Green Infrastructure Rapid Assessment Plan

East Branch Allen Creek Watershed

Prepared by:

The Stormwater Coalition of Monroe County and

Monroe County Department of Environmental Services

Prepared for:

New York State Environmental Protection Fund Round 10

October, 2013

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Cover Photo: Upper - East Brook at French Road; Lower - confluence of East Brook and East Branch

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List of Abbreviations

cfs	cubic feet per second
CWP	Center for Watershed Protection
E	Education
EMC	Event Mean Concentration
EPA	US Environmental Protection Agency
GI	Green Infrastructure
GIS	Geographic Information System
GPS	Global Positioning System
IC	Impervious Cover
I	Infiltration
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
POC	Pollutant of Concern
S	Flood Storage
CP	Channel Protection
CR	Community Revitalization
Sc	Source Control
SWAAP	Stormwater Assessment and Action Plan
RH	Riparian Habitat
Wq	Water Quality
WS	Watershed
USGS	US Geological Survey

Section 1. Assessment Overview

1.1 PROBLEM STATEMENT:

Similar to many developing areas, growth in Monroe County has caused some unfortunate consequences to water quality. One consequence is that developed areas shed larger volumes of stormwater from impervious surfaces (roads, buildings and parking lots) than from natural landscapes. Because there is more volume, there is more pollution. Typical pollutants include: petroleum products and heavy metals from vehicles; fertilizers, chemicals and animal waste from lawns; and, sediment from eroded streambanks, construction sites and roadways.

A second consequence is that streams more frequently flow full or overflow their banks. High stormwater flows can cause flooding, damage property, and harm fish and wildlife habitat. Common damages from high flows are eroded stream banks, wider and deeper stream channels, and excessive sediment deposition. The degradation results in poor water quality and added maintenance costs to municipalities and property owners. In Monroe County, stormwater pollution and associated wet weather flows have harmed virtually all urban streams, the Genesee River and Lake Ontario's shoreline.

1.2 PURPOSE:

Developing plans to improve our impacted water resources is the objective of this the Rapid Green Infrastructure Assessment Plan (Plan). Due to limited funding, a method was devised to quickly evaluate multiple watersheds for stormwater retrofit potential. The main product is a ranked inventory of retrofit projects that, if constructed, have the potential to improve water quality and stream health and provide flow attenuation that will reduce erosive storm flows and localized drainage problems. A second significant product is the creation of multiple, electronic data files and maps that lay the foundation for future, more in-depth studies. The Plan is a simplified version of more detailed Stormwater Assessment and Action Plans being done in other parts of Monroe County. These larger studies include water quality sampling as well as modeling the effects of the current watershed's condition and the potential improvement from proposed retrofits. The field work completed for this report was kept to a minimum and only a summary report is produced (herein). The project was conducted with funding from New York's Environmental Protection Fund, the Monroe County Department of Environmental Services, and the Stormwater Coalition of Monroe County.

1.3 SETTING:

Allen Creek consists of two significant and diverse subwatersheds, Main branch and East branch (Figure 1). After merging with the Main branch in the Town of Pittsford, the Creek flows through Brighton and then discharges into Irondequoit Creek in Panorama Valley (Penfield). Because of their size and diversity, the two branches were assessed separately (see also "Green Infrastructure Rapid Assessment Plan Allen Creek Watershed—Main Branch"). A middle branch of the creek, referred to as West Brook, drains into the Erie Canal at lock 32 near Clover Street. Retrofits for that tributary area of approximately 1000 acres were considered in this report.

Virtually the entire 6300 acre East Branch watershed lies in the Town of Pittsford. The main land use throughout the upper watershed is agriculture which transitions to residential in the central and lower portion and a small area of commercial land use along Monroe Avenue in the northeast (Figure 2).

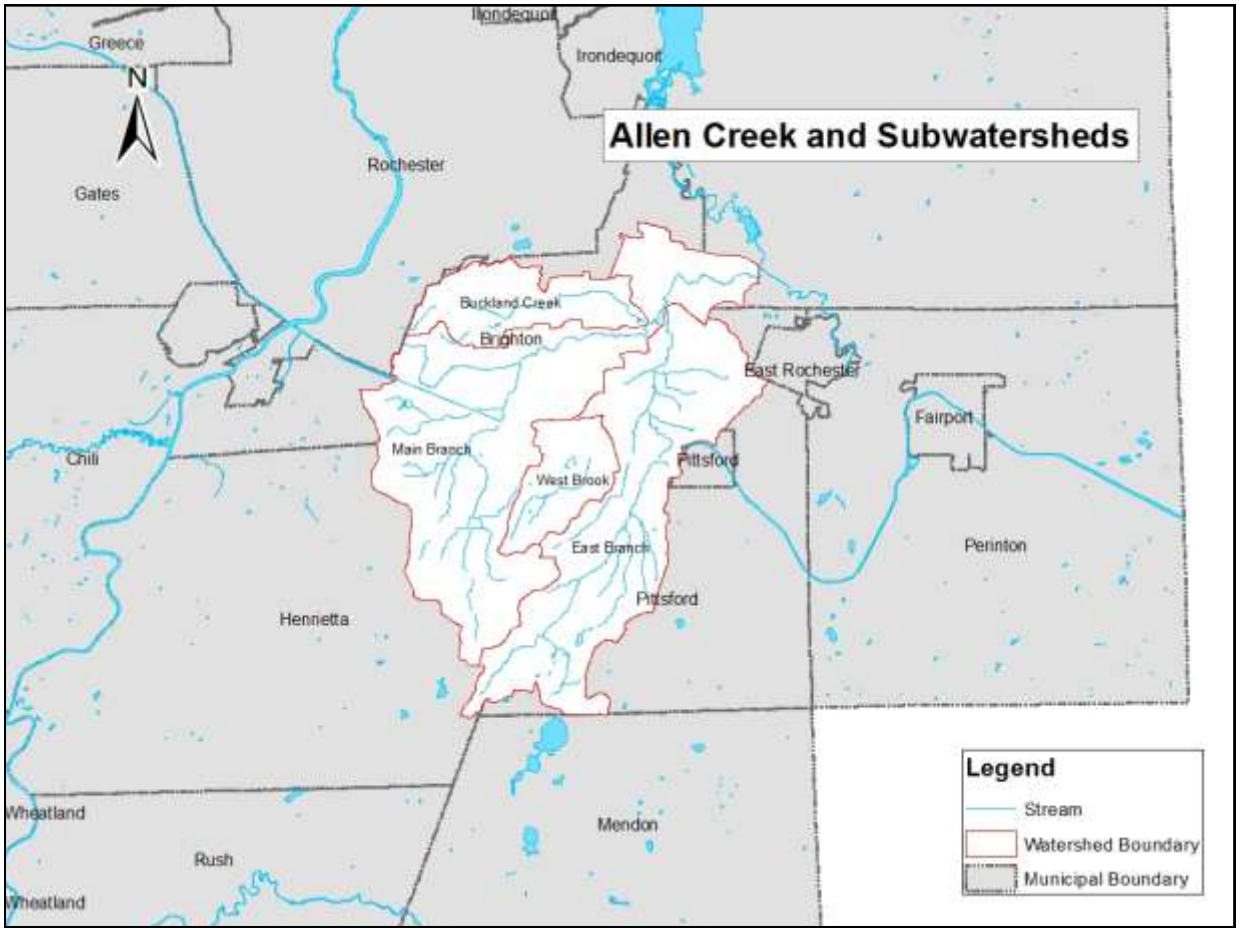


Figure 1: Allen Creek watershed.

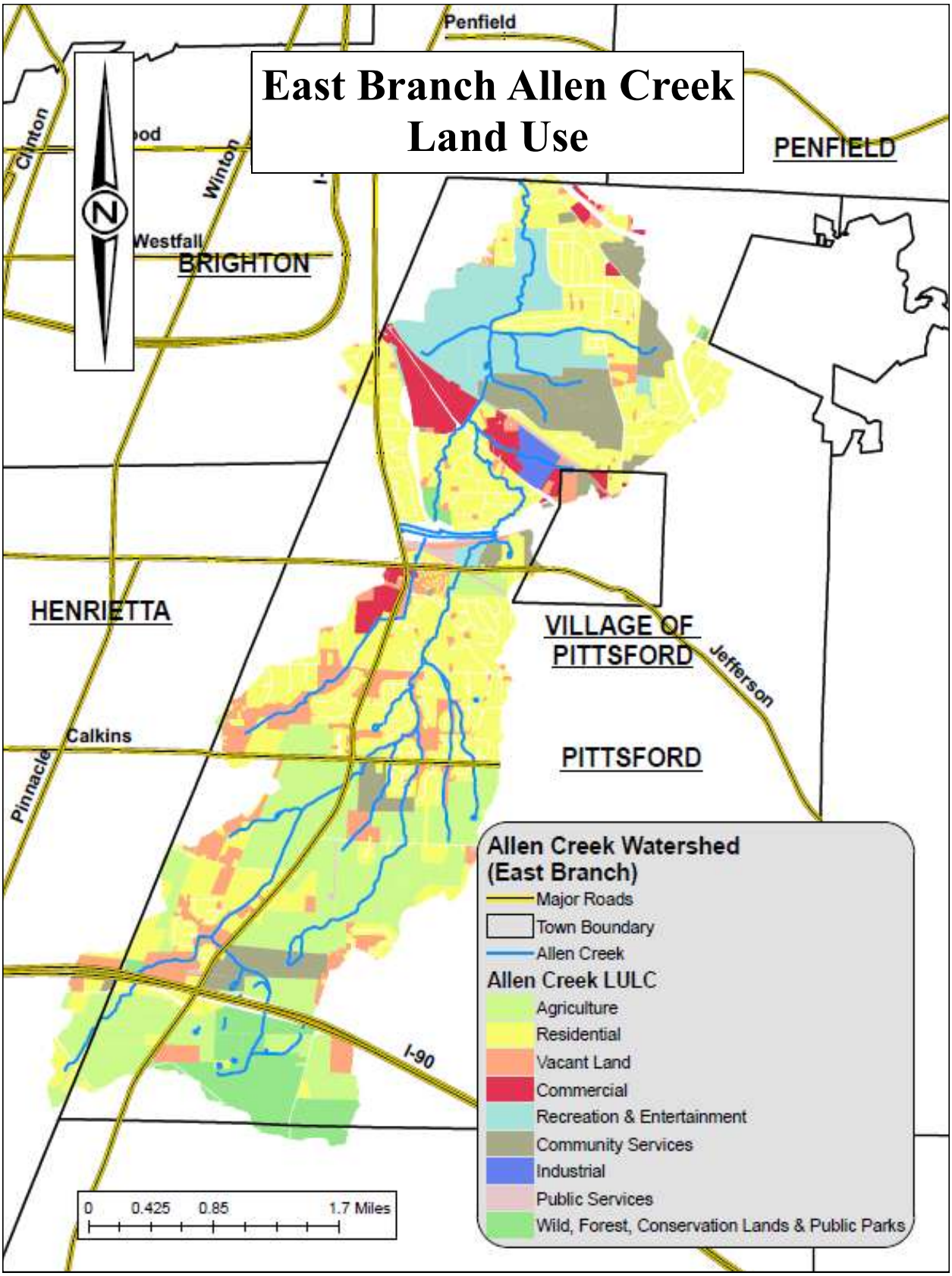


Figure 2: Land use within East Branch Allen Creek watershed.

Table 1. Watershed Data	
Metric	**Value**
Area	6303 (Acres)
Mapped Stream Length	21.1 (Miles)
Percent of Stream Channelized	7%
Primary/secondary land use	Residential/Wild, Forested, Conserv. Land &
Land Use (percent of watershed)	
Agricultural	19%
Residential	29%
Vacant Land	9%
Commercial	3%
Recreation & Entertainment	2%
Community Service	12%
Industrial	1%
Public Services	1%
Wild, Forested, Conservation Lands & Public	25%
# of Stormwater Treatment Ponds	39
# of Stormwater Outfalls	175
Current Impervious Cover (%)	24.40%
Estimated Future Impervious Cover (%)*	30.01%
Wetland acres	≈450
Municipal Jurisdiction	Pittsford 98%, Henrietta 1%, Brighton 1%

* estimated for 20 year build out

1.4 WATERSHED CHARACTERISTICS:

1.4.1 Water Quality Concerns According to the New York State Department of Environmental Conservation's "Lake Ontario Basin Waterbody Inventory and Priority Waterbodies List" (NYSDEC 2004), Allen Creek and its tributaries have minor impairments. An excerpt from the waterbody datasheet states that *"… various urban/stormwater sources and other nonpoint sources in the watershed...Urban and stormwater runoff related to the high degree of impervious surface area (shopping plazas, parking lots, roadways, etc.) has been identified as the primary source of nutrients and other pollutants (pathogens, oil and grease, floatables) to the creek…Agricultural activities in the upper watershed, impacts from failing and/or inadequate on-site septic systems, tributary stream erosion and residential and commercial development throughout the watershed are also thought to contribute to nutrient and silt/sediment loadings."* The full (two-page) waterbody datasheet is included in Appendix B.

Allen Creek is part of the larger, Irondequoit Creek watershed which has been the focus of numerous water quantity and quality studies conducted by the U.S. Geological Survey (USGS) in cooperation with Monroe County. Streamflow and water quality is monitored and analyzed to determine chemical and flow properties and to document changes. Prior to 2003, precipitation quantities and groundwater levels were also measured, and atmospheric deposition and groundwater samples were analyzed for selected chemical constituents. USGS has written extensive reports and updates that describe streamflow, examine water-quality trends and report annual loads of selected constituents to Irondequoit Creek and Bay (USGS, multiple years).

The west-to-east flowing Erie Canal intersects many north flowing streams in Monroe County with most being conveyed underneath the Canal via aqueducts. The Canal has siphon discharges to several streams in Monroe County including both the Main and East Branches of Allen Creek. Since Canal water quality is generally very poor, these discharges contribute significant pollutant loads to the receiving streams. Sampling the Creek and Canal discharges for approximately 15 years has shown turbidity and total suspended solids were higher in water from the siphon than above the siphon and generally resulted in elevated concentrations and overall higher pollutant loads in the receiving streams. Removing these discharges, especially to smaller streams like East Branch Allen Creek, is a recommendation of this report.

USGS monitoring determined the effects of a 15 acre detention basin built on the stream at Jefferson Road in August 1995 to alleviate downstream flooding and improve water quality. The basin has been credited for significant reductions in all nutrient water pollutants except Phosphorus (typically a pollutant of concern in New York streams) however some lower than normal runoff periods have also been sited. Retroftting this pond has been discussed with the Town of Pittsford Department of Public Works (DPW) staff. Modifications to improve its pollutant removal efficiency and reduce erosion on the banks of the basin are a recommendation of this report.

USGS also developed a precipitation-runoff model of Irondequoit Creek watershed to simulate the effects of land-use changes and storm flow-detention basins on flooding and stormwater pollution. Results of model simulations indicated that peak flows and loads of sediment and total phosphorus would increase if the upper (rural) watershed became developed. Discussions between Monroe County and USGS to update the model took place in late 2012 and are a recommendation of this report as well.

1.4.2 Impervious Cover Analysis The Center for Watershed Protection created the "Impervious Cover Model" (ICM) to predict a typical stream's health using the relationship between subwatershed impervious cover and stream quality indicators. This relationship has have been confirmed by nearly 60 peer-reviewed stream research studies (Figure 4). The ICM shows stream quality decline becomes evident when the watershed impervious cover exceeds ten percent. The East Branch has an average of 24 percent impervious cover identifying stream quality somewhere between poor and good and impacted (aquatic life).

impervious cover identifying stream quality somewhere between poor and fair and impacted aquatic life.

Based on current zoning, future impervious cover (over the next 10 years) will increase by 4 percent.

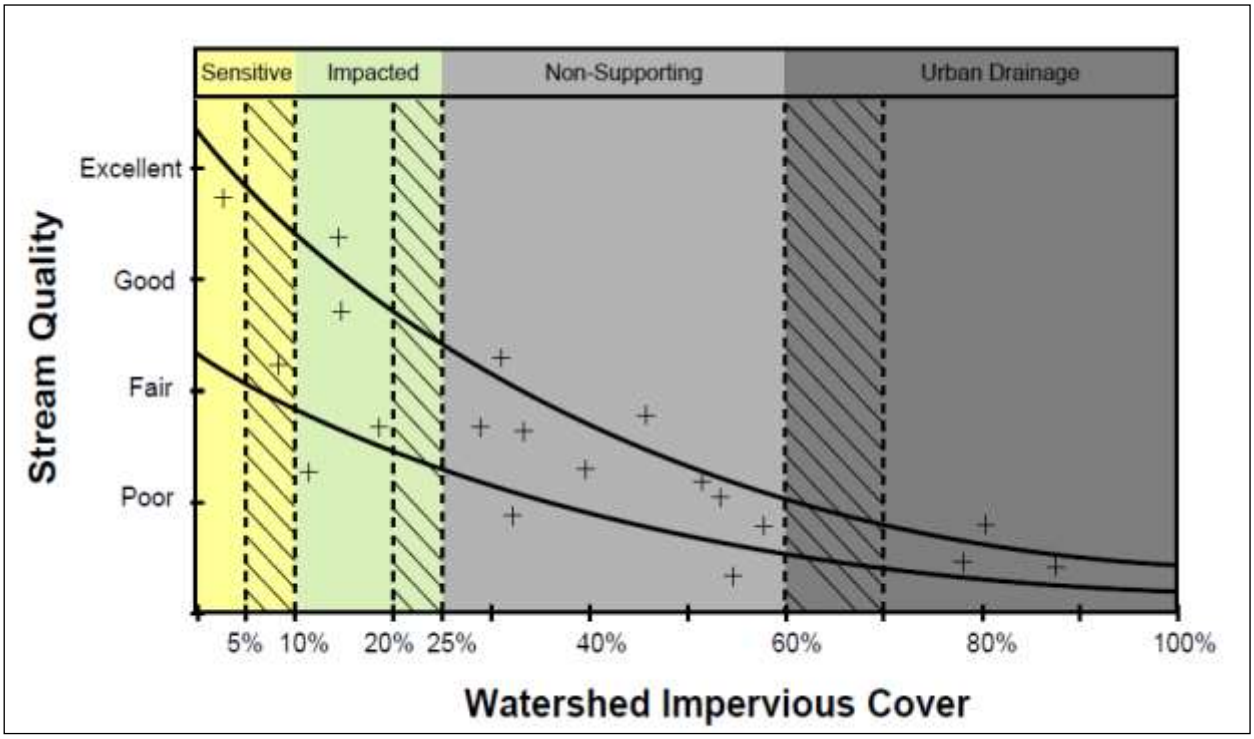


Figure 4: Impervious Cover Model

1.4.3 Drainage Concerns Interviews with DPW staff at the Town of Pittsford and a review of their Comprehensive Drainage Study (Lozier, 1982) identified drainage issue within the town. While most drainage issues have been addressed by an active stormwater management program in the Town, some minor drainage concerns persist in low-lying areas downstream of the Erie Canal and above French Road. Below French Road and the Pittsford Plaza area there are occasional high flows that cause streambank erosion and some out of bank flows.

Also described in the 1982 Report are potential locations for stormwater storage basins – most in the upper portions of the watershed. For example, there is an opportunity to provide stormwater storage in a small drainage area in the northwest corner of the Village of Pittsford. Also, the use of the old (empty) Barge Canal bed should be investigated (Figure 5). Construction of these storage basins may reduce flooding and erosion problems in downstream areas and are included as retrofits.

1.4.4 Streambank Erosion There are five reported erosion sites on East Branch Allen Creek from assessments done in 2001 by the Monroe County Soil & Water Conservation District. All sites are located upstream of Jefferson Road. All five sites were visited and show mostly minor eroded stream banks (Figure 6). DPW staff at the Town of Pittsford found no recent reports of erosion complaints elsewhere however, the stream has been heavily armored in the most downstream reach as it meanders through Oak Hill Country Club (Figure 7). This suggests the stream was migrating and likely impacting the course.

Figure 5: Old Erie Canal Bed—potential available storage.

Figure 6: Eroded Streambank downstream of Toby Road in Pittsford on East Branch Allen Creek.

Figure 7: Rock-lined streambanks as it flows through Oak Hill Country Club.

1.4.5 Soils A simplistic yet useful way to define how much stormwater runs off the pervious land surface is to determine soils' infiltration capabilities, their ability to absorb stormwater. Soil scientist have categorized soils into four categories, A through D. A and B soils are well drained and absorb much of the stormwater that drains on or over them. C and D soils are more poorly drained. However, the soils in some parts of this watershed are not categorized, denoting areas that have been so altered by land development thus grouping a specific soil type is not feasible. The amount of each soil type in East Branch Allen Creek is: A soils 5%; B soils 62%; C soils 18%; D soils or not verified 14% (Figure 8).

The large percentage of B soils will allow for infiltration-type stormwater retrofits. These practices installed in the upper parts of the watershed may prevent and reduce flooding, drainage problems, and streambank erosion as well as greatly improving water quality in Allen Creek.

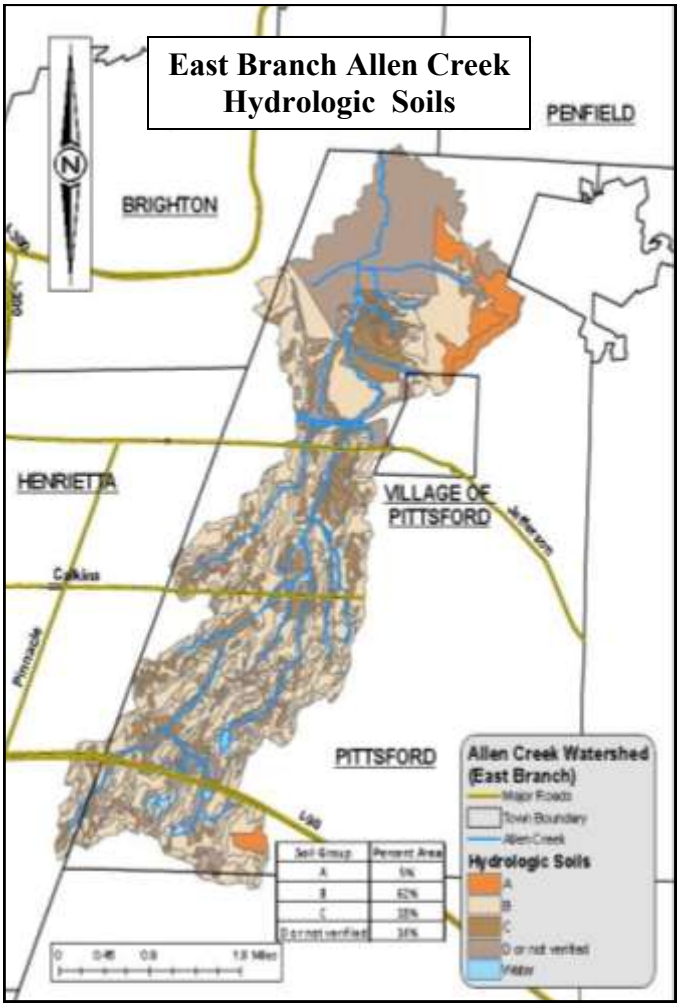


Figure 8. Hydric Soils Map of East Branch Allen Creek

Section 2. Retrofit Inventory

An inventory of potential retrofit sites was generated using GIS mapping tools to locate public properties, stormwater practices like ponds, old urban areas (built before stormwater management requirements) and, pervious soil areas. Next, the appropriate stormwater management practice was determined for the properties identified and those were ranked based on their feasibility, how much they would improve water quality and, be cost-effective. While the stormwater management practice types focused on green infrastructure (stormwater volume-reducing practices such as infiltration) retrofitting stormwater ponds is a highly cost-effective practice and these projects rank well and are recommended. Complete details of methods used to complete the rapid assessment and retrofit ranking is explained in a reference document titled "Assessment Methodology, Project Descriptions, and Retrofit Ranking Criteria For Monroe County Green Infrastructure Rapid Assessment Plans".

Two broad categories of retrofit project types were considered:

1. New stormwater ponds, upgrades to existing stormwater ponds and new stormwater storage to existing drainage channels.
2. Green Infrastructure (GI). This category was divided and ranked by where a GI project might be installed and includes:
   - Public Right of Ways,
   - Older Residential Neighborhoods, and
   - Other Locations (such as areas with large impervious surfaces, ie shopping malls)

Green infrastructure projects can be installed on private property as well as in the right of way on neighborhood streets, major roadways, and highways. These types of projects involve the modification of concrete channels and stormwater conveyance systems . Green infrastructure projects on private property involve the installation of rain gardens to capture and retain roof runoff. Project locations and project number within the watershed are shown in Figure 9. Table 2 lists project addresses and how they scored. Diagrams of the top scoring projects follow the table.

Other watershed retrofitting that would help meet water quality goals include the investigation and remediation of any stormwater hotspots (Appendix C) and dechannelization and revegetation of straightened and degraded stream corridors (Appendix D). However these projects are outside the scope of this report and therefore were not ranked. Figure 8 shows

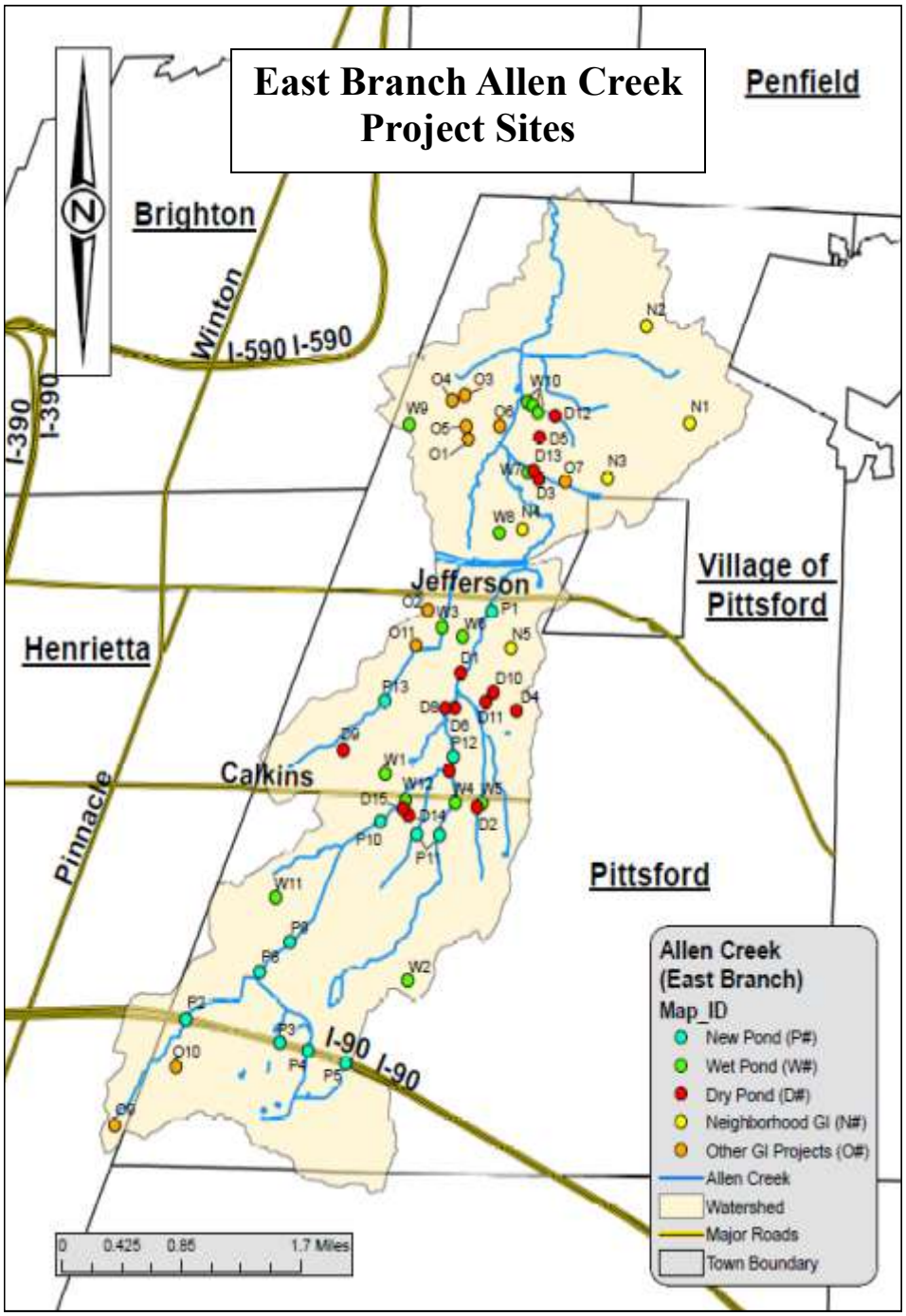


Figure 9: A map of the potential projects sites branch watershed.

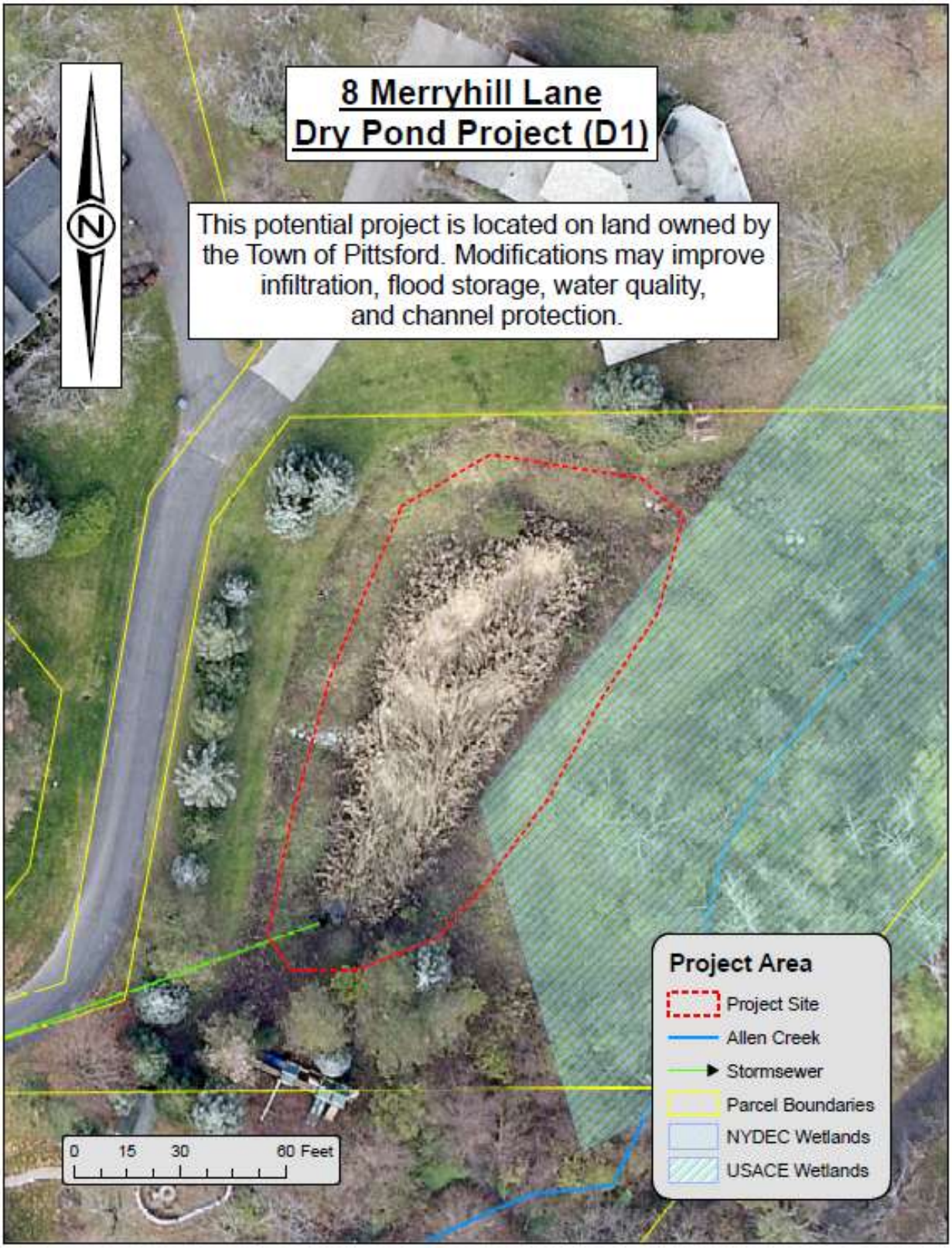
Table 2 Allen Creek East Branch Retrofit Ranking List							
Map I.D.	**Project Type**	**Overall Rank**	**Project Location**	**Feasability**	**Watershed Benefits**	**Cost Effec-tiveness**	**Score**
D1	Dry Pond	1	8 Merryhill Lane	5	I, FS, WQ, CP	3	13
D6	Dry Pond	2	Corner of Stone Road and Chatham Woods	5	I, FS, WQ, CP	3	13
D8	Dry Pond	3	Corner of Stone Road and Chelsea Park	5	I, FS, WQ, CP	3	13
P1	New Pond	4	165 W Jefferson Road	5	I, FS, WQ, CP	3	13
P12	Check Dams	5	Chatham Woods	5	I, FS, WQ, CP	3	13
P13	Check Dams	6	Wexford Glen	5	I, FS, WQ, CP	3	13
W2	Wet Pond	7	Access off Dunnewood	5	I, FS, WQ, CP	3	13
W4	Wet Pond	8	Corner of Calkins and Barrington Hills	5	I, FS, WQ, CP	3	13
W5	Wet Pond	9	Crownwood Circle	5	I, FS, WQ, CP	3	13
P2	ROW	10	I-90 (1)	5	I, FS, WQ	3	12
P3	ROW	11	I-90 (2)	5	I, FS, WQ	3	12
P4	ROW	12	I-90 (3)	5	I, FS, WQ	3	12
P5	ROW	13	I-90 (4)	5	I, FS, WQ	3	12
D2	Dry Pond	14	Calkins b/w Ambergate & Crownwood	4	I, FS, WQ, CP	3	12
D7	Dry Pond	15	Chatham Woods (off Hadley Court)	4	I, FS, WQ, CP	3	12
D9	Dry Pond	16	Roxbury Lane	4	I, FS, WQ, CP	3	12
D13	Dry Pond	17	3600 Monroe Ave. (Brittany Lane) (West)	3	I, FS, WQ, CP, E	3	12
W1	Wet Pond	18	Settlers Green - Pittsford	5	FS, WQ, CP	3	11
D14	Dry Pond	19	1899 Calkins road (South)	4	I, FS, WQ	3	11
D15	Dry Pond	20	1899 Calkins Road (North)	4	I, FS, WQ	3	11
P8	Check Dams	21	Woodgreen Drive	4	I, FS, WQ	3	11
D3	Dry Pond	22	3600 Monroe Ave. (Brittany Lane) (South)	3	I, FS, WQ, E	3	11
P11	Check Dams	23	1899 Calkins Road (East)	3	I, FS, WQ, CP, E	2	11
W3	Wet Pond	24	Corner of Clover St and Tobey St (South side of Tobey)	5	FS, WQ	3	10
W12	Wet Pond	25	1899 Calkins Road	4	FS, WQ, CP	3	10

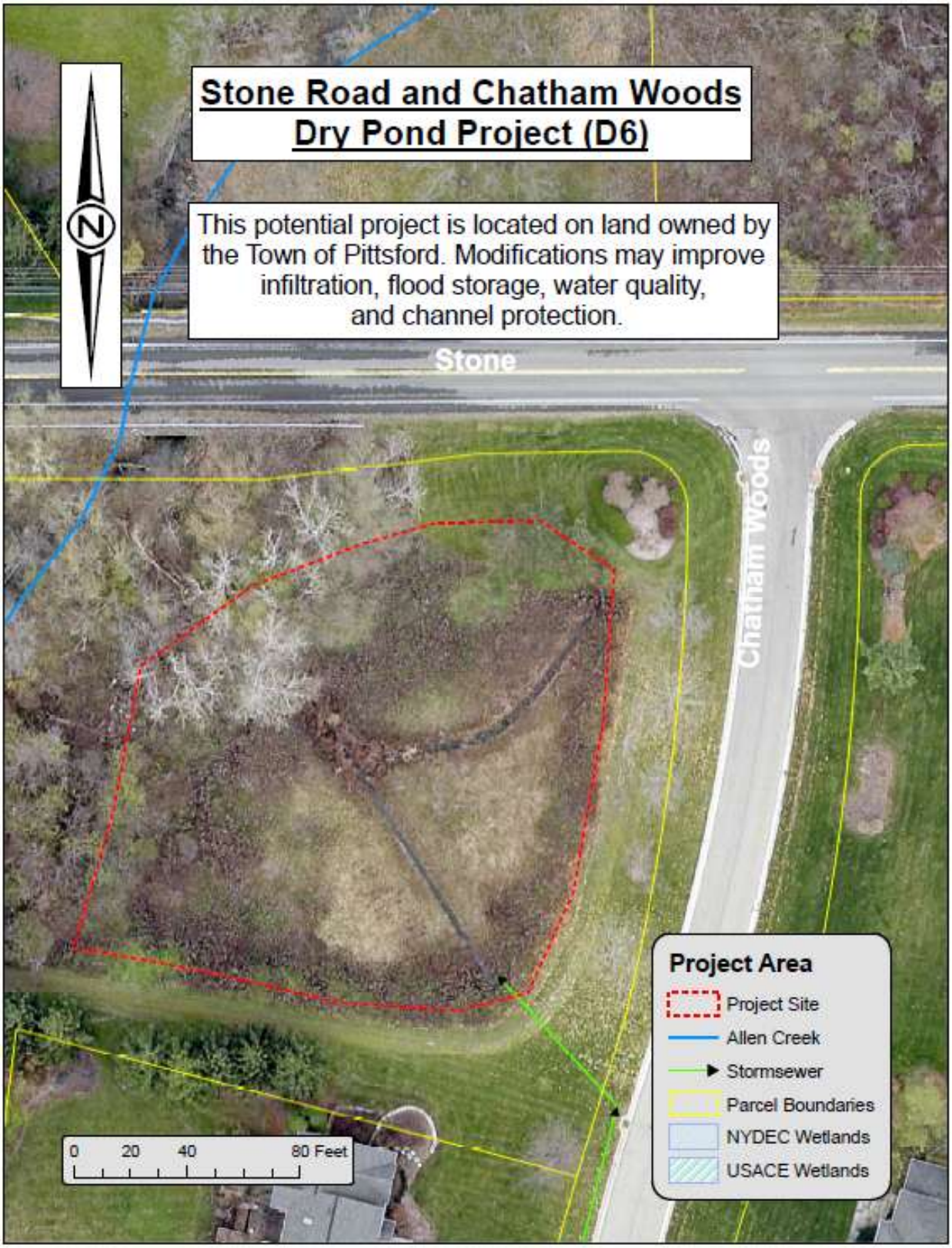
Allen Creek East Branch Retrofit Ranking List

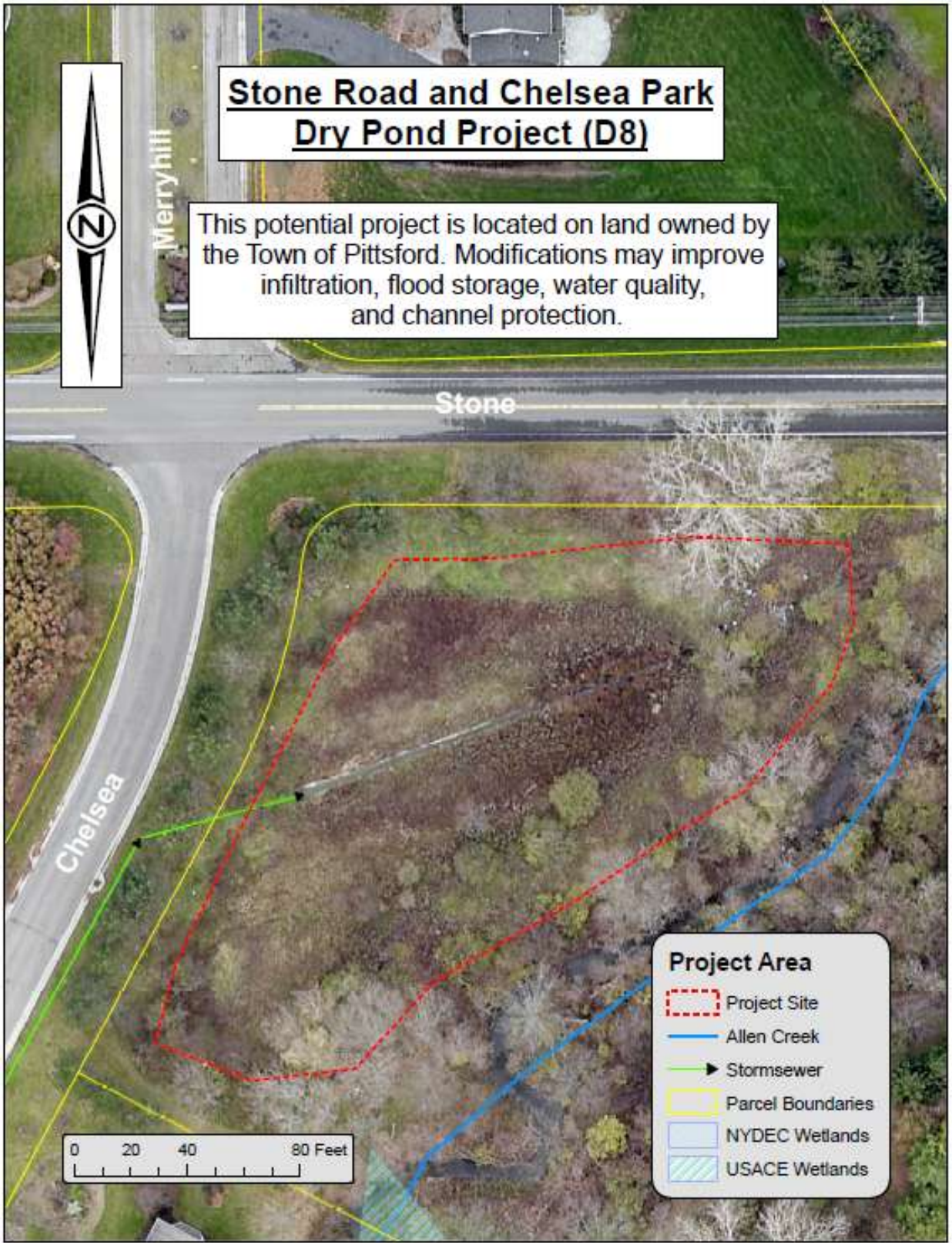
Map I.D.	Project Type	Overall Rank	Project Location	Feasability	Watershed Benefits	Cost Effec-tiveness	Score
D10	Dry Pond	26	4 Kinwood Lane	3	I, FS, WQ	3	10
D4	Dry Pond	27	7 Stonebridge Lane	3	I, FS, WQ	3	10
D5	Dry Pond	28	131 French Rd	3	I, FS, WQ	3	10
O5	ICR	29	3349 Monroe Ave.	3	I, S, WQ, SC	2	10
O6	ICR	30	3400 Monroe Ave.	3	I, S, WQ, SC	2	10
D12	Dry Pond	31	150 French Road	2	I, FS, WQ, CP	3	10
O1	Bioretention	32	3349 Monroe Ave.	3	I, S, SC	2	9
O3	Bioretention	33	3220 Monroe Ave.	3	I, WQ, SC	2	9
O4	Bioretention	34	3195 Monroe Ave.	3	I, S, SC	2	9
O7	ICR	35	3750 Monroe Ave	3	I, WQ, SC	2	9
W7	Wet Pond	36	3592 Monroe Ave	3	FS,WQ, CP	3	9
W10	Wet Pond	37	150 French Road	1	I, FS, WQ, CP	3	9
W9	Wet Pond	38	4 Taylors Rise	1	I, FS, WQ, CP	3	9
P14	Check Dams	39	1899 Calkins Road (West)	3	I, WQ, E	2	8
W6	Wet Pond	40	Tobey Brook	3	FS, WQ	3	8
D11	Dry Pond	41	5 Kinwood Lane	2	I, WQ	3	8
N1	NGI	42	East Ave Management	2	WQ, CR, E, SC	2	8
N2	NGI	43	East Ave (East side of East Ave)	2	WQ, CR, E, SC	2	8
N3	NGI	44	French Road	2	WQ, CR, E, SC	2	8
N4	NGI	45	Woodland Road	2	WQ, CR, E, SC	2	8

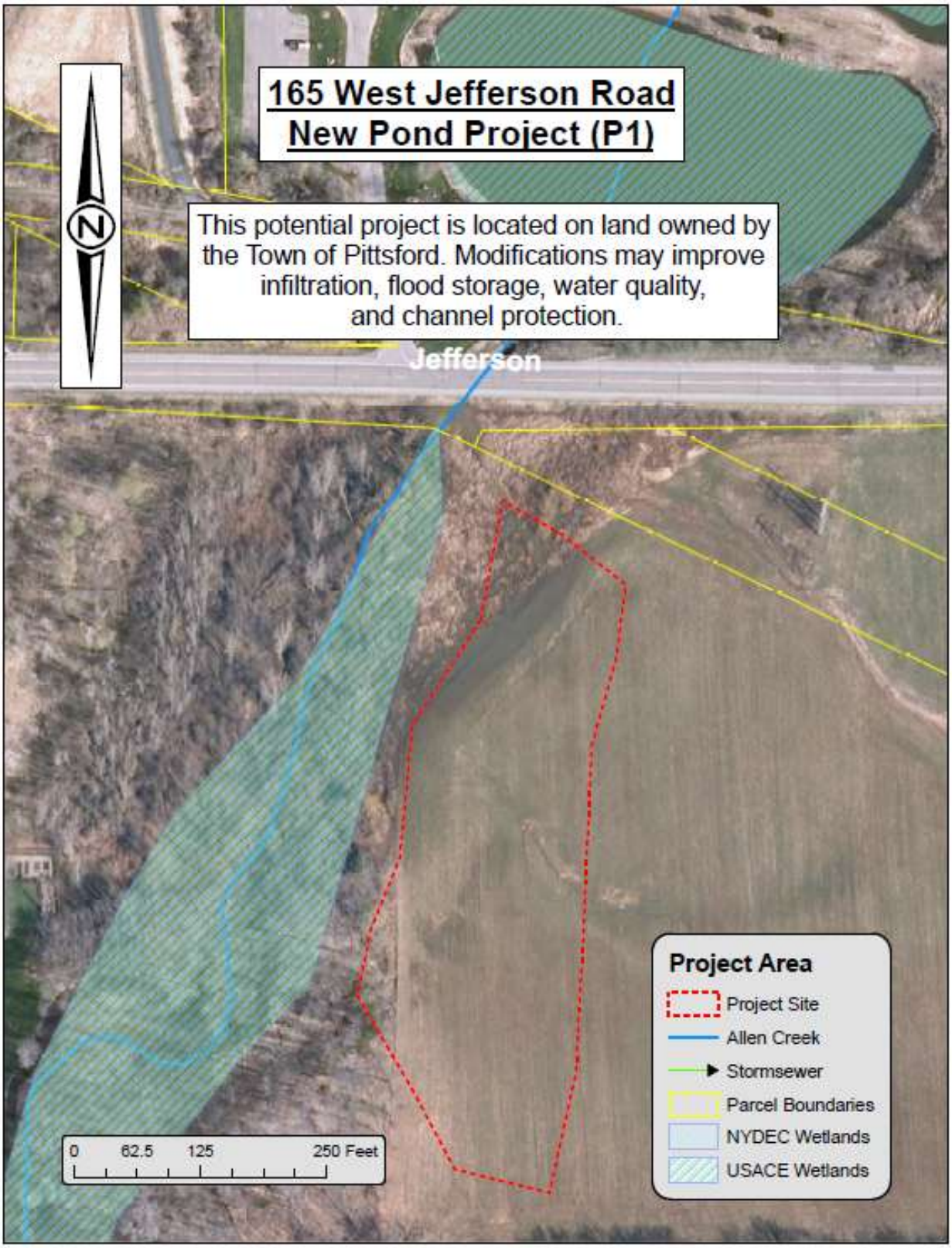
Allen Creek East Branch Retrofit Ranking List

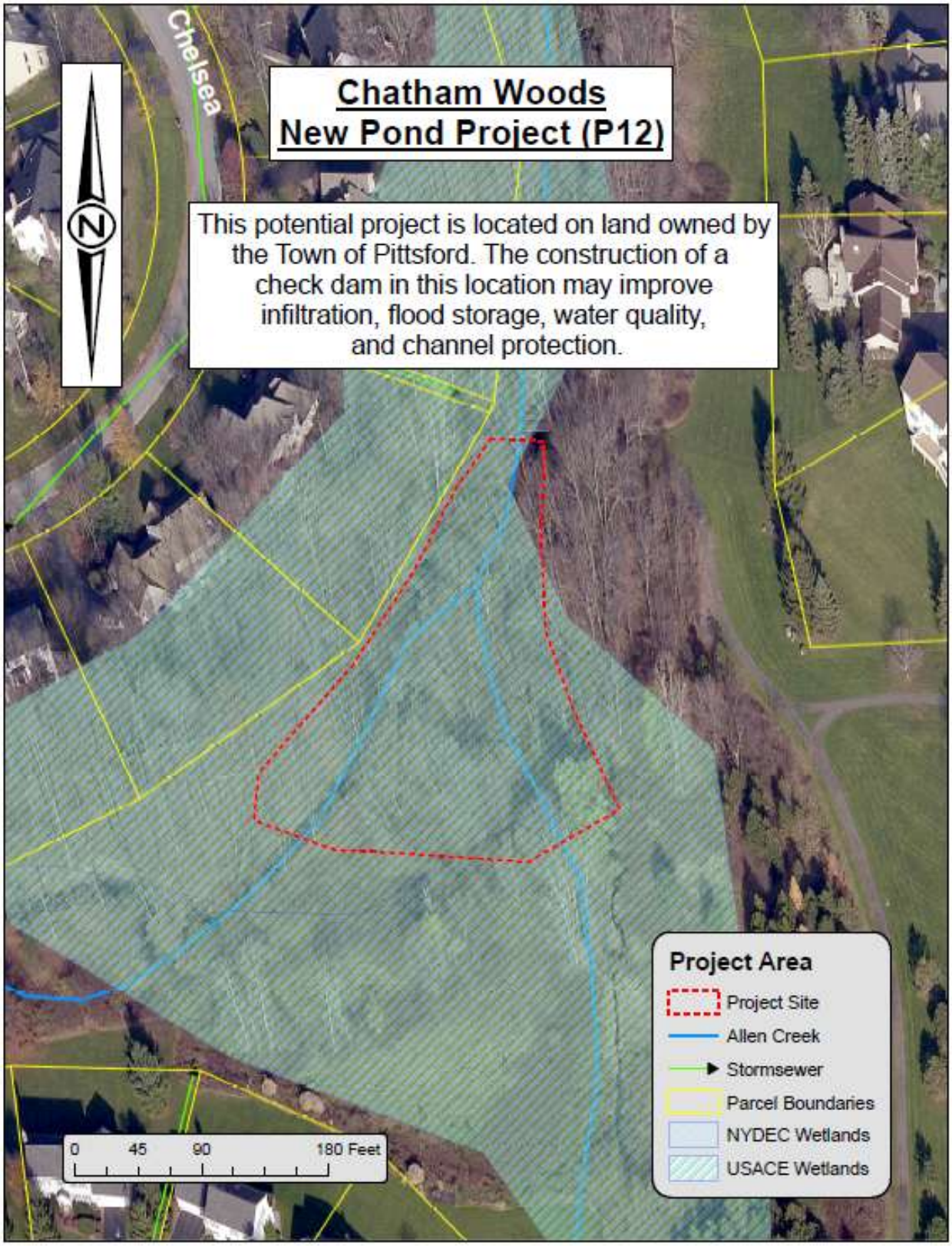
Map I.D.	Project Type	Overall Rank	Project Location	Feasability	Watershed Benefits	Cost Effec-tiveness	Score
N5	NGI	46	Tobey Estates	2	WQ, CR, E, SC	2	8
P10	Check Dams	47	3151 Clover Street	1	I, FS, WQ	3	8
P9	Check Dams	48	21 Graywood Lane	1	I, FS, WQ	3	8
W8	Wet Pond	49	14 Hearthstone	1	I, FS, WQ	3	8
O2	Bioretention	50	2851 Clover St	3	S, SC	2	7
W11	Wet Pond	51	1 Poinciana Drive	1	I, FS	3	7
O10	Zero Order	52	3571 Clover Street	0	I, FS, CP	3	7
O11	Zero Order	53	Behind 2919 Clover Street	0	I, FS, CP	3	7
O9	Zero Order	54	175 Tobin Road	0	I, FS, CP	3	7

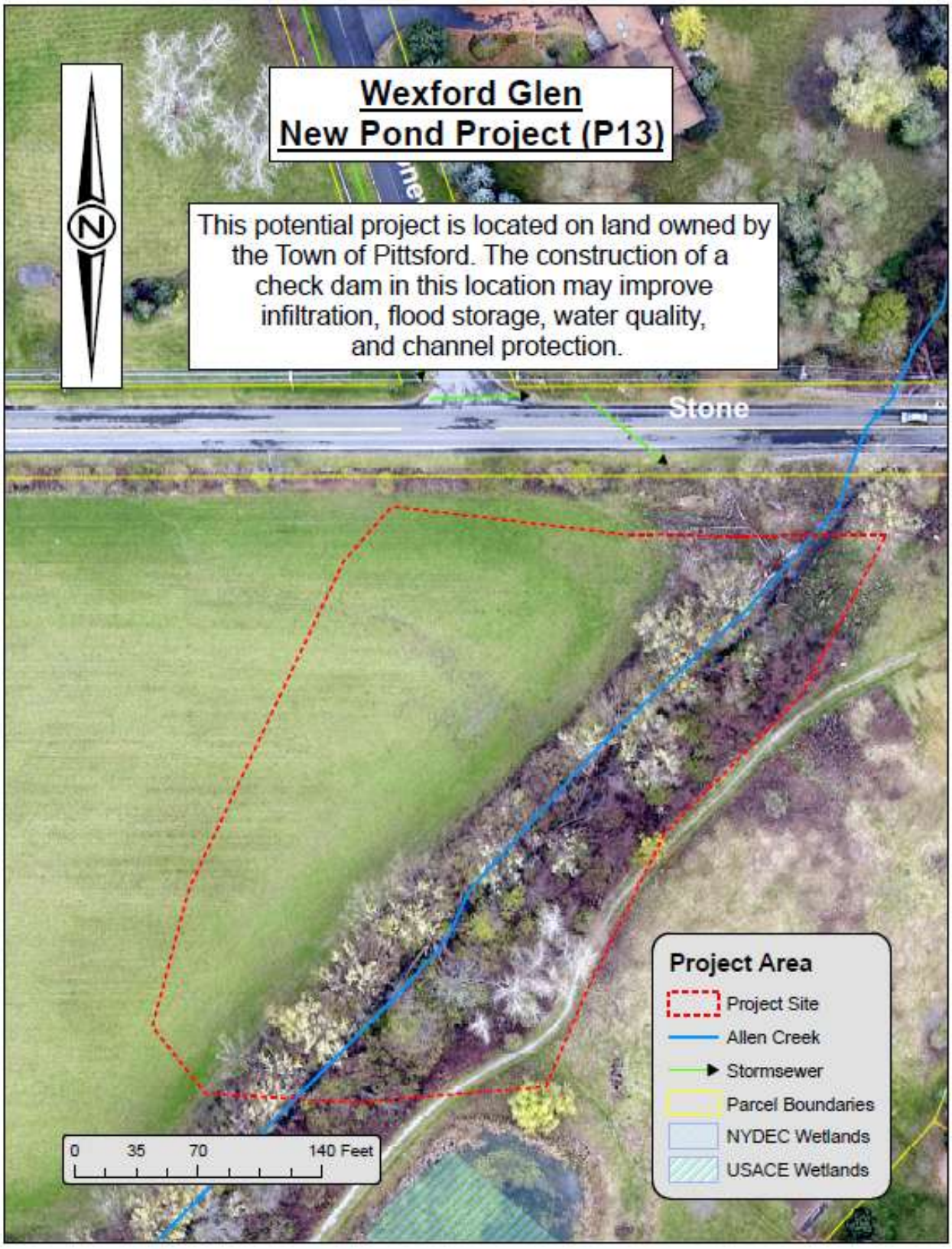

8 Merryhill Lane
Dry Pond Project (D1)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
0 15 30 60 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

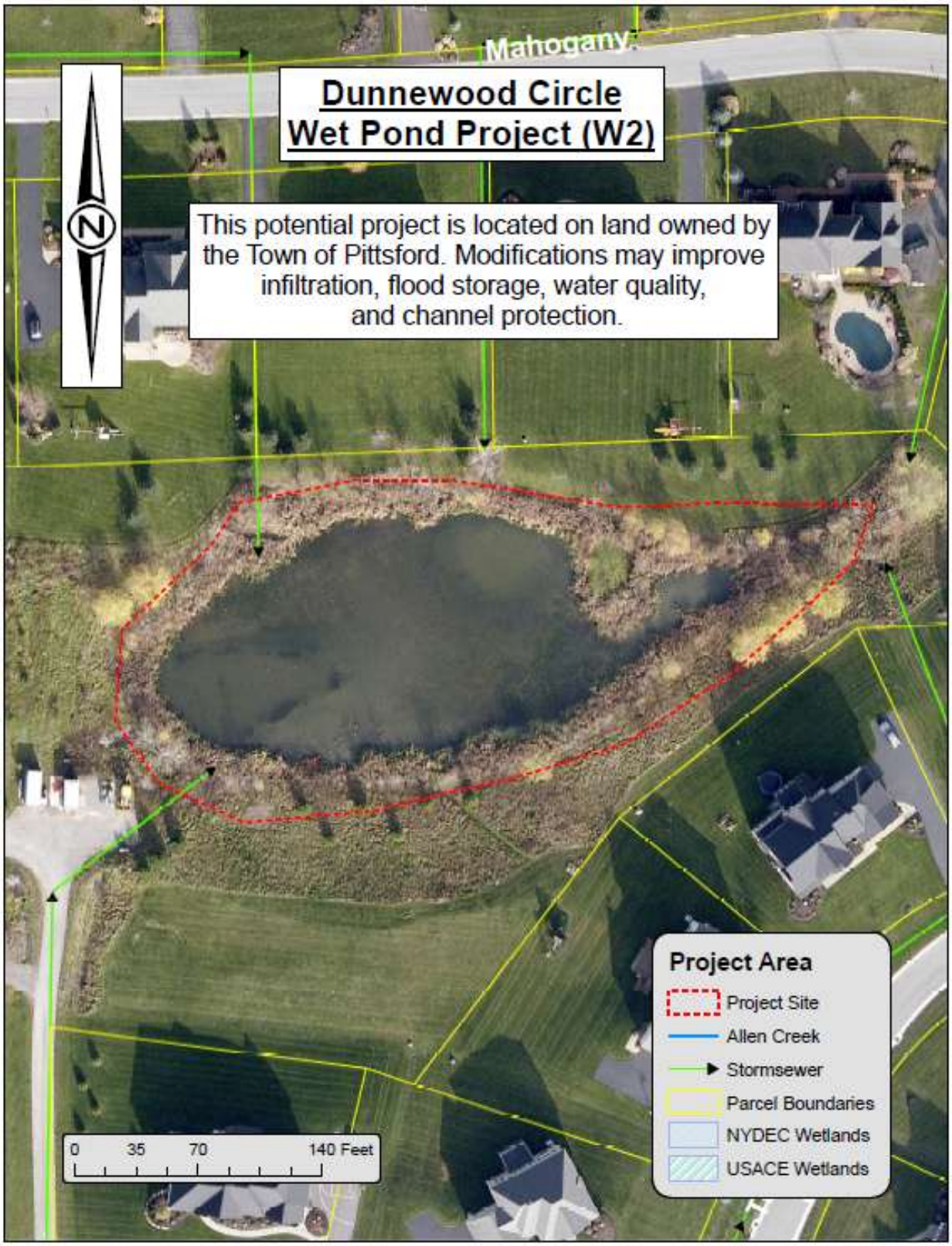

Stone Road and Chatham Woods
Dry Pond Project (D6)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
Stone
Chatham Woods
0 20 40 80 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

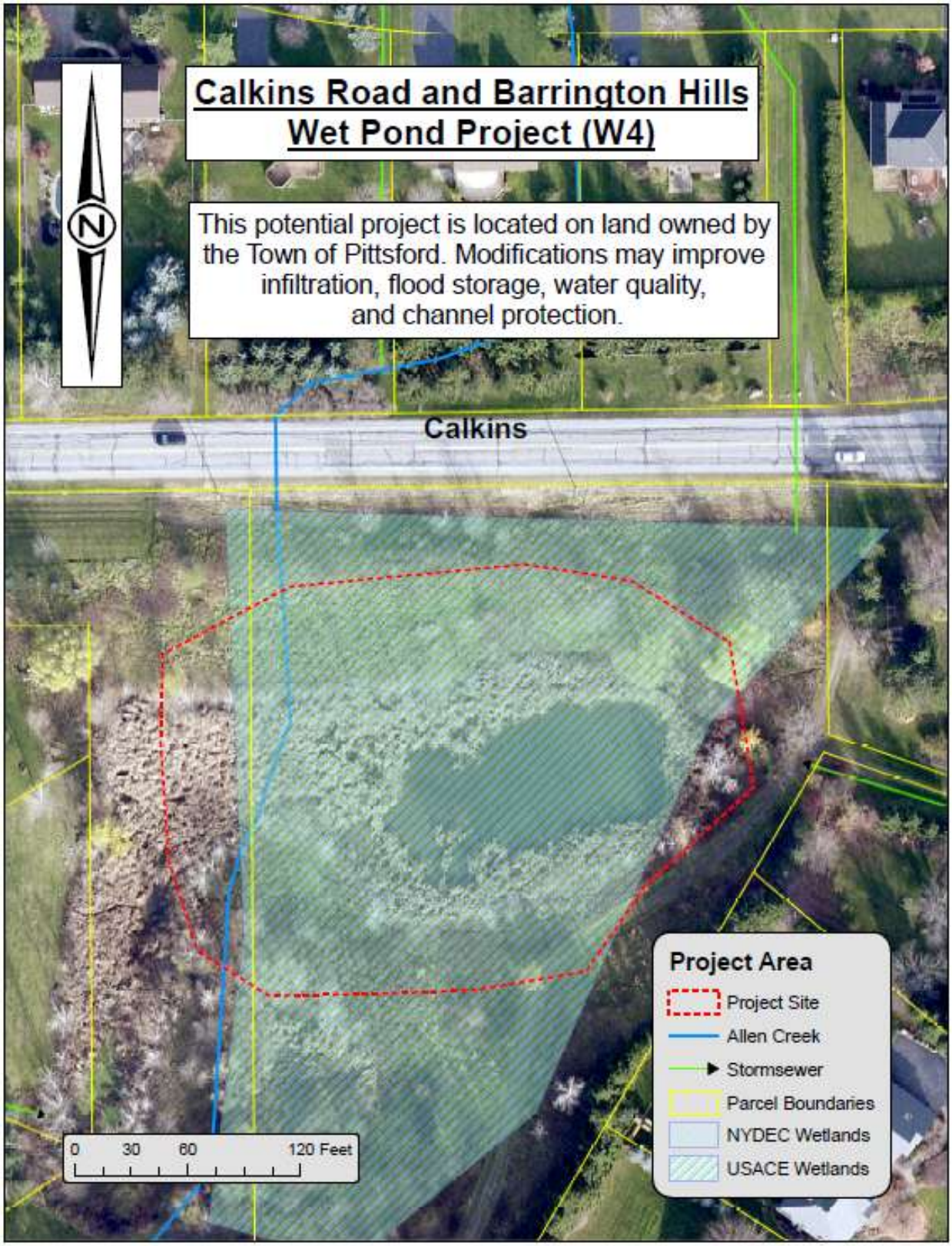

Stone Road and Chelsea Park
Dry Pond Project (D8)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
Merryhill
Stone
Chelsea
0 20 40 80 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

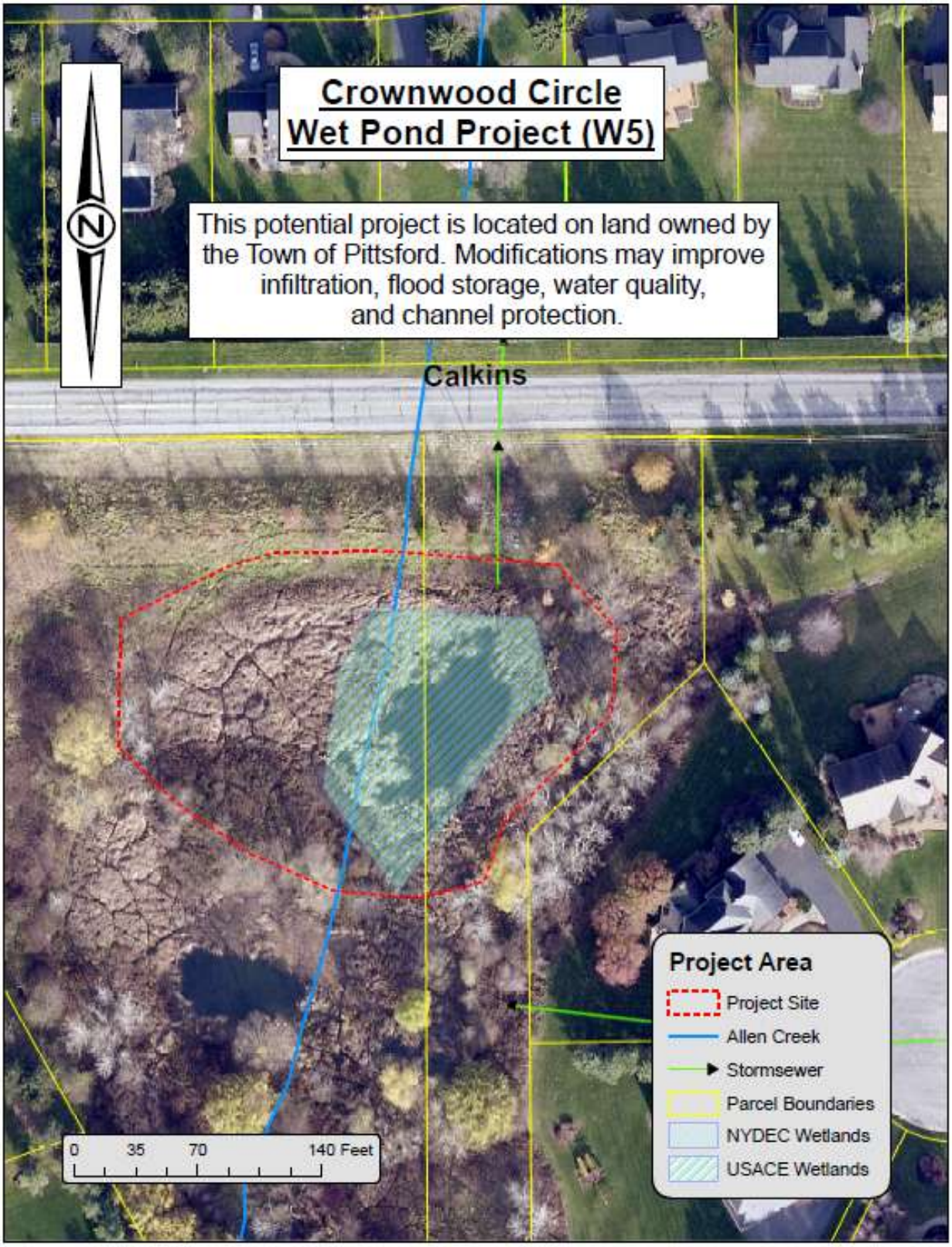

165 West Jefferson Road
New Pond Project (P1)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
Jefferson
0 62.5 125 250 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

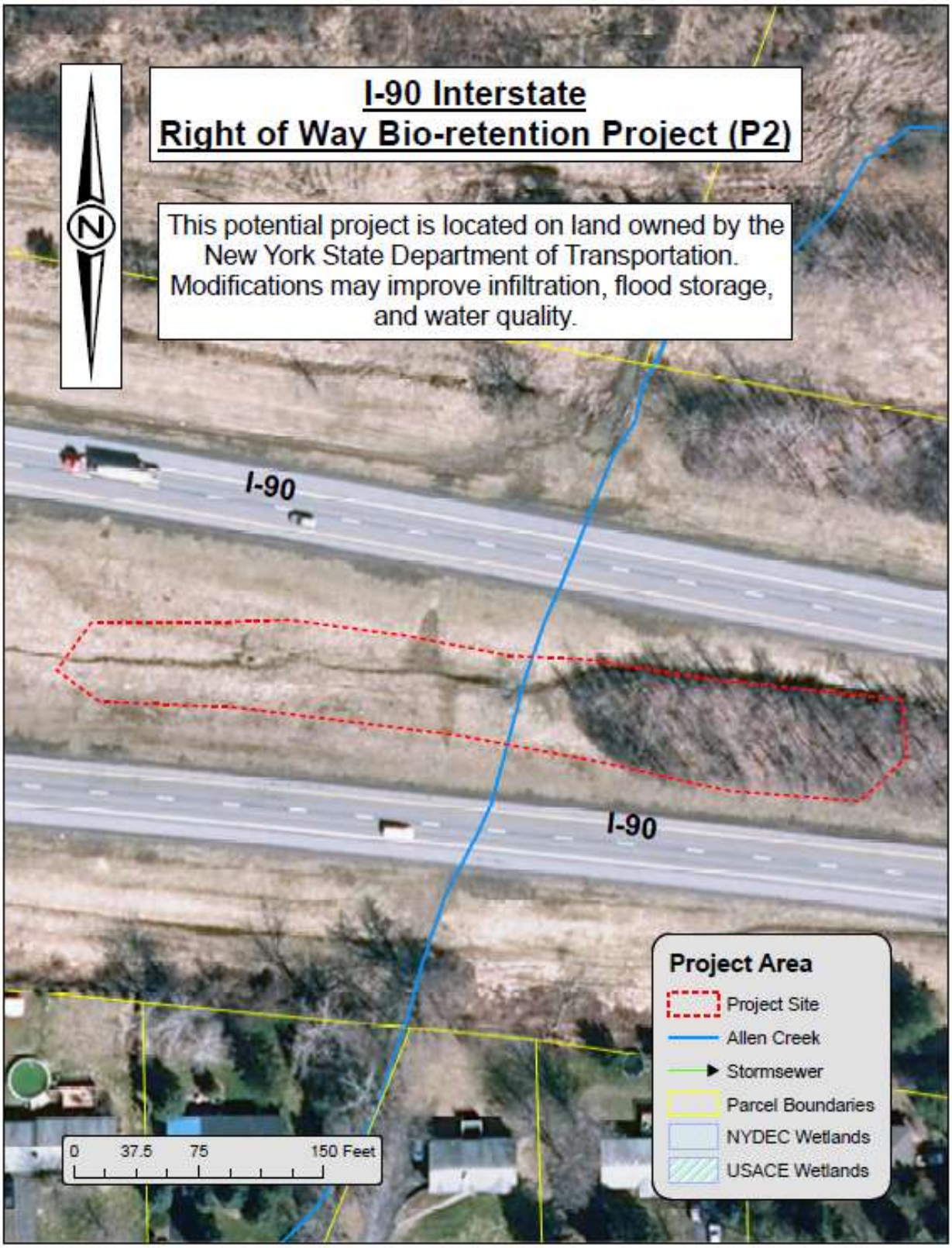

Chelsea
Chatham Woods
New Pond Project (P12)
This potential project is located on land owned by the Town of Pittsford. The construction of a check dam in this location may improve infiltration, flood storage, water quality, and channel protection.
N
0 45 90 180 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

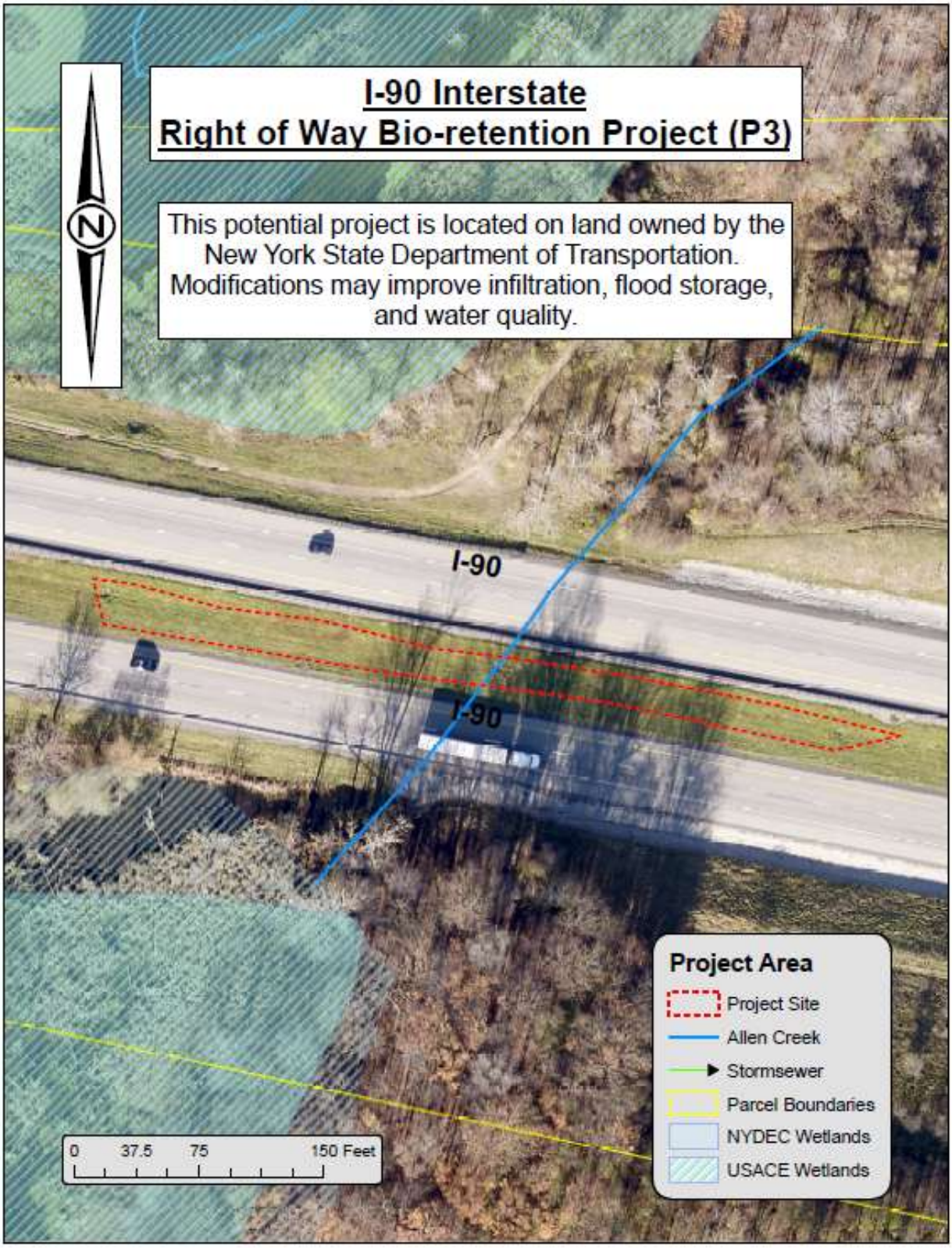

Wexford Glen
New Pond Project (P13)
This potential project is located on land owned by the Town of Pittsford. The construction of a check dam in this location may improve infiltration, flood storage, water quality, and channel protection.
N
Stone
0 35 70 140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

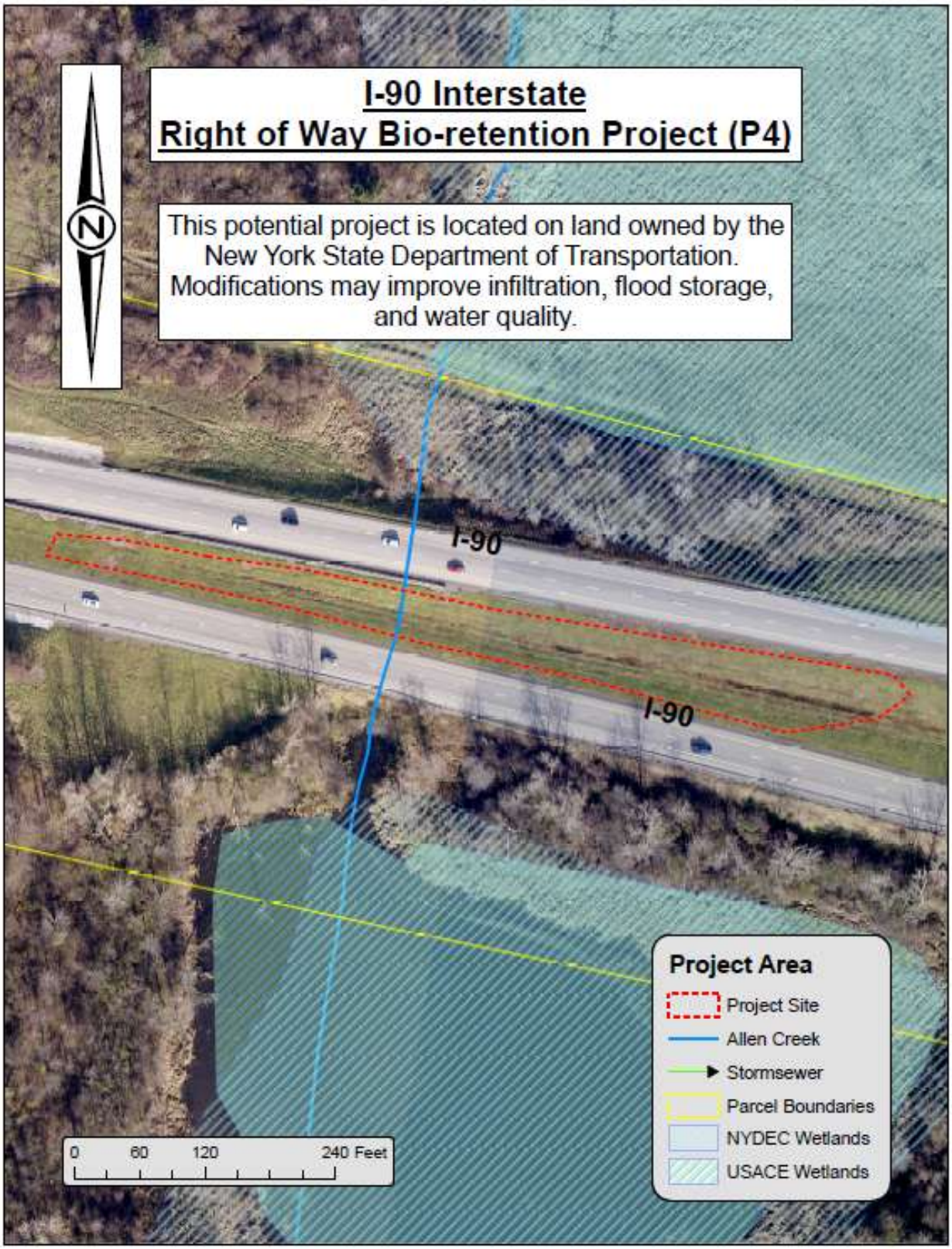

Mahogany
Dunnewood Circle
Wet Pond Project (W2)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
0 35 70 140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

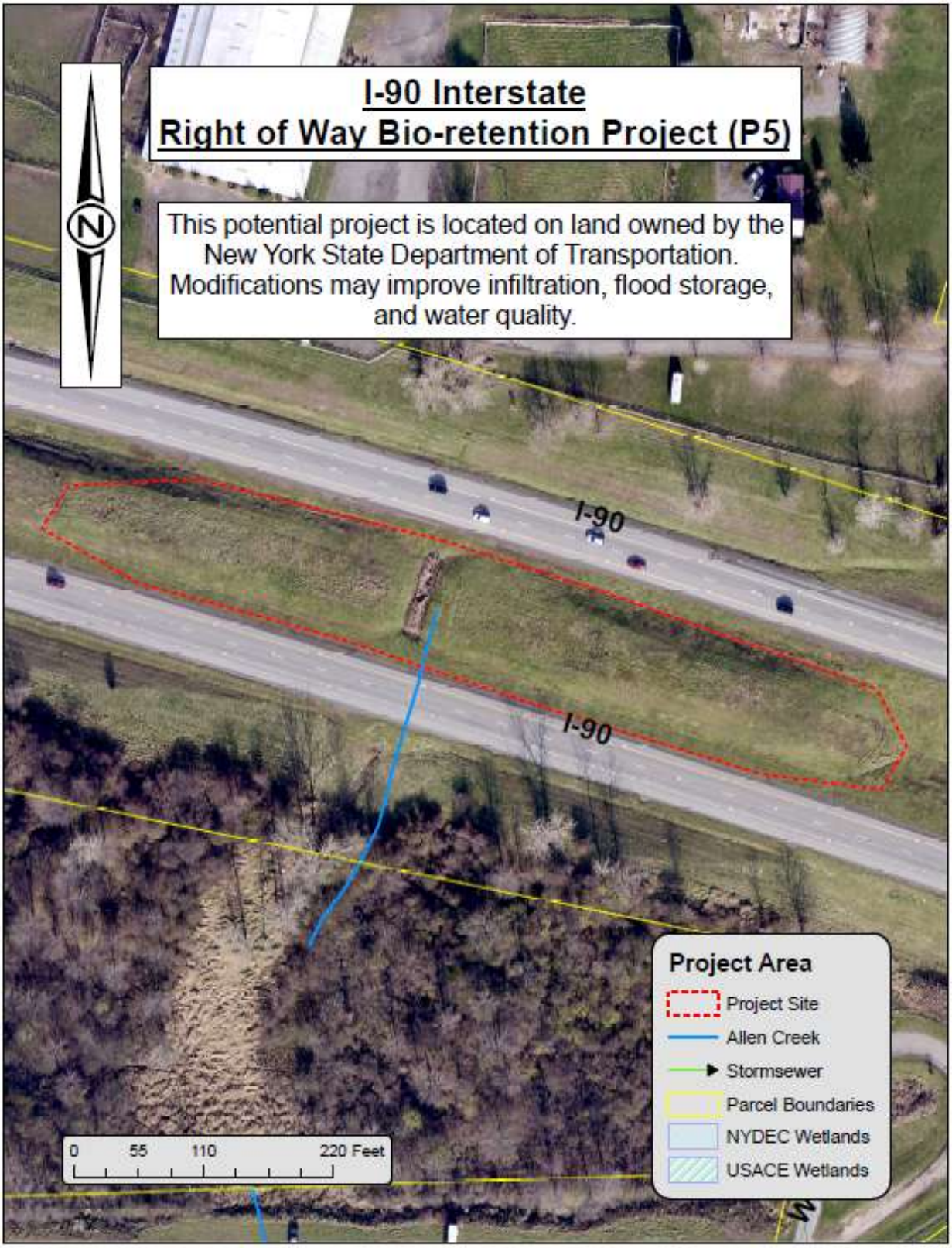

Calkins Road and Barrington Hills
Wet Pond Project (W4)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
Calkins
0 30 60 120 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

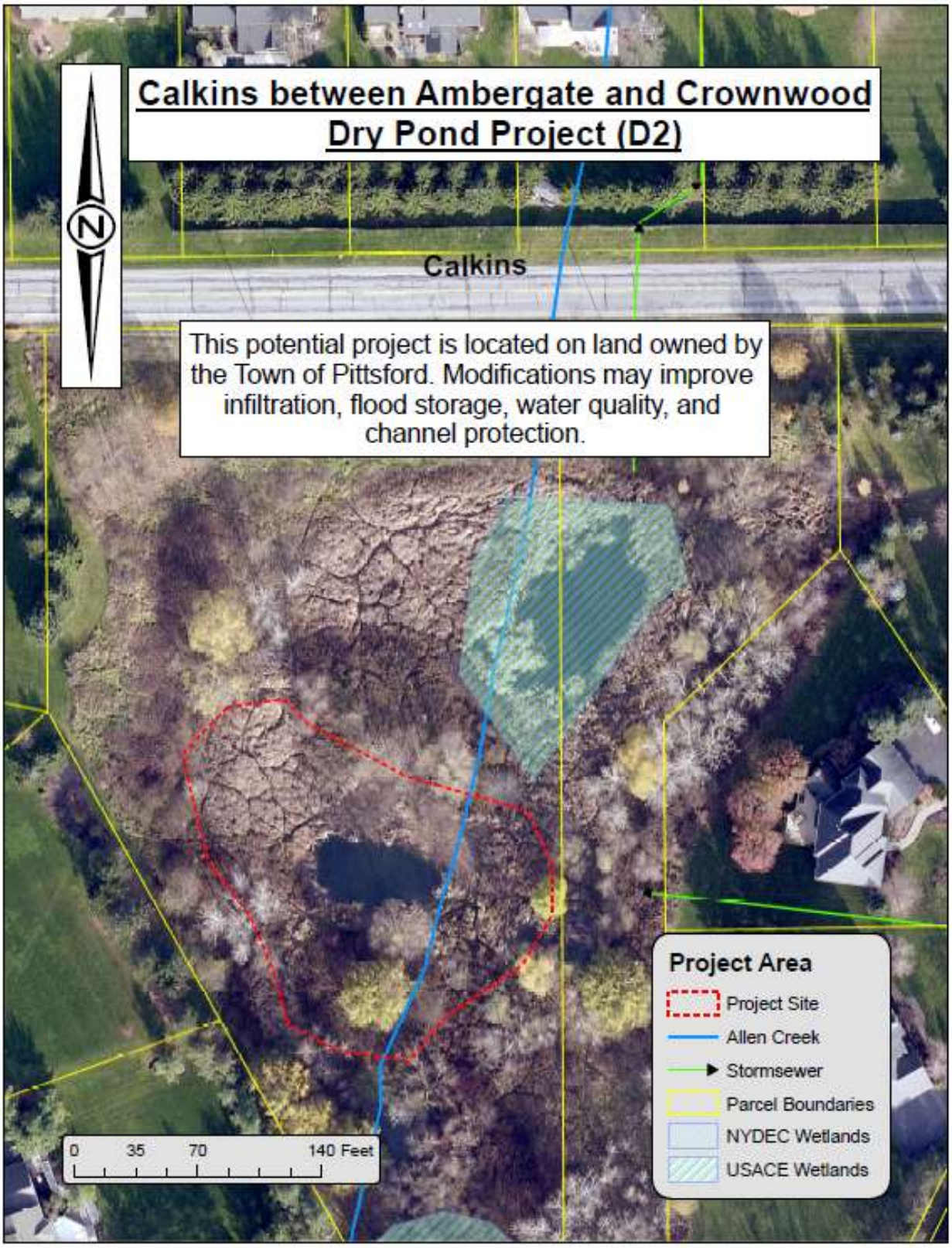

Crownwood Circle
Wet Pond Project (W5)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
Calkins
0 35 70 140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

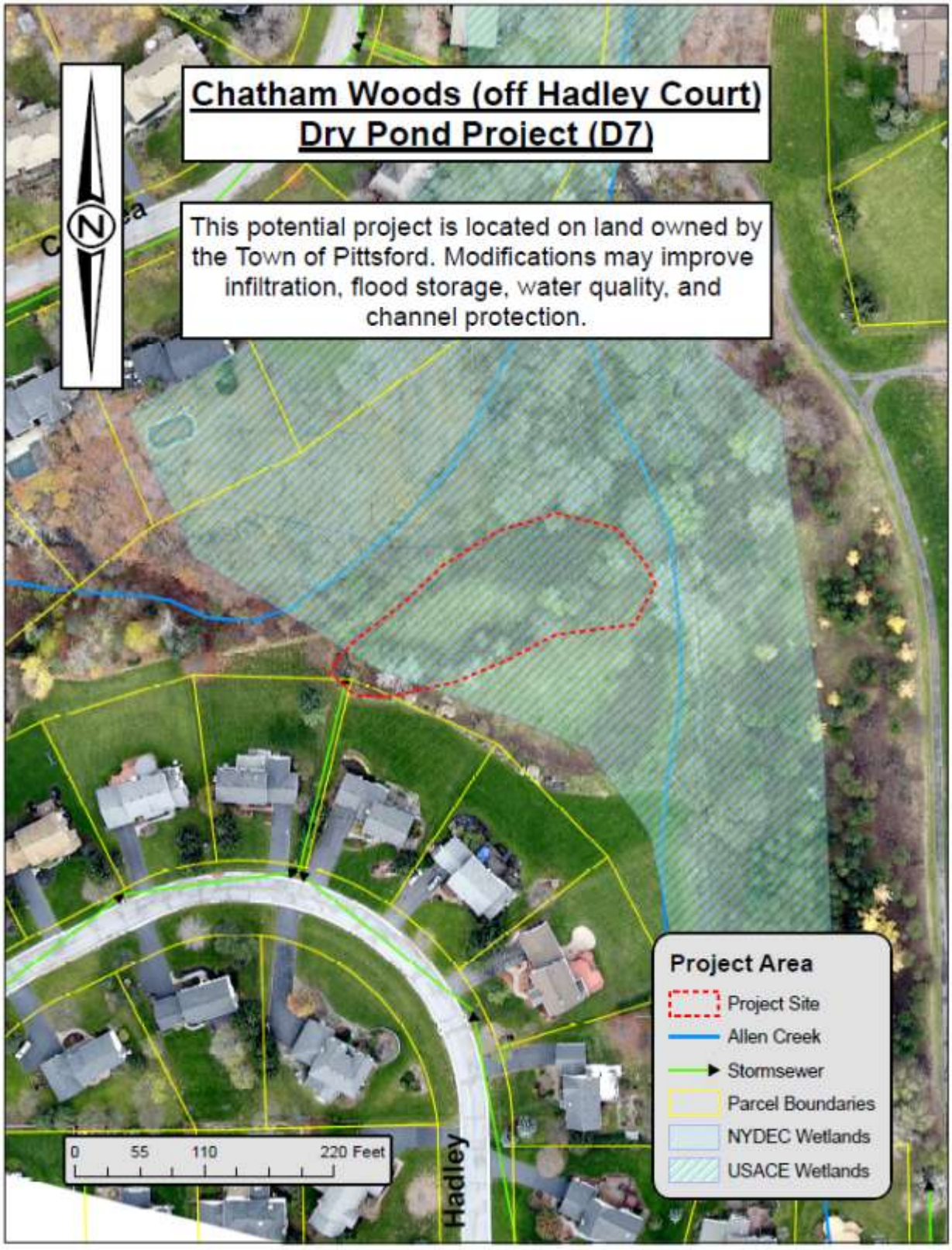

I-90 Interstate
Right of Way Bio-retention Project (P2)
This potential project is located on land owned by the New York State Department of Transportation. Modifications may improve infiltration, flood storage, and water quality.
N
I-90
I-90
0 37.5 75 150 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

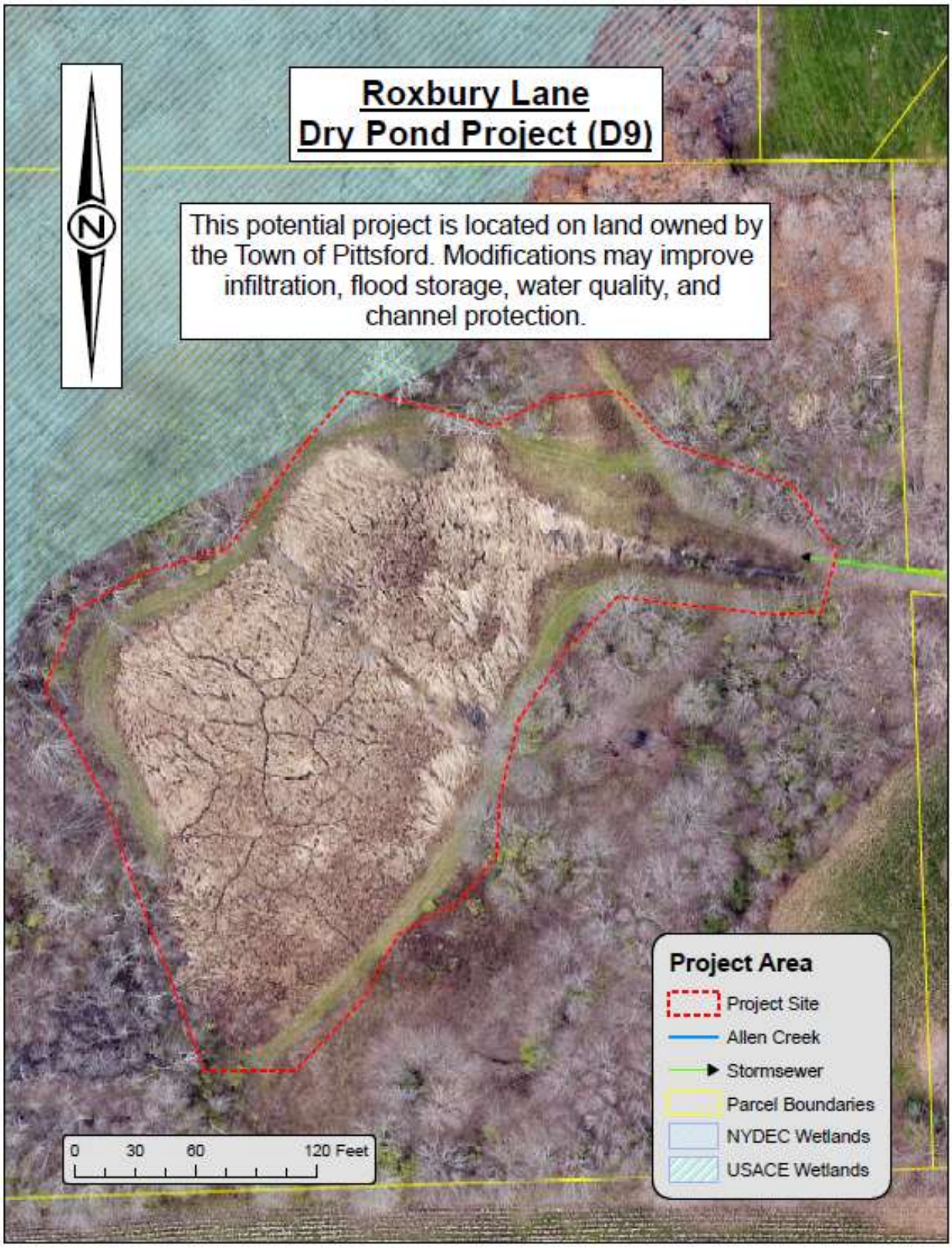

I-90 Interstate
Right of Way Bio-retention Project (P3)
This potential project is located on land owned by the New York State Department of Transportation. Modifications may improve infiltration, flood storage, and water quality.
N
I-90
I-90
0 37.5 75 150 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

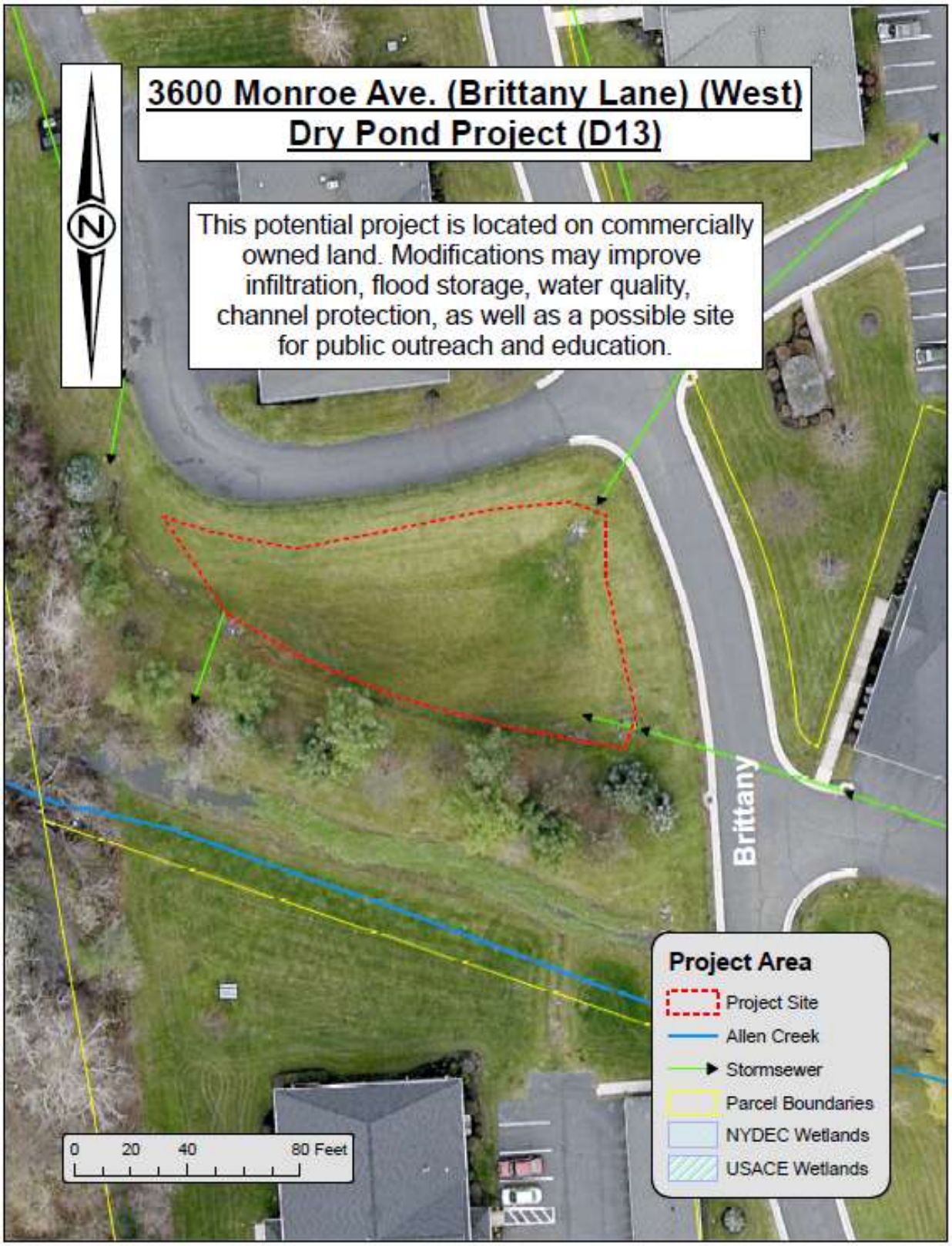

I-90 Interstate
Right of Way Bio-retention Project (P4)
This potential project is located on land owned by the New York State Department of Transportation. Modifications may improve infiltration, flood storage, and water quality.
N
I-90
I-90
0
60
120
240 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

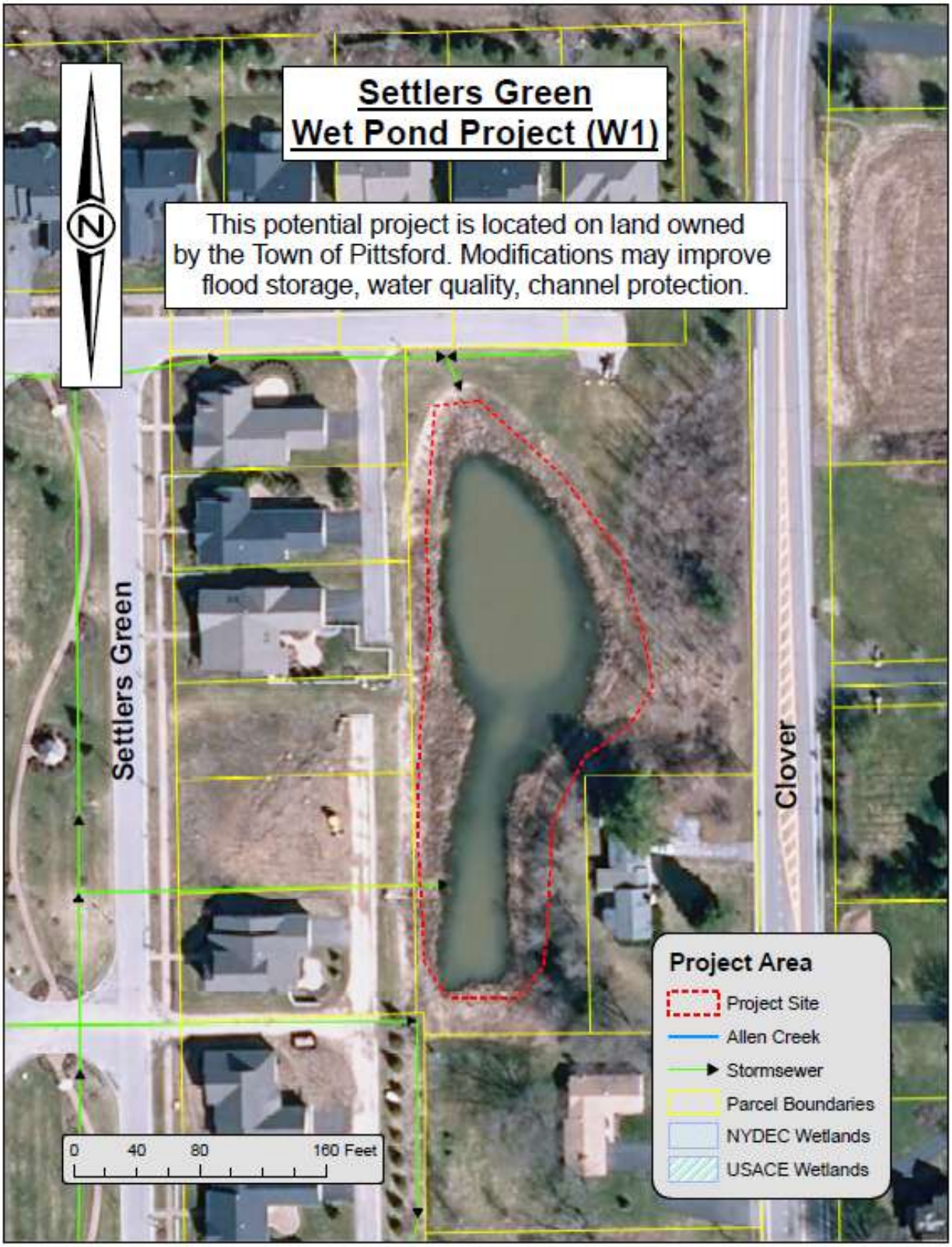

I-90 Interstate
Right of Way Bio-retention Project (P5)
This potential project is located on land owned by the New York State Department of Transportation. Modifications may improve infiltration, flood storage, and water quality.
N
I-90
I-90
0 55 110 220 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

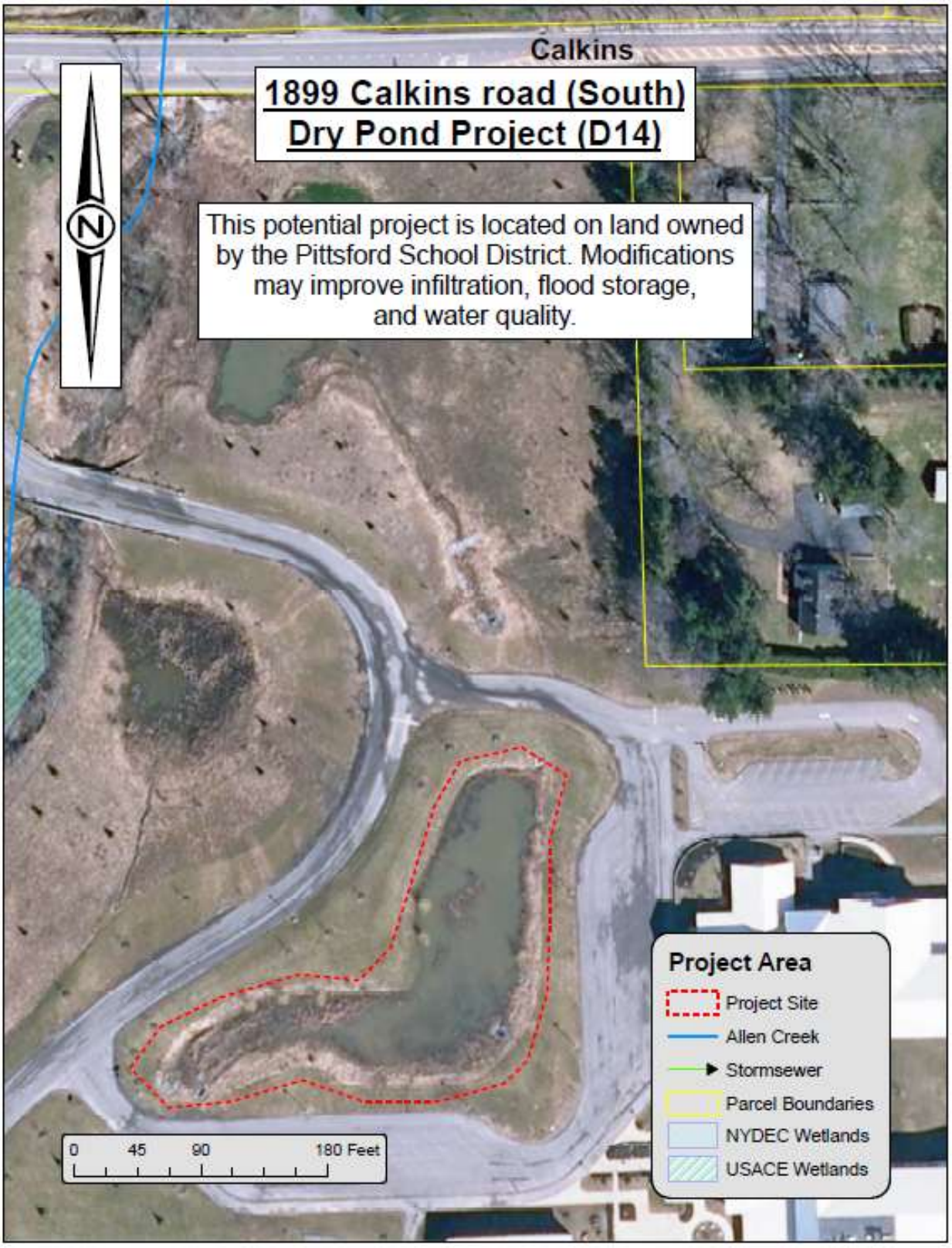

Calkins between Ambergate and Crownwood
Dry Pond Project (D2)
N
Calkins
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
0 35 70 140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

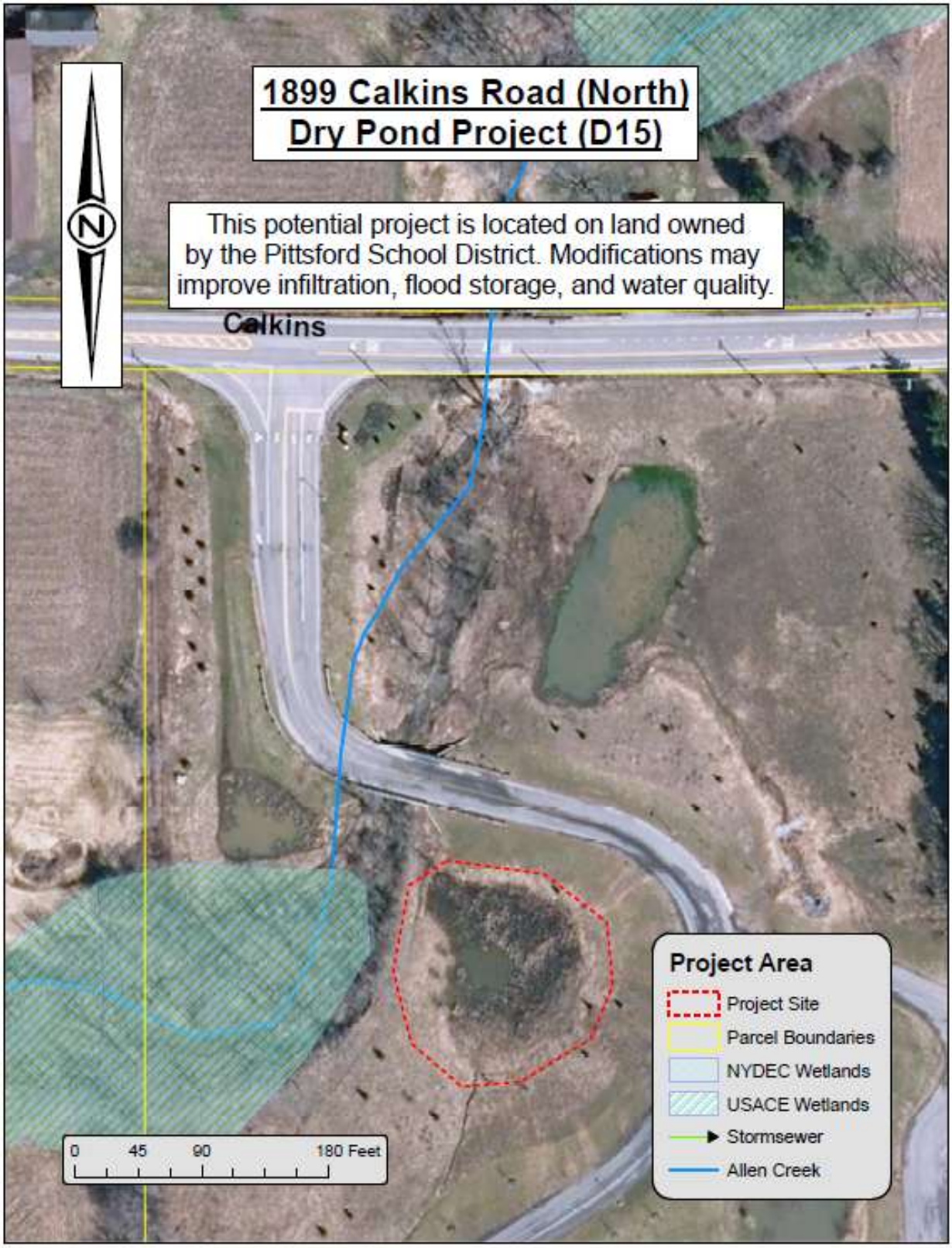

Chatham Woods (off Hadley Court)
Dry Pond Project (D7)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
0 55 110 220 Feet
Hadley
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

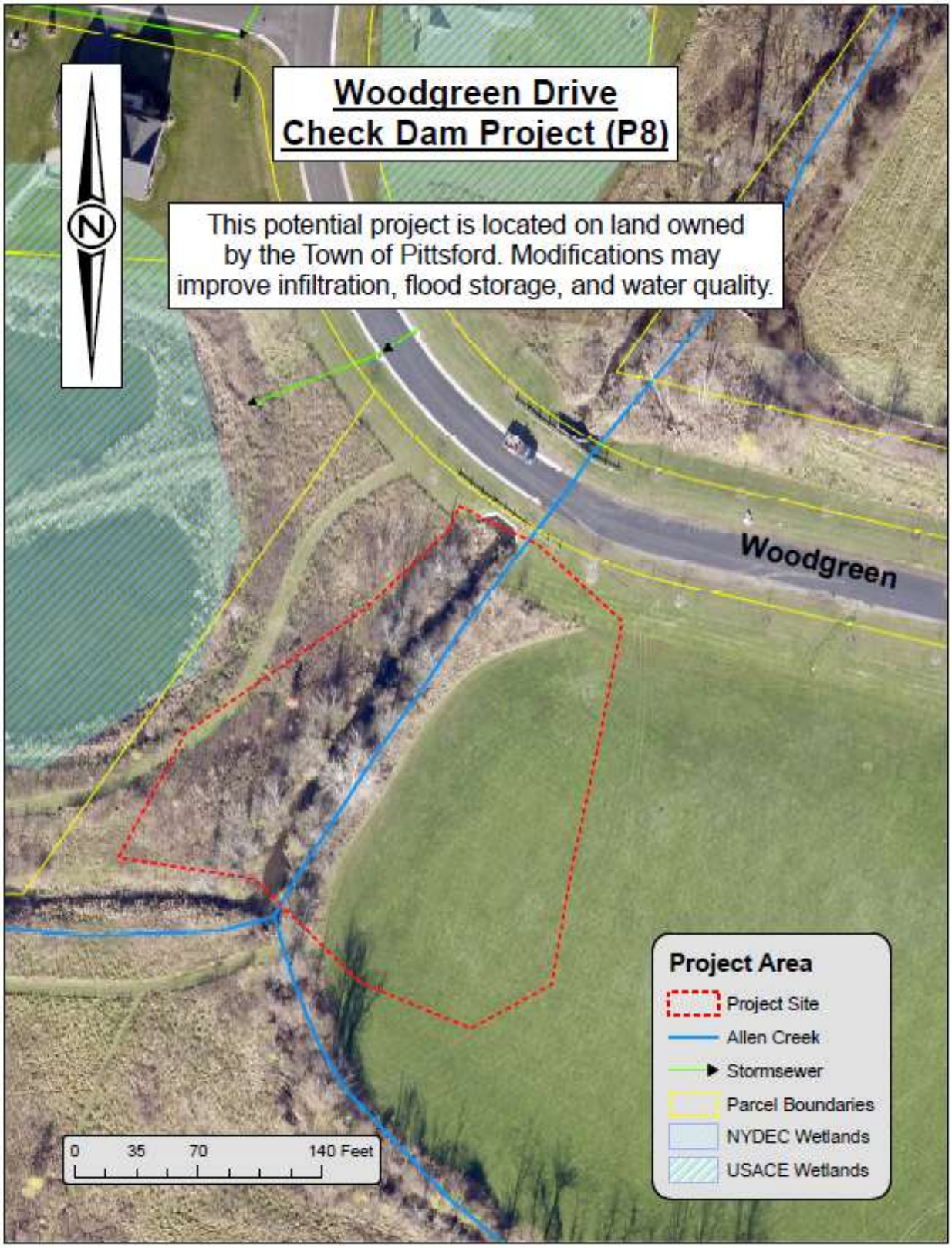

Roxbury Lane
Dry Pond Project (D9)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, water quality, and channel protection.
N
0
30
60
120 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

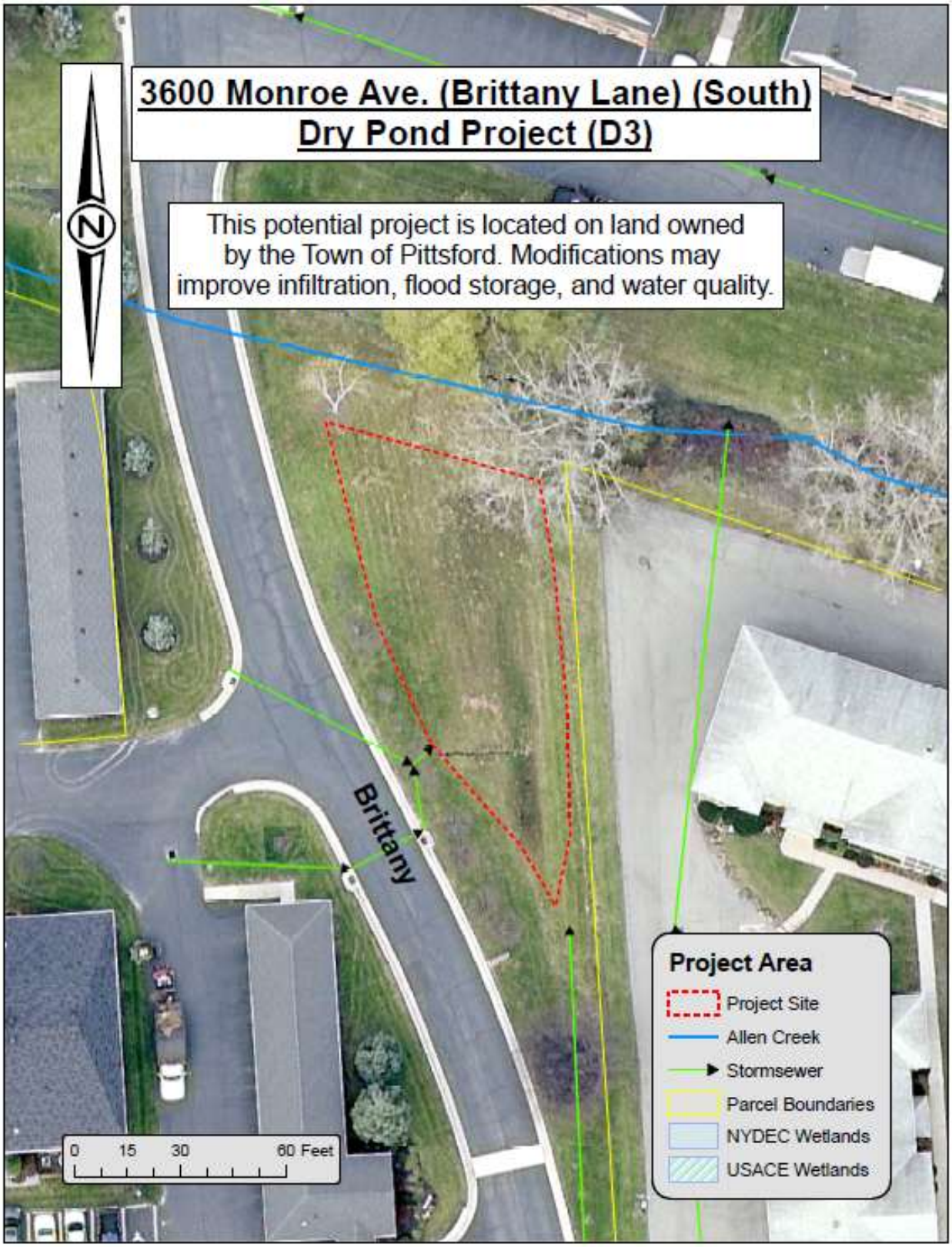

3600 Monroe Ave. (Brittany Lane) (West)
Dry Pond Project (D13)
This potential project is located on commercially owned land. Modifications may improve infiltration, flood storage, water quality, channel protection, as well as a possible site for public outreach and education.
N
Brittany
0 20 40 80 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

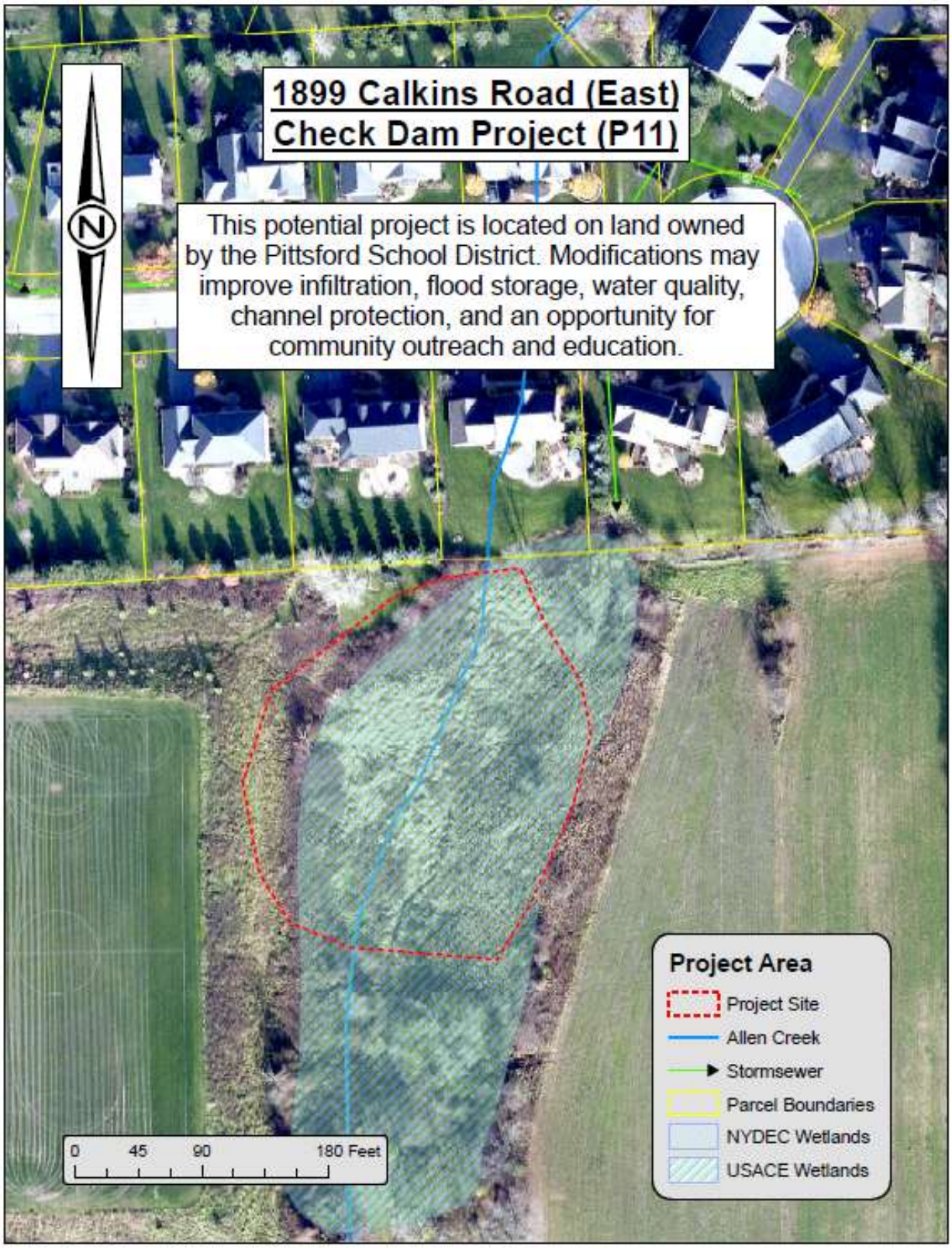

Settlers Green
Wet Pond Project (W1)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve flood storage, water quality, channel protection.
N
Settlers Green
Clover
0
40
80
160 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


Calkins
1899 Calkins road (South)
Dry Pond Project (D14)
This potential project is located on land owned by the Pittsford School District. Modifications may improve infiltration, flood storage, and water quality.
N
0 45 90 180 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


1899 Calkins Road (North)
Dry Pond Project (D15)
This potential project is located on land owned by the Pittsford School District. Modifications may improve infiltration, flood storage, and water quality.
Calkins
N
0
45
90
180 Feet
Project Area
Project Site
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands
Stormsewer
Allen Creek


Woodgreen Drive
Check Dam Project (P8)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, and water quality.
N
Woodgreen
0
35
70
140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


3600 Monroe Ave. (Brittany Lane) (South)
Dry Pond Project (D3)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve infiltration, flood storage, and water quality.
N
Brittany
0 15 30 60 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


1899 Calkins Road (East)
Check Dam Project (P11)
This potential project is located on land owned by the Pittsford School District. Modifications may improve infiltration, flood storage, water quality, channel protection, and an opportunity for community outreach and education.
N
0 45 90 180 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


Clover St and Tobey St
Wet Pond Project (W3)
This potential project is located on land owned by the Town of Pittsford. Modifications may improve flood storage, and water quality.
N
Tobey
Clover
0
35
70
140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

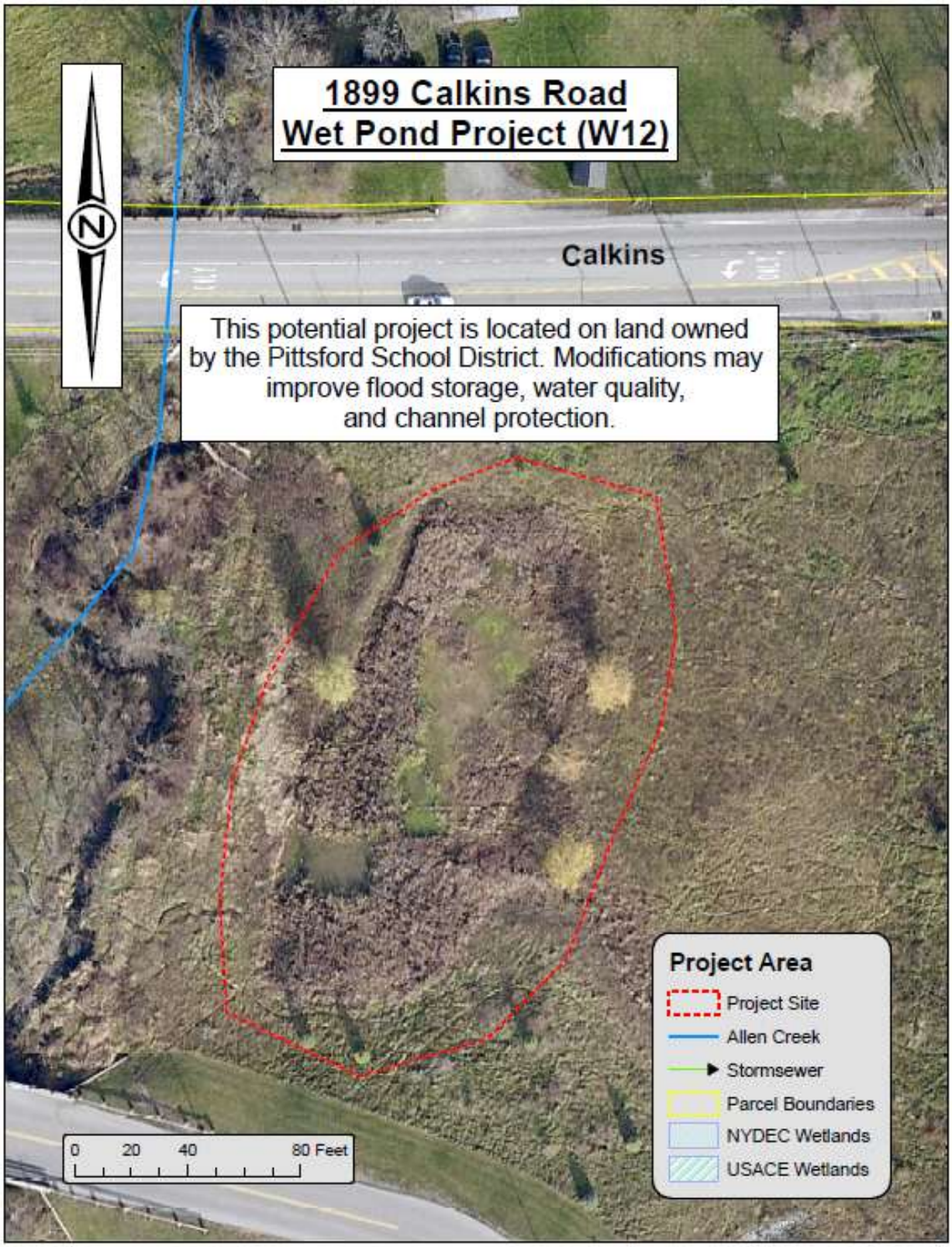
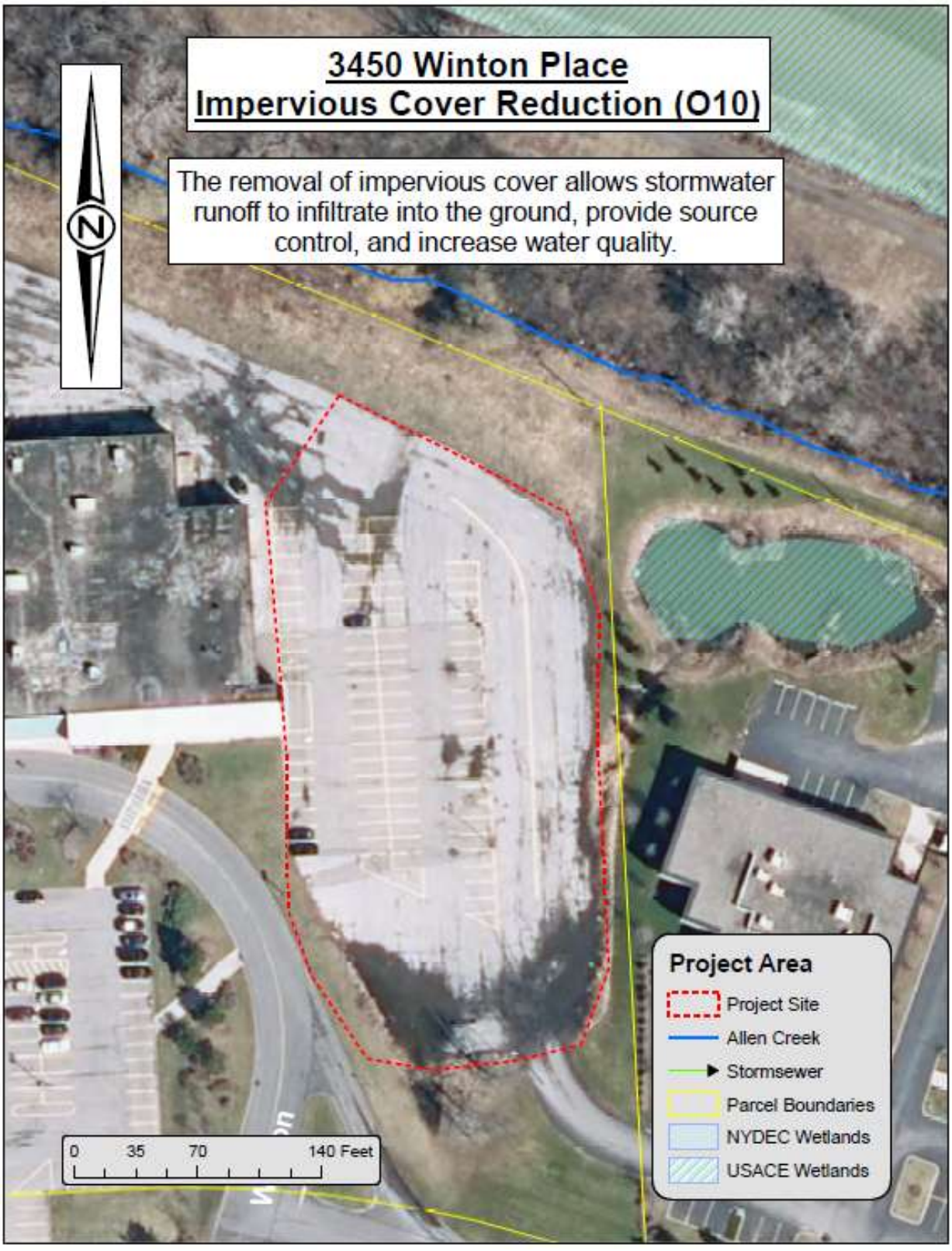
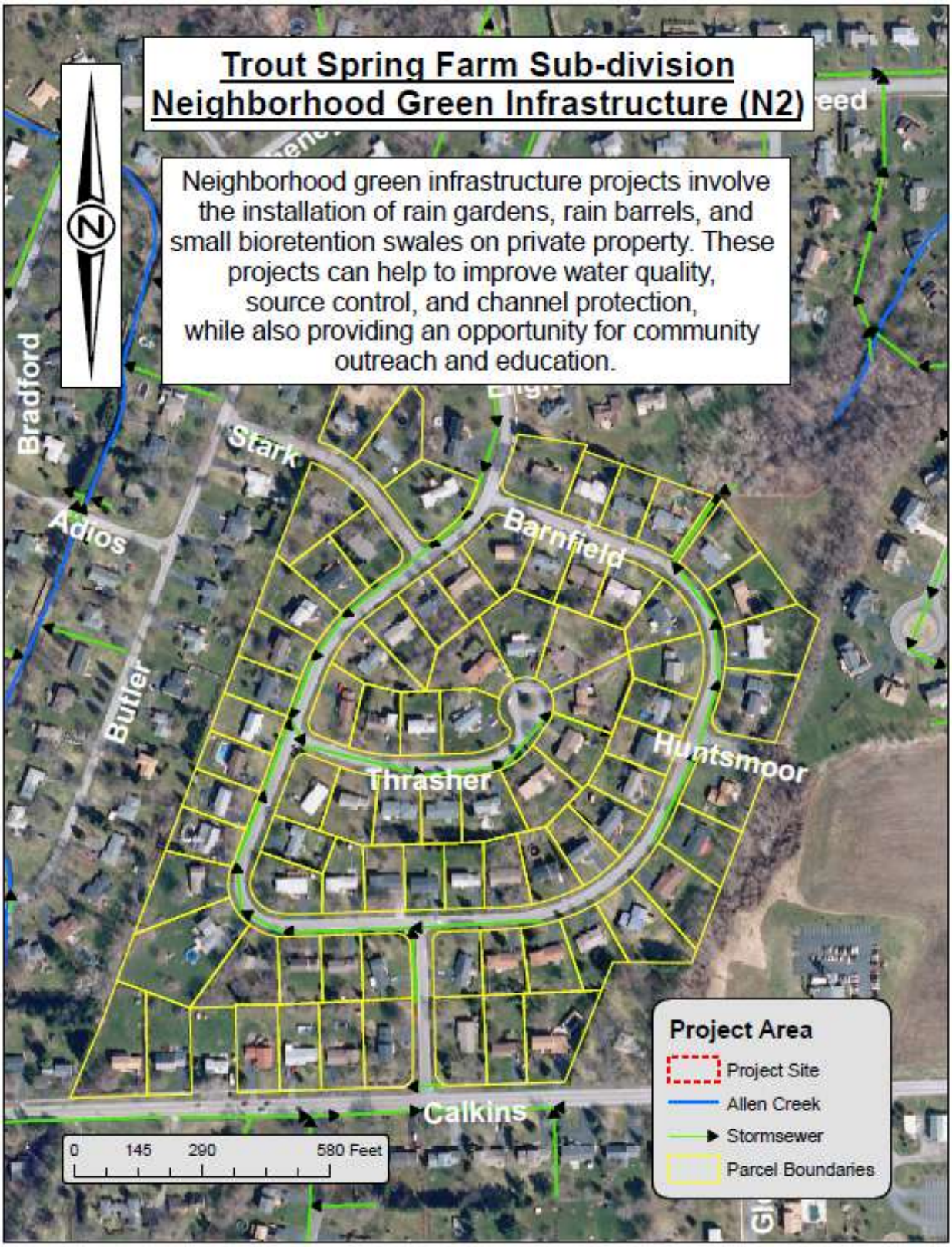

1899 Calkins Road
Wet Pond Project (W12)
Calkins
This potential project is located on land owned by the Pittsford School District. Modifications may improve flood storage, water quality, and channel protection.
N
0 20 40 80 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands

Figure 7: Above is an example typical residential street. Stormwater runoff is channeled into the concrete gutters along the sides of the road and conveyed to the stormwater sewer system through the storm inlets (red arrows). In order to reduce runoff into the stormwater sewer system and increase infiltration, bio-retention swales could be installed. These green infrastructure retrofits would replace the concrete gutter and contain stormwater runoff and allow it to infiltrate back into groundwater.

Figure 8: Above is a example of a neighborhood with standard stormwater management practices i.e. concrete gutters along the streets which connect to the stormwater sewer, fair amounts of impervious cover, and roof top connections to the stormwater sewer. Replacing the concrete gutter with bio-retention swales and diverting roof top runoff to rain gardens provide source control and infiltration for stormwater runoff.


3450 Winton Place
Impervious Cover Reduction (O10)
The removal of impervious cover allows stormwater runoff to infiltrate into the ground, provide source control, and increase water quality.
N
0 35 70 140 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries
NYDEC Wetlands
USACE Wetlands


Trout Spring Farm Sub-division
Neighborhood Green Infrastructure (N2)
Neighborhood green infrastructure projects involve the installation of rain gardens, rain barrels, and small bioretention swales on private property. These projects can help to improve water quality, source control, and channel protection, while also providing an opportunity for community outreach and education.
N
Bradford
Stark
Adios
Barnfield
Butler
Thrasher
Huntsmoor
Calkins
0 145 290 580 Feet
Project Area
Project Site
Allen Creek
Stormsewer
Parcel Boundaries

References:

Barton & Loguidice. 2011. *Preliminary Geomorphic Assessment of Allen Creek (Corbett's Glen Nature Park to Mouth)*

2012. *Conceptual Restoration Design & Engineering Report – Allens Creek at Burrows Hills Drive*

Center for Watershed Protection. 2004a. *Unified Stream Assessment: A User's Manual*. Manual 10 in the Urban Subwatershed Restoration Manual Series. Center for Watershed Protection, Inc. Ellicott City, MD.

2004b. *Unified Subwatershed and Site Reconnaissance: A User's Manua*l. Manual 11 in the Urban Subwatershed Restoration Manual Series.

2005. *An Integrated Framework to Restore Small Urban Streams User's Manua*l. Manual 1 in the Urban Subwatershed Restoration Manual Series.

2007. *Stormwater Retrofit Practices*. Manual 3 in the Urban Subwatershed Restoration Manual Series.

Lozier Engineers. 1982. *Comprehensive Drainage Plan Town of Pittsford New York*

New York State Department of Environmental Conservation. 2004. *Ontario Basin Waterbody Inventory and Priority Waterbodies List, Revised 2007*

O'Brien and Gere, 1978, *Brighton Town-wide Drainage Study*.

Stormwater Coalition of Monroe County. 2010. *Buckland Creek Stormwater Assessment and Action Plan*

USGS. Coon, W.F., 2003, Simulating Land-Use Changes and Stormwater-Detention Basins and Evaluating their Effect on Peak Streamflows and Stream-Water Quality in Irondequoit Creek Basin, New York

Sherwood, D.A., 2003, Water Resources of Monroe County, New York, Water Years 1997-99, with Emphasis on Water Quality in the Irondequoit Creek Basin--Atmospheric Deposition, Ground Water, Streamflow, Trends in Water Quality, and Chemical Loads to Irondequoit Bay

Sherwood, D.A., 2006, Water resources of Monroe County, New York, water years 2000-02: Atmospheric deposition, ground water, streamflow, trends in water quality, and chemical loads in streams

APPENDIX A

Rapid Assessment Compiled Data

Allen Creek East Branch Rapid Assessment Resource List

All file are located in the following directory in not otherwise stated: H:\IW\Stormwater\Asmnt\Allen Creek\Main Branch\Resource Directory

Item #	Description	File Name	Data Origin
GIS Data			
G1	Parcel data clipped to the extent of the watershed boundary.	AllenCrEast_Parcels.shp	Monroe County
G2	Diplays soil types and the drainage characteristics of the soils. An "A" soil has the highest drainage rate and "D" soils the lowest.	AllenCrEast_HydroSoils.shp	Monroe County
G3	Shapefile of the Allen Creek main branch watershed from the USGS StreamStats website. The boundary was reshaped to reflect the influence of stormwater and combined sewer system.	AllenCrEast_Watershed_Boundary.shp	Monroe County
G4	Points show the location of new pond, pond retrofit, impervious cover, and storage projects.	AllenCrEast_Project_Sites.shp	Monroe County
G5	Shapefile of the Town of Pittsford stormwater management facilites.	AllenCrEast_Pittsford_SWMF.shp	Town of Pittsford
G6	Indicates the basic stream channel path through the watershed.	AllenCrEast_Streams.shp	Monroe County

Allen Creek East Branch Rapid Assessment Resource List

All file are located in the following directory in not otherwise stated: H:\IW\Stormwater\Asmnt\Allen Creek\Main Branch\Resource Directory

Item #	Description	File Name	Data Origin
Maps			
M1	A map of the watershed boundary.	Allen Creek East Branch Watershed.pdf	Monroe County
M2	A map of the watershed displaying the different land use types based upon parcel data.	Allen Creek East Branch LULC.pdf	Monroe County
M3	This map displays all of the hot spot locations throughout the watershed.	Allen Creek East Branch HS.pdf	Monroe County
M4	This map displays all of the outall locations throughout the watershed. The outfalls are rated based upon possible illiciet discharge.	Allen Creek East Branch Outfalls.pdf	Monroe County
M5	This map displays the hydrolic soils (A, B, C, D) throughout the watershed.	Allen Creek East Branch Soils.pdf	Monroe County
M6	This map displays the locations of various stream projects throughout the watershed.	Allen Creek East Branch Stream Projects.pdf	Monroe County
M7	This map displays the locations of the potential projects sites throughout the watershed.	Allen Creek East Branch Project Sites.pdf	Monroe County

Allen Creek East Branch Rapid Assessment Resource List

All file are located in the following directory in not otherwise stated: H:\IW\Stormwater\Asmnt\Allen Creek\Main Branch\Resource Directory

Item #	Description	File Name	Data Origin
Retrofit Diagrams			
D1	8 Merryhill Lane	D1.pdf	Monroe County
D6	Stone Road and Chatham Woods	D6.pdf	Monroe County
D8	Stone Road and Chelsea Park	D8.pdf	Monroe County
P1	165 West Jefferson Road	P1.pdf	Monroe County
P12	Chatham Woods	P12.pdf	Monroe County
P13	Wexford Glen	P13.pdf	Monroe County
W2	Access off Dunnewood	W2.pdf	Monroe County
W4	Calkins and Barrington Hills	W4.pdf	Monroe County
W5	Crownwood Circle	W5.pdf	Monroe County
P2	I-90 (1)	P2.pdf	Monroe County
P3	I-90 (2)	P3.pdf	Monroe County
P4	I-90 (3)	P4.pdf	Monroe County
P5	I-90 (4)	P5.pdf	Monroe County
D2	Calkins b/w Amergate and Crownwood	D2.pdf	Monroe County
D7	Chatham Woods (off Hadley Court)	D7.pdf	Monroe County
D9	Roxbury Lane	D9.pdf	Monroe County
D13	3600 Monroe Ave. (Brittany Lane) (North)	D13.pdf	Monroe County
W1	Settlers Green - Pittsford	W1.pdf	Monroe County
D14	1899 Calkins Road (South)	D14.pdf	Monroe County
D15	1899 Calkins Road (North)	D15.pdf	Monroe County
P8	Woodgreen Drive	P8.pdf	Monroe County
D3	3600 Monroe Ave. (Brittany Lane) (South)	D3.pdf	Monroe County
P11	1899 Calkins Road (East)	P11.pdf.pdf	Monroe County
W3	Clover Street and Tobey Street	W3.pdf	Monroe County
W12	1899 Calkins Road	W12.pdf	Monroe County

APPENDIX B

NYSDEC PWL Datasheet

Allen Creek and tribs (0302-0022) MinorImpacts

Waterbody Location Information

Revised: 03/19/2002

Water Index No: Ont 108/P113- 3- 8
Hydro Unit Code: 04140101/010 **Str Class:** B
Waterbody Type: River
Waterbody Size: 59.8 Miles
Seg Description: entire stream and tribs

Drain Basin: Lake Ontario
Irondequoit/Ninemile
Reg/County: 8/Monroe Co. (28)
Quad Map: ROCHESTER EAST (I-10-2)

Water Quality Problem/Issue Information

(CAPS indicate MAJOR Use Impacts/Pollutants/Sources)

Use(s) Impacted	Severity	Problem Documentation
Public Bathing	Stressed	Suspected
Aquatic Life	Stressed	Known
Recreation	Stressed	Known

Type of Pollutant(s)

Known: NUTRIENTS
Suspected: Salts, Silt/Sediment
Possible: Pathogens

Source(s) of Pollutant(s)

Known: URBAN/STORM RUNOFF, Construction, Other Sanitary Disch
Suspected: Agriculture, Deicing (stor/appl), Streambank Erosion
Possible: - - -

Resolution/Management Information

Issue Resolvability: 1 (Needs Verification/Study (see STATUS))
Verification Status: 4 (Source Identified, Strategy Needed)
Lead Agency/Office: ext/WQCC **Resolution Potential:** Medium
TMDL/303d Status: n/a

Further Details

Aquatic life support, public bathing and various recreational uses (fishing, boating, etc) in Allen Creek are affected by impacts from various urban/stormwater sources and other nonpoint sources in the watershed.

A biological (macroinvertebrate) assessment of Allen Creek near Penfield was conducted in 1999 and again in 2004. Field sampling results indicated slightly impacted water quality conditions in 1999. The field assessment was verified by laboratory-sorting of the sample to order level. In 2004 the stream was found to have been significantly altered - perhaps relocated - due to construction in the area. Moderate impacts were indicated, but these results may have been influenced by habitat conditions. Additional monitoring to verify the impacts is recommended. A 1998 assessment conducted by Dr. William Sutton in cooperation with NYSDEC found slight to moderate impacts. Both assessments indicate the presence of nutrient enrichment in the stream. (DEC/DOW, BWAM/SBU, January 2001)

Urban and stormwater runoff related to the high degree of impervious surface area (shopping plazas, parking lots, roadways, etc) has been identified as the primary source of nutrients and other pollutants (pathogens, oil and grease,

floatables) to the creek. A significant portion of one tributary (Buckland Creek) is enclosed and serves primarily as a storm sewer for Elmwood Avenue. Agricultural activities in the upper watershed, impacts from failing and/or inadequate on-site septic systems, tributary stream erosion and residential and commercial development throughout the watershed are also thought to contribute to nutrient and silt/sediment loadings. (Monroe County WQCC, May 2001)

Considerable bay and watershed water quality management and monitoring efforts are continuing. Municipalities within the watershed have formed the Irondequoit Watershed Collaborative. IWC activities have focused on comprehensive stormwater management efforts and (with USGS) hydrologic modeling to predict the impact of land use changes. Efforts within Monroe County include the establishment of a collaborative to assist with the implementation of phase II stormwater regulations. The Monroe County WQCC has evaluated road salt use and conducted a residential lawn care education project. A town highway facility is the focus of a pollutant removal demonstration project being conducted with NYS DEC funding. (Monroe County WQCC, May 2001)

The Monroe County Environmental Health Laboratory has maintained a cooperative monitoring program with USGS which grew out of a Nationwide Urban Runoff Program effort on Irondequoit Basin in 1980s. Subsequent USGS reports on water quality in the basin have been published in 1996, 1997 and 1999. (Monroe County Environmental Health Laboratory, May 2001)

This segment includes the entire stream and all tribs. The waters of the stream are primarily Class B, B(T); the upper reaches are Class C. Tribs to this reach/segment, including West Brook (-1), are Class B, B(TS) and C. (May 2001)

APPENDIX C

Potential Stormwater Hotspots in the East Branch Allen Creek Watershed

Stormwater Hotspots are defined as commercial, municipal, industrial, institutional or transport related operations that produce higher levels of stormwater pollutants and may present a higher than normal risk for spills, leaks or illicit discharges. In many cases the hotspot exists on private property where a change in how the facility is managed is all that is required to prevent water pollution. Pollution prevention is a term commonly used for hotspots and refers to reducing or eliminating the generation of pollutants where they are generated. Another term used is "Good Housekeeping" meaning a practical and cost-effective way to maintain a clean and orderly facility to prevent potential pollution sources from coming into contact with stormwater. Good housekeeping practices also help to enhance safety and improve the overall work environment.

Using the watershed parcel records and the parcel property class description, potential hotspots were identified, mapped and listed (Figure C-1 and Table C-1 respectively). Property uses include trucking, gas stations, auto washing, storage, repair and recyclers, minimarts, and fast food restaurants. Pollution prevention methods will vary greatly depending on the type of facility but could include better handling of automotive fluids at an auto recycling yard or installing a canopy over a gas station's fueling island. The goal is to have the facility owners implement site specific practices to treat the quality of runoff from all severe stormwater hotspots using existing authority under industrial and/or municipal stormwater permits and ordinances. It is recommended that the sites listed be visited and evaluated by technical staff in order to a) determine if and how stormwater pollutants are being generated and exported from the site and, b) define the specific needed retrofit project.

Figure C-1: This gas station is a potential hotspot locations

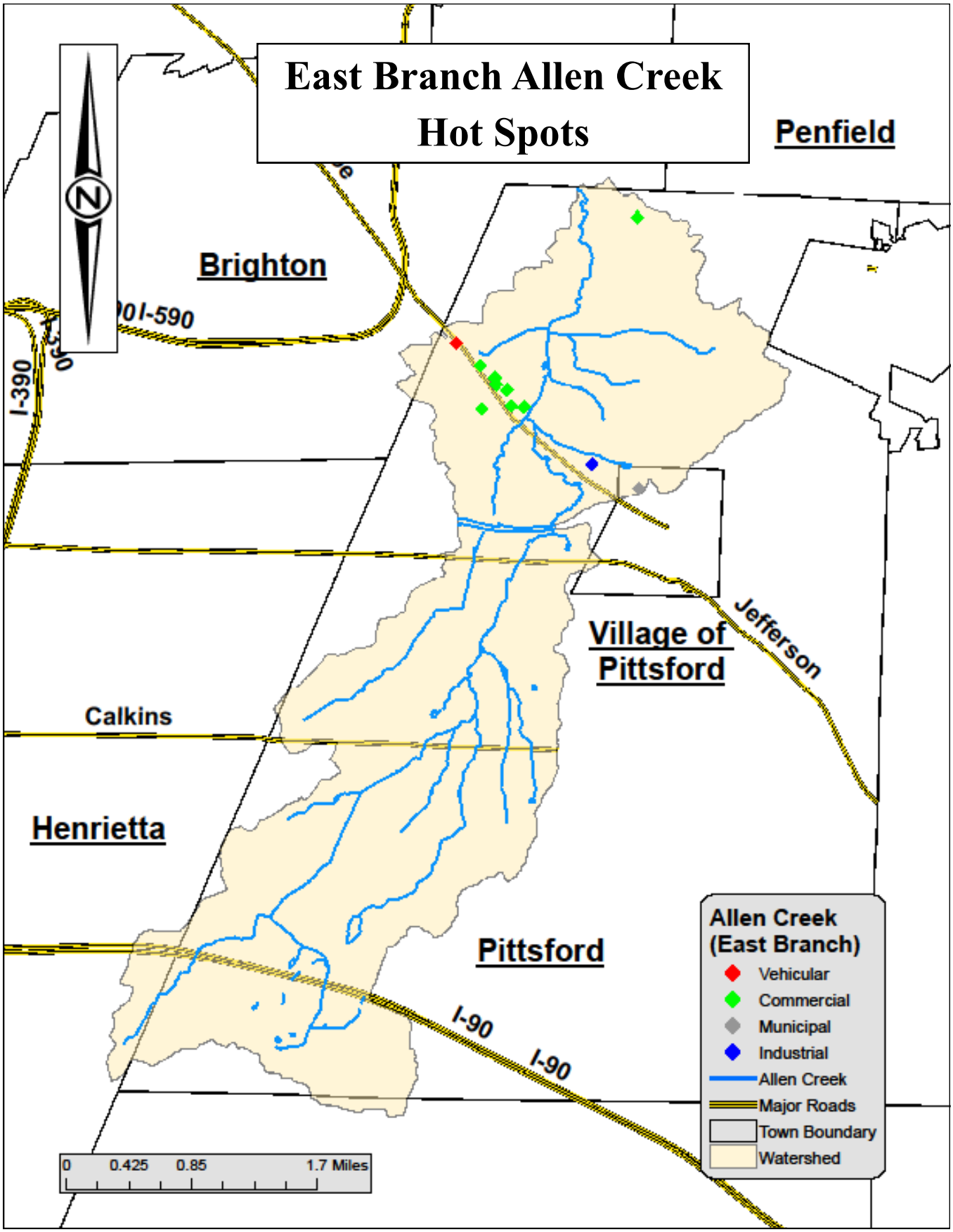


Figure C-2: Locations for potential hotspot within the Allen Creek east branch watershed.

Allen Creek East Branch Watershed Hotspots		
Location	**Property Class**	**Property Description**
3500 EAST AVE	421	Restaurant
3280 MONROE AVE	426	Fast food
3180 MONROE AVE	426	Fast food
3055 MONROE AVE	432	Gas station
3349 MONROE AVE	451	Shopping center
3240& 3246 MONROE AVE	452	Shopping center
3400 MONROE AVE	452	Shopping center
3300 MONROE AVE	452	Shopping center
3340 MONROE AVE	453	Large retail
MONROE AVE	651	Highway garage
3750 MONROE AVE	710	Manufacture

Table C-1: List of potential hotspot locations

APPENDIX D

Potential Stream Repair Projects in the Allen Creek East Branch Watershed

Stream Repairs include physical modifications to stream channels, banks, and in-stream habitat to repair and improve degraded or unstable conditions. The project objectives are to reduce streambank erosion, recover biological diversity of a naturalized stream, protect threatened infrastructure such as adjacent homes or roads, and to add community resources, aesthetics and recreation opportunities (Figure D-1).

In 2001, the Monroe County Soil & Water Conservation District began a streambank and shoreline erosion assessment program (SEAP) to inventory, assess, and prioritize erosion sites with the expertise of SUNY Geneseo's Dr. Richard Young and local knowledge of town and village highway superintendents, who were asked to identify their most severe erosion sites. The severity of each site was evaluated by measuring its physical properties such as area of eroded bank, stream hydrology, and geology. Limited grant funding over the years has allowed some of these sites to be repaired. The data from this program has been entered into the County's GIS database and was used to identify potential projects in this watershed.

Using aerial photos and SEAP data, potential sites were identified, mapped and listed (Figure D-2and Table D-1). The sites listed should be visited and evaluated by technical staff in order to a) determine the extent of the repair needed, b) define the specific needed repair project and cost and c) rank projects according to an agreed prioritization criteria.

Potential Stream Repairs Project Types:

- Stream Channel Modification: As areas become more urbanized, stream channels are frequently straightened and stream banks are armored in order to accommodate additional growth. Channel modification projects attempt to restore a natural meandering path, gently sloped banks and strategically placed obstructions within the stream channel to create variable habitat.
- Stream Buffers: Urbanized streams frequently are disconnected from their flood plain or have development, such as pavement or lawns, right up to the stream bank. These factors have negative effects on the stability of the stream in terms of bank erosion, and stream health (as a result of runoff and lack of shade). Stream buffer projects create a vegetated zone along a length of stream that acts as a filter for incoming runoff and add space for the stream to meander and rise to minimize erosion and property damage.
- Streambank Stabilization: There are numerous streambank erosion sites in Monroe County which deliver significant quantities of sediment and associated pollutants to our local water resources. Streambank stabilization projects can help reduce the delivery of sediment and nutrients from bank erosion and include both hard armoring the banks but can also include bioengineered practices on smaller streams and tributaries.

Figure D-1 . Streams need naturalized buffers to protect aquatic habitat and maintain water quality (Source, Philadelphia Water Department).

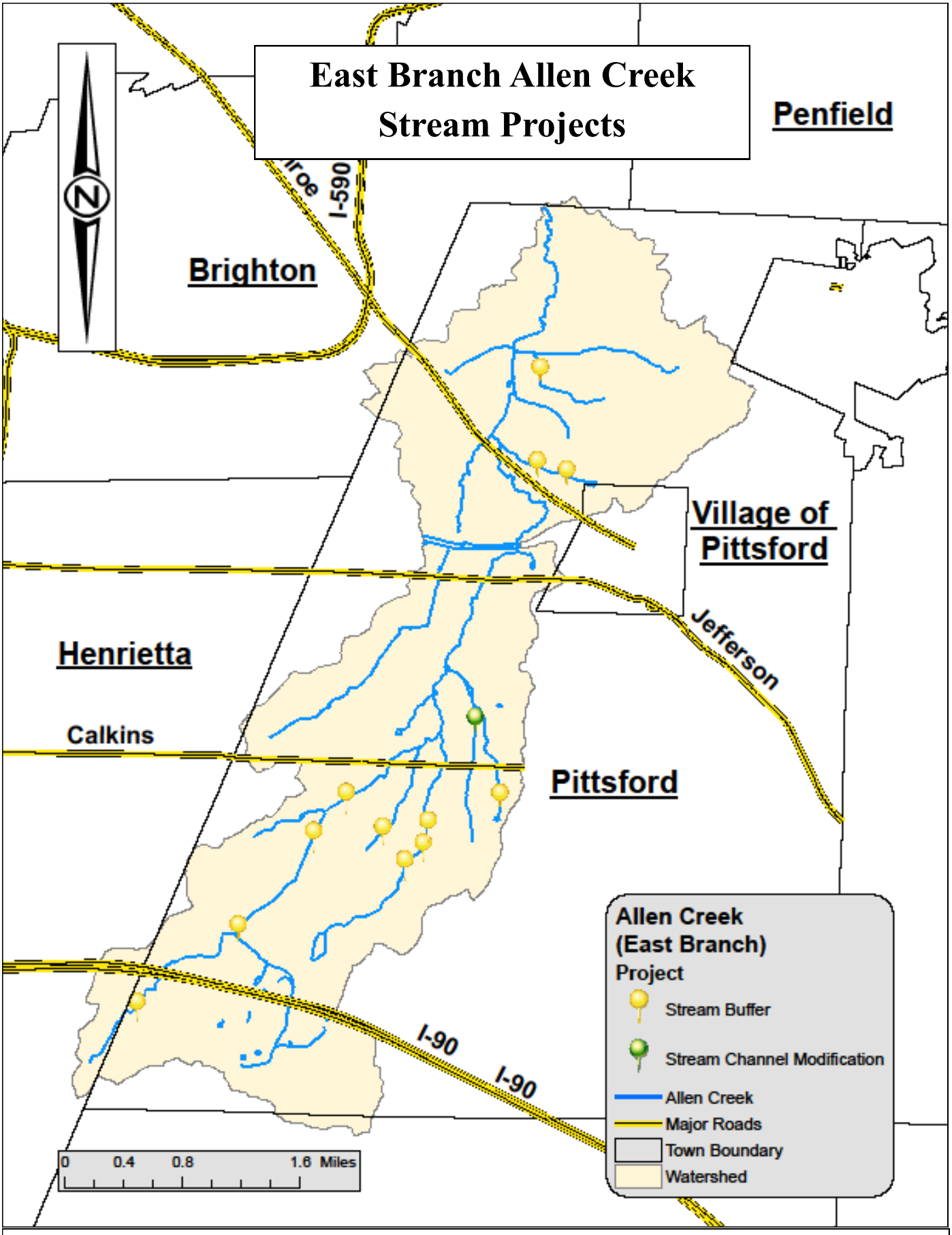


Figure D-1. Locations of Potential Stream Repair Projects

East Branch Allen Creek Stream Project Sites	
Location	**Project Type**
Woodgreen off Clover St	Buffer
Willard Rd East of Clover St before Grandhill	Buffer
3600 Monroe Ave, stream runs under Brittany Lane	Buffer
4045 East Ave.	Buffer
Willard Rd, parcel surrond Grandhill Way homes	Buffer
3151 Clover St	Buffer
3262 Clover St	Buffer
111 Willard Rd	Buffer
3750 Monreo Ave.	Buffer
116 Willard Rd	Buffer
219 Mendon Center Rd	Buffer
3571 Clover St	Buffer
Farm Field Lane	Channel Mod.

Table 1: List of potential streambank repair or modification sites within the Allen Creek east branch watershed.