Appendix 3-A: Wetland Delineation Report

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Wetland Delineation Report

Cricket Valley Energy
Town of Dover
Dutchess County, New York

August 28, 2009

ARCADIS

Wetland Delineation Report

Cricket Valley Energy
Town of Dover
Dutchess County, New York

Anthony Esposito
Wetland Scientist

Lynn Gresock
Associate Vice President

Prepared for:
Cricket Valley Energy LLC

Prepared by:
ARCADIS
Two Executive Drive
Suite 303
Chelmsford, MA 01824
Tel 978.937.9999
Fax 978.937.7555

Our Ref.:
CO001447.0001

Date:
August 28, 2009

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Table of Contents

Cricket Valley Energy
Dutchess County, New York

Table of Contents

Cricket Valley Energy
Dutchess County, New York

1 Introduction

This report presents the results of a wetland identification and boundary delineation performed by ARCADIS for the Cricket Valley Energy Site located in Dover, New York (Figure 1). Field activities for the wetland evaluation were performed on April 22-24, 2009 within the limits of the wetland assessment area presented on Figure 2. Portions of the site west of the Swamp River were not assessed, as not project work is proposed in that area; all portions of the site west of the Swamp River is currently mapped as New York State Department of Conservation (NYSDEC) wetland. The wetland identification and boundary delineations were performed in accordance with the Routine Determination Method presented in the 1987 United States Army Corps of Engineers (ACOE) *Wetlands Delineation Manual* (the Manual) (Environmental Laboratory 1987) and the draft regional supplement to the Manual (ACOE 2008). The Manual presents the current federal methodology for delineating regulated wetlands. The Manual defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetland delineation methods presented in the Manual require areas identified as wetlands to meet all of the following criteria:

- The dominant vegetation is hydrophytic (water tolerant);
- The soils are hydric or possess reducing soil characteristics; and
- The area is either permanently or periodically at mean water depths less than or equal to 6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.

The Routine Method combines information gathering and review with on-site evaluation of field characteristics to identify and delineate wetland boundaries. Descriptions of the information gathering and on-site activities are presented in the following sections.

2 Information Review

The information review consisted of obtaining and reviewing the following sources of environmental information for the site:

- United States Geological Survey (USGS) Topographic Quadrangle – Dover Plains, New York (USGS 1958);
- Custom Soil Resource Report for Dutchess County, New York (United States Department of Agriculture [USDA] 2009a);
- Dutchess County Hydric Soils List (USDA 2009b);
- New York State Freshwater Wetland Map, Dover Plains, New York (NYSDEC 2009); and
- National Wetlands Inventory, Dover Plains, New York (United States Department of the Interior [USDI] 2006.

Information obtained from these sources is discussed in the following sections.

2.1 Topographic Mapping

The USGS topographic map of the Dover, New York quadrangle (Figure 1) indicates the site is generally bounded to the west by the Swamp River, to the east by State Route 22, to the northeast by a utility line right-of-way, and to the south by an adjacent property. A MetroNorth railroad line can be seen running north/south, transecting the site. Wetland symbols are present west of the river, on the northern portion of the site east of the rail line, and on the east side of the rail line south of the site. The overall topography of the site indicates higher elevations (480 feet above mean sea level [amsl]) to the east and lower elevations (420 feet amsl) to the west, with the majority of the area between the river and the rail line being relatively flat. Several buildings are shown on the site with railroad spurs connecting them to the rail line.

2.2 Dutchess County Soil Information

The Custom Soil Resource Report for Dutchess County, New York (USDA 2009a) provides information regarding the mapped soil types in the wetland assessment area. The site is located within Land Resource Region (LRR) R and Major Land Resource Area (MLRA) 144A (USDA 2006a). As required in the delineation methodology, soils characterization was conducted within the context of this general soils classification.

The mapped soil types were compared to the list of hydric soils in Dutchess County (USDA 2009b) to determine if the mapped soils were hydric or contained potential hydric inclusions. Figure 3 presents the Soil Survey Map for the site. As shown, the soil types mapped for the majority of the site are: Sun silt loam (Su); Farmington-

Galway complex, undulating, very rocky (FcB); Farmington-Galway complex, hilly, very rocky (FcD); Copake gravelly silt loam, nearly level (CuA); Udorthents, smoothed (Ud); Wayland silt loam (Wy); and Galway-Farmington-urban land complex, undulating, rocky (GIB) (USDA 2009a). Descriptions of these soil types are provided below.

Sun silt loam (Su) consists of very deep, poorly drained soils formed in till derived primarily from limestone and sandstone with smaller amounts of schist, shale and granite in some areas (USDA 2006b). These soils are in low areas or depressions on till plains (USDA 2006b). The Ap horizon (0-9 inches) is typically very dark gray (10YR 3/1 [Munsell color descriptor indicating hue value/chroma]) loam and the Bg horizon (9-18 inches) is gray (10YR 6/1) gravelly fine sand loam with a weak fine blocky structure and common medium distinct yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) masses of iron accumulation (USDA 2006b). Sun soils are listed as a hydric soil in Dutchess County (USDA 2009c). Sun silt loam is mapped in areas north and east of the inactive industrial portion of the site (Figure 3).

Farmington-Galway complex, undulating, very rocky (FcB) and ***Farmington-Galway complex, hilly, very rocky (FcD)*** are both complexes consisting of 45 percent Farmington and similar soils and 35 percent Galway and similar soils (USDA 2007a and USDA 2006c, respectively). The Farmington series consists of shallow, well drained and somewhat excessively drained soils formed in till and are nearly level to very steep soils on glaciated uplands (USDA 2007a). Bedrock is at a depth of 10 to 20 inches and slope ranges from 0 to 70 percent (USDA 2007a). The Ap horizon (0 to 8 inches) is typically dark grayish brown (10YR 4/2) silt loam and the Bw1 horizon (8 to 14 inches) is yellowish brown (10YR 5/4) silt loam (USDA 2007a). The Galway series consists of moderately deep, well drained and moderately well drained soils formed in till (USDA 2006c). Galway series soils are nearly level to very steep soils that are 20 to 40 inches deep over calcareous sedimentary bedrock (USDA 2006c). The Ap horizon (0 to 5 inches) is very dark grayish brown (10YR 3/2) loam, the Bw1 horizon (5 to 9 inches) is dark brown (10YR 3/3) fine sandy loam, and the Bw2 horizon (9-18 inches) is brown (10YR 4/3) fine sandy loam (USDA 2006c). Neither Farmington-Galway complex (FcB or FcD) is listed as a hydric soil in Dutchess County. FcB is mapped in the northern portion of the site and along the western portion of the inactive industrial portion of the site. FcD is mapped in the eastern portion of the site (Figure 3).

Galway-Farmington-Urban land complex, undulating, rocky (GIB) is a complex consisting of 30 percent Galway and similar soils, 25 percent Farmington and similar soils, 25 percent urban land, and 20 percent other soils and rock outcrops (USDA 2001a and USDA 2009a). Galway and Farmington soils are described in detail above.

Urban land consists of areas covered by buildings, streets, parking lots and other impervious surfaces which obscure soil identification and can have soil layers that have been altered or mixed with non-soil material such as bricks, broken concrete, or cinders (USDA 2001a). GIB is not listed as a hydric soil in Dutchess County. GIB soils are mapped in the inactive industrial portion of the site (Figure 3).

Copake gravely silt loam, nearly level (CuA) consists of well drained soils formed in loamy mantled stratified drift and glacial outwash (USDA 2001b). The soils are moderately deep to stratified sand and gravel and are very deep to bedrock (USDA 2001b). Copake soils are nearly level to very steep soils on outwash plains, terraces, kames, eskers, and moraines (USDA 2001b). The Ap horizon (0 to 6 inches) is a dark brown (10YR 3/3) fine sandy loam and the AB horizon (6 to 13 inches) is a dark olive drown (2.5Y 3/3) gravely fine sandy loam (USDA 2001b). Copake is not listed as a hydric soil in Dutchess County. Copake soils are mapped in the northwest portion of the site (Figure 3).

Udorthents, smoothed (Ud) consist of well drained soils that have been altered by cutting and filling (USDA 2001a; USDA 2009a). Because of its variability, a typical pedon[1] description is not provided and the characteristics of this unit are so variable that an onsite investigation is required to determine the suitability for proposed uses (USDA 2001a). Udorthents are not listed as a hydric soil in Dutchess County. Udorthents are mapped in the northern portion of the site (Figure 3).

Wayland silt loam (Wy) consists of very deep, poorly drained and very poorly drained, nearly level soils formed in recent alluvium (USDA 2007b). Wayland series soils are found in low areas or slackwater areas on floodplains (USDA 2007b). The A horizon (0 to 6 inches) is very dark grayish brown (10YR 3/2) silt loam with common fine prominent yellowish brown (10YR 5/8) masses of iron accumulation within old root channels. The Bg1 horizon (6 to 12 inches) is dark grayish brown (10YR 4/2) silt loam with common medium distinct dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix. The Bg2 horizon (12 to 18 inches) is grayish brown (10YR 5/2) silt loam with common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) masses of iron accumulation in the matrix (USDA 2007b).

[1] The smallest unit or volume of soil that contains all the soil horizons of a particular soil type, usually having a surface area of 10.76 square feet or approximately 1 square meter and extending from the ground surface down to bedrock.

Wayland soil is listed as a hydric soil in Dutchess County (USDA 2009b). Wayland soil is mapped in the southwest portion of the site (Figure 3).

2.3 National Wetlands Inventory Map

The National Wetlands Inventory (NWI) Map for the Dover Plains Quadrangle is presented on Figure 4. The NWI map indicates the boundaries of wetlands inventoried by the U.S. Fish and Wildlife Service to monitor changes in waterfowl habitat and do not have regulatory significance other than indicating the locations of areas potentially meeting the federal wetland criteria. The NWI map identifies 16 wetlands in the wetland assessment area (Figure 5). Three wetlands are mapped in the northern portion of the wetland assessment area: 1) a small palustrine, emergent, seasonally flooded/saturated wetland with persistent vegetation (PEM1E) between the road and the railroad line; 2) a small palustrine, scrub-shrub, seasonally flooded/saturated wetland with broad-leaved deciduous vegetation (PSS1E) just north of the first wetland; and 3) a larger palustrine, emergent /semi-permanently flooded wetland, with narrow-leaved persistent vegetation (PEM1/EM5F) northwest of the first two wetlands and bounded to the northwest by the rail line. Wetlands in the northwest portion of the wetland assessment area between the rail line and river are mapped as PEM1E at three locations along the river and along the rail line. Sandwiched between the emergent wetlands is a large palustrine, forested, seasonal wetland with broad-leaved deciduous vegetation (PFO1C). The southwestern portion of the wetland assessment area is mapped as PEM1E at four locations along the river. The majority of the wetlands mapped in the southwest portion of the wetland assessment area are mapped as temporarily flooded palustrine forested wetlands with broad-leaved deciduous vegetation (PFO1A), with a seasonally flooded/saturated forested wetland (PFO1E) mapped between the railroad line and the river. A wetland mapped as a PEM1E is present on the east side of the rail line near the southern boundary of the site.

2.4 New York State Freshwater Wetlands Map

The New York State Freshwater Wetlands Map (NYSFWM) for the Dover Plains Quadrangle is presented on Figure 5. The NYSFWMs indicate the boundaries of wetlands regulated by NYSDEC. The NYSFWM shows the majority of the area west of the rail line to be a component of state wetland DP-22. DP-22 is a 5,513-acre floodplain forest of the Great Swamp North Flow and is a Class I wetland (NYSDEC 2009). DP-22 extends north and south of the wetland assessment area and across Swamp River to the west. The portion of DP-22 in the wetland assessment area occurs between the rail line and the river.

Note that NYSDEC has evaluated wetlands on the site and has extended state jurisdiction to include a portion of wetlands east of the rail line. Confirmation of NYSDEC wetland boundaries and jurisdiction are included on the site map provided in Appendix C.

3 On-Site Investigation

3.1 General Site Description

The on-site investigation component of the wetland assessment was performed on April 22-24, 2009. Abandoned buildings associated with former industrial uses of the property were observed on site and appeared to be in dilapidated condition. Portions of the northern section of the site, east of the rail line, were observed to contain debris associated with former industrial uses of the property. Standing water and emergent vegetation were observed at two locations in the northeastern portion of the site. Forested areas with standing water were observed between the rail line and the river.

The wetland assessment was performed by walking through the site and identifying areas that exhibited characteristics that potentially met any of the federal wetland criteria. When the soil, vegetation, or hydrology characteristics of an area indicated a potential wetland, that area was further evaluated to determine if all three wetland criteria were met. If all three criteria were met, the area was identified as a wetland. The following sections describe the field characteristics that were used to evaluate and delineate wetlands found in the assessment area.

3.2 Vegetation Assessment

The criterion for wetland vegetation is a dominance of hydrophytic (water tolerant) species. A species is considered hydrophytic if it is classified as obligate (OBL), facultative wet (FACW), or facultative (FAC) in the *National List of Plant Species That Occur in Wetlands* published by the USFWS (1988). A dominance of hydrophytic vegetation requires that greater than 50 percent of the vegetation in an area be hydrophytic.

In accordance with the Manual, observations of vegetation focused on dominant plant species for four strata: trees ($\geq$3 inches diameter at breast height); saplings/shrubs (<3 inches diameter at breast height and >3.2 feet tall); herbs; and woody vines. Dominant species are the most abundant plant species that immediately exceed 50 percent of the total dominance measure for the stratum, plus any additional species comprising 20 percent or more of the total dominance measure for the stratum. Dominant vegetative species of the plant communities were recorded on field data forms (Appendix B) and evaluated for the percentage of hydrophytic vegetation for wetland determinations. Vegetative communities dominated by hydrophytic vegetation were concluded to meet the vegetation criterion for wetlands.

3.3 Soil Assessment

Site-specific soil characteristics were evaluated for consistency with the soil series description obtained from USDA (2001 a, b; 2006 a, b, c, d; 2007 a, b; 2009 a, b), or for the presence of hydric soil field indicators. Hydric soil field indicators for Land Resource Region R and Major Land Resource Area 144A were used for the soil assessment of the site (USDA 2006d). Investigatory boreholes were manually advanced with a Dutch auger at sample plots to a depth of at least 12 inches to evaluate soil characteristics. Observed soil characteristics of texture, degree of saturation, matrix color, and the presence and color of mottles, when present, were recorded on field data forms (Appendix B). Soils that were confirmed to be the hydric soil types mapped in the soil survey or that exhibited field indicators of hydric soils were concluded to meet the hydric soil criterion for wetlands.

3.4 Hydrology Assessment

According to the Manual, wetland hydrology consists of permanent or periodic inundation, or soil saturation to the surface during the growing season. Hydrology can be evaluated by observing field conditions for the presence of primary and/or secondary hydrology indicators. The project area was examined for field indicators of wetland hydrology. If these indicators were present within the sample plots, the hydrology criterion for wetlands was concluded to be met. Hydrologic indicators within the sample plots were recorded on field data forms (Appendix B).

3.5 Wetland Identification Methodology

Wetland criteria evaluations were conducted in data collection plots within areas exhibiting potential wetland characteristics. Field data sheets were completed and evaluations of soil, hydrology, and vegetation characteristics were performed along the wetland/upland interface to locate and refine the wetland boundary. Sample plot data were not documented on report forms if they were consistent with the conditions previously documented for the area. The identified wetland boundaries were flagged with sequentially numbered wetland delineation tape. The flag locations were subsequently surveyed and their locations transferred onto the site plan to depict the identified wetland boundaries (Figure 2). Field data forms documenting the observed field characteristics that resulted in the identified wetlands are included in this report as Appendix B.

4 Wetland Identification Results

Five areas were identified as wetlands in the wetland assessment area. Three wetlands were identified east of the rail line and two large wetlands were identified between the rail line and the Swamp River. The wetlands east of the rail line were surrounded by uplands of the site and were entirely present within the site boundaries. The eastern bank of the Swamp River defined the western limit of the wetland assessment area. Although identified wetlands adjacent to the river continued west of the river (portions of the site west of the Swamp River are mapped by NYSDEC as wetland), their characteristics were not confirmed, as no work is proposed in that area. The following sections provide brief descriptions of the five identified wetland areas. Details of the observed field characteristics that defined the wetland boundary are presented in Appendix B. Photographs of the identified wetlands are provided in Figures 6 through 10.

4.1 Wetland 1

Wetland 1 was identified in the northeast portion of the site east of the inactive industrial area (Figure 2). The majority of the interior of Wetland 1 was emergent wetland dominated by *Phragmites australis*, but the fringes transitioned into forested wetlands. Tree and shrub species in the wetland are green ash (*Fraxinus pennsylvanica*), eastern red cedar (*Juniperus virginiana*), silky dogwood (*Cornus amomum*), and honeysuckle (*Lonicera* sp.). Industrial debris overgrown with trees formed the northern and northwestern boundary of this wetland. Hydrology of this wetland ranged from standing water to saturated soils within 12 inches of the ground surface. Although observed soil characteristics did not match the series description in the soil survey, Wetland 1 soils exhibited hydric soil properties of low matrix value and chroma, meeting the hydric soil requirements of black histic (A3) (see Appendix B). NYSDEC has determined this is not a state-jurisdictional wetland. Photographs of Wetland 1 are presented in Figure 6.

4.2 Wetland 2

Wetland 2 was identified in the northern portion of the site and was bounded to the west by the rail line (Figure 2). The majority of the interior of Wetland 2 was emergent wetland dominated by *Phragmites* and *Typha* (cattails) with open water transitioning into forested wetlands. Industrial debris overgrown with trees formed the northern and western boundaries of this wetland. Hydrology of this wetland ranged from standing water to saturated soils within 12 inches of the ground surface. Although observed soil

characteristics did not match the series description in the soil survey, Wetland 2 soils exhibited hydric soil properties of low matrix value and chroma in sandy and silty clay soil textures, meeting the hydric soil requirements of dark surface (S7) (see Appendix B). This wetland has been determined by NYSDEC to be state jurisdictional. Photographs of Wetland 2 are presented in Figure 7.

4.3 Wetland 3

Wetland 3 was identified in the south central portion of the site between the eastern side of the rail line and a former drainage canal southwest of the industrial portion of the site (Figure 2). The remnants of a drainage canal ranged from containing stagnant standing water to being completely dry. Portions of this canal supporting wetland vegetation were identified as wetlands, which also created a seep that ponded water in lower elevations along the east side of the rail line and supported wetland vegetation. Much of the vegetation of Wetland 3 was dominated by *Phragmites*. Although observed soil characteristics did not match the series description in the soil survey, soils exhibited hydric soil properties of low matrix chroma values forming a depleted matrix (F3) (see Appendix B). NYSDEC has determined this is not a state-jurisdictional wetland. Photographs of Wetland 3 are presented in Figure 8.

4.4 Wetlands 4 and 5

Wetlands 4 and 5 were identified within the majority of the area between the western side of the rail line and the Swamp River (Figure 2). Except for some upland areas of exposed bedrock and a vehicle access path to a pump house located on the banks of the river, these forested wetlands exhibited pockets of standing water or have saturated soils with 12 inches of the ground surface. Dominant trees of these wetlands were green ash, gray birch (*Betula populifolia*), silver maple (*Acer saccharinum*), and red cedar. Although observed soil characteristics in Wetland 4 did not match the series description in the soil survey, Wetland 4 soils exhibited hydric soil properties of low matrix chroma colors with redox concentrations meeting the requirements of Redox Dark Surface (F6) (Appendix B). These wetlands are part of an existing NYSDEC-mapped wetland. The results of the onsite soil evaluations within Wetland 5 were consistent with the properties of the mapped soil unit Wayland silt loam (Wy) which is mapped in the majority of the wetland. Soils within Wetland 5 exhibited hydric soil properties of low matrix chroma colors with redox concentrations meeting the requirements of Redox Dark Surface (F6) and low chroma values forming a depleted matrix (F3) (see Appendix B). Photographs of Wetlands 4 and 5 are presented in Figures 9 and 10.

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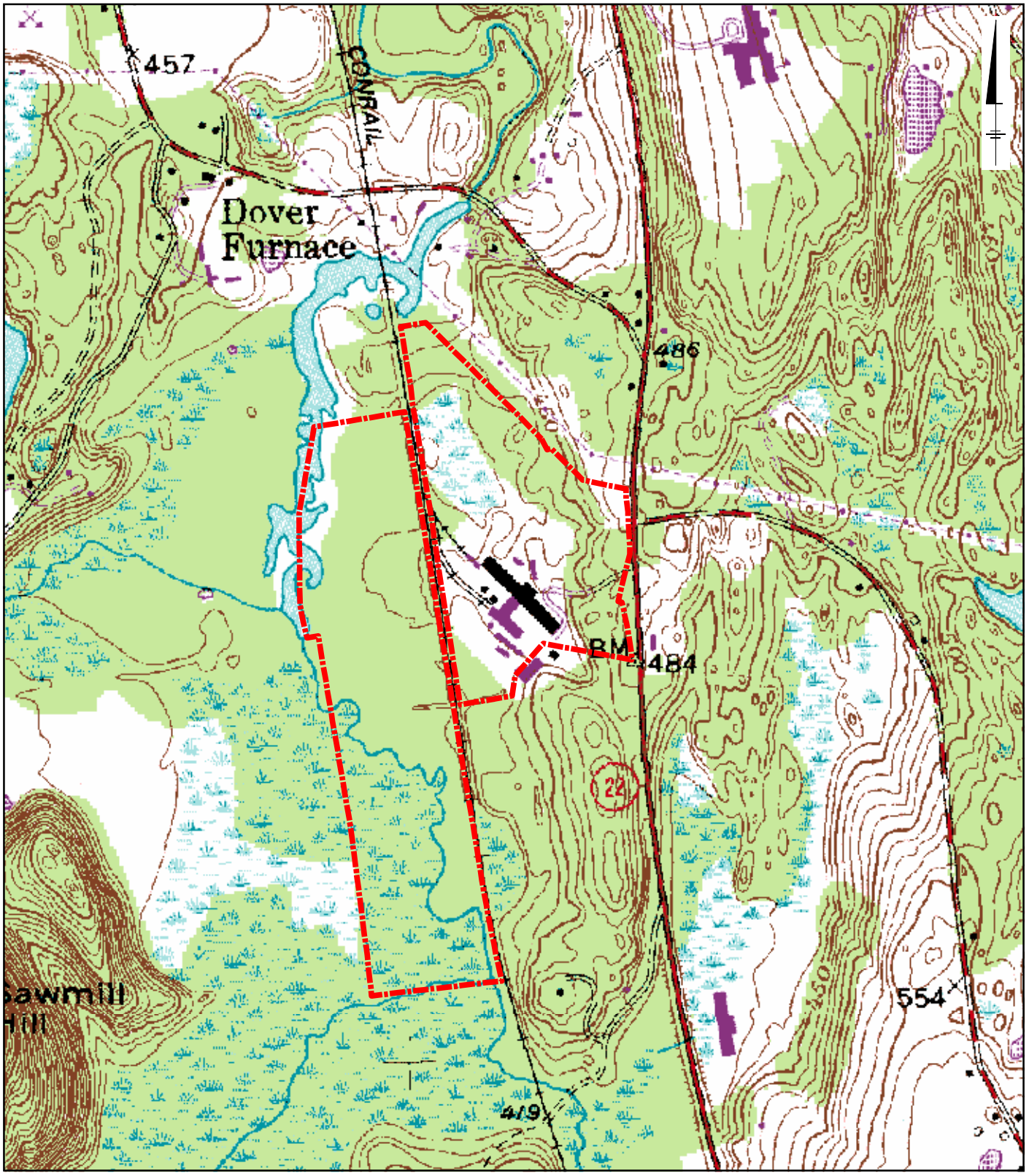
Appendix A

Figures



LEGEND:

WETLAND ASSESSMENT AREA

0 1,000 2,000 Feet

GRAPHIC SCALE

NOTE:

1. DOVER PLAINS, NY USGS QUAD MAP PHOTOREVISED 1984.

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WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

SITE LOCATION MAP

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FIGURE 1

CITY: SYR DIV/GROUP: SYE40 DB: KEW JCR
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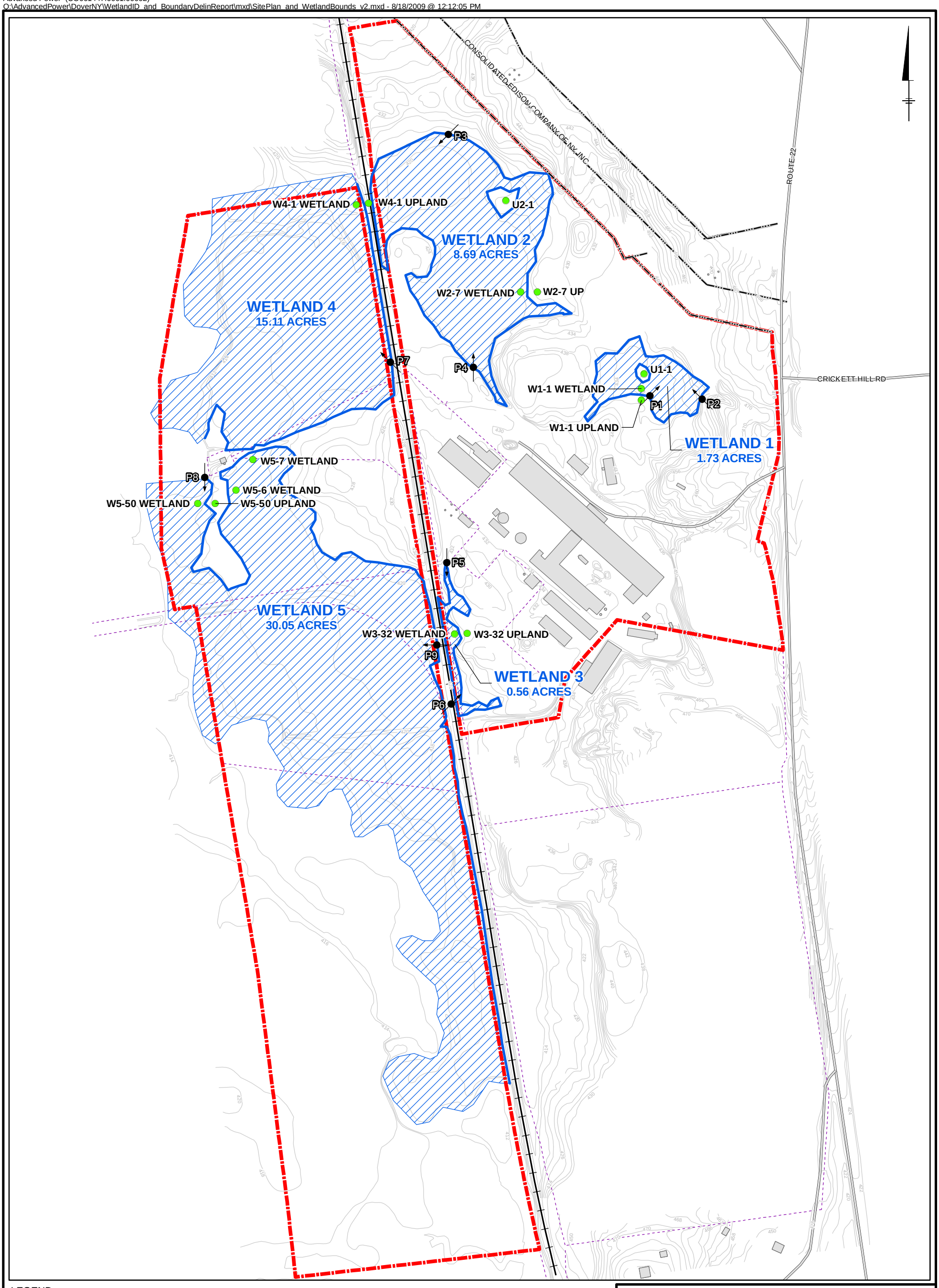

LEGEND:
- WETLAND/UPLAND DATA COLLECTION POINT
- PHOTOGRAPH LOCATION AND NUMBER
- ROAD
- RAILROAD
- CON EDISON RIGHT OF WAY
- WETLAND ASSESSMENT AREA
- WETLAND
- EXISTING STRUCTURE
- PARCEL BOUNDARY
- CONTOUR

0 350 700 Feet
GRAPHIC SCALE

NOTE:
1. BASEMAPPING FEATURES AND WETLAND SURVEY DATA PROVIDED BY ZARECKI & ASSOCIATES, LLC.

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WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

SITE PLAN AND IDENTIFIED WETLAND BOUNDARIES

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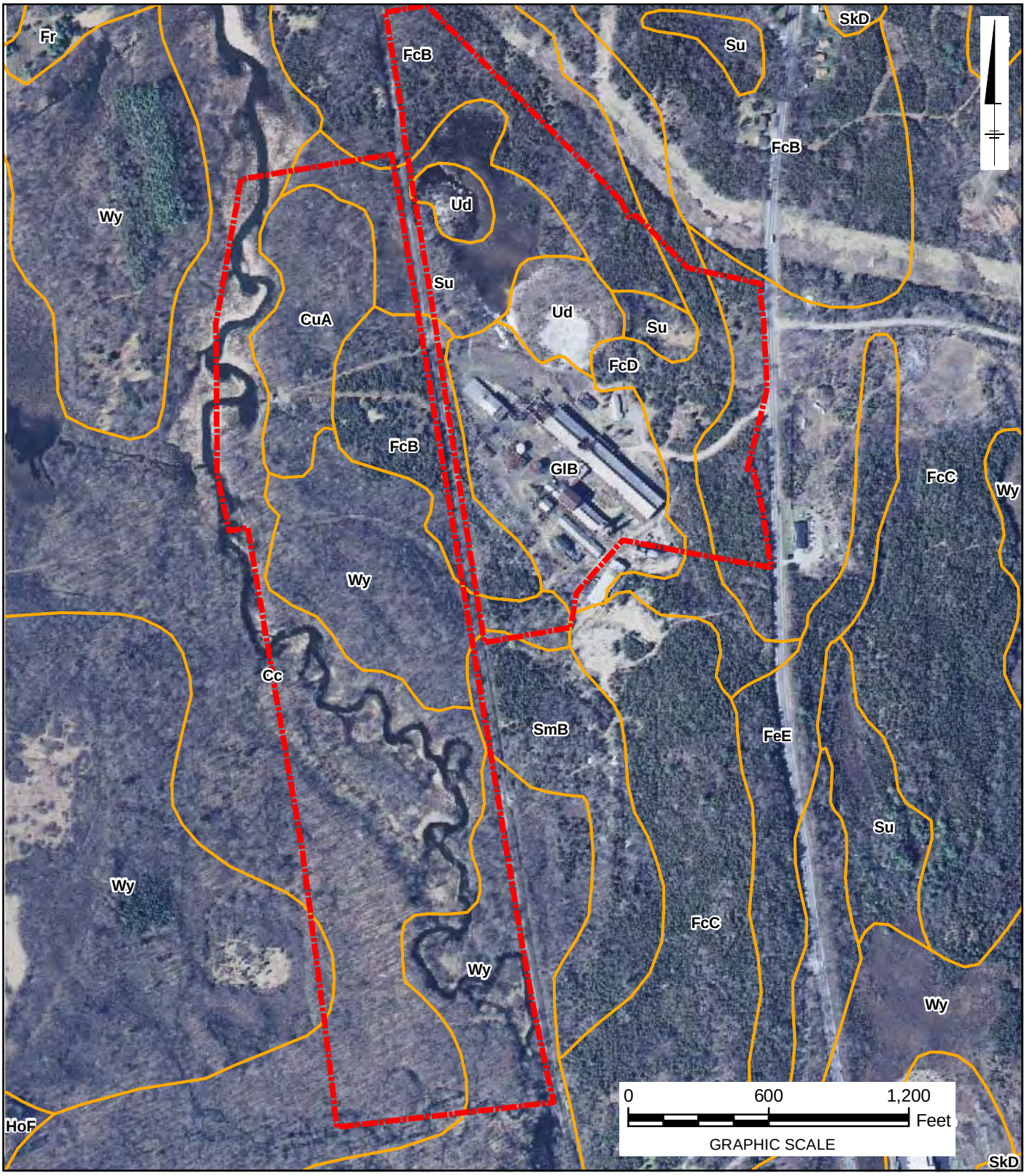
FIGURE
2



LEGEND:

WETLAND ASSESSMENT AREA

MAPPED SOIL TYPE BOUNDARY

NOTES:

1. 2004 AERIAL IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE AT http://www.nysgis.state.ny.us/
2. SOIL DATA FOR DOVER, NY PROVIDED BY THE USDA NATURAL RESOURCES CONSERVATION OFFICE AT http://soildatamart.nrcs.usda.gov/

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WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

SOIL SURVEY MAP

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FIGURE 3

CITY: SYR DIV/GROUP: SYE40 DB: KEW JCR
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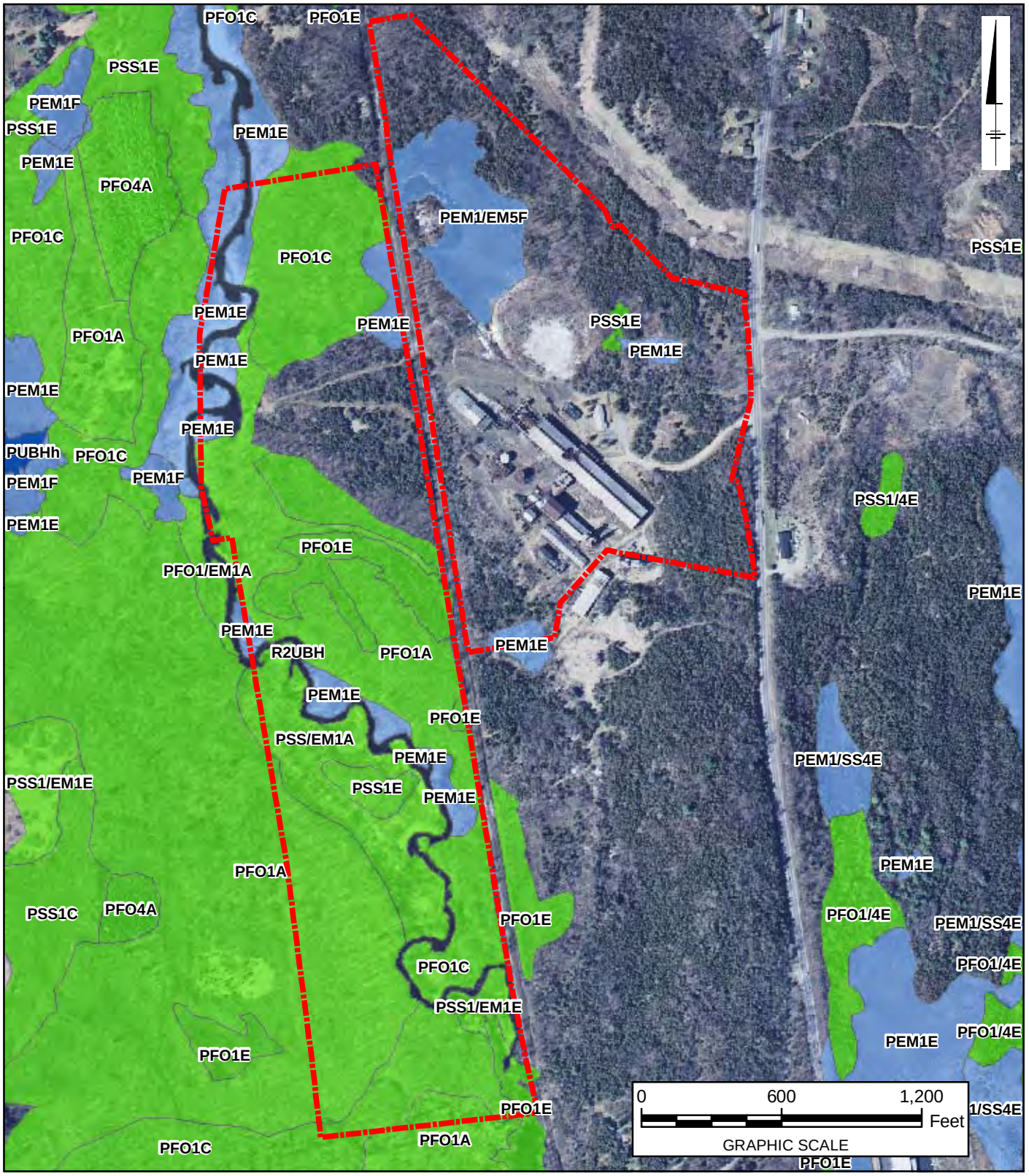

LEGEND:

- WETLAND ASSESSMENT AREA
- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND

NOTES:

1. 2004 AERIAL IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE AT http://www.nysgis.state.ny.us/
2. NATIONAL WETLANDS INVENTORY DATA PROVIDED BY THE U.S. FISH AND WILDLIFE SERVICE AT http://www.fws.gov/wetlands/

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WETLAND IDENTIFICATION AND BOUNDARY DELINEATION REPORT

NATIONAL WETLAND INVENTORY MAP

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FIGURE 4

CITY: SYR DIV/GROUP: SYE40 DB: KEW JCR
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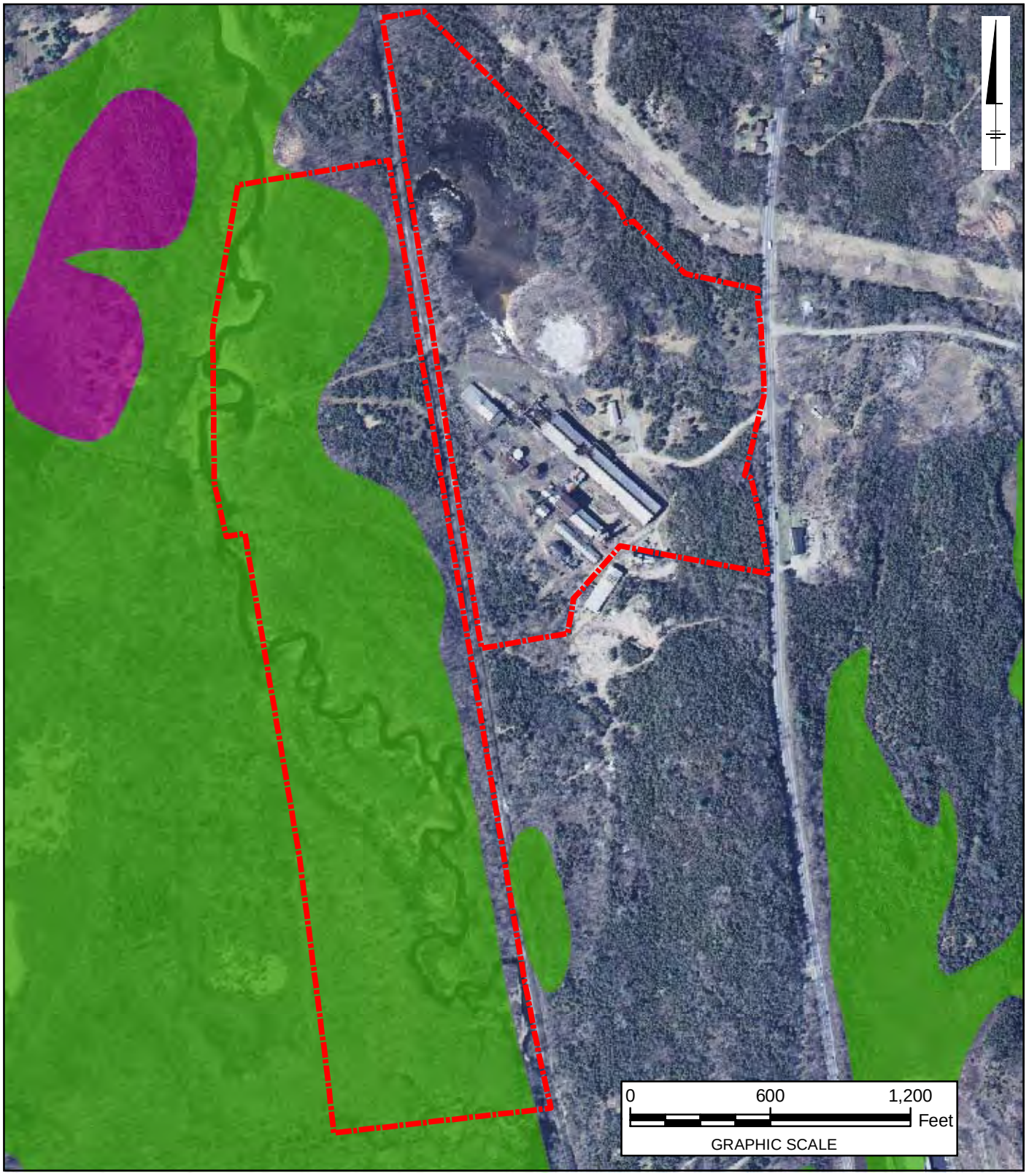

LEGEND:

- WETLAND ASSESSMENT AREA
- DP-22
- DP-22 UPL

NOTES:

1. 2004 AERIAL IMAGERY DOWNLOADED FROM THE NEW YORK STATE GIS CLEARINGHOUSE AT http://www.nysgis.state.ny.us/
2. NEW YORK STATE REGULATORY FRESHWATER WETLANDS DATA PROVIDED BY THE NYSDEC AT http://cugir.mannlib.cornell.edu

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NEW YORK STATE FRESHWATER WETLANDS MAP

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FIGURE 5

CITY: SYR DIV/GROUP: SYE40 DB: KEW JCR
Adv. Power (CO001447.0001.00002)
Q:\AdvancedPower\Dover\NY\WetlandID_and_BoundaryDelinReport\mxd\NYS_FreshwaterWetland_v2.mxd - 8/18/2009 @ 12:10:55 PM

1

Photo #1: Wetland 1, looking northeast.

2

Photo #2: Wetland 1, looking northwest.

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Dover, New York
Wetland Identification and Boundary Delineation Report

Photographs of Wetland 1

ARCADIS

Figure 6

3

Photo #3: Wetland 2, looking southwest.

4

Photo #4: Wetland 2, looking north.

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Photographs of Wetland 2

ARCADIS

Figure 7

5

Photo #5: Wetland 3, looking south along ditch.

6

Photo #6: Wetland 3, looking northeast.

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Photographs of Wetland 3

ARCADIS

Figure 8

Photo #7: Wetland 4, looking northwest.

7

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Photographs of Wetland 4

ARCADIS

Figure 9

8

Photo #8: Wetland 5, looking south at emergent portion of wetland.

9

Photo #9: Wetland 5, looking west.

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Photographs of Wetland 5

ARCADIS

Figure 10