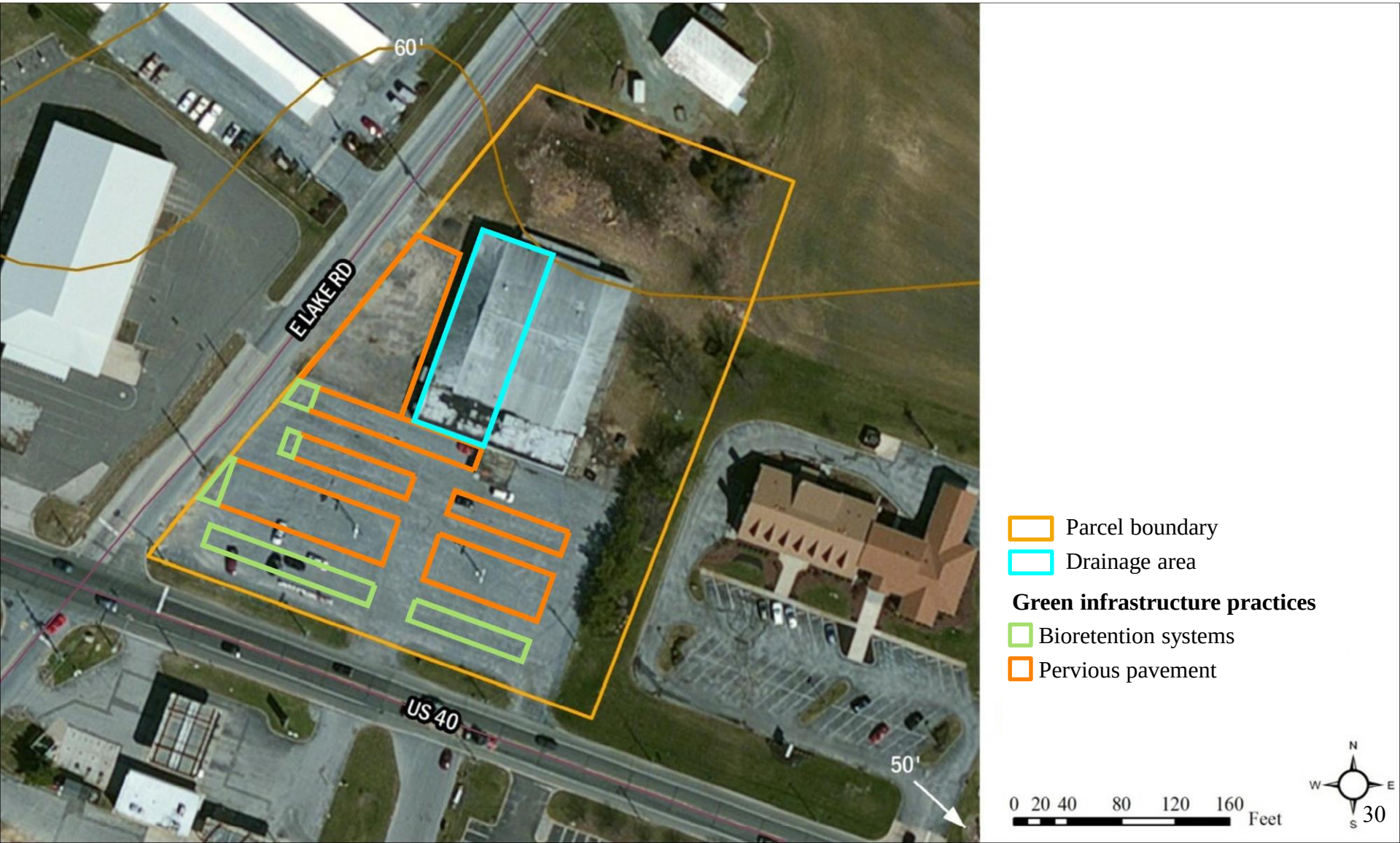
Grass pavers could be installed along the western edge of the building to treat its runoff. The parking lot could be retrofitted with bioretention systems and pervious pavement. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics 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"
69	82,292	3.97	41.56	377.83	0.06	2.26

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	0.113	19	8,310	0.28	1,090	$5,450
Pervious pavement	0.764	128	56,003	1.87	4,580	$114,500

14. Wood Lanes

1173 US 40 Pilesgrove, NJ 08098
Block 40, Lot 12.05
118,567 sq. ft.
Salem River Watershed (east)



15. Franklin Bank

1179 US 40 Pilesgrove, NJ 08098
Block 40, Lot 12.06
119,518 sq. ft.
Salem River Watershed (east)

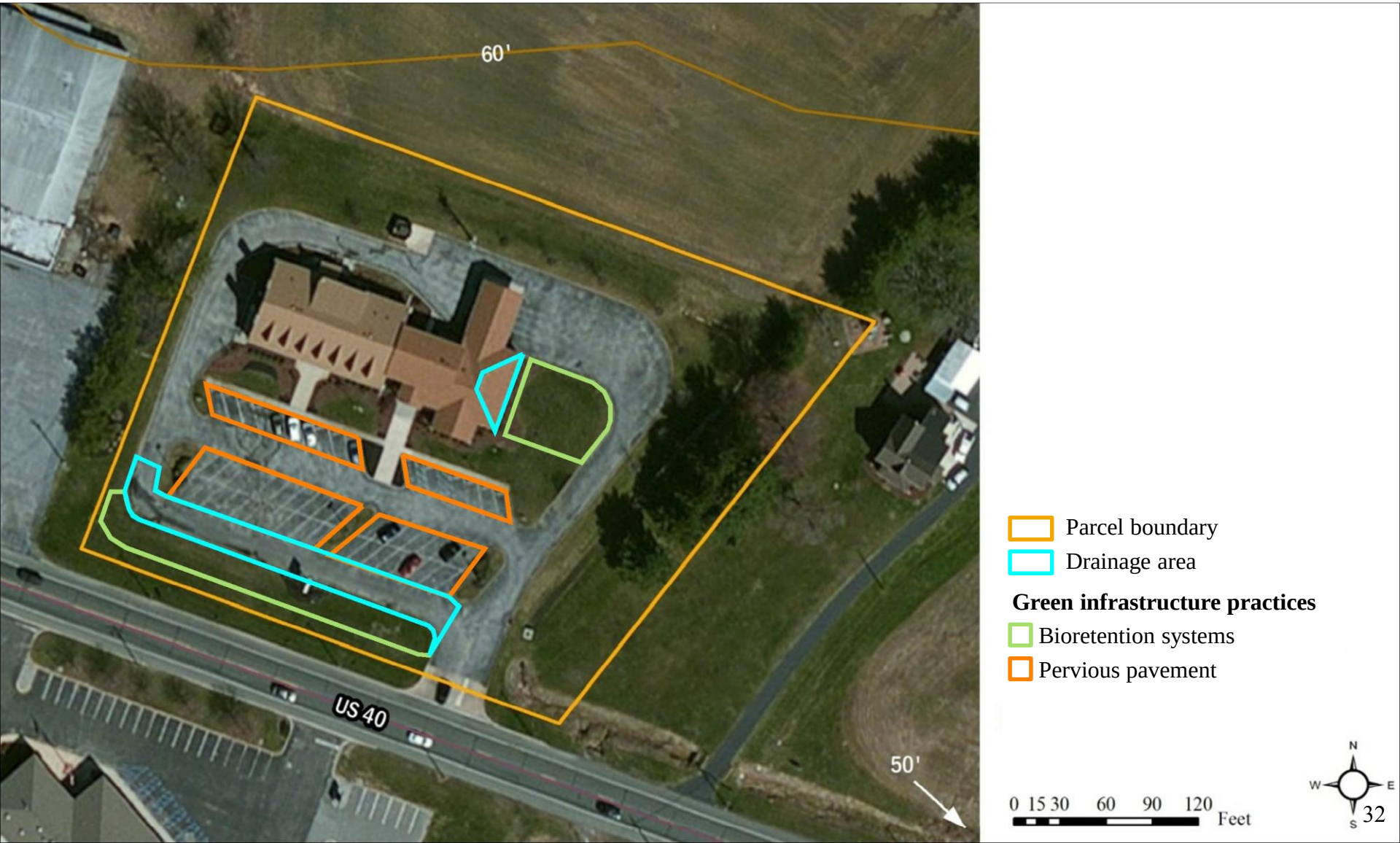
All of the parking spaces could be repaved with pervious pavement. The building and portions of the paved lot could be routed to bioretention systems. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

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"
55	65,539	3.16	33.10	300.92	0.05	1.80

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	0.151	25	11,093	0.37	1,450	$7,250
Pervious pavement	0.260	44	19,059	0.64	1,560	$39,000

15. Franklin Bank

1179 US 40 Pilesgrove, NJ 08098
Block 40, Lot 12.06
119,518 sq. ft.
Salem River Watershed (east)



16. Lighthouse Christian Center

90 Fox Rd. Pilesgrove, NJ 08098
Block 80, Lot 2.03
125,820 sq. ft.
Salem River Watershed (east)

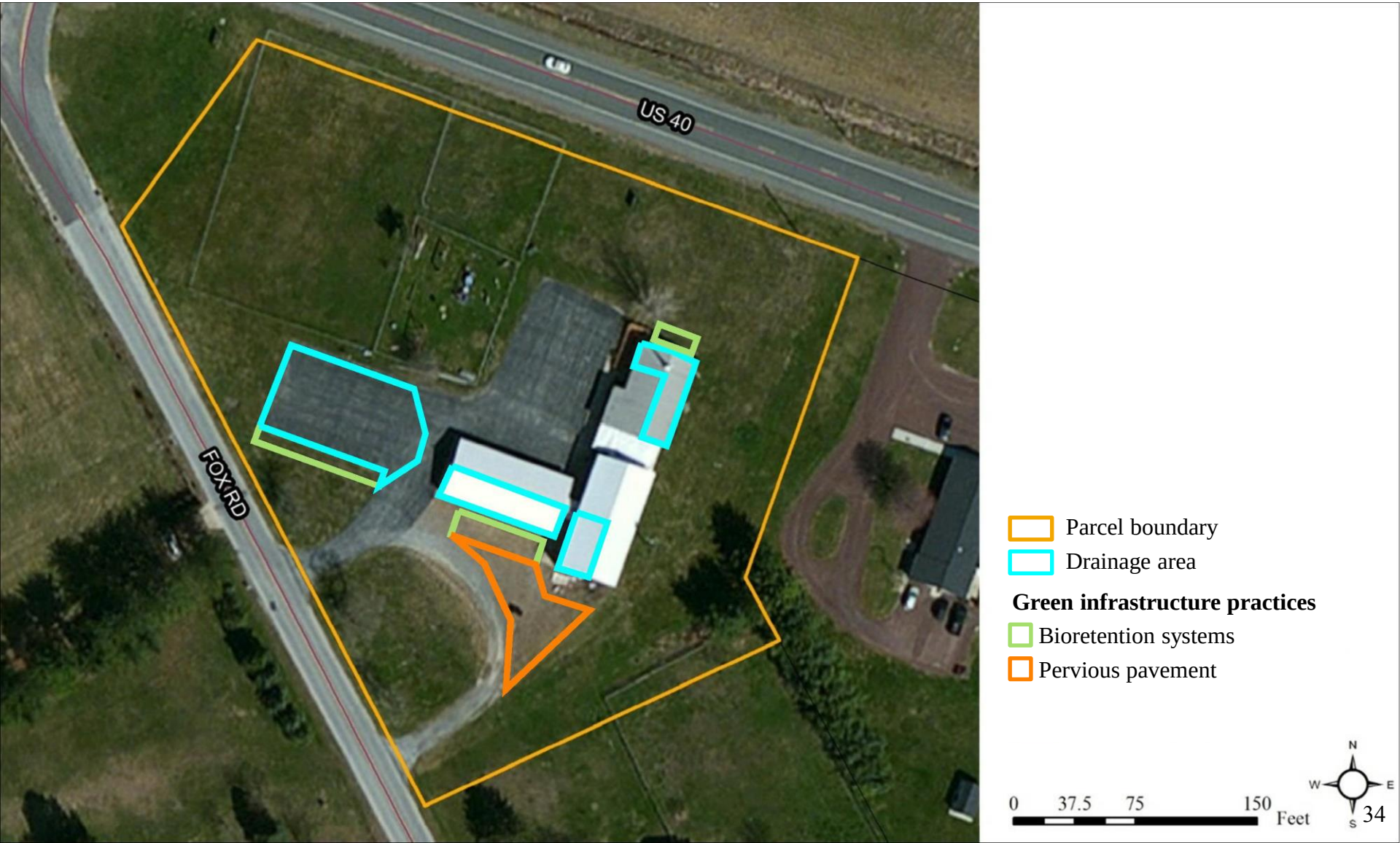
Bioretention systems could be installed in grass areas to treat runoff from the building and its paved lot. Grass pavers could replace compacted and eroded unpaved surfaces to enhance infiltration. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing 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"
34	42,766	2.06	21.6	196.35	0.03	1.17

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.217	36	15,925	0.53	2,090	$10,450
Pervious pavement	0.062	10	4,548	0.15	370	$9,250

16. Lighthouse Christian Center

90 Fox Rd. Pilesgrove, NJ 08098
Block 80, Lot 2.03
125,820 sq. ft.
Salem River Watershed (east)



17. Woodstown Veterinary Hospital

1250 US 40 Woodstown, NJ 08098
Block 80, Lot 2.04
67,784 sq. ft.
Salem River Watershed (east)

A bioretention system could be installed in the front lawn to treat the driveway's runoff and enhance the site's aesthetic appeal. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing 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"
38	26,047	1.26	13.16	119.59	0.02	0.71

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	0.029	5	2,117	0.07	280	$1,400

17. Woodstown Veterinary Hospital

1250 US 40 Woodstown, NJ 08098
Block 80, Lot 2.04
67,784 sq. ft.
Salem River Watershed (east)

18. Camp Crockett County Park

148 Avis Mill Rd. Pilesgrove, NJ 08098
Block 81, Lot 14
2,246,029 sq. ft.
Salem River Watershed (east)

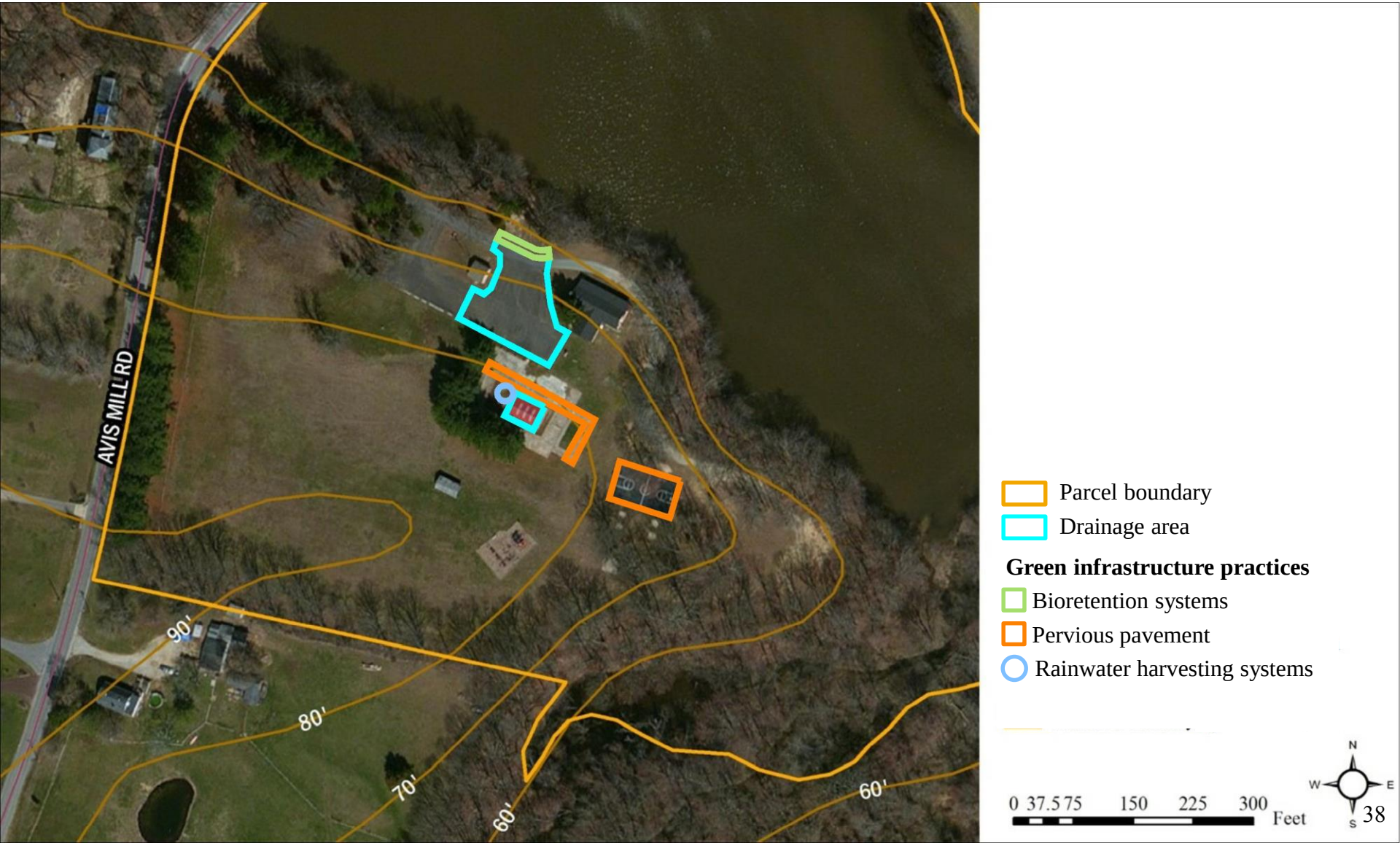
The site's paved surfaces could be repaved with pervious pavement. Buildings could use rainwater harvesting systems to collect their runoff. Bioretention systems could be implemented to intercept runoff before it reaches the nearby lake. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing 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"
2	49,301	2.38	24.9	226.36	0.04	1.35

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.283	47	20,757	0.69	2,720	$13,600
Pervious pavement	0.157	26	11,512	0.38	940	$23,500
Rainwater harvesting systems	0	3	2,446	0.08	5,000	$10,000

18. Camp Crockett County Park

148 Avis Mill Rd. Pilesgrove, NJ 08098
Block 81, Lot 14
2,246,029 sq. ft.
Salem River Watershed (east)



Nichomus Run Watershed

1. Acme
2. Rite Aid
3. Wendy's
4. Joe's Pizza / Donna's Hallmark Shop
5. Tri-County Veterinary Hospital

RUTGERS New Jersey Agricultural Experiment Station

1. Acme

857 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5
296,686 sq. ft.
Nichomus Run Watershed

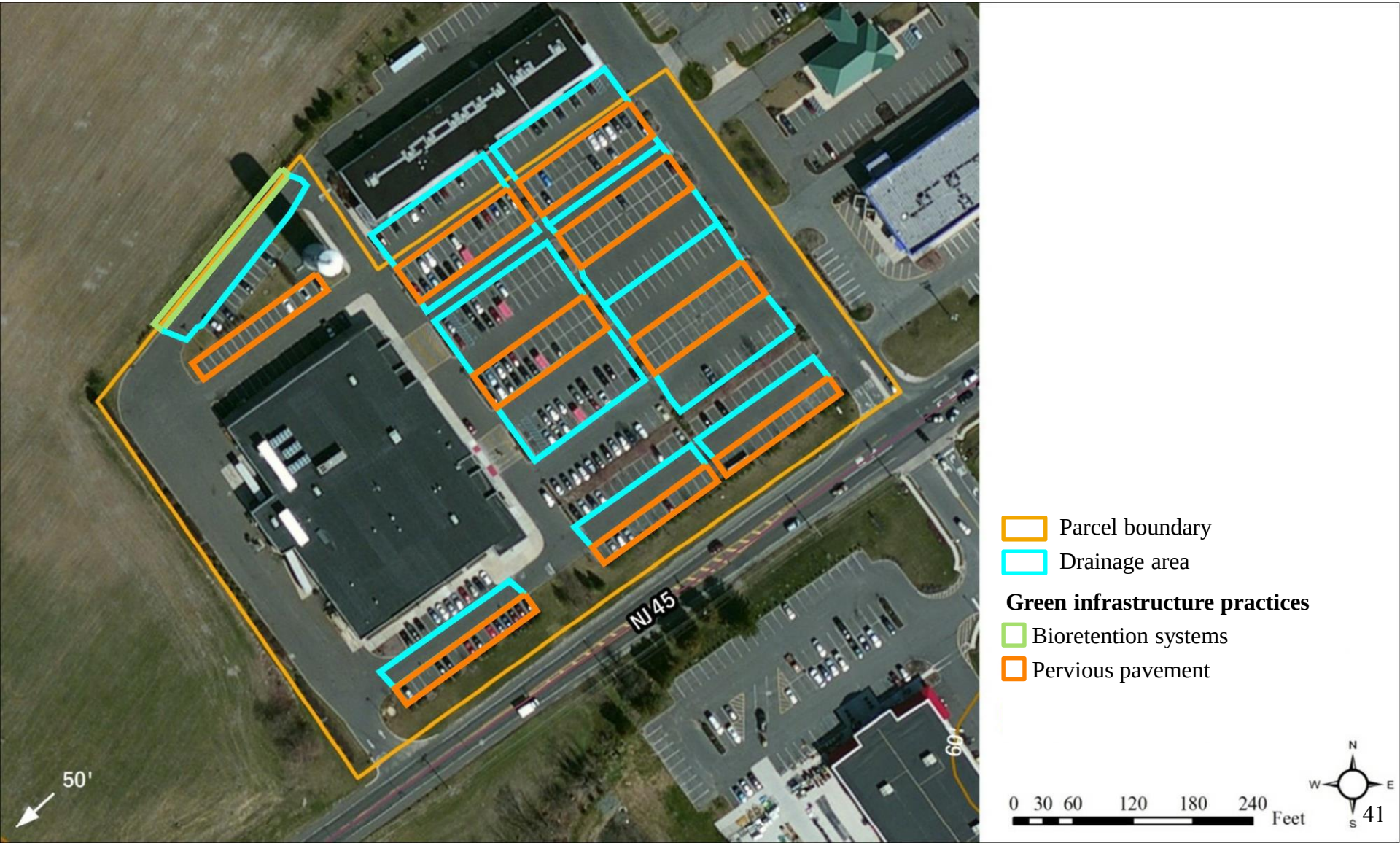
Parking spaces could be repaved with pervious pavement to intercept runoff prior to storm drains, thereby reducing loads to storm sewers. Bioretention systems could also be utilized to collect runoff. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage 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"
89	264,274	12.74	133.47	1,213.37	0.21	7.25

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	0.132	22	9,664	0.32	1,270	$6,350
Pervious pavement	2.671	447	195,789	6.53	16,020	$400,500

1. Acme

857 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5
296,686 sq. ft.
Nichomus Run Watershed



2. Rite Aid

865 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5.02
91,552 sq. ft.
Nichomus Run Watershed

Parking spaces could be repaved with pervious pavement to intercept runoff prior to storm drains, thereby reducing loads to storm sewers. A preliminary soil assessment for this site suggests that the site's existing 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"
72	65,796	3.17	33.23	302.09	0.05	1.80

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.781	131	57,229	1.91	4,680	$117,000

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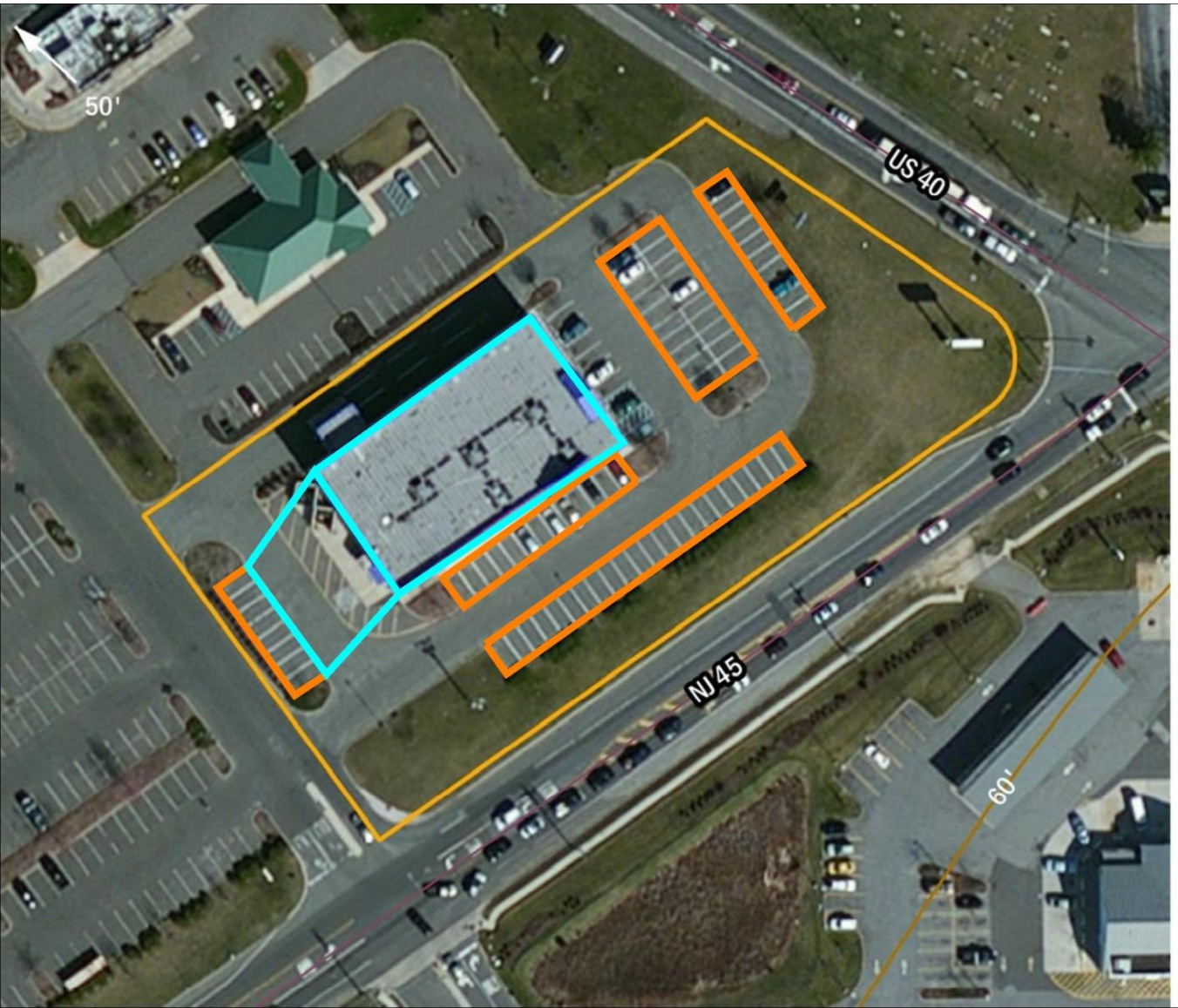
2. Rite Aid

865 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5.02
91,552 sq. ft.
Nichomus Run Watershed



Parcel boundary
Drainage area

Green infrastructure practices

Pervious pavement

0 20 40 80 120 160 Feet

N
W E
S

3. Wendy's

861 US 40 Pilesgrove, NJ 08098
Block 64, Lot 5.04
61,425 sq. ft.
Nichomus Run Watershed

Parking spaces could be repaved with pervious pavement to intercept runoff prior to storm drains, thereby reducing loads to storm sewers. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

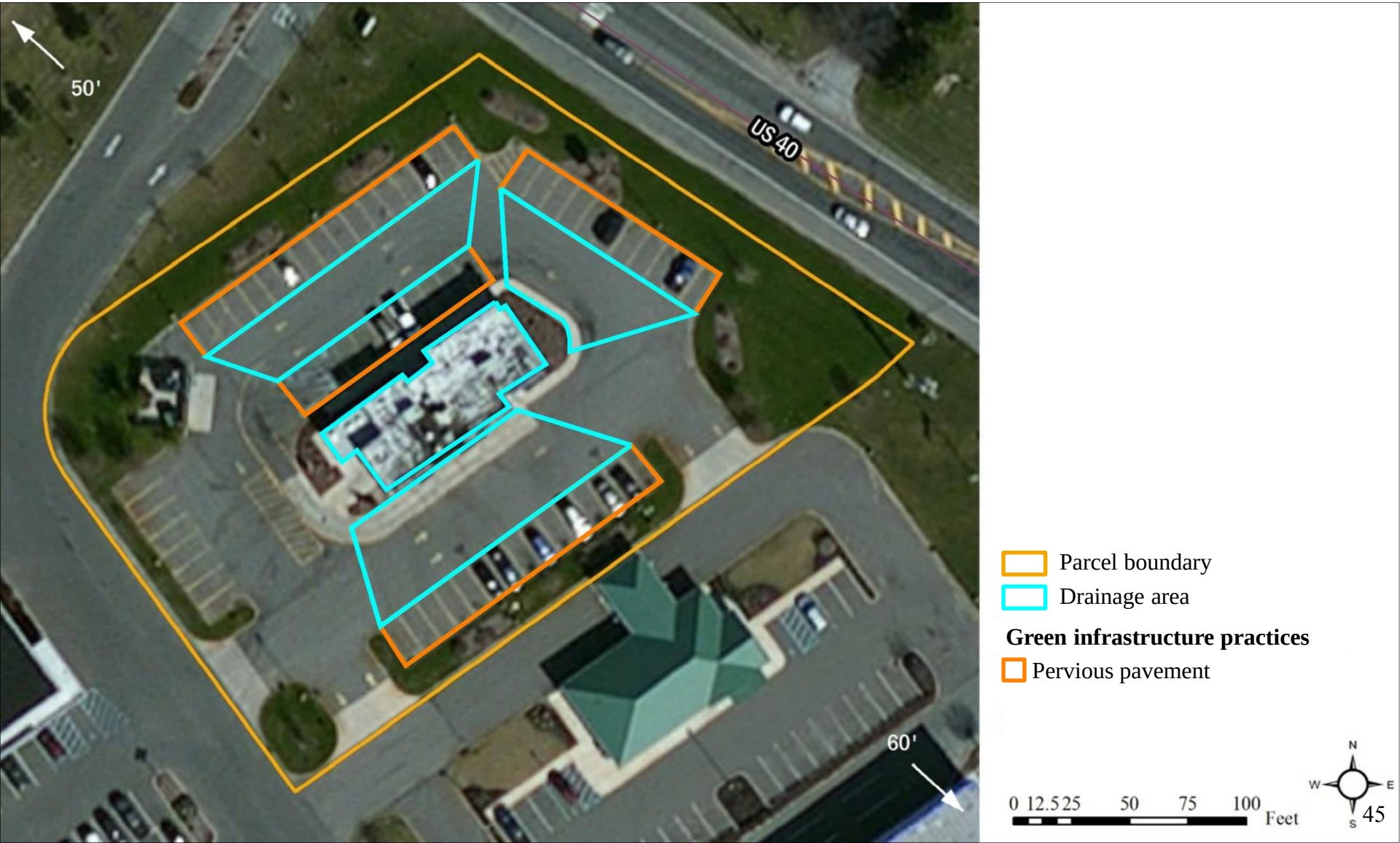
Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
75	46,269	2.23	23.37	212.44	0.04	1.27

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	0.589	99	43,175	1.44	3,530	$88,250

RUTGERS New Jersey Agricultural Experiment Station

3. Wendy's

861 US 40 Pilesgrove, NJ 08098
Block 64, Lot 5.04
61,425 sq. ft.
Nichomus Run Watershed



4. Joe's Pizza / Donna's Hallmark Shop

859 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5.05
87,689 sq. ft.
Nichomus Run Watershed

Parking spaces could be repaved with pervious pavement to intercept runoff prior to storm drains, thereby reducing loads to storm sewers. A preliminary soil assessment for this site suggests that the site's existing 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"
69	60,736	2.93	30.67	278.86	0.05	1.67

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	0.340	57	24,878	0.83	2,040	$51,000

4. Joe's Pizza / Donna's Hallmark Shop

859 NJ 45 Pilesgrove, NJ 08098
Block 64, Lot 5.05
87,689 sq. ft.
Nichomus Run Watershed

5. Tri-County Veterinary Hospital

816 US 40, Pilesgrove, NJ 08098
Block 65, Lot 7.02
439,214 sq. ft.
Nichomus Run Watershed

One or more bioretention systems could be installed along the rear parking lot to manage its stormwater runoff. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics for green infrastructure.

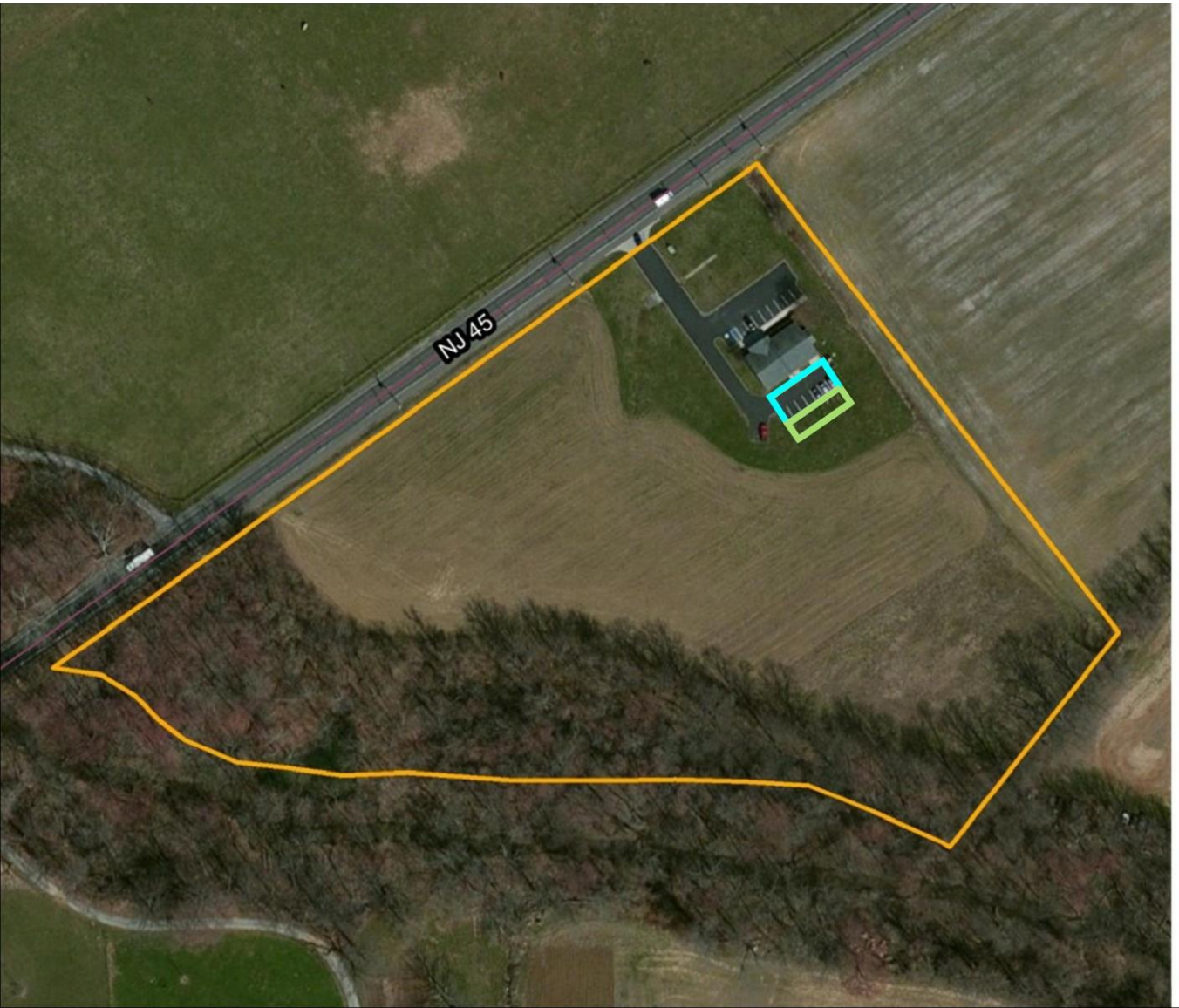
Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
5	19,980	0.96	10.09	91.73	0.02	0.55

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	0.061	10	4,466	0.15	590	$2,950

RUTGERS New Jersey Agricultural Experiment Station

5. Tri-County Veterinary Hospital

816 US 40, Pilesgrove, NJ 08098
Block 65, Lot 7.02
439,214 sq. ft.
Nichomus Run Watershed



Parcel boundary
Drainage area

Green infrastructure practices

Bioretention systems

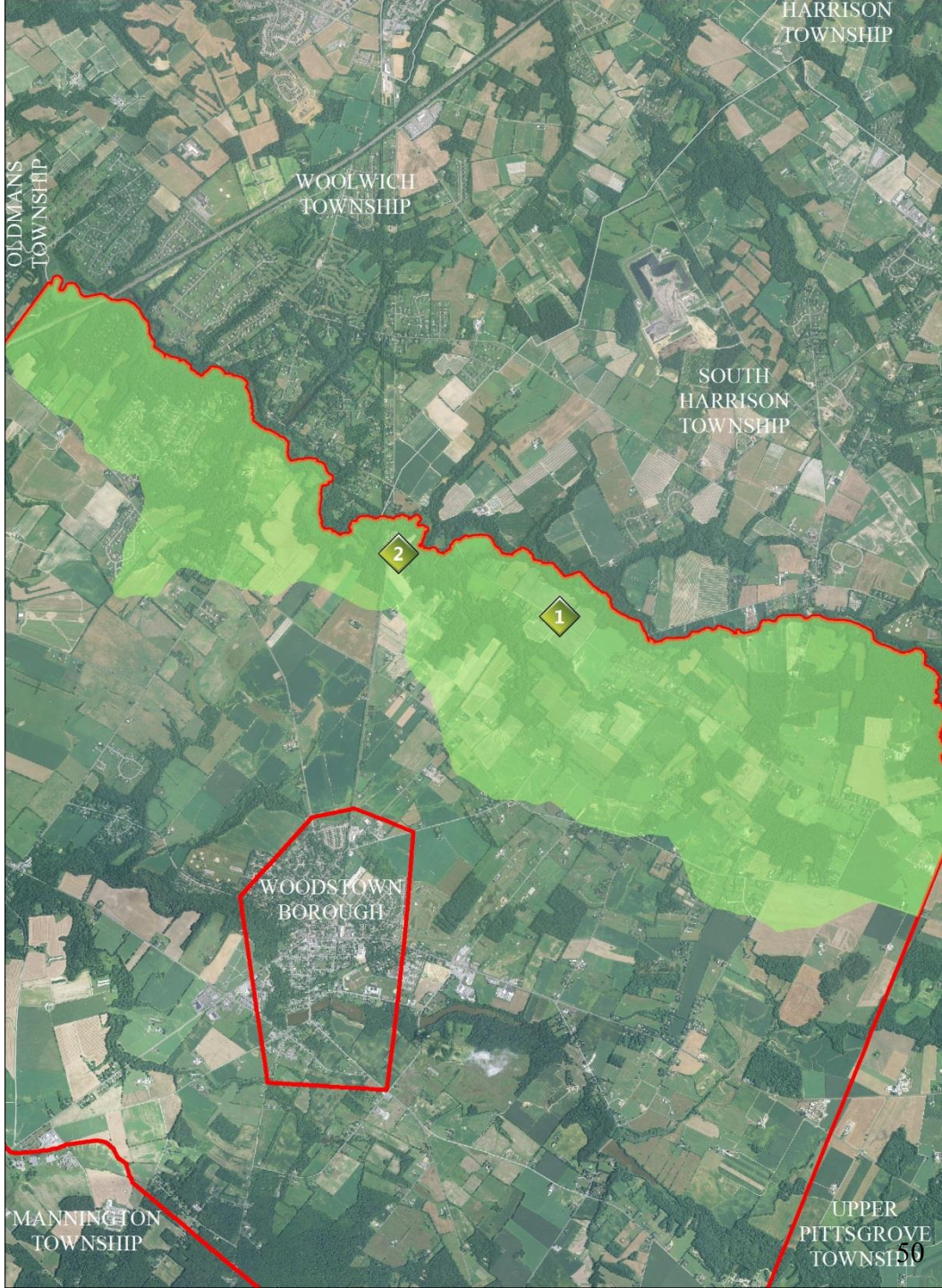
0 75 150 300 Feet

N
W E
S

Oldmans Creek Watershed

1. Woodstown Preschool Academy

2. R E Pierson Construction Co. Inc.



RUTGERS New Jersey Agricultural Experiment Station

1. Woodstown Preschool Academy

343 Lincoln Rd. Pilesgrove, NJ 08098
Block 9, Lot 3.03
123,844 sq. ft.
Oldmans Creek Watershed

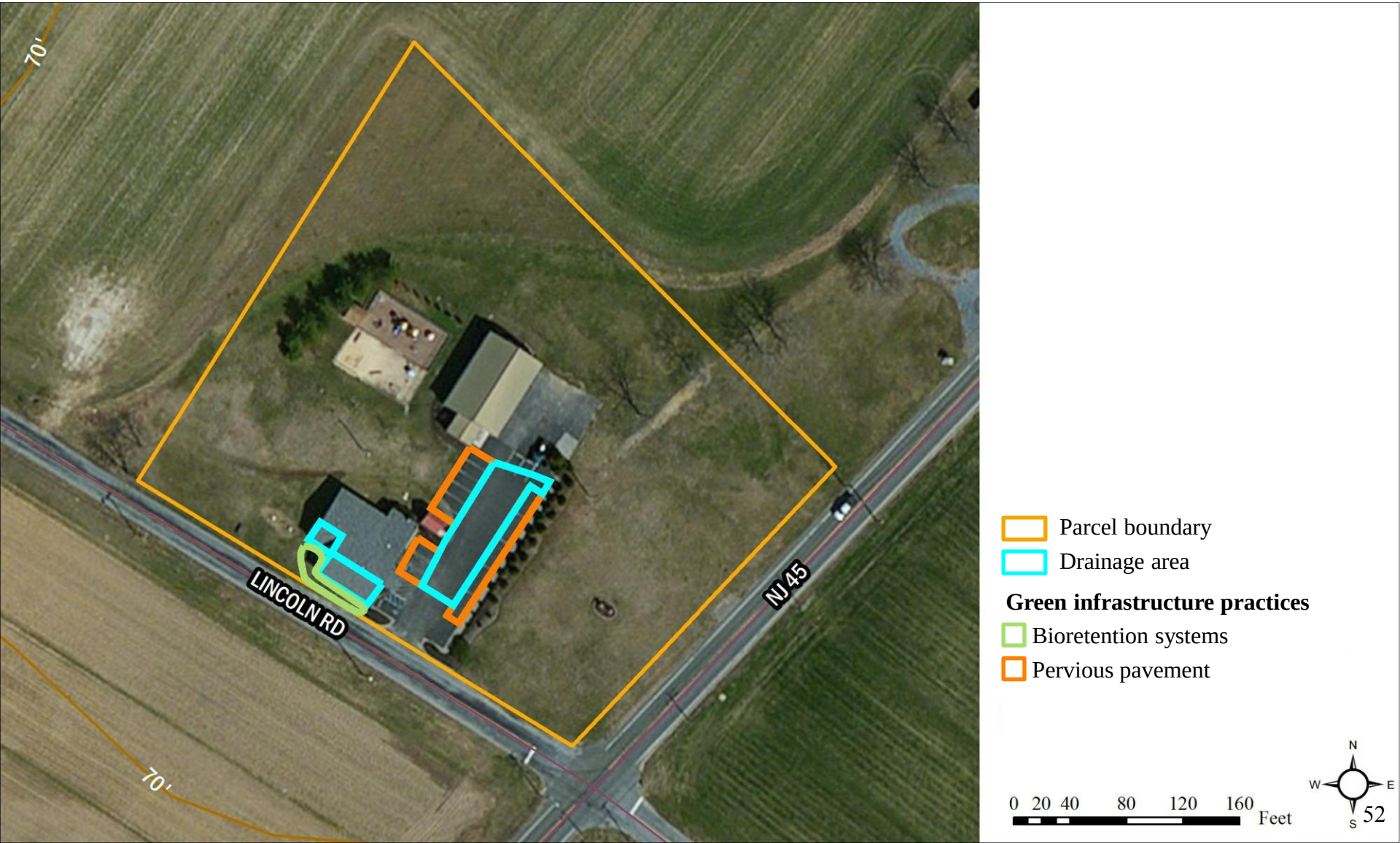
The buildings' downspouts could be routed to bioretention systems for improved infiltration and aesthetic appeal. The parking lot's runoff could be better managed by pervious pavement. A preliminary soil assessment for this site suggests that the site's existing soils have suitable drainage characteristics 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"
17	20,748	1	10.48	95.26	0.02	0.57

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	0.027	5	1,990	0.07	260	$1,300
Pervious pavement	0.151	25	11,078	0.37	900	$22,500

1. Woodstown Preschool Academy

343 Lincoln Rd. Pilesgrove, NJ 08098
Block 9, Lot 3.03
123,844 sq. ft.
Oldmans Creek Watershed



2. R E Pierson Construction Co. Inc.

426 Swedesboro Rd. Pilesgrove, NJ 08098
Block 11, Lot 3.01
959,577 sq. ft.
Oldmans Creek Watershed

Pervious pavement would intercept runoff prior to storm drains, thereby reducing loads to storm sewers and reducing localized flooding. Several building could be retrofitted with rainwater harvesting systems. A preliminary soil assessment for this site suggests that more soil testing would be required to determine the existing soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
32	305,765	14.74	154.43	1403.88	0.24	8.39

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	0.901	151	66,011	2.20	5,400	$135,000
Rainwater harvesting systems	0	14	12,357	0.41	5,000	$10,000

2. R E Pierson Construction Co. Inc.

426 Swedesboro Rd. Pilesgrove, NJ 08098
Block 11, Lot 3.01
959,577 sq. ft.
Oldmans Creek Watershed