RUTGERS
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Experiment Station

Draft

Impervious Cover Reduction Action Plan
for
Far Hills Borough, Somerset County, New Jersey

Prepared for Far Hills Borough by the
Rutgers Cooperative Extension Water Resources Program

February 26, 2020

Highlands Council
New Jersey

ACKNOWLEDGEMENTS:

This document has been prepared by the Rutgers Cooperative Extension Water Resources Program, with funding and direction from the New Jersey Highlands Water Protection and Planning Council and the New Jersey Agricultural Experiment Station, to highlight green infrastructure opportunities within Far Hills Borough. We would like to thank the New Jersey Highlands Water Protection and Planning Council, the New Jersey Agricultural Experiment Station, and Far Hills Borough for their input and support in creating this document.

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New Jersey

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Introduction

Located in Somerset County, New Jersey, Far Hills Borough covers approximately 4.88 square miles. Figures 1 and 2 illustrate that Far Hills Borough is dominated by forest land use. A total of 26.4% of the municipality's land use is classified as urban. Of the urban land in Far Hills Borough, rural residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2015 land use/land cover geographical information system (GIS) data layer categorizes Far Hills Borough 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 Far Hills Borough. Based upon the 2015 NJDEP land use/land cover data, approximately 4.0% of Far Hills Borough has impervious cover. This level of impervious cover suggests that the streams in Far Hills Borough likely are likely sensitive streams. [1]

Methodology

Far Hills Borough contains portions of two subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in one 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] Schuler, T.R., L. Fraley-McNeal, and K. Cappiella. 2009. Is Impervious Cover Still Important? Review of Recent Research. *Journal of Hydrologic Engineering* 14 (4): 309-315.

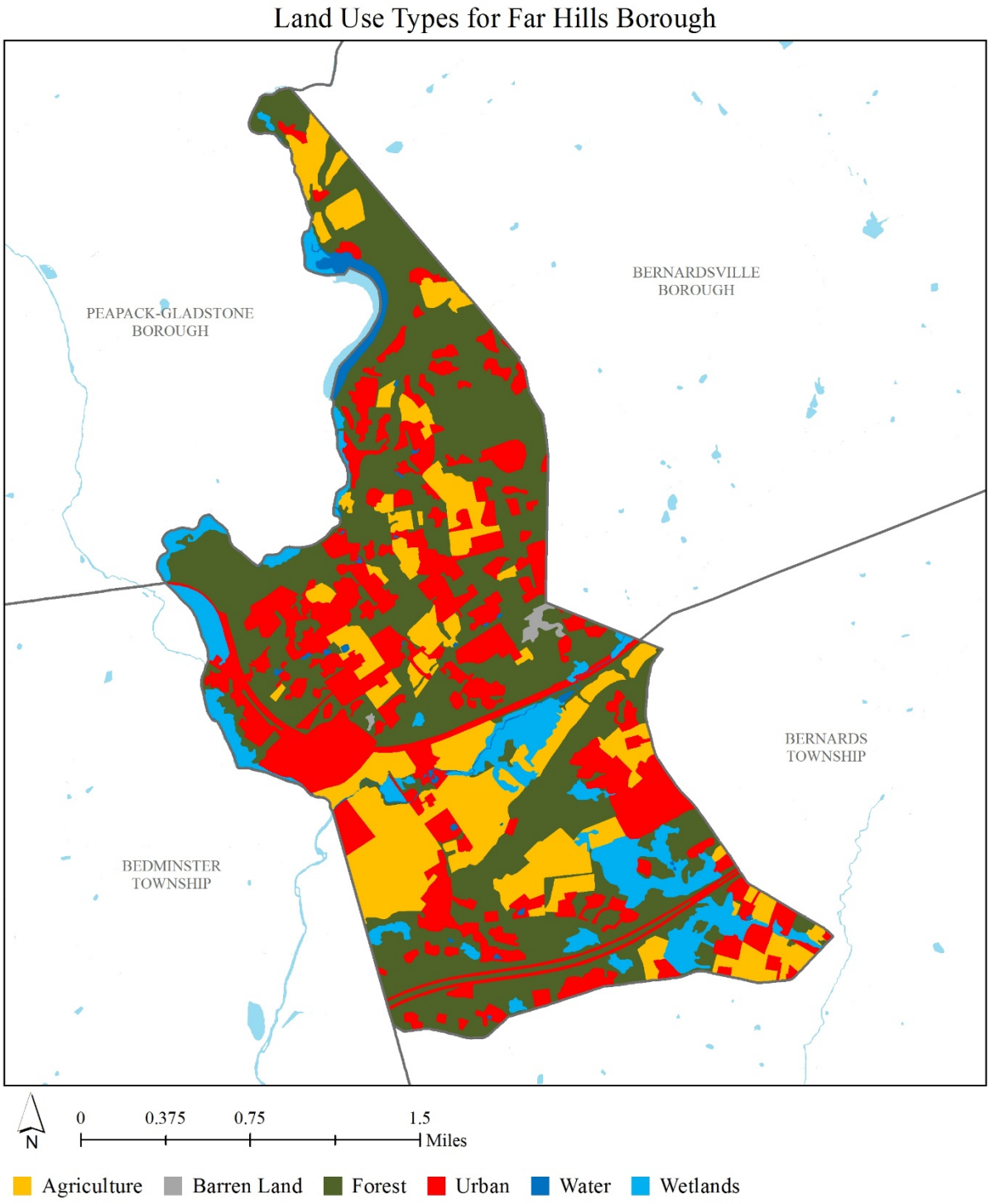


Figure 1: Map illustrating the land use in Far Hills Borough

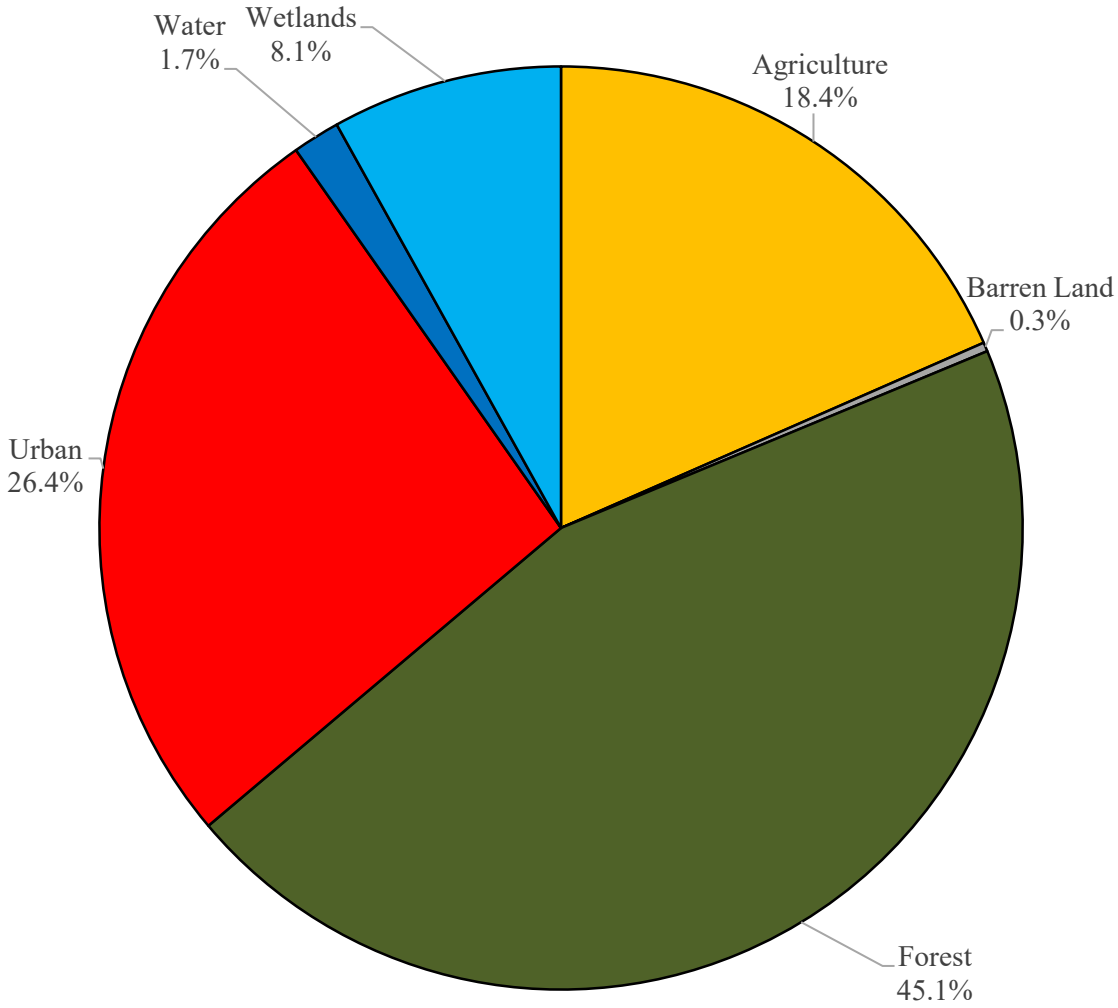


Figure 2: Pie chart illustrating the land use in Far Hills Borough

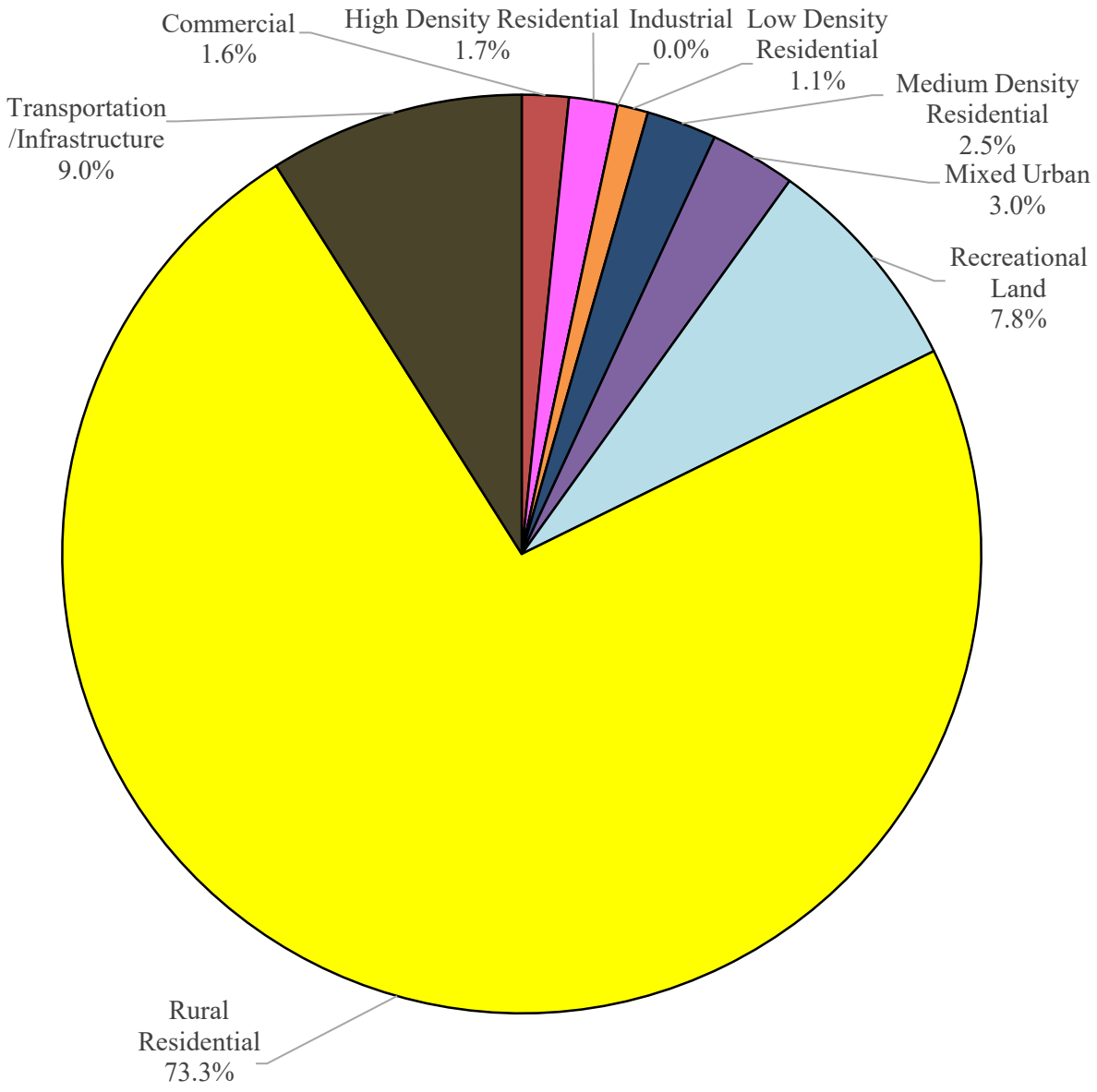


Figure 3: Pie chart illustrating the various types of urban land use in Far Hills Borough

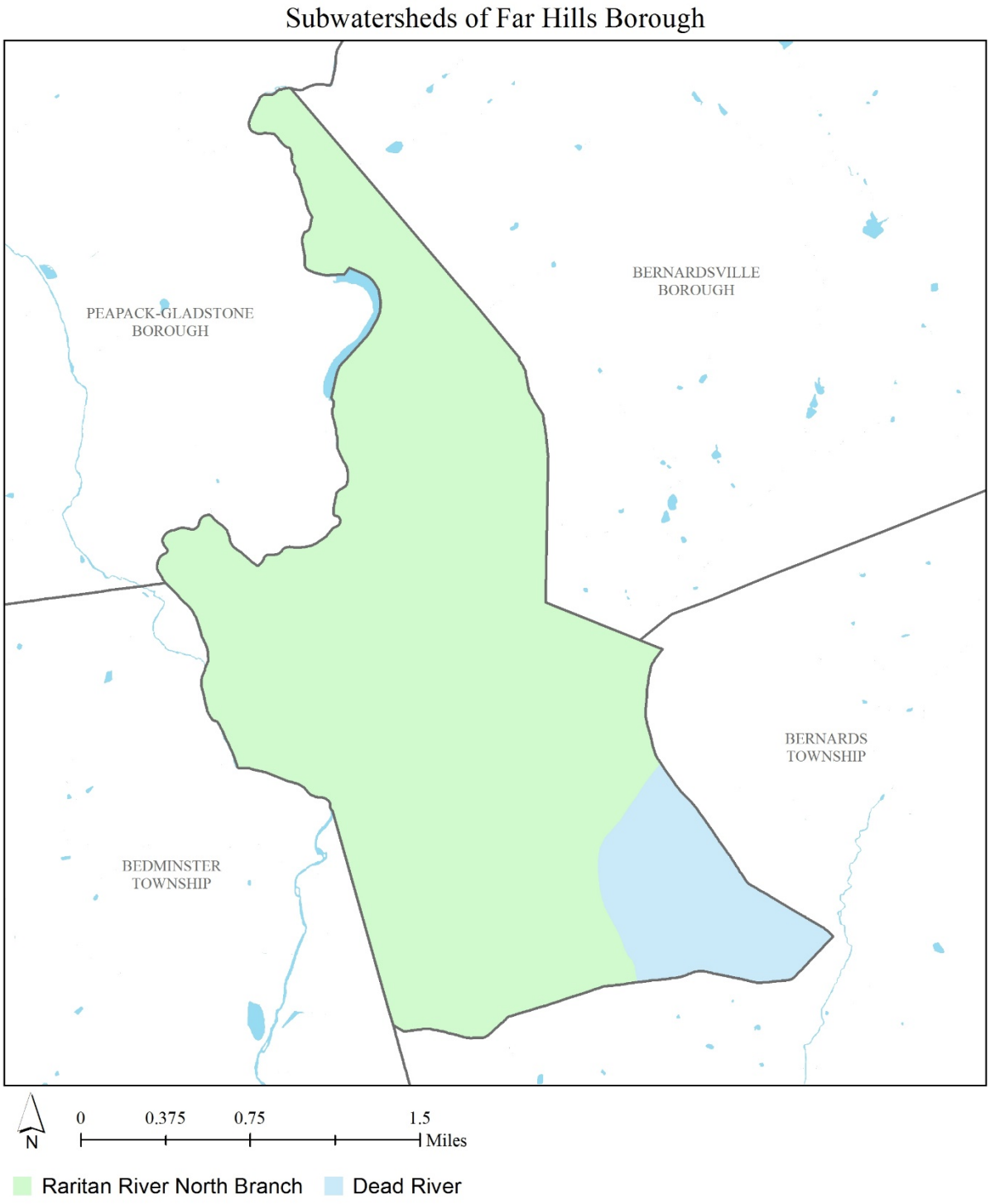


Figure 4: Map of the subwatersheds in Far Hills Borough

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 2015 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 Far Hills Borough 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 principle, 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 Far Hills Borough. 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.

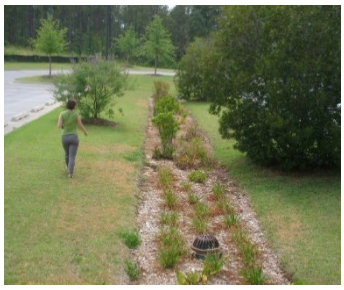
Downspout planter boxes

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

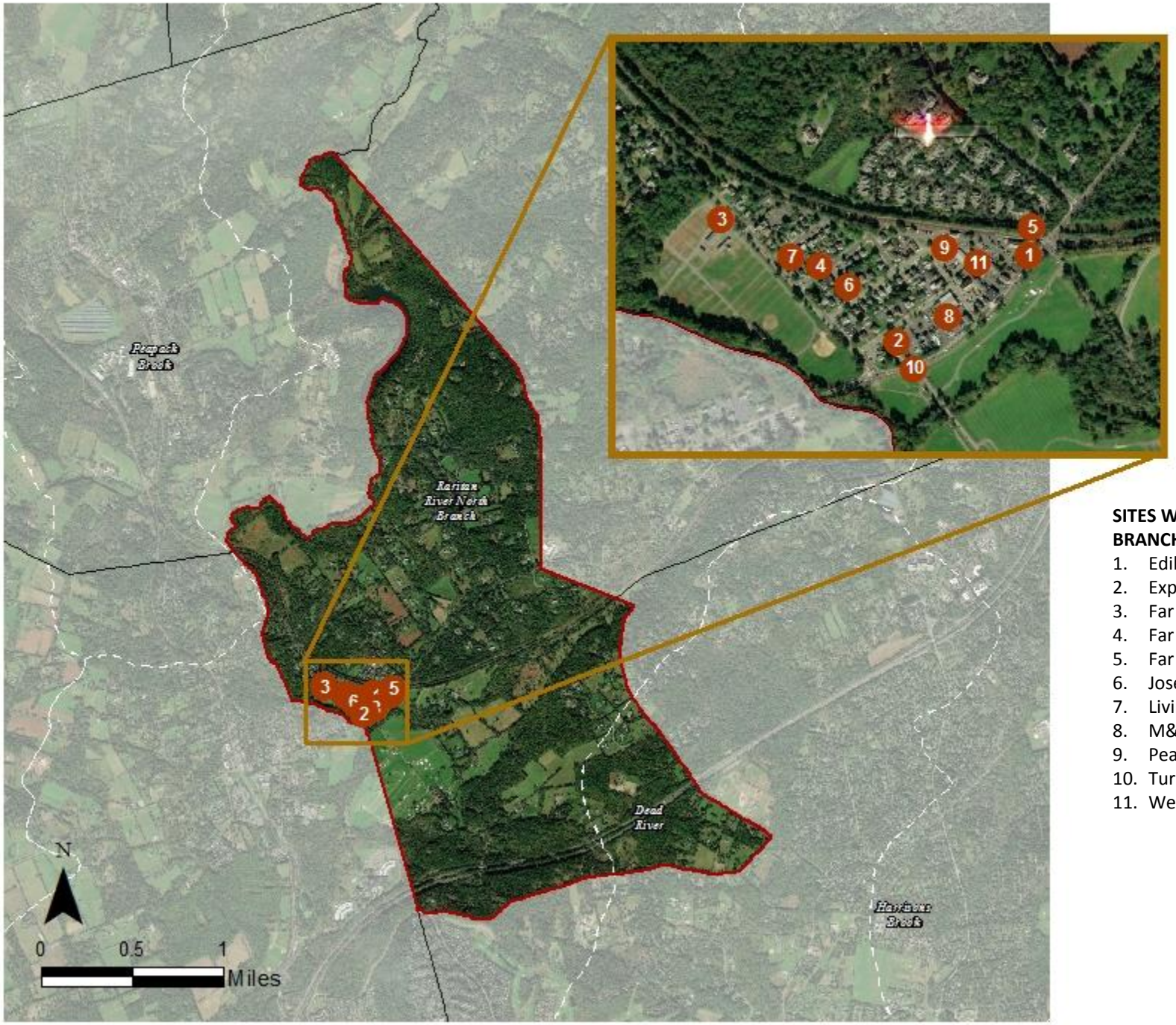
This impervious cover reduction action plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such as boy scouts,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

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

FAR HILLS BOROUGH: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE RARITAN RIVER NORTH BRANCH

1. Edible Arrangements
2. Express Yourself Salon
3. Far Hills Fairgrounds
4. Far Hills Police Department
5. Far Hills Station
6. Joseph D'Apolito & Son
7. Living Plate
8. M&M Perrotti's Prepared Foods
9. Peapack-Gladstone Bank
10. Turpin Real Estate
11. Wealth Planning Advisors

b. Proposed Green Infrastructure Concepts

EDIBLE ARRANGEMENTS

Subwatershed: Raritan River North Branch

Site Area: 6,128 sq. ft.

Address: 55 US Route 202
Far Hills, NJ 07931

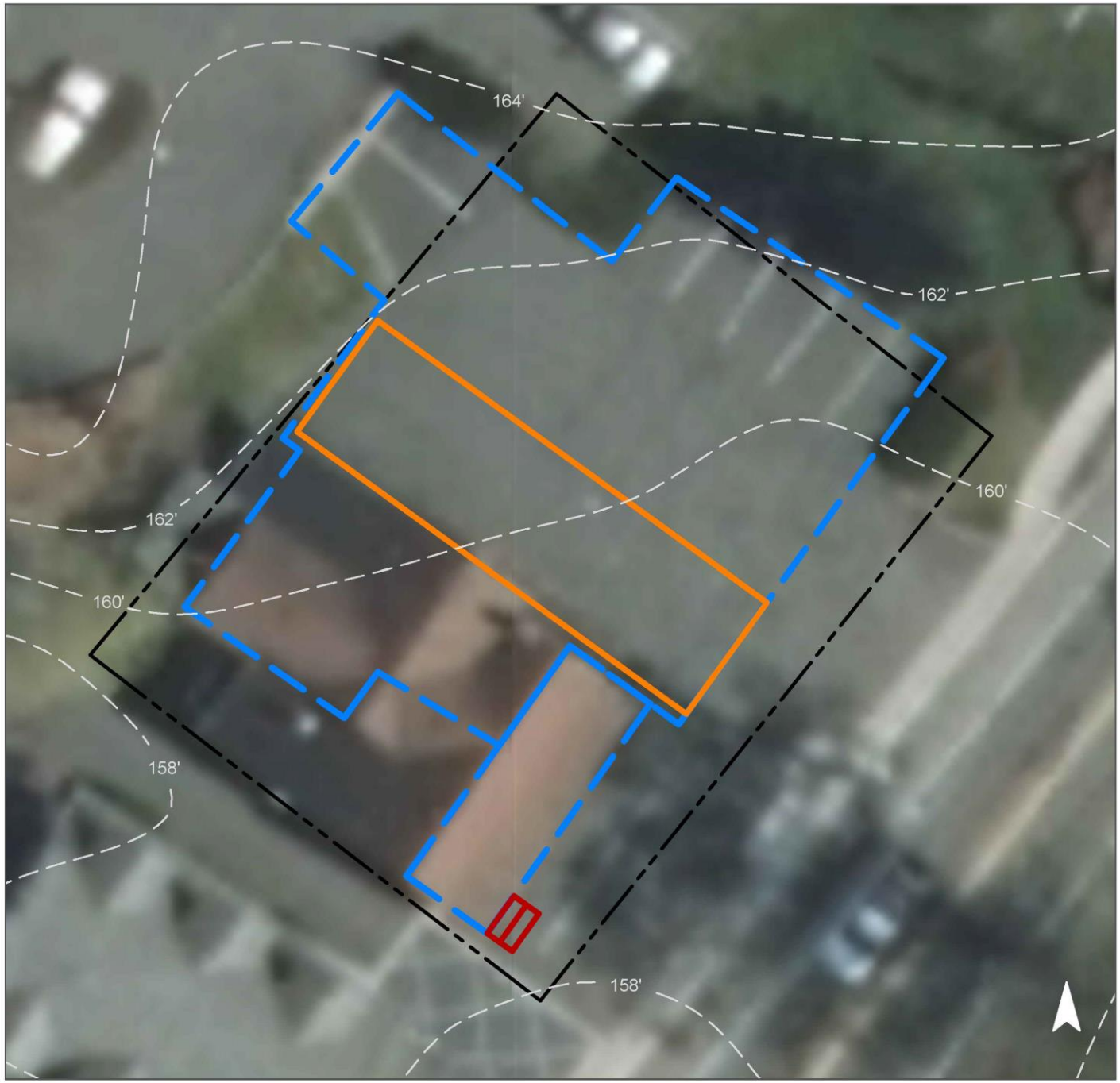
Block and Lot: Block 15, Lot 8

Parking spaces in the parking lot to the north of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot and roof. The downspout on the front of the building can be directed to downspout planter boxes to help capture stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
89	5,474	0.3	2.6	23.9	0.004	0.14

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	0.122	20	8,946	0.34	1,135	$28,375
Planter boxes	n/a	2	n/a	n/a	2 (boxes)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Edible Arrangements

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

0 10' 20'

EXPRESS YOURSELF SALON

Subwatershed: Raritan River North Branch

Site Area: 17,100 sq. ft.

Address: US Route 202 & Peapack Road
Far Hills, NJ 07931

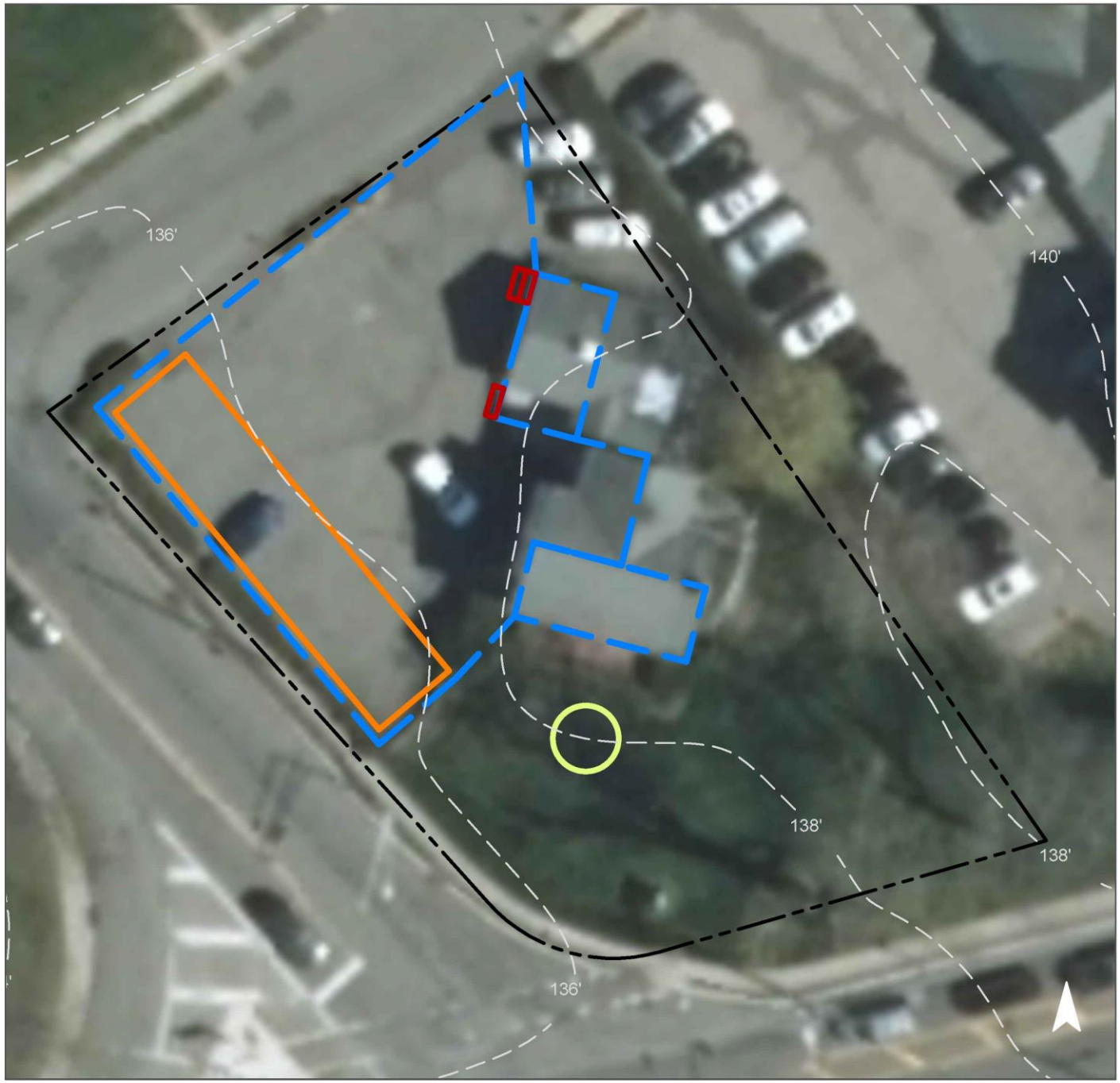
Block and Lot: Block 14, Lot 1

Parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot and roof. On the south side of the building a bioretention system can be installed to help capture, treat, and infiltrate stormwater from the building's roof. Downspout planter boxes can be installed on the parking lot side of the building to help capture additional stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
89	15,275	0.7	7.7	70.1	0.012	0.42

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	1,002	0.04	130	$650
Pervious pavement	0.172	29	12,649	0.48	1,460	$36,500
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Express Yourself Salon

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

0 15' 30'

FAR HILLS FAIRGROUNDS

Subwatershed: Raritan River North Branch

Site Area: 851,544 sq. ft.

Address: 42 Peapack Road
Far Hills, NJ 07931

Block and Lot: Block 15, Lot 2

A section of parking spaces can be converted to porous pavement to capture and infiltrate runoff from the parking area. An area of turfgrass can be converted to a rain garden to capture, treat, and infiltrate stormwater runoff from the basketball courts 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"
25	210,233	10.1	106.2	965.3	0.164	5.77

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.068	11	5,012	0.19	655	$3,275
Pervious pavement	0.095	16	6,956	0.26	650	$16,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Far Hills Fairgrounds

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

0 50' 100'

FAR HILLS POLICE DEPARTMENT

Subwatershed: Raritan River North Branch

Site Area: 31,316 sq. ft.

Address: 6 Prospect Street
Far Hills, NJ 07931

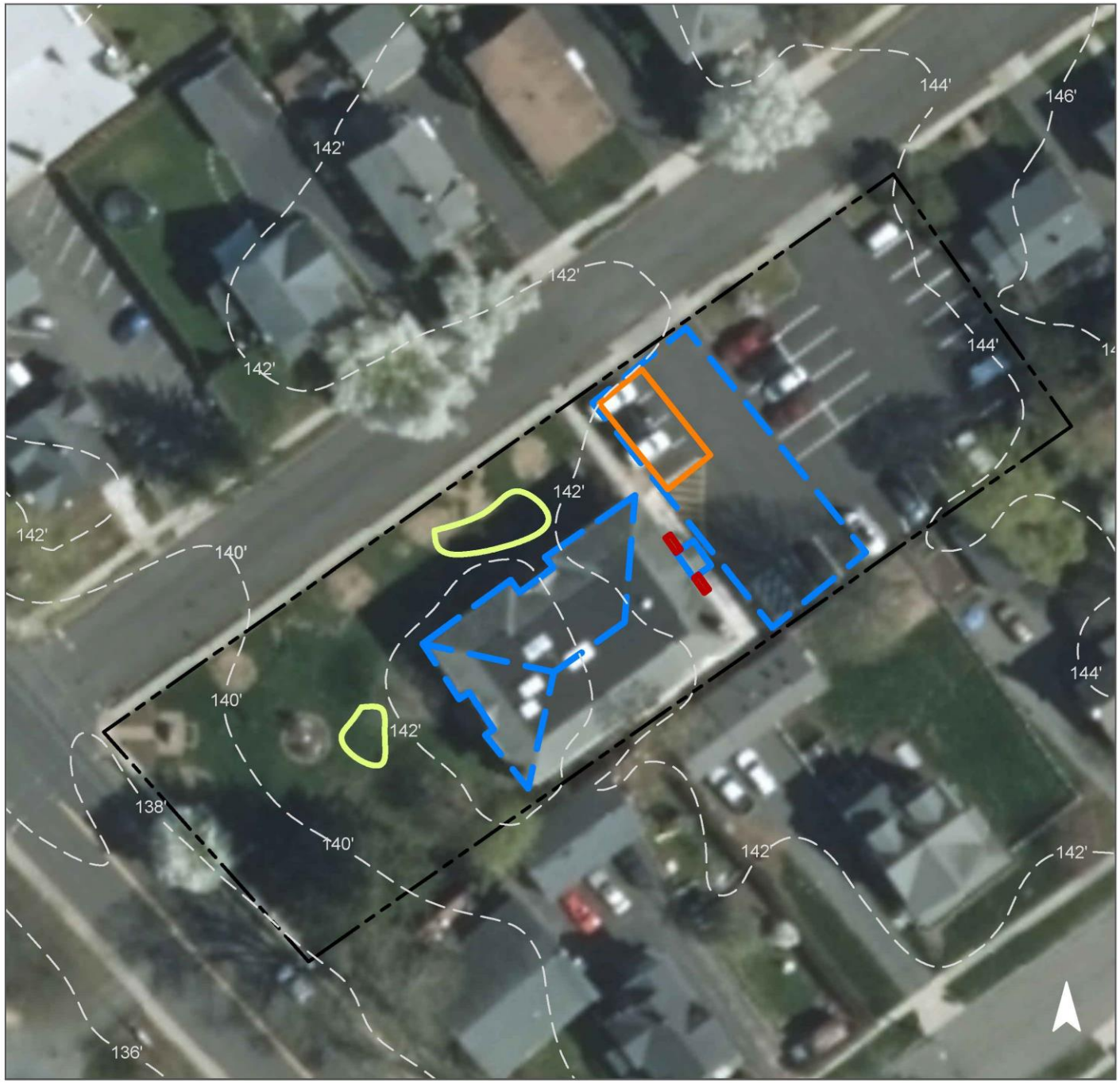
Block and Lot: Block 11, Lot 1

Turfgrass areas to the northwest and southwest of the building can be converted to a bioretention system to capture, treat, and infiltrate stormwater runoff from the roof. Pervious pavement can be installed in the southwest corner of the parking lot to capture and infiltrate stormwater. Downspout planter boxes can be installed at the parking lot entrance awning to help capture stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
80	24,973	1.2	12.6	114.7	0.019	0.68

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 systems	0.068	11	5,012	0.19	655	$3,275
Pervious pavement	0.095	16	6,956	0.26	650	$16,250
Planter boxes	n/a	0	n/a	n/a	2 (boxes)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Far Hills Police Department

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

0 25' 50'

FAR HILLS STATION

Subwatershed: Raritan River North Branch

Site Area: 1,394,613 sq. ft.

Address: 57 US Route 202
Far Hills, NJ 07931

Block and Lot: Block 101, Lot 1

Downspouts on the north and south of the building can be disconnected and converted to planter boxes to capture stormwater runoff from the roof. 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"
7	92,792	4.5	46.9	426.0	0.072	2.54

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
Pervious pavement	0.607	102	6,956	0.26	4,730	$118,250
Planter boxes	n/a	5	n/a	n/a	6 (boxes)	$6,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Far Hills Station

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

0 25' 50'

JOSEPH D'APOLITO & SON

Subwatershed: Raritan River North Branch

Site Area: 15,641 sq. ft.

Address: 16 Peapack Road
Far Hills, NJ 07931

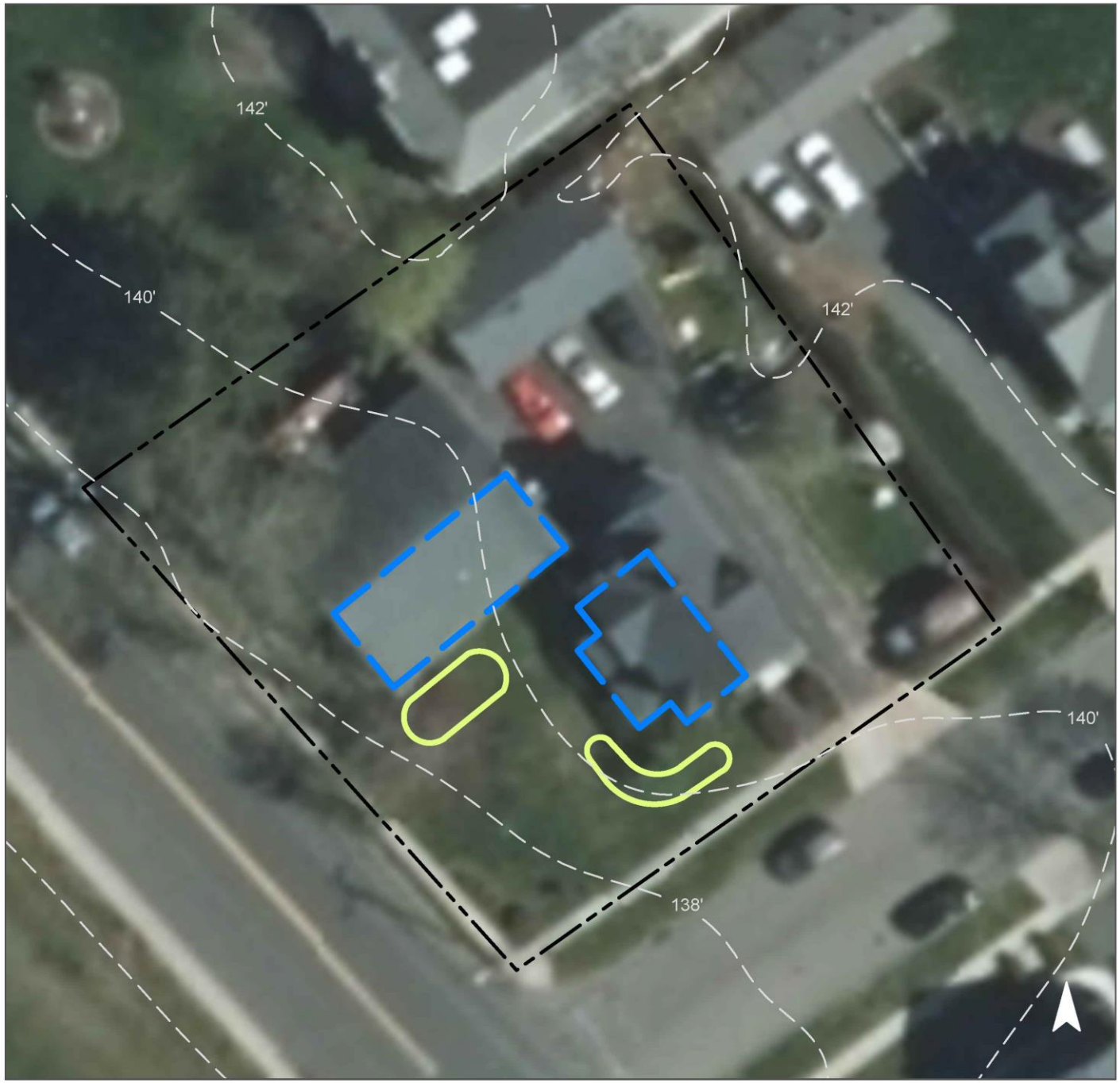
Block and Lot: Block 11, Lot 2

Two bioretention systems can be installed in the turfgrass area to the southeast 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"
74	11,559	0.6	5.8	53.1	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
Bioretention systems	0.038	6	2,775	0.10	380	$1,900

GREEN INFRASTRUCTURE RECOMMENDATIONS



Joseph D'Apolito & Son

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

0 15' 30'

LIVING PLATE

Subwatershed: Raritan River North Branch

Site Area: 5,674 sq. ft.

Address: 22 Peapack Road
Far Hills, NJ 07931

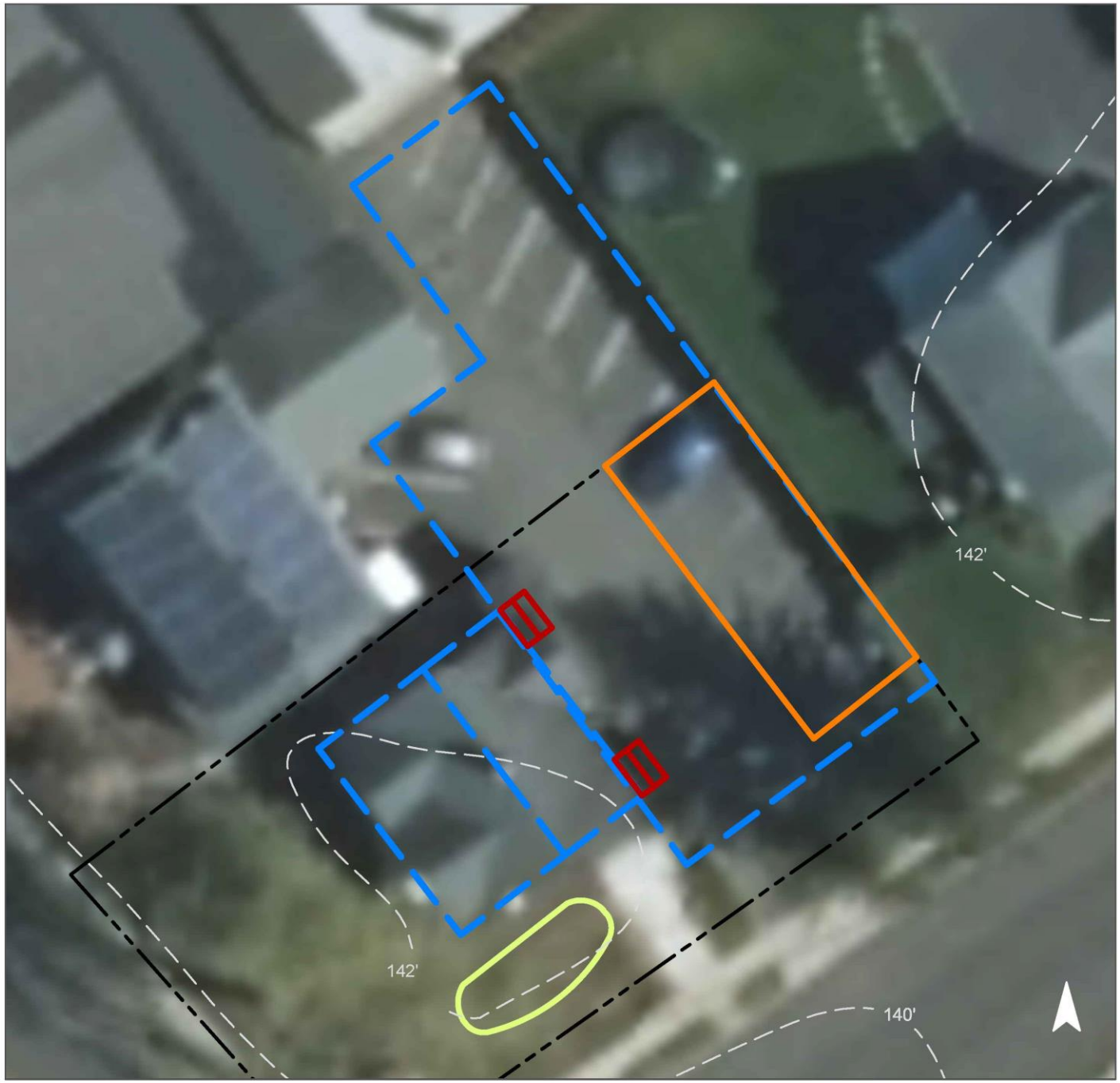
Block and Lot: Block 10, Lot 3

The turfgrass to the southeast of the building can be converted to a bioretention system to capture, treat, and infiltrate stormwater runoff from the roof. The western edge of the parking lot can be converted to pervious pavement to help capture and infiltrate stormwater runoff. On the western side of the building downspout planter boxes can be installed to also help with capturing 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"
80	4,525	0.2	2.3	20.8	0.004	0.12

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	0.019	3	1,369	0.05	180	$900
Pervious pavement	0.072	12	5,296	0.20	790	$19,750
Planter boxes	n/a	1	n/a	n/a	4 (boxes)	$4,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Living Plate

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

0 10' 20'

M&M PERROTTI'S PREPARED FOODS

Subwatershed: Raritan River North Branch

Site Area: 58,525 sq. ft.

Address: 27 US Route 202
Far Hills, NJ 07931

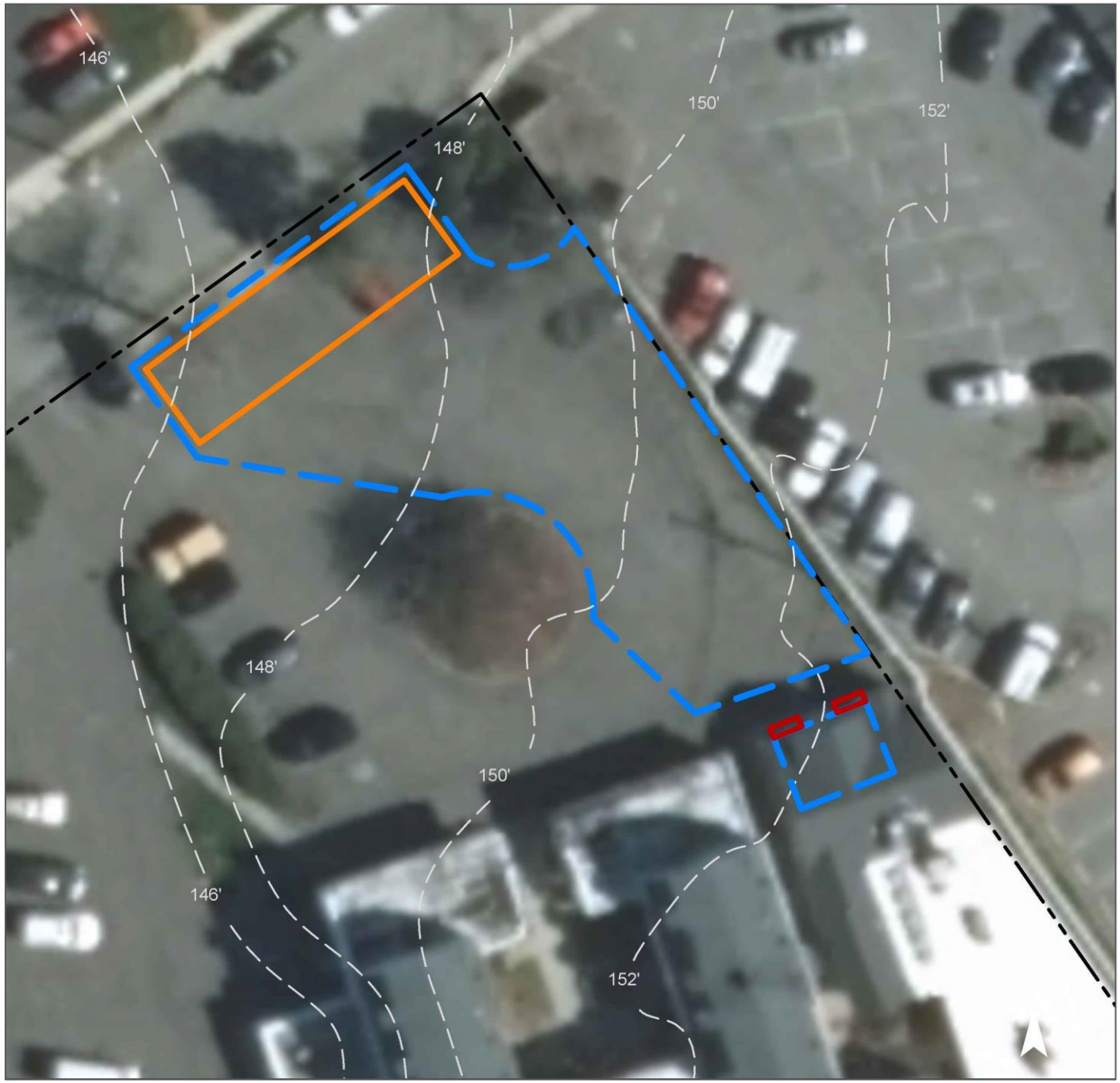
Block and Lot: Block 14, Lot 3

Parking spaces in the parking lot to the north of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. On the north side of the building downspout planter boxes can be installed to help capture stormwater runoff from the building's 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"
89	52,280	2.5	26.4	240.0	0.041	1.43

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.165	28	12,133	0.46	1,135	$28,375
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



M&M Perrotti's Prepared Foods

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

0 15' 30'

PEAPACK-GLADSTONE BANK

Subwatershed: Raritan River North Branch

Site Area: 12,932 sq. ft.

Address: 26 Dumont Road
Far Hills, NJ 07931

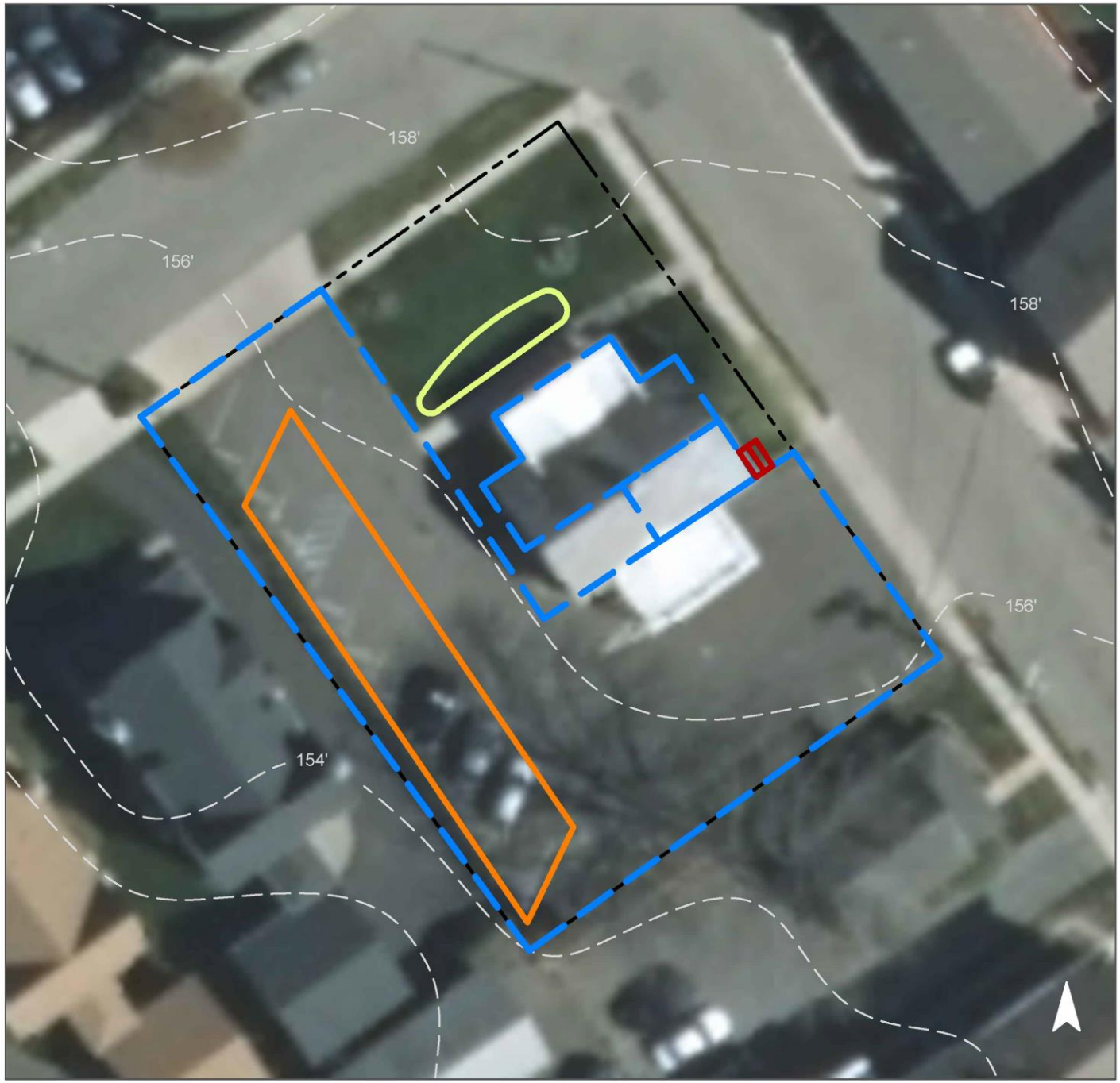
Block and Lot: Block 13, Lot 12

The turfgrass area to the northwest of the building can be converted to a bioretention system to capture, treat, and infiltrate stormwater runoff from the roof. The western area of the parking lot can be converted to pervious pavement to help capture and infiltrate stormwater runoff from the lot. A downspout planter box can be placed on the eastern side of the building to help capture 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"
87	11,253	0.5	5.7	51.7	0.009	0.31

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	1,855	0.07	245	$1,225
Pervious pavement	0.219	37	16,082	0.60	1,785	$44,625
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	$2,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Peapack-Gladstone Bank

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

0 15' 30'

TURPIN REAL ESTATE

Subwatershed: Raritan River North Branch

Site Area: 20,658 sq. ft.

Address: 21 US Route 202
Far Hills, NJ 07931

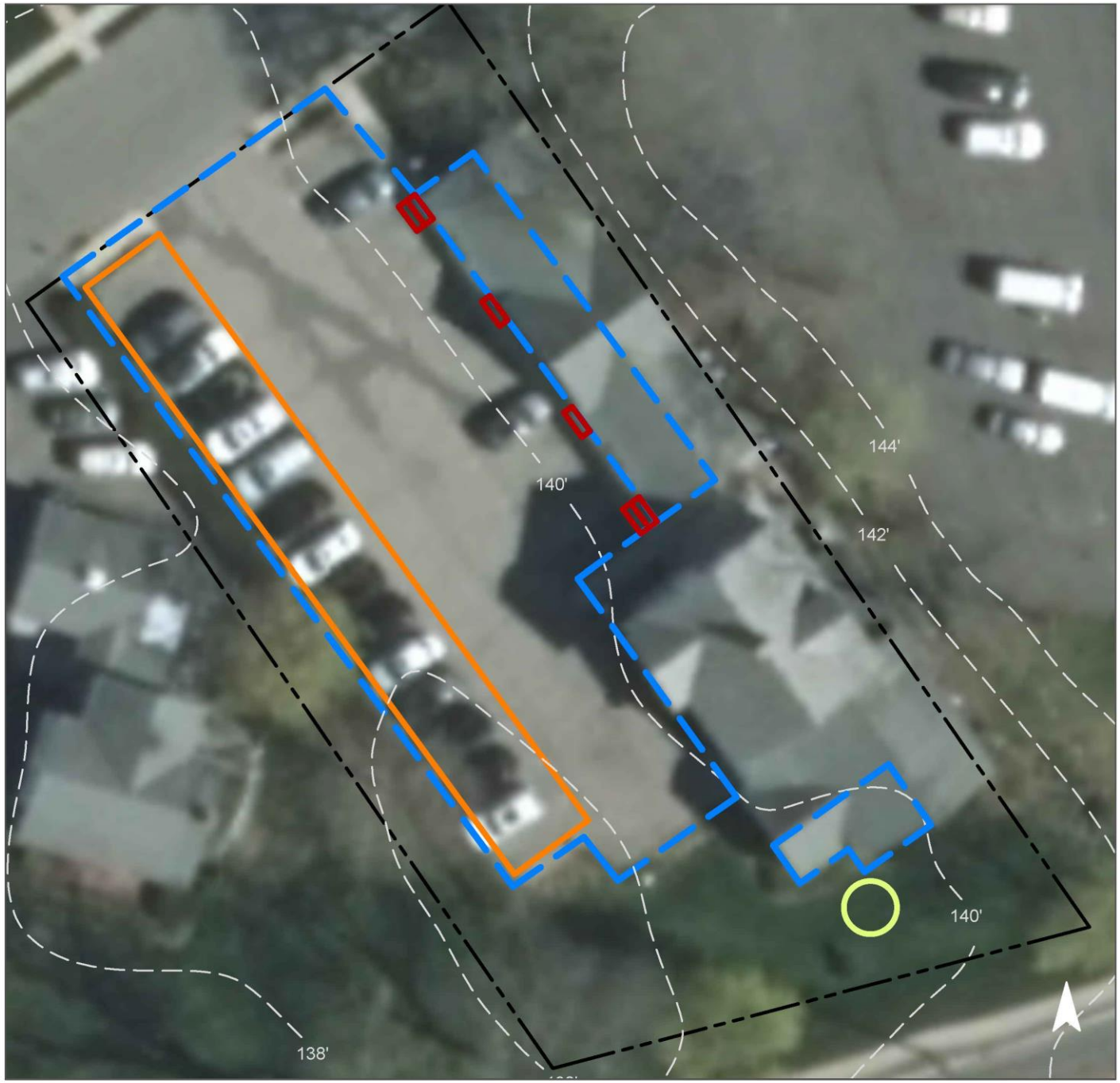
Block and Lot: Block 14, Lot 2

The turfgrass to the southeast of the building can be converted to a bioretention system to help capture, treat, and infiltrate stormwater runoff from the building's roof. Parking spaces in the western portion of the parking lot can be converted to pervious pavement to capture and infiltrate stormwater runoff from the 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"
89	18,453	0.9	9.3	84.7	0.014	0.51

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.009	1	651	0.02	85	$425
Pervious pavement	0.240	40	17,645	0.66	2,570	$64,250
Planter boxes	n/a	4	n/a	n/a	6 (boxes)	$6,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Turpin Real Estate

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

0 15' 30'

WEALTH PLANNING ADVISORS

Subwatershed: Raritan River North Branch

Site Area: 6,576 sq. ft.

Address: 37 Dumont Road
Far Hills, NJ 07931

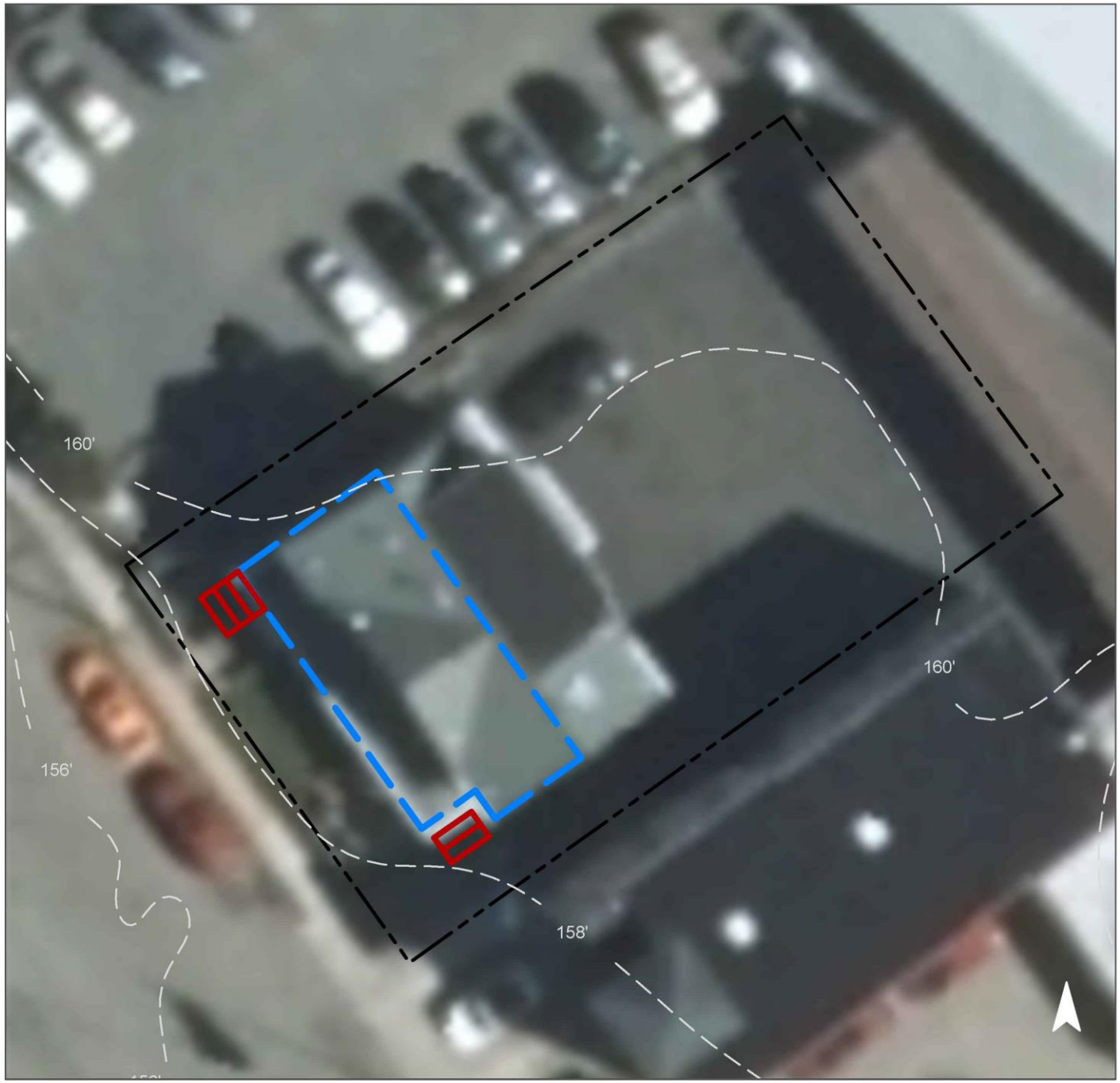
Block and Lot: Block 15, Lot 2

Downspouts on the northwest and southeast corners of the building can be disconnected and converted to planter boxes to capture 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"
89	5,874	0.3	3.0	27.0	0.005	0.16

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
Planter boxes	n/a	2	n/a	n/a	5 (boxes)	$5,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Wealth Planning Advisors

- planter box
- drainage area
- property line
- 2015 Aerial: NJOIT, OGIS

0 10' 20'

c. Summary of Existing Conditions

Summary of Existing 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) TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Runoff Volumes from I.C. Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	Raritan River North Branch	**37.26**	**1,623,051**				**20.57**	**895,890**	**43.2**	**452.5**	**4,113.4**	**93,322**	**3,284,929**	**0.698**	**24.57**
1	**Edible Arrangements**														
	Total Site Info	0.14	6,128	15	8	89	0.13	5,474	0.3	2.8	25.1	570	20,073	0.004	0.15
2	**Express Yourself Salon**														
	Total Site Info	0.39	17,100	14	1	89	0.35	15,275	0.7	7.7	70.1	1,591	56,009	0.012	0.42
3	**Far Hills Fairgrounds**														
	Total Site Info	19.55	851,544	11	1	25	4.83	210,233	10.1	106.2	965.3	21,899	770,855	0.164	5.77
4	**Far Hills Police Department**														
	Total Site Info	0.72	31,316	11	1	80	0.57	24,973	1.2	12.6	114.7	2,601	91,567	0.019	0.68
5	**Far Hills Station**														
	Total Site Info	33.25	1,448,501	101	1	52	17.13	746,224	36.0	376.9	3,426.2	77,732	2,736,153	0.581	20.47
6	**Joseph D'Apolito & Son**														
	Total Site Info	0.36	15,641	11	2	74	0.27	11,559	0.6	5.8	53.1	1,204	42,382	0.009	0.32
7	**Living Plate**														
	Total Site Info	0.13	5,674	10	3	80	0.10	4,525	0.2	2.3	20.8	471	16,590	0.004	0.12
8	**M&M Perrotti's Prepared Foods**														
	Total Site Info	1.34	58,525	14	3	89	1.20	52,280	2.5	26.4	240.0	5,446	191,692	0.041	1.43
9	**Peapack-Gladstone Bank**														
	Total Site Info	0.30	12,932	13	12	87	0.26	11,253	0.5	5.7	51.7	1,172	41,261	0.009	0.31
10	**Turpin Real Estate**														
	Total Site Info	0.47	20,658	14	2	89	0.42	18,453	0.9	9.3	84.7	1,922	67,663	0.014	0.51
11	**Wealth Planning Advisors**														
	Total Site Info	0.15	6,576	15	2	89	0.13	5,874	0.3	3.0	27.0	612	21,540	0.005	0.16

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 %
	Raritan River North Branch	**53,120**	**0.63**	**1.259**	**118**	**92,371**	**3.47**				**$278,500.00**	**5.9%**
1	**Edible Arrangements**											
	Pervious pavement	4,680	0.11	0.122	20	8,946	0.34	1,135	$25	SF	$28,375	85.5%
	Planter boxes	480	0.01	n/a	2	n/a	n/a	2	$1,000	box	$2,000	8.8%
	Total Site Info	**5,160**	**0.12**	**0.122**	**22**	**8,946**	**0.34**				**$30,375**	**94.3%**
2	**Express Yourself Salon**											
	Bioretention system	525	0.01	0.014	2	1,002	0.04	130	$5	SF	$650	3.4%
	Pervious pavement	6,615	0.15	0.172	29	12,649	0.48	1,460	$25	SF	$36,500	43.3%
	Planter boxes	430	0.01	n/a	2	n/a	n/a	3	$1,000	box	$3,000	2.8%
	Total Site Info	**7,570**	**0.17**	**0.186**	**33**	**13,651**	**0.52**				**$40,150**	**49.6%**
3	**Far Hills Fairgrounds**											
	Bioretention system	2,620	0.06	0.068	11	5,012	0.19	655	$5	SF	$3,275	1.2%
	Pervious pavement	3,640	0.08	0.095	16	6,956	0.26	650	$25	SF	$16,250	1.7%
	Total Site Info	**6,260**	**0.14**	**0.163**	**27**	**11,968**	**0.45**				**$19,525**	**3.0%**
4	**Far Hills Police Department**											
	Bioretention systems	2,620	0.06	0.068	11	5,012	0.19	655	$5	SF	$3,275	10.5%
	Pervious pavement	3,640	0.08	0.095	16	6,956	0.26	650	$25	SF	$16,250	14.6%
	Planter boxes	70	0.00	n/a	0	n/a	n/a	2	$1,000	box	$2,000	0.3%
	Total Site Info	**6,330**	**0.15**	**0.163**	**28**	**11,968**	**0.45**				**$21,525**	**25.3%**
5	**Far Hills Station**											
	Pervious pavement	23,300	0.53	0.607	102	6,956	0.26	4,730	$25	SF	$118,250	3.1%
	Planter boxes	1,290	0.03	n/a	5	n/a	n/a	6	$1,000	box	$6,000	0.2%
	Total Site Info	**1,290**	**0.03**	**n/a**	**5**	**n/a**	**n/a**				**$6,000**	**3.3%**
6	**Joseph D'Apolito & Son**											
	Bioretention systems	1,450	0.03	0.038	6	2,775	0.10	380	$5	SF	$1,900	12.5%
	Total Site Info	**1,450**	**0.03**	**0.038**	**6**	**2,775**	**0.10**				**$1,900**	**12.5%**
7	**Living Plate**											
	Bioretention system	715	0.02	0.019	3	1,369	0.05	180	$5	SF	$900	15.8%
	Pervious pavement	2,770	0.06	0.072	12	5,296	0.20	790	$25	SF	$19,750	61.2%
	Planter boxes	390	0.01	n/a	1	n/a	n/a	4	$1,000	box	$4,000	8.6%
	Total Site Info	**3,875**	**0.09**	**0.091**	**17**	**6,665**	**0.25**				**$24,650**	**85.6%**

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
8	**M&M Perrotti's Prepared Foods**											
	Pervious pavement	6,345	0.15	0.165	28	12,133	0.46	1,135	$25	SF	$28,375	12.1%
	Planter boxes	290	0.01	n/a	1	n/a	n/a	2	$1,000	box	$2,000	0.6%
	Total Site Info	**6,635**	**0.15**	**0.165**	**29**	**12,133**	**0.46**				**$30,375**	**12.7%**
9	**Peapack-Gladstone Bank**											
	Bioretention system	970	0.02	0.025	4	1,855	0.07	245	$5	SF	$1,225	8.6%
	Pervious pavement	8,410	0.19	0.219	37	16,082	0.60	1,785	$25	SF	$44,625	74.7%
	Planter boxes	305	0.01	n/a	1	n/a	n/a	2	$1,000	box	$2,000	2.7%
	Total Site Info	**9,685**	**0.22**	**0.244**	**42**	**17,937**	**0.67**				**$47,850**	**86.1%**
10	**Turpin Real Estate**											
	Bioretention system	340	0.01	0.009	1	651	0.02	85	$5	SF	$425	1.8%
	Pervious pavement	9,230	0.21	0.240	40	17,645	0.66	2,570	$25	SF	$64,250	50.0%
	Planter boxes	1,125	0.03	n/a	4	n/a	n/a	6	$1,000	box	$6,000	6.1%
	Total Site Info	**10,695**	**0.25**	**0.249**	**46**	**18,296**	**0.68**				**$70,675**	**58.0%**
11	**Wealth Planning Advisors**											
	Planter boxes	430	0.01	n/a	2	n/a	n/a	5	$1,000	box	$5,000	7.3%
	Total Site Info	**430**	**0.01**	**n/a**	**2**	**n/a**	**n/a**				**$5,000**	**7.3%**