RUTGERS
New Jersey Agricultural Experiment Station

Impervious Cover Reduction Action Plan for Alpha Borough, Warren County, New Jersey

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

November 3, 2016

WILLIAM PENN FOUNDATION

ANJEC
Local Environment Matters

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Introduction

Located in Warren County, Alpha Borough covers approximately 1.7 square miles. Figures 1 and 2 illustrate that Alpha Borough is dominated by urban land uses. A total of 46.9% of the municipality's land use is classified as urban. Of the urban land in Alpha Borough, medium density residential is the dominant land use (Figure 3).

The New Jersey Department of Environmental Protection's (NJDEP) 2007 land use/land cover geographical information system (GIS) data layer categorizes Alpha Borough into many unique land use areas, assigning a percent impervious cover for each delineated area. These impervious cover values were used to estimate the impervious coverage for Alpha Borough. Based upon the 2007 NJDEP land use/land cover data, approximately 17.8% of Alpha Borough has impervious cover. This level of impervious cover suggests that the streams in Alpha Borough are likely impacted streams. [1]

Methodology

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

[1] Caraco, D., R. Claytor, P. Hinkle, H. Kwon, T. Schueler, C. Swann, S. Vysotsky, and J. Zielinski. 1998. Rapid Watershed Planning Handbook. A Comprehensive Guide for Managing Urbanizing Watersheds. Prepared by Center For Watershed Protection, Ellicott City, MD. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans and Watersheds and Region V. October 1998

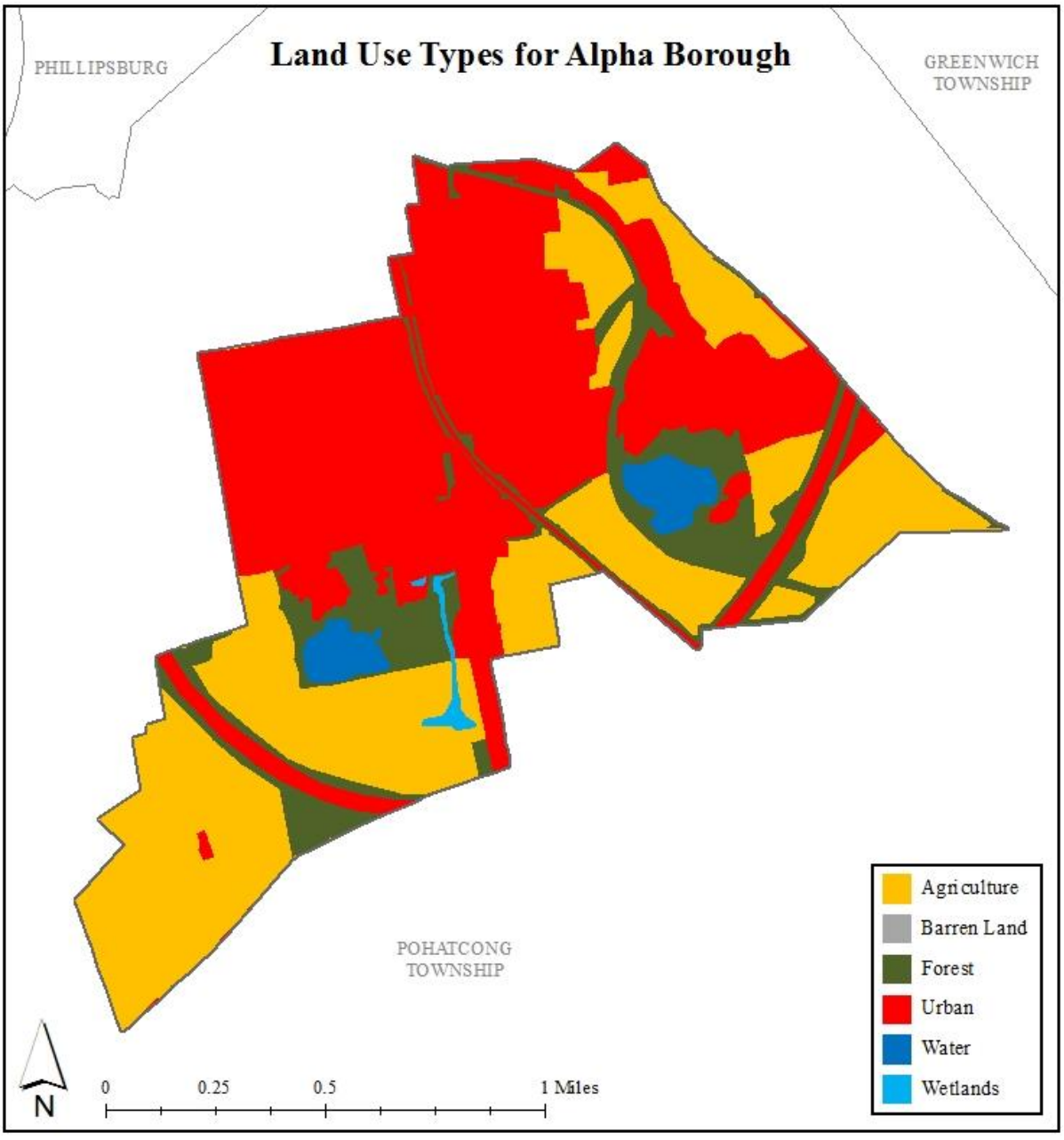


Figure 1: Map illustrating the land use in Alpha Borough

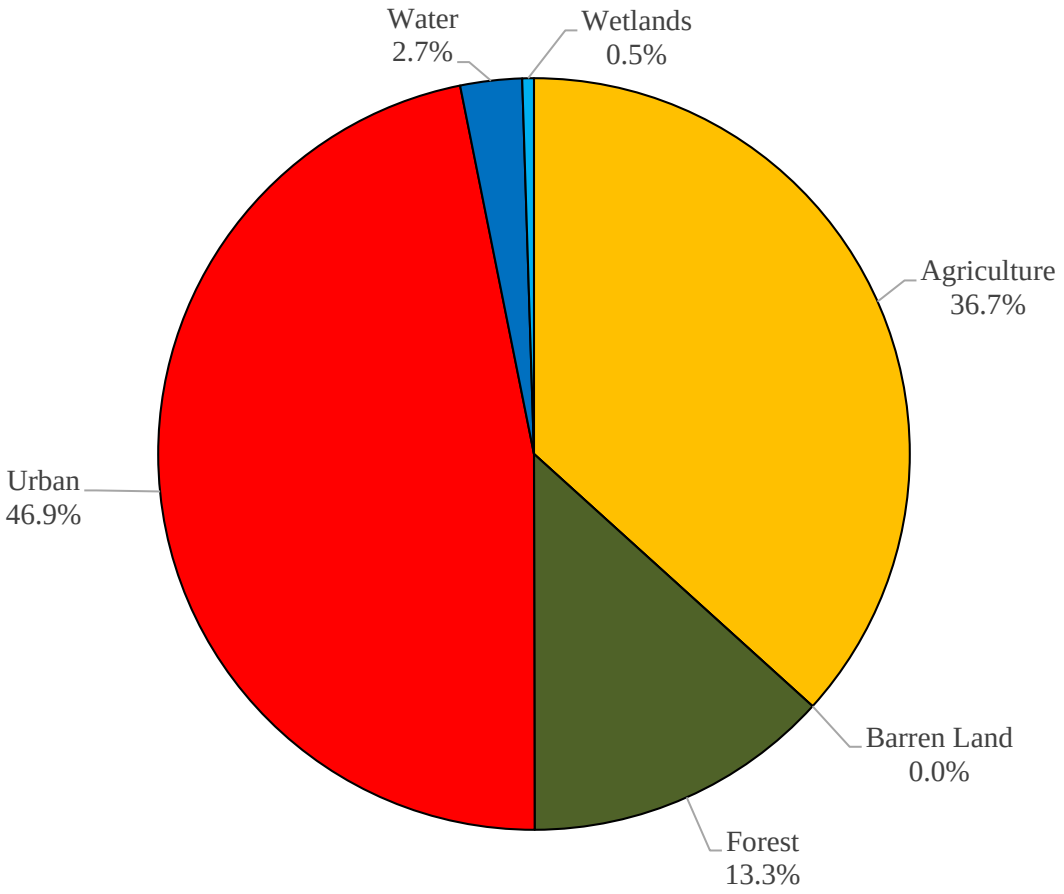


Figure 2: Pie chart illustrating the land use in Alpha Borough

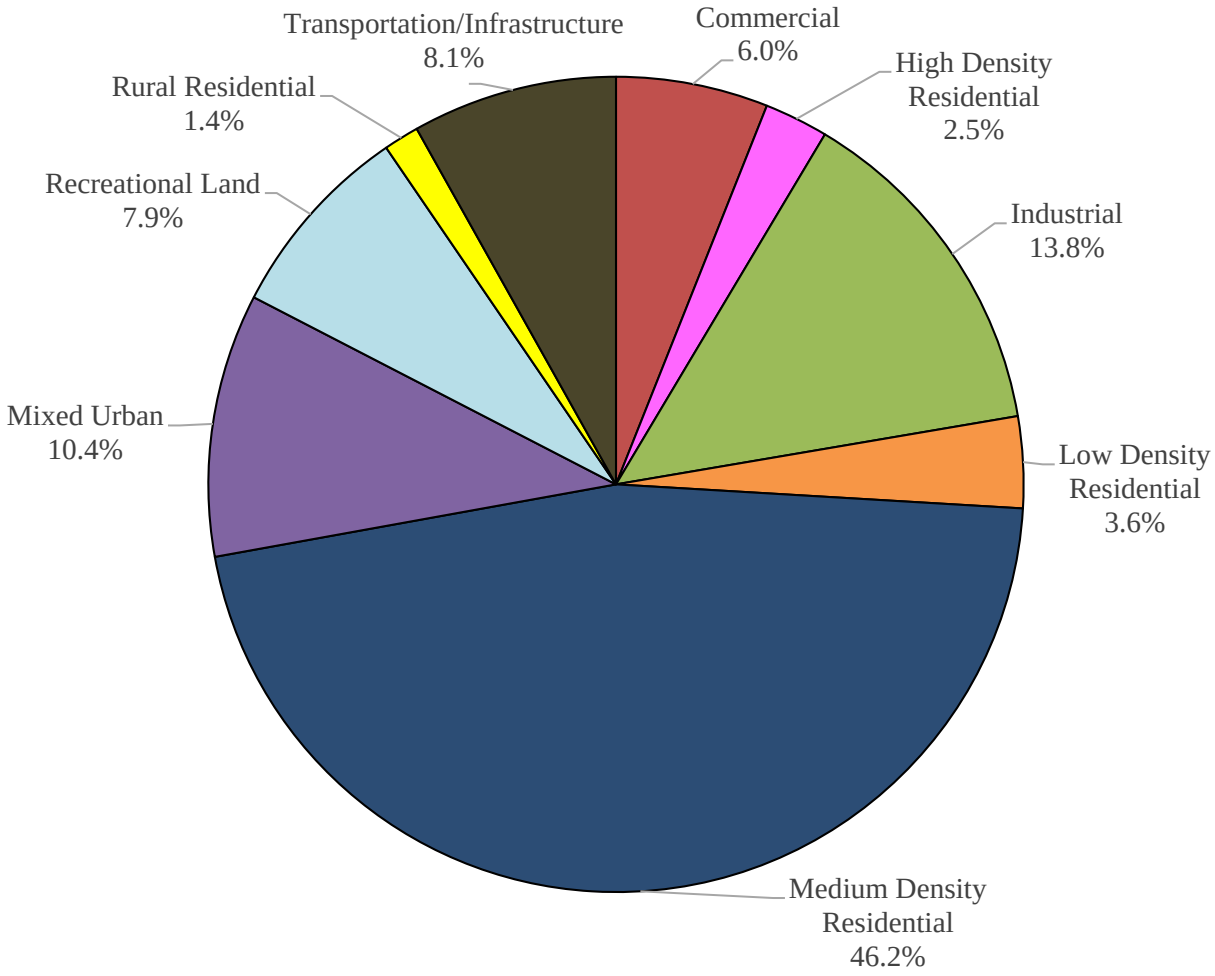


Figure 3: Pie chart illustrating the various types of urban land use in Alpha Borough

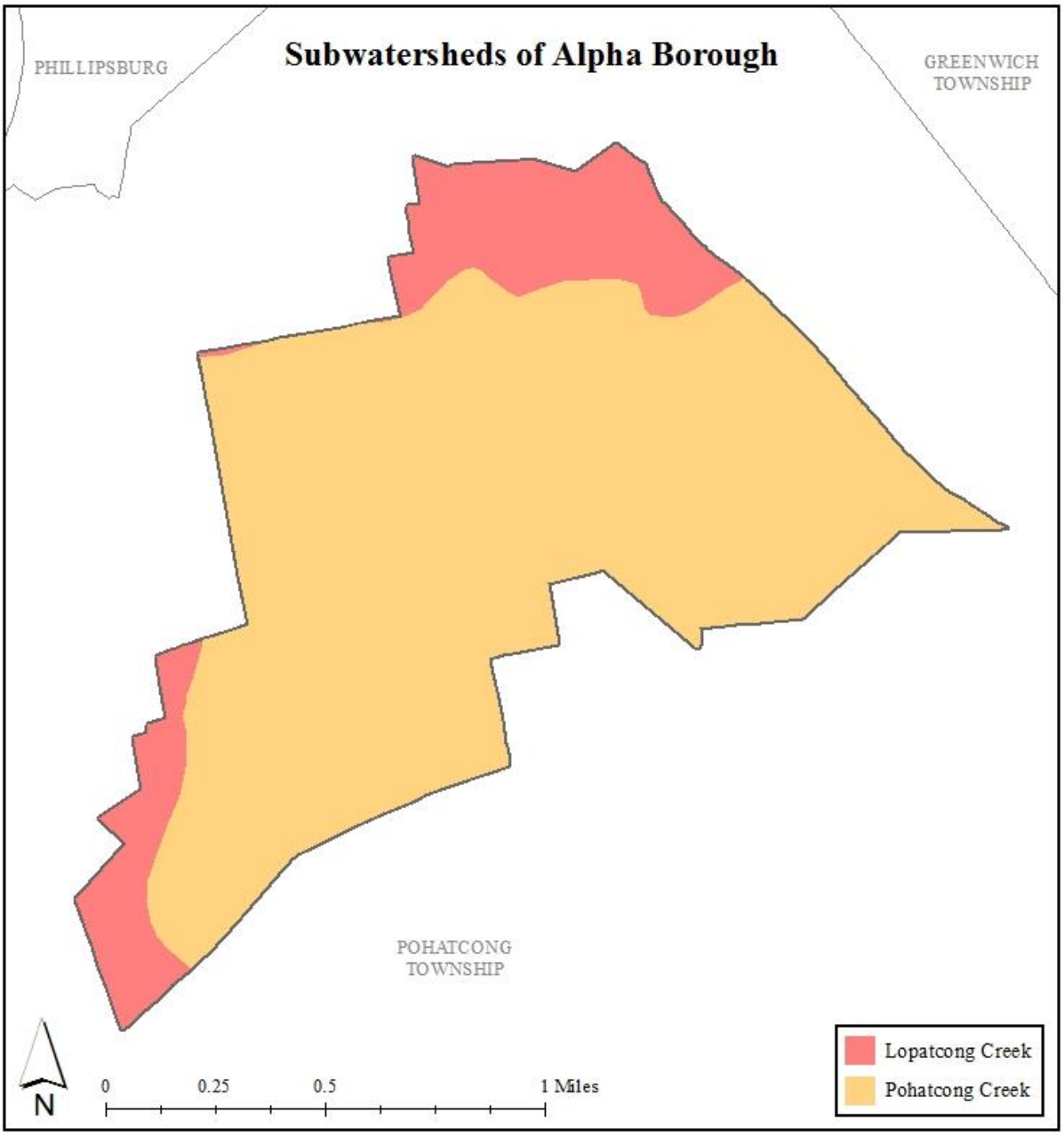


Figure 4: Map of the subwatersheds in Alpha Borough

For each potential project site, specific aerial loading coefficients for commercial land use were used to determine the annual runoff loads for total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS) from impervious surfaces (Table 1). These are the same aerial loading coefficients that NJDEP uses in developing total maximum daily loads (TMDLs) for impaired waterways of the state. The percentage of impervious cover for each site was extracted from the 2007 NJDEP land use/land cover database. For impervious areas, runoff volumes were determined for the water quality design storm (1.25 inches of rain over two-hours) and for the annual rainfall total of 44 inches.

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

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

Table 1: Aerial Loading Coefficients[2]

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

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

Green Infrastructure Practices

Green infrastructure is an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly. Green infrastructure projects capture, filter, absorb, and reuse stormwater to maintain or mimic natural systems and to treat runoff as a resource. As a general 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 Alpha Borough. Each practice is discussed below.

Disconnected downspouts

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

Pervious pavements

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




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

Bioretention systems/rain gardens

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

Downspout planter boxes

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

Rainwater harvesting systems (cistern or rain barrel)

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

Bioswale

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

Stormwater planters

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

Tree filter boxes

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

Potential Project Sites

Attachment 1 contains information on potential project sites where green infrastructure practices could be installed. The recommended green infrastructure practices and the drainage area that the green infrastructure practice can treat are identified for each potential project site. For each practice, the recharge potential, TSS removal potential, maximum volume reduction potential per storm, and the peak reduction potential are provided. This information is also provided so that proposed development projects that cannot satisfy the New Jersey stormwater management requirements for major development can use one of the identified projects to offset a stormwater management deficit. [4]

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

Conclusion

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

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

a. Green Infrastructure Sites

ALPHA BOROUGH: GREEN INFRASTRUCTURE SITES

SITES WITHIN THE LOPATCONG CREEK SUBWATERSHED:

1. Alpha Veterinary Care

SITES WITHIN THE POHATCONG CREEK SUBWATERSHED:

2. Alpha Fire Department
3. Alpha Pizza & Sub Shop
4. Creative K & B LLC
5. Gotham Shredders & Binding
6. John Dolak Ballfield
7. John Dolak Memorial Pool
8. oKaysions Katering and Fresh Market
9. Pub 519
10. St. Mary Roman Catholic Church
11. W. H. Walters Free Public Library

b. Proposed Green Infrastructure Concepts

ALPHA VETERINARY CARE

Subwatershed: Lopatcong Creek

Site Area: 22,079 sq. ft.

Address: 334 Third Avenue
Alpha, NJ 08865

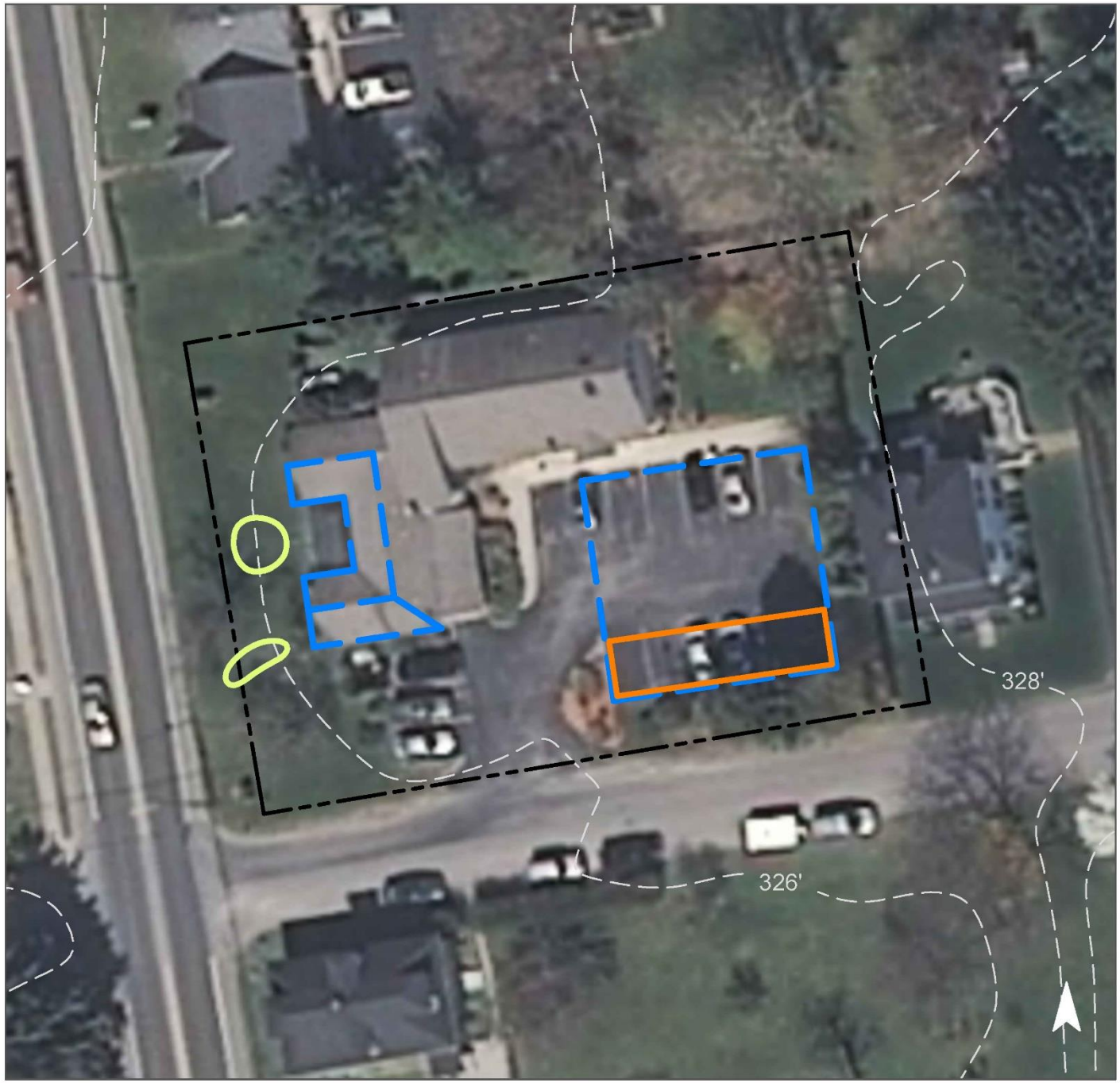
Block and Lot: Block 52, Lot 8

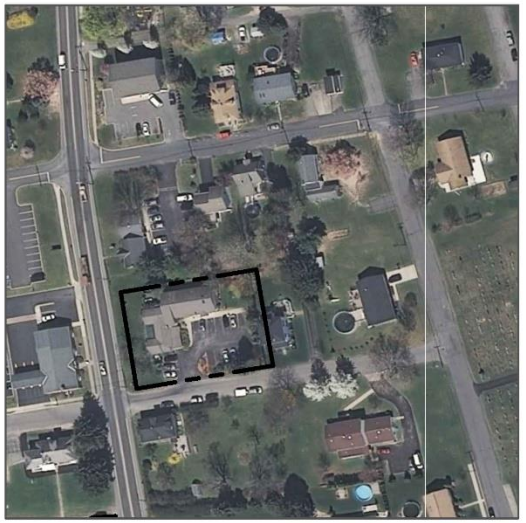
Parking spots can be replaced with porous asphalt to capture and infiltrate stormwater. Installing rain gardens adjacent to the building can capture, treat, and infiltrate roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
64	14,179	0.7	7.2	65.1	0.011	0.39

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.023	4	1,689	0.06	255	$1,275
Pervious pavement	0.089	15	6,560	0.25	830	$20,750

GREEN INFRASTRUCTURE RECOMMENDATIONS





Alpha Veterinary Care

- bioretention sytem
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 20' 40'

ALPHA FIRE DEPARTMENT

Subwatershed: Pohatcong Creek

Site Area: 46,168 sq. ft.

Address: 817 North Boulevard
Alpha, NJ 08865

Block and Lot: Block 31, Lot 7

Parking spots to the west of the building can be replaced with porous asphalt to capture and infiltrate stormwater. Installing rain gardens adjacent to the building can capture, treat, and infiltrate roof 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"
59	27,426	1.3	13.9	125.9	0.021	0.75

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.126	21	9,245	0.35	1,610	$8,050
Pervious pavement	0.386	65	28,334	1.07	4,940	$123,500

GREEN INFRASTRUCTURE RECOMMENDATIONS

Alpha Fire Department

- bioretention system
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 20' 40'

ALPHA PIZZA & SUB SHOP

Subwatershed: Pohatcong Creek

Site Area: 9,803 sq. ft.

Address: 1408 3rd Avenue
Phillipsburg, NJ 08865

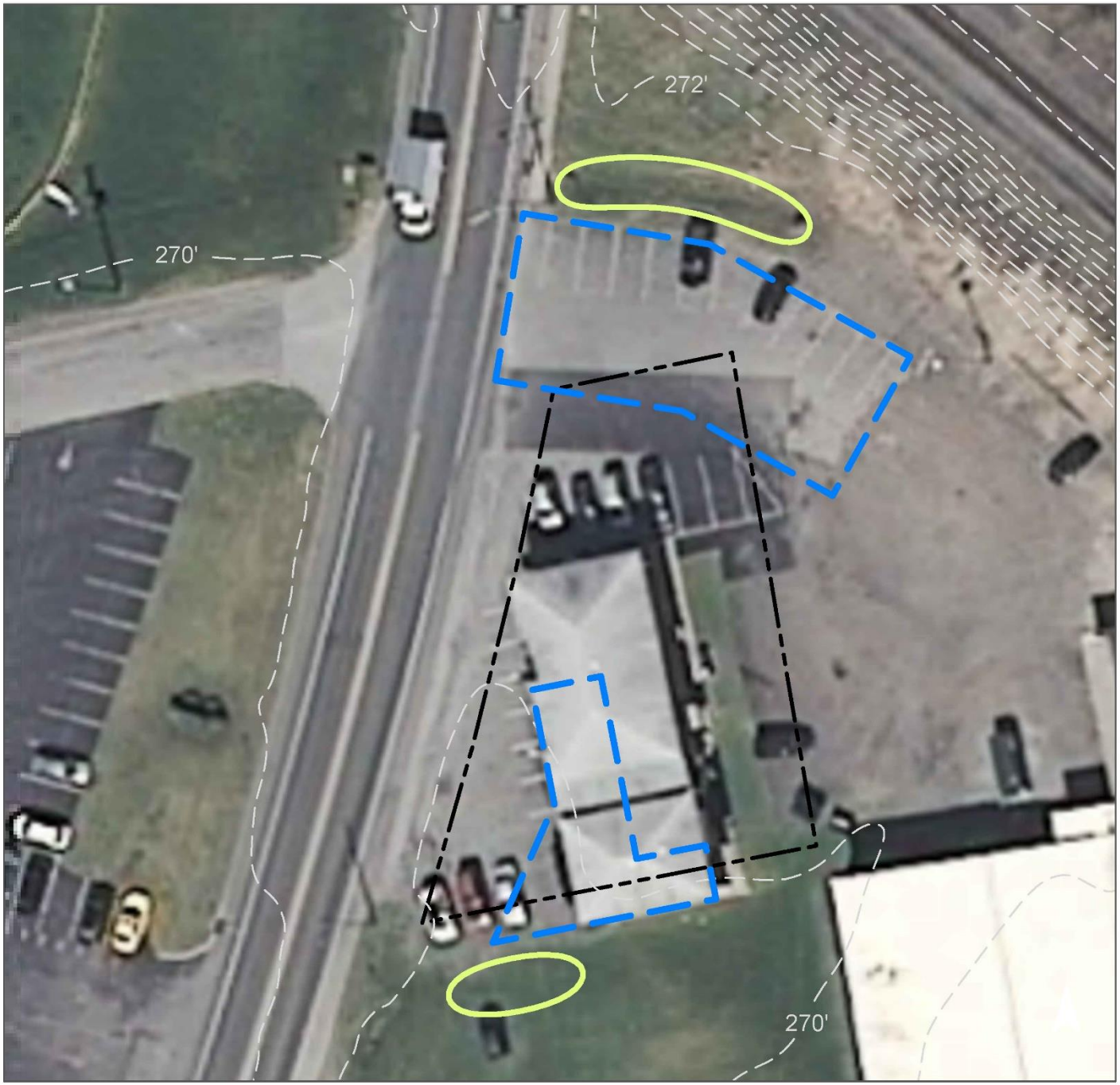
Block and Lot: Block 96, Lot 1

Installing a rain garden adjacent to the building can capture, treat, and infiltrate roof runoff, and another rain garden can be installed north of parking spaces to infiltrate parking lot 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"
65	6,372	0.3	3.2	29.3	0.005	0.17

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.161	27	11,796	0.44	1,210	$6,050

GREEN INFRASTRUCTURE RECOMMENDATIONS



Alpha Pizza & Sub Shop

- bioretention system
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 20' 40'

CREATIVE K&B LLC

Subwatershed: Pohatcong Creek

Site Area: 7,531 sq. ft.

Address: 1001 3rd Avenue
Alpha, NJ 08865

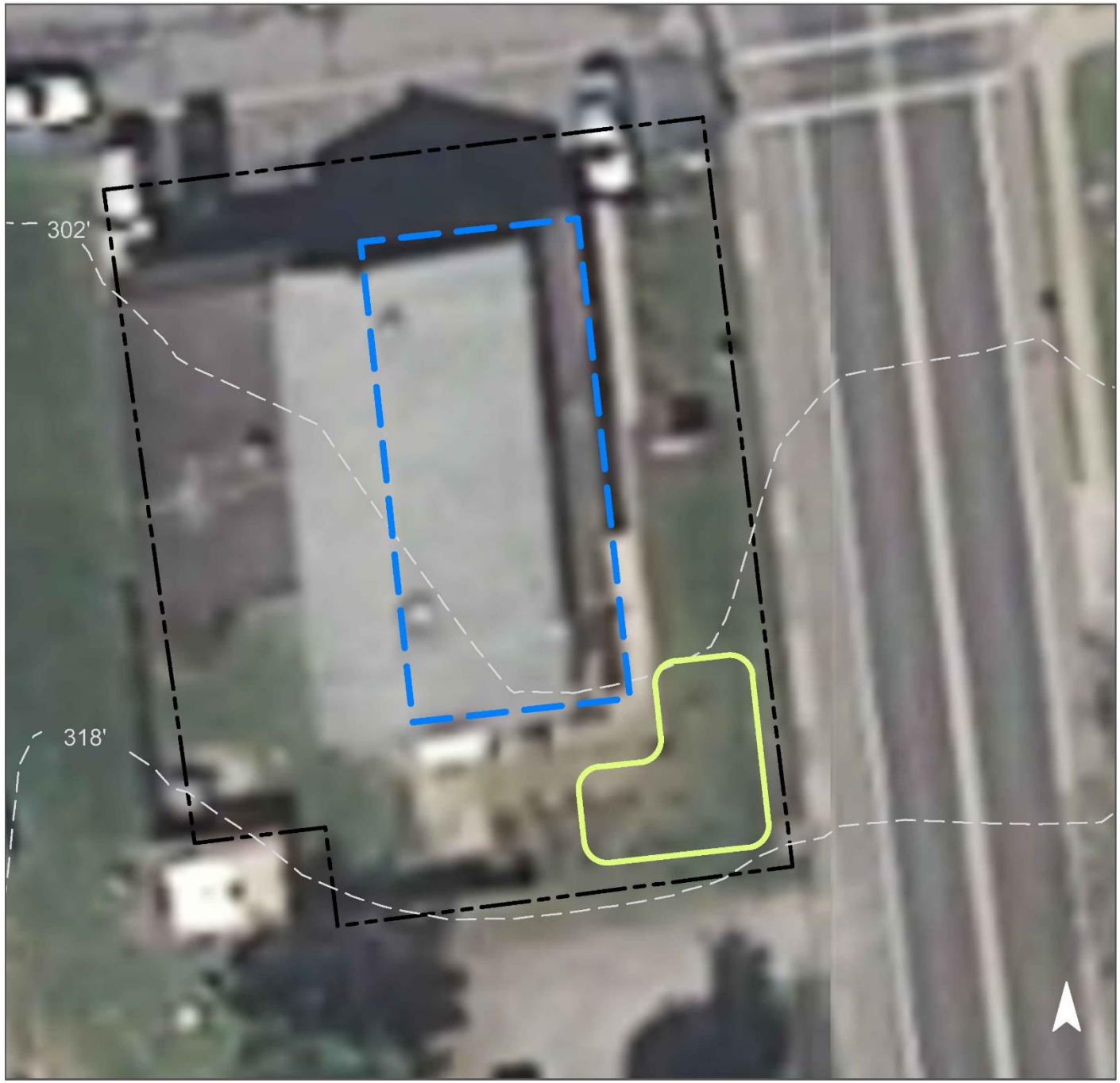
Block and Lot: Block 76, Lot 10

Installing a rain garden adjacent to the building can capture, treat, and infiltrate roof 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"
35	2,636	0.1	1.3	12.1	0.002	0.07

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	0.047	8	3,463	0.13	360	$1,800

GREEN INFRASTRUCTURE RECOMMENDATIONS



Creative K&B LLC

- bioretention system
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 10' 20'

GOTHAM SHREDDERS & BINDING

Subwatershed: **Pohatcong Creek**

Site Area: **113,656 sq. ft.**

Address: **1425 3rd Avenue**
Alpha, NJ 08865

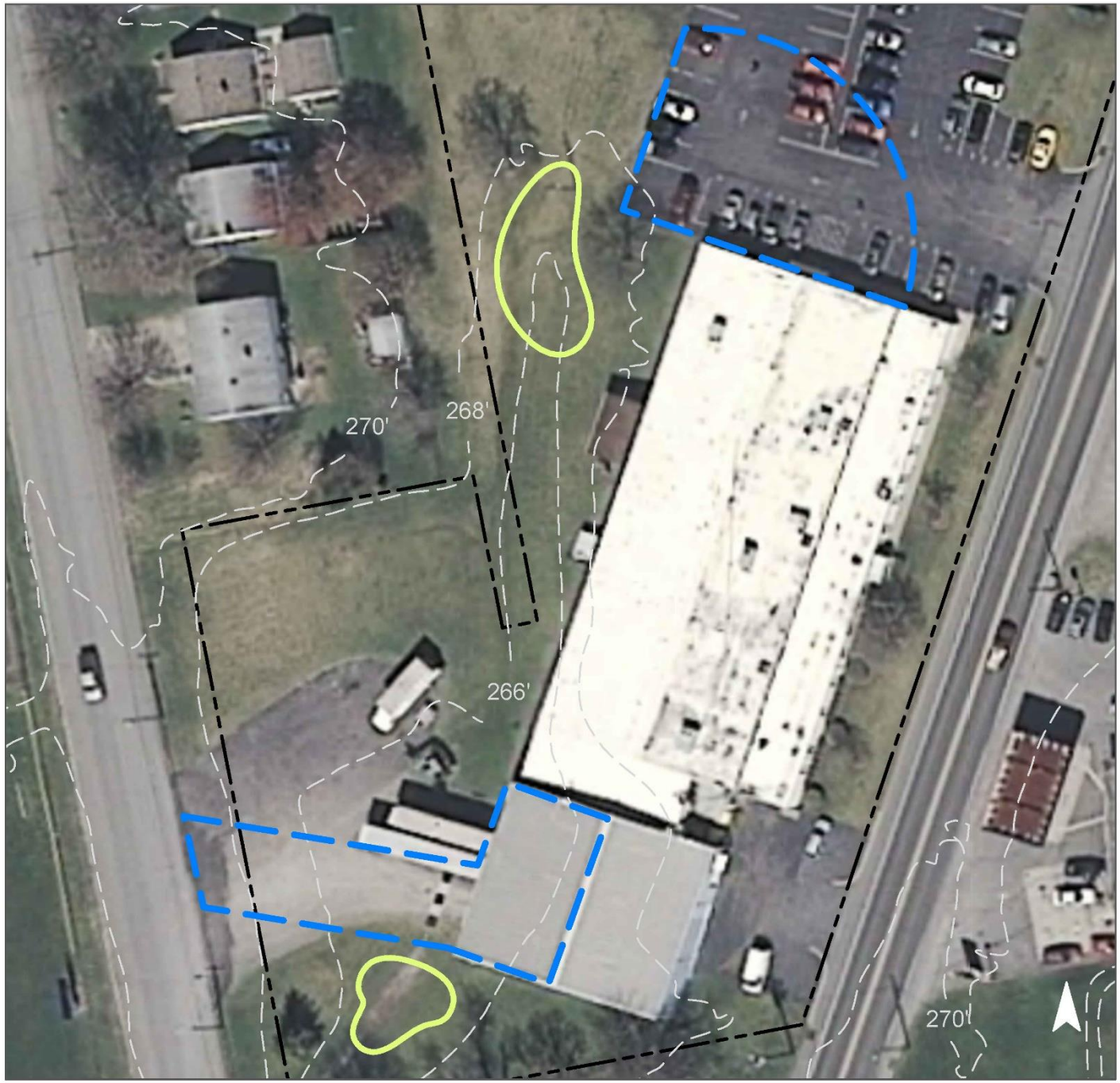
Block and Lot: **Block 95, Lot 4, 5, 6**

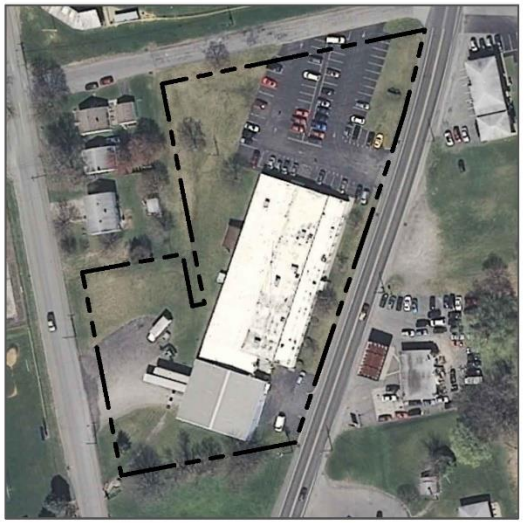
Rain gardens can be placed adjacent to the building and parking lot to capture, treat, and infiltrate roof and parking lot runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
56	63,963	3.1	32.3	293.7	0.050	1.75

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.379	63	27,818	1.05	2,990	$14,950

GREEN INFRASTRUCTURE RECOMMENDATIONS





Gotham Shredders & Binding

- bioretention system
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

JOHN DOLAK BALLFIELD

Subwatershed: Pohatcong Creek

Site Area: 168,188 sq. ft.

Address: Vulcanite Avenue
Alpha, NJ 08865

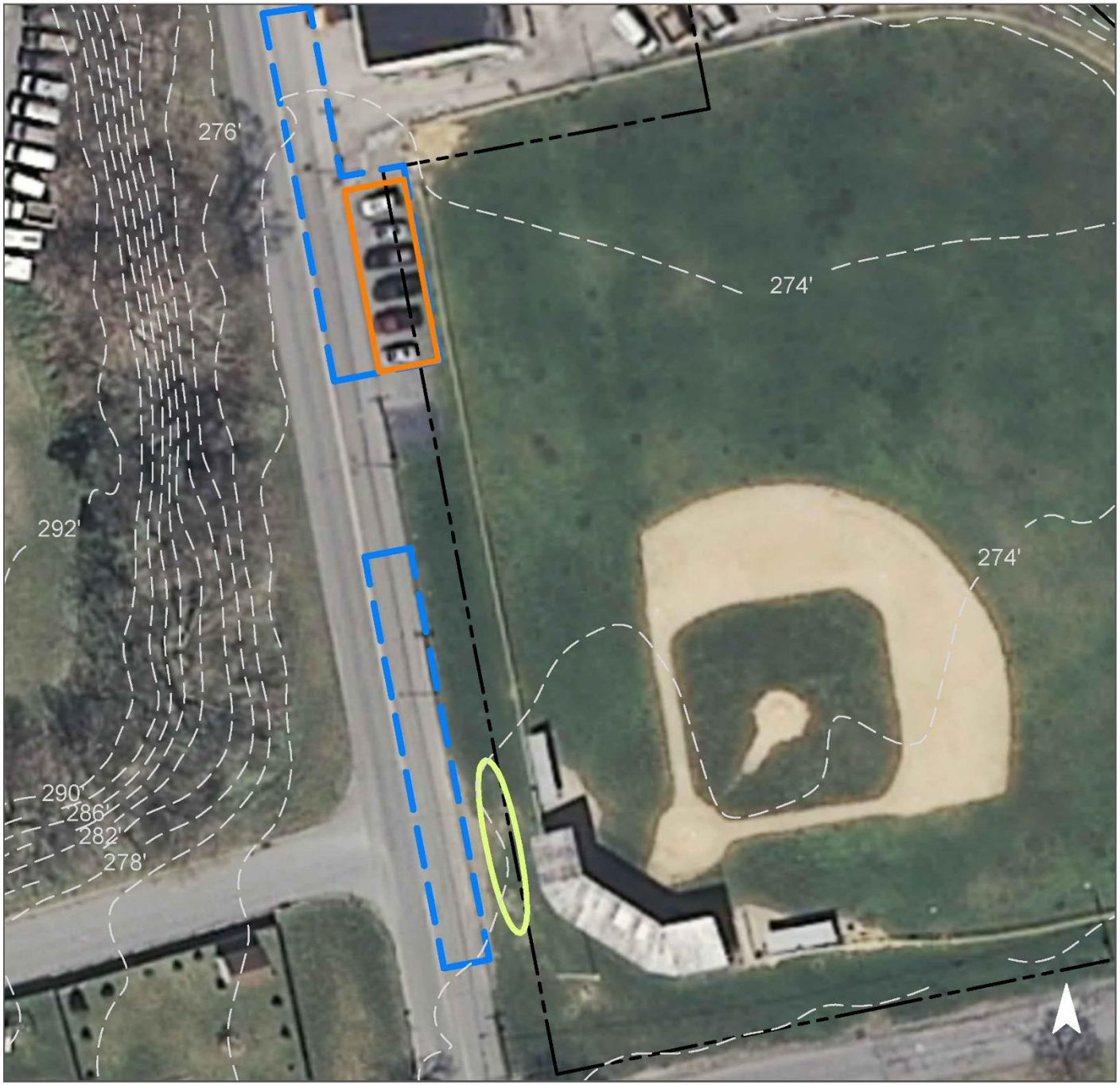
Block and Lot: Block 93, 94 Lot 1,4,5

Parking spots to the north of the field can be replaced with porous asphalt to capture and infiltrate stormwater. Installing a rain garden adjacent to the road can capture, treat, and infiltrate road runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
7	11,902	0.6	6.0	54.6	0.009	0.33

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention system	0.078	13	5,707	0.21	600	$3,000
Pervious pavement	0.120	20	8,774	0.33	1,720	$43,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



John Dolak Ballfield

- bioretention system
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

JOHN DOLAK MEMORIAL POOL

Subwatershed: **Pohatcong Creek**

Site Area: **1,704,030 sq. ft.**

Address: **Vulcanite Avenue**
Alpha, NJ 08865

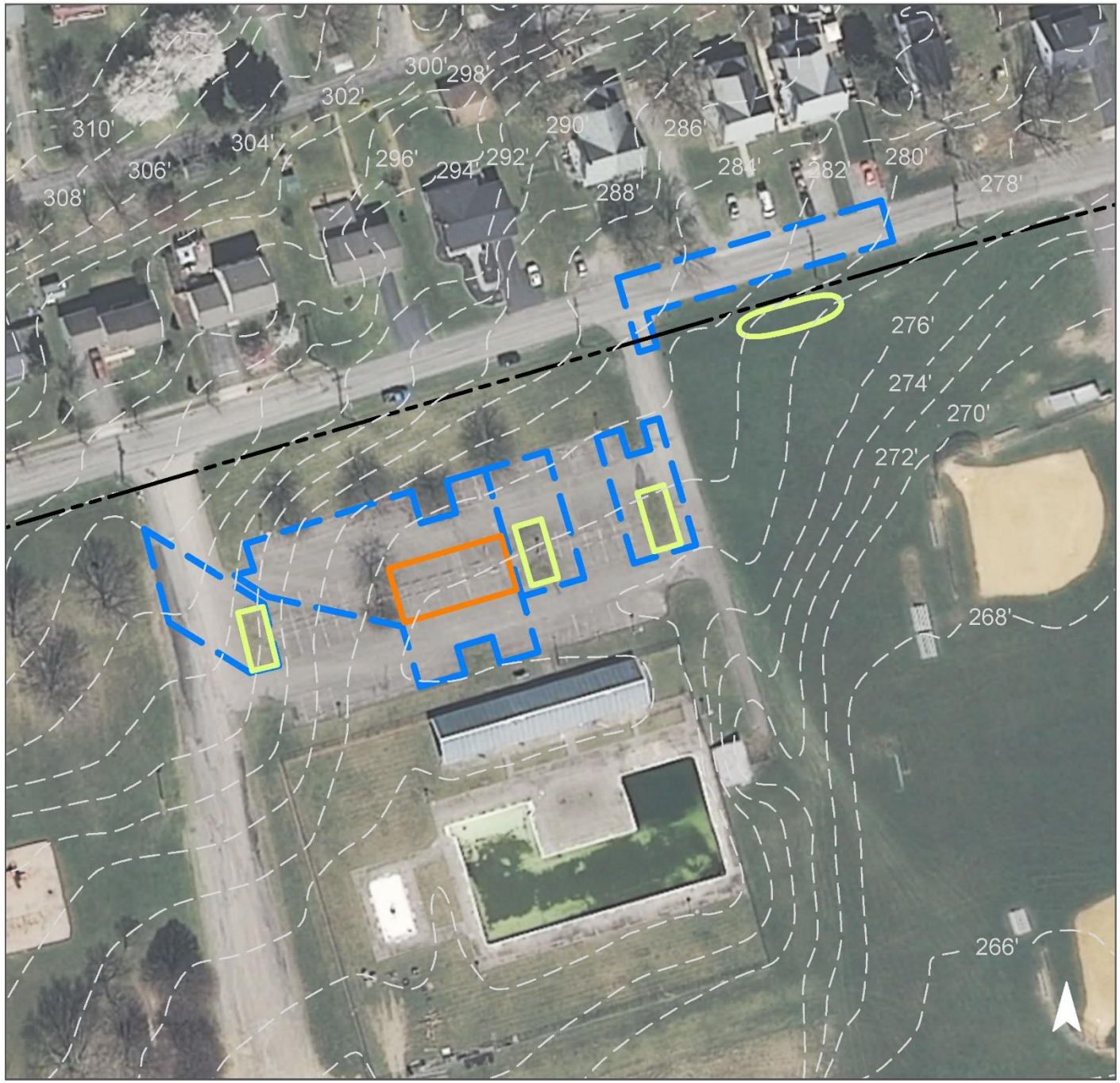
Block and Lot: **Block 97, Lot 1,1.1**

Parking spots in the middle of the parking lot and the playground in the northeastern corner can be replaced with porous asphalt to capture and infiltrate stormwater. Installing bioretention systems in the parking lot and adjacent to the road can capture, treat, and infiltrate runoff. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
10	173,821	8.4	87.8	798.1	0.135	4.77

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.418	70	30,683	1.15	3,160	$15,800
Pervious pavement	0.721	121	52,884	1.99	18,600	$465,000

GREEN INFRASTRUCTURE RECOMMENDATIONS



John Dolak Memorial Pool

- bioretention system
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 50' 100'

GREEN INFRASTRUCTURE RECOMMENDATIONS

John Dolak Memorial Pool

- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 30' 60'

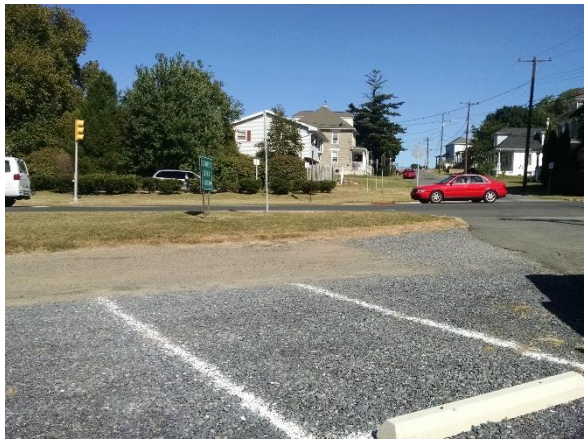
OKAYSIONS KATERING AND FRESH MARKET

Subwatershed: Pohatcong Creek

Site Area: 6,390 sq. ft.

Address: 615 Third Avenue
Phillipsburg, NJ 08865

Block and Lot: Block 60, Lot 1

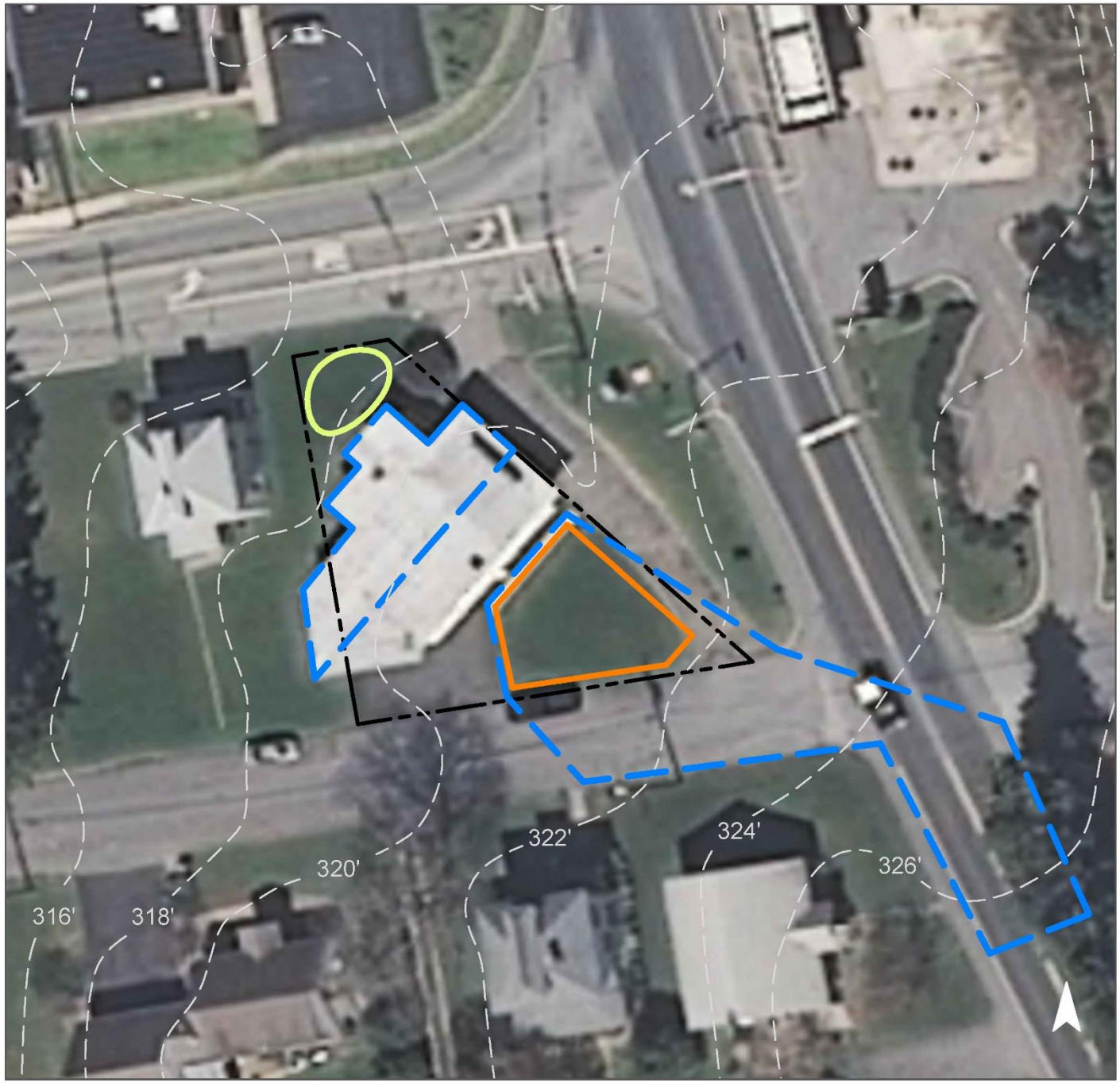


Installing a rain garden adjacent to the building can capture, treat, and infiltrate roof runoff. Pervious pavement can be installed in the gravel parking area to capture, treat, and infiltrate road runoff from the site and the surrounding area. A preliminary soil assessment suggests that the soils have 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"
35	2,236	0.1	1.1	10.3	0.002	0.06

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	0.043	7	3,164	0.12	345	$1,725
Pervious pavement	0.013	2	957	0.04	1,295	$32,375

GREEN INFRASTRUCTURE RECOMMENDATIONS



oKaysions Katering and Fresh Market

- bioretention system
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 20' 40'

PUB 519

Subwatershed: Pohatcong Creek

Site Area: 18,532 sq. ft.

Address: 431 Third Avenue
Alpha, NJ 08865

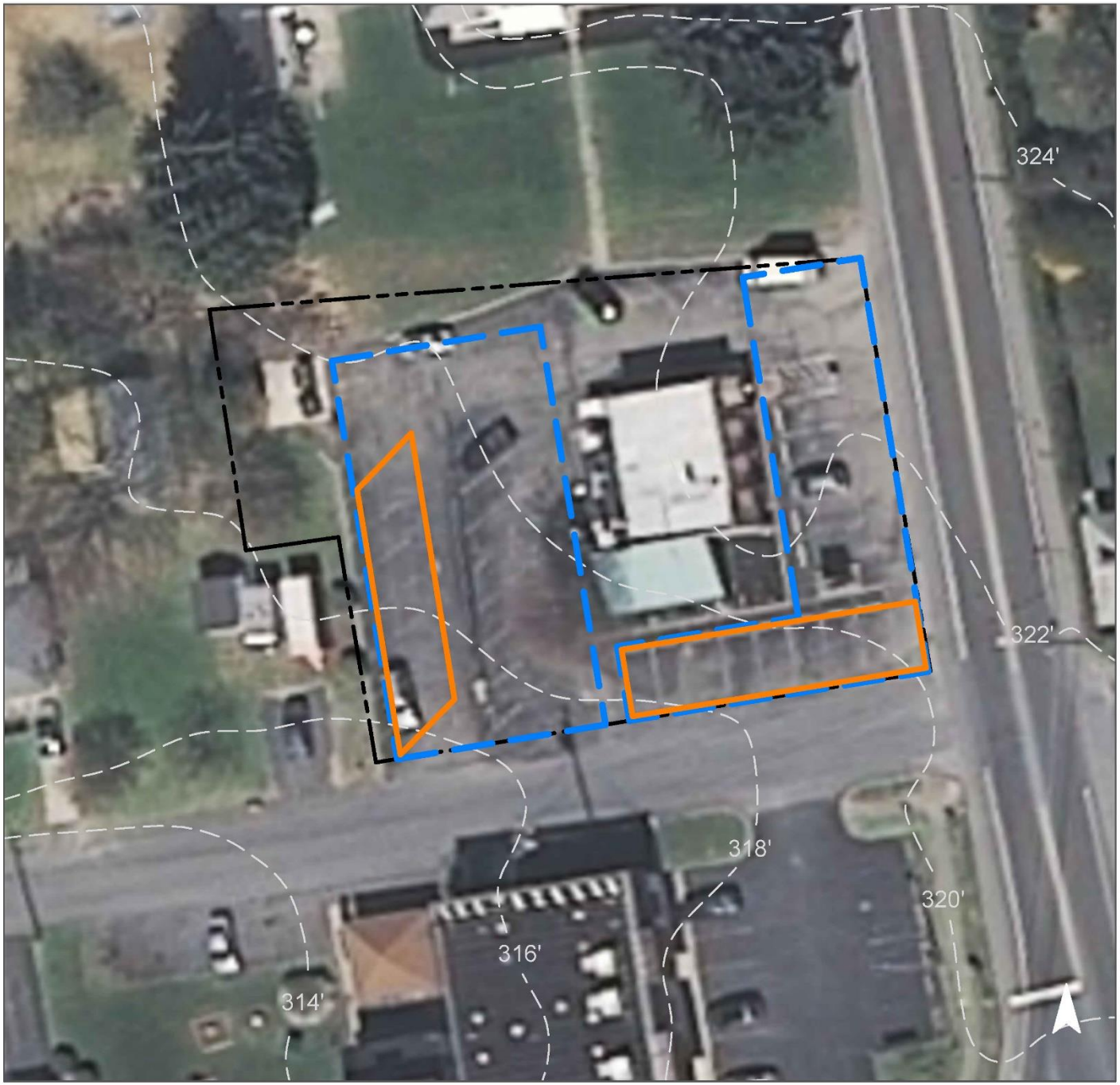
Block and Lot: Block 56, Lot 6

Parking spots to the east and west of the building can be replaced with porous asphalt to capture and infiltrate stormwater. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

Impervious Cover		Existing Loads from Impervious Cover (lbs/yr)			Runoff Volume from Impervious Cover (Mgal)	
%	sq. ft.	TP	TN	TSS	For the 1.25" Water Quality Storm	For an Annual Rainfall of 44"
73	13,508	0.7	6.8	62.0	0.011	0.37

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Pervious pavement	0.266	44	19,500	0.73	2,545	$63,625

GREEN INFRASTRUCTURE RECOMMENDATIONS



Pub 519

- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 20' 40'

ST. MARY ROMAN CATHOLIC CHURCH

Subwatershed: Pohatcong Creek

Site Area: 131,779 sq. ft.

Address: 830 5th Avenue
Alpha, NJ 08865

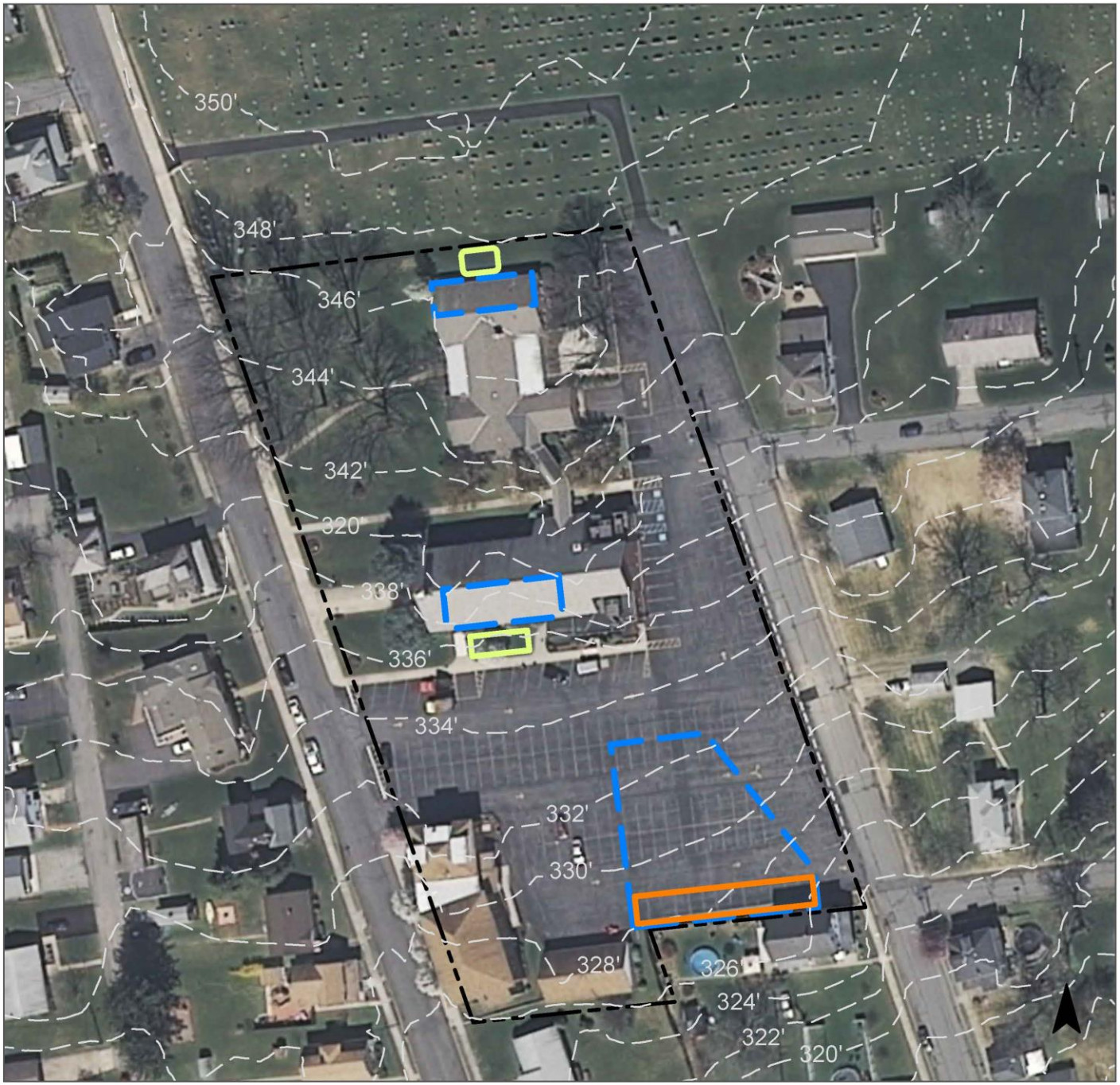
Block and Lot: Block 58, Lot 6, 7, 8, 9

Parking spots to the south of the building can be replaced with porous asphalt to capture and infiltrate stormwater. Installing rain gardens adjacent to the building can capture, treat, and infiltrate roof 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"
65	85,182	4.1	43.0	391.1	0.066	2.34

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Bioretention systems	0.114	19	8,355	0.31	1,100	$5,500
Pervious pavement	0.306	51	22,485	0.85	2,100	$52,500

GREEN INFRASTRUCTURE RECOMMENDATIONS



St. Mary Roman Catholic Church

- bioretention system
- pervious pavement
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 50' 100'

W. H. WALTERS FREE PUBLIC LIBRARY

Subwatershed: Pohatcong Creek

Site Area: 14,765 sq. ft.

Address: 1003 East Boulevard
Alpha, NJ 08865

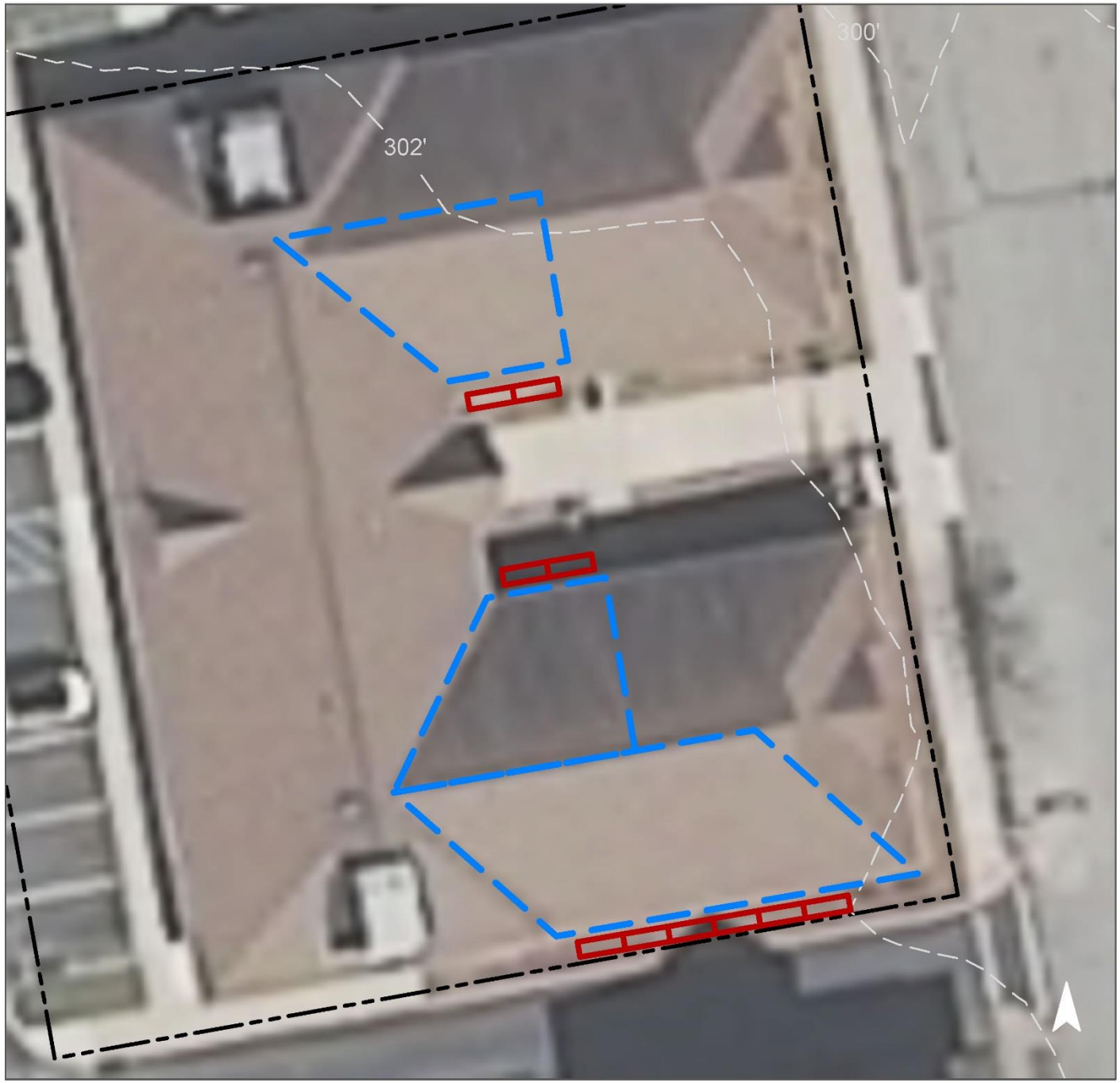
Block and Lot: Block 32, Lot 9

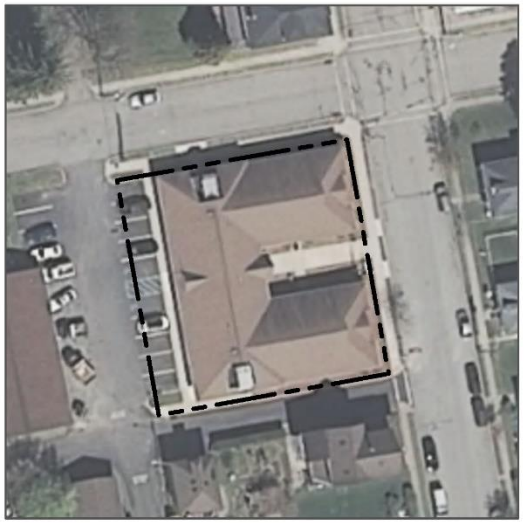
Installing planter boxes adjacent to the building can capture and treat roof runoff. A preliminary soil assessment suggests that the soils have suitable drainage characteristics for green infrastructure.

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"
50	7,383	0.4	3.7	33.9	0.006	0.20

Recommended Green Infrastructure Practices	Recharge Potential (Mgal/yr)	TSS Removal Potential (lbs/yr)	Maximum Volume Reduction Potential (gal/storm)	Peak Discharge Reduction Potential (cu. ft./second)	Estimated Size (sq. ft.)	Estimated Cost
Planter boxes	0.057	8	-	-	120	$10,000

GREEN INFRASTRUCTURE RECOMMENDATIONS





W. H. Walters Free Public Library

- planter box
- drainage area
- property line
- 2012 Aerial: NJOIT, OGIS

0 10' 20'

c. Summary of Existing Conditions

Summary of Existing Conditions

Subwatershed/Site Name/Total Site Info/GI Practice	Area (ac)	Area (SF)	Block	Lot	Existing Annual Loads			I.C. %	I.C. Area (SF)	Runoff Volumes from I.C.	
					TP (lb/yr)	TN (lb/yr)	TSS (lb/yr)			Water Quality Storm (1.25" over 2-hours) (Mgal)	Annual (Mgal)
LOPATCONG CREEK SUBWATERSHED	**0.51**	**22,079**			**0.7**	**7.2**	**65.1**		**14,179**	**0.011**	**0.39**
Alpha Veterinary Care											
Total Site Info	0.51	22,079	52	8	0.7	7.2	65.1	64	14,179	0.011	0.39
POHATCONG CREEK SUBWATERSHED	**50.98**	**2,220,842**			**19.0**	**199.2**	**1,811.0**		**394,429**	**0.307**	**10.82**
Alpha Fire Department											
Total Site Info	1.06	46,168	31	7	1.3	13.9	125.9	59	27,426	0.021	0.75
Alpha Pizza & Sub Shop											
Total Site Info	0.23	9,803	96	1	0.3	3.2	29.3	65	6,372	0.005	0.17
Creative K&B LLC											
Total Site Info	0.17	7,531	76	10	0.1	1.3	12.1	35	2,636	0.002	0.07
Gotham Shredders & Binding											
Total Site Info	2.61	113,656	95	4,5,6	3.1	32.3	293.7	56	63,963	0.050	1.75
John Dolak Ballfield											
Total Site Info	3.86	168,188	93, 94	1,4,5	0.6	6.0	54.6	7	11,902	0.009	0.33
John Dolak Memorial Pool											
Total Site Info	39.12	1,704,030	97	1,1.1	8.4	87.8	798.1	10	173,821	0.135	4.77
oKaysions Katering and Fresh Market											
Total Site Info	0.15	6,390	60	1	0.1	1.1	10.3	35	2,236	0.002	0.06
Pub 519											
Total Site Info	0.43	18,532	56	6	0.7	6.8	62.0	73	13,508	0.011	0.37
St. Mary's School											
Total Site Info	3.03	131,779	58	6,7,8,9	4.1	43.0	391.1	65	85,182	0.066	2.34
W. H. Walters Free Public Library											
Total Site Info	0.34	14,765	32	9	0.4	3.7	33.9	50	7,383	0.006	0.20

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 (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
	LOPATCONG CREEK SUBWATERSHED	**4,320**	**0.10**	**0.113**	**19**	**8,258**	**0.31**	**1,085**			**$22,025**	**19.6%**
1	**Alpha Veterinary Care**											
	Bioretention systems	890	0.02	0.023	4	1,698	0.06	255	5	SF	$1,275	6.3%
	Pervious pavement	3,430	0.08	0.089	15	6,560	0.25	830	25	SF	$20,750	24.2%
	Total Site Info	**4,320**	**0.10**	**0.113**	**19**	**8,258**	**0.31**	**1,085**			**$22,025**	**30.47%**
	POHATCONG CREEK SUBWATERSHED	**124,140**	**2.85**	**3.235**	**540**	**233,166**	**8.77**	**42,695**			**$831,075**	**5.9%**
2	**Alpha Fire Department**											
	Bioretention systems	4,835	0.11	0.126	21	9,245	0.35	1,610	5	SF	$8,050	17.6%
	Pervious pavement	14,820	0.34	0.386	65	28,334	1.07	4,940	25	SF	$123,500	54.0%
	Total Site Info	**19,655**	**0.45**	**0.512**	**86**	**37,580**	**1.42**	**6,550**			**$131,550**	**71.67%**
3	**Alpha Pizza & Sub Shop**											
	Bioretention systems	6,170	0.14	0.161	27	11,796	0.44	1,210	5	SF	$6,050	96.8%
	Total Site Info	**6,170**	**0.14**	**0.161**	**27**	**11,796**	**0.44**	**1,210**			**$6,050**	**96.8%**
4	**Creative K&B LLC**											
	Bioretention system	1,810	0.04	0.047	8	3,463	0.13	360	5	SF	$1,800	68.7%
	Total Site Info	**1,810**	**0.04**	**0.047**	**8**	**3,463**	**0.13**	**360**			**$1,800**	**68.7%**
5	**Gotham Shredders & Binding**											
	Bioretention systems	14,550	0.33	0.379	63	27,818	1.05	2,990	5	SF	$14,950	22.7%
	Total Site Info	**14,550**	**0.33**	**0.379**	**63**	**27,818**	**1.05**	**2,990**			**$14,950**	**22.7%**
6	**John Dolak Ballfield**											
	Bioretention system	2,985	0.07	0.078	13	5,707	0.21	600	5	SF	$3,000	25.1%
	Pervious pavement	4,590	0.11	0.120	20	8,774	0.33	1,720	25	SF	$43,000	38.6%
	Total Site Info	**7,575**	**0.17**	**0.197**	**33**	**14,481**	**0.54**	**2,320**			**$46,000**	**63.6%**
7	**John Dolak Memorial Pool**											
	Bioretention systems	16,050	0.37	0.418	70	30,683	1.15	3,160	5	SF	$15,800	9.2%
	Pervious pavement	27,660	0.63	0.721	121	52,884	1.99	18,600	25	SF	$465,000	15.9%
	Total Site Info	**43,710**	**1.00**	**1.139**	**191**	**83,567**	**3.14**	**21,760**			**$465,000**	**15.9%**

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 (SF)	Unit Cost ($)	Unit	Total Cost ($)	I.C. Treated %
8	**oKaysions Katering and Fresh Market**											
	Bioretention system	1,655	0.04	0.043	7	3,164	0.12	345	5	SF	$1,725	74.0%
	Pervious pavement	500	0.01	0.013	2	957	0.04	1,295	25	SF	$32,375	22.4%
	Total Site Info	**2,155**	**0.05**	**0.056**	**9**	**4,121**	**0.16**	**1,640**			**$34,100**	**96.4%**
9	**Pub 519**											
	Pervious pavement	10,200	0.23	0.266	44	19,500	0.73	2,545	25	SF	$63,625	75.5%
	Total Site Info	**10,200**	**0.23**	**0.266**	**44**	**19,500**	**0.73**	**2,545**			**$63,625**	**75.5%**
10	**St. Mary Roman Catholic Church**											
	Bioretention systems	4,370	0.10	0.114	19	8,355	0.31	1,100	5	SF	$5,500	5.1%
	Pervious pavement	11,760	0.27	0.306	51	22,485	0.85	2,100	25	SF	$52,500	13.8%
	Total Site Info	**16,130**	**0.37**	**0.420**	**70**	**30,840**	**1.16**	**3,200**			**$58,000**	**18.9%**
11	**W. H. Walters Free Public Library**											
	Planter box	2,185	0.05	0.057	8	n/a	n/a	120	1,000	box	$10,000	29.6%
	Total Site Info	**2,185**	**0.05**	**0.057**	**8**	**n/a**	**n/a**	**120**			**$10,000**	**29.6%**