Appendix E: Wetland Delineation and Stream Identification

Wetlands and Other Waters
Delineation Report

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for:

South Field Energy, 86.5 acres
Yellow Creek Township, Columbiana County, Ohio

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STATEMENT OF CERTIFICATION

The analyses, opinions and conclusions in this report are based entirely on EnviroScience's unbiased, professional judgment. EnviroScience's compensation is not in any way contingent on any action or event resulting from this study. Neither EnviroScience nor any EnviroScience employee has any vested interest in the property examined in this study.

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EXECUTIVE SUMMARY

EnviroScience, Inc. performed a delineation of wetlands and other waters in April 2015 for Tetra Tech, Inc. at the South Field Energy project located east and north of Hibbetts Mill Road in Yellow Creek Township, Columbiana County, Ohio. The project area is approximately 86.5 acres and is located just northwest of Wellsville, Ohio.

Nine small wetlands were identified within the project area and account for a total of 0.783 acres. All onsite wetlands are dominated by a palustrine emergent vegetative community. The quality of the onsite wetlands was assessed using the Ohio Rapid Assessment Method. Eight onsite wetlands fall within the range for Category 1 wetlands, which is the lowest quality of wetland in Ohio. One wetland (Wetland W-1) scored within the range for a Modified Category 2 wetland. Modified Category 2 wetlands are of slightly higher quality than Category 1 wetlands.

Three intermittent streams and three ephemeral streams were also identified within the project area, accounting for an additional 0.105 acres and 1,472 linear feet of waterway within the project area. Onsite streams were assessed using the Headwater Habitat Evaluation Index (HHEI). Stream S-3 is classified as a Modified Class I Primary Headwater Habitat (PHWH) stream. Streams S-2 and S-6 are classified as Class I PHWH streams. Streams S-1, S-4, and S-5 are classified as Class II PHWH streams. These classifications indicate that all streams are generally small in size and are of low to moderate quality. No open water aquatic resources were identified within the project area.

The wetlands and waterbodies are under the jurisdiction of the Ohio EPA or U.S. Army Corps of Engineers (USACE). No filling may occur within these areas without their written permission.

1.0 INTRODUCTION AND SITE DESCRIPTION

EnviroScience, Inc. performed a delineation of wetlands and other waters in April 2015 for Tetra Tech, Inc. at the South Field Energy project located east and north of Hibbetts Mill Road in Yellow Creek Township, Columbiana County, Ohio. The project area is approximately 86.5 acres and is located just northwest of Wellsville, Ohio. Two residential properties are located within the project area. Each residential property includes one house and one detached outbuilding.

Six distinct vegetative communities were identified within the project area, including one wetland community type. The project area exists as maintained lawn, forest and field vegetative communities. The surrounding area exists as forest with scattered rural residential properties. The project area includes nine small wetlands, three intermittent streams, and three ephemeral streams.

The project area is located in the Upper Ohio drainage basin (Hydrologic # 05030101) which drains approximately 1,980 square miles in eastern Ohio, western Pennsylvania, and north-central West Virginia. It is within the Western Allegheny Plateau ecoregion (Woods *et al.* 1998) of Ohio. The project area is located within the area covered by the Eastern Mountains and Piedmont Regional Supplement (USACE 2012) and associated plant list (Lichvar 2014). The project area is regulated by the USACE Pittsburgh District.

2.0 METHODS

Government agencies regulate coastal and inland waters for commerce, flood control and water quality. These water bodies provide numerous functions and values necessary to protect and sustain our quality of life. Wetlands comprise a significant portion of regulated waters. The USACE and U.S. Environmental Protection Agency (EPA) jointly define wetlands as:

> "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The remaining deepwater aquatic habitats (open waters) are defined by the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) as:

> ". . . areas that are permanently inundated at mean annual water depths >6.6 ft or permanently inundated areas <6.6 ft in depth that do not support rooted emergent or woody plant species."

The methods used for determining and delineating wetlands and open waters strictly adhere to those found in the *Corps of Engineers Wetlands Delineation Manual*

(Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (USACE 2012). Wetlands and open water boundaries were determined by the disappearance of one or more of their diagnostic characteristics.

Ordinary high water marks (OHWM) defined the outermost regulatory boundaries of ephemeral and open waters.

Each sample plot and the perimeter of each wetland and other water was surveyed and marked in the field with plain pink flags and pink "wetland boundary" flags, respectively. A global positioning system (GPS) unit with submeter accuracy was used, in conjunction with aerial photography and topographic figures, for the survey. Computer Aided Design (CAD) software was used to determine wetland dimensions and produce a map of the project area showing wetlands and other waters.

2.1 WETLANDS

2.1.1 Determination

A review of secondary literature sources was performed to find known wetlands and other significant ecological resources and areas with high potential for wetlands in or near the proposed project area. Resources included the following:

1. U.S. Geological Survey (USGS) topographic maps;
2. National Wetlands Inventory (NWI) maps;
3. Web Soil Survey; and
4. Aerial Photographs.

A field inspection of the project area was then completed to identify major plant communities and to visually locate potential wetlands. The routine, onsite (Level 2) wetland determination was used to perform the delineation. Wetland communities were classified according to the classification scheme of Cowardin *et al.* (1979) (Table 1). Mature nonwetland communities that had reached a stable equilibrium were classified according to Anderson (1982) and Gordon (1966, 1969). Disturbed and successional nonwetland communities were classified as one of the categories described in Table 2.

Table 1. Wetland Communities (Cowardin *et al.* 1979)

Community	Description
PEM	Palustrine Emergent
PSS	Palustrine Scrub-Shrub
PFO	Palustrine Forested
POW	Palustrine Open Water

Table 2. Disturbed and Successional Nonwetland Communities

Community		Description
Disturbed	Urban	regularly maintained land; residential; industrial
	Agricultural	land used for producing crops or raising livestock; cropland; pastureland
	Cleared	disturbed areas devoid of most vegetation from recent clearing, grading or filling
Successional	Open Field	herbaceous community without woody vegetation
	Old Field	herbaceous community having woody vegetation coverage of <50%
	Scrub-Shrub	community dominated by woody vegetation <6 m (20 ft) tall
	Forest	community dominated by woody vegetation >6 m (20 ft) tall

Sample plots were established within each natural community and potential wetland within the study area. Complete data for each sample plot were collected and recorded on the USACE's Routine Wetland Determination Data Forms contained in the applicable USACE Regional Supplement (USACE 2012). Vegetation, hydrology and soils were evaluated at each sample plot.

2.1.1.1 Vegetation

To detect the presence or absence of hydrophytic vegetation, four plant strata were evaluated within specific radii of the plot center. Each stratum was ranked by aerial cover in descending order of abundance. Table 3 provides information on each vegetative stratum.

Table 3. Vegetative Strata

Stratum	Definition	Survey Area
Tree	woody plants > or equal to 3 in. (7.6 cm) diameter at breast height (dbh), regardless of height	30 ft (9.1 m) radius
Sapling/shrub	woody plants <3 in. (7.6 cm) dbh and ≥3.28 ft (1 m) tall	15 ft (4.6 m) radius
Herbaceous	herbs and woody plants less than 3.28 ft (1 m) in height	5 ft (1.5 m) radius
Woody vines	woody vines >3.28 ft (1 m) in height	30 ft (9.1 m) radius

Percent dominance was obtained for each species and within each stratum. Dominant species are those which cumulatively totaled in order of abundance immediately exceed 50% and also include any individual species with an abundance of 20% or more (USACE 2012). Dominant taxa were identified using recognized local guides: nomenclature follows the *National List of Scientific Plant Names* (USDA 1982). Following the identification of each plant species present within the plot, all dominant species within each stratum were assigned a wetland indicator status according to Lichvar (2014). Indicators are summarized in Table 4.

Table 4. Plant Indicators

Indicator	Category	Definition
OBL	Obligate Wetland	almost exclusively (>99% of occurrences) found in wetlands
FACW	Facultative Wetland	most likely found in wetlands (67-99% of occurrences)
FAC	Facultative	equally likely found in wetlands or nonwetlands (34-66%)
FACU	Facultative Upland	most likely found in nonwetlands (1-33% occurrence in wetlands)
UPL	Obligate Upland	almost exclusively found in nonwetlands (<1% occurrence in wetlands)

An 'NI' (no indicator) designation represents species where not enough information is available to assign an indicator; an 'NL' (no listing) designation is given to species whose identification was not determined sufficiently enough to assign an indicator. Once the indicator status is assigned to each dominant species, the evaluator can perform the percent dominance test according to the protocol outlined within the applicable Regional Supplement (USACE 2012) to determine if the plot meets the criterion for hydrophytic vegetation.

2.1.1.2 Hydrology

To detect the presence or absence of wetland hydrology, surface and subsurface hydrologic indicators were evaluated at the sample plot and throughout the adjacent community. Primary sources of wetland hydrology include direct precipitation, headwater flooding, backwater flooding, groundwater or any combination of these. When obtaining data at each sample plot, the evaluator observes evidence of hydrology. Primary indicators of hydrology (only one of these is necessary to indicate sufficient wetland hydrology) include the presence of surface water, water marks, sediment deposits, drift deposits, etc. (USACE 2012). Secondary indicators of hydrology (which requires two or more at each sample plot) include surface soil cracks, drainage patterns, crayfish burrows, etc. (USACE 2012).

2.1.1.3 Soils

The upper horizons of the soil at each sample plot were examined to detect the presence or absence of hydric soils indicators. Current USACE guidance requires the evaluator to assess the upper 20 inches of soil for hydric soil characteristics. Most indicators of hydric soils require an assessment of soil matrix color and mottle characteristics (Environmental Laboratory 1987, USACE 2012) for each horizon. These characteristics were determined by comparing a moist sample with *Munsell Soil Color Chart* (Munsell Color 2009) or *The Globe Soil Color Book* (Visual Color Systems, 2004).

2.1.2 ORAM Categorization

Each wetland system was categorized in accordance with version 5.0 of the Ohio EPA's Ohio Rapid Assessment Method for Wetlands (ORAM) (Mack 2001). Field scoring forms are contained in Appendix D.

Ohio EPA has established three primary and three intermediate categories of wetland quality which are based on a wetland's size, its hydrologic function, the types of plant communities present, the physical structure of the wetland plant community and the wetland's level of disturbance (OAC 3745-1-54). The relationship between the various wetland categories and their respective ORAM scores is presented in Table 5. ES also evaluated the project area for the presence of state threatened and endangered species as part of the ORAM evaluation.

Table 5. ORAM Scores and Categories

ORAM Score	ORAM Category	Description
0-29.9	Category 1	Lowest quality, and are generally characterized by hydrological isolation, lack of plant species diversity, insufficient habitat availability, and limited potential to perform major wetland functions.
30-34.9	Category 1 or 2 (Gray Zone)	ORAM score is insufficient to categorize wetland. In absence of a nonrapid method such as VIBI, assign the wetland to the higher functional category (Category 2)
35-44.9	Modified Category 2	Category 2 wetlands that may be of lower quality or degraded but have reasonable potential to be restored.
45-59.9	Category 2	Wetlands that have the capability to support a moderate wildlife community or maintain mid-level hydrological functions.
60-64.9	Category 2 or 3 (Gray Zone)	ORAM score is insufficient to categorize wetland. In absence of a nonrapid method such as VIBI, assign the wetland to the higher functional category (Category 3)
65-100	Category 3	Highest quality, generally characterized by a high level of biological diversity and topographical variation, threatened or endangered species, large numbers of native species, or a high level of functional importance to its surroundings.

Category 3 wetlands have the highest quality, and are generally characterized by a high level of biological diversity and topographical variation, large numbers of native species, or a high level of functional importance to its surroundings. Category 2 wetlands have the capability to support a moderate wildlife community or maintain mid-level hydrological functions. Category 2 also includes wetlands that may be of lower quality or degraded but have reasonable potential to be restored (Modified Category 2). Category 1 wetlands are of the lowest quality, and are generally characterized by hydrological isolation, lack of plant species diversity, insufficient habitat availability, and limited potential to perform major wetland functions (OAC 3745-1-54).

Since the ORAM is a rapid assessment method, there are certain wetland scores which fail to clearly differentiate the wetland's functional category. The so-called "gray zone" wetlands fall between the definite scoring breaks between the categories. Ohio EPA requires that "gray zone" wetlands be considered as the higher category unless more detailed functional assessments such as the VIBI or AmphIBI are conducted on those wetlands. As a result of this requirement, wetlands whose scores fall between the breakpoints for Categories 1 and 2 (1 or 2 gray zone wetlands) wetlands will be considered as Category 2 wetland for purposes of this report. Wetlands whose scores fall between the breakpoints for Categories 2 and 3 wetlands (2 or 3 gray zone wetlands) will be considered a Category 3 wetland for purposes of this report.

2.1.3 Cowardin Wetland Classification

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory uses the *Classification of Wetlands and Deepwater Habitats of the United States* to classify wetland habitat types (Cowardin *et al.* 1979). This classification system is hierarchical and defines five major systems – Marine, Estuarine, Riverine, Lacustrine, and Palustrine. The Palustrine system was the only type of wetland system identified within the study area and is defined as including all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean driven-derived salts is below 0.5 percent (Cowardin *et al.* 1979).

2.2 OTHER WATERS

Other waters include ephemeral and open waters. These waters are broken down into two categories: 1) ponds and lakes; and 2) streams and rivers.

2.2.1 Ponds and Lakes

Palustrine systems other than wetlands, and lacustrine waters are addressed as ponds and lakes, respectively. These non-linear open waters may harbor important aquatic communities such as vegetated shallows (aquatic bed) and mud flats. They are classified according to Cowardin *et al.* (1979).

2.2.2 Streams and Rivers

Riverine systems are linear flowing waters bounded by a channel. Cowardin *et al.* (1979) divides these system into four groups, however, for the purpose of this report streams are placed into three regulatory types, listed below.

Ephemeral: An ephemeral stream only conveys runoff precipitation and meltwater. It is permanently located above the water table and is most often dry.

Intermittent: An intermittent stream is located below the water table for parts of the year, but does have dry periods.

Perennial: A perennial stream typically has flowing water throughout the entire year.

In addition to flow characteristics, the USACE has defined other regulatory categories that apply to streams, which are listed below (USACE and USEPA, 2007).

Traditional Navigable Waters (TNW): all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.

Relatively Permanent Waters (RPW): non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months).

Non-Relatively Permanent Waters (Non-RPW): non-navigable tributaries of traditional navigable waters that are not relatively permanent where the tributaries typically do not have continuous flow at least seasonally (e.g., typically three months).

The Corps and USEPA will assert jurisdiction under the Clean Water Act on Traditional Navigable Waters (TNWs) and all wetlands adjacent to them, non-navigable tributaries of TNWs that are Relatively Permanent Waters (RPW) [i.e., tributaries that typically flow year-round or have continuous flow at least seasonally]; and wetlands that directly abut such tributaries. In addition, the agencies will assert jurisdiction over every water body that is not an RPW if that water body is determined (on the basis of a fact-specific analysis) to have a significant nexus with a TNW.

“A significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or an insubstantial effect on the chemical, physical, and/or biological, integrity of a TNW. Principal considerations when evaluating significant nexus include the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a TNW, plus the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.”

2.2.3 HHEI and QHEI

Data collection for all streams included the completion of either the Ohio EPA Headwater Habitat Evaluation Index (HHEI) for primary headwater habitat (PHWH) streams or the Qualitative Habitat Evaluation Index (QHEI) for larger streams. Biologists are Ohio EPA trained to assess streams using the QHEI and HHEI. Following the Ohio EPA guidance, any stream with a drainage area of less than or equal to one mi^2 (2.589 km^2) and pools with a maximum water depths less than or equal to 15.75 in (40 cm) were evaluated using the HHEI (Ohio EPA 2002). The QHEI was used to evaluate streams with drainage areas greater than one mi^2 and pools with maximum water depths greater than 15.75 in (40 cm). The assessment location is representative of the stream/headwater within the project area.

3.0 LITERATURE REVIEW

3.1 USGS TOPOGRAPHIC MAP

The U.S. Geological Survey (USGS) 7.5-minute topographic series (West Point Quadrangle) is shown on Figure 2 (Appendix A). The project area is relatively flat with steep slopes near the western and southern property boundaries near Hibbetts Mill Road. Elevations range from approximately 970 feet above mean sea level (AMSL) to approximately 1,020 feet AMSL. An intermittent stream is shown on the USGS map crossing through the northeastern property boundary. This stream corresponds to the delineated Stream S-4.

3.2 NWI MAP

The National Wetlands Inventory (NWI) map (West Point Quadrangle) of the project area is shown on Figure 3 in Appendix A. No wetlands or other deepwater habitats are depicted within the project area. Given the topography, soils, and scarcity of other mapped NWI wetland in the surrounding area, the lack of onsite NWI wetlands is expected and common.

3.3 COUNTY SOIL SURVEY

The project area is found on the *Soil Survey of Columbiana County, Ohio* and was accessed on the Soil Survey Geographic (SSURGO) Database (USDA Web Soil

Survey, 2011) (Figure 4; Appendix A). Nine soil types are depicted within the project area and are listed in Table 6. All onsite soil types are listed as not hydric or predominantly non-hydric within Columbiana County.

Table 6. Soil Types Mapped Project Area.

Symbol	Soil Type	Status	Common Landform	Percent Hydric	Acres in Project Area	Percent Within Project Area
WkE	Westmoreland-Berks complex, 25 to 40 percent slopes	Not Hydric	hills	0	3.170	3.7
BkC	Berks channery silt loam, 6 to 15 percent slopes	Not Hydric	hills	0	17.914	20.7
GnB	Gilpin silt loam, 2 to 6 percent slopes	Not Hydric	hills	0	3.281	3.8
GaB	Gavers silt loam, 2 to 6 percent slopes	Predominantly Non-Hydric	depressions	5	6.040	7.0
HeC	Hazleton channery loam, 6 to 15 percent slopes	Not Hydric	hills	0	4.836	5.6
HeB	Hazleton channery loam, 2 to 6 percent slopes	Not Hydric	hills	0	1.817	2.1
BkE	Berks channery silt loam, 25 to 40 percent slopes	Not Hydric	hills	0	7.030	8.1
CoC	Coshocton silt loam, 6 to 15 percent slopes	Not Hydric	hills	0	13.888	16.0
KeB	Keene silt loam, 2 to 6 percent slopes	Not Hydric	hills	0	28.556	33.0

3.4 U.S. FISH AND WILDLIFE SERVICE

The project area was examined for suitable habitat for federally listed species whose known range includes Columbiana County, Ohio. These species are the federally endangered Indiana bat (*Myotis sodalis*), the federally threatened northern long-eared bat (*Myotis septentrionalis*), the federal species of concern eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*), the federal candidate species eastern massasauga (*Sistrurus catenatus catenatus*), and the federal species of concern bald eagle (*Haliaeetus leucocephalus*).

Living or dead trees with shedding or peeling bark or cavities may serve as roosting trees for the Indiana bat and/or the northern long-eared bat. In addition, sheds and barns may serve as roosting habitat for the northern long-eared bat. No potential winter hibernaculum is located within the project area. Several structures are located within the project area. All of the onsite barns, homes, and sheds appeared to be in good repair without and obvious entrances for the northern long-eared bat to use. Approximately 15 acres within the project area are forested. Forested areas generally occur along the eastern and western property boundaries, with several tree rows within the interior portion of the property. The majority of onsite forest consists of smaller trees that do not display habitat features for either bat species. An in-depth habitat analysis was not performed, however; there are three general areas within the project area that contain suitable habitat features. Suitable habitat features include, but are not limited to, larger canopy trees, trees exhibiting peeling bark, holes, or crevices, open understory, and stream or wetland corridors. These areas of suitable habitat are located in the southwest corner of the property, along the corridor of Stream S-4 (a-d), and along the corridor of Stream S-1.

The eastern hellbender is found in habitats with swift-running, fairly shallow, and highly oxygenated water. They require an abundance of large, flat rocks or logs for use as cover objects. No perennial streams within the above habitat are found within the project area.

Preferred habitat for the eastern massasauga includes wet areas including wet prairies, marshes and low areas along rivers and lakes. Massasaugas also use adjacent uplands during part of the year. The majority of the project area is upland field and forest that is not preferable habitat for the eastern massasauga. The wetlands that are located within the project area are open and do not provide appropriate cover for the eastern massasauga.

The bald eagle nests in large trees near water. No bald eagle habitat was observed within the project area.

Data from the Ohio Department of Natural Resources (ODNR) Natural Heritage database was received on May 29, 2015. The Database indicated a record of the bowman's root (*Porteranthus trifoliatus*), a state threatened species, within a one (1) mile radius of the project area. No unique ecological sites, geologic features, animal assemblages, scenic rivers, state wildlife areas, state nature preserves, state or national parks, state or national forests, national wildlife refuges, or other protected natural areas are located within the project area.

3.5 AERIAL PHOTOGRAPHY

A recent aerial photograph of the project area is shown on Figure 5 (Appendix A). The site is depicted as maintained lawn in the south-central portion of the project area. The maintained lawn area includes two driveways and four buildings. A wide utility easement is shown near the eastern property boundary. The remainder of the property contains a mix of forest, shrub, and field vegetative communities. Hibbetts Mill Road is located to the west and south of the project area. The project area is surrounded by forest with some rural residential properties.

4.0 RESULTS

Twenty sample plots were established within five natural communities. One of those communities is considered wetland. Table 7 summarizes the sample plot data.

Table 7. Sample Plot Results.

Sample Plot	Photo*	Community**	Hydrophytic Vegetation	Wetlands Hydrology	Hydric Soil	Status	Location
1	1	PEM	X	X	X	Wetland	W-1
2	2	Forest				Non-Wetland	SP-2
3	3	PEM	X	X	X	Wetland	W-2
4	4	PEM	X	X	X	Wetland	W-3
5	5	Open Field				Non-Wetland	SP-5
6	6	PEM	X	X	X	Wetland	W-4
7	7	PEM	X	X	X	Wetland	W-5
8	8	PEM	X	X	X	Wetland	W-6
9	9	Open Field	X			Non-Wetland	SP-9
10	10	PEM	X	X	X	Wetland	W-7
11	11	PEM	X	X	X	Wetland	W-8
12	12	PEM	X	X	X	Wetland	W-8
13	13	Open Field				Non-Wetland	SP-13
14	14	Old Field				Non-Wetland	SP-14
15	15	PEM	X	X	X	Wetland	W-9
16	16	Old Field				Non-Wetland	SP-16
17	17	Open Field	X			Non-Wetland	SP-17
18	18	Scrub/Shrub				Non-Wetland	SP-18
19	19	Old Field	X			Non-Wetland	SP-19
20	20	Open Field				Non-Wetland	SP-20

*photos are located in Appendix B
** PEM =Palustrine Emergent

Each sample plot, delineated wetland, and other waters are illustrated on Figure 5 (Appendix A). The following section describes general conditions found within each plant community and summarizes relevant information from the data forms, located in Appendix C.

4.1 NONWETLANDS

Five upland communities including forest, scrub/shrub, old field, open field, and maintained lawn exist within the project area. The forest community is represented by Sample Plot 2. Growing in the tree layer of the onsite forest are red oak (*Quercus rubra*, FACU), white oak (*Quercus alba*, FACU), black locust (*Robinia pseudoacacia*, FACU), black cherry (*Prunus serotina*, FACU), red maple (*Acer rubrum*, FAC) sugar maple (*Acer saccharum*, FACU), and shagbark hickory (*Carya ovata*, FACU). Growing in the shrub layer of the forest are tree saplings, flowering dogwood (*Cornus florida*, FACU), rambler rose (*Rosa multiflora*, FACU), and Allegheny blackberry (*Rubus allegheniensis*, FACU). The herbaceous layer of the forest includes garlic mustard (*Alliaria petiolata*, FACU), mayapple (*Podophyllum peltatum*, FACU), and cut-leaf toothwort (*Cardamine concatenata*, FACU).

The upland scrub/shrub community is represented by Sample Plot 18 and includes hawthorn (*Crataegus* sp., NI), European privet (*Ligustrum vulgare*, FACU), gray dogwood (*Cornus racemosa*, FAC), crabapple (*Pyrus malus*, UPL), and Allegheny blackberry in the shrub layer. Growing in the herbaceous layer of the scrub/shrub community is late goldenrod (*Solidago gigantea*, FACW), deer-tongue rosette grass (*Dichanthelium clandestinium*, FAC), oldfield cinquefoil (*Potentilla simplex*, FACU), and Kentucky blue-grass (*Poa pratensis*, FACU).

The old field vegetative community is represented by Sample Plots 14, 16, and 19. Species observed growing in this shrub layer of this community include black locust, Allegheny blackberry, rambler rose, black cherry, and crabapple. The herbaceous layer includes garlic mustard, Kentucky blue-grass, late goldenrod, purple dead nettle (*Lamium purpureum*, UPL), false little bluestem (*Schizachyrium scoparium*, FACU), der-tongue rosette grass, and oldfield cinquefoil.

The open field community is represented by Sample Plots 5, 9, 13, 17, and 20. Small amounts of Allegheny blackberry were observed growing in the shrub layer. The herbaceous layer of the open field includes late goldenrod, deer-tongue rosette grass, oldfield cinquefoil, Queen Ann's lace (*Daucus carota*, UPL), common yarrow (*Achillea millefolium*, FACU), red clover (*Trifolium pratense*, FACU), Canada goldenrod (*Solidago canadensis*, FACU), quaker-ladies (*Houstonia caerulea*, FACU), and reed canary grass (*Phalaris arundinacea*, FACW).

A sample plot was not taken within the maintained lawn community, however a list of dominant species was recorded. Growing within the maintained lawn is Kentucky bluegrass, red clover, common dandelion (*Taraxacum officinale*, FACU), ground-ivy (*Glechoma hederacea*, FACU), common plantain (*Plantago major*, FACU), and English plantain (*Plantago lanceolata*, FACU) in the herbaceous layer.

4.2 WETLANDS

Nine wetlands were identified and delineated within the project area. The onsite portion of these wetlands consist of palustrine emergent (PEM) vegetation. The delineated wetlands have been categorized using the Ohio Rapid Assessment Method for Wetlands v.5.0 (ORAM); scoring forms are included in Appendix D. Wetland results are given in Table 8 and are briefly described in the following section. Wetland size has been determined for areas within the project area. Wetlands are illustrated on Figure 5 (Appendix A).

Table 8. Wetland Results within the Project Area.

Wetland	Photo*	Cowardin Classification	ORAM Score	ORAM Category	Size within Project Area (acres)	Jurisdiction
W-1	21	PEM	35.5	Modified 2	0.118	Jurisdictional
W-2	22	PEM	19	1	0.109	Jurisdictional
W-3	23	PEM	25	1	0.144	Jurisdictional
W-4	24	PEM	26	1	0.031	Jurisdictional
W-5	25	PEM	26	1	0.028	Jurisdictional
W-6	26	PEM	26	1	0.010	Jurisdictional
W-7	27	PEM	26	1	0.015	Jurisdictional
W-8	28	PEM	29	1	0.319	Jurisdictional
W-9	29	PEM	28.5	1	0.009	Jurisdictional
Total Wetland					**0.783**	

*photos are located in Appendix B

All onsite wetlands are dominated by PEM vegetation and are represented by Sample Plots 1, 3, 4, 6, 7, 8, 10, 11, 12, and 15. Species growing within the onsite PEM wetlands include narrow-leaf cattail (*Typha angustifolia*, OBL), cottongrass bulrush (*Scirpus cyperinus*, FACW), swamp smartweed (*Persicaria hydropiperoides*, OBL), lamp rush (*Juncus effusus*, FACW), common fox sedge (*Carex vulpinoidea*, OBL), black bent (*Agrostis gigantea*, FACW), seedbox (*Ludwigia alternifolia*, FACW), lesser poverty rush

(*Juncus tenuis*, FAC), spotted touch-me-not (*Impatiens capensis*, FACW), blunt spike rush (*Eleocharis obtusa*, OBL), stalk-grain sedge (*Carex stipata*, OBL), sensitive fern (*Onoclea sesibilis*, FACW), late goldenrod, and canary reed grass.

Wetlands W-2, W-3, W-4, W-5, W-6, W-7, W-8, and W-9 assessed within the range for Category 1 wetlands using the ORAM scoring method. These wetlands are all relatively small in size and have moderate surrounding land use and narrow buffers. These wetlands are also experiencing impacts from mowing, grazing, farming, and fill. Wetland W-1 scored within the range for a Modified 2 wetland due to better and wider natural buffer and less modifications.

All onsite wetlands are considered jurisdictional and would be regulated by the USACE. Wetlands W-1, W-2, W-8, and W-9 have a direct connection to RPWs. Wetlands W-3, W-4, W-5, W-6, and W-7 are considered adjacent to Wetlands W-1 and W-2, which would constitute a jurisdictional connection.

4.3 Streams and Rivers

Three intermittent streams and three ephemeral streams were identified and delineated within the project area. The results are depicted in Table 9 and illustrated on Figure 5 (Appendix A).

Table 9. Stream Results within the Project Area.

Stream		Photos*	Type	Bankfull Width (feet)	Depth at Time of Survey (inch)	Length Within Project Area (linear feet)	Area Within Project Area (acres)	HHEI Score	Regulatory Category
S-1		30-32	Intermittent	2	2	298	0.014	39	RPW
S-2		33-35	Ephemeral	3	1	19	0.001	14	Non-RPW
S-3		36-38	Ephemeral	1.5	1	49	0.002	22	Non-RPW
S-4	a	39-41	Intermittent	4	4	328	0.030	60	RPW
	b					56	0.005		
	c					17	0.002		
	d					408	0.037		
S-5		42-44	Intermittent	1	2	22	0.001	42	Non-RPW
S-6	a	45-47	Ephemeral	2	0	230	0.011	18	Non-RPW
	b					45	0.002		
Total Stream						**1,472**	**0.105**		

*photos are located in Appendix B

The streams within the project area are primarily headwater streams formed along valleys throughout the project area or are formed as erosional channels. Stream S-1, S-2, and S-3 flow generally northwest into an unnamed tributary (located to the west of the project area) of Little Yellow Creek. Stream S-4, S-5, and S-6 flow generally east into an unnamed tributary (located to the east of the project area) of Little Yellow Creek. All onsite streams have been assessed using the HHEI; the scoring forms are included in Appendix E. Stream S-3 is classified as a Modified Class I Primary Headwater Habitat (PHWH) stream. Streams S-2 and S-6 are classified as Class I PHWH streams. Streams S-1, S-4, and S-5 are classified as Class II PHWH streams. These classifications indicate that all streams are generally small in size and are of low to moderate quality.

4.4 PONDS AND LAKES

No open water aquatic resources were identified within the project area.

5.0 REGULATORY JURISDICTION

A jurisdictional determination must be completed by the USACE in order to validate the results contained in this report. Once this is completed, the USACE will make a final decision regarding jurisdiction of the onsite water resources. The wetlands and waterbodies are under the jurisdiction of the Ohio EPA or USACE. No filling may occur within these areas without their written permission. Please contact the Ohio EPA Division of Surface Water at (614) 644-2001 or the Pittsburgh District, U.S. Army Corps of Engineers, at (412) 395-7500 before working in these areas.

The following information is excerpted and summarized from the 2007 *U.S. Army Corps Of Engineers Jurisdictional Determination Form Instructional Guidebook.*

> "In 2001, the … U.S. Supreme Court's decision in the *Solid Waste Agency of Northern Cook County (SWANCC) v. Corps* held that isolated, intrastate, non-navigable waters could not be regulated under the CWA based solely on the presence of migratory birds. Following the SWANCC decision it generally was believed that a water body (including a wetland) was subject to CWA jurisdiction if the water body was part of the U.S. territorial seas, or a traditional navigable water, or any tributary to a traditional navigable water, or a wetland adjacent to any one of the above. In addition, isolated wetlands and other waters might be considered jurisdictional where they had the necessary link to either navigable waters or interstate commerce."

In the state of Ohio, the Ohio EPA isolated wetland permitting program was legislatively created in response to the 2001 SWANC decision. On July 17, 2001, House Bill 231 was signed into law, establishing a permanent permitting process for isolated wetlands. The provisions of House Bill 231 were incorporated in Sections 6111.021 through 6111.029 of the Ohio Revised Code.

“In 2006, the Supreme Court once again addressed the jurisdictional scope of Section 404 of the CWA, specifically the term “the waters of the U.S.,” in *Rapanos v. U.S*. and in *Carabell v. U.S*. (hereafter referred to as Rapanos).

The decision provides two new analytical standards for determining whether water bodies that are not traditional navigable waters (TNWs), including wetlands adjacent to those non-TNWs, are subject to CWA jurisdiction: (1) if the water body is relatively permanent, or if the water body is a wetland that directly abuts (e.g., the wetland is not separated from the tributary by uplands, a berm, dike, or similar feature) a relatively permanent water body (RPW), or (2) if a water body, in combination with all wetlands adjacent to that water body, has a significant nexus with TNWs. CWA jurisdiction over TNWs and their adjacent wetlands was not in question in this case, and, therefore, was not affected by the Rapanos decision. In addition, at least five of the Justices in Rapanos agreed that CWA jurisdiction exists over all TNWs and over all wetlands adjacent to TNWs.

The Memo states that the [Corps and USEPA] will assert jurisdiction over the following categories of water bodies: TNWs; all wetlands adjacent to TNWs; non-navigable tributaries of TNWs that are relatively permanent (i.e., tributaries that typically flow year-round or have continuous flow at least seasonally); and wetlands that directly abut such tributaries. In addition, the agencies will assert jurisdiction over every water body that is not an RPW if that water body is determined (on the basis of a fact-specific analysis) to have a significant nexus with a TNW. The classes of water body that are subject to CWA jurisdiction only if such a significant nexus is demonstrated are: non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally; wetlands adjacent to such tributaries; and wetlands adjacent to but that do not directly abut a relatively permanent, non-navigable tributary. A significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or an insubstantial effect on the chemical, physical, and/or biological, integrity of a TNW. Principal considerations when evaluating significant nexus include the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a TNW, plus the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.”

6.0 ASSUMPTIONS AND DISCLAIMERS

The constant influence of human activity on the project area can result in a rapid change of ecological boundaries. Over time, natural succession and changes in hydrology can also affect their boundaries. Precision of GPS collected data is subject to variation caused by canopy cover, atmospheric interference and satellite configuration. Because slight inaccuracies are possible, all acreages and derived boundaries presented in this report are approximate.

The results and conclusions contained in this report apply to the year and date in which the data were collected. This report is not considered officially valid until it is approved by the Corps. The report is then valid for a period of five years. Refer to the Corps’ Regulatory Guidance Letter # 94-1 (23 May 1994).

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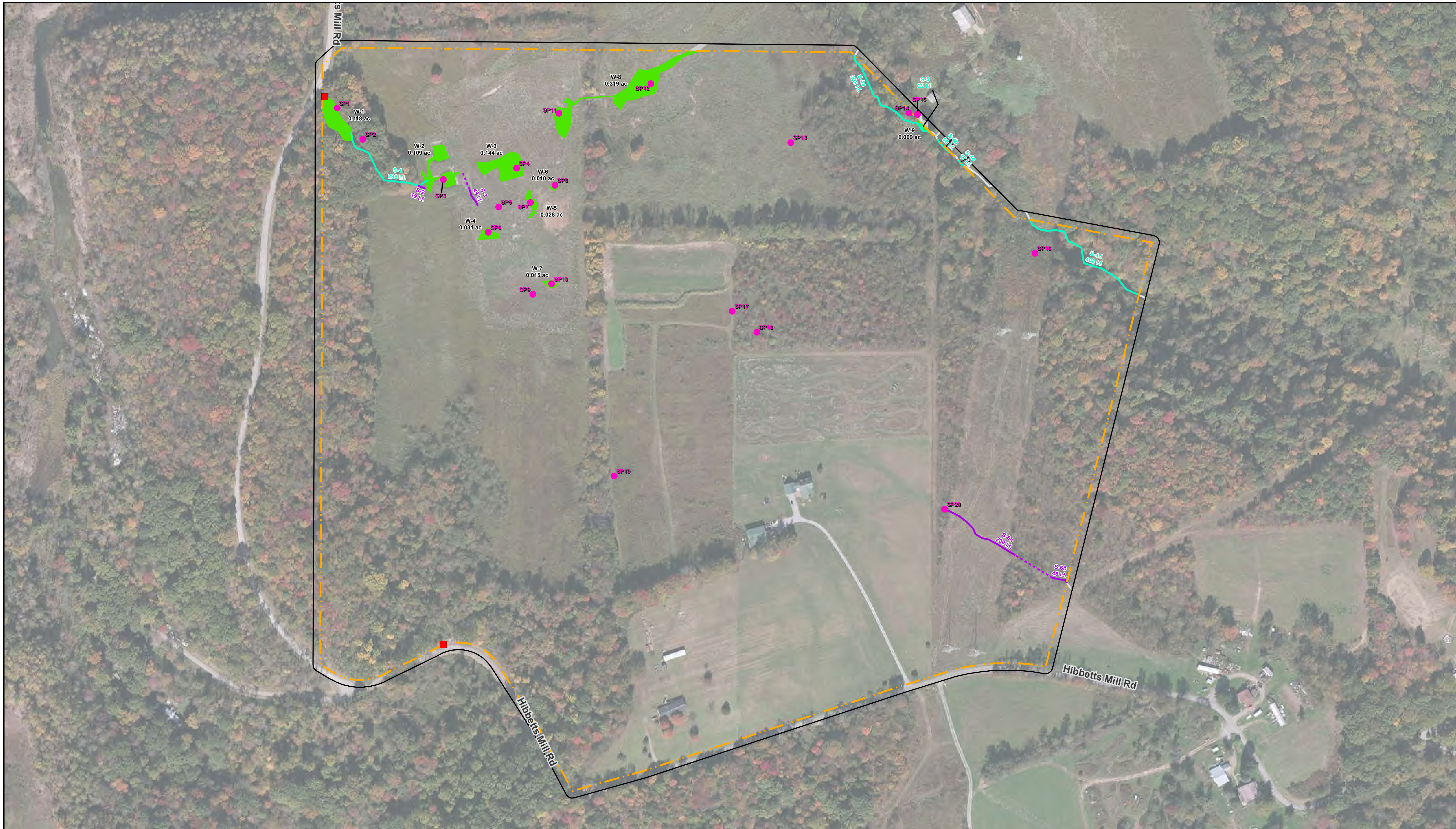

Figure 5. Site Map of Wetlands and Other Water Resources. Hibbetts Mill Road - Tetra Tech.

Sample Plot
Culvert
Culvert (Offsite)
Stream (Ephemeral)
Hydrologic Connection
Stream (Intermittent)
Stream (Offsite)
Wetland (PEM)
Wetland (Offsite)
Project Area
Project Area Buffer (add. 20')

0 100 200 400 Feet
0 25 50 100 Meters

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Date: 5/29/2015

Basemap courtesy of Esri.

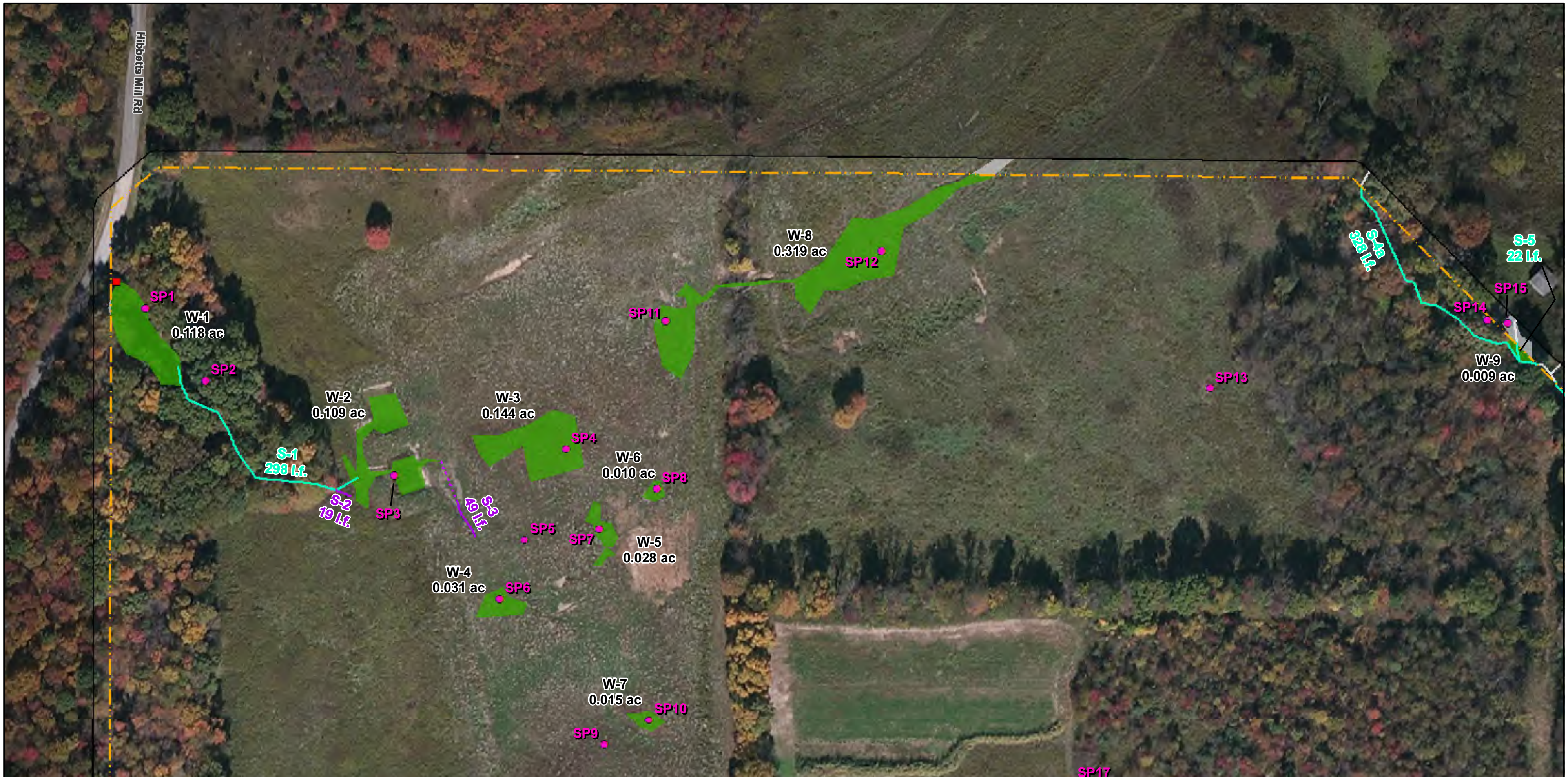

Figure 5.01. Site Map of Wetlands and Other Water Resources.
Hibbetts Mill Road - Tetra Tech.

Sample Plot	Stream (Ephemeral)	Stream (Offsite)	Project Area
Culvert	Hydrologic Connection	Wetland (PEM)	Project Area Buffer (add. 20')
Culvert (Offsite)	Stream (Intermittent)	Wetland (Offsite)	

0 100 200 400 Feet

0 20 40 80 Meters

5.01

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Date: 5/21/2015

Basemap courtesy of NAIP (2013).

Figure 5.02. Site Map of Wetlands and Other Water Resources.
Hibbetts Mill Road - Tetra Tech.

Sample Plot	Stream (Ephemeral)	Stream (Offsite)	Project Area
Culvert	Hydrologic Connection	Wetland (PEM)	Project Area Buffer (add. 20')
Culvert (Offsite)	Stream (Intermittent)	Wetland (Offsite)	

0 100 200 400 Feet

0 20 40 80 Meters

5.02

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Date: 5/21/2015

Basemap courtesy of NAIP (2013).

Figure 5.03. Site Map of Wetlands and Other Water Resources.
Hibbetts Mill Road - Tetra Tech.

5.03

Sample Plot	Stream (Ephemeral)	Stream (Offsite)	Project Area
Culvert	Hydrologic Connection	Wetland (PEM)	Project Area Buffer (add. 20')
Culvert (Offsite)	Stream (Intermittent)	Wetland (Offsite)	

0 100 200 400 Feet

0 20 40 80 Meters

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Date: 5/21/2015

Basemap courtesy of NAIP (2013).

Figure 5.04. Site Map of Wetlands and Other Water Resources.
Hibbetts Mill Road - Tetra Tech.

Sample Plot	Stream (Ephemeral)	Stream (Offsite)	Project Area
Culvert	Hydrologic Connection	Wetland (PEM)	Project Area Buffer (add. 20')
Culvert (Offsite)	Stream (Intermittent)	Wetland (Offsite)	

0 100 200 400 Feet

0 20 40 80 Meters

5.04

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Date: 5/21/2015

Basemap courtesy of NAIP (2013).

Figure 5.05. Site Map of Wetlands and Other Water Resources.
Hibbetts Mill Road - Tetra Tech.

Sample Plot	Stream (Ephemeral)	Stream (Offsite)	Project Area
Culvert	Hydrologic Connection	Wetland (PEM)	Project Area Buffer (add. 20')
Culvert (Offsite)	Stream (Intermittent)	Wetland (Offsite)	

0 100 200 400 Feet

0 20 40 80 Meters

5.05

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