Clinton Town

Introduction

Located in Hunterdon County in New Jersey, Clinton Town covers about 1.4 square miles. With a population of 2,773 (2020 United States Census), Clinton Town consists of 57.9% of urban land uses by area. Of that urban land use, approximately 43.8% is comprised of medium-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 approximately 29.9% of Clinton Town.

Clinton Town contains portions of four subwatersheds (Table 1). There are approximately 4.5 miles of rivers and streams within the municipality; these include Beaver Brook, South Branch Raritan River and its tributaries, and Spruce Run. Clinton Town is within the New Jersey Department of Environmental Protection (NJDEP) Watershed Management Area (WMA) 8 (North and South Branch Raritan).

Table 1: Subwatersheds of Clinton Town

Subwatershed	HUC14
Raritan River South Branch (Spruce Run to Stone Mill gage)	02030105010080
Spruce Run Reservoir / Willoughby Brook	02030105020040
Beaver Brook (Clinton)	02030105020050
Raritan River South Branch (River Road to Spruce Run)	02030105020070

The purpose of this report is to provide a comprehensive understanding of key, defining features within the subwatersheds throughout Clinton Town. 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 Clinton Town'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 Clinton Town in relation to the study area. Figure 2 shows the portions of the four HUC14s in Clinton Town and highlights the HUC14s that are contained within the study area. Figure 3 illustrates the land use in Clinton Town. A detailed land use analysis and nonpoint source loading analysis was completed for each HUC14 in Clinton Town and is presented in Table 2. Figure 4 shows the impervious cover in Clinton Town based upon NJDEP's 2015 impervious cover layer. An impervious cover analysis was completed for each HUC14 in Clinton Town 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". Only a naturalized detention basin was identified in Clinton Town within the study area.

The Q-Farms in Clinton Town 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 Clinton Town 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 107.3 acres of agricultural land use in Clinton Town, of which, 27.4 acres lie within the study area for this Watershed Restoration and Protection Plan. There is one Q-Farm in the study area portion of Clinton Town, totaling 29.6 acres. Within the one Q-Farm, there are approximately 24.9 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, 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. One HUC14 is included in the study area (02030105010080). Within this HUC14, there are 5.9 acres of buildings and 14.3 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 Clinton Town, approximately 0.4 acres of rooftop runoff would be managed with 0.07 acres of rain gardens. The plan also calls for the management of 10% of the roadways with bioswales. For the study area within Clinton Town, approximately 1.4 acres of roadway would be managed, or 0.4 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

The Property Class 15 parcels for Clinton Town are shown in Figure 10 and presented in Table 8. 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 9. Class 15E parcels were excluded from the assessment. Five of these properties offer opportunities to be retrofitted with green infrastructure to help reduce pollutant loads. These properties are identified in Table 9 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 two classifications that apply to the streams in Clinton Town. Figure 13 depicts the water quality classifications of surface waters throughout Clinton Town and Table 10 summarizes the total miles and percentage of each surface water quality classification in the municipality.

Areas Prone to Flooding

An administrator from Clinton Town has identified that approximately 1/3 of the municipality lies in a flood zone and is therefore particularly susceptible to flooding during heavy rainfall or storm events. Figure 14 shows a flood insurance rate map (FIRM) panel obtained from the Federal Emergency Management Agency (FEMA) that highlights the aforementioned areas of concern.

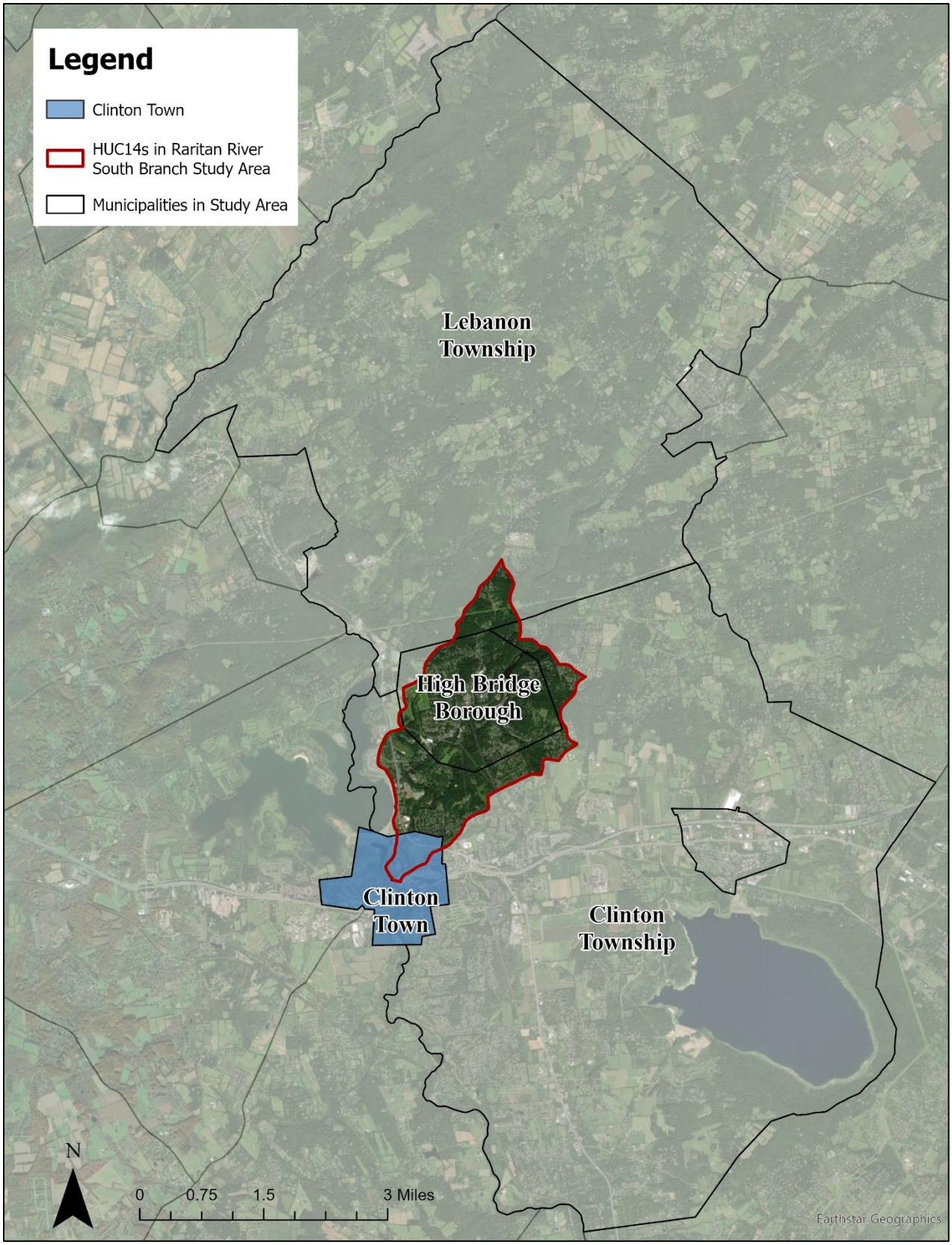


Figure 1: Municipalities in the Study Area

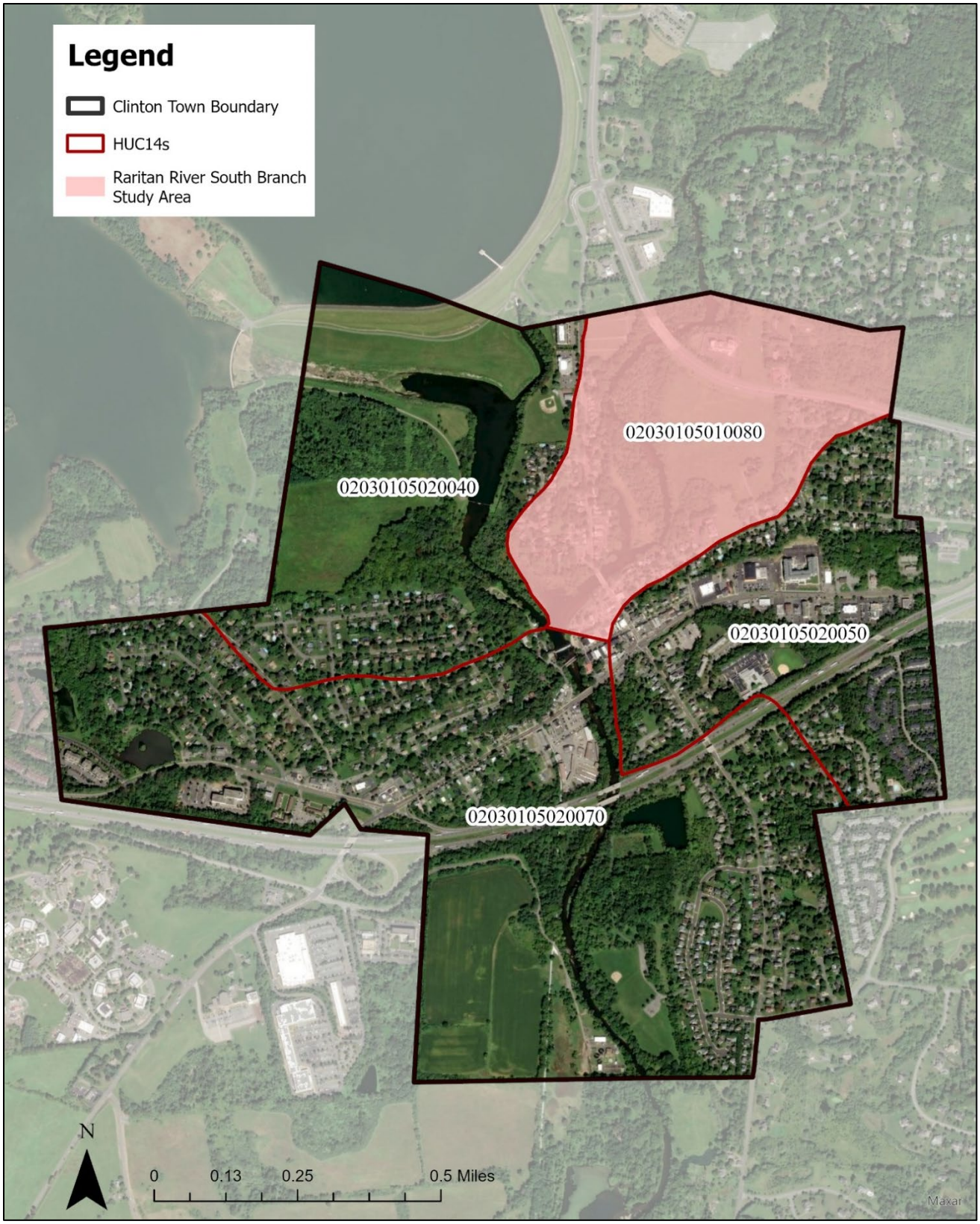


Figure 2: Portions of four HUC14s are in Clinton Town

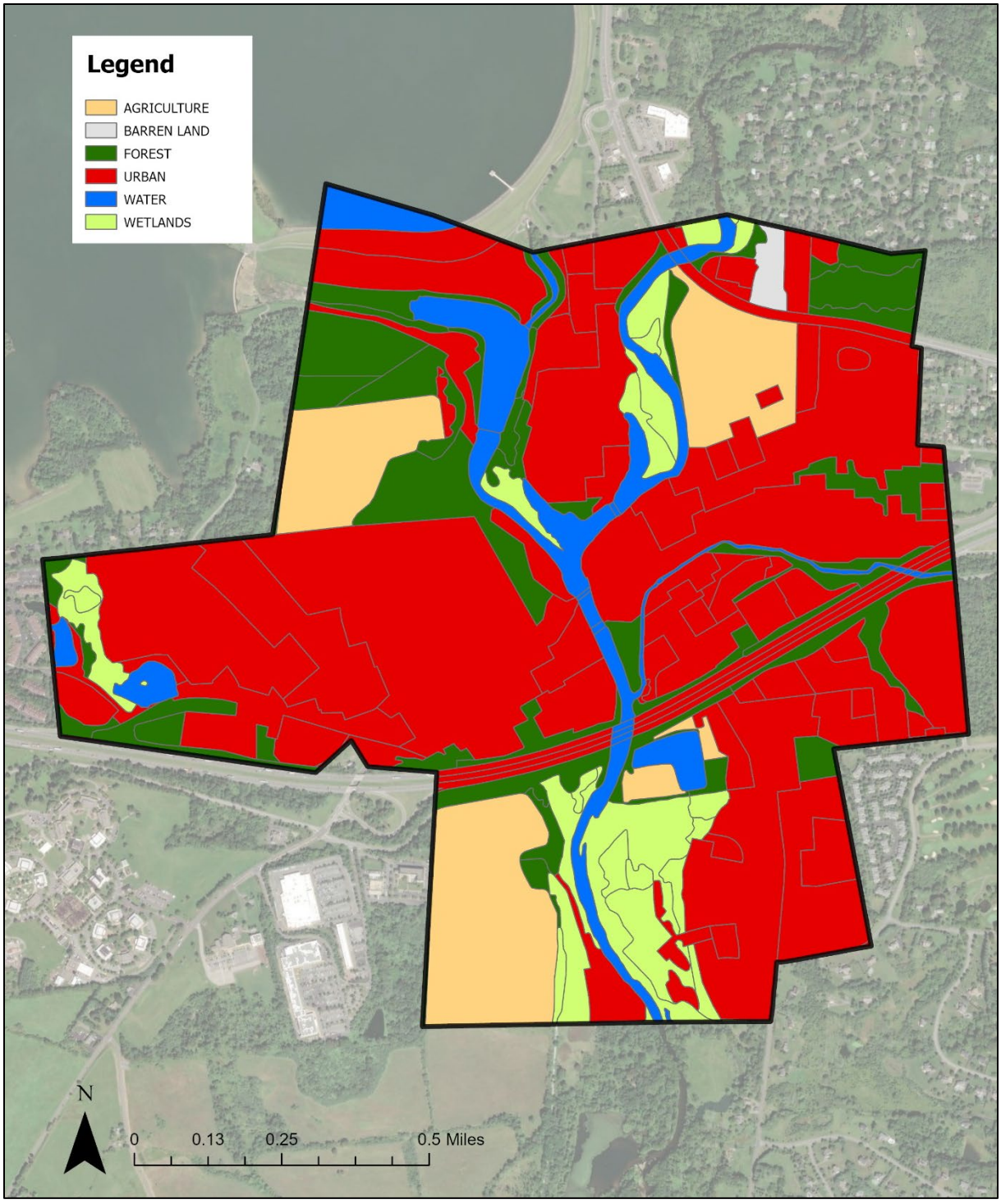


Figure 3: Land Use in Clinton Town

Table 2: Land Use Analysis and Nonpoint Source Loading Analysis by HUC14 for Clinton Town

Land Use	Area (acres)	TP Load (lbs/yr)	TN Load (lbs/yr)	TSS Load (lbs/yr)
02030105010080				
Agriculture	27.4	35.6	273.7	8,209.7
Barren Land	4.4	2.2	22.0	263.7
Forest	20.1	2.0	60.3	803.4
Urban	68.5	95.9	1,028.0	9,594.8
Water	16.0	1.6	47.9	639.0
Wetlands	14.3	1.4	42.8	570.9
TOTAL =	**150.6**	**138.8**	**1,474.6**	**20,081.5**
02030105020040				
Agriculture	26.7	34.7	267.3	8,017.8
Barren Land	0.0	0.0	0.0	0.0
Forest	53.7	5.4	161.0	2,146.9
Urban	88.9	124.5	1,333.5	12,445.8
Water	23.8	2.4	71.4	951.9
Wetlands	2.8	0.3	8.5	112.7
TOTAL =	**195.9**	**167.2**	**1,841.6**	**23,675.2**
02030105020050				
Agriculture	0.0	0.0	0.0	0.0
Barren Land	0.0	0.0	0.0	0.0
Forest	22.1	2.2	66.4	884.8
Urban	127.2	178.1	1,907.9	17,806.8
Water	2.9	0.3	8.6	114.9
Wetlands	0.0	0.0	0.0	0.0
TOTAL =	**152.2**	**180.6**	**1,982.9**	**18,806.5**
02030105020070				
Agriculture	53.2	69.1	531.6	15,948.0
Barren Land	0.0	0.0	0.0	0.0
Forest	43.3	4.3	130.0	1,733.3
Urban	247.3	346.2	3,709.3	34,619.8
Water	22.4	2.2	67.3	896.8
Wetlands	53.0	5.3	159.0	2,119.4
TOTAL =	**419.2**	**427.2**	**4,597.1**	**55,317.3**
All HUCs				
Agriculture	107.3	139.4	1,072.5	32,175.5
Barren Land	4.4	2.2	22.0	263.7
Forest	139.2	13.9	417.6	5,568.4
Urban	531.9	744.7	7,978.6	74,467.2
Water	65.1	6.5	195.2	2,602.7
Wetlands	70.1	7.0	210.2	2,803.0
TOTAL =	**917.9**	**913.7**	**9,896.2**	**117,880.5**

Impervious Cover Analysis

NJDEP's Open Data impervious surface GIS data layer depicts surfaces throughout Clinton Town 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 Clinton Town. Based upon the NJDEP impervious surface data, Clinton Town has impervious cover totaling 26.1%. Table 3 shows impervious cover for each HUC14. The extent of the impervious cover in Clinton Town 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, Clinton Town'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 Clinton Town

Table 3: Impervious Cover Analysis by HUC14 for Clinton Town

Class	Area (acres)	HUC Impervious Cover (%)
02030105010080		
Building	5.89	
Other	10.50	
Road	14.31	
TOTAL =	**30.7**	**20.4%**
02030105020040		
Building	4.95	
Other	8.22	
Road	8.24	
TOTAL =	**21.4**	**10.9%**
02030105020050		
Building	18.95	
Other	32.00	
Road	23.69	
TOTAL =	**74.6**	**49.0%**
02030105020070		
Building	22.64	
Other	46.37	
Road	43.84	
TOTAL =	**112.9**	**26.9%**
All HUCs		
Building	52.43	
Other	97.10	
Road	90.08	
TOTAL =	**239.6**	**26.1%**

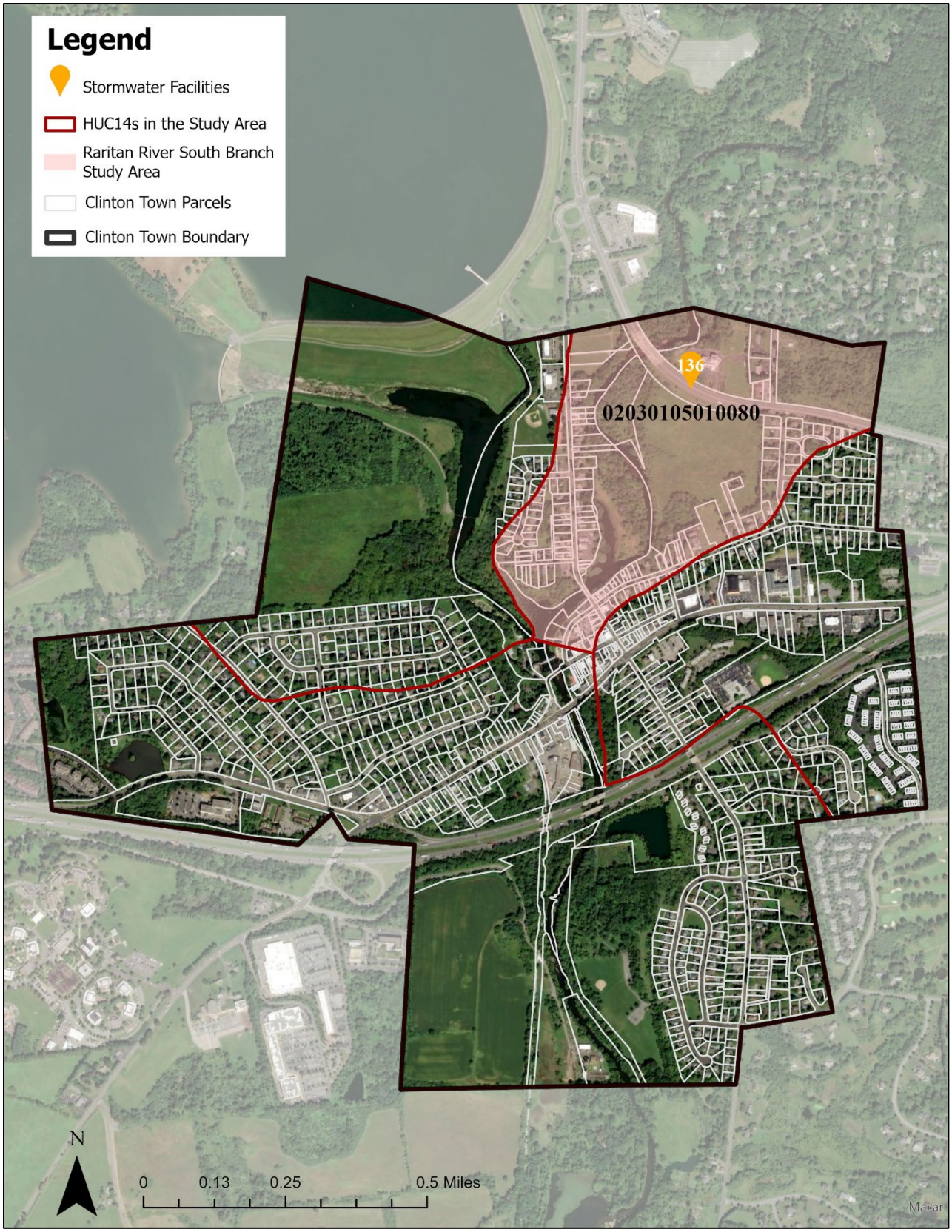


Figure 5: Stormwater Facilities in the Study Area of Clinton Town

Table 4: Location of Stormwater Facilities in the Study Area of Clinton Town

Raritan River South Branch Study Area		
ID	**Address**	**Type**
136	1638 Rt 31 North	N

"N" = Naturalized

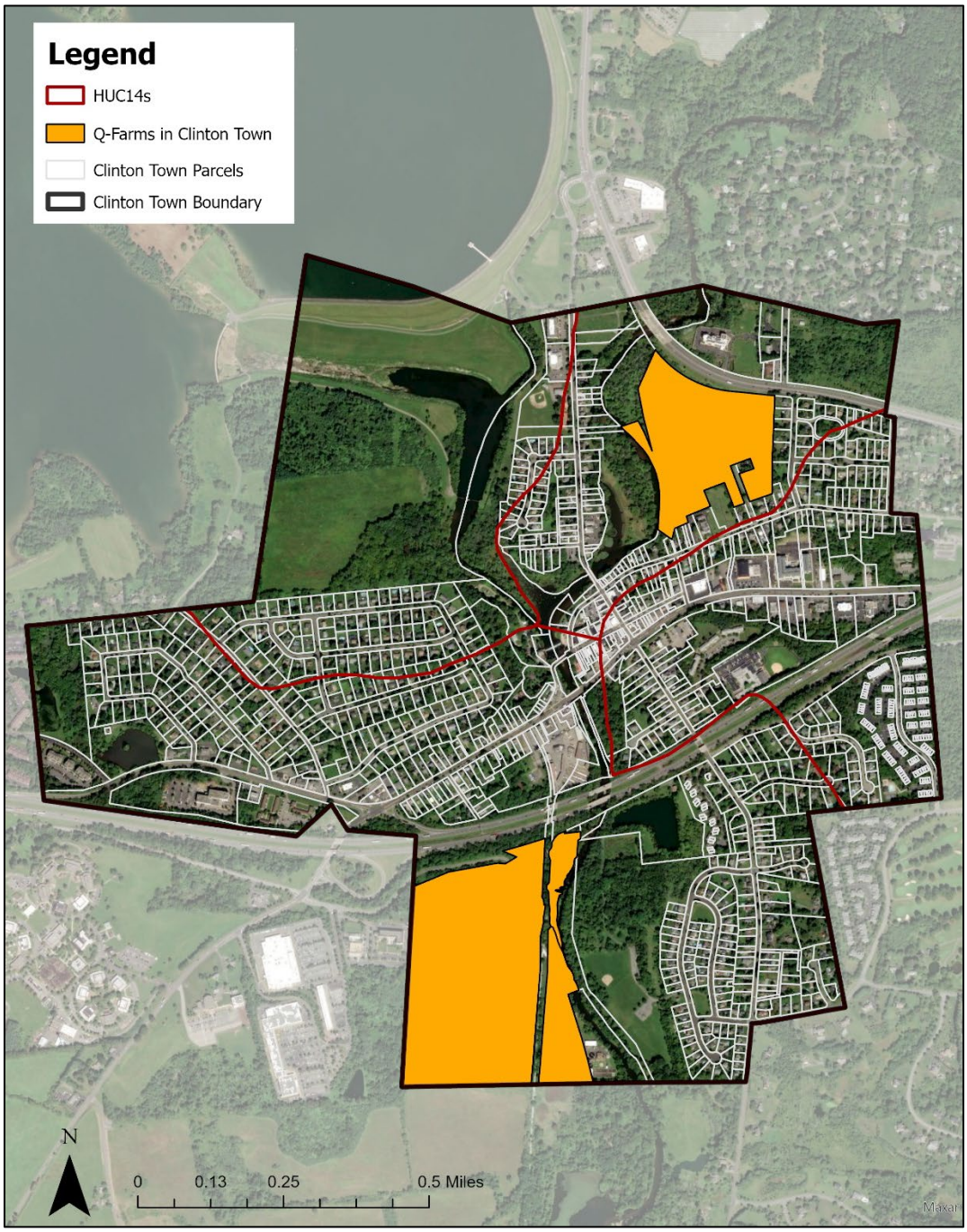


Figure 6: Q-Farm Parcels in Clinton Town

Table 5: Q-Farm Parcels in Clinton Town

Block	Lot	Q-Code	Prop Class	Location
14	32	QFARM	3B	65 1/2 Center St
27	1	QFARM	3B	1 Ramsey Rd
28	1	QFARM	3B	Access Rd Wof Lvrr
30	1	QFARM	3B	Hwy Right of Way-Rar.Riv.

Figure 7: Q-Farm Parcels in the Study Area of Clinton Town

Table 6: Q-Farm Parcels in the Study Area of Clinton Town

Block	Lot	Q-Code	Prop Class	Location
14	32	QFARM	3B	65 1/2 Center St

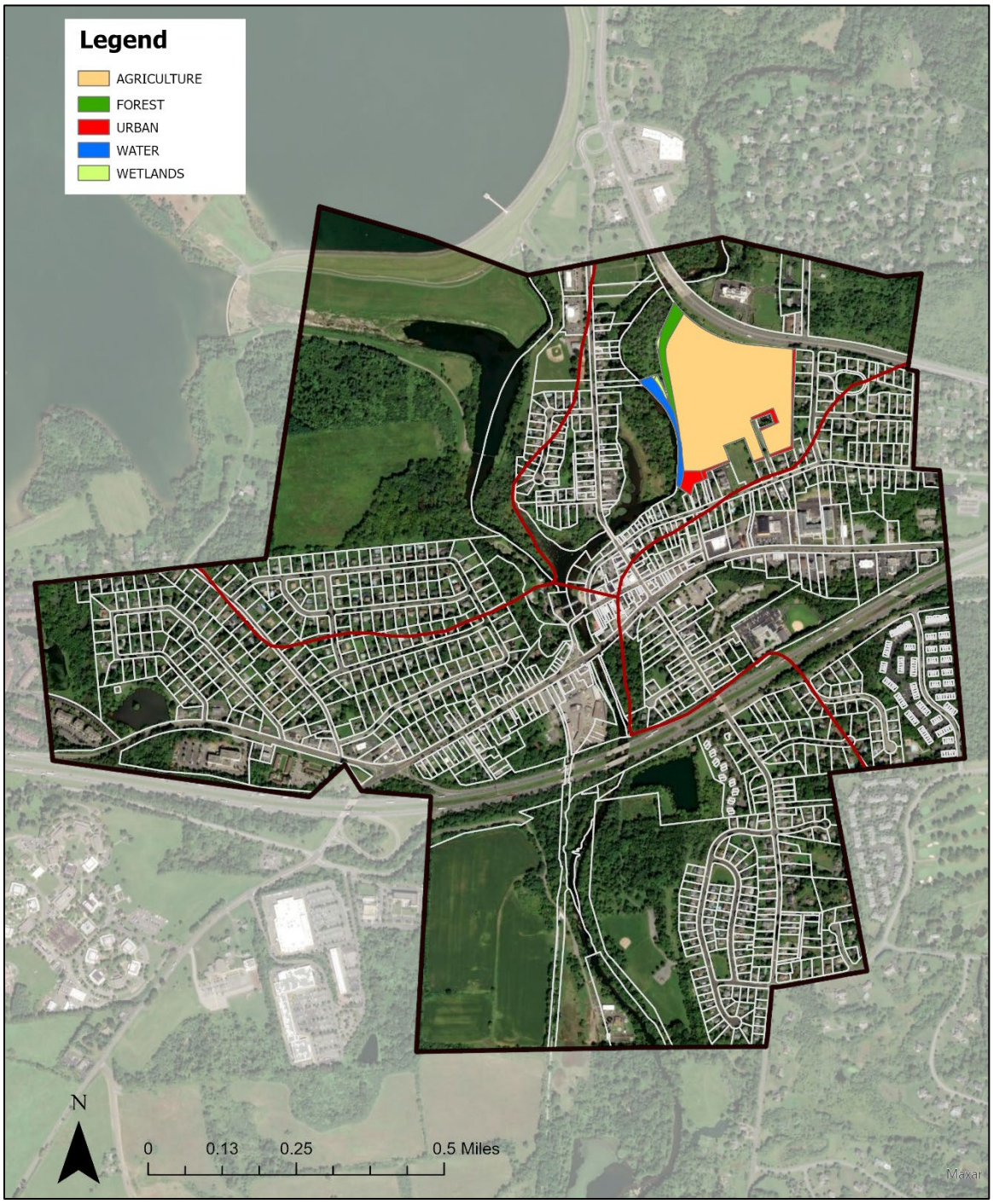


Figure 8: Land Use on Q-Farm Parcels in the Study Area of Clinton Town

Table 7: Land Use on Q-Farms in the Study Area of Clinton Town

Land Use	Area (acres)
Agriculture	24.9
Barren Land	0.0
Forest	1.6
Urban	1.6
Water	1.3
Wetlands	0.2
Total:	**29.6**

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

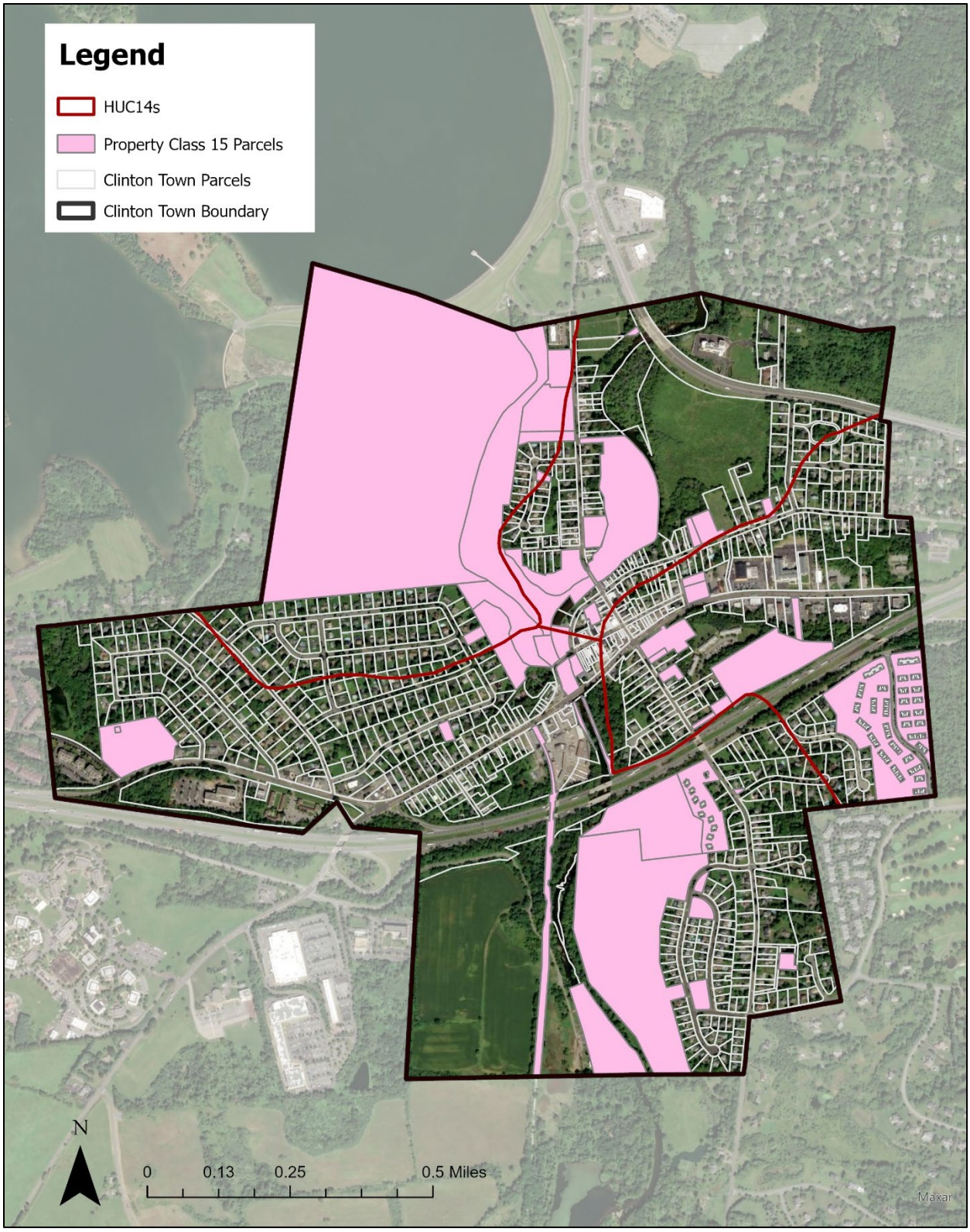


Figure 10: Property Class 15 Parcels in Clinton Town

Table 8: Property Class 15 Parcels in Clinton Town

Block	Lot	Prop Class	Location	Facility Type
22	13	15A	School St	School
22	13.01	15A	Rear Of School St	Vacant Land
22	13.02	15A	Leigh St	Vacant Land
1	59	15C	Well Lot, R Of 10	Well
1	60.01	15C	Demott Pk&Fishing Pd	Park
7	1	15C	W Main St	River
8	1	15C	Quarry Road	Water Supply
10	11	15C	20 Center St	Parking Area
14	1	15C	Center St & Leigh St	Vacant Land
14	1.01	15C	Along River	Vacant Land
14	3.01	15C	Along River	Vacant Land
15	14	15C	Halstead St	Vacant Land
15	31	15C	Route 31	Highway
16	20.01	15C	Water Street	Vacant Land
16	20.32	15C	Rachel Court	Vacant Land
16	21	15C	63 Halstead St	Community House
16	22.01	15C	65 Halstead St	Library
16	23	15C	Spruce Run	Water Supply
22	1	15C	43 Leigh St	Municipal Building
22	2	15C	47 Leigh St	Municipal Annex
23	14	15C	River	Riverbank
24	9	15C	West Main St	Vacant Land
28	2	15C	2 Ramsey Road	Sewage Treatment
29	3	15C	Leigh Street	Vacant Land
29	8	15C	30a Haver Farm Road	Park
29.02	1	15C	Kings Boulevard	Vacant Land
29.02	10	15C	Haver Farm Road	Vacant Land
31	10.01	15C	Leigh Street	Vacant Land
33	1	15C	Country Club Dr	Vacant Land
100	1	15C	Clinton Branch	Park
14	20	15D	75 Center St	Parking Area
14	21	15D	91 Center Street	Church
14	25	15D	105 Center St	Parsonage
15	4	15D	10-12 Halstead St	Church
22	5.01	15D	55 Leigh St	Church Offices
6	35	15F	24 Marudy Drive	Disabled Vet
8	3	15F	54 Main St	Historical Museum
8	3.01	15F	54 Main Street	Historical Museum
8	4	15F	Raritan River	River Museum
8	30	15F	45 Quarry Ridge Rd	Disabled Vet
9	1	15F	7 Center St	Education Center
11	15.01	15F	Off Rt. 22 Rear Of Lot 16	Condo Common Element
11	16	15F	49-51 Main St.	Condo Common Element
16	20.06	15F	7 Rachel Court	Disabled Vet
21	36	15F	29-31 Route 173	Volunteer Fire Co.
21	37	15F	New Street	Parking Area

22	18.01	15F	48 Route 173	Rescue Squad
29	3.03	15F	Pond Ridge Drive	Condo Common Element
29.01	1	15F	34 Goosetown Drive	Disabled Vet
31	7	15F	2 Alexandra Way	Disabled Vet
31	7	15F	Alton Place	Condo Common Element
31	29	15F	6 Olsens Lane	Disabled Vet
31.01	7.01	15F	Common Elements	Condo Common Element

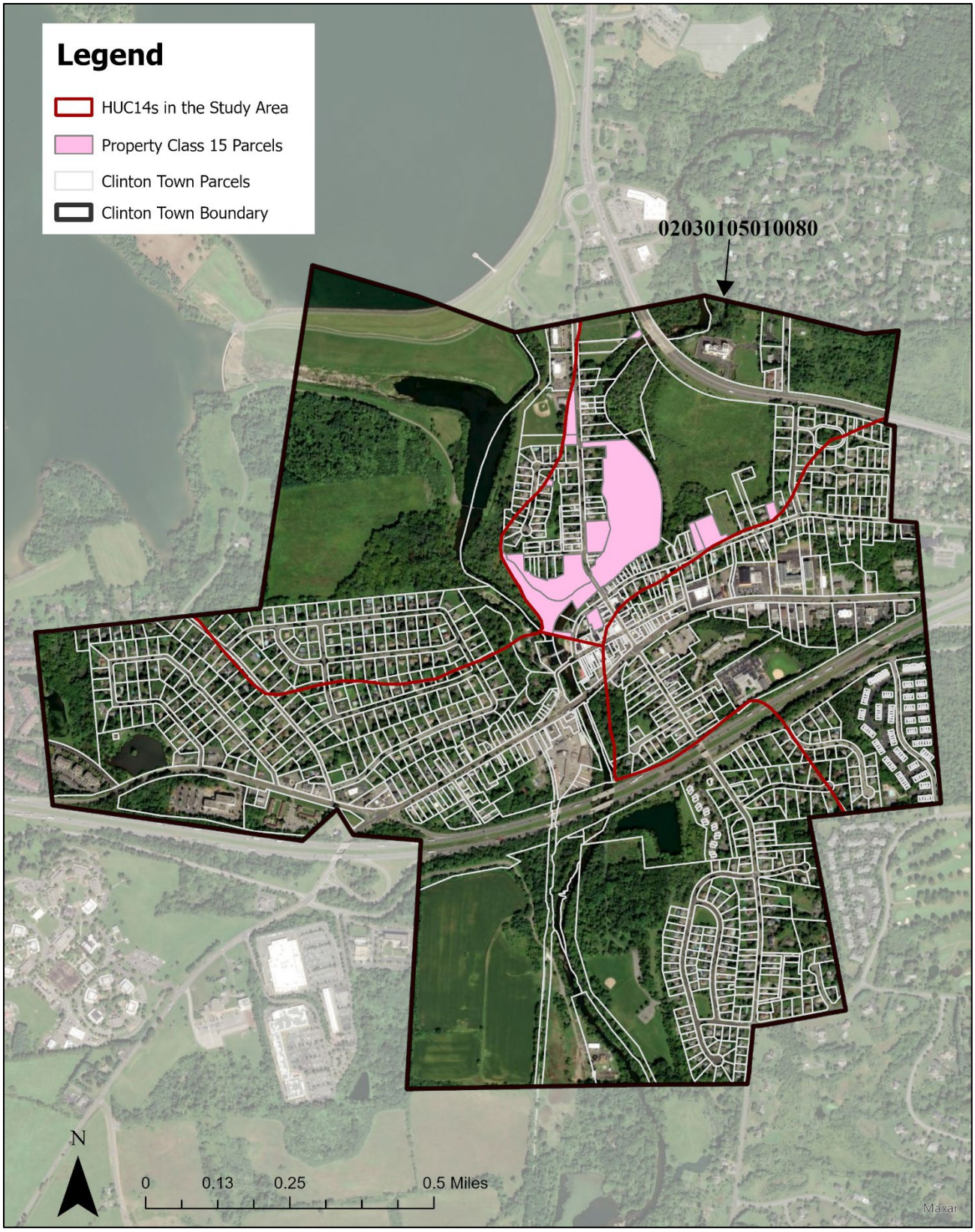


Figure 11: Property Class 15 Parcels in the Study Area of Clinton Town

Table 9: Property Class 15 Parcels in the Study Area of Clinton Town

Block	Lot	Prop Class	Location	Facility Type
10	11	15C	20 Center St	Parking Area
14	1	15C	Center St & Leigh St	Vacant Land
14	1.01	15C	Along River	Vacant Land
14	3.01	15C	Along River	Vacant Land
15	14	15C	Halstead St	Vacant Land
15	31	15C	Route 31	Highway
16	20.01	15C	Water Street	Vacant Land
16[1]	20.32	15C	Rachel Court	Vacant Land
***16[1]**	**21**	**15C**	**63 Halstead St**	**Community House**
***16[1]**	**22.01**	**15C**	**65 Halstead St**	**Library**
16[1]	23	15C	Spruce Run	Water Supply
***14[2]**	**20**	**15D**	**75 Center St**	**Parking Area**
***14[1, 2]**	**21**	**15D**	**91 Center Street**	**Church**
14[1]	25	15D	105 Center St	Parsonage
***15**	**4**	**15D**	**10-12 Halstead St**	**Church**
8[1]	3	15F	54 Main St	Historical Museum
***9[1]**	**1**	**15F**	**7 Center St**	**Education Center**
16[1]	20.06	15F	7 Rachel Court	Disabled Vet

*** Sites that can be retrofitted with green infrastructure**

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 Clinton Town

BASIL BANDWAGON

RAP ID: 1

Subwatershed: Beaver Brook

Site Area: 44,236 sq. ft.

Address: 38 Old Highway 22
Clinton, NJ 08809

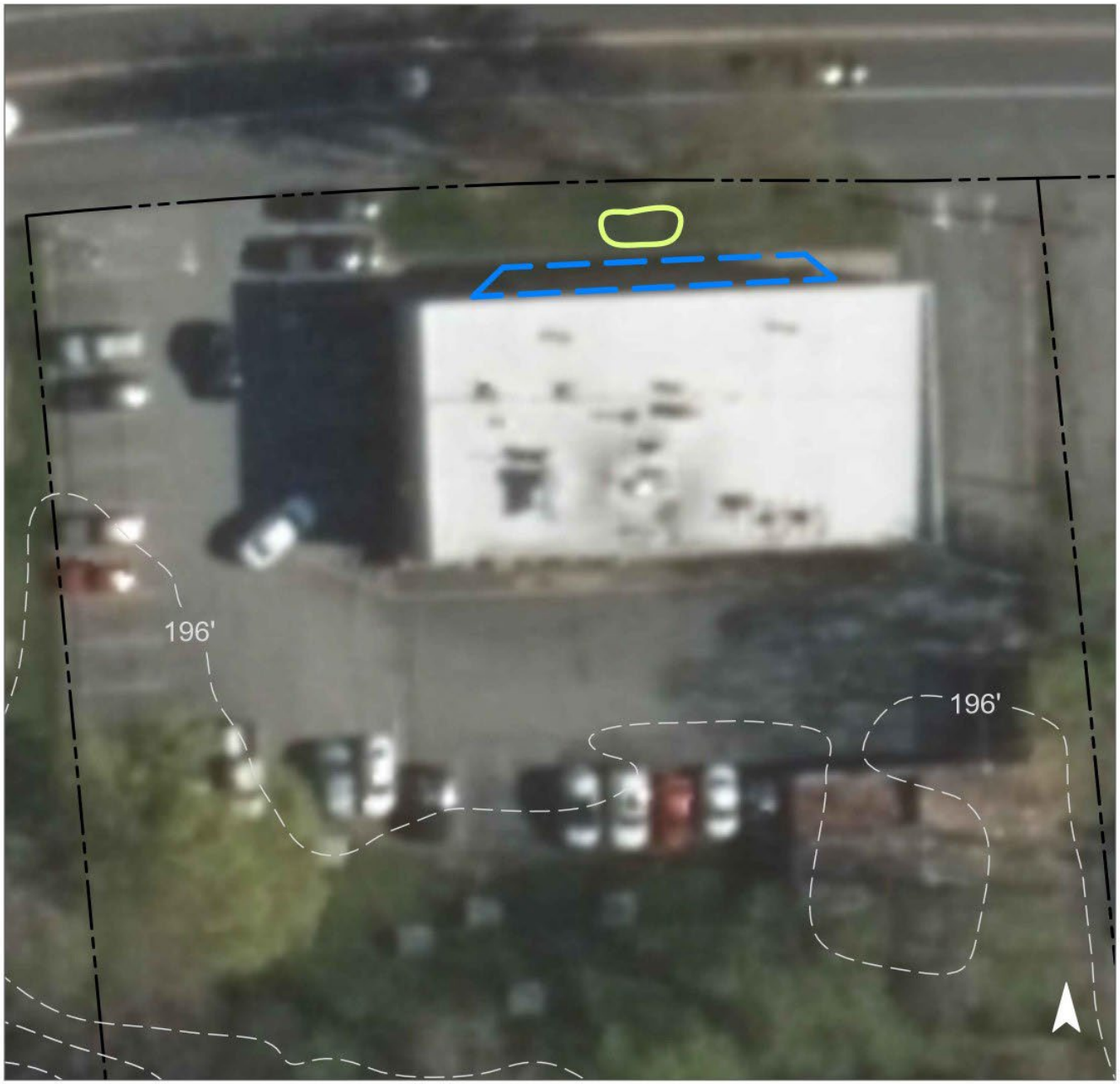
Block and Lot: Block 22, Lot 16

A rain garden can be installed in front of the building to capture the stormwater from the rooftop awning 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)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
37	136,325	6.6	68.9	625.9	0.106	3.74

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	2	680	0.03	90	$450

GREEN INFRASTRUCTURE RECOMMENDATIONS



Basil Bandwagon

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

0 15' 30'

CLINTON ELEMENTARY SCHOOL

RAP ID: 2

Subwatershed: Beaver Brook

Site Area: 369,275 sq. ft.

Address: 10 School Street
Clinton, NJ 08809

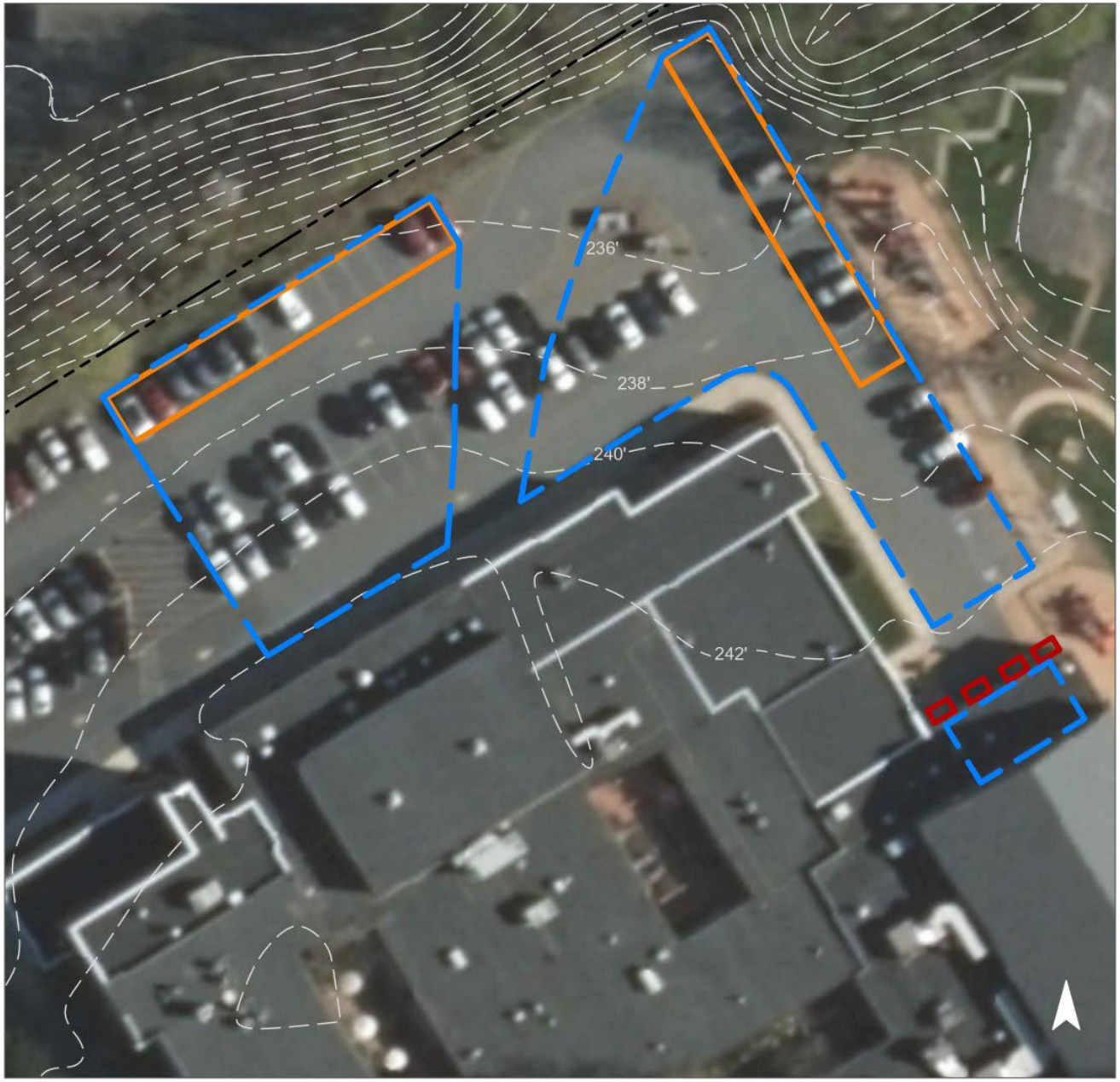
Block and Lot: Block 22, Lot 13

Porous pavement can be installed on the northern and eastern parking strips to capture stormwater from the parking lot. Downspout planter boxes can be constructed along the northeastern edge of the building to allow roof runoff to be reused. 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"
37	136,325	6.6	68.9	625.9	0.106	3.74

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.589	99	44,630	1.68	4,535	$113,375
Planter boxes	n/a	6	n/a	n/a	4 (boxes)	$4,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Clinton Elementary School

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

0 25' 50'

CLINTON FIRE DEPARTMENT

RAP ID: 3

Subwatershed: Beaver Brook

Site Area: 51,009 sq. ft.

Address: 1 New Street
Clinton, NJ 08809

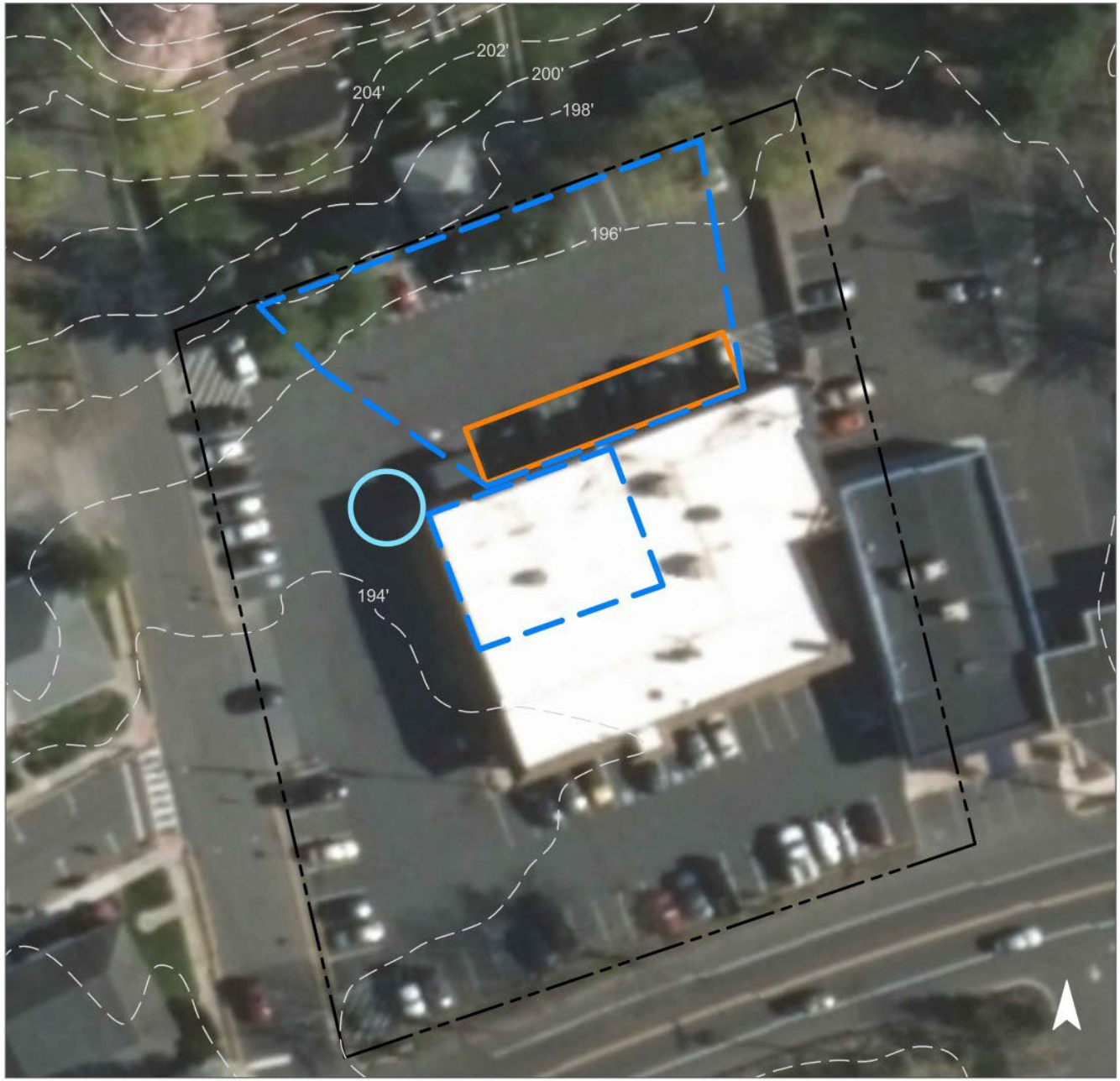
Block and Lot: Block 21, Lots 36 & 37

A rainwater harvesting system can be installed near the west corner of the building to capture rainwater and be reused for activities such as washing vehicles. The parking strip north of the building can be converted to pervious pavement to aid in the infiltration of stormwater from the large pavement. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
80	40,925	2.0	20.7	187.9	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
Pervious pavement	0.264	44	19,990	0.75	2,120	$53,000
Rainwater harvesting	0.079	13	2,500	0.09	2,500 (gal)	$5,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Clinton Fire Department

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

0 25' 50'

CLINTON MUNICIPAL OFFICES

RAP ID: 4

Subwatershed: Beaver Brook

HUC14 ID: 02030105020050

Site Area: 98,757 sq. ft.

Address: 43 Leigh Street
Clinton, NJ 08809

Block and Lot: Block 22, Lot 1

Rain gardens can be installed to the north and south of the building to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout redirection and disconnections. Existing parking spaces to the northwest of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the parking lot and from the northern garage rooftop, which already has disconnected downspouts directing runoff to the asphalt. Trench drains will be needed to intercept and redirect some of the parking lot runoff to the pervious pavement. 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 49.4"
75	74,018	3.6	37.4	339.8	0.058	2.28

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	2,210	0.065	10	4,430	0.17	555	$5,550
Pervious pavement	24,910	0.729	108	49,940	1.88	6,480	$162,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Clinton Municipal Offices

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

0 30' 60'

EVANGEL CHAPEL

RAP ID: 5

Subwatershed: Beaver Brook

Site Area: 21,907 sq. ft.

Address: 55 Leigh Street
Clinton, NJ 08809

Block and Lot: Block 22, Lot 5.01

Porous pavement can be installed to capture stormwater from the rear end of the building as well as the parking lot. A downspout planter box can be installed along the building's eastern wall to capture some of the rooftop drainage. 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"
61	13,302	0.6	6.7	61.1	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
Pervious pavement	0.065	11	4,940	0.19	1,000	$25,000
Planter box	n/a	<1	n/a	n/a	1 (box)	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Evangel Chapel

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

0 20' 40'

NEO SUSHI

RAP ID: 6

Subwatershed: Beaver Brook

Site Area: 27,206 sq. ft.

Address: 42 Old Highway 22
Clinton, NJ 08809

Block and Lot: Block 22, Lot 17

Porous pavement can be installed in front of the building to aid in the infiltration of stormwater from the large pavement and rooftop areas if the gutter is reversed in direction into the lot instead of alongside 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)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
78	21,200	1.0	10.7	97.3	0.017	0.58

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.121	20	9,200	0.35	975	$24,375

GREEN INFRASTRUCTURE RECOMMENDATIONS

Neo Sushi

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

0 15' 30'

TIRPOK CLEANERS

RAP ID: 7

Subwatershed: Beaver Brook

Site Area: 17,758 sq. ft.

Address: 36 Old Highway 22
Clinton, NJ 08809

Block and Lot: Block 22, Lot 15

Porous pavement can be installed in the parking lot to capture stormwater from the building and parking lot to alleviate flooding issues as seen in the image above. 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"
82	14,477	0.7	7.3	66.5	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
Pervious pavement	0.098	16	7,420	0.28	970	$24,250

GREEN INFRASTRUCTURE RECOMMENDATIONS

Tirpok Cleaners

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

0 15' 30'

UNITED STATES POSTAL SERVICE

RAP ID: 8

Subwatershed: Beaver Brook

Site Area: 10,638 sq. ft.

Address: 24 East Main Street
Clinton, NJ 08809

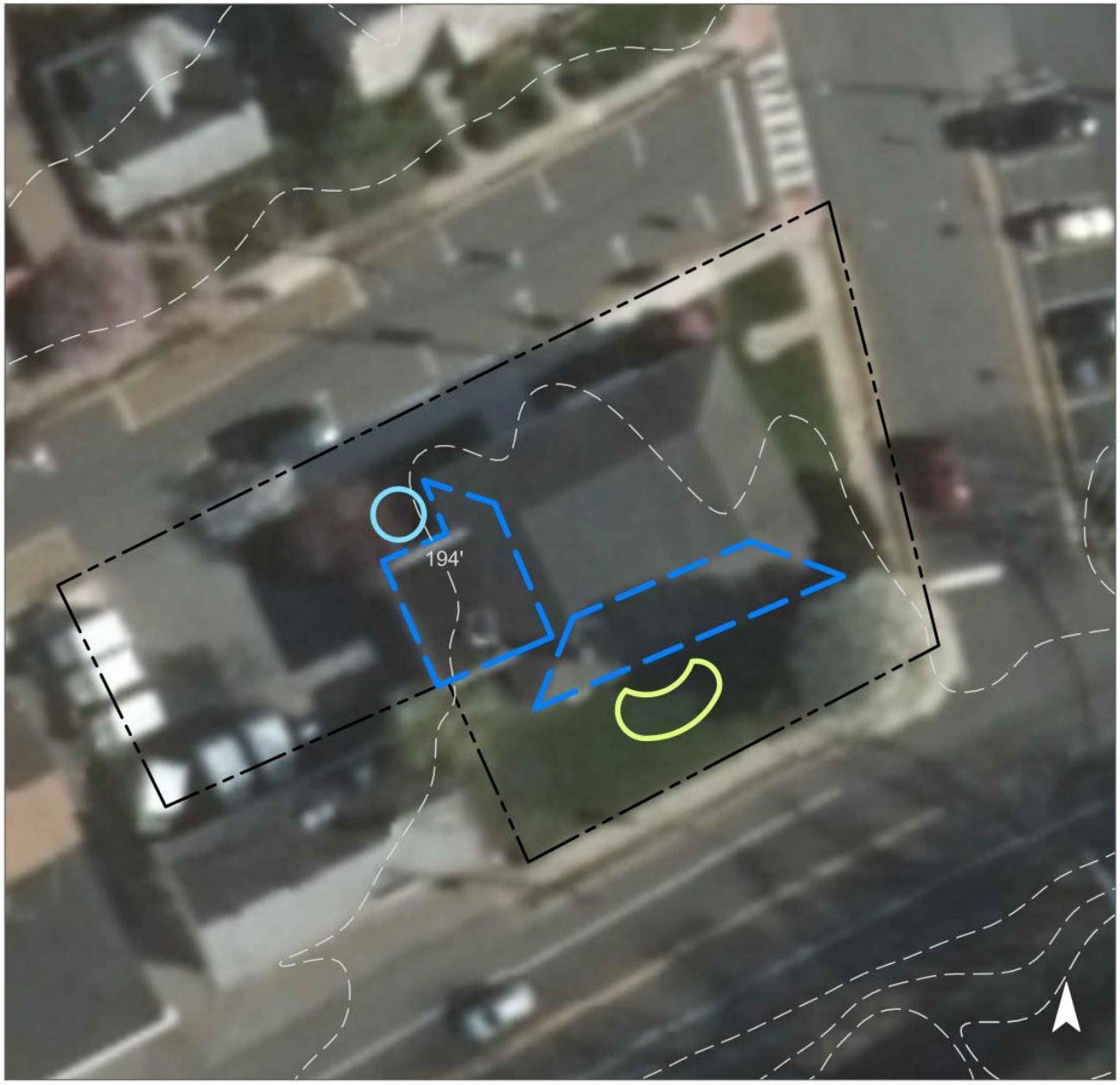
Block and Lot: Block 12, Lot 8

A rain garden can be installed next to the post office to capture stormwater from the roof of the building. A cistern can be installed in the northwestern corner of the building to reuse rainwater for activities such as car washing or watering plants. 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"
82	8,672	0.4	4.4	39.8	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	0.018	3	1,380	0.05	175	$875
Rainwater harvesting	0.019	3	600	0.02	600 (gal)	$1,200

GREEN INFRASTRUCTURE RECOMMENDATIONS



United States Postal Service

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

0 15' 30'

CLINTON PRESBYTERIAN CHURCH

RAP ID: 9

Subwatershed: Raritan South River Branch

Site Area: 71,446 sq. ft.

Address: 91 Center Street
Clinton, NJ 08809

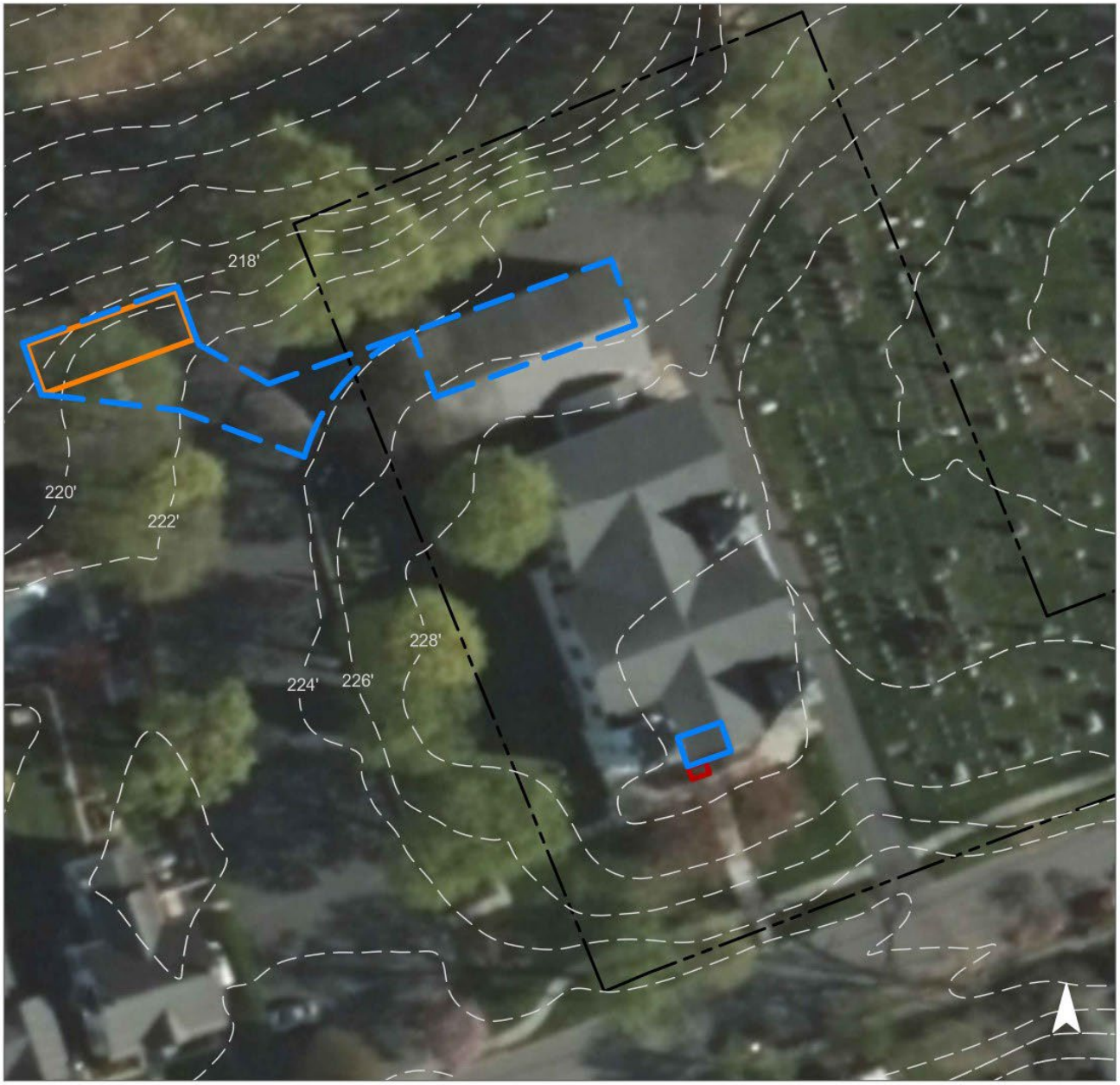
Block and Lot: Block 14, Lots 20 & 21

Porous pavement can be installed in the northwestern corner of the parking lot to capture stormwater from the parking lot as well as the nearby building's disconnected downspouts. A downspout planter box can be installed next to the south entrance of the building to capture and treat the rooftop 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)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
44	31,409	1.5	15.9	144.2	0.024	0.86

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	0.117	20	8,890	0.33	970	$24,250
Planter box	n/a	<1	n/a	n/a	1 (box)	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Clinton Presbyterian Church

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

0 25' 50'

CLINTON UNITED METHODIST CHURCH

RAP ID: 10

Subwatershed: Raritan River South Branch

HUC14 ID: 02030105010080

Site Area: 56,694 sq. ft.

Address: 12 Halstead Street
Clinton, NJ 08809

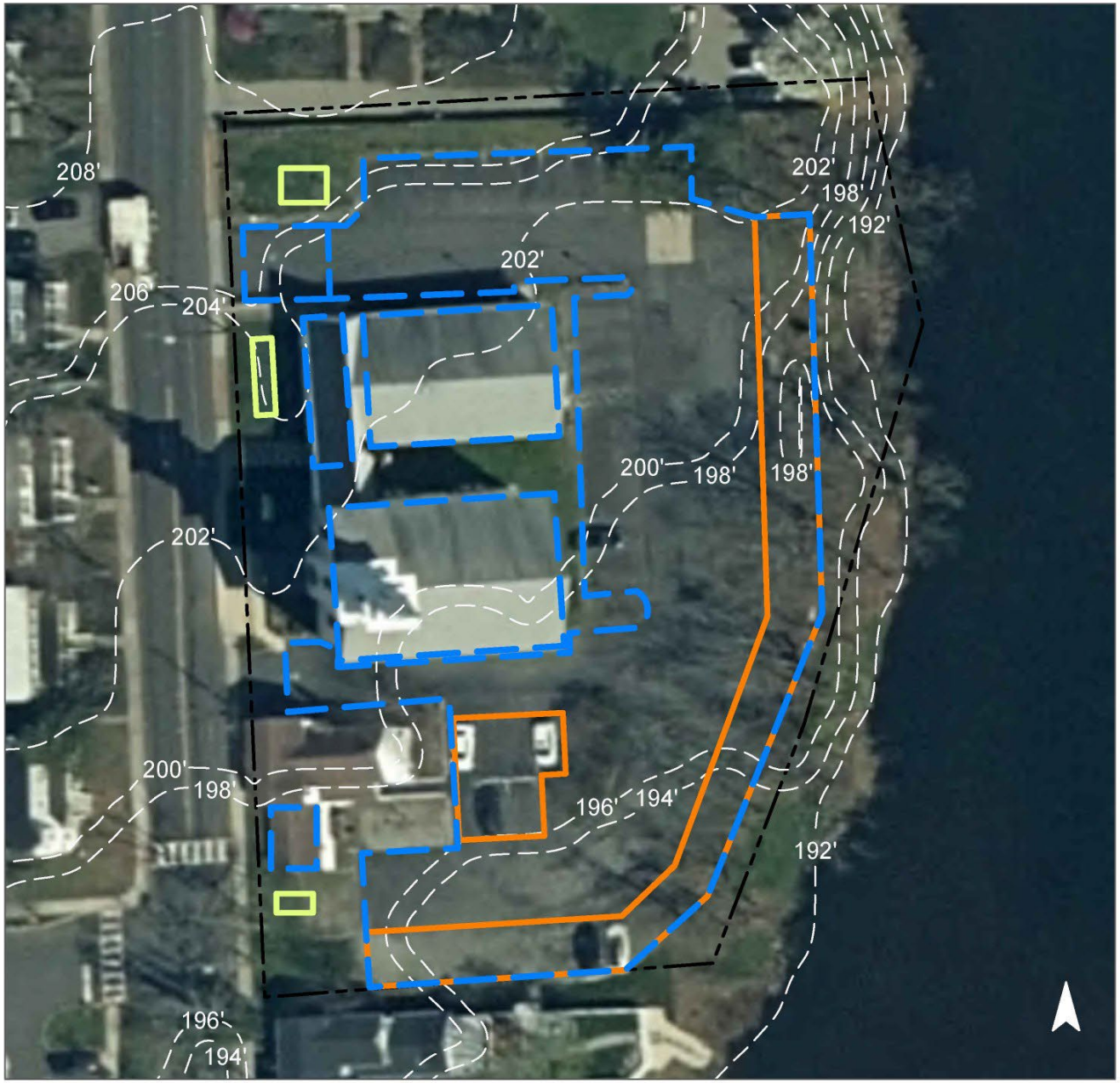
Block and Lot: Block 15, Lot 4

Rain gardens can be installed in multiple grass areas around the property to capture, treat, and infiltrate the stormwater runoff from the asphalt and rooftops. This will require downspout disconnections, trench drains, and curb cuts. Existing parking spaces in the east and south of the lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the asphalt. The pervious pavement will also manage some rooftop runoff, as the connected downspouts on the east of the church building direct runoff to the parking lot. Trench drains will be needed to intercept and redirect some of the parking lot runoff to the pervious pavement. 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 49.4"
79	45,045	2.2	22.7	206.8	0.035	1.39

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	1,605	0.047	8	3,220	0.12	405	$4,050
Pervious pavement	33,220	0.972	144	66,610	2.50	6,965	$174,125

GREEN INFRASTRUCTURE RECOMMENDATIONS



Clinton United Methodist Church

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

0 25' 50'

HUNTERDON ART MUSEUM

RAP ID: 11

Subwatershed: Raritan River South Branch

Site Area: 41,440 sq. ft.

Address: 7 Lower Center Street
Clinton, NJ 08809

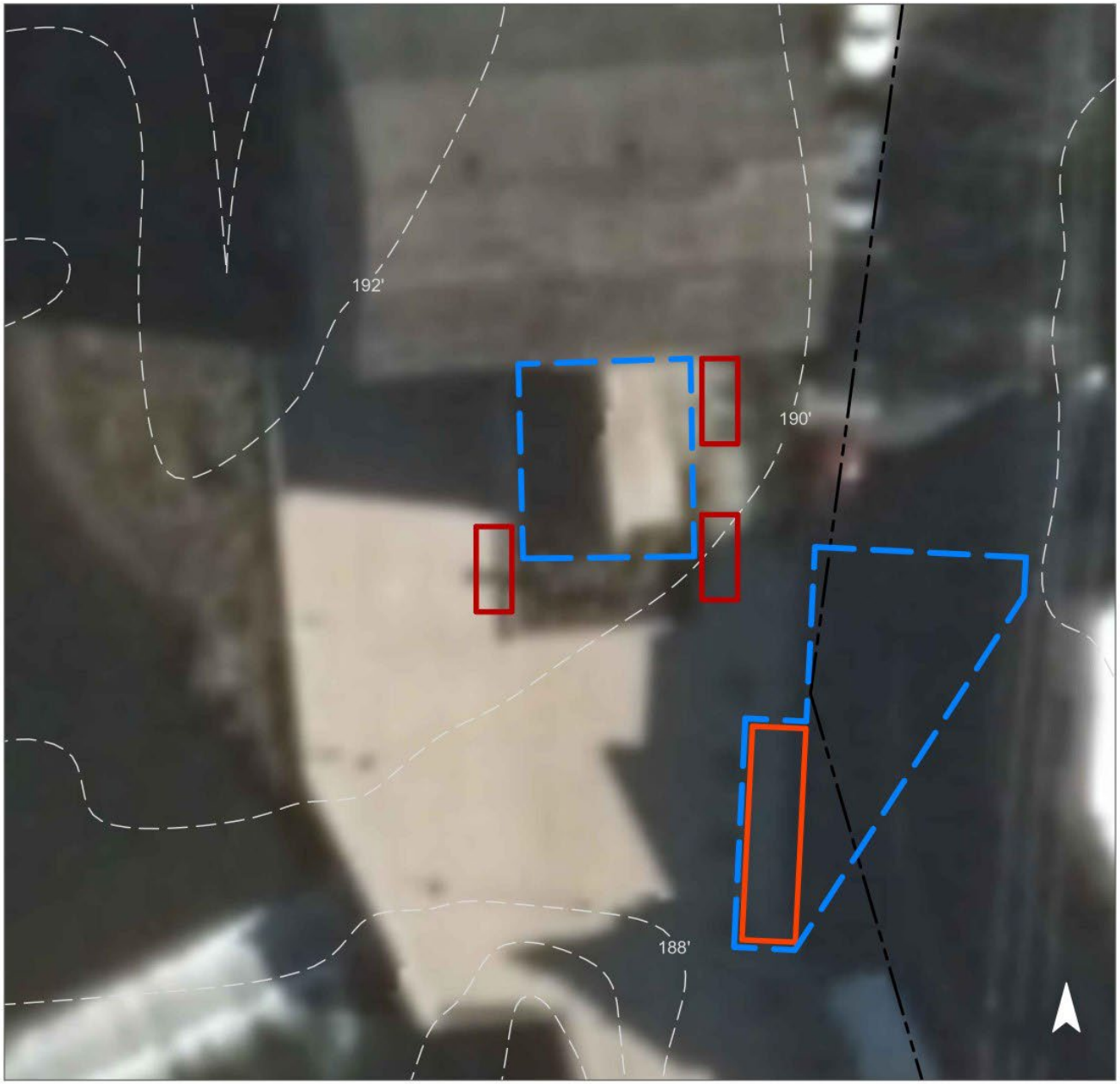
Block and Lot: Block 9, Lot 1

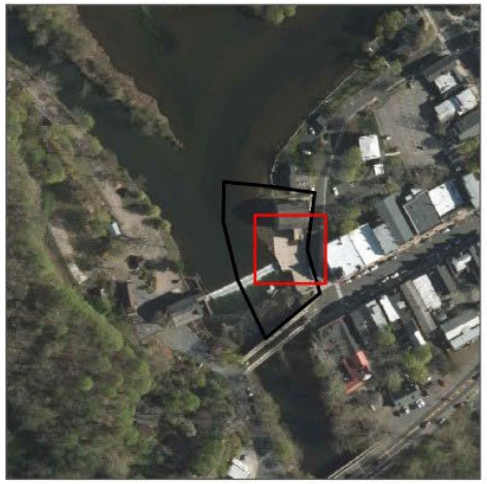
A stormwater planter can be installed in the sidewalk to intercept stormwater runoff from the roadway or sidewalk to allow the stormwater to infiltrate into the ground. Downspout planter boxes can be constructed along the building to allow roof runoff to be reused. A preliminary soil assessment suggests 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"
28	11,704	0.6	5.9	53.7	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
Planter boxes	n/a	2	n/a	n/a	3 (boxes)	$3,000
Stormwater planter	0.025	4	1,890	0.07	240	$90,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Hunterdon Art Museum

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

0 10' 20'

HUNTS MILLS PARK

RAP ID: 12

Subwatershed: Raritan River South Branch

HUC14 ID: 02030105020070

Site Area: 1,587,929 sq. ft.

Address: 32 Haver Farm Road
Clinton, NJ 08809

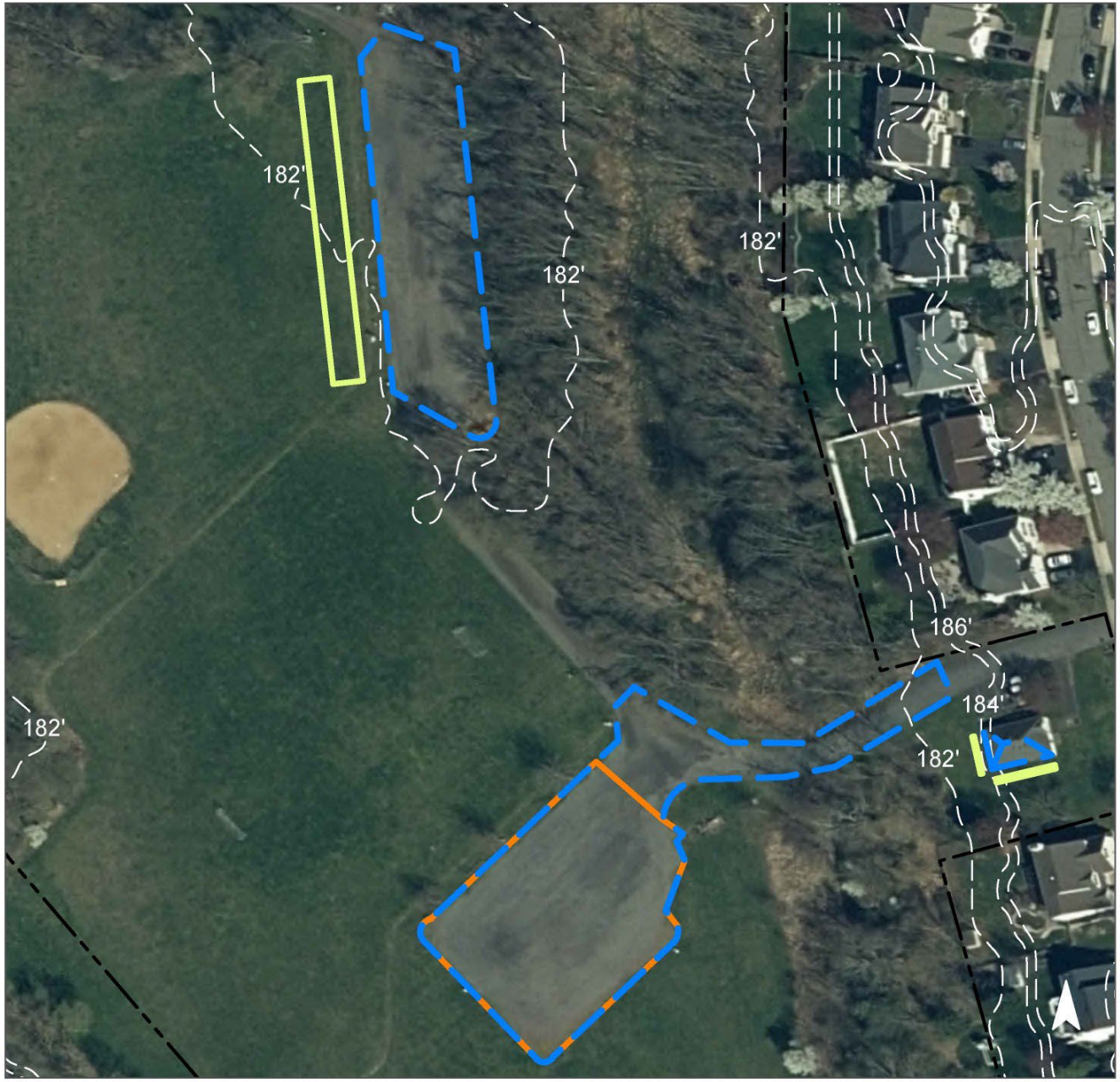
Block and Lot: Block 29, Lot 8

A rain garden can be installed to the west of the northern parking area to capture, treat, and infiltrate the stormwater runoff from the lot. Two rain gardens can be installed near the park building to capture, treat, and infiltrate the stormwater runoff from the rooftop using the disconnected downspouts. The southern parking lot can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the lot and driveway. 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 49.4"
4	69,084	3.3	34.9	317.2	0.054	2.13

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	16,465	0.482	72	33,010	1.24	4,115	$41,150
Pervious pavement	26,635	0.779	116	53,410	2.01	18,990	$474,750

GREEN INFRASTRUCTURE RECOMMENDATIONS



Hunts Mills Park

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

0 50' 100'

NORTH COUNTY BRANCH LIBRARY

RAP ID: 13

Subwatershed: Spruce Run Reservoir / Willoughby Brook

HUC14 ID: 02030105020040

Site Area: 76,533 sq. ft.

Address: 65 Halstead Street
Clinton, NJ 08809

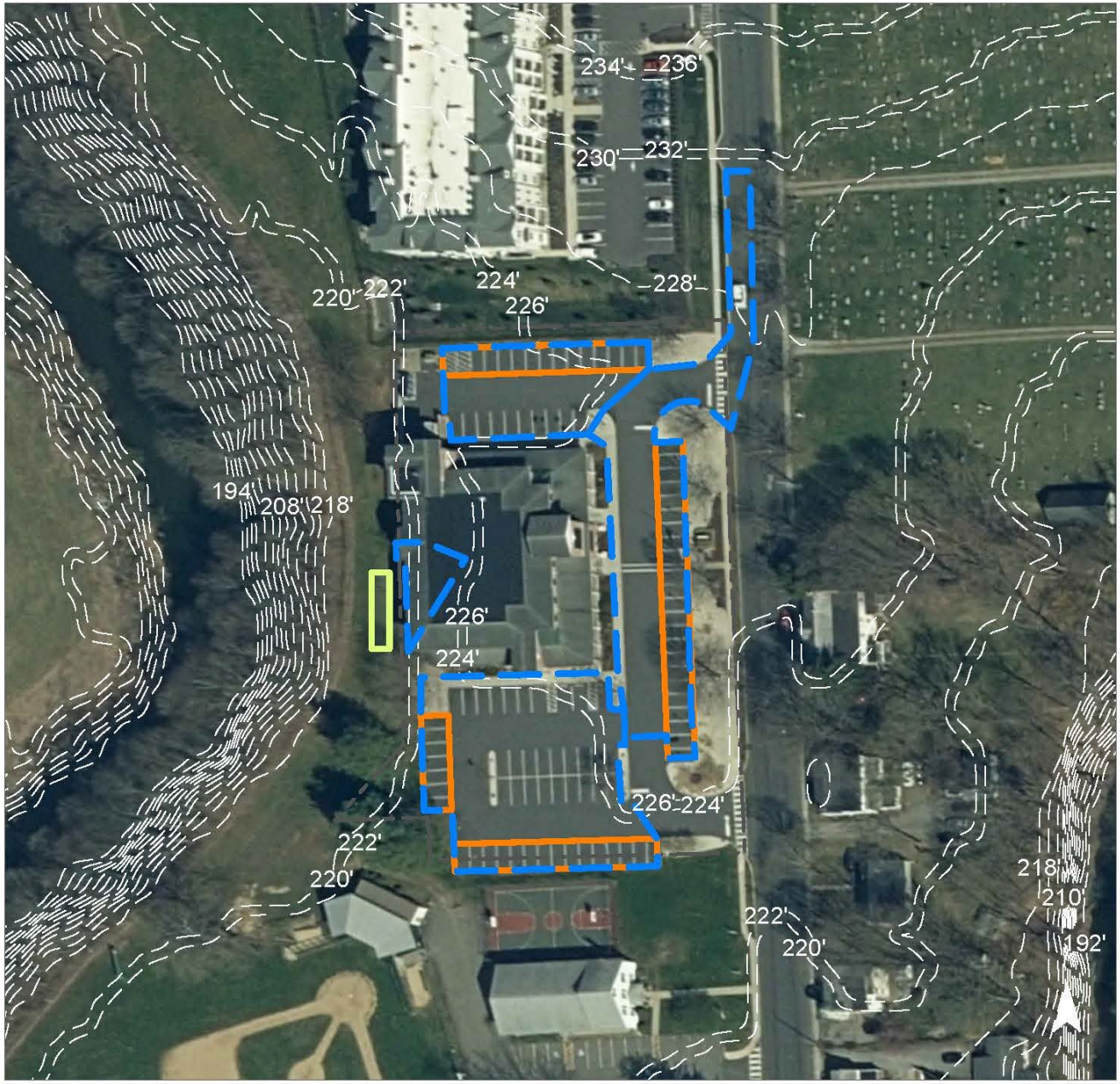
Block and Lot: Block 16, Lot 22.01

A rain garden can be installed to the west of the building near the existing outfall to capture, treat, and infiltrate the stormwater runoff from the rooftop. This will require downspout redirection and disconnections. The parking spaces to the north, east, and south of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the lot and from the road. Trench drains will be needed to intercept and redirect some of the runoff to the pervious pavement. 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 49.4"
90	68,697	3.3	34.7	315.4	0.054	2.12

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	1,555	0.045	8	3,120	0.12	595	$5,950
Pervious pavement	37,930	1.110	165	76,050	2.86	10,205	$255,125

GREEN INFRASTRUCTURE RECOMMENDATIONS



North County Branch Library

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

0 30' 60'

PODIATRIC SURGICAL ASSOCIATES

RAP ID: 14

Subwatershed: Spruce Run Reservoir/Willoughby Brook

Site Area: 27,148 sq. ft.

Address: 122 West Main Street
Clinton, NJ 08809

Block and Lot: Block 1, Lot 1

A proposed rain garden can be installed in the front of the building to aid in infiltration of stormwater from the roof top. A downspout planter box can be installed at the northwestern corner of the building to prevent rooftop stormwater from flowing across the pavement. 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"
69	18,661	0.9	9.4	85.7	0.015	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	0.016	3	1,200	0.05	155	$775
Planter box	n/a	1	n/a	n/a	1 (box)	$1,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

Podiatric Surgical Associates

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

0 20' 40'

TOWN OF CLINTON COMMUNITY CENTER

RAP ID: 15

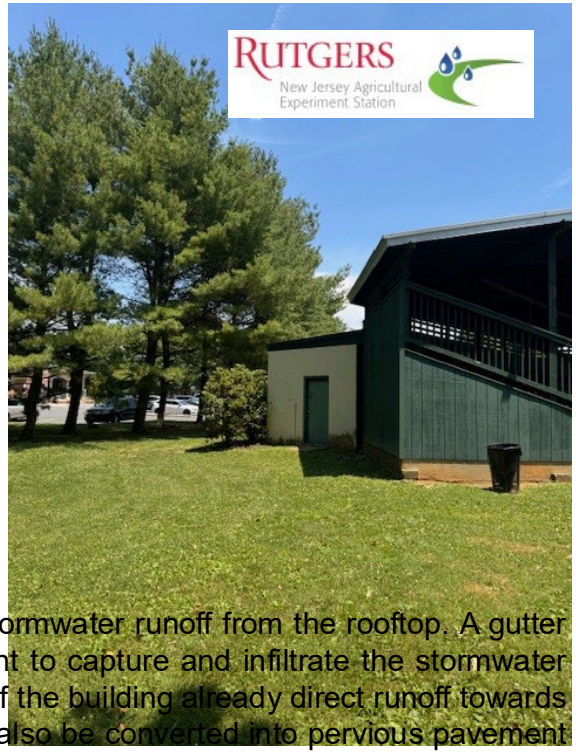
Subwatershed: Spruce Run Reservoir / Willoughby Brook

HUC14 ID: 02030105020040

Site Area: 180,581 sq. ft.

Address: 63 Halstead Street
Clinton, NJ 08809

Block and Lot: Block 16, Lot 21

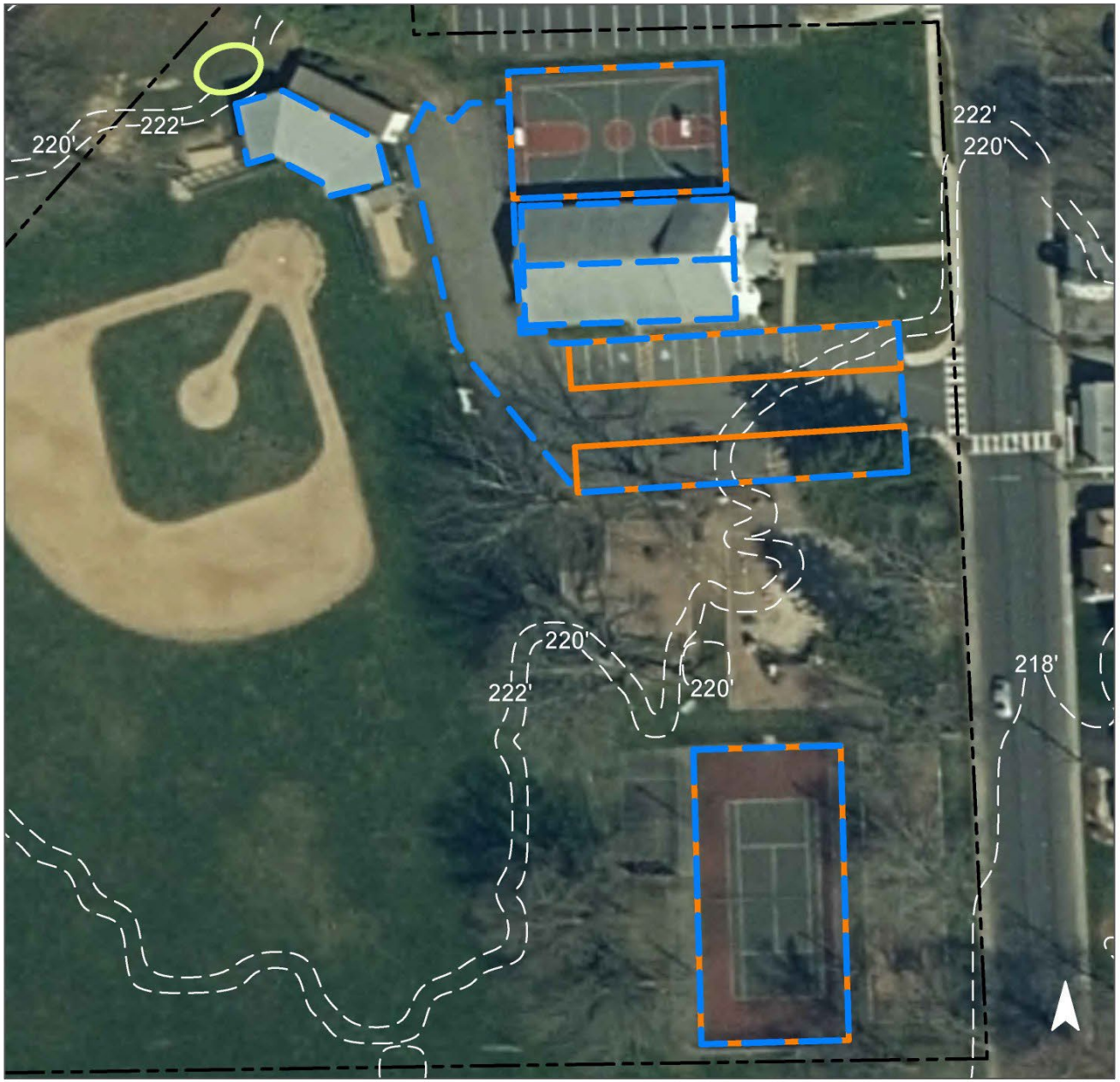


A rain garden can be installed to the west of the bleachers to capture, treat, and infiltrate the stormwater runoff from the rooftop. A gutter system will have to be installed. The basketball court can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the court and from the building rooftop. The disconnected downspouts on the north of the building already direct runoff towards the court, though trench drains or downspout redirection may be needed. The tennis court can also be converted into pervious pavement to capture and infiltrate the stormwater runoff from the court. The parking spaces to the south of the building can be converted into pervious pavement to capture and infiltrate the stormwater runoff from the driveway, the lot, and the rooftop. The disconnected downspouts on the south of the building already direct runoff to the parking lot. Trench drains will be needed to intercept and redirect some of the parking lot runoff to the pervious pavement. 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 49.4"
18	32,140	1.5	16.2	147.6	0.025	0.99

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	1,433	0.042	6	2,870	0.11	360	$3,600
Pervious pavement	26,950	0.788	118	54,040	2.03	15,610	$390,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Town of Clinton Community Center

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

0 30' 60'

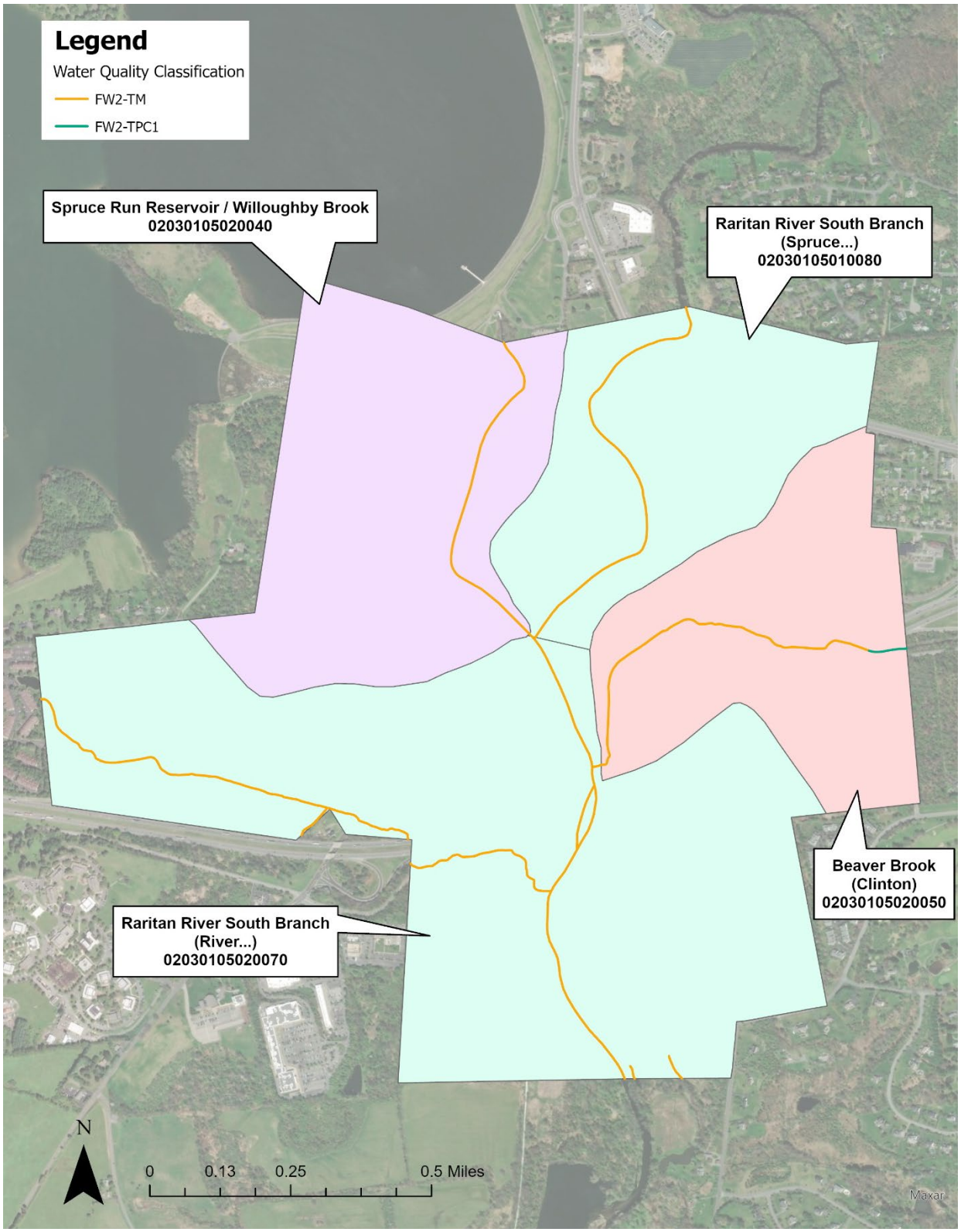


Figure 13. Water Quality Classification of Surface Waters in Clinton Town

Table 10. Water Quality Classification of Surface Waters in Clinton Town

Surface Water Quality Classification	Surface Water Quality Code	Miles	Percent of Municipal Streams
Freshwater 2, trout production, Category One	FW2-TPC1	0.1	2.2%
Freshwater 2, trout maintenance	FW2-TM	4.4	97.8%

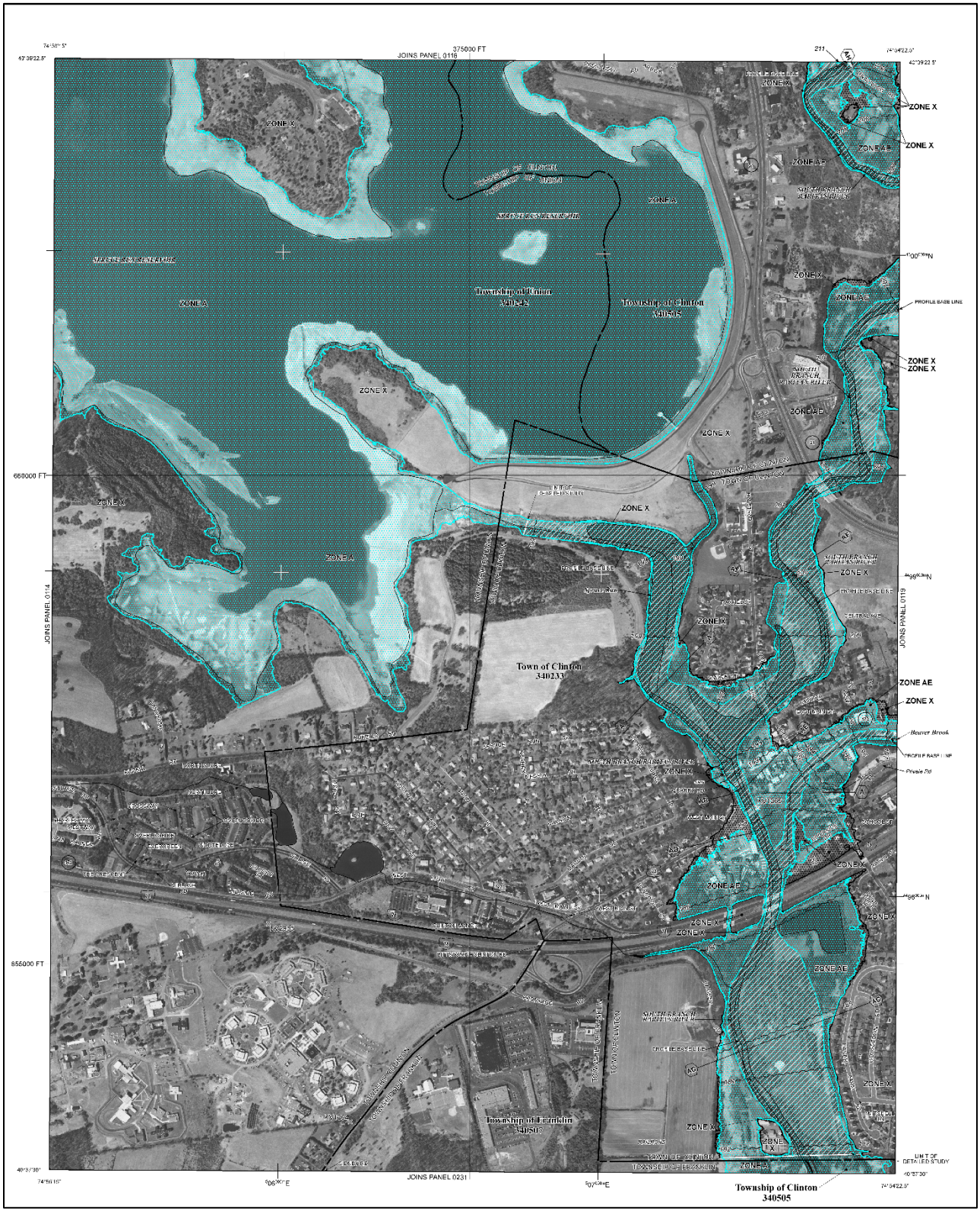


Figure 14. Flood Zones of Clinton Town (FIRM Panel from FEMA)