Green Infrastructure Action Plan
for
Caldwell Borough, Essex County, New Jersey

Prepared for Caldwell Borough by the
Rutgers Cooperative Extension Water Resources Program

April 23, 2020

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Introduction

Located in northwestern Essex County, New Jersey, Caldwell covers approximately 1.17 square miles. Figures 1 and 2 illustrate that Caldwell is dominated by urban land use. A total of 92.3% of the municipality's land use is classified as urban. Of the urban land in Caldwell, medium density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2012 land use/land cover geographical information system (GIS) data layer categorizes Caldwell into many unique land use areas, assigning a percent impervious cover for each delineated area. These impervious cover values were used to estimate the impervious coverage for Caldwell. Based upon the 2012 NJDEP land use/land cover data, approximately 37.9% of Caldwell has impervious cover. This level of impervious cover suggests that the streams in Caldwell are likely non-supporting streams. [1]

Methodology

Caldwell contains portions of two subwatersheds (Figure 4). For this impervious cover reduction action plan, projects have been identified in both of these watersheds. Initially, aerial imagery was used to identify potential project sites that contain extensive impervious cover. Field visits were then conducted at each of these potential project sites to determine if a viable option exists to reduce impervious cover or to disconnect impervious surfaces from draining directly to the local waterway or storm sewer system. During the site visit, appropriate green infrastructure practices for the site were determined. Sites that already had stormwater management practices in place were not considered.

[1] Schuler, T.R., L. Fraley-McNeal, and K. Cappiella. 2009. Is Impervious Cover Still Important? Review of Recent Research. *Journal of Hydrologic Engineering* 14 (4): 309-315.

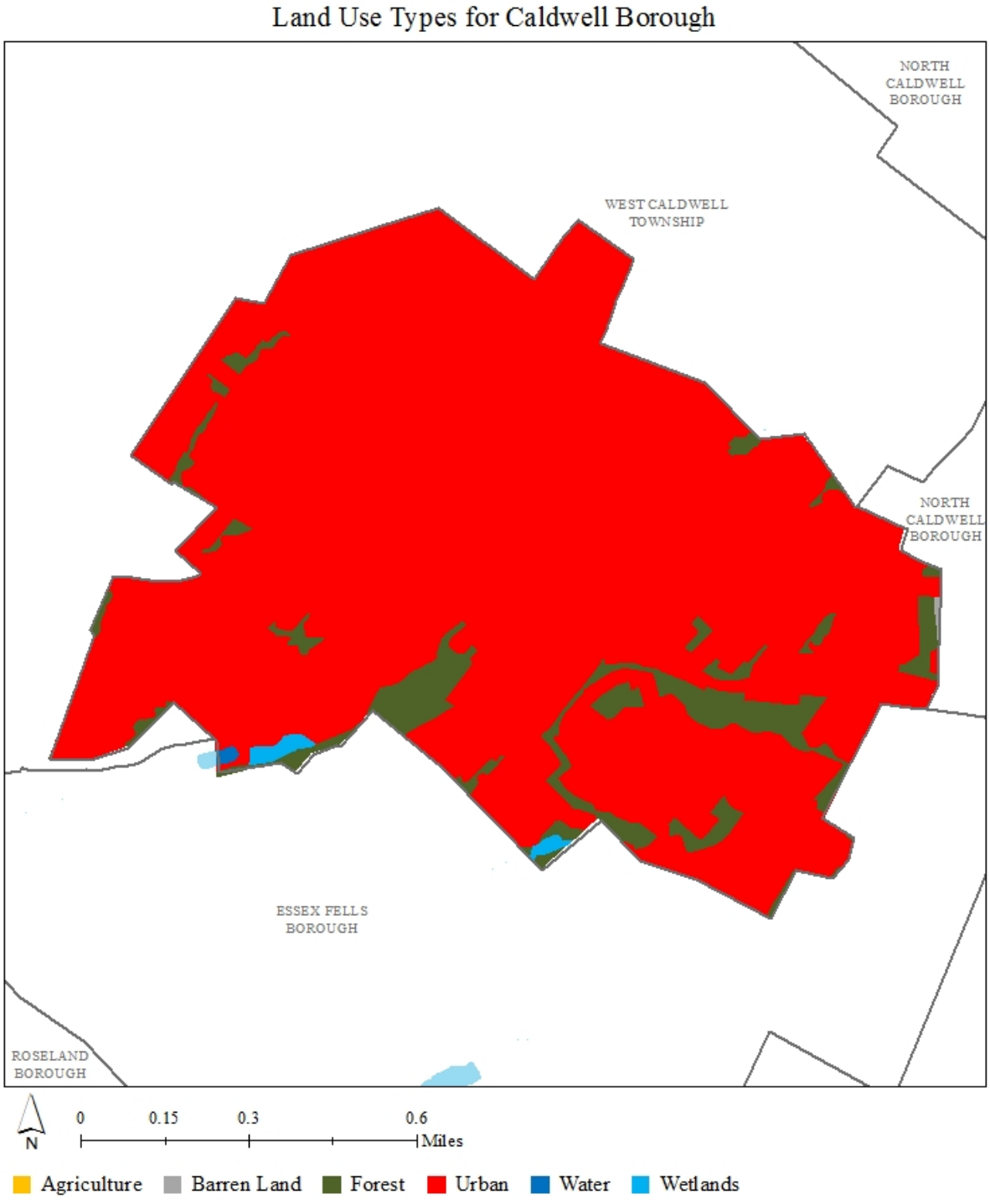


Figure 1: Map illustrating the land use in Caldwell

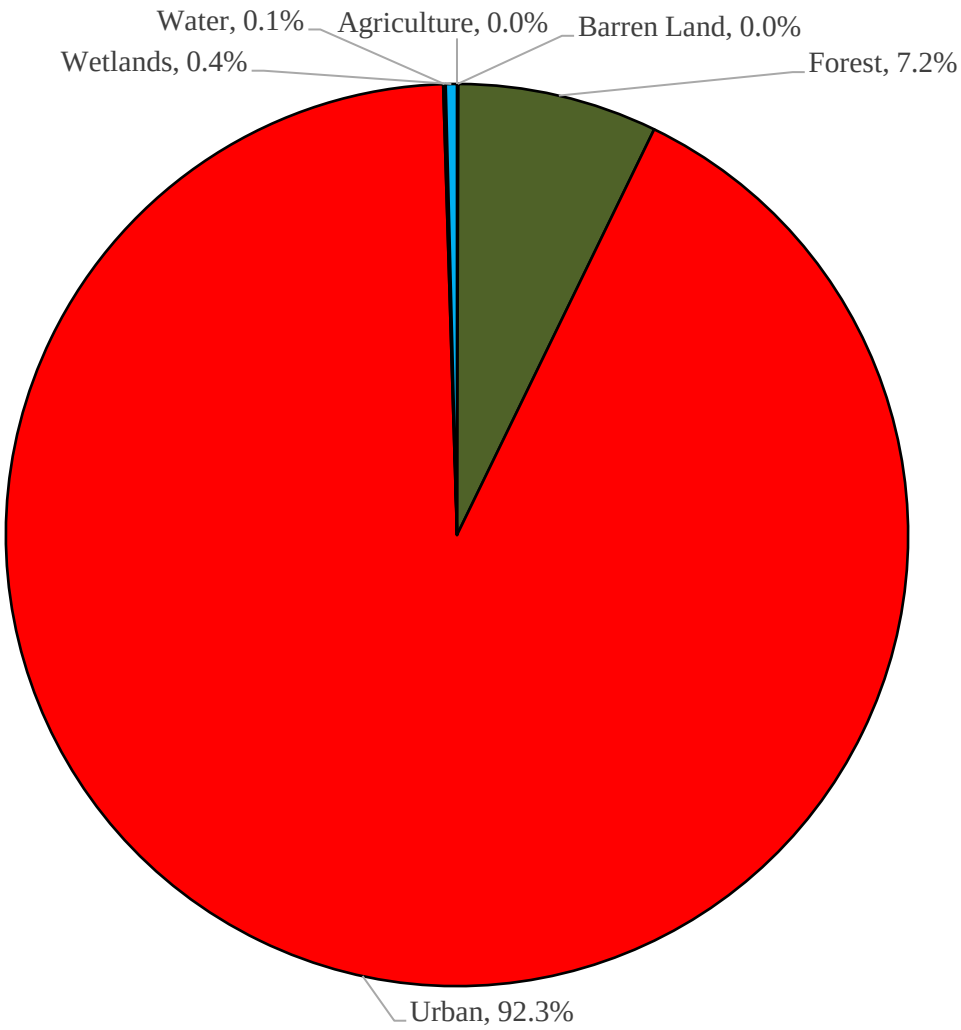


Figure 2: Pie chart illustrating the land use in Caldwell

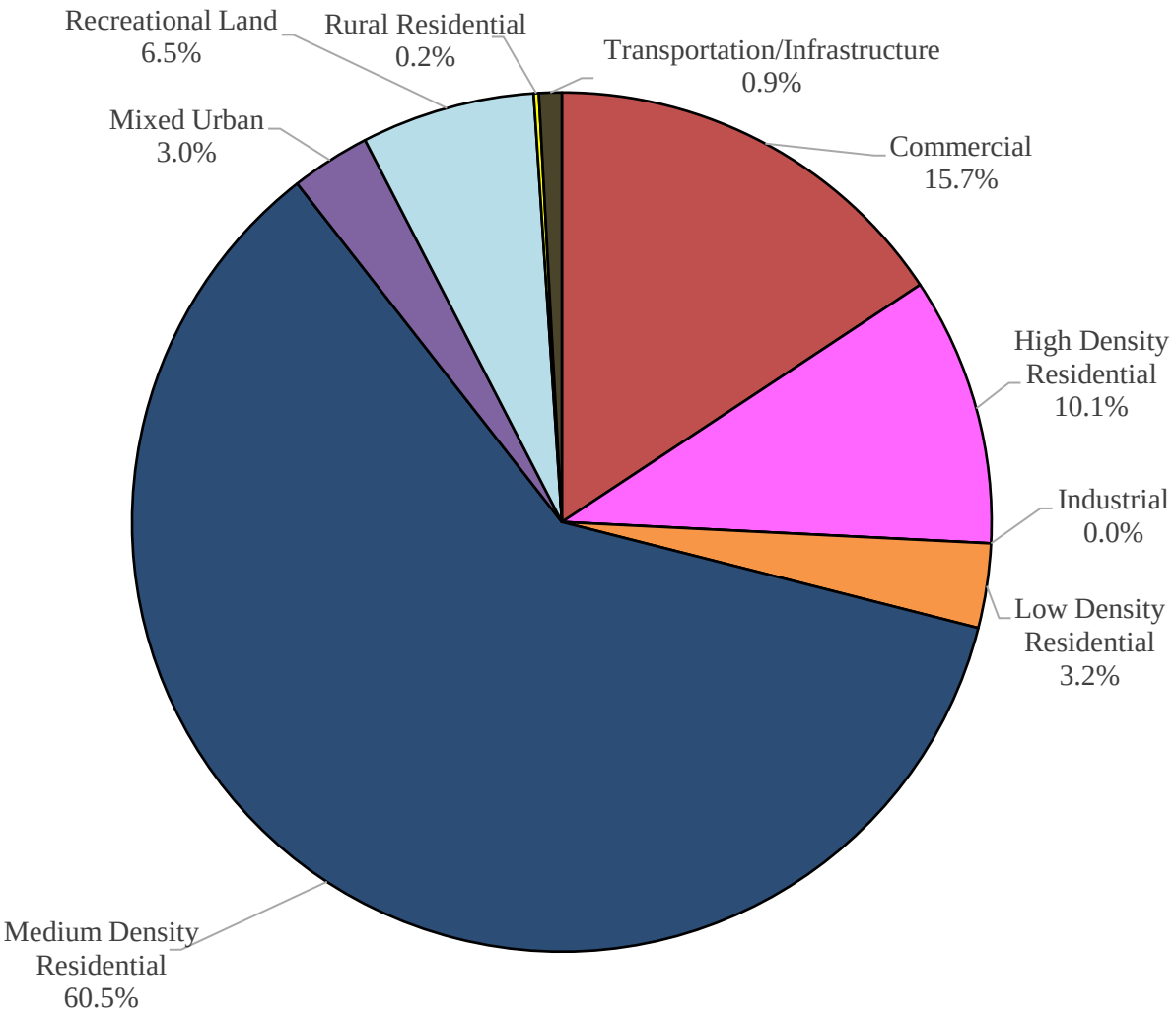


Figure 3: Pie chart illustrating the various types of urban land use in Caldwell

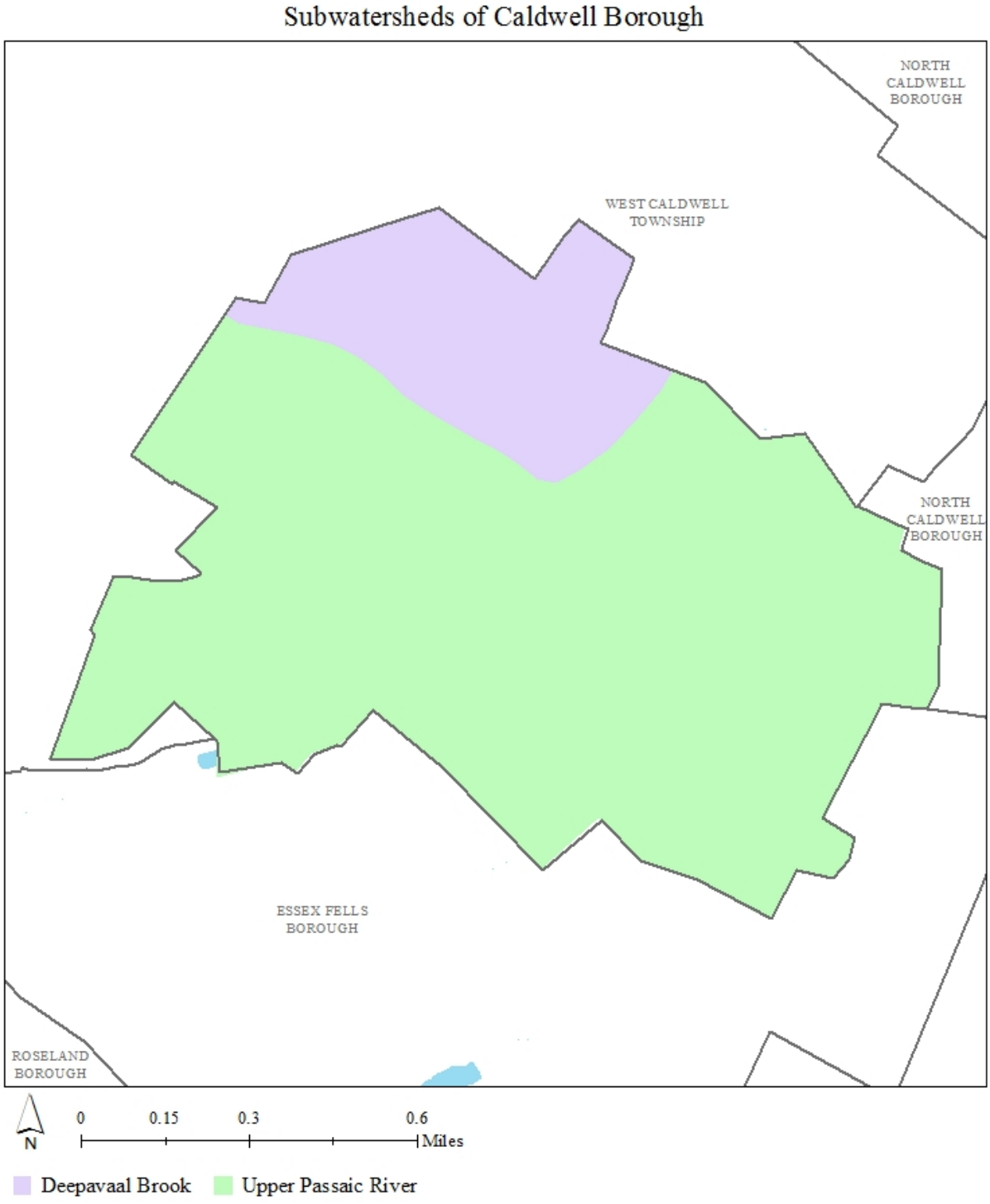


Figure 4: Map of the subwatersheds in Caldwell

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2012 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

Preliminary soil assessments were conducted for each potential project site identified in Caldwell using the United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey, which utilizes regional and statewide soil data to predict soil types in an area. Several key soil parameters were examined (e.g., natural drainage class, saturated hydraulic conductivity of the most limiting soil layer (K_{sat}), depth to water table, and hydrologic soil group) to evaluate the suitability of each site's soil for green infrastructure practices. In cases where multiple soil types were encountered, the key soil parameters were examined for each soil type expected at a site.

For each potential project site, drainage areas were determined for each of the green infrastructure practices proposed at the site. These green infrastructure practices were designed to manage the 2-year design storm, enabling these practices to capture 95% of the annual rainfall. Runoff volumes were calculated for each proposed green infrastructure practice. The reduction in TSS loading was calculated for each drainage area for each proposed green infrastructure practice using the aerial loading coefficients in Table 1. The maximum volume reduction in stormwater runoff for each green infrastructure practice for a storm was determined by calculating the volume of runoff captured from the 2-year design storm. For each green infrastructure practice, peak discharge reduction potential was determined through hydrologic modeling in HydroCAD. For each green infrastructure practice, a cost estimate is provided. These costs are based upon the square footage of the green infrastructure practice and the real cost of green infrastructure practice implementation in New Jersey.

Table 1: Aerial Loading Coefficients[2]

Land Cover	TP load (lbs/acre/yr)	TN load (lbs/acre/yr)	TSS load (lbs/acre/yr)
High, Medium Density Residential	1.4	15	140
Low Density, Rural Residential	0.6	5	100
Commercial	2.1	22	200
Industrial	1.5	16	200
Urban, Mixed Urban, Other Urban	1.0	10	120
Agriculture	1.3	10	300
Forest, Water, Wetlands	0.1	3	40
Barrenland/Transitional Area	0.5	5	60

[2] New Jersey Department of Environmental Protection (NJDEP), Stormwater Best Management Practice Manual, 2004.

Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general principal, green infrastructure practices use soil and vegetation to recycle stormwater runoff through infiltration and evapotranspiration. When used as components of a stormwater management system, green infrastructure practices such as bioretention, green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these practices can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits[3]. A wide range of green infrastructure practices have been evaluated for the potential project sites in Caldwell. Each practice is discussed below.

Disconnected downspouts

This is often referred to as simple disconnection. A downspout is simply disconnected, prevented from draining directly to the roadway or storm sewer system, and directed to discharge water to a pervious area (i.e., lawn).

Pervious pavements

There are several types of permeable pavement systems including porous asphalt, pervious concrete, permeable pavers, and grass pavers. These surfaces are hard and support vehicle traffic but also allow water to infiltrate through the surface. They have an underlying stone layer to store stormwater runoff and allow it to slowly seep into the ground.

[3] United States Environmental Protection Agency (USEPA), 2013. Watershed Assessment, Tracking, and Environmental Results, New Jersey Water Quality Assessment Report. http://ofmpub.epa.gov/waters10/attains_state.control?p_state=NJ

Bioretention systems/rain gardens

These are landscaped features that are designed to capture, treat, and infiltrate stormwater runoff. These systems can easily be incorporated into existing landscapes, improving aesthetics and creating wildlife habitat while managing stormwater runoff. Bioretention systems also can be used in soils that do not quickly infiltrate by incorporating an underdrain into the system.

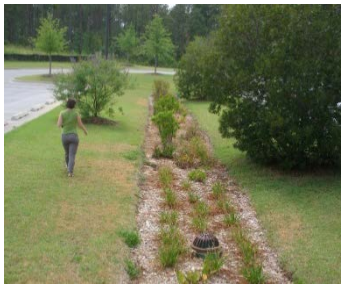
Downspout planter boxes

These are wooden boxes with plants installed at the base of a downspout that provide an opportunity to beneficially reuse rooftop runoff.

Rainwater harvesting systems (cistern or rain barrel)

These systems capture rainwater, mainly from rooftops, in cisterns or rain barrels. The water can then be used for watering gardens, washing vehicles, or for other non-potable uses.

Bioswale



Bioswales are landscape features that convey stormwater from one location to another while removing pollutants and providing water an opportunity to infiltrate.

Stormwater planters

Stormwater planters are vegetated structures that are built into the sidewalk to intercept stormwater runoff from the roadway or sidewalk. Many of these planters are designed to allow the water to infiltrate into the ground while others are designed simply to filter the water and convey it back into the stormwater sewer system.

Tree filter boxes

These are pre-manufactured concrete boxes that contain a special soil mix and are planted with a tree or shrub. They filter stormwater runoff but provide little storage capacity. They are typically designed to quickly filter stormwater and then discharge it to the local sewer system.

Potential Project Sites

Appendix A contains information on potential project sites where green infrastructure practices could be installed as well as information on existing site conditions. The recommended green infrastructure practices and the drainage area that the green infrastructure practices can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, the peak reduction potential, and estimated costs are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

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

Funding Strategy, Implementation Agenda, and Community Engagement

Caldwell will create a green infrastructure subcommittee of the green team that meets monthly to discuss opportunities for projects and coordinates the implementation of projects. Much of the implementation thus far has been a function of the availability of the municipality's public works department. The goal is to install five to ten projects per year and possibly increase this number as funding becomes available. Projects can be designed throughout the year with most being installed in the spring, summer, and fall. These are exciting times for Caldwell as they hope to be on the forefront of the green infrastructure movement.

Funding Sources

The first source of funding will be provided by Caldwell from the capital improvement fund and tree fund. Caldwell is committed to implementing green infrastructure throughout the municipality and is currently partnering with the Rutgers Cooperative Extension (RCE) Water Resources Program on a municipal-wide green infrastructure initiative. The RCE Water Resources Program is designing green infrastructure projects and overseeing their implementation. Additionally, the RCE Water Resources Program has trained the public works staff to install and maintain rain gardens. They have already successfully installed rain gardens at the municipal building.

The second source of funding will be provided by volunteers as part of their effort to participate in the municipality's green infrastructure initiative. For example, in the past a Boy Scout helped with a rain garden at the high school as part of his Eagle Scout project, and a Girl Scout installed one at the intermediate school as part of her Gold Award project. These scouts organized groups of volunteers (mostly other scouts and their parents) to help construct the rain gardens. The scouts also conducted fund raising to purchase plants for each rain garden. There are other community groups that are interested in participating in the green infrastructure initiative that can provide labor and funding for supplies.

The third source of funding would be through local, state, and federal grant programs. The NJDEP provides some grant funding for stormwater management projects. Other groups like the National Fish and Wildlife Foundation, US Environmental Protection Agency, Sustainable Jersey, and ANJEC (Association of New Jersey Environmental Commissions) have also provided grant

funding for stormwater management projects in the past. Private foundations could be another source of funding for designing and building green infrastructure projects.

The final possible source of funding is the New Jersey Water Bank (formerly known as the Environmental Infrastructure Trust) Financing Program. This program provides low interest loans for water projects. Caldwell could seek funding from the New Jersey Water Bank for green infrastructure projects.

Incentive Programs

Although Caldwell has been focusing on implementing green infrastructure projects on municipally owned property, Caldwell may pursue a rain garden rebate program to install rain gardens throughout the municipality. The environmental commission and green team will seek funding for this initiative. As the green infrastructure initiative moves forward, there will be opportunities to provide additional incentive programs for homeowners and businesses to participate in the effort.

As stormwater utilities become a reality in New Jersey, there may also be opportunities to offer incentives to homeowners and businesses to install green infrastructure. A stormwater utility can provide a reduced utility fee to property owners that have installed green infrastructure. A stormwater utility program can also provide direct funding to property owners to install green infrastructure.

Short-term Goal

The short-term goal of Caldwell's green infrastructure initiative is to manage stormwater runoff from 5% (or 14.4 acres) of the impervious surfaces in the municipality within the next five years. This goal is highly dependent on securing adequate funding for the implementation of green infrastructure projects.

Conclusion

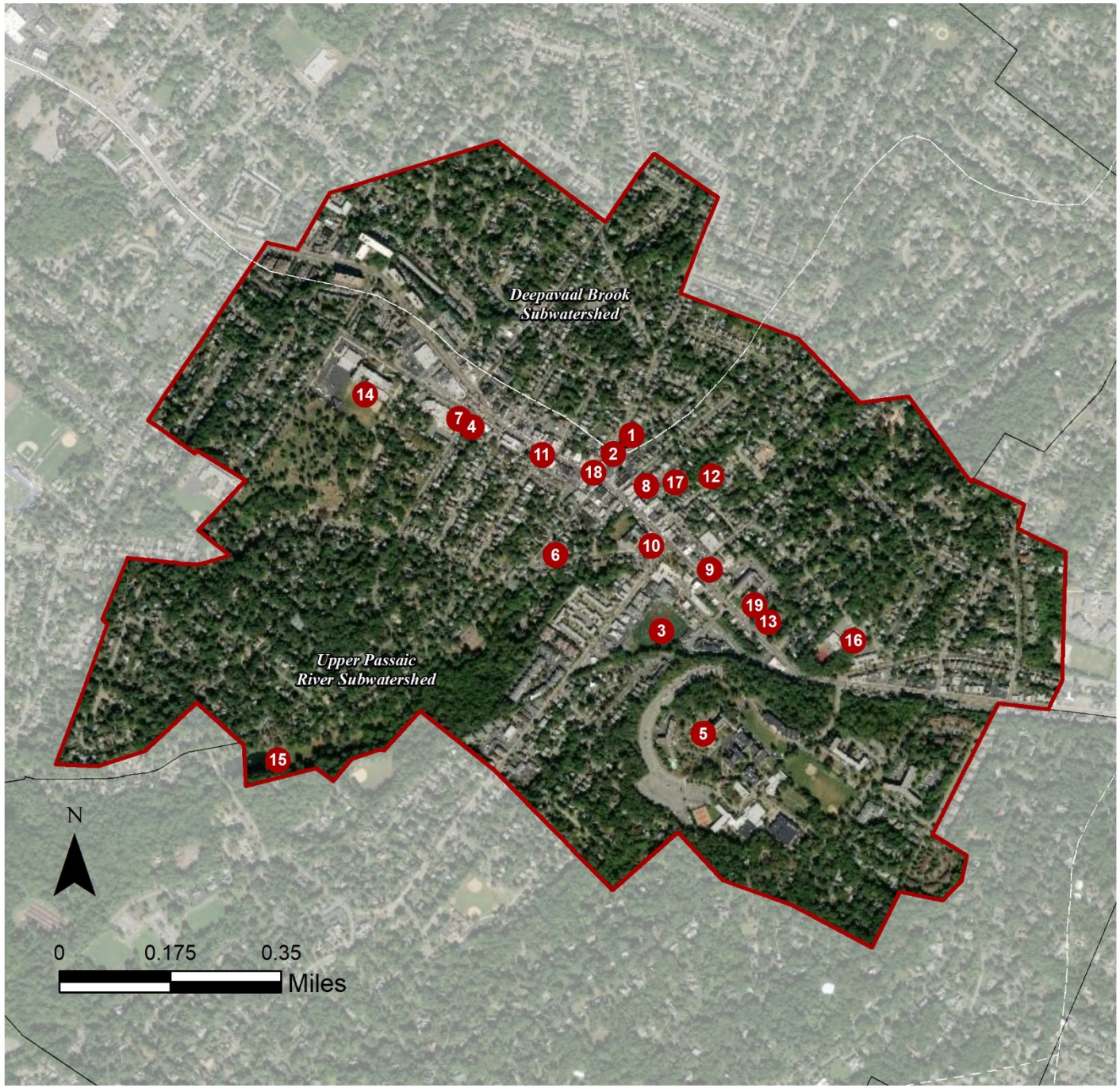
This green infrastructure action plan and strategic plan is meant to provide the municipality with a blueprint for implementing green infrastructure practices that will reduce the impact of stormwater runoff from impervious surfaces. These projects can be implemented by a wide variety of people such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

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

Appendix A: Climate Resilient Green Infrastructure

a. Green Infrastructure Sites

CALDWELL BOROUGH: GREEN INFRASTRUCTURE SITES



SITES WITHIN THE DEEPAVAAL BROOK SUBWATERSHED

1. Grover Cleveland Center for Senior Citizens
2. United States Postal Service

SITES WITHIN THE UPPER PASSAIC RIVER SUBWATERSHED

3. Caldwell Municipal Complex
4. Caldwell United Methodist Church
5. Caldwell University
6. Center For Spiritual Living North Jersey
7. Congregation Agudath Israel
8. Essex Lodge No. 7
9. First Baptist Church
10. First Presbyterian Church
11. Gould Place & Bloomfield Avenue Right of Way
12. Green Acres: 27 Personette Street
13. Grover Cleveland Birthplace
14. Grover Cleveland Middle School
15. Grover Cleveland Park
16. Lincoln Elementary School
17. Municipal Parking Lot
18. Park Avenue & Bloomfield Avenue Right of Way
19. Saint Aloysius Roman Catholic Church

b. Proposed Green Infrastructure Concepts

GROVER CLEVELAND CENTER FOR SENIOR CITIZENS

Subwatershed: Deepavaal Brook

Site Area: 5,707 sq. ft.

Address: 14 Park Avenue
Caldwell, NJ 07006

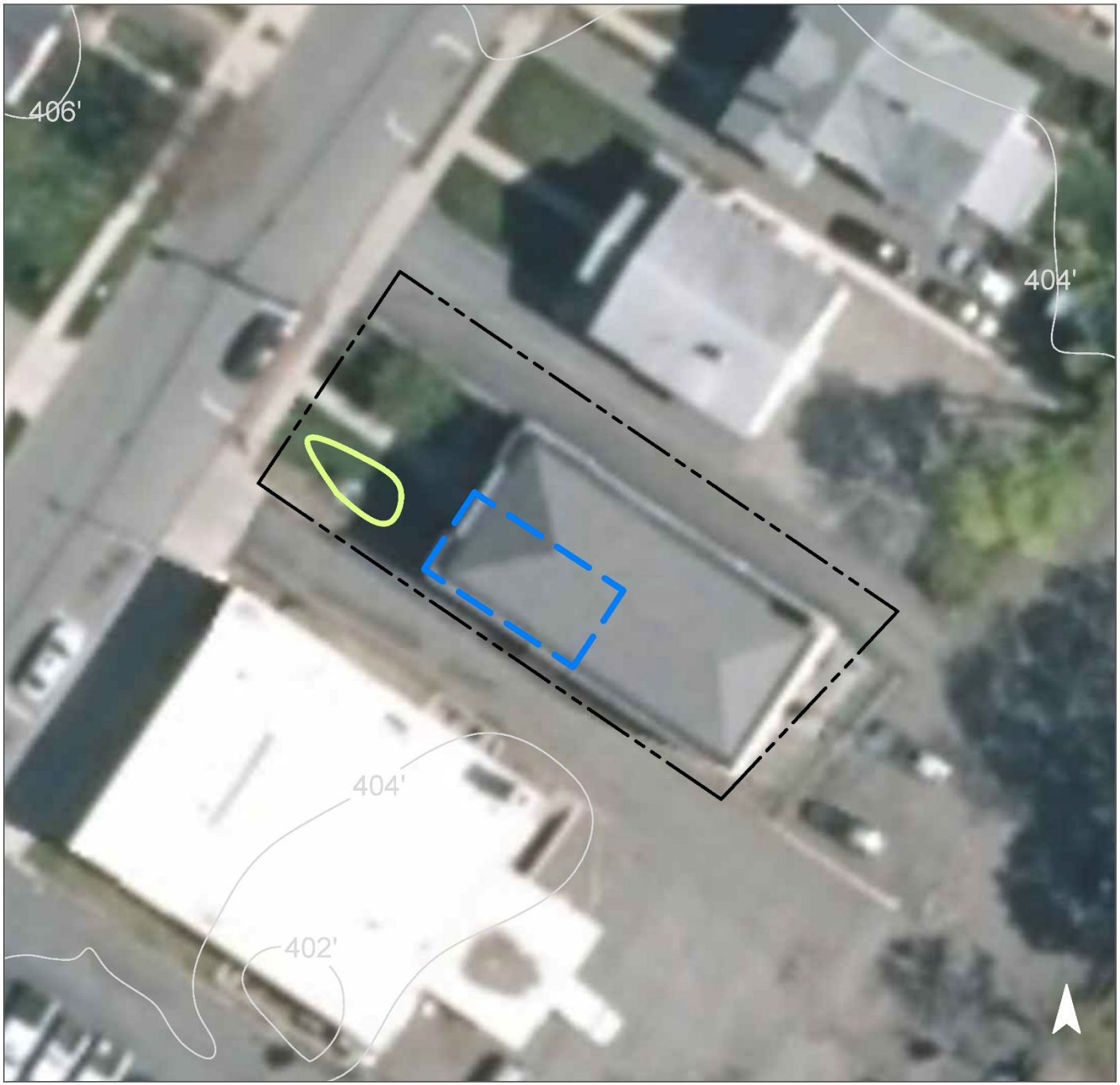
Block and Lot: Block 23, Lot 9.03

A rain garden can be installed at the front of the building around the flag pole by disconnecting the downspout from the corner of the building into the garden. 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"
95	5,422	0.3	2.7	24.9	0.004	0.15

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	1,240	0.05	160	$800

GREEN INFRASTRUCTURE RECOMMENDATIONS



Grover Cleveland Center for Senior Citizens

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

0 15' 30'

UNITED STATES POSTAL SERVICE

Subwatershed: Deepavaal Brook

Site Area: 28,614 sq. ft.

Address: 10 Park Avenue
Caldwell, NJ 07006

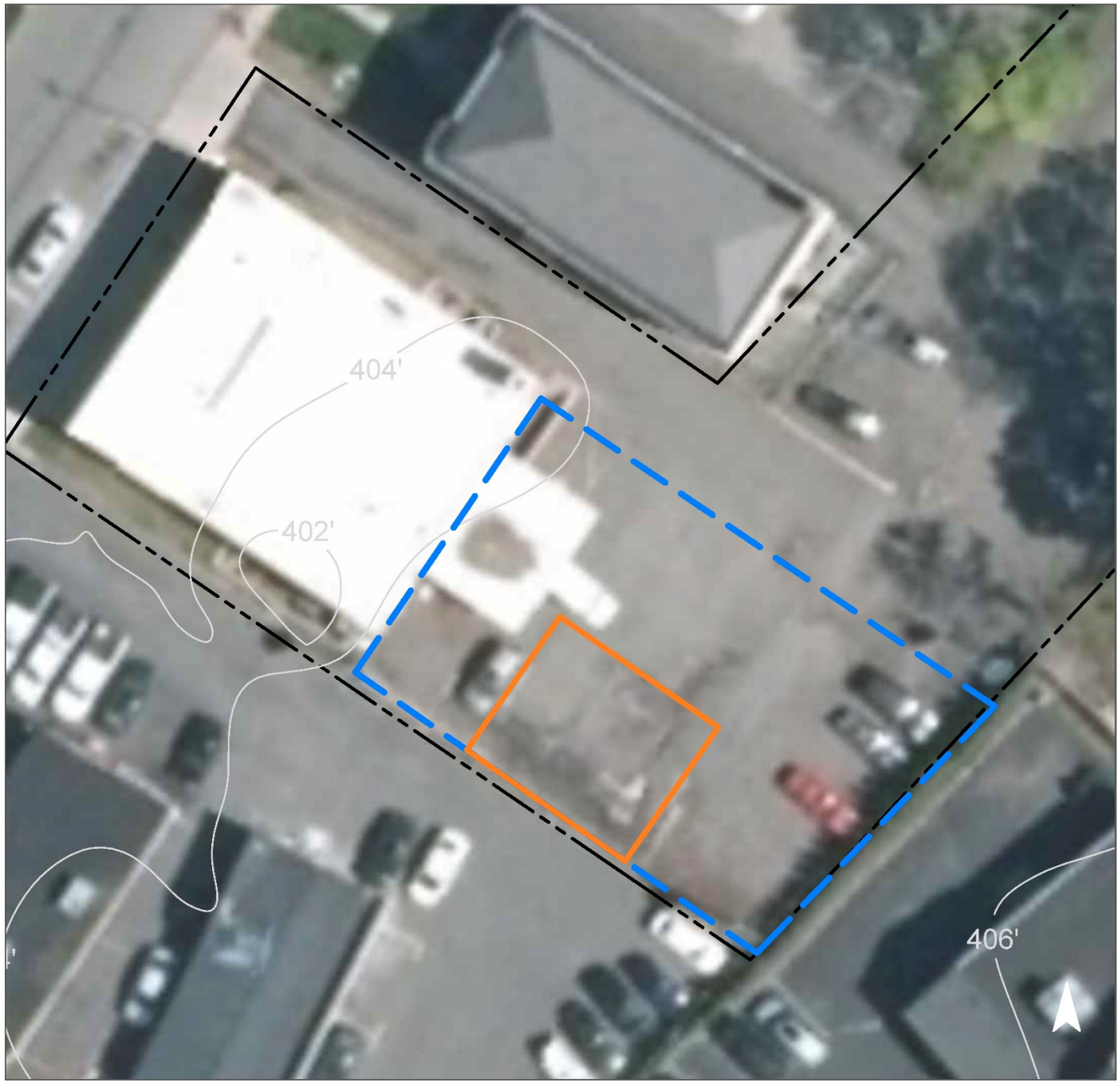
Block and Lot: Block 23, Lot 9.03, 9.04

Parking spaces in the parking lot at the back of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Porous pavement can also help drain the large pooling area of 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"
94	27,015	1.3	13.6	124.0	0.021	0.74

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	0.175	29	13,260	0.50	1,200	$30,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



United States Postal Service

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

0 15' 30'

CALDWELL MUNICIPAL COMPLEX

Subwatershed: Upper Passaic River

Site Area: 343,616 sq. ft.

Address: 1 Provost Square
Caldwell, NJ 07006

Block and Lot: Block 56, Lot 1, 2, 3, 10.01, 10.02, 0.03, 10.06, 17

Several rain gardens can be installed in the turfgrass area around the municipal complex to capture, treat, and infiltrate stormwater runoff from the field and help reported flooding in the area. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
90	307,669	14.8	155.4	1,412.6	0.240	8.44

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.179	30	13,540	0.51	1,715	$8,575

GREEN INFRASTRUCTURE RECOMMENDATIONS

Caldwell Municipal Complex

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

0 75' 150'

CALDWELL UNITED METHODIST CHURCH

Subwatershed: Upper Passaic River

Site Area: 47,735 sq. ft.

Address: 8 Academy Road
Caldwell, NJ 07006

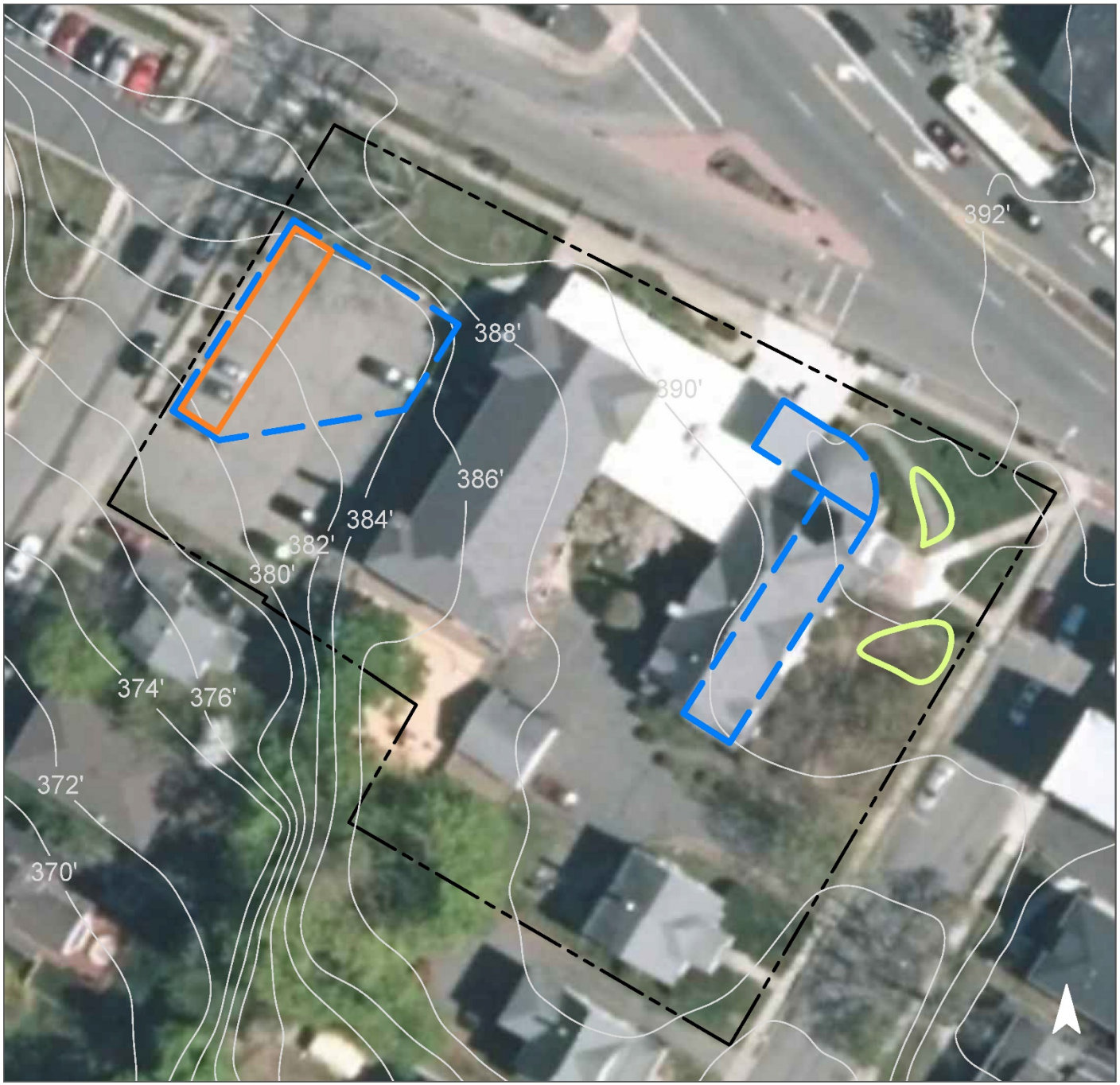
Block and Lot: Block 50, Lot 29, 30, 31.01

Parking spaces can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Rain gardens can be installed in the turfgrass areas at the eastern side of the building to capture, treat, and infiltrate stormwater runoff from the roof if the downspouts are disconnected. 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"
70	33,277	1.6	16.8	152.8	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
Bioretention systems	0.059	10	4,500	0.17	575	$2,875
Pervious pavement	0.099	17	7,480	0.28	1,330	$33,250

GREEN INFRASTRUCTURE RECOMMENDATIONS



Caldwell United Methodist Church

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

0 25' 50'

CALDWELL UNIVERSITY

Subwatershed: Upper Passaic River

Site Area: 2,782,378 sq. ft.

Address: 3 Ryerson Avenue
Caldwell, NJ 07006

Block and Lot: Block 57; 60 Lot 5; 3, 3.01, 3.02, 3.03

A rain garden can be installed in the turfgrass areas adjacent to various buildings to capture, treat, and infiltrate stormwater runoff from the roof. Another rain garden can also installed toward the northeast, adjacent to the driveway, to capture runoff by installing curb cuts. Parking spaces can be converted to porous pavement to capture large portions of runoff from the parking lots. 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"
36	996,020	48.0	503.0	4,573.1	0.776	27.32

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	0.366	61	27,710	1.04	4,300	$21,500
Pervious pavement	2.008	336	152,090	5.72	15,900	$397,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Caldwell University

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

0 100' 200'

CENTER FOR SPIRITUAL LIVING NORTH JERSEY

Subwatershed: Upper Passaic River

Site Area: 14,915 sq. ft.

Address: 31 Westville Avenue
Caldwell, NJ 07006

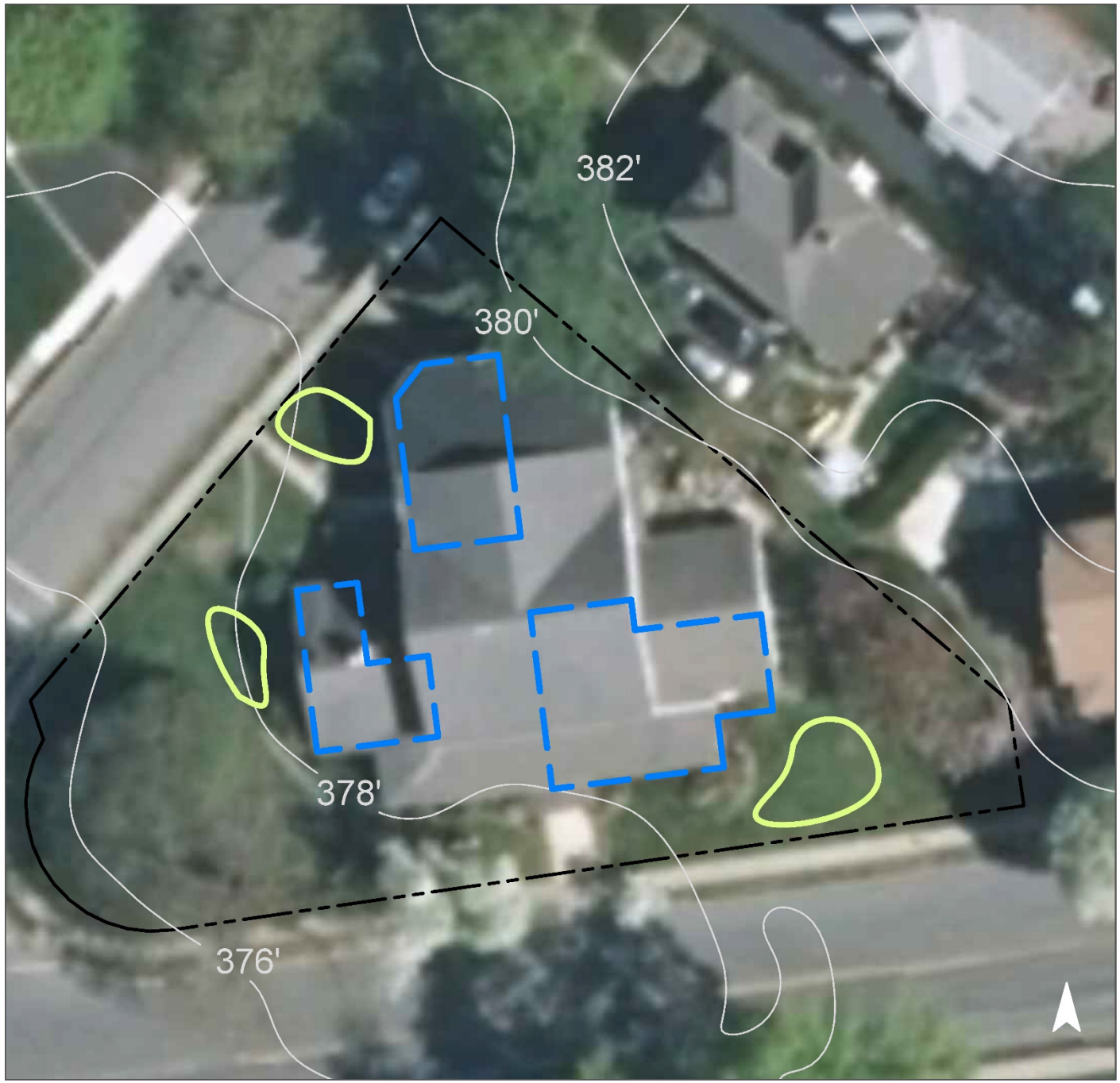
Block and Lot: Block 53, Lot 7

A rain garden can be installed in the turfgrass area near the downspouts of the southeast corner near the entrance of the building to capture, treat, and infiltrate stormwater runoff from the roof. Two other rain gardens can be installed along the west end of the building by redirecting downspouts into the gardens. 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"
30	4,475	0.2	2.3	20.5	0.003	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 systems	0.062	10	4,670	0.18	600	$3,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Center for Spiritual Living North Jersey

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

0 15' 30'

CONGREGATION AGUDATH ISRAEL

Subwatershed: Upper Passaic River

Site Area: 103,306 sq. ft.

Address: 20 Academy Road
Caldwell, NJ 07006

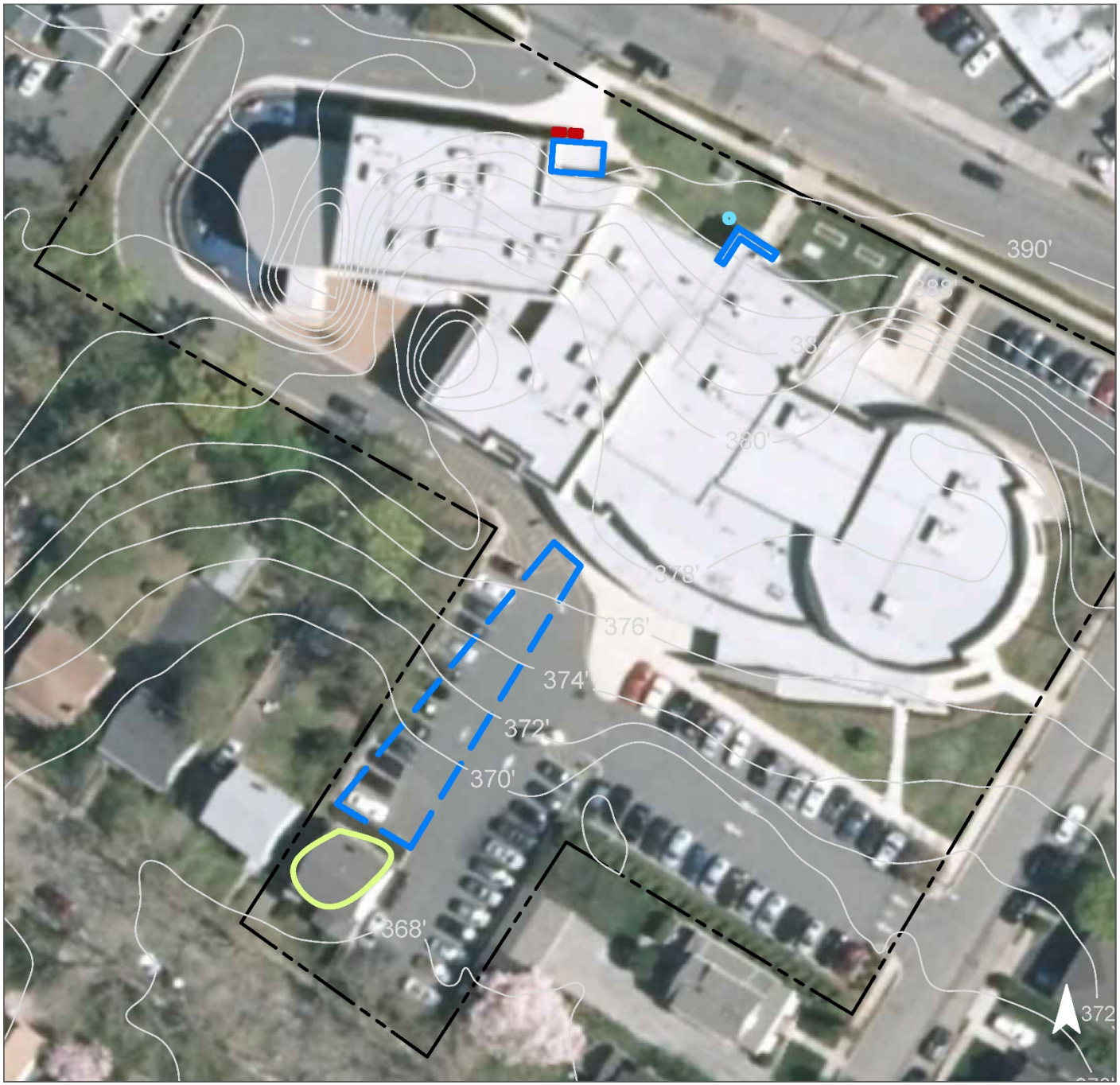
Block and Lot: Block 43.01, Lot 9.11, 9.12, 12, 13, 13.01, 13.02, 14, 15, 16, 17

A rain garden can be installed in the parking lot island to capture, treat, and infiltrate stormwater runoff from the parking lot by installing curb cuts. Downspout planter boxes can be used to capture stormwater from downspouts around the building. A rain barrel can be installed to harvest rainwater for use in the garden. 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"
86	89,314	4.3	45.1	410.1	0.070	2.45

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	0.081	14	6,120	0.23	775	$3,875
Planter boxes	n/a	1	n/a	n/a	2 (boxes)	$2,000
Rainwater harvesting	0.002	0	70	0.00	70 (gal)	$140

GREEN INFRASTRUCTURE RECOMMENDATIONS



Congregation Agudath Israel

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

0 30' 60'

ESSEX LODGE NO. 7

Subwatershed: Upper Passaic River

Site Area: 9,945 sq. ft.

Address: 8 Smull Avenue
Caldwell, NJ 07006

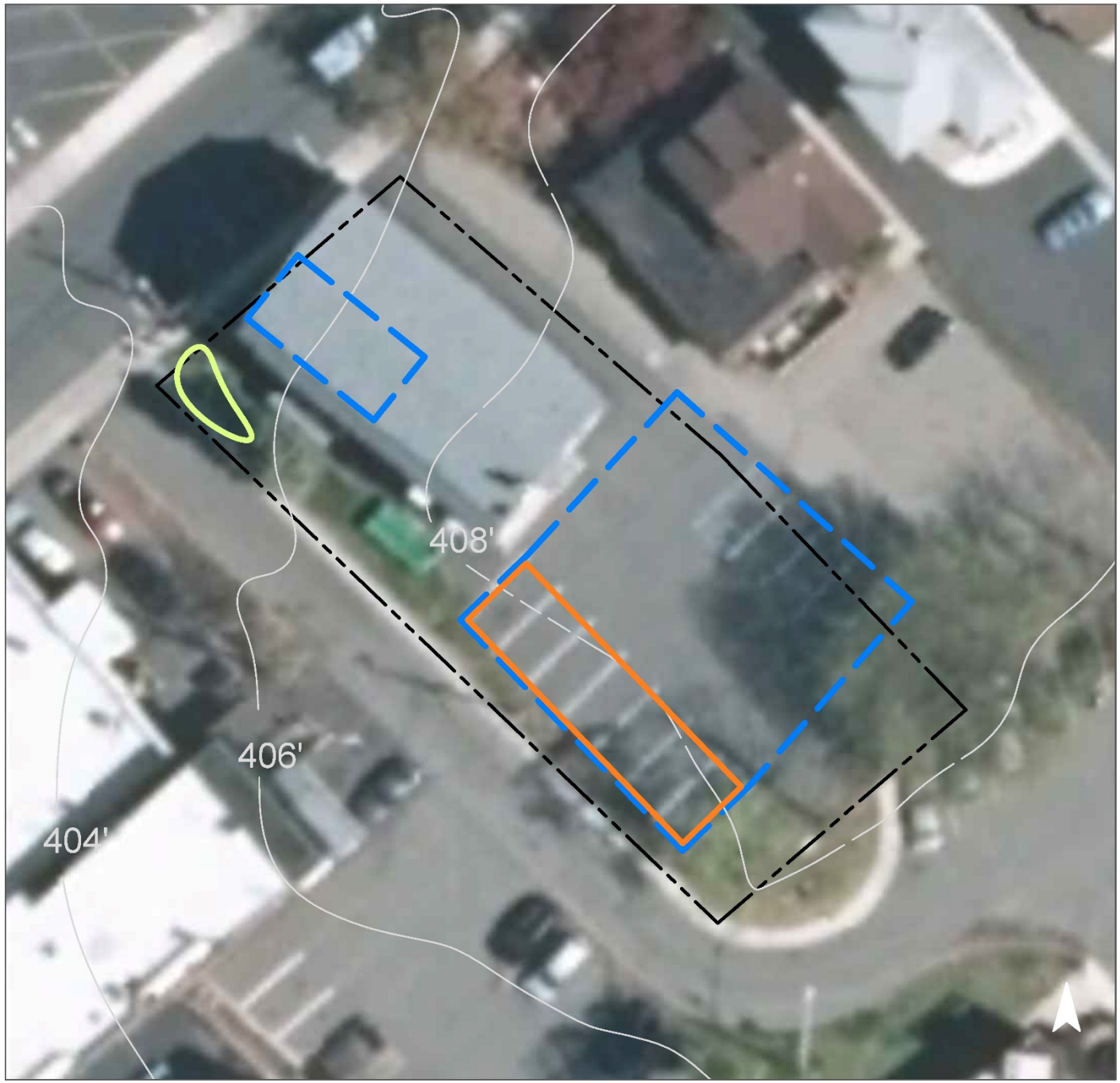
Block and Lot: Block 22, Lot 15

A rain garden can be installed in the turfgrass area along the west side of the building to capture, treat, and infiltrate stormwater runoff from the roof via the nearby downspout. Parking spaces in the parking lot at the back of the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot before it flows onto the street. 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"
95	9,448	0.5	4.8	43.4	0.007	0.26

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.013	2	1,010	0.04	130	$650
Pervious pavement	0.104	17	7,900	0.30	1,135	$28,375

GREEN INFRASTRUCTURE RECOMMENDATIONS



Essex Lodge No. 7

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

0 15' 30'

FIRST BAPTIST CHURCH

Subwatershed: Upper Passaic River

Site Area: 32,452 sq. ft.

Address: 259 Bloomfield Avenue
Caldwell, NJ 07006

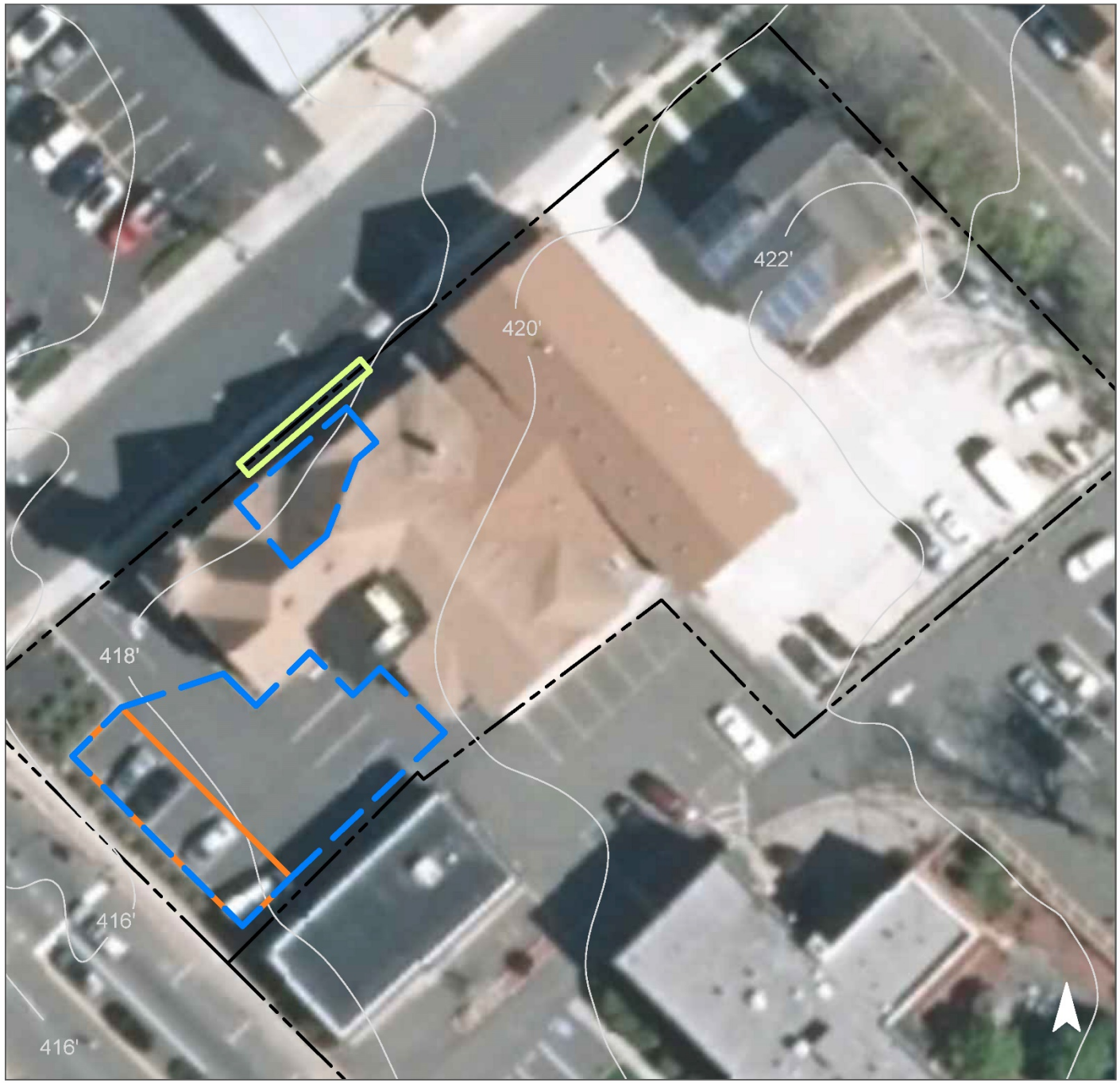
Block and Lot: Block 10, Lot 6, 6.01, 7

A rain garden can be installed in the turfgrass and shrub area along the side of the building to capture, treat, and infiltrate stormwater runoff from the roof. Parking spaces in the parking lot can be converted to porous pavement to capture and infiltrate stormwater runoff from the front 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"
85	27,584	1.3	13.9	126.6	0.021	0.76

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	0.033	5	2,470	0.09	161	$805
Pervious pavement	0.104	17	7,900	0.30	1,135	$28,375

GREEN INFRASTRUCTURE RECOMMENDATIONS



First Baptist Church

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

0 20' 40'

FIRST PRESBYTERIAN CHURCH

Subwatershed: Upper Passaic River

Site Area: 101,635 sq. ft.

Address: 326 Bloomfield Avenue
Caldwell, NJ 07006

Block and Lot: Block 53, Lot 9

A rain garden can be installed in the turfgrass along the side of the church to capture, treat, and infiltrate stormwater runoff from the roof. An existing asphalt strip adjacent to the sidewalk can be replaced with a series of stormwater planters that could capture stormwater from the roadway. 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"
33	33,845	1.6	17.1	155.4	0.026	0.93

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	0.017	3	1,320	0.05	170	$850
Stormwater planters	0.070	12	5,290	0.20	680	$255,000

GREEN INFRASTRUCTURE RECOMMENDATIONS

First Presbyterian Church

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

0 25' 50'

GOULD PLACE & BLOOMFIELD AVENUE RIGHT OF WAY

Subwatershed: Upper Passaic River

Site Area: 5,548 sq. ft.

Address: Gould Place & Bloomfield Avenue
Caldwell, NJ 07006

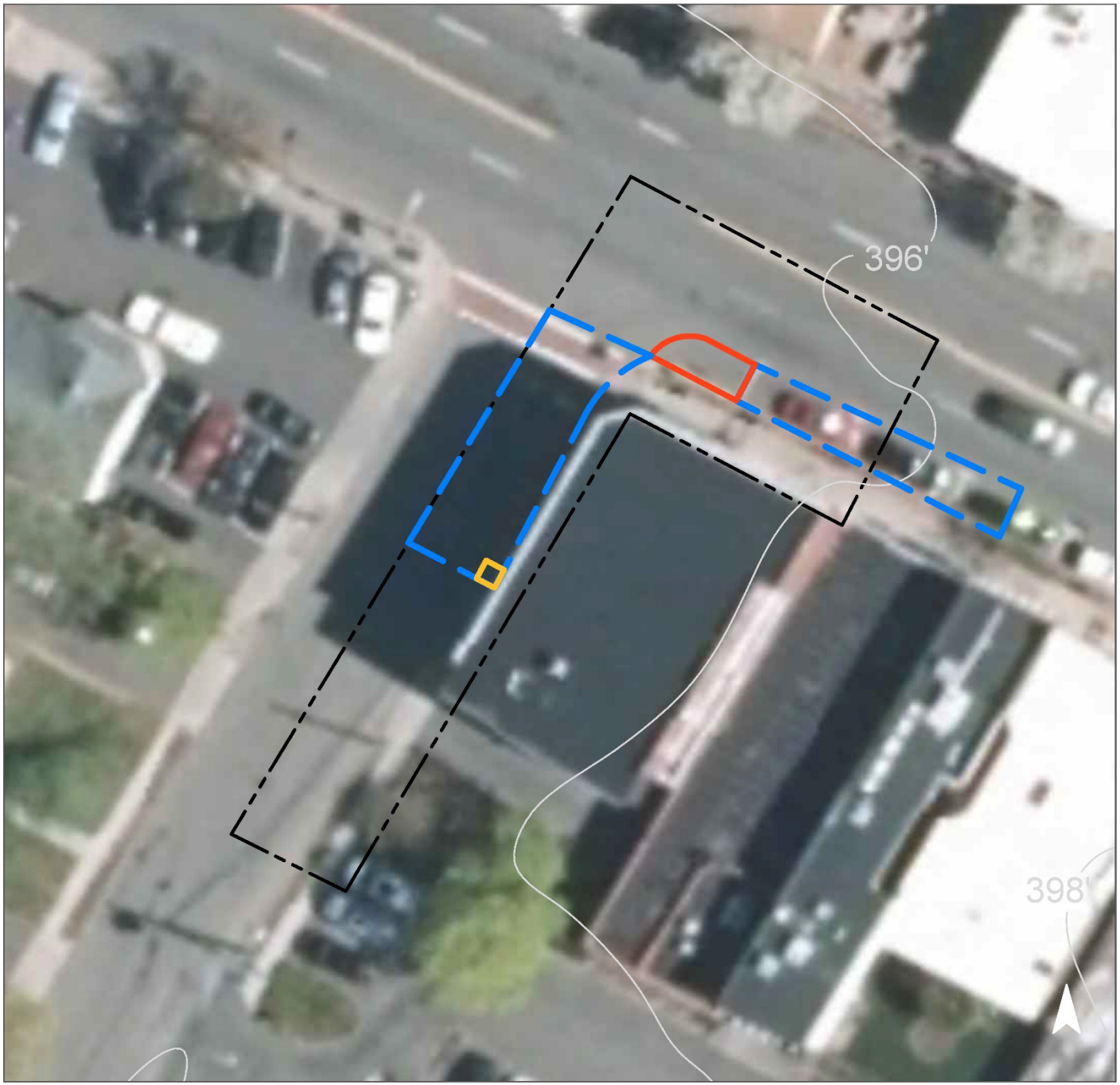
Block and Lot: Right of Way

A stormwater planter can be installed near the catch basin to intercept stormwater coming from the roadway. A tree filter box can be installed in the sidewalk area to capture additional 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.

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"
94	5,217	0.3	2.6	24.0	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
Stormwater planter	0.014	2	1,020	0.04	130	$48,750
Tree filter box	n/a	4	n/a	n/a	1 (box)	$10,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Gould Place & Bloomfield Avenue Right of Way

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

0 15' 30'

GREEN ACRES: 27 PERSONETTE STREET

Subwatershed: Upper Passaic River

Site Area: 7,849 sq. ft.

Address: 27 Personette Street
Caldwell, NJ 07006

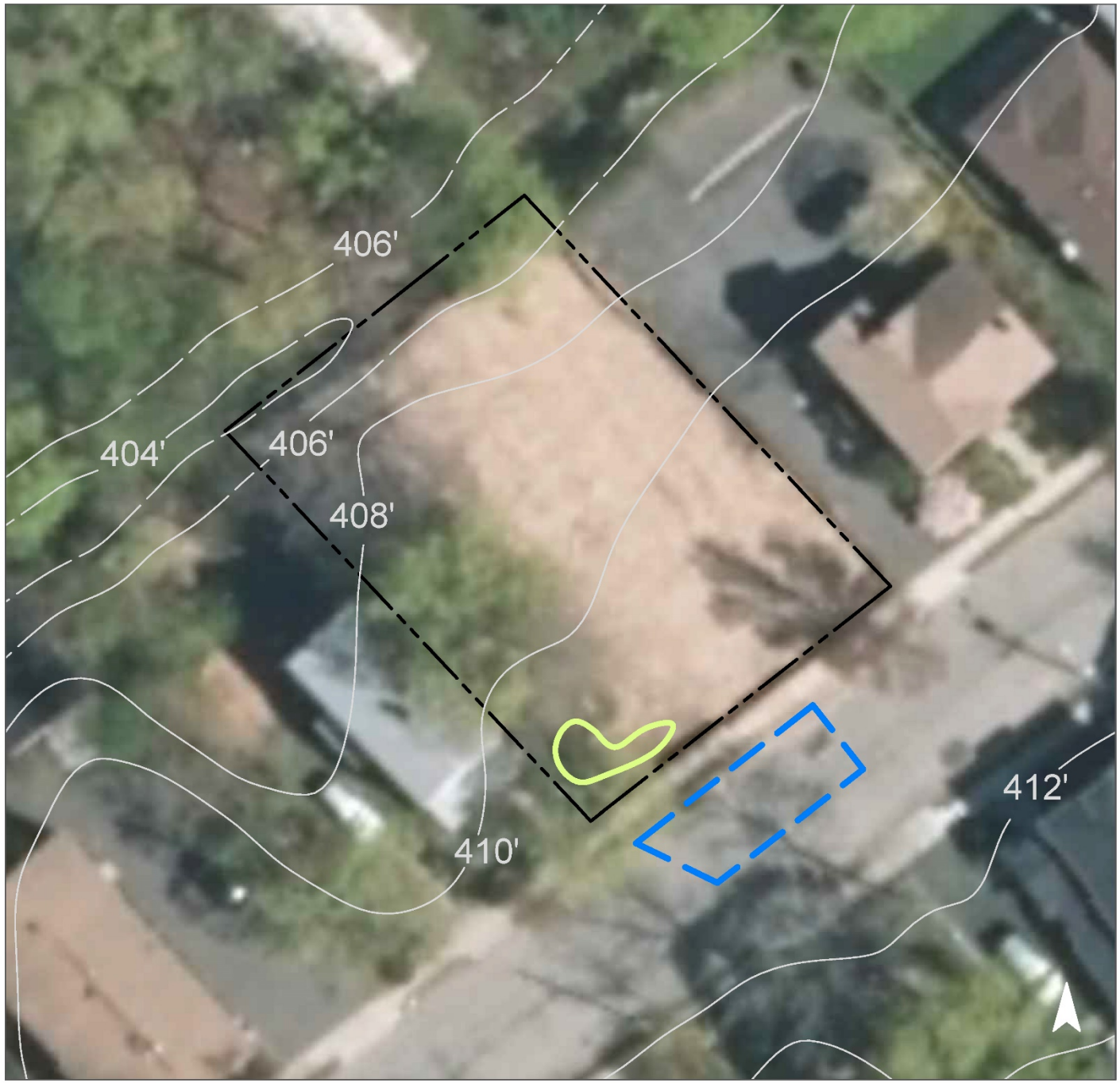
Block and Lot: Block 22, Lot 25.02

A rain garden can be installed in the turfgrass area along the fence to capture, treat, and infiltrate stormwater runoff from the roadway. 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"
40	3,140	0.2	1.6	14.4	0.002	0.09

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	0.017	3	1,260	0.05	160	$800

GREEN INFRASTRUCTURE RECOMMENDATIONS



Green Acres:
27 Personette Street

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

0 15' 30'

GROVER CLEVELAND BIRTHPLACE

Subwatershed: Upper Passaic River

Site Area: 94,147 sq. ft.

Address: 217 Bloomfield Avenue
Caldwell, NJ 07006

Block and Lot: Block 10, Lot 12, 13, 14

Rain gardens can be installed in the turfgrass areas around the building to capture, treat, and infiltrate stormwater runoff from the roof by redirecting the downspouts into the gardens. 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"
16	14,667	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 systems	0.029	5	2,170	0.08	280	$1,400

GREEN INFRASTRUCTURE RECOMMENDATIONS

Grover Cleveland Birthplace

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

0 15' 30'

GROVER CLEVELAND MIDDLE SCHOOL

Subwatershed: Upper Passaic River

Site Area: 341,439 sq. ft.

Address: 36 Academy Road
Caldwell, NJ 07006

Block and Lot: Block 42, Lot 6, 7

Parking spaces in the parking lot to the north of the building, near the entrance, can be converted to porous pavement to capture and infiltrate stormwater runoff from the rooftop by disconnected the downspouts into the pavement. Rain gardens can be installed in the turfgrass areas in front of the building by installing curb cuts and trench drains to redirect runoff from the roadway. Ponding at the back of the school could be remediated with a rain garden. 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"
52	178,896	8.6	90.4	821.4	0.139	4.91

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 systems	0.415	69	31,420	1.18	3,980	$19,900
Pervious pavement	0.225	38	17,050	0.64	1,630	$40,750

GREEN INFRASTRUCTURE RECOMMENDATIONS

Grover Cleveland Middle School

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

0 50' 100'

GROVER CLEVELAND PARK

Subwatershed: Upper Passaic River

Site Area: 1,053,001 sq. ft.

Address: 69 Brookside Avenue
Caldwell, NJ 07006

Block and Lot: Block 54; 67, Lot 2, 3, 4, 5; 1

A rain garden can be installed along the back of the building to capture, treat, and infiltrate stormwater runoff from the roof by installing gutters to direct the water into the garden. 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"
2	22,748	1.1	11.5	104.4	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	0.022	4	1,660	0.06	210	$1,050

GREEN INFRASTRUCTURE RECOMMENDATIONS

Grover Cleveland Park

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

0 25' 50'

LINCOLN ELEMENTARY SCHOOL

Subwatershed: Upper Passaic River

Site Area: 152,731 sq. ft.

Address: 18 Crane Street
Caldwell, NJ 07006

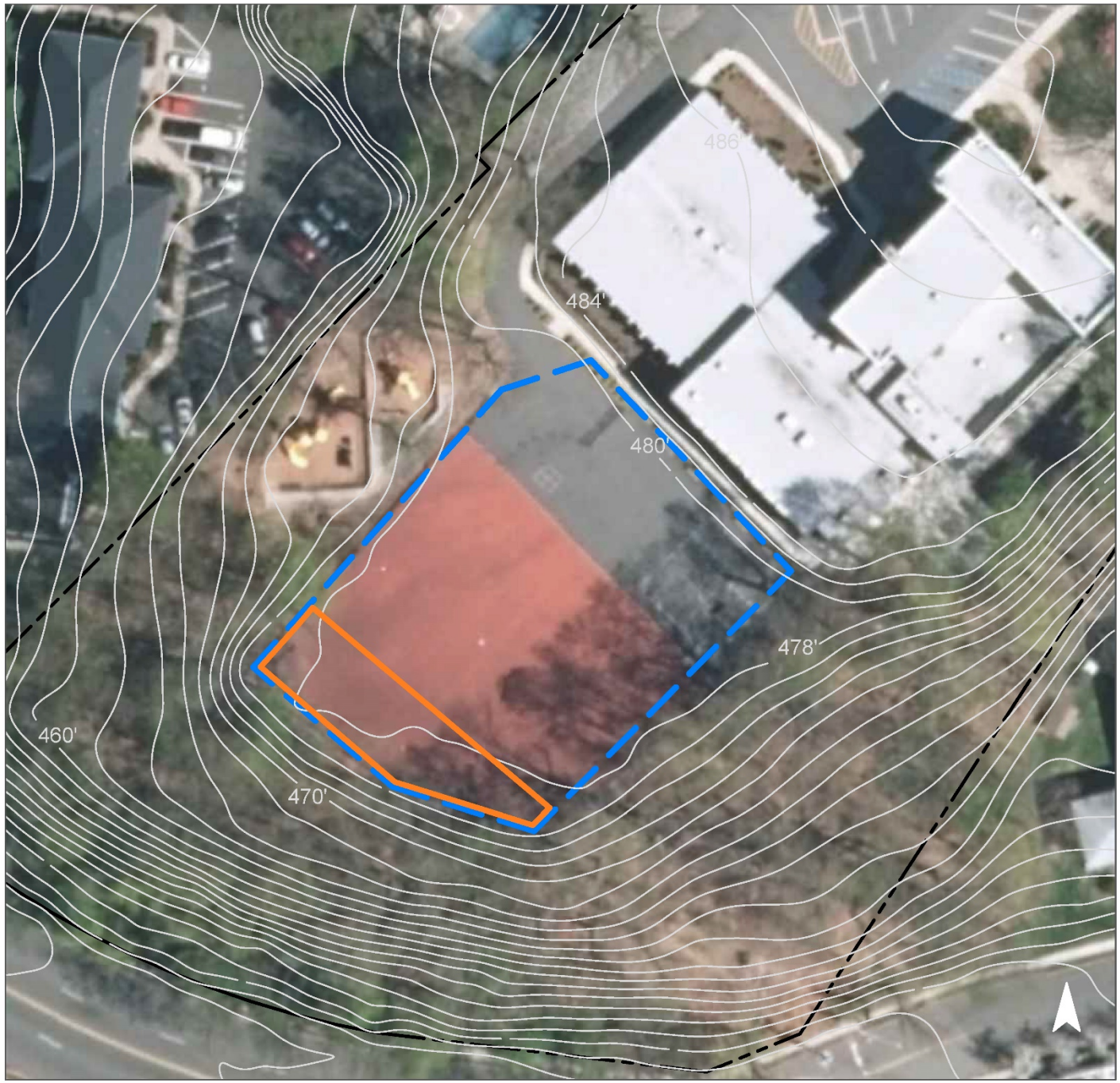
Block and Lot: Block 1, Lot 3, 5

Porous pavement can be installed at the back of the building in the playground to capture runoff from the large area of 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"
55	83,889	4.0	42.4	385.2	0.065	2.30

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
Pervious pavement	0.556	93	42,100	1.58	3,825	$95,625

GREEN INFRASTRUCTURE RECOMMENDATIONS



Lincoln Elementary School

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

0 30' 60'

MUNICIPAL PARKING LOT

Subwatershed: Upper Passaic River

Site Area: 44,149 sq. ft.

Address: 6 Smull Avenue
Caldwell, NJ 07006

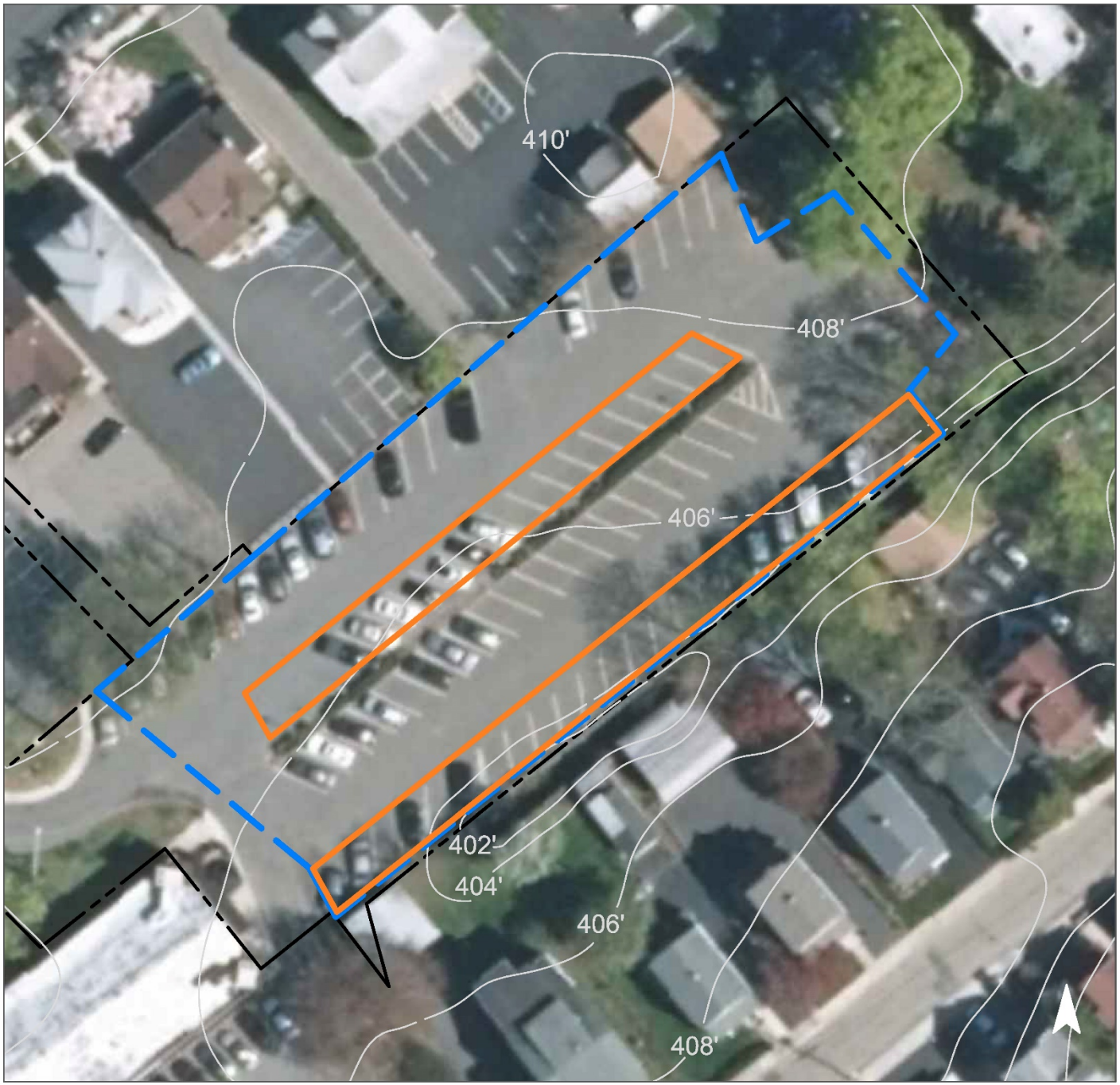
Block and Lot: Block 22, Lot 14.02

Parking spaces throughout the lot can be converted to porous pavement to capture and infiltrate stormwater runoff from the rest 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.

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"
94	41,587	2.0	21.0	190.9	0.032	1.14

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	0.788	132	59,710	2.24	8,115	$202,875

GREEN INFRASTRUCTURE RECOMMENDATIONS



Municipal Parking Lot

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

0 25' 50'

PARK AVENUE & BLOOMFIELD AVENUE RIGHT OF WAY

Subwatershed: Upper Passaic River

Site Area: 6,106 sq. ft.

Address: Park Avenue & Bloomfield Avenue
Caldwell, NJ 07006

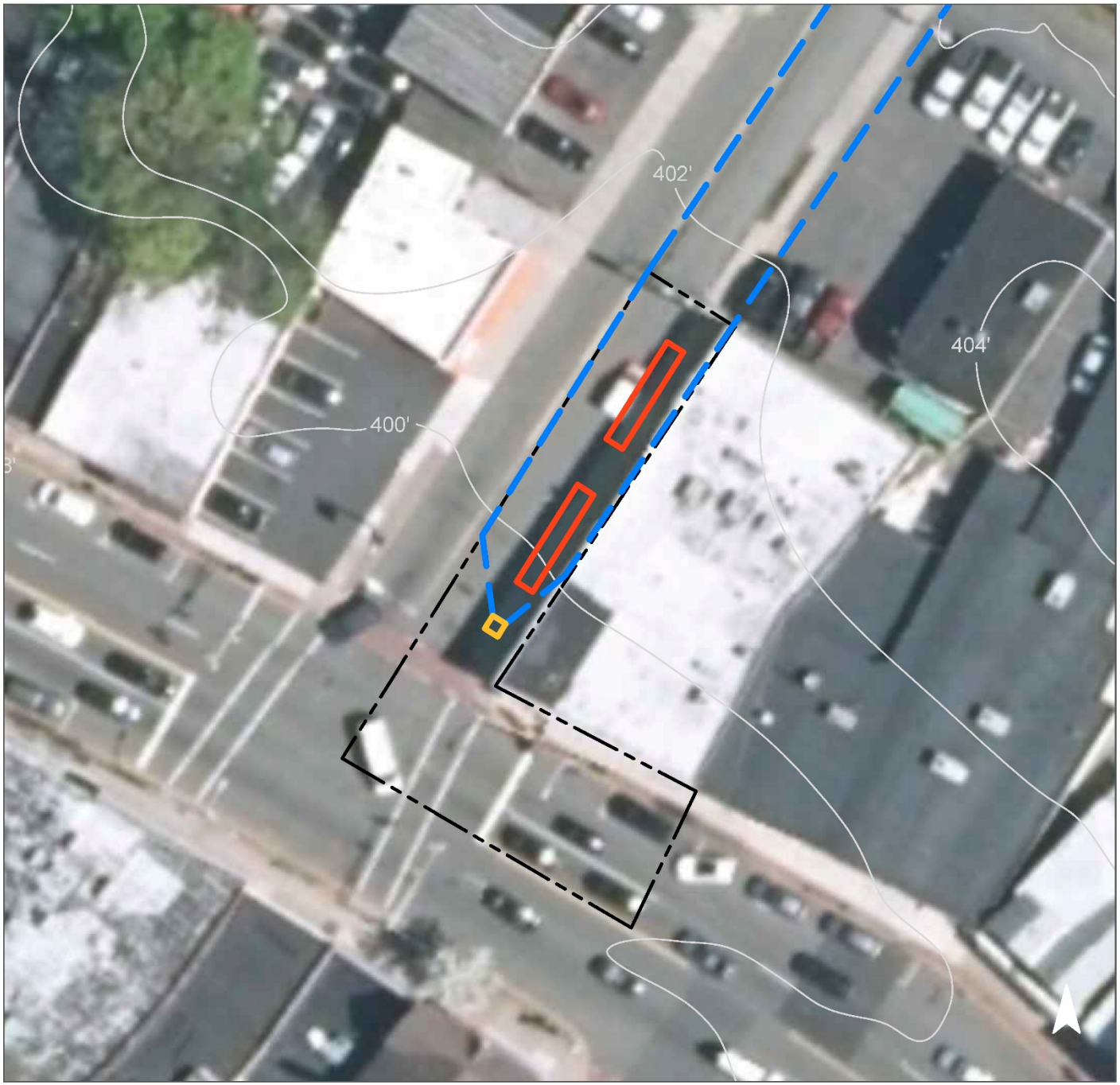
Block and Lot: Right of Way

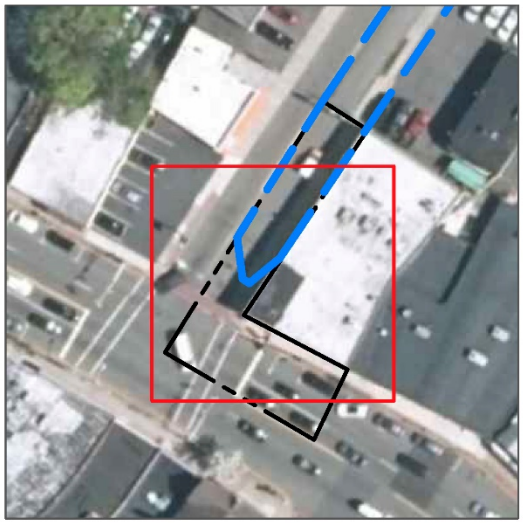
Stormwater planters can be installed in the sidewalk area before the catch basin to intercept stormwater coming from the roadway. A tree filter box can also be installed in the sidewalk area to filter additional runoff from the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
95	5,801	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
Stormwater planters	0.031	5	2,370	0.09	300	$112,500
Tree filter box	n/a	26	n/a	n/a	1	$10,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





Park Avenue & Bloomfield Avenue Right of Way

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

0 20' 40'

SAINT ALOYSIUS ROMAN CATHOLIC CHURCH

Subwatershed: Upper Passaic River

Site Area: 194,198 sq. ft.

Address: 219 Bloomfield Avenue
Caldwell, NJ 07006

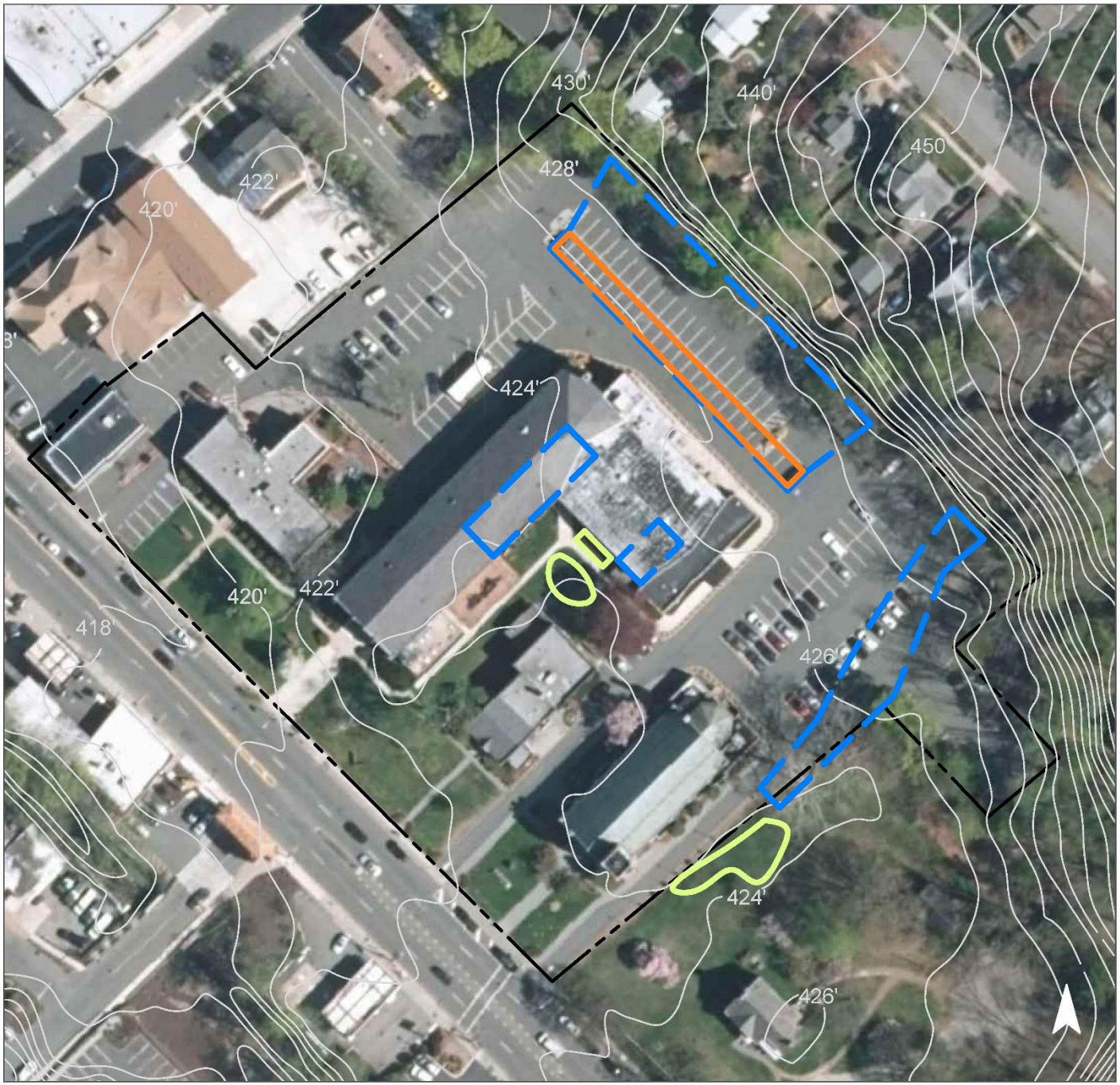
Block and Lot: Block 10, Lot 8, 9, 10, 11

Parking spaces in the parking lot behind the building can be converted to porous pavement to capture and infiltrate stormwater runoff from the parking lot. Rain gardens can be installed in the turfgrass area along the side of the building to capture, treat, and infiltrate stormwater runoff from the roof if nearby downspouts are disconnected. A rain garden can also be installed at the south end of the site by installing curb cuts to direct stormwater into the garden. 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"
85	164,760	7.9	83.2	756.5	0.128	4.52

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	0.242	40	18,320	0.69	2,335	$11,675
Pervious pavement	0.414	69	31,390	1.18	4,000	$100,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



Saint Aloysius Roman Catholic Church

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

0 50' 100'

c. Summary of Existing Conditions

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			Runoff Volumes from I.C.		Runoff Volumes from I.C.	
									TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
	DEEPAVAAL BROOK SITES	**0.79**	**34,321**				**0.74**	**32,437**	**1.6**	**16.4**	**148.9**	**3,379**	**118,934**	**0.025**	**0.89**
1	**Grover Cleveland Center for Senior Citizens**														
	Total Site Info	0.13	5,707	23	9.01	95	0.12	5,422	0.3	2.7	24.9	565	19,881	0.004	0.15
2	**United States Postal Service**														
	Total Site Info	0.66	28,614	23	9.03, 9.04	94	0.62	27,015	1.3	13.6	124.0	2,814	99,054	0.021	0.74
	UPPER PASSAIC RIVER SITES	**122.48**	**5,335,148**				**46.43**	**2,022,336**	**97.5**	**1021.4**	**9,285.3**	**210,660**	**7,415,232**	**1.576**	**55.47**
3	**Caldwell Municipal Complex**														
	Total Site Info	7.89	343,616	56	1,2,3,10.01,10.02, 10.03,10.06,17	90	7.06	307,669	14.8	155.4	1,412.6	32,049	1,128,118	0.240	8.44
4	**Caldwell United Methodist Church**														
	Total Site Info	1.10	47,735	50	29, 30, 31.01	70	0.76	33,277	1.6	16.8	152.8	3,466	122,014	0.026	0.91
5	**Caldwell University**														
	Total Site Info	63.87	2,782,378	57; 60	5; 3,3.01,3.02,3.03	36	22.87	996,020	48.0	503.0	4,573.1	103,752	3,652,072	0.776	27.32
6	**Center for Spiritual Living North Jersey**														
	Total Site Info	0.34	14,915	53	7	30	0.10	4,475	0.2	2.3	20.5	466	16,407	0.003	0.12
7	**Congregation Agudath Israel**														
	Total Site Info	2.37	103,306	43.01	9.11,9.12,12,13,13.01, 13.02,14,15,16,17	86	2.05	89,314	4.3	45.1	410.1	9,304	327,485	0.070	2.45
8	**Essex Lodge No. 7**														
	Total Site Info	0.23	9,945	22	15	95	0.22	9,448	0.5	4.8	43.4	984	34,643	0.007	0.26
9	**First Baptist Church**														
	Total Site Info	0.74	32,452	10	6,6.01,7	85	0.63	27,584	1.3	13.9	126.6	2,873	101,142	0.021	0.76
10	**First Presbyterian Church**														
	Total Site Info	2.33	101,635	53	9	33	0.78	33,845	1.6	17.1	155.4	3,525	124,097	0.026	0.93
11	**Gould Place & Bloomfield Avenue Right of Way**														
	Total Site Info	0.13	5,548	RoW	RoW	94	0.12	5,217	0.3	2.6	24.0	543	19,130	0.004	0.14
12	**Green Acres: 27 Personette Street**														
	Total Site Info	0.18	7,849	22	25.02	40	0.07	3,140	0.2	1.6	14.4	327	11,512	0.002	0.09
13	**Grover Cleveland Birthplace**														
	Total Site Info	2.16	94,147	10	12, 13, 14	16	0.34	14,667	0.7	7.4	67.3	1,528	53,781	0.011	0.40
14	**Grover Cleveland Middle School**														
	Total Site Info	7.84	341,439	42	6,7	52	4.11	178,896	8.6	90.4	821.4	18,635	655,954	0.139	4.91
15	**Grover Cleveland Park**														
	Total Site Info	24.17	1,053,001	54; 67	2,3,4,5; 1	2	0.52	22,748	1.1	11.5	104.4	2,370	83,410	0.018	0.62
16	**Lincoln Elementary School**														
	Total Site Info	3.51	152,731	1	3,5	55	1.93	83,889	4.0	42.4	385.2	8,738	307,595	0.065	2.30
17	**Municipal Parking Lot**														
	Total Site Info	1.01	44,149	22	14.02	94	0.95	41,587	2.0	21.0	190.9	4,332	152,486	0.032	1.14
18	**Park Avenue & Bloomfield Avenue Right of Way**														
	Total Site Info	0.14	6,106	RoW	RoW	95	0.13	5,801	0.3	2.9	26.6	604	21,269	0.005	0.16

Summary of Existing Conditions

	Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	I.C. %	I.C. Area (ac)	I.C. Area (SF)	Existing Annual Loads (Commercial)			Runoff Volumes from I.C.		Runoff Volumes from I.C.	
									TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)	Water Quality Storm (1.25" over 2-hours) (cu.ft.)	Annual (cu.ft.)	Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
19	**Saint Aloysius Roman Catholic Church**														
	Total Site Info	4.46	194,198	10	8, 9, 10, 11	85	3.78	164,760	7.9	83.2	756.5	17,162	604,118	0.128	4.52

d. Summary of Proposed Green Infrastructure Practices

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	DEEPAVAAL BROOK SITES	**7,350**	**0.17**	**0.192**	**32**	**14,500**	**0.55**				**$30,800**	**22.7%**
1	**Grover Cleveland Center for Senior Citizens**											
	Bioretention system	630	0.01	0.016	3	1,240	0.05	160	$5	SF	$800	11.6%
	Total Site Info	**630**	**0.01**	**0.016**	**3**	**1,240**	**0.05**				**$800**	**11.6%**
2	**United States Postal Service**											
	Pervious pavement	6,720	0.15	0.175	29	13,260	0.50	1,200	$25	SF	$30,000	24.9%
	Total Site Info	**6,720**	**0.15**	**0.175**	**29**	**13,260**	**0.50**				**$30,000**	**24.9%**
	UPPER PASSAIC RIVER SITES	**239,650**	**5.50**	**6.042**	**1,042**	**457,650**	**17.21**				**$1,470,470**	**11.9%**
3	**Caldwell Municipal Complex**											
	Bioretention systems	6,860	0.16	0.179	30	13,540	0.51	1,715	$5	SF	$8,575	2.2%
	Total Site Info	**6,860**	**0.16**	**0.179**	**30**	**13,540**	**0.51**				**$8,575**	**2.2%**
4	**Caldwell United Methodist Church**											
	Bioretention systems	2,280	0.05	0.059	10	4,500	0.17	575	$5	SF	$2,875	6.9%
	Pervious pavement	3,790	0.09	0.099	17	7,480	0.28	1,330	$25	SF	$33,250	11.4%
	Total Site Info	**6,070**	**0.14**	**0.158**	**26**	**11,980**	**0.45**				**$36,125**	**18.2%**
5	**Caldwell University**											
	Bioretention systems	14,040	0.32	0.366	61	27,710	1.04	4,300	$5	SF	$21,500	1.4%
	Pervious pavement	77,050	1.77	2.008	336	152,090	5.72	15,900	$25	SF	$397,500	7.7%
	Total Site Info	**91,090**	**2.09**	**2.373**	**397**	**179,800**	**6.76**				**$419,000**	**9.1%**
6	**Center for Spiritual Living North Jersey**											
	Bioretention systems	2,365	0.05	0.062	10	4,670	0.18	600	$5	SF	$3,000	52.9%
	Total Site Info	**2,365**	**0.05**	**0.062**	**10**	**4,670**	**0.18**				**$3,000**	**52.9%**
7	**Congregation Agudath Israel**											
	Bioretention system	3,100	0.07	0.081	14	6,120	0.23	775	$5	SF	$3,875	3.5%
	Planter boxes	240	0.01	n/a	1	n/a	n/a	2	$1,000	box	$2,000	0.3%
	Rainwater harvesting	90	0.00	0.002	0	70	0.00	70	$2	gal	$140	0.1%

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
	Total Site Info	**3,430**	**0.08**	**0.083**	**15**	**6,190**	**0.23**				**$6,015**	**3.8%**
8	**Essex Lodge No. 7**											
	Bioretention system	510	0.01	0.013	2	1,010	0.04	130	$5	SF	$650	5.4%
	Pervious pavement	4,000	0.09	0.104	17	7,900	0.30	1,135	$25	SF	$28,375	42.3%
	Total Site Info	**4,510**	**0.10**	**0.118**	**20**	**8,910**	**0.34**				**$29,025**	**47.7%**
9	**First Baptist Church**											
	Bioretention system	1,250	0.03	0.033	5	2,470	0.09	161	$5	SF	$805	4.5%
	Pervious pavement	4,000	0.09	0.104	17	7,900	0.30	1,135	$25	SF	$28,375	14.5%
	Total Site Info	**5,250**	**0.12**	**0.137**	**23**	**10,370**	**0.39**				**$29,180**	**19.0%**
10	**First Presbyterian Church**											
	Bioretention systems	670	0.02	0.017	3	1,320	0.05	170	$5	SF	$850	2.0%
	Pervious pavement	3,600	0.08	0.094	16	7,110	0.27	1,135	$25	SF	$28,375	10.6%
	Stormwater planters	2,680	0.06	0.070	12	5,290	0.20	680	$375	SF	$255,000	7.9%
	Total Site Info	**6,950**	**0.16**	**0.181**	**30**	**13,720**	**0.52**				**$284,225**	**20.5%**
11	**Gould Place & Bloomfield Avenue Right of Way**											
	Stormwater planter	520	0.01	0.014	2	1,020	0.04	130	$375	SF	$48,750	10.0%
	Tree filter box	965	0.02	n/a	4	n/a	n/a	1	$10,000	box	$10,000	18.5%
	Total Site Info	**1,485**	**0.03**	**0.014**	**6**	**1,020**	**0.04**				**$58,750**	**28.5%**
12	**Green Acres: 27 Personette Street**											
	Bioretention system	640	0.01	0.017	3	1,260	0.05	160	$5	SF	$800	20.4%
	Total Site Info	**640**	**0.01**	**0.017**	**3**	**1,260**	**0.05**				**$800**	**20.4%**
13	**Grover Cleveland Birthplace**											
	Bioretention systems	1,100	0.03	0.029	5	2,170	0.08	280	$5	SF	$1,400	7.5%
	Total Site Info	**1,100**	**0.03**	**0.029**	**5**	**2,170**	**0.08**				**$1,400**	**7.5%**
14	**Grover Cleveland Middle School**											
	Bioretention systems	15,920	0.37	0.415	69	31,420	1.18	3,980	$5	SF	$19,900	8.9%
	Pervious pavement	8,635	0.20	0.225	38	17,050	0.64	1,630	$25	SF	$40,750	4.8%
	Total Site Info	**24,555**	**0.56**	**0.640**	**107**	**48,470**	**1.82**				**$60,650**	**13.7%**

Summary of Proposed Green Infrastructure Practices

	Subwatershed/Site Name/Total Site Info/GI Practice	Potential Management Area Area (SF)	Potential Management Area Area (ac)	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Max Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cfs)	Size of BMP	Unit Cost ($/unit)	Unit	Total Cost ($)	I.C. Treated %
15	**Grover Cleveland Park**											
	Bioretention system	840	0.02	0.022	4	1,660	0.06	210	$5	SF	$1,050	3.7%
	Total Site Info	**840**	**0.02**	**0.022**	**4**	**1,660**	**0.06**				**$1,050**	**3.7%**
16	**Lincoln Elementary School**											
	Pervious pavement	21,325	0.49	0.556	93	42,100	1.58	3,825	$25	SF	$95,625	25.4%
	Total Site Info	**21,325**	**0.49**	**0.556**	**93**	**42,100**	**1.58**				**$95,625**	**25.4%**
17	**Municipal Parking Lot**											
	Pervious pavement	30,250	0.69	0.788	132	59,710	2.24	8,115	$25	SF	$202,875	72.7%
	Total Site Info	**30,250**	**0.69**	**0.788**	**132**	**59,710**	**2.24**				**$202,875**	**72.7%**
18	**Park Avenue & Bloomfield Avenue Right of Way**											
	Stormwater planters	1,200	0.03	0.031	5	2,370	0.09	300	$375	SF	$112,500	20.7%
	Tree filter box	6,550	0.15	n/a	26	n/a	n/a	1	$10,000	box	$10,000	112.9%
	Total Site Info	**7,750**	**0.18**	**0.031**	**31**	**2,370**	**0.09**				**$122,500**	**133.6%**
19	**Saint Aloysius Roman Catholic Church**											
	Bioretention systems	9,280	0.21	0.242	40	18,320	0.69	2,335	$5	SF	$11,675	5.6%
	Pervious pavement	15,900	0.37	0.414	69	31,390	1.18	4,000	$25	SF	$100,000	9.7%
	Total Site Info	**25,180**	**0.58**	**0.656**	**110**	**49,710**	**1.87**				**$111,675**	**15.3%**