Bedminster Township

Introduction

Located in Somerset County in New Jersey, Bedminster Township covers about 26.4 square miles. With a population of 8,272 (2020 United States Census), Bedminster Township consists of 21.7% of urban land uses by area. Of that urban land use, approximately 39.9% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 44.5% of Bedminster Township.

Bedminster Township contains portions of nine subwatersheds (Table 1). There are approximately 106.4 miles of rivers and streams within the municipality; these include Axle Brook and its tributaries, Chambers Brook and its tributaries, Herzog Brook and its tributaries, Hoopstick Brook and its tributaries, Lamington River and its tributaries, Middle Brook and its tributaries, Mine Brook, Muddy Run and its tributaries, North Branch Raritan River and its tributaries, Peapack Brook and its tributaries, Quail Brook, and several uncoded tributaries. Bedminster Township is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Area (WMA) 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Bedminster Township

Subwatershed	HUC14
Pottersville tributary (Lamington River)	02030105050050
Lamington River (Halls Bridge Road-Herzog Brook)	02030105050070
Lamington River (Herzog Brook-Pottersville gage)	02030105050130
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040
Peapack Brook (below Gladstone Brook)	02030105060060
Raritan River North Branch (including Mine Brook to Peapack Brook)	02030105060070
Middle Brook (North Branch Raritan River)	02030105060080
Raritan River North Branch (Lamington River to Mine Brook)	02030105060090

Raritan River North Branch (Route 28 to	
Lamington River)	

02030105070010

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Bedminster Township. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Bedminster Township's existing stormwater infrastructure were provided by the township and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Bedminster Township in relation to the study area. Figure 2 shows the portions of the nine HUC14s in Bedminster Township and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Bedminster Township. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Bedminster Township and is presented in Table 2. Figure 4 shows the impervious cover in Bedminster Township based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Bedminster Township and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basin). Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins with vegetative shoreline buffers were identified in Bedminster Township within the study area.

The Q-Farms in Bedminster Township have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the study area of Bedminster Township have been identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 5,668.6 acres of agricultural land use in Bedminster Township, of which, 5,212.0 acres lie within the study area for this Watershed Restoration and Protection Plan. There are 90 Q-Farms and a portion of one Q-Farm in the study area portion of Bedminster Township, totaling 3,840.3 acres. Within the 90 Q-Farms and portion of one Q-Farm, there are approximately 1,004.3 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Bedminster Township are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Eight HUC14s are included in the study area (02030105050050, 02030105050070, 0203010505050130, 02030105060040, 02030105060060, 02030105060070, 02030105060080, 02030105060090). Within these eight HUC14s, there are 192.6 acres of buildings and 408.4 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Bedminster Township, approximately 12.0 acres of rooftop runoff would be managed with 2.41 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Bedminster Township, approximately 40.8 acres of roadway would be managed, or 11.2 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Bedminster Township are shown in Figure 10 and presented in Table 9. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for

the Property Class 15 parcels in the study area (see Figure 11). Available information for each parcel in the study area is presented in Table 10. Class 15E parcels were excluded from the assessment. Nine of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 10 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 12 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some

measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are six classifications that apply to the streams in Bedminster Township. Figure 13 depicts the water quality classifications of surface waters throughout Bedminster Township and Table 11 summarizes the total miles and percentage of each surface water quality classification in the municipality.

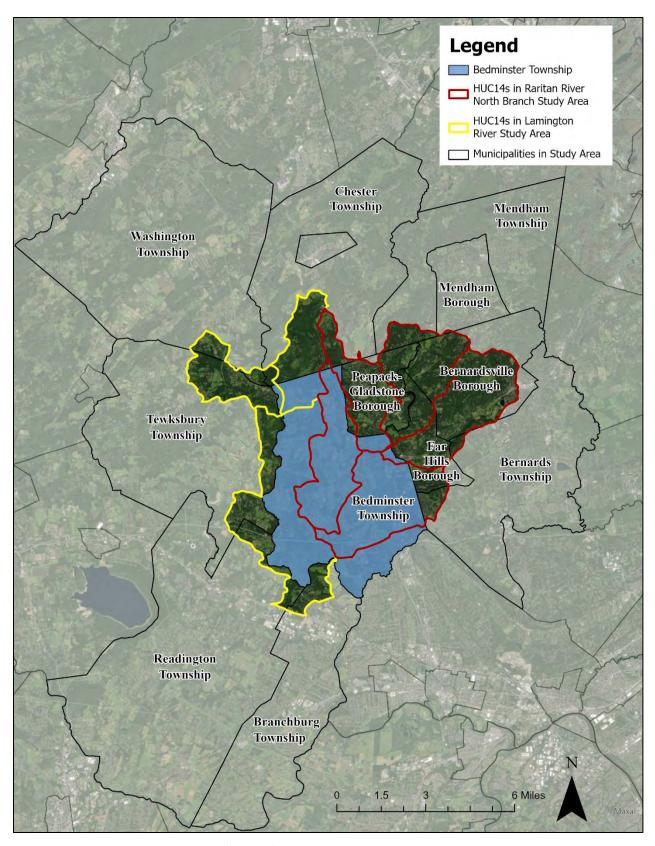


Figure 1: Municipalities in the Study Area

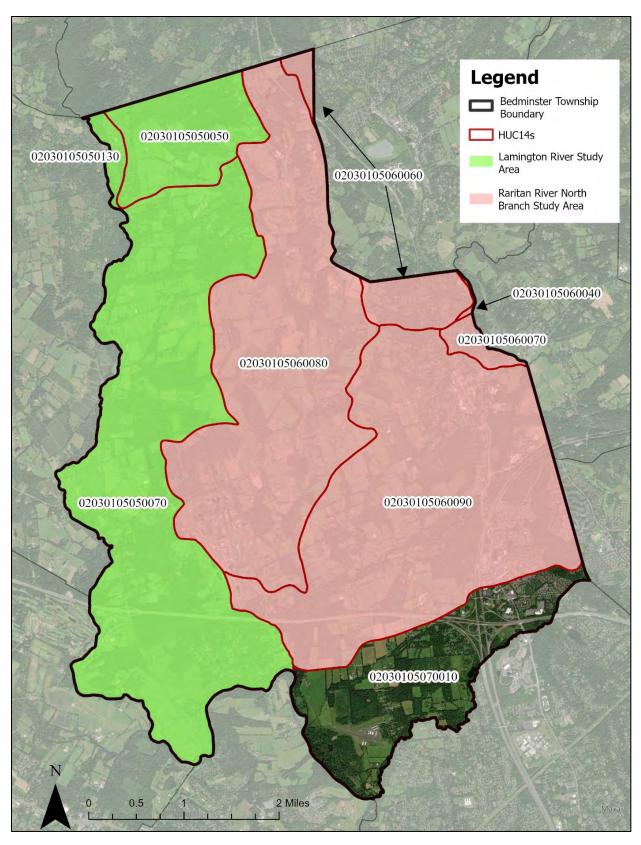


Figure 2: Portions of nine HUC14s are in Bedminster Township

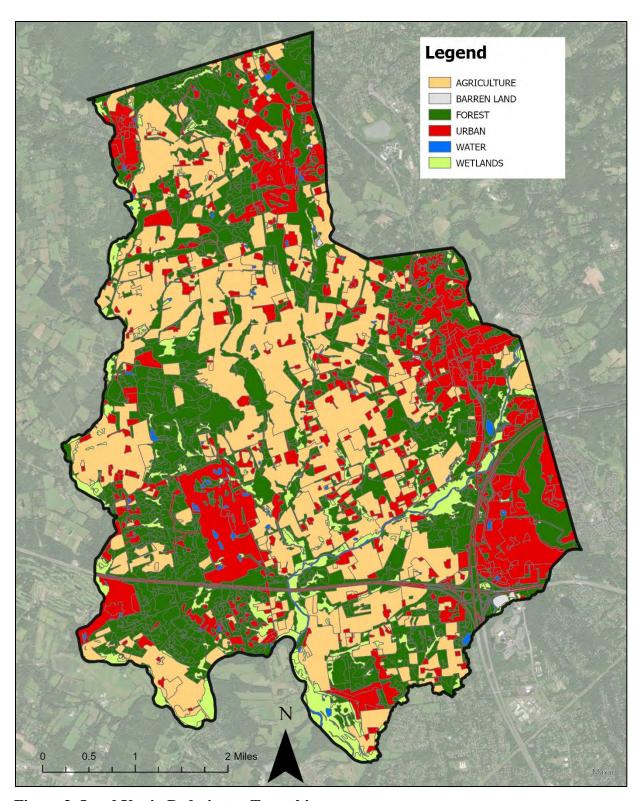


Figure 3: Land Use in Bedminster Township

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Bedminster Township

Land Use	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)			
02030105050050							
Agriculture	315.8	410.5	3,158.1	94,741.8			
Barren Land	0.0	0.0	0.0	0.0			
Forest	426.8	42.7	1,280.3	17,070.8			
Urban	120.4	168.6	1,806.1	16,856.9			
Water	4.8	0.5	14.5	192.7			
Wetlands	32.2	3.2	96.7	1,289.4			
TOTAL =	900.0	625.5	6,355.7	130,151.6			
		02030105050070					
Agriculture	1,667.1	2,167.2	16,671.1	500,133.4			
Barren Land	0.0	0.0	0.0	0.0			
Forest	2,101.8	210.2	6,305.5	84,072.8			
Urban	665.7	932.0	9,986.2	93,204.4			
Water	70.6	7.1	211.8	2,824.5			
Wetlands	312.4	31.2	937.2	12,495.5			
TOTAL =	4,817.6	3,347.7	34,111.8	692,730.6			
		02030105050130					
Agriculture	8.2	10.7	82.3	2,470.2			
Barren Land	0.0	0.0	0.0	0.0			
Forest	25.7	2.6	77.2	1,029.9			
Urban	67.9	95.1	1,018.6	9,506.8			
Water	4.2	0.4	12.6	167.7			
Wetlands	10.7	1.1	32.2	429.5			
TOTAL =	116.7	109.9	1,222.9	13,604.1			
		02030105060040					
Agriculture	0.0	0.0	0.0	0.0			
Barren Land	0.0	0.0	0.0	0.0			
Forest	5.2	0.5	15.5	207.3			
Urban	6.0	8.4	89.6	836.1			
Water	1.7	0.2	5.1	68.6			
Wetlands	0.0	0.0	0.0	0.0			
TOTAL =	12.9	9.1	110.2	1,112.0			
		02030105060060					
Agriculture	68.6	89.2	685.8	20,573.7			
Barren Land	0.9	0.4	4.5	53.4			
Forest	246.6	24.7	739.9	9,865.9			
Urban	118.5	165.9	1,778.0	16,594.6			
Water	3.7	0.4	11.1	147.9			
Wetlands	3.1	0.3	9.2	123.2			
TOTAL =	441.4	280.9	3,228.5	47,358.7			

		02030105060070		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	49.3	4.9	147.8	1,970.7
Urban	74.0	103.7	1,110.7	10,366.3
Water	3.3	0.3	10.0	133.0
Wetlands	8.9	0.9	26.6	354.3
TOTAL =	135.5	109.8	1,295.1	12,824.3
		02030105060080		
Agriculture	1,781.4	2,315.8	17,814.0	534,420.0
Barren Land	5.1	2.5	25.3	303.1
Forest	1,281.2	128.1	3,843.7	51,249.7
Urban	899.9	1,259.9	13,499.0	125,990.3
Water	31.2	3.1	93.5	1,247.3
Wetlands	95.4	9.5	286.2	3,816.3
TOTAL =	4,094.2	3,718.9	35,561.7	717,026.7
		02030105060090		
Agriculture	1,370.9	1,782.2	13,709.3	411,278.6
Barren Land	1.9	1.0	9.7	116.0
Forest	1,500.3	150.0	4,500.9	60,011.6
Urban	1,264.9	1,770.9	18,973.6	177,087.3
Water	67.3	6.7	201.9	2,692.4
Wetlands	346.6	34.7	1,039.7	13,863.2
TOTAL =	4,551.9	3,745.5	38,435.1	665,049.1
		02030105070010		
Agriculture	456.6	593.6	4,565.9	136,978.4
Barren Land	15.9	7.9	79.3	951.3
Forest	599.7	60.0	1,799.2	23,989.8
Urban	452.7	633.7	6,790.0	63,373.7
Water	37.2	3.7	111.7	1,488.8
Wetlands	242.9	24.3	728.7	9,715.4
TOTAL =	1,805.0	1,323.2	14,074.8	236,497.4
		All HUCs		
Agriculture	5,668.6	7,369.2	56,686.5	1,700,596.1
Barren Land	23.8	11.8	118.8	1,423.8
Forest	6,236.6	623.7	18,710.0	249,468.5
Urban	3,670.0	5,138.2	55,051.8	513,816.4
Water	224.0	22.4	672.2	8,962.9
Wetlands	1,052.2	105.2	3,156.5	42,086.8
TOTAL =	16,875.2	13,270.5	134,395.8	2,516,354.5

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Bedminster Township that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Bedminster Township. Based upon the NJDEP impervious surface data, Bedminster Township has impervious cover totaling 8.2%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Bedminster Township is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Bedminster Township's impervious cover percentage would suggest that its waterways are primarily sensitive and most likely preventing degradation of the state's surface water quality standards.

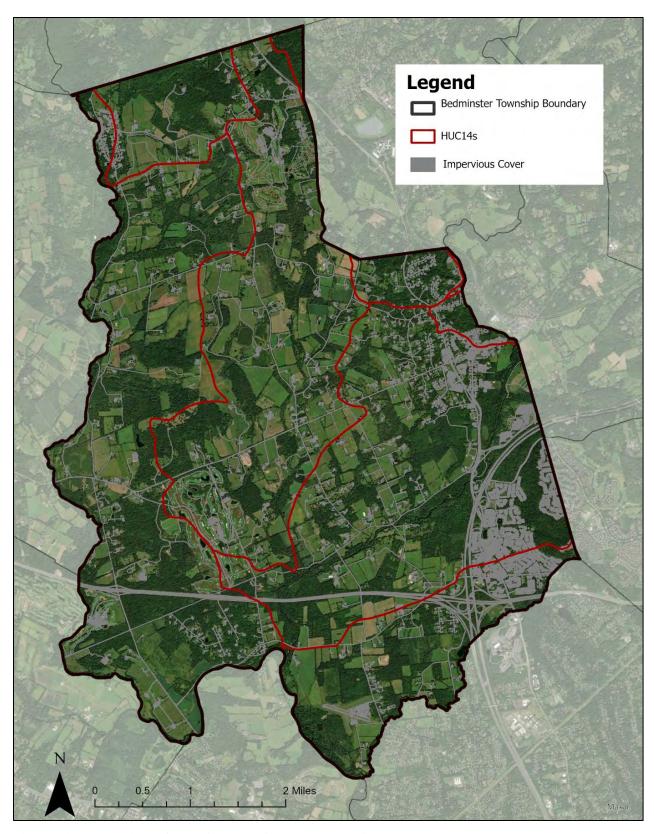


Figure 4: Impervious Cover in Bedminster Township

 Table 3: Impervious Cover Analysis by HUC14 for Bedminster Township

Class	Area (acres)	HUC Impervious Cover (%)
	02030105050050	1
Building	5.98	
Other	23.81	
Road	13.70	
TOTAL =	43.5	4.8%
	02030105050070	
Building	21.88	
Other	109.25	
Road	88.75	
TOTAL =	219.9	4.6%
	02030105050130	
Building	3.56	
Other	11.67	
Road	5.63	
TOTAL =	20.9	17.9%
	02030105060040	
Building	0.35	
Other	0.54	
Road	1.14	
TOTAL =	2.0	15.7%
<u> </u>	02030105060060	
Building	6.64	
Other	16.75	
Road	12.05	
TOTAL =	35.4	8.0%
,	02030105060070	,
Building	5.48	
Other	12.08	
Road	8.28	
TOTAL =	25.8	19.1%
,	02030105060080	,
Building	26.42	
Other	138.41	
Road	51.14	
TOTAL =	216.0	5.3%
	02030105060090	
Building	122.30	
Other	223.44	
Road	227.68	
TOTAL =	573.4	12.6%
- ~	02030105070010	

Building		42.32	
Other		90.14	
Road		106.69	
	TOTAL =	239.2	13.2%
		All HUCs	
Building		234.93	
Other		626.09	
Road		515.06	
	TOTAL =	1,376.1	8.2%

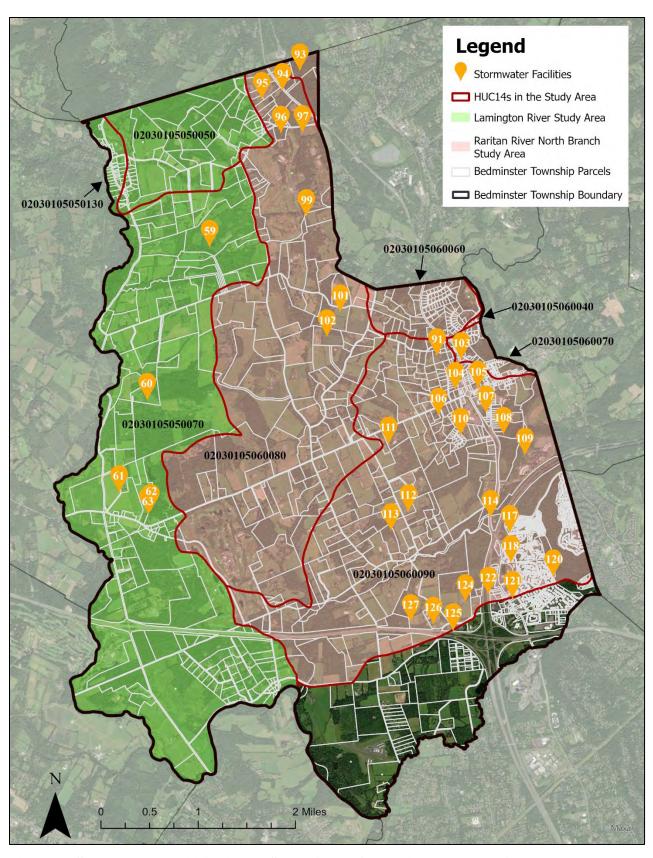


Figure 5: Stormwater Facilities in the Study Area of Bedminster Township

Table 4: Location of Stormwater Facilities in the Study Area of Bedminster Township

L	Lamington River Study Area				
<u>ID</u>	<u>Address</u>	<u>Type</u>			
59	2121 Larger Cross Road	N			
60	620 Black River Road	N			
61	100 Black River Road	N			
62	555 Lamington Road	N			
63	555 Lamington Road	R			
Rarita	n River North Branch Study	Area			
<u>ID</u>	<u>Address</u>	<u>Type</u>			
91	1691 US Highway 206	D			
93	14 Old Farm Lane	D			
94	3546 US Highway 206	D			
95	3545 Route 206	D			
96	1150 Pottersville Rd	N			
97	Pottersville Rd	N			
99	61 Fowler Rd	R			
101	7 Columbia Tpke	N			
102	420 Spook Hollow Rd	N			
103	1641 US Highway 206	D			
104	1590 US Highway 206	D			
105	18 Steeple Chase Ct	N			
106	2345 Lamington Rd	D			
107	223 Somerville Rd	D			
108	1 Miller Lane	D			
109	900 Rt 206	D			
110	98 Clucas Brook Rd	D			
111	1888 Lamington Rd	N			
112	320 Cedar Ridge Rd	D			
113	307 Cedar Ridge Rd	D			
114	US Highway 202 206	N			
117	96 Birchwood Rd	D			
118	50 Wescott Rd	D			
120	99 Brightwood Ln	N			
121	17 Mountain Ct	D			
122	20 Pluckemin Way	D			
124	359 US Highway 206	D			
125	I-78 West	N			
126	155A Klines Mill Rd	I			
127	155 Klines Mill Rd	D			

"D" = Detention, "R" = Retention, "I" = Infiltration, "N" = Naturalized

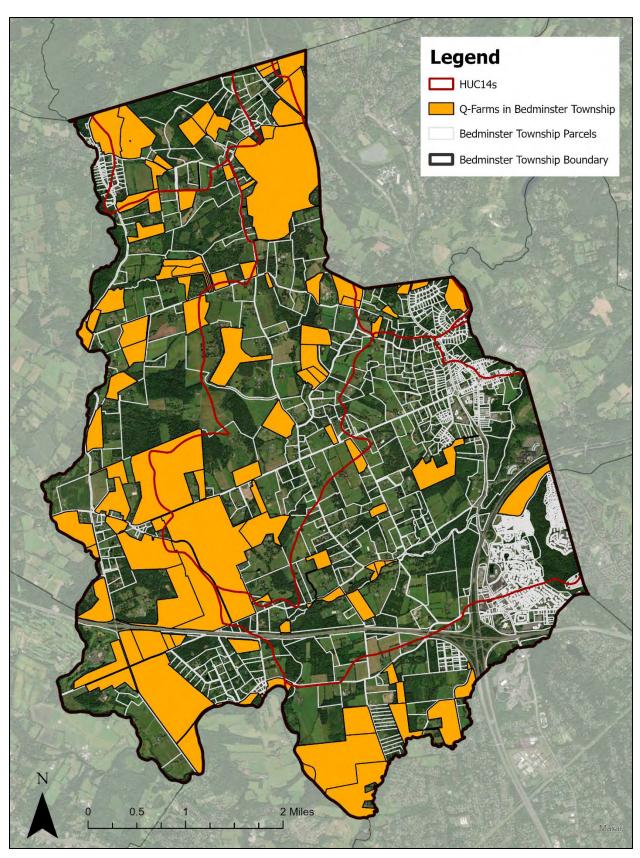


Figure 6: Q-Farm Parcels in Bedminster Township

Table 5: Q-Farm Parcels in Bedminster Township

Block	Lot	Q-Code	Prop Class	Location
2	1	QFARM	3B	N Side Pottersville Road
2	5	QFARM	3B	Pottersville Road
2	5.03	QFARM	3B	Pottersville Road
2	8.03	QFARM	3B	Windsor Lane
2	8.04	QFARM	3B	Windsor Lane
2	8.05	QFARM	3B	Windsor Lane
5	8	QFARM	3B	Pottersville Road
6	1.03	QFARM	3B	3584 E Side Rt 206
*6	1.04	QFARM	3B	3630 E Side Sh 206
6	2	QFARM	3B	3476 E Side Sh 206
6	3	QFARM	3B	3350 E Side Sh 206
7	15	QFARM	3B	Black River Road
8	15	QFARM	3B	Pottersville Road
8	16	QFARM	3B	1800 Black River Road
8	17.08	QFARM	3B	Pottersville Road
8	18	QFARM	3B	Larger Cross Road
8	23.01	QFARM	3B	Long Lane
8	23.03	QFARM	3B	805 Long Lane
8	24.03	QFARM	15C	Black River Road
8	24.09	QFARM	3B	615 Long Lane
8	24.11	QFARM	3B	505 Long Lane
8	24.12	QFARM	3B	Black River Road
8	24.13	QFARM	3B	Black River Road
8	24.15	QFARM	3B	605 Long Lane
8	24.16	QFARM	3B	625 Long Lane
9	1	QFARM	3B	Pottersville Road
9	1.04	QFARM	3B	960 Pottersville Road
9	4	QFARM	3B	Larger Cross Road
9	8	QFARM	3B	Spook Hollow Road
9	10	QFARM	3B	Spook Hollow Road
9	10.01	QFARM	3B	Spook Hollow Road
10	1	QFARM	3B	Black River Road
12	1.06	QFARM	3B	655 Lamington Road
12	1.08	QFARM	3B	Long Lane
12	1.1	QFARM	3B	200 Black River Road
12	1.12	QFARM	3B	Black River Road
12	1.14	QFARM	3B	600 Black River Road
12	1.16	QFARM	3B	Long Lane
12	1.17	QFARM	3B	Long Lane
12	3.06	QFARM	3B	Larger Cross Road
12	3.08	QFARM	3B	Long Lane

12	11.01	QFARM	3B	875 Lamington Road
12	13.01	QFARM	3B	Larger Cross Road
12	13.02	QFARM	3B	Lamington Road
13	2	QFARM	3B	1500 Larger Cross Road
13	9	QFARM	3B	Holland Road
13	9.01	QFARM	3B	Holland Road
13	12.01	QFARM	3B	Holland Road
13	12.02	QFARM	3B	Holland Road
14	5	QFARM	3B	Route 206
14	6.01	QFARM	3B	2121 Route 206
14	8	QFARM	3B	Holland Road
14	11	QFARM	3B	Old Dutch Rd W & White Oak
				Ln
15	25	QFARM	3B	Route 206
*19	2	QFARM	15F	151 Peapack Road
20	2	QFARM	15F	100 Peapack Road
21	11.03	QFARM	3B	1635 Lamington Road
37	1.01	QFARM	3B	Rattlesnake Bridge Road
37	2	QFARM	3B	Rattlesnake Bridge Road
37	4	QFARM	3B	Rattlesnake Bridge Road
37.01	2	QFARM	15C	Rattlesnake Bridge Road
38	4	QFARM	3B	Lamington Road
38	8	QFARM	3B	Cowperthwaite Road
38	8.01	QFARM	3B	1000 Rattlesnake Bridge
38	13	QFARM	3B	Cowperthwaite Road
38.01	1	QFARM	15C	Rattlesnake Brdge Road
38.01	2	QFARM	15C	Rattlesnake Brdge Road
38.01	3.02	QFARM	15C	River Road
38.01	3.03	QFARM	15C	River Road
39	7	QFARM	3B	Lamington Road
39	10	QFARM	3B	Lamington Road
39	12	QFARM	3B	Elizabeth Lane
39	16	QFARM	3B	Lamington Road
39	26.01	QFARM	3B	3 Elizabeth Lane
39	29.01	QFARM	3B	River Road
40	4	QFARM	3B	Cedar Ridge Road
40	8.02	QFARM	3B	325 Cedar Ridge Road
41	26	QFARM	15C	Thosmor Road
43.01	1	QFARM	15C	Schley Mountain Road
44	1	QFARM	15C	River Road
45	1	QFARM	15F	Rattlesnake Bridge Road
45.05	12	QFARM	3B	Cowperthwaite Road
46	1	QFARM	15F	100 Rattlesnake Bridge Rd
46	3	QFARM	3B	Burnt Mills Road
48	3	QFARM	3B	River Road & Bunn Road

49	3	QFARM	3B	Burnt Mills Road
50	3	QFARM	3B	River Road
51	2	QFARM	3B	So Side River Road
51	2.1	QFARM	3B	River Road
51	3	QFARM	3B	So Side River Road
52	1.01	QFARM	3B	Bunn Road
60	1	QFARM	3B	Airport Road
61	5	QFARM	3B	Airport Road
61	6	QFARM	3B	Airport Road
61	7	QFARM	15C	Airport Road
62	3	QFARM	3B	Burnt Mills Road
62	9	QFARM	3B	Airport Road
62	13	QFARM	3B	Meadow Road
62	27	QFARM	15C	Airport Road
63	1.01	QFARM	3B	Country Club Road
69	4	QFARM	3B	Country Club Road
71.02	1	QFARM	3B	Country Club Road

^{*}Only a portion of the Q-Farm is within the Bedminster Township boundary

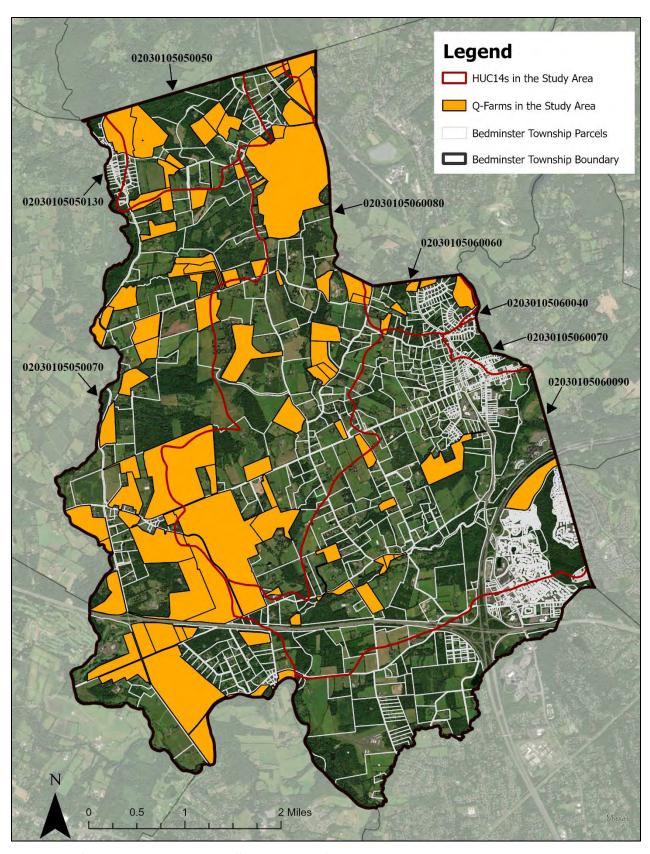


Figure 7: Q-Farm Parcels in the Study Area of Bedminster Township

Table 6: Q-Farm Parcels in the Study Area of Bedminster Township

Block	Lot	Q-Code	Prop Class	Location
2	1	QFARM	3B	N Side Pottersville Road
2	5	QFARM	3B	Pottersville Road
2	5.03	QFARM	3B	Pottersville Road
2	8.03	QFARM	3B	Windsor Lane
2	8.04	QFARM	3B	Windsor Lane
2	8.05	QFARM	3B	Windsor Lane
5	8	QFARM	3B	Pottersville Road
6	1.03	QFARM	3B	3584 E Side Rt 206
6	1.04	QFARM	3B	3630 E Side Sh 206
6	2	QFARM	3B	3476 E Side Sh 206
6	3	QFARM	3B	3350 E Side Sh 206
7	15	QFARM	3B	Black River Road
8	15	QFARM	3B	Pottersville Road
8	16	QFARM	3B	1800 Black River Road
8	17.08	QFARM	3B	Pottersville Road
8	18	QFARM	3B	Larger Cross Road
8	23.01	QFARM	3B	Long Lane
8	23.03	QFARM	3B	805 Long Lane
8	24.03	QFARM	15C	Black River Road
8	24.09	QFARM	3B	615 Long Lane
8	24.11	QFARM	3B	505 Long Lane
8	24.12	QFARM	3B	Black River Road
8	24.13	QFARM	3B	Black River Road
8	24.15	QFARM	3B	605 Long Lane
8	24.16	QFARM	3B	625 Long Lane
9	1	QFARM	3B	Pottersville Road
9	1.04	QFARM	3B	960 Pottersville Road
9	4	QFARM	3B	Larger Cross Road
9	8	QFARM	3B	Spook Hollow Road
9	10	QFARM	3B	Spook Hollow Road
9	10.01	QFARM	3B	Spook Hollow Road
10	1	QFARM	3B	Black River Road
12	1.06	QFARM	3B	655 Lamington Road
12	1.08	QFARM	3B	Long Lane
12	1.1	QFARM	3B	200 Black River Road
12	1.12	QFARM	3B	Black River Road
12	1.14	QFARM	3B	600 Black River Road
12	1.16	QFARM	3B	Long Lane
12	1.17	QFARM	3B	Long Lane
12	3.06	QFARM	3B	Larger Cross Road
12	3.08	QFARM	3B	Long Lane

12	11.01	QFARM	3B	875 Lamington Road
12	13.01	QFARM	3B	Larger Cross Road
12	13.02	QFARM	3B	Lamington Road
13	2	QFARM	3B	1500 Larger Cross Road
13	9	QFARM	3B	Holland Road
13	9.01	QFARM	3B	Holland Road
13	12.01	QFARM	3B	Holland Road
13	12.02	QFARM	3B	Holland Road
14	5	QFARM	3B	Route 206
14	6.01	QFARM	3B	2121 Route 206
14	8	QFARM	3B	Holland Road
14	11	QFARM		Old Dutch Rd W & White Oak Ln
15	25	QFARM	3B	Route 206
19	2	QFARM	15F	151 Peapack Road
20	2	QFARM	15F	100 Peapack Road
21	11.03	QFARM	3B	1635 Lamington Road
37	1.01	QFARM	3B	Rattlesnake Bridge Road
37	2	QFARM	3B	Rattlesnake Bridge Road
37	4	QFARM	3B	Rattlesnake Bridge Road
37.01	2	QFARM	15C	Rattlesnake Bridge Road
38	4	QFARM	3B	Lamington Road
38	8	QFARM	3B	Cowperthwaite Road
38	8.01	QFARM	3B	1000 Rattlesnake Bridge
38	13	QFARM	3B	Cowperthwaite Road
38.01	1	QFARM	15C	Rattlesnake Brdge Road
38.01	2	QFARM	15C	Rattlesnake Brdge Road
38.01	3.02	QFARM	15C	River Road
38.01	3.03	QFARM	15C	River Road
39	7	QFARM	3B	Lamington Road
39	10	QFARM	3B	Lamington Road
39	12	QFARM	3B	Elizabeth Lane
39	16	QFARM	3B	Lamington Road
39	26.01	QFARM	3B	3 Elizabeth Lane
39	29.01	QFARM	3B	River Road
40	4	QFARM	3B	Cedar Ridge Road
40	8.02	QFARM	3B	325 Cedar Ridge Road
41	26	QFARM	15C	Thosmor Road
43.01	1	QFARM	15C	Schley Mountain Road
44	1	QFARM	15C	River Road
45	1	QFARM	15F	Rattlesnake Bridge Road
45.05	12	QFARM	3B	Cowperthwaite Road
46	1	QFARM	15F	100 Rattlesnake Bridge Rd
46	3	QFARM	3B	Burnt Mills Road
48	3	QFARM	3B	River Road & Bunn Road

*49	3	QFARM	3B	Burnt Mills Road	
50	3	QFARM	3B	River Road	
51	2	QFARM	3B	SO Side River Road	
51	2.1	QFARM	3B	River Road	
51	3	QFARM	3B	SO Side River Road	
52	1.01	QFARM	3B	Bunn Road	

^{*}Only a portion of the Q-Farm is within the study area

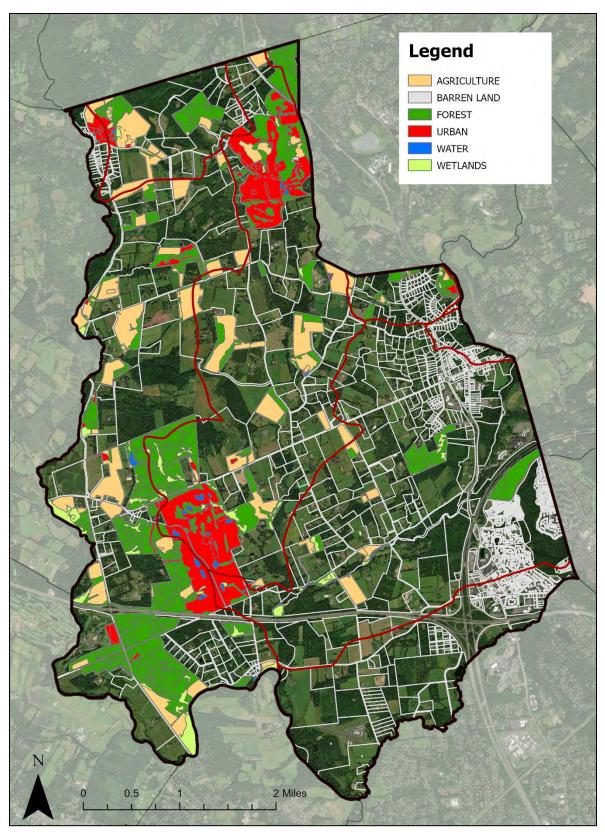


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Bedminster Township

Table 7: Land Use on Q-Farms in the Study Area of Bedminster Township

Land Use	Area (acres)
Agriculture	1,004.3
Barren Land	2.6
Forest	1,812.1
Urban	774.1
Water	53.5
Wetlands	193.7
Total:	3,840.3

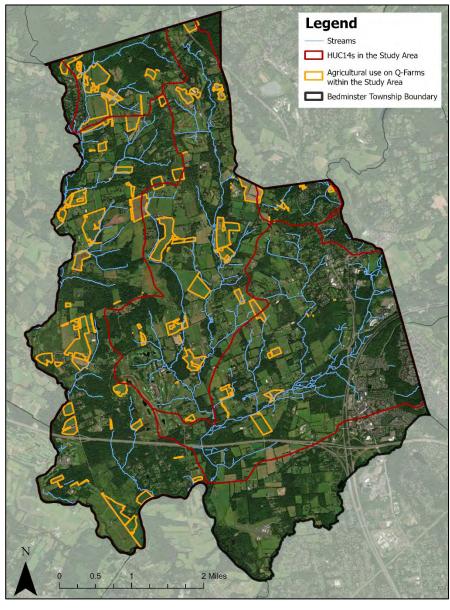


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Bedminster Township

Table 8: Recommendations for Specific Farms in the Study Area of Bedminster Township

	North Branch Raritan River Study Area									
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.		
51	2.1	QFARM						X		
52	1.01	QFARM	X							
		•		Lamington I	River Study Ar	ea		•		
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.		
8	16	QFARM				X				
8	24.1	QFARM	X							
12	1.14	QFARM	X							
12	1.16	QFARM	X							
12	1.17	QFARM	X							
37	1.01	QFARM	X							
38	4	QFARM	X	X						
46	1	QFARM	X							

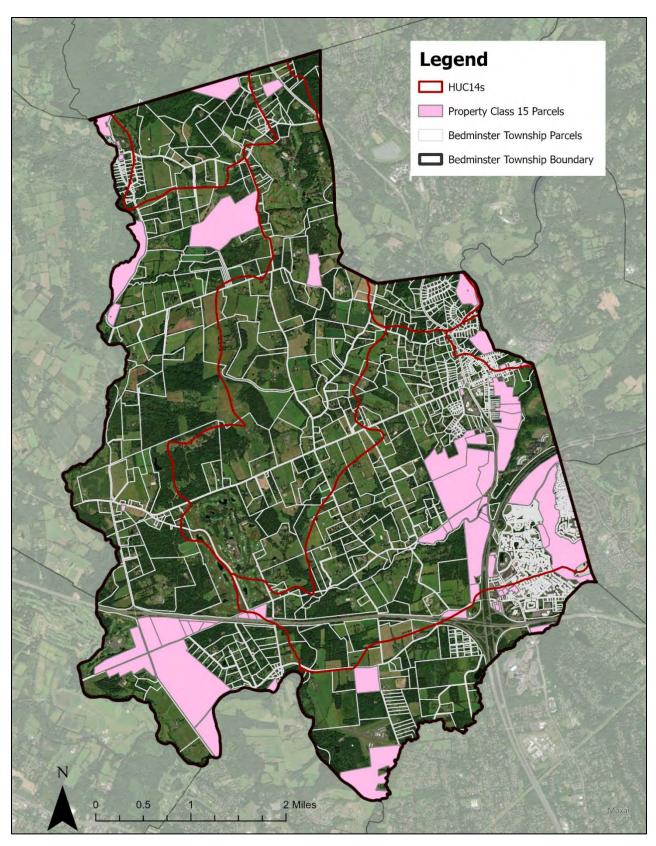


Figure 10: Property Class 15 Parcels in Bedminster Township

Table 9: Property Class 15 Parcels in Bedminster Township

Block Lot		Prop Class	Location	Facility Type
36	1	15A	Somerville Road	School
2	1	15B	Pottersville Road	Schools
8	20	15B	2121 Larger Cross Road	Educ/Science/Office
38	3	15B	300 Lamington Road	Schools
61	4	15B	1130 Burnt Mills Road	School For Autism
62.01	1	15B	1810 Burnt Mills Road	School For Autism
5	8	15C	1150 Pottersville Road	School
7	22	15C	Black River Road	Vacant Land
8	24.03	15C	Black River Road	Pony Farm
8	24.03	15C	1100 Black River Road	Pony Farm
14	15	15C	Old Dutch Road	Highway R/W
17	7	15C	Route 206	Right of Way
18	21.01	15C	Old Stonehouse Road	Drainage
19	1	15C	West Side Peapack Road	Vacant Land
20	1	15C	East Side Peapack Road	Drainage
23	1	15C	White Oaks Road	Vacant Land
26	8	15C	Deer Haven Road	Park
36	14	15C	Miller Lane	Sewer/Polic/Municpa
36	19	15C	Somerville Road	Municipal Land
37.01	2	15C	Rattlesnake Bridge Road	Farm
38.01	1	15C	Rattlesnake Brdge Road	Farm
38.01	2	15C	Rattlesnake Brdge Road	Farm
38.01	3.01	15C	River Road	Vacant Land
38.01	3.02	15C	River Road	Farm
38.01	3.03	15C	River Road	Farm
41	26	15C	Thosmor Road	Vacant Land
41	30.01	15C	Route 206	Vacant Land
41	34	15C	3055 River Road	Jacobus Vanderveer
41	34.01	15C	3055 River Road	Farm
42	1.01	15C	Route 206	Vacant Land
43.01	1	15C	Schley Mountain Road	Vacant Land
44	1	15C	River Road	Vacant Land
46	4	15C	Milnor Road	Water Shed
53	1	15C	River Road	Park
53	1.02	15C	River Road	Vacant Land
53	2	15C	River Road	Vacant Land
54	5	15C	Burnt Mills Road	Vacant Land
54	10	15C	Burnt Mills Road	Green Acres
59	1	15C	Schley Mountain Road	Vacant Land
59	1.102	15C	Ann Obrien Archeological	Archeological Dig
61	7	15C	81 Airport Road	Farmpreservation
71	3	15C	2000 Burnt Mills Road	Vacant Land
71	4	15C	2020 Burnt Mills Road	Schoolhouse Parcel
71	4.01	15C	Burnt Mills Road	Vacant Land
71	5	15C	2032 Burnt Mills Road	Vacant Land

71	6	15C	2042 Burnt Mills Road	Vacant Land
5	1.04	15D	3545 Route 206	Church
8.01	1	15D	2090 Black River Road	Church
32	4	15D	355 Main Street	Parsonage
32	5	15D	375 Main Street	Church
57	6.01	15D	Burnt Mills Road	Cancer Support Cnj
57	11	15D	285 Route 202/206	Church;Medical Minst
57	12	15D	279 Route 202/206	Church
57	12.01	15D	279 Route 202/206	Schools
1	1	15F	Hacklebarney Road	Park
1	8	15F	Hacklebarney Road	Vacant Land
2	2	15F	28 Hacklebarney Road	Recreation Cntr
2	3	15F	8 Hacklebarney Road	Volunteer Fire Co.
2	7	15F	Bedminster Grove Road	Agricultural Reserva
9	7	15F	Spook Hollow Road	Farm
*19	2	15F	151 Peapack Road	Farm
19	2	15F	151 Peapack Road	Farm
20	2	15F	100 Peapack Road	Farm
20	2	15F	100 Peapack Road	Farm
35	14	15F	500 Main Street	Rescue Squad
38.01	3.04	15F	River Road	Right of Way
41	16.01	15F	2336 Lamington Road	Library
45	1	15F	500 Rattlesnake Bridge Rd	Farm
45	1	15F	Rattlesnake Bridge Road	Farm
45.01	1	15F	405 River Road	Right of Way
45.01	2	15F	River Road	Right of Way
45.01	3	15F	River Road	Right of Way
45.01	4	15F	River Road	Right of Way
46	1	15F	100 Rattlesnake Bridge Rd	Farm
53	2.01	15F	River Road & Route 206	Right of Way
54	1	15F	Route 206	Right of Way
54	2	15F	725 Route 206	House
54.01	1	15F	Route 206	Right of Way
55.01	2	15F	455-457 Route 206	Maintenance Yard
58	7	15F	286 Route 202/206	Senior Cit. Complex
59.06	9627	15F	27 Cambridge Road	Disabled Veteran
59.1	3345	15F	45 Sage Court	Disabled Veteran
59.23	81107	15F	107 Cortland Lane	Disabled Veteran
61	7	15F	81 Airport Road	Farm
72.01	1	15F	25 Route 206	Recreation Center

^{*}Only a portion of the parcel is within the Bedminster Township boundary

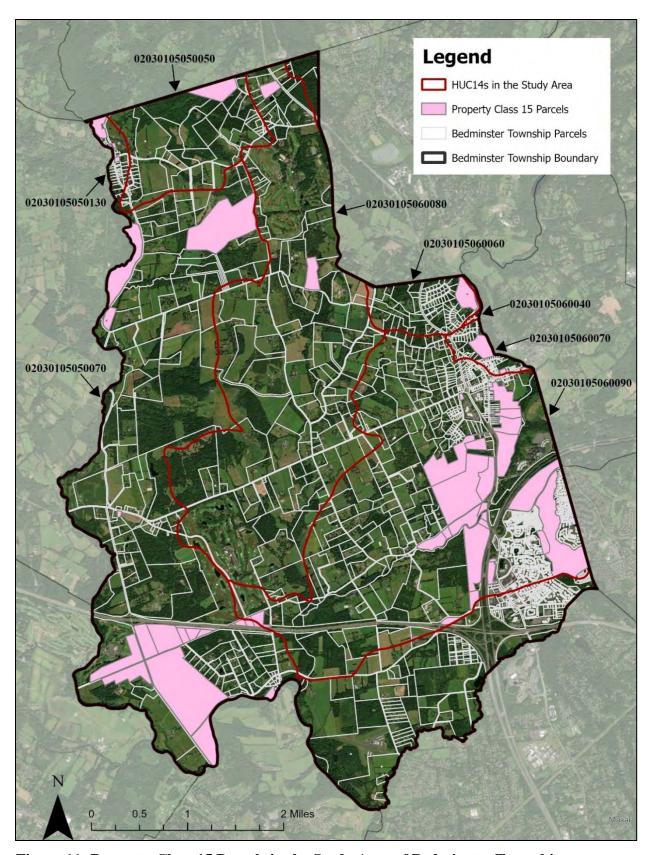


Figure 11: Property Class 15 Parcels in the Study Area of Bedminster Township

Table 10: Property Class 15 Parcels in the Study Area of Bedminster Township

Block Lot		Prop Class	Location	Facility Type
*36	1	15A	Somerville Road	School
2	1	15B	Pottersville Road	Schools
8	20	15B	2121 Larger Cross Road	Educ/Science/Office
38	3	15B	300 Lamington Road	Schools
61 ¹	4	15B	1130 Burnt Mills Road	School For Autism
*62.011	1	15B	1810 Burnt Mills Road	School for Autism
5	8	15C	1150 Pottersville Road	School
7	22	15C	Black River Road	Vacant Land
8	24.03	15C	Black River Road	Pony Farm
8	24.03	15C	1100 Black River Road	Pony Farm
14	15	15C	Old Dutch Road	Highway R/W
17	7	15C	Route 206	Right of Way
18	21.01	15C	Old Stonehouse Road	Drainage
19	1	15C	West Side Peapack Road	Vacant Land
20	1	15C	East Side Peapack Road	Drainage
23	1	15C	White Oaks Road	Vacant Land
26	8	15C	Deer Haven Road	Park
*36	14	15C	Miller Lane	Sewer/Police/Municipal
*36	19	15C	Somerville Road	Municipal Land
37.01	2	15C	Rattlesnake Bridge Road	Farm
38.01	1	15C	Rattlesnake Brdge Road	Farm
38.01	2	15C	Rattlesnake Brdge Road	Farm
38.01	3.01	15C	River Road	Vacant Land
38.01	3.02	15C	River Road	Farm
38.01	3.03	15C	River Road	Farm
41	26	15C	Thosmor Road	Vacant Land
41	30.01	15C	Route 206	Vacant Land
41	34	15C	3055 River Road	Jacobus Vanderveer
41	34.01	15C	3055 River Road	Farm
42	1.01	15C	Route 206	Vacant Land
43.01	1	15C	Schley Mountain Road	Vacant Land
44	1	15C	River Road	Vacant Land
46	4	15C	Milnor Road	Water Shed
53	1	15C	River Road	Park
53	1.02	15C	River Road	Vacant Land
53	2	15C	River Road	Vacant Land
*54 ¹	5	15C	Burnt Mills Road	Vacant Land
54	10	15C	Burnt Mills Road	Green Acres
59 ¹	1	15C	Schley Mountain Road	Vacant Land
59	1.102	15C	Ann Obrien Archeological	Archeological Dig
*5	1.04	15D	3545 Route 206	Church
8.01	1	15D	2090 Black River Road	Church
32	4	15D	355 Main Street	Parsonage
*32	5	15D	375 Main Street	Church
57 ¹	11	15D	285 Route 202/206	Church; Medical Minst
1	1	15F	Hacklebarney Road	Park

1	8	15F	Hacklebarney Road	Vacant Land
2	2	15F	28 Hacklebarney Road	Recreation Cntr
*2	3	15F	8 Hacklebarney Road	Volunteer Fire Co.
2	7	15F	Bedminster Grove Road	Agricultural Reserva
9	7	15F	Spook Hollow Road	Farm
19	2	15F	151 Peapack Road	Farm
19	2	15F	151 Peapack Road	Farm
20	2	15F	100 Peapack Road	Farm
20	2	15F	100 Peapack Road	Farm
35	14	15F	500 Main Street	Rescue Squad
38.01	3.04	15F	River Road	Right of Way
*41	16.01	15F	2336 Lamington Road	Library
45	1	15F	500 Rattlesnake Bridge Rd	Farm
45	1	15F	Rattlesnake Bridge Road	Farm
45.01	1	15F	405 River Road	Right of Way
45.01	2	15F	River Road	Right of Way
45.01	3	15F	River Road	Right of Way
45.01	4	15F	River Road	Right of Way
46	1	15F	100 Rattlesnake Bridge Rd	Farm
53	2.01	15F	River Road & Route 206	Right of Way
54	1	15F	Route 206	Right of Way
54	2	15F	725 Route 206	House
54.01	1	15F	Route 206	Right of Way
55.01	2	15F	455-457 Route 206	Maintenance Yard
59.1	3345	15F	45 Sage Court	Disabled Veteran
59.23	81107	15F	107 Cortland Lane	Disabled Veteran

^{*} Sites that can be retrofitted with green infrastructure

¹Only a portion of the parcel is within the study area

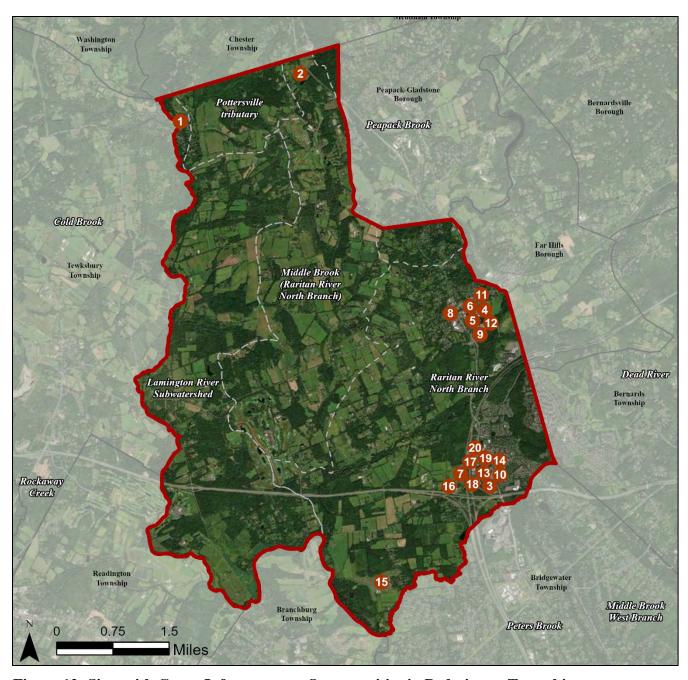


Figure 12: Sites with Green Infrastructure Opportunities in Bedminster Township

POTTERSVILLE VOLUNTEER FIRE COMPANY



RAP ID: 1

Subwatershed: Lamington River

HUC14 ID: 02030105050130

Site Area: 16,327 sq. ft.

Address: 8 Hacklebarney Road

Pottersville, NJ 07979

Block and Lot: Block 2, Lot 3



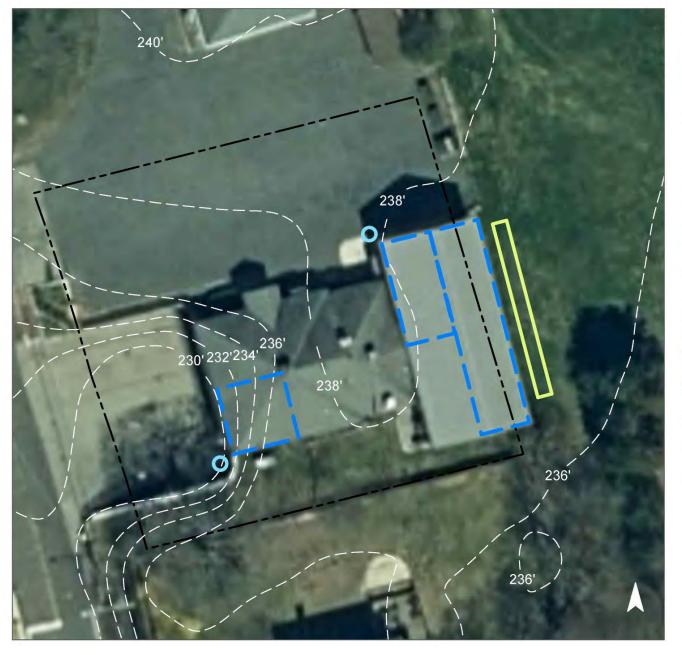


A rain garden can be installed in the grass area to the east of the building to capture, treat, and infiltrate the stormwater runoff from the rooftop. This would require downspout disconnections. Cisterns can be installed to the northeast and southwest of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure. An underdrain would be required.

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 49''	
94	15,311	0.7	7.7	70.3	0.012	0.47	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	1,155	0.034	6	2,240	0.08	290	\$2,900
Rainwater harvesting	1,085	0.031	4	850	N/A	850 (gal)	\$2,550

GREEN INFRASTRUCTURE RECOMMENDATIONS





Pottersville Volunteer Fire Company

- bioretention system
- rainwater harvesting
- captured drainage area
- property line
- ☐ 2020 Aerial: NJOIT, OGIS

0 15' 30'

RESURGENT CHURCH

RAPID: 2

Subwatershed: Middle Brook (Raritan

River North Branch)

HUC14 ID: 02030105060080

Site Area: 645,494 sq. ft.

Address: 3545 US-206

Far Hills, NJ 07931

Block and Lot: Block 5, Lot 1.04





Multiple rain gardens can be installed in grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops and driveway. This may require downspout disconnections, curb cuts, and trench drains. The existing eastern parking spaces can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the driveway. A cistern can be installed to the south of the church building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden or washing a vehicle. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
15	94,649	4.6	47.8	434.6	0.074	2.89	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	10,365	0.301	46	20,080	0.75	2,595	\$25,950
Pervious pavement	2,030	0.059	10	3,930	0.15	740	\$18,500
Rainwater harvesting	975	0.028	4	800	N/A	800 (gal)	\$2,400



ANNIE'S DELI



RAP ID: 3

Subwatershed: Raritan River North

Branch

Site Area: 14,130 sq. ft.

Address: 2095 Burnt Mills Road

Bedminster, NJ 07921

Block and Lot: Block 57, Lot 19





Parking spaces located in the south section of the parking lot can be replaced with pervious pavement to capture and infiltrate stormwater. Downspouts at Annie's Deli can be disconnected and directed into downspout planter boxes to capture and filter rooftop runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
85	12,012	0.6	6.1	55.1	0.009 0.33		

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	0.226	38	16,570	0.73	1,440	\$36,000
Planter boxes	n/a	2	n/a	n/a	4 (boxes)	\$4,000





Annie's Deli

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

BEDMINSTER PUBLIC SCHOOL





RAPID: 4

Subwatershed: Raritan River North

Branch

Site Area: 1,345,130 sq. ft.

Address: 234 Somerville Road

Bedminster, NJ 07921

Block and Lot: Block 36, Lot 1

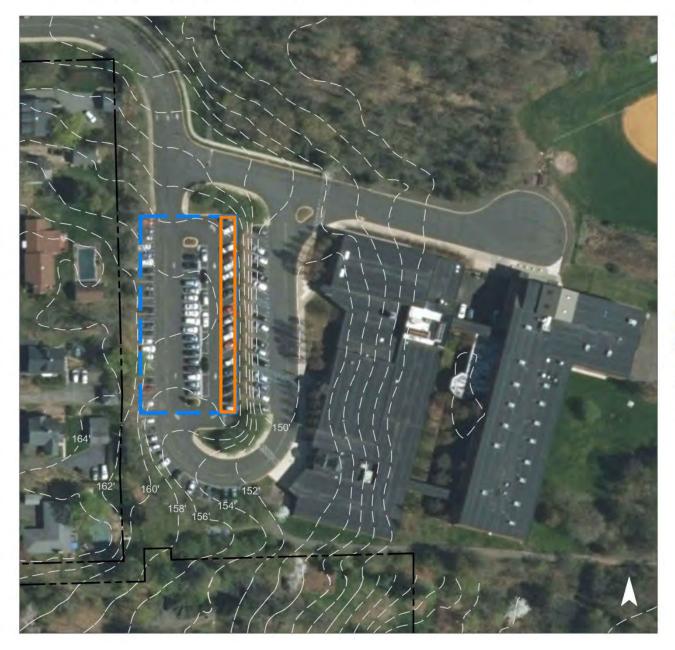




Pervious pavement can be installed in the front parking lot of the building to capture storm water runoff from the parking lot. A preliminary soil assessment suggests that the soil is suitable for green infrastructure implementations.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
19	251,990	12.1	127.3	1,157.0	0.196	6.91	

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	0.636	107	46,690	2.06	4,300	\$107,500





Bedminster Public School

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

0 50' 100'

BEDMINSTER TOWNSHIP MUNICIPAL COURT





RAPID: 5

Subwatershed: Raritan River North

Branch

Site Area: 802,900 sq. ft.

Address: 55 Miller Lane

Bedminster, NJ 07921

Block and Lot: Block 36, Lots 10,11,12,14

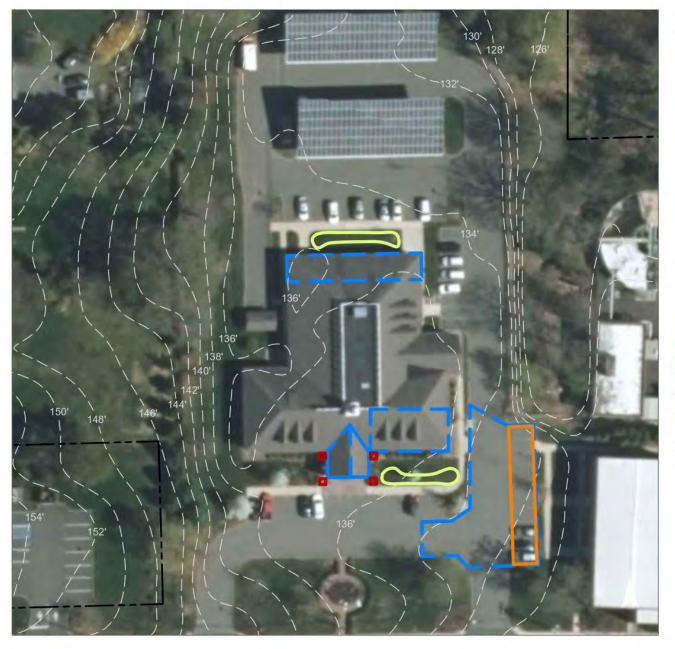




Bioretention systems can be installed to capture, treat, and infiltrate rooftop runoff on the north and south of the building. Pervious pavement can be installed in the southeast corner of the parking lot to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
25	203,380	9.8	102.7	933.8	0.158	5.58	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.081	14	5,955	0.26	795	\$3,975
Pervious pavement	0.138	23	10,115	0.45	1,710	\$42,750
Planter boxes	n/a	3	n/a	n/a	4 (boxes)	\$4,000





Bedminster Municipal Court

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

0 30' 60'

BEDMINSTER USPS



RAP ID: 6

Subwatershed: Raritan River North

Branch

Site Area: 29,710 sq. ft.

Address: 251 Somerville Road

Bedminster, NJ 07921

Block and Lot: Block 33, Lot 11





A rain garden can be installed east of the building to capture runoff from the building's roof. Additionally, pervious pavement can be installed in the parking lot to capture stormwater before it reaches the drain. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
83	24,750	1.2	12.5	113.6	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 system	0.052	9	3,785	0.17	500	\$1,875
Pervious pavement	0.132	22	9,709	0.43	2,070	\$51,750



BURNT MILLS PARK



RAPID: 7

Subwatershed: Raritan River North

Branch

Site Area: 483,140 sq. ft.

Address: 1850 Burnt Mills Road

Bedminster, NJ 07921

Block and Lot: Block 54, Lot 5





Bioretention systems can be installed to capture, treat, and infiltrate parking lot and rooftop runoff. Potential locations are in the northeast corner of the parking lot and the easternmost side of the structure shown in the above right image. Pervious pavement can be installed in the southwest corner of the parking lot to manage pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
10	47,790	2.3	24.1	219.4	0.037	1.31	

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 systems	0.183	31	13,405	0.59	1,805	\$9,025
Pervious pavement	0.193	32	14,175	0.62	1,300	\$32,500





Burnt Mills Park

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



CLARENCE DILLON PUBLIC LIBRARY





RAP ID: 8

Subwatershed: Raritan River North

Branch

Site Area: 70,850 sq. ft.

Address: 2336 Lamington Road

Bedminster, NJ 07921

Block and Lot: Block 41, Lot 16.01



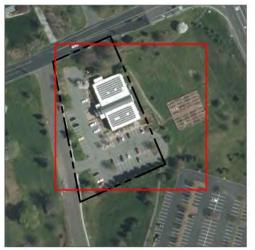


A rain garden can be installed on the eastern island in the parking lot to capture stormwater runoff from the impervious surface. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
72	51,040	2.5	25.8	234.4	0.040 1.40		

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	0.143	24	10,520	0.46	560	\$2,810





Clarence Dillon Public Library

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

FAR HILLS-BEDMINSTER FIRE DEPARTMENT





RAPID: 9

Subwatershed: Raritan River North

Branch

Site Area: 1,088,910 sq. ft.

Address: 1 Miller Lane

Bedminster, NJ 07921

Block and Lot: Block 36, Lot 19





A cistern can be installed in the southwest corner of the building to allow roof runoff to be reused. A bioretention system can be installed at the northeast corner of the building to capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed in the parking spaces behind and south of the building to filter and infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
4	48,960	2.4	24.7	224.8	0.038 1.34		

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	0.250	42	18,300	0.81	2,300	\$11,500
Pervious pavement	0.127	21	15,580	0.69	1,500	\$37,500
Rainwater harvesting	0.091	15	3,000	0.29	3,000 (gal)	\$6,000





Far Hills-Bedminster Fire Department

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



FRESH MARKET



RAPID: 10

Subwatershed: Raritan River North

Branch

Site Area: 139,930 sq. ft.

Address: 75 Washington Valley

Road

Bedminster, NJ 07921

Block and Lot: Block 58, Lot 13, 14



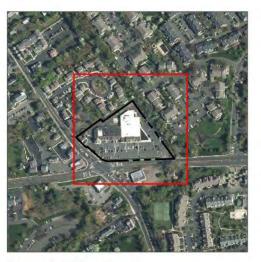


Pervious pavement can be installed within the parking lot to capture stormwater runoff from the impervious surfaces that surround the area. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		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	132,810	6.4	67.1	609.8	0.103 3.64		

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	1.039	174	76,235	3.36	8,170	\$204,250





Fresh Market

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

GRACE CHAPEL

RUTGERS
New Jersey Agricultural
Experiment Station

RAP ID: 11

Subwatershed: Raritan River North

Branch

HUC14 ID: 02030105060070

Site Area: 95,467 sq. ft.

Address: 375 Main Street

Bedminster, NJ 07

Block and Lot: Block 32, Lot 5

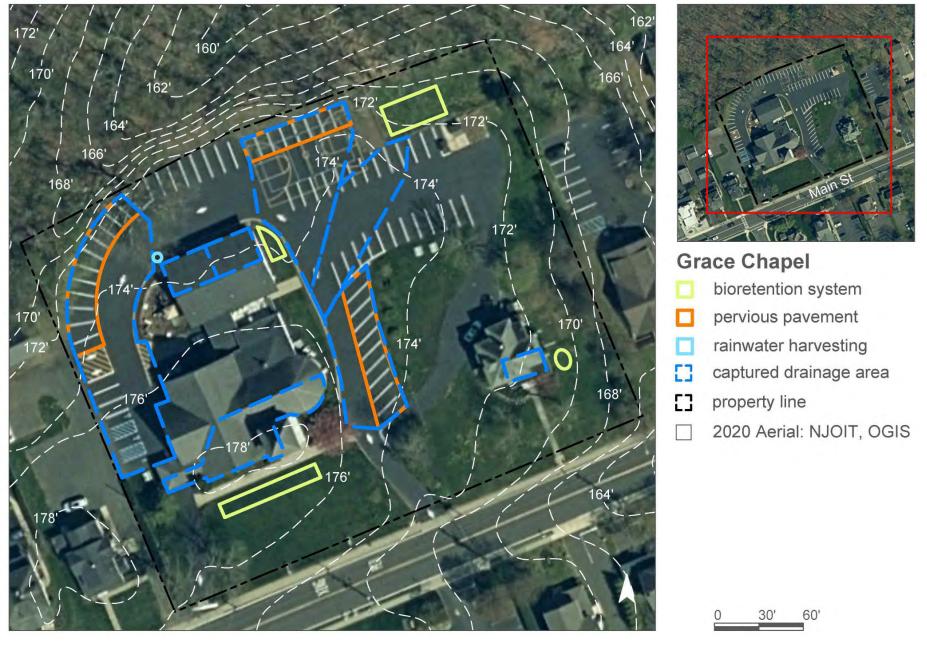




Multiple rain gardens can be installed in grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops and driveway. This will require downspout disconnections. The existing northern, eastern, and western parking spaces can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the driveway and parking lot. A cistern can be installed to the north of the church building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
65	61,662	3.0	31.1	283.1	0.048	1.88	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	7,085	0.206	30	13,720	0.52	1,770	\$17,700
Pervious pavement	16,675	0.484	72	32,290	1.21	5,140	\$128,500
Rainwater harvesting	735	0.021	4	600	N/A	600 (gal)	\$1,800



MILLER LANE PARK





RAP ID: 12

Subwatershed: Raritan River North

Branch

Site Area: 617,490 sq. ft.

Address: 75 Miller Lane

Bedminster, NJ 07921

Block and Lot: Block 36, Lot 14

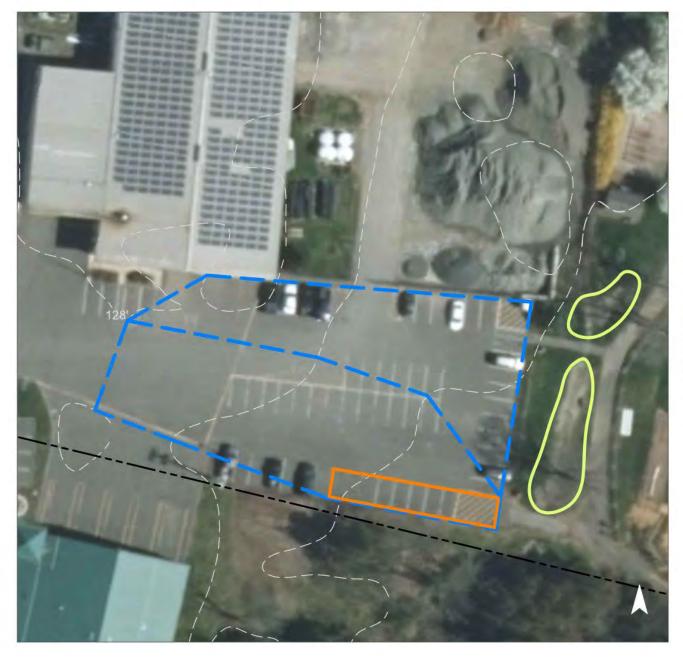




Connected bioretention systems can be installed on the eastern edge of the parking lot to capture, treat, and infiltrate runoff. The systems can be linked by pipes (already installed) shown in the above image. Pervious pavement can be installed in the parking spaces on the southern edge of the parking lot to filter and infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
22	133,840	6.5	67.6	614.5	0.104 3.67		

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
Bioretention systems	0.273	46	19,995	0.88	2,640	\$13,200
Pervious pavement	0.361	60	26,472	1.17	1,740	\$43,500





Miller Lane Park

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

0 25' 50'

OASIS DAY SPA





RAP ID: 13

Subwatershed: Raritan River North

Branch

Site Area: 10,890 sq. ft.

Address: 274 US Highway 202/206

North

Pluckemin, NJ 07978

Block and Lot: Block 58, Lots 9 and 10





A bioretention system can be installed northeast of the building, adjacent to the parking lot, to capture, treat, and infiltrate rooftop runoff. The potential site location is shown in the above left image. Pervious pavement can be installed on the southwest side of the parking lot, adjacent to the sidewalk, to capture, filter, and infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
85	9,250	0.4	4.7	42.5	0.007 0.25		

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 system	0.036	6	2,655	0.12	360	\$1,800
Pervious pavement	0.130	22	9,462	0.42	880	\$22,000



PLUCKEMIN USPS



RAPID: 14

Subwatershed: Raritan River North

Branch

Site Area: 81,890 sq. ft.

Address: 318 US Highway 206

Pluckemin, NJ 07921

Block and Lot: Block 58, Lot 2

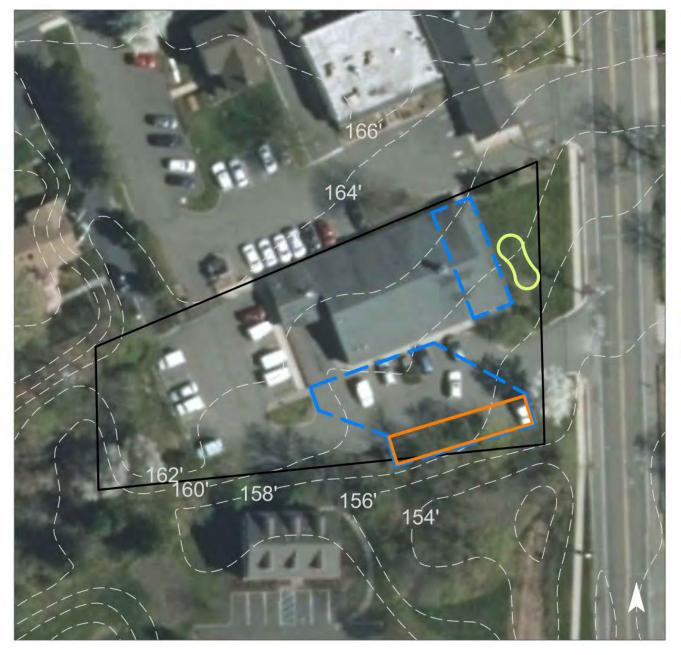




A rain garden can be installed north of the building to capture, treat, and infiltrate stormwater runoff from the rooftop of the building. Additionally, pervious pavement can be installed in the northeast parking lot to capture stormwater from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
100	81,890	3.9	41.4	376.0	0.064 2.25		

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 system	0.038	6	2,798	0.12	360	\$1,800
Pervious pavement	0.126	21	9,260	0.41	1,460	\$36,500





Pluckemin USPS

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

0 25' 50'

SOMERSET AIRPORT





RAP ID: 15

Subwatershed: Raritan River North

Branch

Site Area: 8,831,920 sq. ft.

Address: 150 Airport Road

Bedminster, NJ 07921

Block and Lot: Block 61, Lot 6

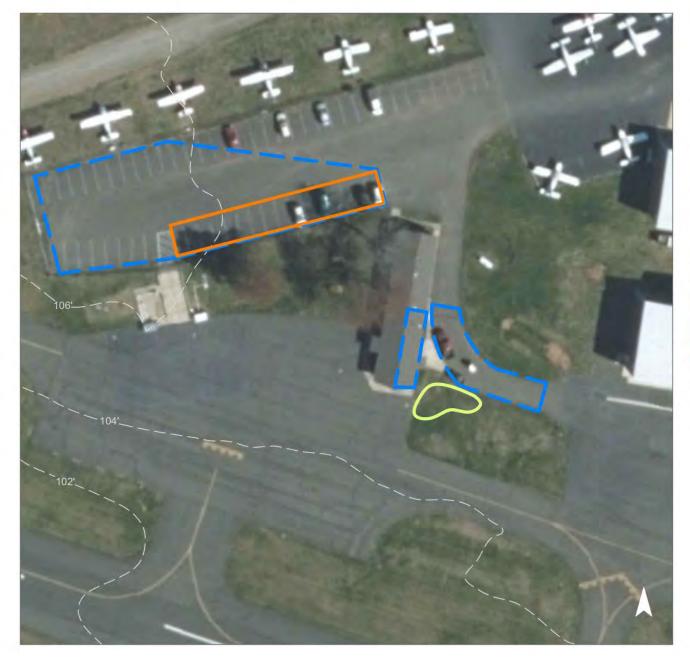




A bioretention system can be installed in the turfgrass located at the southeast corner of the building (shown in the above left image) to capture, treat, and infiltrate rooftop and pavement runoff. Parking spaces can be replaced with pervious pavement to filter and infiltrate stormwater runoff from the parking lot located north of the building shown. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
11	953,870	46.0	481.8	4,379.6	0.743 26.16		

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
Bioretention system	0.070	12	5,161	0.23	675	\$1,800
Pervious pavement	0.130	22	9,462	0.42	880	\$22,000





Somerset Airport

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

SOMERSET HILLS LEARNING INSTITUTE





RAP ID: 16

Subwatershed: Raritan River North

Branch

Site Area: 538,250 sq. ft.

Address: 1810 Burnt Mills Road

Bedminster, NJ 07921

Block and Lot: Block 62.01, Lot 1





Bioretention systems can be installed at the northeast corner of the school (just beyond the corner of the sidewalk seen) and in the center of the courtyard to capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed at the western edge of the parking lot to manage pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
11	60,808	2.9	30.7	279.2	0.047 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
Bioretention systems	0.143	24	10,517	0.46	1,300	\$6,500
Pervious pavement	0.243	41	177,840	0.79	2,015	\$50,375





Somerset Hills Learning Institute

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

SORDONI CONSTRUCTION COMPANY





RAP ID: 17

Subwatershed: Raritan River North

Branch

Site Area: 107,690 sq. ft.

Address: 1 Pluckemin Way

Bedminster, NJ 07921

Block and Lot: Block 57, Lot 7

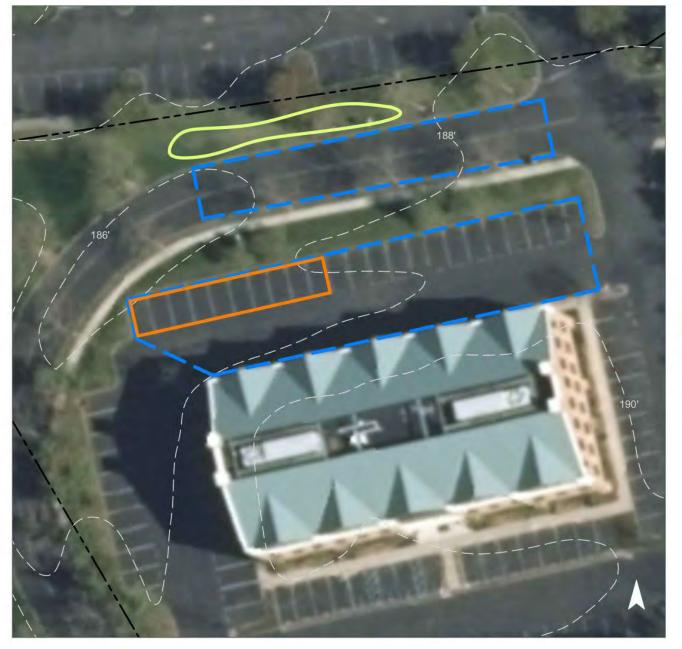




A bioretention system can be installed north of the road in front of the building to manage pavement runoff. Parking spaces north of the building can be replaced with pervious pavement to capture and infiltrate stormwater runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous 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"	
77	83,420	4.0	42.1	383.0	0.065 2.29		

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	0.100	17	7,323	0.32	960	\$4,800
Pervious pavement	0.214	36	15,738	0.69	1,620	\$40,500





Sordoni Construction Co

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



THE CENTER FOR CONTEMPORARY ART





RAP ID: 18

Subwatershed: Raritan River North

Branch

Site Area: 17,700 sq. ft.

Address: 2020 Burnt Mills Road

Bedminster, NJ 07921

Block and Lot: Block 71, Lot 4

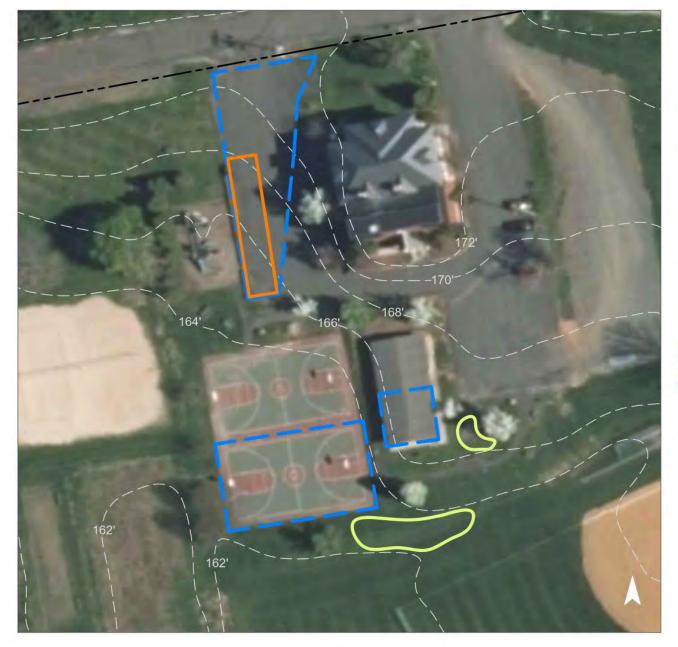




Bioretention systems can be installed southeast of the southernmost building and southeast of the tennis court to capture, treat, and infiltrate rooftop, tennis court, and parking lot runoff. Parking spaces located to the west of the northernmost building can be replaced with pervious pavement to capture and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
59	10,480	0.5	5.3	48.0	0.008 0.29		

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	0.134	22	9,844	0.43	1,290	\$6,450
Pervious pavement	0.120	20	8,811	0.39	1,460	\$36,500





The Center for Contemporary Art

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

0 25' 50'

THE HILLS VILLAGE CENTER





RAPID: 19

Subwatershed: Raritan River North

Branch

Site Area: 535,740 sq. ft.

Address: 402 Route 206 North

Bedminster, NJ 07921

Block and Lot: Block 59.27, Lot 11.1





A bioretention system can be installed on the northwestern side of Pancheros Mexican Grill to capture, treat, and infiltrate rooftop runoff from Pancheros Mexican Grill located in the Hills Village Center. Pervious pavement can be installed in various locations on the northern side of the parking lot to filter and infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
84	448,910	21.6	226.7	2,061.1	0.35 12.31		

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	0.079	13	5,782	0.25	735	\$3,675
Pervious pavement	0.703	118	51,560	2.27	4,925	\$123,125



THE PLUCKEMIN INN



RAPID: 20

Subwatershed: Raritan River North

Branch

Site Area: 66,940 sq. ft.

Address: 359 US Highway 206

Bedminster, NJ 07921

Block and Lot: Block 57, Lot 3



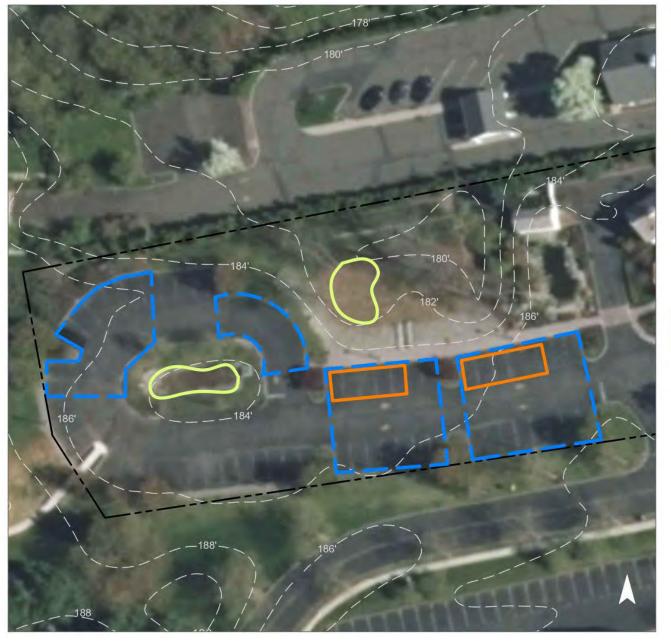


The detention basin in the center of the parking lot can be retrofitted to act as a bioretention system to capture, treat, and infiltrate parking lot runoff. An additional bioretention system can be installed north of the parking lot to capture, treat, and infiltrate additional parking lot runoff. Pervious pavement can be installed in the parking spaces in the northeastern side of the parking lot to infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		xisting Loads from ervious Cover (lbs/yr)		Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
70	46,870	2.3	23.7	215.2	0.037	1.29

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	0.109	18	8,011	0.35	1,430	\$7,150
Pervious pavement	0.208	35	15,244	0.67	1,435	\$35,875

GREEN INFRASTRUCTURE RECOMMENDATIONS





The Pluckemin Inn

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



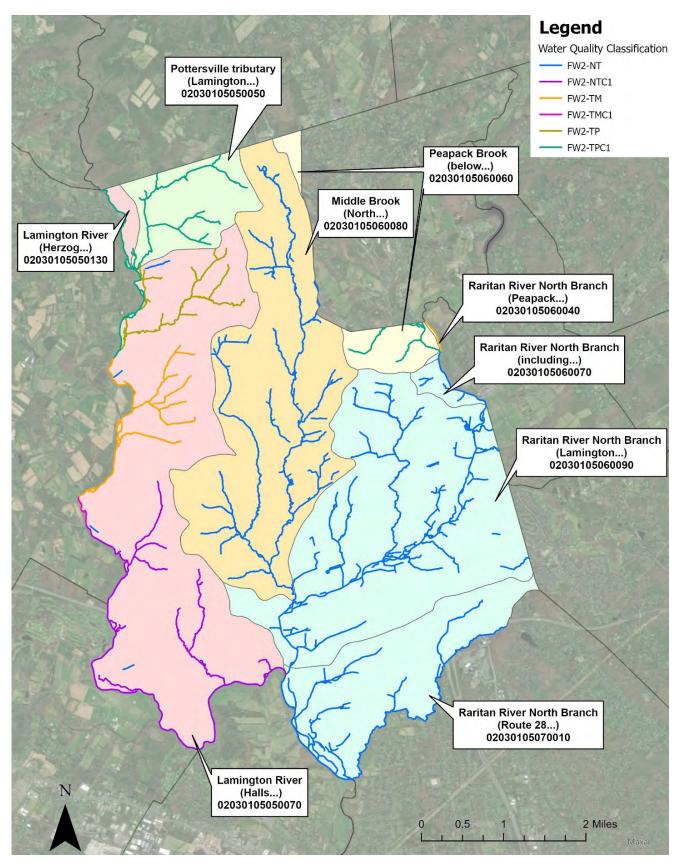


Figure 13. Water Quality Classification of Surface Waters in Bedminster Township

Table 11. Water Quality Classification of Surface Waters in Bedminster Township

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	67.6	63.6 %
Freshwater 2, non-trout, Category One	FW2-NTC1	13.0	12.2%
Freshwater 2, trout production, Category One	FW2-TPC1	11.0	10.4%
Freshwater 2, trout maintenance	FW2-TM	7.9	7.5%
Freshwater 2, trout production	FW2-TP	6.4	6.0%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	0.4	0.4%

Bernards Township

Introduction

Located in Somerset County in New Jersey, Bernards Township covers about 24.3 square miles. With a population of 27,830 (2020 United States Census), Bernards Township consists of 54.2% of urban land uses by area. Of that urban land use, approximately 32.0% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 42.1% of Bernards Township.

Bernards Township contains portions of ten subwatersheds (Table 1). There are approximately 85.9 miles of rivers and streams within the municipality; these include tributaries to Chambers Brook, Dead River and its tributaries, Dock Watch Hollow Brook, Harrisons Brook and its tributaries, Indian Grove Brook, North Branch Raritan River and its tributaries, Passaic River and its tributaries, Penns Brook and its tributaries, Spring Brook, tributaries to West Branch Middle Brook, and several uncoded tributaries. Bernards Township is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Bernards Township

Subwatershed	HUC14
Passaic River Upper (above Osborn Mills)	02030103010010
Passaic River Upper (Dead River to Osborn Mills)	02030103010070
Dead River (above Harrisons Brook)	02030103010080
Harrisons Brook	02030103010090
Dead River (below Harrisons Brook)	02030103010100
Raritan River North Branch (including Mine Brook to Peapack Brook)	02030105060070
Raritan River North Branch (Lamington River to Mine Brook)	02030105060090
Raritan River North Branch (Route 28 to Lamington River)	02030105070010
Middle Brook East Branch	02030105120050
Middle Brook West Branch	02030105120060

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Bernards Township. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Bernards Township's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Municipal Analysis Summary

An analysis was completed by municipality. Figure 1 shows Bernards Township in relation to the study area. Figure 2 shows the portions of the ten HUC14s in Bernards Township and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Bernards Township. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Bernards Township and is presented in Table 2. Figure 4 shows the impervious cover in Bernards Township based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Bernards Township and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins in Table 4 (identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". Only detention basins and a naturalized detention basin were identified in Bernards Township within the study area.

The Q-Farms in Bernards Township have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. There are 433.3 acres of agricultural land use in Bernards Township, of which, 23.3 acres lie within the study area for this Watershed Restoration and Protection Plan. However, there are no Q-Farms in Bernards Township within the study area.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Two HUC14s are

included in the study area (02030105060070, 02030105060090). Within these two HUC14s, there are 41.9 acres of buildings and 43.5 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Bernards Township, approximately 2.6 acres of rooftop runoff would be managed with 0.52 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Bernards Township, approximately 4.4 acres of roadway would be managed, or 1.2 miles of roadway. Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Bernards Township are shown in Figure 7 and presented in Table 6. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 8). Available information for each parcel in the study area is presented in Table 7. Class 15E parcels were excluded from the assessment. One of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. This property is identified in Table 7 and represents a watershed improvement project that can be included in the municipality's Watershed Improvement Plan. Figure 9 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the

support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are four classifications that apply to the streams in Bernards Township. Figure 10 depicts the water quality classifications of surface waters throughout Bernards Township and Table 8 summarizes the total miles and percentage of each surface water quality classification in the municipality.

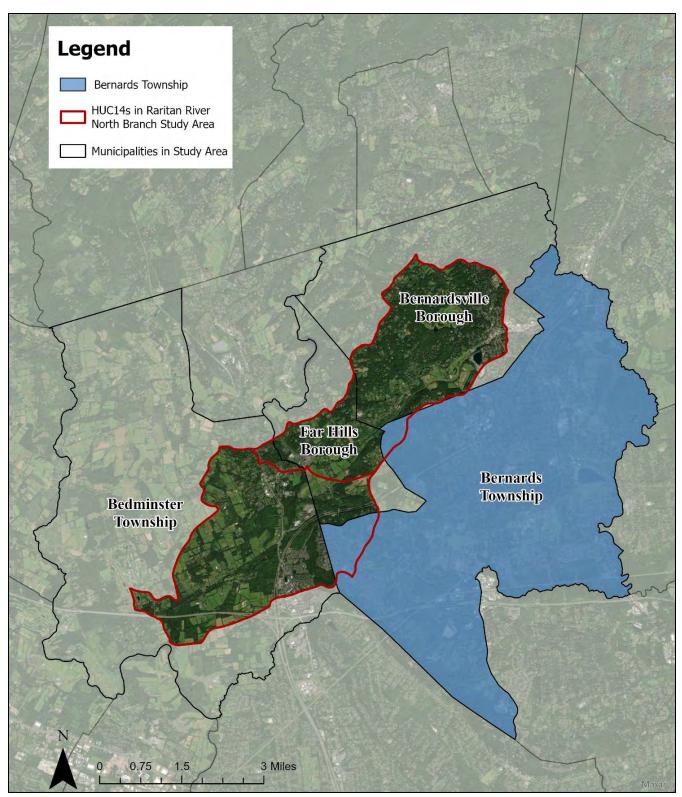


Figure 1: Municipalities in the Study Area

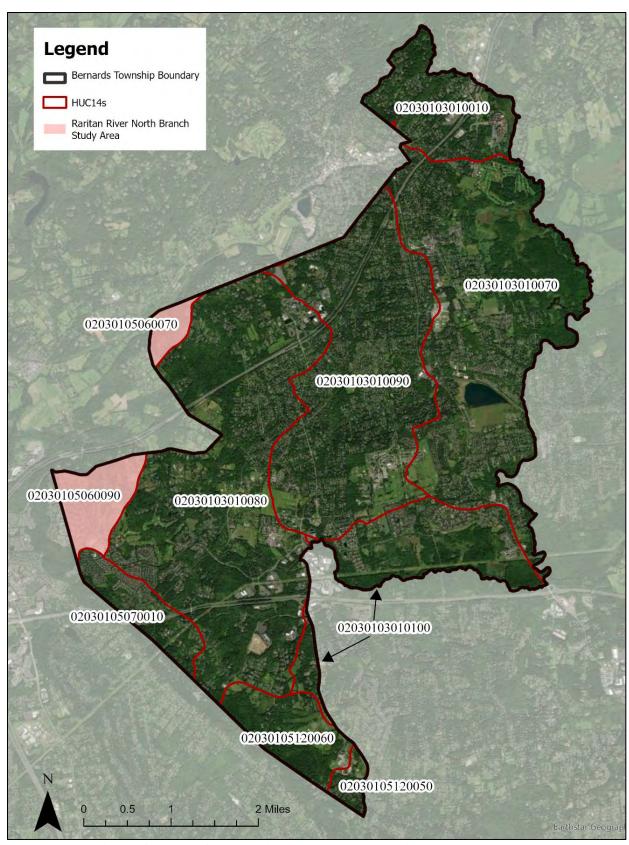


Figure 2: Portions of ten HUC14s are in Bernards Township

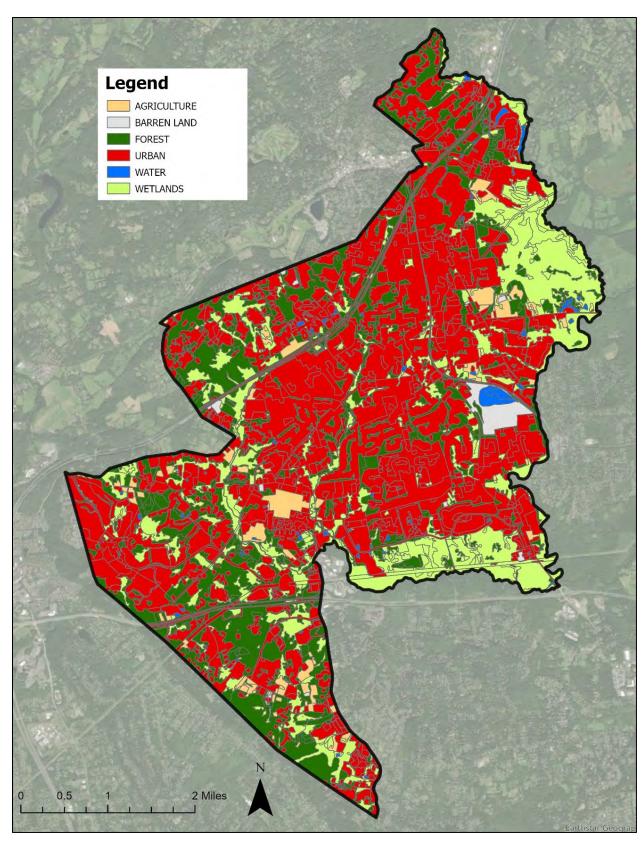


Figure 3: Land Use in Bernards Township

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Bernards Township

Bernards Township Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030103010010		-
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	314.9	31.5	944.6	12,594.3
Urban	540.4	756.6	8,106.1	75,657.0
Water	27.4	2.7	82.1	1,094.5
Wetlands	72.6	7.3	217.7	2,902.8
TOTAL =	955.2	798.1	9,350.5	92,248.6
		02030103010070		
Agriculture	136.5	177.4	1,364.7	40,942.2
Barren Land	121.6	60.8	607.9	7,294.7
Forest	479.8	48.0	1,439.4	19,192.0
Urban	1,917.2	2,684.1	28,757.8	268,406.0
Water	93.1	9.3	279.4	3,725.0
Wetlands	1,059.7	106.0	3,179.2	42,389.1
TOTAL =	3,807.9	3,085.5	35,628.4	381,948.9
		02030103010080		
Agriculture	163.6	212.7	1,636.4	49,093.2
Barren Land	11.7	5.9	58.7	704.0
Forest	1,385.6	138.6	4,156.8	55,424.5
Urban	2,211.3	3,095.9	33,169.9	309,586.0
Water	30.7	3.1	92.0	1,226.5
Wetlands	680.4	68.0	2,041.3	27,216.8
TOTAL =	4,483.4	3,524.1	41,155.1	443,251.0
		02030103010090		
Agriculture	38.8	50.4	388.0	11,640.0
Barren Land	4.7	2.3	23.4	280.6
Forest	571.5	57.2	1,714.4	22,859.2
Urban	2,439.3	3,415.0	36,589.2	341,499.6
Water	15.7	1.6	47.1	627.3
Wetlands	198.4	19.8	595.3	7,937.5
TOTAL =	3,268.4	3,546.3	39,357.4	384,844.2
		02030103010100		
Agriculture	22.0	28.6	219.7	6,592.0
Barren Land	6.7	3.4	33.7	404.5
Forest	171.2	17.1	513.6	6,847.9
Urban	441.9	618.6	6,628.1	61,862.0
Water	15.8	1.6	47.4	632.0
Wetlands	570.3	57.0	1,710.8	22,810.4

TOTAL =	1,227.8	726.3	9,153.3	99,148.8
		02030105060070		
Agriculture	4.5	5.9	45.3	1,358.2
Barren Land	0.5	0.3	2.6	31.4
Forest	75.5	7.6	226.6	3,021.7
Urban	74.2	103.8	1,112.3	10,381.1
Water	0.0	0.0	0.0	0.0
Wetlands	0.5	0.1	1.4	18.5
TOTAL =	155.2	117.6	1,388.2	14,810.9
		02030105060090		
Agriculture	18.8	24.4	187.7	5,629.8
Barren Land	0.0	0.0	0.0	0.0
Forest	78.7	7.9	236.1	3,147.9
Urban	294.3	412.0	4,414.1	41,197.8
Water	0.7	0.1	2.2	28.9
Wetlands	63.3	6.3	190.0	2,533.3
TOTAL =	455.8	450.7	5,030.0	52,537.6
•		02030105070010	•	
Agriculture	9.3	12.1	93.3	2,799.1
Barren Land	0.0	0.0	0.0	0.0
Forest	150.8	15.1	452.3	6,031.0
Urban	283.3	396.6	4,249.6	39,663.3
Water	3.3	0.3	9.9	132.2
Wetlands	19.9	2.0	59.8	796.6
TOTAL =	466.6	426.2	4,864.9	49,422.2
		02030105120050		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	16.7	1.7	49.9	665.9
Urban	81.2	113.6	1,217.6	11,364.2
Water	0.8	0.1	2.5	33.3
Wetlands	30.3	3.0	90.8	1,210.4
TOTAL =	128.9	118.4	1,360.8	13,273.8
		02030105120060		
Agriculture	39.8	51.7	397.7	11,930.5
Barren Land	3.4	1.7	17.0	204.1
Forest	303.0	30.3	909.0	12,120.1
Urban	149.5	209.4	2,243.2	20,936.2
Water	1.4	0.1	4.2	55.6
Wetlands	121.0	12.1	363.0	4,840.2
TOTAL =	618.1	305.3	3,934.1	50,086.6
		All HUCs		
Agriculture	433.3	563.3	4,332.8	129,984.9
				•

Barren Land	148.7	74.3	743.3	8,919.3
Forest	3,547.6	354.8	10,642.8	141,904.5
Urban	8,432.5	11,805.5	126,487.8	1,180,553.0
Water	188.9	18.9	566.6	7,555.2
Wetlands	2,816.4	281.6	8,449.2	112,655.8
TOTAL =	15,567.3	13,098.4	151,222.6	1,581,572.6

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Bernards Township that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Bernards Township. Based upon the NJDEP impervious surface data, Bernards Township has impervious cover totaling 16.9%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Bernards Township is shown in Figure 4. The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Bernards Township's impervious cover percentage would suggest that its waterways are primarily impacted and most likely contributing to not meeting the state's surface water quality standards.

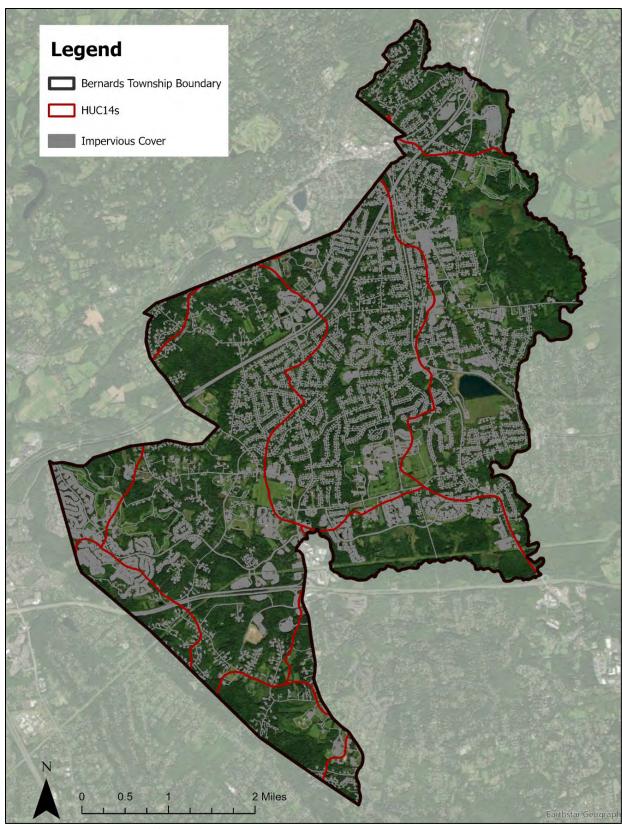


Figure 4: Impervious Cover in Bernards Township

Table 3: Impervious Cover Analysis by HUC14 for Bernards Township

Class	Area (acres)	HUC Impervious Cover (%)
	02030103010010	1
Building	39.74	
Other	78.97	
Road	78.44	
TOTAL =	197.2	20.6%
	02030103010070	
Building	129.46	
Other	259.42	
Road	168.25	
TOTAL =	557.1	14.6%
	02030103010080	
Building	142.02	
Other	290.08	
Road	252.23	
TOTAL =	684.3	15.3%
•	02030103010090	•
Building	160.77	
Other	319.77	
Road	230.26	
TOTAL =	710.8	21.7%
	02030103010100	
Building	53.55	
Other	62.01	
Road	60.69	
TOTAL =	176.3	14.4%
<u> </u>	02030105060070	1
Building	4.29	
Other	9.97	
Road	4.48	
TOTAL =	18.7	12.1%
_ 3	02030105060090	
Building	37.59	
Other	38.60	
Road	38.97	
TOTAL =	115.2	25.3%
1011H -	02030105070010	2010 / 0
Building	35.29	
Other	29.60	
Road	43.88	
TOTAL =	108.8	23.3%
IOIAL -	02030105120050	<u> </u>
Building	3.14	
Other	11.59	
Road	7.10	
TOTAL =	21.8	16.9%

	02030105120060	
Building	7.15	
Other	23.52	
Road	8.55	
TOTAL	= 39.2	6.3%
	All HUCs	
Building	613.00	
Other	1123.53	
Road	892.85	
TOTAL	= 2,629.4	16.9%

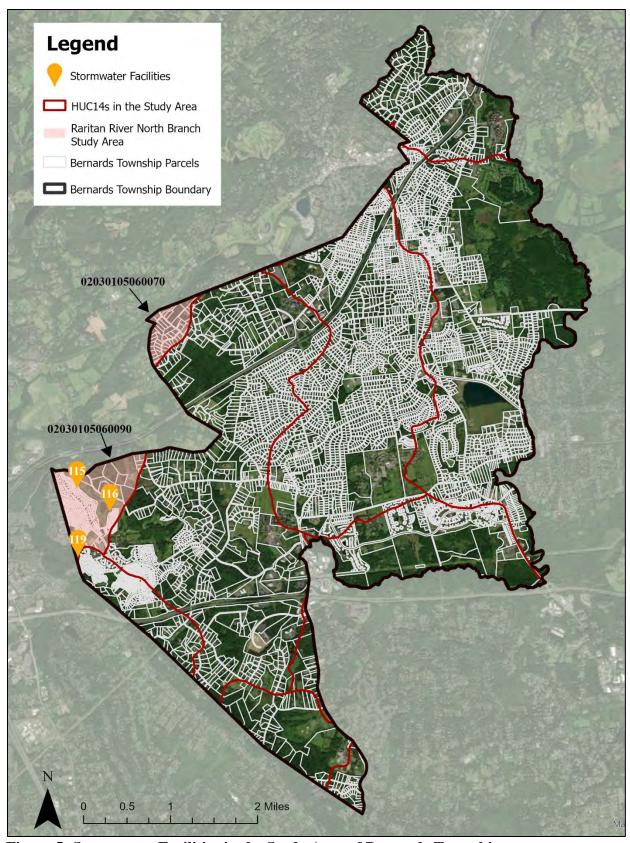


Figure 5: Stormwater Facilities in the Study Area of Bernards Township

Table 4: Location of Stormwater Facilities in the Study Area of Bernards Township

Raritan River North Branch Study Area				
<u>ID</u>	<u>Address</u>	Type		
115	Douglas Rd	D		
116	52 Layton Rd	N		
119	Hansom Rd	D		

"D" = Detention, "N" = Naturalized

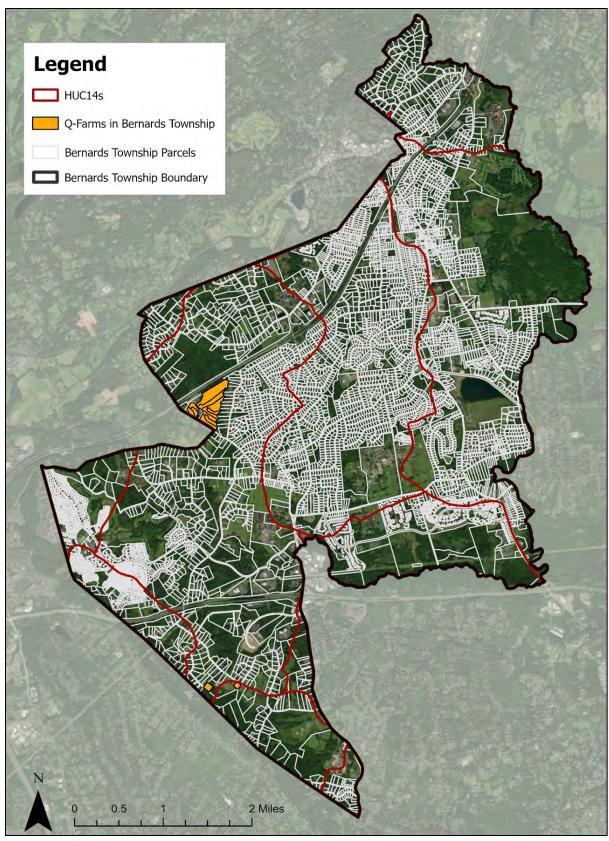


Figure 6: Q-Farm Parcels in Bernards Township

Table 5: Q-Farm Parcels in Bernards Township

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Block	Lot	Q-Code	Prop Class	Location
4701	2.01	Q0025		River Farm Ln
4701	2.02	Q0025		River Farm Ln
4701	2.03	Q0025		River Farm Ln
4701	2.04	Q0025		River Farm Ln
4701	2.05	Q0025		River Farm Ln
4701	2.06	Q0025		Mine Brook Rd
4701	2.07	Q0025		Mine Brook Rd & River Farm Ln
4701	2.08	Q0025		River Farm Ln
4701	2.09	Q0025		River Farm Ln
4701	2.1	Q0025		27 River Farm Ln
4701	2.11	Q0025		River Farm Ln
4701	2.12	Q0025		Annin Rd & N Stone Hedge Rd
11501	3.02	Q0027		Mountain Rd
11501	3.03	00027		Kings Ridge Rd

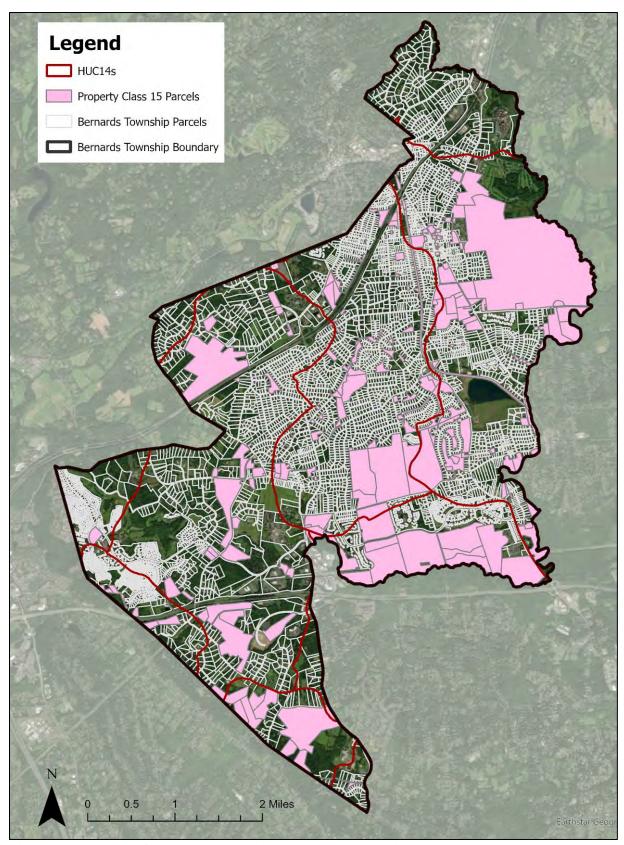


Figure 7: Property Class 15 Parcels in Bernards Township

Table 6: Property Class 15 Parcels in Bernards Township

Table 6:	Property (Class 15 Pa	arcels in Bernards Townshij	0
Block	Lot	Prop Class	Location	Facility Type
1805	41	15A	70 W Oak St	School
2801	3	15A	S Maple Ave (rear)	School Campus
2801	6	15A	285 S Maple Ave	Vacant Land
2801	33	15A	268 S Finley Ave	Ridge & Cedar Hill
5401	1	15A	70 Quincy Rd	School
7002	22	15A	319 Lyons Rd	Vacant Land
7501	3	15A	61 Church St (rear)	Vacant Land
7501	19	15A	61 Church St	School
10001	1	15A	111 Hansom Rd	School
1701	8	15B	173 Madisonville Rd	School
9401	14	15B	361 Somerville Rd	School
*24.01	17	15C	9 Crosswood Way	Vacant Land
*131	11.01	15C	108 Mount Airy Rd.	Vacant Land
*135	6	15C	Pennington Ave.	Vacant Land
200	1	15C	Railroad R O W	Railroad
200	2	15C	Railroad R O W	Railroad
200	3	15C	Railroad R O W	Railroad
200	4	15C	Railroad R O W	Railroad
200	5	15C	Railroad R O W	Railroad
200	6	15C	100 Lyons Pl	Parking Area
200	7	15C	Railroad R O W	Railroad
200	8	15C	Railroad R O W	Railroad
200	9	15C	Railroad R O W	Railroad
200	9.01	15C	Railroad R O W	Railroad
*901	1	15C	Washington Valley Rd	Recreation Center
*901	11.01	15C	Washington Valley Rd.	Vacant Land
*901	13	15C	Route 78	Vacant Land
*902	39.01	15C	Hunter Road	Dedicated Open Space
*903	3	15C	1430 Hunter Road	Vacant Land
*904	44	15C	Washington Valley Rd	Vacant Land
*916	1	15C	Bermuda Avenue	Vacant Land
*918	3	15C	Penn Street	Vacant Land
1004	1	15C	Birch Dr-Island	Island-Traffic
1005	8	15C	40 Walnut Cir	Vacant Land
1005	19	15C	132 N Maple Ave	Park
1302	13	15C	174 W Oak St	Vacant Land
1403	1.01	15C	40 Washington Ave	Vacant Land
1403	2	15C	30 Washington Ave	Fire House
1406	1	15C	69 N Brook Ave	Vacant Land
1406	34.01	15C	70 Conkling St	Vacant Land
1409	1	15C	46 Conkling St	Park
1506	1	15C	10 N Finley Ave	Park
1506	10	15C	15 W Oak St	Former Town Hall
1511	7	15C	24 Depot Pl	Parking Areas
1512	2	15C	18 Conkling St	Vacant Land
1601	1	15C	Collyer Ln & S Finley	Island-Traffic

1603	13	15C	Maple Ave	Parking Lot
1603	21.02	15C	Lewis St	Parking Lot
1603	22	15C	S Maple Ave	Parking Lot
1603	23	15C	S Finley Ave	Parking Lot
1604	6	15C	S Maple Ave	Parking Lot
1605	1	15C	S Finley Ave	Island-Traffic
1606	1	15C	E Oak & S Maple	Island-Traffic
1609	21	15C	67 N Maple Ave	Park
1609	24	15C	E Oak St (rear)	Pumping Station
1610	1	15C	32 S Maple Ave	Library
1610	15	15C	10 Lindbergh Ln	Parking Lot
1611	39	15C	Manchester Dr	Park
1701	11	15C	135 N Maple Ave	Park
1701	13	15C	Lord Stirling Rd	Park
1701	14	15C	190 Lord Stirling Rd	Environ.Educat.Bldg
1701	15	15C	96 Lord Stirling Rd	Park
1701	18	15C	12 Lord Stirling Rd	Vacant Land
1701	23	15C	270 S Maple Ave	Farm/Vacant Land
1701	24	15C	256 S Maple Ave	Park
1805	43	15C	25 Brownlee Pl	Post Office
1901	33	15C	20 E Ash St	Open Space/House
1902	26	15C	28 Voorhees Dr	Park
2001	2	15C	Culberson Rd (rear)	Vacant Land
2101	10	15C	Mt Airy Rd	Vacant Land
2101	45	15C	Chimney Ash Farm Rd-rear	Vacant Land
2301	10	15C	Pill Hill Rd	Land Fill
2301	37	15C	Whitenack Rd-rear	Passive Recreation
2301	41	15C	Whitenack Rd-rear	Passive Recreation
2401	9	15C	Mt Airy Rd (rear)	Vacant Land
2501	23	15C	Kinnan Way-rear	Vacant Land
2601	4	15C	Culberson Rd (rear)	Vacant
2801	1	15C	1 Collyer Ln	Municipal Bldg.
2801	2	15C	255 S Maple Ave	Farm
2801	4	15C	277 S Maple Ave	Maintenance Garage
2801	5	15C	279 S Maple Ave	Recreation Center
2801	9	15C	315 S Maple Ave	Park
2801	10	15C	325 S Maple Ave	Memorial Field
2801	35	15C	262 S Finley Ave	Municipal Offices
2904	35	15C	Woodstone Rd	Drainage Easement
2905	6	15C	32 Grove Rd	Park
3101	18	15C	146 Riverside Dr	Park
3201	5	15C	183 Lord Stirling Rd	Park
3201	7	15C	Lord Stirling Rd	Park
3201	8	15C	Lord Stirling Rd	Open Space
3201	18	15C	145 Riverside Dr	Park
3301	1	15C	530 S Maple Ave	Pumping Station
3302	6	15C	Castle Way	Park
3303	12	15C	Castle Way	Park

3402	14	15C	40 Hill Top Rd	Park
3604	5	15C	31 Stonehouse Rd	Maintenance Bldg.
3605	1	15C	S Finley&Stonehouse Rd	Island-Traffic
3705	2	15C	Cross Rd	Parking Areas
3802	22	15C	52 Woods End	Detention Basin
3901	61	15C	95 Spring House Ln	Open Space
3901	62	15C	Tamarisk Ct	Open Space
4005	1	15C	74 Autumn Dr	Open Space
4005	5	15C	Sleepy Hollow Rd	Vacant Land
4201	2	15C	Whitenack Rd	Vacant Land Vacant Land
4301	51	15C	264 Whitenack Rd	Recreation
4601	5.01	15C	225 Whitenack Rd	Vacant Land
4701	22	15C	Annin Rd (rear)	Vacant Land
4902	21	15C	Victoria Dr	Rebel Hill Park
5303	19	15C	136 Galloping Hill Rd	Park
5303	28	15C	90 Galloping Hill Rd	Vacant Land
5503	13	15C	Woods End-rear	Open Space
5601	10	15C	Jeffrey Ct	Open Space
5602	5	15C	24 Gerard Ave	Vacant Land
5602	35	15C	Rear Land	Open Space
5802	1	15C	477 S Finley Ave	Vacant Land
5901	1	15C	450 S Finley Ave	Park
5901	2	15C	470 S Finley Ave	Park
5901	29	15C	80 Stonehouse Rd	Vacant Land
6001	11	15C	100 Pond Hill Rd	Park
6102	1	15C	131 Pond Hill Rd	Park
6103	1	15C	85 Pond Hill Rd	Park
6208	10	15C	Overlook Ave	Vacant Land
6303	12	15C	Pheasant Run Dr	Open Space
6401	1	15C	100 Stonehouse Rd	Vacant Land
6401	5	15C	Blackburn Rd	Open Space
6404	9	15C	Governor Dr	Open Space
6404	27	15C	Governor Dr	Detention Basin
6501	1	15C	100 Summit Dr	Open Space
6503	1	15C	43 Blackburn Rd	Open Space
6702	16	15C	81 Manor Dr	Water Tower
6703	7	15C	39 Penwood Rd	Park
6801	27	15C	50 Knollcroft Rd	Open Space
6801	44	15C	6 Knollcroft Rd	Open Space
6802	4	15C	132 Lyons Rd	Park
7001	15	15C	Grist Mill Dr-rear	Park
7002	33	15C	3 Lincroft Dr	Parkland
7101	9	15C	Stockmar Dr	Vacant Land
7101	25	15C	Carriage Way	Vacant Land
7101	29	15C	Canterbury Way	Vacant Land
7201	28	15C	87 Mine Brook Rd	Vacant Land
7301	27	15C	86 Mine Brook Rd	Vacant Land
7301	35	15C	216 Liberty Corner Rd	Vacant Land
7302	1	15C	54 Mine Brook Rd	Vacant Land

7302	5	15C	95 Church St	Fire House
7302	6	15C	91 Church St	Tennis Courts
7302	11	15C	Somerville Rd	Land
7402	12	15C	Canterbury Way	Vacant Land
7502	1	15C	Church St	Island Traffic
7601	15	15C	180 Goltra Dr	Park
7804	8	15C	Lurline Dr-rear	Park
7901	10	15C	Archgate Rd	Park
7903	6	15C	340 Lyons Rd	Vacant Land
8001	1	15C	81 Archgate Rd	Park
8001	2	15C	3410 Valley Rd	Recreation Cntr
8001	3	15C	Valley Rd	Hospital
8001	4	15C	Valley Rd	Hospital
8101	3	15C	Stonehouse Rd	Open Space
8101	23	15C	Bernard Dr	Drainage
8101	47	15C	Blackburn Rd	Detention Basin
8102	18	15C	Bernard Dr	Open Space
8201	10	15C	3144 Valley Rd	Park
8201	33	15C	3010 Valley Rd	Pumping Station
8301	1	15C	155 Haas Rd	Park
8301	6	15C	117 Haas Rd	Park
8301	11.02	15C	93 Haas Rd	Park
8401	16	15C	72 Crest Dr	Vacant Land
8401	23	15C	450 King George Rd	Park
8501	1	15C	90 Acken Rd	Open Space
8501	5.01	15C	Open space	Open space
8501	8	15C	1 Monarch Cir	Pumping Station
*8501	41	15C	355 King George Rd	Park
8501	46	15C	100 Acken Rd	Open Space
8501	47	15C	110 Acken Rd	Open Space
8501	48	15C	King George Rd (rear)	Vacant Land
8502	2	15C	440 King George Rd	Park
8602	108	15C	King George Rd	Vacant Land
8602	109	15C	King George/Spring Valley	Vacant Land
9101	2	15C	Spring Valley Blvd-rear	Open Space
9101	3	15C	101 Acken Rd	Deeded Open Space
9204	2	15C	726 Martinsville Rd	Sewerage Disposal
9204	4	15C	3545 Valley Rd	Park
9204	6	15C	Spring Valley Blvd-rear	Vacant Land
9204	8	15C	Valley Rd	Open Space
9205	1	15C	Mt Airy Rd	Island
9401	11	15C	233 Allen Rd	Park
9501	3	15C	241 Liberty Corner Rd	Recreation Center
10301	26	15C	277 Somerville Rd	Open Space
10301	27	15C	262 Somerville Rd	Open Space
10401	38	15C	77 Milito Way	Nature Trail
10704	39	15C	25 Old Stagecoach Rd	Open Space
10801	96	15C	101 Old Stagecoach Rd	Open Space
*11001	14	15C	Somerville Rd	Vacant Land

11001	15	15C	66 Somerville Rd	Open Space
11101	2	15C	Somerville Rd	County Park
11101	6	15C	Rear Of 11101 2	Open Space
11102	5	15C	Mountain	County Park
11102	6	15C	333 Mountain Rd	Park
11102	41	15C	Pacer Ct	Open Space
11201	6	15C	Allen Rd	Vacant Land
11201	11	15C	Allen Rd	Vacant Land
11501	5.02	15C	Mountain Rd (rear)	Open Space
11501	6	15C	160 Mountain Rd	Park
11501	18	15C	Mountain Rd (rear)	Open Space
11501	19	15C	Mountain Rd (rear)	Open Space
*11501	23	15C	Mountain Rd	Open Space
11601	1	15C	255 Martinsville Rd	Pavilion
11601	23	15C	115 Sunset Ln	Vacant Land
11601	25	15C	Sunset Ln (rear)	Vacant Land
11701	10	15C	Darren Dr	Dedicated Open Space
11701	19	15C	Darren Dr	Detention Basin
11701	20	15C	Sunset Ln	Vacant Land
11701	21	15C	Sunset Ln	Roadway
11701	22	15C	Sunset Ln	Vacant Land
*11702	11	15C	Darren Dr	Dedicated Open Space
*24.01	3	15D	42 Liberty Corner Road	Church
1404	13	15D	16 Evergreen Pl	Residence
1405	4	15D	127 W Oak St	Chapel
1602	1	15D	S Finley Ave	Church/School
1602	6	15D	140 S Finley Ave	Church & Manse
1602	15.01	15D	175 S Maple Ave	Residence
1604	4	15D	22 S Finley Ave	Church
1604	5	15D	1 E Oak St	Office Rec Bldg
1607	1	15D	2 E Oak St	Church
1608	1	15D	12 E Allen St	Paige Whitney
1609	1	15D	5 N Maple Ave	Family Center
1609	7	15D	33 N Maple Ave	Residence
2001	10	15D	22 Ash St	Parsonage
2101	56	15D	130 Mt Airy Rd	Residence
2401	6	15D	142 Mt Airy Rd	Office Space
2401	7.01	15D	140 Mt Airy Rd	Recreation Cntr
2501	29	15D	17 Vail Ter	Residence
2502	13	15D	10 Flintlock Ct	Residence
2702	1	15D	128 Spencer Rd	Parsonage
4002	2	15D	350 Lake Rd	Church
7002	48	15D	510 Mt Airy Rd	Church
7501	4	15D	45 Church St	Church
7703	5	15D	11 Lafayette Ln	Group Residence
8201	25	15D	3048 Valley Rd	Church/School
8201	26	15D	3038 Valley Rd	Parsonage
8402	3	15D	3031 Valley Rd	Parsonage
8402	7	15D	498 King George Rd	Parsonage

8903	36	15D	3265 Valley Rd	House of Worship
9002	1	15D	3415 Valley Rd	Schools
9101	1	15D	500 Spring Valley Blvd	Farm
9204	3	15D	740 Martinsville Rd	Rescue Squad
9301	2	15D	124 Church St	House of Worship
103	1	15F	180 Hardscrabble Rd	Wildlife Sanctuary
1609	22.02	15F	150 Manchester Dr	Long Term Tax Exempt
1609	22.03	15F	150 Manchester Dr	Long Term Tax Exempt
1611	32	15F	35 Lindbergh Ln	Long Term Tax Exempt
1611	40	15F	95 Manchester Dr	Long Term Tax Exempt
1611	45	15F	22 Prospect Ave	Disabled Veteran
2502	4	15F	32 Kinnan Way	Ss Disabled Veteran
2701	35	15F	135 Spencer Rd	Disabled Veteran
2905	1	15F	24 Woodstone Rd	Disabled Veteran
3502	71	15F	1 Bradford Ln	Disabled Veteran Ss
3705	1	15F	415 S Finley Ave	Railroad Station
5203	10	15F	355 Grist Mill Dr	Disabled Veteran
7002	2	15F	15 Wexford Way	Disabled Veteran
8101	2	15F	240 Stonehouse Rd	Disabled Veteran
8604	5	15F	159 Jamestown Rd	Disabled Veteran
8604	29	15F	183 Jamestown Rd	Disabled Veteran
8701	47	15F	130 Potomac Dr	Disabled Veteran
8701	327	15F	97 Potomac Dr	Disabled Veteran
9001	5.05	15F	70 Sycamore Ct	Disabled Veteran
9001	9.12	15F	141 Bayberry Row	Disabled Veteran
9001	24.03	15F	2405 Privet Way	Disabled Veteran
9001	33.01	15F	3312 Balsam Way	Disabled Veteran
9202	30.18	15F	201 English Pl	Disabled Veteran
9903	18	15F	38 Dickinson Rd	Disabled Veteran
10002	5.03	15F	22 Battalion Dr	Disabled Veteran Ss
10201	32	15F	90 Independence Dr	Disabled Vet Spouse
10401	35	15F	15 Milito Way	Disabled Veteran
10706	26.03	15F	21 Dorchester Dr	Disabled Veteran
11301	8	15F	136 Mountainview Blvd	Hospital

^{*}Only a portion of the parcel is within the Bernards Township boundary

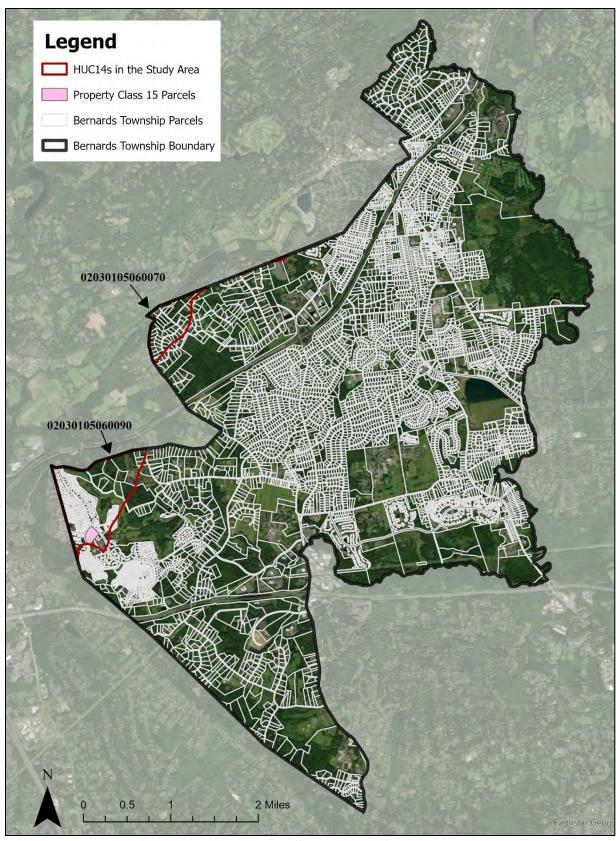


Figure 8: Property Class 15 Parcels in the Study Area of Bernards Township

Table 7: Property Class 15 Parcels in the Study Area of Bernards Township

		Prop
Block	Lot	Class
*100011	1	15A
200	9	15C
200	9.01	15C
2301 ¹	10	15C
9903 ¹	18	15F

^{*} Sites that can be retrofitted with green infrastructure

¹Only a portion of the parcel is within the study area

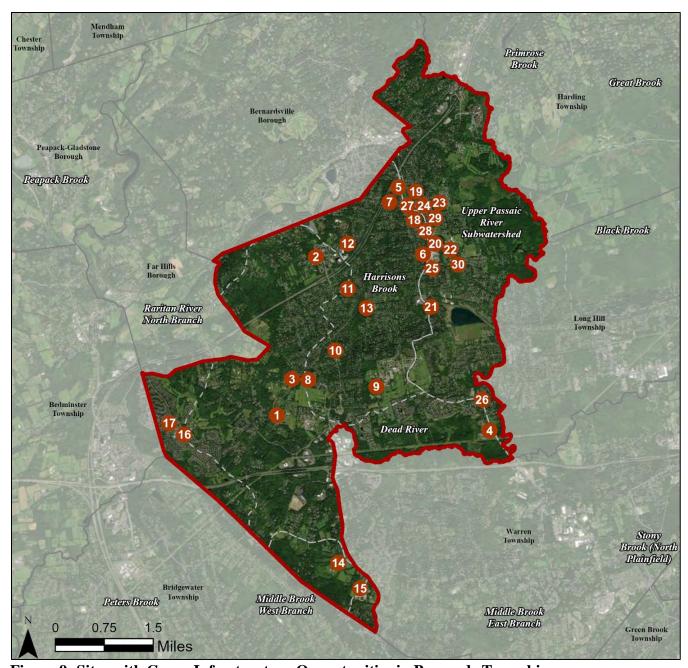


Figure 9: Sites with Green Infrastructure Opportunities in Bernards Township

ALBROOK SCHOOL



RAP ID: 1

Subwatershed: Dead River

HUC14 ID 02030103010080

Site Area: 274,845 sq. ft.

Address: 361 Somerville Road

Basking Ridge, NJ 07920

Block and Lot: Block 9401, Lot 14

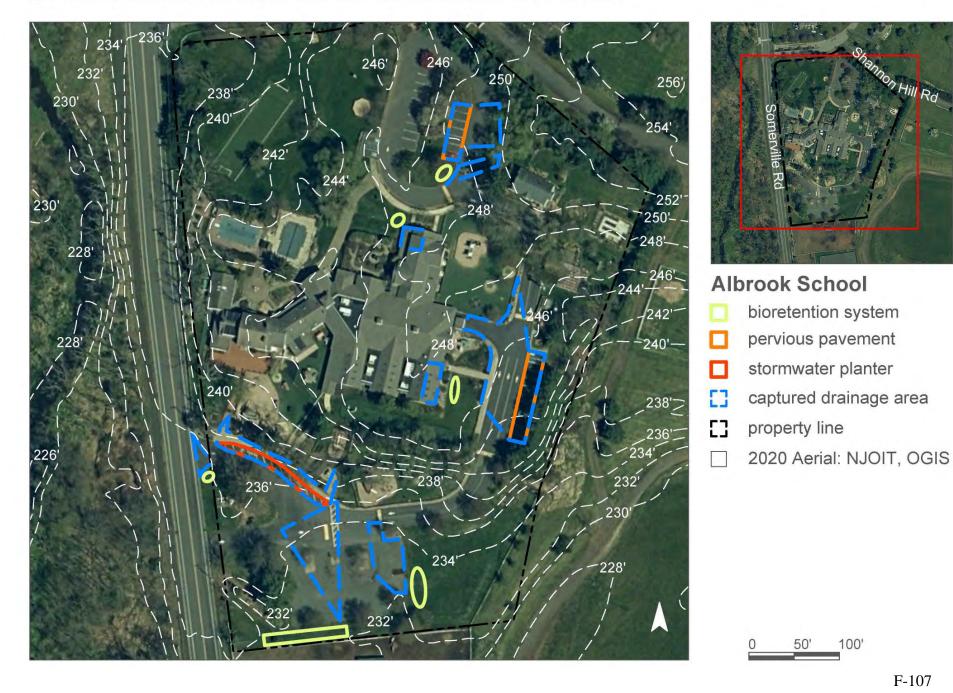


Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from rooftops, driveways, and parking lots. This may require curb cuts and redirection of downspouts underneath sidewalks. The proposed rain garden on the south of the property can be constructed around an existing catch basin. Existing parking spaces in the northern and eastern lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A stormwater planter can be installed in the no-parking zone on the southwest driveway to capture, treat, and infiltrate the stormwater runoff from the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover Existing Loads from Impervious Cover (lbs/yr) Runoff Volume from Impervious Cover (Mg			npervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"
49	133,909	6.5	67.6	614.8	0.104	4.09

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	8,390	0.243	36	16,250	0.61	2,100	\$21,000
Pervious pavement	10,115	0.293	44	19,590	0.74	2,925	\$73,125
Stormwater planter	2,660	0.077	11	5,150	0.19	1,135	\$425,625

GREEN INFRASTRUCTURE RECOMMENDATIONS



KING OF KINGS WORSHIP CENTER





RAPID: 2

Subwatershed: Dead River

Site Area: 418,078 sq. ft.

Address: 219 Mt. Airy Road

Bernards Township, NJ

07920

Block and Lot: Block 2301, Lot 31





Stormwater runoff from the parking lot north of the building can be captured by a rain garden installed in the turfgrass area of the parking lot island to capture, treat, and infiltrate stormwater runoff. A rain garden would not only capture stormwater but it would provide wildlife habitat as well as provide aesthetic value. A section of parking spaces can also 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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
27	112,372	5.4	56.8	515.9	0.088	3.08	

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	0.221	37	16,250	0.61	2,125	\$10,625
Pervious pavement	0.246	41	18,060	0.68	2,080	\$52,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



LIBERTY CORNER FIRE COMPANY



RAPID: 3

Subwatershed: Dead River

HUC14 ID 02030103010080

Site Area: 356,323 sq. ft.

Address: 95 Church Street

Liberty Corner, NJ 07938

Block and Lot: Block 7302, Lot 5





Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from rooftops, parking lot, driveway, and the tennis court on the far east corner of the property. This will require curb cuts, trench drains, and redirection of downspouts under the sidewalk. Existing parking spaces in the eastern lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A cistern can be installed to the southeast of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
19	68,378	3.3	34.5	313.9	0.053	2.09	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	23,715	0.688	103	45,930	1.73	5,935	\$59,350
Pervious pavement	7,300	0.212	32	14,140	0.53	1,990	\$49,750
Rainwater harvesting	1,885	0.055	8	1,500	N/A	1,500 (gal)	\$4,500





Liberty Corner Fire Company

- bioretention system
- rainwater harvesting
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS



DUNKIN'



RAPID:

Subwatershed: **Dead River**

Site Area: 748,635 sq. ft.

Address: 415 King George Road

Bernards Township, NJ

07920

Block and Lot: Block 8501, Lot 39

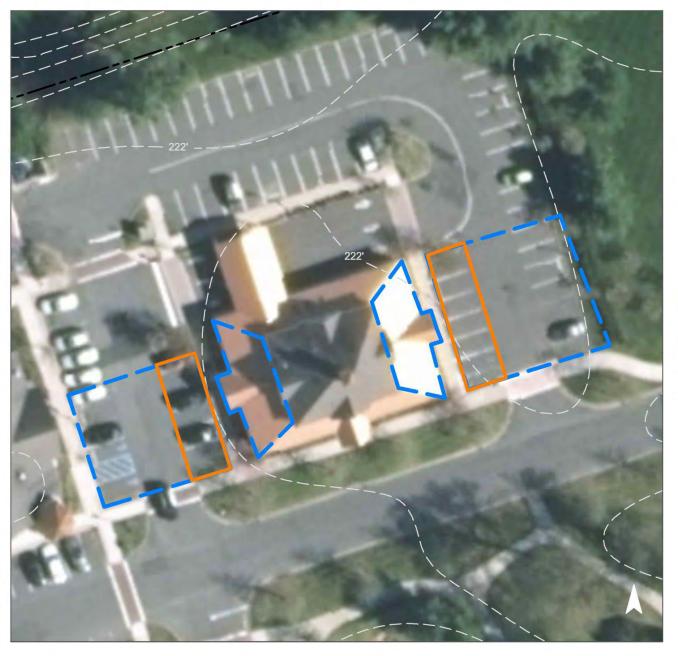




Parking spaces in the parking lot to the east and west of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Porous pavement comes in different forms such as porous asphalt, pervious concrete, permeable pavers, and grass pavers. These are sturdy materials that allow for vehicles to pass over but still allow water to infiltrate into the ground. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
56	416,526	20.1	210.4	1,912.4	0.325 11.42		

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
Pervious pavement	0.244	41	17,880	0.67	2,070	\$51,750





Dunkin'

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



BASKING RIDGE FIRE COMPANY

RUTGERS

New Jersey Agricultural Experiment Station

RAP ID: 5

Subwatershed: Harrisons Brook

HUC14 ID 02030103010090

Site Area: 176,014 sq. ft.

Address: 30 Washington Avenue

Basking Ridge, NJ 07920



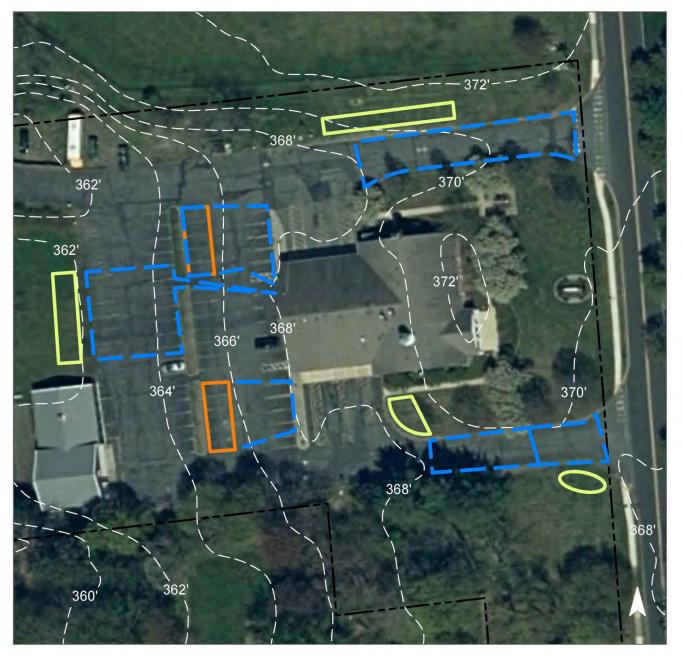


Block and Lot: Block 1403, Lot 2

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveways and parking lot. This will require curb cuts and trench drains. Existing parking spaces in the east of the parkinglot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
41	72,153	3.5	36.4	331.3	0.056	2.20	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	10,115	0.293	44	19,590	0.74	2,535	\$25,350
Pervious pavement	4,990	0.145	21	9,660	0.36	1,560	\$39,000





Basking Ridge Fire Company

- bioretention system
- pervious pavement
- captured drainage area
- property line
- ☐ 2020 Aerial: NJOIT, OGIS

BERNARDS TOWNSHIP HEALTH DEPARTMENT





RAPID: 6

Subwatershed: Harrisons Brook

Site Area: 80,551 sq. ft.

Address: 262 South Finley Avenue

Bernards Township, NJ

07920

Block and Lot: Block 2801, Lot 31





Rain gardens can be installed in the turfgrass area near the entrance of the building and in the rear to capture, treat, and infiltrate stormwater runoff from the parking lot. Downspout planter boxes can be installed to capture and treat stormwater runoff form the rooftop. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
55	44,134	2.1	22.3	202.6	0.034	1.21	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.217	36	15,920	0.60	2,085	\$10,425
Planter box	n/a	1	n/a	n/a	1 (box)	\$1,000





Bernards Township Health Department

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

COVENANT CHAPEL REFORMED





RAP ID: 7

Subwatershed: Harrisons Brook

Site Area: 21,671 sq. ft.

Address: 127 West Oak Street

Bernards Township, NJ

07920

Block and Lot: Block 1405, Lot 4





A rain garden can be installed in the turfgrass area near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. This addition could keep rooftop runoff from the storm drain while also enhancing the environment using different colored native flowering plants. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
68	14,655	0.7	7.4	67.3	0.011 0.40		

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	0.023	4	1,720	0.06	225	\$1,125





Covenant Chapel Reformed

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

LIBERTY CORNER ELEMENTARY SCHOOL



RAPID: 8

Subwatershed: Harrisons Brook

HUC14 ID 02030103010090

Site Area: 323,097 sq. ft.

Address: 61 Church Street

Liberty Corner, NJ 07938

Block and Lot: Block 7501, Lot 3

Block 7501, Lot 19



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveway, parking lot, and basketball court. This will require curb cuts and trench drains. Existing parking spaces in the extern and western parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A prelminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
41	132,211	6.4	66.8	607.0	0.103	4.04	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	9,695	0.281	42	18,770	0.71	2,425	\$24,250
Pervious pavement	25,935	0.753	114	50,230	1.89	6,885	\$172,125





Liberty Corner Elementary School

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- ☐ 2020 Aerial: NJOIT, OGIS

PLEASANT VALLEY PARK





RAPID: 9

Subwatershed: Harrisons Brook

Site Area: 3,426,769 sq. ft.

Address: Valley Road

Bernards Township, NJ

07920

Block and Lot: Block 8001, Lot 1

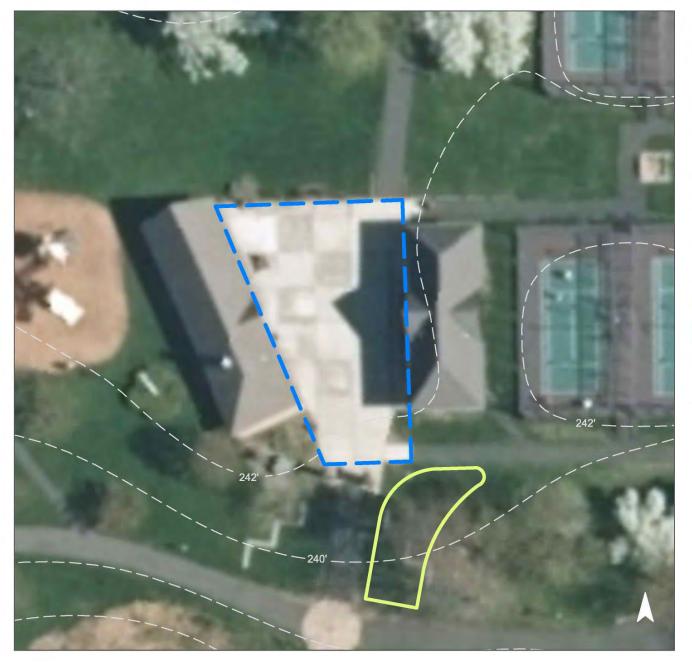




The stormwater runoff coming from the impervious cover in this park center can be captured by a rain garden. A rain garden in this location could provide an attraction that would improve the overall quality of the park's atmosphere. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		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	223,159	10.8	112.7	1,024.6	0.174	6.12	

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	0.102	17	7,490	0.28	980	\$4,900





Pleasant Valley Park

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

SOMERSET HILLS BAPTIST CHURCH





RAP ID: 10

Subwatershed: Harrisons Brook

Site Area: 256,362 sq. ft.

Address: 510 Mt. Airy Road

Bernards Township, NJ

07920

Block and Lot: Block 7002, Lot 48





Several rain gardens can be installed in the turfgrass to capture, treat, and infiltrate stormwater runoff from the roof. These rain gardens can provide wildlife habitat and beautify the area. A cistern can be installed to capture rooftop stormwater runoff. A section of parking spaces can be converted to porous pavement to capture and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
24	61,133	2.9	30.9	280.7	0.048	1.68	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.160	27	11,740	0.44	1,550	\$7,750
Pervious pavement	0.167	28	12,270	0.46	1,780	\$44,500
Rainwater harvesting	0.033	6	1,000	0.04	1,000 (gal)	\$2,000



SOMERSET HILLS LUTHERAN CHURCH





RAP ID: 11

Subwatershed: Harrisons Brook

Site Area: 241,691 sq. ft.

Address: 350 Lake Road

Bernards Township, NJ

07920

Block and Lot: Block 4002, Lot 2





A small strip of turfgrass can be converted to a rain garden to capture, treat, and infiltrate the runoff from the parking lot. A cistern can also be placed adjacent to the building to capture runoff and be used for non-potable purposes such as watering plants. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
33	80,309	3.9	40.6	368.7	0.063	2.20	

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	0.135	23	9,940	0.37	1,300	\$6,500
Rainwater harvesting	0.033	6	2,000	0.07	2,000 (gal)	\$4,000



SOMERSET HILLS YMCA



RAP ID: 12

Subwatershed: Harrisons Brook

HUC14 ID 02030103010090

Site Area: 698,346 sq. ft.

Address: 140 Mount Airy Road

Basking Ridge, NJ 07920



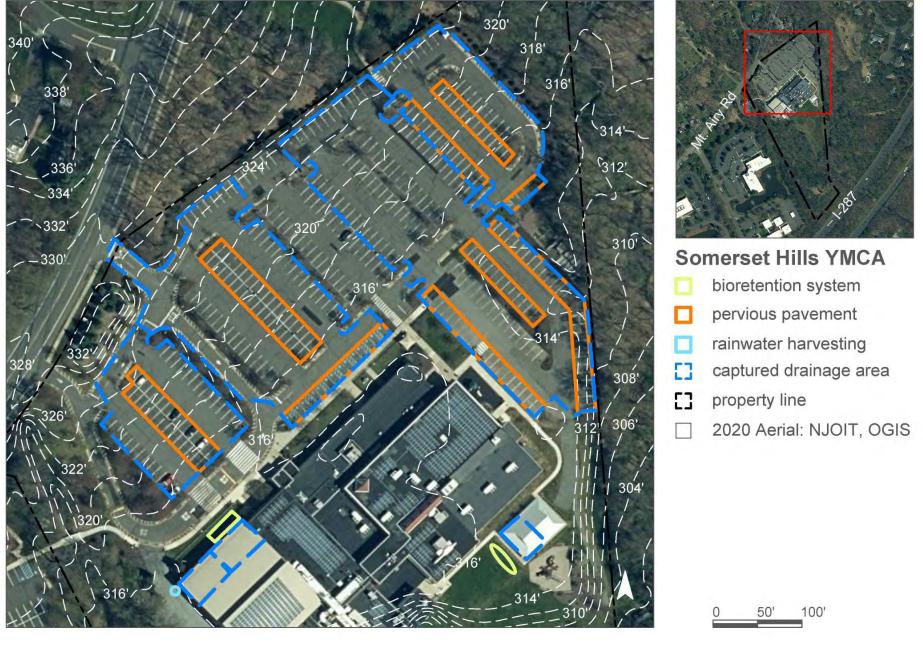


Block and Lot: Block 2401, Lot 7.01

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops. Existing parking spaces in much of the parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A cistern can be installed to the west of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing a vehicle or watering a garden. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		ting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
39	275,844	13.3	139.3	1,266.5	0.215	8.43	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	2,905	0.084	13	5,620	0.21	725	\$7,250
Pervious pavement	128,685	3.734	561	249,230	9.37	27,770	\$694,250
Rainwater harvesting	1,680	0.049	8	1,350	N/A	1,350 (gal)	\$4,050



WILLIAM ANNIN MIDDLE SCHOOL



RAPID: 13

Subwatershed: Harrisons Brook

HUC14 ID 02030103010090

Site Area: 1,506,001 sq. ft.

Address: 70 Quincy Road

Basking Ridge, NJ 07920



Block and Lot: Block 5410, Lot 1

Rain gardens can be installed in various locations around the property to capture, treat, and infiltrate the stormwater runoff from the driveway, parking lot, and shed rooftops. This will require curb cuts, trench drains, and redirection of downspouts. Existing parking spaces in the northern parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Imper	vious Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
22	336,285	16.2	169.8	1,544.0	0.262	10.27	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	35,905	1.042	156	69,530	2.61	8,975	\$89,750
Pervious pavement	57,660	1.673	251	111,670	4.20	13,685	\$342,125





William Annin Middle School

- bioretention system
- pervious pavement
 - captured drainage area
- [] property line
- ☐ 2020 Aerial: NJOIT, OGIS

0 100' 200'

MOUNTAIN PARK BASEBALL AND SOCCER FIELDS





RAP ID: 14

Subwatershed: Middle Brook West Branch

Site Area: 6,274,742 sq. ft.

Address: 114 Mountain Road

Bernards Township, NJ

07920

Block and Lot: Block 11601, Lot 1

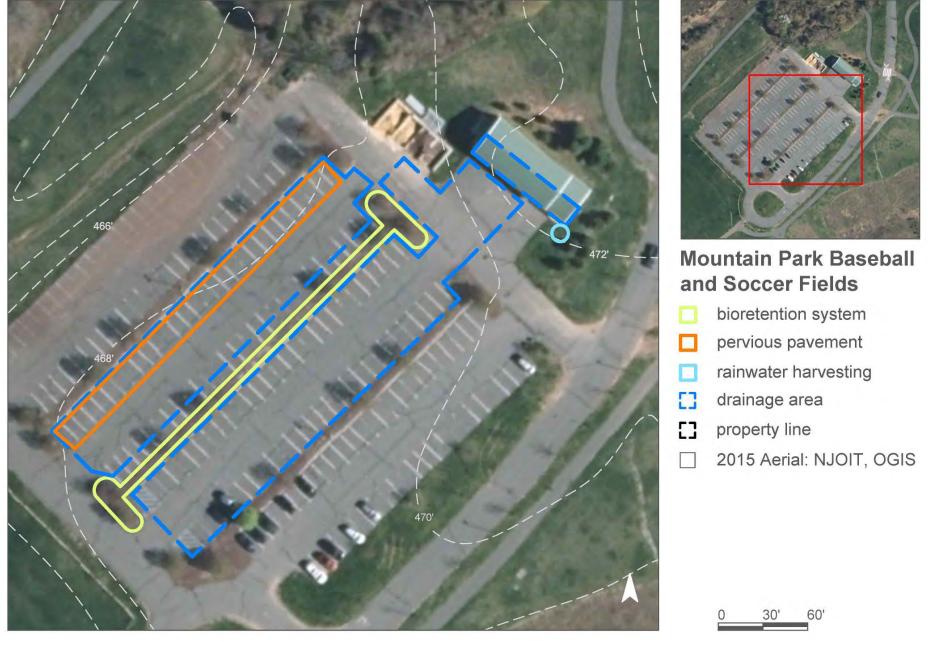




A cistern can be placed adjacent to the building to capture stormwater runoff from the roof. The captured water can then be used for non-potable uses such as washing vehicles. A section of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. A parking lot island can be converted to a rain garden to capture, treat, and infiltrate stormwater from another area of the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
7	409,064	19.7	206.6	1,878.2	0.319	11.22	

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	0.482	81	35,330	1.33	4,620	\$23,100
Pervious pavement	0.348	58	25,540	0.96	4,560	\$114,000
Rainwater harvesting	0.031	5	1,000	0.04	1,000 (gal)	\$3,000



THE PINGRY SCHOOL





RAP ID: 15

Subwatershed: MIDDLE BROOK WEST

BRANCH

Site Area: 8,176,598 sq. ft.

Address: 42 Liberty Corner Road

Bernards Township, NJ

07920

Block and Lot: Block 11601, Lot 3





Rain gardens can be installed in the turfgrass areas surrounding the northern part of the building and can be used to capture runoff from the building. They can beautify the front entrance while also infiltrating the captured stormwater. A bioswale can also be placed west of the school to transport water while reducing its flow and pollutant load. A cistern can capture stormwater from the roof which can then be used for non-potable uses. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
11	901,661	43.5	455.4	4,139.9	0.703	24.73	

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	0.280	47	20,570	0.77	2,690	\$13,450
Bioswale	0.117	28	8,420	10.00	2,250	\$11,250
Rainwater harvesting	0.026	4	1,000	0.04	1,000 (gal)	\$2,000





The Pingry School

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

FULTON BANK OF NEW JERSEY





RAP ID: 16

Subwatershed: Raritan River North

Branch

Site Area: 53,698 sq. ft.

Address: 578 Allen Road

Bernards Township, NJ

07920

Block and Lot: Block 10001, Lot 4





Parking spaces in the parking lot can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Downspout planter boxes can be installed at the entrance of the building to beautify the space and 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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
67	304,580	14.7	153.8	1,398.4	0.237	8.35	

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
Pervious pavement	0.217	36	15,950	0.60	1,490	\$37,250
Planter box	n/a	3	n/a	n/a	4 (boxes)	\$4,000



MOUNT PROSPECT SCHOOL



RAPID: 17

Subwatershed: Raritan River North

Branch

HUC14 ID 02030105060090

Site Area: 524,252 sq. ft.

Address: 111 Hansom Road

Basking Ridge, NJ 07920

Block and Lot: Block 10001, Lot 1



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveways and building rooftop. This will require curb cuts, trench drains, and redirection of downspouts underneath the sidewalk. Existing parking spaces in the western parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
44	231,469	11.2	116.9	1,062.8	0.180	7.07	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	11,905	0.345	51	23,050	0.87	2,975	\$29,750
Pervious pavement	32,890	0.954	144	63,700	2.39	8,370	\$209,250



BANK OF AMERICA FINANCIAL CENTER





RAP ID: 18

Subwatershed: Upper Passaic River

Site Area: 33,652 sq. ft.

Address: 125 South Finley Avenue

Bernards Township, NJ

07920

Block and Lot: Block 1802, Lot 25

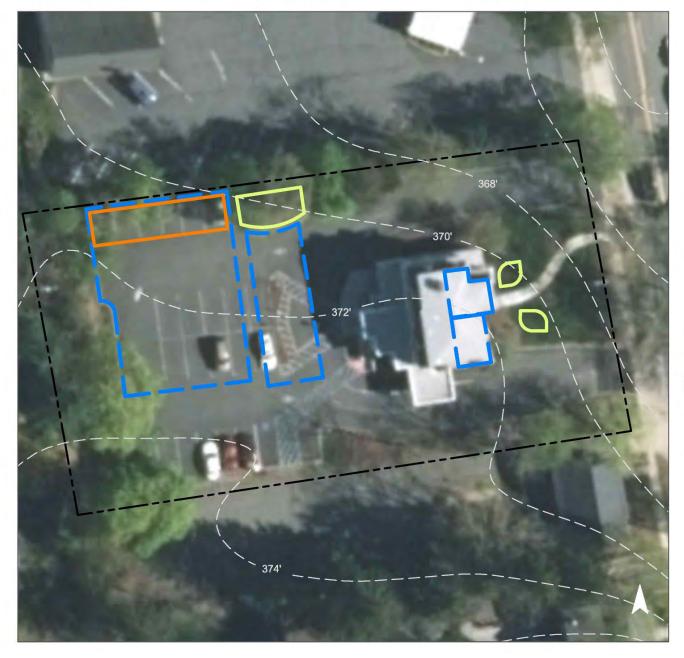




Parking spaces in the parking lot to the west of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Two rain gardens can be installed in the turfgrass area near the entrance of the building and a third in the rear of the building to capture more 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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
81	27,413	1.3	13.8	125.9	0.021	0.75	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.060	10	4,410	0.17	580	\$2,900
Pervious pavement	0.131	22	9,630	0.36	900	\$22,500





Bank of America Financial Center

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



BASKING RIDGE POST OFFICE





RAP ID: 19

Subwatershed: Upper Passaic River

Site Area: 41,005 sq. ft.

Address: 21 Brownlee Place

Bernards Township, NJ

07920

Block and Lot: Block 1805, Lot 43

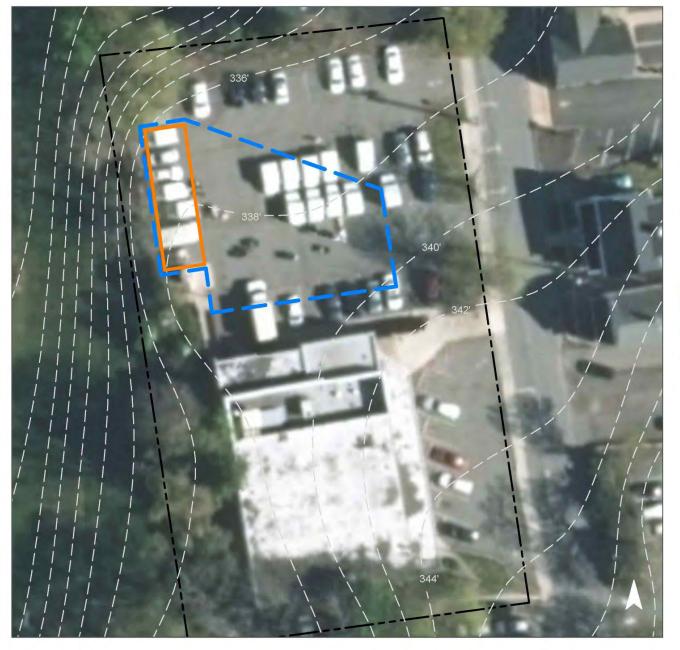




Parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Porous pavement captures stormwater by having small pores that allow stormwater to infiltrate with a bed of rocks underneath that allow it to slowly percolate into the ground. Porous pavement can serve as both a method of capturing stormwater while also maintaining its functionality as a parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
81	33,119	1.6	16.7	152.1	0.026	0.91	

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	12,100	0.45	1,130	\$28,250





Basking Ridge Post Office

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



BERNARDS TOWNSHIP MUNICIPAL COURT & POLICE DEPARTMENT



RAP ID: 20

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 1,167,145 sq. ft.

Address: 1 Collyer Lane

Basking Ridge, NJ 0792



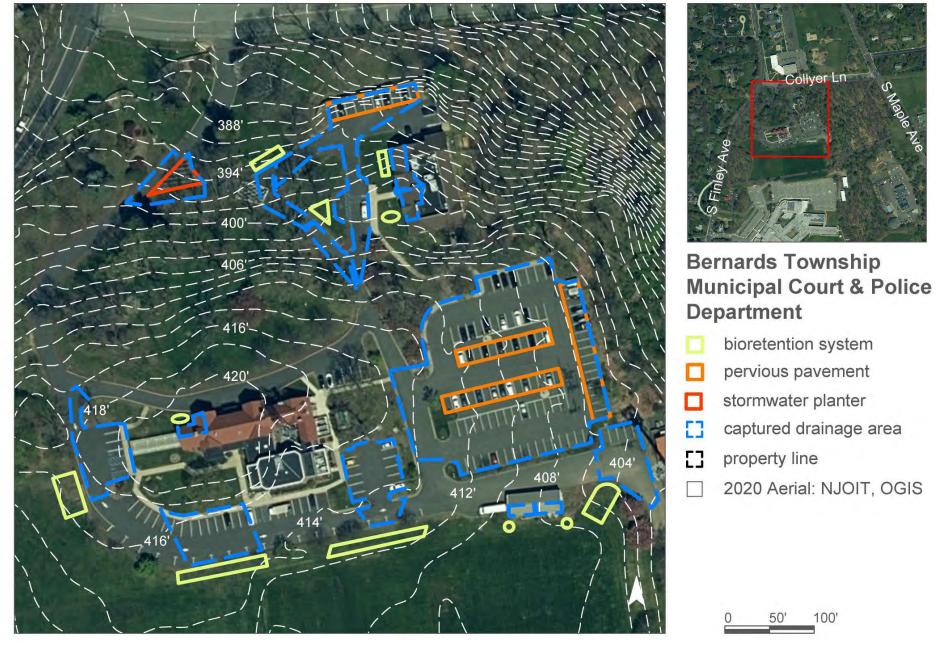


Block and Lot: Block 2801, Lot 1

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveway, parking lots, and building rooftops. This will require curb cuts, trench drains, and downspout disconnections. Existing parking spaces in the northern and eastern parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A stormwater planter can be installed in the intersection on the northwest driveway to capture, treat, and infiltrate the stormwater runoff from the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soils suitability for green infrastructure.

Impervi	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
15	180,567	8.7	91.2	829.1	0.141	5.52	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	23,320	0.677	103	45,160	1.70	5,825	\$58,250
Pervious pavement	48,415	1.405	211	93,760	3.52	9,510	\$237,750
Stormwater planter	2,890	0.084	13	5,600	0.21	1,035	\$388,125



BERNARDS TOWNSHIP COMMUNITY SERVICES





RAP ID: 21

Subwatershed: Upper Passaic River

Site Area: 61,473 sq. ft.

Address: 31 Stonehouse Road

Bernards Township, NJ

07920

Block and Lot: Block 3604, Lot 4





A rain garden can be installed in the front of the building to capture, treat, and infiltrate stormwater runoff from the roof. A cistern can be installed to the north of the building as a method of rainwater harvesting to capture runoff from the roof. This water can have many uses including watering plants, washing cars, or any other non-potable use. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
73	44,662	2.2	22.6	205.1	0.035	1.22	

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	0.010	2	760	0.03	100	\$500
Rainwater harvesting	0.033	6	1,000	0.04	1,000 (gal)	\$2,000





Bernards Township Community Services

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

BERNARDS TOWNSHIP FIRE DEPARTMENT





RAPID: 22

Subwatershed: Upper Passaic River

Site Area: 464,589 sq. ft.

Address: 277 South Maple Avenue,

Bernards Township, NJ

07920

Block and Lot: Block 2801, Lot 4





Cisterns can be installed at multiple locations on the buildings to capture stormwater runoff from the roof. This water can be used to wash vehicles or for other non-potable uses. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
39	180,157	8.7	91.0	827.2	0.140 4.94		

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Rainwater harvesting	0.169	28	5,000	0.19	5,000 (gal)	\$10,000





Bernards Township Fire Department

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

BERNARDS TOWNSHIP LIBRARY



RAP ID: 23

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 50,263 sq. ft.

Address: 32 South Maple Avenue

Basking Ridge, NJ 07920

Block and Lot: Block 1610, Lot 1





A rain garden can be installed in front of the building to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require a downspout disconnection. Existing parking spaces in the northern and eastern parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The concrete walkway near the library entrance can be replaced with porous pavers to infiltrate runoff from the walkway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Riinatt valiime tram impervialis (aver (vigal)			
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"		
80	40,288	1.9	20.3	185.0	0.031	1.23		

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	610	0.018	2	1,180	0.04	150	\$1,500
Pervious pavement	19,330	0.561	84	37,440	1.41	5,965	\$149,125





Bernards Township Library

- bioretention system
- pervious pavement
- captured drainage area
- property line
- ☐ 2020 Aerial: NJOIT, OGIS

0 20' 40'

BISHOP JANES UNITED METHODIST CHURCH





RAP ID: 24

Subwatershed: Upper Passaic River

Site Area: 39,334 sq. ft.

Address: 22 South Finley Avenue

Bernards Township, NJ

07920

Block and Lot: Block 1805, Lot 43





A rain garden can be planted in the patch of turf grass in front of the west entrance to the building. A section 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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
81	32,042	1.5	16.2	147.1	0.025	0.88	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.057	10	4,200	0.16	550	\$2,750
Pervious pavement	0.085	14	6,250	0.23	830	\$20,750





Bishop Janes United Methodist Church

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



CEDAR HILL ELEMENTARY SCHOOL & RIDGE HIGH SCHOOL



RAP ID: 25

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 1,549,784 sq. ft.

Address: 100 Peachtree Road & 268

South Finley Avenue Basking Ridge, NJ 07920

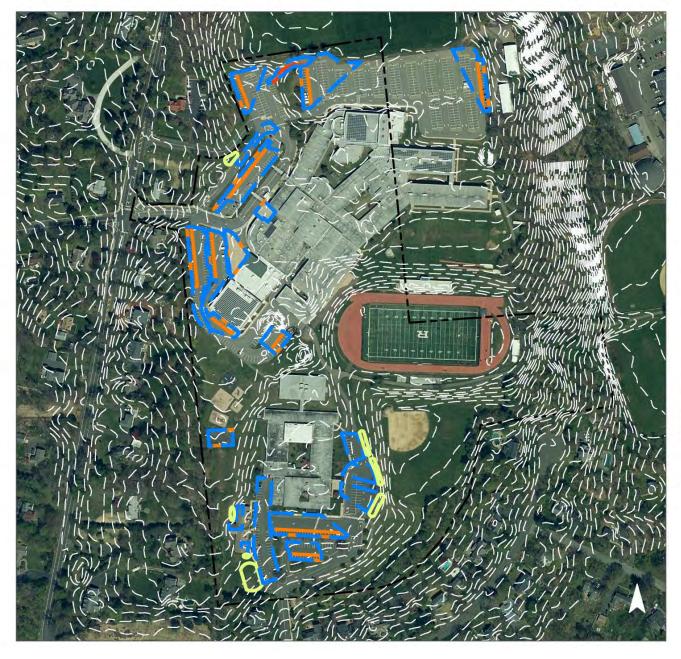
Block and Lot: Block 2801, Lot 33



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveways, parking lots, and building rooftops. This will require curb cuts, trench drains, and downspout disconnections. Existing parking spaces in multiple parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. Concrete walkways in front of the high school can be replaced with porous pavers to infiltrate runoff from the walkways. A stormwater planter can be installed in the no-parking zone on the northern high school driveway to capture, treat, and infiltrate the stormwater runoff from the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)			
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''		
54	842,038	40.6	425.3	3,866.1	0.656	25.72		

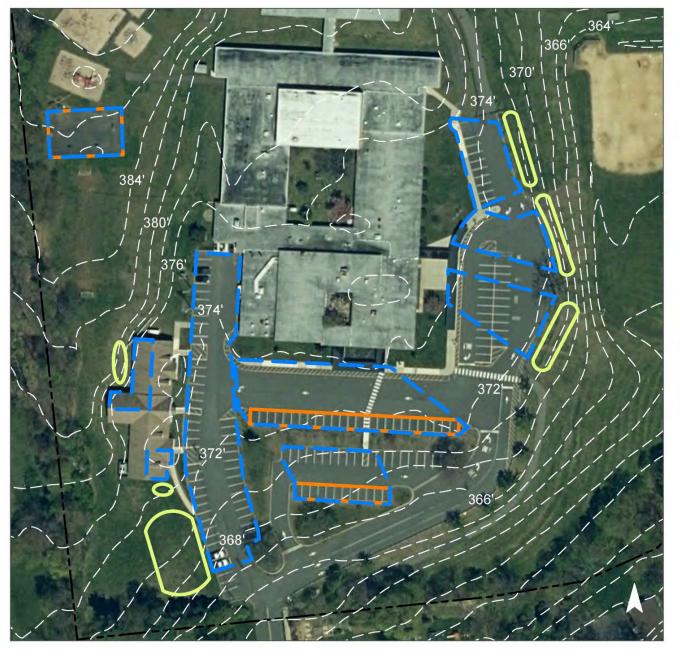
Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	40,995	1.190	179	79,390	2.98	10,250	\$102,500
Pervious pavement	126,655	3.675	553	245,290	9.22	42,100	\$1,052,500
Stormwater planter	3,800	0.110	17	7,360	0.28	1,465	\$549,375



Cedar Hill Elementary School & Ridge High School Overall View

- bioretention system
- pervious pavement
- stormwater planter
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

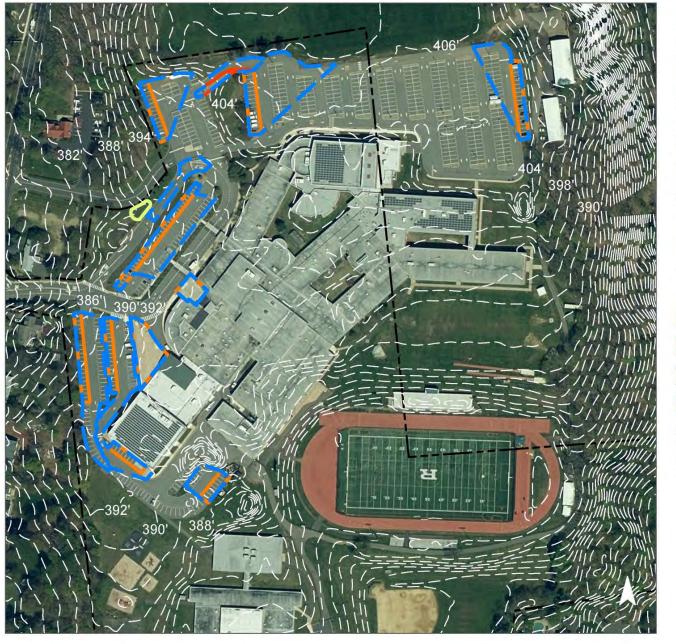
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Cedar Hill Elementary School Page 1 of 2

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- ☐ 2020 Aerial: NJOIT, OGIS





Ridge High School Page 2 of 2

- bioretention system
- pervious pavement
- stormwater planter
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

MILLINGTON BAPTIST CHURCH





RAP ID: 26

Subwatershed: Upper Passaic River

Site Area: 150,967 sq. ft.

Address: 520 King George Road

Bernards Township, NJ

07920

Block and Lot: Block 8402, Lot 4





Rain gardens can be installed to capture, treat, and infiltrate stormwater runoff from sections of the roof. A section of parking spaces can be converted to porous pavement to capture and infiltrate runoff from the parking lot. A cistern can be installed to capture rooftop runoff and provide water for watering gardens or other non-potable uses. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)			
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''		
47	70,857	3.4	35.8	325.3	0.055	1.94		

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	0.082	14	6,010	0.23	790	\$3,950
Pervious pavement	0.181	30	13,280	0.50	1,630	\$40,750
Rainwater harvesting	0.033	6	1,000	0.04	1,000 (gal)	\$2,000



OAK STREET ELEMENTARY SCHOOL



RAPID: 27

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 534,355 sq. ft.

Address: 70 West Oak Street

Basking Ridge, NJ 07920

Block and Lot: Block 1805, Lot 41



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the asphalt driveways and walkways. The tennis court, basketball court, and existing parking spaces in the southern parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt and courts. A cistern can be installed to the west of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing a vehicle or watering a garden. A preliminary soil assessment suggests that more soil testing would be required before determining the sol's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)			
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''		
35	184,476	8.9	93.2	847.0	0.144	5.63		

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	8,095	0.235	36	15,680	0.59	2,035	\$20,350
Pervious pavement	24,385	0.708	106	47,230	1.77	19,385	\$484,625
Rainwater harvesting	885	0.026	4	700	N/A	700 (gal)	\$2,100





Oak Street Elementary School

- bioretention system
- pervious pavement
- rainwater harvesting
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 100' 200'

ST. JAMES ROMAN CATHOLIC CHURCH AND SCHOOL



RAPID: 28

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 804,603 sq. ft.

Address: 200 South Finley Avenue

Basking Ridge, NJ 07920





Block and Lot: Block 1602, Lot 1

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the road, driveway, parking lot, and building rooftops. This will require curb cuts, trench drains, and downspout redirection bereath sidewalks. Existing parking spaces in much of the parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	Impervious Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''
35	280,406	13.5	141.6	1,287.4	0.218	8.56

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	22,635	0.657	99	43,840	1.65	5,655	\$56,550
Pervious pavement	121,055	3.513	528	234,450	8.81	23,185	\$579,625





St. James Roman Catholic Church & School

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- ☐ 2020 Aerial: NJOIT, OGIS

0 100' 200'

SAINT MARK'S EPISCOPAL CHURCH



RAP ID: 29

Subwatershed: Upper Passaic River

Site Area: 48,559 sq. ft.

Address: 140 South Finley Avenue

Bernards Township, NJ

07920

Block and Lot: Block 1602, Lot 6





A rain garden can be placed in the center courtyard, and another can be placed to the east of the building in the turfgrass. Both will capture and infiltrate stormwater runoff from the roof. A section of parking spaces can be converted to porous pavement to capture and infiltrate runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	Impervious Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
75	36,237	1.7	18.3	166.4	0.028	0.99

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	0.039	7	2,860	0.11	375	\$1,875
Pervious pavement	0.195	33	14,340	0.54	1,460	\$36,500



WAR MEMORIAL FIELD



RAPID: 30

Subwatershed: Upper Passaic River

Site Area: 490,758 sq. ft.

Address: 325 South Maple Avenue

Bernards Township, NJ

07920

Block and Lot: Block 2801, Lot 10

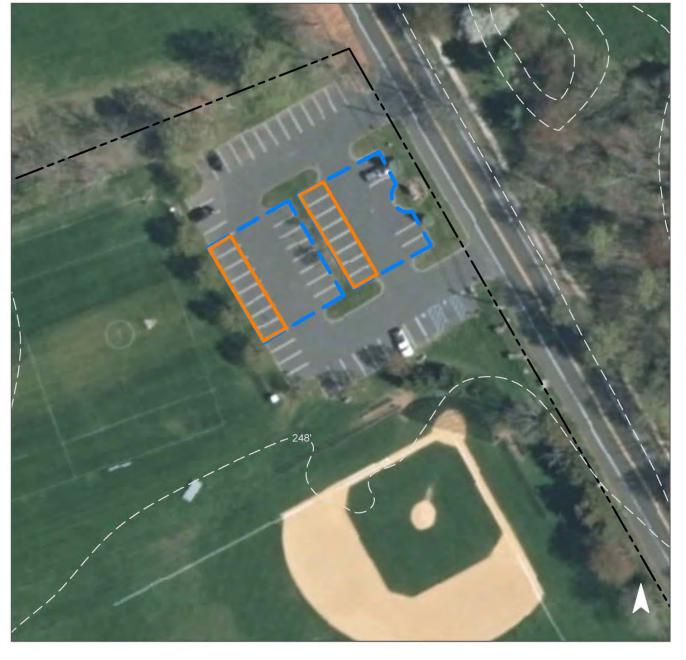




Two sections of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
7	35,571	1.7	18.0	163.3	0.028	0.98

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	0.225	38	16,500	0.62	2,540	\$63,500





War Memorial Field

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

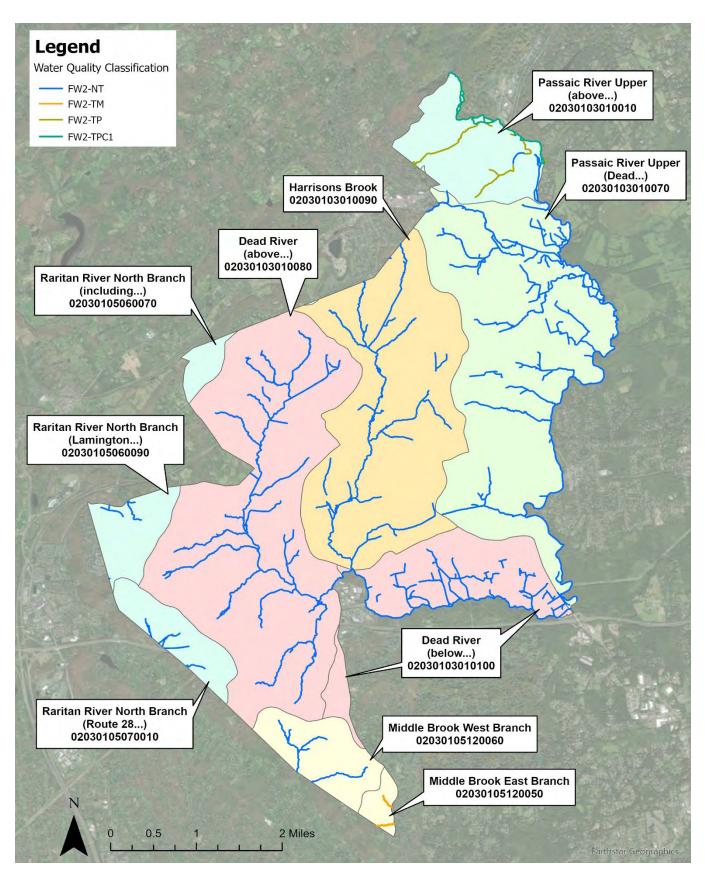


Figure 10. Water Quality Classification of Surface Waters in Bernards Township

Table 8. Surface Water Quality Classifications of Bernards Township Streams

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	79.9	93.0%
Freshwater 2, trout production, Category One	FW2-TPC1	3.2	3.7%
Freshwater 2, trout maintenance	FW2-TM	0.4	0.5%
Freshwater 2, trout production	FW2-TP	2.4	2.8%

Bernardsville Borough

Introduction

Located in Somerset County in New Jersey, Bernardsville Borough covers approximately 12.9 square miles. With a population of 7,893 (2020 United States Census), Bernardsville Borough consists of 45.1% of urban land uses by area. Of that urban land use, approximately 62.1% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 48.4% of Bernardsville Borough.

Bernardsville Borough contains portions of seven subwatersheds (Table 1). There are approximately 38.2 miles of rivers and streams within the municipality; these include tributaries to Harrisons Brook, Indian Grove Brook and its tributaries, McVikers Brook, Mine Brook and its tributaries, North Branch Raritan River and its tributaries, Passaic River and its tributaries, tributaries to Penns Brook, and several uncoded tributaries. Bernardsville Borough is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Bernardsville Borough

Subwatershed	HUC14
Passaic River Upper (above Osborn Mills)	02030103010010
Passaic River Upper (Dead River to Osborn Mills)	02030103010070
Dead River (above Harrisons Brook)	02030103010080
Harrisons Brook	02030103010090
Raritan River North Branch (including McVickers to Indian Brook)	02030105060030
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040
Raritan River North Branch (including Mine Brook to Peapack Brook)	02030105060070

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Bernardsville Borough. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and

implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Bernardsville Borough's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Bernardsville Borough in relation to the study area. Figure 2 shows the portions of the seven HUC14s in Bernardsville Borough and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Bernardsville Borough. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Bernardsville Borough and is presented in Table 2. Figure 4 shows the impervious cover in Bernardsville Borough based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Bernardsville Borough and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins). Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No naturalized detention basins nor retention basins with vegetative shoreline buffers were identified in Bernardsville Borough within the study area.

The Q-Farms in Bernardsville Borough have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the study area of Bernardsville Borough have been identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 524.7 acres of agricultural land use in Bernardsville Borough, of which, 458.8 acres lie within the study area for this Watershed Restoration and Protection Plan. There are 39 Q-Farms in the study area portion of Bernardsville Borough, totaling 551.4 acres. Within the 39 Q-Farms, there are approximately 256.2 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Bernardsville Borough are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Three HUC14s are included in the study area (02030105060030, 02030105060040, 02030105060070). Within these three HUC14s, there are 132.2 acres of buildings and 174.94 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Bernardsville Borough, approximately 8.3 acres of rooftop runoff would be managed with 1.65 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Bernardsville Borough, approximately 17.5 acres of roadway would be managed, or 4.8 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Bernardsville Borough are shown in Figure 10 and presented in Table 9. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 11). Available information for each parcel in the study area is presented in Table 10. Class 15E parcels were excluded from the assessment. Ten of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 10 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 12 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters

except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are five classifications that apply to the streams in Bernardsville Borough. Figure 13 depicts the water quality classifications of surface waters throughout Bernardsville Borough and Table 11 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

Administrators from Bernardsville Borough have identified several locations throughout the municipality that are particularly susceptible to flooding during heavy rainfall or storm events. Mine Brook at Route 202 and at Meeker Road have been noted as sites that frequently experience flooding, posing risks to nearby infrastructure and public safety. At Mine Brook by Route 202, there is an undersized culvert that runs underneath the roadway and adjacent train tracks that may be a contributing factor to the frequent flooding observed at this location. Figure 14 shows the locations of the aforementioned areas of concern.

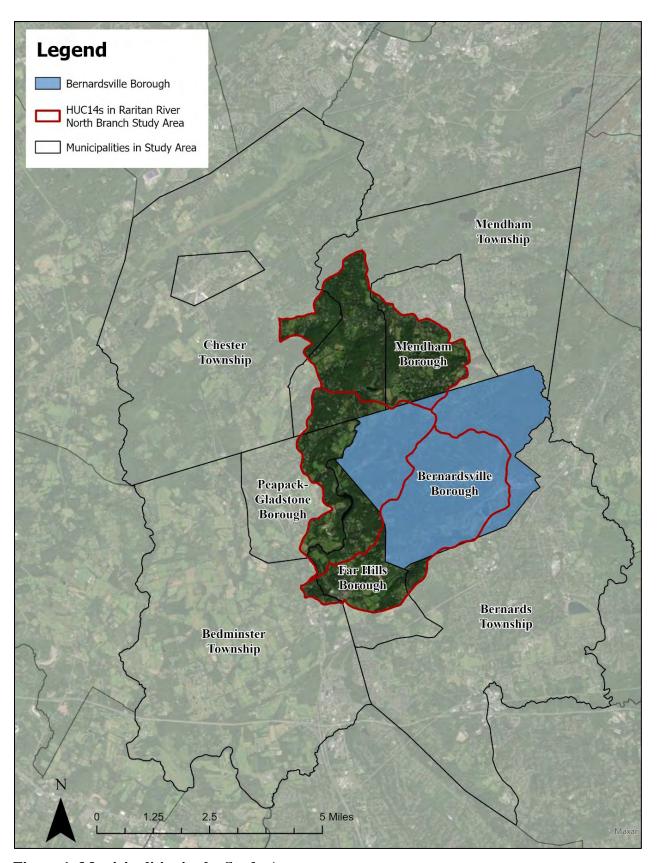


Figure 1: Municipalities in the Study Area

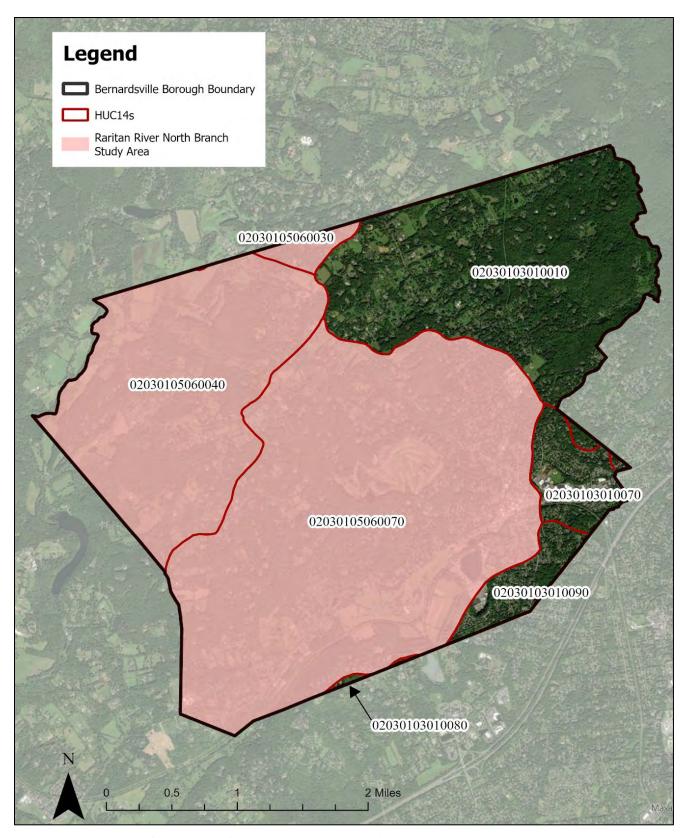


Figure 2: Portions of seven HUC14s are in Bernardsville Borough

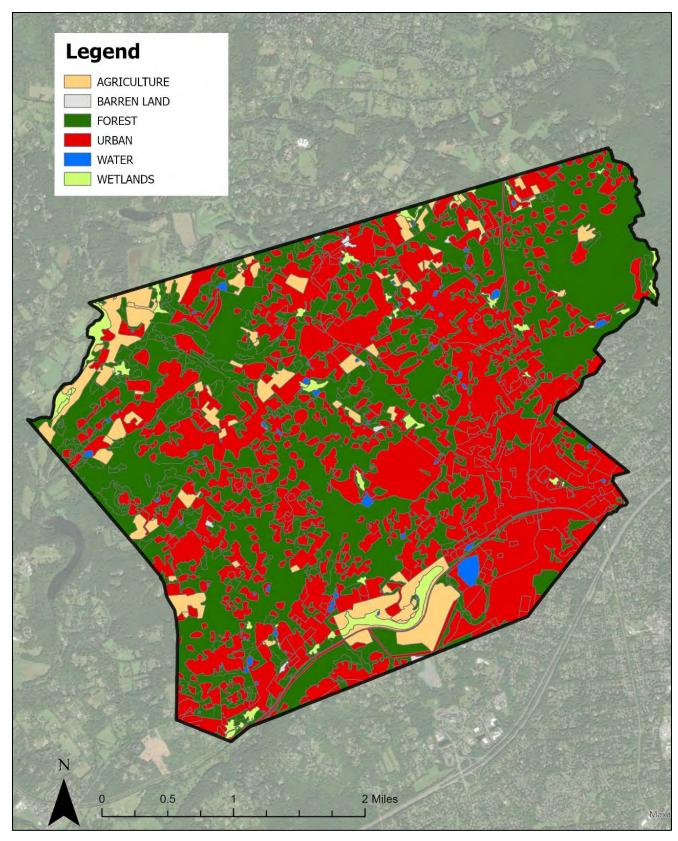


Figure 3: Land Use in Bernardsville Borough

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Bernardsville Borough

Bernardsville Boroi				TSS Load
Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	(lbs/yr)
		02030103010010		
Agriculture	65.9	85.6	658.6	19,758.6
Barren Land	3.0	1.5	15.0	179.7
Forest	1,068.5	106.9	3,205.6	42,741.3
Urban	817.7	1,144.8	12,266.2	114,484.9
Water	16.3	1.6	48.8	650.5
Wetlands	33.6	3.4	100.9	1,345.5
TOTAL =	2,005.0	1,343.8	16,295.1	179,160.6
		02030103010070		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	31.6	3.2	94.9	1,265.6
Urban	245.0	343.0	3,674.6	34,296.0
Water	0.5	0.0	1.4	19.2
Wetlands	3.1	0.3	9.2	122.4
TOTAL =	280.2	346.5	3,780.1	35,703.3
		02030103010080		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	3.1	0.3	9.2	122.8
Urban	7.7	10.7	115.1	1,073.9
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	10.7	11.0	124.3	1,196.7
		02030103010090		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.3	0.2	1.6	19.5
Forest	40.5	4.0	121.5	1,619.4
Urban	175.9	246.2	2,638.2	24,622.8
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	216.7	250.4	2,761.2	26,261.7
		02030105060030		
Agriculture	0.5	0.7	5.1	152.3
Barren Land	2.2	1.1	11.0	132.4
Forest	44.7	4.5	134.2	1,789.0
Urban	38.3	53.7	575.1	5,367.5
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0

TOTAL =	85.8	59.9	725.4	7,441.3
		02030105060040		
Agriculture	229.1	297.8	2,291.1	68,733.0
Barren Land	1.4	0.7	6.8	81.7
Forest	994.3	99.4	2,982.9	39,771.9
Urban	582.3	815.3	8,735.0	81,526.6
Water	12.0	1.2	36.1	481.6
Wetlands	45.0	4.5	134.9	1,798.9
TOTAL =	1,864.1	1,218.9	14,186.8	192,393.7
		02030105060070		
Agriculture	229.2	297.9	2,291.8	68,752.7
Barren Land	5.7	2.8	28.4	340.6
Forest	1,581.1	158.1	4,743.2	63,242.1
Urban	1,863.9	2,609.4	27,958.2	260,943.1
Water	44.0	4.4	131.9	1,758.7
Wetlands	78.4	7.8	235.1	3,134.4
TOTAL =	3,802.1	3,080.5	35,388.5	398,171.5
		All HUCs		
Agriculture	524.7	682.1	5,246.6	157,396.5
Barren Land	12.6	6.3	62.8	754.0
Forest	3,763.8	376.4	11,291.4	150,552.2
Urban	3,730.8	5,223.1	55,962.3	522,314.8
Water	72.8	7.3	218.3	2,910.1
Wetlands	160.0	16.0	480.1	6,401.2
TOTAL =	8,264.6	6,311.1	73,261.4	840,328.8

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Bernardsville Borough that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Bernardsville Borough. Based upon the NJDEP impervious surface data, Bernardsville Borough has impervious cover totaling 12.2%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Bernardsville Borough is shown in Figure 4. The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have

a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Bernardsville Borough's impervious cover percentage would suggest that its waterways are primarily impacted and most likely contributing to not meeting the state's surface water quality standards.

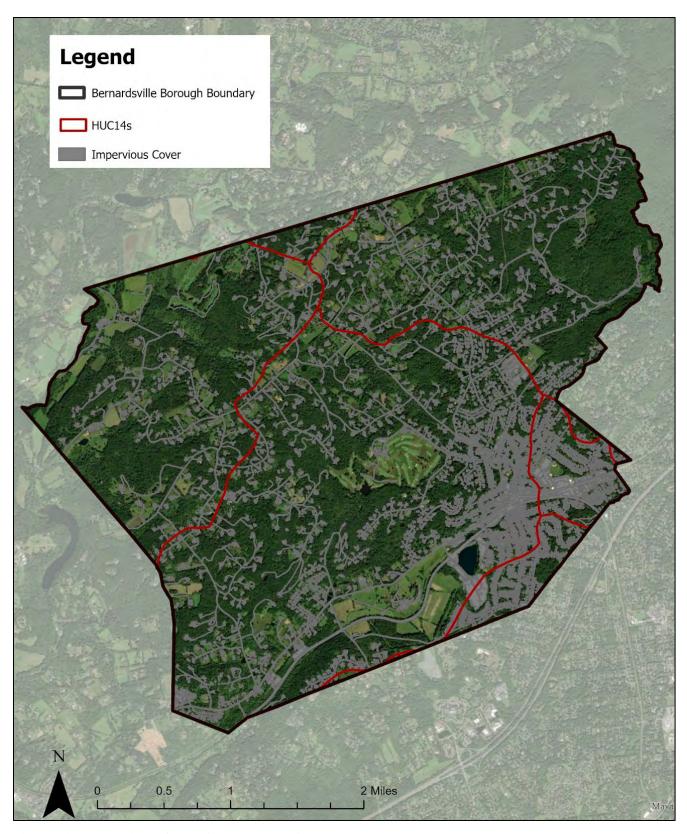


Figure 4: Impervious Cover in Bernardsville Borough

 Table 3: Impervious Cover Analysis by HUC14 for Bernardsville Borough

Class	Area (acres)	HUC Impervious Cover (%)
	02030103010010	
Building	32.82	
Other	89.44	
Road	44.61	
TOTAL =	166.9	8.3%
·	02030103010070	
Building	27.40	
Other	57.90	
Road	23.98	
TOTAL =	109.3	39.0%
	02030103010080	
Building	0.42	
Other	0.41	
Road	0.00	
TOTAL =	0.8	7.7%
	02030103010090	•
Building	15.34	
Other	34.92	
Road	20.04	
TOTAL =	70.3	32.4%
·	02030105060030	
Building	2.21	
Other	4.80	
Road	1.76	
TOTAL =	8.8	10.2%
	02030105060040	•
Building	21.91	
Other	58.26	
Road	30.69	
TOTAL =	110.9	5.9%
·	02030105060070	•
Building	108.07	
Other	288.04	
Road	142.49	
TOTAL =	538.6	14.2%
	All HUCs	•
Building	208.16	
Other	533.77	
Road	263.56	
TOTAL =	1,005.5	12.2%

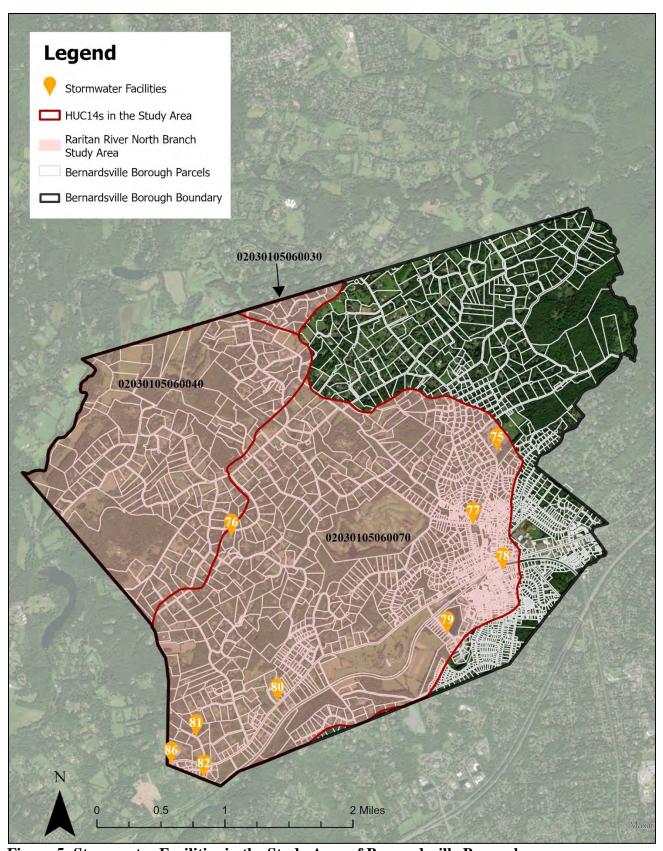


Figure 5: Stormwater Facilities in the Study Area of Bernardsville Borough

Table 4: Location of Stormwater Facilities in the Study Area of Bernardsville Borough

Rarita	Raritan River North Branch Study Area						
<u>ID</u>	<u>Address</u>	Type					
75	115 Seney Dr	R					
76	37 Boulderwood Dr	D					
77	80 Claremont Rd	I					
78	22 Mount Airy Rd	I					
79	15 Old Quarry Rd	D					
80	475 Mine Brook Rd	D					
81	681 Mine Brook Rd	D					
82	689 Mine Brook Rd	D					
86	5 Castle Court	I					

"D" = Detention, "R" = Retention, "I" = Infiltration

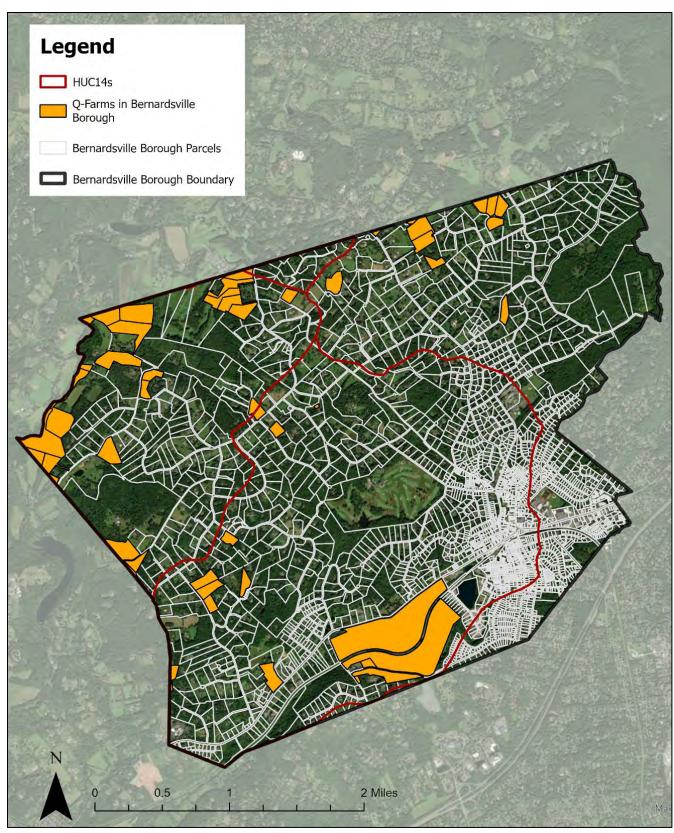


Figure 6: Q-Farm Parcels in Bernardsville Borough

Table 5: Q-Farm Parcels in Bernardsville Borough

Table 5:	able 5: Q-Farm Parcels in Bernardsville Borough						
Block	Lot	Q-Code	Prop Class	Location			
1	1	Q0001	3B	51 Stevens Lane			
2	1	Q0001	3B	41 Stevens Lane			
2	2	Q0001	3B	Stevens Lane			
2	11	Q0001	3B	51 Stevens Lane			
1	5	Q0002	3B	141 Stevens Lane			
9	15.02	Q0002	3B	212 Stevens Lane			
2	48.02	Q0006	3B	40 Campbell Rd.			
2	48.03	Q0006	3B	171 Clark Rd.			
2	43	Q0008	3B	71 Mountain Top Rd.			
7	23.09	Q0010	3B	3 Donner Road			
7	24	Q0012	3B	Mendham Rd.			
9	15.01	Q0013	3B	214 Stevens Lane			
10	2	Q0014	3B	160 Campbell Rd.			
12	5	Q0015		Ravine Lake Road			
16	5	Q0017		Mountain Top Rd & Post Ln			
23	4.01	Q0018	3B	141 Lloyd Rd.			
28	8	Q0021	3B	350 Mt. Harmony Rd.			
28	60.05	Q0023	3B	211 Douglass Rd.			
96	2	Q0027	3B	Mine Brook Rd.			
100	1	Q0027	3B	Pill Hill Rd.			
100	1.02	Q0027	3B	241 Pill Hill Rd.			
101	2	Q0027	3B	78 Meeker Rd			
101	3	Q0027	3B	280 Meeker Rd.			
27	14	Q0028	3B	Mitchel Rd.			
15	14	Q0029		Overleigh Rd			
7	23	Q0030	3B	1 Donner Rd.			
28	48	Q0031	3B	487 Mine Brook Rd.			
1	4	Q0032	3B	131 Stevens Lane			
9	3	Q0035	3B	30 Stevens Lane			
28	61	Q0037	3B	227 Douglass Ave.			
2	7.02	Q0046	3B	170-4 Dryden Rd			
2	7.03	Q0046	3B	170-7 Dryden Rd			
2	7.04	Q0046	3B	170-5 Dryden Rd			
2	7.05	Q0046	3B	170-3 Dryden Rd			
2	7.06	Q0046	3B	170-1 Dryden Rd			
28	59.02	Q0047	3B	191 Douglass Ave.			
10	26	Q0051	3B	211 Ravine Lake Rd.			
12	4	Q0051		Ravine Lake Rd			
5	8	Q0056	3B	41 Chapin Rd.			
5	2.01	Q0057	3B	1-6 Chapin Rd.			
8	2	Q0059	3B	Hardscrabble Rd.			

9	14	Q0064	3B	231 Campbell Rd.
9	16	Q0064	3B	Campbell Rd.
28	60.04	Q0070	3B	69 Charles Rd.
7	1.01	Q0077	3B	Mendham Rd.
7	4.05	Q0078	3B	1 Rose Hill Ct.
7	4.04	Q0081	3B	3 Rose Hill Ct.
7	4.06	Q0082	3B	8 Preserve Lane
7	4.08	Q0083	3B	3 Preserve Lane
9	17	Q0084	3B	Campbell Road
7	20.02	Q0091	3B	331-1 Mendham Rd.

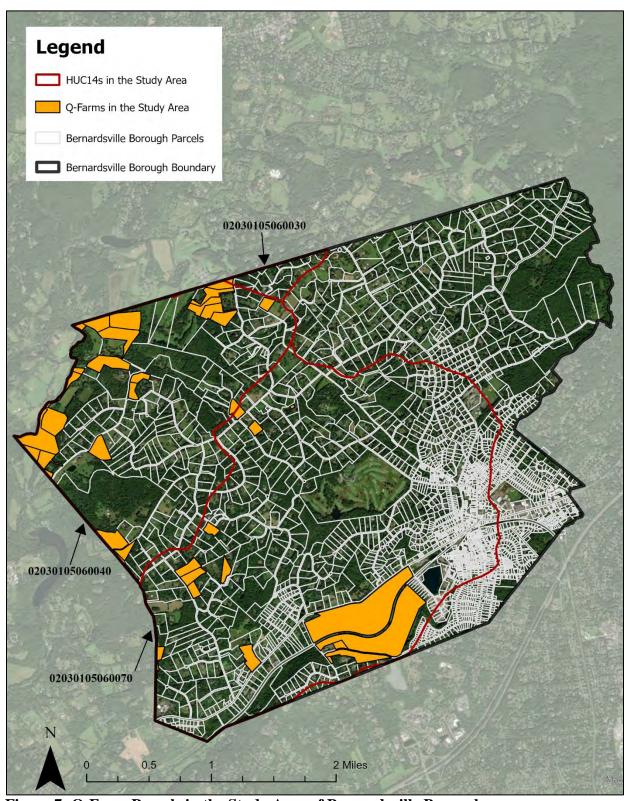


Figure 7: Q-Farm Parcels in the Study Area of Bernardsville Borough

Table 6: Q-Farm Parcels in the Study Area of Bernardsville Borough

Block	Table 6:	Q-Farm I	<u>'arcels in t</u>	he Study A	Area of Bernardsville Borou
2 1 Q0001 3B 41 Stevens Lane 2 2 Q0001 3B Stevens Lane 2 11 Q0001 3B 51 Stevens Lane 1 5 Q0002 3B 141 Stevens Lane 9 15.02 Q0006 3B 40 Campbell Rd. 2 48.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 8 Q0021 3B 211 Douglass Rd. 96 2 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 <td< th=""><th>Block</th><th>Lot</th><th>Q-Code</th><th></th><th>Location</th></td<>	Block	Lot	Q-Code		Location
2 2 Q0001 3B Stevens Lane 2 11 Q0001 3B 51 Stevens Lane 1 5 Q0002 3B 141 Stevens Lane 9 15.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 40 Campbell Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101	1	1	Q0001	3B	51 Stevens Lane
2 11 Q0001 3B 51 Stevens Lane 1 5 Q0002 3B 141 Stevens Lane 9 15.02 Q0002 3B 212 Stevens Lane 2 48.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 171 Clark Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100	2	1	Q0001	3B	41 Stevens Lane
1 5 Q0002 3B 141 Stevens Lane 9 15.02 Q0002 3B 212 Stevens Lane 2 48.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 171 Clark Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 8 Q0021 3B 211 Douglass Rd. 96 2 Q0027 3B Pill Hill Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 78 Meeker Rd 101 3	2	2	Q0001	3B	Stevens Lane
9 15.02 Q0002 3B 212 Stevens Lane 2 48.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 171 Clark Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27	2	11	Q0001	3B	51 Stevens Lane
2 48.02 Q0006 3B 40 Campbell Rd. 2 48.03 Q0006 3B 171 Clark Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 101 3 Q0027 3B Witchel Rd. 27 1	1	5	Q0002	3B	141 Stevens Lane
2 48.03 Q0006 3B 171 Clark Rd. 2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd. 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd. 28 48 Q00	9	15.02	Q0002	3B	212 Stevens Lane
2 43 Q0008 3B 71 Mountain Top Rd. 9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 101 3 Q0027 3B Mitchel Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031	2	48.02	Q0006	3B	40 Campbell Rd.
9 15.01 Q0013 3B 214 Stevens Lane 10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032<	2	48.03	Q0006	3B	171 Clark Rd.
10 2 Q0014 3B 160 Campbell Rd. 12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 28 61 Q0037 <td>2</td> <td>43</td> <td>Q0008</td> <td>3B</td> <td>71 Mountain Top Rd.</td>	2	43	Q0008	3B	71 Mountain Top Rd.
12 5 Q0015 Ravine Lake Road 16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 101 2 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037	9	15.01	Q0013	3B	214 Stevens Lane
16 5 Q0017 Mountain Top Rd & Post Ln 28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 280 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02	10	2	Q0014	3B	160 Campbell Rd.
28 8 Q0021 3B 350 Mt. Harmony Rd. 28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 <t< td=""><td>12</td><td>5</td><td>Q0015</td><td></td><td>Ravine Lake Road</td></t<>	12	5	Q0015		Ravine Lake Road
28 60.05 Q0023 3B 211 Douglass Rd. 96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-5 Dryden Rd 2 7.04 Q0046 3B 170-1 Dryden Rd 2	16	5	Q0017		Mountain Top Rd & Post Ln
96 2 Q0027 3B Mine Brook Rd. 100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-3 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 28 59	28	8	Q0021	3B	350 Mt. Harmony Rd.
100 1 Q0027 3B Pill Hill Rd. 100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-3 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 <	28	60.05	Q0023	3B	211 Douglass Rd.
100 1.02 Q0027 3B 241 Pill Hill Rd. 101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-5 Dryden Rd 2 7.04 Q0046 3B 170-1 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12	96	2	Q0027	3B	Mine Brook Rd.
101 2 Q0027 3B 78 Meeker Rd 101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-5 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd. 5 8 <td< td=""><td>100</td><td>1</td><td>Q0027</td><td>3B</td><td>Pill Hill Rd.</td></td<>	100	1	Q0027	3B	Pill Hill Rd.
101 3 Q0027 3B 280 Meeker Rd. 27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-5 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd 2 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0	100	1.02	Q0027	3B	241 Pill Hill Rd.
27 14 Q0028 3B Mitchel Rd. 15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-3 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 <td< td=""><td>101</td><td>2</td><td>Q0027</td><td>3B</td><td>78 Meeker Rd</td></td<>	101	2	Q0027	3B	78 Meeker Rd
15 14 Q0029 Overleigh Rd 28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16	101	3	Q0027	3B	280 Meeker Rd.
28 48 Q0031 3B 487 Mine Brook Rd. 1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-3 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B 69 Charles Rd.	27	14	Q0028	3B	Mitchel Rd.
1 4 Q0032 3B 131 Stevens Lane 9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	15	14	Q0029		Overleigh Rd
9 3 Q0035 3B 30 Stevens Lane 28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-1 Dryden Rd 2 7.06 Q0046 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	28	48	Q0031	3B	487 Mine Brook Rd.
28 61 Q0037 3B 227 Douglass Ave. 2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-3 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	1	4	Q0032	3B	131 Stevens Lane
2 7.02 Q0046 3B 170-4 Dryden Rd 2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-3 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	9	3	Q0035	3B	30 Stevens Lane
2 7.03 Q0046 3B 170-7 Dryden Rd 2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-3 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	28	61	Q0037	3B	227 Douglass Ave.
2 7.04 Q0046 3B 170-5 Dryden Rd 2 7.05 Q0046 3B 170-3 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	2	7.02	Q0046	3B	170-4 Dryden Rd
2 7.05 Q0046 3B 170-3 Dryden Rd 2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	2	7.03	Q0046	3B	170-7 Dryden Rd
2 7.06 Q0046 3B 170-1 Dryden Rd 28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	2	7.04	Q0046	3B	170-5 Dryden Rd
28 59.02 Q0047 3B 191 Douglass Ave. 10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	2	7.05	Q0046	3B	170-3 Dryden Rd
10 26 Q0051 3B 211 Ravine Lake Rd. 12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	2	7.06	Q0046	3B	170-1 Dryden Rd
12 4 Q0051 Ravine Lake Rd 5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	28	59.02	Q0047	3B	191 Douglass Ave.
5 8 Q0056 3B 41 Chapin Rd. 9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	10	26	Q0051	3B	211 Ravine Lake Rd.
9 14 Q0064 3B 231 Campbell Rd. 9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	12	4	Q0051		Ravine Lake Rd
9 16 Q0064 3B Campbell Rd. 28 60.04 Q0070 3B 69 Charles Rd.	5	8	Q0056	3B	41 Chapin Rd.
28 60.04 Q0070 3B 69 Charles Rd.	9	14	Q0064	3B	231 Campbell Rd.
	9	16	Q0064	3B	Campbell Rd.
9 17 Q0084 3B Campbell Road	28	60.04	Q0070	3B	69 Charles Rd.
	9	17	Q0084	3B	Campbell Road

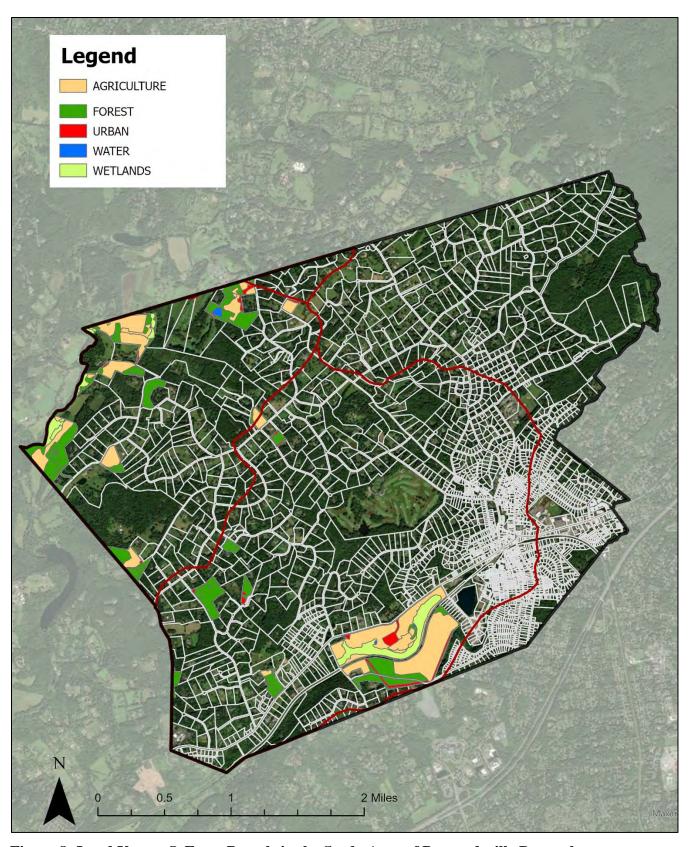


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Bernardsville Borough

Table 7: Land Use on Q-Farms in the Study Area of Bernardsville Borough

Land Use	Area (acres)
Agriculture	256.2
Barren Land	0.0
Forest	205.3
Urban	23.3
Water	5.1
Wetlands	61.3
Total:	551.4

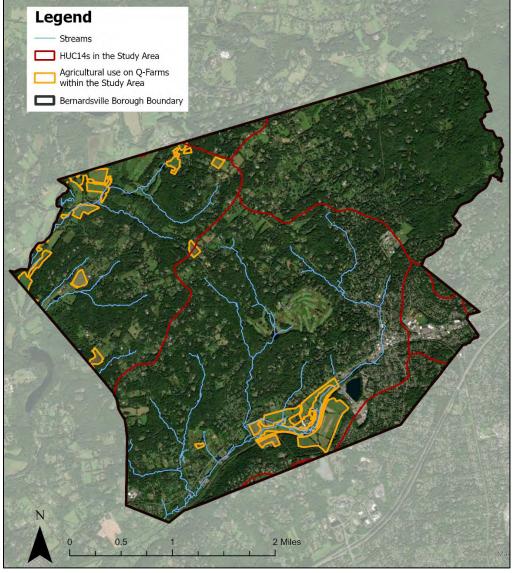


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Bernardsville Borough

 Table 8: Recommendations for Specific Farms in the Study Area of Bernardsville Borough

	North Branch Raritan River Study Area										
Block	Lot	Q- Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.			
2	11	Q0001						X			
10	2	Q0014	X								
1	4	Q0032						X			

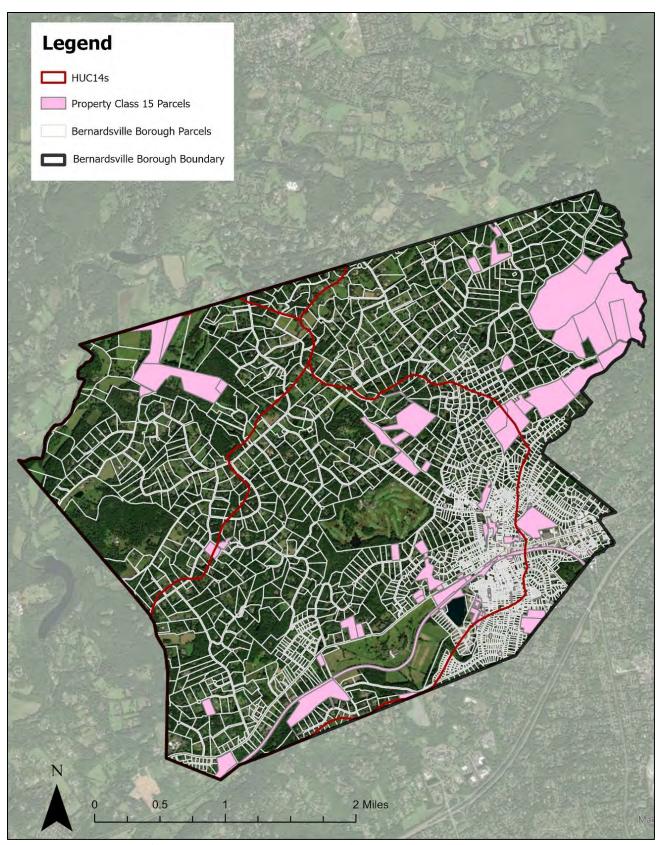


Figure 10: Property Class 15 Parcels in Bernardsville Borough

Table 9: Property Class 15 Parcels in Bernardsville Borough

Table 9:	Property Class 15 Parcels in Bernardsville Borough					
Block	Lot	Prop Class	Location	Facility Type		
35	1	15A	141 Seney Dr.	Schools		
58	1	15A	2 Childsworth Ave.	Vacant Land		
64	1	15A	25 Olcott Ave.	Schools		
2	3	15C	Stevens Lane	Park		
2	4	15C	Stevens Lane	Park		
2	12	15C	21 Stevens Lane	Park		
2	13	15C	Stevens Lane	Park		
9	4.01	15C	11 Campbell Rd.	Park		
17	30	15C	277 Claremont Rd.	Park		
17	43	15C	122 Mendham Rd.	Roads		
35	2	15C	121 Seney Dr.	Swimming Pool		
35	6	15C	115 Chestnut Ave.	Recreation		
36	5.01	15C	Olcott Lane	Road		
38	13	15C	Windwood Road	Vacant Land		
66	22	15C	1-7 Anderson Hill Road	Common Elements		
68	4	15C	60 Claremont Rd.	Kuser Park		
69	8	15C	79 Claremont Rd.	Playground		
69	9	15C	Claremont Rd.	Claremont Field		
69	28	15C	30 Anderson Hill Rd.	Land		
69	29	15C	14 Park Lane	Recreation Bldg.		
70	4	15C	35 Quimby Lane	Parking Lot		
75	5	15C	40 Claremont Rd.	Kuser Park		
80	14.07	15C	off Spring House Rd.	Vacant Land		
80	15	15C	Round Top Rd.	Vacant Land		
80	15.07	15C	Laurelwood Dr.	Vacant Land		
80	15.38	15C	Mine Brook Rd.	Vacant Land		
80	18	15C	76 Round Top Rd.	Water Supply		
80	58	15C	4 Chilton St.	Vacant Land		
93	10	15C	622 Mine Brook Rd.	Vacant Land		
95	4.22	15C	Meeker Rd.	Vacant Land		
97	1	15C	166 Mine Brook Rd.	Municipal Bldg.		
98	1	15C	Mine Brook Rd.	Parking Area		
100	2.23	15C	1 Old Quarry Road	Vacant Land		
100	2.49	15C	2 Old Quarry Road	Pistol Range		
100	4	15C	Clinton St	Storage Bldg.		
101	5	15C	150 Pill Hill Rd.	Sewer Disposal		
102	3	15C	Mine Ave.	Vacant Land		
111	4	15C	Center St. Ext.	Right Of Way		
111	18	15C	Crescent Rd.	Vacant Land		
114	1	15C	70 Bernards Ave.	Common Elements Coa		
114	1.01	15C	1 Pine St.	Open Space		
115	1	15C	47-3 Maple St.	Vacant Land		
115	2	15C	47-4 Maple St.	Vacant Land		
115	7	15C	Liberty Rd.	Park		
123	13	15C	33 Ann St.	Pump House		
124	1	15C	18 Mount Airy Rd.	Vacant Land		

125	13	15C	65 Morristown Rd.	Commercial Building
125	27.29	15C	202 North Finley	Water Basin
125	27.3	15C	12 Fox Hollow Trail	Pumphouse
129	22	15C	14 Morrison Avenue	Pump House
131	11.01	15C	108 Mount Airy Rd.	Vacant Land
131	12	15C	120 Mount Airy Rd.	Vacant Land
135	1	15C	2 Conkling Ave.	Vacant Land
135	6	15C	Pennington Ave.	Vacant Land
142	11.02	15C	Brookside Ave.	Right Of Way
144	1	15C	50 Mine Brook Rd.	Railroad Station
14	21	15D	379 Mt. Harmony Rd.	St. Johns Chapel
28	7	15D	370 Mt. Harmony Rd.	Church Parking
37	18.01	15D	108 Claremont Rd.	Vacant Land
39	6	15D	111 Claremont Rd.	R.C. Church
65	10	15D	22 Church St.	Methodist Church
81	3	15D	321 Mine Brook Rd.	Church
81	4.01	15D	315 Mine Brook Rd.	Rectory
94	19	15D	11 Meeker Rd.	Church
105	1	15D	49 Bernards Ave.	Chapel
105	12	15D	47 Bernards Ave.	Parking Area
113	1	15D	50 Bernards Ave.	Parking Area
7	4.01	15F	2 Preserve Lane	Disabled Veteran
7	4.07	15F	200 Washington Corner Rd	Land & Water Presrvt
16	6.03	15F	300 Claremont Rd.	Water Shed
17	17	15F	181 Claremont Rd.	Disabled Adults
17	28	15F	251 Claremont Rd.	Vacant House
21	1	15F	61 Jockey Hollow Rd.	National Park
21	2	15F 15F	121 Jockey Hollow Rd.	National Park
21	12	15F	131 Hardscrabble Rd.	Park
21	13		51 Hardscrabble Rd.	Bird Sanctuary
21	14	15F 15F	21 Hardscrabble Rd.	Bird Sanctuary Bird Sanctuary
21	14.02		11 Hardscrabble Rd.	Bird Sanctuary Bird Sanctuary
	+	15F		•
23	5.01	15F	83 Stone Fence Rd. Mitchell Road	Disable Veteran
27	18	15F		Vacant Land
30	33	15F	121 Round Top Rd.	Disabled Veteran
31	1	15F	240 Claremont Rd.	Water Shed
35	8	15F	161 Chestnut Ave.	Bird Sanctuary
35	13	15F	64 Hardscrabble Rd.	Vacant Land
36	24.02	15F	93 Mine Mount Rd.	Disable Vet
62	4.27B	15F	7b Somerset Hills Court	Disabled Veteran
80	14	15F	189 Mine Brook Rd.	Vacant Land
80	14.01	15F	4 Spring House Rd.	Vacant House
80	59	15F	117 Mine Brook Rd.	Fire House
89	3	15F	50 Pickle Brook Rd	Disable Veteran
97	2	15F	118 Mine Brook Rd.	Fire House
110	16	15F	11 Bernards Ave	Disable Veteran
120	4	15F	16 Sunnybrook Rd.	Disabled Vet
125	4	15F	11 Morristown Rd.	Congdon Lodge
125	27.13	15F	5 Blazure Dr.	Disable Veteran

129 31.01 15F 24 Burrows Ave. Disabled Vet

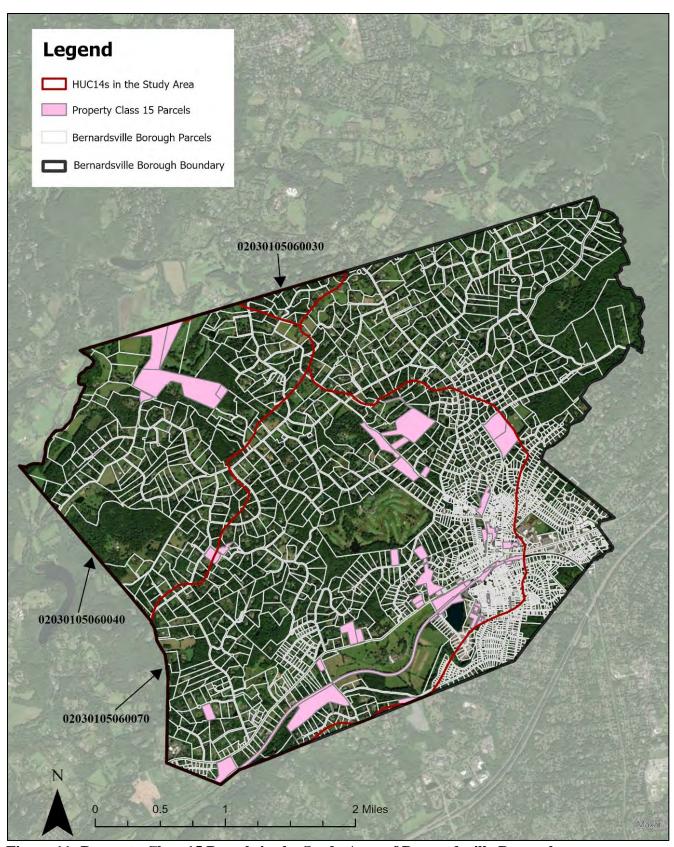


Figure 11: Property Class 15 Parcels in the Study Area of Bernardsville Borough

Table 10: Property Class 15 Parcels in the Study Area of Bernardsville Borough

4510 101	1 1		arcels in the Study Area of	_ : _ : _ : _ : _ : _ : _ : _ :
Block	Lot	Prop Class	Location	Facility Type
*35 ¹	1	15A	141 Seney Dr.	Schools
64 ¹	1	15A	25 Olcott Ave.	Schools
2	3	15C	Stevens Lane	Park
2	4	15C	Stevens Lane	Park
2	12	15C	21 Stevens Lane	Park
2	13	15C	Stevens Lane	Park
9	4.01	15C	11 Campbell Rd.	Park
17	30	15C	277 Claremont Rd.	Park
17	43	15C	122 Mendham Rd.	Roads
*351	2	15C	121 Seney Dr.	Park
36	5.01	15C	Olcott Lane	Road
38	13	15C	Windwood Road	Vacant Land
*66	22	15C	1-7 Anderson Hill Road	Common Elements
68	4	15C	60 Claremont Rd.	Kuser Park
69	8	15C	79 Claremont Rd.	Playground
69	9	15C	Claremont Rd.	Claremont Field
69	28	15C	30 Anderson Hill Rd.	Land
69	29	15C	14 Park Lane	Recreation Bldg.
70	4	15C	35 Quimby Lane	Parking Lot
75	5	15C	40 Claremont Rd.	Kuser Park
80	14.07	15C	Off Spring House Rd.	Vacant Land
80	15	15C	Round Top Rd.	Vacant Land
80	15.07	15C	Laurelwood Dr.	Vacant Land
80	15.38	15C	Mine Brook Rd.	Vacant Land Vacant Land
80	18	15C	76 Round Top Rd.	Water Supply
80	58	15C	4 Chilton St.	Vacant Land
93	10	15C	622 Mine Brook Rd.	Vacant Land
95	4.22	15C	Meeker Rd.	Vacant Land
*97	1	15C	166 Mine Brook Rd.	Municipal Bldg.
98	1	15C	Mine Brook Rd.	Parking Area
100	2.23	15C	1 Old Quarry Road	Vacant Land
100	2.49	15C	2 Old Quarry Road	Pistol Range
100	4	15C	Clinton St	Storage Bldg.
101 ¹	5	15C	150 Pill Hill Rd.	Sewer Disposal
102	3	15C	Mine Ave.	Vacant Land
111	4	15C	Center St. Ext.	Right Of Way
	18	15C		
111	18		Crescent Rd. 70 Bernards Ave.	Vacant Land Common Florents Con
114		15C		Common Elements Coa
114	1.01	15C	1 Pine St.	Open Space
115	1	15C	47-3 Maple St.	Vacant Land
115	2	15C	47-4 Maple St.	Vacant Land
115 ¹	7	15C	Liberty Rd.	Park
124	1	15C	18 Mount Airy Rd.	Vacant Land
1 4 41	-1			
144 ¹ * 14	1 21	15C 15D	50 Mine Brook Rd. 379 Mt. Harmony Rd.	Railroad Station St. Johns Chapel

37	18.01	15D	108 Claremont Rd.	Vacant Land
*39	6	15D	111 Claremont Rd.	R.C. Church
65 ¹	10	15D	22 Church St.	Methodist Church
*81	3	15D	321 Mine Brook Rd.	Church
81	4.01	15D	315 Mine Brook Rd.	Rectory
*94	19	15D	11 Meeker Rd.	Church
*1052	1	15D	49 Bernards Ave.	Chapel
*1052	12	15D	47 Bernards Ave.	Parking Area
113	1	15D	50 Bernards Ave.	Parking Area
16	6.03	15F	300 Claremont Rd.	Water Shed
17	17	15F	181 Claremont Rd.	Disabled Adults
17	28	15F	251 Claremont Rd.	Vacant House
27	18	15F	Mitchell Road	Vacant Land
30	33	15F	121 Round Top Rd.	Disabled Veteran
31	1	15F	240 Claremont Rd.	Water Shed
36	24.02	15F	93 Mine Mount Rd.	Disable Vet
80	14	15F	189 Mine Brook Rd.	Vacant Land
80	14.01	15F	4 Spring House Rd.	Vacant House
80	59	15F	117 Mine Brook Rd.	Fire House
89	3	15F	50 Pickle Brook Rd	Disable Veteran
*97	2	15F	118 Mine Brook Rd.	Fire House
110	16	15F	11 Bernards Ave	Disable Veteran
125	4	15F	11 Morristown Rd.	Congdon Lodge

* Sites that can be retrofitted with green infrastructure

¹ Only a portion of the parcel is within the study area ² Site includes two tax-exempt parcels

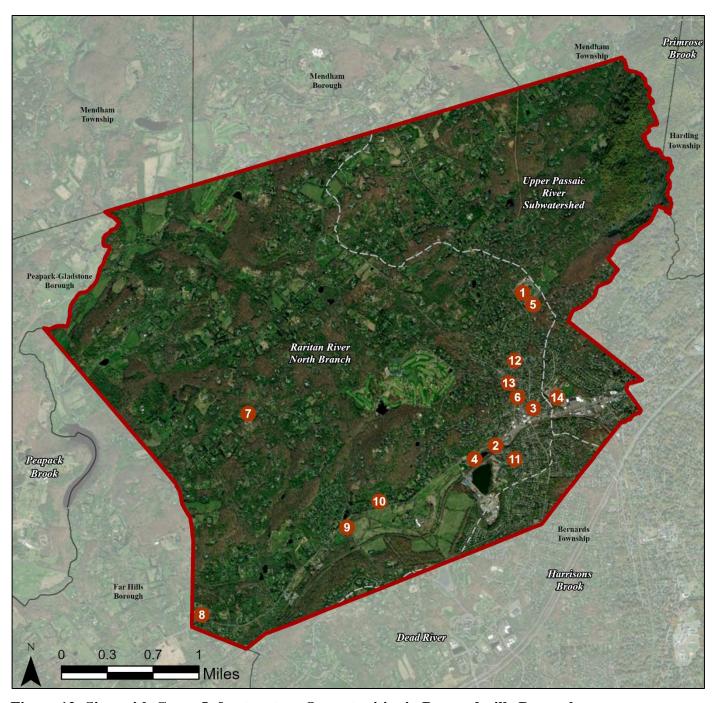


Figure 12: Sites with Green Infrastructure Opportunities in Bernardsville Borough

BEDWELL ELEMENTARY SCHOOL





RAPID: 1

Subwatershed: Raritan River North

Branch

Site Area: 684,276 sq. ft.

Address: 141 Seney Drive

Bernardsville, NJ 07924

Block and Lot: Block 35, Lot 1

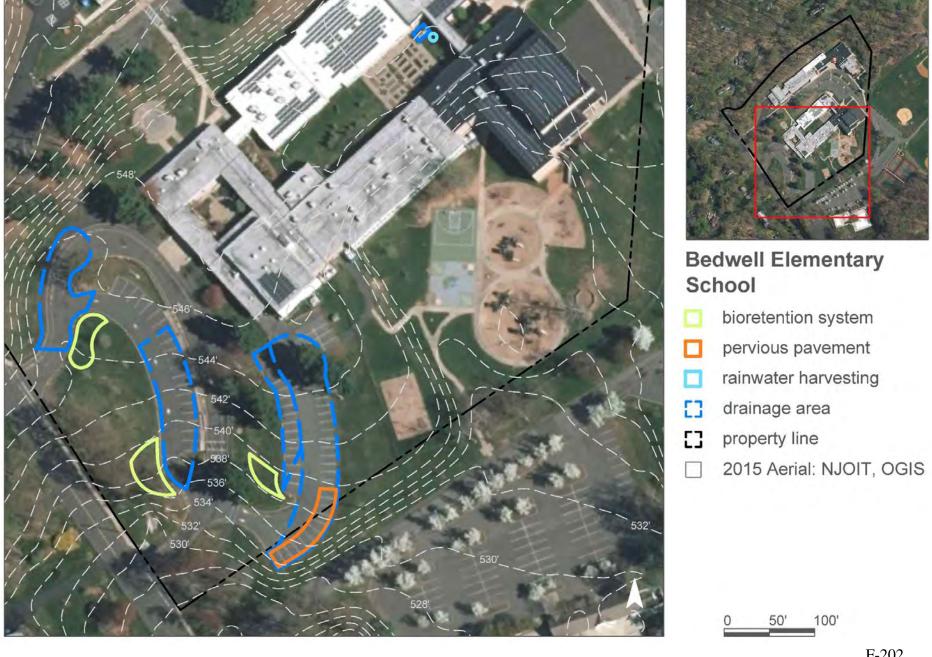




Rain gardens can be installed in parking lot islands to capture, treat, and infiltrate stormwater runoff from the parking lot. A section of parking spaces can be converted to porous asphalt to capture and infiltrate runoff from the parking lot as well. A rain barrel can be installed at the small greenhouse in the courtyard to capture runoff to be reused for watering the garden. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	Impervious Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
52	357,822	17.3	180.7	1,642.9	0.279	9.81	

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	0.351	59	25,750	0.97	3,370	\$16,850
Pervious pavement	0.278	47	20,420	0.77	1,925	\$48,125
Rainwater harvesting	0.004	1	115	0.00	115 (gal)	\$230



BERNARDSVILLE FIRE COMPANY





RAP ID: 2

Subwatershed: Raritan River North

Branch

Site Area: 46,026 sq. ft.

Address: 118 Mine Brook Road

Bernardsville, NJ 07924

Block and Lot: Block 97, Lot 2





Cisterns can be installed at the northeast and west corners of the main building to capture and reuse stormwater. A downspout planter box can be installed next to the main entrance to capture and filter stormwater. A rain garden can be installed at the bottom of the hill to help manage stormwater causing erosion along the hill. Additional measures should be taken to stabilize the slope. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
60	27,463	1.3	13.9	126.1	0.021	0.75	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.073	12	5,360	0.20	700	\$3,500
Planter box	n/a	0.1	n/a	n/a	1 (box)	\$1,000
Rainwater harvesting	0.076	13	2,280	0.26	2,280 (gal)	\$4,560



BERNARDSVILLELIBRARY





RAP ID: 3

Subwatershed: Raritan River North

Branch

Site Area: 131,851 sq. ft.

Address: 1 Anderson Hill Road

Bernardsville, NJ 07924

Block and Lot: Block 66, Lot 22

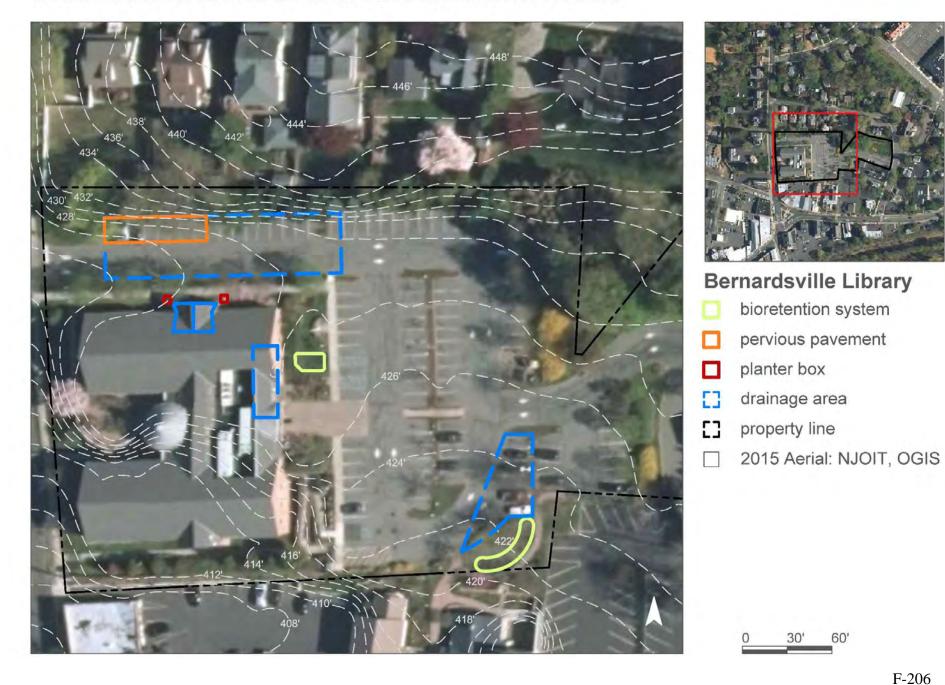




Downspout planter boxes can be installed alongside the northern side of the building to capture and filter stormwater. Pervious pavement can be installed in the parking spaces to the east to capture, treat, and infiltrate parking lot runoff. Rain gardens can be installed adjacent to parking spaces and downspouts to capture, treat, and infiltrate runoff from the parking lot and rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
81	106,775	5.1	53.9	490.2	0.083 2.93		

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	0.066	11	4,810	0.18	680	\$3,400
Pervious pavement	0.167	28	12,240	0.46	1,145	\$28,625
Planter boxes	n/a	2	n/a	n/a	2 (boxes)	\$2,000



BERNARDSVILLE MUNICIPAL COURT & NERVINE PARK





RAPID: 4

Subwatershed: Raritan River North

Branch

Site Area: 465,036 sq. ft.

Address: 166 Mine Brook Road

Bernardsville, NJ 07924

Block and Lot: Block 97, Lot 1





Pervious pavement can be installed in the parking lot to capture, treat, and infiltrate parking lot runoff. Two cisterns can be attached to the building to capture and filter stormwater runoff from the rooftop. Rain gardens can be installed adjacent to the roadways to capture, treat, and infiltrate runoff from the road. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
34	156,500	7.5	79.0	718.5	0.122	4.29	

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	0.241	40	17,710	0.67	2,315	\$11,575
Pervious pavement	0.473	79	34,690	1.30	3,240	\$81,000
Rainwater harvesting	0.061	10	1,830	0.07	1,830 (gal)	\$3,660





BERNARDSVILLE MUNICIPAL POOL





RAP ID: 5

Subwatershed: Raritan River North

Branch

Site Area: 1,630,208 sq. ft.

Address: 141 Seney Drive

Bernardsville, NJ 07924

Block and Lot: Block 35, Lot 2, 6

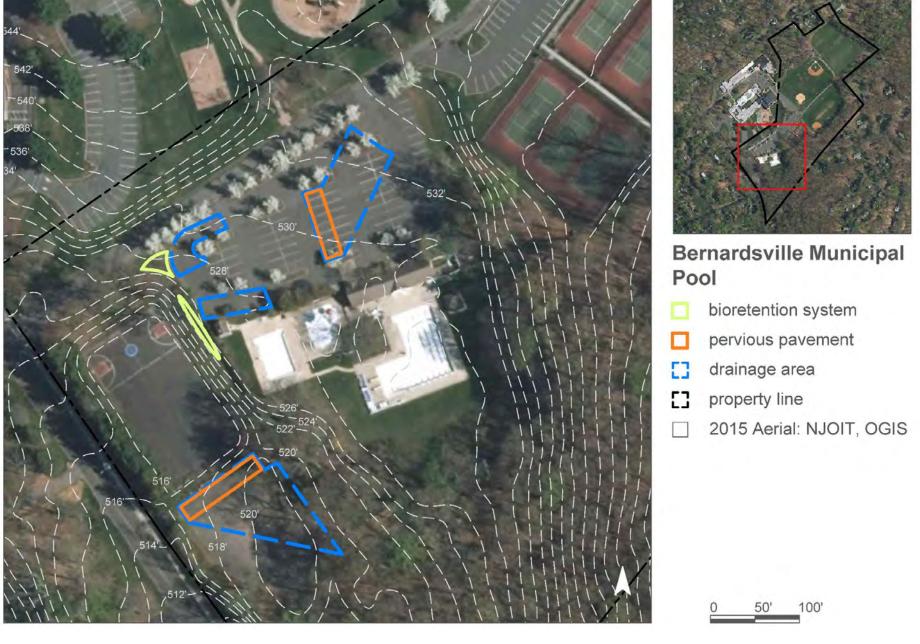




Two sections of parking spaces can be converted to pervious pavement to capture and infiltrate parking lot runoff. Sections of turfgrass adjacent to the parking lot can be converted to rain gardens to capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
16	263,800	12.7	133.2	1,211.2	0.206 7.24		

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	0.088	15	6,460	0.24	845	\$4,225
Pervious pavement	0.460	77	33,760	1.27	3,150	\$78,750



BERNARDSVILLE SCHOOL OF MUSIC





RAPID: 6

Subwatershed: Raritan River North

Branch

Site Area: 36,235 sq. ft.

Address: 75 Claremont Road #101

Bernardsville, NJ 07924

Block and Lot: Block 69, Lot 5, 6, 7





Pervious pavement can be installed in the back parking lot to capture, treat, and infiltrate parking lot runoff. Downspout planter boxes can be installed at the bases of the downspouts connected to the support beams at the southeast corner of the building to capture and filter stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
81	29,441	1.4	14.9	135.2	0.023 0.81		

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	0.423	71	31,050	1.17	2,900	\$72,500
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	\$3,000





Bernardsville School of Music

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

CHURCH OF SAINT JOHN OF THE MOUNTAIN





RAPID: 7

Subwatershed: Raritan River North

Branch

Site Area: 124,250 sq. ft.

Address: 370 Mount Harmony Road

Bernardsville, NJ 07924



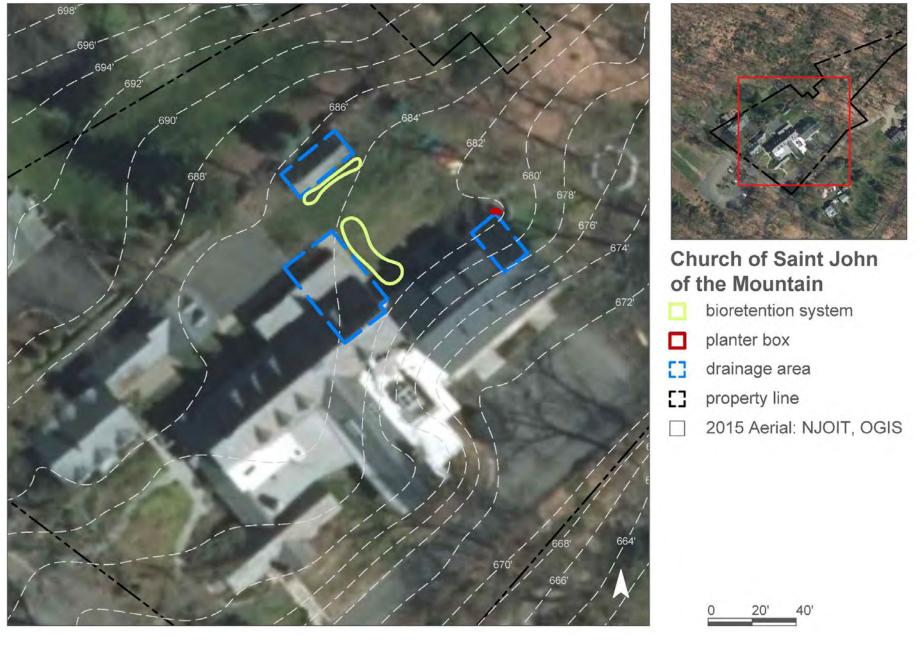


Block and Lot: Block 14, Lot 21

Rain gardens can be installed at the corner of the sidewalk and adjacent to the shed to the north of the church to capture, treat, and infiltrate rooftop runoff. Downspout planter boxes can be installed at the northeast corner of the building to capture and filter stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
27	33,683	1.6	17.0	154.7	0.026 0.92		

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	0.042	7	3,100	0.14	405	\$2,025
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	\$2,000



FAR HILLS COUNTRY DAY SCHOOL





RAP ID: 8

Subwatershed: Raritan River North

Branch

Site Area: 803,550 sq. ft.

Address: 697 US-202

Far Hills, NJ 07931

Block and Lot: Block 89, Lot 10





Rain gardens can be installed in the turfgrass to capture, treat, and infiltrate rooftop and parking lot runoff. Downspout planter boxes can be installed in the courtyard to capture and filter 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''	
44	350,940	16.9	177.2	1,611.3	0.273	9.63	

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	0.229	38	16,820	0.63	2,200	\$11,000
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	\$3,000





Far Hills Country Day School

- bioretention system
- planter box
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

FIRST CHURCH OF CHRIST, SCIENTIST





RAP ID: 9

Subwatershed: Raritan River North

Branch

Site Area: 101,910 sq. ft.

Address: 11 Meeker Road

Bernardsville, NJ 07924

Block and Lot: Block 94, Lot 19





A rain garden can be installed in the turfgrass court to capture, treat, and infiltrate parking lot runoff. Pervious pavement can be installed in the parking spaces to capture, treat, and infiltrate parking lot 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)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
29	29,507	1.4	14.9	135.5	0.023	0.81	

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	0.133	22	9,790	0.37	1,280	\$6,400
Pervious pavement	0.141	24	10,380	0.39	970	\$24,250



GOOD SHEPHERD CHURCH





RAPID: 10

Subwatershed: Raritan River North

Branch

Site Area: 372,570 sq. ft.

Address: 321 Mine Brook Road

Bernardsville, NJ 07924

Block and Lot: Block 81, Lot 3





Rain gardens can be installed in the courtyard in the corner of the building and adjacent to the parking lot south of the building to capture, treat, and infiltrate rooftop and parking lot runoff. Pervious pavement can be installed in the small area of parking spaces in front and in the larger parking lot in the rear of the building to capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of 44		
19	71,293	3.4	36.0	327.3	0.056	1.96	

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	0.231	39	16,920	0.64	2,215	\$11,075
Pervious pavement	0.270	45	19,810	0.74	1,850	\$46,250



SACRED HEART CHAPEL





RAP ID: 11

Subwatershed: Raritan River North

Branch

Site Area: 15,409 sq. ft.

Address: 47 Bernards Avenue

Bernardsville, NJ 07924

Block and Lot: Block 105, Lots 1,12

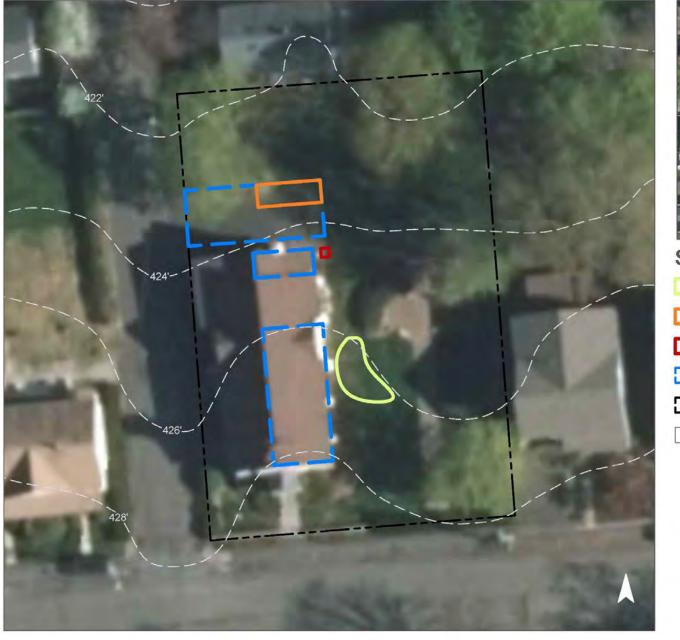




A rain garden can be installed on the eastern side of the church to capture, treat, and infiltrate rooftop runoff. A downspout planter box can be installed at the northeast corner of the church to capture and filter stormwater. Pervious pavement can be installed in the parking spaces north of the building to capture, treat, and infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
50	7,656	0.4	3.9	35.2	0.006	0.21	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.024	4	1,770	0.07	230	\$1,150
Pervious pavement	0.022	4	1,650	0.06	160	\$4,000
Planter box	n/a	1	n/a	n/a	1 (box)	\$1,000





Sacred Heart Chapel

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

SCHOOL OF SAINT ELIZABETH



RAP ID: 12

Subwatershed: Raritan River North

Branch

Site Area: 263,055 sq. ft.

Address: 30 Seney Drive

Bernardsville, NJ 07924

Block and Lot: Block 39, Lot 6

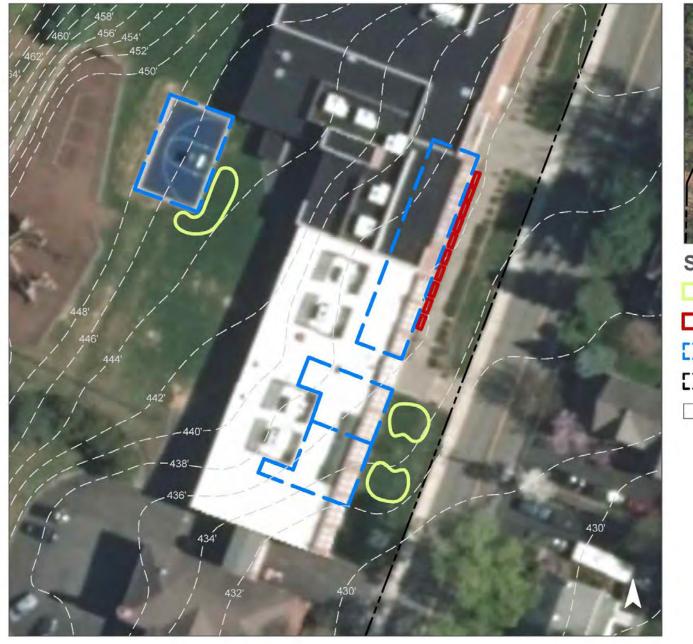




Rain gardens can be installed on either side of the red tree shown to the southeast of the school and along the southeast corner of the tennis court to capture, treat, and infiltrate rooftop and pavement runoff. Downspout planter boxes can be installed to the right of the main entrance to capture and filter stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
42	110,897	5.3	56.0	509.2	0.086	3.04	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.083	14	6,120	0.23	815	\$4,075
Planter boxes	n/a	8	n/a	n/a	10 (boxes)	\$10,000





School of Saint Elizabeth

- bioretention system
- planter box
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

SAINT BERNARD'S CHURCH





RAPID: 13

Subwatershed: Raritan River North

Branch

Site Area: 158,487 sq. ft.

Address: 88 Claremont Road

Bernardsville, NJ 07924

Block and Lot: Block 68, Lot 9





A rain garden can be installed along the southeast side of the church and at the bottom of a hill on the property to capture, treat, and infiltrate parking lot and rooftop runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
50	78,635	3.8	39.7	361.0	0.061	2.16	

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
Bioretention systems	0.056	9	4,130	0.16	540	\$2,700



BERNARDS HIGH SCHOOL

RUTGERS

New, Jersey Agricultural
Experiment Station

RAP ID: 14

Subwatershed: Upper Passaic River

HUC14 ID 02030103010070

Site Area: 1,172,134 sq. ft.

Address: 25 Olcott Avenue

Bernardsville, NJ 07924



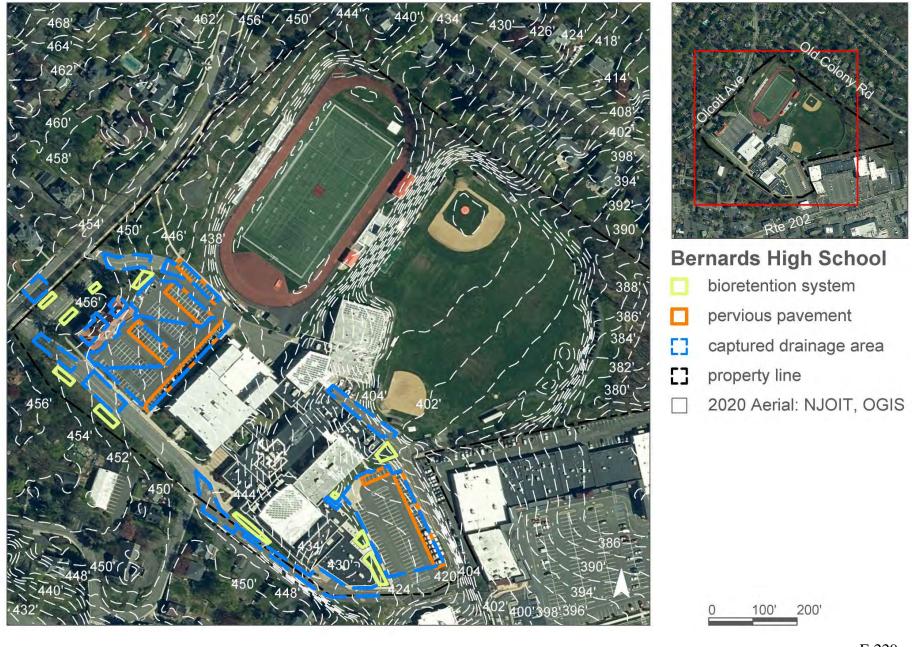


Block and Lot: Block 64, Lot 1

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from rooftops, walkways, road, and driveways. Some of these gardens require curb cuts and trench drains to intercept and redirect runoff to the gardens. Existing parking spaces in the northern and southern parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous 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 49"	
49	570,245	27.5	288.0	2,618.2	0.444	17.42	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	30,415	0.883	133	58,910	2.21	7,610	\$76,100
Pervious pavement	81,540	2.366	355	157,920	5.93	20,555	\$513,875



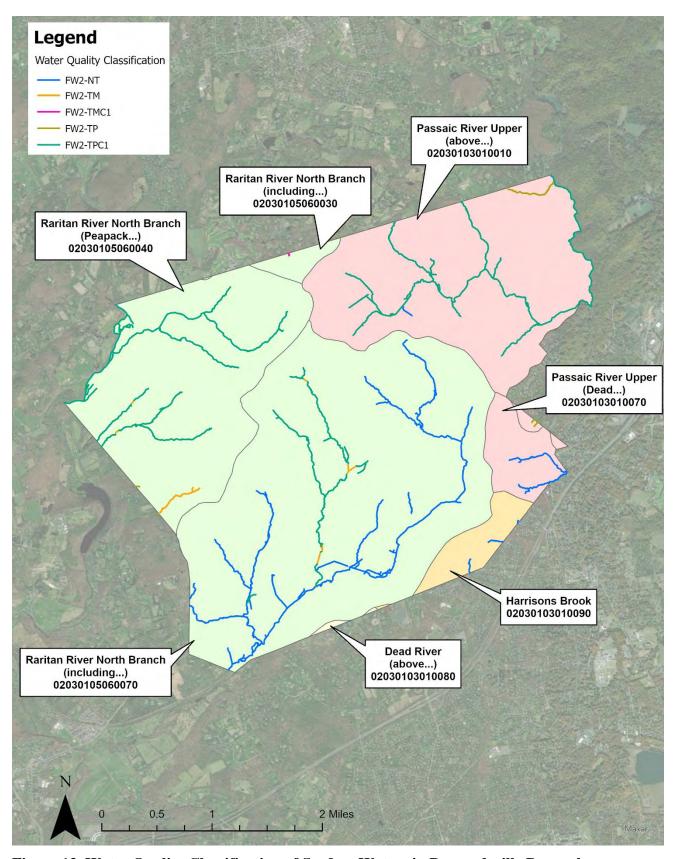


Figure 13. Water Quality Classification of Surface Waters in Bernardsville Borough

Table 11. Water Quality Classification of Surface Waters in Bernardsville Borough

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	14.9	39.1%
Freshwater 2, trout production, Category One	FW2-TPC1	21.5	56.1%
Freshwater 2, trout maintenance	FW2-TM	1.1	3.0%
Freshwater 2, trout production	FW2-TP	0.7	1.7%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	0.03	0.1%

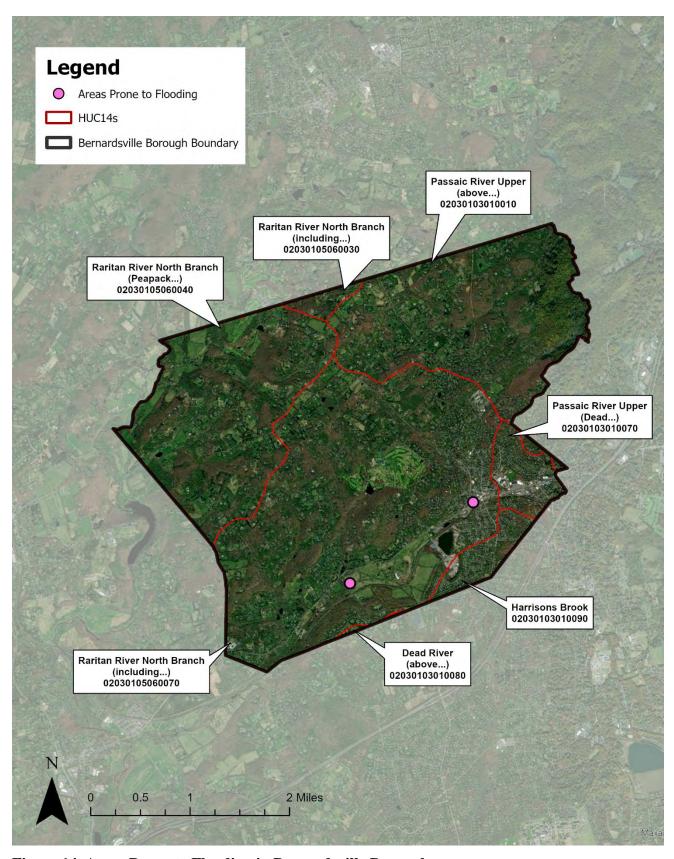


Figure 14. Areas Prone to Flooding in Bernardsville Borough

Chester Borough

Introduction

Located in Morris County in New Jersey, Chester Borough covers about 1.6 square miles. With a population of 1,681 (2020 United States Census), Chester Borough consists of 68.1% of urban land uses by area. Of that urban land use, approximately 28.9% is comprised of low-density residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 28.7% of Chester Borough.

Chester Borough contains portions of four subwatersheds (Table 1). There are approximately 2.3 miles of rivers and streams within the municipality; these include tributaries to Burnett Brook, Hacklebarney Brook, tributaries to the Lamington River, and Peapack Brook and its tributaries. Chester Borough is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Area (WMA) 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Chester Borough

Subwatershed	HUC14		
Lamington River (Furnace Road to Hillside Road)	02030105050030		
Lamington River (Pottersville gage to Furnace Road)	02030105050040		
Burnett Brook (above Old Mill Road)	02030105060020		
Peapack Brook (above/including Gladstone Brook)	02030105060050		

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Chester Borough. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Chester Borough's existing

stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Chester Borough in relation to the study area. Figure 2 shows the portions of the four HUC14s in Chester Borough and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Chester Borough. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Chester Borough and is presented in Table 2. Figure 4 shows the impervious cover in Chester Borough based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Chester Borough and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins. Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins with vegetative shoreline buffers were identified in Chester Borough within the study area.

The Q-Farms in the study area of Chester Borough, which includes the entire municipality, have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 7 illustrates the land use on the Q-Farms, which is summarized in Table 6. There are 31.3 acres of agricultural land use in Chester Borough, all of which lie within the study area for this Watershed Restoration and Protection Plan. There are 9 Q-Farms in Chester Borough, totaling 108.0 acres. Within the 9 Q-Farms, there are approximately 27.2 acres of agricultural land use. Aerial photography (see Figure 8) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Chester Borough are presented in Table 7.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Four HUC14s are included in the study area (02030105050030, 02030105050040, 02030105060020, 02030105060050). Within these four HUC14s, there are 56.2 acres of buildings and 66.3 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Chester Borough, approximately 3.5 acres of rooftop runoff would be managed with 0.70 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study

area within Chester Borough, approximately 6.6 acres of roadway would be managed, or 1.8 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 9). Available information for each parcel in the study area is presented in Table 8. Class 15E parcels were excluded from the assessment. Nine of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 8 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 10 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are three classifications that apply to the streams in Chester Borough. Figure 11 depicts the water quality classifications of surface waters throughout Chester Borough and Table 9 summarizes the total miles and percentage of each surface water quality classification in the municipality.

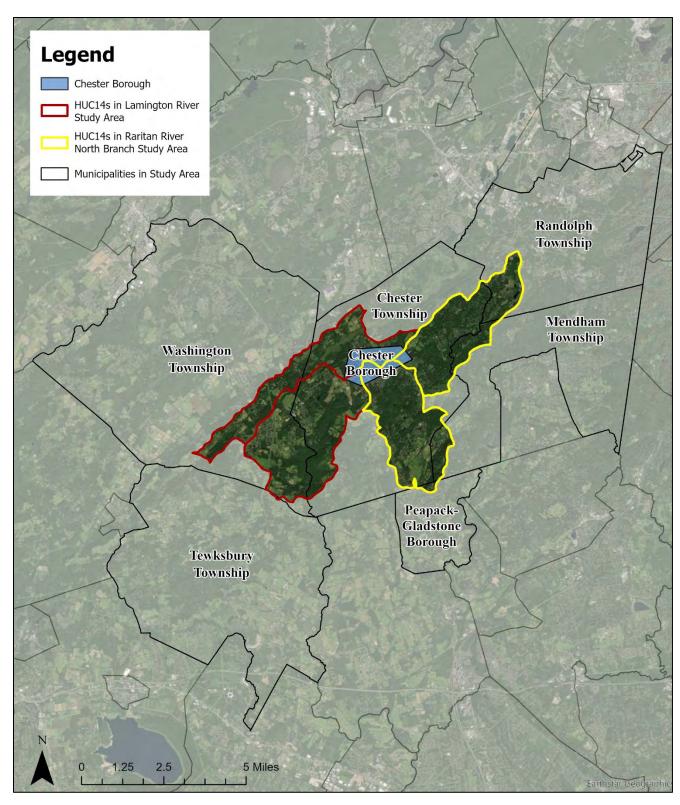


Figure 1: Municipalities in the Study Area

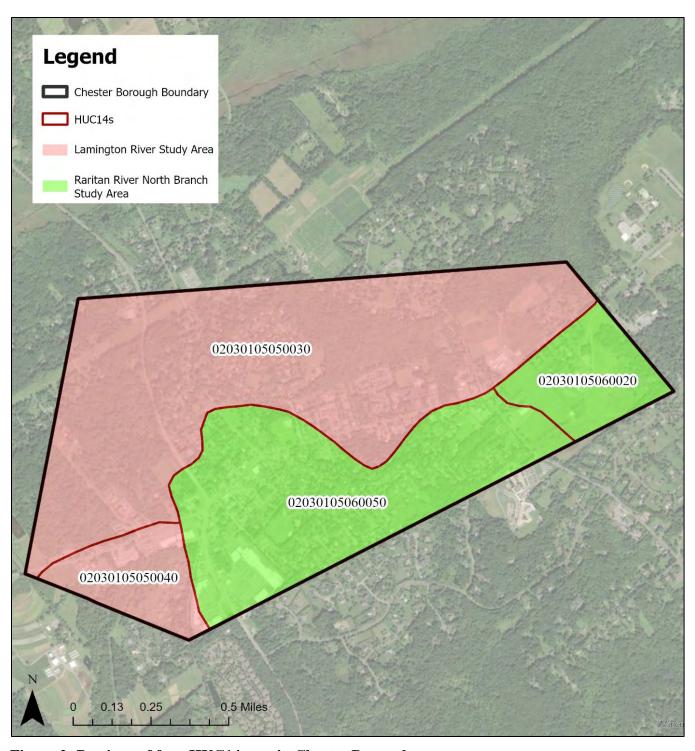


Figure 2: Portions of four HUC14s are in Chester Borough

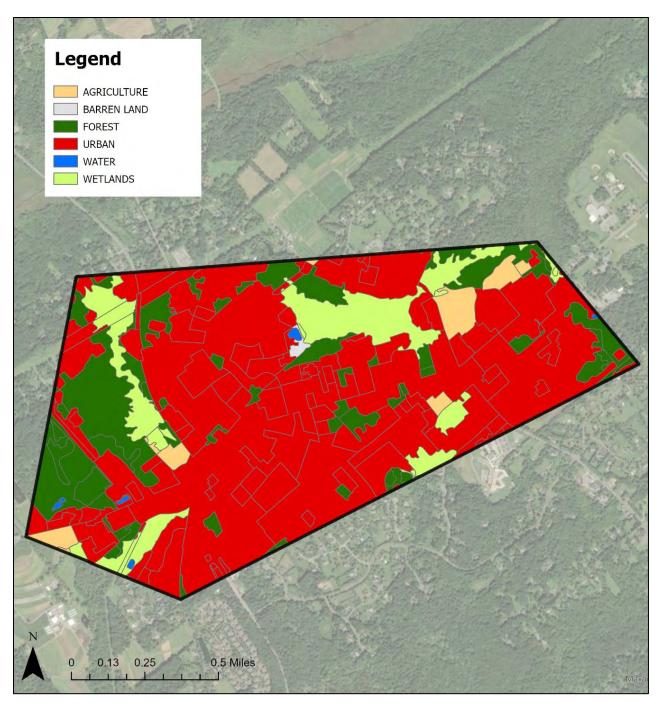


Figure 3: Land Use in Chester Borough

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Chester Borough

Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)	
		02030105050030			
Agriculture	20.2	26.3	202.1	6,064.3	
Barren Land	1.9	0.9	9.3	111.9	
Forest	148.9	14.9	446.8	5,957.3	
Urban	303.3	424.6	4,549.4	42,461.1	
Water	1.4	0.1	4.1	55.0	
Wetlands	83.0	8.3	249.0	3,320.3	
TOTAL =	558.7	475.1	5,460.7	57,969.9	
		02030105050040			
Agriculture	4.9	6.4	49.4	1,482.7	
Barren Land	0.0	0.0	0.0	0.0	
Forest	5.5	0.5	16.5	219.8	
Urban	47.5	66.5	712.5	6,649.9	
Water	0.7	0.1	2.0	26.7	
Wetlands	13.1	1.3	39.4	525.0	
TOTAL =	71.7	74.8	819.8	8,904.1	
		02030105060020		•	
Agriculture	0.0	0.0	0.0	0.0	
Barren Land	0.0	0.0	0.0	0.0	
Forest	16.7	1.7	50.1	668.3	
Urban	66.4	92.9	995.8	9,294.1	
Water	0.2	0.0	0.5	6.2	
Wetlands	0.0	0.0	0.0	0.0	
TOTAL =	83.3	94.6	1,046.4	9,968.6	
		02030105060050			
Agriculture	6.2	8.0	61.8	1,854.8	
Barren Land	0.0	0.0	0.0	0.0	
Forest	11.1	1.1	33.4	444.7	
Urban	277.3	388.2	4,158.9	38,816.1	
Water	0.0	0.0	0.0	0.0	
Wetlands	12.0	1.2	35.9	478.7	
TOTAL =	306.6	398.5	4,290.0	41,594.3	
		All HUCs			
Agriculture	31.3	40.7	313.3	9,401.8	
Barren Land	1.9	0.9	9.3	111.9	
Forest	182.2	18.2	546.8	7,290.1	
Urban	694.5	972.2	10,416.6	97,221.2	
Water	2.3	0.2	6.6	87.9	
Wetlands	108.1	10.8	324.3	4,324.0	

TOTAL =	1,020.3	1,043.0	11,616.9	118,436.9

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Chester Borough that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Chester Borough. Based upon the NJDEP impervious surface data, Chester Borough has impervious cover totaling 25.7%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Chester Borough is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Chester Borough's impervious cover percentage would suggest that its waterways are primarily non-supporting and most likely contributing to not meeting the state's surface water quality standards.

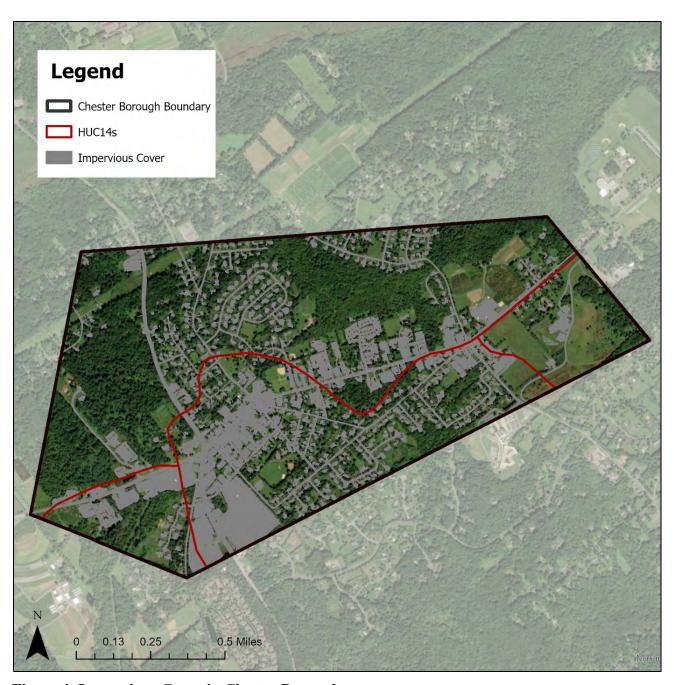


Figure 4: Impervious Cover in Chester Borough

Table 3: Impervious Cover Analysis by HUC14 for Chester Borough

Class	Area (acres)	HUC Impervious Cover (%)
<u> </u>	02030105050030	
Building	22.23	
Other	48.91	
Road	29.35	
TOTAL =	100.5	18.0%
	02030105050040	
Building	4.19	
Other	15.54	
Road	4.24	
TOTAL =	24.0	33.4%
·	02030105060020	•
Building	1.51	
Other	4.28	
Road	1.63	
TOTAL =	7.4	8.9%
	02030105060050	•
Building	28.23	
Other	71.53	
Road	31.08	
TOTAL =	130.8	42.7%
·	All HUCs	
Building	56.16	
Other	140.26	
Road	66.30	
TOTAL =	262.7	25.7%

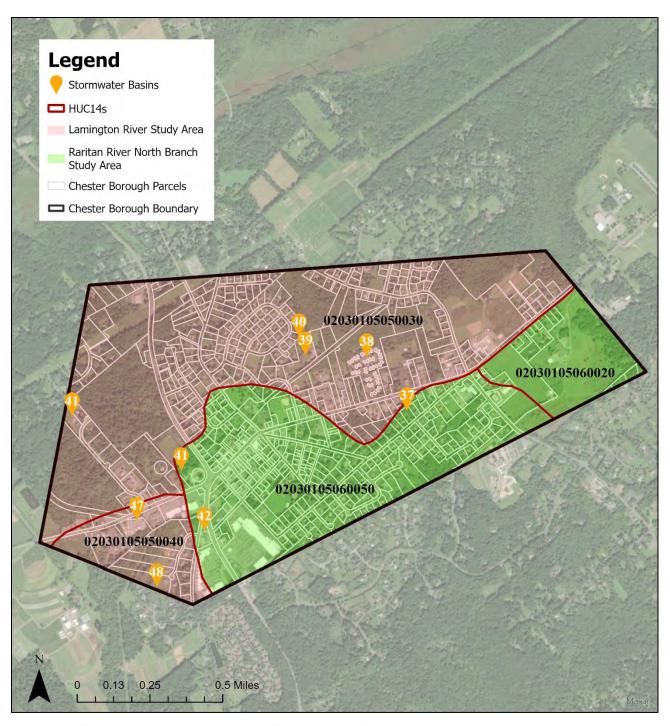


Figure 5: Stormwater Facilities in the Study Area of Chester Borough

Table 4: Location of Stormwater Facilities in the Study Area of Chester Borough

Raritan River North Branch Study Area						
<u>ID</u>	<u>Address</u>	<u>Type</u>				
41	146 US Highway 206 S	D				
42	198 US Highway 206 S	D				
Lamington River Study Area						
<u>ID</u>	<u>Address</u>	Type				
37	384 Main St	I				
38	Barkman Way	N				
39	64 Collis Ln	R				
40	31 Ammerman Way	N				
41	32 Mill Ridge Ln	N				
47	1 Mill Ridge Ln	R				
48	14 Windy Top Ln	N				

"D" = Detention, "R" = Retention, "N" = Naturalized, "I" = Infiltration

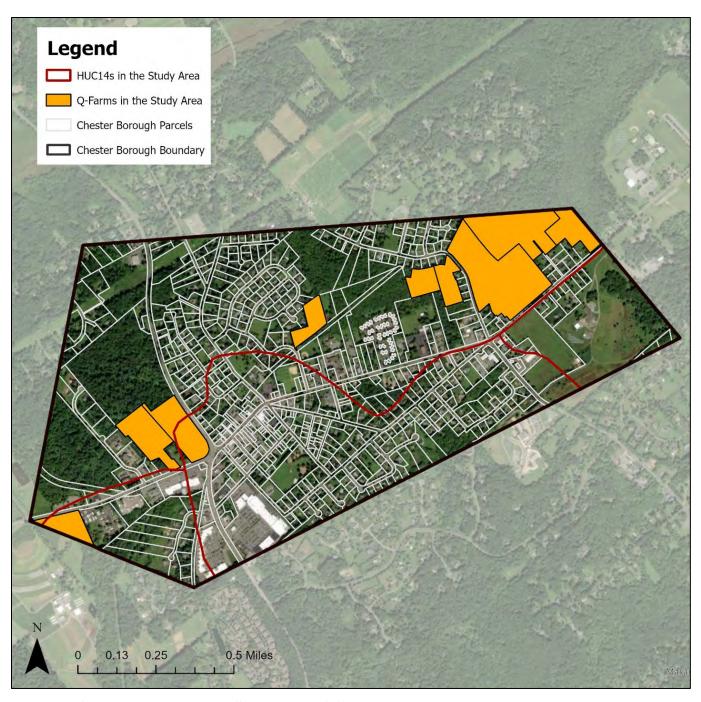


Figure 6: Q-Farm Parcels in the Study Area of Chester Borough

Table 5: Q-Farm Parcels in the Study Area of Chester Borough

Block	Lot	Q-Code	Prop Class	Location
101	13	QFARM	3B	2 Route 24
101	15	QFARM	3B	46 West Main St
110	18	QFARM	3B	77a Oakdale Rd.Rear
110	57	QFARM	3B	64 Collis Ln
110	67	QFARM	QFARM 3B 77 Oakdale F	
114	4	QFARM	3B	10 Williamson Ln
114	5	QFARM	3B 47 North Rd	
114	15	QFARM	QFARM 3B 15 North Rd	
133	1	QFARM	3B	255 Route 24

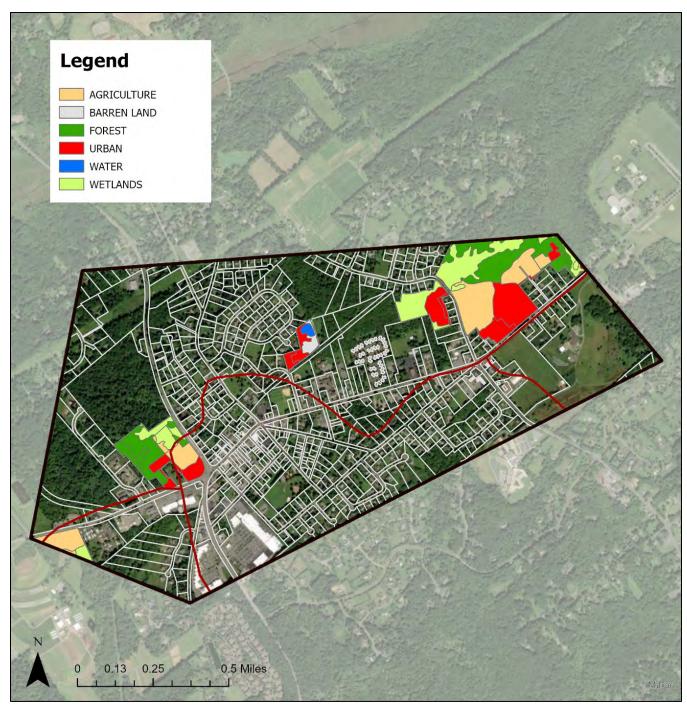


Figure 7: Land Use on Q-Farm Parcels in the Study Area of Chester Borough

Table 6: Land Use on Q-Farms in the Study Area of Chester Borough

Land Use	Area (acres)
Agriculture	27.2
Barren Land	1.7
Forest	26.7
Urban	26.8
Water	0.8
Wetlands	24.7
Total:	108.0

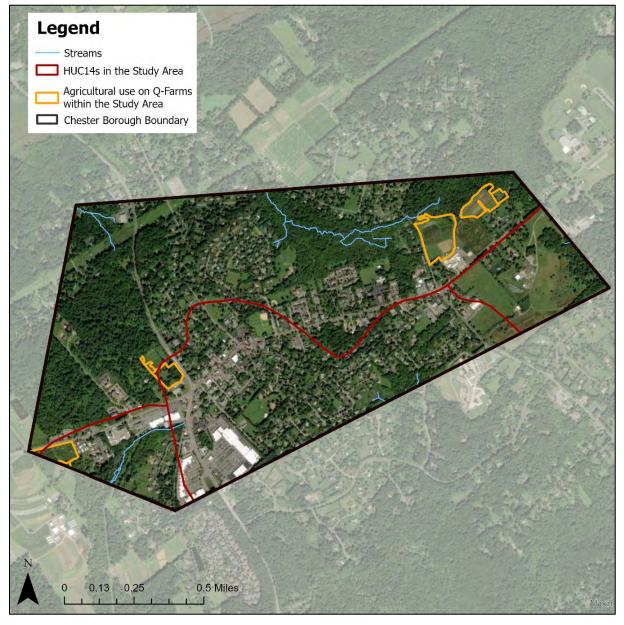


Figure 8: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Chester Borough

Table 7: Recommendations for Specific Farms in the Study Area of Chester Borough

	Lamington River Study Area								
Rlock Lot Stream 1							Manure Mgt.		
114	4	QFARM	X						
114	15	QFARM	X		X	X			

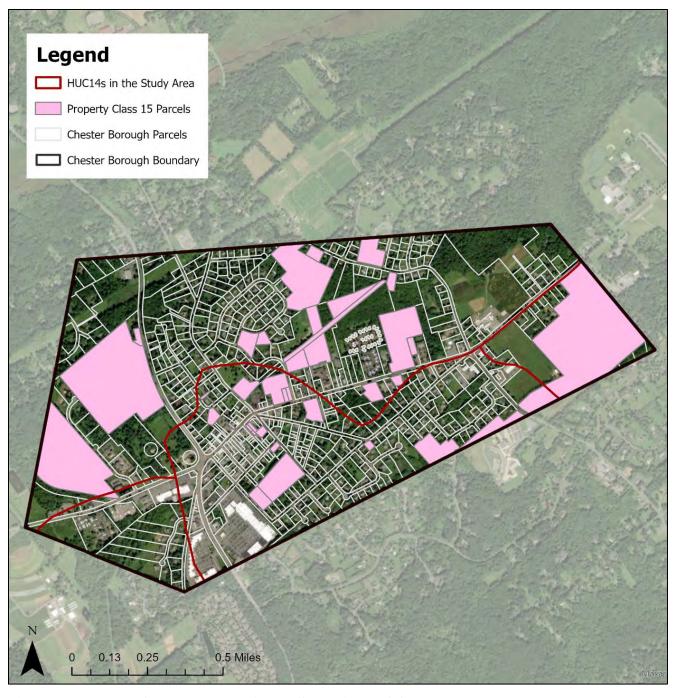


Figure 9: Property Class 15 Parcels in the Study Area of Chester Borough

 Table 8: Property Class 15 Parcels in the Study Area of Chester Borough

Block Lot		Prop Class	Location	Facility Type
110	47	15A	54 Collis Ln	Vacant Land
118	12	15A	640 Main St	Parking Areas
101	11	15C	235 Route 206	Storage Bldg.
101	12	15C	185 Route 206	Vacant Land
101	18	15C	140 West Main St	Park
103	25	15C	67 Main St	Parking Areas
104	10	15C	18 Hedges Rd	Water Supply
*107 ¹	11	15C	155 Main St	Playground
*107 ¹	13	15C	175 Main St	Vacant Land
110	1	15C	31 Ammerman Way	Vacant Land
110	3	15C	111b Oakdale Rd	Vacant Land
110	49	15C	62 Collis Ln	Vacant Land
110	53	15C	43 Ammerman Way	Vacant Land
110	54	15C	41 Ammerman Way	Vacant Land
110	62	15C	62 Collis La.Rear	Vacant Land
110	64	15C	93 Oakdale Rd.Rear	Vacant Land
*115	17	15C	50 North Rd	Administrative Bldg.
119	8	15C	300 Main St	Municipal Bldg.
120	16	15C	21 Larch Dr	Vacant Land
127	4	15C	70 Grove St	Park
*127	13	15C	107 Seminary Ave	Park
*107	18	15D	30 Hillside Rd	Church & Parsonage
110	13	15D	91 Oakdale Rd	Office
110	31	15D	Main St	Church
*110	32	15D	375 Main St	Church & Rectory
*110	48	15D	245 Main St.Rear	Retirement Home
110.01	2	15D	1 Meadow Ln	Retirement Home
110.01	3	15D	3 Meadow Ln	Retirement Home
110.01	4	15D	5 Meadow Ln	Retirement Home
110.01	5	15D	7 Meadow Ln	Retirement Home
110.01	6	15D	9 Meadow Ln	Retirement Home
110.01	7	15D	11 Meadow Ln	Retirement Home
110.01	8	15D	13 Meadow Ln	Retirement Home
110.01	9	15D	15 Meadow Ln	Retirement Home
110.01	10	15D	2 Meadow Ln	Retirement Home
110.01	11	15D	4 Meadow Ln	Retirement Home
110.01	12	15D	8 Meadow Ln	Retirement Home
110.01	13	15D	6 Meadow Ln	Retirement Home
112	5	15D	100 Oakdale Rd	Chapel
*123	6	15D	196-220 Main St	Church
103	14	15F	11 Hedges Rd	Disabled Veteran
*107 ¹	12	15F	177 Main St	Club House
110.01	37	15F	43 Barkman Way	Disabled Veteran
		+	2 North Rd #1	Cancer Hope Network
	1	135	21101111111111111111111111111111111111	
115 * 119	1 11	15F 15F	370 Main St	Masonic Temple

*126 ²	2	15F	80 Main St	Volunteer Fire Co
*126 ²	3	15F	86 Main St	Volunteer Fire Co
*126 ²	4	15F	86 Main St	Vacant Land
*126 ²	7	15F	Main St	Vacant Land
*126 ²	8	15F	26 Grove St	Vacant Land
127	1	15F	54 Grove St	Theater

*Sites that can be retrofitted with green infrastructure

¹Site includes three tax-exempt parcels ²Site includes five tax-exempt parcels

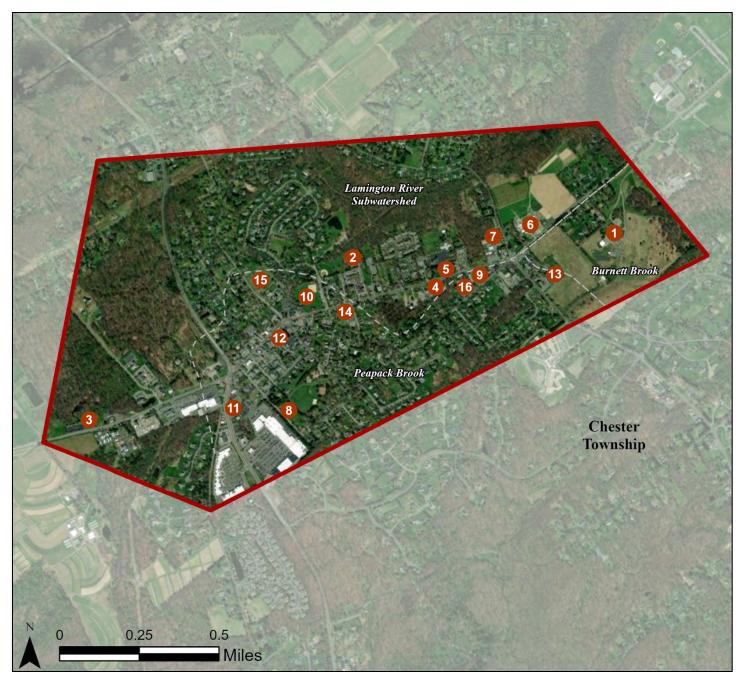


Figure 10: Sites with Green Infrastructure Opportunities in Chester Borough

CHESTER BOROUGH OFFICE



RAPID: 1

Subwatershed: Burnett Brook

HUC14 ID: 02030105060020

Site Area: 2,589,180 sq. ft.

Address: 50 North Road

Chester, NJ 07930

Block and Lot: Block 115, Lot 17

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveway and parking lot. Trench drains will be required for some of these gardens. Existing parking spaces in the northern and southern parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
9	234,240	11.3	118.3	1,075.5	0.183	7.30	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	3,660	0.108	15	7,640	0.29	915	\$9,150
Pervious pavement	19,110	0.566	84	39,860	1.50	6,990	\$174,750



CHESTER SENIOR HOUSING





RAPID: 2

Subwatershed: Lamington River

Site Area: 171,540 sq. ft.

Address: 1 Cole Court

Chester Borough, NJ 07930

Block and Lot: Block 110, Lot 4





Two rain gardens can be installed west of the two buildings to accumulate and infiltrate stormwater runoff from the buildings. Additionally, porous pavement can be used to capture stormwater from the parking lot in front of the main building. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
24	40,325	1.9	20.4	185.1	0.031	1.11	

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 systems	0.042	7	2,980	0.11	405	\$2,025
Pervious pavement	0.178	30	12,640	0.48	1,450	\$36,250



CHESTER LIBRARY



RAPID: 3

Subwatershed: Lamington River

Site Area: 393,550 sq. ft.

Address: 250 West Main Street

Chester, NJ 07930

Block and Lot: Block 101, Lot 21

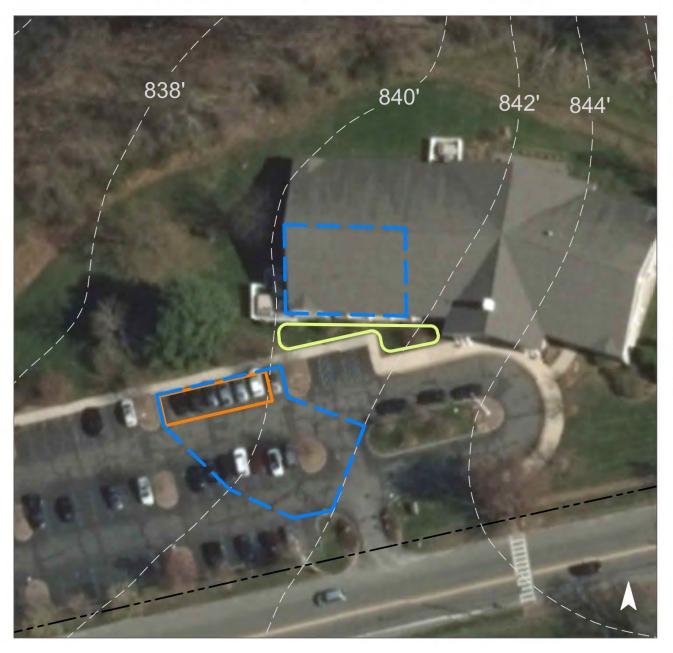




Parking spaces in the parking lot to the west of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot, before it enters the nearby storm drain. A rain garden can be installed south of the building to capture, filter, and infiltrate stormwater runoff from the roof if the front downspouts are disconnected. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
17	68,470	3.3	34.6	314.4	0.053 1.88		

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.089	15	6,310	0.24	860	\$4,300
Pervious pavement	0.157	26	11,120	0.42	1,055	\$26,375





Chester Library

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



COLONIAL PROSPECT LODGE #24 MASONIC LODGE



RAPID: 4

Subwatershed: Lamington River

HUC14 ID: 02030105050030

Site Area: 29,963 sq. ft.

Address: 370 Main Street

Chester, NJ 07930

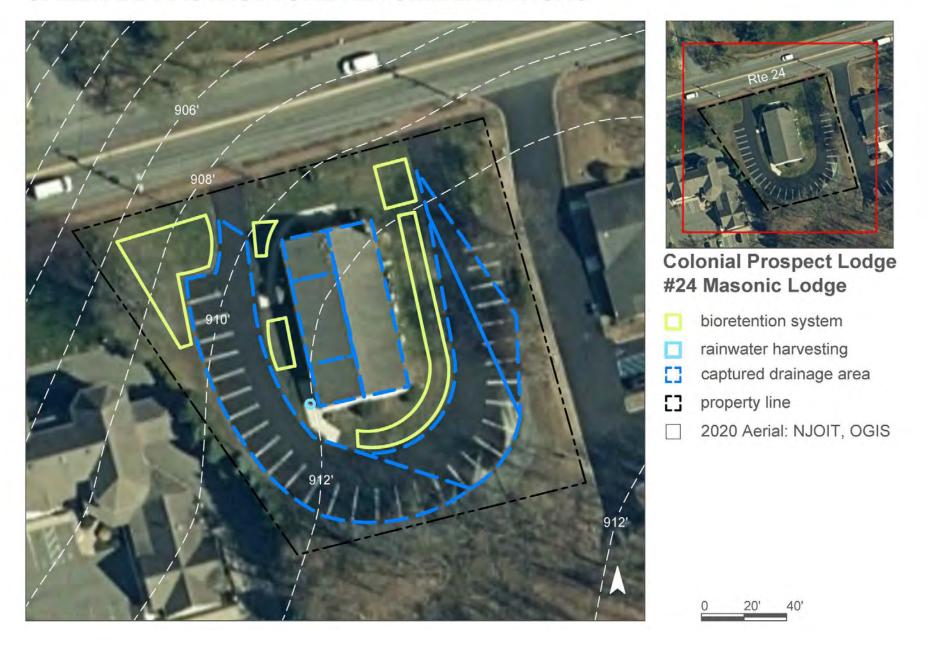
Block and Lot: Block 119, Lot 11



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the driveway and rooftop. This will require downspout disconnections, trench drains, and in some cases downspout redirection beneath the sidewalk. A cistern can be installed to the southwest of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden bed. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	ТР	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
58	17,428	0.8	8.8	80.0	0.014	0.54	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	12,090	0.358	53	25,220	0.95	3,025	\$30,250
Rainwater harvesting	430	0.013	2	350	N/A	350 (gal)	\$1,050



ST. LAWRENCE CHURCH



RAP ID: 5

Subwatershed: Lamington River

Site Area: 534,640 sq. ft.

Address: 375 Main Street

Chester, NJ 07930

Block and Lot: Block 110, Lot 32





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

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
22	116,365	5.6	58.8	534.3	0.091	3.19	

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	0.214	36	15,160	0.57	2,050	\$10,250



STONY HILL FARM MARKET



RAP ID: 6

Subwatershed: Lamington River

Site Area: 1,466,765 sq. ft.

Address: 15 North Road

Chester Borough, NJ 07930

Block and Lot: Block 114, Lot 15





Pervious pavement can be installed in the parking lot to capture the stormwater runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
3	39,515	1.9	20.0	181.4	0.031 1.08		

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
Pervious pavement	0.316	53	22,460	0.84	2,700	\$67,500



SUBURBAN HILLS SCHOOL



RAPID: 7

Subwatershed: Lamington River

Site Area: 53,755 sq. ft.

Address: 41 Oakdale Road

Chester Borough, NJ 07930

Block and Lot: Block 110, Lot 25

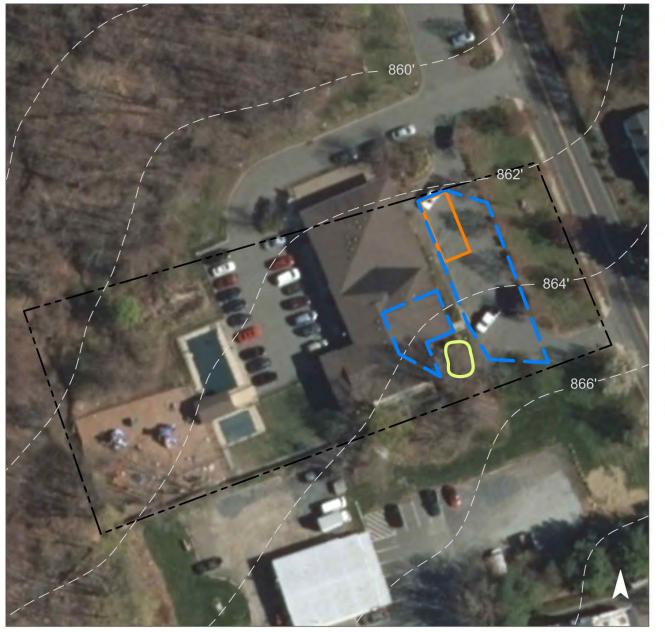




Parking spaces in the parking lot to the northeast of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. A rain garden can be installed in the turfgrass area near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
64	34,200	1.6	17.3	157.0	0.027	0.94	

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	0.038	6	2,690	0.10	365	\$1,825
Pervious pavement	0.131	22	9,320	0.35	900	\$22,500





Suburban Hills School

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

BORO OF CHESTER RECREATION OFFICE



RAP ID: 8

Subwatershed: Peapack Brook

HUC14 ID: 02030105060050

Site Area: 84,985 sq. ft.

Address: 107 Seminary Avenue

Chester, NJ 07930

Block and Lot: Block 127, Lot 13





Rain gardens can be installed to the northwest of the parking lot and to the southeast of the building to capture, treat, and infiltrate the stormwater runoff from the parking lot and building rooftop. This will require curb cuts and downspout redirection beneath the sidewalk. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
19	16,463	0.8	8.3	75.6	0.013	0.51	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	8,915	0.264	38	18,600	0.70	2,230	\$22,300





Boro of Chester Recreation Office

- bioretention system
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

0 20' 40'

CHASE BANK



RAPID: 9

Subwatershed: Peapack Brook

Site Area: 34,760 sq. ft.

Address: 444 East Main Street

Chester, NJ 07930

Block and Lot: Block 116, Lot 1





A rain garden can be installed north of the building to capture, treat, and infiltrate stormwater runoff from the roof and parking lot. Parking spaces near the catch basin in the rear parking lot can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
65	22,590	1.1	11.4	103.7	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	0.031	5	2,180	0.08	295	\$1,475
Pervious pavement	0.098	16	6,930	0.26	810	\$20,250



CHESTER BOROUGH PARK



RAPID: 10

Subwatershed: Peapack Brook

Site Area: 198,640 sq. ft.

Address: 134 Main Street

Chester Borough, NJ 07930

Block and Lot: Block 107, Lots 11, 12, & 13

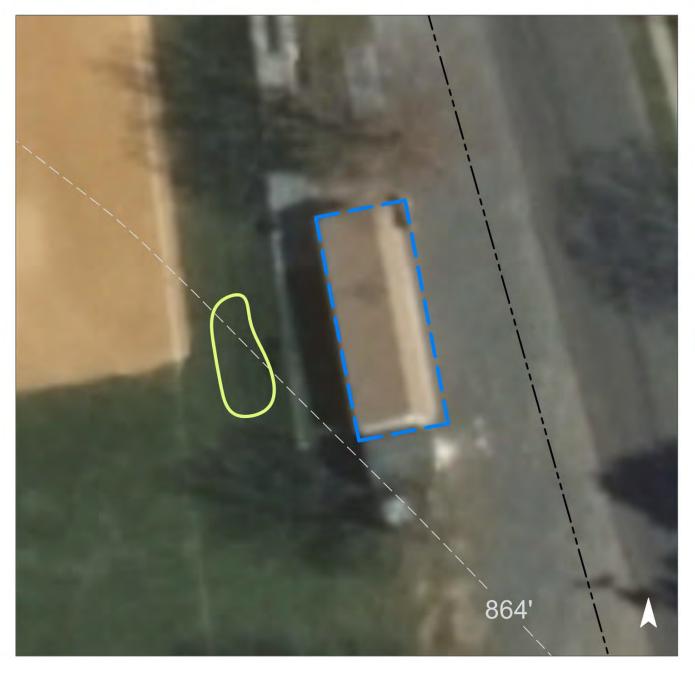




A rain garden can be installed to the west of the building nearby the baseball field. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
10	19,760	1.0	10.0	90.7	0.015	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
Bioretention system	0.026	4	1,850	0.07	250	\$1,250





Chester Borough Park

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

CHESTER DINER



RAP ID: 11

Subwatershed: Peapack Brook

Site Area: 63,920 sq. ft.

Address: 65 US-206

Chester Borough, NJ 07930

Block and Lot: Block 131, Lot 17





Porous pavement can be installed on the west side of the building to capture and infiltrate stormwater runoff from the building and surrounding area. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		ting Loads f		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	48,190	2.3	24.3	221.3	0.038	1.32	

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
Pervious pavement	0.155	26	11,000	0.41	1,080	\$27,000



CHESTER FIRE COMPANY



RAP ID: 12

Subwatershed: Peapack Brook

HUC14 ID: 02030105060050

Site Area: 45,869 sq. ft.

Address: 86 Main Street

Chester, NJ 07930

Block and Lot: Block 126, Lots 2,3,4,7 & 8





A rain garden can be installed to the west of the shed to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require a downspout disconnection. The gutters on the eastern section of the shed can also be reworked and directed towards the raingarden to increase the treated drainage area. Existing parking spaces in the eastern parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	ТР	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
87	39,938	1.9	20.2	183.4	0.031	1.24	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	810	0.024	4	1,690	0.06	205	\$2,050
Pervious pavement	18,255	0.541	80	38,070	1.43	4,155	\$103,875



CHESTER TENNIS CLUB





RAPID: 13

Subwatershed: Peapack Brook

Site Area: 91,750 sq. ft.

Address: 581 Main Street

Chester, NJ 07930

Block and Lot: Block 115, Lot 5

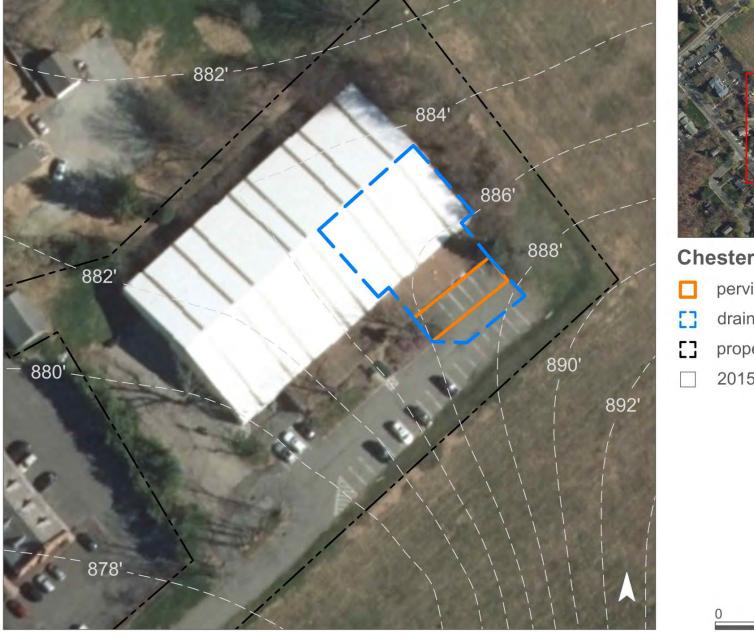




Parking spaces in the parking lot to the south of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the roof via the downspouts, which are disconnected. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
59	54,365	2.6	27.5	249.6	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
Pervious pavement	0.190	32	13,490	0.51	1,300	\$32,500





Chester Tennis Club

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



COMMUNITY PRESBYTERIAN CHURCH



RAPID: 14

Subwatershed: Peapack Brook

HUC14 ID: 02030105060050

Site Area: 101,358 sq. ft.

Address: 220 Main Street

Chester, NJ 07930

Block and Lot: Block 123, Lot 6

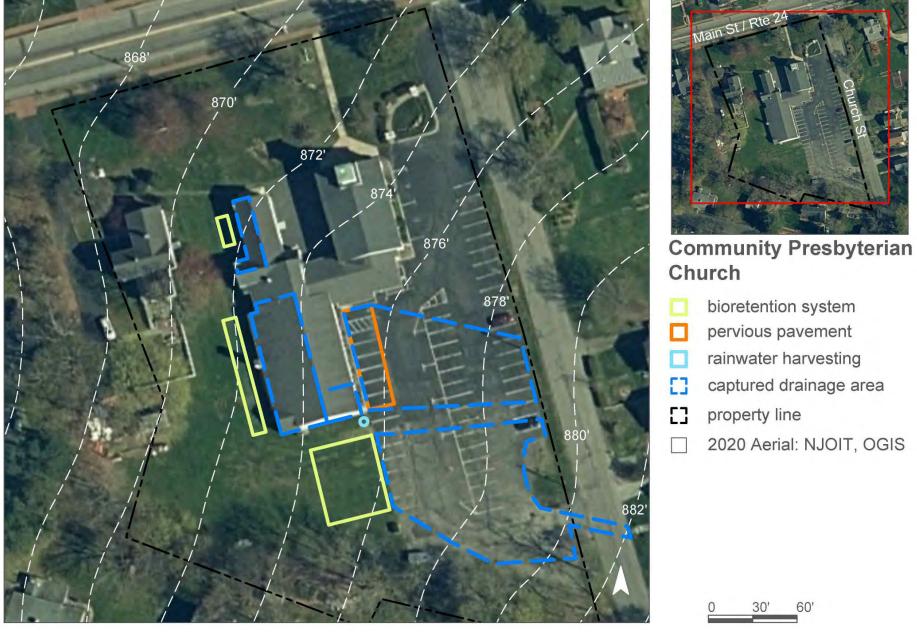




Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops and parking lot. This will require downspout redirection and disconnections. Existing parking spaces in western section of the parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A cistern can be installed to the southeast of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden bed. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous 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 50"	
54	55,160	2.7	27.9	253.3	0.043	1.72	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	12,290	0.364	53	25,630	0.96	3,075	\$30,750
Pervious pavement	6,735	0.199	29	14,050	0.53	1,255	\$31,375
Rainwater harvesting	510	0.015	2	400	N/A	400 (gal)	\$1,200



FIRST CONGREGATIONAL CHURCH



RAP ID: 15

Subwatershed: Peapack Brook

HUC14 ID: 02030105060050

Site Area: 278,454 sq. ft.

Address: 30 Hillside Road

Chester, NJ 07930





Block and Lot: Block 107, Lots 18 & 19

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops. This will require downspout disconnections, and in some cases downspout redirection underneath the sidewalk. Existing parking spaces in the eastern and western parking lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous 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 50"	
20	55,020	2.7	27.8	252.6	0.043	1.71	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	2,090	0.062	10	4,360	0.16	520	\$5,200
Pervious pavement	14,800	0.438	65	30,870	1.16	3,480	\$87,000



UNITED STATES POSTAL SERVICE





RAPID: 16

Subwatershed: Peapack Brook

Site Area: 47,570 sq. ft.

Address: 1 Sentry Lane

Chester, NJ 07930

Block and Lot: Block 119, Lot 15





Parking spaces in the parking lot to the east of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot and the downspout. A septic system in the turfgrass area north of the building limits rain garden opportunities. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
62	29,480	1.4	14.9	135.4	0.023	0.81	

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	0.123	21	8,750	0.33	900	\$22,500





pervious pavement

2015 Aerial: NJOIT, OGIS

drainage area

property line

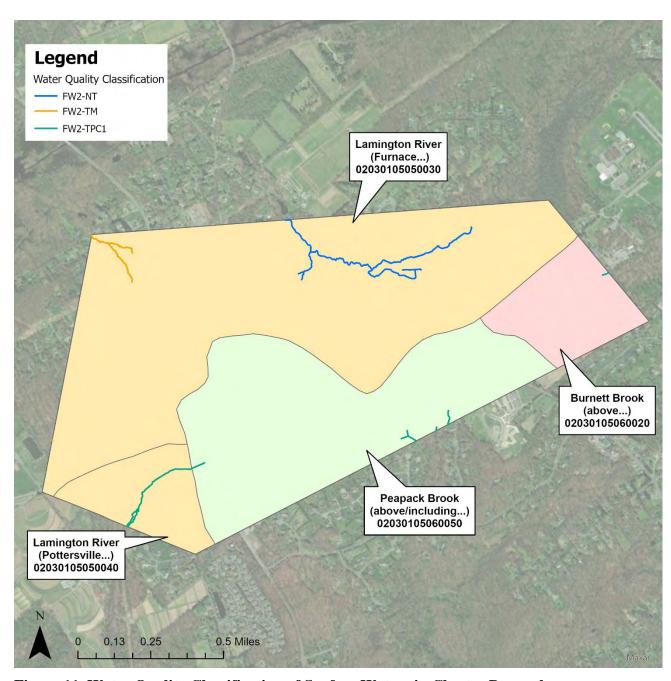


Figure 11. Water Quality Classification of Surface Waters in Chester Borough

Table 9. Water Quality Classification of Surface Waters in Chester Borough

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	1.3	56.7 %
Freshwater 2, trout production, Category One	FW2-TPC1	0.6	27.7%
Freshwater 2, trout maintenance	FW2-TM	0.4	15.7%

Chester Township

Introduction

Located in Morris County in New Jersey, Chester Township covers about 29.2 square miles. With a population of 7,838 (2020 United States Census), Chester Township consists of 26.6% of urban land uses by area. Of that urban land use, approximately 75.7% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 62.9% of Chester Township.

Chester Township contains portions of twelve subwatersheds (Table 1). There are approximately 103.9 miles of rivers and streams within the municipality; these include Burnett Brook and its tributaries, tributaries to Drakes Brook, Gladstone Brook and its tributaries, Hacklebarney Brook and its tributaries, Herzog Brook and its tributaries, Lamington River and its tributaries, Peapack Brook and its tributaries, tributaries to the South Branch Raritan River, Tanners Brook, Trout Brook, and several uncoded tributaries. Chester Township is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Area (WMA) 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Chester Township

Subwatershed	HUC14
Drakes Brook (below Eyland Avenue)	02030105010020
Raritan River South Branch (Long Valley bridge to 74d44m15s)	02030105010050
Lamington River (Hillside Road to Route 10)	02030105050020
Lamington River (Furnace Road to Hillside Road)	02030105050030
Lamington River (Pottersville gage to Furnace Road)	02030105050040
Pottersville tributary (Lamington River)	02030105050050
Lamington River (Herzog Brook to Pottersville gage)	02030105050130
Burnett Brook (above Old Mill Road)	02030105060020
Raritan River North Branch (including McVickers to India Brook)	02030105060030

Peapack Brook (above/including Gladstone Brook)	02030105060050
Peapack Brook (below Gladstone Brook)	02030105060060
Middle Brook (North Branch Raritan River)	02030105060080

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Chester Township. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Chester Township's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Chester Township in relation to the Study Area. Figure 2 shows the portions of the twelve HUC14s in Chester Township and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Chester Township. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Chester Township and is presented in Table 2. Figure 4 shows the impervious cover in Chester Township based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Chester Township and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins). Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins with vegetative shoreline buffers were identified in Chester Township within the study area.

The Q-Farms in the study area of Chester Township, which includes the entire municipality, have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 7 illustrates the land use on the Q-Farms, which is summarized in Table 6. There are 1,916.7 acres of agricultural land use in Chester Township, all of which lie within the study area for this Watershed Restoration and Protection Plan. There are 166 Q-Farms in Chester Township, totaling 3,222.1 acres. Within the 166 Q-Farms, there are approximately 1,328.8 acres of agricultural land use. Aerial photography (see Figure 8) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Chester Township are presented in Table 7.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Twelve HUC14s are included in the study area (02030105010020, 02030105010050, 02030105050020, 02030105050030, 02030105050040, 02030105050050, 02030105050130, 02030105060020, 02030105060030, 02030105060050, 02030105060060, 02030105060080). Within these twelve HUC14s, there are 235.7 acres of buildings and 399.4 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Chester Township, approximately 14.7 acres of rooftop runoff would be managed with 2.95 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Chester Township, approximately 39.9 acres of roadway would be managed, or 11.0 miles of roadway. Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 9). Available information for each parcel in the study area is presented in Table 8. Class 15E parcels were excluded from the assessment. Eleven of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 8 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 10 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are six classifications that apply to the streams in Chester Township. Figure 11 depicts the water quality classifications of surface waters throughout Chester Township and Table 9 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

An administrator from Chester Township has identified several locations throughout the municipality that are particularly susceptible to flooding during heavy rainfall or storm events. Flooding on South Road between Locust and Cromwell Drive has been observed when adjacent Burnett Brook overflows its banks. A bridge along a trail in Tiger Brook Park washes out when Tiger Brook floods as well, posing risks to nearby infrastructure and public safety. Figure 12 shows the locations of the aforementioned areas of concern.

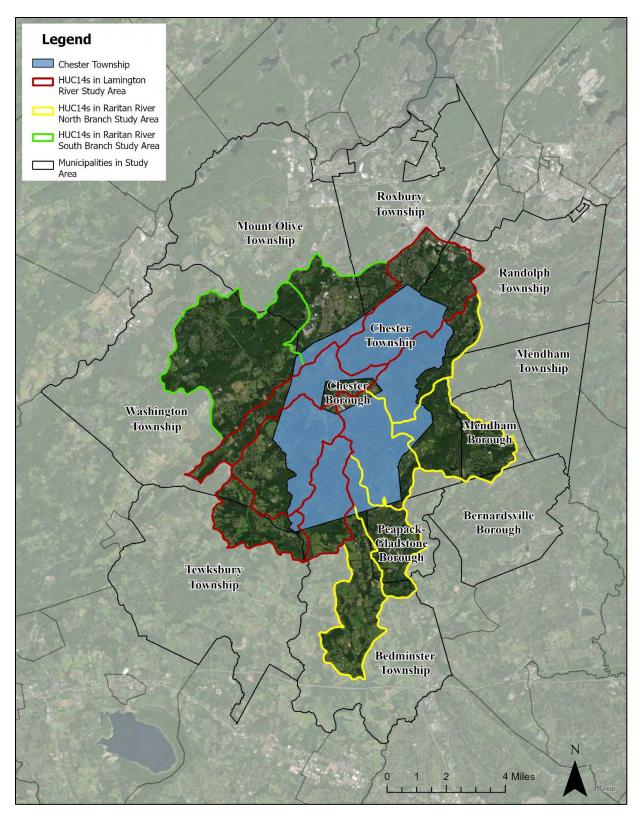


Figure 1: Municipalities in the Study Area

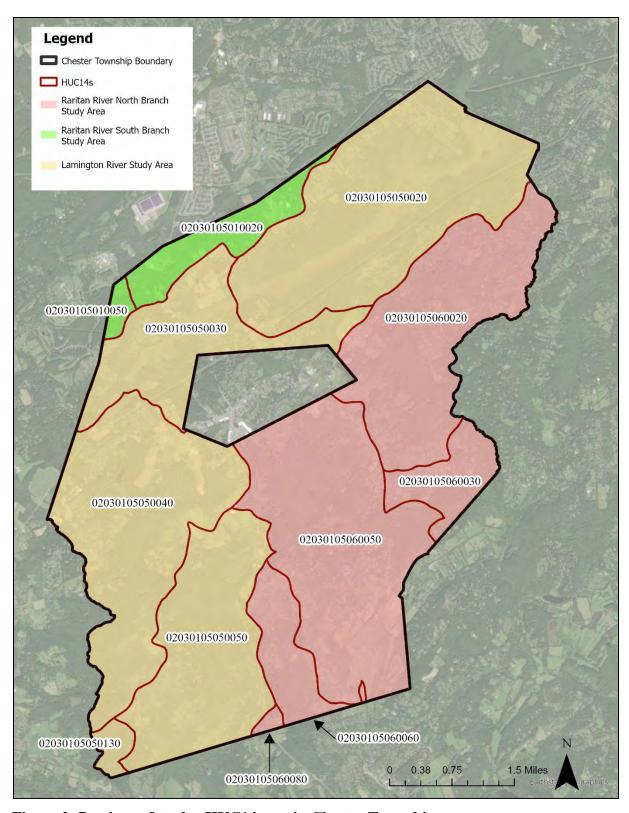


Figure 2: Portions of twelve HUC14s are in Chester Township

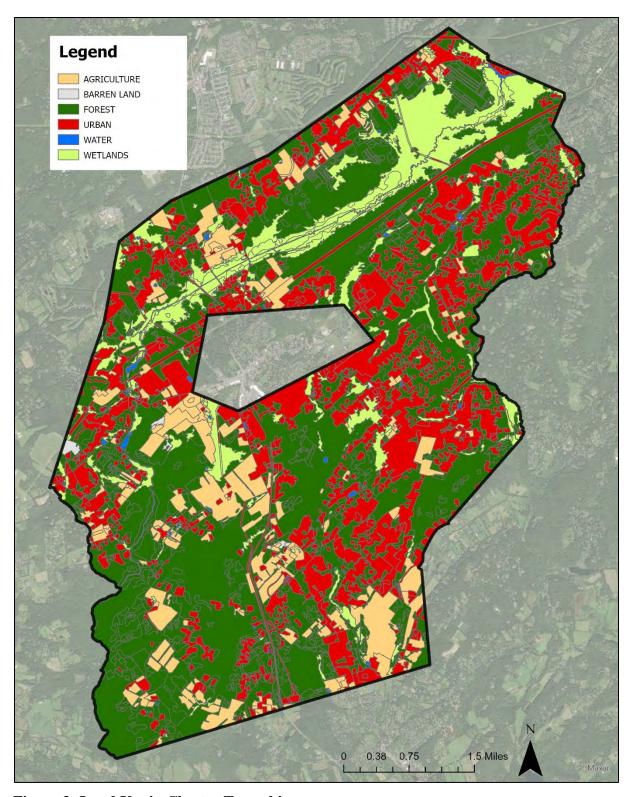


Figure 3: Land Use in Chester Township

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Chester Township

Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030105010020		
Agriculture	85.0	110.5	849.7	25,489.9
Barren Land	0.0	0.0	0.0	0.0
Forest	332.0	33.2	996.0	13,280.5
Urban	199.3	279.0	2,989.5	27,901.8
Water	1.9	0.2	5.7	76.4
Wetlands	39.8	4.0	119.4	1,591.9
TOTAL =	658.0	426.8	4,960.3	68,340.4
		02030105010050		
Agriculture	3.0	4.0	30.5	914.6
Barren Land	0.0	0.0	0.0	0.0
Forest	64.6	6.5	193.9	2,585.1
Urban	23.6	33.0	353.7	3,300.8
Water	0.0	0.0	0.0	0.0
Wetlands	14.0	1.4	42.1	560.8
TOTAL =	105.3	44.8	620.1	7,361.3
		02030105050020		
Agriculture	146.5	190.5	1,465.3	43,960.4
Barren Land	0.0	0.0	0.0	0.0
Forest	1,799.5	180.0	5,398.6	71,980.9
Urban	546.8	765.5	8,201.7	76,549.4
Water	28.9	2.9	86.8	1,157.6
Wetlands	1,079.7	108.0	3,239.2	43,189.6
TOTAL =	3,601.5	1,246.8	18,391.7	236,837.9
		02030105050030		
Agriculture	175.7	228.4	1,756.6	52,697.0
Barren Land	2.0	1.0	10.1	121.5
Forest	560.0	56.0	1,680.1	22,401.3
Urban	530.5	742.7	7,957.0	74,265.8
Water	14.7	1.5	44.1	588.2
Wetlands	329.7	33.0	989.2	13,189.6
TOTAL =	1,612.6	1,062.5	12,437.2	163,263.4
		02030105050040		
Agriculture	499.0	648.7	4,989.7	149,691.9
Barren Land	26.8	13.4	133.9	1,606.5
Forest	1,688.3	168.8	5,065.0	67,533.3
Urban	568.5	795.9	8,527.2	79,586.8
Water	45.2	4.5	135.5	1,807.2
Wetlands	211.3	21.1	633.8	8,450.4

TOTAL =	TOTAL = 3,039.0		19,485.1	308,676.2
		02030105050050		
Agriculture	397.4	516.6	3,974.0	119,220.6
Barren Land	0.5	0.3	2.7	32.2
Forest	1,543.7	154.4	4,631.1	61,747.4
Urban	282.6	395.6	4,238.3	39,557.1
Water	3.2	0.3	9.7	129.9
Wetlands	20.5	2.0	61.4	818.8
TOTAL =	2,247.9	1,069.2	12,917.2	221,506.1
		02030105050130		
Agriculture	1.8	2.3	17.8	533.5
Barren Land	0.0	0.0	0.0	0.0
Forest	151.5	15.2	454.6	6,061.5
Urban	0.4	0.5	5.8	54.4
Water	2.6	0.3	7.9	105.7
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	156.3	18.3	486.2	6,755.1
,		02030105060020		, ,
Agriculture	53.5	69.5	534.5	16,035.1
Barren Land	0.0	0.0	0.0	0.0
Forest	1,240.9	124.1	3,722.7	49,635.8
Urban	1,184.3	1,658.0	17,763.9	165,796.7
Water	15.2	1.5	45.6	607.9
Wetlands	118.9	11.9	356.6	4,755.3
TOTAL =	2,612.7	1,865.0	22,423.4	236,830.9
•	,	02030105060030	,	,
Agriculture	41.4	53.8	414.2	12,424.7
Barren Land	0.0	0.0	0.0	0.0
Forest	283.1	28.3	849.2	11,322.4
Urban	215.5	301.7	3,232.9	30,173.9
Water	4.2	0.4	12.5	166.9
Wetlands	43.0	4.3	129.1	1,721.6
TOTAL =	587.2	388.6	4,637.9	55,809.4
		02030105060050		
Agriculture	360.1	468.2	3,601.2	108,036.2
Barren Land	1.6	0.8	8.1	97.4
Forest	1,545.2	154.5	4,635.6	61,808.4
Urban	1,285.3	1,799.5	19,280.2	179,948.9
Water	10.4	1.0	31.2	415.4
Wetlands	166.0	16.6	497.9	6,638.1
TOTAL =	3,368.6	2,440.6	28,054.2	356,944.4
		02030105060060		
Agriculture	144.1	187.3	1,440.9	43,226.1

Barren Land	6.6	3.3	33.0	396.3	
Forest	forest 373.6 37.4		1,120.9	14,944.8	
Urban	124.8	174.8	1,872.6	17,477.7	
Water	1.8	0.2	5.5	72.7	
Wetlands	7.7	0.8	23.1	308.5	
TOTAL =	658.7	403.7	4,496.0	76,426.2	
		02030105060080			
Agriculture	9.3	12.1	93.1	2,792.3	
Barren Land	0.0	0.0	0.0	0.0	
Forest	20.2	2.0	60.7	809.5	
Urban	17.2	24.1	258.1	2,409.1	
Water	0.0	0.0	0.0	0.0	
Wetlands	0.0	0.0	0.0	0.0	
TOTAL =	46.8	38.2	411.9	6,011.0	
		All HUCs			
Agriculture	1,916.7	2,491.8	19,167.4	575,022.4	
Barren Land	37.6	18.8	187.8	2,253.9	
Forest	9,602.8	960.3	28,808.3	384,110.9	
Urban	4,978.7	6,970.2	74,681.0	697,022.4	
Water	128.2	12.8	384.6	5,128.0	
Wetlands	2,030.6	203.1	6,091.9	81,224.7	
TOTAL =	18,694.6	10,656.9	129,321.0	1,744,762.2	

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Chester Township that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Chester Township. Based upon the NJDEP impervious surface data, Chester Township has impervious cover totaling 6.6%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Chester Township is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover

of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Chester Township's impervious cover percentage would suggest that its waterways are primarily sensitive and most likely preventing degradation of the state's surface water quality standards.

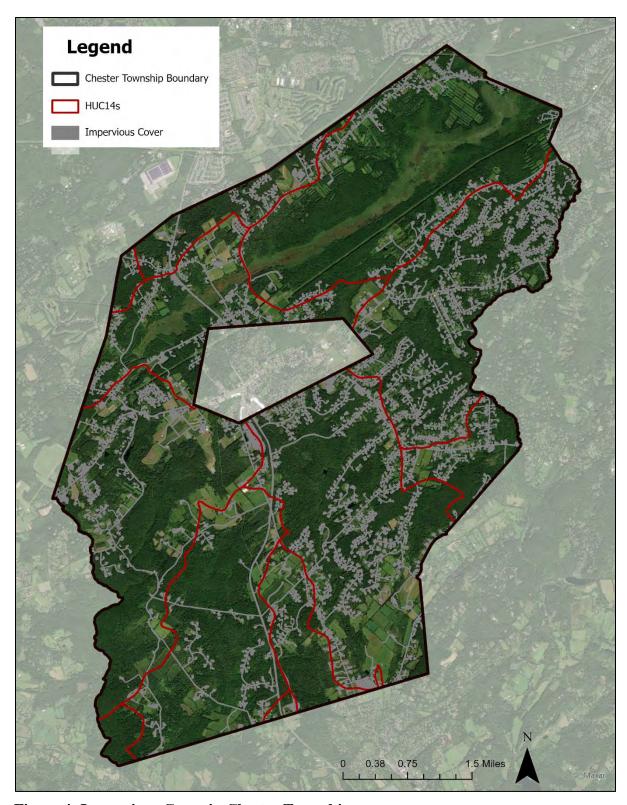


Figure 4: Impervious Cover in Chester Township

 Table 3: Impervious Cover Analysis by HUC14 for Chester Township

Class	Area (acres)	HUC Impervious Cover (%)
1	02030105010020	
Building	11.19	
Other	21.87	
Road	18.56	
TOTAL =	51.6	7.8%
	02030105010050	
Building	1.33	
Other	3.22	
Road	1.71	
TOTAL =	6.3	5.9%
<u>, </u>	02030105050020	,
Building	19.94	
Other	50.82	
Road	34.16	
TOTAL =	104.9	2.9%
	02030105050030	1
Building	22.05	
Other	61.64	
Road	38.67	
TOTAL =	122.4	7.6%
101112	02030105050040	7.070
Building	28.76	
Other	89.91	
Road	46.76	
TOTAL =	165.4	5.4%
TOTAL -	02030105050050	J. 70
Building	11.26	
Other	35.57	
Road	51.04	
TOTAL =	97.9	4.4%
101AL =	02030105050130	4.4 76
Duilding		
Building	0.03	
Other	0.06	
Road	0.00 0.1	0.10/
TOTAL =		0.1%
Duilding	02030105060020	
Building	59.44 143.35	
Other		
Road	84.67	11 00/
TOTAL =	287.5	11.0%
D2142	02030105060030	T
Building	9.22	
Other	23.29	
Road	19.97	0.007
TOTAL =	52.5	8.9%

	02030105060050	
Building	64.19	
Other	148.45	
Road	88.29	
TOTAL =	300.9	8.9%
	02030105060060	
Building	6.82	
Other	17.35	
Road	13.60	
TOTAL =	37.8	5.7%
	02030105060080	
Building	1.53	
Other	3.25	
Road	1.91	
TOTAL =	6.7	14.3%
	All HUCs	
Building	235.73	
Other	598.77	
Road	399.35	
TOTAL =	1,233.9	6.6%

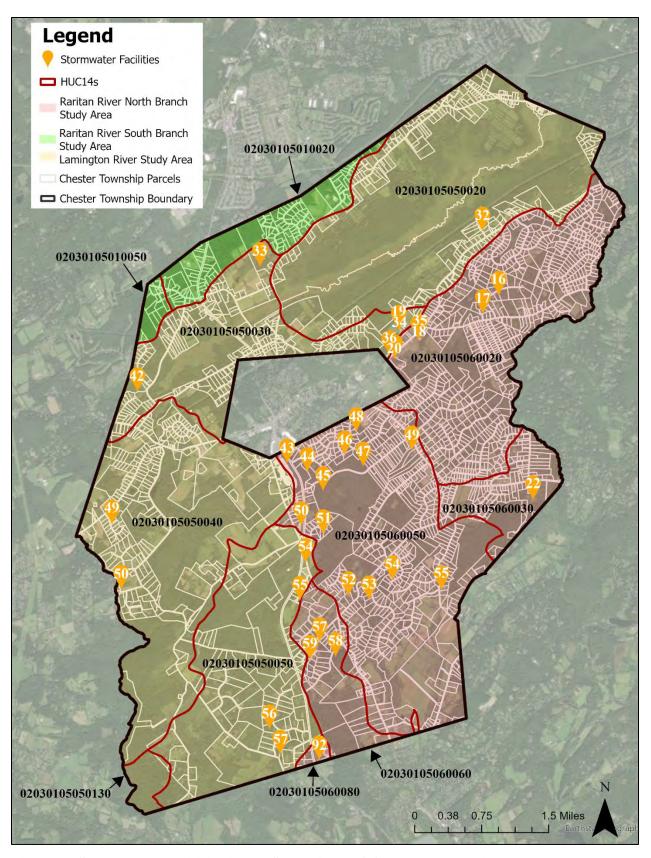


Figure 5: Stormwater Facilities in the Study Area of Chester Township

Table 4: Location of Stormwater Facilities in the Study Area of Chester Township

I	Lamington River Study Area					
<u>ID</u>	<u>Address</u>	<u>Type</u>				
32	10 Horton Dr	N				
33	85 Pleasant Hill Rd	D				
34	233 North Rd	N				
36	133 North Rd	N				
42	1 Carlisle Ct	D				
49	1 Highland Dr	D				
50	1 Trout Brook Ct	N				
54	1 Hunters Trl	N				
55	10 Hall Rd	D				
56	13 Spring Lake Dr	N				
57	4 Bamboo Ln	D				
Rarita	n River North Branch Study	Area				
<u>ID</u>	Address	Type				
16	11 S Gables Dr	D				
17	Warren Cutting Rd	D				
18	233 North Rd	I				
19	233 North Rd	I				
20	North Rd	N				
22	480 Route 24	D				
35	233 North Rd	I				
43	499 US Highway 206 S	D				
44	38 Colby Farm Rd	N				
45	4 Skinner Trl	N				
46	24 Colby Farm Rd	RB				
47	17 Colby Farm Rd	N				
48	250 Rt 24	D				
49	361 Route 24 W	D				
50	1250 US Highway 206	D				
51	3 Colt Run	D				
52	5 Heath Dr	N				
53	1 Beacon Hill Dr	N				
54	10 Sugar Maple Row	N				
55	42 E Fox Chase Rd	N				
57	75 Fox Chase Rd	N				
58	85 Rogers Rd	D				
59	54 Fox Chase Rd	D/N*				
92	2 Rogers Rd	D				

"D" = Detention, "R" = Retention, "N" = Naturalized, "I" = Infiltration

*Basin is partially naturalized, but mostly mowed

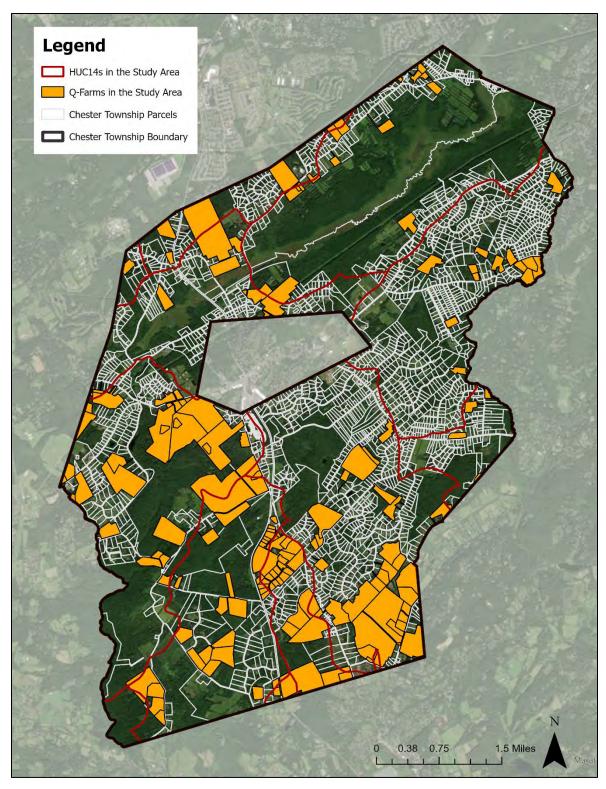


Figure 6: Q-Farm Parcels in the Study Area of Chester Township

 Table 5: Q-Farm Parcels in the Study Area of Chester Township

Block	Lot	Q-Code	Prop Class	Location
1	13	QFARM	3B	770 Pottersville Rd
1	14	QFARM	3B	650 Pottersville Rd
1	14.01	QFARM	3B	740 Pottersville Rd
1	15	QFARM	3B	700 Pottersville Rd
1	26	QFARM	3B	55 Hacklebarney Rd
3	14	QFARM	3B	55 Lamerson Rd
3	16.01	QFARM	3B	5 Luce Dr
3	16.02	QFARM	3B	6 Luce Dr
3	16.04	QFARM	3B	299 Longview Rd
3	16.05	QFARM	3B	297 Longview Rd
3	16.06	QFARM		Howell Dr & Luce Ct
3	16.09	QFARM	3B	3 Howell Dr
3	16.15	QFARM	3B	57 Lamerson Rd
3.01	2.03	QFARM	3B	8 Daly Rd
4	35.01	QFARM	3B	1200 Old Chester Gladston
4	35.02	QFARM	3B	1100 Old Chester Rd
4	36	QFARM	3B	2 Rogers Rd
4	41	QFARM	3B	8 Rogers Rd
4	42	QFARM	3B	Old Chester Gladstone Rd
4	43	QFARM	3B	20 Rogers Rd
4	44	QFARM	3B	600 Old Chester Gladstone
7	12.05	QFARM	3B	158 - 158-A Fox Chase Rd
7	13.22	QFARM	3B	60 East Fox Chase Rd
7	13.23	QFARM	3B	48 E Fox Chase Rd
7	13.24	QFARM	3B	5 Hickory Dr
7	13.25	QFARM	3B	11-B Hickory Dr
7	13.26	QFARM	3B	11-A Hickory Dr
7	14.01	QFARM	3B	222 E Fox Chase Rd
7	14.03	QFARM	3B	55 Mendham Rd
7	15	QFARM	3B	15 Mendham Rd
7	15.01	QFARM	3B	Mendham Rd
7	15.02	QFARM	3B	Mendham Rd
7	15.03	QFARM	3B	Mendham Rd
7	15.04	QFARM	3B	15 Mendham Rd
7	17.02	QFARM	3B	35 Beacon Hill Dr
7	27	QFARM	3B	1015 Old Chester Gladston
7	44	QFARM	3B	15 St Bernards Rd
7	44.01	QFARM	3B	11 St Bernards Rd
7	44.02	QFARM	3B	15 St Bernards Rd
7.01	4.01	QFARM	3B	398 Fox Chase Rd
7.01	7.07	QFARM	3B	38 E Fox Chase Rd

8	7	QFARM	3B	20 Mendham Rd
9	4.02	QFARM	3B	11 Winston Farm Ln
9	16	QFARM	3B	23 Mt Paul Rd
10	3	QFARM	3B	185 Fox Chase Rd
10	4	QFARM	3B	201 Fox Chase Rd
10	17	QFARM	3B	255 Fox Chase Rd
10.04	12	QFARM	3B	6 Pond View Rd
10.05	31	QFARM	3B	378 Route 24
10.05	31.04	QFARM	3B	37 Cliffwood Rd
10.05	48	QFARM	3B	75 Cliffwood Rd
12	1.01	QFARM	3B	450 Old Chester Gladstone
12	1.03	QFARM	3B	1901 Route 206
12	1.04	QFARM	3B	16 Hall Rd
12	1.05	QFARM	3B	14 Hall Rd
12	1.06	QFARM	3B	12 Hall Rd
12	1.07	QFARM	3B	10 Hall Rd
12	1.08	QFARM	3B	8 Hall Rd
12	1.09	QFARM	3B	6 Hall Rd
12	1.11	QFARM	3B	2 Hall Rd
12	1.13	QFARM	3B	3 Hall Rd
12	1.14	QFARM	3B	5 Hall Rd
12	1.15	QFARM	3B	21 Knight Dr
12	1.16	QFARM	3B	19 Knight Dr
12	1.17	QFARM	3B	17 Knight Dr
12	1.18	QFARM	3B	15 Knight Dr
12	1.19	QFARM	3B	11 Knight Dr
12	1.2	QFARM	3B	9 Knight Dr
12	1.21	QFARM	3B	7 Knight Dr
12	1.22	QFARM	3B	5 Knight Dr
12	1.23	QFARM	3B	3 Knight Dr
12	1.24	QFARM	3B	1 Knight Dr
12	1.25	QFARM	3B	2 Knight Dr
12	1.26	QFARM	3B	4 Knight Dr
12	1.27	QFARM	3B	6 Knight Dr
12	1.28	QFARM	3B	8 Knight Dr
12	1.29	QFARM	3B	10 Knight Dr
12	3.01	QFARM	3B	444 Old Chester Rd
12	3.02	QFARM	3B	446 Old Chester Gladstone
12	3.03	QFARM	3B	444 Old Chester Gladstone
12	4	QFARM	3B	500 Old Chester Gladstone
13	2	QFARM	3B	120 Lamerson Rd
13	3.01	QFARM	3B	250 Lamerson Rd
13	3.02	QFARM	3B	210 Lamerson Rd
13	4.03	QFARM	3B	201 Pottersville Rd

13	7	QFARM	3B	100 Pottersville Rd	
15	2	QFARM	3B	20 Hacklebarney Rd	
15	3	QFARM	3B	55 Hacklebarney Rd	
15	9	QFARM	3B	260 Pottersville Rd	
15	27	QFARM	3B	80 Route 24	
15	28.01	QFARM	3B	100 Route 24	
15	28.02	QFARM	3B	2 Alstede Farms Ln	
15	28.03	QFARM	3B	182 Old Ch Gl Rd	
15	28.04	QFARM	3B	182 Old Ch Gl Rd	
15	28.05	QFARM	3B	84 Route 24	
15	28.06	QFARM	3B	84 Route 24	
15	28.07	QFARM	3B	82 Route 24	
15	28.08	QFARM	3B	82 Route 24	
15	29	QFARM	3B	92 Route 24	
15	30	QFARM	3B	94 Route 24	
15	40.01	QFARM	3B	200 Old Chester Gladstone	
15	42.01	QFARM	3B	300 Old Chester Gladstone	
15	42.02	QFARM	3B	300 Old Chester Gladstone	
15	45	QFARM	3B	100 Pottersville Rd	
16	6	QFARM	3B	125 Parker Rd	
16	7	QFARM	3B	Parker Rd	
16	9	QFARM	3B	165 Parker Rd	
16	10	QFARM	3B	163 Parker Rd	
16	13	QFARM	3B	60 State Park Rd	
16	21.02	QFARM		State Park Rd	
16.02	5	QFARM	3B	104 State Park Rd	
17	1	QFARM	3B	120 Parker Rd	
17	2	QFARM	3B	116 Parker Rd	
17	3	QFARM	3B	110 Parker Rd	
17	22	QFARM	3B	21 Schoolhouse Ln	
*17	31.01	QFARM	3B	20 Schoolhouse Ln	
17	33	QFARM	3B	10 Route 24	
17	33.01	QFARM	3B	8 Route 24	
18.02	1	QFARM	3B	2 Chesterfield Dr	
18.04	1	QFARM	3B	3 Chesterfield Dr	
19	2	QFARM	3B	4240 Route 206	
19	3	QFARM	3B	4250 Route 206	
26	159	QFARM	3B	40 Valley Pl	
26.01	18.01	QFARM	3B	525 Route 24	
26.01	50	QFARM	3B	31 Old Mill Rd	
26.04	75	QFARM	3B	62 Twinbrooks Trl	
27	6.01	QFARM	3B	42 Old Mill Rd	
*27	6.02	QFARM	3B	38 Old Mill Rd	
28	4	QFARM	3B	140 South Rd	

28	5	QFARM	3B	160 South Rd
28	6	QFARM	3B	180 South Rd
28	9	QFARM	3B	Off South Rd
32	52	QFARM	3B	145 South Rd
32	53.01	QFARM	3B	127 South Rd
32	57.01	QFARM	3B	95 South Rd
32	57.02	QFARM	3B	97 South Rd
32	85.05	QFARM	3B	9 South Gables Dr
32	85.17	QFARM	3B	17 South Gables Dr
32.06	13	QFARM	3B	20 Ironia Mendham Rd
33	2.01	QFARM	3B	30 Pleasant Hill Rd
33	4	QFARM	3B	122 Oakdale Rd
33	38	QFARM	3B	295 North Rd
33	100.01	QFARM	3B	24 Ironia Rd
33	107	QFARM	3B	250 Pleasant Hill Rd
33	110.02	QFARM	3B	214-B Pleasant Hill Rd
33	111.03	QFARM	3B	180 Pleasant Hill Rd
33	112.01	QFARM	3B	160 Pleasant Hill Rd
33	113.01	QFARM	3B	158 Pleasant Hill Rd
33	113.02	QFARM	3B	150 Pleasant Hill Rd
*34	4	QFARM	3B	109 Oakdale Rd
34	5	QFARM	3B 107 Oakdale Rd	
40	7	QFARM	3B	33 Pleasant Hill Rd
40	14	QFARM	3B	10 Larison Rd
42	33	QFARM	3B	25 Tanners Brook Rd
43	20.01	QFARM	3B	15 Old Four Bridges Rd
44	7	QFARM	3B	80 Route 206
44	11	QFARM		Us Hwy 206
46	19	QFARM	3B	7 Larison Rd
46	20.03	QFARM	3B	65 Pleasant Hill Rd
46.06	35	QFARM	3B	175 Pleasant Hill Rd
48	10	QFARM	3B	233 Pleasant Hill Rd
48	11	QFARM	3B	239 Pleasant Hill Rd
49	5	QFARM	3B	319 Pleasant Hill Rd
*51.01	7.02	QFARM	3B	316 Pleasant Hill Rd
51.01	7.04	QFARM	3B	316 Pleasant Hill Rd
51.01	7.06	QFARM	3B	316 Pleasant Hill Rd

^{*}Only a portion of the Q-Farm parcel is within the Chester Township boundary

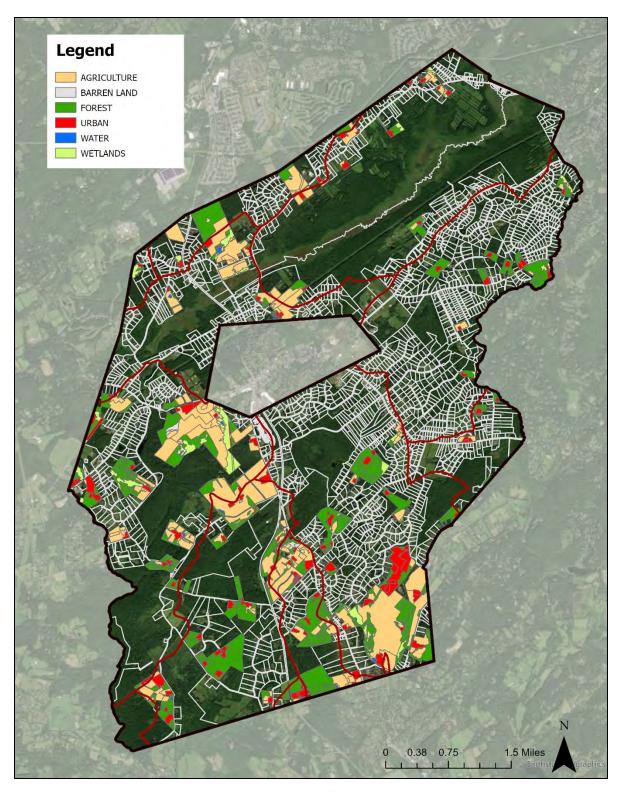


Figure 7: Land Use on Q-Farm Parcels in the Study Area of Chester Township

Table 6: Land Use on Q-Farms in the Study Area of Chester Township

Land Use	Area (acres)
Agriculture	1,328.8
Barren Land	17.0
Forest	1,294.5
Urban	385.7
Water	15.0
Wetlands	181.2
Total:	3,222.1

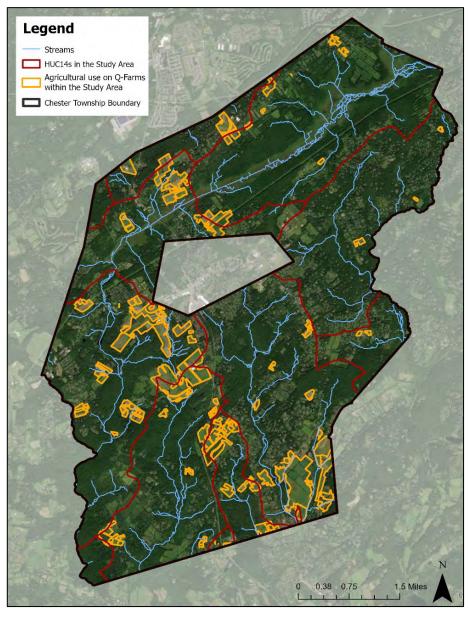


Figure 8: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Chester Township

Table 7: Recommendations for Specific Farms in the Study Area of Chester Township

	Lamington River Study Area								
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.	
15	9	QFARM	X	X					
15	28.01	QFARM	X	X	X	X			
15	28.03	QFARM	X						
15	28.05	QFARM	X		X	X			
15	45	QFARM	X	X		X			
16	13	QFARM		X		X			
33	38	QFARM		X		X			
46	19	QFARM	X					X	

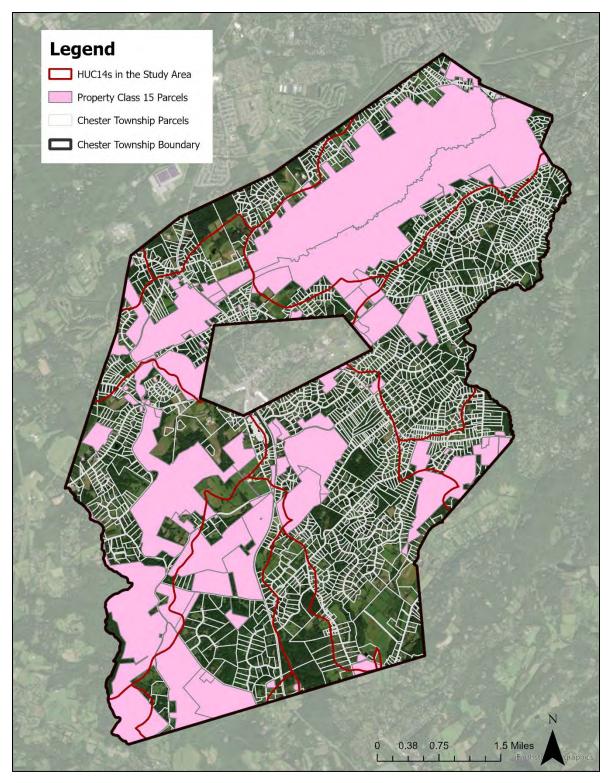


Figure 9: Property Class 15 Parcels in the Study Area of Chester Township

 Table 8: Property Class 15 Parcels in the Study Area of Chester Township

Block	Lot	Prop Class	Location	Facility Type
*25.01	38.01	15A	250 Route 24	Schools
33	17.01	15A	233 North Rd	School Fields
*33	17.02	15A	133 North Rd	School
5	1	15B	25 St Bernards Rd	Schools
7	43.01	15B	3 St Bernards Rd	Residence
*27	4	15B	577 Route 24	Montessori School
1	1	15C	634 Pottersville Rd	Preserve
1.01	1	15C	Pottersville Rd	Vacant Land
2	1	15C	300 Longview Rd	Bamboo Brook Edu Ctr
2	4.01	15C	170 Longview Rd	Park
2	6	15C	725 Pottersville Rd	Brady/Millhouse O/Sp
3	15	15C	Lamerson Rd	Knight - Open Space
3	17	15C	Lamerson Rd	Park
3	17.03	15C	Lamerson Rd	Knight - Open Space
9	3.01	15C	452 Fox Chase Rd	Park
9	15.03	15C	Mt Paul Rd	Road
9	22	15C	900 Route 24	Open Space
10	52	15C	Cliffwood Rd	Macgregor Park
10	58.01	15C	48 Cliffwood Rd	Vacant Land
10	100	15C	68 Cliffwood Rd	Tiger Brook Reservoi
10	107	15C	375 Old Chester Gladstone	Macgregor Park
10	108	15C	Off Old Chester Gladstone	Macgregor Park
10	120	15C	Route 206	Tiger Brook Park
13	1.01	15C	1000 Route 206	Conserved Land
13	3	15C	120 Lamerson Rd	Knight - Open Space
13	4	15C	Pottersville Rd	Allen - Open Space
13	6	15C	155 Pottersville Rd	Vacant Land
13	9	15C	75 Pottersville Rd	Vacant Land
14	1	15C	751 Route 206	Vacant Land
*15	1	15C	200 Pottersville Rd	Park
15	12.01	15C	Pottersville Rd	Park
15	23	15C	70 Route 24	Park
15	41	15C	Old Chester Gladstone	Park
*16	34	15C	1 Parker Rd	Municipal Bldg.
16.01	16	15C	State Park Rd	Open Space
17	7	15C	98a Parker Rd	Filtering Plant
17	22.05	15C	Parker Rd	Parker Rd Fields
18	3	15C	Furnace Rd	Open Space
18	4	15C	65 Furnace Rd	Chubb Park
18	12.01	15C	Route 24	Park
18	38	15C	Route 24	Park
20	4	15C	145 Old Chester Gladstone	Vacant Land
20	16	15C	Old Chester Gladstone Rd	Vacant Land
25	19	15C	100 Cooper Ln	Tiger Brook Park
25.03	13	15C	168 Cooper Ln	Tiger Brook Park
25.03	16	15C	605 Route 206	Park

26	70	15C	26 South Rd	Evans - Park
*26	78.01	15C	120 North Rd	Telecordia - Park
*26	78.02	15C	100 North Rd	Administrative Bldg.
26	79	15C	50 North Rd	Dedicated Open Space
26.06	7	15C	345 Route 24	Leased To Cereb Pals
26.09	1	15C	245 Route 24	Dedicated Open Space
33	36	15C	275 North Rd	Game Preserve
33	72.02	15C	401 North Rd	Park
33	110.01	15C	246 Pleasant Hill Rd	Game Preserve
35	1	15C	Oakdale Rd	Open Space
40	12	15C	Pleasant Hill Rd	Game Preserve
41	1.01	15C	201 Route 206	Game Preserve
41	5.02	15C	Hillside Rd	Dedicated Open Space
41	13	15C	215 Route 206	Open Space
41	16.02	15C	225 Route 206	Open Space
42	10.01	15C	36 Furnace Rd	Vacant Land
42	31	15C	7 Tanners Brook Rd	Vacant Land
42	35	15C	Tanners Brook Rd	Game Preserve
42	35.01	15C	Tanners Brook Rd	Open Space
43	6	15C	Carlisle Ct	Open Space
43	8	15C	80 Tanners Brook Rd	Tannersbrk-Op Space
43	21	15C	25 Old Four Bridges Rd	Tannersbrk Open Sp
45	1	15C	Route 206	Road
52	18	15C	20 Golf Course Rd	Well
52	19	15C	65 Ironia Rd	Park
4	36	15D	2 Rogers Rd	Admin Bldg
9	20	15D	2 Mt Paul Rd	Conservation-Park
*9	20.01	15D	480 Route 24	Church
*17	38	15D	50 Route 24	Church
18	15.01	15D	30 Cherry Tree Ln	Residence
18	48	15D	83 Furnace Rd	Group Residence
33			80/82 Pleasant Hill Rd	Church
33	2.02	15D 15D		Residence
*33.01	126 10	15D 15D	228 Pleasant Hill Rd	Church
			100 Oakdale Rd	
9.01	1 29	15F	1 Benjamin Rd	Disabled Veteran
10.05	28	15F	398 Route 24	Disabled Veteran
18.02	12	15F	24 Chesterfield Dr	Disabled Veteran
19	4	15F	3 Daly Rd	Widow - Disabled Vet
20	2	15F	30 Wyckoff Way	Disabled Veteran
*26.07	6	15F	333 Route 24	Hall
33	1	15F	138 Oakdale Rd	Disabled Veteran
33	47.08	15F	10 Horton Dr Disabled Vete	
33	181	15F	3 Ann Ln Disabled Vete	
39	5.03	15F	4 Furnace Rd	Widow - Disabled Vet
51	32	15F	9 Golf Course Rd	Disabled Veteran

 $[\]boldsymbol{*}$ Sites that can be retrofitted with green infrastructure

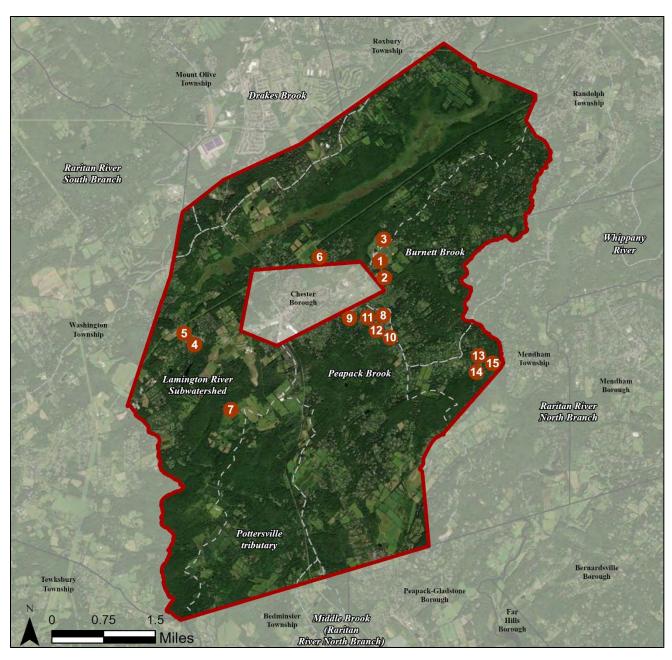


Figure 10: Sites with Green Infrastructure Opportunities in Chester Township

HIGHLANDS RIDGE PARK



RAP ID: 1

Subwatershed: Burnett Brook

HUC14 ID 02030105060020

Site Area: 4,445,427 sq. ft.

Address: County Road 510

Chester, NJ 07930



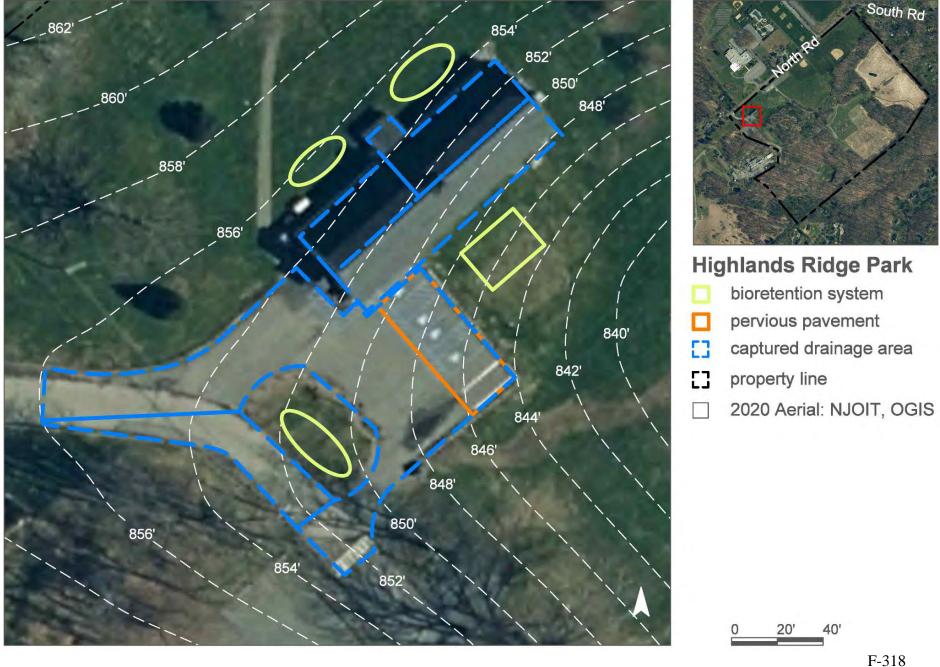


Block and Lot: Block 26, Lot 78.01

Rain gardens can be installed in multiple grass areas to capture, treat, and infiltrate the stormwater runoff from the building rooftop and from the asphalt driveway. This will require downspout disconnections. The existing parking spaces to the southeast of the park building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		0	ng Loads from ous 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 50"
4	188,825	9.1	95.4	867.0	0.147	5.89

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	6,930	0.205	30	14,450	0.54	1,735	\$17,350
Pervious pavement	8,515	0.252	38	17,760	0.67	1,565	\$39,125



NEW JERSEY HIGHLANDS COUNCIL





RAPID: 2

Subwatershed: Burnett Brook

Site Area: 434,470 sq. ft.

Address: 100 North Road

Chester, NJ 07930

Block and Lot: Block 26, Lot 78.02





A rain garden can be installed south of the storage building to capture stormwater runoff from the parking lot and roadway. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)				Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
27	117,715	5.7	59.5	540.5	0.092	3.23	

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
Bioretention system	0.189	32	13,860	0.52	1,815	\$9,075



BLACK RIVER MIDDLE SCHOOL



RAPID: 3

Subwatershed: Lamington River

HUC14 ID 02030105050030

Site Area: 1,716,100 sq. ft.

Address: 133 North Road

Chester, NJ 07930

Block and Lot: Block 33, Lot 17.02

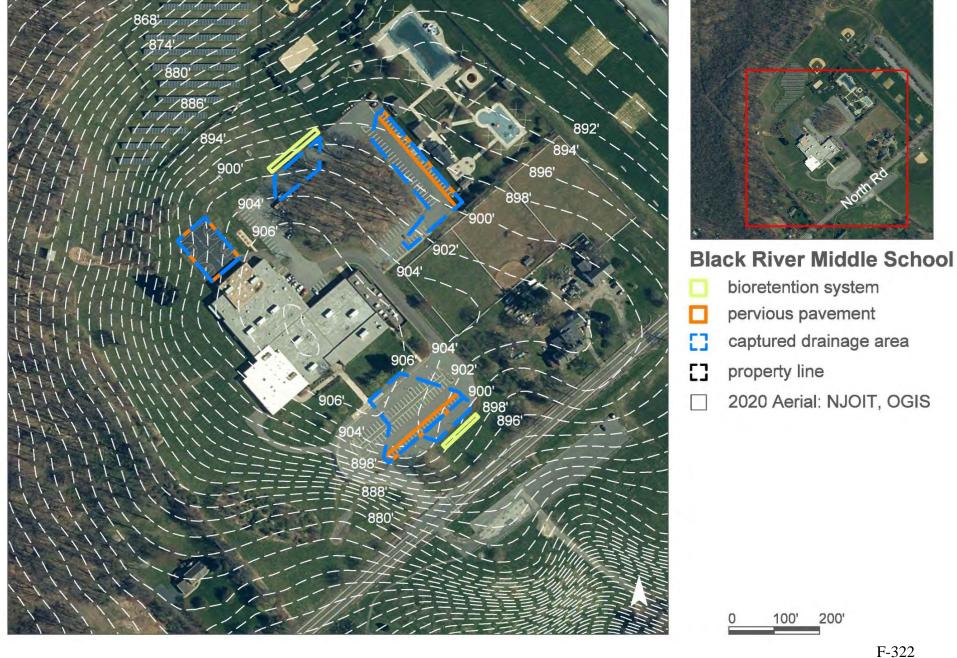




Rain gardens can be installed near the northern and southern parking lots to capture, treat, and infiltrate the stormwater runoff from the asphalt. This will require downspout disconnections. Existing parking spaces in the northern and southern lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The basketball court to the north of the school can also be converted into pervious pavement. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)				Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	ТР	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
18	301,365	14.5	152.2	1,383.7	0.235	9.39	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	10,080	0.298	44	21,030	0.79	2,520	\$25,200
Pervious pavement	47,990	1.421	209	100,100	3.76	17,550	\$438,750



CHESTER TOWNSHIP MUNICIPAL BUILDING





RAPID: 4

Subwatershed: Lamington River

Site Area: 90,055 sq. ft.

Address: 1 Parker Road

Chester, NJ 07930

Block and Lot: Block 16, Lot 34

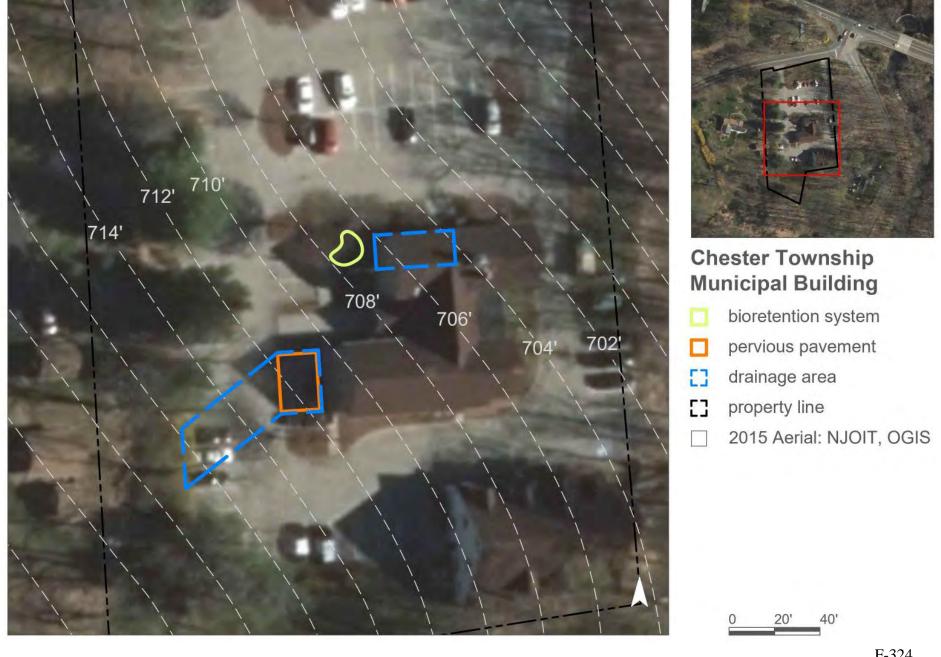




Pervious pavement can be installed in the parking spaces west of the building to capture and infiltrate stormwater. A rain garden can be installed to the northwest of the building to capture, treat, and infiltrate stormwater runoff from the roof. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)		Runoff Volume from Impervious Cover (Mgal)			
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
53	47,320	2.3	23.9	217.3	0.037	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 system	0.014	2	1,000	0.04	130	\$650
Pervious pavement	0.044	7	3,190	0.12	490	\$12,250



CHURCH OF THE MESSIAH



RAP ID: 5

Subwatershed: Lamington River

HUC14 ID 02030105050040

Site Area: 330,558 sq. ft.

Address: 50 County Highway 513

Chester, NJ 07930

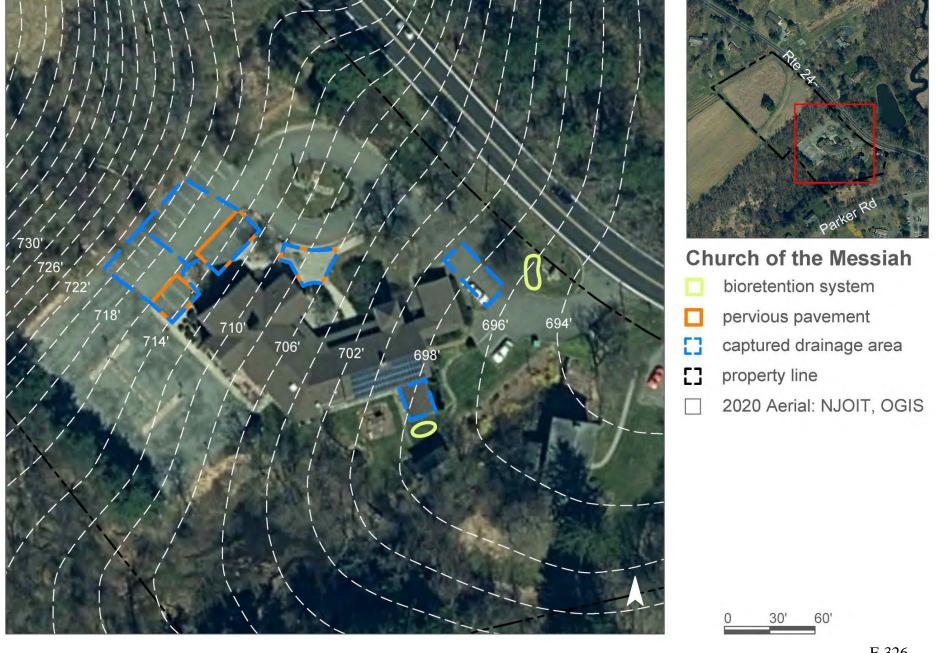
Block and Lot: Block 17, Lot 38



A rain garden can be installed near the south of the building using the disconnected downspouts to capture, treat, and infiltrate the stormwater runoff from the rooftop. Another rain garden can be installed around an existing catch basin near the driveway entrance to capture, treat, and infiltrate the stormwater runoff from the asphalt. A trench drain will be needed to intercept and redirect the driveway runoff. Existing parking spaces to the northwest of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The concrete walkway near the building entrance can be replaced with permeable pavers. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from In	unoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
16	52,338	2.5	26.4	240.3	0.041	1.63	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	1,095	0.032	6	2,280	0.09	275	\$2,750
Pervious pavement	5,190	0.154	23	10,820	0.41	1,910	\$47,750



GRACE BIBLE CHAPEL



RAPID: 6

Subwatershed: Lamington River

HUC14 ID 02030105050030

Site Area: 357,759 sq. ft.

Address: 100 Oakdale Road

Chester, NJ 07930

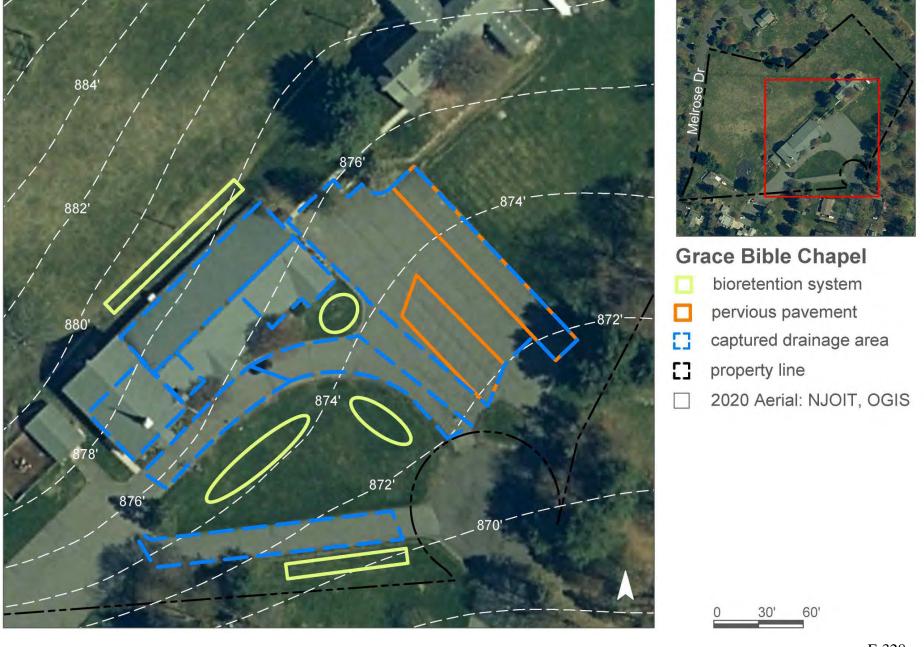
Block and Lot: Block 33.01, Lot 10



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftop and driveways. This may require downspout disconnections, trench drains, and curb cuts. Existing parking spaces to the east of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. This may require a trench drain. 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 50"		
19	69,577	3.4	35.1	319.5	0.054	2.17		

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	16,895	0.500	74	35,240	1.32	4,225	\$42,250
Pervious pavement	13,315	0.394	59	27,770	1.04	5,450	\$136,250



KAY ENVIRONMENTAL EDUCATION CENTER





RAP ID: 7

Subwatershed: Lamington River

Site Area: 24,177,870 sq. ft.

Address: 200 Pottersville Road

Chester, NJ 07930

Block and Lot: Block 15, Lot 1





Pervious pavement can be installed in the parking spaces to capture the stormwater runoff from the pavement. A rain garden can be installed to capture and infiltrate stormwater runoff from the building's rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
0.27	65,755	3.2	33.2	301.9	0.051	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 system	0.012	2	860	0.03	130	\$650
Pervious pavement	0.078	13	5,740	0.22	600	\$15,000





Kay Environmental Education Center

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

AMERICAN LEGION POST 342



RAPID: 8

Subwatershed: Peapack Brook

HUC14 ID 02030105060050

Site Area: 28,354 sq. ft.

Address: 333 County Highway 510

Chester, NJ 07930

Block and Lot: Block 26.07, Lot 6

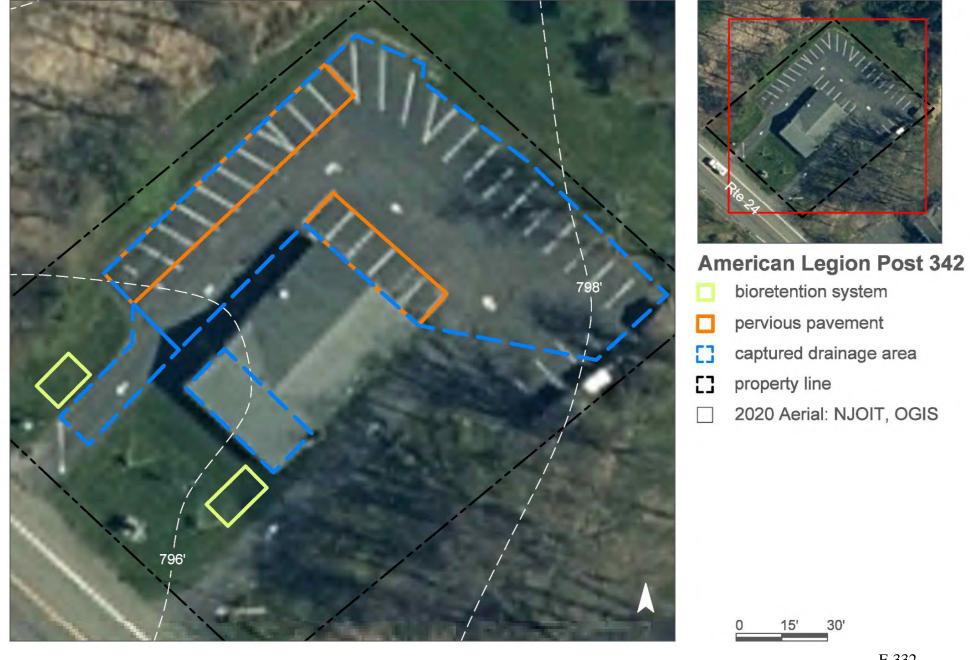




A rain garden can be installed to the south of the building to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout disconnection. Another rain garden can be installed near the western driveway entrance to capture, treat, and infiltrate the stormwater runoff from the asphalt. This will require a trench drain. Existing parking spaces to the north and west of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the parking lot. This may require a trench drain. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
70	19,897	1.0	10.0	91.4	0.016	0.62	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	1,315	0.039	6	2,750	0.10	330	\$3,300
Pervious pavement	9,555	0.283	42	19,930	0.75	2,100	\$52,500



BRAGG SCHOOL & DICKERSON SCHOOL



RAP ID: 9

Subwatershed: Peapack Brook

HUC14 ID 02030105060050

Site Area: 1,195,284 sq. ft.

Address: 250 State Route 24

Chester, NJ 07930

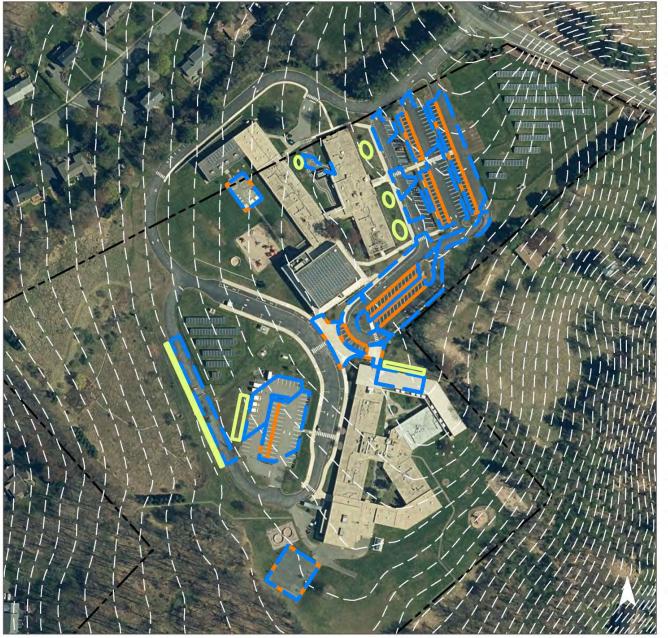
Block and Lot: Block 25.01, Lot 38.01



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftops, parking lots, and driveways. This may require downspout disconnections, redirection of downspouts beneath sidewalks trench drains, and curb cuts. Existing parking spaces in multiple lots can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. This may require trench drains in some locations. The basketball courts near each school building can also be converted into pervious pavement. The concrete walkway near the entrance of Bragg School can be replaced with permeable pavers. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
31	366,012	17.6	184.9	1,680.5	0.285	11.41	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	27,040	0.801	118	56,400	2.12	6,760	\$67,600
Pervious pavement	87,420	2.588	382	182,340	6.85	34,685	\$867,125





Bragg & Dickerson Schools Overall View

- bioretention system
- pervious pavement
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

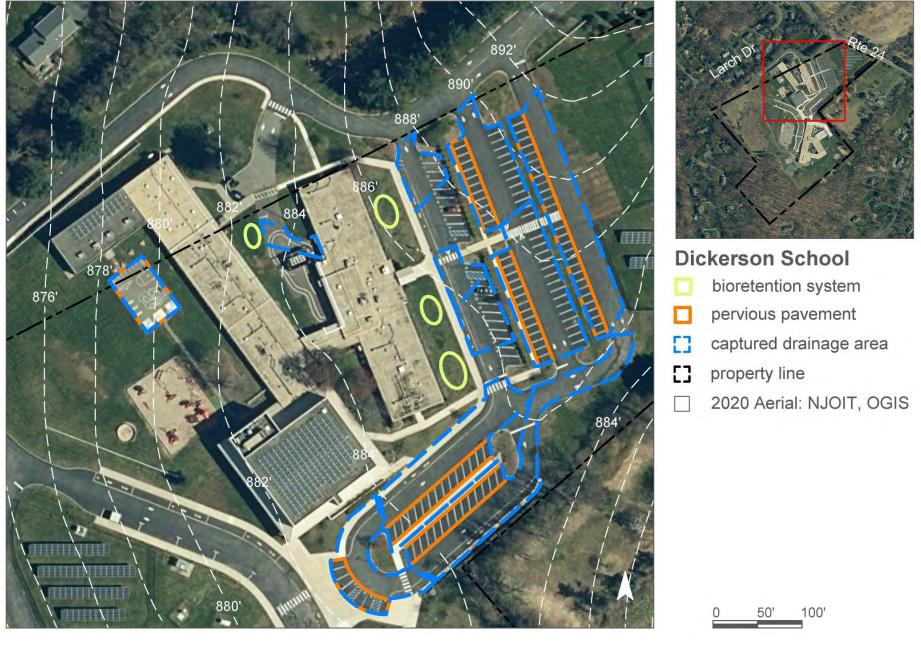
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Bragg School

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS



HUDSON CITY SAVINGS BANK





RAP ID: 10

Subwatershed: Peapack Brook

Site Area: 257,810 sq. ft.

Address: 385 Route 24

Chester, NJ 07930

Block and Lot: Block 26.05, Lot 12

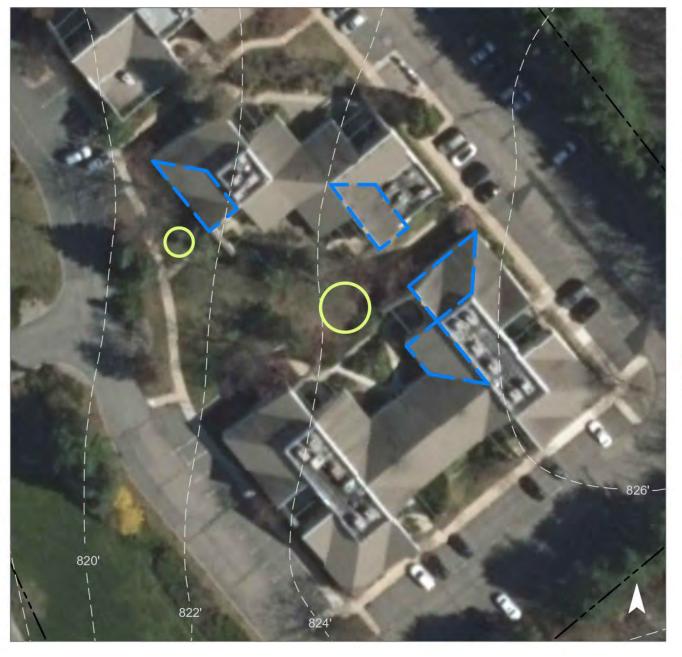




Rain gardens can be installed in the center courtyard and to the west of the building to capture rooftop runoff from multiple buildings. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
46	118,660	5.7	59.9	544.8	0.092 3.25		

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	0.82	14	6,020	0.23	790	\$3,950





Hudson City Savings Bank

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



IANDOLI & EDENS ATTORNEYS AT LAW





RAP ID: 11

Subwatershed: Peapack Brook

Site Area: 104,110 sq. ft.

Address: 310 Route 24

Chester, NJ 07930

Block and Lot: Block 25, Lot 37.03





A rain garden can be installed to reduce the flooding that occurs east of the parking lot. Pervious pavement can be installed in the parking lot row directly west of the building to capture stormwater runoff from both the parking lot and the rooftop. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
32	33,470	1.6	16.9	153.7	0.026	0.92	

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	0.093	16	6,810	0.26	890	\$4,450
Pervious pavement	0.093	16	6,810	0.26	650	\$16,250



PIZZA & BAGELS 24



RAP ID: 12

Subwatershed: Peapack Brook

Site Area: 132,295 sq. ft.

Address: 2631, 324 Route 24

Chester, NJ 07930

Block and Lot: Block 25, Lot 36





Pervious pavement can be installed in the western corner of the parking lot to capture and infiltrate stormwater runoff from the parking lot. A rain garden can be installed along the roadway south of the building to capture stormwater runoff from the pavement. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
16	20,800	1.0	10.5	95.5	0.016 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 system	0.023	4	1,660	0.06	220	\$1,375
Pervious pavement	0.140	23	10,240	0.38	970	\$24,250



MENDHAM ANIMAL HOSPITAL





RAPID: 13

Subwatershed: Raritan River North

Branch

Site Area: 126,630 sq. ft.

Address: 571 Route 24

Mendham, NJ 07945

Block and Lot: Block 27, Lot 3





A rain garden can be installed south of the building to capture stormwater runoff from both the rooftop of the building as well as the parking lot. Downspout planter boxes can be installed in front of the building to capture the stormwater runoff from the western rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
14	17,580	0.8	8.9	80.7	0.014	0.48

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	0.029	5	2,090	0.08	275	\$1,375
Planter boxes	N/A	2	N/A	N/A	2 (boxes)	\$2,000



MENDHAM HILLS COMMUNITY CHURCH





RAP ID: 14

Subwatershed: Raritan River North

Branch

Site Area: 269,785 sq. ft.

Address: 480 Route 24

Chester, NJ 07930

Block and Lot: Block 9, Lot 20.01

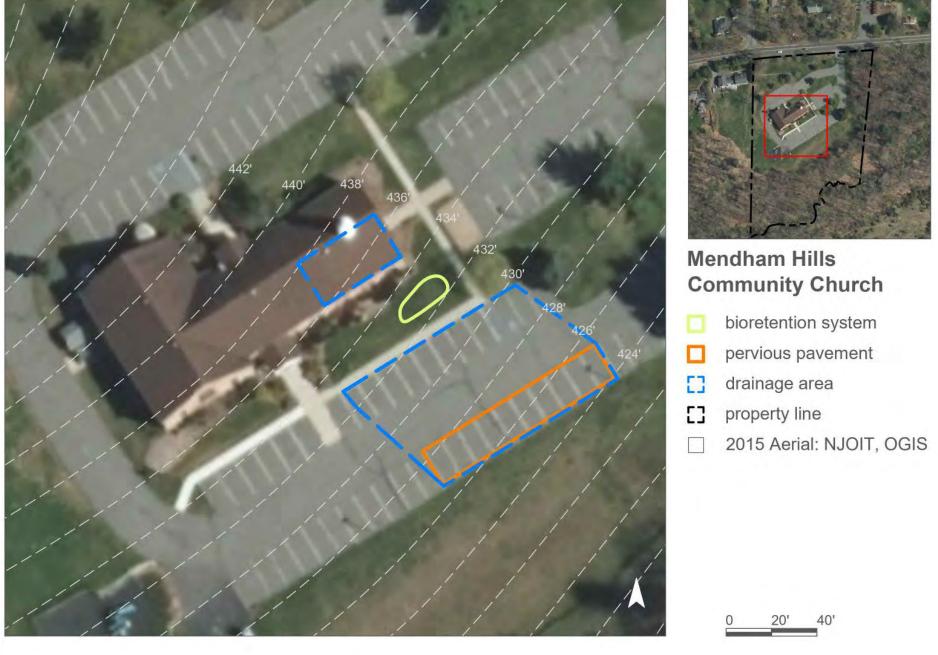




A rain garden can be installed southwest of the building to capture, treat, and infiltrate the stormwater coming from the top of the building. Pervious pavement can be installed in the southeastern corner of the parking lot to capture stormwater runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
24	64,060	3.1	32.4	294.1	0.050	1.76

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	0.023	4	1,680	0.06	220	\$1,100
Pervious pavement	0.142	24	10,420	0.39	1,620	\$40,500



WESTMONT MONTESSORI SCHOOL





RAP ID: 15

Subwatershed: Raritan River North

Branch

Site Area: 133,335 sq. ft.

Address: 577 Route 24

Mendham, NJ 07945

Block and Lot: Block 27, Lot 4

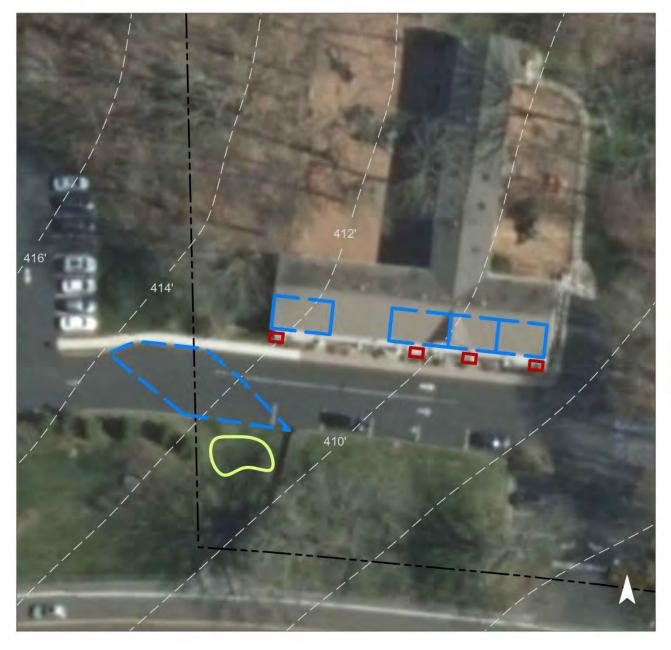




A rain garden can be installed south of the roadway to capture, treat, and infiltrate stormwater runoff from the pavement. Downspout planter boxes can be installed along the front, southern wall of the building to capture stormwater runoff from the rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
16	21,600	1.0	10.9	99.2	0.017	0.59

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	2,960	0.11	390	\$1,950
Planter boxes	N/A	3	N/A	N/A	4 (boxes)	\$4,000





Westmont Montessori School

- bioretention system
- planter box
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS



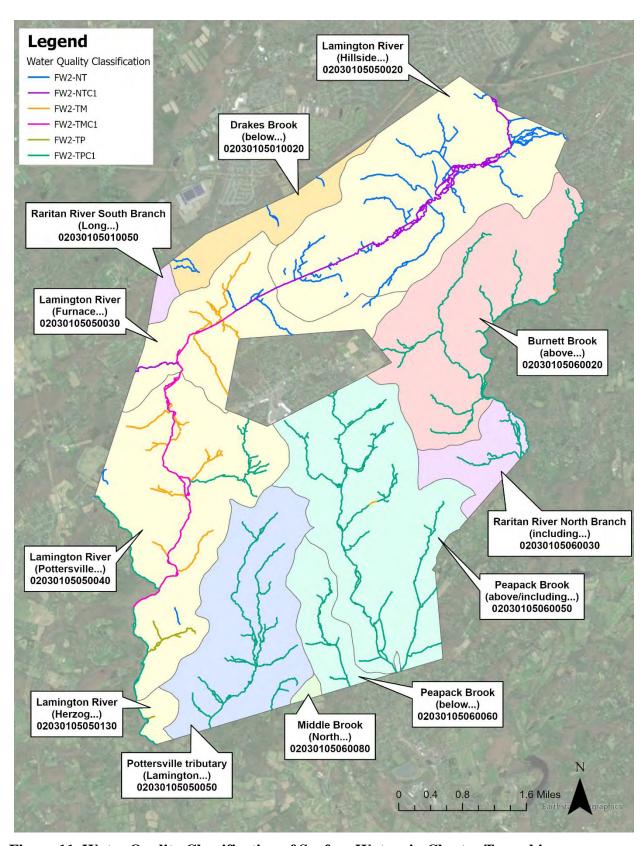


Figure 11. Water Quality Classification of Surface Waters in Chester Township

Table 9. Water Quality Classification of Surface Waters in Chester Township

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	19.1	18.4%
Freshwater 2, non-trout, Category One	FW2-NTC1	10.8	10.4%
Freshwater 2, trout production, Category One	FW2-TPC1	57.3	55.1%
Freshwater 2, trout maintenance	FW2-TM	9.0	8.6%
Freshwater 2, trout production	FW2-TP	1.4	1.4%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	6.4	6.1%

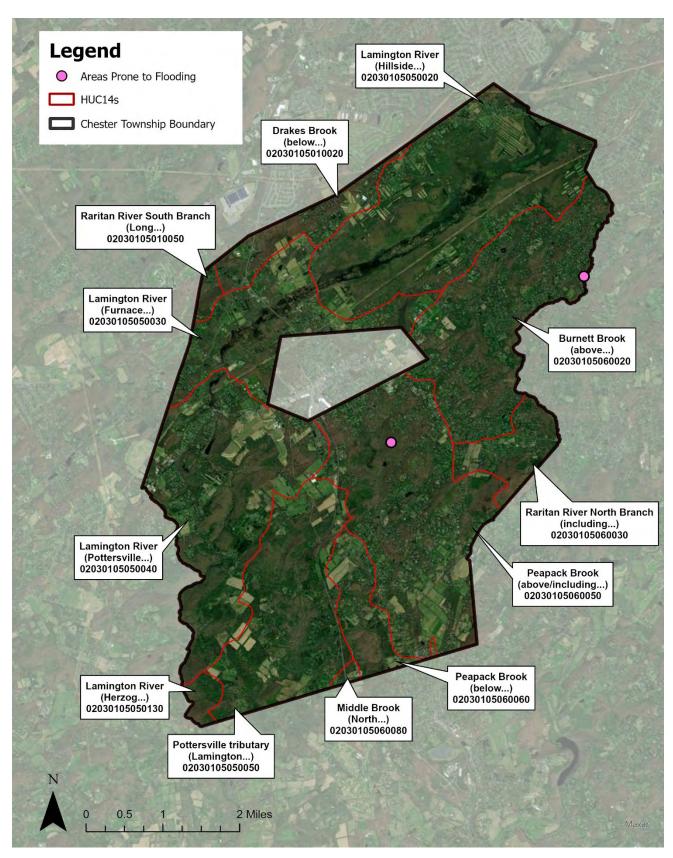


Figure 12. Areas Prone to Flooding in Chester Township

Far Hills Borough

Introduction

Located in Somerset County in New Jersey, Far Hills Borough covers about 4.9 square miles. With a population of 924 (2020 United States Census), Far Hills Borough consists of 27.8% of urban land uses by area. Of that urban land use, approximately 74.6% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 53.4% of Far Hills Borough.

Far Hills Borough contains portions of four subwatersheds (Table 1). There are approximately 21.9 miles of rivers and streams within the municipality; these include tributaries to the Dead River, Mine Brook and its tributaries, and the North Branch Raritan River and its tributaries. Far Hills Borough is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Far Hills Borough

Subwatershed	HUC14
Dead River (above Harrisons Brook)	02030103010080
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040
Raritan River North Branch (including Mine Brook to Peapack Brook)	02030105060070
Raritan River North Branch (Lamington River to Mine Brook)	02030105060090

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Far Hills Borough. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Far Hills Borough's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Far Hills Borough in relation to the Study Area. Figure 2 shows the portions of the four HUC14s in Far Hills Borough and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Far Hills Borough. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Far Hills Borough and is presented in Table 2. Figure 4 shows the impervious cover in Far Hills Borough based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Far Hills Borough and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins in Table 4 (identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". Only detention and infiltration basins were identified in Far Hills Borough within the study area.

The Q-Farms in Far Hills Borough have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the Study Area of Far Hills Borough have been identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 589.3 acres of agricultural land use in Far Hills Borough, of which, 518.3 acres lie within the study area for this Watershed Restoration and Protection Plan. There are nine Q-Farms and a portion of one Q-Farm in the study area portion of Far Hills Borough, totaling 475.7 acres. Within the nine Q-Farms and portion of one Q-Farm, there are approximately 179.0 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Far Hills Borough are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Three HUC14s are included in the study area (2030105060040, 2030105060070, 2030105060090). Within these three HUC14s, there are 36.9 acres of buildings and 71.4 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Far Hills Borough, approximately 2.3 acres of rooftop runoff would be managed with 0.46 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Far Hills Borough, approximately 7.1 acres of roadway would be managed, or 2.0 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in Far Hills Borough (see Figure 10). Available information for each parcel in the Far Hills Borough is presented in Table 9. All tax-exempt parcels within Far Hills Borough are within the study area. Class 15E parcels were excluded from the assessment. One of these properties offers opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. This property is identified in Table 9 and represents a watershed improvement project that can be included in the municipality's Watershed Improvement Plan. Figure 11 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3

waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are four classifications that apply to the streams in Far Hills Borough. Figure 12 depicts the water quality classifications of surface waters throughout Far Hills Borough and Table 10 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

Administrators from Far Hills Borough have identified Far Hills Fairgrounds within the municipality as a site particularly susceptible to flooding during heavy rainfall or storm events. Lack of adequate stormwater infrastructure under Route 202 may be a contributing factor to the observed frequent flooding at this location. There are reports that the field becomes waterlogged and the roads experience significant water accumulation following heavy rain. Figure 13 shows the location of the area of concern. There is a plan to replace a bridge at this site in the summer of 2025 with the intention to alleviate flooding concerns.

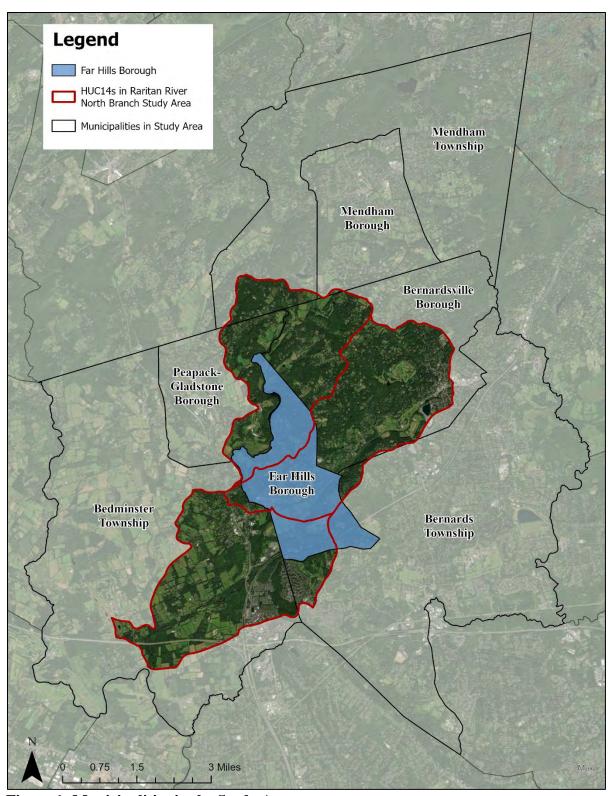


Figure 1: Municipalities in the Study Area

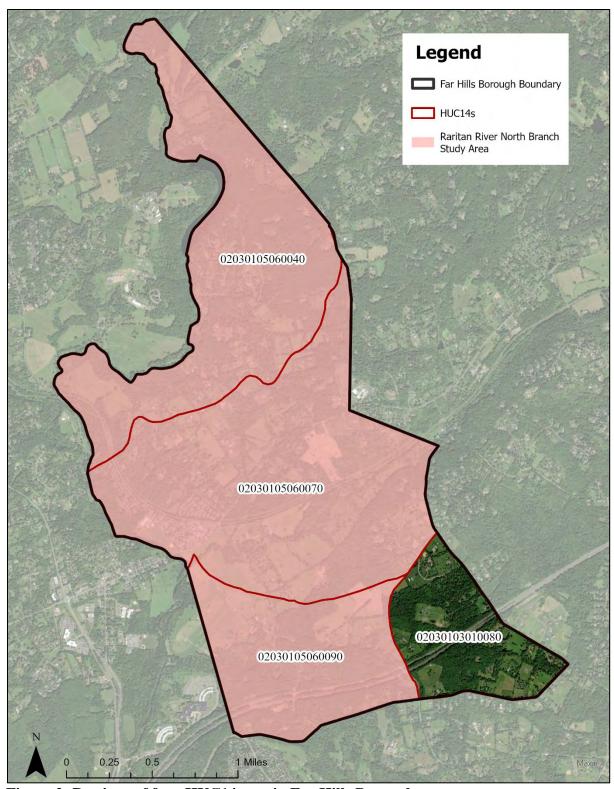


Figure 2: Portions of four HUC14s are in Far Hills Borough

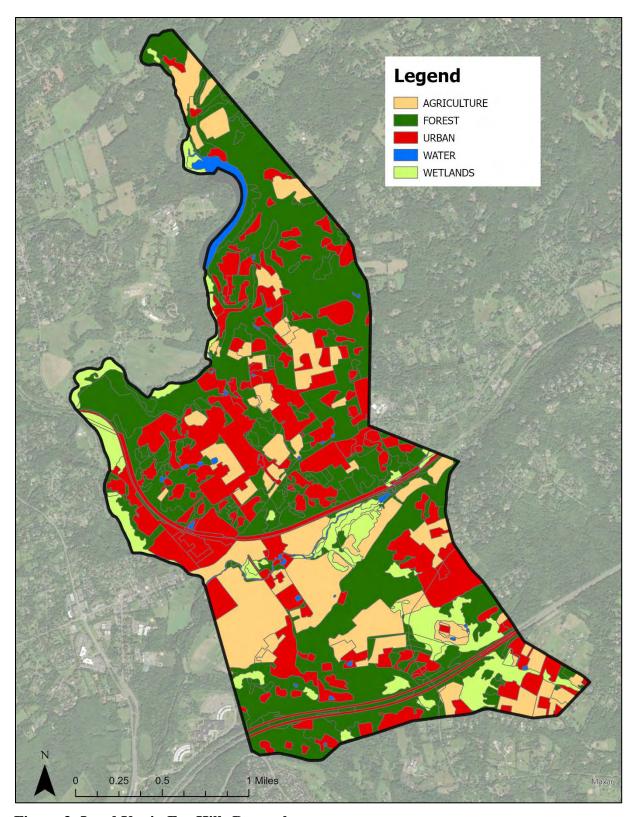


Figure 3: Land Use in Far Hills Borough

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Far Hills Borough

Hills Borough Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030103010080		-
Agriculture	71.0	92.3	710.0	21,299.7
Barren Land	0.0	0.0	0.0	0.0
Forest	88.5	8.9	265.6	3,540.9
Urban	100.7	141.0	1,510.4	14,097.3
Water	1.0	0.1	3.0	40.6
Wetlands	88.4	8.8	265.3	3,537.5
TOTAL =	349.7	251.1	2,754.3	42,515.9
		02030105060040		
Agriculture	116.4	151.3	1,164.2	34,925.4
Barren Land	0.0	0.0	0.0	0.0
Forest	546.3	54.6	1,638.9	21,852.0
Urban	204.1	285.7	3,061.1	28,570.3
Water	37.7	3.8	113.1	1,508.4
Wetlands	52.7	5.3	158.2	2,109.5
TOTAL =	957.2	500.7	6,135.5	88,965.6
		02030105060070		
Agriculture	263.0	341.9	2,630.2	78,904.9
Barren Land	0.0	0.0	0.0	0.0
Forest	480.9	48.1	1,442.7	19,235.5
Urban	446.7	625.4	6,700.8	62,540.7
Water	15.3	1.5	45.8	610.3
Wetlands	81.4	8.1	244.2	3,256.6
TOTAL =	1,287.3	1,025.1	11,063.6	164,548.0
		02030105060090		
Agriculture	138.9	180.6	1,389.2	41,674.5
Barren Land	0.0	0.0	0.0	0.0
Forest	265.1	26.5	795.3	10,603.6
Urban	125.2	175.3	1,878.7	17,534.7
Water	1.6	0.2	4.9	65.4
Wetlands	24.2	2.4	72.6	967.8
TOTAL =	555.1	385.0	4,140.6	70,846.0
		All HUCs		
Agriculture	589.3	766.2	5,893.5	176,804.6
Barren Land	0.0	0.0	0.0	0.0
Forest	1,380.8	138.1	4,142.4	55,231.9
Urban	876.7	1,227.4	13,151.0	122,743.0
Water	55.6	5.6	166.8	2,224.6
Wetlands	246.8	24.7	740.4	9,871.5

TOTAL =	3,149.3	2,161.9	24,094.1	366,875.6
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Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Far Hills Borough that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Far Hills Borough. Based upon the NJDEP impervious surface data, Far Hills Borough has impervious cover totaling 8.6%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Far Hills Borough is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Far Hills Borough's impervious cover percentage would suggest that its waterways are primarily sensitive and most likely preventing degradation of the state's surface water quality standards.

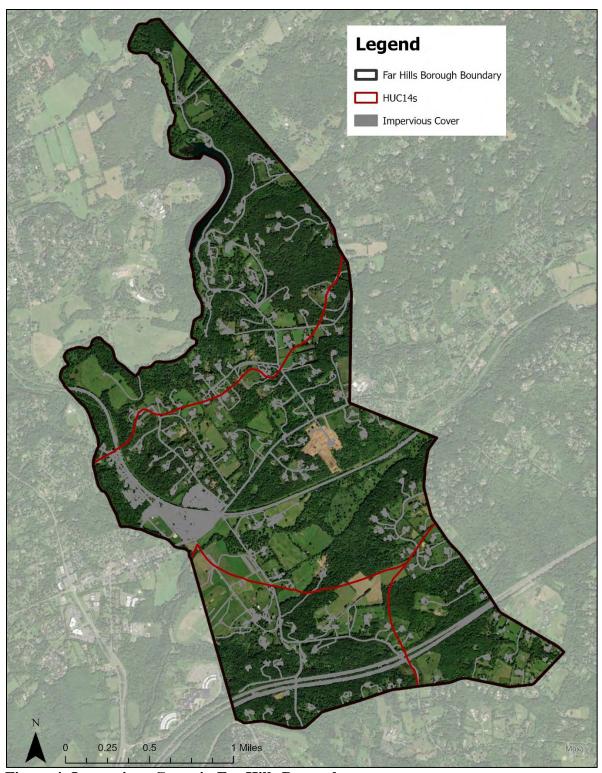


Figure 4: Impervious Cover in Far Hills Borough

 Table 3: Impervious Cover Analysis by HUC14 for Far Hills Borough

Class	Area (acres)	HUC Impervious Cover (%)
	02030103010080	
Building	2.49	
Other	9.32	
Road	16.58	
TOTAL =	28.4	8.1%
·	02030105060040	
Building	8.63	
Other	38.46	
Road	11.91	
TOTAL =	59.0	6.2%
·	02030105060070	•
Building	24.07	
Other	73.84	
Road	29.07	
TOTAL =	127.0	9.9%
	02030105060090	
Building	4.21	
Other	21.50	
Road	30.43	
TOTAL =	56.1	10.1%
	All HUCs	
Building	39.40	
Other	143.13	
Road	87.99	
TOTAL =	270.5	8.6%

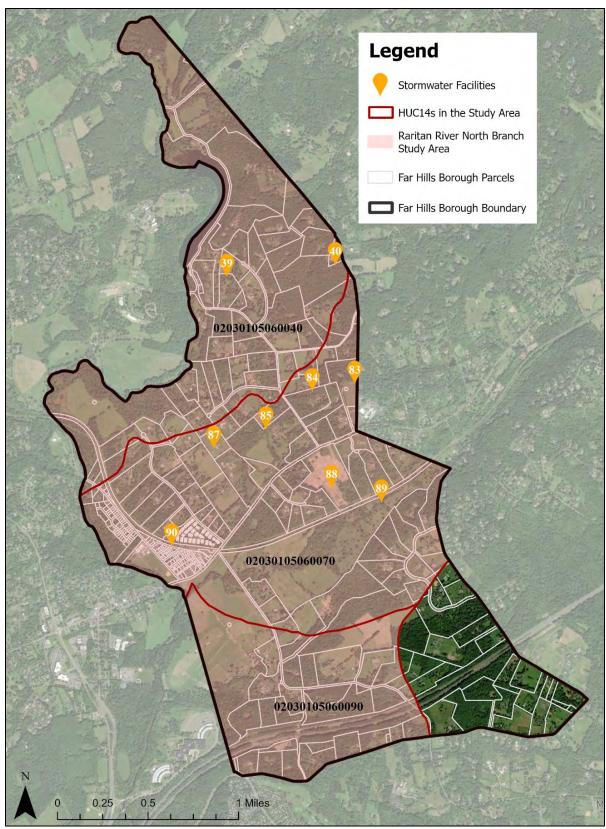


Figure 5: Stormwater Facilities in the Study Area of Far Hills Borough

Table 4: Location of Stormwater Facilities in the Study Area of Far Hills Borough

Raritan River North Branch Study Area								
<u>ID</u>	Address	Type						
39	Papandreou, Nicholas & Amy J	I						
40	Miller, Andrew & Julia	I						
83	Torgovnik, Vladimir & Sandra E	I						
84	Far Hills Country Day School	I						
85	Frerich, Kevin & Tara	I						
87	97 Spring Hollow Road,LLC	I						
88	Group K Developers, LLC	D						
89	Group K Developers LLC	D						
90	Hurlingham Club Rd	D						

[&]quot;D" = Detention, "I" = Infiltration

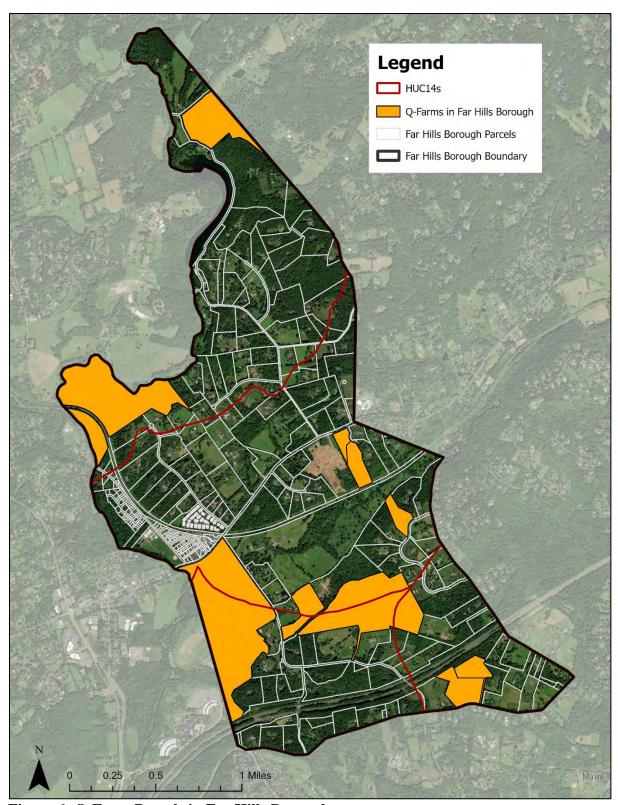


Figure 6: Q-Farm Parcels in Far Hills Borough

Table 5: Q-Farm Parcels in Far Hills Borough

Table 5. Q-raim raicels in rai iims bolough								
Block	Lot	Q-Code	Prop Class	Location				
1	2	QFARM	3B	Campbell Road				
3	1	QFARM	3B	500 Lake Road				
5	3.03	QFARM	3B	6 Castle Court				
5	3.04	QFARM	3B	4 Castle Court				
6	9	QFARM	15C	148 Peapack Road				
7	1	QFARM	15C	146 Peapack Road				
18	1	QFARM	3B	80-100 Liberty Corner Rd				
19	6.01	QFARM	3B	131 Liberty Corner Road				
19	10	QFARM	3B	261 Liberty Corner Road				
19	18.12	QFARM	3B	10 Sherwood Farm Road				
23	2.01	QFARM	3B	210 Douglas Road				
23	2.02	QFARM	3B	228 Douglas Road				

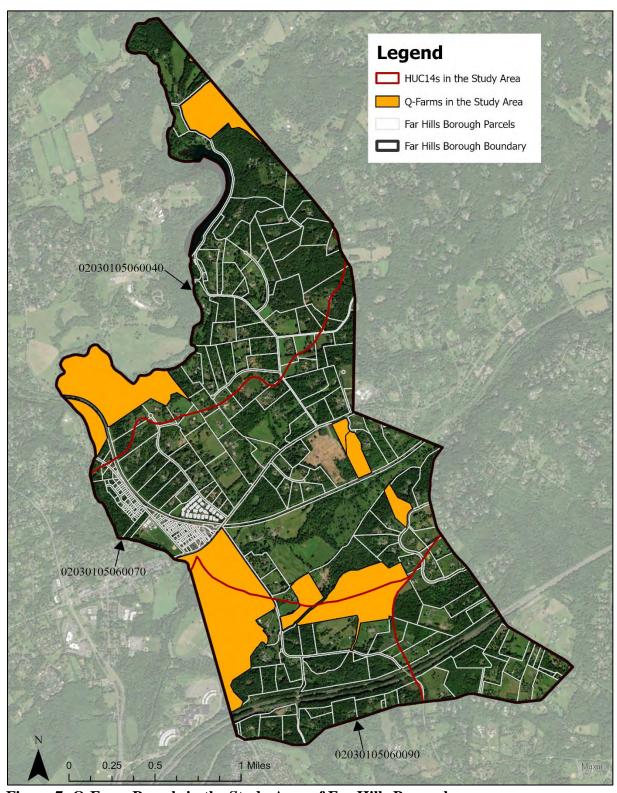


Figure 7: Q-Farm Parcels in the Study Area of Far Hills Borough

Table 6: Q-Farm Parcels in the Study Area of Far Hills Borough

Block	Lot	Q-Code	Prop Class	Location
1	2	QFARM	3B	Campbell Road
3	1	QFARM	3B	500 Lake Road
5	3.03	QFARM	3B	6 Castle Court
5	3.04	QFARM	3B	4 Castle Court
6	9	QFARM	15C	148 Peapack Road
7	1	QFARM	15C	146 Peapack Road
18	1	QFARM	3B	80-100 Liberty Corner Rd
19	6.01	QFARM	3B	131 Liberty Corner Road
*19	10	QFARM	3B	261 Liberty Corner Road
19	18.12	QFARM	3B	10 Sherwood Farm Road

^{*}Only a portion of the Q-Farm is within the study area

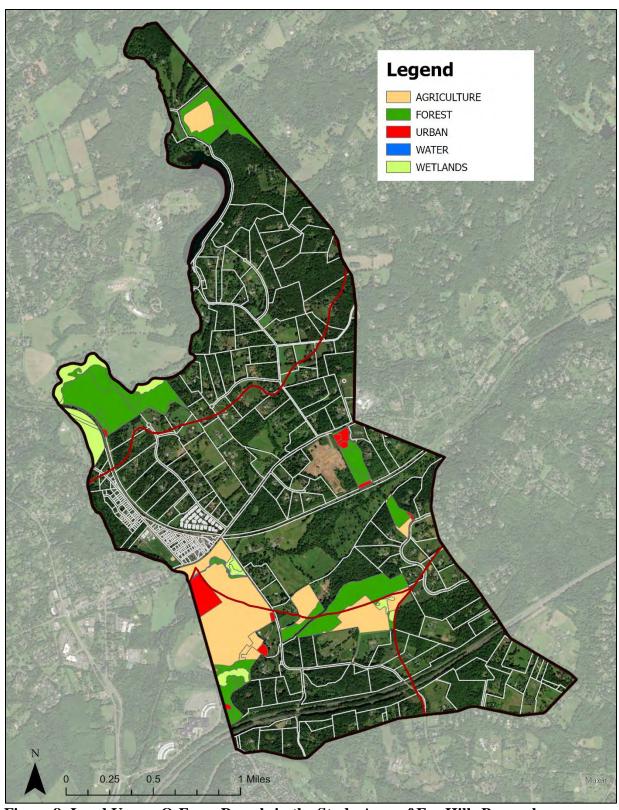


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Far Hills Borough

Table 7: Land Use on Q-Farms in the Study Area of Far Hills Borough

Land Use	Area (acres)
Agriculture	179.0
Barren Land	0.0
Forest	216.8
Urban	25.6
Water	5.9
Wetlands	48.4
Total:	475.7

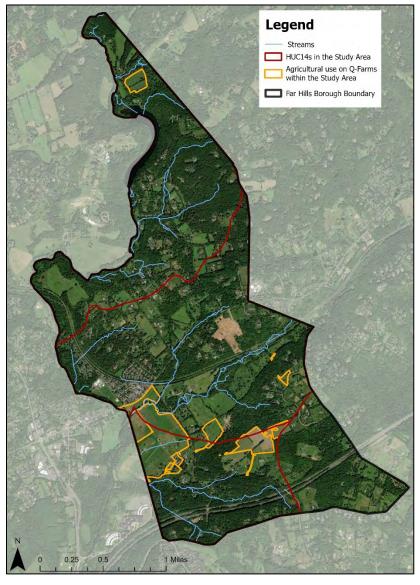


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Far Hills Borough

Table 8: Recommendations for Specific Farms in the Study Area of Far Hills Borough

	North Branch Raritan River Study Area										
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.			
18	1	QFARM			X	X		X			

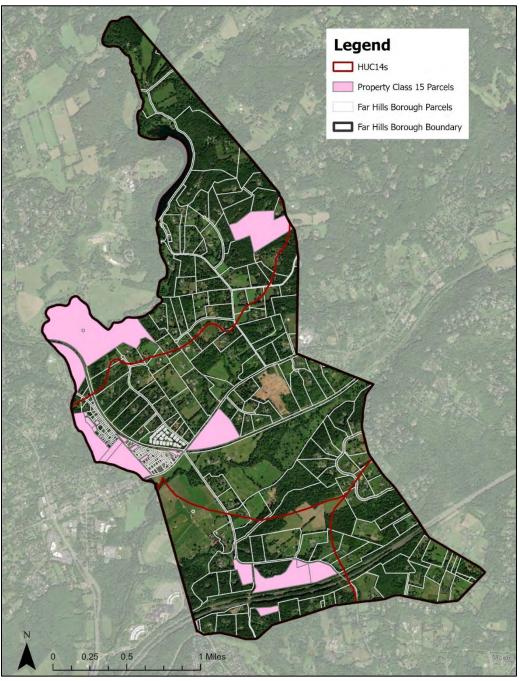


Figure 10: Property Class 15 Parcels in Far Hills Borough

Table 9: Property Class 15 Parcels in Far Hills Borough¹

Block	Lot	Prop Class	Location	Facility Type
4	11	15B	279 Route 202	Far Hills C Day Sch
3	21	15C	185 Pennbrook Road	Recreation Center
5	7	15C	80 Route 202	Community Center
6	9	15C	148 Peapack Road	Farm
6	9	15C	148 Peapack Road	Barn
7	1	15C	146 Peapack Road	Farm
*11	1	15C	6 Prospect St	Municipal Bldg.
15	7	15C	61 Route 202	Parking Areas
16	1	15C	1 Peapack Road	Community Center
16	2	15C	63 Peapack Road	Community Center
18	6	15C	186 Liberty Corner Road	Conservation
20	2	15C	11 Layton Road	Park
21	1	15C	2 Douglas Road	Farm
22	1	15C	Layton Road	Park
9	1	15D	34 Peapack Road	Church
16	14.02	15D	9 Schley Road	Pastors Home
8	1	15F	46 Peapack Road	Affordable Housing
8	3	15F	38 Peapack Road	Disabled Veteran
16	10	15F	47 Schley Road	Water Shed
16	17	15F	21 Schley Road	Water Shed
16	18	15F	31 Schley Road	Water Shed
16	19	15F	46 Schley Road	Water Shed
16	24	15F	26 Schley Road	Water Shed
20	3	15F	300 Liberty Corner Road	Water Shed

^{*} Sites that can be retrofitted with green infrastructure

¹ All tax-exempt parcels within Far Hills Borough are within the study area

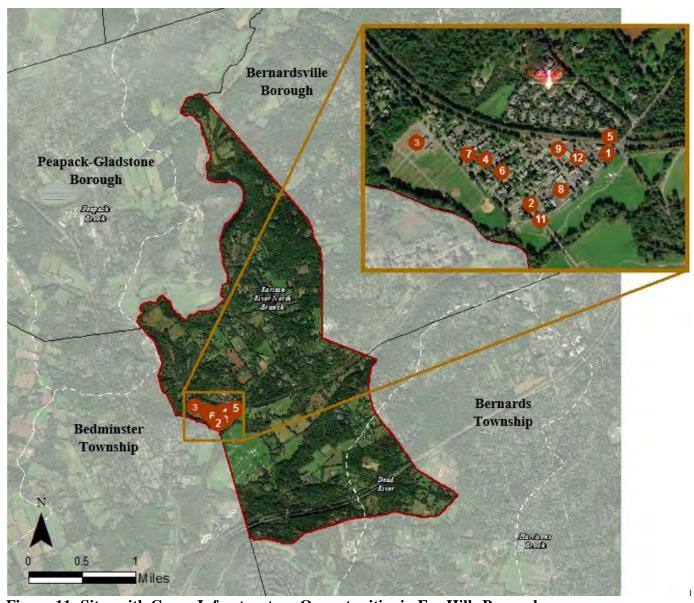


Figure 11: Sites with Green Infrastructure Opportunities in Far Hills Borough

EDIBLE ARRANGEMENTS



RAP ID: 1

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.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	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





Edible Arrangements

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

EXPRESS YOURSELF SALON





RAP ID: 2

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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	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



FAR HILLS FAIRGROUNDS



RAPID: 3

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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	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



FAR HILLS POLICE DEPARTMENT





RAPID: 4

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.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)				Runoff Volume from Impervious Cover (Mgal)		
0/0	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



FAR HILLS STATION



RAP ID: 5

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

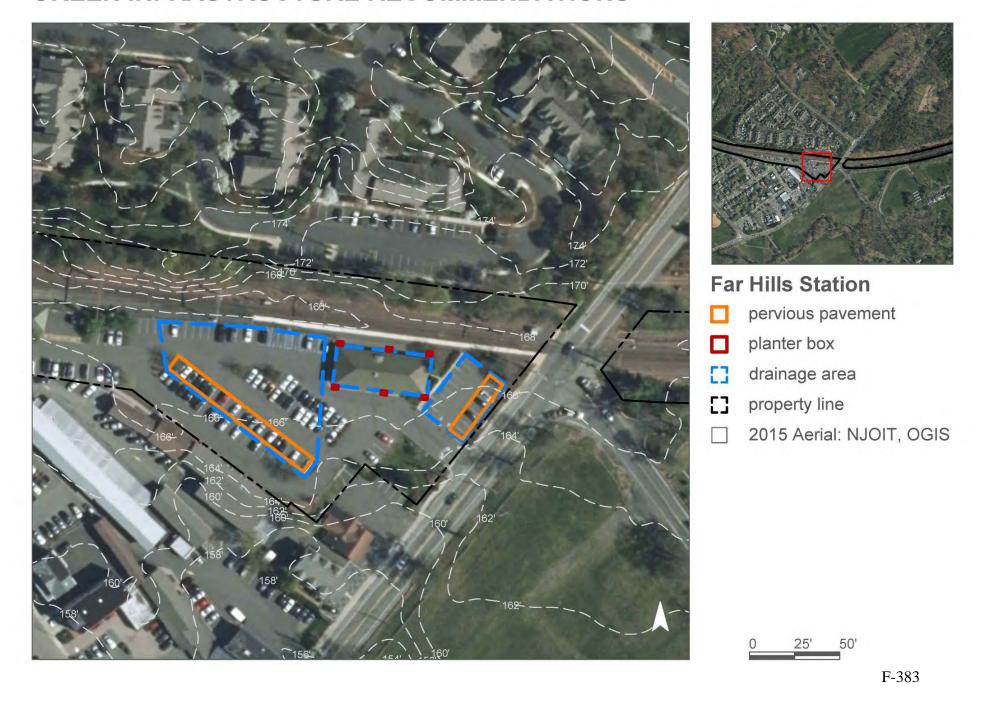




Downspouts on the north and south of the building can be disconnected and converted to planter boxes to capture stormwater runoff from the roof. Sections of parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Riinoff Volume from Impervious (Tover (Mgal)		
0/0	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



JOSEPH D'APOLITO & SON





RAP ID: 6

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.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr) Runoff Volume from Impervious Cover				npervious Cover (Mgal)	
0/0	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



LIVING PLATE





RAP ID: 7

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.

Impervio	Impervious Cover Existing Loads from Impervious Cover (lbs/yr)				Runoff Volume from Impervious Cover (Mgal)		
0/0	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



M&M PERROTTI'S PREPARED FOODS





RAPID: 8

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.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	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



PEAPACK-GLADSTONE BANK





RAP ID: 9

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.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	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



TURPIN REAL ESTATE





RAP ID: 10

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)		
0/0	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



WEALTH PLANNING ADVISORS





RAP ID: 11

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

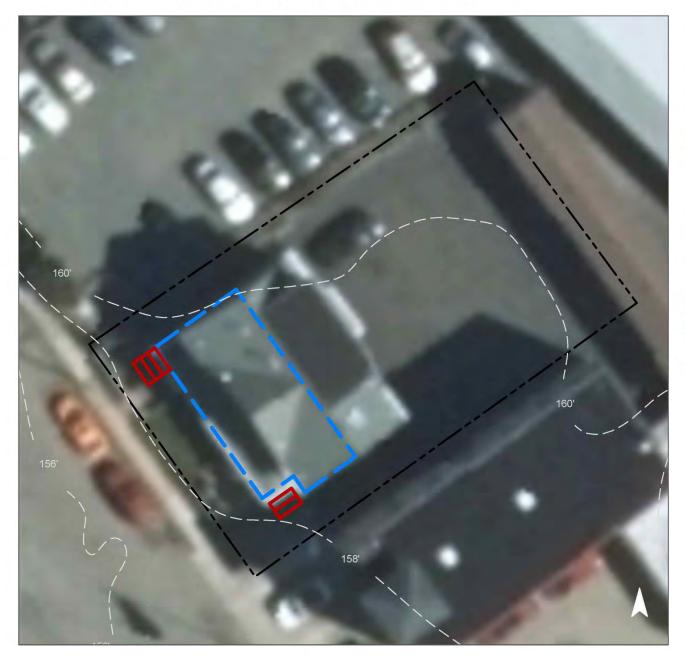




Downspouts on the northwest and southeast corners of the building can be disconnected and converted to planter boxes to capture stormwater runoff from the roof. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	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





Wealth Planning Advisors

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



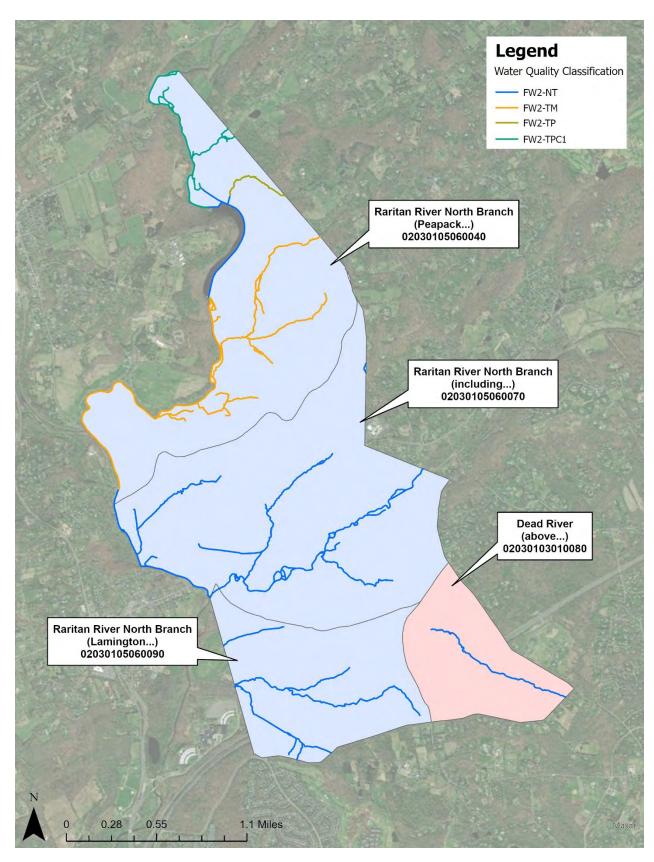


Figure 12. Water Quality Classification of Surface Waters in Far Hills Borough

 Table 10. Water Quality Classification of Surface Waters in Far Hills Borough

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	12.8	58.4%
Freshwater 2, trout production, Category One	FW2-TPC1	2.3	10.6%
Freshwater 2, trout maintenance	FW2-TM	6.3	28.8%
Freshwater 2, trout production	FW2-TP	0.5	2.2%

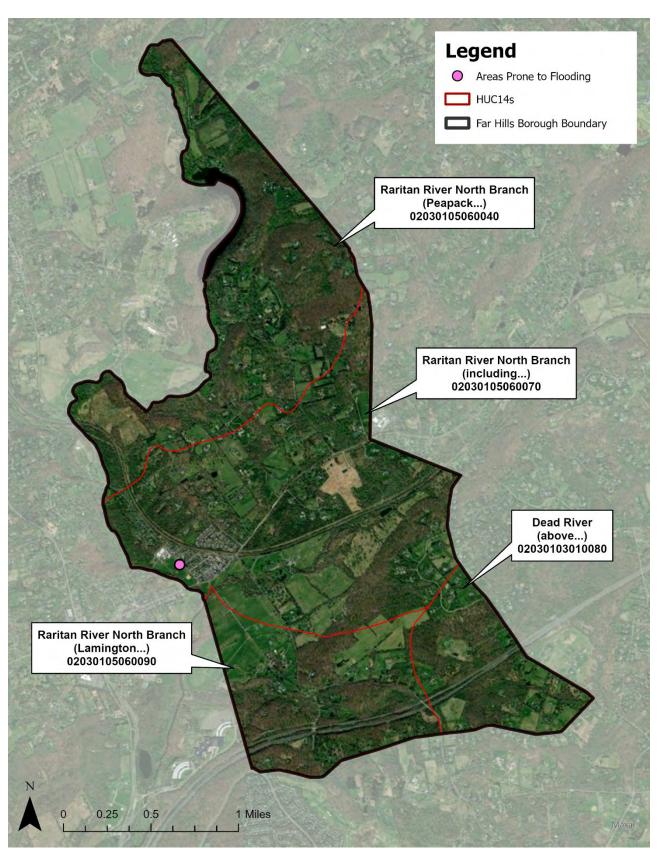


Figure 13. Areas Prone to Flooding in Far Hills Borough

Mendham Borough

Introduction

Located in Morris County in New Jersey, Mendham Borough covers about 6.0 square miles. With a population of 4,981 (2020 United States Census), Mendham Borough consists of 57.5% of urban land uses by area. Of that urban land use, approximately 51.8% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 34.1% of Mendham Borough.

Mendham Borough contains portions of four subwatersheds (Table 1). There are approximately 17.0 miles of rivers and streams within the municipality; these include India Brook, Indian Grove Brook and its tributaries, McVickers Brook and its tributaries, North Branch Raritan River and its tributaries, Passaic River and its tributaries, and several uncoded tributaries. Mendham Borough is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Mendham Borough

Subwatershed	HUC14		
Passaic River Upper (above Osborn Mills)	02030103010010		
Raritan River North Branch (above/including India Brook)	02030105060010		
Raritan River North Branch (including McVickers to India Brook)	02030105060030		
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040		

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Mendham Borough. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Mendham Borough's existing

stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Mendham Borough in relation to the study area. Figure 2 shows the portions of the four HUC14s in Mendham Borough and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Mendham Borough. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Mendham Borough and is presented in Table 2. Figure 4 shows the impervious cover in Mendham Borough based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Mendham Borough and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins. Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins with or without vegetative shoreline buffers were identified in Mendham Borough within the study area.

The Q-Farms in Mendham Borough have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the study area of Mendham Borough have been identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 318.5 acres of agricultural land use in Mendham Borough, of which, 249.2 acres lie within the study area for this Watershed Restoration and Protection Plan. There are 52 Q-Farms and portions of seven Q-Farms in the study area portion of Mendham Borough, totaling 941.3 acres. Within the 52 Q-Farms and portions of seven Q-Farms, there are approximately 215.9 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Mendham Borough are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Three HUC14s are included in the study area (02030105060010, 02030105060030, 02030105060040). Within these three HUC14s, there are 96.8 acres of buildings and 114.4 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Mendham Borough, approximately 6.1 acres of

rooftop runoff would be managed with 1.21 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Mendham Borough, approximately 11.4 acres of roadway would be managed, or 3.1 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Mendham Borough are shown in Figure 10 and presented in Table 9. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 11). Available information for each parcel in the study area is presented in Table 10. Class 15E parcels were excluded from the assessment. Ten of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 10 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 12 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are four classifications that apply to the streams in Mendham Borough. Figure 13 depicts the water quality classifications of surface waters throughout Mendham Borough and Table 11 summarizes the total miles and percentage of each surface water quality classification in the municipality.

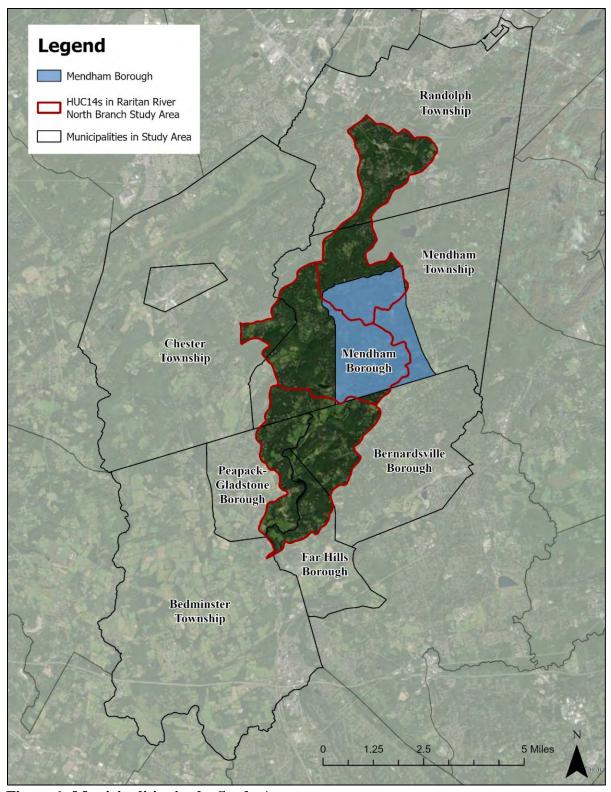


Figure 1: Municipalities in the Study Area

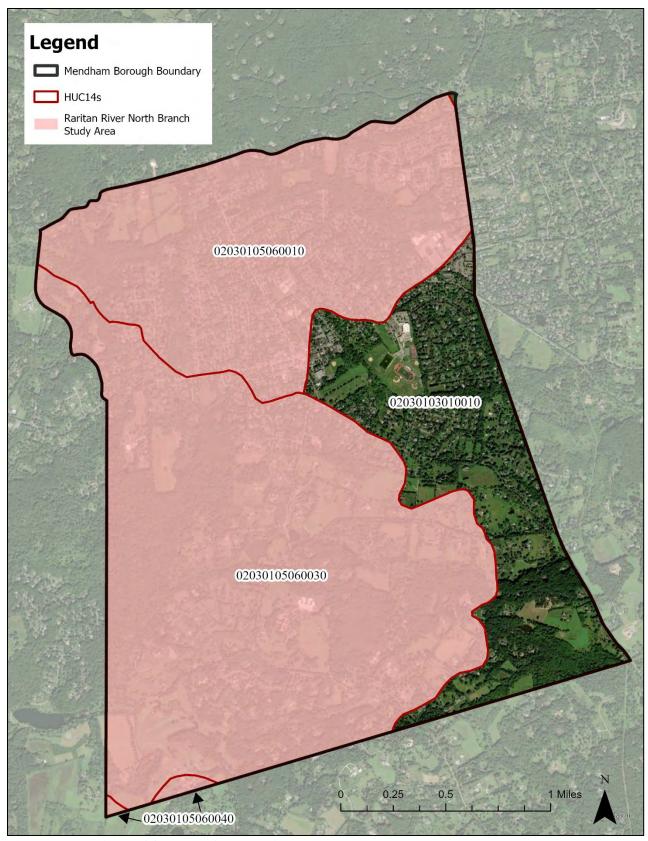


Figure 2: Portions of four HUC14s are in Mendham Borough

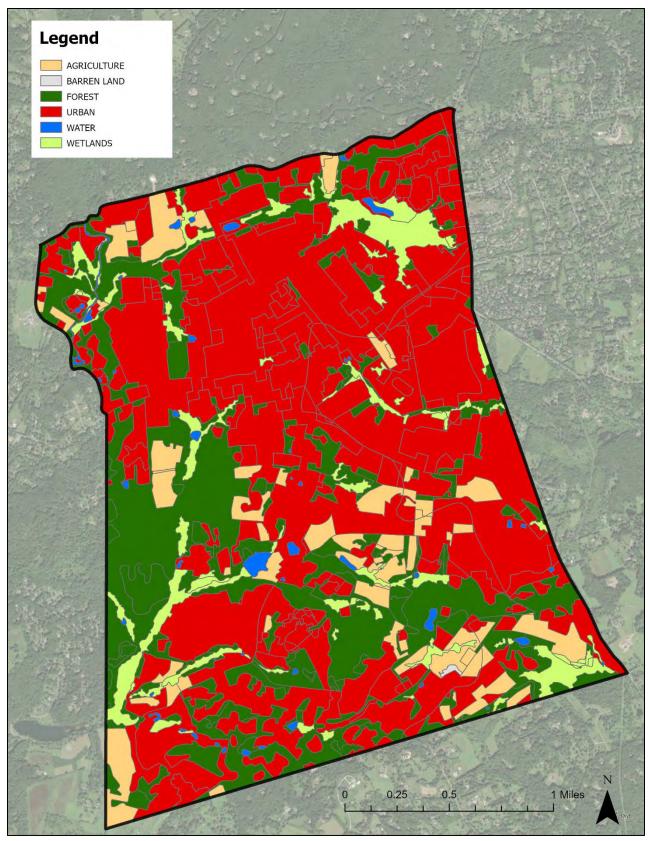


Figure 3: Land Use in Mendham Borough

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Mendham Borough

Mendham Borough Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030103010010		()
Agriculture	69.3	90.0	692.7	20,779.8
Barren Land	0.0	0.0	0.0	0.0
Forest	120.4	12.0	361.1	4,814.2
Urban	559.0	782.6	8,385.5	78,265.0
Water	2.8	0.3	8.3	110.8
Wetlands	49.9	5.0	149.6	1,995.1
TOTAL =	801.3	890.0	9,597.2	105,964.8
		02030105060010		
Agriculture	51.2	66.5	511.8	15,354.3
Barren Land	0.0	0.0	0.1	0.7
Forest	162.1	16.2	486.2	6,482.7
Urban	759.0	1,062.7	11,385.7	106,266.7
Water	9.5	1.0	28.6	381.0
Wetlands	95.2	9.5	285.6	3,807.7
TOTAL =	1,077.0	1,155.9	12,697.9	132,293.1
		02030105060030		
Agriculture	194.0	252.3	1,940.4	58,212.0
Barren Land	1.9	0.9	9.4	112.3
Forest	732.8	73.3	2,198.5	29,312.9
Urban	871.8	1,220.5	13,076.5	122,047.0
Water	23.2	2.3	69.5	926.3
Wetlands	107.6	10.8	322.8	4,304.1
TOTAL =	1,931.3	1,560.0	17,617.0	214,914.6
		02030105060040		
Agriculture	4.0	5.3	40.4	1,213.4
Barren Land	0.0	0.0	0.0	0.0
Forest	1.3	0.1	4.0	53.3
Urban	10.6	14.8	158.8	1,481.7
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	16.0	20.2	203.2	2,748.5
		All HUCs		
Agriculture	318.5	414.1	3,185.3	95,559.5
Barren Land	1.9	0.9	9.4	113.1
Forest	1,016.6	101.7	3,049.7	40,663.1
Urban	2,200.4	3,080.6	33,006.5	308,060.4
Water	35.5	3.5	106.4	1,418.0
Wetlands	252.7	25.3	758.0	10,106.9

TOTAL =	3,825.5	,626.1 40	,115.3	55,921.1
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Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Mendham Borough that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Mendham Borough. Based upon the NJDEP impervious surface data, Mendham Borough has impervious cover totaling 14.7%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Mendham Borough is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Mendham Borough's impervious cover percentage would suggest that its waterways are primarily impacted and most likely contributing to not meeting the state's surface water quality standards.

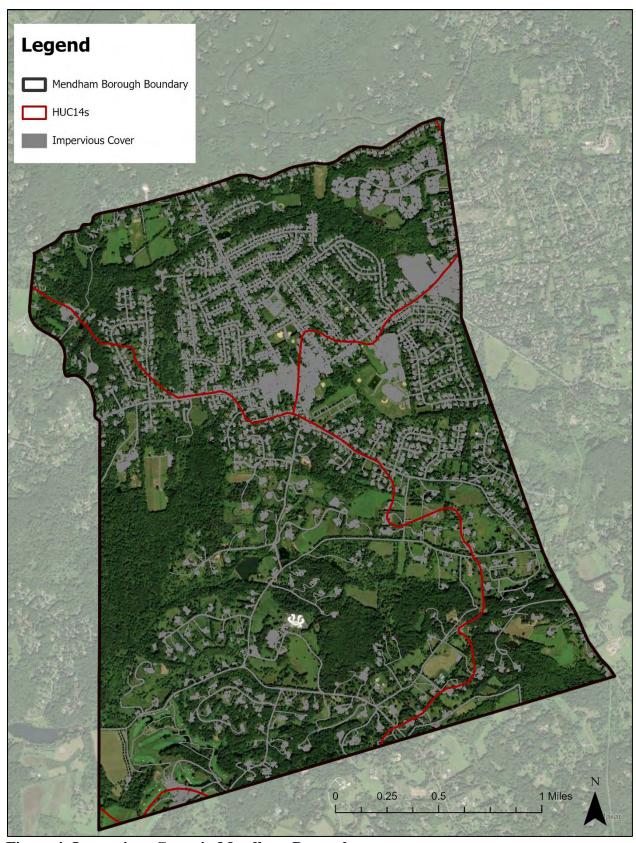


Figure 4: Impervious Cover in Mendham Borough

 Table 3: Impervious Cover Analysis by HUC14 for Mendham Borough

Class	Area (acres)	HUC Impervious Cover (%)
1	02030103010010	
Building	32.48	
Other	76.58	
Road	40.77	
TOTAL =	149.8	18.7%
	02030105060010	
Building	63.64	
Other	116.61	
Road	62.51	
TOTAL =	242.8	22.5%
•	02030105060030	•
Building	32.74	
Other	82.16	
Road	51.90	
TOTAL =	166.8	8.6%
	02030105060040	
Building	0.43	
Other	3.78	
Road	0.00	
TOTAL =	4.2	26.3%
	All HUCs	
Building	129.29	
Other	279.13	
Road	155.18	
TOTAL =	563.6	14.7%

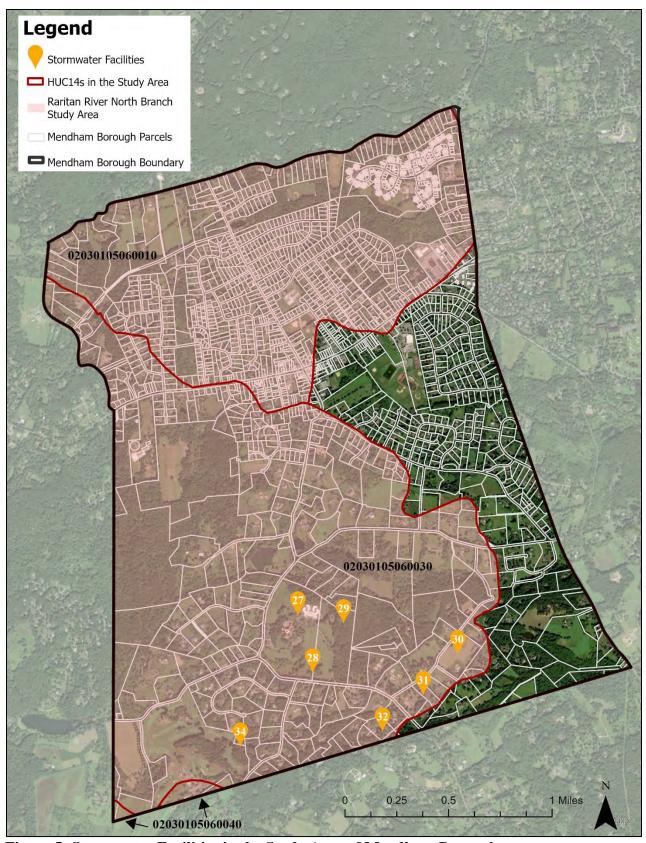


Figure 5: Stormwater Facilities in the Study Area of Mendham Borough

Table 4: Location of Stormwater Facilities in the Study Area of Mendham Borough

Raritan River North Branch Study Area					
<u>ID</u>	<u>Address</u>	Type			
27	350 Bernardsville Rd	D			
28	350 Bernardsville Rd	D			
29	350 Bernardsville Rd	D			
30*	20 Horseshoe Bend Rd	I/U			
31	Horseshoe Bend Ln	D			
32	51 Horseshoe Bend Rd	D			
34	31 Balbrook Dr	N			

[&]quot;D" = Detention, "N" = Naturalized, "I" = Infiltration, "U" = Underground

^{*}Unable to locate basin in the field. According to the New Jersey Hydrologic Modeling Database, basin is an underground infiltration basin.

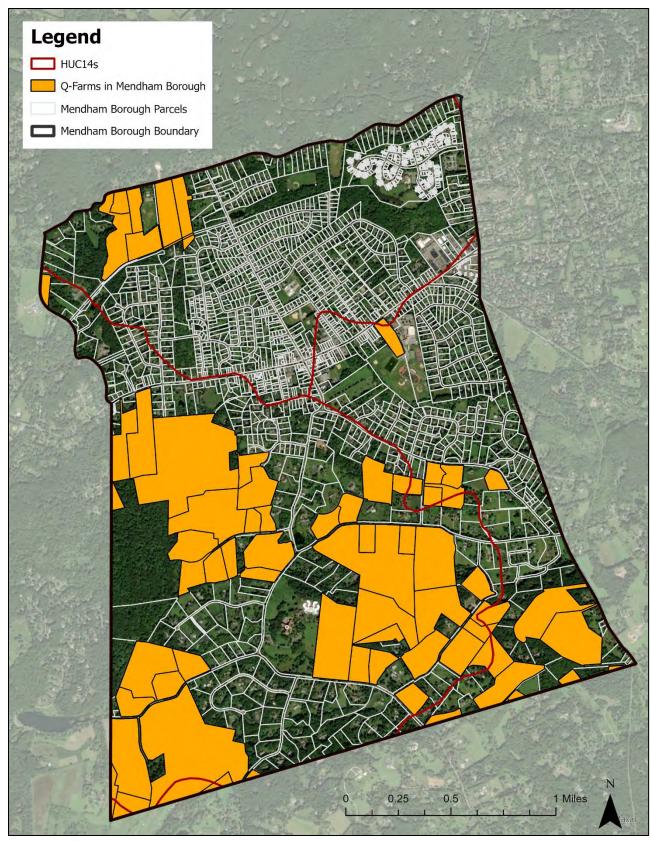


Figure 6: Q-Farm Parcels in Mendham Borough

Table 5: Q-Farm Parcels in Mendham Borough

Block Lot Q-Code Class Location 7 4.06 Q0082 3B 8 Preserve Lane 101 13 QFARM 3B 210 Mountainside Rd 101 14 QFARM 3B 220 Mountainside Rd 101 16 QFARM 3B 226 Mountainside Rd 101 17 QFARM 3B 240 Mountainside Rd 101 18 QFARM 3B 250 Mountainside Rd 101 19 QFARM 3B 260 Mountainside Rd 101 30 QFARM 3B Mountainside Rd 102 5 QFARM 3B Mountainside Rd 102 6 QFARM 3B Mountainside Rd 101 7 QFARM 3B 80-8-8 West Main St	Table 5:	Q-Farm Parcels in Mendham			Borougn	
101	Block	Lot	Q-Code		Location	
101	7	4.06	Q0082	3B	8 Preserve Lane	
101	101	13	QFARM	3B	210 Mountainside Rd	
101	101	14	QFARM	3B	220 Mountainside Rd	
101	101	16	QFARM	3B	226 Mountainside Rd	
101	101	17	QFARM	3B	240 Mountainside Rd	
101 30 QFARM 3B 127 Ironia Rd 102 5 QFARM 3B Mountainside Rd 102 6 QFARM 3B Mountainside Rd 201 63 QFARM 3B Mountainside Rd 1401 7 QFARM 3B Mountainside Rd 1401 7 QFARM 3B Mountainside Rd 1801 5 QFARM 3B 80-88 West Main St 1801 5.01 QFARM 3B W Main St 1801 16 QFARM 3B W Main St 1801 36.02 QFARM 3B 3 Spring Meadow Ln 1801 36.03 QFARM 3B 4 Thomas Rd 1801 36.05 QFARM 3B 2 Thomas Rd 1801 36.05 QFARM 3B 2 Thomas Rd 1801 36 QFARM 3B 298 Thomas Rd 1801 38 QFARM 3B W Main St	101	18	QFARM	3B	250 Mountainside Rd	
102 5 QFARM 3B Mountainside Rd 102 6 QFARM 3B Mountainside Rd 201 63 QFARM 3B Mountainside Rd 1401 7 QFARM 3B 63 E. Main St 1801 5 QFARM 3B 80-88 West Main St 1801 5.01 QFARM 3B W Main St 1801 16 QFARM 3B W Main St 1801 36.02 QFARM 3B 3 Spring Meadow Ln 1801 36.03 QFARM 3B 3 Spring Meadow Ln 1801 36.04 QFARM 3B 3 Spring Meadow Ln 1801 36.05 QFARM 3B 2 Thomas Rd 1801 36.05 QFARM 3B 2 Thomas Rd 1801 37 QFARM 3B 2 Thomas Rd 1801 38 QFARM 3B 2 W Ain St 2001 1.02 QFARM 3B 3 Charolais Farm Rd	101	19	QFARM	3B	260 Mountainside Rd	
102 6 QFARM 3B Mountainside Rd 201 63 QFARM 3B Mountainside Rd 1401 7 QFARM 3B 63 E. Main St 1801 5 QFARM 3B 80-88 West Main St 1801 5.01 QFARM 3B W Main St 1801 16 QFARM 3B W Main St 1801 36.02 QFARM 3B 3 Spring Meadow Ln 1801 36.03 QFARM 3B 3 Spring Meadow Ln 1801 36.04 QFARM 3B 2 Thomas Rd 1801 36.05 QFARM 3B 2 Thomas Rd 1801 37 QFARM 3B 298 Thomas Rd 1801 38 QFARM 3B 298 Thomas Rd 1801 39 QFARM 3B 3 Charolais Farm Rd 2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 3 S Prentice Ln<	101	30	QFARM	3B	127 Ironia Rd	
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1401 7 QFARM 3B 63 E. Main St 1801 5 QFARM 3B 80-88 West Main St 1801 5.01 QFARM 3B W Main St 1801 16 QFARM 3B W Main St 1801 36.02 QFARM 3B 3 Spring Meadow Ln 1801 36.03 QFARM 3B 2 Thomas Rd 1801 36.04 QFARM 3B 2 Thomas Rd 1801 36.05 QFARM 3B 2 Thomas Rd 1801 37 QFARM 3B 298 Thomas Rd 1801 38 QFARM 3B 298 Thomas Rd 1801 39 QFARM 3B W Main St 2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 3 Charolais Farm Rd 2001 1.07 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln	102	6	QFARM	3B	Mountainside Rd	
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1801 36.03 QFARM 3B 4 Thomas Rd 1801 36.04 QFARM 3B Spring Meadow Ln 1801 36.05 QFARM 3B 2 Thomas Rd 1801 37 QFARM 3B Thomas Rd 1801 38 QFARM 3B 298 Thomas Rd 1801 39 QFARM 3B W Main St 2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 6 Charolais Farm Rd 2001 1.07 QFARM 3B 35 Prentice Ln 2001 1.07 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.01 QFARM 3B 147 Talmage Rd 2101 4.02 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B 230 Thomas Rd </td <td>1801</td> <td>16</td> <td>QFARM</td> <td>3B</td> <td>W Main St</td>	1801	16	QFARM	3B	W Main St	
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1801 38 QFARM 3B 298 Thomas Rd 1801 39 QFARM 3B W Main St 2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 6 Charolais Farm Rd 2001 1.07 QFARM 3B 5 Charolais Farm Rd 2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B 230 Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop	1801	36.05	QFARM	3B	2 Thomas Rd	
1801 39 QFARM 3B W Main St 2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 6 Charolais Farm Rd 2001 1.07 QFARM 3B 5 Charolais Farm Rd 2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B 230 Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B	1801	37	QFARM	3B	Thomas Rd	
2001 1.02 QFARM 3B 3 Charolais Farm Rd 2001 1.05 QFARM 3B 6 Charolais Farm Rd 2001 1.07 QFARM 3B 5 Charolais Farm Rd 2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 275 Hilltop Rd 2201 5 QFARM 3B 291 Hilltop Rd 2201 7 QFARM 3B 279 Pleasant Valley Rd 2201 19 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B	1801	38	QFARM	3B	298 Thomas Rd	
2001 1.05 QFARM 3B 6 Charolais Farm Rd 2001 1.07 QFARM 3B 5 Charolais Farm Rd 2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 275 Hilltop Rd 2201 5 QFARM 3B 291 Hilltop Rd 2201 7 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B <	1801	39	QFARM	3B	W Main St	
2001 1.07 QFARM 3B 5 Charolais Farm Rd 2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Plea	2001	1.02	QFARM	3B	3 Charolais Farm Rd	
2001 23.02 QFARM 3B 35 Prentice Ln 2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B Pleasant Valley Rd 2201 19.04 QFARM 3B 243 Pleasant Valley Rd	2001	1.05	QFARM	3B	6 Charolais Farm Rd	
2101 1.03 QFARM 3B 44 Prentice Ln 2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2001	1.07	QFARM	3B	5 Charolais Farm Rd	
2101 1.11 QFARM 3B 48 Prentice Ln 2101 4.02 QFARM 3B 147 Talmage Rd 2101 5 QFARM 3B 135 Talmage Rd 2101 5.01 QFARM 3B 135 Talmage Rd 2201 3 QFARM 3B Thomas Rd 2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2001	23.02	QFARM	3B	35 Prentice Ln	
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2201 4 QFARM 3B 230 Thomas Rd 2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2101	5.01	QFARM	3B	135 Talmage Rd	
2201 4.02 QFARM 3B 220 Thomas Rd 2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2201	3	QFARM	3B		
2201 5 QFARM 3B 275 Hilltop Rd 2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2201	4	QFARM	3B		
2201 7 QFARM 3B 291 Hilltop Rd 2201 19 QFARM 3B 279 Pleasant Valley Rd 2201 19.02 QFARM 3B 95 Pleasant Valley Rd 2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2201	4.02	QFARM	3B		
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2201 19.04 QFARM 3B Pleasant Valley Rd 2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2201	19.02	QFARM	3B		
2201 19.05 QFARM 3B 243 Pleasant Valley Rd	2201	19.04	QFARM	3B	·	
	2201	19.05		3B	243 Pleasant Valley Rd	
	2301	2.01	QFARM	3B	·	

2301	2.02	QFARM	M 3B 175-179 Cherry Ln		
2301	2.03	QFARM	3B	175-179 Cherry Ln	
2301	3	QFARM	3B	375 Cherry Ln	
2301	4.01	QFARM	3B	7 Horseshoe Bend Rd	
2301	4.03	QFARM	3B	3 Horseshoe Bend Rd	
2301	5	QFARM	3B	11 Horseshoe Bend Rd	
2301	6	QFARM	3B	15 Horseshoe Bend Ln	
2301	7	QFARM	3B	8 Horseshoe Bend Ln	
2301	11	QFARM	3B	460 Bernardsville Rd	
2301	12	QFARM	3B	440 Bernardsville Rd	
2301	13	QFARM	3B	350 Bernardsville Rd	
2401	2	QFARM	3B	1 County Line Rd	
2401	5	QFARM	3B	9 County Line Rd	
2401	6.01	QFARM	3B	10 Horseshoe Bend Rd	
2401	7	QFARM	3B	Bernardsville Rd	
2401	8	QFARM	3B	Nichols Rd	
2401	9.01	QFARM	3B	Washington Corner Rd	
2401	9.03	QFARM	3B	Washington Corner Rd	
2401	31	QFARM	3B	2 Oak Forest Ln	
2401	31.06	QFARM	3B	99 Hardscrabble Rd	
2401	31.07	QFARM	3B	6 Horseshoe Bend Rd	
2401	31.08	QFARM	3B	8 Horseshoe Bend Rd	
2401	32	QFARM	3B	16 Horseshoe Bend Rd	
2401	36	QFARM	3B	500 Bernardsville Rd	
2501	1	QFARM	3B	Bliss Rd	
2601	3	QFARM	3B	179 Bliss Rd	
2601	4	QFARM	3B	Bliss Rd	
2601	5	QFARM	3B	Pleasant Valley Rd	
2601	6	QFARM	3B	Pleasant Valley Rd	
2601	7	QFARM	3B	290 Pleasant Valley Rd	

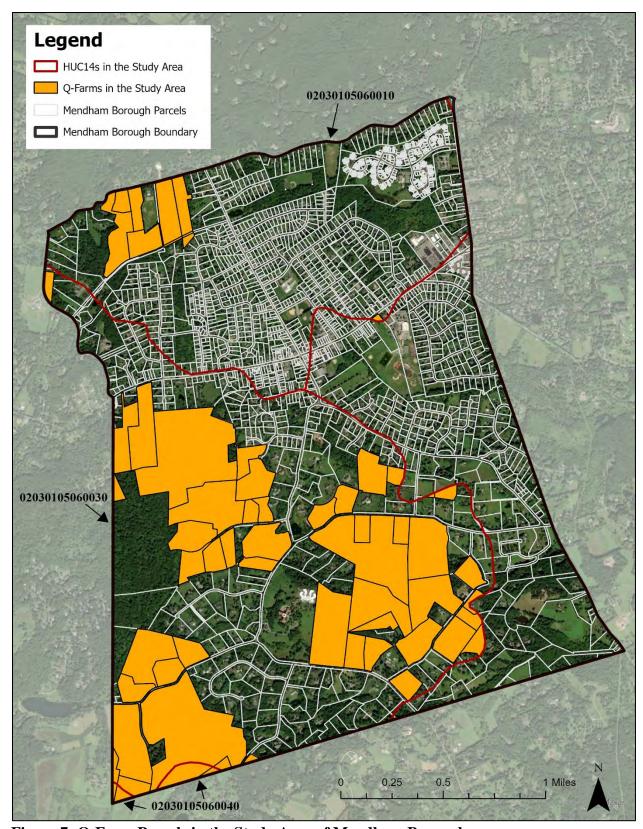


Figure 7: Q-Farm Parcels in the Study Area of Mendham Borough

Table 6: Q-Farm Parcels in the Study Area of Mendham Borough

Table 6:	Q-Farm F	Parcels in t	he Study A	Area of Mendham Borough	
Block	Lot	Q-Code	Prop Class	Location	
101	13	QFARM	3B	210 Mountainside Rd	
101	14	QFARM	3B	220 Mountainside Rd	
101	16	QFARM	3B	226 Mountainside Rd	
101	17	QFARM	3B	240 Mountainside Rd	
101	18	QFARM	3B	250 Mountainside Rd	
101	19	QFARM	3B	260 Mountainside Rd	
101	30	QFARM	3B	127 Ironia Rd	
102	5	QFARM	3B	Mountainside Rd	
102	6	QFARM	3B	Mountainside Rd	
201	63	QFARM	3B	Mountainside Rd	
*1401	7	QFARM	3B	63 E. Main St	
1801	5	QFARM	3B	80-88 West Main St	
1801	5.01	QFARM	3B	W Main St	
1801	16	QFARM	3B	W Main St	
1801	36.02	QFARM	3B	3 Spring Meadow Ln	
1801	36.03	QFARM	3B	4 Thomas Rd	
1801	36.04	QFARM	3B	Spring Meadow Ln	
1801	36.05	QFARM	3B	2 Thomas Rd	
1801	37	QFARM	3B	Thomas Rd	
1801	38	QFARM	3B	298 Thomas Rd	
1801	39	QFARM	3B	W Main St	
2001	1.02	QFARM	3B	3 Charolais Farm Rd	
2001	1.05	QFARM	3B	6 Charolais Farm Rd	
2001	1.07	QFARM	3B	5 Charolais Farm Rd	
*2001	23.02	QFARM	3B	35 Prentice Ln	
*2101	1.03	QFARM	3B	44 Prentice Ln	
*2101	1.11	QFARM	3B	48 Prentice Ln	
2201	3	QFARM	3B	Thomas Rd	
2201	4	QFARM	3B	230 Thomas Rd	
2201	4.02	QFARM	3B	220 Thomas Rd	
2201	5	QFARM	3B	275 Hilltop Rd	
2201	7	QFARM	3B	291 Hilltop Rd	
2201	19	QFARM	3B	279 Pleasant Valley Rd	
2201	19.02	QFARM	3B	·	
2201	19.04	QFARM	3B	•	
2201	19.05	QFARM	3B	BB 243 Pleasant Valley Rd	
2301	2.01	QFARM	3B	-	
2301	2.02	QFARM	3B	175-179 Cherry Ln	
2301	2.03	QFARM	3B	175-179 Cherry Ln	
2301	3	QFARM	3B	375 Cherry Ln	
2301	4.01	QFARM	3B	7 Horseshoe Bend Rd	

2301	4.03	QFARM	3B	3 Horseshoe Bend Rd	
2301	5	QFARM	3B	11 Horseshoe Bend Rd	
2301	6	QFARM	3B	15 Horseshoe Bend Ln	
2301	7	QFARM	3B	8 Horseshoe Bend Ln	
2301	11	QFARM	3B	460 Bernardsville Rd	
2301	12	QFARM	3B	440 Bernardsville Rd	
2301	13	QFARM	3B	350 Bernardsville Rd	
*2401	6.01	QFARM	3B	10 Horseshoe Bend Rd	
*2401	31.07	QFARM	4 3B 6 Horseshoe Bend Rd		
*2401	31.08	QFARM	QFARM 3B 8 Horseshoe I		
2401	32	QFARM	FARM 3B 16 Horseshoe Bend		
2401	36	QFARM	3B 500 Bernardsville Rd		
2501	1	QFARM	3B	Bliss Rd	
2601	3	QFARM	3B	179 Bliss Rd	
2601	4	QFARM	3B Bliss Rd		
2601	5	QFARM	3B Pleasant Valley Rd		
2601	6	QFARM	3B Pleasant Valley Rd		
2601	7	QFARM	M 3B 290 Pleasant Valley Rd		

^{*}Only a portion of the parcel is within the study area

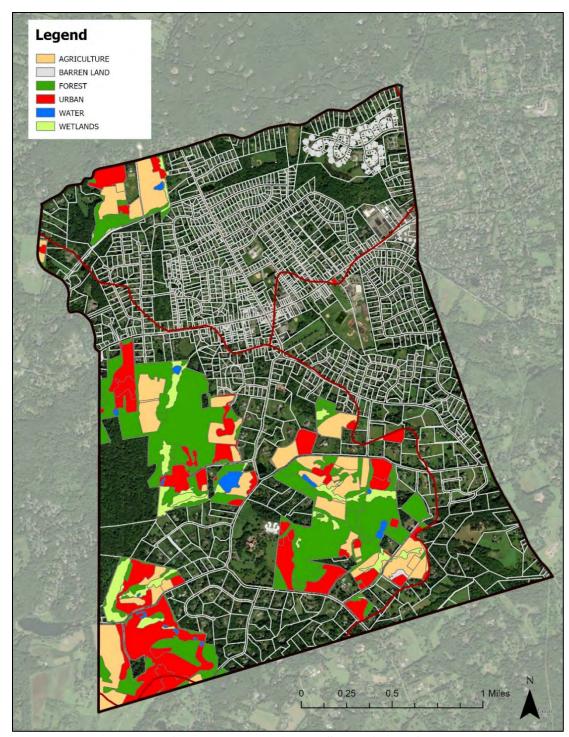


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Mendham Borough

Table 7: Land Use on Q-Farms in the Study Area of Mendham Borough

Land Use	Area (acres)
Agriculture	215.9

Barren Land	1.7		
Forest	381.4		
Urban	255.9		
Water	15.3		
Wetlands	71.0		
Total:	941.3		

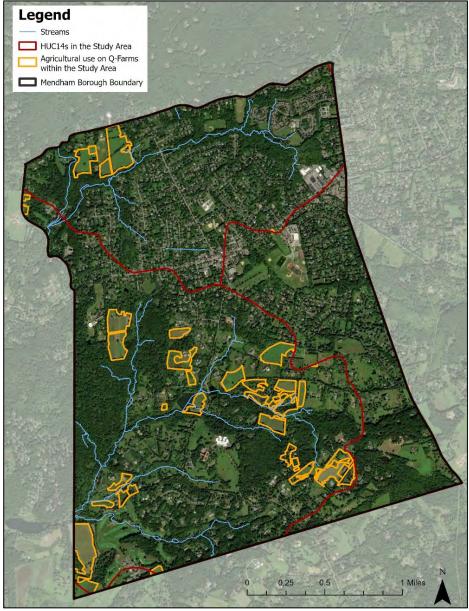


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Mendham Borough

Table 8: Recommendations for Specific Farms in the Study Area of Mendham Borough

	North Branch Raritan River Study Area							
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.
101	13	QFARM				X		X
101	14	QFARM						X
101	19	QFARM				X		X

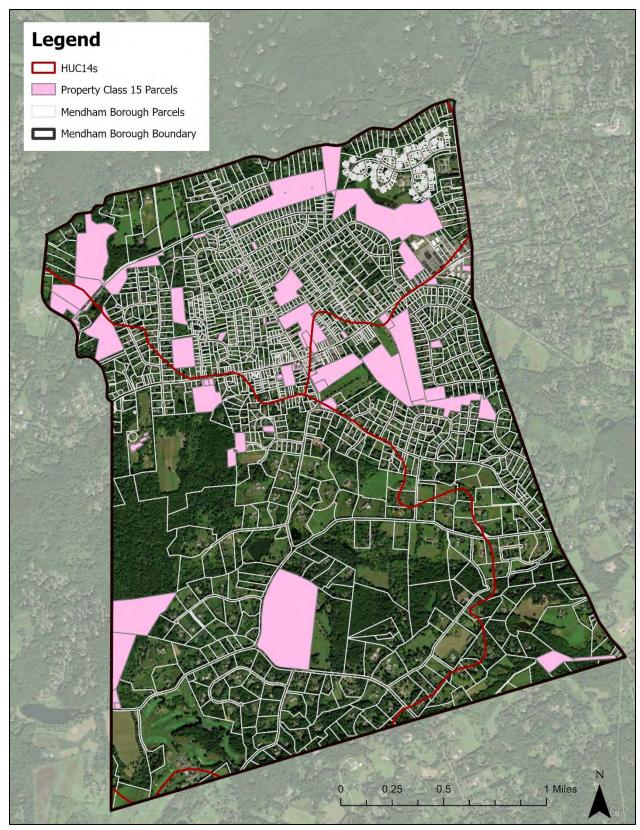


Figure 10: Property Class 15 Parcels in Mendham Borough

Table 9: Property Class 15 Parcels in Mendham Borough

Table 9: Property Class 15 Parcels in Mendham Borough						
Block	Lot	Prop Class	Location	Facility Type		
203	79	15A	Aster Ter	Vacant Land		
601	16	15A	8 Orchard St	Coop Nursey School		
703	16	15A	100 Dean Rd	Schools		
1401	8	15A	65-1/2 E Main St	Schools		
1401	9	15A	E Main St	School & Field House		
1501	9.01	15A	E Main St R.O.W.	Schools		
1501	35	15A	12 Hilltop Rd	Schools		
101	21	15C	Mountainside Rd	Vacant Land		
101	31	15C	Ironia Rd	Sewerage Disposal		
101	32	15C	Ironia Rd	Park		
102	1	15C	Old Railroad Bed	Sewerage		
201	1	15C	Ironia Rd	Sewerage Disposal		
201	2	15C	Ironia Rd	Park		
201	3	15C	Ironia Rd	Park		
201	5	15C	Ironia Rd	Park		
201	6	15C	Ironia Rd	Incinerator		
201	42	15C	Mountainside Rd	Park		
201	70	15C	North Linden Ln	Park		
301	22	15C	4 Wilson St	Community Center		
404	18	15C	Maple Ave	Park		
501	23	15C	88 Mountainside Rd	Recreation Fields		
501	43	15C	Mountainside Rd	Park		
501	43.01	15C	Mountainside Rd	Well / Pump Hse		
501	43.01	15C	Mountainside Rd	Well / Pump Hse		
501	44	15C	Dean Rd	Park		
601	11	15C	24 E Main St	Fire House		
602	3.02	15C	34b East Main St	Park		
801	25	15C	A1-D8 Heritage Manor Dr	Senior Housing		
1401	37	15C	Coventry Rd	Park		
1403	1	15C	Cold Hill Rd & E Main St	Park		
1707	3	15C	Franklin Rd	Park		
1801	16.02	15C	W Main St	Recreation Park		
1801	16.03	15C	W Main St	Recreation Park		
1801	16.04	15C	W Main St	Recreation Park		
1801	19	15C	Heather Hill Way	Park		
1801	38.01	15C	Thomas Rd	Park		
1902	24	15C	2 W Main St	Boro Hall		
1902	26	15C	6 W Main St	Administrative Bldg.		
2701	1	15C	2 Tempe Wick Rd	Post Office		
2701	4	15C	3 Cold Hill Rd	Police Station		
303	3	15D	13 Country Ln	Parsonage		
601	5	15D	10 E Main St	Church		
1401	68	15D	65 E Main St	Church		
1501	4	15D	7 E Main St	Church		
1501	31	15D	20 Hilltop Rd	Church		
1501	34	15D	16 Hilltop Rd	Parsonage		

1801	5	15D	80-88 West Main St	Schools
1902	3	15D	4 New St	Parsonage
1902	4	15D	6 New St	Parish House
1902	27	15D	8 W Main St	Church
2301	13	15D	350 Bernardsville Rd	Schools
2701	5	15D	5 Cold Hill Rd South, 10c	Office Bldg.
301	19	15F	20 Mountain Ave	Disabled Veteran
402	3	15F	4 Garabrant St	Disabled Veteran
902	16	15F	10 Phoenix Dr	Disabled Veteran
1401	64	15F	27 Lowery Ln	Disabled Veteran
1501	37	15F	10 Hilltop Rd	Library
1705	1	15F	8 Leddell Rd	Disabled Veteran
1801	38.01	15F	Thomas Rd	Park
1901	22	15F	4 Muirfield Ln	Disabled Veteran
1902	1	15F	14 W Main St	Administrative Bldg.
1902	22	15F	3 Hilltop Rd	Club
2201	19.01	15F	Pleasant Valley Rd	Conservation Easemnt
2201	19.03	15F	Pleasant Valley Rd	Recreational Park
2201	21	15F	329 Pleasant Valley Rd	Dedicated Open Space
2201	22	15F	Pleasant Valley Rd	Conservation Easemnt
2401	9.04	15F	Washington Corner Rd	Dedicated Open Space

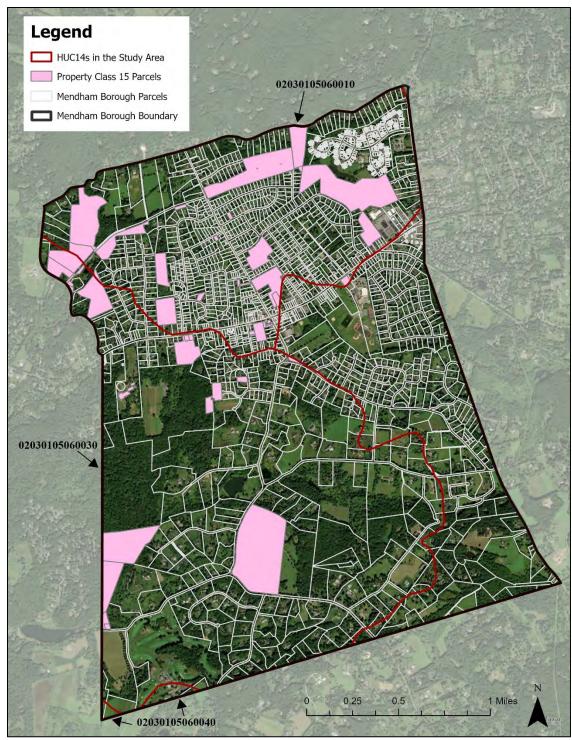


Figure 11: Property Class 15 parcels in the Study Area of Mendham Borough

Table 10: Property Class 15 Parcels in the Study Area of Mendham Borough

Block	Lot	Prop Class	Location	Facility Type
203	79	15A	Aster Ter	Vacant Land
*601 ¹	16	15A	8 Orchard St	Coop Nursey School

703	16	15A	100 Dean Rd	Schools
*1401 ¹	8	15A	65-1/2 E Main St	Schools
101	21	15C	Mountainside Rd	Vacant Land
101	31	15C	Ironia Rd	Sewerage Disposal
101	32	15C	Ironia Rd	Park
102	1	15C	Old Railroad Bed	Sewerage
201	1	15C	Ironia Rd	Sewerage Disposal
201	2	15C	Ironia Rd	Park
201	3	15C	Ironia Rd	Park
201	5	15C	Ironia Rd	Park
*201	6	15C	Ironia Rd	Public Works
201	42	15C	Mountainside Rd	Park
201	70	15C	North Linden Ln	Park
301	22	15C	4 Wilson St	Community Center
404	18	15C	Maple Ave	Park
501	23	15C	88 Mountainside Rd	Recreation Fields
501	43	15C	Mountainside Rd	Park
501	43.01	15C	Mountainside Rd	Well / Pump Hse
501	43.01	15C	Mountainside Rd	Well / Pump Hse
501	44	15C	Dean Rd	Park
801	25	15C	A1-D8 Heritage Manor Dr	Senior Housing
1801	16.02	15C	W Main St	Recreation Park
1801	16.03	15C	W Main St	Recreation Park
1801	16.04	15C	W Main St	Recreation Park
1801	19	15C	Heather Hill Way	Park
1801	38.01	15C	Thomas Rd	Park
*1902	24	15C		
1902	26	15C	2 W Main St 6 W Main St	Boro Hall Administrative Bldg.
303	3	15D	13 Country Ln	Parsonage
*601 ¹	<u> </u>	15D	•	Church
*1401 ¹	68	15D 15D	10 E Main St 65 E Main St	Church
*1501 ¹	31	15D 15D	20 Hilltop Rd	Church
	5	15D 15D	80-88 West Main St	Schools
*1801 *1902 ²	3	15D 15D	4 New St	Parsonage
*1902 *1902 ²	4	15D 15D	6 New St	Parish House
*1902 ²	27	15D 15D	8 W Main St	
		+		Church
2301	13	15D	350 Bernardsville Rd	Schools
301	19	15F	20 Mountain Ave	Disabled Veteran
402	3	15F	4 Garabrant St	Disabled Veteran
902	16	15F	10 Phoenix Dr	Disabled Veteran
*15011	37	15F	10 Hilltop Rd	Library
1801	38.01	15F	Thomas Rd	Park
1901	22	15F	4 Muirfield Ln	Disabled Veteran
1902	1	15F	14 W Main St	Administrative Bldg.
1902	22	15F	3 Hilltop Rd	Club
2201	19.01	15F	Pleasant Valley Rd	Conservation Easemnt
2201	19.03	15F	Pleasant Valley Rd	Recreational Park
2201	21	15F	329 Pleasant Valley Rd	Dedicated Open Space
2201	22	15F	Pleasant Valley Rd	Conservation Easemnt

*Sites that can be retrofitted with green infrastructure

- ¹ Only a portion of the site is within the study area
- ² Site includes three tax-exempt parcels

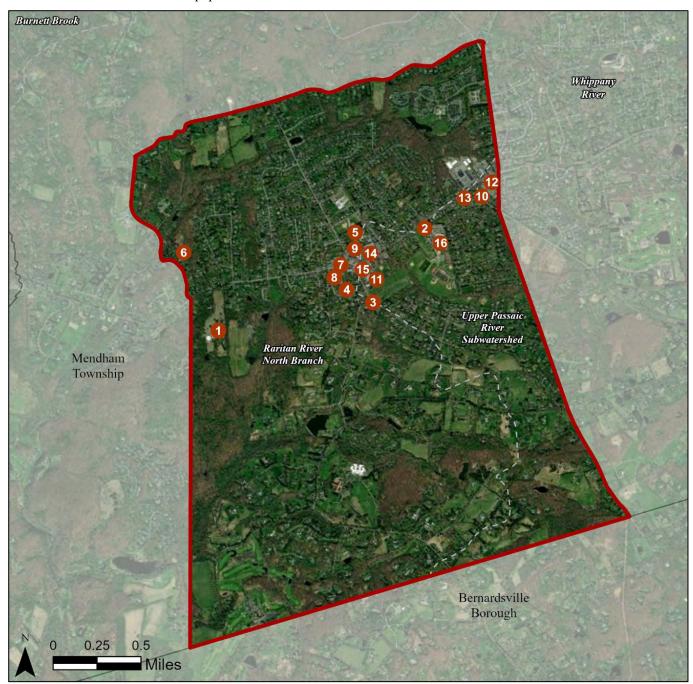


Figure 12: Sites with Green Infrastructure Opportunities in Mendham Borough

DAYTOP PREPARATORY SCHOOL





RAPID: 1

Subwatershed: Raritan River North

Branch

Site Area: 1,167,548 sq. ft.

Address: 80 West Main Street

Mendham, NJ 07945

Block and Lot: Block 1801, Lot 5

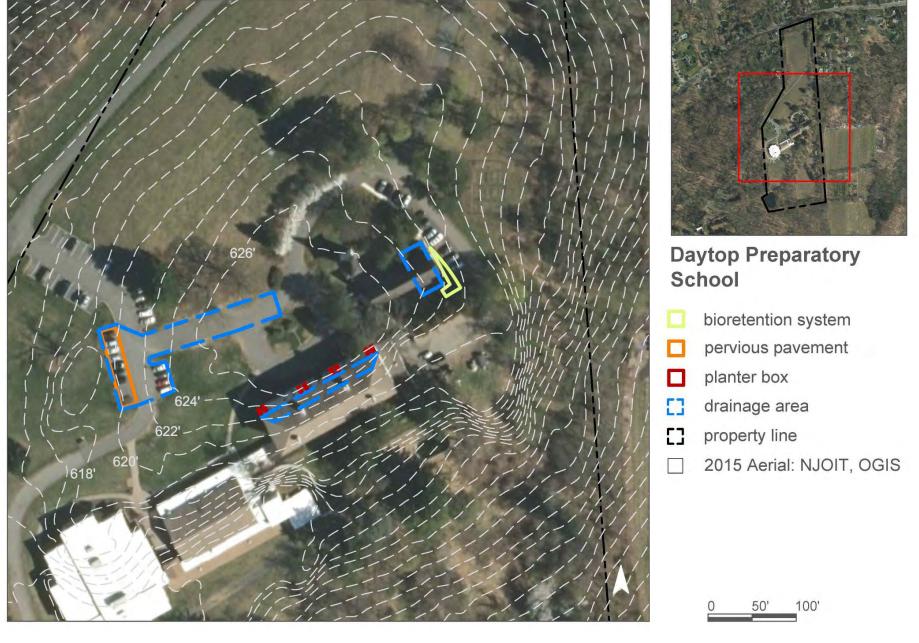




A rain garden can be installed to capture, treat, and filter runoff from the rooftop of the easternmost building on the property. Pervious pavement can be installed in the parking spaces to infiltrate the water from the driveway, and downspout planter boxes can be installed along the front of the school. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of 44		
17	193,923	9.3	97.9	890.4	0.151	5.32	

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 system	0.036	6	2,680	0.10	350	\$1,750
Pervious pavement	0.236	40	17,340	0.65	1,620	\$40,500
Planter boxes	n/a	6	n/a	n/a	8 (boxes)	\$8,000



GRACE LUTHERAN CHURCH



RAPID: 2

Subwatershed: Raritan River North Branch

HUC14 ID: 02030105060010

Site Area: 88,239 sq. ft.

Address: 65 East Main Street

Mendham Borough, NJ 07945

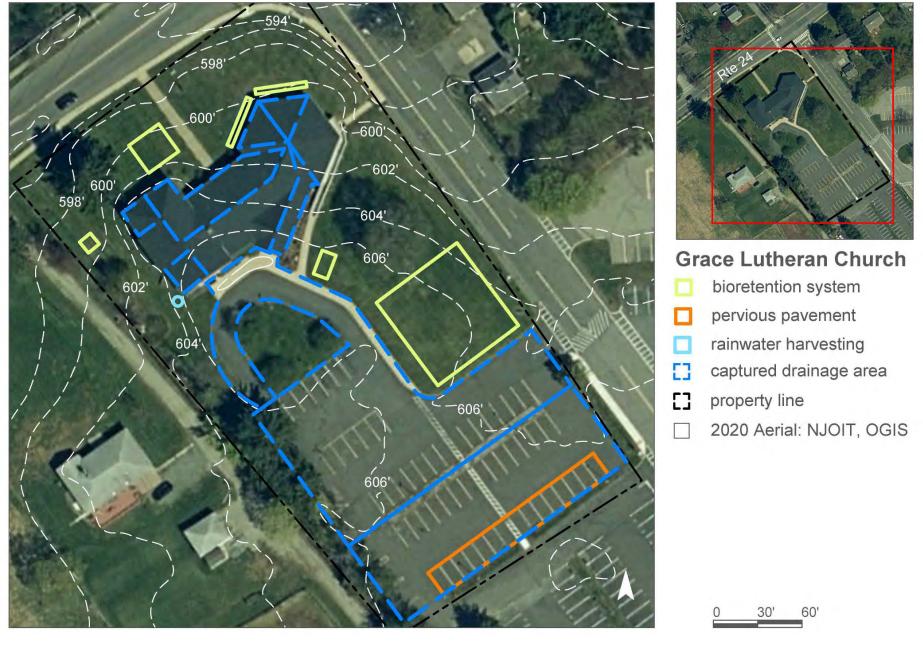




Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the rooftop and parking lot. These may require downspout disconnections, redirection of downspouts underneath the sidewalk, trench drains, and curb cuts. The southernmost parking spaces can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt lot. A trench drain may be required. A cistern can be installed to the southwest of the building to divert and detainthe stormwater runoff from the rooftop for later non-potable reuse such as watering garden beds. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
53	47,168	2.3	23.8	216.6	0.037	1.47	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	23,315	0.690	103	48,630	1.83	5,830	\$58,300
Pervious pavement	11,905	0.352	51	24,830	0.93	2,485	\$62,125
Rainwater harvesting	400	0.012	2	350	0.01	350 (gal)	\$1,050



HILLTOP PRESBYTERIAN CHURCH





RAPID: 3

Subwatershed: Raritan River North

Branch

Site Area: 100,931 sq. ft.

Address: 20 Hilltop Road

Mendham, NJ 07945

Block and Lot: Block 1501, Lot 31





A small section of pervious pavement in parking spaces near the entrance can capture rooftop runoff and help prevent pooling in the adjacent street. Additionally, a rain garden can be installed in front of the building to capture, treat, and infiltrate runoff from the roof. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of 44		
33	32,966	1.6	16.6	151.4	0.026	0.90	

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	0.065	11	4,780	0.18	650	\$3,250
Pervious pavement	0.065	11	4,780	0.18	445	\$11,125



MENDHAM BOROUGH LIBRARY





RAP ID: 4

Subwatershed: Raritan River North

Branch

Site Area: 18,324 sq. ft.

Address: 10 Hilltop Road

Mendham, NJ 07945

Block and Lot: Block 1501, Lot 37





The rooftop drainage area can be treated by the installation of downspout planter boxes around the building near downspouts. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
74	13,553	0.7	6.8	62.2	0.011	0.37

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
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	\$3,000



MENDHAM BOROUGH PARK



RAP ID: 5

Subwatershed: Raritan River North Branch

HUC14 ID: 02030105060010

Site Area: 622,058 sq. ft.

Address: 8 Orchard Street

Mendham Borough, NJ

07945

Block and Lot: Block 601, Lot 16





Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater ru—noff from rooftops, a driveway, and a parking lot. Downspout redirection and redirection beneath a sidewalk may be required. The rain garden to the east of the carriage house c—an be constructed around the nearby catch basin. Parking spaces to the south of fire department can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt lot. The basketball court can also be converted into pervious pavement to capture and infiltrate stormwater runoff from the court. A cistern can be installed to the south of the shed near the fire department to divert and detain the stormwa—ter runoff from the rooftop for later non-potable reuse such as washing vehicles. A gutter system would need to be installed on the structure. A preliminary soil asse—ssment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
30	188,732	9.1	95.3	866.5	0.147	5.88	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	25,860	0.766	112	53,940	2.03	6,465	\$64,650
Pervious pavement	32,170	0.953	141	67,100	2.52	14,600	\$365,000
Rainwater harvesting	455	0.013	2	400	0.02	400 (gal)	\$1,200



MENDHAM BOROUGH PUBLIC WORKS GARAGE





RAPID: 6

Subwatershed: Raritan River North

Branch

Site Area: 658,388 sq. ft.

Address: 37 Ironia Road

Mendham, NJ 07945

Block and Lot: Block 201, Lot 6





Two cisterns can be installed adjacent to the building to treat the building's drainage area. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
14	89,604	4.3	45.3	411.4	0.070	2.46	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Rainwater harvesting	0.067	11	2,000	0.07	2,000 (gal)	\$4,000





Mendham Borough Public Works Garage

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



MENDHAM RECREATION DEPARTMENT





RAP ID: 7

Subwatershed: Raritan River North

Branch

Site Area: 8,097 sq. ft.

Address: 2 West Main Street

Mendham, NJ 07945

Block and Lot: Block 1902, Lot 24

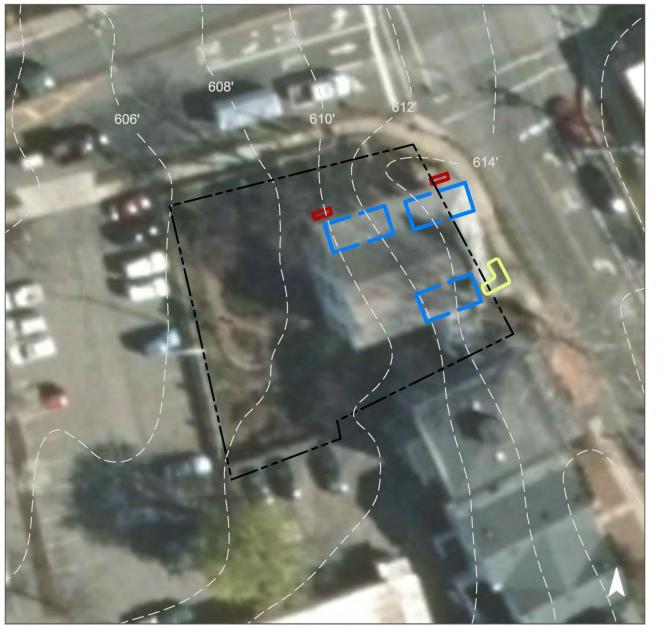




A section of the rooftop runoff can be treated with a small rain garden, and two additional sections of the roof can be treated with two downspout planter boxes. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
84	6,778	0.3	3.4	31.1	0.005	0.19	

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	0.005	1	380	0.01	55	\$275
Planter boxes	n/a	2	n/a	n/a	2 (boxes)	\$2,000





Mendham Recreation Department

- bioretention system
- planter box
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

0 25' 50'

ST. JOSEPH'S SCHOOL



RAPID: 8

Subwatershed: Raritan River North Branch

HUC14 ID: 02030105060010

Site Area: 178,483 sq. ft.

Address: 8 West Main Street

Mendham Borough, NJ 07945

Block and Lot: Block 1902, Lots 3, 4 & 27





A rain garden can be installed near the western parish house to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout redirection. Existing parking spaces to the north, west, and east of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		ting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
65	188,732	5.6	59.0	536.7	0.091	3.64	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	415	0.012	2	870	0.03	105	\$1,050
Pervious pavement	14,775	0.437	65	30,820	1.16	4,395	\$109,875



ST. MARK'S EPISCOPAL CHURCH





RAP ID: 9

Subwatershed: Raritan River North

Branch

Site Area: 32,559 sq. ft.

Address: 9 East Main Street

Mendham, NJ 07945

Block and Lot: Block 1501, Lot 4





A rain garden can be installed near the rear entrance of the building to capture, treat, and infiltrate the water from five nearby connected downspouts. Two downspout planter boxes can be installed to capture rooftop runoff from different sections of the building. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
75	24,471	1.2	12.4	112.4	0.019	0.67	

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
Bioretention system	0.031	5	2,300	0.09	300	\$1,500
Planter boxes	n/a	1	n/a	n/a	2	\$2,000



ATLANTIC CARDIOLOGY GROUP, LLP





RAPID: 10

Subwatershed: Upper Passaic River

Site Area: 104,400 sq. ft.

Address: 8 Tempe Wick Road

Mendham, NJ 07945

Block and Lot: Block 2701, Lots 9,10,11





Rain gardens can be installed throughout the property to capture, treat, and infiltrate stormwater runoff from both the rooftop and the parking lot areas. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
69	71,602	3.5	36.2	328.8	0.056	1.96	

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	0.109	18	8,030	0.30	1,050	\$5,250





Atlantic Cardiology Group, LLP

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

0 25' 50'

HILLTOP ELEMENTARY SCHOOL





RAP ID: 11

Subwatershed: Upper Passaic River

Site Area: 514,676 sq. ft.

Address: 12 Hilltop Road

Mendham, NJ 07945

Block and Lot: Block 1501, Lot 35

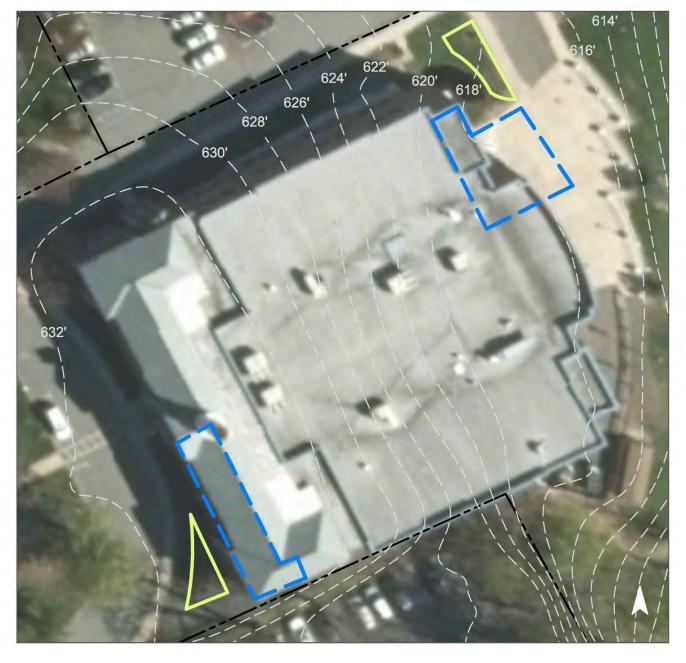




Two rain gardens can be installed in the front and back of the building in the turfgrass areas to help infiltrate the water from the nearby downspouts. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
18	91,769	4.4	46.3	421.3	0.072	2.52	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.085	14	6,250	0.23	815	\$4,075





Hilltop Elementary School

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

0 20' 40

MENDHAM BOROUGH POLICE DEPARTMENT

RAP ID: 12

Subwatershed: Upper Passaic River

HUC14 ID: 02030103010010

Site Area: 32,420 sq. ft.

Address: 3 Cold Hill Road South

Mendham Borough, NJ 07945





A rain garden can be installed to the east of the building using the disconnected downspouts to capture, treat, and infiltrate the stormwater runoff from the rooftop. Two rain gardens can be installed to the east and west of the shed to capture, treat, and infiltrate stormwater runoff from the rooftop. Existing parking spaces on the western side of the lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. This may require trench drains. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous 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 50''	
68	22,136	1.1	11.2	101.6	0.017	0.69	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	2,130	0.063	10	4,440	0.17	530	\$5,300
Pervious pavement	3,350	0.099	15	6,990	0.26	845	\$21,125





Mendham Borough Police Department

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS



MENDHAM POST OFFICE





RAPID: 13

Subwatershed: Upper Passaic River

Site Area: 36,879 sq. ft.

Address: 2 Tempe Wick Road

Mendham, NJ 07945

Block and Lot: Block 2701, Lot 1

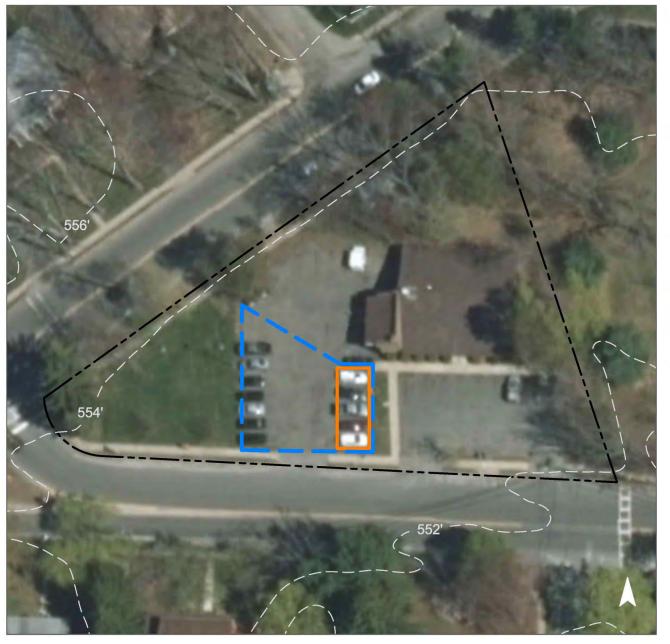




Pervious pavement can be installed in parking spaces to treat runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Cover Existing Loads from Impervious Cover (lbs/yr)		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
69	25,330	1.2	12.8	116.3	0.020	0.69

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
Pervious pavement	0.118	20	8,670	0.33	810	\$20,250





Mendham Post Office

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

MENDHAM UNITED METHODIST CHURCH



RAP ID: 14

Subwatershed: Upper Passaic River

HUC14 ID: 02030103010010

Site Area: 102,831 sq. ft.

Address: 10 East Main Street

Mendham Borough, NJ 07945

Block and Lot: Block 601, Lot 5

07945

A rain garden can be installed to the south of the building using to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout disconnection and redirection. Existing parking spaces in the northern area of the lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous 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 50"	
20	20,403	1.0	10.3	93.7	0.016	0.64	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	870	0.026	4	1,820	0.07	220	\$2,200
Pervious pavement	3,310	0.098	15	6,900	0.26	715	\$17,875



NAILS OF MENDHAM & GRAND BAZAAR





RAP ID: 15

Subwatershed: Upper Passaic River

Site Area: 18,120 sq. ft.

Address: 6 Hilltop Road

Mendham, NJ 07945

Block and Lot: Block 1501, Lot 41





Pervious pavement can be installed to decrease the pooling and erosion caused by the pitch of the pavement and the downspouts leading to the northeast corner of the parking lot. Downspout planter boxes can also be installed to capture runoff from the rooftop. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
79	14,252	0.7	7.2	65.4	0.011	0.39	

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	0.213	36	15,630	0.59	1,460	\$36,500
Planter boxes	n/a	4	n/a	n/a	2 (boxes)	\$2,000



WEST MORRIS MENDHAM HIGH SCHOOL



RAP ID: 16

Subwatershed: Upper Passaic River

HUC14 ID: 02030103010010

Site Area: 1,980,479 sq. ft.

Address: 65 East Main Street

Mendham Borough, NJ 07945

Block and Lot: Block 1401, Lots 8 & 9





A rain garden can be installed to the south corner of the building near the tennis courts to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout disconnection and redirection. The center tennis courts can be converted into pervious pavement to capture and infiltrate the stormwater runoff from all the courts. The downspouts on the adjacent building can be disconnected and redirected to the courts as well, to manage rooftop runoff with the pervious pavement. Existing parking spaces in the northern lot can be converted into pervious pavement to capture and infiltrate stormwater runoff from the asphalt. Trench drains may be required. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous 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 50"	
34	667,501	32.2	337.1	3,064.7	0.520	20.80	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	1,260	0.037	6	2,630	0.10	315	\$3,150
Pervious pavement	83,990	2.487	367	175,190	6.58	22,550	\$563,750





West Morris Mendham High School

- bioretention system
- pervious pavement
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

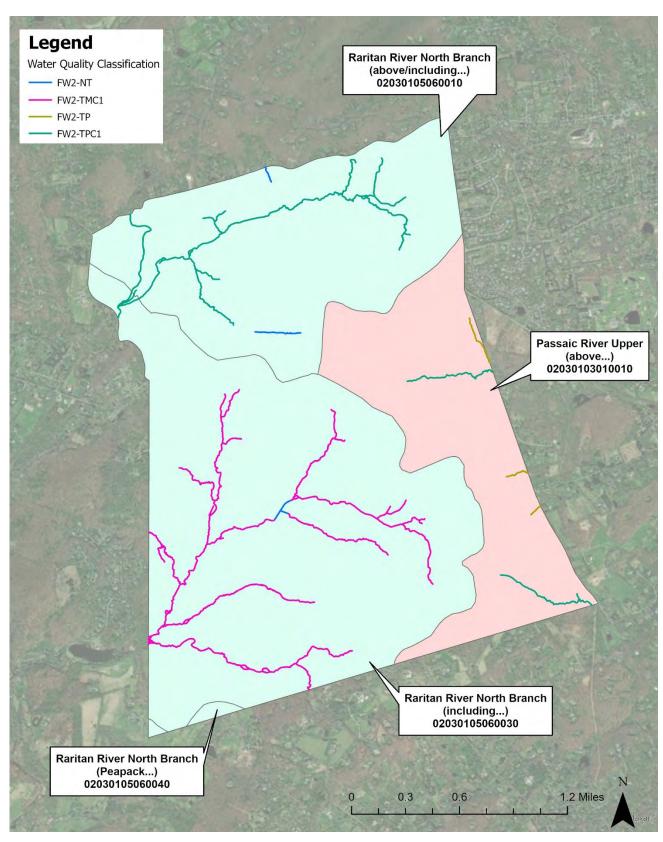


Figure 13. Water Quality Classification of Surface Waters in Mendham Borough

Table 11. Water Quality Classification of Surface Waters in Mendham Borough

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	0.6	3.3%
Freshwater 2, trout production, Category One	FW2-TPC1	6.4	37.5%
Freshwater 2, trout production	FW2-TP	0.5	3.0%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	9.6	56.2%

Mendham Township

Introduction

Located in Morris County in New Jersey, Mendham Township covers about 18.0 square miles. With a population of 6,016 (2020 United States Census), Mendham Township consists of 33.0% of urban land uses by area. Of that urban land use, approximately 74.4% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 61.2% of Mendham Township.

Mendham Township contains portions of ten subwatersheds (Table 1). There are approximately 48.2 miles of rivers and streams within the municipality; these include Burnett Brook and its tributaries, Dawsons Brook and its tributaries, tributaries to Gladstone Brook, Harmony Brook and its tributaries, India Brook and its tributaries, McVickers Brook and its tributaries, North Branch Raritan River and its tributaries, Passaic River and its tributaries, Whippany River and its tributaries, and several uncoded tributaries. Mendham Township is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Mendham Township

Subwatershed	HUC14
Passaic River Upper (above Osborn Mills)	02030103010010
Primrose Brook	02030103010020
Whippany River (above road at 74d 33m)	02030103020010
Whippany River (Washington Valley Road to 74d 33m)	02030103020020
Whippany River (Lake Pocahontas to Washington Valley Road)	02030103020040
Raritan River North Branch (above/including India Brook)	02030105060010
Burnett Brook (above Old Mill Road)	02030105060020
Raritan River North Branch (including McVickers to India Brook)	02030105060030
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040

Peapack Brook (above/including Gladstone Brook)	02030105060050
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The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Mendham Township. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Mendham Township's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Mendham Township in relation to the study area. Figure 2 shows the portions of the ten HUC14s in Mendham Township and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Mendham Township. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Mendham Township and is presented in Table 2. Figure 4 shows the impervious cover in Mendham Township based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Mendham Township and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basin). Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins without vegetative shoreline buffers were identified in Mendham Township within the study area.

The Q-Farms in Mendham Township have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the study area of Mendham Township have been identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is

often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 647.9 acres of agricultural land use in Mendham Township, of which, 412.0 acres lie within the study area for this Watershed Restoration and Protection Plan. There are 89 Q-Farms in the study area portion of Mendham Township, totaling 1,203.7 acres. Within the 89 Q-Farms, there are approximately 311.4 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Mendham Township are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Five HUC14s are included in the study area (02030105060010, 02030105060020, 02030105060030, 02030105060040, 02030105060050). Within these five HUC14s, there are 72.3 acres of buildings and 128.0 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Mendham Township, approximately 4.5 acres of rooftop runoff would be managed with 0.90 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Mendham Township, approximately 12.8 acres of roadway would be managed, or 3.5 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Mendham Township are shown in Figure 10 and presented in Table 9. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 11). Available information for each parcel in the study area is presented in Table 10. Class 15E parcels were excluded from the assessment. Four of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 10 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 12 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Nontrout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further classified based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are five classifications that apply to the streams in Mendham Township. Figure 13 depicts the water quality classifications of surface waters throughout Mendham Township and Table 11 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

Administrators from Mendham Township have identified several locations throughout the municipality that are particularly susceptible to flooding during heavy rainfall or storm events. The municipal building parking area has been observed to experience flooding when the adjacent Harmony Brook overflows after heavy rainfall. East Main Street, near Dismal Harmony Natural Area, has also been identified as an area prone to flooding. Mendham Township administrators believe that dredging of an old pond nearby may reduce flooding concerns. Dredging the pond would increase its storage capacity and subsequently help reduce the volume and speed of runoff to nearby areas. Mosle Bridge over the North Branch Raritan River has also been reported to experience flooding after storm events. Some repairs have been made to the bridge and the stream bank has undergone stabilization in efforts reduce flooding in the area. Figure 14 shows the locations of the aforementioned areas of concern.

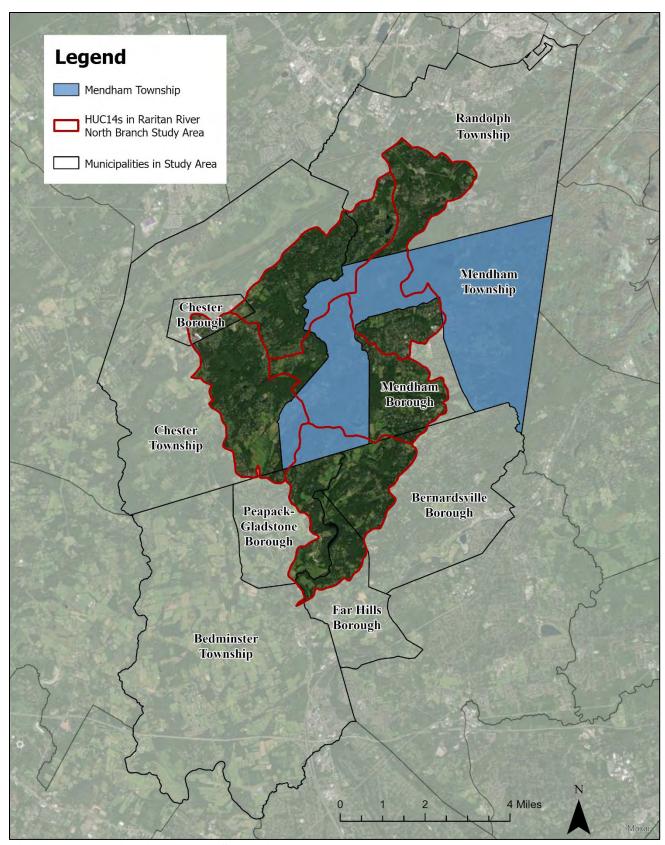


Figure 1: Municipalities in the Study Area

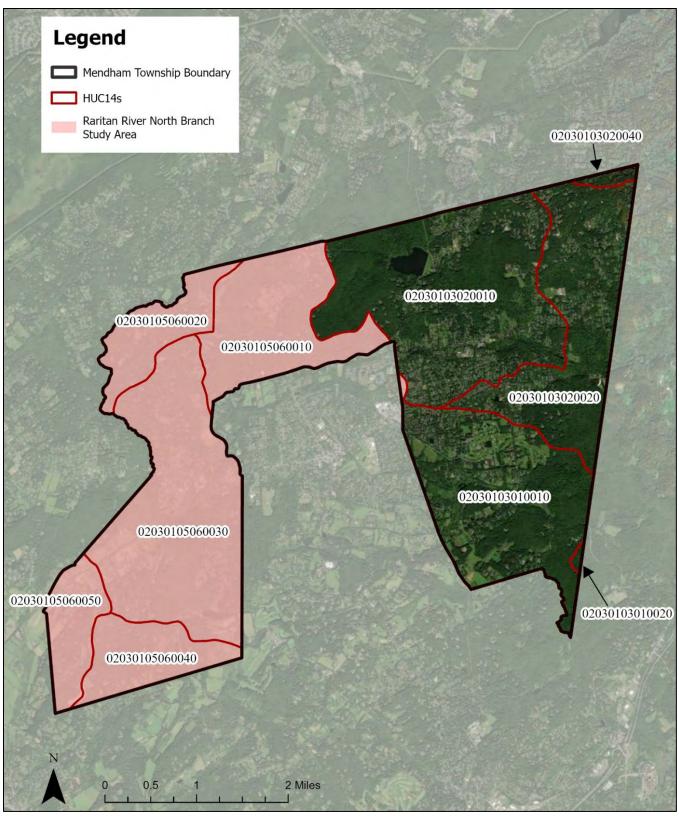


Figure 2: Portions of ten HUC14s are in Mendham Township

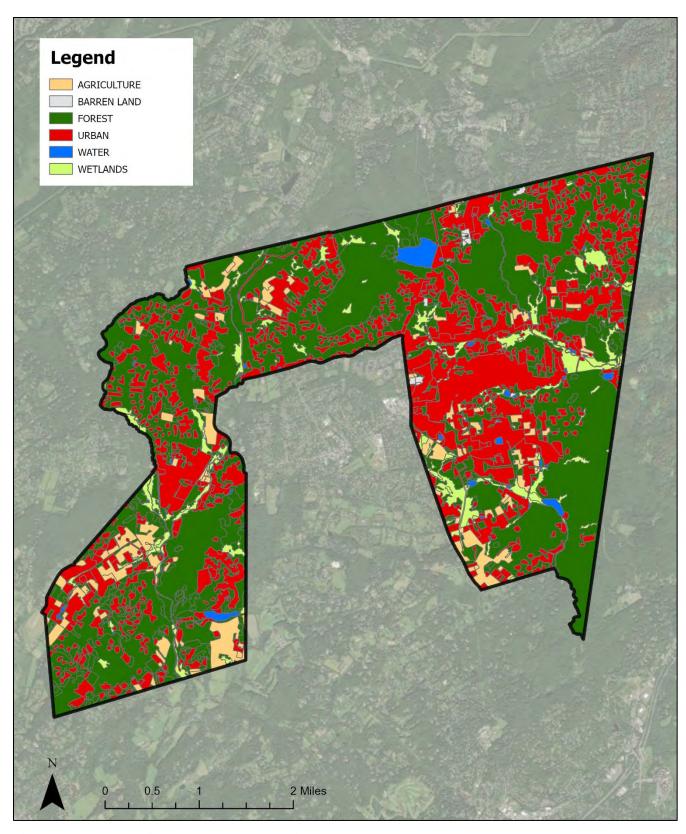


Figure 3: Land Use in Mendham Township

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Mendham Township

Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030103010010		
Agriculture	184.6	240.0	1,846.5	55,393.7
Barren Land	0.0	0.0	0.0	0.0
Forest	928.3	92.8	2,784.8	37,131.1
Urban	636.1	890.6	9,542.2	89,060.3
Water	33.9	3.4	101.7	1,355.8
Wetlands	148.1	14.8	444.4	5,925.1
TOTAL =	1,931.1	1,241.7	14,719.5	188,866.0
		02030103010020		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	17.6	1.8	52.9	706.0
Urban	0.0	0.0	0.0	0.0
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	17.6	1.8	52.9	706.0
		02030103020010		
Agriculture	37.8	49.1	378.0	11,341.3
Barren Land	19.2	9.6	96.2	1,154.8
Forest	1,407.6	140.8	4,222.7	56,302.1
Urban	1,015.6	1,421.9	15,234.2	142,185.4
Water	74.4	7.4	223.1	2,975.0
Wetlands	118.7	11.9	356.0	4,746.9
TOTAL =	2,673.3	1,640.7	20,510.2	218,705.4
		02030103020020		
Agriculture	13.5	17.6	135.2	4,056.1
Barren Land	1.2	0.6	5.8	69.8
Forest	914.6	91.5	2,743.7	36,583.3
Urban	603.6	845.0	9,053.5	84,499.2
Water	15.1	1.5	45.4	605.6
Wetlands	121.8	12.2	365.4	4,872.2
TOTAL =	1,669.8	968.3	12,349.1	130,686.2
		02030103020040		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	33.1	3.3	99.2	1,323.2
Urban	26.3	36.9	395.1	3,687.8
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0

TOTAL =	59.4	40.2	494.4	5,011.0
		02030105060010		
Agriculture	56.2	73.0	561.7	16,852.0
Barren Land	3.1	1.6	15.5	186.3
Forest	731.2	73.1	2,193.6	29,247.6
Urban	382.2	535.1	5,733.5	53,512.3
Water	10.8	1.1	32.4	432.3
Wetlands	49.2	4.9	147.5	1,966.8
TOTAL =	1,232.7	688.8	8,684.2	102,197.2
		02030105060020		·
Agriculture	24.9	32.3	248.6	7,457.9
Barren Land	0.0	0.0	0.0	0.0
Forest	370.4	37.0	1,111.2	14,816.6
Urban	141.2	197.7	2,118.1	19,769.3
Water	6.9	0.7	20.6	274.6
Wetlands	9.1	0.9	27.4	364.9
TOTAL =	552.5	268.7	3,525.9	42,683.3
		02030105060030	,	
Agriculture	198.4	257.9	1,984.1	59,522.2
Barren Land	0.0	0.0	0.0	0.0
Forest	1,233.4	123.3	3,700.3	49,336.9
Urban	700.3	980.4	10,504.1	98,038.2
Water	39.9	4.0	119.7	1,596.4
Wetlands	120.9	12.1	362.7	4,835.3
TOTAL =	2,292.9	1,377.7	16,670.8	213,329.1
	,	02030105060040	,	,
Agriculture	76.1	99.0	761.2	22,835.2
Barren Land	0.0	0.0	0.0	0.0
Forest	391.3	39.1	1,174.0	15,653.4
Urban	126.4	177.0	1,896.4	17,700.2
Water	4.7	0.5	14.0	187.2
Wetlands	21.8	2.2	65.4	872.2
TOTAL =	620.4	317.7	3,911.1	57,248.2
		02030105060050		
Agriculture	56.4	73.3	563.9	16,916.6
Barren Land	0.0	0.0	0.0	0.0
Forest	241.7	24.2	725.2	9,669.3
Urban	171.0	239.4	2,564.7	23,937.3
Water	3.0	0.3	8.9	119.2
Wetlands	5.1	0.5	15.2	202.1
TOTAL =	477.1	337.7	3,877.9	50,844.6
All HUCs				
Agriculture	647.9	842.3	6,479.2	194,375.1
				· ·

Barren Land	23.5	11.8	117.6	1,410.9
Forest	6,269.2	626.9	18,807.7	250,769.5
Urban	3,802.8	5,323.9	57,041.8	532,390.0
Water	188.7	18.9	566.0	7,546.0
Wetlands	594.6	59.5	1,783.9	23,785.5
TOTAL =	11,526.7	6,883.2	84,796.1	1,010,276.9

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Mendham Township that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Mendham Township. Based upon the NJDEP impervious surface data, Mendham Township has impervious cover totaling 7.8%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Mendham Township is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Mendham Township's impervious cover percentage would suggest that its waterways are primarily sensitive and most likely preventing degradation of the state's surface water quality standards.

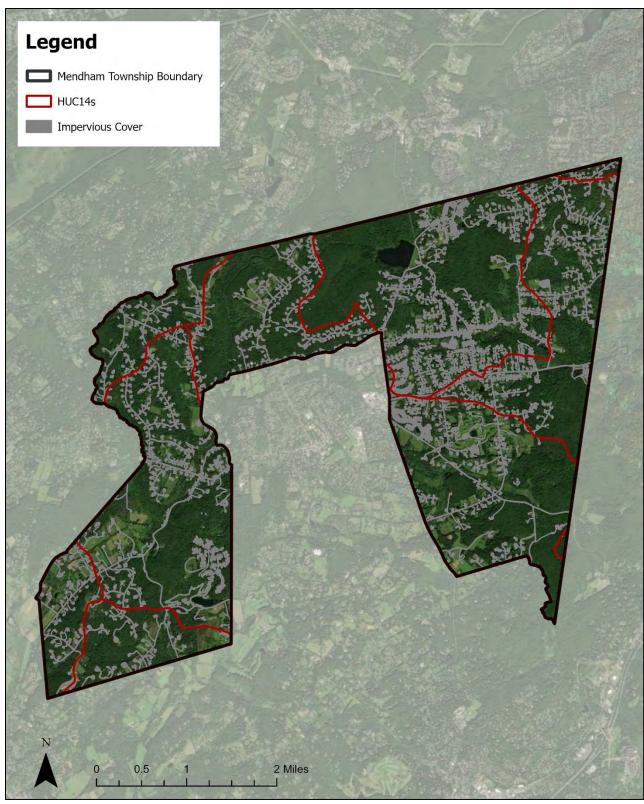


Figure 4: Impervious Cover in Mendham Township

 Table 3: Impervious Cover Analysis by HUC14 for Mendham Township

Class	Area (acres)	HUC Impervious Cover (%)		
	02030103010010			
Building	23.47			
Other	58.84			
Road	41.72			
TOTAL =	124.0	6.4%		
	02030103010020			
Building	0.01			
Other	0.00			
Road	0.00			
TOTAL =	0.01	0.1%		
·	02030103020010			
Building	58.62			
Other	105.95			
Road	77.30			
TOTAL =	241.9	9.0%		
-	02030103020020			
Building	30.92			
Other	68.98			
Road	44.33			
TOTAL =	144.2	8.6%		
10111	02030103020040	3,3,7		
Building	1.84			
Other	3.28			
Road	2.10			
TOTAL =	7.2	12.2%		
TOTAL -	02030105060010	12.270		
Building	18.13			
Other	46.33			
Road	28.07			
TOTAL =	92.5	7.5%		
IOIAL -	02030105060020	7.570		
Building	7.67			
Other	20.19			
Road	12.57			
TOTAL =	40.4	7.3%		
IOIAL -	02030105060030	1.07/0		
Building	32.94			
Other	77.95			
Road	66.32			
TOTAL =	177.2	7.7%		
IOIAL =	02030105060040	1.170		
Duilding				
Building	6.33			
Other	19.44			
Road	8.76	F (0/		
TOTAL =	34.5	5.6%		

02030105060050					
Building	7.27				
Other	20.72				
Road	12.32				
TOTAL	L = 40.3	8.4%			
	All HUCs				
Building	187.19				
Other	421.68				
Road	293.49				
TOTAL	L = 902.4	7.8%			

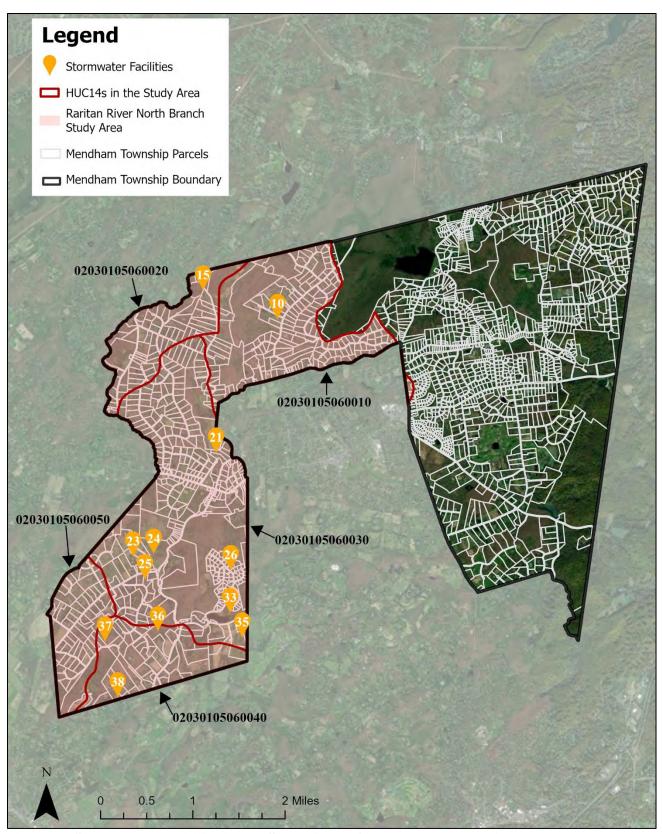


Figure 5: Stormwater Facilities in the Study Area of Mendham Township

Table 4: Location of Stormwater Facilities in the Study Area of Mendham Township

Rarita	Raritan River North Branch Study Area					
<u>ID</u>	<u>Address</u>					
10	2 Barer Ln	I				
15	107 Ironia Rd	I				
21	32 Ironia Rd	D				
23	4 Pine Hollow Ln	N				
24	3 Pine Hollow Ln	N				
25	4 Pine Hollow Ln	N				
26	92 Rockwell Ct	N				
33	Brookrace Dr	N				
35	306 Pleasant Valley Rd	RB				
36	4 Rainetree Rdg	N				
37	11 Wright Ln	D				
38	99 Mosle Rd	I				

"D" = Detention, "N" = Naturalized, "I" = Infiltration, "RB" = Retention with Buffer

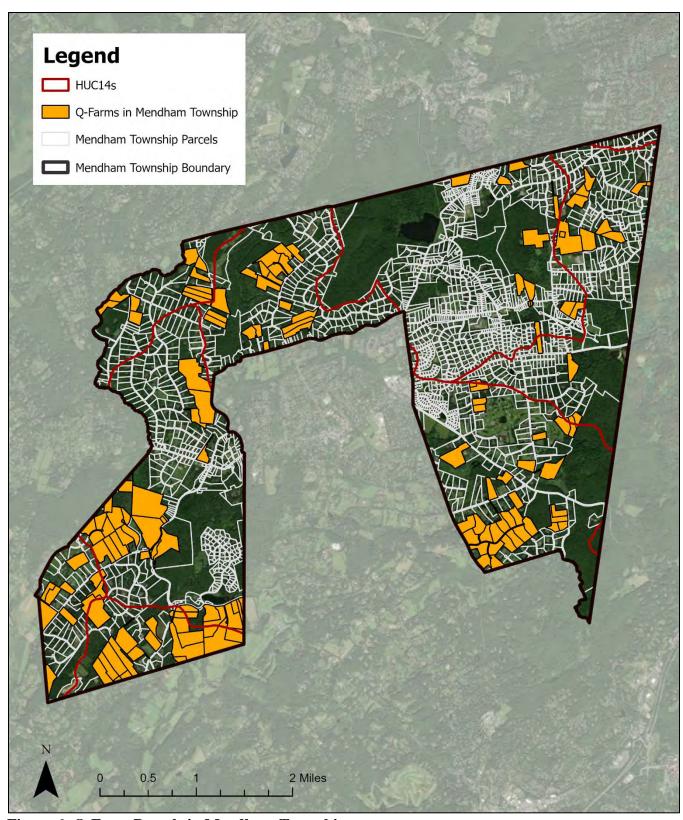


Figure 6: Q-Farm Parcels in Mendham Township

Table 5: Q-Farm Parcels in Mendham Township

Table 5:	Q-Farm Parcels in Mendham Township					
Block	Lot	Q-Code	Prop Class	Location		
27	6.02	QFARM	3B	38 Old Mill Rd		
100	15	QFARM	3B	Roxiticus Rd		
100	19	QFARM	3B	99 Mosle Rd		
100	20	QFARM	3B	103 Mosle Rd		
100	21	QFARM	3B	107 Mosle Rd		
100	22	QFARM	3B	109 Mosle Rd		
100	23	QFARM	3B	105 Mosle Rd		
100	24	QFARM	3B	113 Mosle Rd		
100	26.01	QFARM	3B	123 Mosle Rd		
100	27.06	QFARM	3B	127 Mosle Rd		
100	27.07	QFARM	3B	3 Timber Ridge Rd		
100	29	QFARM		Mosle Rd		
100	31	QFARM	3B	Mosle Rd		
100	32	QFARM	3B	139 Mosle Rd		
100	37	QFARM	3B	34 Roxiticus Rd		
100	52	QFARM	3B	11 Wright Ln		
100	63	QFARM	3B	78 Roxiticus Rd		
100	64	QFARM	3B	76a Roxiticus Rd		
100	71	QFARM	3B	94 Roxiticus Rd		
103	1	QFARM		Brookrace Dr		
103	2	QFARM	3B	140 Mosle Rd		
103	3	QFARM	3B	138 Mosle Rd		
103	4	QFARM	3B	320 Pleasant Valley Rd		
103	5	QFARM	3B	316 Pleasant Valley Rd		
103	6	QFARM	3B	314 Pleasant Valley Rd		
103	7	QFARM	3B	304 Pleasant Valley Rd		
103	8	QFARM	3B	304 Pleasant Valley Rd		
103	9	QFARM	3B	306 Pleasant Valley Rd		
103	10	QFARM	3B	302 Pleasant Valley Rd		
103	11	QFARM	3B	136 Mosle Rd		
103	12	QFARM	3B	134 Mosle Rd		
103	13	QFARM	3B	61 Stevens Ln		
104	27.01	QFARM	3B	44 Roxiticus Rd		
104	27.02	QFARM	3B	2 Union Schoolhouse Rd		
104	27.05	QFARM	3B	50 Roxiticus Rd		
105	1	QFARM	3B	Roxiticus Rd		
106	4	QFARM	3B	71 East Fox Chase Rd		
106	5	QFARM	3B	65 East Fox Chase Rd		
106	8.03	QFARM	3B	2 Winston Farm Ln		
106	8.12	QFARM	3B	87 Roxiticus Rd		
107	44	QFARM	3B	2 Mount Paul Rd		

107	45	45 QFARM 3B 51 Roxiticus			
107	46	QFARM	3B	55-57 Roxiticus Rd	
107	48.03	QFARM	3B	5 Pine Hollow Ln	
107	48.04	QFARM	3B	6 Pine Hollow Ln	
107	48.06	QFARM	3B	4 Pine Hollow Ln	
107	50	QFARM	3B	67 Roxiticus Rd	
107	51	QFARM	3B	69 Roxiticus Rd	
107	52	QFARM	3B	71 Roxiticus Rd	
107	53	QFARM	3B	73 Roxiticus Rd	
107	58	QFARM	3B	1 Bittersweet Ln	
107	59	QFARM	3B	3 Bittersweet Ln	
107	60	QFARM	3B	4 Bittersweet Ln	
107	61	QFARM	3B	2 Bittersweet Ln	
107	66	QFARM	3B	23 Mt Paul Rd	
*107	69	QFARM	3B	5 Mount Paul Rd	
109	22	QFARM	3B	36 Ironia Rd	
109	23	QFARM	3B	32 Ironia Rd	
109	34	QFARM	3B	327 Mendham Rd West	
109	53	QFARM	3B	9 North Gate Rd	
112	1	QFARM	3B	18 Burnett Rd	
112	13	QFARM	3B	72 Old Mill Rd	
113	2	QFARM	3B	81 Old Mill Rd	
113	2.01	QFARM	3B	79 Old Mill Rd	
114	3	QFARM	3B	102 Ironia Rd	
114	4	QFARM	3B	100 Ironia Rd	
114	6	QFARM	3B	96 Ironia Rd	
114	8	QFARM	3B	92 Ironia Rd	
114	9	QFARM	3B	88 Ironia Rd	
114	10	QFARM	3B	84 Ironia Rd	
116	9.04	QFARM	3B	40 Calais Rd	
116	13	QFARM	3B	1 Samantha Ln	
116	15.01	QFARM	3B	3 Barer Ln	
116	15.02	QFARM	3B	1 Barer Ln	
116	15.03	QFARM	3B	2 Barer Ln	
116	17	QFARM	3B	20 Calais Rd	
116	18	QFARM	3B	3 Amalia Ct	
116	20	QFARM	3B	6 Amalia Ct	
116	22	QFARM	3B	18 Calais Rd	
116	43	QFARM	3B	225 Mountainside Rd	
116	46	QFARM	3B	235 Mountainside Rd	
116	46.01	+ -	3B	Mountainside Rd	
116	64	QFARM	3B	79 Ironia Rd	
116	65	QFARM	3B	81 Ironia Rd	
116	67	QFARM	3B	87 Ironia Rd	
116 116 116 116	46 46.01 64 65	QFARM QFARM QFARM QFARM	3B 3B 3B 3B	235 Mountainside Rd Mountainside Rd 79 Ironia Rd 81 Ironia Rd	

117	13	QFARM	3B	2 Lone Spruce Trl
117	49.01		3B	5 Calais Rd
		QFARM		
117	49.02	QFARM	3B	7 Calais Rd
117	55	QFARM	3B	17 Calais Rd
120	21	QFARM	3B	9 Old Brookside Rd
123	21	QFARM	3B	47 Mount Pleasant Rd
123	25.01	QFARM	3B	5 Tufts Ln
125	23	QFARM	3B	7 Schoolhouse Ln
125	26	QFARM	3B	53 Schoolhouse Ln
127	77	QFARM	3B	30 Mount Pleasant Rd
127	105.02	QFARM	3B	7 Queens Ct
127	105.03	QFARM	3B	8 Queens Ct
127	105.04	QFARM	3B	10 Queens Ct
127	122	QFARM	3B	14 Old Orchard Rd
127	126	QFARM	3B	6 Old Orchard Rd
127	148.01	QFARM	3B	32 Old Orchard Rd
127	163	QFARM	3B	59 Tingley Rd
127	164	QFARM	3B	41a Tingley Rd
127	172	QFARM	3B	62 Tingley Rd
127	182	QFARM	3B	34 East Main St
127	187	QFARM	3B	32 East Main St
139	13	QFARM	3B	21 East Main St
139	14	QFARM	3B	23 East Main St
139	80	QFARM	3B	172 Mendham Rd East
141	53	QFARM	3B	19 Tingley Rd
141	54	QFARM	3B	23 Tingley Rd
142	28	QFARM	3B	189 Mendham Rd East
142	58	QFARM	3B	5 Indian Hollow Rd
142	58.01	QFARM	3B	Indian Hollow Rd
142	58.02	QFARM	3B	Indian Hollow Rd
142	67	QFARM	3B	26 Corey Ln
142	73	QFARM	3B	18 Corey Ln
144	29.01	QFARM	3B	25 Corey Ln
144	42	QFARM	3B	14 Kennaday Rd
144	43	QFARM	3B	12a Kennaday Rd
144	46	QFARM	3B	8 Kennaday Rd
144	47	QFARM		Kennaday Rd
146	9	QFARM	3B	43 Tempe Wick Rd
146	14	QFARM	3B	57 Tempe Wick Rd
146	19	QFARM	3B	41 Corey Ln
147	11	QFARM	3B	36 Corey Ln
147	21	QFARM	3B	11 Leddell Rd
147	22	QFARM	15C	13 Leddell Rd
147	23	QFARM	15C	1 Cobblefield Dr
		1 Coolered Di		

147	24	QFARM	15C	3 Cobblefield Dr
147	42.01	QFARM	3B	1 Exmoor Dr
147	42.02	QFARM	3B	54 Hardscrabble Rd
147	42.03	QFARM	3B	1 Applejack Ln
147	42.04	QFARM	3B	3 Exmoor Dr
147	42.05	QFARM	3B	5 Exmoor Dr
147	42.06	QFARM	3B	7 Exmoor Dr
147	42.07	QFARM	3B	9 Exmoor Dr
147	42.08	QFARM	3B	11 Exmoor Dr
147	42.09	QFARM	3B	13 Exmoor Dr
147	42.1	QFARM	3B	10 Exmoor Dr
147	42.11	QFARM	3B	8 Exmoor Dr
147	42.12	QFARM	3B	6 Exmoor Dr
147	42.13	QFARM	3B	4 Exmoor Dr
147	42.14	QFARM	3B	2 Exmoor Dr
147	42.15	QFARM	1	Hardscrabble Rd
147	42.16	QFARM	3B	3 Sutton Pl
147	42.17	QFARM	3B	Exmoor Dr
*3601	7	QFARM	3B	54 School House Ln

^{*}Only a portion of the Q-Farm is within the Mendham Township boundary

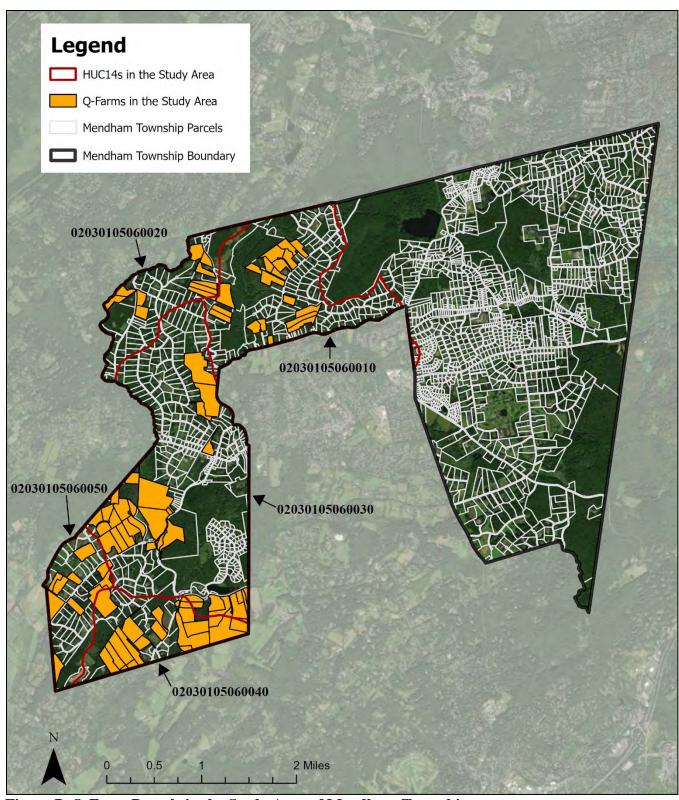


Figure 7: Q-Farm Parcels in the Study Area of Mendham Township

Table 6: Q-Farm Parcels in the Study Area of Mendham Township

Table 6:	Q-Farm Parcels in the Stu			<u>dy Area of Mendham Township</u>		
Block	Lot	Q-Code	Prop Class	Location		
27	6.02	QFARM	3B	38 Old Mill Rd		
100	15	QFARM	3B	Roxiticus Rd		
100	19	QFARM 3B		99 Mosle Rd		
100	20	QFARM	3B	103 Mosle Rd		
100	21	QFARM	3B	107 Mosle Rd		
100	22	QFARM	3B	109 Mosle Rd		
100	23	QFARM	3B	105 Mosle Rd		
100	24	QFARM	3B	113 Mosle Rd		
100	26.01	QFARM	3B	123 Mosle Rd		
100	27.06	QFARM	3B	127 Mosle Rd		
100	27.07	QFARM	3B	3 Timber Ridge Rd		
100	29	QFARM		Mosle Rd		
100	31	QFARM	3B	Mosle Rd		
100	32	QFARM	3B	139 Mosle Rd		
100	37	QFARM	3B	34 Roxiticus Rd		
100	52	QFARM	3B	11 Wright Ln		
100	63	QFARM	3B	78 Roxiticus Rd		
100	64	QFARM	3B	76a Roxiticus Rd		
100	71	QFARM	3B	94 Roxiticus Rd		
103	1	QFARM		Brookrace Dr		
103	2	QFARM	3B	140 Mosle Rd		
103	3	QFARM	3B	138 Mosle Rd		
103	4	QFARM	3B	320 Pleasant Valley Rd		
103	5	QFARM	3B	316 Pleasant Valley Rd		
103	6	QFARM	3B	314 Pleasant Valley Rd		
103	7	QFARM	3B	304 Pleasant Valley Rd		
103	8	QFARM	3B	304 Pleasant Valley Rd		
103	9	QFARM	3B	306 Pleasant Valley Rd		
103	10	QFARM	3B	302 Pleasant Valley Rd		
103	11	QFARM	3B	136 Mosle Rd		
103	12	QFARM	3B	134 Mosle Rd		
103	13	QFARM	3B	61 Stevens Ln		
104	27.01	QFARM	3B	44 Roxiticus Rd		
104	27.02	QFARM	3B	2 Union Schoolhouse Rd		
104	27.05	QFARM	3B	50 Roxiticus Rd		
105	1	QFARM	3B	Roxiticus Rd		
106	4	QFARM	3B	71 East Fox Chase Rd		
106	5	QFARM	3B	65 East Fox Chase Rd		
106	8.03	QFARM	3B	2 Winston Farm Ln		
106	8.12	QFARM	3B	87 Roxiticus Rd		
107	44	+	3B	2 Mount Paul Rd		
103 103 104 104 105 106 106 106	12 13 27.01 27.02 27.05 1 4 5 8.03 8.12	QFARM	3B 3B 3B 3B 3B 3B 3B 3B 3B 3B	136 Mosle Rd 134 Mosle Rd 61 Stevens Ln 44 Roxiticus Rd 2 Union Schoolhouse Rd 50 Roxiticus Rd Roxiticus Rd 71 East Fox Chase Rd 65 East Fox Chase Rd 2 Winston Farm Ln 87 Roxiticus Rd		

107	45	QFARM 3B 51 Roxiticus Rd			
107	46	QFARM	3B	55-57 Roxiticus Rd	
107	48.03	QFARM	3B	5 Pine Hollow Ln	
107	48.04	QFARM	3B	6 Pine Hollow Ln	
107	48.06	QFARM	3B	4 Pine Hollow Ln	
107	50	QFARM	3B	67 Roxiticus Rd	
107	51	QFARM	3B	69 Roxiticus Rd	
107	52	QFARM	3B	71 Roxiticus Rd	
107	53	QFARM	3B	73 Roxiticus Rd	
107	58	QFARM	3B	1 Bittersweet Ln	
107	59	QFARM	3B	3 Bittersweet Ln	
107	60	QFARM	3B	4 Bittersweet Ln	
107	61	QFARM	3B	2 Bittersweet Ln	
107	66	QFARM	3B	23 Mt Paul Rd	
107	69	QFARM	3B	5 Mount Paul Rd	
109	22	QFARM	3B	36 Ironia Rd	
109	23	QFARM	3B	32 Ironia Rd	
109	34	QFARM	3B	327 Mendham Rd West	
109	53	QFARM	3B	9 North Gate Rd	
112	1	QFARM	3B	18 Burnett Rd	
112	13	QFARM	3B	72 Old Mill Rd	
113	2	QFARM	3B	81 Old Mill Rd	
113	2.01	QFARM	3B	79 Old Mill Rd	
114	3	QFARM	3B	102 Ironia Rd	
114	4	QFARM	3B	100 Ironia Rd	
114	6	QFARM	3B	96 Ironia Rd	
114	8	QFARM	3B	92 Ironia Rd	
114	9	QFARM	3B	88 Ironia Rd	
114	10	QFARM	3B	84 Ironia Rd	
116	9.04	QFARM	3B	40 Calais Rd	
116	13	QFARM	3B	1 Samantha Ln	
116	15.01	QFARM	3B	3 Barer Ln	
116	15.02	QFARM	3B	1 Barer Ln	
116	15.03	QFARM	3B	2 Barer Ln	
116	17	QFARM	3B	20 Calais Rd	
116	18	QFARM	3B	3 Amalia Ct	
116	20	QFARM	3B	6 Amalia Ct	
116	22	QFARM	3B	18 Calais Rd	
116	43	QFARM	3B	225 Mountainside Rd	
116	46	QFARM	3B	235 Mountainside Rd	
116	46.01	QFARM	3B	Mountainside Rd	
116	64	QFARM	3B	79 Ironia Rd	
116	65	QFARM	3B	81 Ironia Rd	
116	67	QFARM	3B	87 Ironia Rd	

117	13	QFARM	3B	2 Lone Spruce Trl
117	49.01	QFARM	3B	5 Calais Rd
117	49.02	QFARM	3B	7 Calais Rd
117	55	QFARM	3B	17 Calais Rd

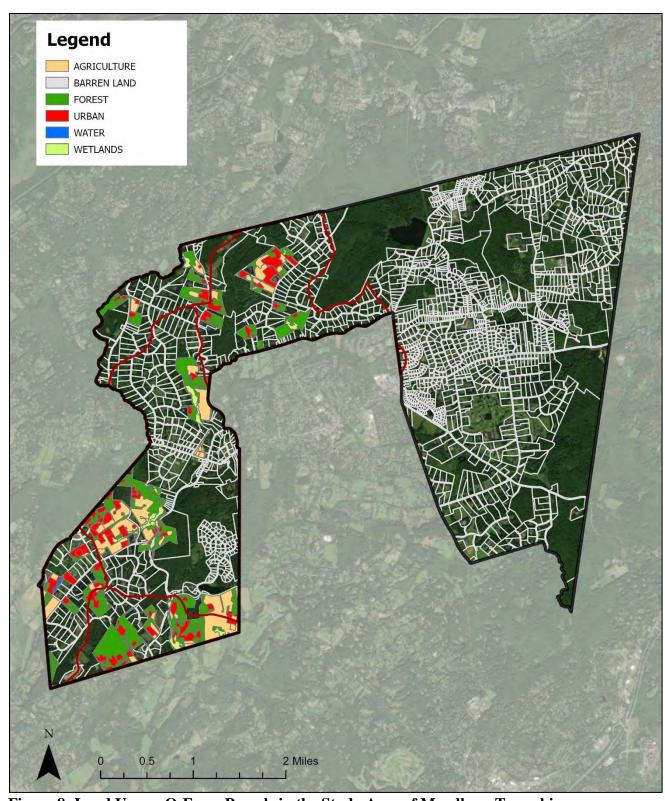


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Mendham Township

Table 7: Land Use on Q-Farms in the Study Area of Mendham Township

Land Use	Area (acres)		
Agriculture	311.4		
Barren Land	0.0		
Forest	558.2		
Urban	253.7		
Water	12.9		
Wetlands	67.4		
Total:	1,203.7		

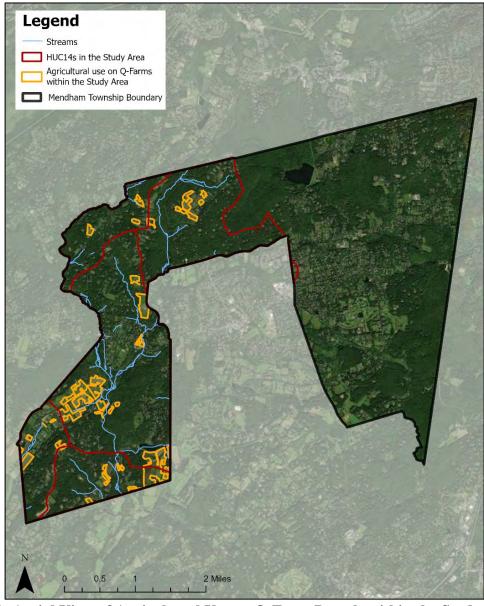


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Mendham Township

Table 8: Recommendations for Specific Farms in the Study Area of Mendham Township

	North Branch Raritan River Study Area								
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.	
104	27.01	QFARM			X	X			
107	44	QFARM	X						
107	46	QFARM						X	
109	22	QFARM	X			X			
109	23	QFARM			X	X		X	
109	34	QFARM	X		X	X			

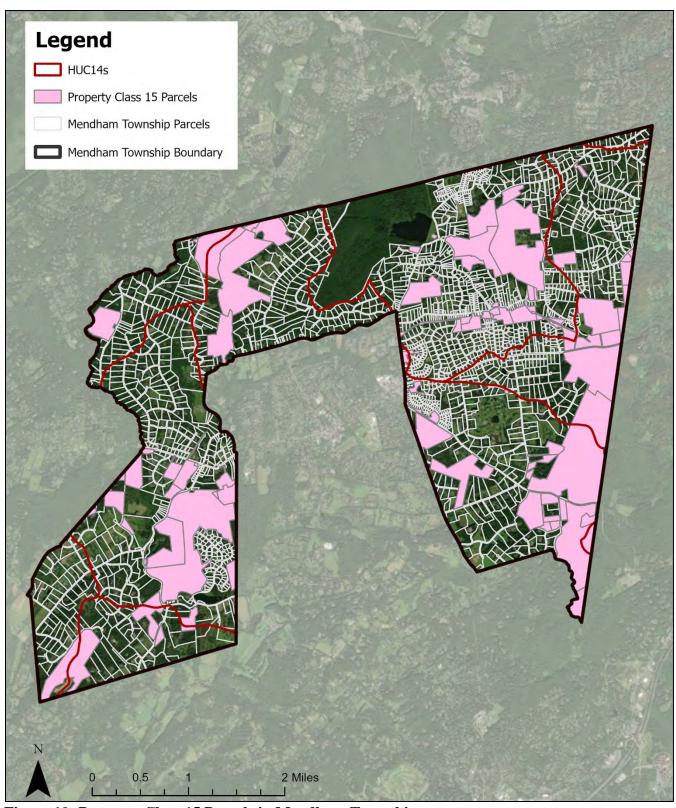


Figure 10: Property Class 15 Parcels in Mendham Township

Table 9: Property Class 15 Parcels in Mendham Township

Table 9:	Property (Class 15 Parcels in Mendham Township				
Block	Lot	Prop Class	Location	Facility Type		
127	152	15A	16 Washington Valley Rd	Middle School		
137	48	15A	16 West Main St	Elementary School		
127	44	15B	5 Franklin Dr	Allegro School		
100	17.02	15C	9 Carriage Hill Dr	Vacant Land		
107	1	15C	336 Mendham Rd West	Historic Site		
107	10	15C	338 Mendham Rd West	Conservation		
107	19	15C	Mendham Rd West	Park, Ball Field		
107	23	15C	320 Mendham Rd West	Firehouse		
107	33	15C	322 Mendham Rd West	Park/Firehouse		
107	35	15C	Mendham Rd West	Park		
107	64	15C	Roxiticus Rd	Park		
107	67	15C	Mount Paul Rd	Conservation		
108	1	15C	313 Mendham Rd West	Historic Sites		
109	27	15C	Ironia Rd	Vacant Land		
109	35	15C	317 Mendham Rd West	Park		
112	48	15C	Oak Knoll Rd	Burial Ground		
113	4	15C	Old Mill Rd	Park		
116	2	15C	Ironia Rd	Park		
116	6	15C	97 Ironia Rd	Dedicated Open Space		
116	7.01	15C	14 Calais Rd	Park		
116	8.05	15C	Calais Rd	Recreational Park		
116	9.01	15C	Combs Hollow Rd	Park Land		
116	52	15C	Mountainside Rd	Park		
118	9	15C	Woodland Rd	Wtr Treatment Plant		
118	10.01	15C	Cold Hill Rd	Vacant Land		
127	19	15C	Stony Hill Rd	Green Acres		
127	20	15C	Woodland Rd	Park		
127	71	15C	Woodland Rd	Park		
127	73	15C	40 Mount Pleasant Rd	Maintenance Bldg.		
127	171	15C	Tingley Rd	Recreational Park		
127	179	15C	East Main St	Park		
130	7.02	15C	Cold Hill Rd	Park		
131	23	15C	Knollwood Trl	Park		
131.01	1.01	15C	1 Cold Hill Rd	Vacant Land		
137	17.01	15C	2 West Main St	House		
137	47	15C	Knollwood Trl	Park		
137	49	15C	18 West Main St	Pond		
137	50	15C	Knollwood Trl	Park		
139	15	15C	East Main St	Park		
139	20	15C	Tingley Rd	Park		
139	21	15C	East Main St	Park		
139	30	15C	Tingley Rd	Patriots Path		
139	41	15C	Tingley Rd	Park		
139	42	15C	Mendham Rd East	Park		
139	50	15C	Glengary Dr	Park		
139	51	15C	Glengary Dr	Park		

139	52	15C	Glengary Dr	Park
141	34	15C	41 Washington Valley Rd	Vacant Land
141	35	15C	45 Washington Valley Rd	Vacant Land
141	37	15C	39 Washington Valley Rd	Vacant Land
141	38	15C	Mendham Rd East	Vacant Land
141	39	15C	Mendham Rd East	Park
141	40	15C	Mendham Rd East	Park
141	41	15C	Mendham Rd East	Park
142	29	15C	Mendham Rd East	Park
142	63	15C	Tempe Wick Rd	Park
142	66	15C	Corey Ln	Park
142	68	15C	Corey Ln	Park
142	70	15C	Corey Ln	Park
145.02	26	15C	Tempe Wick Rd	Sewage Treatment
145.04	41	15C	6 Devonshire Ln	Sewage Treatment
146	4	15C	Tempe Wick Rd	Township of Mendham
146	11	15C	Tempe Wick Rd	Green Acres
147	16	15C	Tempe Wick Rd	Vacant Land
147	17	15C	Tempe Wick Rd Tempe Wick Rd	Vacant Land Vacant Land
		l .	_	
147	22	15C	13 Leddell Rd	Park
147	23	15C	1 Cobblefield Dr	Park
147	24	15C	3 Cobblefield Dr	Park
149	3	15C	Leddell Rd	Vacant Land
149	8	15C	Off Leddell Rd	Parkland
104	22	15D	Mendham Rd West	Convent
128	3	15D	6 East Main St	Church
100	29.01	15F	131 Mosle Rd	Vacant Land
100	35	15F	Roxiticus Rd	Vacant Land
102	1	15F	Mosle Rd	Vacant Land
103	4.01	15F	Pleasant Valley Rd	Vacant Land
104	22.01	15F	Mendham Rd West	Vacant Land
104	23	15F	Pleasant Valley Rd	Recreational Park
104	26	15F	Union Schoolhouse Rd	Recreational Park
104	27.03	15F	40 Roxiticus Rd	Vacant Land
104	27.04	15F	10 Union Schoolhouse Rd	Vacant Land
107	48.02	15F	3 Pine Hollow Ln	Game Preserve
107	70	15F	Mendham Rd West	Vacant Land
127	83	15F	20 Mount Pleasant Rd	Disabled Veteran
127	178	15F	East Main St	Game Preserve
139	1	15F	1 East Main St	Private Club
139	3	15F	1 East Main St	Park
139	9	15F	East Main St	Club House
144	19	15F	15 Yardley Rd	Disabled Veteran
148	4	15F	Leddell Rd	Green Acres
149	6	15F	Tempe Wick Rd	Green Acres
149	7	15F	Tempe Wick Rd	Green Acres

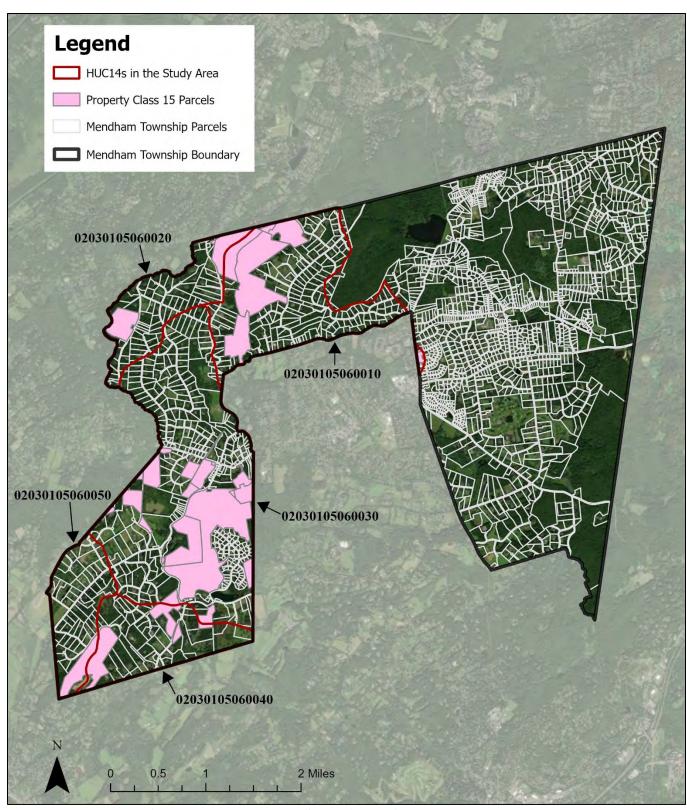


Figure 11: Property Class 15 parcels in the Study Area of Mendham Township

Table 10: Property Class 15 Parcels in the Study Area of Mendham Township

tabic 10.	Troperty	operty Class 15 Farcels in the Study Area of Mendham 10					
Block	Lot	Prop Class	Location	Facility Type			
100	17.02	15C	9 Carriage Hill Dr	Vacant Land			
107	1	15C	336 Mendham Rd West	Historic Site			
107	10	15C	338 Mendham Rd West	Conservation			
107	19	15C	Mendham Rd West	Park, Ball Field			
*107	23	15C	320 Mendham Rd West	Firehouse			
*107	33	15C	322 Mendham Rd West	Park/Firehouse			
107	35	15C	Mendham Rd West	Park			
107	64	15C	Roxiticus Rd	Park			
107	67	15C	Mount Paul Rd	Conservation			
108	1	15C	313 Mendham Rd West	Historic Sites			
109	27	15C	Ironia Rd	Vacant Land			
109	35	15C	317 Mendham Rd West	Park			
112	48	15C	Oak Knoll Rd	Burial Ground			
113	4	15C	Old Mill Rd	Park			
116	2	15C	Ironia Rd	Park			
*116	6	15C	97 Ironia Rd	Dedicated Open Space			
116	7.01	15C	14 Calais Rd	Park			
116	8.05	15C	Calais Rd	Recreational Park			
116	9.01	15C	Combs Hollow Rd	Park Land			
116	52	15C	Mountainside Rd	Park			
131.01	1.01	15C	1 Cold Hill Rd	Vacant Land			
*104	22	15D	Mendham Rd West	Convent			
100	29.01	15F	131 Mosle Rd	Vacant Land			
100	35	15F	Roxiticus Rd	Vacant Land			
102	1	15F	Mosle Rd	Vacant Land			
103	4.01	15F	Pleasant Valley Rd	Vacant Land			
104	22.01	15F	Mendham Rd West	Vacant Land			
104	23	15F	Pleasant Valley Rd	Recreational Park			
104	26	15F	Union Schoolhouse Rd	Recreational Park			
104	27.03	15F	40 Roxiticus Rd	Vacant Land			
104	27.04	15F	10 Union Schoolhouse Rd	Vacant Land			
107	48.02	15F	3 Pine Hollow Ln	Game Preserve			
107	70	15F	Mendham Rd West	Vacant Land			

^{*} Sites that can be retrofitted with green infrastructure

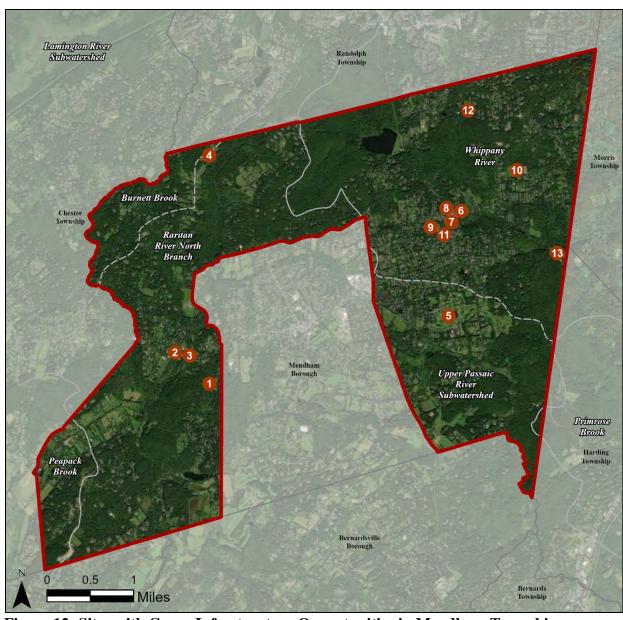


Figure 12: Sites with Green Infrastructure Opportunities in Mendham Township

COMMUNITY OF ST. JOHN BAPTIST



RAP ID: 1

Subwatershed: Raritan River North Branch

HUC14 ID: 02030105060030

Site Area: 901,688 sq. ft.

Address: 82 West Main Street

Mendham Township, NJ 07945

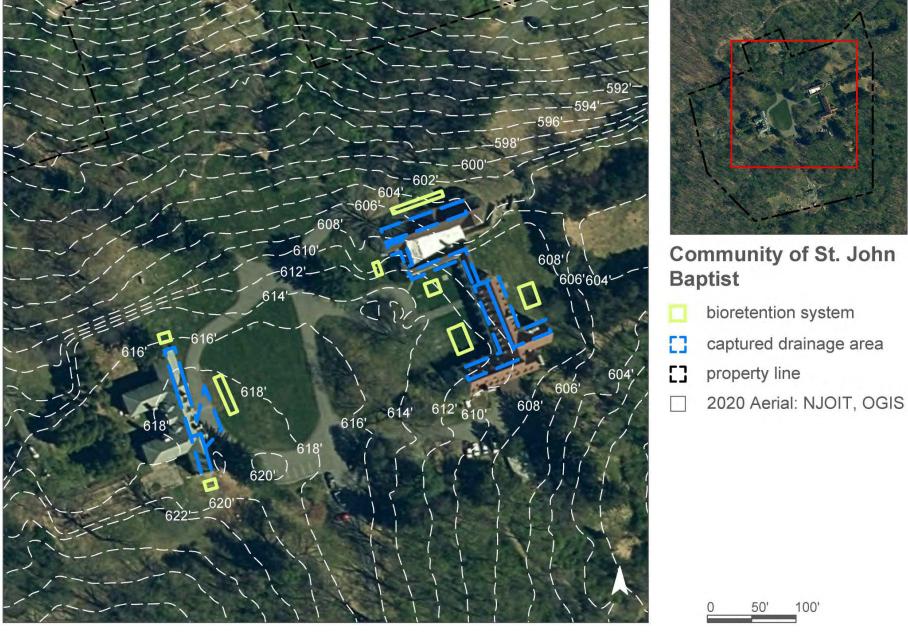
Block and Lot: Block 104, Lot 22



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate stormwater runoff from the building rooftops and pavement. For some of the gardens, this may require downspout redirections and downspout disconnections. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from In	npervious Cover (Mgal)
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''
10	90,971	4.4	45.9	417.7	0.071	2.84

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	8,535	0.253	38	17,800	0.67	2,130	\$21,300



RALSTON ENGINE COMPANY NO. 1





RAPID: 2

Subwatershed: Raritan River North

Branch

Site Area: 1,050,733 sq. ft.

Address: 322 Mendham Road West

Mendham, NJ 07945

Block and Lot: Block 107, Lot 33

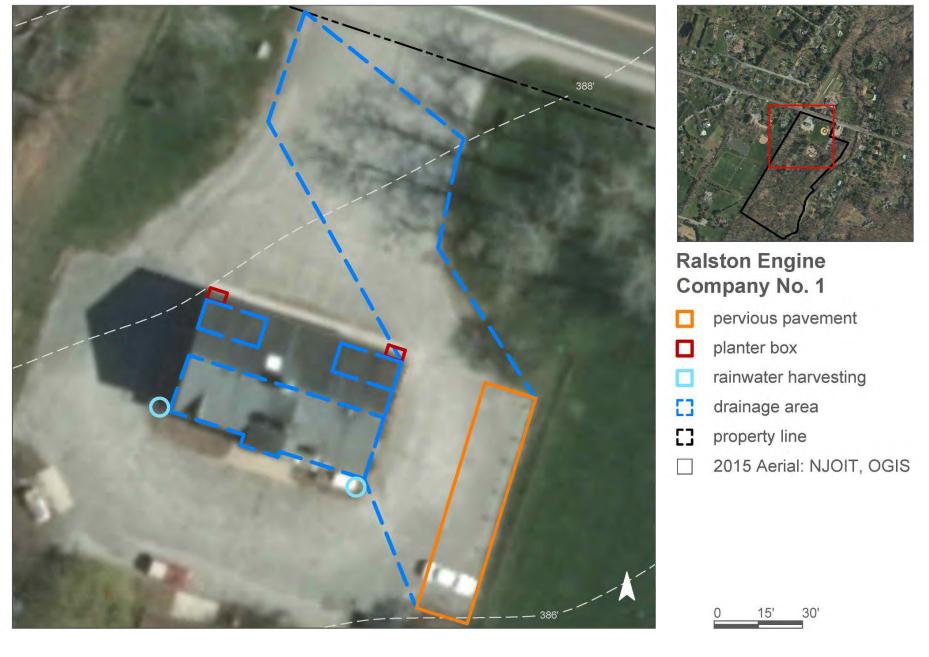




A cistern can be installed along the building to allow stormwater runoff from the roof to be reused for activities such as washing fire engines. To capture runoff from the parking lot, a section of parking spaces can be converted to porous pavement. Downspout planter boxes can be placed on the front 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.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of		
6	61,226	3.0	30.9	281.1	0.048	1.68	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.210	35	15,420	0.58	1,440	\$36,000
Planter boxes	n/a	2	n/a	n/a	2 (boxes)	\$2,000
Rainwater harvesting	0.039	7	1,170	0.04	1,170 (gal)	\$2,340



RALSTON FIELD



RAP ID: 3

Subwatershed: Raritan River North

Branch

Site Area: 35,929 sq. ft.

Address: 326 Mendham Road West

Mendham, NJ 07945

Block and Lot: Block 107, Lot 23

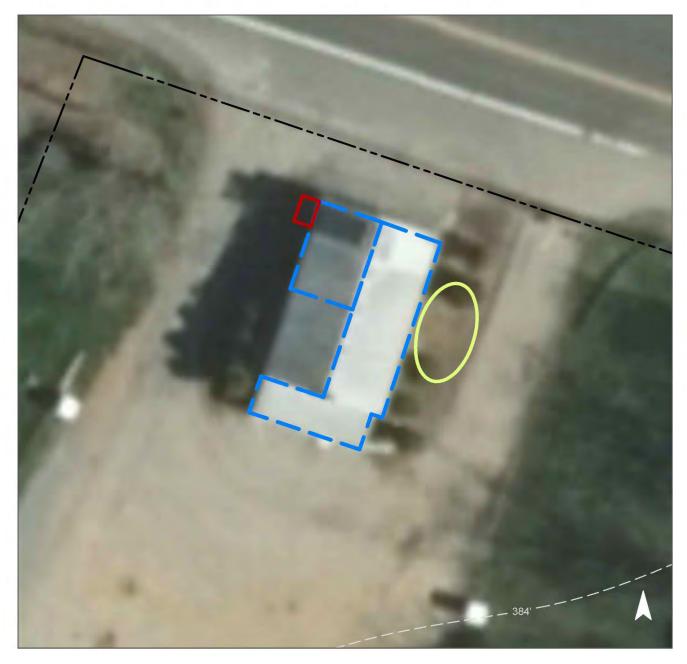




A rain garden can be installed on the east side of the building to capture, treat, and infiltrate rooftop runoff. Along the western side of the building a downspout planter box can be installed to help capture stormwater runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of 44		
19	6,884	0.3	3.5	31.6	0.005	0.19	

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	0.021	3	1,510	0.06	200	\$1,000
Planter box	n/a	1	n/a	n/a	1 (box)	\$1,000





Ralston Field

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

0 10' 20'

RANDOLPH REGIONAL ANIMAL SHELTER





RAPID: 4

Subwatershed: Raritan River North

Branch

Site Area: 3,813,302 sq. ft.

Address: 97 Iroina Road

Mendham, NJ 07945

Block and Lot: Block 116, Lot 6





A rain garden can be installed adjacent to the main building to capture, treat, and infiltrate rooftop runoff. The gated pavement area can be replaced with pervious pavement to capture and infiltrate stormwater from the nearby buildings and the lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Dervious Cover Existing Loads from Impervious Cover (lbs/yr)		Runoff Volume from Impervious Cover (Mgal)			
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of 4	
5	208,114	10.0	105.1	955.5	0.162	5.71

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 system	0.022	4	1,620	0.06	215	\$1,075
Pervious pavement	0.422	71	30,940	1.16	2,890	\$72,250



MENDHAM GOLF & TENNIS CLUB



RAP ID: 5

Subwatershed: Passaic River Upper

Site Area: 5,269,808 sq. ft.

Address: 2 Golf Lane

Mendham, NJ 07945

Block and Lot: Block 137, Lot 48





Pervious pavement can be installed in the west parking lot of the tennis courts to treat the runoff from the driveway and parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm For an Annual Rainfall of		
7	389,983	18.8	197.0	1,790.6	0.304	10.70	

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	0.389	65	28,570	1.07	3,750	\$93,750





Mendham Golf & Tennis Club

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

0 50' 100'

BROOKSIDE COMMUNITY CHURCH





RAP ID: 6

Subwatershed: Whippany River

Site Area: 50,228 sq. ft.

Address: 8 East Main Street

Morristown, NJ 07960

Block and Lot: Block 128, Lot 4





Bioretention systems can be installed on the southeast and southwest side of the building to capture, treat, and infiltrate rooftop runoff. To help with stormwater capture, downspout planter boxes can be placed along the southwestern part of the building. 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)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
26	13,292	0.6	6.7	61.0	0.010	0.36

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	5,020	0.19	655	\$3,275
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	\$3,000



BROOKSIDE COMMUNITY CLUB



RAP ID: 7

Subwatershed: Whippany River

HUC14 ID: 02030103020010

Site Area: 181,143 sq. ft.

Address: 1 East Main Street

Brookside, NJ 07926

Block and Lot: Block 139, Lot 1





A rain garden can be installed to the north of the building to capture, treat, and infiltrate stormwater runoff from the rooftop. This will require downspout disconnection and redirection. Another rain garden can be installed to the south of the parking lot to capture, treat, and infiltrate stormwater runoff from the driveway and the lot. A cistern can be installed to the west of the building to divert and detain stormwater runoff from the rooftop for later non-potable reuse such as watering the plants around the building. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from In	npervious Cover (Mgal)
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"
15	27,730	1.3	14.0	127.3	0.022	0.86

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	4,125	0.122	17	8,600	0.32	1,030	\$10,300
Rainwater harvesting	320	0.009	2	300	0.01	300 (gal)	\$900





Brookside Community Club

- bioretention system
- rainwater harvesting
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

BROOKSIDE POST OFFICE





RAP ID: 8

Subwatershed: Whippany River

Site Area: 10,693 sq. ft.

Address: 2 East Main Street

Morristown, NJ 07960

Block and Lot: Block 128, Lot 1

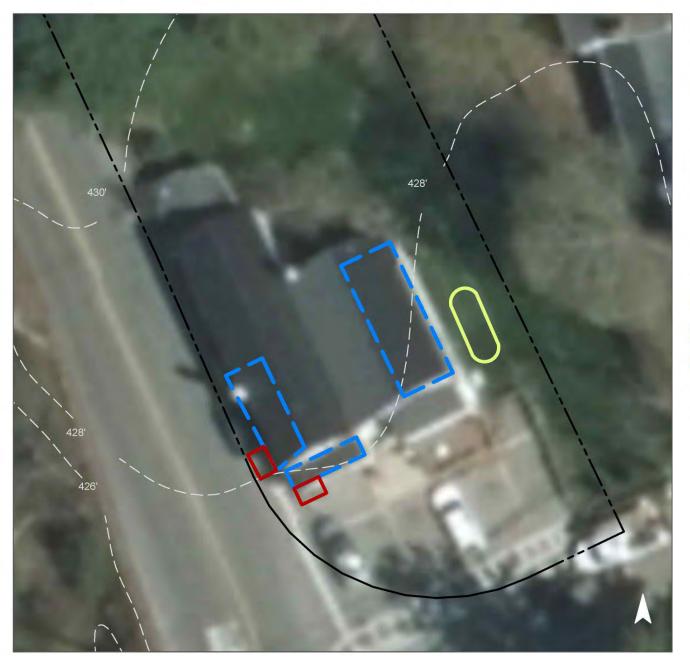




Downspout planter boxes can be installed along the southwest corner of the building to allow roof runoff to be reused and to spread awareness about green infrastructure programs. Along the eastern side of the building a bioretention system can be installed to help capture, treat, and infiltrate stormwater runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover	Cover Existing Loads from Impervious Cover (lbs/yr) Runoff Volume from Impervious Cover (Mgal)				npervious Cover (Mgal)
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
26	2,829	0.1	1.4	13.0	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	0.010	2	730	0.03	95	\$475
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	\$2,000





Brookside Post Office

- bioretention system
- planter box
- drainage area
- [] property line
- ☐ 2015 Aerial: NJOIT, OGIS



MENDHAM TOWNSHIP ELEMENTARY SCHOOL



RAP ID: 9

Subwatershed: Whippany River

HUC14 ID: 02030103020010

Site Area: 635,036 sq. ft.

Address: 18 West Main Stre

Brookside, NJ 07925

Block and Lot: Block 137, Lot 48



Multiple rain gardens can be installed in the grass areas around the property to capture, treat, and infiltrate stormwater runoff from the rooftops. This may require downspout disconnections, downspout redirections, curb cuts, and a trench drain. The existing parking spaces to west and to the northeast of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
37	235,333	11.3	118.9	1,080.5	0.183	7.33	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	14,845	0.440	65	30,970	1.16	4,225	\$42,250
Pervious pavement	21,310	0.631	93	44,450	1.67	5,265	\$131,625





Mendham Township Elementary School

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

0 100' 200'

MENDHAM TOWNSHIP MIDDLE SCHOOL





RAPID: 10

Subwatershed: Whippany River

Site Area: 927,597 sq. ft.

Address: 16 Washington Valley

Road

Morristown, NJ 07960

Block and Lot: Block 127, Lot 152





Bioretention systems can be installed on the east side of the building to capture, treat, and infiltrate rooftop runoff. To help with stormwater runoff from the parking lot, the low northeastern section of parking spaces can be converted to pervious pavement to help capture and infiltrate the runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	Impervious Cover Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Runoff Volume from Impervious Cover (No. 2014) Existing Loads from Existing				npervious Cover (Mgal)	
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
22	204,394	9.9	103.2	938.4	0.159	5.61

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	0.148	25	10,880	0.41	1,420	\$7,100
Pervious pavement	0.686	115	50,320	1.89	4,700	\$117,500





Mendham Township Middle School

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

0 30' 60'

MENDHAM TOWNSHIP POLICE DEPARTMENT, FIRST AID SQUAD, & ENGINE COMPANY _____



RAP ID: 11

Subwatershed: Whippany River

HUC14 ID: 02030103020010

Site Area: 166,317 sq. ft.

Address: 1-3 Cherry Lane

Brookside, NJ 07926

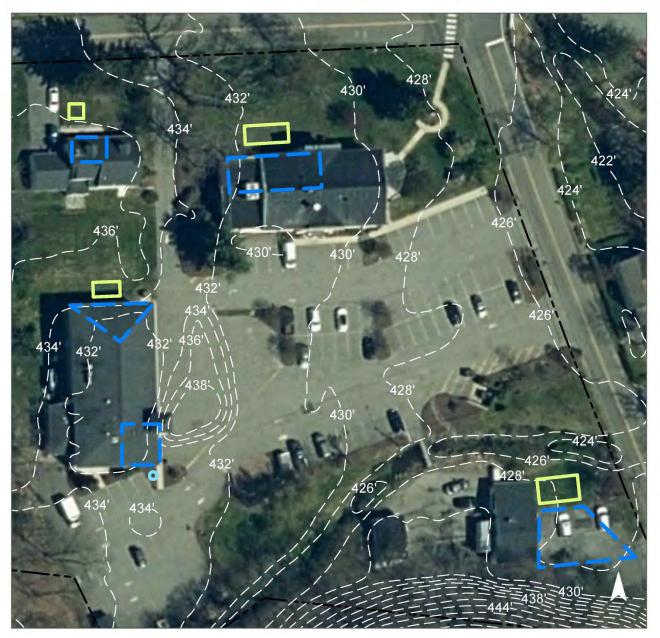
Block and Lot: Block 137, Lot 17.01



Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate stormwater runoff from the building rooftops. This may require downspout disconnections and downspout redirections. A rain garden can be installed near the police department building to capture, treat, and infiltrate stormwater runoff from the parking lot. A cistern can be installed to the southeast of the engine company building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
54	89,128	4.3	45.0	409.2	0.069	2.78	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	4,555	0.135	19	9,500	0.36	1,135	\$11,350
Rainwater harvesting	730	0.022	4	600	0.02	600 (gal)	\$1,800





Mendham Township Police Department, First Aid Squad, & Engine Company

- bioretention system
- rainwater harvesting
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

MT. PLEASANT RECREATION AREA



RAPID: 12

Subwatershed: Whippany River

HUC14 ID: 02030103020010

Site Area: 695,386 sq. ft.

Address: 40 Mount Pleasant Road

Randolph, NJ 07869

Block and Lot: Block 127, Lot 73





A rain garden can be installed to the west of the entry to capture, treat, and infiltrate stormwater runoff from the asphalt. Another rain garden can be installed to the south of the tennis courts to capture, treat, and infiltrate stormwater runoff from the court and asphalt driveway. This may require trench drains. Cisterns can be installed to the north and south of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f	coads from 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 50''
19	133,175	6.4	67.3	611.5	0.104	4.15

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	16,775	0.497	74	34,990	1.31	4,195	\$41,950
Rainwater harvesting	1,800	0.053	8	1,400	0.05	1,400 (gal)	\$4,200





Mt. Pleasant Recreation Area

- bioretention system
- rainwater harvesting
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

0 50' 100'

PARQUE



RAPID: 13

Subwatershed: Whippany River

Site Area: 6,182,106 sq. ft.

Address: 197 Mendham Road East

Mendham, NJ 07945

Block and Lot: Block 142, Lot 29





Bioretention systems can be installed in the back of the building to capture, treat, and infiltrate rooftop runoff. Downspout planter boxes can be constructed at the entrance of the building to allow roof runoff to be reused and to spread awareness about green infrastructure programs. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	Existing Loads from Impervious Cover (lbs/yr)				Runoff Volume from Impervious (Tover (VIgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
4	238,942	11.5	120.7	1,097.1	0.186	6.55	

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 system	0.045	7	3,280	0.12	430	\$2,150
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	\$2,000



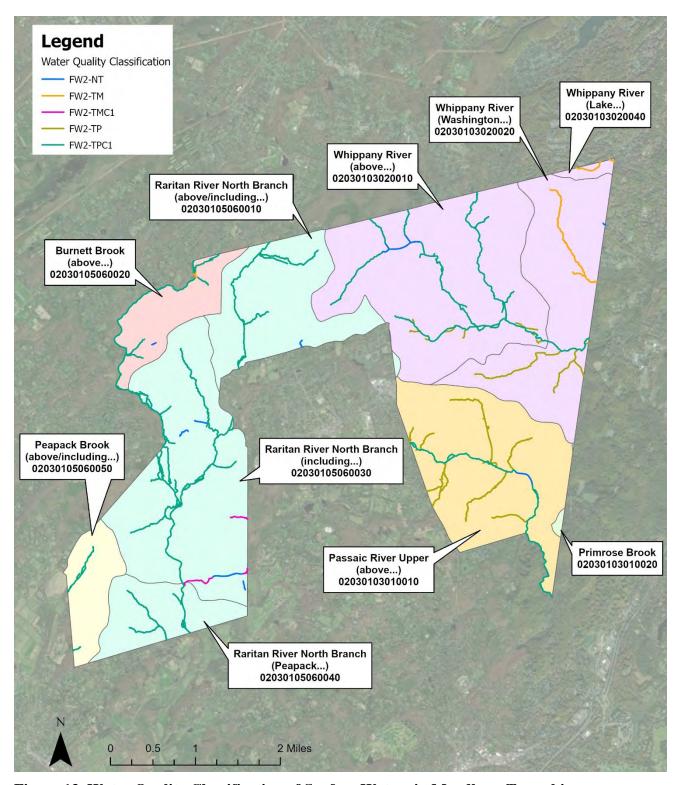


Figure 13. Water Quality Classification of Surface Waters in Mendham Township

Table 11. Water Quality Classification of Surface Waters in Mendham Township

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	2.0	4.1%
Freshwater 2, trout production, Category One	FW2-TPC1	34.7	72.0%
Freshwater 2, trout maintenance	FW2-TM	2.3	4.8%
Freshwater 2, trout production	FW2-TP	8.4	17.5%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	0.8	1.7%

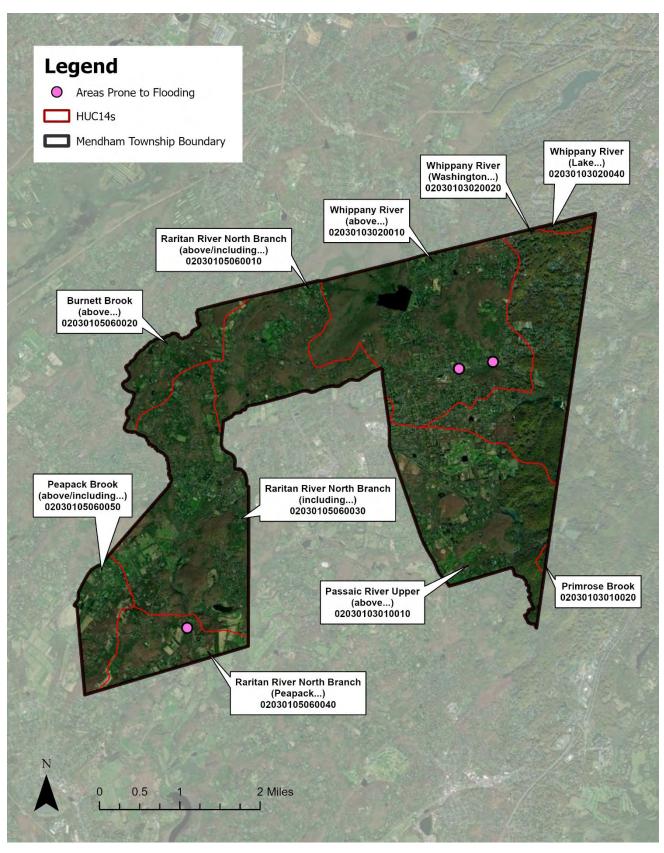


Figure 14. Areas Prone to Flooding in Mendham Township

Peapack-Gladstone Borough

Introduction

Located in Somerset County in New Jersey, Peapack-Gladstone Borough covers about 5.8 square miles. With a population of 2,558 (2020 United States Census), Peapack-Gladstone Borough consists of 40.0% of urban land uses by area. Of that urban land use, approximately 42.7% is comprised of rural residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up approximately 43.7% of Peapack-Gladstone Borough.

Peapack-Gladstone Borough contains portions of four subwatersheds (Table 1). There are approximately 19.7 miles of rivers and streams within the municipality; these include Gladstone Brook, tributaries to Middle Brook, North Branch Raritan River and its tributaries, Peapack Brook and its tributaries, and several uncoded tributaries. Peapack-Gladstone Borough is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Area (WMA) 8 (North and South branch Raritan).

Table 1: Subwatersheds of Peapack-Gladstone Borough

Subwatershed	HUC14
Raritan River North Branch (Peapack Brook to McVickers Brook)	02030105060040
Peapack Brook (above/including Gladstone Brook)	02030105060050
Peapack Brook (below Gladstone Brook)	02030105060060
Middle Brook (North Branch Raritan River)	02030105060080

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Peapack-Gladstone Borough. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Peapack-Gladstone Borough's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Peapack-Gladstone Borough in relation to the study area. Figure 2 shows the portions of the four HUC14s in Peapack-Gladstone Borough and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Peapack-Gladstone Borough. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Peapack-Gladstone Borough and is presented in Table 2. Figure 4 shows the impervious cover in Peapack-Gladstone Borough based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Peapack-Gladstone Borough and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basins. Detention basins that are already naturalized are identified as type "N". The retention basins in Table 4 (identified as type "R") could benefit from the addition of vegetative shoreline buffers. Retention basins that already have a vegetative shoreline buffer are listed as type "RB". No retention basins with vegetative shoreline buffers were identified in Peapack-Gladstone Borough within the study area.

The Q-Farms in the study area within Peapack-Gladstone Borough, which includes the entire municipality, have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 7 illustrates the land use on the Q-Farms, which is summarized in Table 6. There are 591.8 acres of agricultural land use in Peapack-Gladstone Borough, all of which lie within the study area for this Watershed Restoration and Protection Plan. There are 55 Q-Farms in Peapack-Gladstone Borough, totaling 1,027.7 acres. Within the 55 Q-Farms, there are approximately 203.7 acres of agricultural land use. Aerial photography (see Figure 8) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, there are no recommendations for green infrastructure implementation on the agricultural lands in the study area in Clinton Town.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Four HUC14s are included in the study area (02030105060040, 02030105060050, 02030105060060, 02030105060080). Within these four HUC14s, there are 76.5 acres of buildings and 122.8 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Peapack-Gladstone Borough, approximately 4.8 acres of rooftop runoff would be managed with 0.96 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Peapack-Gladstone Borough, approximately 12.3 acres of roadway would be managed, or 3.4 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 9). Available information for each parcel in the study area is presented in Table 7. Class 15E parcels were excluded from the assessment. Seven of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 7 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 10 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Non-trout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further subcategorized based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest

protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are four classifications that apply to the streams in Peapack-Gladstone Borough. Figure 11 depicts the water quality classification of surface waters throughout Peapack-Gladstone Borough and Table 8 summarizes the total miles and percentage of each surface water quality classification in the municipality.

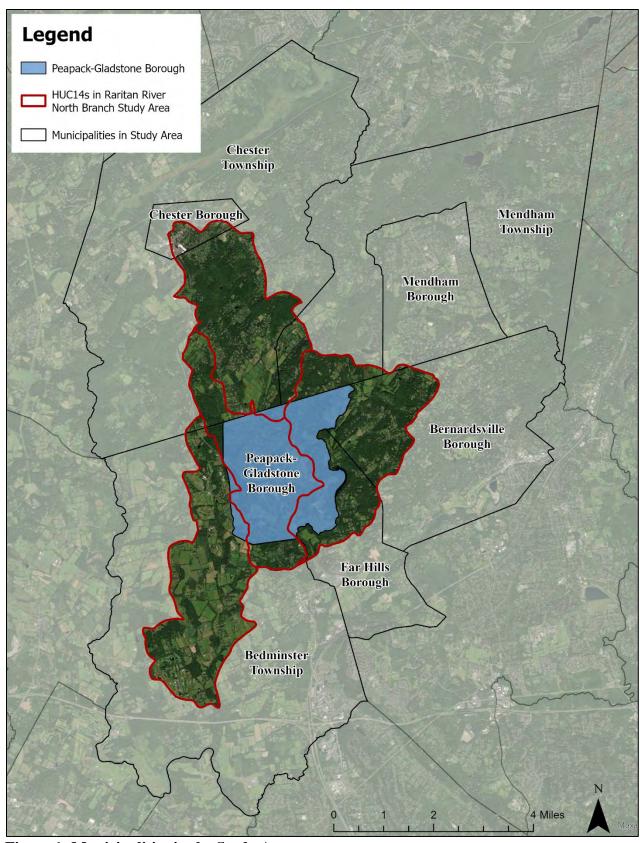


Figure 1: Municipalities in the Study Area

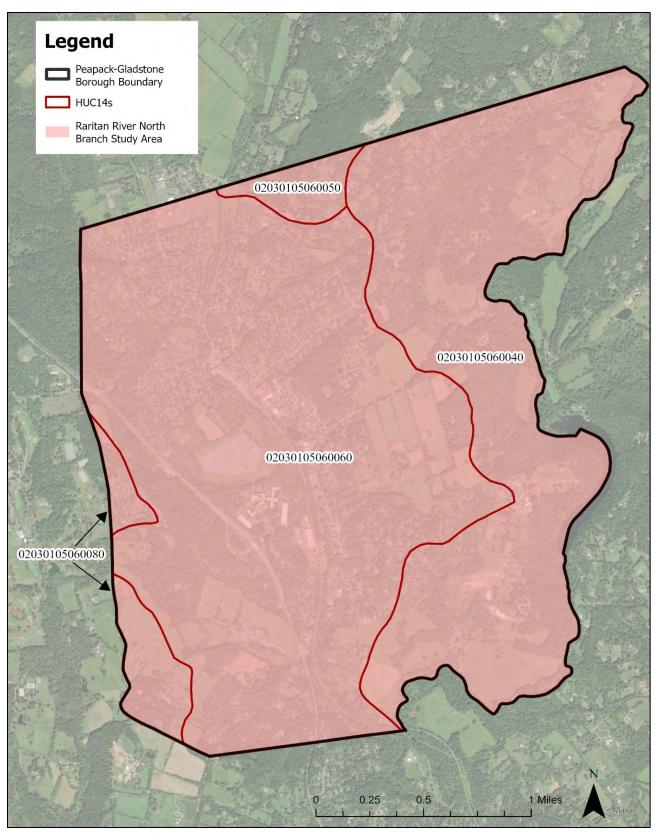


Figure 2: Portions of four HUC14s are in Peapack-Gladstone Borough

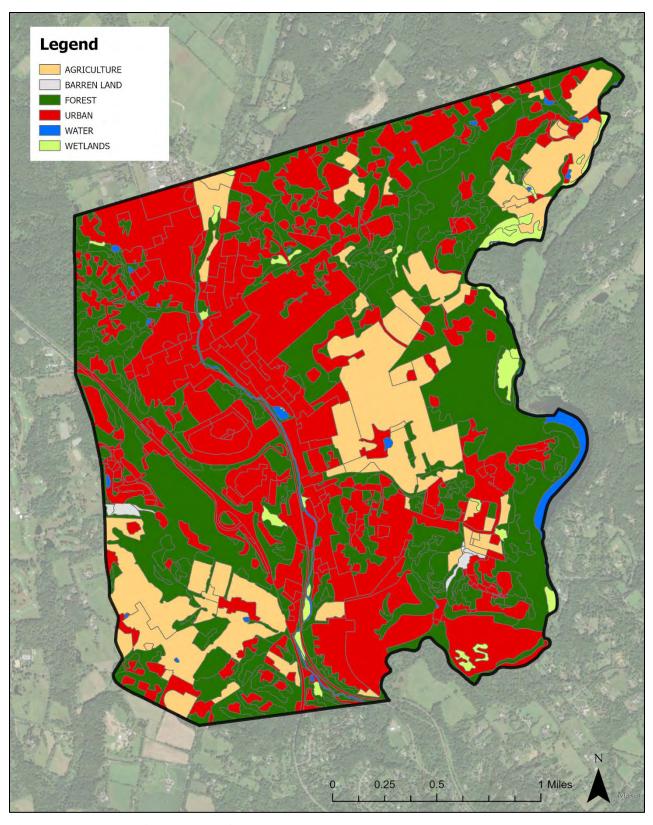


Figure 3: Land Use in Peapack-Gladstone Borough

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Peapack-Gladstone Borough

Peapack-Gladstone Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030105060040		
Agriculture	181.7	236.2	1,816.7	54,500.2
Barren Land	5.1	2.5	25.3	303.6
Forest	678.9	67.9	2,036.8	27,157.8
Urban	387.3	542.2	5,809.0	54,217.5
Water	35.4	3.5	106.1	1,415.1
Wetlands	45.9	4.6	137.6	1,834.4
TOTAL =	1,334.2	856.9	9,931.5	139,428.7
		02030105060050		
Agriculture	4.0	5.2	39.7	1,190.4
Barren Land	0.0	0.0	0.0	0.0
Forest	28.8	2.9	86.4	1,152.2
Urban	42.4	59.4	636.4	5,940.0
Water	0.0	0.0	0.0	0.0
Wetlands	0.8	0.1	2.3	31.0
TOTAL =	76.0	67.5	764.8	8,313.6
		02030105060060		
Agriculture	349.5	454.4	3,495.3	104,858.2
Barren Land	5.1	2.6	25.7	308.4
Forest	755.9	75.6	2,267.6	30,234.2
Urban	1,006.2	1,408.7	15,093.3	140,870.7
Water	15.6	1.6	46.7	622.7
Wetlands	15.5	1.6	46.6	621.7
TOTAL =	2,147.9	1,944.4	20,975.2	277,516.0
		02030105060080		
Agriculture	56.6	73.6	566.3	16,990.4
Barren Land	0.6	0.3	3.1	37.7
Forest	35.9	3.6	107.8	1,437.1
Urban	44.1	61.7	661.4	6,173.2
Water	1.1	0.1	3.2	43.1
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	138.4	139.4	1,341.9	24,681.6
		All HUCs		
Agriculture	591.8	769.3	5,918.0	177,539.3
Barren Land	10.8	5.4	54.1	649.7
Forest	1,499.5	150.0	4,498.6	59,981.3
Urban	1,480.0	2,072.0	22,200.2	207,201.5
Water	52.0	5.2	156.1	2,081.0
Wetlands	62.2	6.2	186.5	2,487.2

TOTAL =	3,696.4	3,008.1	33,013.5	449,939.9

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Peapack-Gladstone Borough that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Peapack-Gladstone Borough. Based upon the NJDEP impervious surface data, Peapack-Gladstone Borough has impervious cover totaling 11.3%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Peapack-Gladstone Borough is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Peapack-Gladstone Borough's impervious cover percentage would suggest that its waterways are primarily impacted and most likely contributing to the degradation of the state's surface water quality standards.

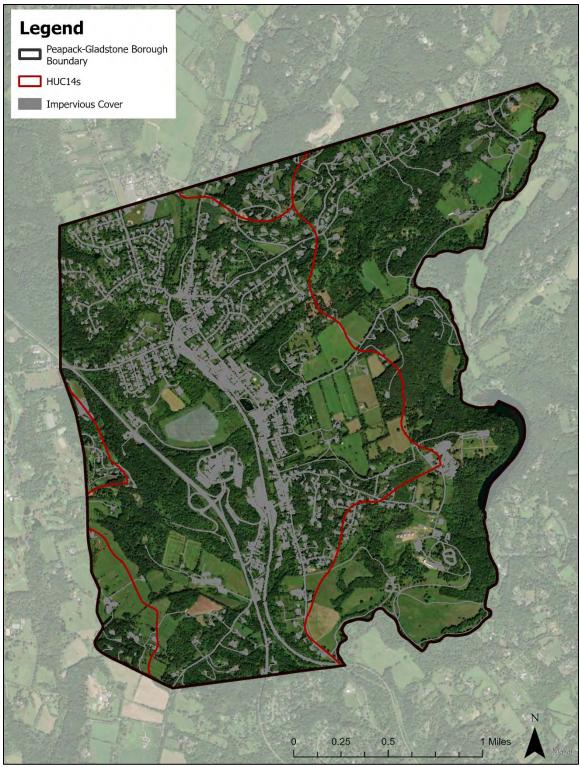


Figure 4: Impervious Cover in Peapack-Gladstone Borough

 Table 3: Impervious Cover Analysis by HUC14 for Peapack-Gladstone Borough

Class	Area (acres)	HUC Impervious Cover (%)
1	02030105060040	
Building	12.32	
Other	50.15	
Road	16.67	
TOTAL =	79.1	5.9%
·	02030105060050	•
Building	2.09	
Other	5.25	
Road	3.02	
TOTAL =	10.4	13.6%
·	02030105060060	•
Building	60.21	
Other	155.27	
Road	99.18	
TOTAL =	314.7	14.7%
	02030105060080	
Building	1.92	
Other	7.49	
Road	3.95	
TOTAL =	13.4	9.7%
	All HUCs	
Building	76.54	
Other	218.17	
Road	122.82	
TOTAL =	417.5	11.3%

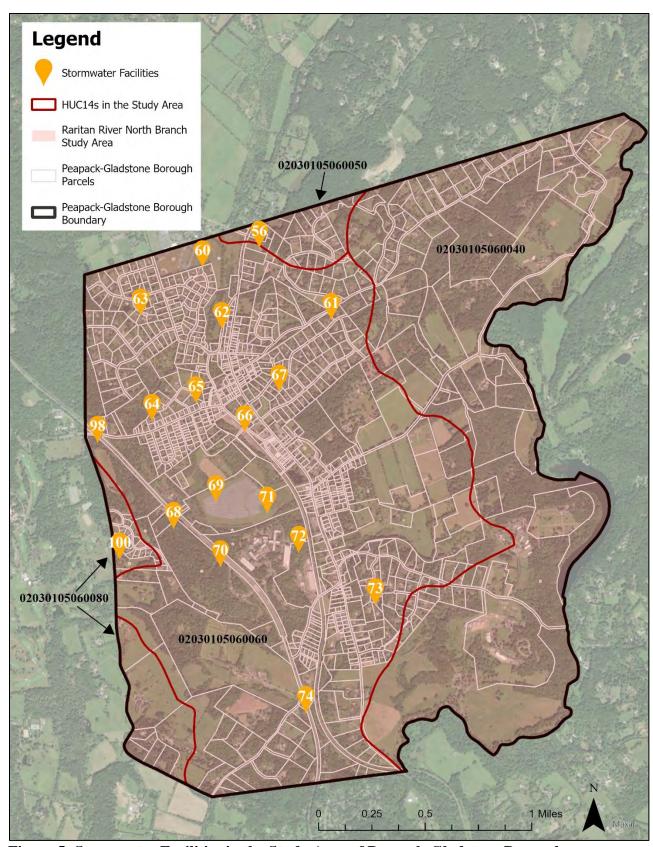


Figure 5: Stormwater Facilities in the Study Area of Peapack-Gladstone Borough

Table 4: Location of Stormwater Facilities in the Study Area of Peapack-Gladstone Borough

Raritan River North Branch Study Area			
<u>ID</u>	Address	Type	
56	110 Mendham Rd	D	
60	60 Old Chester Rd	D	
61	45 Mosle Rd	D	
62	99 Meadow View Rd	D	
63	7 Farm Cottage Rd	D	
64	6 Blue Heron Ln	D	
65	1 Rockabye Valley Rd	D	
66	230 Main St	I	
67	3 Tiger Hill Dr	D	
68	145 US Highway 206	D	
69	140 Rt 206	I	
70	140 Rt 206	I	
71	140 Rt 206	D	
72	100 Rt 206	N	
73	6 Jonah Ct	D	
74	28 US Highway 206	D	
98	Pottersville Road	D	
100	62 Fowler Road	RB	

"D" = Detention, "N" = Naturalized, "I" = Infiltration, "R" = Retention with Buffer

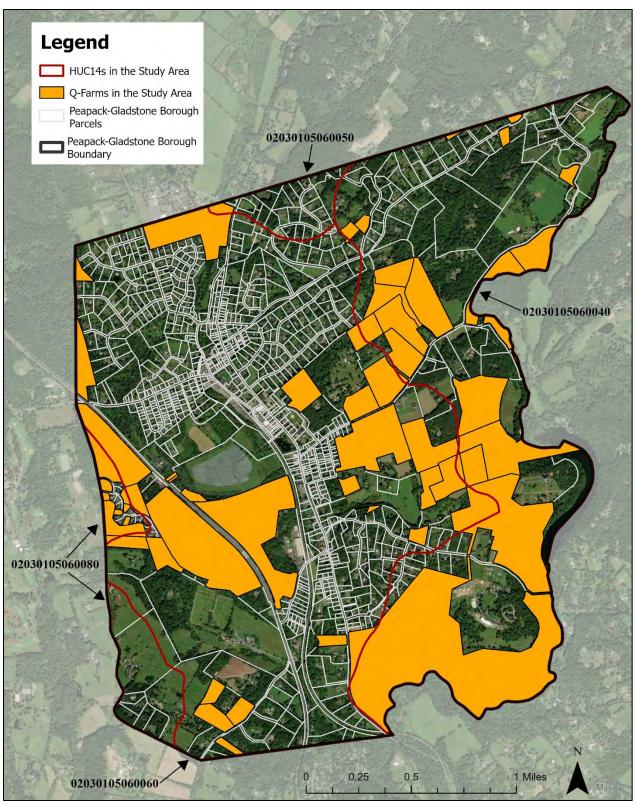


Figure 6: Q-Farm Parcels in the Study Area of Peapack-Gladstone Borough

Table 5: Q-Farm Parcels in Peapack-Gladstone Borough

Table 5: Q-Farm Parcels in Peapack-Gladstone Borough					
Block	Lot	Q-Code	Prop Class	Location	
1	39	QFARM	3B	54 Route 206	
1.01	26	QFARM	3B	16 Farm Cottage Road	
2.02	1	QFARM	15B	60 Old Chester Road	
4.04	2.01	QFARM	3B	28 Sheephill Drive	
4.04	3.02	QFARM	3B	Sheephill Drive	
5	16	QFARM	3B	99 Mosle Road	
5	20	QFARM	3B	113 Mosle Road	
7	4.06	QFARM	3B	37 Branch Road	
7	6.03	QFARM	3B	114 Mosle Road	
7	10	QFARM	3B	75 Willow Avenue	
8	2.03	QFARM		School St & St Lukes Ave	
8	2.06	QFARM	3B	55 Willow Avenue	
8	2.07	QFARM	3B	59 Willow Avenue	
8	2.08	QFARM	3B	33 Willow Avenue	
8	2.11	QFARM	3B	59 Willow Ave	
8	2.12	QFARM	3B	Willow Avenue	
8	3.05	QFARM	3B	68 Mosle Road	
8	3.06	QFARM	3B	70 Mosle Road	
*19	2	QFARM	15F	151 Peapack Road	
20	7	QFARM	3B	146 Route 206	
20	8	QFARM	3B	144 Route 206	
20	10	QFARM	3B	100 Route 206	
20	15	QFARM	3B	130 Route 206	
26	16.02	QFARM	3B	102 Willow Avenue	
26	16.03	QFARM	3B	35 Highland Avenue	
26	16.04	QFARM	3B	Blair Drive	
26	16.05	QFARM	3B	38 Willow Avenue	
26	16.09	QFARM	3B	Todd Avenue	
26	16.1	QFARM	3B	Todd Ave	
26	23	QFARM	3B	Blair Drive	
26	23.01	QFARM	3B	Blair Drive	
26	23.02	QFARM	3B	96 Wiillow Ave	
26	26	QFARM	3B	75 Highland Avenue	
26	29	QFARM	3B	Blair Drive	
27	1	QFARM	3B	26 Branch Road	
27	2	QFARM	3B	12 Branch Road	
27	4	QFARM	3B	87 Willow Avenue	
27	5	QFARM	3B	91 Willow Avenue	
28	24.01	QFARM	15C	Main Street	
29	32.1	QFARM	3B	Main Street	
32	7	QFARM	3B	77 Holland Road	
29	32.1	QFARM	3B	Main Street	

33	4.01	QFARM	3B	66a Holland Road
33	4.02	QFARM	3B	66b Holland Road
33	4.03	QFARM	3B	66c Holland Road
33	13	QFARM	3B	125 Route 206
33	13.01	QFARM	3B	72 Fowler Road
33	13.03	QFARM	3B	62 Fowler Road
33	13.04	QFARM	3B	Brady Drive West
33	13.05	QFARM	3B	2 Brady Drive West
33	13.09	QFARM	3B	10 Brady Drive West
33	13.12	QFARM		Brady Dr
33	13.19	QFARM	3B	Pine Meadow Lane
33	13.22	QFARM	3B	9 Brady Drive West
33	13.24	QFARM	3B	58 Fowler Road
33	13.25	QFARM	3B	58 F0wler Road

^{*}Only a portion of the Q-Farm parcel is within the Peapack-Gladstone Borough boundary

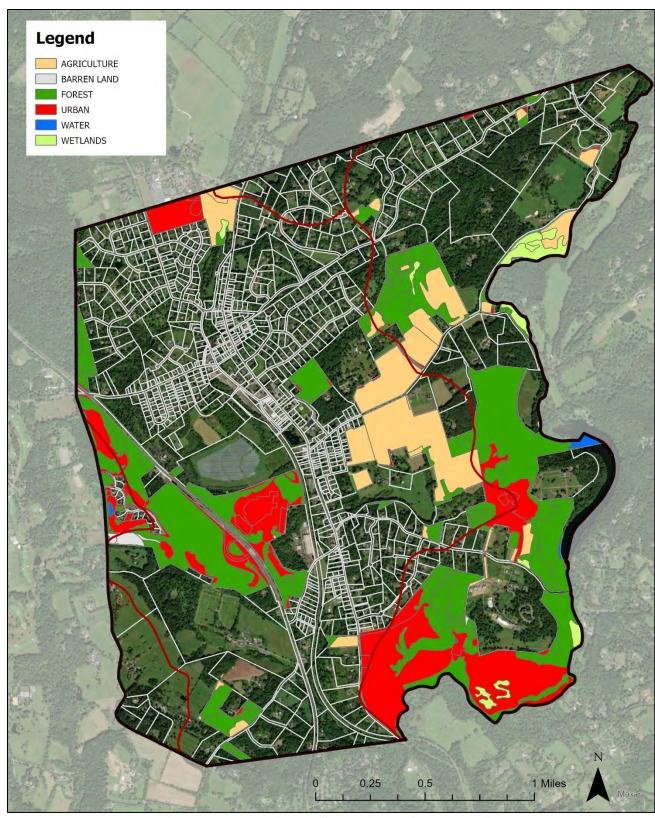


Figure 7: Land Use on Q-Farm Parcels in the Study Area of Peapack-Gladstone Borough

Table 6: Land Use on Q-Farms in the Study Area of Peapack-Gladstone Borough

Land Use	Area (acres)
Agriculture	203.7
Barren Land	6.1
Forest	496.9
Urban	277.7
Water	13.4
Wetlands	29.9
Total:	1,027.7

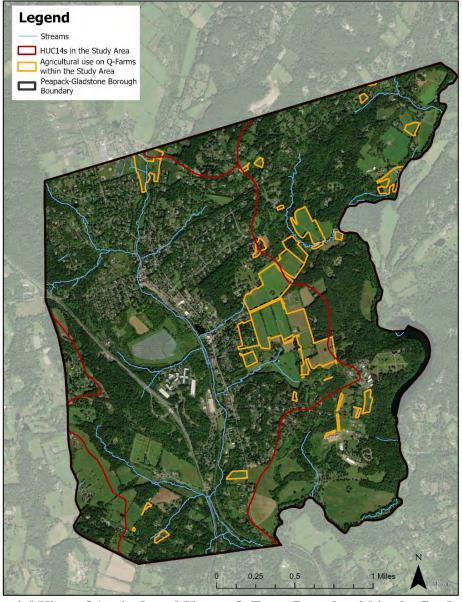


Figure 8: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Peapack-Gladstone Borough

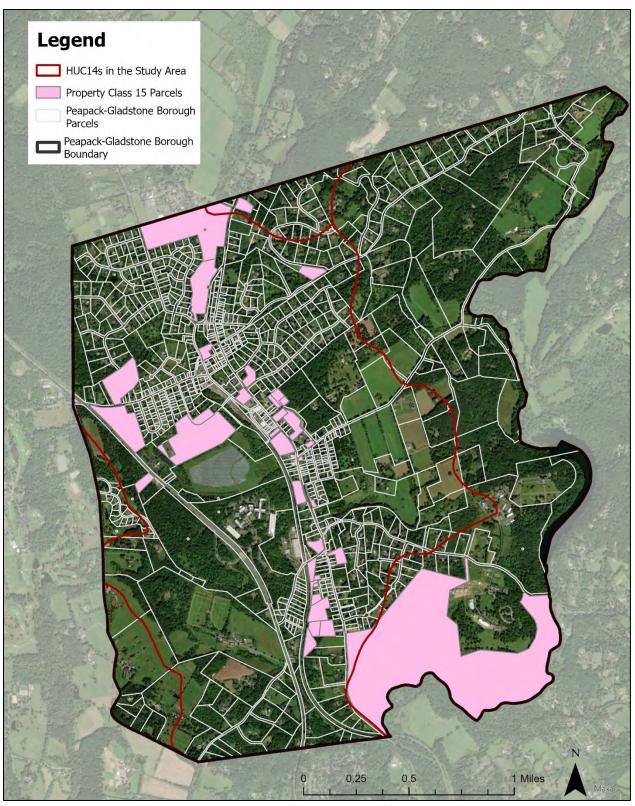


Figure 9: Property Class 15 Parcels in the Study Area of Peapack-Gladstone Borough

Table 7: Property Class 15 Parcels in the Study Area of Peapack-Gladstone Borough

table /:	Property (1	arceis in the Study Area of P	eapack-Giaustone borouş
.	. .	Prop		- ···
Block	Lot	Class	Location	Facility Type
29	12	15A	2 Brook Street	
2.02	1	15B	60 Old Chester Road	Farm
2.02	1	15B	60 Old Chester	Shed
34	1	15B	Cor.Rt.206&Pottersville	School
1	16	15C	Pottersville Road	Easement
1	35	15C	42 Pottersville Road	Vacant Land
2.02	31	15C	11-15 Church Street	Pumping Station
4	25.06	15C	110 Mendham Road	Drainage
4.01	1	15C	1 Sheephill Drive	Drainage
8	16	15C	5 Willow Avenue	Vacant Land
*8	21	15C	160 Main Street	Municipal Bldg.
8.02	13	15C	24 Mendham Road	Detention Pond
*11	14	15C	6 Dewey Avenue	Firehouse
20	1	15C	25 Apgar Avenue	Farm
20	1.03	15C	15 Apgar Avenue	
22	12	15C	2 Park Avenue	Club House
23	2	15C	181 Main Street	Park
24	1	15C	146 Main Street	Parking Area
26	42.11	15C	122 Main Street	Vacant Land
*28	24.01	15C	Main Street	Farm
29	11	15C	4 Railroad Avenue	Vacant Land
29	15	15C	8 Brook Street	Vacant Land
29	15.01	15C	Railroad Avenue	Vacant Land
29	30	15C	12-14 Brook Street	Sewer Plant & Land
29	31	15C	12-14 Brook Street	Vacant Land
29	31.01	15C	12-14 Brook Street	Vacant Land
29	32.05	15C	Off Peapack Road	Sewer Disposal
31	5.01	15C	10 Trimmer Lane	Sewer Disposal
8	2.04	15D	3 Saint Lukes Avenue	Parking Area
8	11	15D	5 Saint Lukes Avenue	Rectory
*8	26	15D	182 Main Street	Church & Parish Hse
*21	4	15D	224 Main Street	Church & Cemetery
*23	10	15D	129 Main Street	Church
*8	10	15F	1 Saint Lukes Ave	Squad Bldg
19 ¹	2	15F	151 Peapack Road	Farm
19	11	15F	206 Route 206	Vacant Land
23	17	15F	85 Main Street	Low/Mod Apartments
28	18.01	15F	64 Main Street	Land Preservation
29	10.01	15F	28 Holland Avenue	Garages
33	16	15F	151 Route 206	Hall
JJ	10	135	131 Koute 200	пан

^{*} Sites that can be retrofitted with green infrastructure

¹ Only a portion of the parcel is within the Peapack-Gladstone Borough boundary

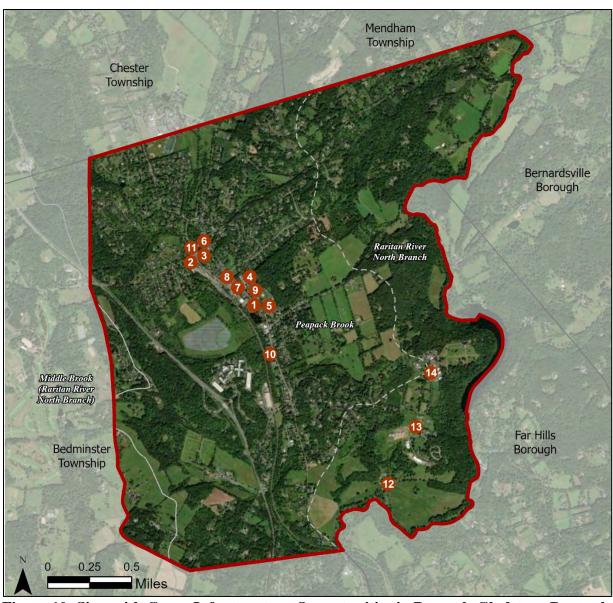


Figure 10: Sites with Green Infrastructure Opportunities in Peapack-Gladstone Borough

BAILEY FUNERAL HOME



RAP ID: 1

Subwatershed: Peapack Brook

Site Area: 24,480 sq. ft.

Address: 176 Main Street

Peapack, NJ 07977

Block and Lot: Block 8, Lot 25





Rain gardens can be installed in front of the building, on either side of the walkway to help capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed on the northwest side of the home to infiltrate and filter parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
70	17,110	0.8	8.6	78.6	0.013	0.47	

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	0.044	7	3,200	0.12	500	\$2,500
Pervious pavement	0.069	11	5,030	0.19	470	\$11,750



GLADSTONE TAVERN



RAP ID: 2

Subwatershed: Peapack Brook

Site Area: 50,370 sq. ft.

Address: 273 Main Street

Gladstone, NJ 07934

Block and Lot: Block 13, Lot 1





Rain gardens can be installed at the southeast corner of the building to help capture, treat, and infiltrate stormwater runoff from the roof of the building. Pervious pavement can be installed in the parking spaces to the west and to the north of the tavern to infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
81	40,975	2.0	20.7	188.1	0.032	1.12	

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 systems	0.038	6	2,780	0.10	500	\$2,500
Pervious pavement	0.246	41	18,060	0.68	1,855	\$46,375





Gladstone Tavern

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



MURPHY CAPITAL MANAGEMENT





RAPID: 3

Subwatershed: Peapack Brook

Site Area: 9,895 sq. ft.

Address: 268 Main Street

Gladstone, NJ 07934

Block and Lot: Block 12, Lot 15





A rain garden can be installed adjacent to the sidewalk and north of the building to capture, treat, and infiltrate stormwater runoff from the roof of the building. Pervious pavement can be installed in the southeastern corner of the parking lot to infiltrate pavement runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
90	8,905	0.4	4.5	40.9	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	0.019	3	1,380	0.05	180	\$900
Pervious pavement	0.057	9	4,160	0.16	650	\$16,250



PEAPACK-GLADSTONE FIRST AID SQUAD



RAPID: 4

Subwatershed: Peapack Brook

HUC14 ID 02030105060060

Site Area: 39,230 sq. ft.

Address: 1 Saint Lukes Avenue

Gladstone, NJ 07934

Block and Lot: Block 8, Lot 10



Multiple rain gardens can be installed in the grass areas surrounding the building to capture, treat, and infiltrate stormwater runoff from the rooftop and from the driveway. This requires disconnecting downspouts, curb cuts, and trench drains. A cistern can be installed behind the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden bed or washing vehicles. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	ТР	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49"	
23	9,094	0.4	4.6	41.8	0.007	0.28	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	3,555	0.103	15	6,880	0.26	890	\$8,900
Rainwater harvesting	585	0.017	2	500	0.02	500 (gal)	\$1,500



PEAPACK AND GLADSTONE LIBRARY BRANCH AND POLICE DEPARTMENT



RAP ID: 5

Subwatershed: Peapack Brook

HUC14 ID 02030105060060

Site Area: 181,490 sq. ft.

Address: 1 School Street

Peapack and Gladstone,

NJ 07977

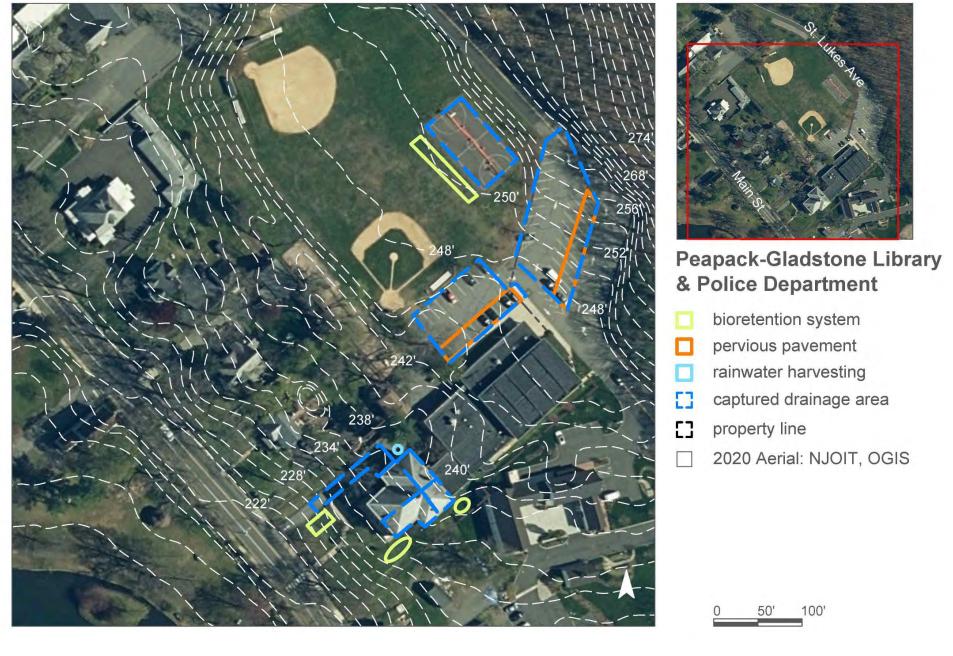
Block and Lot: Block 8, Lot 21



Rain gardens can be installed near the southern end of the building and next to the basketball court to capture, treat, and infiltrate the stormwater runoff from the rooftop and court. This will require disconnecting downspouts, redirecting downspouts under sidewaks, curb cuts, and a trench drain. Existing parking spaces in the parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A trench drain may be needed. A cistern can be installed to the west of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden bed or washing vehicles. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	Impervious Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
33	59,797	2.9	30.2	274.5	0.047	1.83	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	8,680	0.252	38	16,810	0.63	2,165	\$21,650
Pervious pavement	17,935	0.520	78	34,740	1.31	4,210	\$105,250
Rainwater harvesting	935	0.027	4	750	0.03	750 (gal)	\$2,250



PEAPACK FIRE DEPARTMENT





RAP ID: 6

Subwatershed: Peapack Brook

Site Area: 88,770 sq. ft.

Address: 6 Dewey Avenue

Gladstone, NJ 07934

Block and Lot: Block 11, Lot 14

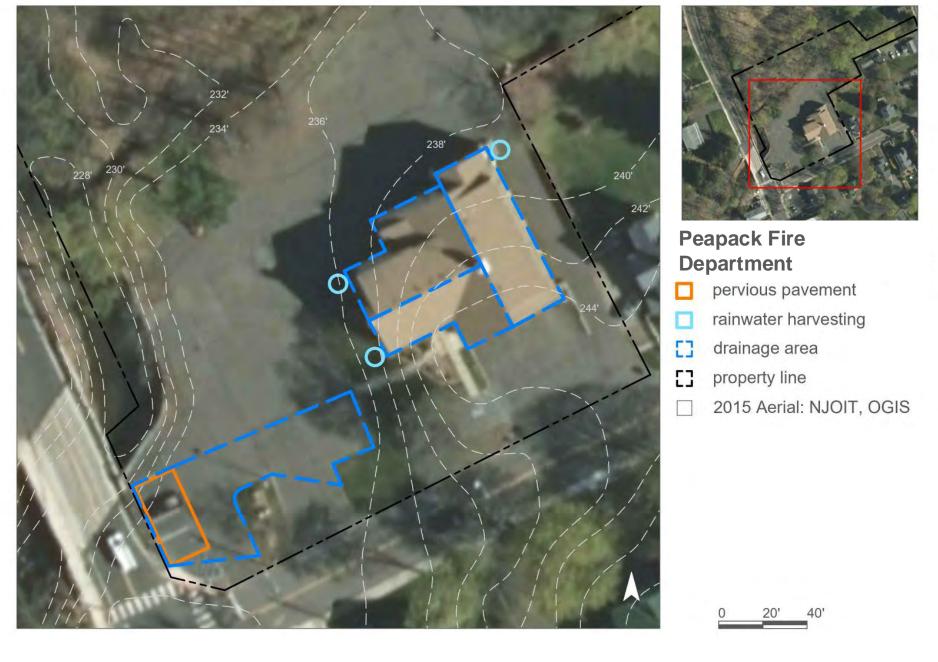




Cisterns can be installed at the southwest, west, and northeast corners of the building to capture and allow non-potable reuse of stormwater. Pervious pavement can be installed in the parking spaces southwest of the building to infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
58	51,480	2.5	26.0	236.4	0.040	1.41	

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
Pervious pavement	0.094	16	6,880	0.26	800	\$20,000
Rainwater harvesting	0.136	23	4,500	0.44	4,500 (gal)	\$9,000



PEAPACK-GLADSTONE BANK





RAP ID: 7

Subwatershed: Peapack Brook

Site Area: 149,780 sq. ft.

Address: 190 Main Street

Gladstone, NJ 07934

Block and Lot: Block 8, Lot 5





Rain gardens can be installed at the northwest corner and in front of the bank to capture, treat, and infiltrate rooftop runoff. Pervious pavement can be installed in the parking spaces behind the building to infiltrate and filter parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
41	61,270	3.0	30.9	281.3	0.048 1.68		

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.066	11	4,810	0.18	630	\$3,150
Pervious pavement	0.155	26	11,390	0.43	1,000	\$25,000



PEAPACK REFORMED CHURCH





RAP ID: 8

Subwatershed: Peapack Brook

Site Area: 98,015 sq. ft.

Address: 224 Main Street

Gladstone, NJ 07934

Block and Lot: Block 21, Lot 4

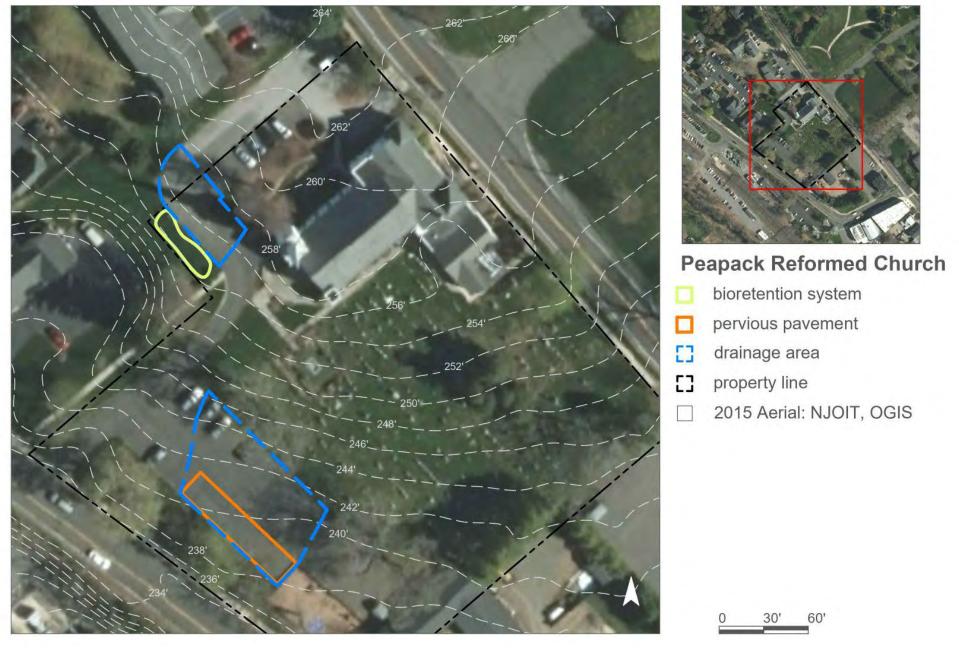




A rain garden can be installed at the edge of the parking lot to the southwest of the church to capture, treat, and infiltrate parking lot runoff. Pervious pavement can be installed in the parking spaces south of the church to infiltrate parking lot runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
45	44,415	2.1	22.4	203.9	0.035	1.22	

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	4,970	0.19	650	\$3,250
Pervious pavement	0.168	28	12,290	0.46	1,800	\$45,000



ST. LUKE'S EPISCOPAL CHURCH





RAPID: 9

Subwatershed: Peapack Brook

Site Area: 64,825 sq. ft.

Address: 182 Main Street

Gladstone, NJ 07934

Block and Lot: Block 8, Lot 26





A rain garden can be installed north of the church to capture, treat, and infiltrate rooftop runoff. Downspout planter boxes can be installed by the main entrance to capture and filter stormwater. Pervious pavement can be installed in the parking spaces to the northeast of the church to filter and infiltrate stormwater. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
69	44,985	2.2	22.7	206.5	0.035 1.23		

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
Bioretention system	0.059	10	4,300	0.16	565	\$2,825
Pervious pavement	0.233	39	17,130	0.64	1,600	\$40,000
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	\$2,000



ST. BRIGID ROMAN CATHOLIC CHURCH



RAPID: 10

Subwatershed: Peapack Brook

HUC14 ID 02030105060060

Site Area: 139,874 sq. ft.

Address: 129 Main Street

Peapack, NJ 07977

Block and Lot: Block 23, Lot 10

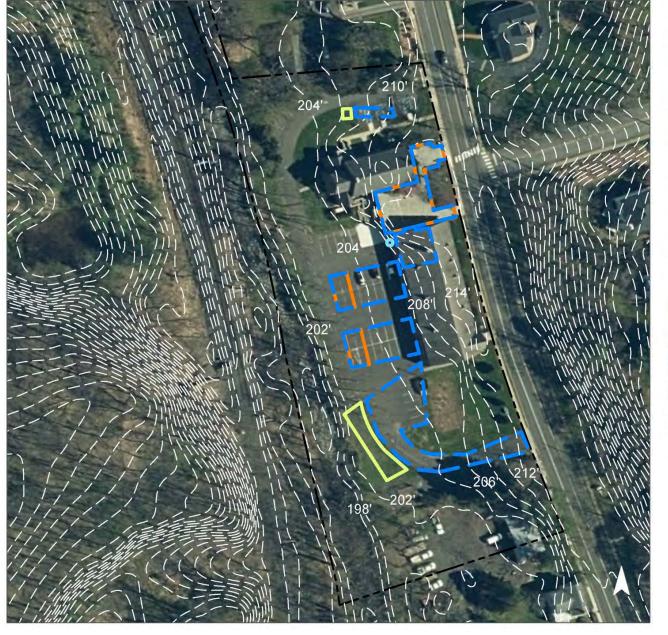


Rain gardens can be installed near the southern and northern driveways to capture, treat, and infiltrate the stormwater runoff from the asphalt. A trench drain and curb cuts may be required. The existing parking spaces in the center of the parking lot can be converted into pervious

pavement to capture and infiltrate the stormwater runoff from the asphalt. The stone in the courtyard can be replaced with porous pavers to infiltrate stormwater runoff from the courtyard. A cistern can be installed to the south of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as watering a garden bed or washing a vehicle. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	Impervious Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 49''	
54	75,641	3.6	38.2	347.3	0.059	2.31	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	7,070	0.205	30	13,700	0.51	1,770	\$17,700
Pervious pavement	10,505	0.305	46	20,350	0.76	5,745	\$143,625
Rainwater harvesting	1,525	0.044	8	1,200	0.04	1,200 (gal)	\$3,600





St. Brigid Roman Catholic Church

- bioretention system
- pervious pavement
- rainwater harvesting
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

0 50' 100'

USPS



RAP ID: 11

Subwatershed: Peapack Brook

Site Area: 6,430 sq. ft.

Address: 266 Main Street

Gladstone, NJ 07934

Block and Lot: Block 12, Lot 14





A rain garden can be installed between the post office and the parking lot to capture, treat, and infiltrate rooftop runoff since no gutters are installed. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
90	5,785	0.3	2.9	26.6	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
Bioretention system	0.008	1	620	0.02	80	\$400



THE COOKING SCHOOL AT NATIRAR





RAPID: 12

Subwatershed: Raritan River North

Branch

Site Area: 3,689,440 sq. ft.

Address: 2 Main Street

Peapack, NJ 07977

Block and Lot: Block 28, Lot 24.02

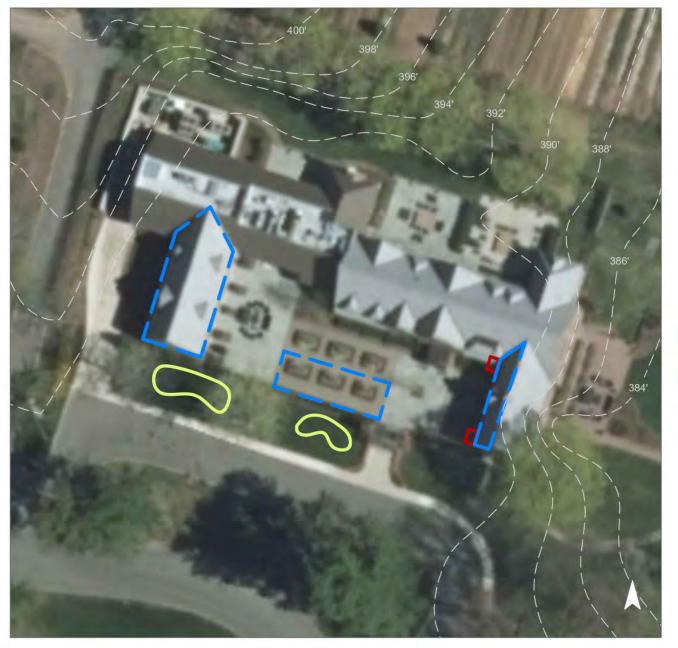




Rain gardens can be installed between the existing landscaped area and the sidewalk to capture, treat, and infiltrate stormwater runoff from the roof of the building. Downspout planter boxes can be installed on the eastern side of the building to capture and filter stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
8	288,540	13.9	145.7	1,324.8	0.225	7.91	

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	0.062	10	4,550	0.17	595	\$2,975
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	\$2,000





The Cooking School at Natirar

- bioretention system
- planter box
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

0 20' 40

NATIRAR PARK



RAPID: 13

Subwatershed: Raritan River North

Branch

Site Area: 10,567,360 sq. ft.

Address: 2 Main Street

Gladstone, NJ 07934

Block and Lot: Block 28, Lot 24.01





Several rain gardens can be installed in multiple locations around the parking lots and driveways to capture stormwater runoff from those areas. 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)				
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
0.18	19,340	0.9	9.8	88.8	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 systems	0.612	106	44,920	1.69	5,880	\$29,400



THE MATHENY SCHOOL



RAPID: 14

Subwatershed: Raritan River North

Branch

Site Area: 3,972,380 sq. ft.

Address: 65 Highland Avenue

Peapack, NJ 07977

Block and Lot: Block 26, Lot 26

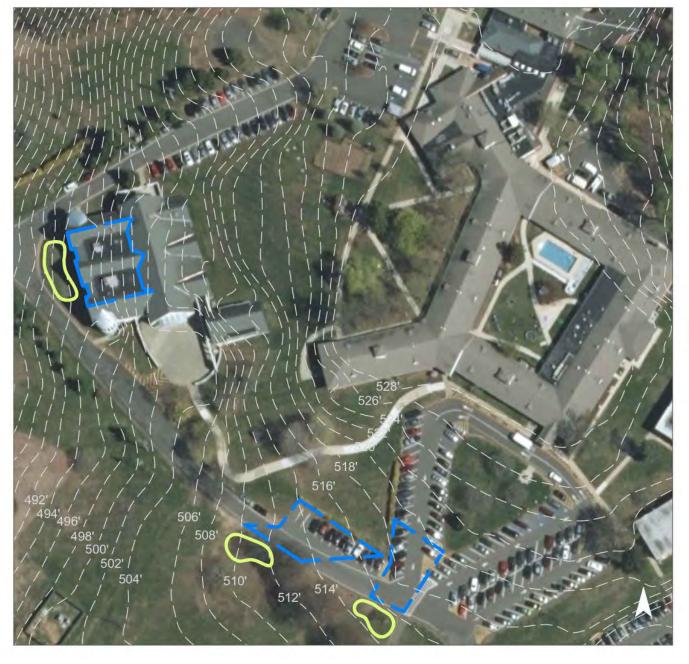




Rain gardens can be installed along the outer perimeter of the property, adjacent to the driveways and parking spaces, to capture, treat, and infiltrate stormwater runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover Existing Loads from Impervious Cover (lbs/yr)		Runoff Volume from Impervious Cover (Mgal)				
0/0	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''
8.1	321,150	15.5	162.2	1,474.5	0.250	8.81

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	0.363	61	26,610	1.00	3,480	\$17,400





The Matheny School

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

0 100' 200'

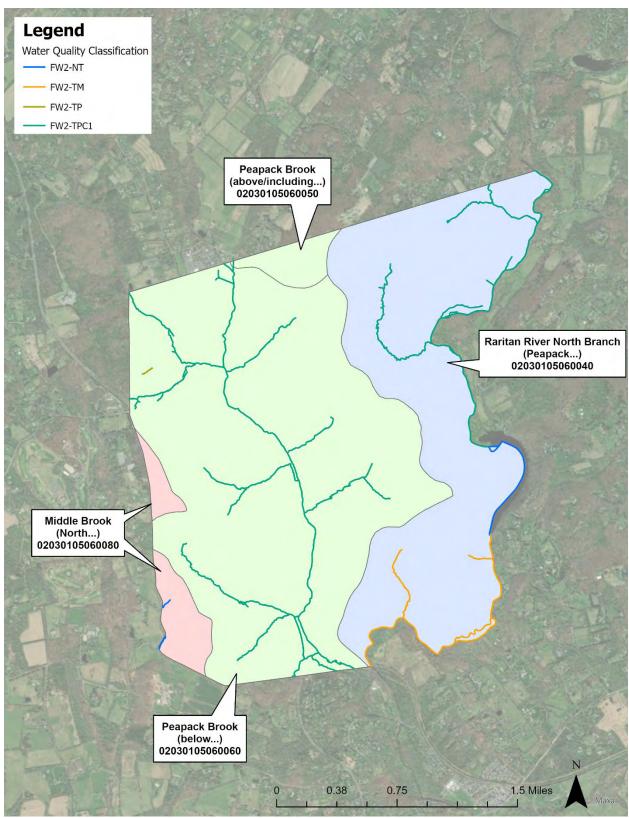


Figure 11. Water Quality Classification of Surface Waters in Peapack-Gladstone Borough

Table 8. Water Quality Classification of Surface Waters in Peapack-Gladstone Borough

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	1.1	5.6%
Freshwater 2, trout production, Category One	FW2-TPC1	15.7	79.5%
Freshwater 2, trout maintenance	FW2-TM	2.9	14.6%
Freshwater 2, trout production	FW2-TP	0.1	0.4%

Randolph Township

Introduction

Located in Morris County in New Jersey, Randolph Township covers about 21.2 square miles. With a population of 26,504 (2020 United States Census), Randolph Township consists of 52.1% of urban land uses by area. Of that urban land use, approximately 36.0% is comprised of low-density residential properties (NJDEP Open Data). In addition to residential development, urban land use also includes land used for commercial, industrial, recreational, and transportation purposes. Natural lands (forests, wetlands, and water) make up 46.3% of Randolph Township.

Randolph Township contains portions of eleven subwatersheds (Table 1). There are approximately 55.1 miles of rivers and streams within the municipality; these include Burnett Brook and its tributaries, Dawsons Brook and its tributaries, Den Brook and its tributaries, Harmony Brook and its tributaries, India Brook and its tributaries, Jackson Brook and its tributaries, Lamington River and its tributaries, Mill Brook and its tributaries, Rockaway River and its tributaries, tributaries to the Whippany River, and several uncoded tributaries. Randolph Township is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Areas (WMA) 6 (Upper Passaic, Whippany, and Rockaway) and 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Randolph Township

Subwatershed	HUC14
Whippany River (above road at 74d 33m)	02030103020010
Whippany River (Washington Valley Road to 74d 33m)	02030103020020
Whippany River (Lake Pocahontas to Washington Valley Road)	02030103020040
Rockaway River (74d 33m 30s to Stephens Brook)	02030103030070
Mill Brook (Morris County)	02030103030080
Rockaway River (Benchmark 534 bridge to 74d 33m 30s)	02030103030090
Den Brook	02030103030120
Lamington River (above Route 10)	02030105050010
Lamington River (Hillside Road to Route 10)	02030105050020

Raritan River North Branch (above/including India Brook)	02030105060010	
Burnett Brook (above Old Mill Road)	02030105060020	

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Randolph Township. This involves gathering, organizing, and presenting information about existing conditions and infrastructure within each subwatershed. It aims to serve as a tool for informed decision-making, planning, and implementation of sustainable watershed management strategies aimed to protect and enhance the health of the watershed, its associated ecosystems, and the surrounding communities.

A geographic information system (GIS) was used to visualize data pertaining to the existing stormwater infrastructure, land cover, watershed delineation, and water quality classification and impairments within separate layers. Datasets from the New Jersey Department of Environmental Protection's (NJDEP's) GIS database was used to populate the watershed inventory map, from which the relevant data were isolated. Datasets representing Randolph Township's existing stormwater infrastructure were provided by the municipality and were manipulated, if necessary, for the specific purposes of this report.

Analysis by Municipality

An analysis was completed by municipality. Figure 1 shows Randolph Township in relation to the study area. Figure 2 shows the portions of the eleven HUC14s in Randolph Township and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Randolph Township. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Randolph Township and is presented in Table 2. Figure 4 shows the impervious cover in Randolph Township based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Randolph Township and is presented in Table 3.

For the area of the municipality in the study area, a stormwater facilities analysis was completed (see Figure 5). Two sources were used to identify stormwater facilities. The first data source was the New Jersey Hydrologic Modeling Database (SCS, 2024) that was prepared by the Soil Conservation Districts (SCD) and Rutgers University. The second data source was the NJDEP 2020 land use/land cover GIS Layer. Land use data uses a land use code (1499) to identify stormwater basins. Each stormwater basin was inspected (see Table 4). The detention basins in Table 4 (identified as type "D") could benefit from naturalization (i.e., conversion from a detention basin to a bioretention basin). Detention basins that are already naturalized are identified as type "N". Only detention basins and naturalized detention basins were identified Randolph Township within the study area.

The Q-Farms in Randolph Township have been identified (see Figure 6). Table 5 presents the data available for each Q-Farm parcel. Q-Farms are the parcels that have been qualified for farmland tax assessment. The Q-Farms in the study area of Randolph Township have been

identified (see Figure 7 and Table 6). It is important to note that the land use on a Q-Farm is often not all agriculture. Figure 8 illustrates the land use on the Q-Farms, which is summarized in Table 7. There are 171.0 acres of agricultural land use in Randolph Township, of which, 138.9 acres lie within the study area for this Watershed Restoration and Protection Plan. There are 20 Q-Farms and a portion of one Q-Farm in the study area portion of Randolph Township, totaling 262.5 acres. Within the 20 Q-Farms and portion of one Q-Farm, there are approximately 78.6 acres of agricultural land use. Aerial photography (see Figure 9) was used to identify areas where riparian buffers may be able to be enhanced to further protect the waterways from agricultural impacts. Based upon the aerial photograph and site visits, recommendations for the agricultural lands in the study area in Randolph Township are presented in Table 8.

The impervious cover analysis was used to calculate targets for areas of rooftops to be treated with rain gardens and length of roadways to be managed with bioswales. Four HUC14s are included in the study area (02030105050010, 02030105050020, 02030105060010, 02030105060020). Within these four HUC14s, there are 178.6 acres of buildings and 227.4 acres of roadway. The Watershed Restoration and Protection Plan recommends managing stormwater runoff from ¼ of 25% of the building rooftops. For the study area within Randolph Township, approximately 11.2 acres of rooftop runoff would be managed with 2.23 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Randolph Township, approximately 22.7 acres of roadway would be managed, or 6.3 miles of roadway.

Finally, the parcel data was used to identify parcels that are classified as Property Class 15. Property Class 15 parcels are tax-exempt, and include six subcategories:

15A – Public School Property

15B- Other School Property

15C- Public Property

15D- Church and Charitable Property

15E- Cemeteries and Graveyards

15F- Other Exempt

The Property Class 15 parcels for Randolph Township are shown in Figure 10 and presented in Table 9. When the municipality develops their Watershed Improvement Plan to satisfy their Municipal Separate Storm Sewer System (MS4) permit, these are the first sites that are assessed for opportunities to install watershed improvement projects. This assessment was completed for the Property Class 15 parcels in the study area (see Figure 11). Available information for each parcel in the study area is presented in Table 10. Class 15E parcels were excluded from the assessment. Eight of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 10 and represent watershed improvement projects that can be included in the municipality's Watershed Improvement Plan. Figure 12 shows parcels within the entire municipality that offer opportunities to be retrofitted with green infrastructure. These sites are included in the Impervious Cover Reduction Action Plan that was completed by the RCE Water Resources Program for the municipality.

Water Quality Classification

The New Jersey Department of Environmental Protection (NJDEP) Surface Water Quality Standards (SWQS) are regulations that govern the water quality goals and pollution limitations for surface waters in New Jersey. Surface waters are classified based on their designated uses, such as drinking water supply, aquatic life habitat, recreation, or shellfish harvesting. The SQWS are used to protect those uses and guide permitting, monitoring, and water quality restoration efforts.

Under the SWQS, freshwaters are classified as Fresh Water 1 (FW1), Fresh Water 2 (FW2), or Pinelands (PL). FW1 waters are nondegradation waters with unique ecological significance, in which man-made wastewater discharges are not permitted. FW2 waters are all other freshwaters except for Pinelands waters. FW2 waters are further classified based on their ability to support trout. Trout Production waters (TP) are designated for use by trout for spawning or nursery purposes during their first summer. Trout Maintenance waters (TM) are designated for the support of trout throughout the year. Non-trout waters (NT) are generally unsuitable for trout due to their physical, chemical, or biological characteristics. Pinelands waters – which may be either fresh or saline waters – are surface waters within the Pinelands Protection and Preservation areas.

Saline waters that are not PL are classified under the SWQS as either Saline Estuarine (SE) or Saline Coastal (SC). SE waters are further subcategorized based on their ability to support recreation, shellfish harvesting, and warm water fish species. SE1 waters have the highest protection within the SE category, and must support the maintenance, migration, and propagation of fish and aquatic life, as well as shellfish harvesting. SE2 waters must support the maintenance, migration, and propagation of fish and aquatic life but do not need to support shellfish harvesting. SE3 waters must support the migration of fish but do not need to support permanent aquatic biota populations or shellfish harvesting. Some coastal waters have dual classifications where the waters change from freshwater to saltwater as they drain into the estuary or ocean.

Finally, there are three antidegradation classifications assigned to all New Jersey surface waters. Outstanding National Resource Waters (ONRW) is the most protective classification and applies to all F1 and PL waters. No degradation is permitted in ONRW waters. Category One waters (C1) are protected from any measurable change to existing water quality because of their exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resources. Category Two waters (C2) permit some measurable degradation in water quality, but the changes must be limited and justified. C2 is the default classification for all surface waters that are not categorized as F1, PL, or C1.

There are five classifications that apply to the streams in Randolph Township. Figure 13 depicts the water quality classification of surface waters throughout Randolph Township and Table 11 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

Administrators from Randolph Township have identified several locations throughout the municipality that are particularly susceptible to flooding during heavy rainfall or storm events. The intersection of Route 10 and Sussex Turnpike has often been observed to experience flooding. In preparation for severe weather events, the municipality requests that the Department of Transportation (DOT) clears stormwater basins to minimize the risk of roadway inundation because the location falls under DOT and county jurisdiction. Rockaway Road adjacent to the railroad tracks experiences similar flooding issues and the municipality must contact the DOT prior to heavy rainfall events to request debris be cleared from the area because it falls under their jurisdiction. Debris that is not cleared can obstruct stormwater infrastructure and contribute to flooding that can pose a risk to infrastructure and public safety. The intersection of Jennifern Avenue and Route 10 is also identified as a location prone to flooding within Randolph Township. Figure 14 shows the locations of the aforementioned areas of concern.

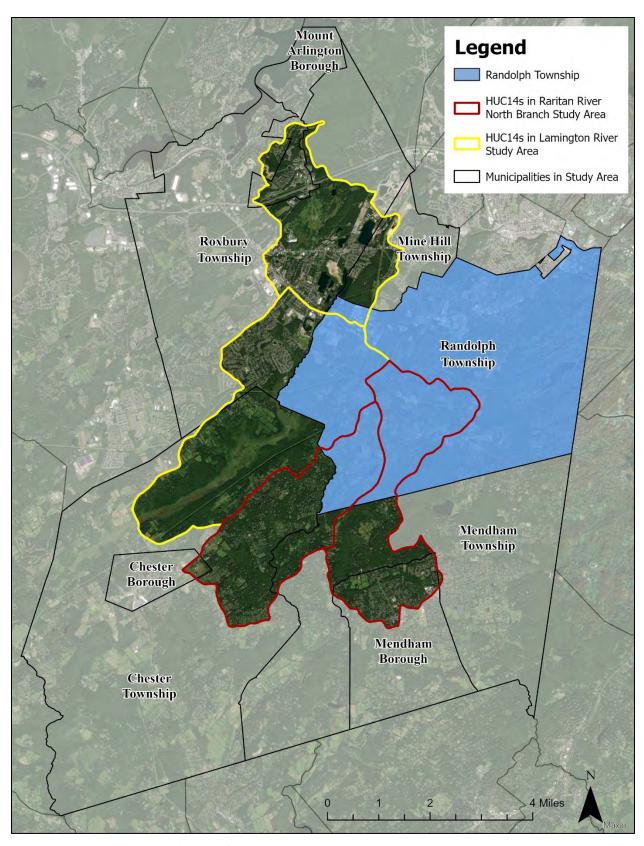


Figure 1: Municipalities in the Study Area

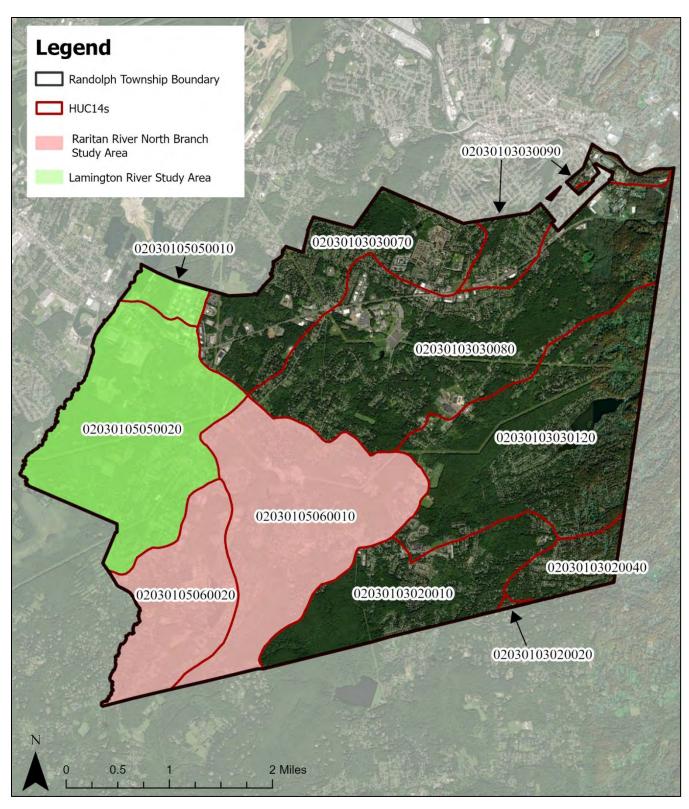


Figure 2: Portions of eleven HUC14s are in Randolph Township

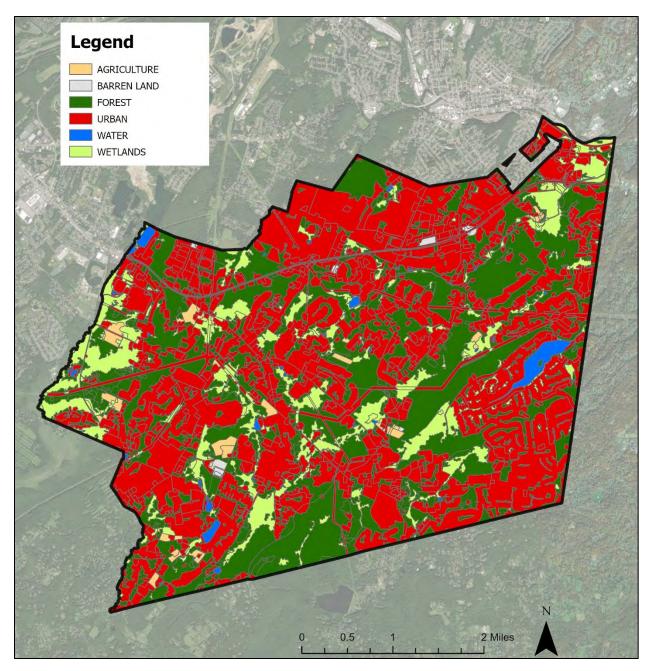


Figure 3: Land Use in Randolph Township

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Randolph Township

Land Use Type	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
		02030103020010		
Agriculture	0.04	0.1	0.4	13.4
Barren Land	0.0	0.0	0.0	0.0
Forest	640.2	64.0	1,920.7	25,610.0
Urban	480.2	672.3	7,203.1	67,229.0
Water	1.0	0.1	2.9	39.0
Wetlands	80.1	8.0	240.2	3,203.0
TOTAL =	1,201.6	744.5	9,367.4	96,094.3
		02030103020020		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	4.4	0.4	13.1	175.2
Urban	8.0	11.2	119.9	1,119.4
Water	0.0	0.0	0.0	0.0
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	12.4	11.6	133.1	1,294.7
		02030103020040		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	67.0	6.7	201.1	2,680.7
Urban	258.3	361.6	3,874.7	36,163.5
Water	0.0	0.0	0.0	0.0
Wetlands	1.8	0.2	5.3	70.1
TOTAL =	327.1	368.5	4,081.0	38,914.3
		02030103030070		
Agriculture	0.8	1.0	8.1	242.1
Barren Land	3.6	1.8	18.0	216.4
Forest	377.3	37.7	1,131.9	15,092.2
Urban	888.7	1,244.1	13,329.9	124,412.1
Water	3.2	0.3	9.7	129.9
Wetlands	84.0	8.4	252.0	3,359.6
TOTAL =	1,357.6	1,293.4	14,749.6	143,452.4
		02030103030080		
Agriculture	16.0	20.7	159.6	4,787.8
Barren Land	4.5	2.2	22.5	269.4
Forest	1,071.7	107.2	3,215.1	42,868.2
Urban	1,518.9	2,126.5	22,783.9	212,649.3
Water	23.4	2.3	70.2	936.4
Wetlands	269.8	27.0	809.5	10,792.9

TOTAL =	2,904.3	2,286.0	27,060.7	272,304.1
		02030103030090		
Agriculture	0.0	0.0	0.0	0.0
Barren Land	10.7	5.3	53.4	640.7
Forest	60.3	6.0	180.9	2,412.5
Urban	274.7	384.5	4,119.9	38,452.0
Water	3.2	0.3	9.6	127.9
Wetlands	30.3	3.0	90.8	1,211.1
TOTAL =	379.1	399.2	4,454.6	42,844.3
		02030103030120		
Agriculture	15.3	19.9	153.2	4,595.1
Barren Land	1.4	0.7	6.9	82.5
Forest	806.2	80.6	2,418.6	32,248.0
Urban	1,146.8	1,605.5	17,201.8	160,550.4
Water	77.6	7.8	232.7	3,102.4
Wetlands	214.5	21.4	643.4	8,578.3
TOTAL =	2,261.7	1,735.9	20,656.5	209,156.7
,	,	02030105050010	,	
Agriculture	0.0	0.0	0.0	0.0
Barren Land	2.3	1.2	11.6	138.7
Forest	41.4	4.1	124.1	1,655.3
Urban	98.4	137.8	1,476.2	13,777.8
Water	20.0	2.0	60.1	801.9
Wetlands	5.9	0.6	17.6	234.4
TOTAL =	168.0	145.7	1,689.6	16,608.1
_		02030105050020	,	,
Agriculture	62.3	81.0	622.7	18,682.0
Barren Land	0.0	0.0	0.0	0.0
Forest	582.6	58.3	1,747.9	23,305.9
Urban	950.1	1,330.1	14,250.8	133,007.7
Water	12.0	1.2	36.1	481.0
Wetlands	345.1	34.5	1,035.4	13,805.7
TOTAL =	1,952.1	1,505.0	17,693.0	189,282.3
		02030105060010		
Agriculture	35.3	45.9	353.1	10,591.8
Barren Land	6.8	3.4	34.0	408.5
Forest	703.1	70.3	2,109.4	28,125.8
Urban	894.7	1,252.6	13,421.2	125,264.8
Water	13.4	1.3	40.2	535.8
Wetlands	319.1	31.9	957.3	12,763.8
TOTAL =	1,972.5	1,405.5	16,915.2	177,690.6
		02030105060020		
Agriculture	41.3	53.6	412.6	12,377.1

Barren Land	9.3	4.6	46.4	556.3			
Forest	308.4	30.8	925.1	12,334.8			
Urban	542.5	759.5	8,137.4	75,948.8			
Water	21.1	2.1	63.4	844.7			
Wetlands	82.8	8.3	248.3	3,310.9			
TOTAL =	1,005.3	859.0	9,833.1	105,372.6			
	All HUCs						
Agriculture	171.0	222.3	1,709.6	51,289.3			
Barren Land	38.5	19.3	192.7	2,312.6			
Forest	4,662.7	466.3	13,988.2	186,508.7			
Urban	7,061.3	9,885.8	105,918.8	988,575.0			
Water	175.0	17.5	524.9	6,998.9			
Wetlands	1,433.2	143.3	4,299.7	57,329.8			
TOTAL =	13,541.7	10,754.4	126,633.9	1,293,014.3			

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Randolph Township that have been covered with materials that are highly resistant to infiltration by water, rendering them impervious. These surfaces include rooftops, roadways, sidewalks, and other paved areas. These impervious cover values were used to estimate the impervious coverage for Randolph Township. Based upon the NJDEP impervious surface data, Randolph Township has impervious cover totaling 18.7%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Randolph Township is shown in Figure 4.

The literature suggests a link between impervious cover and stream ecosystem impairment (Schueler, 1994; Arnold and Gibbons, 1996; May et al., 1997). Impervious cover may be linked to the quality of lakes, reservoirs, estuaries, and aquifers (Caraco et al., 1998), and the amount of impervious cover in a watershed can be used to project the current and future quality of streams. Based on scientific literature, Caraco et al. (1998) classified urbanizing streams into the following three categories: sensitive streams, impacted streams, and non-supporting streams.

Schueler (1994, 2004) developed an impervious cover model that classified "sensitive streams" as typically having a watershed impervious surface cover from 0-10%. "Impacted streams" have a watershed impervious cover ranging from 11-25% and typically show clear signs of degradation from urbanization. "Non-supporting streams" have a watershed impervious cover of greater than 25%; at this high level of impervious cover, streams are simply conduits for stormwater flow and no longer support a diverse stream community.

Schueler et al. (2009) reformulated the impervious cover model based upon new research that had been conducted. This analysis determined that stream degradation was first detected at 2 to 15% impervious cover. The updated impervious cover model recognizes the wide variability of stream degradation at impervious cover below 10%. The updated model also moves away from having a fixed line between stream quality classifications. For example, 5 to 10% impervious

cover is included for the transition from sensitive to impacted, 20 to 25% impervious cover for the transition between impacted and non-supporting, and 60 to 70% impervious cover for the transition from non-supporting to urban drainage.

Based upon this information, Randolph Township's impervious cover percentage would suggest that its waterways are primarily impacted and most likely contributing to degradation of the state's surface water quality standards.

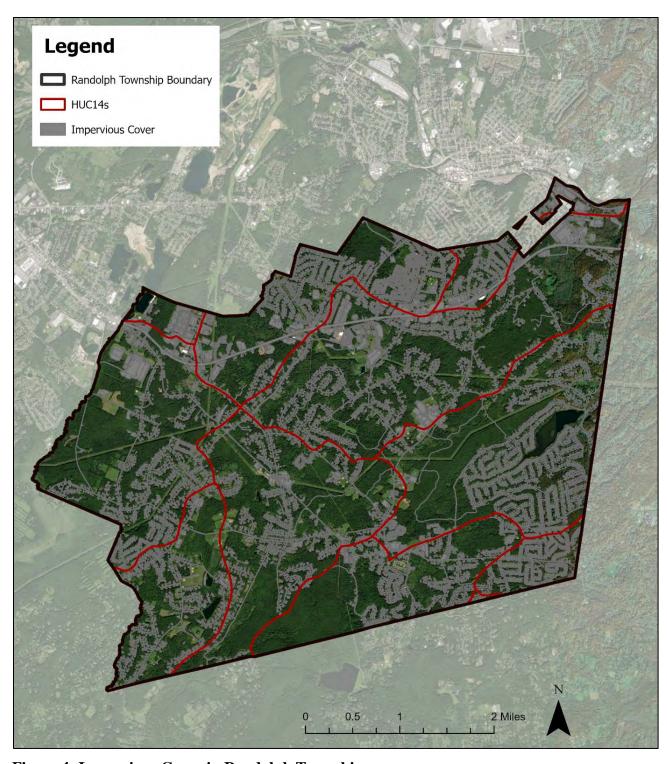


Figure 4: Impervious Cover in Randolph Township

Table 3: Impervious Cover Analysis by HUC14 for Randolph Township

Class	Area (acres)	HUC Impervious Cover (%)
I	02030103020010	
Building	42.72	
Other	77.16	
Road	53.50	
TOTAL =	173.4	14.4%
<u> </u>	02030103020020	
Building	0.75	
Other	1.09	
Road	0.47	
TOTAL =	2.3	18.7%
<u>, </u>	02030103020040	
Building	27.15	
Other	36.69	
Road	32.61	
TOTAL =	96.4	29.5%
	02030103030070	•
Building	91.77	
Other	173.15	
Road	128.28	
TOTAL =	393.2	29.0%
101112	02030103030080	
Building	121.58	
Other	279.52	
Road	167.12	
TOTAL =	568.2	19.6%
101111	02030103030090	221070
Building	28.26	
Other	73.40	
Road	35.83	
TOTAL =	137.5	36.3%
101112	02030103030120	00070
Building	97.46	
Other	155.78	
Road	122.42	
TOTAL =	375.7	16.6%
1011111-	02030105050010	2010/0
Building	17.14	
Other	30.18	
Road	6.97	
TOTAL =	54.3	32.3%
IOIAL -	02030105050020	OMIO /V
Building	78.01	
Other	155.67	
Road	92.95	
TOTAL =	326.6	16.7%
IUIAL =	340.0	10.7 70

	02030105060010	
Building	51.58	
Other	127.13	
Road	81.24	
TOTAL =	260.0	13.2%
	02030105060020	
Building	31.85	
Other	70.59	
Road	46.20	
TOTAL =	148.6	14.8%
	All HUCs	
Building	588.27	
Other	1,180.37	
Road	767.58	
TOTAL =	2,536.2	18.7%

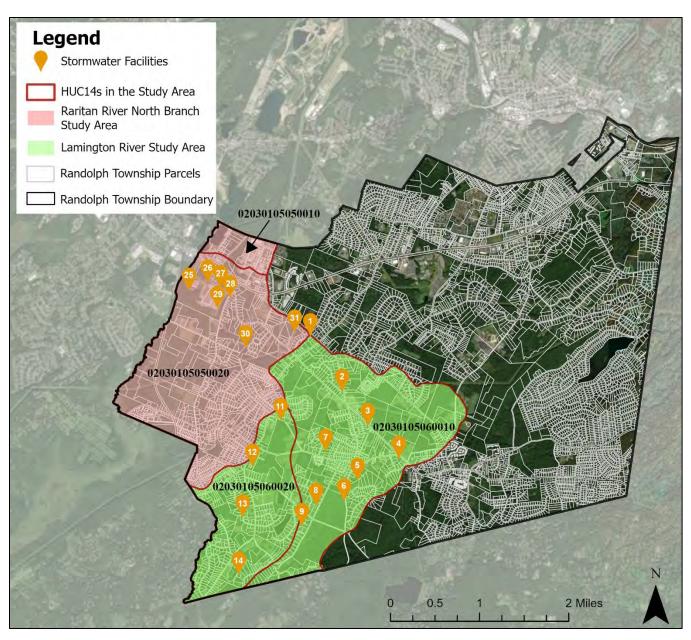


Figure 5: Stormwater Facilities in the Study Area of Randolph Township

Table 4: Location of Stormwater Facilities in the Study Area of Randolph Township

I	Lamington River Study Area						
<u>ID</u>	<u>Address</u>	<u>Type</u>					
25	1578 Sussex Tpke	N					
26	1578 Sussex Tpke	N					
27	1578 Sussex Tpke	N					
28	1578 Sussex Tpke	D					
29	1578 Sussex Tpke	N					
30	Sherwood Ct	N					
31	1447 Sussex Tpke	D					
Rarita	Raritan River North Branch Study Area						
<u>ID</u>	Address	Type					
1	2 Tamari Ct	N					
2	122 Morris Tpke	D					
3	1318 Sussex Tpke	N					
4	1264 Sussex Tpke	N					
5	83 Heritage Ct	N					
6	5 Dolly Bridge Rd	D					
7	3 Edgewood Ter	N					
8	57 Combs Hollow Rd	N					
9	92 Doby Rd	N					
11	99 Fairway	D					
12	335 Dover Chester Rd	D					
13	82 Patriots Way	N					
14	Shadowbrook Way	N					

[&]quot;D" = Detention, "N" = Naturalized

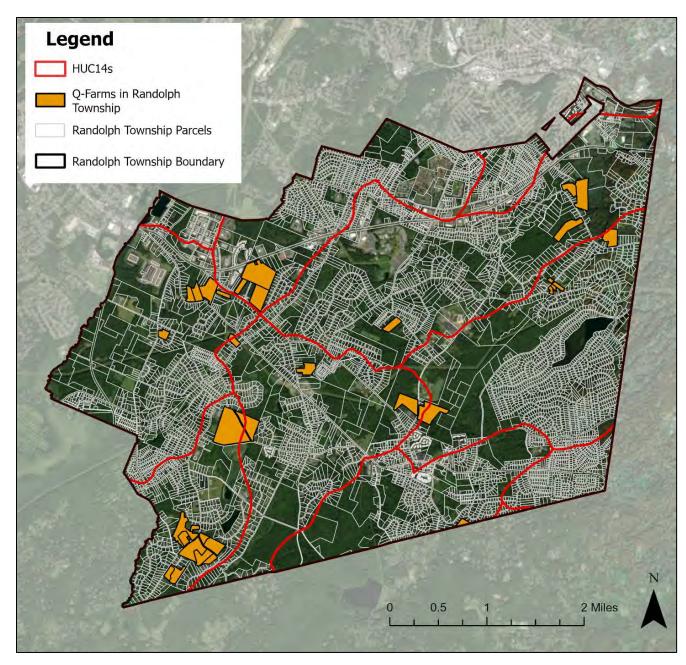


Figure 6: Q-Farm Parcels in Randolph Township

Table 5: Q-Farm Parcels in Randolph Township

Block	Lot	Q-Code	Prop Class	Location
20	9	QFARM	3B	19 Canfield Ave
20	11	QFARM	3B	1491 Sussex Tpke
20	12	QFARM	3B	1501 Sussex Tpke
21	28	QFARM	3B	230 Dover-Chester Rd
21.07	12	QFARM	3B	54 Park Ave
35	50	QFARM	3B	8 Patriots Way
35	50.16	QFARM	3B	85 South Rd
35	52	QFARM	3B	65 South Rd
40	1	QFARM	3B	10 Combs Ave
40	2	QFARM	3B	22 Combs Ave
40	3	QFARM	3B	30 Combs Ave
40	20.01	QFARM	3B	50 South Rd
40	20.02	QFARM	3B	50 South Rd
44	4	QFARM	3B	931 Route 10
44	41	QFARM	3B	65 Morris Tpke
44	48	QFARM	3B	39 Morris Tpke
45	1.01	QFARM	3B	40 Canfield Ave
47	34	QFARM	3B	95A Calais Rd
48	2	QFARM	3B	141 Calais Rd
51	18	QFARM	3B	21 Combs Ave
51	19	QFARM	3B	5 Combs Ave
82	26	QFARM	3B	52 School House Rd
82	39	QFARM	3B	645 Millbrook Ave
86	79	QFARM	3B	137 Morris Tpke
119	114	QFARM	3B	654 Millbrook Ave
146	42.01	QFARM	3B	73 Mountainside Dr
146	61	QFARM	3B	55 Everdale Rd
199	45	QFARM	3B	124 Mountainside Dr
199	48	QFARM	3B	58 Mountainside Dr
199	56	QFARM		
201	1.01	QFARM	3B	55 Everdale Rd
201	2	QFARM	3B	55 Everdale Rd
201	3	QFARM	3B	60 Everdale Rd
227	72	QFARM	3B	Off Knights Bridge Dr

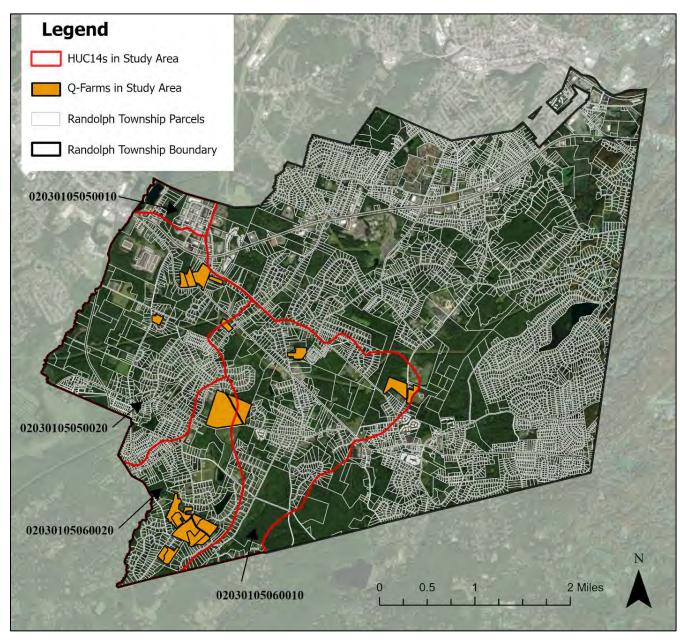


Figure 7: Q-Farm Parcels in the Study Area of Randolph Township

Table 6: Q-Farm Parcels in the Study Area of Randolph Township

Block	Lot	Q-Code	Prop Class	Location
20	9	QFARM	3B	19 Canfield Ave
20	11	QFARM	3B	1491 Sussex Tpke
20	12	QFARM	3B	1501 Sussex Tpke
21	28	QFARM	3B	230 Dover-Chester Rd
21.07	12	QFARM	3B	54 Park Ave
35	50	QFARM	3B	8 Patriots Way
35	50.16	QFARM	3B	85 South Rd
35	52	QFARM	3B	65 South Rd
40	1	QFARM	3B	10 Combs Ave
40	2	QFARM	3B	22 Combs Ave
40	3	QFARM	3B	30 Combs Ave
40	20.02	QFARM	3B	50 South Rd
45	1.01	QFARM	3B	40 Canfield Ave
47	34	QFARM	3B	95A Calais Rd
48	2	QFARM	3B	141 Calais Rd
51	18	QFARM	3B	21 Combs Ave
51	19	QFARM	3B	5 Combs Ave
82	39	QFARM	3B	645 Millbrook Ave
86	79	QFARM	3B	137 Morris Tpke
*119	114	QFARM	3B	654 Millbrook Ave

^{*}Only a portion of the Q-Farm is within the study area

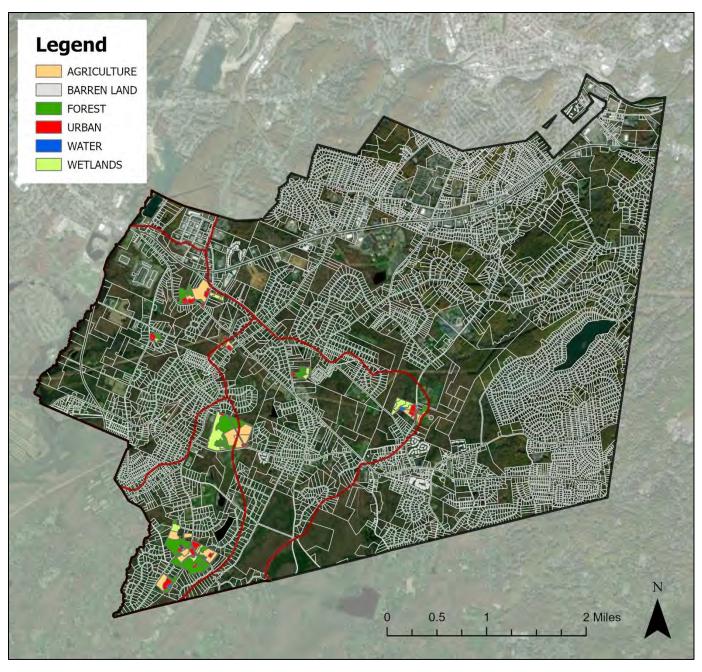


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Randolph Township

Table 7: Land Use on Q-Farms in the Study Area of Randolph Township

Land Use	Area (acres)	
Agriculture	78.6	
Barren Land	0.0	
Forest	105.3	
Urban	31.3	
Water	2.0	
Wetlands	45.2	
Total:	262.4	

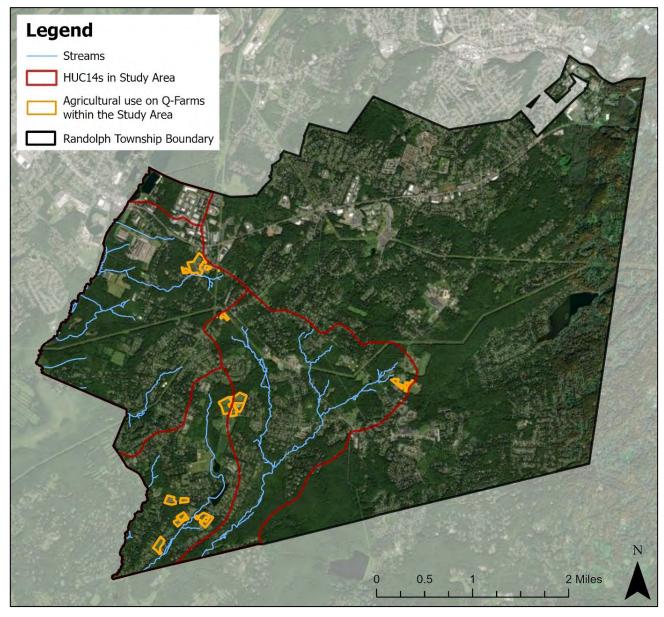


Figure 9: Aerial View of Agricultural Use on Q-Farm Parcels within the Study Area of Randolph Township

Table 8: Recommendations for Specific Farms in the Study Area of Randolph Township

	Lamington River Study Area								
Block	Lot	Q-Farm Code	Cover Crop	Enhanced Stream Buffer	Impervious Cover Mgt.	Rainwater Harvesting	Livestock Exclusion	Manure Mgt.	
20	9	QFARM	X		X	X			
20	11	QFARM							

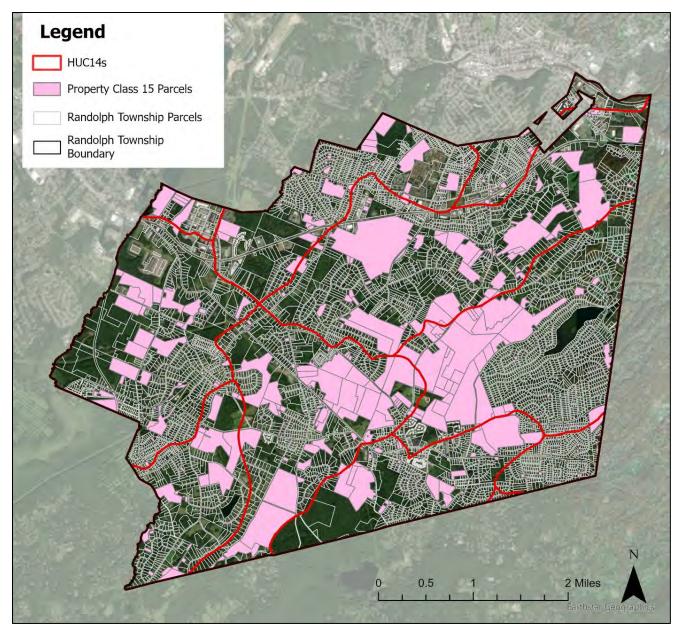


Figure 10: Property Class 15 Parcels in Randolph Township

Table 9: Property Class 15 Parcels in Randolph Township

Block	Lot	Prop Class	Location	Facility Type
47	7.32	15A	Off Quail Run	Sanitary Disposal
48	5	15A	303 Dover-Chester Rd	Ironia School
81	1	15A	214 Center Grove Rd	County College
110	11	15A	206 Quaker Church Rd	Fernbrook School
116	28	15A	507 Millbrook Ave	High & Intermediate
116	30	15A	522 Millbrook Ave	Schools
116	31	15A	559 Millbrook Ave	Vacant Land
116	33	15A	575 Millbrook Ave	Farm
116	34	15A	25 School House Rd	Intermediate School
168	58	15A	9 Arrow Pl	Shongum School
1	2	15C	43 Green Ln	Randolph Park
2	1	15C	76 Green Ln	Randolph Park
2	2	15C	68 Green Ln	Vacant Land
2	3	15C	64 Green Ln	Vacant Land Vacant Land
5	19	15C	41 Park Ave	Day Camp
5	22	15C	15 Righter Rd	Open Space
5	23	15C	45 Righter Rd	Vacant Land
5	26	15C	55A Righter Rd	
6	16	15C	49 Pleasant Hill Rd	Open Space Vacant Land
6	26	15C	111 Park Ave	
6				Open Space
6	27.01	15C	57 Pleasant Hill Rd	Mua Easement
	42	15C	83 Park Ave	Vacant Land
6	43	15C	75 Park Ave	Vacant Land
6	52	15C	18 Righter Rd	Vacant Land
6	53	15C	34 Righter Rd	Open Space
14	2.01	15C	147 Selma Blvd	Vacant Land
14	9	15C	Pleasant Hill Rd	Vacant Land
14	11	15C	9 Chester Ave	Well
14	27	15C	Off Selma Blvd	Vacant Land
18.01	1	15C	80 Irish Spring Rd	Vacant Land
21	19.15	15C	11 Nottingham Way	Dedicated Open Space
21	20	15C	1466 Sussex Tpke	Open Space
21	32.08	15C	Sherwood Ct	Open Space
21	39	15C	5 Stonehill Rd	Well
21	127.01	15C	110 Park Ave	Open Space
21	129	15C	Park Ave	Vacant Land
21	130.02	15C	72 Park Ave	Open Space
21	142	15C	18 James Rd	Open Space
21	149	15C	34 Park Ave	Camp
21	150.02	15C	32 Park Ave	Vacant Land
21.05	152	15C	Pleasant Hill Rd	Vacant Land
21.10	1	15C	Nottingham Way	Dedicated Open Space
23	18	15C	18 Aldebaran Dr	Vacant Land
27	5.08	15C	Off Spring Brook Dr	Vacant Land
27	6	15C	88A Pleasant Hill Rd	Vacant Land
27	8	15C	Dover-Chester Rd	Vacant Land

27	86.02	15C	152.5 Park Ave	Vacant Land
30	1	15C	159 Park Ave	Foreclosure
32	7	15C	4 Sunset Dr	Well
47	7.32	15A	Off Quail Run	Sanitary Disposal
48	5	15A	303 Dover-Chester Rd	Ironia School
35	5	15C	385 Dover-Chester Rd	County Garage
35	50.05	15C	10 Patriots Way	Detention Basin
35	50.14	15C	Patriots Path	Patriots Path
35	65	15C	37 Ironia Mendham Rd	Vacant Land
38	54	15C	4 Burnett Brook Dr	Vacant Land
38.02	6	15C	9 Burnett Brook Dr	Vacant Land
40	4.34	15C	Shadowbrook Way	Vacant Land
40	4.36	15C	Shadowbrook Way	Vacant Land
40	4.37	15C	Shadowbrook Way	Vacant Land
40	4.38	15C	Shadowbrook Way	Vacant Land
40	7	15C	Off South Rd	Open Space
40	15	15C	Off South Rd	Open Space
42	3.01	15C	40 Bedminster Rd	Vacant Land
42	26	15C	97 Randolph Ave	Detention Basin
42	123	15C	164 Canfield Ave	Inspection Station
44	15	15C	723 Route 10	Vacant Land
44	57	15C	2 Sweetwood Dr	Detention Basin
46	1	15C	1425 Sussex Tpke	Park Land
46	13.02	15C	122 Morris Tpke	Detention Basin
46	28	15C	1411 Sussex Tpke	Retention Basin
47	1	15C	1428 Sussex Tpke	Vacant Land
47	7.30	15C	1392 Sussex Tpke	Dedicated Open Space
47	12.17	15C	Lake Cherokee	Vacant Land
47	27.13	15C	Nina Place	Stream Management
47	27.27	15C	24 Nina Pl	Detention Basin
47	27.28	15C	Nina Place	Stream Management
47	27.29	15C	Nina Place	Vacant Land
47	28.33	15C	India Brook & Calais Rd	Detention Basin
49	2	15C	112 Calais Rd	Vacant Land
49	3	15C	100 Calais Rd	Pavillion
49	8	15C	9 Farmstead Ct W	Vacant Land
50	3	15C	63 Dolly Bridge Rd	Open Space
51	7	15C	40 Doby Rd	Park
51	30	15C	126 South Rd	Park
52	1.01	15C	Doby Rd	Open Space
52	2.08	15C	Combs Hollow Rd	Vacant Land
53	1	15C	Wallace Brook	Morris County Park
*53	3	15C	Linwood Ave	Morris County Park
53	76.01	15C	Valley Rd	Draninage Easement
53	98	15C	Off Valley Dr	Morris County Park
53	99	15C	Off Dogwood Trl	Morris County Park
53	100	15C	Off Valley Dr	Morris County Park
54	5	15C	38 Center Rd	Well House
65	2	15C	24 Calumet Rd	Well House

73	14	15C	9 Guy St	Vacant Land
77	1	15C	124 Reservoir Ave	Vacant
80	10	15C	Birch St	Foreclosure
81	29.32	15C	30 Wilkeshire Blvd	Vacant Land
81	29.42	15C	10 Wilkeshire Blvd	Vacant Land
81	68	15C	103 Dover-Chester Rd	Vacant Land
81.03	14	15C	288 Center Grove Rd	Open Space
81.03	24	15C	Off Castle Ct	Detention Basin
81.03	37	15C	8 Tudor Pl	Vacant Land
82	27.02	15C	Off School House Rd	Vacant Land
82	38	15C	631 Millbrook Ave	Residence
82	50	15C	103 Carrell Rd	Club House
82	51	15C	99 Carrell Rd	Vacant Land
82	52	15C	75 Carrell Rd	Vacant Land
82	86	15C	287 Center Grove Rd	Vacant Land
82	89.02	15C	Center Grove Rd	Open Space
82	105	15C	7 Leigh Ct	Detention Basin
84	7	15C	55 Carrell Rd	Vacant Land
84	8	15C	57 Carrell Rd	Vacant Land
84	9	15C	57A Carrell Rd	Vacant Land
86	32	15C	Off Cypress Pl	Vacant Land
86	55	15C	60 Carrell Rd	Brundage Park
86	56	15C	60 Carrell Rd	Brundage Park
86	57	15C	74 Carrell Rd	Brundage Park
86	58	15C	84 Carrell Rd	Vacant Land
86	61	15C	25 Church Rd	Vacant Land
86	62	15C	Off Church Rd	Brundage Park
86	63.02	15C	1275 Sussex Tpke	Vacant Land
86	64	15C	Off Church Rd	Brundage Park
86	65	15C	Sussex Turnpike	Brundage Park
86	66	15C	1313 Sussex Tpke	Vacant Land
86	72.02	15C	1339 Sussex Tpke	Vacant Land
86	72.03	15C	1341 Sussex Tpke	Vacant Land
86	73	15C	1345 Sussex Tpke	Township Garage
86	74	15C	151 Morris Tpke	Maintenance Bldg.
86	75	15C	147 Morris Tpke	Vacant Land
88	7.10	15C	1318 Sussex Tpke	Vacant Land
88	12	15C	Off Sussex Tpke	Vacant Land
91	2	15C	14 Tucker Ave	Vacant Land
91	3	15C	8 Tucker Ave	Vacant Land
92	4	15C	1304 Sussex Tpke	Vacant Land
92	24	15C	9 Tucker Ave	Vacant Land
92	25	15C	13 Tucker Ave	Public Housing
93	3	15C	30 Calais Rd	Library
93	20	15C	32A Old Brookside Rd	Water Storage Tank
93	21.01	15C	32B Old Brookside Rd	Vacant Land
93	38.27	15C	Heritage Ct - Off In Back	Vacant Land
93	39	15C	Off Old Brookside Rd	Vacant Land
93	40	15C	Off Old Brookside Rd	Vacant Land

93	52	52 15C Morris Tpke Stream M		Stream Management
93	56.01	15C	213 Morris Tpke	Public Housing
93.02	1	15C	3 Dolly Bridge Rd	Vacant Land
93.03	8	15C	Calais Rd / Sussex Tpke	Detention Basin
97	30.29	15C	Valley Rd	Vacant Land
103	72	15C	17 Wick Ln	Vacant Land
103	103	15C	19 Wick Ln	Vacant Land
103	105	15C	25 Wick Ln	Vacant Land
112	16	15C	389 Route 10	Gas Station
112.01	52	15C	Robin Dr	Water Plant
113	1	15C	Center Grove Rd	Vacant Land
115	3	15C	343 Millbrook Ave	Public Housing
115	7	15C	Off Millbrook Ave	Vacant Land
115	25.02	15C	421 Millbrook Ave	Open Space
115	68.01	15C	Center Grove Rd	Vacant Land
115	76.01	15C	15 Fords Rd	Vacant Land
115	76.04	15C	17 Fords Rd	Vacant Land
115	80.02	15C	Off Fords Rd	Vacant Land
115	83	15C	Off Cambridge Ct	Vacant Land
115	84	15C	43 Fords Rd	Open Space
116	31.01	15C	555 Millbrook Ave	Vacant Land
116	32	15C	565 Millbrook Ave	Residence
119	2	15C	112 Everdale Rd	Park Land
119	3	15C	110 Everdale Rd	Park Land
119	5	15C	108 Everdale Rd	Utility Bldg.
119	14.13	15C	8 Rebecca Ct	Detention Basin
119	14.30	15C	Rebecca Ct	Open Space
119	76	15C	73 Radtke Rd	Park Land
119	79	15C	111 Radtke Rd	Park Land
119	83	15C	123 Radtke Rd	Park Land
119	84	15C	135 Radtke Rd	Park Land
119	85	15C	167 Radtke Rd	Park Land
119	91.50	15C	31 W Hanover Ave	Open Space
119	95	15C	Off W Hanover Ave	Park Land
119	96	15C	Off W Hanover Ave	Park Land
119	97	15C	Off W Hanover Ave	County Park
119	98	15C	Off W Hanover Ave	County Park
119	99	15C	Radtke Rd	Park Land
119	100	15C	Off W Hanover Ave	Park Land
119	101.01	15C	Off Millbrook Ave	Open Space
119	115.01	15C	630 Millbrook Ave	Residence
119	115.02	15C	Millbrook Ave	Open Space
119	116.01	15C	620 Millbrook Ave	Open Space
119	118	15C	554 Millbrook Ave	Park Land
119	119	15C	502 Millbrook Ave	Town Hall
119	121	15C	496 Millbrook Ave	Public Housing
119	122	15C	488 Millbrook Ave	Public Housing
119	124	15C	Off Everdale Rd	Park Land
119	129	15C	Off Everdale Rd	Park Land

119	145	15C	22 Bragman Rd Detention Basi	
121	68.01	15C	2 Laurel Hill Dr	Vacant Land
131	51.16	15C	4 Dyer Ln	Detention Basin
131.01	7	15C	Fairfield Ave	Detention Basin
135	5	15C	10 Fairlawn Ave	Foreclosure
137	1	15C	216 Millbrook Ave	Residence
137	3	15C	222 Millbrook Ave	For Millbrook Circle
142	5	15C	High St	Water Line
142	19.01	15C	19 Grist Mill Rd	Vacant Land
142	28	15C	Hill St	Vacant Land
145	51	15C	87 Grist Mill Rd	Vacant Land
146	42.02	15C	71 Mountainside Dr	Open Space
146	45.02	15C	Off Mountainside Dr	Vacant Land
146	72.03	15C	Skyline Dr	Vacant Land
146	72.11	15C	40 Piersons Hill Rd	Vacant Land
146	72.16	15C	Skyline Dr	Vacant Land
146	72.31	15C	Skyline Dr	Vacant Land
146	79.02	15C	Piersons Hill Rd	Vacant Land
147	1	15C	1 Piersons Hill Rd	Vacant Land
147	14	15C	107 Everdale Rd	Vacant Land
155	18	15C	79 W Hanover Ave	County Park
155	59	15C	89 W Hanover Ave	County Park
155	60	15C	89A W Hanover Ave	County Park
155	61	15C	71 W Hanover Ave	County Park
155	62	15C	180 Radtke Rd	County Park
155	63	15C	51 W Hanover Ave	County Park
166	1	15C	50 W Hanover Ave	Forest
166	3	15C	119 W Hanover Ave	Park Land
166	4.14	15C	Off Block Ct	Vacant Land
166	15.08	15C	1127 Sussex Tpke	Detention Facility
168	87	15C	140 W Hanover Ave	Open Space
168	106	15C	Forrest Hill Rd	Vacant Land
176	40	15C	Off Shady Ln	Vacant Land
191	7	15C	11-19 Bennett Ave	Housing
195	1	15C	202 S Salem St	Vacant Land
195	3	15C	8 Bennett Ave	Public Housing
195	18	15C	80 Route 10	Vacant Land
195	25	15C	232 S Salem St	Park
198	1	15C	87 Route 10	Vacant Land
199	1	15C	217 Route 10	Vacant Land
199	46.17	15C	100 Mountainside Dr	Open Space
199.02	34.04	15C	Off Roc Etam Rd	Drainage
201	37.11	15C	22 Heather Ln	Drainage
201	43	15C	1 Openaki Rd	Vacant Land
201	48	15C	4 Farm Rd	Vacant Land
208.02	119.37	15C	16 Timber Ln	Park
212	1	15C	167 W Hanover Ave	Well
215	29	15C	190 W Hanover Ave	Park & County Radio
215	73	15C	1015 Sussex Tpke	Pumping Station

217	8.01	15C	Chestnut Hill Rd	Vacant Land
217	17.01	15C	Cottonwood Dr	Vacant Land
221	49	15C	16 Drake Ct	Detention Basin
222	7	15C	25 Drake Ct	Vacant Land
222	8	15C	23 Drake Ct	Detention Basin
222	11.01	15C	7A Mount Pleasant Rd	Vacant Land
224	16	15C	15 Musiker Ave	Well
224	23	15C	5 Leonard Ln	Vacant Land
224	24	15C	2 Sylvia Pl	Vacant Land
224	32	15C	17 Knights Bridge Dr	Recreation Area
224	34	15C	9 Knights Bridge Dr	Detention Basin
224	35	15C	7 Knights Bridge Dr	Pump. Station
224	78	15C	47 Brookside Rd	Retention Basin
1706	24	15C	W Munson Ave	Shed
*10102	7	15C	13 Black Birch Dr	Pond
23	8	15D	4 East Logan Rd	Vacant Land
23	9	15D	2 East Logan Rd	Parsonage
23	10	15D	298 Dover-Chester Rd	Church
33	51	15D	186 Park Ave	Church
35	28	15D	17 Pamela Dr	Group Residence
42	95	15D	23 Gilmar Rd	Parsonage
42	97	15D	764 Route 10/44 Fernia Dr	Church
42	109	15D	790 Route 10	Church
44	13.01	15D	791 Route 10	2.89 Ac Is Taxable
44	19	15D	120 Dover-Chester Rd	Church
44	31.01	15D	146 Dover-Chester Rd	Schools
45	21	15D	220 Dover-Chester Rd	Church
45	25	15D	1447 Sussex Tpke	Church
47	40	15D	267 Dover-Chester Rd	Parsonage
49	2.01	15D	335 Dover-Chester Rd	Church
50	6	15D	140 Combs Hollow Rd	Autism House
53	44	15D	45 High Ave	Group Home
55	1	15D	443 Quaker Church Rd	Church
73	56	15D	6 Emery Ave	Church
73	58	15D	10 Emery Ave	Parking Area
73	59	15D	12 Emery Ave	Church
77	35	15D	318 Quaker Church Rd	Church
78	3	15D	319 Quaker Church Rd	Church
82	30	15D	40 School House Rd	Health & Welfare
82	40	15D	651 Millbrook Ave	Catholic Church
82	48	15D	107 Carrell Rd	Parsonage
93	14	15D	12 Old Brookside Rd	Church
97	1	15D	1253 Sussex Tpke	Church
97	1	15D	16 Church Rd	Church
97	23	15D	1207 Sussex Tpke	Synagogue
97	24	15D	1209 Sussex Tpke	Vacant Land
103	17	15D	1 Nuko Ter	Rabbi Residence
111	22.06	15D	390 Route 10	Church Offices
115	74	15D	185 Center Grove Rd	Church

119	114.03	15D	658 Millbrook Ave	Church
131	55	15D	2 Quaker Ave	Church
141	11	15D	343 S Morris St	Parsonage
141	12	15D	367 S Morris St	Church
145	58	15D	246 Millbrook Ave	Church
166	1.01	15D	48 W Hanover Ave	Rabbi Residence
176	82	15D	18 Cedar Ter	NJ Dept. Group Home
180	1	15D	322 S Morris St	Christadel Ecclesia
3	3	15F	1579 Sussex Tpke	Office
21.05	129	15F	13 Orchard Dr	Disabled Veteran
27	5	15F	86 Pleasant Hill Rd	Disabled Veteran
27	66	15F	14 Seneca Trl	Disabled Veteran
38	60	15F	20 Cromwell Dr	Disabled Veteran
38.01	21	15F	11 South Rd	Disabled Veteran
42	107	15F	780 Route 10	Rescue Squad
42	110	15F	800 Route 10	Disabled Veteran
42	122.02	15F	100 Canfield Ave	Girls Scouts Of Amer
42.06	66	15F	26 Dover-Chester Rd	Morris County Ymca
46.01	38	15F	106 Morris Tpke	Disabled Veteran
49	2.02	15F	331 Dover-Chester Rd	Chemical Co. # 4
59	6	15F	28 Treaty Rd	Disabled Veteran
60	6	15F	34 Ridge Rd	Disabled Veteran
60	11	15F	37 Treaty Rd	Disabled Veteran
81	29.31	15F	32 Wilkeshire Blvd	Vacant Land
81.03	10	15F	15 Rippling Brook Way	Disabled Veteran
82	49	15F	105 Carrell Rd	Disabled Veteran
86	10	15F	40 Carrell Rd	Disabled Veteran
101	22.01	15F	108 Albert Ct	Disabled Veteran
119	102.02	15F	9&10 Westminster Dr	Disabled Veteran
119	110.68	15F	5 Mahogany Way	Disabled Veteran
119	114.01	15F	670 Millbrook Ave	Volunteer Fire Co
120	5	15F	24 W Hanover Ave	Vacant Land
120	5.01	15F	26 W Hanover Ave	Synagogue
121	52	15F	1100 Sussex Tpke	Disabled Veteran
137	6	15F	99 Quaker Church Rd	Fire House
137	8	15F	340 Route 10	Fire House #2
145	12	15F	119 High St	Disabled Veteran
146	38	15F	51 Mountainside Dr	Disabled Veteran
148	17	15F	17 Winding Way	Disabled Veteran Disabled Veteran
161	8	15F	19 Forrest Rd	Disabled Veteran Disabled Veteran
167	1	15F	118 W Hanover Ave	Fire House #5
184	6.01	15F	601 Wendover Ct	Disabled Veteran
220	16	15F	57 Misty Mountain Rd	Disabled Veteran Disabled Veteran
220	27	15F	31 Ash Ln	Disabled Veteran Disabled Veteran
220		ТЭГ	31 ASII LII	Disabled Veterali

^{*}Only a portion of the parcel is within the Randolph Township boundary

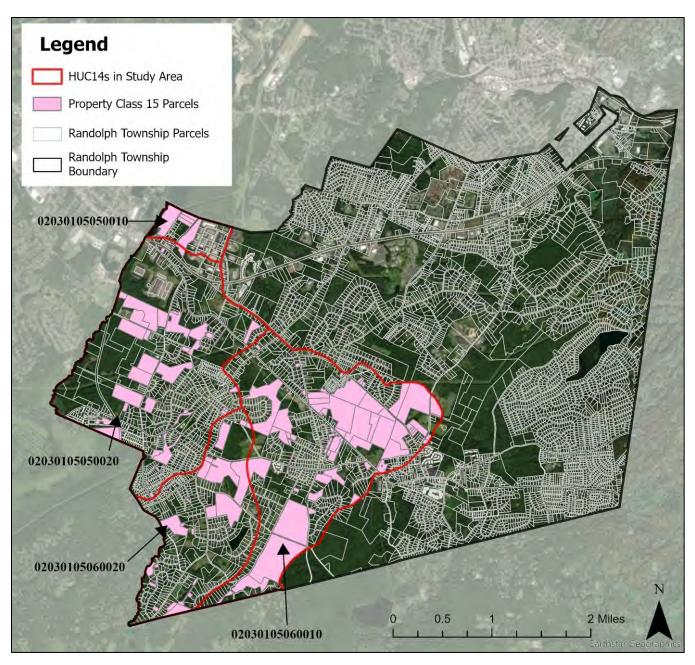


Figure 11: Property Class 15 parcels in the Study Area of Randolph Township

Table 10: Property Class 15 Parcels in the Study Area of Randolph Township

Block	Lot	Prop Class	Location	Facility Type	
47	7.32	15A	Off Quail Run	Sanitary Disposal	
*48	5	15A	303 Dover-Chester Rd	Ironia School	
1	2	15C	43 Green Ln	Randolph Park	
2	1	15C	76 Green Ln	Randolph Park	
2	2	15C	68 Green Ln	Vacant Land	
2	3	15C	64 Green Ln	Vacant Land	
5	19	15C	41 Park Ave	Day Camp	
5	22	15C	15 Righter Rd	Open Space	
5	23	15C	45 Righter Rd	Vacant Land	
5	26	15C	55A Righter Rd	Open Space	
6	16	15C	49 Pleasant Hill Rd	Vacant Land	
6	26	15C	111 Park Ave	Open Space	
6	27.01	15C	57 Pleasant Hill Rd	Mua Easement	
6	42	15C	83 Park Ave	Vacant Land	
6	43	15C	75 Park Ave	Vacant Land	
6	52	15C	18 Righter Rd	Vacant Land	
6	53	15C	34 Righter Rd	Open Space	
14	2.01	15C	147 Selma Blvd	Vacant Land	
14	9	15C	Pleasant Hill Rd	Vacant Land	
14	11	15C	9 Chester Ave	Well	
14	27	15C	Off Selma Blvd	Vacant Land	
18.01	1	15C	80 Irish Spring Rd	Vacant Land	
21	19.15	15C	11 Nottingham Way	Dedicated Open Space	
21	20	15C	1466 Sussex Tpke	Open Space	
21	32.08	15C	Sherwood Ct	Open Space	
21	39	15C	5 Stonehill Rd	Well	
21	127.01	15C	110 Park Ave	Open Space	
21	129	15C	Park Ave	Vacant Land	
21	130.02	15C	72 Park Ave	Open Space	
21	142	15C	18 James Rd	Open Space	
21	149	15C	34 Park Ave	Camp	
21	150.02	15C	32 Park Ave	Vacant Land	
21.05	152	15C	Pleasant Hill Rd	Vacant Land	
21.10	1	15C	Nottingham Way	Dedicated Open Space	
23	18	15C	18 Aldebaran Dr	Vacant Land	
27	5.08	15C	Off Spring Brook Dr	Vacant Land	
27	6	15C	88A Pleasant Hill Rd	Vacant Land	
27	8	15C	Dover-Chester Rd	Vacant Land	
27	86.02	15C	152.5 Park Ave	Vacant Land	
30	1	15C	159 Park Ave	Foreclosure	
32	7	15C	4 Sunset Dr	Well	
35	5	15C	385 Dover-Chester Rd	County Garage	
35	50.05	15C	10 Patriots Way	Detention Basin	
35	50.14	15C	Patriots Path	Patriots Path	
35	65	15C	37 Ironia Mendham Rd	Vacant Land	
38	54	15C	4 Burnett Brook Dr	Vacant Land	

38.02	6	15C	9 Burnett Brook Dr	Vacant Land
40	4.34	15C	Shadowbrook Way	Vacant Land
40	4.36	15C	Shadowbrook Way	Vacant Land
40	4.37	15C	Shadowbrook Way	Vacant Land
40	4.38	15C	Shadowbrook Way	Vacant Land
40	7	15C	Off South Rd	Open Space
40	15	15C	Off South Rd	Open Space
422	123	15C	164 Canfield Ave	Inspection Station
46	1	15C	1425 Sussex Tpke	Park Land
46	13.02	15C	122 Morris Tpke	Detention Basin
46	28	15C	1411 Sussex Tpke	Retention Basin
47	1	15C	1428 Sussex Tpke	Vacant Land
47	7.30	15C	1392 Sussex Tpke	Dedicated Open Space
47	12.17	15C	Lake Cherokee	Vacant Land
47	27.13	15C	Nina Place	Stream Management
47	27.27	15C	24 Nina Pl	Detention Basin
47	27.28	15C	Nina Place	Stream Management
47	27.29	15C	Nina Place	Vacant Land
47	28.33	15C	India Brook & Calais Rd	Detention Basin
49	2	15C	112 Calais Rd	Vacant Land
49	3	15C	100 Calais Rd	Pavillion
49	8	15C	9 Farmstead Ct W	Vacant Land
50	3	15C	63 Dolly Bridge Rd	Open Space
*51¹	7	15C	40 Doby Rd	Park
*51 ¹	30	15C	126 South Rd	Park
	1.01	+	Doby Rd	Open Space
52	1.01 2.08	15C	Doby Rd Combs Hollow Rd	Open Space Vacant Land
52 52	2.08	15C 15C	Combs Hollow Rd	Vacant Land
52 52 82 ²	2.08 38	15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave	Vacant Land Residence
52 52 82 ² 82	2.08 38 50	15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd	Vacant Land Residence Club House
52 52 82 ² 82 82	2.08 38 50 51	15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd	Vacant Land Residence Club House Vacant Land
52 52 82 ² 82 82 82 82 ²	2.08 38 50 51 52	15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land
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52 52 82 ² 82 82 82 82 82 84 84	2.08 38 50 51 52 89.02 7 8	15C 15C 15C 15C 15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd Center Grove Rd 55 Carrell Rd 57 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land Open Space Vacant Land Vacant Land Vacant Land Vacant Land
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52 52 82 ² 82 82 82 82 82 84 84 84 86 86	2.08 38 50 51 52 89.02 7 8 9 32 55	15C 15C 15C 15C 15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd Center Grove Rd 55 Carrell Rd 57 Carrell Rd 57 Carrell Rd Off Cypress Pl 60 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land Open Space Vacant Land Vacant Land Vacant Land Vacant Land Vacant Land Fundage Park
52 52 82 ² 82 82 82 82 84 84 84 86 86	2.08 38 50 51 52 89.02 7 8 9 32 55 56	15C 15C 15C 15C 15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd Center Grove Rd 55 Carrell Rd 57 Carrell Rd 57 Carrell Rd 60 Carrell Rd 60 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land Open Space Vacant Land Vacant Land Vacant Land Vacant Land Frundage Park Brundage Park
52 52 82 ² 82 82 82 82 82 84 84 84 86 86	2.08 38 50 51 52 89.02 7 8 9 32 55	15C 15C 15C 15C 15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd Center Grove Rd 55 Carrell Rd 57 Carrell Rd 57A Carrell Rd Off Cypress Pl 60 Carrell Rd 60 Carrell Rd 74 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land Open Space Vacant Land Vacant Land Vacant Land Vacant Land Fundage Park Brundage Park Brundage Park
52 52 82 ² 82 82 82 82 84 84 86 86 86 86	2.08 38 50 51 52 89.02 7 8 9 32 55 56 57	15C 15C 15C 15C 15C 15C 15C 15C 15C 15C	Combs Hollow Rd 631 Millbrook Ave 103 Carrell Rd 99 Carrell Rd 75 Carrell Rd Center Grove Rd 55 Carrell Rd 57 Carrell Rd 57 Carrell Rd 60 Carrell Rd 74 Carrell Rd 84 Carrell Rd	Vacant Land Residence Club House Vacant Land Vacant Land Open Space Vacant Land Vacant Land Vacant Land Vacant Land Frundage Park Brundage Park
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	1			
86	74	15C	151 Morris Tpke	Maintenance Bldg.
86	75	15C	147 Morris Tpke	Vacant Land
88	7.10	15C	1318 Sussex Tpke	Vacant Land
88	12	15C	Off Sussex Tpke	Vacant Land
91	2	15C	14 Tucker Ave	Vacant Land
91	3	15C	8 Tucker Ave	Vacant Land
92	4	15C	1304 Sussex Tpke	Vacant Land
92	24	15C	9 Tucker Ave	Vacant Land
92	25	15C	13 Tucker Ave	Public Housing
*93	3	15C	30 Calais Rd	Library
93 ²	20	15C	32A Old Brookside Rd	Water Storage Tank
93	38.27	15C	Heritage Ct - Off In Back	Vacant Land
93 ²	39	15C	Off Old Brookside Rd	Vacant Land
93	52	15C	Morris Tpke	Stream Management
93	56.01	15C	213 Morris Tpke	Public Housing
93.02	1	15C	3 Dolly Bridge Rd	Vacant Land
93.03	8	15C	Calais Rd / Sussex Tpke	Detention Basin
*1192	115.01	15C	630 Millbrook Ave	Residence
119 ²	115.02	15C	Millbrook Ave	Open Space
23	8	15D	4 East Logan Rd	Vacant Land
23	9	15D	2 East Logan Rd	Parsonage
23	10	15D	298 Dover-Chester Rd	Church
33	51	15D	186 Park Ave	Church
35	28	15D	17 Pamela Dr	Group Residence
45	21	15D	220 Dover-Chester Rd	Church
45	25	15D	1447 Sussex Tpke	Church
47	40	15D	267 Dover-Chester Rd	Parsonage
49	2.01	15D	335 Dover-Chester Rd	Church
50	6	15D	140 Combs Hollow Rd	Autism House
*82	40	15D	651 Millbrook Ave	Catholic Church
82	48	15D	107 Carrell Rd	Parsonage
97	1	15D	1253 Sussex Tpke	Church
97 ²	1	15D	16 Church Rd	Church
119 ²	114.03	15D	658 Millbrook Ave	Church
3	3	15F	1579 Sussex Tpke	Office
21.05	129	15F	13 Orchard Dr	Disabled Veteran
27	5	15F	86 Pleasant Hill Rd	Disabled Veteran
27	66	15F	14 Seneca Trl	Disabled Veteran
38	60	15F	20 Cromwell Dr	Disabled Veteran
38.01	21	15F	11 South Rd	Disabled Veteran
42	122.02	15F	100 Canfield Ave	Girls Scouts Of Amer
46.01	38	15F	106 Morris Tpke	Disabled Veteran
*49	2.02	15F	331 Dover-Chester Rd	Chemical Co. # 4
82	49	15F	105 Carrell Rd	Disabled Veteran
86 ^{1,2}	10	15F	40 Carrell Rd	Disabled Veteran Disabled Veteran
*1192	_			Volunteer Fire Co
"119 ⁻	114.01	15F	670 Millbrook Ave	voiunteer rire Co

* Sites that can be retrofitted with green infrastructure ¹Site includes two tax-exempt parcels ²Only a portion of the parcel is within the study area

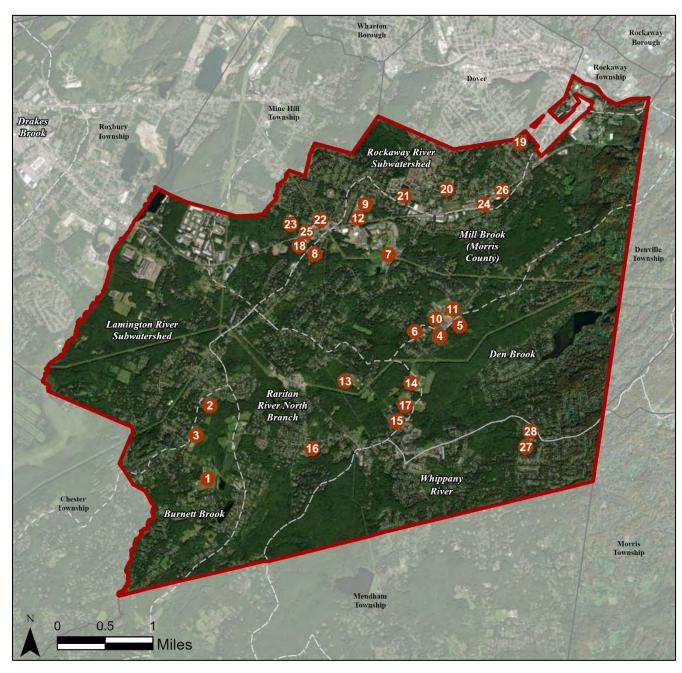


Figure 12: Sites with Green Infrastructure Opportunities in Randolph Township

HEISTEIN PARK



RAPID: 1

Subwatershed: Burnett Brook

Site Area: 1,849,597 sq. ft.

Address: Heistein Park Road

Randolph, NJ 07869

Block and Lot: Block 51 | Lot 7,30



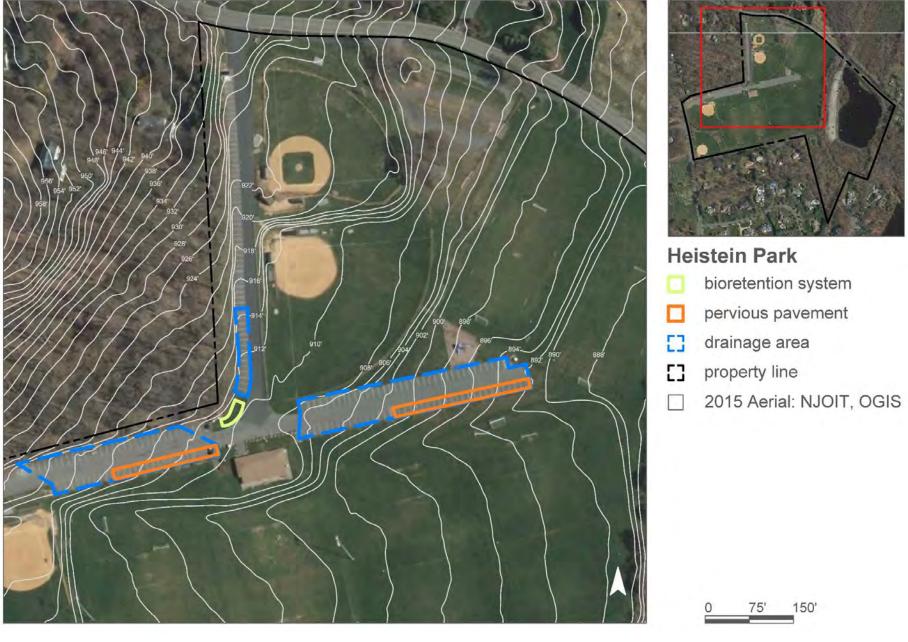


A bioretention system can be installed in the parking lot bump out to treat the parking lot drainage area. Pervious pavement can be installed in the east and west strips of the parking lot to manage additional runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
9	174,724	8.4	88.2	802.2	0.136	4.79	

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	0.078	13	6,110	0.23	750	\$3,750
Pervious pavement	1.091	183	85,230	3.20	7,520	\$188,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



IRONIA ELEMENTARY SCHOOL



RAPID: 2

Subwatershed: Burnett Brook

Site Area: 653,414 sq. ft.

Address: 303 Dover Chester Road

Randolph, NJ 07869

Block and Lot: Block 48 | Lot 5



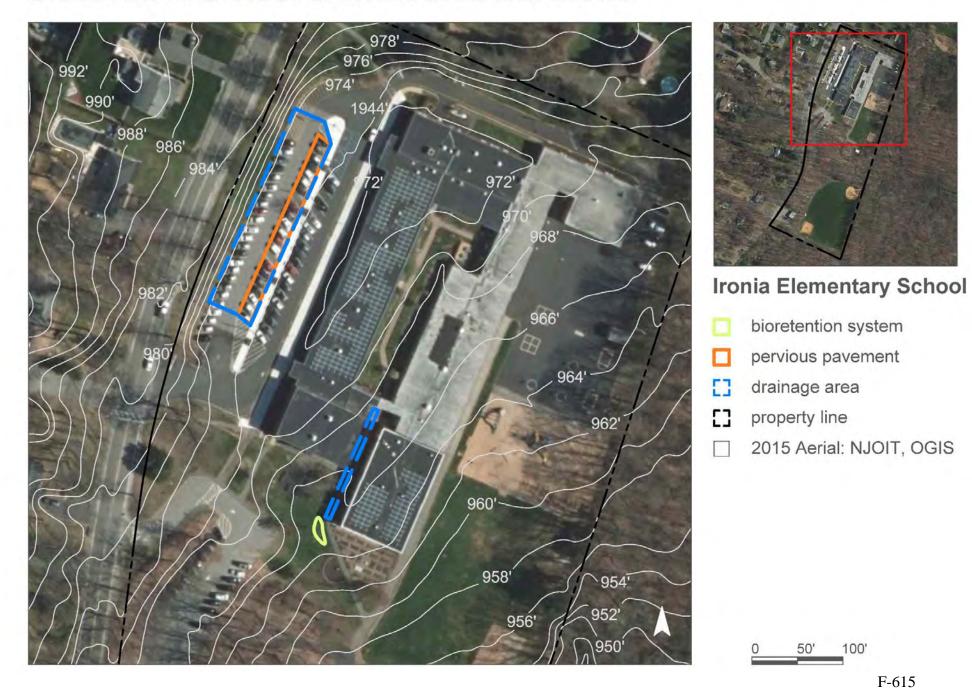


A bioretention system can be created at the south end the building to capture, treat, and infiltrate the building's stormwater runoff. Pervious pavement can be installed in a strip of parking spaces to treat runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would 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''	
38	247,317	11.9	124.9	1,135.5	0.193	6.78	

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	0.020	3	1,590	0.06	200	\$1,000
Pervious pavement	0.312	52	24,350	0.92	3,925	\$98,125

GREEN INFRASTRUCTURE RECOMMENDATIONS



100'

RANDOLPH TOWNSHIP FIRE DEPARTMENT COMPANY #4



RAP ID: 3

Subwatershed: Burnett Brook

Site Area: 100,313 sq. ft.

Address: 331 Dover Chester Road

Randolph, NJ 07869

Block and Lot: Block 49 | Lot 2.02





A bioretention system can be installed in the east and south turfgrass areas to capture, treat, and infiltrate the runoff from the parking area. Additionally, a cistern can be installed on the northeast corner of the building to capture the rooftop drainage area that can be reused to wash the fire trucks and water the existing landscaping. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
67	67,102	3.2	33.9	308.1	0.052	1.84	

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	0.231	39	18,060	0.68	2,220	\$55,500
Rainwater harvesting	0.066	11	2,000	0.07	2,000 (gal)	\$4,000





Randolph Township Fire Department Company #4

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

JOHN DASILVA MEMORIAL FIELD



RAP ID: 4

Subwatershed: Den Brook

HUC14 ID: 02030103020010

Site Area: 453,633 sq. ft.

Address: 555 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 116, Lots 31 & 31.01





A rain garden can be installed to the northeast of the garage to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require disconnecting downspouts. The existing parking spaces to the west of the entry driveway and in the western lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)			
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"		
40	181,313	8.7	91.6	832.5	0.141	5.65		

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	2,295	0.068	10	4,790	0.18	575	\$5,750
Pervious pavement	25,940	0.768	114	54,100	2.03	7,595	\$189,875



RANDOLPH TOWNSHIP RECREATION

RAP ID: 5

Subwatershed: Den Brook

HUC14 ID: 02030103030120

Site Area: 847,700 sq. ft.

Address: 502 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 119, Lot 119

A rain garden can be installed to the northeast country of the building to capture, treat, and infiltrate. This will require downspout disconnection and reprection. The concrete entry walkway to the so with permeable pavers. Existing parking spaces capture and infiltrate stormwater runoff from the southwastern and southwestern lots can be captured and redirect runoff. The downspouts on the southwastern lots and detain the stormwater runoff from the rooftop. A cistern can be installed to the southwastern lot wastern and detain the stormwater runoff.

r of the building to capture, treat, and infiltrate the stormwater runoff from the rooftop. rection. The concrete entry walkway to the southwest of the building can be replaced pervious pavement to exhalt the pervious pavement to the southeast will require a trench drain to intercept and the southwest end to the southwest will require a trench drain to intercept and the southwest will require a trench drain to intercept and the southwest and detain the stormwater runoff from the rooftop for later non-

potable reuse such as washing township vehicles. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
21	181,641	8.8	91.7	834.0	0.142	5.66	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	430	0.013	2	900	0.03	110	\$1,100
Pervious pavement	20,035	0.593	87	41,790	1.57	6,390	\$159,750
Rainwater harvesting	575	0.017	2	500	0.02	500 (gal)	\$1,500



CENTER GROVE ELEMENTARY SCHOOL



RAP ID: 6

Subwatershed: Den Brook

Site Area: 886,920 sq. ft.

Address: 25 Schoolhouse Road

Randolph, NJ 07869

Block and Lot: Block 116 | Lot 34

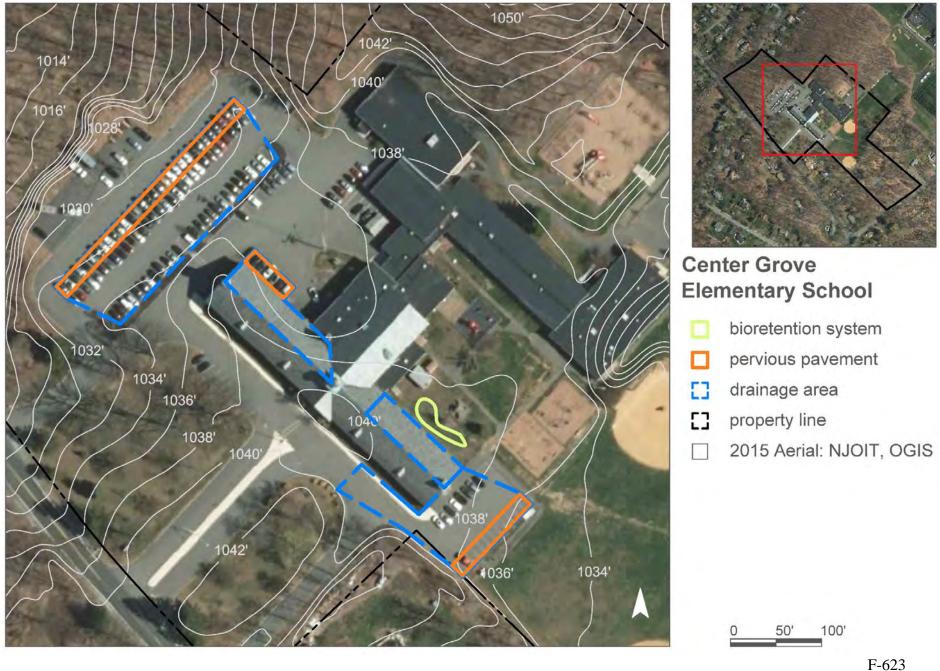




Pervious pavement can be installed in parking spaces throughout the site to capture and infiltrate stormwater runoff from the parking lot and adjacent rooftops. A rain garden can be installed in the area to the south of the building to capture additional stormwater from the rooftop by redirecting downspouts into it. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		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	302,005	14.6	152.5	1,386.6	0.235	8.28	

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	0.092	15	7,210	0.27	885	\$22,125
Pervious pavement	0.996	167	77,850	2.93	1,980	\$49,500



COUNTY COLLEGE OF MORRIS



RAPID: 7

Subwatershed: Mill Brook

Site Area: 9,259,582 sq. ft.

Address: 214 Center Grove Road

Randolph, NJ 07869

Block and Lot: Block 81 | Lot 1

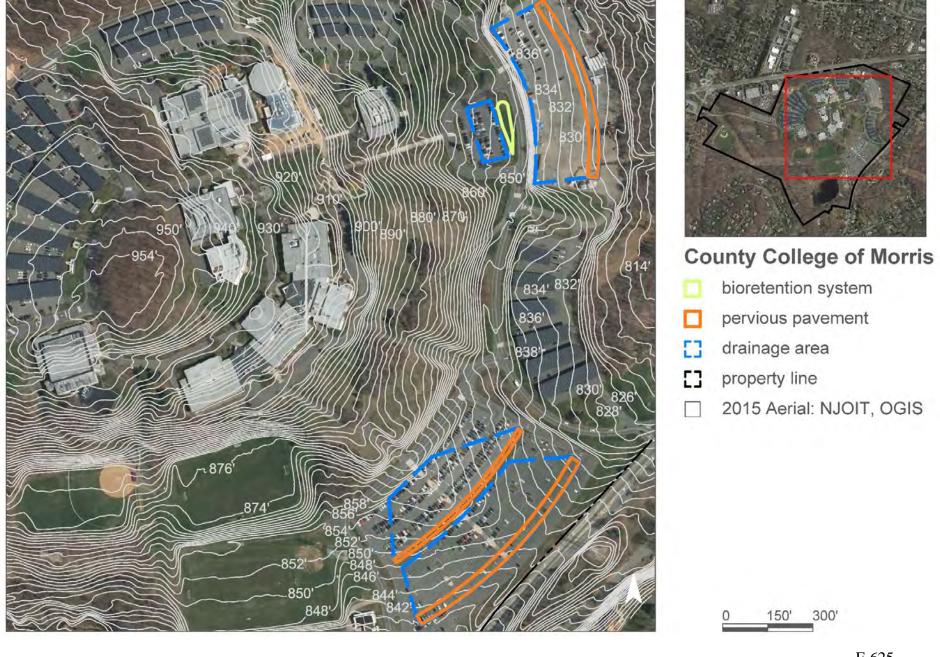




A bioretention system can be installed at the east end of the parking lot adjacent to Henderson Hall to treat the parking lot's drainage area. Pervious pavement can be installed in parking spaces throughout the campus to manage the large amount of stormwater runoff generated by the parking lot areas. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervi	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
27	2,484,265	119.8	1254.7	11,406.2	1.936	68.14	

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
Bioretention system	0.417	70	32,580	1.22	4,000	\$20,000
Pervious pavement	8.189	1,371	639,940	24.05	60,800	\$1,520,000



HOLY TRINITY ORTHODOX CHURCH



RAPID: 8

Subwatershed: Mill Brook

HUC14 ID: 02030103030080

Site Area: 199,885 sq. ft.

Address: 120 Dover Chester Road

Randolph, NJ 07869



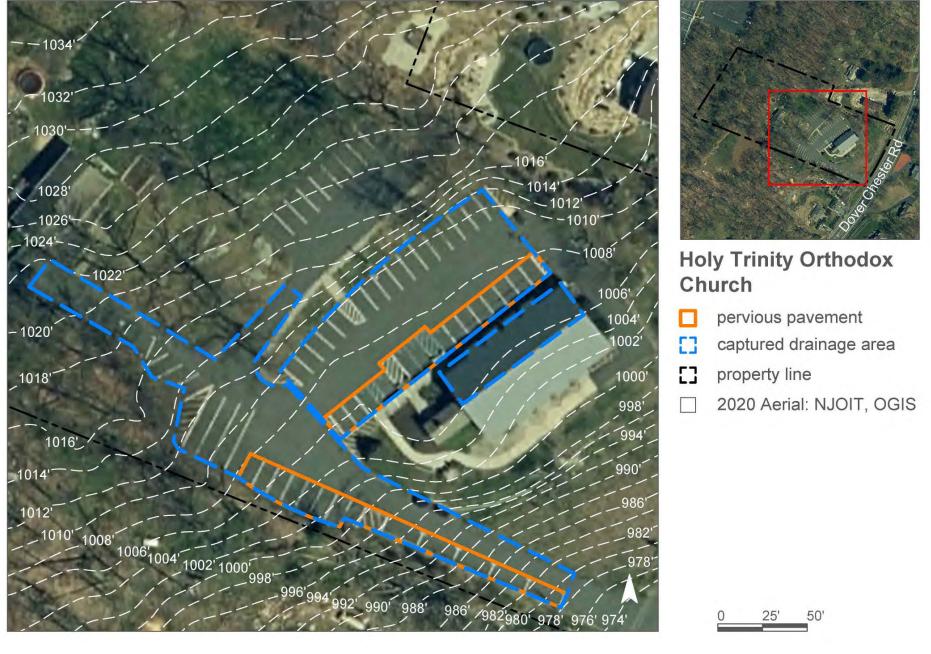


Block and Lot: Block 44, Lot 19

Existing parking spaces to the north and southwest of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The pervious pavement to the north of the building will also manage rooftop runoff. A trench drain will be needed to intercept and redirect the water to the southwestern pervious pavement. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover	Existing Loads from Impervious Cover (lbs/yr) Runoff Volume from Impervious Cover (No. 1)				npervious Cover (Mgal)
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"
21	41,923	2.0	21.2	192.5	0.033	1.31

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	22,615	0.670	99	47,170	1.77	4,870	\$121,750



IGLESIA ALIANZA



RAP ID: 9

Subwatershed: Mill Brook

Site Area: 93,605 sq. ft.

Address: 12 Emery Avenue

Randolph, NJ 07869

Block and Lot: Block 73, Lot 58, 59

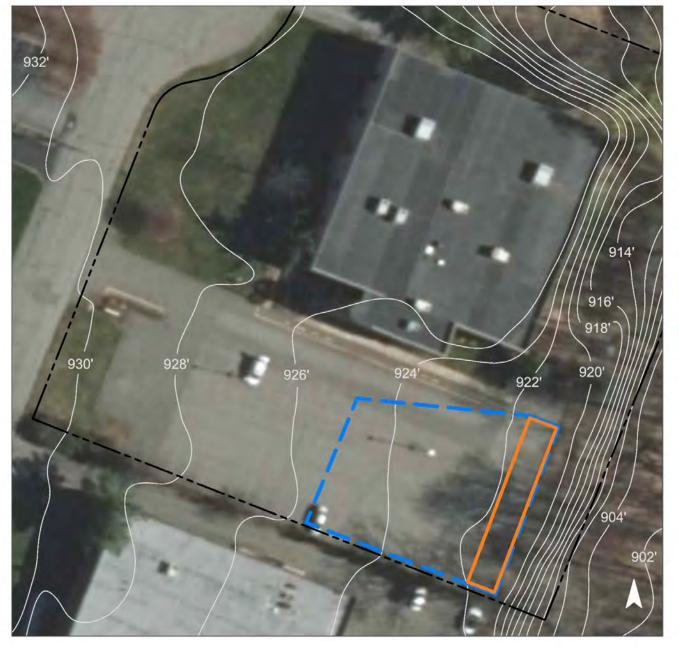




Parking spaces at the southeast end of the parking lot can be converted to pervious pavement to capture and infiltrate stormwater from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
53	49,950	2.4	25.2	229.3	0.039	1.37	

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	0.263	44	20,530	0.77	1,800	\$45,000





Iglesia Alianza

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

0 25' 50'

RANDOLPH HIGH SCHOOL



RAP ID: 10

Subwatershed: Mill Brook

Site Area: 1,241,714 sq. ft.

Address: 511 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 116 | Lot 30





Parking spaces in the parking lot to the southeast of the building can be converted to pervious pavement to capture and infiltrate stormwater runoff from the parking lot. Additional parking spaces throughout the site could be retrofitted as well. A small bioretention system can be installed adjacent to the shed to manage the rooftop runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
47	584,321	28.2	295.1	2,682.8	0.455	16.03	

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	0.010	2	820	0.03	100	\$500
Pervious pavement	0.771	129	60,270	2.26	5,940	\$148,500



RANDOLPH MIDDLE SCHOOL



RAP ID: 11

Subwatershed: Mill Brook

HUC14 ID: 02030103030080

Site Area: 1,301,901 sq. ft.

Address: 507 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 116, Lot 28

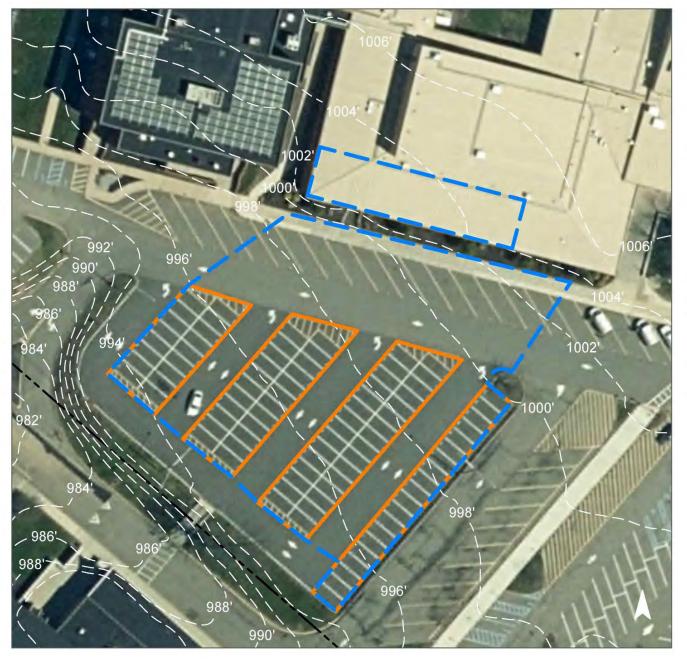




The existing parking spaces to the south of the school can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. Trench drains will be required. The downspouts on the southern side of the building can also be disconnected to the pervious pavement to manage rooftop runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
50	657,085	31.7	331.9	3,016.9	0.512	20.48	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	45,790	1.356	200	95,510	3.59	18,005	\$450,125





Randolph Middle School

- pervious pavement
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

0 30' 60'

THE CONNECT CHURCH: RANDOLPH



RAPID: 12

Subwatershed: Mill Brook

Site Area: 75,871 sq. ft.

Address: 6 Emery Avenue

Randolph, NJ 07869

Block and Lot: Block 73 | Lot 56

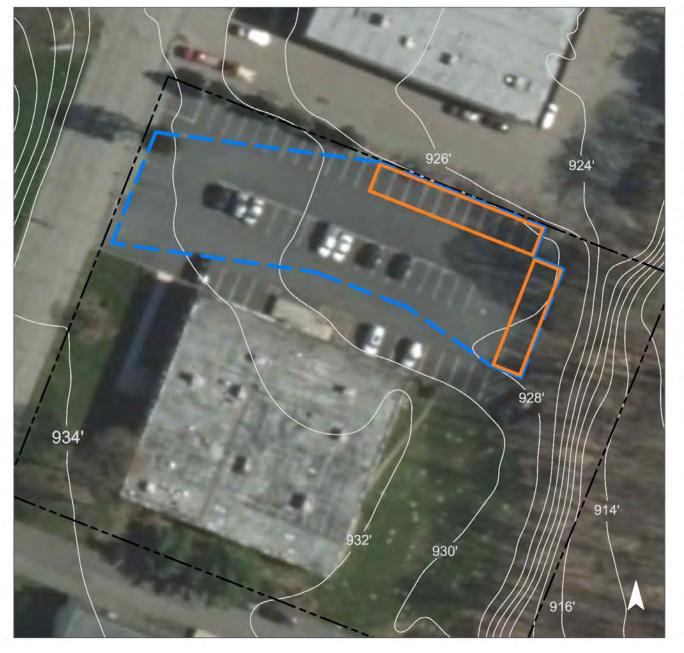




Pervious pavement can be installed in the northeast portion of the parking lot to capture and infiltrate stormwater runoff from the parking area. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervi	Impervious Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
62	47,152	2.3	23.8	216.5	0.037	1.29	

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	0.550	92	42,970	1.61	2,970	\$74,250





The Connect Church: Randolph

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

BRUNDAGE PARK



RAPID: 13

Subwatershed: Raritan River North Branch

HUC14 ID: 02030105060010

Site Area: 818,135 sq. ft.

Address: 43 North Bungalow Lane

Randolph, NJ 07869

Block and Lot: Block 86, Lot 56

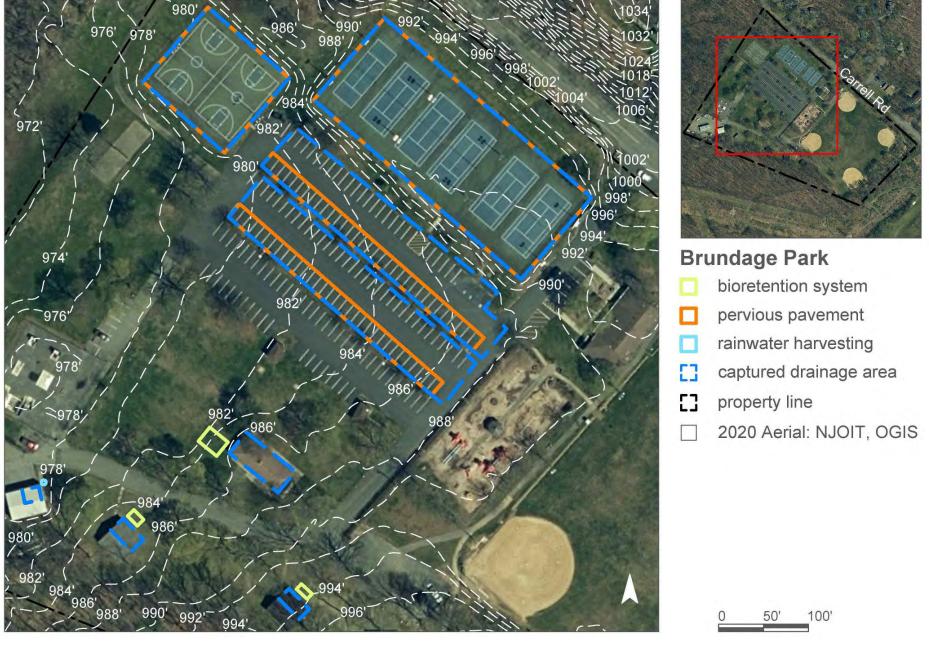




Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate stormwater runoff from the rooftops of the park buildings. This may require downspout redirections and disconnections. A gutter system will need to be installed on the pavilion for the northern rain garden. Existing parking spaces in the northern lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The tennis and basketball courts can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the courts. A cistern can be installed to the northeast of the southern park building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		ting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
27	217,150	10.5	109.7	997.0	0.169	6.77	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	3,235	0.096	13	6,750	0.25	810	\$8,100
Pervious pavement	87,850	2.601	384	183,240	6.89	61,430	\$1,535,750
Rainwater harvesting	285	0.008	2	300	0.01	300 (gal)	\$900



FREEDOM PARK



RAP ID: 14

Subwatershed: Den Brook

Site Area: 4,398,539 sq. ft.

Address: 630 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 119 | Lot 15. 01,

115.02, 101.01, 116.01

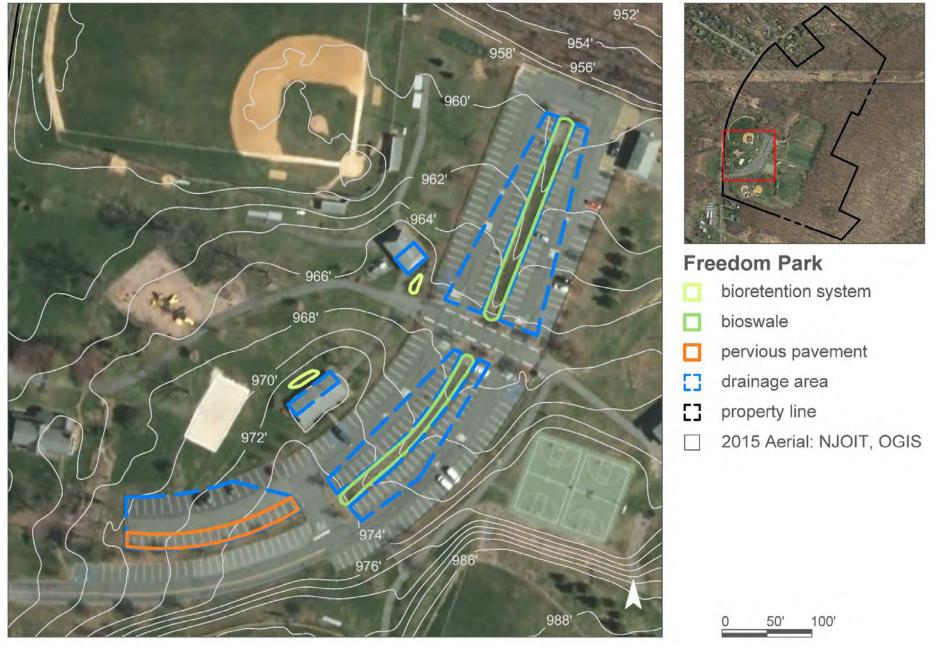




Bioretention systems can be installed near the park buildings to manage their rooftop areas. The existing swales in the center of the parking lot can be retrofitted with bioswales to enhance infiltration and slow down the stormwater runoff from the parking lot area. Pervious pavement can be installed in the northwest corner of the parking lot to capture additional stormwater runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
8	348,578	16.8	176.0	1,600.4	0.272	9.56	

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	0.039	7	3,080	0.12	380	\$1,900
Bioswales	0.305	73	21,880	0.35	5,850	\$146,250
Pervious pavement	0.266	44	20,770	0.78	3,530	\$88,250



RANDOLPH TOWNSHIP FIRE DEPARTMENT COMPANY #3



RAP ID: 15

Subwatershed: Raritan River

Site Area: 199,614 sq. ft.

Address: 670 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 119 | Lot 114.01

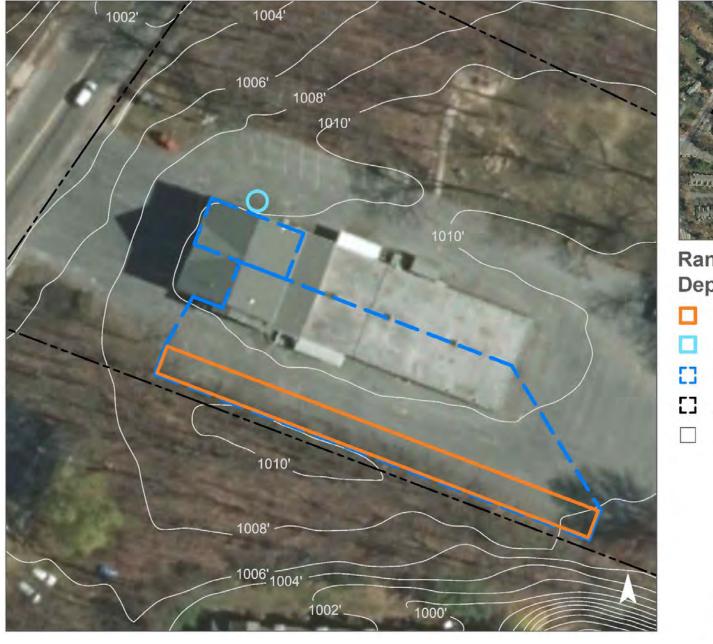




Parking spaces along the south end of the building near multiple disconnected downspouts can be converted to pervious pavement to capture and infiltrate stormwater runoff from the parking lot and rooftop areas. A cistern can be installed on the north side of the building near a disconnected downspout to capture rainwater that can be used for watering gardens, washing vehicles, or for other non-potable uses. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
35	70,861	3.4	35.8	325.3	0.055 1.94		

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	0.438	73	34,210	1.29	4,680	\$117,000
Rainwater harvesting	0.039	7	1,200	0.05	1,200 (gal)	\$2,400



Randolph Township Fire Department Company #3

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

RANDOLPH TOWNSHIP LIBRARY & COMMUNITY CENTER



RAPID: 16

Subwatershed: Raritan River

Site Area: 431,087 sq. ft.

Address: 30 Calais Road

Randolph, NJ 07869

Block and Lot: Block 93 | Lot 3

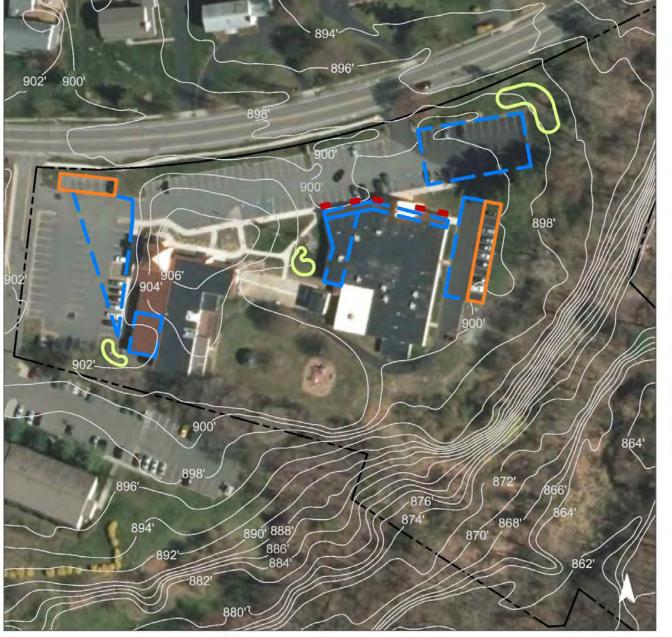




Five downspout planter boxes can be installed on the north end of the library to filter the rooftop drainage area and beautify the area. Pervious pavement can be installed in the parking areas to capture and infiltrate stormwater runoff from the parking lot. Bioretention systems can be installed to manage areas from the rooftop by redirecting downspouts and from the parking lot by creating curb cuts. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"	
28	121,846	5.9	61.5	559.4	0.095	3.34	

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	0.269	45	21,030	0.79	2,590	\$12,950
Planter boxes	0.028	5	n/a	n/a	5 (boxes)	\$5,000
Pervious pavement	0.327	55	25,580	0.96	2,450	\$61,250





Randolph Township Library & Community Center

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

0 50' 100'

RESURRECTION PARISH



RAPID: 17

Subwatershed: Raritan River

Site Area: 347,087 sq. ft.

Address: 651 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 82 | Lot 40

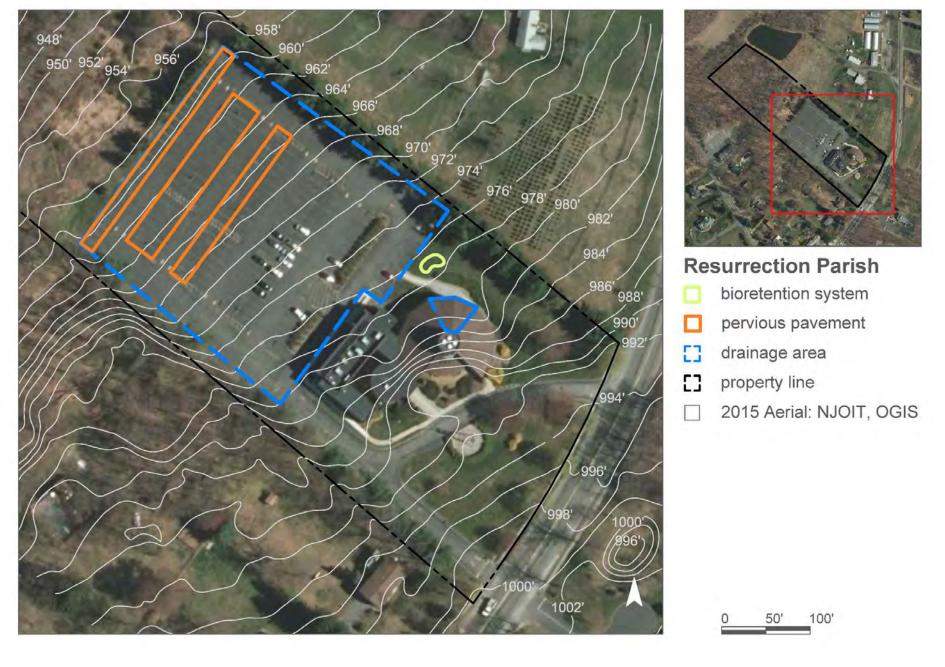




A rain garden can be installed on the north side of the building near the connected downspouts. The connected downspouts can be disconnected and led into the rain garden to capture, treat, and infiltrate stormwater runoff from the roof. The parking spaces in the parking lot can be retrofitted into pervious pavement to capture a large volume of stormwater running off from the parking lot during storm events. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
35	120,730	5.8	61.0	554.3	0.094 3.31		

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	0.033	6	2,590	0.10	320	\$1,600
Pervious pavement	2.210	370	172,740	6.49	16,430	\$410,750



BIBLE CHURCH INTERNATIONAL



RAP ID: 18

Subwatershed: Rockaway River

Site Area: 336,955 sq. ft.

Address: 791 NJ Route 10

Randolph, NJ 07869

Block and Lot: Block 44 | Lot 13.01

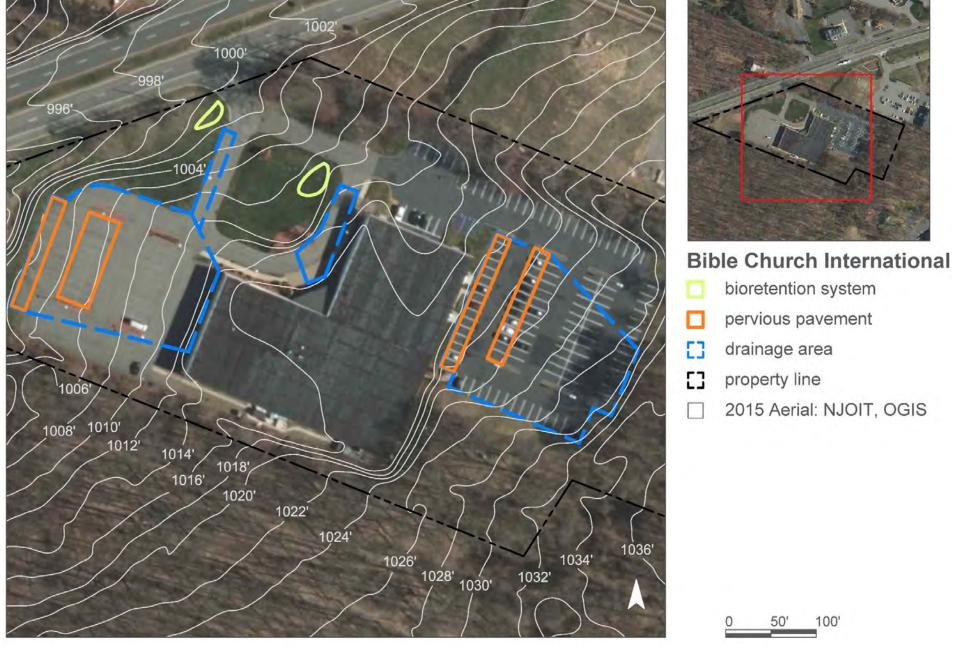




Pervious pavement can be installed in both parking lots to capture and infiltrate stormwater runoff from the parking lot. Bioretention systems can be installed in the turfgrass areas by using curb cuts to direct water from the pavement into them. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
50	167,782	8.1	84.7	770.3	0.131 4.60		

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	0.112	19	8,750	0.33	1,075	\$5,375
Pervious pavement	0.327	55	25,580	0.96	2,500	\$62,500



CHRISTADELPHIAN CHAPEL



RAP ID: 19

Subwatershed: Rockaway River

Site Area: 130,981 sq. ft.

Address: 322 South Morris Street

Randolph, NJ 07869

Block and Lot: Block 180 | Lot 1

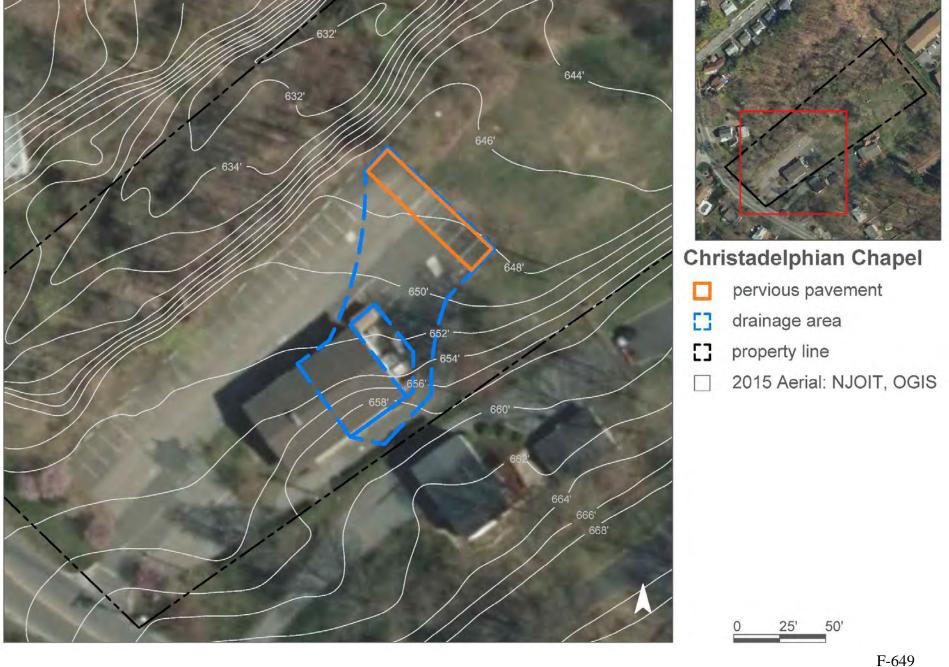




Parking spaces in the parking lot to the northeast of the building can be converted to pervious pavement to capture and infiltrate stormwater runoff from the parking lot. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
19	24,620	1.2	12.4	113.0	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
Pervious pavement	0.210	35	16,420	0.62	1,440	\$36,000



FERNBROOK ELEMENTARY SCHOOL



RAPID: 20

Subwatershed: Rockaway River

HUC14 ID: 02030103030070

Site Area: 741,674 sq. ft.

Address: 206 Quaker Church Road

Randolph, NJ 07869

Block and Lot: Block 110, Lot 11





Multiple rain gardens can be installed to the west of the school to capture, treat, and infiltrate stormwater runoff from the rooftop. Some downspouts will need to be redirected beneath the asphalt pathway. Rain gardens can also be installed to the north of the northern parking lot and the western play area. Trench drains will need to be installed on the western side of the asphalt to intercept and redirect the runoff to the rain gardens. Existing parking spaces to the east of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. Adjacent downspouts can be disconnected to the pervious pavement to manage stormwater runoff from the rooftop. The concrete entryway to the south of the building can be replaced with permeable pavers. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
31	229,220	11.1	115.8	1,052.4	0.179	7.14	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	26,235	0.777	114	54,720	2.06	6,565	\$65,650
Pervious pavement	29,455	0.872	129	61,440	2.31	7,615	\$190,375





Fernbrook Elementary School

- bioretention system
- pervious pavement
- captured drainage area
- [] property line
- 2020 Aerial: NJOIT, OGIS

0 50' 100'

GOOD SHEPHERD LUTHERAN CHURCH



RAP ID: 21

Subwatershed: Rockaway River

HUC14 ID: 02030103030070

Site Area: 229,094 sq. ft.

Address: 319 Quaker Church Road

Randolph, NJ 07869

Block and Lot: Block 78, Lot 3





Rain gardens can be installed to the north and west of the church buildings to capture, treat, and infiltrate the stormwater runoff from the rooftop. Some downspouts will need to be disconnected. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50''	
29	66,518	3.2	33.6	305.4	0.052	2.07	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	3,930	0.116	17	8,200	0.31	985	\$9,850





Good Shepherd Lutheran Church

- bioretention system
- captured drainage area
- property line
- 2020 Aerial: NJOIT, OGIS

GRACE CHURCH BETHLEHEM CAMPUS



RAPID: 22

Subwatershed: Rockaway River

Site Area: 442,120 sq. ft.

Address: 758 Route 10 West

Randolph, NJ 07869

Block and Lot: Block 42 | Lot 97,98,99

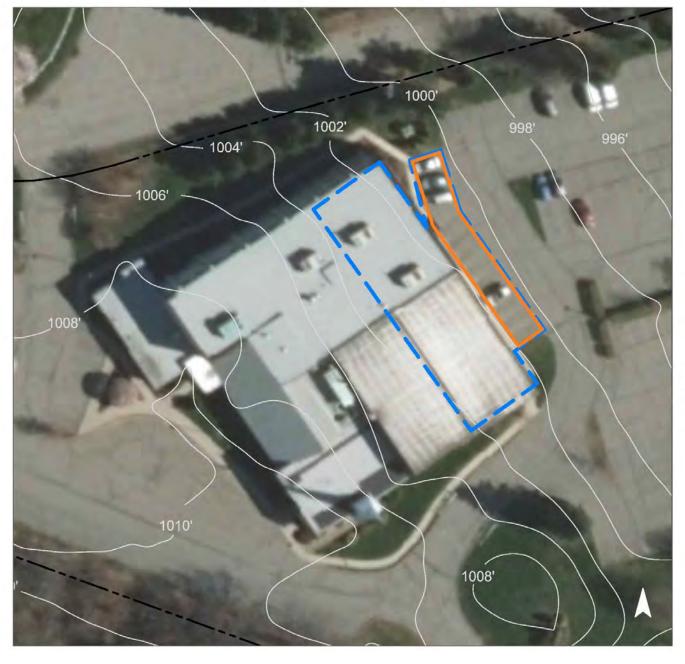




Pervious pavement can be installed on a strip of parking spaces north of the building near connected downspouts. Parking spaces can be replaced with pervious pavement to capture and infiltrate stormwater. The downspouts can be disconnected and redirected into the pervious pavement to capture additional stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		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	139,728	6.7	70.6	641.5	0.109	3.83	

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	0.238	40	18,630	0.70	2,130	\$53,250





Grace Church Bethlehem Campus

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

MAR THOMA CHURCH OF NEW JERSEY



RAPID: 23

Subwatershed: Rockaway River

Site Area: 70,616 sq. ft.

Address: 790 NJ Route 10

Randolph, NJ 07869

Block and Lot: Block 42 | Lot 109

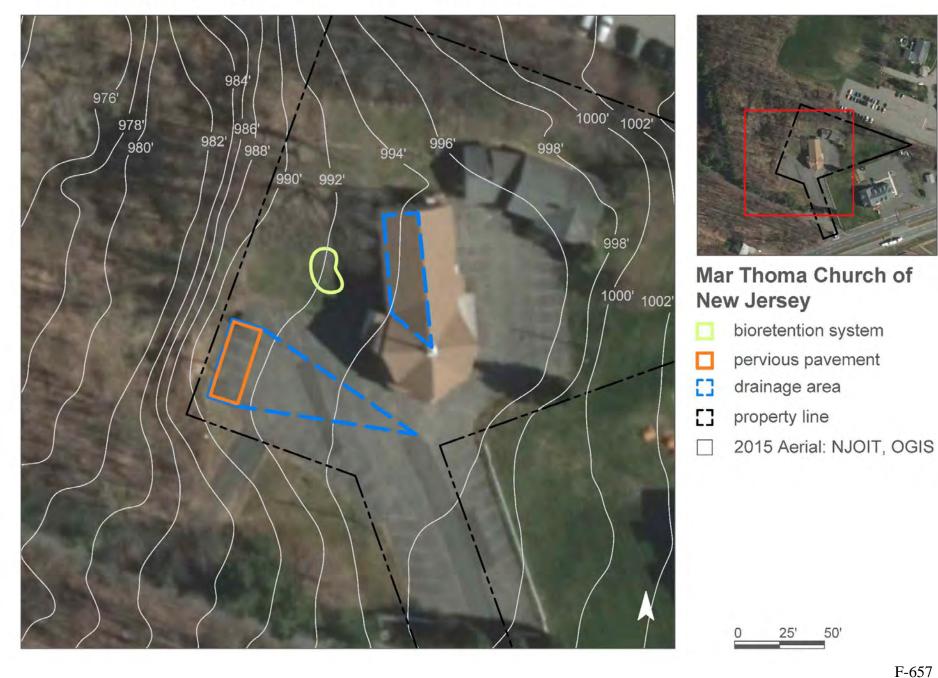




Parking spaces in the parking lot to the southwest of the building can be converted to pervious pavement to capture and infiltrate stormwater runoff from the parking lot. A rain garden can be installed in the turfgrass area west of the building to capture, treat, and infiltrate stormwater runoff from the roof. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
67	47,055	2.3	23.8	216.0	0.037	1.29	

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	0.033	6	2,620	0.10	300	\$1,500
Pervious pavement	0.078	13	6,110	0.23	810	\$20,250



MILLBROOK UNITED METHODIST CHURCH



RAPID: 24

Subwatershed: Rockaway River

Site Area: 269,443 sq. ft.

Address: 246 Millbrook Avenue

Randolph, NJ 07869

Block and Lot: Block 145 | Lot 3, 58





Pervious pavement can be installed south of the building near two disconnected downspouts to capture and infiltrate stormwater runoff from the parking lot and building. Parking spaces in the north parking lot can also be retrofitted with pervious pavement. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f vious Cover		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
12	32,099	1.5	16.2	147.4	0.025	0.88	

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.254	43	19,840	0.75	2,485	\$62,125





Millbrook United Methodist Church

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

0 25' 50'

RANDOLPH RESCUE SQUAD

RAPID: 25

Subwatershed: Rockaway River

HUC14 ID: 02030103030070

Site Area: 59,005 sq. ft.

Address: 780 NJ-10

Randolph, NJ 07869

Block and Lot: Block 42, Lot 107



Rain gardens can be installed to the northwest and southwest of the building to capture, treat, and infiltrate stormwater runoff from the rooftop. This will require downspout disconnections. Existing parking spaces to the north and east of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. Downspouts on the north of the building can be disconnected to the pervious pavement to manage stormwater runoff from the rooftop. A cistern can be installed to the north of the building to divert and detain the stormwater runoff from the rooftop for later non-potable reuse such as washing vehicles. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 50"	
56	33,088	1.6	16.7	151.9	0.026	1.03	

Recommended Green Infrastructure Practices	Drainage Area (sq. ft.)	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	1,160	0.034	6	2,420	0.09	290	\$2,900
Pervious pavement	11,500	0.340	49	23,990	0.90	2,210	\$55,250
Rainwater harvesting	1,080	0.032	4	900	0.03	900 (gal)	\$2,700



RANDOLPH TOWNSHIP FIRE DEPARTMENT COMPANY #2



RAPID: 26

Subwatershed: Rockaway River

Site Area: 94,287 sq. ft.

Address: 340 NJ Route 10

Randolph, NJ 07869

Block and Lot: Block 137, Lot 6, 7, 8





Pervious pavement can be installed in the parking spaces north of the building to capture and infiltrate stormwater runoff from the parking lot. A cistern can be installed north of the building near a downspout. The water from the cistern can then be used for watering gardens, washing vehicles, or for other non-potable uses. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervio	ous Cover		sting Loads f		Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
61	57,966	2.8	29.3	266.1	0.045	1.59	

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	0.384	64	30,000	1.13	2,710	\$67,750
Rainwater harvesting	0.061	10	2,300	0.09	2,300 (gal)	\$4,000





Randolph Township Fire Department Company #2

- pervious pavement
- rainwater harvesting
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

SHONGUM ELEMENTARY SCHOOL



RAP ID: 27

Subwatershed: Whippany River

Site Area: 675,450 sq. ft.

Address: 9 Arrow Place

Randolph, NJ 07869

Block and Lot: Block 168 | Lot 58

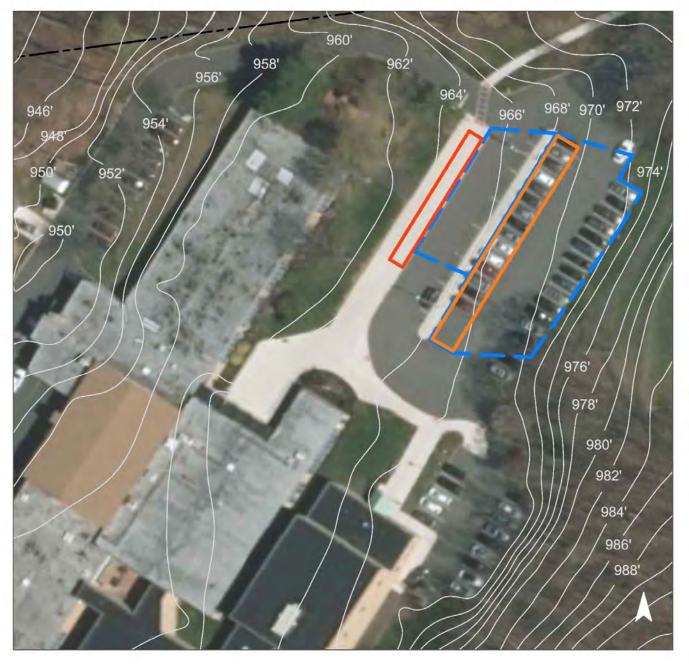




Pervious pavement can be installed in the center parking spaces to capture and infiltrate stormwater runoff from the parking lot. A stormwater planter can be installed by depaving a portion of the wide sidewalk. A curb cut can be used to intercept stormwater runoff from the parking lot. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
26	173,966	8.4	87.9	798.7	0.136	4.77	

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
Pervious pavement	0.267	45	20,830	0.78	2,890	\$5,780
Stormwater planter	0.104	17	8,150	0.31	1,000	\$5,000





Shongum Elementary School

- stormwater planter
- pervious pavement
- drainage area
- [] property line
- ☐ 2015 Aerial: NJOIT, OGIS

RANDOLPH TOWNSHIP FIRE DEPARTMENT COMPANY #5



RAPID: 28

Subwatershed: Whippany River

Site Area: 20,984 sq. ft.

Address: 118 West Hanover Avenue

Randolph, NJ 07869

Block and Lot: Block 167 | Lot 1

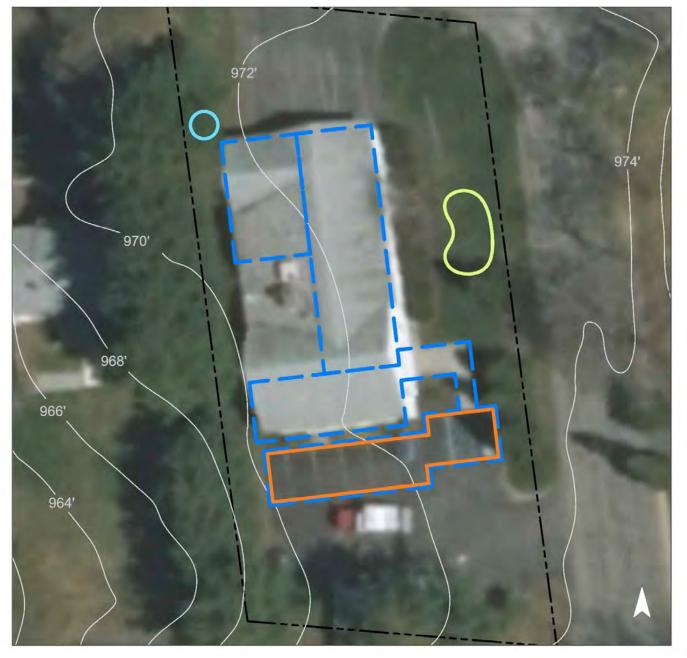




Pervious pavement can be installed in parking spaces along the south side of the building to capture and infiltrate stormwater from the adjacent paved areas and rooftop. A rain garden can be installed to the east of the building near a disconnected downspout to capture, treat, and infiltrate stormwater runoff. A cistern can be installed on the north side of the building to capture stormwater and reuse it for watering gardens, washing vehicles, or for other non-potable uses. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)		
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44''	
33	6,928	0.3	3.5	31.8	0.005	0.19	

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	0.052	9	4,070	0.15	500	\$2,500
Pervious pavement	0.071	12	5,540	0.21	1,400	\$35,000
Rainwater harvesting	0.026	4	800	0.03	800 (gal)	\$1,600





Randolph Township Fire Department Company #5

- bioretention system
- pervious pavement
- rainwater harvesting
- drainage area
- [] property line
- 2015 Aerial: NJOIT, OGIS

0 15' 30'

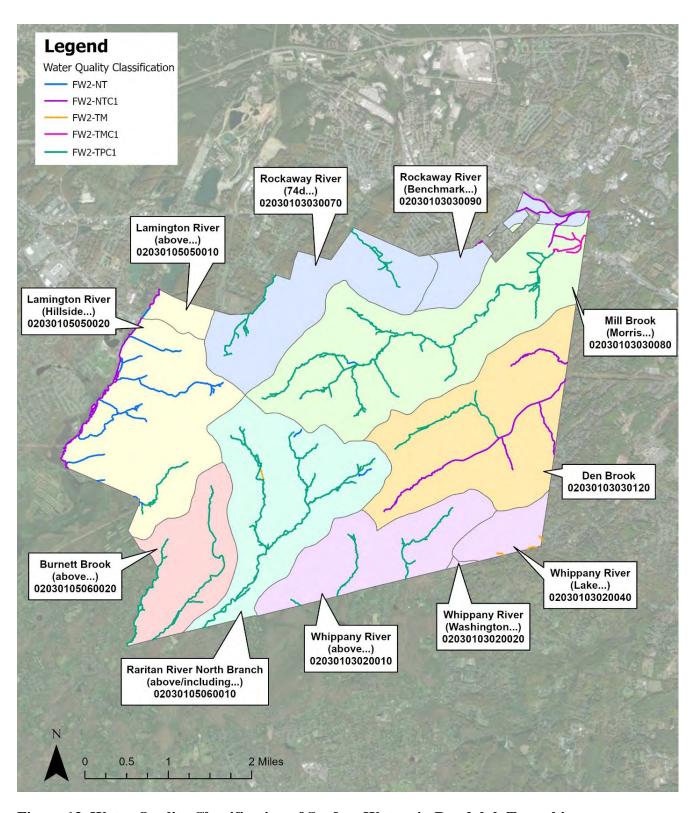


Figure 13. Water Quality Classification of Surface Waters in Randolph Township

Table 11. Water Quality Classification of Surface Waters in Randolph Township

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, non-trout	FW2-NT	6.1	11.1%
Freshwater 2, non-trout, Category One	FW2-NTC1	11.0	20.0%
Freshwater 2, trout production, Category One	FW2-TPC1	36.2	65.7%
Freshwater 2, trout maintenance	FW2-TM	0.4	0.8%
Freshwater 2, trout maintenance, Category One	FW2-TMC1	1.3	2.4%

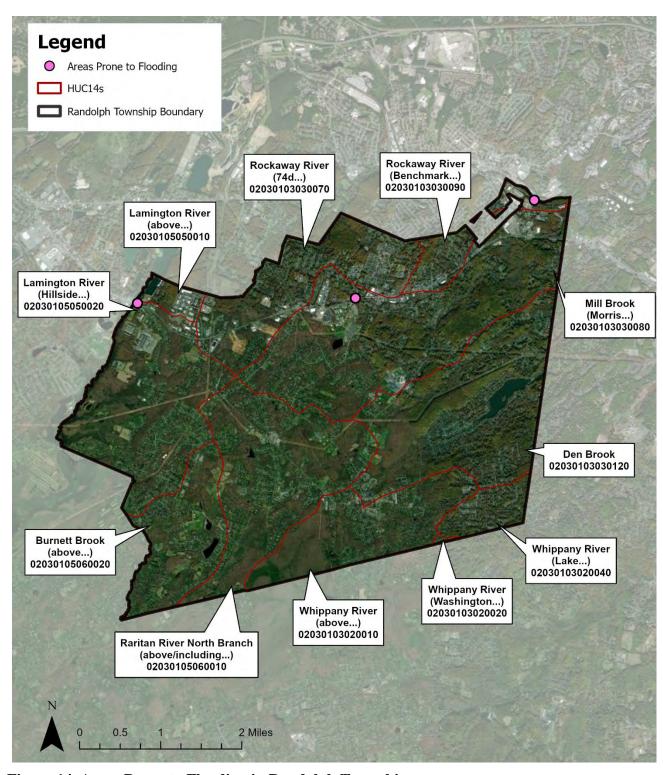


Figure 14. Areas Prone to Flooding in Randolph Township