



AQUATIC RESOURCE IDENTIFICATION & DELINEATION REPORT

**SR 0001 Section RC3 Improvement Project (MPMS # 93446)
Langhorne and Langhorne Manor Boroughs, and Middletown Township
Bucks County, Pennsylvania**

JMT Project #: 00-0285-005

Submitted to:
PennDOT Engineering District 6-0

Revised January 15, 2025



TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	2
II.	INTRODUCTION.....	4
III.	WETLAND AND WATERCOURSE DELINEATION	4
A.	METHODOLOGY.....	5
a.	RECORDS RESEARCH.....	5
b.	FIELD INVESTIGATIONS	5
1.	Hydrophytic Vegetation	6
2.	Wetland Hydrology	7
3.	Hydric Soils	7
4.	Watercourse Identification	7
c.	FUNCTIONS AND VALUES ASSESSMENT	8
B.	RESULTS OF INVESTIGATION.....	8
a.	RECORDS RESEARCH.....	8
b.	SOIL CHARACTERISTICS	9
c.	WATER AND WETLAND DESCRIPTIONS.....	10
IV.	SUMMARY	22
V.	REFERENCES	24

LIST OF TABLES

Table 1: Wetland Indicator Descriptions Under Natural Conditions.....	6
Table 2: Soils Series Units within the SR 0001 Section RC3 Project Study Area.....	9
Table 3: Summary of Watercourses within the SR 0001 Section RC3 Project Study Area.....	11
Table 4: Summary of Wetlands within the SR 0001 Section RC3 Project Study Area	17

LIST OF APPENDICES

- A. Professional Qualifications
- B. Figures
- C. Wetland Determination Data Forms
- D. Site Photographs
- E. Wetland Functional Assessment Data Forms and Key
- F. Wetland and Waterways Delineation Plans



I. EXECUTIVE SUMMARY

This report presents the results of an aquatic resource identification and delineation study conducted by Johnson, Mirmiran, and Thompson, Inc. (JMT) on behalf of the Pennsylvania Department of Transportation (PennDOT) Engineering District 6-0, for the SR 0001 Section RC3 Improvement Project located in Langhorne and Langhorne Manor Boroughs, and Middletown Township, Bucks County, Pennsylvania. Several improvements along the project corridor are proposed, which are primarily related to safety concerns and areas of the corridor failing to meet current design standards. The primary purpose of this project is to facilitate safe and efficient travel within and through the project area to meet current and future transportation needs of the area, while providing a functional and modern roadway that meets current design criteria and driver expectations.

The aquatic resource investigation was conducted on April 19, May 4, 11, and 19, 2021, and November 26, 2024. An additional investigation took place on November 26, 2024 due to changes in the proposed project area. Wetlands were delineated using a combination of secondary data analysis and field verification. Fieldwork was conducted in accordance with the *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (2012), and the *PennDOT Wetland Resources Handbook* (Publication No. 325, 2015). Twenty watercourses were identified and delineated in the study area (WUS-1 to WUS-21, excluding WUS-20), including fourteen tributaries to Neshaminy Creek and six tributaries to Mill Creek. Eight palustrine wetlands were also identified and delineated, including four palustrine emergent (PEM) wetlands (WET-A, WET-B, WET-D, WET-E), two palustrine scrub-shrub (PSS) wetlands (WET-1, WET-C), one palustrine forested (PFO) wetland (WET-3), and one mixed PFO/PEM wetland (WET-2). Per 25 Pa. Code § 105.17(1), none of the wetlands within the project area would be classified as Exceptional Value (EV) wetlands.

As of March 20, 2023, the new federal *Waters of the U.S. Rule* had taken effect. However, in light of the U.S. Supreme Court ruling in *Sackett v. Environmental Protection Agency* that was published on May 25, 2023, the USACE is currently interpreting “waters of the United States” (WUS) consistent with this Supreme Court decision.

A Preliminary Jurisdictional Determination (PJD) was held with the USACE on July 27, 2022 in order to verify delineated boundaries and obtain unofficial opinions from the USACE on the jurisdictional status of a subset of resources from the project. The PJD resulted in the following revisions to the previously delineated resources:

- WET-1: The wetland boundary was revised to include a narrow drainage connection to WUS-3;
- WUS-2: The watercourse boundary was extended further upstream along the western side of SR 0413, connecting downstream to a 24-inch reinforced concrete pipe (RCP) that drains to the WUS-2/WUS-3 confluence;
- WET-2: The wetland boundary was revised to include a narrow drainage connection to WUS-2;
- WUS-12: It was determined that this feature was not a watercourse (previously delineated as ephemeral stream); therefore, WUS-12 is no longer included as a watercourse in this report;
- WUS-13: It was determined that this feature was not a watercourse (previously delineated as



ephemeral stream); therefore, WUS-13 is no longer included as a watercourse in this report.

All watercourses in the study area drain to either the Neshaminy Creek or Mill Creek, both of which are classified as Warm Water Fisheries (WWFs) and Migratory Fisheries (MFs) in the Pennsylvania Department of Environmental Protection's (PADEP), PA Code Title 25, Chapter 93 *Water Quality Standards*. According to the Pennsylvania Fish and Boat Commission (PFBC), no stocked trout streams, Approved Trout Waters, Class A wild trout streams, or streams supporting natural trout reproduction occur within or in the vicinity of the study area. In addition, no streams supporting natural trout reproduction were identified downstream of the project area; therefore, no in-stream work restrictions will be required for this project. Any impacts to wetlands and/or waters within the study area will require a permit from the PADEP and the U.S. Army Corps of Engineers (USACE).



II. INTRODUCTION

This *Aquatic Resource Identification & Delineation Report* has been prepared on behalf of PennDOT Engineering District 6-0 for engineering and environmental studies being performed for the SR 0001 Section RC3 Improvement Project in Langhorne and Langhorne Manor Boroughs, and Middletown Township, Bucks County, Pennsylvania. Several improvements along the project corridor are proposed, which are primarily related to safety concerns and areas of the corridor failing to meet current design standards. The primary purpose of this project is to facilitate safe and efficient travel within and through the project area to meet current and future transportation needs of the area, while providing a functional and modern roadway that meets current design criteria and driver expectations.

The project includes approximately 2.6 miles of roadway reconstruction and widening from just north of the Lincoln Highway (SR 0001) bridge over Business Route 1 (SR 2037) / CSX / SEPTA to approximately 0.2 miles north of the Corn Crib Lane (SR 2197) bridge over Lincoln Highway (SR 0001). A two-mile segment of the northbound and southbound service (frontage) roads along Lincoln Highway also occur within the project limits.

The proposed project is located in Langhorne and Langhorne Manor Boroughs, and Middletown Township, Bucks County, Pennsylvania, and is situated in the Langhorne, PA 7.5-Minute USGS topographic quadrangle (**Figure 1 in Appendix B**). The project occurs in suburban Bucks County and is in a densely developed residential area with heavy traffic demand. Land use/cover within the immediate vicinity of the study area consists of residential and commercial development, public facilities, woodlands, agricultural fields, and maintained (i.e., mowed) areas. There are several educational and community facilities in the study area, such as Neshaminy High School, the Woods School for children and adults with disabilities, and Cairn University. Our Lady of Grace Cemetery is located north and west of the project along the southbound service road. This project occurs within an area of rolling terrain and variable site topography.

Aquatic resource delineation fieldwork was completed within a study area approximately 100.9 acres in size. This study area consisted of an approximately 2.6-mile long corridor along SR 0001, which extended from approximately 1,000 feet northeast of the SR 0001 bridge crossing over Business Route 1, to approximately 885 feet northeast of the bridge carrying Corn Crib Lane over SR 0001. Due to the proposed work associated with adjacent roads, the width of the study area varied throughout the project corridor.

III. WETLAND AND WATERCOURSE DELINEATION

Investigations were conducted on April 19, May 4, 11, and 19, 2021, and November 26, 2024 by JMT, to identify and delineate the extent and location of jurisdictional waters and wetlands within the project study area pursuant to the federal Clean Water Act (Section 404), the PA Clean Streams Law, the PA Dam Safety and Encroachments Act, and the PA Flood Plain Management Act. The EPA/Corps of Engineers joint memorandum: *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (December 02, 2008), Code of Federal Regulations (33 CFR Parts 320-330) and Chapter 105 of PA Code Title 25, Dam Safety and Waterway Management Rules and Regulations define wetlands and watercourses and provide regulatory jurisdictional guidance on water



obstructions and encroachments. Wetlands with potential federal jurisdiction are defined as those areas satisfying the technical criteria contained in the *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, United States Waterway Experiment Station, Vicksburg, Mississippi 1987 (Delineation Manual) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0*, Technical Report (April 2012). The field investigations were also conducted in accordance with the PennDOT *Wetland Resources Handbook* (Publication No. 325, 2015). Professional qualifications of the individuals involved in the preparation of this report are provided in **Appendix A**.

As of March 20, 2023, the new federal *Waters of the U.S. Rule* had taken effect. However, in light of the U.S. Supreme Court ruling in *Sackett v. Environmental Protection Agency* that was published on May 25, 2023, the USACE is currently interpreting “waters of the United States” (WUS) consistent with this Supreme Court decision. The delineated resource descriptions have been structured to aid USACE regulators in determining jurisdiction using the current regulations. However, resources not jurisdictional to USACE may still be regulated by PADEP.

A. METHODOLOGY

a. RECORDS RESEARCH

In accordance with the Delineation Manual, the Langhorne, PA 7.5-Minute USGS topographic quadrangle (**Figure 1 in Appendix B**), the Web Soil Survey of Bucks County (**Figure 2 in Appendix B**), the National Wetlands Inventory (NWI) web-based Interactive Mapper (**Figure 3 in Appendix B**), and FEMA flood maps (**Figure 4 in Appendix B**) were reviewed to identify areas with topographical configurations or previously identified mapped wetlands and/or hydric soils, which may suggest the presence of wetlands. The PA Code Title 25, Chapter 93 *Water Quality Standards* were also investigated.

b. FIELD INVESTIGATIONS

The on-site, “routine” level, wetland identification and delineation methodology contained in the U.S. Army Corps of Engineers (USACE) Delineation Manual (USACE, 1987) was followed. The on-site field investigation involved inspection of the study area to identify areas that satisfy the three wetland parameters (i.e., criteria): a predominance of hydrophytic (wetland) vegetation, wetland hydrology, and hydric soils. In order to make a determination that an area is a wetland, the Delineation Manual requires that, under normal (typical) circumstances, a minimum of one primary wetland indicator be confirmed for each of the three wetland parameters. A failure to confirm or account for all three parameters must result in a finding that the area under evaluation is a non-wetland under normal circumstances. When applicable, site characteristics were evaluated based on the potential for problematic wetland situations, as described in the *Eastern Mountains and Piedmont Regional Supplement*. Data from representative wetland and upland sample plots were recorded on Wetland Determination Data Forms (**Appendix C**). In accordance with the Delineation Manual, the following wetland delineation criteria and primary field indicators were used:



1. Hydrophytic Vegetation

Vegetation in the study area was initially characterized to plant community type based on guidance provided in the *Eastern Mountains and Piedmont Regional Supplement*. Within a plant community, sample plots were established. When possible, 30-foot radius circular sample plots for the tree and woody vine strata, 15-foot radius circular plots for the shrub/sapling stratum, and 5-foot radius circular plots for the herbaceous stratum were used. Larger or smaller plot sizes were used as conditions dictated.

Dominant plant species were then assigned a wetland indicator classification according to the *U.S. Army Corps of Engineers (USACE) National Wetland Plant List (NWPL)* (USACE, 2018). The 2018 NWPL (version 3.4) was used, which features updates that were approved on May 18, 2020 (85 Fed. Reg. 29,689, 2020). The indicator status is based on a species frequency of occurrence in wetlands. The wetland indicator rating and the corresponding frequency of occurrence are explained in **Table 1**.

Table 1. Wetland Indicator Descriptions Under Natural Conditions.

Indicator Status Code	Indicator Status Name	Description
OBL	Obligate Wetland	Plants that occur almost always (more than 99% of the time) in wetlands
FACW	Facultative Wetland	Plants that occur usually (67-99% of the time) in wetlands
FAC	Facultative	Plants with similar likelihood (34-66% of the time) of occurring in wetlands/non-wetlands
FACU	Facultative Upland	Plants that may occur (1-33% of the time) in wetlands, but are usually in non-wetlands
UPL	Obligate Upland	Plants that occur rarely (less than 1% of the time) in wetlands under natural conditions
NI	Not Included	Only genus information known and/or cannot assign accurate indicator status

Once the dominant plant species are determined, the procedure for using the hydrophytic vegetation indicators is as follows:

- Step 1: Apply Indicator 1 (Rapid Test for Hydrophytic Vegetation; if not met proceed to Step 2),
- Step 2: Apply Indicator 2 (Dominance Test, if not met proceed to Step 3),
- Step 3: Apply Indicator 3 (Prevalence Test; if not met proceed to Step 4),
- Step 4: Apply Indicator 4 (Morphological Adaptations).

If none of the indicators are satisfied, then the hydrophytic vegetation parameter is not met unless indicators of hydric soil and wetland hydrology are present and the site meets the requirements for a problematic



wetland (see Chapter 5 of the *Eastern Mountains and Piedmont Regional Supplement*).

2. Wetland Hydrology

The study area was investigated for indicators of wetland hydrology and hydric soils following the *Eastern Mountain and Piedmont Regional Supplement*. Wetland hydrology means that water is present at or above the surface for a prolonged period (in consecutive days) during the growing season. Prolonged duration of seasonally inundated or saturated areas is longer than 12.5 percent of the growing season. Primary indicators of wetland hydrology include direct observation of inundation or saturation at the surface, recorded stream gauge data (where available), water marks or sediment deposits on objects and vegetation (i.e., water-stained leaves), water-carried debris drift lines, oxidized rhizospheres on living roots, etc. Secondary indicators of hydrology include drainage patterns, stressed plants, microtopographic relief, sparsely vegetated concave surfaces, etc. Some vegetative physiological adaptations, such as tree buttressing, shallow rooting, and multiple stems may also indicate wetland hydrology. Any observed wetland hydrologic field indicators were then noted on the data forms. Factors such as the depth of water or depth to free water in the soil excavation pit were also noted. A minimum of one primary or two secondary indicators are required to satisfy the wetland hydrology parameter.

3. Hydric Soils

Soils were investigated in the field using a soil auger and/or sharpshooter shovel. The exposed soils were divided into distinct layers based on color, mottling, and structural and textural differences. Color (chroma) was determined by comparison with standard soil color chips contained in the *Munsell Soil Color Charts* (Munsell, 2009). Because hydric soils are saturated to the surface for periods of sufficient duration during the growing season to create oxygen-free conditions in the upper layer, indicators of oxygen-free conditions develop. Following the guidelines outlined in the *Eastern Mountain and Piedmont Regional Supplement*, observations were made for hydric soil indicators (e.g., depleted or gleyed matrix, redox depletions or concentrations). Soil characteristics of each layer and any hydrologic indicators were recorded on the data forms provided in **Appendix C**.

4. Watercourse Identification

Watercourses were identified and delineated as channels or surface water conveyances featuring defined bed and banks, natural or artificial, hydrologically sorted substrate material, and the presence of an Ordinary High Water Mark (OHWM). These aquatic resources are regulated as Waters of the Commonwealth of Pennsylvania under Chapter 105 of the Pennsylvania Code Title 25, and as Waters of the U.S. (WUS) under the Federal Clean Water Act. The USACE in its Regulatory Guidance Letter 07-01, *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (December 02, 2008), and *Corps and EPA Responses to the Rapanos Decision* (December 02, 2008), established the basic guidance for determining what will be regulated as WUS. As previously noted, the USACE is currently defining WUS consistent with the *Sackett v. Environmental Protection Agency* Supreme Court ruling.



A determination of the flow regime (i.e., perennial, intermittent, or ephemeral) for each identified watercourse was made during the field investigations. Watercourses were typically characterized as ephemeral when the following conditions were noted: a lack of baseflow within or below the channel bed, little to no sinuosity, streambed substrate primarily made up of soil particles (except for constructed channels with rock/riprap), and a lack of benthic macroinvertebrates observed in the channel.

Roadside ditches and other stormwater management features that either meet the definition of a wetland or possess an OHWM and are determined to be Relatively Permanent Waters (RPWs), which for the purposes of this report exhibit perennial or intermittent flow, are also regulated as Waters of the Commonwealth and Waters of the U.S. For wetlands located in roadside ditches or stormwater management features to be regulated as Waters of the U.S., they must either generate RPW flow or abut a regulated tributary. Typically, roadside ditches or other stormwater management features that satisfy the definitions of Waters of the Commonwealth and Waters of the U.S. but were constructed in uplands and not relocated natural watercourses, are eligible for PADEP Chapter 105 Waiver #6 and are non-reporting for the USACE under the PASPGP-6.

c. FUNCTIONS AND VALUES ASSESSMENT

A functional assessment was conducted on each identified wetland habitat in the study area. The assessment, presented in narrative format, describes the biotic and abiotic functional parameters of the identified wetland habitats. The assessment was based on parameters as outlined in the USACE *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach* (USACE, 2015). Abiotic parameters included the following wetland functions: groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, production export, and sediment/shoreline stabilization. Biotic wetland functions and values include fish and shellfish habitat, wildlife habitat, recreation, education/scientific value, uniqueness/heritage, visual quality/aesthetics, and endangered species habitat.

Each function was assessed in terms of its suitability within the wetland being evaluated. This assesses the effectiveness or the “physical or biological ability” of a wetland to perform a particular function or maintain a value. A list of rationales was given to surveyed wetlands for each suitable function and/or value recorded. Principal function(s)/value(s) were assigned to each wetland assessed. The Wetland Function-Value Evaluation Forms and key are provided in **Appendix E**.

B. RESULTS OF INVESTIGATION

a. RECORDS RESEARCH

The study area lies within the Core Creek-Neshaminy Creek (020402010303) and Mill Creek-Silver Lake (020402010405) HUC-12 subwatersheds, which both occur within the Crosswicks-Neshaminy HUC-8 watershed. The NWI map (**Figure 3 in Appendix B**) revealed two intermittent riverine systems in the immediate study area, including an unnamed tributary (UNT) to Neshaminy Creek (Cowardin Class =



R4SBC) located on the south side of SR 0001 near the western end of the study area, and an UNT to Neshaminy Creek (Cowardin Class = R4SBC) that crosses beneath SR 0001 near the central portion of the study area. One mapped palustrine wetland was identified on the NWI map, which featured a palustrine forested (PFO) wetland (Cowardin Class = PFO1A) located to the north of SR 0001 near the central portion of the study area. According to the FEMA FIRM Maps, there is a FEMA-designated 100-year floodplain (Zone AE) associated with the UNT to Neshaminy Creek that crosses beneath SR 0001 in the central portion of the study area (**Figure 4 in Appendix B**).

All watercourses in the study area drain to either the Neshaminy Creek or Mill Creek, both of which are designated as Warm Water Fisheries (WWFs) and Migratory Fisheries (MFs) in the Chapter 93 *Water Quality Standards*. Warm Water Fishery indicates “maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.” Migratory Fishery indicates “passage, maintenance and propagation of anadromous and catadromous fishes and other fishes which ascend to flowing waters to complete their life cycle.” Any tributaries in the immediate study area would also be considered WWFs and MFs.

According to the Pennsylvania Fish and Boat Commission (PFBC), no stocked trout streams, Approved Trout Waters, Class A wild trout streams, or streams supporting natural trout reproduction occur within or in the vicinity of the study area. In addition, no streams supporting natural trout reproduction were identified downstream of the project area; therefore, no in-stream work restrictions will be required for this project.

b. SOIL CHARACTERISTICS

The project study area lies in the Piedmont Upland Section of the Piedmont Physiographic Province (W. D. Sevon, 2000). The dominant topographic forms of this section include broad, rounded to flat-topped hills and shallow valleys. It is underlain primarily by felsic gneiss of the Precambrian era. The predominant soils within the study area include the Chalfont silt loam (CbA), Chester silt loam (CdA, CdB, CdC), Glenville silt loam (GrA), Lawrenceville silt loam (LkA), quarry pits (Pr), Udorthents (Ub), Urban land-Chester complex (UkB, UkD), and Urban land-Glenville complex (UpB) series (**Figure 2 in Appendix B**). The CbA, CdA, GrA, and LkA soils all contain hydric inclusions, while the remainder of the mapped soils are listed as non-hydric. **Table 2** below provides a summary of the dominant soil unit in each soil series based on information obtained from the *Web Soil Survey*.

**Table 2: Soil Series Units within the SR 0001 Section RC3
Improvement Project Study Area**

Soil Mapping Symbol	Soil Mapping Unit	Drainage Class	Depth to Water Table	Frequency of Flooding	Frequency of Ponding	Hydric Status
CbA	Chalfont silt loam, 0 to 3 percent slopes	Somewhat poorly drained	6 to 18 inches	None	None	Hydric Inclusions (Hydric Rating = 7)



CdA	Chester silt loam, 0 to 3 percent slopes	Well drained	More than 80 inches	None	None	Hydric Inclusions (Hydric Rating = 5)
CdB	Chester silt loam, 3 to 8 percent slopes	Well drained	More than 80 inches	None	None	Non-hydric
CdC	Chester silt loam, 8 to 15 percent slopes	Well drained	More than 80 inches	None	None	Non-hydric
GrA	Glenville silt loam, 0 to 3 percent slopes	Moderately well drained	6 to 36 inches	None	None	Hydric Inclusions (Hydric Rating = 5)
LkA	Lawrenceville silt loam, 0 to 3 percent slopes	Moderately well drained	18 to 36 inches	None	None	Hydric Inclusions (Hydric Rating = 4)
Pr	Pits, quarry	N/A	N/A	N/A	N/A	Non-hydric
Ub	Udorthents, loamy	Moderately well drained	12 to 36 inches	None	None	Non-hydric
UkB	Urban land-Chester complex, 0 to 8 percent slopes	Well drained	More than 80 inches	None	None	Non-hydric
UKD	Urban land-Chester complex, 8 to 25 percent slopes	Well drained	More than 80 inches	None	None	Non-hydric
UpB	Urban land-Glenville complex, 0 to 8 percent slopes	Moderately well drained	6 to 36 inches	None	None	Non-hydric

c. WATER AND WETLAND DESCRIPTIONS

Twenty watercourses (WUS-1 to WUS-21, excluding WUS-20) and eight palustrine wetlands (WET-1 to WET-3, and WET-A to WET-E) were initially identified and delineated in the study area. The following are brief descriptions of each aquatic resource and additional notes from the field investigation. Photographs are provided in **Appendix D**. The study area boundary, delineated wetland and watercourse boundaries, sample plot locations, and photograph locations are shown on the Wetland and Waterways Delineation Plans (**Appendix F**). Please see **Table 3** and **Table 4** below for summaries of the watercourses and wetlands, respectively.

Please note that based on the results of the PJD with the USACE on July 27, 2022, both WUS-12 and WUS-13 have been removed from this report. These features were initially delineated as ephemeral watercourses but were considered by the USACE to be areas of upland drainage and not true channelized watercourses.



Watercourses

Table 3: Summary of Delineated Watercourses within the SR 0001 Section RC3 Improvement Project Study Area

Stream ID	Stream Name	Stream Flow Type	Cowardin Classification	25 PA Code §93 Stream Designation	Channel Width (ft)	Bank Height (ft)	Substrate	Latitude and Longitude (center of stream length in study area)
WUS-1	Trib to Mill Creek	Intermittent	R4SB4	WWF, MF	2-8	0.5-1	silt/sand, gravel	40.170451 N -74.915623 W
WUS-2	Trib to Mill Creek	Intermittent	R4SB3	WWF, MF	5-6	0.5-1	silt/sand, gravel, cobble	40.170433 N -74.914804 W
WUS-3	Trib to Mill Creek	Intermittent	R4SB4	WWF, MF	4-5	2-3	silt/sand, gravel	40.170493 N -74.916710 W
WUS-4	Trib to Neshaminy Creek	Perennial	R5UB1H	WWF, MF	12-45	2-8	silt/sand, gravel, cobble, boulder	40.165800 N -74.925366 W
WUS-5	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	5-6	2-4	silt/sand, gravel, cobble, concrete rubble	40.165991 N -74.925598 W
WUS-6	Trib to Neshaminy Creek	Perennial	R5UBH1	WWF, MF	6-8	2-3	silt/sand, gravel, cobble, boulder, concrete rubble	40.157442 N -74.943189 W
WUS-7	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	3-4	3-4	silt/sand, gravel, cobble, concrete rubble	40.157205 N -74.943182 W
WUS-8	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	2-6	0.5-1	silt/sand, gravel	40.154792 N -74.945707 W
WUS-9	Trib to Mill Creek	Intermittent	R4SB3/4	WWF, MF	2.5-10	1-5	silt/sand, gravel, cobble, concrete rubble	40.174386 N -74.910373 W
WUS-10	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	3-5	2	silt/sand, gravel, cobble	40.166174 N -74.925563 W
WUS-11	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	4-6	3-5	silt/sand, gravel, cobble	40.169159 N -74.924571 W
WUS-14	Trib to Neshaminy Creek	Intermittent	R4SB3	WWF, MF	6-12	3-8	silt/sand, gravel, cobble	40.166226 N -74.923121 W
WUS-15	Trib to Mill Creek	Intermittent	R4SB3/4	WWF, MF	6-8	3-5	silt/sand, gravel, cobble	40.174568 N -74.909734 W
WUS-16	Trib to Mill Creek	Ephemeral	R4SB4	WWF, MF	2-3	0.5-1	silt/sand, gravel	40.174611 N -74.910387 W
WUS-17	Trib to Neshaminy Creek	Perennial	R5UB1	WWF, MF	10-15	3	silt/sand, gravel, cobble, boulder	40.169009°N -74.925064°W



Stream ID	Stream Name	Stream Flow Type	Cowardin Classification	25 PA Code §93 Stream Designation	Channel Width (ft)	Bank Height (ft)	Substrate	Latitude and Longitude (center of stream length in study area)
WUS-18	Trib to Neshaminy Creek	Perennial	R5UB1	WWF, MF	10-20	2-6	silt/sand, gravel, cobble	40.168839°N -74.925724°W
WUS-19	Trib to Neshaminy Creek	Intermittent	R4SB4	WWF, MF	2-4	0.5-1.5	silt/sand, gravel, cobble	40.165087°N -74.924519°W
WUS-21	Trib to Neshaminy Creek	Intermittent	R4SB4	WWF, MF	5-6	2-4	silt/sand, gravel, cobble	40.166225°N -74.922985°W

Waters of the U.S. 1 (WUS-1)

Waters of the U.S. 1 (WUS-1) is an intermittent UNT to Mill Creek (Cowardin classification = R4SB4) that generally flows in a northeasterly direction along the southern side of SR 0001 (see **Photos 67-68** in **Appendix D**). This watercourse is approximately 2 to 8 feet wide and the water depth was generally 4 to 6 inches at the upstream end and 1 to 2 inches at the downstream end. Observed substrate consisted of a mix of silt/sand and gravel. Bank heights ranged from 0.5 to 1 foot, with several areas moderately incised, and the riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 2 (WUS-2)

Waters of the U.S. 2 (WUS-2) is an intermittent UNT to Mill Creek (Cowardin classification = R4SB3) that generally flows in a southeasterly direction along the western side of SR 0413 (Pine Street), to the south of SR 0001 (see **Photos 68-70, 74, and 81-82** in **Appendix D**). This watercourse is then piped beneath SR 0413 just south of Central Avenue and continues northeast along the southern side of Woods Drive. The average stream width was approximately 5 to 6 feet and the water depth was generally 1 to 3 inches. Observed substrate consisted of a mix of silt/sand, gravel, and sparse cobble rock. Bank heights ranged from 0.5 to 1 foot, with very little areas being incised, and the riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 3 (WUS-3)

Waters of the U.S. 3 (WUS-3) is an intermittent UNT to Mill Creek (Cowardin classification = R4SB4) that generally flows in a southeasterly direction between East Gillam Avenue and the northern side of SR 0001, where it is then piped and ultimately discharged into the system feeding WUS-2 (see **Photos 9-10** in **Appendix D**). The average stream width was approximately 4 to 5 feet and the water depth was generally 1 to 3 inches. Observed substrate consisted of a mix of silt/sand and sparse gravel. Bank heights ranged from 2 to 3 feet, with some areas being moderately incised. The riparian area consisted of a mix of trees and shrubs.



Waters of the U.S. 4 (WUS-4)

Waters of the U.S. 4 (WUS-4) is a perennial UNT to Neshaminy Creek (Cowardin classification = R5UB1H) that generally flows in a southeasterly direction beneath SR 0001, within woodlands located between SR 2027 (Hulmeville Road) and West Interchange Road (see **Photos 32-33, 58, and 90** in **Appendix D**). The stream width was approximately 12 to 45 feet and the water depth was generally 2 to 12 inches with some deeper pools. Observed substrate consisted of a mix of silt/sand, gravel, cobble rock, and sparse boulders. Bank heights ranged from 2 to 8 feet, with some areas being moderately to heavily incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 5 (WUS-5)

Waters of the U.S. 5 (WUS-5) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB3) that generally flows in a northeasterly direction on the north side of SR 0001, within woodlands located between SR 2027 (Hulmeville Road) and West Interchange Road (see **Photos 34-35** in **Appendix D**). This stream is fed by WET-3, and ultimately discharges into WUS-4 just north of its crossing beneath SR 0001. The average stream width was approximately 5 to 6 feet and the water depth was generally 2 to 6 inches. Observed substrate consisted of a mix of silt/sand, gravel, cobble rock, and sparse concrete rubble. Bank heights ranged from 2 to 4 feet, with some areas being moderately to heavily incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 6 (WUS-6)

Waters of the U.S. 6 (WUS-6) is a perennial UNT to Neshaminy Creek (Cowardin classification = R5UBH1) that generally flows in a southeasterly direction, entering the study area from the north side of SR 2045 (Old Lincoln Highway) and continuing to SR 0001 (see **Photos 25-26, 53, and 80** in **Appendix D**). This watercourse is then piped beneath SR 0001 and SR 2008 (Highland Avenue), where it daylights and continues further southeast. The average stream width was approximately 6 to 8 feet and the water depth was generally 4 to 6 inches with some pools averaging 8 to 10 inches. Observed substrate consisted of a mix of silt/sand, gravel, cobble rock, and concrete rubble. Bank heights (some areas lined with rock) ranged from 2 to 3 feet, with some areas being moderately incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 7 (WUS-7)

Waters of the U.S. 7 (WUS-7) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB3) that generally flows in a northeasterly direction and is located on the north side of SR 0001, east of SR 2008 (Highland Avenue) (see **Photos 23-24** in **Appendix D**). This watercourse emanates from below a pipe outfall on the northeastern side of SR 2008. Surface and roadway runoff hydrology 'upstream' of the pipe outfall is supplied by non-jurisdictional stormwater pipes and inlets. The average stream width was approximately 3 to 4 feet and the water depth was generally 1 to 2 inches. Observed substrate consisted of a mix of silt/sand, gravel, cobble rock, and concrete rubble. Bank heights ranged from 3 to 4 feet, with some areas being



heavily incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 8 (WUS-8)

Waters of the U.S. 8 (WUS-8) is an intermittent UNT to Neshaminy Creek Cowardin classification = R4SB3) that generally flows in a southerly direction and is located inside a roadway ramp depression in the southwestern portion of the study area (see **Photo 18** in **Appendix D**). The average stream width was approximately 5 to 6 feet upstream and 2 to 3 feet downstream, and the water depth was generally 2 to 4 inches. Observed substrate consisted of a mix of silt/sand and gravel. Natural bank heights ranged from 0.5 to 1 feet, with some areas being lined with concrete walls. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 9 (WUS-9)

Waters of the U.S. 9 (WUS-9) is an intermittent UNT to Mill Creek (Cowardin classification = R4SB3/4) that generally flows in a southeasterly direction beneath SR 0001 near the northeastern end of the study area (see **Photos 1-2, 77, and 83** in **Appendix D**). The average stream width was approximately 2.5 feet to the north of SR 0001 and 8-10 feet south of SR 0001, and the water depth was generally 1 to 3 inches. Observed substrate consisted of a mix of silt/sand, gravel, and cobble rock. Bank heights ranged from 3 to 5 feet, with some areas being heavily incised and stabilized by rock and gabions. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 10 (WUS-10)

Waters of the U.S. 10 (WUS-10) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB3) that generally flows in a southeasterly direction alongside WET-3 before discharging into WUS-4 (see **Photo 36** in **Appendix D**). The average stream width was approximately 3 to 5 feet and the water depth was generally 1 to 2 inches. Observed substrate consisted of a mix of silt/sand, gravel, and cobble rock. Bank heights averaged 2 feet, with some areas being moderately incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 11 (WUS-11)

Waters of the U.S. 11 (WUS-11) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB3) that generally flows in a westerly direction and is located to the south of West Gillam Avenue and west of West Interchange Road (see **Photos 43 and 85** in **Appendix D**). This watercourse discharges into Waters of the U.S. 17 (WUS-17). The average stream width was approximately 4 to 5 feet and the water depth was generally 2 to 4 inches. Observed substrate consisted of a mix of silt/sand, gravel, and cobble rock. Bank heights ranged from 3 to 5 feet, with some areas being heavily incised. The riparian area consisted of a mix of trees and shrubs.



Waters of the U.S. 14 (WUS-14)

Waters of the U.S. 14 (WUS-14) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB3) that generally flows in a southerly direction along the east side of West Interchange Road, to the south of SR 0001 (see **Photos 63-65**, and **91** in **Appendix D**). This watercourse then flows in a southwesterly direction beneath West Interchange Road, continuing toward its confluence with WUS-4. This watercourse emanates from below a pipe outfall on the southern side of SR 0001. Surface and roadway runoff hydrology 'upstream' of the pipe outfall is supplied by non-jurisdictional stormwater pipes and inlets. The average stream width was approximately 6 to 8 feet to the east of West Interchange Road and 10 to 12 feet to the west of West Interchange Road, and the water depth was generally 1 to 2 inches (a deeper 1 to 2 foot scour pool was observed just downstream of the road crossing). Observed substrate consisted of a mix of silt/sand, gravel, and cobble rock. Bank heights ranged from 3 to 8 feet, with some areas being heavily incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 15 (WUS-15)

Waters of the U.S. 15 (WUS-15) is an intermittent UNT to Mill Creek (Cowardin classification = R4SB3/4) that generally flows in a southeasterly direction on the southern side of SR 0001, near the northeastern end of the study area (see **Photos 78-79** in **Appendix D**). This watercourse emanates from below a pipe outfall on the southern side of SR 0001. Surface and roadway runoff hydrology 'upstream' of the pipe outfall is supplied by non-jurisdictional stormwater pipes, inlets, and ditches. The average stream width was approximately 6 to 8 feet and the water depth was generally 1 to 2 inches. Observed substrate consisted of a mix of silt/sand, gravel, and cobble rock. Bank heights ranged from 3 to 5 feet, with some areas being heavily incised. The riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 16 (WUS-16)

Waters of the U.S. 16 (WUS-16) is an ephemeral UNT to Mill Creek (Cowardin classification = R4SB4) that generally flows in a southwesterly direction towards its confluence with WUS-9 on the northern side of SR 0001 (see **Photo 84** in **Appendix D**). The average stream width was approximately 2 to 3 feet and no base flow was observed in the channel at the time of the field investigation. Observed substrate consisted primarily of silt/sand with sparse gravel. Bank heights averaged 0.5 feet and the riparian area consisted of a mix of trees, shrubs, and herbaceous vegetation. No benthic macroinvertebrates were observed in WUS-16 at the time of the field investigation.

Waters of the U.S. 17 (WUS-17)

Waters of the U.S. 17 (WUS-17) is a perennial UNT to Neshaminy Creek (Cowardin classification = R5UB1) that generally flows in a southwesterly direction and emanates from an outfall pipe beneath West Gillam Avenue (see **Photo 86** in **Appendix D**). The average stream width was approximately 10 to 15 feet and water depth ranged from 8 to 12 inches. Observed substrate consisted primarily of silt/sand, gravel, cobble, and sparse boulders. Bank heights averaged 3 feet and were moderately incised, and the riparian area



consisted of a mix of trees and shrubs.

Waters of the U.S. 18 (WUS-18)

Waters of the U.S. 18 (WUS-18) is a perennial UNT to Neshaminy Creek (Cowardin classification = R5UB1) that generally flows in a southeasterly direction and emanates from an outfall pipe beneath West Gillam Avenue (see **Photo 87** in **Appendix D**). The average stream width was approximately 10 to 20 feet and water depth was 6 to 30 inches. Observed substrate consisted primarily of silt/sand, gravel, and cobble. Bank heights averaged 2 to 6 feet and were moderately to heavily incised, and the riparian area consisted of a mix of trees and shrubs.

Waters of the U.S. 19 (WUS-19)

Waters of the U.S. 19 (WUS-19) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB4) that generally flows in a southwesterly direction along W Highland Avenue and south towards its confluence with WUS-4 (see **Photos 88-89** in **Appendix D**). The average stream width was approximately 2 to 4 feet and surface water was observed from 0 to 1 inches at the time of the field investigation. Observed substrate consisted primarily of silt/sand with sparse gravel and cobble. Bank heights averaged 0.5 to 1.5 feet and the riparian area consisted of a mix of trees and shrubs. It was noted that the channel was covered in leaf litter, with hydric soils evident.

Waters of the U.S. 21 (WUS-21)

Waters of the U.S. 21 (WUS-21) is an intermittent UNT to Neshaminy Creek (Cowardin classification = R4SB4) that generally flows in a westerly direction towards its confluence with WUS-14 on the eastern side of West Interchange Road (see **Photo 92** in **Appendix D**). The average stream width was approximately 5 to 6 feet and water depth was generally 1 to 3 inches. Observed substrate consisted primarily of silt/sand, gravel, and sparse cobble. Bank heights averaged 2 to 4 feet and were moderately incised, and the riparian area consisted of a mix of trees and shrubs.

Wetlands

Notably, none of the wetlands identified in the study area satisfy any of the criteria for Exceptional Value (EV) wetland status, per the requirements listed in 25 Pa. Code § 105.17(1). Therefore, all wetlands in the SR 0001 Section RC3 Improvement Project study area would be considered 'Other Wetlands' per 25 Pa. Code § 105.17(2).



**Table 4: Summary of Delineated Wetlands within the SR 0001 Section RC3
Improvement Project Study Area**

Wetland ID	Cowardin Class	Acreage (Delineated Area)	Primary Hydrology Sources	Dominant Vegetation ^a	Latitude and Longitude (wetland center)
WET-1	PSS	0.129 acres (open-ended)	seasonally high water table, roadway/surface runoff	boxelder, silky dogwood, smartweed	40.170248 N -74.917069 W
WET-2	PFO/PEM	0.302 acres	seasonally high water table, roadway/surface runoff	red maple, silky dogwood, soft rush	40.170977 N -74.915659 W
WET-3	PFO	0.188 acres (open-ended)	seasonally high water table, roadway/surface runoff, high stream flows, groundwater seeps	red maple, skunk cabbage	40.166019 N -74.925817 W
WET-A	PEM	0.005 acres	seasonally high water table, roadway/surface runoff, high stream flows	eastern poison-ivy	40.154851 N -74.945805 W
WET-B	PEM	0.007 acres (open-ended)	seasonally high water table, roadway/surface runoff	lesser celandine, Japanese stiltgrass, shallow sedge, soft rush	40.167359 N -74.924060 W
WET-C	PSS	0.027 acres (open-ended)	groundwater seeps, seasonally high water table, roadway/surface runoff	northern spicebush, skunk cabbage, jewelweed	40.165330 N -74.925743 W
WET-D	PEM	0.133 acres	seasonally high water table, roadway/surface runoff	common reed	40.169202 N -74.913524 W
WET-E	PEM	0.004 acres	seasonally high water table, roadway/surface runoff	soft rush, broadleaf cattail, path rush	40.171834 N -74.914805 W

^a dominant vegetation listed is for wetlands as a whole, and may not correspond exactly to dominant species identified within sample plots as presented on the Wetland Determination Data Forms and in the wetland descriptions below.

Wetland 1 (WET-1)

Wetland 1 (WET-1) is a small PSS wetland located north of SR 0001 and east of SR 2049 (Bellevue Avenue) (see **Photos 11-12** in **Appendix D**). The delineated portion of the wetland was approximately 0.129 acres in size. This wetland was delineated as open-ended and continues further north outside the study area. The eastern end of WET-1 discharges into WUS-3. Hydrology in WET-1 is supplied primarily by a seasonally high water table and surface/roadway runoff. Wetland hydrology indicators observed for WET-1 included surface water, high water table, saturation, water marks, algal mat or crust, water-stained leaves, geomorphic position, microtopographic relief, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter. Vegetation within the TP-3 sample plot was dominated by boxelder (*Acer negundo*, FAC), sweetgum (*Liquidambar styraciflua*, FAC), smartweed (*Persicaria* sp.), grape (*Vitis* sp.), silky dogwood (*Cornus*



amomum, FACW), multiflora rose (*Rosa multiflora*, FACU), and soft rush (*Juncus effusus*, FACW). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-3 featured a silt loam texture with a 10 YR 4/2 matrix and 5 YR 4/6 redoximorphic features between 0 and 12 inches in depth, which fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Based on these reasons, WET-1 was delineated as a jurisdictional wetland.

WET-1 displays some effectiveness at performing floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal functions of WET-1 include sediment/toxicant retention and nutrient removal due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-1 in **Appendix E**.

Wetland 2 (WET-2)

Wetland 2 (WET-2) is a mixed PFO/PEM wetland approximately 0.302 acres in size located north of SR 0001 and west of SR 0413 (Pine Street) (see **Photos 13-14** in **Appendix D**). The eastern end of WET-2 discharges into WUS-2. Hydrology in WET-2 is supplied primarily by a seasonally high water table and surface/roadway runoff. Wetland hydrology indicators observed for WET-2 included surface water, high water table, saturation, water marks, water-stained leaves, geomorphic position, microtopographic relief, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter. Vegetation within the TP-4 sample plot was dominated by red maple (*Acer rubrum*, FAC), sweetgum (FAC), silky dogwood (FACW), smooth alder (*Alnus serrulata*, OBL), and apple (*Malus* sp.). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-4 featured a silt loam texture with a 10 YR 4/2 matrix and 5 YR 4/6 redoximorphic features between 0 and 4 inches in depth, a silty clay loam texture with a 10 YR 5/2 matrix and 7.5 YR 4/6 redoximorphic features from 4 to 10 inches in depth, and a silty clay texture with a 10 YR 5/3 matrix and 10 YR 6/8 redoximorphic features from 10 to 16 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Based on these reasons, WET-2 was delineated as a jurisdictional wetland.

WET-2 displays some effectiveness at performing floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal functions of WET-2 include floodflow alteration due to its ability to retain excessive rainfall and roadway/surface runoff from heavy storm events, as well as sediment/toxicant retention and nutrient removal due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-2 in **Appendix E**.

Wetland 3 (WET-3)

Wetland 3 (WET-3) is a PFO wetland located in the central portion of the study area, north of SR 0001 (see **Photos 35** and **37-38** in **Appendix D**). The delineated portion of the wetland was approximately 0.188 acres in size. This wetland was delineated as open-ended and continues further north outside the study area. Hydrology in WET-3 is primarily supplied by groundwater springs/seeps, a seasonally high water table, high flows from adjacent streams, and roadway/surface runoff. Wetland hydrology indicators observed for WET-



3 included surface water, high water table, saturation, water marks, water-stained leaves, drainage patterns, geomorphic position, microtopographic relief, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter. Vegetation within the TP-9 sample plot was dominated by red maple (FAC), northern spicebush (*Lindera benzoin*, FAC), skunk cabbage (*Symplocarpus foetidus*, OBL), and fox grape (*Vitis vulpina*, FAC). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-9 featured mucky (sapric) organic soils with a 10 YR 2/2 matrix between 0 and 10 inches in depth. Below 10 inches, a rock restrictive layer was encountered. This soil characterization fulfills the hydric soil parameter as defined by Indicator A1 (Histosol). Based on these reasons, WET-3 was delineated as a jurisdictional wetland.

WET-3 displays some effectiveness at performing the groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, production export, and wildlife habitat functions. The principal functions of WET-3 include floodflow alteration due to its ability to retain excessive amounts of water from flooding and storm events, sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff, and wildlife habitat, as WET-3 provides ample habitat for small mammals, birds, reptiles, amphibians, and insects. See the Wetland Function-Value Evaluation Form for WET-3 in **Appendix E**.

Wetland A (WET-A)

Wetland A (WET-A) is a small PEM wetland approximately 0.005 acres in size, located in a depression north of SR 0001 near the southwestern end of the study area (see **Photo 19** in **Appendix D**). This wetland discharges into WUS-8. Hydrology in WET-A is primarily supplied by a seasonally high water table, high flows from WUS-8, and roadway/surface runoff. Wetland hydrology indicators observed for WET-A included surface water, a high water table, saturation, water-stained leaves, and geomorphic position. Vegetation within the TP-6 sample plot was dominated by poison ivy (*Toxicodendron radicans*, FAC) and red maple (FAC) saplings. The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-6 featured a silt loam texture with a 10 YR 2/1 matrix between 0 and 4 inches in depth, and a 10 YR 3/2 matrix with 7.5 YR 5/6 redoximorphic features from 4 to 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F6 (Redox Dark Surface). Based on these reasons, WET-A was delineated as a jurisdictional wetland.

WET-A displays some effectiveness at performing floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal function of WET-A is sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-A in **Appendix E**.

Wetland B (WET-B)

Wetland B (WET-B) is a PEM wetland located north of SR 0001 and west of West Interchange Road (see **Photos 40-41** in **Appendix D**). The delineated portion of the wetland was approximately 0.007 acres in size. This wetland was delineated as open-ended and continues further west outside the study area. This wetland



emanates from a small pipe beneath West Interchange Road. Hydrology in WET-B is supplied primarily by a seasonally high water table and surface/roadway runoff. Wetland hydrology indicators observed for WET-B included surface water, a high water table, saturation, geomorphic position, and microtopographic relief, which satisfied the wetland hydrology parameter. Vegetation within the TP-11 sample plot was dominated by lesser celandine (*Ficaria verna*, FAC) and Japanese stiltgrass (*Microstegium vimineum*, FAC). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-11 featured a mucky loam/clay texture with a 10 YR 2/2 matrix between 0 and 2 inches in depth, and a silt loam texture with a 10 YR 3/2 matrix and 7.5 YR 4/6 redoximorphic features from 2 to 10 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F6 (Redox Dark Surface). Based on these reasons, WET-B was delineated as a jurisdictional wetland.

WET-B displays some effectiveness at performing the sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal function of WET-B is sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-B in **Appendix E**.

Wetland C (WET-C)

Wetland C (WET-C) is a PSS wetland located south of SR 0001 and west of WUS-4 (see **Photo 60** in **Appendix D**). The delineated portion of the wetland was approximately 0.027 acres in size. This wetland was delineated as open-ended and continues further south outside the study area. Multiple narrow fingers fed by groundwater seepage were observed in the vicinity of the study area. Hydrology in WET-C is primarily supplied by groundwater springs/seeps, a seasonally high water table, and roadway/surface runoff. Wetland hydrology indicators observed for WET-C included surface water, high water table, saturation, iron deposits, water-stained leaves, drainage patterns, geomorphic position, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter. Vegetation within the TP-14 sample plot was dominated by northern spicebush (FAC), skunk cabbage (OBL), lesser celandine (FAC), and jewelweed (*Impatiens capensis*, FACW). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-14 featured mucky (sapric) organic soils with a 10 YR 2/1 matrix and some depleted 10 YR 4/2 mineral soils between 0 and 8 inches in depth, and a 10 YR 3/2 matrix from 8 to 12 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator A2 (Histic Epipedon). Based on these reasons, WET-C was delineated as a jurisdictional wetland.

WET-C displays some effectiveness at performing the groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal function of WET-C is sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-C in **Appendix E**.



Wetland D (WET-D)

Wetland D (WET-D) is a PEM wetland approximately 0.133 acres in size and is located south of SR 0001 and east of SR 0413 (Pine Street) (see **Photo 72** in **Appendix D**). Hydrology in WET-D is supplied primarily by a seasonally high water table and surface/roadway runoff. Wetland hydrology indicators observed for WET-D included oxidized rhizospheres on living roots, geomorphic position, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter (the wetland was primarily dry during the delineation). Vegetation within the TP-16 sample plot was dominated by common reed (*Phragmites australis*, FACW). The hydrophytic vegetation parameter was met by the rapid test and dominance test indicators. The soil sample from TP-16 featured a silt loam texture with a 10 YR 4/2 matrix between 0 and 2 inches in depth, a clay loam texture with a 10 YR 4/3 matrix and 10YR 4/6 redoximorphic features from 2 to 7 inches in depth, and a silty clay loam texture with a 10 YR 2/2 matrix and 7.5 YR 4/6 redoximorphic features from 7 to 14 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F6 (Redox Dark Surface). Based on these reasons, WET-D was delineated as a jurisdictional wetland.

WET-D displays some effectiveness at performing floodflow alteration, sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal function of WET-D is sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-D in **Appendix E**.

Wetland E (WET-E)

Wetland E (WET-E) is a PEM wetland approximately 0.004 acres in size and is located north of SR 0001 and east of SR 0413 (Pine Street) (see **Photo 5** in **Appendix D**). This wetland consists of a small, shallow depression located at the edge of a maintained field. Hydrology in WET-E is supplied primarily by a seasonally high water table and surface/roadway runoff. Wetland hydrology indicators observed for WET-E included surface water, saturation (episaturation), water-stained leaves, geomorphic position, microtopographic relief, and the FAC-Neutral Test, which satisfied the wetland hydrology parameter. Vegetation within the TP-1 sample plot was dominated by soft rush (FACW), broad-leaf cattail (*Typha latifolia*, OBL), and path rush (*Juncus tenuis*, FAC). The hydrophytic vegetation parameter was met by the dominance test indicator. The soil sample from TP-1 featured a clay texture with a 10 YR 5/2 matrix and 10YR YR 6/8 redoximorphic features between 0 and 10 inches in depth. This soil characterization fulfills the hydric soil parameter as defined by Indicator F3 (Depleted Matrix). Based on these reasons, WET-E was delineated as a jurisdictional wetland.

WET-E displays some effectiveness at performing the sediment/toxicant retention, nutrient removal, and wildlife habitat functions. The principal function of WET-E is sediment/toxicant retention due to the wetland's ability to trap and filter sediment and pollutants from roadway and other surface runoff. See the Wetland Function-Value Evaluation Form for WET-E in **Appendix E**.



Stormwater Management Features

Typical roadside drainage features were observed throughout the study area and included stormwater inlets and small pipes, ditches, and grass swales. With the exception of any aquatic resources noted above, these features lacked a continuous OHWM and RPW flow and did not meet the definition of a wetland.

Uplands

Uplands within the study area primarily consisted of forested lands, non-maintained fields, and maintained ROW and other mowed areas. Vegetation commonly observed in upland areas throughout the study area included tulip poplar (*Liriodendron tulipifera*, FACU), American beech (*Fagus grandifolia*, FACU), black cherry (*Prunus serotina*, FACU), black walnut (*Juglans nigra*, FACU), Norway maple (*Acer platanoides*, UPL), boxelder (FAC), sassafras (*Sassafras albidum*, FACU), oaks (*Quercus* sp.), Amur honeysuckle (*Lonicera maackii*, UPL), multiflora rose (*Rosa multiflora*, FACU), Japanese wineberry (*Rubus phoenicolasius*, FACU), Japanese honeysuckle (*Lonicera japonica*, FACU), garlic mustard (*Alliaria petiolata*, FACU), lesser celandine (FAC), Japanese stiltgrass (FAC), tall goldenrod (*Solidago altissima*, FACU), common mugwort (*Artemisia vulgaris*, UPL), and upland grasses.

Soil samples observed in the study area outside of the aforementioned wetlands were typically non-hydric. For additional data on uplands within the study area, please see the upland sample plot data forms (TP-2, TP-5, TP-7, TP-8, TP-10, TP-12, TP-13, TP-15, TP-17) in **Appendix C**.

IV. SUMMARY

JMT has completed an aquatic resource identification and delineation in the established study area for the proposed SR 0001 Section RC3 Improvement Project located in Langhorne and Langhorne Manor Boroughs, and Middletown Township, Bucks County, Pennsylvania. The study area consisted of approximately 100.9 acres along a 2.6-mile long corridor of SR 0001, which extended from approximately 1,000 feet northeast of the SR 0001 bridge crossing over Business Route 1, to approximately 885 feet northeast of the bridge carrying Corn Crib Lane over SR 0001.

Twenty watercourses were initially identified and delineated in the study area (WUS-1 to WUS-21, excluding WUS-20), including fourteen tributaries to Neshaminy Creek and six tributaries to Mill Creek. Eight palustrine wetlands were also identified and delineated, including four palustrine emergent (PEM) wetlands (WET-A, WET-B, WET-D, WET-E), two palustrine scrub-shrub (PSS) wetlands (WET-1, WET-C), one palustrine forested (PFO) wetland (WET-3), and one mixed PFO/PEM wetland (WET-2). Per 25 Pa. Code § 105.17(1), none of the wetlands within the project area would be classified as Exceptional Value (EV) wetlands.

A Preliminary Jurisdictional Determination (PJD) was held with the USACE on July 27, 2022 in order to verify delineated boundaries and obtain unofficial opinions from the USACE on the jurisdictional status of a subset of resources from the project. The PJD resulted in the following revisions to the previously delineated resources:



- WET-1: The wetland boundary was revised to include a narrow drainage connection to WUS-3;
- WUS-2: The watercourse boundary was extended further upstream along the western side of SR 0413, connecting downstream to a 24-inch RCP that drains to the WUS2/WUS-3 confluence;
- WET-2: The wetland boundary was revised to include a narrow drainage connection to WUS-2;
- WUS-12: It was determined that this feature was not a watercourse (previously delineated as ephemeral stream); therefore, WUS-12 is no longer included as a watercourse in this report;
- WUS-13: It was determined that this feature was not a watercourse (previously delineated as ephemeral stream); therefore, WUS-13 is no longer included as a watercourse in this report.

Any temporary or permanent impacts to wetlands and/or watercourses would require permits from the PADEP and USACE.

All watercourses in the study area drain to either the Neshaminy Creek or Mill Creek, both of which are classified as WWFs and MFs in the PADEP, PA Code Title 25, Chapter 93 *Water Quality Standards*. According to the PFBC, no stocked trout streams, Approved Trout Waters, Class A wild trout streams, or streams supporting natural trout reproduction occur within or in the vicinity of the study area. In addition, no streams supporting natural trout reproduction were identified downstream of the project area; therefore, no in-stream work restrictions will be required for this project.

Wetland and waterways investigations of this type reflect the current state of conditions. The delineation is often based on professional judgment, experience, and the information and techniques available. A determination of jurisdictional areas and their boundaries, especially in highly disturbed and variable conditions of a developed area, can only be conducted through a consultation with the USACE and/or PADEP.



V. REFERENCES

Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*, Joint EPA/Army Memorandum, December 02, 2008 (revision of original dated June 6, 2007).

Cowardin, Lewis M., et al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of the Interior, Office of Biological Services, Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31.

Environmental Laboratory. (1987). *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

Gertler, E. 2004. *Keystone Canoeing: A Guide to Canoeable Waters of Eastern Pennsylvania*. Silver Spring, Maryland, Seneca Press.

Geyer, A. R. and J. P. Wilshusen. 1982. *Engineering Characteristics of the Rocks of Pennsylvania*, Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, Environmental Geology Report 1.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. *The National Wetland Plant List: 2016 wetland ratings*. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

Munsell. 2009. *Munsell Soil Color Charts*. Munsell Color, Grand Rapids, MI.

Pennsylvania Department of Environmental Protection (PADEP). 2014. *Chapter 93: Water Quality Standards*. Pennsylvania Code Title 25. Harrisburg, Pennsylvania.

Pennsylvania Department of Environmental Protection (PADEP). 2014. *Chapter 105: Dam Safety and Waterway Management*. Pennsylvania Code Title 25. Harrisburg, Pennsylvania.

Pennsylvania Department of Transportation (PennDOT). 2015. *Publication 325: Wetland Resources Handbook*.

Pennsylvania Fish & Boat Commission (PFBC). 2021. *Class A Wild Trout Waters*. (<http://fishandboat.com/classa.pdf>)

Pennsylvania Fish & Boat Commission (PFBC). 2021. *Pennsylvania Wild Trout Waters (Natural Reproduction)* (http://fishandboat.com/trout_repro.pdf)

Sackett v. Environmental Protection Agency, 598 U.S. ____ (2023).



Sevon, W. D., 2000. *Physiographic Province of Pennsylvania*, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey, Map 13.

U.S. Army Corps of Engineers. 2015. *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach*. U.S. Army Corps of Engineers New England Division.

U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0*, ed. J.F. Berkowitz, J.S. Wakeley, R.W. Lichvar, C.V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

U.S. Army Corps of Engineers. 2018. National Wetland Plant List, version 3.4. U.S. Army Corps of Engineers, Engineer Research and Development Center. Cold Regions Research and Engineering Laboratory, Hanover, NH. http://wetland_plants.usace.army.mil/

U.S. Army Corps of Engineers. "National Wetland Plant List (final notice)." 85 Fed. Reg. 29,689 (May 18, 2020).

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 1997. *Hydric Soils of Pennsylvania*. <http://www.statlab.iastate.edu:80/soils/hydric/pa.html/>

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2024. *Web Soil Survey of Clearfield County, Pennsylvania*.

U.S. Department of Homeland Security, Federal Emergency Management Agency. 2024. *Flood Map Service Center*. <https://msc.fema.gov/portal/>

U.S. Fish and Wildlife Service. 2024. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. <http://www.fws.gov/wetlands/>

U.S. Geological Survey. 2019. *Langhorne, PA 7.5 Minute Quadrangle Map*. Scale 1:24,000. Northeastern Topographic Series V-1. Reston, VA: U.S. Department of the Interior, USGS.



Appendix A

Professional Qualifications

Pennsylvania Department of Transportation

Consultant Qualifications Package

Resumes



Please include a brief resume of key persons within your firm: (Note: Please use the “copy and paste” capabilities of your word processing program to duplicate this template for each resume included with the submission)

Resume # _____



Name Craig Patterson Nein

Title Environmental Scientist

Primary Responsibilities

Resource Delineation, Endangered Species, Permitting, NEPA Documentation

Years Experience: **With This Firm** 10

With Other Firms 8

Education

Institution	Degree(s)	Year	Specialization
<u>University of Mary Washington</u>	<u>BS</u>	<u>2004</u>	<u>Environmental Science</u>
<u>Towson University</u>	<u>MS</u>	<u>2012</u>	<u>Biology</u>

Active Registration

Year first registered _____

Disciplines _____

Other Experience and Qualifications

Mr. Nein has over 15 years of experience in the natural resources field. He has held positions with the Maryland Department of Natural Resources, the Department of the Interior (US Fish & Wildlife Service), Towson University, and the Maryland Conservation Corps prior to joining JMT. His areas of expertise include wetlands, endangered species (specifically the bog turtle (*Glyptemys muhlenbergii*)), and habitat assessments. Mr. Nein also has experience in the preparation of environmental permit applications and NEPA documents, including Chapter 105/Section 404 permitting, NPDES permitting, and portions of environmental impact statements. Mr. Nein is recognized by state and federal agencies as a Qualified Bog Turtle Surveyor in the states of Pennsylvania, Maryland, and Delaware. Other experience includes assistance with Phase I archaeological investigations and ambient noise monitoring. Some of his project specific experience includes:

PTC MP 53 – 57 Total Reconstruction, Allegheny County, PTC, Plum Borough and Monroeville, PA: Environmental Scientist. Mr. Nein assisted with the delineation of wetlands and Waters of the U.S. along the 4 mile project corridor of the PA Turnpike. He prepared a complete Wetland Identification and Delineation Report that was accepted by PTC without comments. Mr. Nein compiled extensive environmental data and information on the project area and prepared an Environmental Overview Document (EOD). Mr. Nein also assisted with the collection of ambient noise measurements in the field and the preparation of a Preliminary Technical Noise Report.

S.R. 0216, Section 015 Blooming Grove Road Bridge Replacement, PennDOT District 8-0, Codorus and Manheim Townships, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. He conducted a Phase 1 Bog Turtle Habitat Assessment for the delineated wetlands and prepared a Wetland Identification and Delineation Report and Phase 1 Bog Turtle Habitat Assessment Report. Mr. Nein also led a Phase 2 Bog Turtle Survey to determine the presence/probable absence of the species within wetlands with potential habitat in the vicinity of the project area, and submitted a Phase 2 Bog Turtle Survey Report to the USFWS in order to obtain project clearance. Mr. Nein also assisted with the preparation of a

Pennsylvania Department of Transportation

Consultant Qualifications Package

Resumes



CE BRPA document.

S.R. 0216, Section 016 Sticks Road Bridge Replacement, PennDOT District 8-0, Codorus Township, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. He conducted a Phase 1 Bog Turtle Habitat Assessment for the delineated wetlands and prepared a Wetland Identification and Delineation Report and Phase 1 Bog Turtle Habitat Assessment Report. Mr. Nein also led a Phase 2 Bog Turtle Survey to determine the presence/probable absence of the species within wetlands with potential habitat in the vicinity of the project area, and submitted a Phase 2 Bog Turtle Survey Report to the USFWS in order to obtain project clearance. Mr. Nein also prepared a Joint Permit Application for impacts to waterways and wetlands.

S.R. 2001, Section A15 Bunola River Road Bridge Replacement, PennDOT District 11-0, Forward, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. Mr. Nein assisted with the preparation of a Wetland Identification and Delineation Report. He also completed a GP-11 permit application for encroachments to Perry Mill Run.

S.R. 2118, Section A02 Ripple Road Bridge Replacement, PennDOT District 11-0, White Oak, PA: Environmental Scientist. Responsible for the identification and delineation of all waters of the U.S. on site, including wetlands. Mr. Nein assisted with the preparation of a Wetland Identification and Delineation Report. He also assisted with the completion of a GP-11 permit application for encroachments to Long Run and adjacent tributaries.

Bog Turtle Construction Monitoring – Pipe Maintenance Project, Carroll County Dept. of Public Works, Union Mills, MD: Environmental Scientist. Mr. Nein acted as the Qualified Bog Turtle Surveyor on site during a maintenance project that involved the re-grouting of a structurally deficient culvert in Carroll County, Maryland. He attended a Pre-Construction Meeting with county contractors and Maryland Department of Natural Resources (MD DNR) staff to discuss the nature of the project and to highlight the importance of the bog turtle monitoring activities. Mr. Nein provided bog turtle monitoring services during all phases of the project to ensure that no bog turtles were harmed as a result of the construction project. Following the completion of the project, Mr. Nein prepared a construction monitoring report for Carroll County to submit to MD DNR.

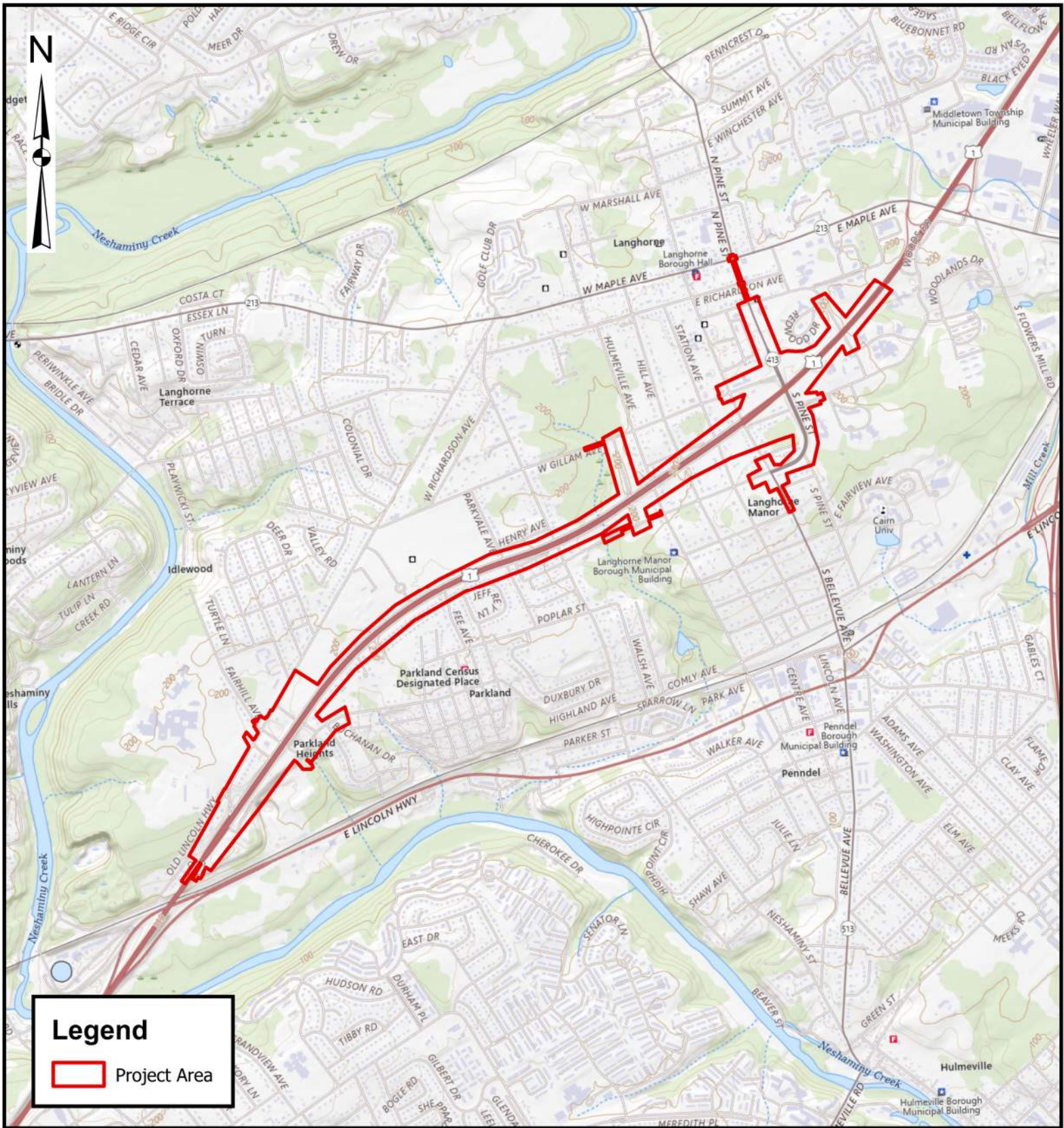
RCN Ranavirus Study, Maryland Department of Natural Resources, MD: Seasonal Biologist. Mr. Nein acted as the lead field biologist on a study investigating the distribution of *Ranavirus* in amphibian breeding ponds. Compiled known wood frog (*Lithobates sylvaticus*) breeding ponds in Maryland and conducted site randomization to select study ponds. Verified breeding at study ponds and assisted with collection of larval amphibian samples for disease analysis. Assisted with development of study protocol manual, permitting, site monitoring, GIS, and database management.

Bog Turtle Site Prioritization Project, U.S. Fish and Wildlife Service (USFWS), MD: Fish and Wildlife Biologist. Mr. Nein led an effort conducting a site prioritization project for bog turtle sites in Maryland. Compiled population and recruitment data for all known bog turtle sites in Maryland and ranked sites based on standardized criteria. Assisted USFWS staff with GIS work, reporting, and presentation of project methodology at regional recovery meeting. The results of the site prioritization are being used by state and federal personnel to help guide survey efforts, monitoring, management, and restoration at bog turtle sites in Maryland.



Appendix B

Figures



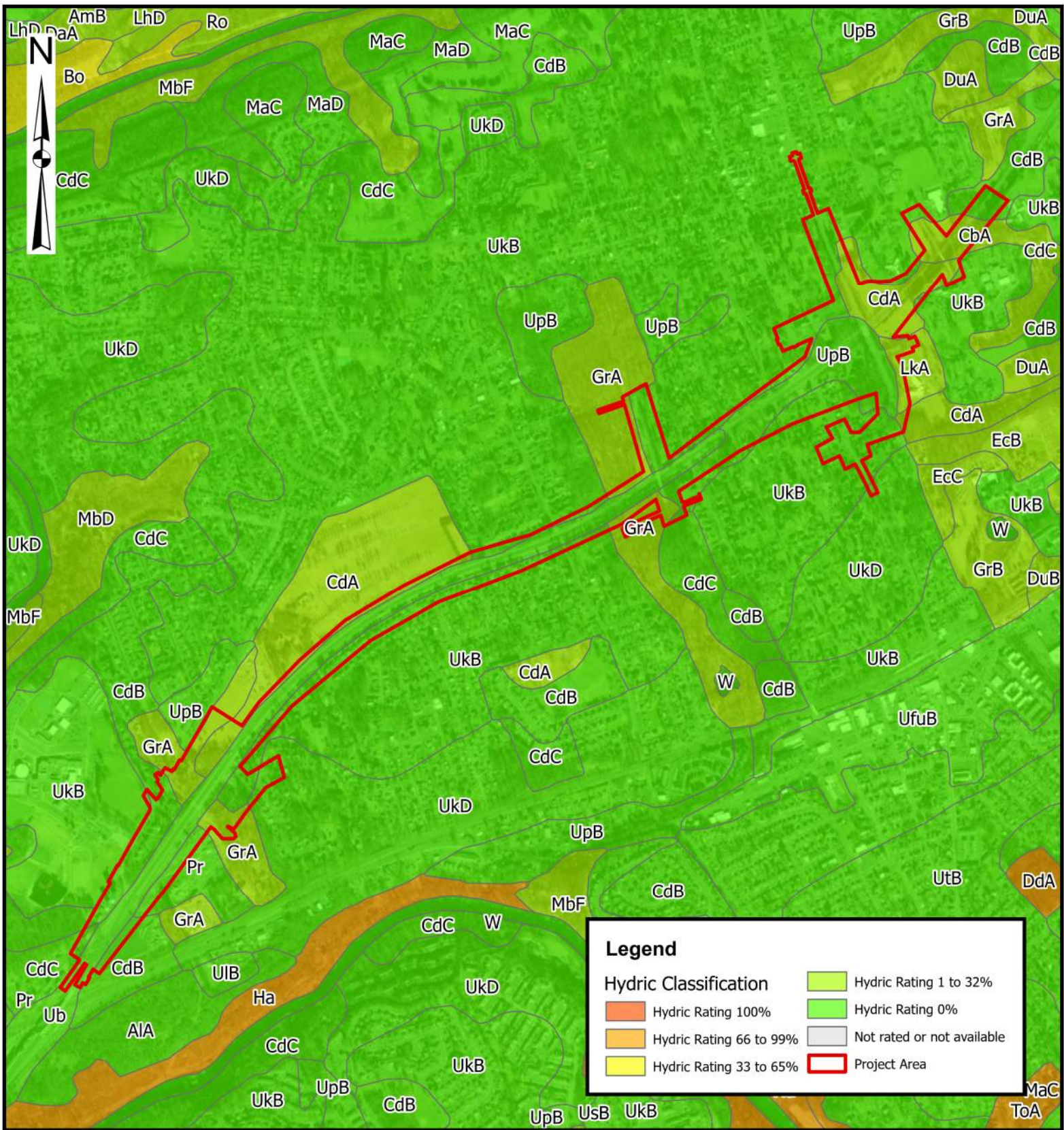
**FIGURE 1:
PROJECT LOCATION MAP**

S.R. 0001 SECTION RC3

LANGHORNE AND LANGHORNE MANOR BOROUGHES,
AND MIDDLETOWN TOWNSHIP, BUCKS COUNTY, PA

DATE: NOVEMBER 2024





0 1,000 2,000 4,000 Feet

1" = 1,500'

SOURCE: ESRI, SSURGO
CREATED BY: NKS

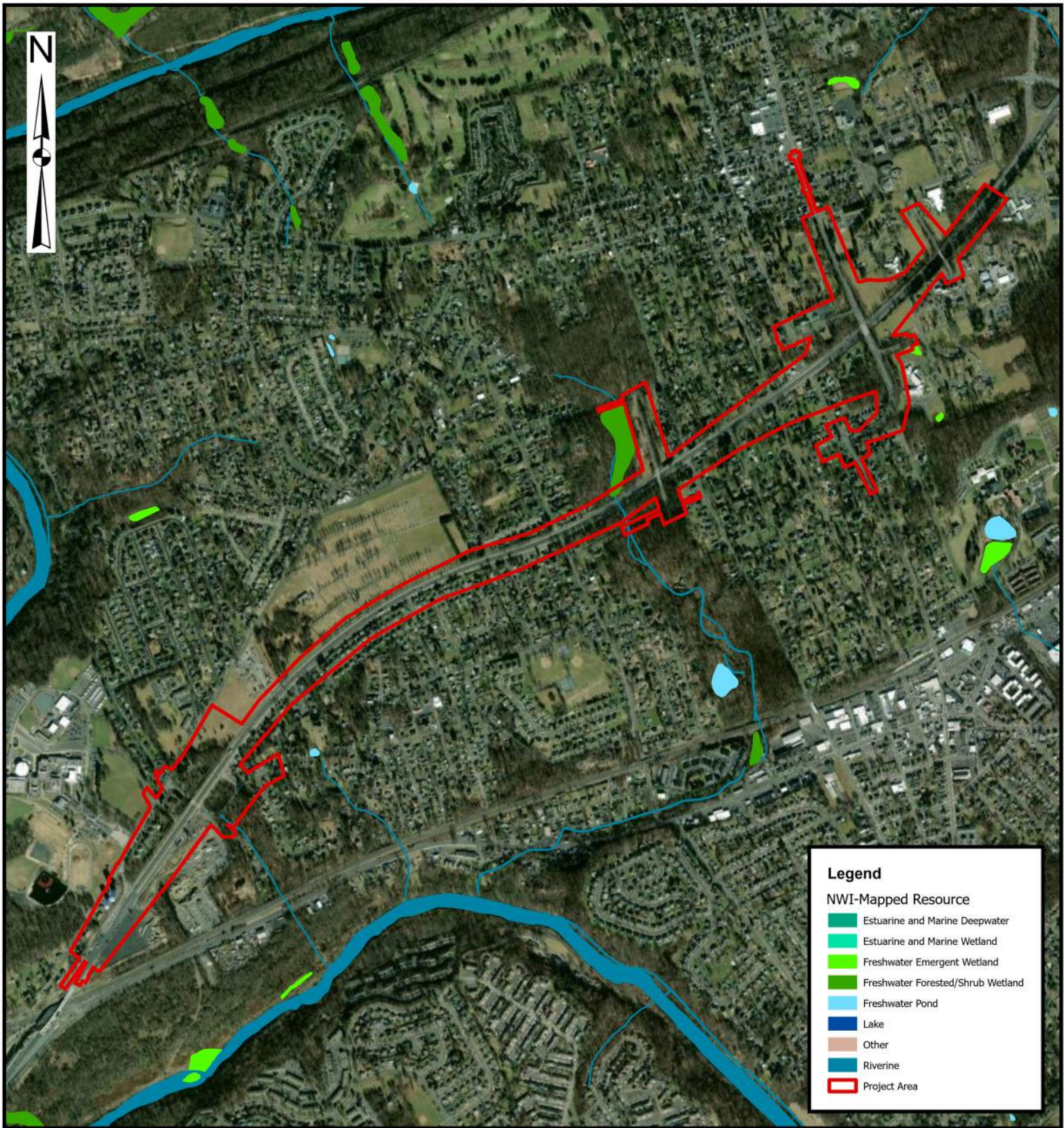


FIGURE 2: HYDRIC SOIL MAPPING

S.R. 0001 SECTION RC3

LANGHORNE AND LANGHORNE MANOR BOROUGHES,
AND MIDDLETOWN TOWNSHIP, BUCKS COUNTY, PA

DATE: NOVEMBER 2024



0 1,000 2,000 4,000
Feet

1" = 1,500'

SOURCE: ESRI, USFWS
CREATED BY: NKS

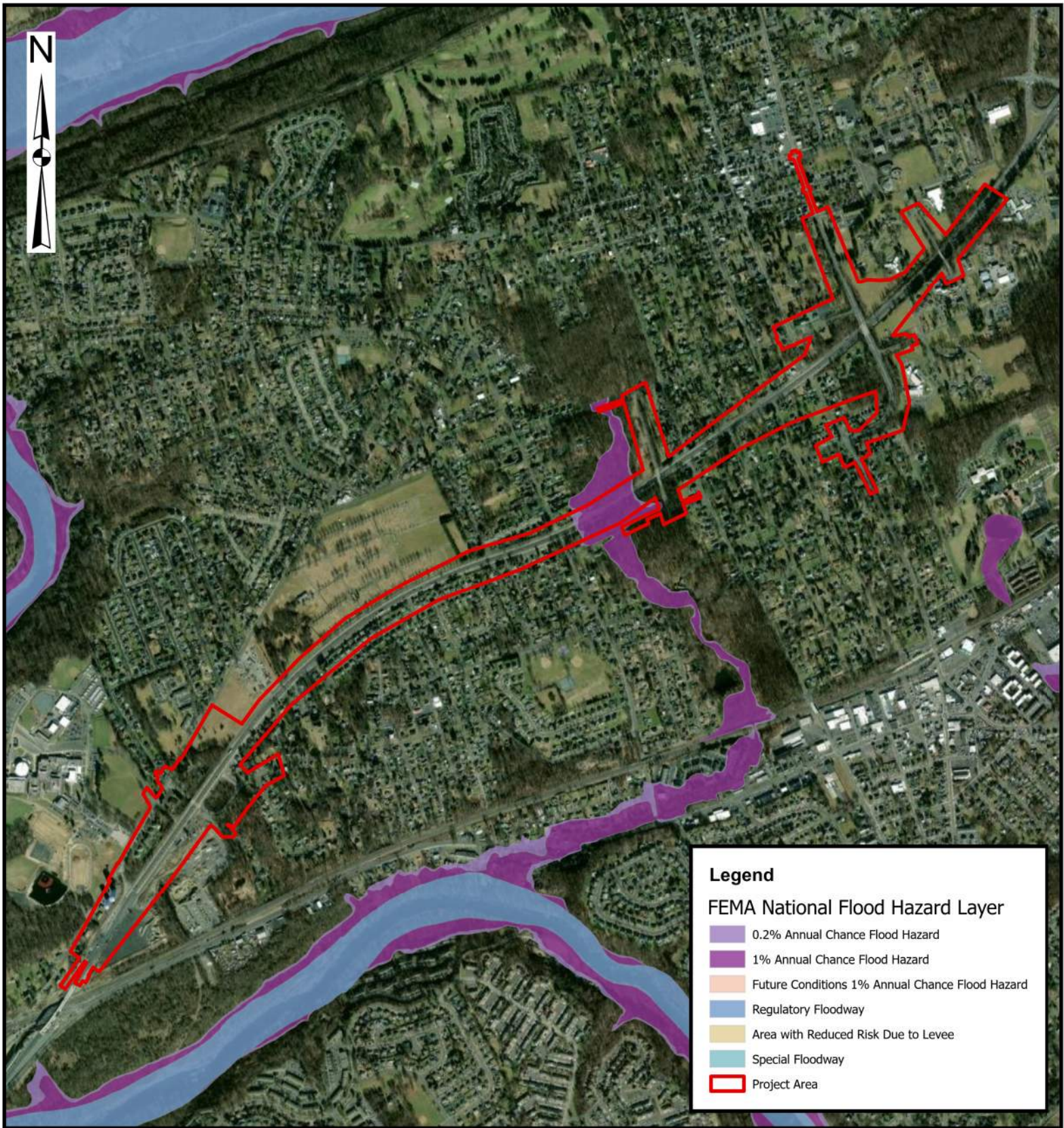


FIGURE 3: NWI MAP

S.R. 0001 SECTION RC3

LANGHORNE AND LANGHORNE MANOR BOROUGHES,
AND MIDDLETOWN TOWNSHIP, BUCKS COUNTY, PA

DATE: NOVEMBER 2024



Legend

FEMA National Flood Hazard Layer

- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Area with Reduced Risk Due to Levee
- Special Floodway
- Project Area

0 1,000 2,000 4,000
Feet

1" = 1,500'

SOURCE: ESRI, FEMA
CREATED BY: NKS



FIGURE 4: FEMA FLOODPLAIN MAP

S.R. 0001 SECTION RC3

LANGHORNE AND LANGHORNE MANOR BOROUGHES,
AND MIDDLETOWN TOWNSHIP, BUCKS COUNTY, PA

DATE: NOVEMBER 2024



Appendix C

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-04-19
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-1
 Investigator(s): Craig Nein, Miranda McKiernan Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.171833 Long: -74.914797 Datum: WGS 84
 Soil Map Unit Name: CdA - Chester silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

Small PEM wetland (WET-E) to the north of SR 0001 and east of Rte 413, on edge of maintained field.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
<u>Primary Indicators (minimum of one is required; check all that apply)</u>			
☒ Surface Water (A1)	_____ True Aquatic Plants (B14)	_____ Surface Soil Cracks (B6)	
_____ High Water Table (A2)	_____ Hydrogen Sulfide Odor (C1)	_____ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Drainage Patterns (B10)	
_____ Water Marks (B1)	_____ Presence of Reduced Iron (C4)	_____ Moss Trim Lines (B16)	
_____ Sediment Deposits (B2)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Dry-Season Water Table (C2)	
_____ Drift Deposits (B3)	_____ Thin Muck Surface (C7)	_____ Crayfish Burrows (C8)	
_____ Algal Mat or Crust (B4)	_____ Other (Explain in Remarks)	_____ Saturation Visible on Aerial Imagery (C9)	
_____ Iron Deposits (B5)		_____ Stunted or Stressed Plants (D1)	
_____ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		_____ Shallow Aquitard (D3)	
_____ Aquatic Fauna (B13)		☒ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 1
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes ☒ No _____ Depth (inches): 0-4
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.
 Episaturation observed due to clay soil layer.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-1

Tree Stratum (Plot size: <u>5 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>40</u></td> <td>x 1 = <u>40</u></td> </tr> <tr> <td>FACW species <u>35</u></td> <td>x 2 = <u>70</u></td> </tr> <tr> <td>FAC species <u>20</u></td> <td>x 3 = <u>60</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>95</u> (A)</td> <td><u>170</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>1.8</u>	Total % Cover of:	Multiply by:	OBL species <u>40</u>	x 1 = <u>40</u>	FACW species <u>35</u>	x 2 = <u>70</u>	FAC species <u>20</u>	x 3 = <u>60</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>95</u> (A)	<u>170</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>40</u>	x 1 = <u>40</u>																	
FACW species <u>35</u>	x 2 = <u>70</u>																	
FAC species <u>20</u>	x 3 = <u>60</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>95</u> (A)	<u>170</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
_____ = Total Cover																		
Sapling/Shrub Stratum (Plot size: <u>5 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
50% of total cover: _____ 20% of total cover: _____																		
_____ = Total Cover																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Juncus effusus</u>	<u>35</u>	☒	<u>FACW</u>															
2. <u>Typha latifolia</u>	<u>30</u>	☒	<u>OBL</u>															
3. <u>Juncus tenuis</u>	<u>20</u>	☒	<u>FAC</u>															
4. <u>Scirpus atrovirens</u>	<u>10</u>		<u>OBL</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
<u>95%</u> = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
50% of total cover: <u>48</u> 20% of total cover: <u>19</u>																		
_____ = Total Cover																		
Woody Vine Stratum (Plot size: <u>5 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.)																		
Hydrophytic vegetation indicator was met. Plot sizes reduced due to small size of wetland.																		

SOIL

Sampling Point: TP-1

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-04-19
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-2
 Investigator(s): Craig Nein, Miranda McKiernan Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): None Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.171769 Long: -74.914781 Datum: WGS 84
 Soil Map Unit Name: CdA - Chester silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Unmaintained field to the south of WET-E. Upland plot associated with TP-1/WET-E.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-2

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>50</u></td> <td>x 3 = <u>150</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>90</u> (A)</td> <td><u>310</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.4</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>50</u>	x 3 = <u>150</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>90</u> (A)	<u>310</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>50</u>	x 3 = <u>150</u>																	
FACU species <u>40</u>	x 4 = <u>160</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>90</u> (A)	<u>310</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>10 ft r</u>)																		
1. <u>Rosa multiflora</u>	<u>15</u>	<u>✓</u>	<u>FACU</u>															
2. <u>Rubus phoenicolasius</u>	<u>15</u>	<u>✓</u>	<u>FACU</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Microstegium vimineum</u>	<u>50</u>	<u>✓</u>	<u>FAC</u>															
2. <u>Solidago altissima</u>	<u>10</u>	_____	<u>FACU</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>																		
Woody Vine Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.)																		
No hydrophytic vegetation indicators were met. Plot sizes adjusted due to proximity of maintained lawn and roadway embankment.																		

Hydrophytic Vegetation Present? Yes _____ No ✓

SOIL

Sampling Point: TP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 4	10YR 4/3	100	2/				Silt Loam	
4 - 12	10YR 4/3	90	10YR 5/6	10	C	M	Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☒

Remarks:

No hydric soil indicators were met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-04-19
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-3
 Investigator(s): Craig Nein, Miranda McKiernan Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.170238 Long: -74.917037 Datum: WGS 84
 Soil Map Unit Name: UpB - Urban land-Glenville complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

PSS wetland area (WET-1) located north of SR 0001 and east of Bellevue Avenue.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
<u>Primary Indicators (minimum of one is required; check all that apply)</u>			
☒ Surface Water (A1)	_____ True Aquatic Plants (B14)	_____ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	_____ Hydrogen Sulfide Odor (C1)	_____ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Drainage Patterns (B10)	
☒ Water Marks (B1)	_____ Presence of Reduced Iron (C4)	_____ Moss Trim Lines (B16)	
_____ Sediment Deposits (B2)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Dry-Season Water Table (C2)	
_____ Drift Deposits (B3)	_____ Thin Muck Surface (C7)	_____ Crayfish Burrows (C8)	
☒ Algal Mat or Crust (B4)	_____ Other (Explain in Remarks)	_____ Saturation Visible on Aerial Imagery (C9)	
_____ Iron Deposits (B5)		_____ Stunted or Stressed Plants (D1)	
_____ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		_____ Shallow Aquitard (D3)	
_____ Aquatic Fauna (B13)		☒ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 2
 Water Table Present? Yes ☒ No _____ Depth (inches): 8
 Saturation Present? Yes ☒ No _____ Depth (inches): 0-4
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-3

Tree Stratum (Plot size: <u>30 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Acer negundo</u>	<u>20</u>	☒	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>57</u> (A/B)														
2. <u>Liquidambar styraciflua</u>	<u>5</u>	☒	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>30</u></td> <td>x 2 = <u>60</u></td> </tr> <tr> <td>FAC species <u>30</u></td> <td>x 3 = <u>90</u></td> </tr> <tr> <td>FACU species <u>10</u></td> <td>x 4 = <u>40</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>70</u> (A)</td> <td><u>190</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.7</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>30</u>	x 2 = <u>60</u>	FAC species <u>30</u>	x 3 = <u>90</u>	FACU species <u>10</u>	x 4 = <u>40</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>70</u> (A)	<u>190</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>30</u>	x 2 = <u>60</u>																	
FAC species <u>30</u>	x 3 = <u>90</u>																	
FACU species <u>10</u>	x 4 = <u>40</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>70</u> (A)	<u>190</u> (B)																	
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
_____ = Total Cover 50% of total cover: <u>13</u> 20% of total cover: <u>5</u>				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Cornus amomum</u>	<u>20</u>	☒	<u>FACW</u>															
2. <u>Rosa multiflora</u>	<u>10</u>	☒	<u>FACU</u>															
3. <u>Acer negundo</u>	<u>5</u>	_____	<u>FAC</u>	Hydrophytic Vegetation Present? Yes ☒ No _____														
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____	Herb Stratum (Plot size: <u>5 ft r</u>)														
12. _____	_____	_____	_____															
13. _____	_____	_____	_____															
14. _____	_____	_____	_____															
15. _____	_____	_____	_____	Herb Stratum (Plot size: <u>5 ft r</u>)														
16. _____	_____	_____	_____															
17. _____	_____	_____	_____															
18. _____	_____	_____	_____															
19. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
20. _____	_____	_____	_____															
21. _____	_____	_____	_____															
22. _____	_____	_____	_____															
23. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
24. _____	_____	_____	_____															
25. _____	_____	_____	_____															
26. _____	_____	_____	_____															
27. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
28. _____	_____	_____	_____															
29. _____	_____	_____	_____															
30. _____	_____	_____	_____															
31. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
32. _____	_____	_____	_____															
33. _____	_____	_____	_____															
34. _____	_____	_____	_____															
35. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
36. _____	_____	_____	_____															
37. _____	_____	_____	_____															
38. _____	_____	_____	_____															
39. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
40. _____	_____	_____	_____															
41. _____	_____	_____	_____															
42. _____	_____	_____	_____															
43. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
44. _____	_____	_____	_____															
45. _____	_____	_____	_____															
46. _____	_____	_____	_____															
47. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
48. _____	_____	_____	_____															
49. _____	_____	_____	_____															
50. _____	_____	_____	_____															
51. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
52. _____	_____	_____	_____															
53. _____	_____	_____	_____															
54. _____	_____	_____	_____															
55. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
56. _____	_____	_____	_____															
57. _____	_____	_____	_____															
58. _____	_____	_____	_____															
59. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
60. _____	_____	_____	_____															
61. _____	_____	_____	_____															
62. _____	_____	_____	_____															
63. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
64. _____	_____	_____	_____															
65. _____	_____	_____	_____															
66. _____	_____	_____	_____															
67. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
68. _____	_____	_____	_____															
69. _____	_____	_____	_____															
70. _____	_____	_____	_____															
71. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
72. _____	_____	_____	_____															
73. _____	_____	_____	_____															
74. _____	_____	_____	_____															
75. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
76. _____	_____	_____	_____															
77. _____	_____	_____	_____															
78. _____	_____	_____	_____															
79. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
80. _____	_____	_____	_____															
81. _____	_____	_____	_____															
82. _____	_____	_____	_____															
83. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
84. _____	_____	_____	_____															
85. _____	_____	_____	_____															
86. _____	_____	_____	_____															
87. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
88. _____	_____	_____	_____															
89. _____	_____	_____	_____															
90. _____	_____	_____	_____															
91. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
92. _____	_____	_____	_____															
93. _____	_____	_____	_____															
94. _____	_____	_____	_____															
95. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
96. _____	_____	_____	_____															
97. _____	_____	_____	_____															
98. _____	_____	_____	_____															
99. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
100. _____	_____	_____	_____															
101. _____	_____	_____	_____															
102. _____	_____	_____	_____															
103. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
104. _____	_____	_____	_____															
105. _____	_____	_____	_____															
106. _____	_____	_____	_____															
107. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
108. _____	_____	_____	_____															
109. _____	_____	_____	_____															
110. _____	_____	_____	_____															
111. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
112. _____	_____	_____	_____															
113. _____	_____	_____	_____															
114. _____	_____	_____	_____															
115. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
116. _____	_____	_____	_____															
117. _____	_____	_____	_____															
118. _____	_____	_____	_____															
119. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
120. _____	_____	_____	_____															
121. _____	_____	_____	_____															
122. _____	_____	_____	_____															
123. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
124. _____	_____	_____	_____															
125. _____	_____	_____	_____															
126. _____	_____	_____	_____															
127. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
128. _____	_____	_____	_____															
129. _____	_____	_____	_____															
130. _____	_____	_____	_____															
131. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
132. _____	_____	_____	_____															
133. _____	_____	_____	_____															
134. _____	_____	_____	_____															
135. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
136. _____	_____	_____	_____															
137. _____	_____	_____	_____															
138. _____	_____	_____	_____															
139. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
140. _____	_____	_____	_____															
141. _____	_____	_____	_____															
142. _____	_____	_____	_____															
143. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
144. _____	_____	_____	_____															
145. _____	_____	_____	_____															
146. _____	_____	_____	_____															
147. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
148. _____	_____	_____	_____															
149. _____	_____	_____	_____															
150. _____	_____	_____	_____															
151. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
152. _____	_____	_____	_____															
153. _____	_____	_____	_____															
154. _____	_____	_____	_____															
155. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
156. _____	_____	_____	_____															
157. _____	_____	_____	_____															
158. _____	_____	_____	_____															
159. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
160. _____	_____	_____	_____															
161. _____	_____	_____	_____															
162. _____	_____	_____	_____															
163. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
164. _____	_____	_____	_____															
165. _____	_____	_____	_____															
166. _____	_____	_____	_____															
167. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
168. _____	_____	_____	_____															
169. _____	_____	_____	_____															
170. _____	_____	_____	_____															
171. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
172. _____	_____	_____	_____															
173. _____	_____	_____	_____															
174. _____	_____	_____	_____															
175. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
176. _____	_____	_____	_____															
177. _____	_____	_____	_____															
178. _____	_____	_____	_____															
179. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
180. _____	_____	_____	_____															
181. _____	_____	_____	_____															
182. _____	_____	_____	_____															
183. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
184. _____	_____	_____	_____															
185. _____	_____	_____	_____															
186. _____	_____	_____	_____															
187. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
188. _____	_____	_____	_____															
189. _____	_____	_____	_____															
190. _____	_____	_____	_____															
191. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
192. _____	_____	_____	_____															
193. _____	_____	_____	_____															
194. _____	_____	_____	_____															
195. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
196. _____	_____	_____	_____															
197. _____	_____	_____	_____															
198. _____	_____	_____	_____															
199. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
200. _____	_____	_____	_____															
201. _____	_____	_____	_____															
202. _____	_____	_____	_____															
203. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
204. _____	_____	_____	_____															
205. _____	_____	_____	_____															
206. _____	_____	_____	_____															
207. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
208. _____	_____	_____	_____															
209. _____	_____	_____	_____															
210. _____	_____	_____	_____															
211. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
212. _____	_____	_____	_____															
213. _____	_____	_____	_____															
214. _____	_____	_____	_____															
215. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
216. _____	_____	_____	_____															
217. _____	_____	_____	_____															
218. _____	_____	_____	_____															
219. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
220. _____	_____	_____	_____															
221. _____	_____	_____	_____															
222. _____	_____	_____	_____															
223. _____	_____	_____	_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
224. _____	_____	_____	_____															
225. _____	_____																	

SOIL

Sampling Point: TP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 8	10YR 4/2	85	5YR 4/6	15	C	PL / M	Silt Loam	
8 - 12	10YR 4/2	65	5YR 4/6	10	C	M	Silt Loam	
12 - 16	10YR 5/4	85	10YR 6/8	10	C	M		10 YR 4/2 redox depletion's 5 %
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (**LRR N**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
- ☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
- ☐ Umbric Surface (F13) (**MLRA 136, 122**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
- ☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
- ☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-04-19
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-4
 Investigator(s): Craig Nein, Miranda McKiernan Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.171032 Long: -74.915626 Datum: WGS 84
 Soil Map Unit Name: UpB - Urban land-Glenville complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

Mixed PFO/PEM wetland (WET-2) located north of SR 0001 and west of Rte 413.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
<u>Primary Indicators (minimum of one is required; check all that apply)</u>			
☒ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)	
☒ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☒ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 1-4
 Water Table Present? Yes ☒ No _____ Depth (inches): 6
 Saturation Present? Yes ☒ No _____ Depth (inches): 2
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-4

Tree Stratum (Plot size: <u>30 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Acer rubrum</u>	<u>50</u>	☒	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>83</u> (A/B)														
2. <u>Liquidambar styraciflua</u>	<u>15</u>	☒	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>5</u></td> <td>x 1 = <u>5</u></td> </tr> <tr> <td>FACW species <u>40</u></td> <td>x 2 = <u>80</u></td> </tr> <tr> <td>FAC species <u>70</u></td> <td>x 3 = <u>210</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>115</u> (A)</td> <td><u>295</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.6</u>	Total % Cover of:	Multiply by:	OBL species <u>5</u>	x 1 = <u>5</u>	FACW species <u>40</u>	x 2 = <u>80</u>	FAC species <u>70</u>	x 3 = <u>210</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>115</u> (A)	<u>295</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>5</u>	x 1 = <u>5</u>																	
FACW species <u>40</u>	x 2 = <u>80</u>																	
FAC species <u>70</u>	x 3 = <u>210</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>115</u> (A)	<u>295</u> (B)																	
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
50% of total cover: <u>33</u> 20% of total cover: <u>13</u> Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
1. <u>Cornus amomum</u>	<u>10</u>	☒	<u>FACW</u>															
2. <u>Alnus serrulata</u>	<u>5</u>	☒	<u>OBL</u>															
3. <u>Malus sp.</u>	<u>5</u>	☒	_____															
4. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____														
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
50% of total cover: <u>10</u> 20% of total cover: <u>4</u> Herb Stratum (Plot size: <u>5 ft r</u>)				Hydrophytic Vegetation Present? Yes ☒ No _____														
1. <u>Juncus effusus</u>	<u>30</u>	☒	<u>FACW</u>															
2. <u>Microstegium vimineum</u>	<u>5</u>	_____	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____														
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
50% of total cover: <u>18</u> 20% of total cover: <u>7</u> Woody Vine Stratum (Plot size: <u>30 ft r</u>)				Hydrophytic Vegetation Present? Yes ☒ No _____														
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes ☒ No _____														
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
50% of total cover: _____ 20% of total cover: _____ Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic vegetation indicator was met.														
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
_____ = Total Cover																		

SOIL

Sampling Point: TP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 4	10YR 4/2	95	5YR 4/6	5	C	PL / M	Silt Loam	
4 - 10	10YR 5/2	80	7.5YR 4/6	20	C	PL / M	Silty Clay Loam	
10 - 16	10YR 5/3	70	10YR 6/6	30	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-04-19
Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-5
Investigator(s): Craig Nein, Miranda McKiernan Section, Township, Range: _____
Landform (hillslope, terrace, etc.): Upland, Flat Local relief (concave, convex, none): None Slope (%): 1
Subregion (LRR or MLRA): S 148 Lat: 40.171197 Long: -74.915769 Datum: WGS 84
Soil Map Unit Name: UpB - Urban land-Glenville complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present?	Yes ☒	No _____	
Wetland Hydrology Present?	Yes _____	No ☒	

Remarks:

Forested area north of WET-2. Upland plot associated with TP-4/WET-2.
Hydric soil and hydrophytic vegetation parameters were satisfied; however, no wetland hydrology indicators were met.

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		_____ Surface Soil Cracks (B6)
_____ Surface Water (A1)	_____ True Aquatic Plants (B14)	_____ Sparsely Vegetated Concave Surface (B8)
_____ High Water Table (A2)	_____ Hydrogen Sulfide Odor (C1)	_____ Drainage Patterns (B10)
_____ Saturation (A3)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Moss Trim Lines (B16)
_____ Water Marks (B1)	_____ Presence of Reduced Iron (C4)	_____ Dry-Season Water Table (C2)
_____ Sediment Deposits (B2)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Crayfish Burrows (C8)
_____ Drift Deposits (B3)	_____ Thin Muck Surface (C7)	_____ Saturation Visible on Aerial Imagery (C9)
_____ Algal Mat or Crust (B4)	_____ Other (Explain in Remarks)	_____ Stunted or Stressed Plants (D1)
_____ Iron Deposits (B5)		_____ Geomorphic Position (D2)
_____ Inundation Visible on Aerial Imagery (B7)		_____ Shallow Aquitard (D3)
_____ Water-Stained Leaves (B9)		_____ Microtopographic Relief (D4)
_____ Aquatic Fauna (B13)		_____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
Water Table Present? Yes _____ No ☒ Depth (inches): _____
Saturation Present? Yes _____ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-5

Tree Stratum (Plot size: <u>30 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Catalpa speciosa</u>	<u>30</u>	☒	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u> (A/B)														
2. <u>Liquidambar styraciflua</u>	<u>10</u>	☒	<u>FAC</u>															
3. <u>Acer rubrum</u>	<u>5</u>		<u>FAC</u>															
4. _____																		
5. _____				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>73</u></td> <td>x 3 = <u>219</u></td> </tr> <tr> <td>FACU species <u>35</u></td> <td>x 4 = <u>140</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>108</u> (A)</td> <td><u>359</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.3</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>73</u>	x 3 = <u>219</u>	FACU species <u>35</u>	x 4 = <u>140</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>108</u> (A)	<u>359</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>73</u>	x 3 = <u>219</u>																	
FACU species <u>35</u>	x 4 = <u>140</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>108</u> (A)	<u>359</u> (B)																	
6. _____																		
7. _____																		
8. _____																		
9. _____				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
10. _____																		
11. _____																		
12. _____																		
50% of total cover: <u>23</u> 20% of total cover: <u>9</u> Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
1. <u>Catalpa speciosa</u>	<u>20</u>	☒	<u>FAC</u>															
2. <u>Rosa multiflora</u>	<u>10</u>	☒	<u>FACU</u>															
3. <u>Rubus phoenicolasius</u>	<u>5</u>		<u>FACU</u>															
4. _____				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
5. _____																		
6. _____																		
7. _____																		
8. _____				Hydrophytic Vegetation Present? Yes ☒ No _____														
9. _____																		
10. _____																		
11. _____																		
50% of total cover: <u>18</u> 20% of total cover: <u>7</u> Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Allium canadense</u>	<u>20</u>	☒	<u>FACU</u>															
2. <u>Microstegium vimineum</u>	<u>5</u>		<u>FAC</u>															
3. <u>Lactuca serriola</u>	<u>3</u>		<u>FAC</u>															
4. _____																		
5. _____																		
6. _____																		
7. _____																		
8. _____																		
9. _____																		
10. _____																		
11. _____																		
50% of total cover: <u>14</u> 20% of total cover: <u>6</u> Woody Vine Stratum (Plot size: <u>30 ft r</u>)																		
1. _____																		
2. _____																		
3. _____																		
4. _____																		
5. _____																		
_____ = Total Cover 50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.																		

SOIL

Sampling Point: TP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 6	10YR 4/2	98	7.5YR 5/4	2	C	PL / M	Silt Loam	
6 - 12	10YR 5/3	75	10YR 5/6	25	C	M	Silt Loam	
12 - 16	10YR 5/6	60	10YR 5/3	40	D	M	Silty Clay Loam	
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-6
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.154862 Long: -74.945814 Datum: WGS 84
 Soil Map Unit Name: CdB- Chester silt loam, 3 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

Small PEM wetland (WET-A) in low depression that discharges into WUS-8. Sparsely vegetated in the actual wetland, which is fringed by trees and shrubs. Located north of SR 0001, near the southwestern end of the study area.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☒ Surface Water (A1)	_____ True Aquatic Plants (B14)	_____ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	_____ Hydrogen Sulfide Odor (C1)	_____ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Drainage Patterns (B10)	
_____ Water Marks (B1)	_____ Presence of Reduced Iron (C4)	_____ Moss Trim Lines (B16)	
_____ Sediment Deposits (B2)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Dry-Season Water Table (C2)	
_____ Drift Deposits (B3)	_____ Thin Muck Surface (C7)	_____ Crayfish Burrows (C8)	
_____ Algal Mat or Crust (B4)	_____ Other (Explain in Remarks)	_____ Saturation Visible on Aerial Imagery (C9)	
_____ Iron Deposits (B5)		_____ Stunted or Stressed Plants (D1)	
_____ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		_____ Shallow Aquitard (D3)	
_____ Aquatic Fauna (B13)		_____ Microtopographic Relief (D4)	
		_____ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 2
 Water Table Present? Yes ☒ No _____ Depth (inches): 0
 Saturation Present? Yes ☒ No _____ Depth (inches): 0
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.
 Water table and saturation observed at the surface.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-6

Tree Stratum (Plot size: <u>3 x 10 ft</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>5</u></td> <td>x 3 = <u>15</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>5</u> (A)</td> <td><u>15</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.0</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>5</u>	x 3 = <u>15</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>5</u> (A)	<u>15</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>5</u>	x 3 = <u>15</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>5</u> (A)	<u>15</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>3 x 10 ft</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
50% of total cover: _____ 20% of total cover: _____																		
Herb Stratum (Plot size: <u>3 x 10 ft</u>)																		
1. <u>Toxicodendron radicans</u>	<u>3</u>	☒	<u>FAC</u>															
2. <u>Acer rubrum</u>	<u>2</u>	☒	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		
Woody Vine Stratum (Plot size: <u>3 x 10 ft</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met. Wetland is primarily non-vegetated.																		

SOIL

Sampling Point: TP-6

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-7
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 4
 Subregion (LRR or MLRA): S 148 Lat: 40.154801 Long: -74.945838 Datum: WGS 84
 Soil Map Unit Name: CdB- Chester silt loam, 3 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Vegetated hill slope to the southwest of WET-A. Upland plot associated with TP-6/WET-A.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)
		☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County.

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-7

Tree Stratum (Plot size: <u>15 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Acer negundo</u>	<u>10</u>	☒	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>9</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)														
2. <u>Acer platanoides</u>	<u>5</u>	☒	<u>UPL</u>															
3. <u>Liriodendron tulipifera</u>	<u>5</u>	☒	<u>FACU</u>															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
<u>20%</u> = Total Cover 50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>30</u></td> <td>x 3 = <u>90</u></td> </tr> <tr> <td>FACU species <u>125</u></td> <td>x 4 = <u>500</u></td> </tr> <tr> <td>UPL species <u>25</u></td> <td>x 5 = <u>125</u></td> </tr> <tr> <td>Column Totals: <u>180</u> (A)</td> <td><u>715</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>4.0</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>30</u>	x 3 = <u>90</u>	FACU species <u>125</u>	x 4 = <u>500</u>	UPL species <u>25</u>	x 5 = <u>125</u>	Column Totals: <u>180</u> (A)	<u>715</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>30</u>	x 3 = <u>90</u>																	
FACU species <u>125</u>	x 4 = <u>500</u>																	
UPL species <u>25</u>	x 5 = <u>125</u>																	
Column Totals: <u>180</u> (A)	<u>715</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Rubus phoenicolasius</u>	<u>40</u>	☒	<u>FACU</u>															
2. <u>Lonicera maackii</u>	<u>15</u>	☒	<u>UPL</u>															
3. <u>Rosa multiflora</u>	<u>15</u>	☒	<u>FACU</u>															
4. <u>Robinia pseudoacacia</u>	<u>5</u>	_____	<u>FACU</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
<u>75%</u> = Total Cover 50% of total cover: <u>38</u> 20% of total cover: <u>15</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Alliaria petiolata</u>	<u>40</u>	☒	<u>FACU</u>	Hydrophytic Vegetation Indicators: ☐ 1 - Rapid Test for Hydrophytic Vegetation ☐ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Ageratina altissima</u>	<u>10</u>	_____	<u>FACU</u>															
3. <u>Lonicera japonica</u>	<u>10</u>	_____	<u>FACU</u>															
4. <u>Artemisia vulgaris</u>	<u>5</u>	_____	<u>UPL</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
<u>65%</u> = Total Cover 50% of total cover: <u>33</u> 20% of total cover: <u>13</u>																		
Woody Vine Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Vitis vulpina</u>	<u>15</u>	☒	<u>FAC</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
2. <u>Toxicodendron radicans</u>	<u>5</u>	☒	<u>FAC</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
<u>20%</u> = Total Cover 50% of total cover: <u>10</u> 20% of total cover: <u>4</u>																		
Remarks: (Include photo numbers here or on a separate sheet.) No hydrophytic vegetation indicators were met.																		

SOIL

Sampling Point: TP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 3	10YR 3/2	100					Silt Loam	
3 - 8	10YR 4/3	85	10YR 6/6	15	C	M	Silt Loam	
8 - 14	10YR 4/4	70	10YR 6/6	30	C	M	Loam	Potential fill material at base of soil profile.
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147, 148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No ☒

Remarks:

No hydric soil indicators were met.
Potential fill material in base of soil profile.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-8
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.157494 Long: -74.943323 Datum: WGS 84
 Soil Map Unit Name: GrA- Glenville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes _____	No ☒
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes _____	No ☒			

Remarks:

Low-lying floodplain area alongside WUS-6, to the north of SR 0001 and northeast of Fairhill Avenue. The wetland hydrology parameter was not satisfied and no problematic situations were evident; therefore, TP-8 was determined to occur in uplands.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes ☒ No _____ Depth (inches): 14
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-8

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:																
1. <u>Acer platanoides</u>	<u>10</u>	☒	<u>UPL</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A)																
2. <u>Acer negundo</u>	<u>5</u>	☒	<u>FAC</u>	Total Number of Dominant Species Across All Strata: <u>6</u> (B)																
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>83</u> (A/B)																
4. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>60</u></td> <td>x 1 = <u>60</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>75</u></td> <td>x 3 = <u>225</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>25</u></td> <td>x 5 = <u>125</u></td> </tr> <tr> <td>Column Totals: <u>160</u> (A)</td> <td><u>410</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>2.6</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>60</u>	x 1 = <u>60</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>75</u>	x 3 = <u>225</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>25</u>	x 5 = <u>125</u>	Column Totals: <u>160</u> (A)	<u>410</u> (B)	Prevalence Index = B/A = <u>2.6</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>60</u>	x 1 = <u>60</u>																			
FACW species <u>0</u>	x 2 = <u>0</u>																			
FAC species <u>75</u>	x 3 = <u>225</u>																			
FACU species <u>0</u>	x 4 = <u>0</u>																			
UPL species <u>25</u>	x 5 = <u>125</u>																			
Column Totals: <u>160</u> (A)	<u>410</u> (B)																			
Prevalence Index = B/A = <u>2.6</u>																				
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain)																
50% of total cover: <u>8</u> 20% of total cover: <u>3</u> 15% = Total Cover																				
Sapling/Shrub Stratum (Plot size: <u>10 ft r</u>)																				
1. <u>Viburnum recognitum</u>	<u>15</u>	☒	<u>FAC</u>																	
2. <u>Lindera benzoin</u>	<u>5</u>	☒	<u>FAC</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
50% of total cover: <u>10</u> 20% of total cover: <u>4</u> 20% = Total Cover																				
Herb Stratum (Plot size: <u>5 ft r</u>)																				
1. <u>Symplocarpus foetidus</u>	<u>60</u>	☒	<u>OBL</u>																	
2. <u>Ficaria verna</u>	<u>50</u>	☒	<u>FAC</u>																	
3. <u>Pachysandra terminalis</u>	<u>15</u>	_____	<u>UPL</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
50% of total cover: <u>63</u> 20% of total cover: <u>25</u> 125% = Total Cover																				
Woody Vine Stratum (Plot size: <u>10 ft r</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
_____ = Total Cover 50% of total cover: _____ 20% of total cover: _____																				
Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																				
Hydrophytic Vegetation Present? Yes ☒ No _____																				
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.																				

SOIL

Sampling Point: TP-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 5	10YR 2/2	100					Silt Loam	
5 - 7	10YR 3/3	85	7.5YR 4/6	15	C	M	Silt Loam	Small rock fragments
7 - 17	10YR 3/2	85	7.5YR 3/4	15	C	PL / M	Silt Loam	
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-9
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.165916 Long: -74.925861 Datum: WGS 84
 Soil Map Unit Name: UkB- Urban land-Chester complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

PFO wetland (WET-3) in central portion of study area, on north side of SR 0001.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
<u>Primary Indicators (minimum of one is required; check all that apply)</u>			
☒ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☒ Drainage Patterns (B10)	
☒ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☒ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 1-4
 Water Table Present? Yes ☒ No _____ Depth (inches): 1
 Saturation Present? Yes ☒ No _____ Depth (inches): 0
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.

Hydrology supplied by groundwater springs/seeps, seasonally high water table, and surface runoff.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-9

Tree Stratum (Plot size: <u>30 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Acer rubrum</u>	<u>25</u>	☒	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. <u>Liquidambar styraciflua</u>	<u>5</u>		<u>FAC</u>															
3. _____	_____		_____															
4. _____	_____		_____															
5. _____	_____		_____	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>70</u></td> <td>x 1 = <u>70</u></td> </tr> <tr> <td>FACW species <u>10</u></td> <td>x 2 = <u>20</u></td> </tr> <tr> <td>FAC species <u>50</u></td> <td>x 3 = <u>150</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>130</u> (A)</td> <td><u>240</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>1.8</u>	Total % Cover of:	Multiply by:	OBL species <u>70</u>	x 1 = <u>70</u>	FACW species <u>10</u>	x 2 = <u>20</u>	FAC species <u>50</u>	x 3 = <u>150</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>130</u> (A)	<u>240</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>70</u>	x 1 = <u>70</u>																	
FACW species <u>10</u>	x 2 = <u>20</u>																	
FAC species <u>50</u>	x 3 = <u>150</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>130</u> (A)	<u>240</u> (B)																	
6. _____	_____		_____															
7. _____	_____		_____															
_____ = Total Cover 50% of total cover: <u>15</u> 20% of total cover: <u>6</u>																		
Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Lindera benzoin</u>	<u>5</u>	☒	<u>FAC</u>	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
2. _____	_____		_____															
3. _____	_____		_____															
4. _____	_____		_____															
5. _____	_____		_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
6. _____	_____		_____															
7. _____	_____		_____															
8. _____	_____		_____															
9. _____	_____		_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
10. _____	_____		_____															
11. _____	_____		_____															
_____ = Total Cover 50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Symplocarpus foetidus</u>	<u>70</u>	☒	<u>OBL</u>	Hydrophytic Vegetation Present? Yes ☒ No _____														
2. <u>Ficaria verna</u>	<u>10</u>		<u>FAC</u>															
3. <u>Impatiens capensis</u>	<u>10</u>		<u>FACW</u>															
4. <u>Grass sp.</u>	<u>5</u>		_____															
5. _____	_____		_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
6. _____	_____		_____															
7. _____	_____		_____															
8. _____	_____		_____															
9. _____	_____		_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
10. _____	_____		_____															
11. _____	_____		_____															
_____ = Total Cover 50% of total cover: <u>48</u> 20% of total cover: <u>19</u>																		
Woody Vine Stratum (Plot size: <u>30 ft r</u>)																		
1. <u>Vitis vulpina</u>	<u>5</u>	☒	<u>FAC</u>	Hydrophytic Vegetation Present? Yes ☒ No _____														
2. _____	_____		_____															
3. _____	_____		_____															
4. _____	_____		_____															
5. _____	_____		_____	Woody Vine Stratum (Plot size: <u>30 ft r</u>)														
6. _____	_____		_____															
7. _____	_____		_____															
8. _____	_____		_____															
_____ = Total Cover 50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: TP-9

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-10
Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): None Slope (%): < 1
Subregion (LRR or MLRA): S 148 Lat: 40.166052 Long: -74.925625 Datum: WGS 84
Soil Map Unit Name: GrA- Glenville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No _____	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Forested terrace located in central portion of the study area to the north of SR 0001 and between WET-3, WUS-5, and WUS-4. Upland plot associated with TP-9/WET-3.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)
		☐ FAC-Neutral Test (D5)

Field Observations:	
Surface Water Present? Yes _____ No ☒ Depth (inches): _____	
Water Table Present? Yes _____ No ☒ Depth (inches): _____	
Saturation Present? Yes _____ No ☒ Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-10

Tree Stratum (Plot size: <u>30 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Acer rubrum</u>	<u>25</u>	☒	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)														
2. <u>Liriodendron tulipifera</u>	<u>15</u>	☒	<u>FACU</u>															
3. <u>Fagus grandifolia</u>	<u>10</u>	☒	<u>FACU</u>															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
<u>50%</u> = Total Cover 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species <u>35</u></td> <td>x 1 = <u>35</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>55</u></td> <td>x 3 = <u>165</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>130</u> (A)</td> <td><u>360</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.8</u>	Total % Cover of:	Multiply by:	OBL species <u>35</u>	x 1 = <u>35</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>55</u>	x 3 = <u>165</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>130</u> (A)	<u>360</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>35</u>	x 1 = <u>35</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>55</u>	x 3 = <u>165</u>																	
FACU species <u>40</u>	x 4 = <u>160</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>130</u> (A)	<u>360</u> (B)																	
<u>5%</u> = Total Cover 50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		
Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Lindera benzoin</u>	<u>5</u>	☒	<u>FAC</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
<u>5%</u> = Total Cover 50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Symplocarpus foetidus</u>	<u>35</u>	☒	<u>OBL</u>	Hydrophytic Vegetation Indicators: ☐ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Microstegium vimineum</u>	<u>15</u>	☒	<u>FAC</u>															
3. <u>Lindera benzoin</u>	<u>10</u>	_____	<u>FAC</u>															
4. <u>Rosa multiflora</u>	<u>10</u>	_____	<u>FACU</u>															
5. <u>Parthenocissus quinquefolia</u>	<u>5</u>	_____	<u>FACU</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
<u>75%</u> = Total Cover 50% of total cover: <u>38</u> 20% of total cover: <u>15</u>																		
Woody Vine Stratum (Plot size: <u>30 ft r</u>)																		
1. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover 50% of total cover: _____ 20% of total cover: _____																		
Hydrophytic Vegetation Present? Yes ☒ No _____																		

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic vegetation indicator was met.

SOIL

Sampling Point: TP-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 6	10YR 2/2	100					Silt Loam	
6 - 10	10YR 3/3	100					Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock, roots
 Depth (inches): > 10

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil indicators were met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-11
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
 Subregion (LRR or MLRA): S 148 Lat: 40.167359 Long: -74.924086 Datum: WGS 84
 Soil Map Unit Name: UkB- Urban land-Chester complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

PEM wetland (WET-B) located north of SR 0001, and west of West Interchange Road. Emanates from a small culvert/pipe beneath West Interchange Road.
 Open ended wetland between flag WET-B1 to WET-B5.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☒ Surface Water (A1)	_____ True Aquatic Plants (B14)	_____ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	_____ Hydrogen Sulfide Odor (C1)	_____ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	_____ Oxidized Rhizospheres on Living Roots (C3)	_____ Drainage Patterns (B10)	
_____ Water Marks (B1)	_____ Presence of Reduced Iron (C4)	_____ Moss Trim Lines (B16)	
_____ Sediment Deposits (B2)	_____ Recent Iron Reduction in Tilled Soils (C6)	_____ Dry-Season Water Table (C2)	
_____ Drift Deposits (B3)	_____ Thin Muck Surface (C7)	_____ Crayfish Burrows (C8)	
_____ Algal Mat or Crust (B4)	_____ Other (Explain in Remarks)	_____ Saturation Visible on Aerial Imagery (C9)	
_____ Iron Deposits (B5)		_____ Stunted or Stressed Plants (D1)	
_____ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
_____ Water-Stained Leaves (B9)		_____ Shallow Aquitard (D3)	
_____ Aquatic Fauna (B13)		☒ Microtopographic Relief (D4)	
		_____ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 0-1
 Water Table Present? Yes ☒ No _____ Depth (inches): 9
 Saturation Present? Yes ☒ No _____ Depth (inches): 0
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.
 Hydrology supplied by seasonally high water table, storm water and surface runoff.
 Episaturation observed.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-11

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>10</u></td> <td>x 1 = <u>10</u></td> </tr> <tr> <td>FACW species <u>5</u></td> <td>x 2 = <u>10</u></td> </tr> <tr> <td>FAC species <u>70</u></td> <td>x 3 = <u>210</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>85</u> (A)</td> <td><u>230</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.7</u>	Total % Cover of:	Multiply by:	OBL species <u>10</u>	x 1 = <u>10</u>	FACW species <u>5</u>	x 2 = <u>10</u>	FAC species <u>70</u>	x 3 = <u>210</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>85</u> (A)	<u>230</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>10</u>	x 1 = <u>10</u>																	
FACW species <u>5</u>	x 2 = <u>10</u>																	
FAC species <u>70</u>	x 3 = <u>210</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>85</u> (A)	<u>230</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
50% of total cover: _____ 20% of total cover: _____																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Ficaria verna</u>	<u>40</u>	☒	<u>FAC</u>															
2. <u>Microstegium vimineum</u>	<u>30</u>	☒	<u>FAC</u>															
3. <u>Carex lurida</u>	<u>10</u>		<u>OBL</u>															
4. <u>Juncus effusus</u>	<u>5</u>		<u>FACW</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
<u>85%</u> = Total Cover																		
50% of total cover: <u>43</u> 20% of total cover: <u>17</u>																		
Woody Vine Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.)																		
Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of wetland area within study area.																		

SOIL

Sampling Point: TP-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 2	10YR 2/2	100					Mucky Loam/Clay	
2 - 10	10YR 3/2	85	7.5YR 4/6	15	C	M	Silt Loam	
10 - 11	10YR 4/4	85	7.5YR 4/6	15	C	M	Silt Loam	
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-04
Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-12
Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 10
Subregion (LRR or MLRA): S 148 Lat: 40.167402 Long: -74.924085 Datum: WGS 84
Soil Map Unit Name: UkB- Urban land-Chester complex, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No _____	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Hill slope located north and east of WET-B. Upland plot associated with TP-11/WET-B.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		____ Surface Soil Cracks (B6)
____ Surface Water (A1)	____ True Aquatic Plants (B14)	____ Sparsely Vegetated Concave Surface (B8)
____ High Water Table (A2)	____ Hydrogen Sulfide Odor (C1)	____ Drainage Patterns (B10)
____ Saturation (A3)	____ Oxidized Rhizospheres on Living Roots (C3)	____ Moss Trim Lines (B16)
____ Water Marks (B1)	____ Presence of Reduced Iron (C4)	____ Dry-Season Water Table (C2)
____ Sediment Deposits (B2)	____ Recent Iron Reduction in Tilled Soils (C6)	____ Crayfish Burrows (C8)
____ Drift Deposits (B3)	____ Thin Muck Surface (C7)	____ Saturation Visible on Aerial Imagery (C9)
____ Algal Mat or Crust (B4)	____ Other (Explain in Remarks)	____ Stunted or Stressed Plants (D1)
____ Iron Deposits (B5)		____ Geomorphic Position (D2)
____ Inundation Visible on Aerial Imagery (B7)		____ Shallow Aquitard (D3)
____ Water-Stained Leaves (B9)		____ Microtopographic Relief (D4)
____ Aquatic Fauna (B13)		____ FAC-Neutral Test (D5)

Field Observations:	Wetland Hydrology Present? Yes _____ No ☒
Surface Water Present? Yes _____ No ☒ Depth (inches): _____	
Water Table Present? Yes _____ No ☒ Depth (inches): _____	
Saturation Present? Yes _____ No ☒ Depth (inches): _____ (includes capillary fringe)	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-12

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>70</u></td> <td>x 3 = <u>210</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 = <u>80</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>90</u> (A)</td> <td><u>290</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.2</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>70</u>	x 3 = <u>210</u>	FACU species <u>20</u>	x 4 = <u>80</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>90</u> (A)	<u>290</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>70</u>	x 3 = <u>210</u>																	
FACU species <u>20</u>	x 4 = <u>80</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>90</u> (A)	<u>290</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>10 ft r</u>)																		
1. <u>Rubus phoenicolasius</u>	<u>5</u>	☒	<u>FACU</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>3</u> 20% of total cover: <u>1</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Ficaria verna</u>	<u>40</u>	☒	<u>FAC</u>															
2. <u>Microstegium vimineum</u>	<u>30</u>	☒	<u>FAC</u>															
3. <u>Reynoutria japonica</u>	<u>15</u>		<u>FACU</u>															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>43</u> 20% of total cover: <u>17</u>																		
Woody Vine Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met. Plot sizes adjusted due to proximity to wetland and roadway.																		

SOIL

Sampling Point: TP-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 5	10YR 4/4	100					Silt Loam	
5 - 10	10YR 4/4	70	10YR 5/8	30	C	M	Loam	
-								
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rocky substrate
 Depth (inches): 10

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil indicators were met

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-11
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-13
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR or MLRA): S 148 Lat: 40.165522 Long: -74.925217 Datum: WGS 84
 Soil Map Unit Name: GrA- Glenville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Low-lying floodplain along right bank (looking downstream) of WUS-4, on south side of SR 0001.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-13

Tree Stratum (Plot size: <u>15 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Liriodendron tulipifera</u>	<u>40</u>	☒	<u>FACU</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
40% = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>2</u></td> <td>x 1 = <u>2</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>120</u></td> <td>x 3 = <u>360</u></td> </tr> <tr> <td>FACU species <u>73</u></td> <td>x 4 = <u>292</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>195</u> (A)</td> <td><u>654</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.4</u>	Total % Cover of:	Multiply by:	OBL species <u>2</u>	x 1 = <u>2</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>120</u>	x 3 = <u>360</u>	FACU species <u>73</u>	x 4 = <u>292</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>195</u> (A)	<u>654</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>2</u>	x 1 = <u>2</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>120</u>	x 3 = <u>360</u>																	
FACU species <u>73</u>	x 4 = <u>292</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>195</u> (A)	<u>654</u> (B)																	
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>																		
Sapling/Shrub Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Lindera benzoin</u>	<u>30</u>	☒	<u>FAC</u>															
2. <u>Rosa multiflora</u>	<u>20</u>	☒	<u>FACU</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
50% = Total Cover																		
50% of total cover: <u>25</u> 20% of total cover: <u>10</u>																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Ficaria verna</u>	<u>80</u>	☒	<u>FAC</u>															
2. <u>Lindera benzoin</u>	<u>10</u>	_____	<u>FAC</u>															
3. <u>Parthenocissus quinquefolia</u>	<u>3</u>	_____	<u>FACU</u>															
4. <u>Persicaria sp.</u>	<u>3</u>	_____	_____															
5. <u>Symplocarpus foetidus</u>	<u>2</u>	_____	<u>OBL</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
98% = Total Cover																		
50% of total cover: <u>49</u> 20% of total cover: <u>20</u>																		
Woody Vine Stratum (Plot size: <u>15 ft r</u>)																		
1. <u>Celastrus orbiculatus</u>	<u>10</u>	☒	<u>FACU</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
10% = Total Cover																		
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>																		
Remarks: (Include photo numbers here or on a separate sheet.) No hydrophytic vegetation indicators were met.																		

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 ___ 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ☒

SOIL

Sampling Point: TP-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 5	10YR 3/3	100					Silt Loam	
5 - 8	10YR 3/4	100					Loam	Small rock fragments throughout - 10%
-								
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (LRR N)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)
- ☐ Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
- ☐ Coast Prairie Redox (A16) (MLRA 147, 148)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rocky substrate
Depth (inches): 8

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil indicators were met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-11
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-14
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1
 Subregion (LRR or MLRA): S 148 Lat: 40.165314 Long: -74.925849 Datum: WGS 84
 Soil Map Unit Name: GrA- Glenville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland?	Yes ☒	No _____
Hydric Soil Present?	Yes ☒	No _____			
Wetland Hydrology Present?	Yes ☒	No _____			

Remarks:

PSS wetland feature (WET-C) embedded in woodlands to south of SR 0001 and west of WUS-4. The wetland was delineated as open ended, and includes multiple narrow fingers that extend into the vicinity of the study area.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☒ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☒ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☒ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☒ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☒ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)	
☒ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)	
		☒ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes ☒ No _____ Depth (inches): 1-2
 Water Table Present? Yes ☒ No _____ Depth (inches): 0
 Saturation Present? Yes ☒ No _____ Depth (inches): 0
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.
 Hydrology supplied primarily by groundwater seepage.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-14

Tree Stratum (Plot size: <u>10 x 5 ft</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>25</u></td> <td>x 1 = <u>25</u></td> </tr> <tr> <td>FACW species <u>10</u></td> <td>x 2 = <u>20</u></td> </tr> <tr> <td>FAC species <u>50</u></td> <td>x 3 = <u>150</u></td> </tr> <tr> <td>FACU species <u>8</u></td> <td>x 4 = <u>32</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>93</u> (A)</td> <td><u>227</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.4</u>	Total % Cover of:	Multiply by:	OBL species <u>25</u>	x 1 = <u>25</u>	FACW species <u>10</u>	x 2 = <u>20</u>	FAC species <u>50</u>	x 3 = <u>150</u>	FACU species <u>8</u>	x 4 = <u>32</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>93</u> (A)	<u>227</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>25</u>	x 1 = <u>25</u>																	
FACW species <u>10</u>	x 2 = <u>20</u>																	
FAC species <u>50</u>	x 3 = <u>150</u>																	
FACU species <u>8</u>	x 4 = <u>32</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>93</u> (A)	<u>227</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. <u>Lindera benzoin</u>	<u>40</u>	☒	<u>FAC</u>															
2. <u>Rosa multiflora</u>	<u>5</u>		<u>FACU</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>																		
Herb Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. <u>Symplocarpus foetidus</u>	<u>25</u>	☒	<u>OBL</u>															
2. <u>Ficaria verna</u>	<u>10</u>	☒	<u>FAC</u>															
3. <u>Impatiens capensis</u>	<u>10</u>	☒	<u>FACW</u>															
4. <u>Lonicera japonica</u>	<u>3</u>		<u>FACU</u>															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>24</u> 20% of total cover: <u>10</u>																		
Woody Vine Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met. Plot sizes adjusted due to small size of this area of the wetland.																		

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☒ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☒ No _____

SOIL

Sampling Point: TP-14

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-11
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-15
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): Undulating Slope (%): 2
 Subregion (LRR or MLRA): S 148 Lat: 40.165344 Long: -74.925775 Datum: WGS 84
 Soil Map Unit Name: GrA- Glenville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No ☒	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Wooded area upslope from WET-C. Upland plot associated with TP-14/WET-C.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)
		☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-15

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. <u>Liriodendron tulipifera</u>	<u>50</u>	☒	<u>FACU</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)														
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)														
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40</u> (A/B)														
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
<u>50%</u> = Total Cover 50% of total cover: <u>25</u> 20% of total cover: <u>10</u>				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>10</u></td> <td>x 1 = <u>10</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>80</u></td> <td>x 3 = <u>240</u></td> </tr> <tr> <td>FACU species <u>85</u></td> <td>x 4 = <u>340</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>175</u> (A)</td> <td><u>590</u> (B)</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>10</u>	x 1 = <u>10</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>80</u>	x 3 = <u>240</u>	FACU species <u>85</u>	x 4 = <u>340</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>175</u> (A)	<u>590</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>10</u>	x 1 = <u>10</u>																	
FACW species <u>0</u>	x 2 = <u>0</u>																	
FAC species <u>80</u>	x 3 = <u>240</u>																	
FACU species <u>85</u>	x 4 = <u>340</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>175</u> (A)	<u>590</u> (B)																	
<u>30%</u> = Total Cover 50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				Prevalence Index = B/A = <u>3.4</u>														
<u>95%</u> = Total Cover 50% of total cover: <u>48</u> 20% of total cover: <u>19</u>				Hydrophytic Vegetation Indicators: ☐ 1 - Rapid Test for Hydrophytic Vegetation ☐ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain)														
<u>10%</u> = Total Cover 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
<u>10%</u> = Total Cover 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
<u>10%</u> = Total Cover 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				Hydrophytic Vegetation Present? Yes _____ No ☒														

Remarks: (Include photo numbers here or on a separate sheet.)

No hydrophytic vegetation indicators were met.
Plot sizes reduced due to proximity of roadway and wetland.

SOIL

Sampling Point: TP-15

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-19
Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-16
Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 1
Subregion (LRR or MLRA): S 148 Lat: 40.169209 Long: -74.913416 Datum: WGS 84
Soil Map Unit Name: LkA- Lawrenceville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No _____	Is the Sampled Area within a Wetland? Yes ☒ No _____
Hydric Soil Present?	Yes ☒	No _____	
Wetland Hydrology Present?	Yes ☒	No _____	

Remarks:

PEM wetland depression (WET-D) on east side of Rte 413 and south of SR 0001.

HYDROLOGY

Wetland Hydrology Indicators:		<u>Secondary Indicators (minimum of two required)</u>
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)
☐ Saturation (A3)	☒ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)
☐ Inundation Visible on Aerial Imagery (B7)		☒ Geomorphic Position (D2)
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)
		☒ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
Water Table Present? Yes _____ No ☒ Depth (inches): _____
Saturation Present? Yes _____ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

Multiple wetland hydrology indicators were met.
Wetland overall was dry during survey.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-16

Tree Stratum (Plot size: <u>10 ft r</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
_____ = Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>5</u></td> <td>x 1 = <u>5</u></td> </tr> <tr> <td>FACW species <u>95</u></td> <td>x 2 = <u>190</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>0</u></td> <td>x 4 = <u>0</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>195</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.0</u>	Total % Cover of:	Multiply by:	OBL species <u>5</u>	x 1 = <u>5</u>	FACW species <u>95</u>	x 2 = <u>190</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>0</u>	x 4 = <u>0</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>100</u> (A)	<u>195</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>5</u>	x 1 = <u>5</u>																	
FACW species <u>95</u>	x 2 = <u>190</u>																	
FAC species <u>0</u>	x 3 = <u>0</u>																	
FACU species <u>0</u>	x 4 = <u>0</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>100</u> (A)	<u>195</u> (B)																	
50% of total cover: _____ 20% of total cover: _____																		
Sapling/Shrub Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
_____ = Total Cover				Hydrophytic Vegetation Indicators: ☒ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☒ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)														
50% of total cover: _____ 20% of total cover: _____																		
Herb Stratum (Plot size: <u>5 ft r</u>)																		
1. <u>Phragmites australis</u>	<u>95</u>	☒	<u>FACW</u>															
2. <u>Typha latifolia</u>	<u>5</u>		<u>OBL</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
50% of total cover: <u>50</u> 20% of total cover: <u>20</u>																		
Woody Vine Stratum (Plot size: <u>10 ft r</u>)																		
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: _____ 20% of total cover: _____																		
Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation indicator was met.																		

SOIL

Sampling Point: TP-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 2	10YR 4/2	100					Silt Loam	Some root matter
2 - 7	10YR 4/3	85	10YR 4/6	15	C	PL / M	Clay Loam	
7 - 14	10YR 2/2	90	7.5YR 4/6	10	C	PL / M	Silty Clay Loam	
-								
-								
-								
-								
-								
-								
-								

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (**LRR N**)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (**MLRA 147, 148**)
☐ Thin Dark Surface (S9) (**MLRA 147, 148**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☒ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☐ Iron-Manganese Masses (F12) (**LRR N, MLRA 136**)
☐ Umbric Surface (F13) (**MLRA 136, 122**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 148**)
☐ Red Parent Material (F21) (**MLRA 127, 147**)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (**MLRA 147**)
☐ Coast Prairie Redox (A16) (**MLRA 147, 148**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 136, 147**)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil indicator was met.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: SR 0001 Section RC3 Improvement Project City/County: Langhorne/Bucks Co. Sampling Date: 2021-05-19
 Applicant/Owner: PennDOT State: Pennsylvania Sampling Point: TP-17
 Investigator(s): Craig Nein, Ginny Boone Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): None Slope (%): 1
 Subregion (LRR or MLRA): S 148 Lat: 40.169430 Long: -74.913480 Datum: WGS 84
 Soil Map Unit Name: LkA- Lawrenceville silt loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No _____	Is the Sampled Area within a Wetland? Yes _____ No ☒
Hydric Soil Present? Yes _____ No ☒	
Wetland Hydrology Present? Yes _____ No ☒	

Remarks:

Vegetated area adjacent to WET-D and maintained lawn. Upland plot associated with TP-16/WET-D.

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ True Aquatic Plants (B14)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Hydrogen Sulfide Odor (C1)	☐ Sparsely Vegetated Concave Surface (B8)	
☐ Saturation (A3)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Drainage Patterns (B10)	
☐ Water Marks (B1)	☐ Presence of Reduced Iron (C4)	☐ Moss Trim Lines (B16)	
☐ Sediment Deposits (B2)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Dry-Season Water Table (C2)	
☐ Drift Deposits (B3)	☐ Thin Muck Surface (C7)	☐ Crayfish Burrows (C8)	
☐ Algal Mat or Crust (B4)	☐ Other (Explain in Remarks)	☐ Saturation Visible on Aerial Imagery (C9)	
☐ Iron Deposits (B5)		☐ Stunted or Stressed Plants (D1)	
☐ Inundation Visible on Aerial Imagery (B7)		☐ Geomorphic Position (D2)	
☐ Water-Stained Leaves (B9)		☐ Shallow Aquitard (D3)	
☐ Aquatic Fauna (B13)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	

Field Observations:

Surface Water Present? Yes _____ No ☒ Depth (inches): _____
 Water Table Present? Yes _____ No ☒ Depth (inches): _____
 Saturation Present? Yes _____ No ☒ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Google Earth 2021, Web Soil Survey of Bucks County

Remarks:

No wetland hydrology indicators were met.

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: TP-17

Tree Stratum (Plot size: <u>10 x 5 ft</u>)	Absolute % Cover	Dominant Species?	Indicator Status															
1. <u>Liquidambar styraciflua</u>	<u>5</u>	☒	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
50% of total cover: <u>3</u>		20% of total cover: <u>1</u>		Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>3</u></td> <td>x 2 = <u>6</u></td> </tr> <tr> <td>FAC species <u>50</u></td> <td>x 3 = <u>150</u></td> </tr> <tr> <td>FACU species <u>20</u></td> <td>x 4 = <u>80</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>73</u> (A)</td> <td><u>236</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>3.2</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>3</u>	x 2 = <u>6</u>	FAC species <u>50</u>	x 3 = <u>150</u>	FACU species <u>20</u>	x 4 = <u>80</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>73</u> (A)	<u>236</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>3</u>	x 2 = <u>6</u>																	
FAC species <u>50</u>	x 3 = <u>150</u>																	
FACU species <u>20</u>	x 4 = <u>80</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>73</u> (A)	<u>236</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. <u>Rosa multiflora</u>	<u>10</u>	☒	<u>FACU</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
50% of total cover: <u>5</u>		20% of total cover: <u>2</u>																
Herb Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. <u>Vitis vulpina</u>	<u>25</u>	☒	<u>FAC</u>	Hydrophytic Vegetation Indicators: ☐ 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% ☐ 3 - Prevalence Index is ≤3.0 ¹ ☐ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ☐ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Juncus tenuis</u>	<u>10</u>	☒	<u>FAC</u>															
3. <u>Solidago altissima</u>	<u>10</u>	☒	<u>FACU</u>															
4. <u>Toxicodendron radicans</u>	<u>10</u>	☒	<u>FAC</u>															
5. <u>Juncus effusus</u>	<u>3</u>	_____	<u>FACW</u>															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
50% of total cover: <u>29</u>		20% of total cover: <u>12</u>																
Woody Vine Stratum (Plot size: <u>10 x 5 ft</u>)																		
1. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
50% of total cover: _____		20% of total cover: _____																
Remarks: (Include photo numbers here or on a separate sheet.)																		
Hydrophytic vegetation indicator was met. Plot sizes reduced due to proximity of wetland and maintained lawn.																		

SOIL

Sampling Point: TP-17

[illegible]



Appendix D

Site Photographs



Photo 1: Looking southeast (downstream) along WUS-9 to the north of SR 0001, near the northeastern end of the study area. Photo taken April 19, 2021.



Photo 2: Looking east (downstream) along WUS-9 towards the headwall of the culvert crossing beneath SR 0001, in the northeastern portion of the study area. Photo taken April 19, 2021.



Photo 3: Looking southwest along SR 0001 southbound towards the Corn Crib Lane overpass, in the northeastern portion of the study area. Photo taken April 19, 2021.



Photo 4: Looking northeast towards maintained lawn and utility ROW located north of SR 0001, in the northeastern portion of the study area. Photo taken April 19, 2021.



Photo 5: Looking northwest towards Wetland E (WET-E), located north of SR 0001 and east of SR 0413, in the northeastern portion of the study area.
Photo taken April 19, 2021.



Photo 6: Looking south towards the TP-2 upland sample plot located to the south of Wetland E (WET-E), in the northeastern portion of the study area. Photo taken April 19, 2021.



Photo 7: Looking southeast along SR 0413 (S. Pine Street) from north of SR 0001.
Photo taken April 19, 2021.



Photo 8: Looking southwest along the toe of slope on the north side of the West Gillam Avenue roadway embankment, to the west of SR 0413 (S. Pine Street). Photo taken April 19, 2021.



Photo 9: Looking northwest (upstream) along WUS-3, to the north of SR 0001 and east of South Bellevue Avenue. Photo taken April 19, 2021.



Photo 10: Looking southeast (downstream) along WUS-3 towards the pipe headwall on the northern side of SR 0001. Photo taken April 19, 2021.



Photo 11: Looking southwest towards the TP-3 sample plot within Wetland 1 (WET-1), to the north of SR 0001 and east of South Bellevue Avenue. Photo taken April 19, 2021.



Photo 12: Looking east towards the eastern side of Wetland 1 (WET-1), to the north of SR 0001 and east of South Bellevue Avenue. Photo taken April 19, 2021.



Photo 13: Looking southwest towards the TP-4 sample plot within Wetland 2 (WET-2), to the north of SR 0001 and west of SR 0413 (S. Pine Street). Photo taken April 19, 2021.



Photo 14: Looking east towards Wetland 2 (WET-2), to the north of SR 0001 and west of SR 0413 (S. Pine Street). Photo taken April 19, 2021.



Photo 15: Looking northwest towards the TP-5 upland sample plot, located to the north of Wetland 2 (WET-2). Photo taken April 19, 2021.



Photo 16: Looking northeast along the northern side of SR 0001, in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 17: Looking northeast towards SR 2045 (Old Lincoln Highway), in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 18: Looking south (downstream) along WUS-8, north of SR 0001 and south of SR 2045 (Old Lincoln Highway) in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 19: Looking northwest towards the TP-6 sample plot within Wetland A (WET-A), located to the west of WUS-8 in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 20: Looking west towards the TP-7 upland sample plot, located west of Wetland A (WET-A) in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 21: Looking southeast along a township road between SR 0001 and SR 2045 (Old Lincoln Highway), in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 22: Looking southeast beneath the bridge carrying SR 0001 over SR 2008 (Highland Avenue), in the southwestern portion of the study area. Photo taken May 4, 2021.



Photo 23: Looking south (upstream) along WUS-7, located north of SR 0001 and east of SR 2008 (Highland Avenue). Photo taken May 4, 2021.



Photo 24: Looking northeast (downstream) along WUS-7 towards its confluence with WUS-6, to the north of SR 0001 and east of SR 2008 (Highland Avenue). Photo taken May 4, 2021.



Photo 25: Looking northwest (upstream) along WUS-6, towards the culvert crossing beneath SR 2045 (Old Lincoln Highway). Photo taken May 4, 2021.



Photo 26: Looking west (upstream) along WUS-6, from just upstream of the SR 0001 culvert crossing. Photo taken May 4, 2021.



Photo 27: Looking northeast towards the TP-8 upland sample plot located adjacent to WUS-6. Photo taken May 4, 2021.



Photo 28: Looking northeast along SR 2045 (Old Lincoln Highway), to the east of Fairhill Avenue. Photo taken May 4, 2021.



Photo 29: Looking southeast within woodlands located between SR 0001 and SR 2045 (Old Lincoln Highway), to the southwest of Orchard Avenue. Photo taken May 4, 2021.



Photo 30: Looking southwest along the northern side of SR 0001, in front of the Our Lady of Grace Cemetery. Photo taken May 4, 2021.



Photo 31: Looking northeast along the northern side of SR 0001, towards its intersection with T-336 (Parkvale Avenue). Photo taken May 4, 2021.



Photo 32: Looking southwest (downstream) along WUS-4 in woodlands located north of SR 0001 in the central portion of the study area. Photo taken May 4, 2021.



Photo 33: Looking south (downstream) along WUS-4 in woodlands located north of SR 0001 in the central portion of the study area. Photo taken May 4, 2021.



Photo 34: Looking southwest (upstream) along WUS-5, located west of WUS-4 in the central portion of the study area. Photo taken May 4, 2021.



Photo 35: Looking west (upstream) along WUS-5 towards the point where it emanates from Wetland 3 (WET-3). Photo taken May 4, 2021.



Photo 36: Looking southeast (downstream) along WUS-10 towards its confluence with WUS-4. Photo taken May 4, 2021.



Photo 37: Looking northwest towards the TP-9 sample plot located within Wetland 3 (WET-3). Photo taken May 4, 2021.



Photo 38: Looking southwest towards the western side of Wetland 3 (WET-3). Photo taken May 4, 2021.



Photo 39: Looking northeast along the northern side of SR 0001, to the west of West Interchange Road. Photo taken May 4, 2021.



Photo 40: Looking east towards Wetland B (WET-B), which is located north of SR 0001 on the west side of the West Interchange Road roadway embankment. Photo taken May 4, 2021.



Photo 41: Looking southwest towards the TP-11 sample plot within Wetland B (WET-B). Photo taken May 4, 2021.



Photo 42: Looking east towards the TP-12 upland sample plot, located just north of Wetland B (WET-B). Photo taken May 4, 2021.



Photo 43: Looking west (downstream) along WUS-11, located at the northern end of West Interchange Road. Photo taken May 4, 2021.



Photo 44: Looking southeast along West Interchange Road from its intersection with West Gillam Avenue. Photo taken May 4, 2021.



Photo 45: Looking north along grass drainage located just north of SR 0001 and east of West Interchange Road. Photo taken May 4, 2021.



Photo 46: Looking north along SR 2047 (Hulmeville Avenue), to the north of SR 0001. Photo taken May 4, 2021.



Photo 47: Looking southwest towards the roadway ROW on the northern side of SR 0001, to the east of Hill Avenue. Photo taken May 4, 2021.



Photo 48: Looking northeast towards the roadway ROW on the southern side of SR 0001, in the southwestern portion of the study area. Photo taken May 11, 2021.



Photo 49: Looking northeast towards the roadway ROW and access drive on the southern side of SR 0001, in the southwestern portion of the study area. Photo taken May 11, 2021.



Photo 50: Looking north along an upland drainage located south of SR 0001, between SR 2008 (Highland Avenue) and Park Avenue. Photo taken May 11, 2021.



Photo 51: Looking east along an upland drainage located south of SR 0001, between SR 2008 (Highland Avenue) and Park Avenue. Photo taken May 11, 2021.



Photo 52: Looking northeast towards a constructed stormwater inlet located between SR 2008 (Highland Avenue) and Park Avenue, to the south of SR 0001. Photo taken May 11, 2021.



Photo 53: Looking northeast (upstream) along WUS-6, towards the outfall located south of SR 2008 (Highland Avenue). Photo taken May 11, 2021.



Photo 54: Looking southwest along SR 2008 (Highland Avenue) towards its intersection with Park Avenue. Photo taken May 11, 2021.



Photo 55: Looking northeast along the southern side of SR 0001, towards its intersection with T-824 (Timber Lane). Photo taken May 11, 2021.



Photo 56: Looking northeast along the southern side of SR 0001, towards its intersection with T-336 (Parkvale Avenue). Photo taken May 11, 2021.



Photo 57: Looking southeast along SR 227 (Hulmeville Road), from its intersection with the southern side of SR 0001. Photo taken May 11, 2021.



Photo 58: Looking north (upstream) along WUS-4, towards the culvert crossing beneath SR 0001. Photo taken May 11, 2021.



Photo 59: Looking southwest towards the TP-13 upland sample plot located in the floodplain of WUS-4, to the south of SR 0001. Photo taken May 11, 2021.



Photo 60: Looking southwest towards the TP-14 sample plot in Wetland C (WET-C), located south of SR 0001 in the central portion of the study area. Photo taken May 11, 2021.



Photo 61: Looking northeast towards the TP-15 upland sample plot, located north of Wetland C (WET-C) and south of SR 0001. Photo taken May 11, 2021.



Photo 62: Looking northeast along the SR 0001 northbound frontage road, beneath the bridge carrying West Interchange Road over SR 0001. Photo taken May 11, 2021.



Photo 63: Looking northeast (upstream) along WUS-14, towards the culvert crossing beneath West Interchange Road. Photo taken May 11, 2021.



Photo 64: Looking southwest (downstream) along WUS-14, towards the culvert crossing beneath West Interchange Road. Photo taken May 11, 2021.



Photo 65: Looking north (upstream) along WUS-14, towards the culvert crossing beneath SR 0001. Photo taken May 11, 2021.



Photo 66: Looking southwest along the roadway ROW on the southern side of SR 0001, between SR 2047 (Hulmeville Avenue) and Hill Avenue. Photo taken May 11, 2021.



Photo 67: Looking northeast (downstream) along WUS-1, located along the southern side of SR 0001 and to the west of SR 0413 (Pine Street). Photo taken May 11, 2021.



Photo 68: Looking southwest (upstream) along WUS-1, towards its confluence with WUS-2. Photo taken May 11, 2021.



Photo 69: Looking northwest (upstream) along WUS-2, to the south of SR 0001 and west of SR 0413 (Pine Street). Photo taken May 11, 2021.



Photo 70: Looking northwest (upstream) along the southern end of WUS-2, to the south of SR 0001 and west of SR 0413 (Pine Street). Photo taken May 11, 2021.



Photo 71: Looking northwest along SR 2049 (Bellevue Avenue) from its intersection with SR 0413 (Pine Street). Photo taken May 11, 2021.



Photo 72: Looking west towards the TP-16 sample plot within Wetland D (WET-D), located east of SR 0413 (Pine Street) and south of Woods Drive. Photo taken May 19, 2021.



Photo 73: Looking northwest towards the TP-17 upland sample plot, located east of Wetland D (WET-D). Photo taken May 19, 2021.



Photo 74: Looking northwest towards the portion of WUS-2 located east of SR 0413 (Pine Street) and south of Woods Drive. Photo taken May 19, 2021.



Photo 75: Looking northwest towards maintained area located east of SR 0413 (Pine Street) and north of Woods Drive. Photo taken May 19, 2021.



Photo 76: Looking southwest along the roadway ROW fence located south of SR 0001 and east of SR 0413 (Pine Street). Photo taken May 19, 2021.



Photo 77: Looking northwest (upstream) along WUS-9 towards the culvert crossing beneath SR 0001. Photo taken May 19, 2021.



Photo 78: Looking north (upstream) along WUS-15, on the southern side of SR 0001 and near the northeastern end of the study area. Photo taken May 19, 2021.



Photo 79: Looking southeast (downstream) along WUS-15, on the southern side of SR 0001 and near the northeastern end of the study area. Photo taken May 19, 2021.



Photo 80: Looking southeast (downstream) along WUS-6, to the south of SR 2008 (Highland Avenue). Photo taken January 11, 2022.



Photo 81: Looking northeast (downstream) along WUS-2, located east of SR 0413 (Pine Street) and south of Woods Drive. Photo taken January 11, 2022.



Photo 82: Looking northwest (upstream) along WUS-2, towards a stormwater pipe outfall that drains into the watercourse. Photo taken January 11, 2022.



Photo 83: Looking northwest (upstream) along WUS-9, to the north of SR 0001.
Photo taken January 11, 2022.



Photo 84: Looking southwest (downstream) along WUS-16, an ephemeral channel that drains into WUS-9 on the north side of SR 0001. Photo taken January 11, 2022.



Photo 85: Facing west (downstream) along WUS-11 toward its confluence with WUS-17 in the central portion of the study area. Photo taken November 26, 2024.



Photo 86: Facing northeast (upstream) along WUS-17 in the central portion of the study area. Photo taken November 26, 2024.



Photo 87: Facing southeast (downstream) along WUS-18 in the central portion of the study area. Photo taken November 26, 2024.



Photo 88: Facing south (downstream) along WUS-19 in the central portion of the study area. Photo taken November 26, 2024.



Photo 89: Facing northeast (upstream) along WUS-19 in the central portion of the study area. Photo taken November 26, 2024.



Photo 90: Facing northwest (upstream) along WUS-4 toward the culvert under West Highland Avenue in the central portion of the study area. Photo taken November 26, 2024.



Photo 91: Facing west (downstream) along WUS-14 in the central portion of the study area. Photo taken November 26, 2024.



Photo 92: Facing northeast (upstream) along WUS-21 in the central portion of the study area. Photo taken November 26, 2024.



Appendix E

Wetland Functional Assessment Data Forms and Key

Wetland Function-Value Evaluation Form

Total area of wetland 0.129 ac Human made? Altered Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 20 feet

Dominant wetland systems present PSS Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 1 (WET-1)

Latitude 40.17024° N Longitude -74.91707° W

Prepared by: CPN Date 08/10/21

Wetland Impact:
Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	☐ ☒			
 Floodflow Alteration	☒ ☐	3,4,5,6,8,9,10,18		Wetland may retain floodwaters during high flows in WUS-3
 Fish and Shellfish Habitat	☐ ☒			
 Sediment/Toxicant Retention	☒ ☐	1,2,4	☒	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	☒ ☐	3,4,7,8,9,10	☒	Dense vegetation filters nutrients from upslope runoff
 Production Export	☐ ☒			
 Sediment/Shoreline Stabilization	☐ ☒			
 Wildlife Habitat	☒ ☐	13,15		Minor wildlife habitat value exhibited in this wetland
 Recreation	☐ ☒			
 Educational/Scientific Value	☐ ☒			
 Uniqueness/Heritage	☐ ☒			
 Visual Quality/Aesthetics	☐ ☒			
ES Endangered Species Habitat	☐ ☒			
Other	☐ ☒			

Notes: Small PSS wetland (open-ended)

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.302 ac Human made? Altered Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 15 feet

Dominant wetland systems present PFO/PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 2 (WET-2)

Latitude 40.17097° N Longitude -74.91566° W

Prepared by: CPN Date 08/10/21

Wetland Impact:
Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X		
 Floodflow Alteration	X	3,4,5,6,7,8,9,10,15,18	X	Wetland may retain excessive runoff and/or rainwater
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1,2,4,5,9	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X	3,4,5,7,8,9,10,11	X	Dense vegetation filters nutrients from upslope runoff
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	13,15,18		Moderate wildlife habitat value exhibited due to potential for seasonally ponded water
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Small PFO/PEM wetland that exhibits ability to retain ponded water

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.188 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 20 feet

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Lower

How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 3 (WET-3)

Latitude 40.16602° N Longitude -74.92581° W

Prepared by: CPN Date 08/10/21

Wetland Impact:
Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	13,15		Multiple groundwater seep discharges evident in this wetland
 Floodflow Alteration	X	3,4,5,6,7,8,9,10,13,18	X	Wetland may retain floodwaters from adjacent streams and/or heavy rainfall
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1,2,4,9,10,14,16	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X	3,4,7,8,9,10,11,12,13		Dense vegetation filters nutrients from upslope runoff
 Production Export	X	2,4,5,7,8,10		Wetland provides wildlife food production, and nutrient export into streams is evident
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	6,8,11,13,15,18	X	Wetland provides potential habitat for variety of wildlife
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Large open-ended PFO wetland

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.005 ac Human made? Altered Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 45 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Lower

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland A (WET-A)

Latitude 40.15485° N Longitude -74.94580° W

Prepared by: CPN Date 08/10/21

Wetland Impact:

Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X		
 Floodflow Alteration	X	3,4,5,8,9,10,13		Wetland may retain floodwaters during high flows in WUS-8
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1,2,4,10	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X	3,4,7,13		Minor nutrient filtration occurs in this wetland (sparse vegetation)
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	13,15		Minor wildlife habitat value exhibited in this wetland
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: Very Small PEM wetland embedded in woodlands; discharges to WUS-8

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.007 ac Human made? Altered Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 30 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland B (WET-B)

Latitude 40.16736° N Longitude -74.92406° W

Prepared by: CPN Date 08/10/21

Wetland Impact:

Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration		X			
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1,2,4,5	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X		3,4,7,8,9,10		Dense vegetation filters nutrients from upslope runoff
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		13		Minor wildlife habitat value exhibited in this wetland
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: Small PEM wetland (open-ended) that is fed by stormwater runoff beneath West Interchange Road.

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.027 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands Distance to nearest roadway or other development 20 feet

Dominant wetland systems present PSS Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland C (WET-C)

Latitude 40.16533° N Longitude -74.92574° W

Prepared by: CPN Date 08/10/21

Wetland Impact:

Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	13,15		Multiple groundwater seep discharges evident in this wetland
 Floodflow Alteration	X	4,5,6,8,9		Wetland may retain surface runoff and/or rainfall
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1,2,4,9	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X	3,4,7,8,9,10		Dense vegetation filters nutrients from upslope runoff
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	13,15		Moderate wildlife habitat value exhibited in this wetland
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: PSS wetland (open-ended) fed by groundwater discharge

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.133 ac Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential/commercial, woodlands Distance to nearest roadway or other development 15 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland D (WET-D)

Latitude 40.16920° N Longitude -74.91352° W

Prepared by: CPN Date 08/10/21

Wetland Impact:

Type Potential fill Area unknown

Evaluation based on:

Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X		
 Floodflow Alteration	X	3,4,5,6,8,9,18		Wetland may retain surface/roadway runoff and/or rainfall
 Fish and Shellfish Habitat		X		
 Sediment/Toxicant Retention	X	1,2,4	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X	3,4,7,8,9,10		Dense vegetation filters nutrients from upslope runoff
 Production Export		X		
 Sediment/Shoreline Stabilization		X		
 Wildlife Habitat	X	13,15		Minor wildlife habitat value exhibited in this wetland
 Recreation		X		
 Educational/Scientific Value		X		
 Uniqueness/Heritage		X		
 Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other		X		

Notes: PEM wetland located between roadway embankment and maintained (mowed) lawn

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.004 ac Human made? Altered Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Roadways, residential, woodlands, mowed lawn Distance to nearest roadway or other development 75 feet

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? Yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland E (WET-E)

Latitude 40.17183° N Longitude -74.91480° W

Prepared by: CPN Date 08/10/21

Wetland Impact:

Type Potential fill Area unknown

Evaluation based on:

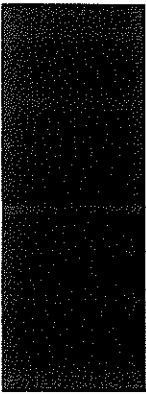
Office N/A Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge		X			
 Floodflow Alteration		X			
 Fish and Shellfish Habitat		X			
 Sediment/Toxicant Retention	X		1,2,4	X	Wetland helps trap/filter sediment and pollutants from roadway/surface runoff
 Nutrient Removal	X		3,4,7,8,9,10		Dense vegetation filters nutrients from upslope runoff
 Production Export		X			
 Sediment/Shoreline Stabilization		X			
 Wildlife Habitat	X		13		Minor wildlife habitat value exhibited in this wetland
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
ES Endangered Species Habitat		X			
Other		X			

Notes: Very small PEM wetland between roadway embankment and maintained (mowed) area

* Refer to backup list of numbered considerations.



Appendix A

Wetland evaluation supporting documentation; Reproducible forms.

Below is an example list of considerations that was used for a New Hampshire highway project. Considerations are flexible, based on best professional judgment and interdisciplinary team consensus. This example provides a comprehensive base, however, and may only need slight modifications for use in other projects.



GROUNDWATER RECHARGE/DISCHARGE— This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

CONSIDERATIONS/QUALIFIERS

1. Public or private wells occur downstream of the wetland.
2. Potential exists for public or private wells downstream of the wetland.
3. Wetland is underlain by stratified drift.
4. Gravel or sandy soils present in or adjacent to the wetland.
5. Fragipan does not occur in the wetland.
6. Fragipan, impervious soils, or bedrock does occur in the wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge are present or piezometer data demonstrates recharge.
9. Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet.
10. Wetland contains only an outlet, no inlet.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with the wetland is high.
13. Signs of groundwater discharge are present (e.g., springs).
14. Water temperature suggests it is a discharge site.
15. Wetland shows signs of variable water levels.
16. Piezometer data demonstrates discharge.
17. Other



FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

CONSIDERATIONS/QUALIFIERS

1. Area of this wetland is large relative to its watershed.
2. Wetland occurs in the upper portions of its watershed.
3. Effective flood storage is small or non-existent upslope of or above the wetland.
4. Wetland watershed contains a high percent of impervious surfaces.
5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in a relatively flat area that has flood storage potential.
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
8. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
11. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.
12. The watershed has a history of economic loss due to flooding.
13. This wetland is associated with one or more watercourses.
14. This wetland watercourse is sinuous or diffuse.
15. This wetland outlet is constricted.
16. Channel flow velocity is affected by this wetland.
17. Land uses downstream are protected by this wetland.
18. This wetland contains a high density of vegetation.
19. Other

FISH AND SHELLFISH HABITAT (FRESHWATER) — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.



CONSIDERATIONS/QUALIFIERS

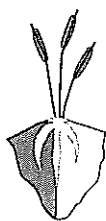
1. Forest land dominant in the watershed above this wetland.
 2. Abundance of cover objects present.
- STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE
3. Size of this wetland is able to support large fish/shellfish populations.
 4. Wetland is part of a larger, contiguous watercourse.
 5. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retain some open water during winter.
 6. Stream width (bank to bank) is more than 50 feet.
 7. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations.
 8. Streamside vegetation provides shade for the watercourse.
 9. Spawning areas are present (submerged vegetation or gravel beds).
 10. Food is available to fish/shellfish populations within this wetland.
 11. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland.
 12. Evidence of fish is present.
 13. Wetland is stocked with fish.
 14. The watercourse is persistent.
 15. Man-made streams are absent.
 16. Water velocities are not too excessive for fish usage.
 17. Defined stream channel is present.
 18. Other

Although the above example refers to freshwater wetlands, it can also be adapted for marine ecosystems. The following is an example provided by the National Marine Fisheries Service (NMFS) of an adaptation for the fish and shellfish function.

FISH AND SHELLFISH HABITAT (MARINE) — This function considers the effectiveness of wetlands, embayments, tidal flats, vegetated shallows, and other environments in supporting marine resources such as fish, shellfish, marine mammals, and sea turtles.

CONSIDERATIONS/QUALIFIERS

1. Special aquatic sites (tidal marsh, mud flats, eelgrass beds) are present.
2. Suitable spawning habitat is present at the site or in the area.
3. Commercially or recreationally important species are present or suitable habitat exists.
4. The wetland/waterway supports prey for higher trophic level marine organisms.
5. The waterway provides migratory habitat for anadromous fish.
6. Essential fish habitat, as defined by the 1996 amendments to the Magnuson-Stevens Fishery & Conservation Act, is present (consultation with NMFS may be necessary).
7. Other



SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS

1. Potential sources of excess sediment are in the watershed above the wetland.
2. Potential or known sources of toxicants are in the watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.
4. Fine grained mineral or organic soils are present.
5. Long duration water retention time is present in this wetland.
6. Public or private water sources occur downstream.
7. The wetland edge is broad and intermittently aerobic.
8. The wetland is known to have existed for more than 50 years.
9. Drainage ditches have not been constructed in the wetland.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

10. Wetland is associated with an intermittent or perennial stream or a lake.
11. Channelized flows have visible velocity decreases in the wetland.
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.
13. No indicators of erosive forces are present. No high water velocities are present.
14. Diffuse water flows are present in the wetland.
15. Wetland has a high degree of water and vegetation interspersion.
16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present.
17. Other



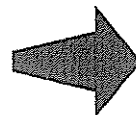
NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

CONSIDERATIONS/QUALIFIERS

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.

4. Potential sources of excess nutrients are present in the watershed above the wetland.
 5. Wetland saturated for most of the season. Ponded water is present in the wetland.
 6. Deep organic/sediment deposits are present.
 7. Slowly drained fine grained mineral or organic soils are present.
 8. Dense vegetation is present.
 9. Emergent vegetation and/or dense woody stems are dominant.
 10. Opportunity for nutrient attenuation exists.
 11. Vegetation diversity/abundance sufficient to utilize nutrients.
- STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.
12. Waterflow through this wetland is diffuse.
 13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.
 14. Water moves slowly through this wetland.
 15. Other

PRODUCTION EXPORT (Nutrient) — This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.



CONSIDERATIONS/QUALIFIERS

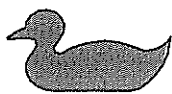
1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland.
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within this wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic vegetative diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. "Flushing" of relatively large amounts of organic plant material occurs from this wetland.
12. Wetland contains flowering plants that are used by nectar-gathering insects.
13. Indications of export are present.
14. High production levels occurring, however, no visible signs of export (assumes export is attenuated).
15. Other

SEDIMENT/ShORELINE STABILIZATION — This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.



CONSIDERATIONS/QUALIFIERS

1. Indications of erosion or siltation are present.
2. Topographical gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. Potential sediment sources are present upstream.
5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.
7. Wide wetland (>10') borders watercourse, lake, or pond.
8. High flow velocities in the wetland.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch is present.
11. Boating activity is present.
12. Dense vegetation is bordering watercourse, lake, or pond.
13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.
14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.
16. Other



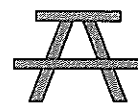
WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.¹

CONSIDERATIONS/QUALIFIERS

1. Wetland is not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.
3. Wetland is not fragmented by development.
4. Upland surrounding this wetland is undeveloped.
5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland is contiguous with other wetland systems connected by a watercourse or lake.
7. Wildlife overland access to other wetlands is present.
8. Wildlife food sources are within this wetland or are nearby.
9. Wetland exhibits a high degree of interspersed vegetation classes and/or open water.
10. Two or more islands or inclusions of upland within the wetland are present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present.
13. Density of the wetland vegetation is high.
14. Wetland exhibits a high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses)
16. Plant/animal indicator species are present. (List species for project)
17. Animal signs observed (tracks, scats, nesting areas, etc.)
18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian populations.
21. Wetland has a high avian utilization or its potential.
22. Indications of less disturbance-tolerant species are present.
23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).
24. Other

¹In March 1995, a rapid wildlife habitat assessment method was completed by a University of Massachusetts research team with funding and oversight provided by the New England Transportation Consortium. The method is called WEThings (wetland habitat indicators for non-game species). It produces a list of potential wetland-dependent mammal, reptile, and amphibian species that may be present in the wetland. The output is based on observable habitat characteristics documented on the field data form. This method may be used to generate the wildlife species list recommended as backup information to the wetland evaluation form and to augment the considerations. Use of this method should first be coordinated with the Corps project manager. A computer program is also available to expedite this process.

RECREATION (Consumptive and Non-Consumptive) — This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat.
6. The watercourse, pond, or lake associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.
13. Other

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.



CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site is within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site is available.
12. Direct access to pond or lake at potential educational site is available.
13. No known safety hazards exist within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.
17. Other



UNIQUENESS/HERITAGE — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

CONSIDERATIONS/QUALIFIERS

1. Upland surrounding wetland is primarily urban.
2. Upland surrounding wetland is developing rapidly.
3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands.
4. Three or more wetland classes are present.
5. Deep and/or shallow marsh or wooded swamp dominate.
6. High degree of interspersed vegetation and/or open water occur in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.
11. Direct access to perennial stream or lake exists at potential educational site.
12. Two or more wetland classes are visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) are visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings are found within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland is within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other

VISUAL QUALITY/AESTHETICS — This value considers the visual and aesthetic quality or usefulness of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Multiple wetland classes are visible from primary viewing locations.
2. Emergent marsh and/or open water are visible from primary viewing locations.
3. A diversity of vegetative species is visible from primary viewing locations.
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.
6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.
13. Other

ENDANGERED SPECIES HABITAT — This value considers the suitability of the wetland to support threatened or endangered species.

ES

CONSIDERATIONS/QUALIFIERS

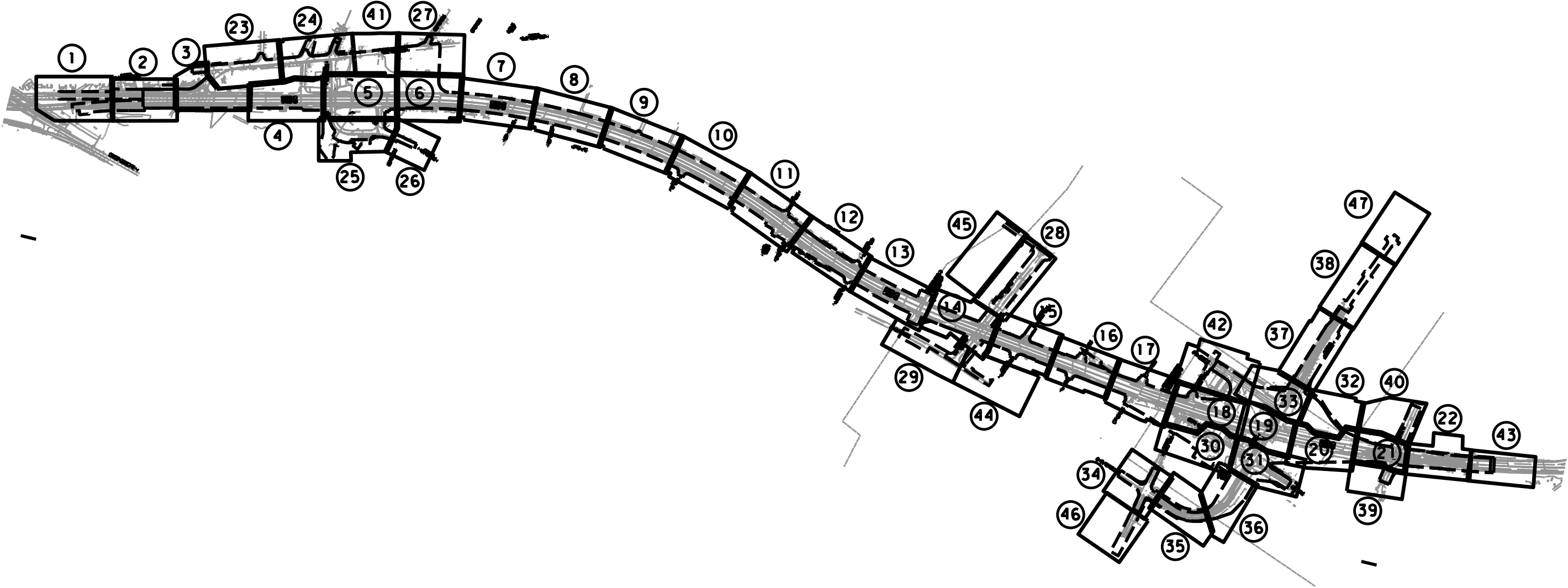
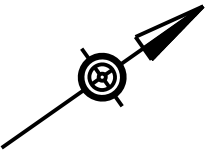
1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.



Appendix F

Wetland and Waterways Delineation Plans

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	OF	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

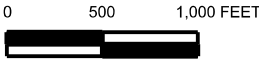


LEGEND

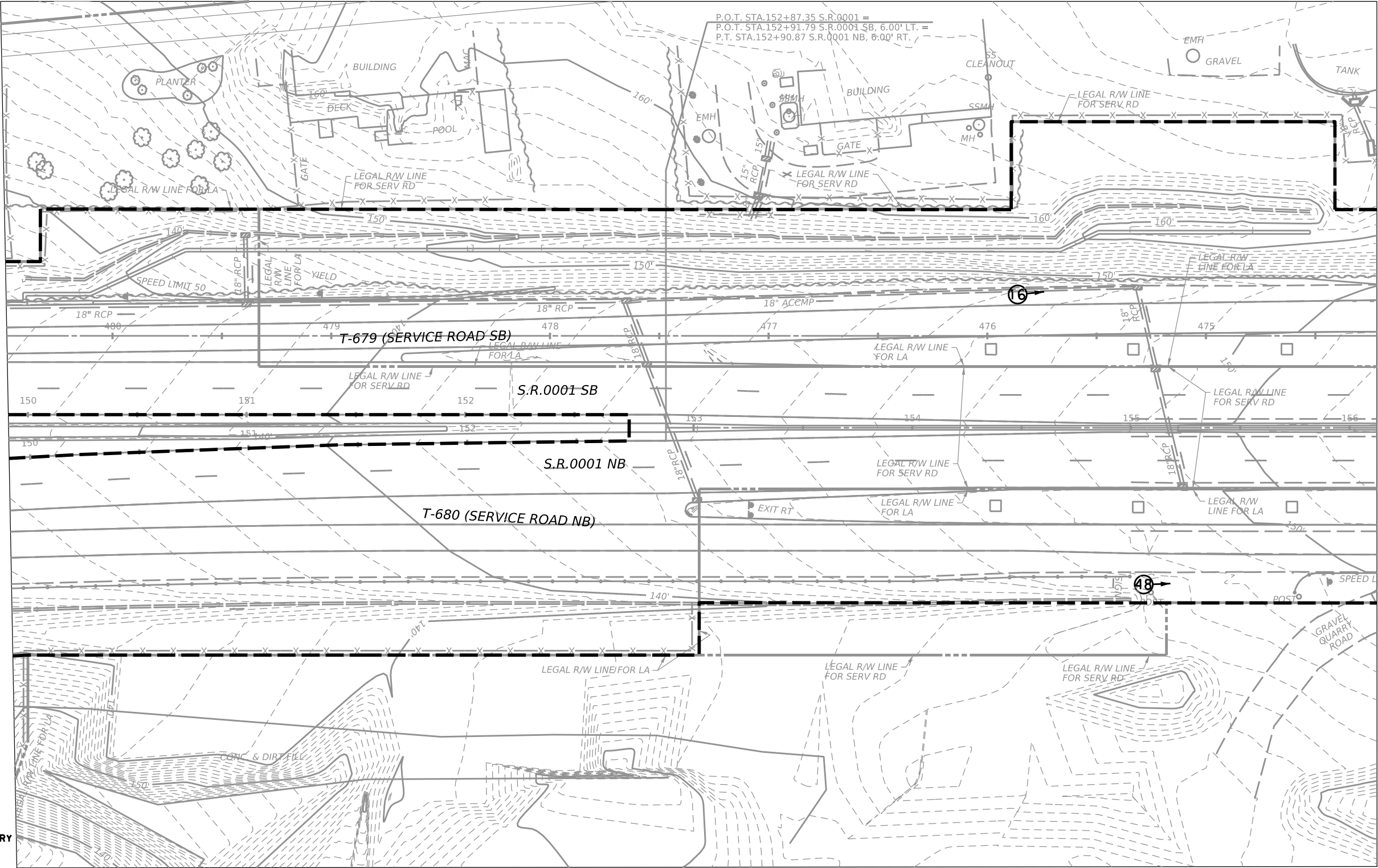
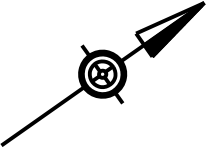
--- STUDY AREA BOUNDARY

WETLAND AND WATERWAYS
DELINEATION PLAN
INDEX SHEET

SCALE



DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP02 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



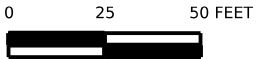
SEE PLAN SHEET WP01

SEE PLAN SHEET WP03

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

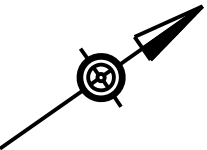
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

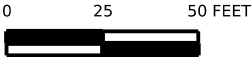
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP03 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

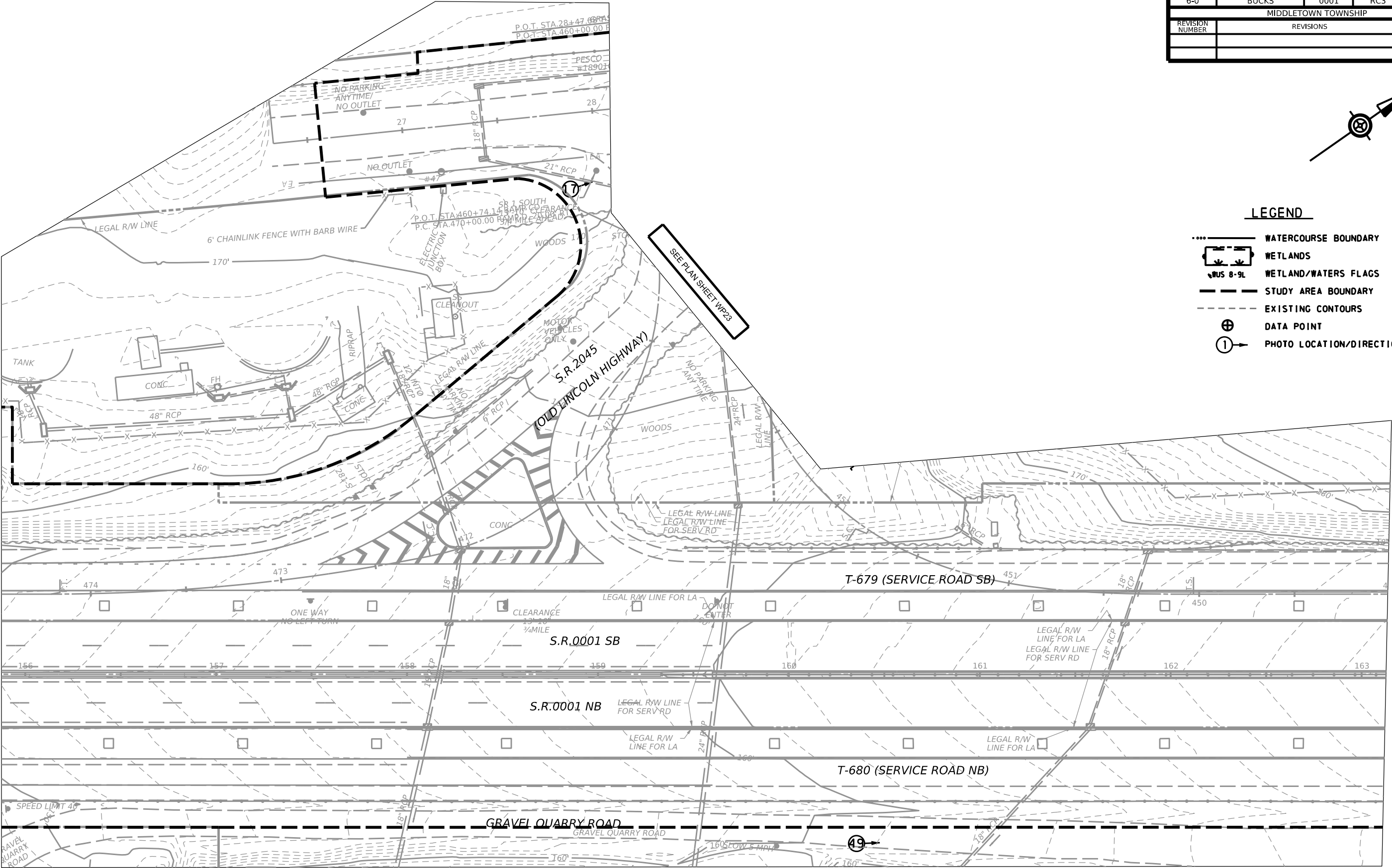
- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273



SEE PLAN SHEET WP02

SEE PLAN SHEET WP04

\$FILES\$

\$DATES\$

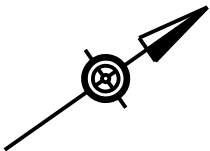
\$TIMES\$

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SEE PLAN SHEET WP23

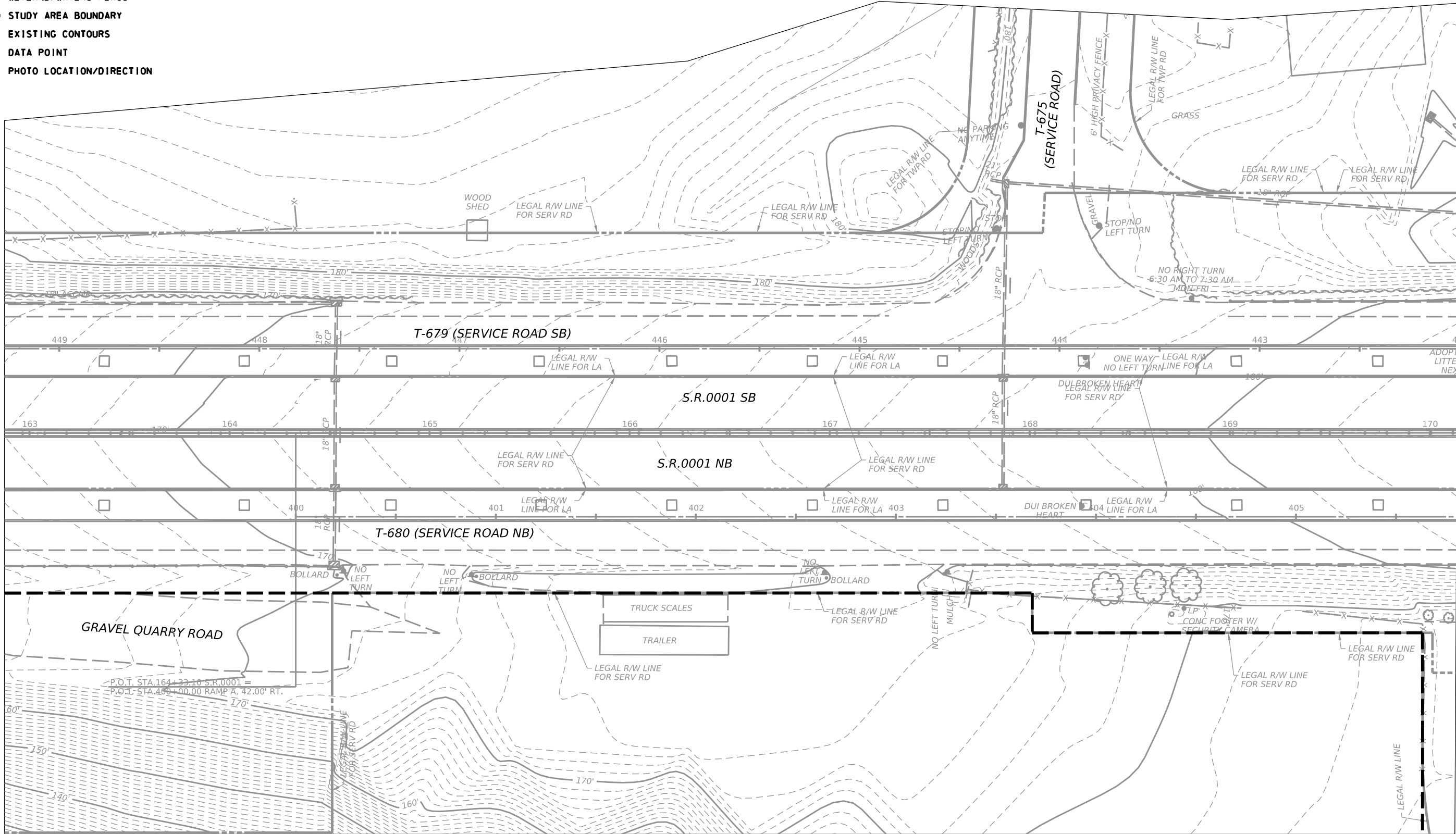
SEE PLAN SHEET WP24



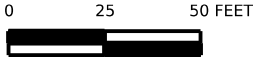
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP04 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

SEE PLAN SHEET WP03

SEE PLAN SHEET WP05



SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

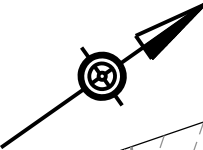
SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

\$FILES\$

\$DATE\$

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP05 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SEE PLAN SHEET WP04

SEE PLAN SHEET WP06

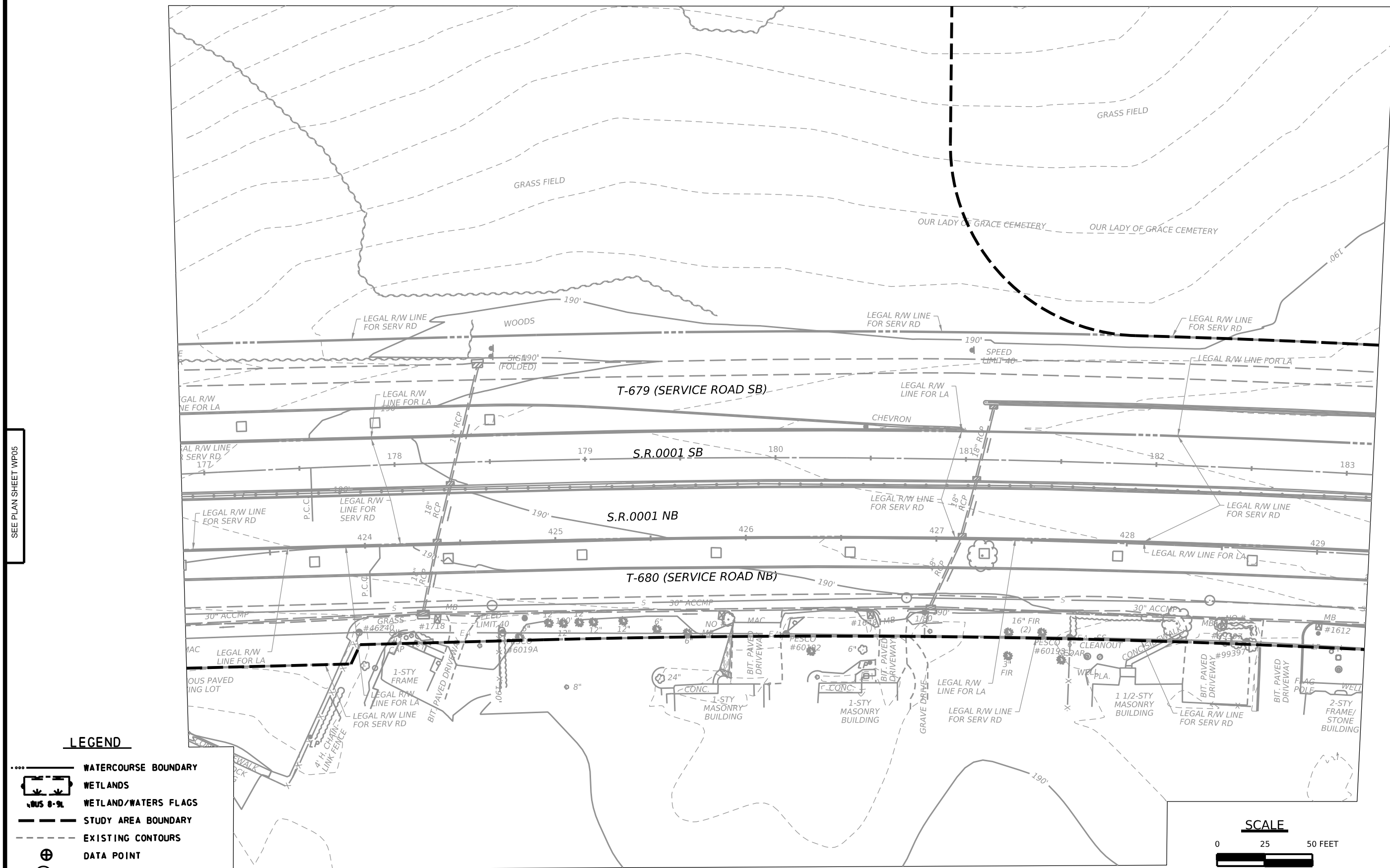
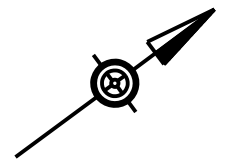
- LEGEND**
- WATERCOURSE BOUNDARY
 - WETLANDS
 - WETLAND/WATERS FLAGS
 - STUDY AREA BOUNDARY
 - EXISTING CONTOURS
 - DATA POINT
 - PHOTO LOCATION/DIRECTION

SCALE

0 25 50 FEET

WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273



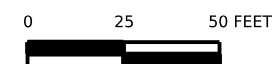
SEE PLAN SHEET WP05

SEE PLAN SHEET WP07

LEGEND

- | | |
|---|--------------------------|
| ---- | WATERCOURSE BOUNDARY |
|  | WETLANDS |
| WUS 0-9L | WETLAND/WATERS FLAGS |
| ---- | STUDY AREA BOUNDARY |
| - - - - - | EXISTING CONTOURS |
| ⊕ | DATA POINT |
| ① → | PHOTO LOCATION/DIRECTION |

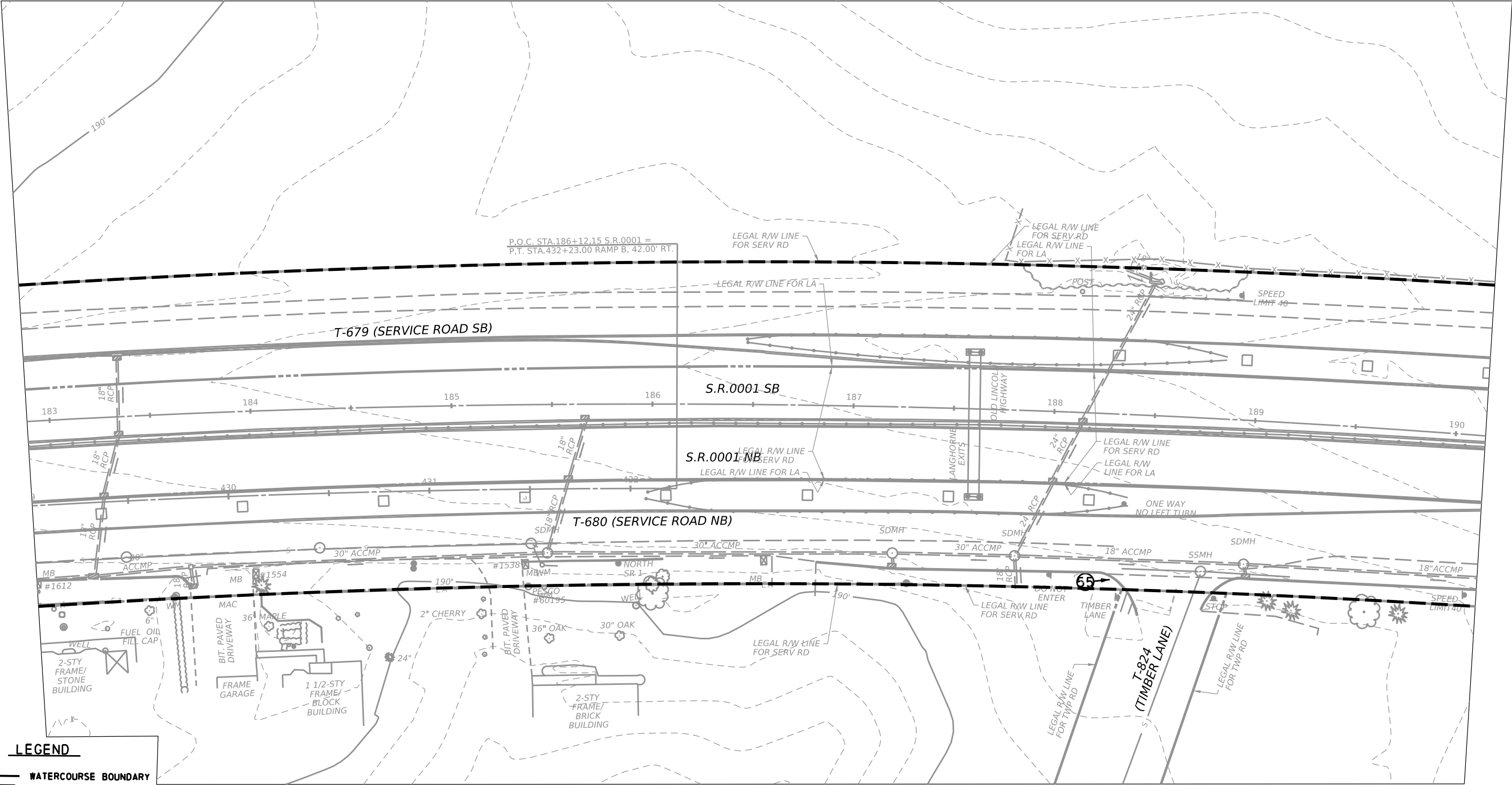
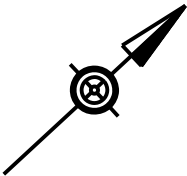
SCALE



WETLAND AND WATERWAYS DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP07 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SEE PLAN SHEET WP06

SEE PLAN SHEET WP08

LEGEND

WATERCOURSE BOUNDARY

WETLANDS

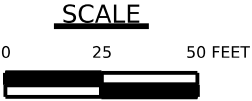
WETLAND/WATERS FLAGS

STUDY AREA BOUNDARY

EXISTING CONTOURS

DATA POINT

PHOTO LOCATION/DIRECTION



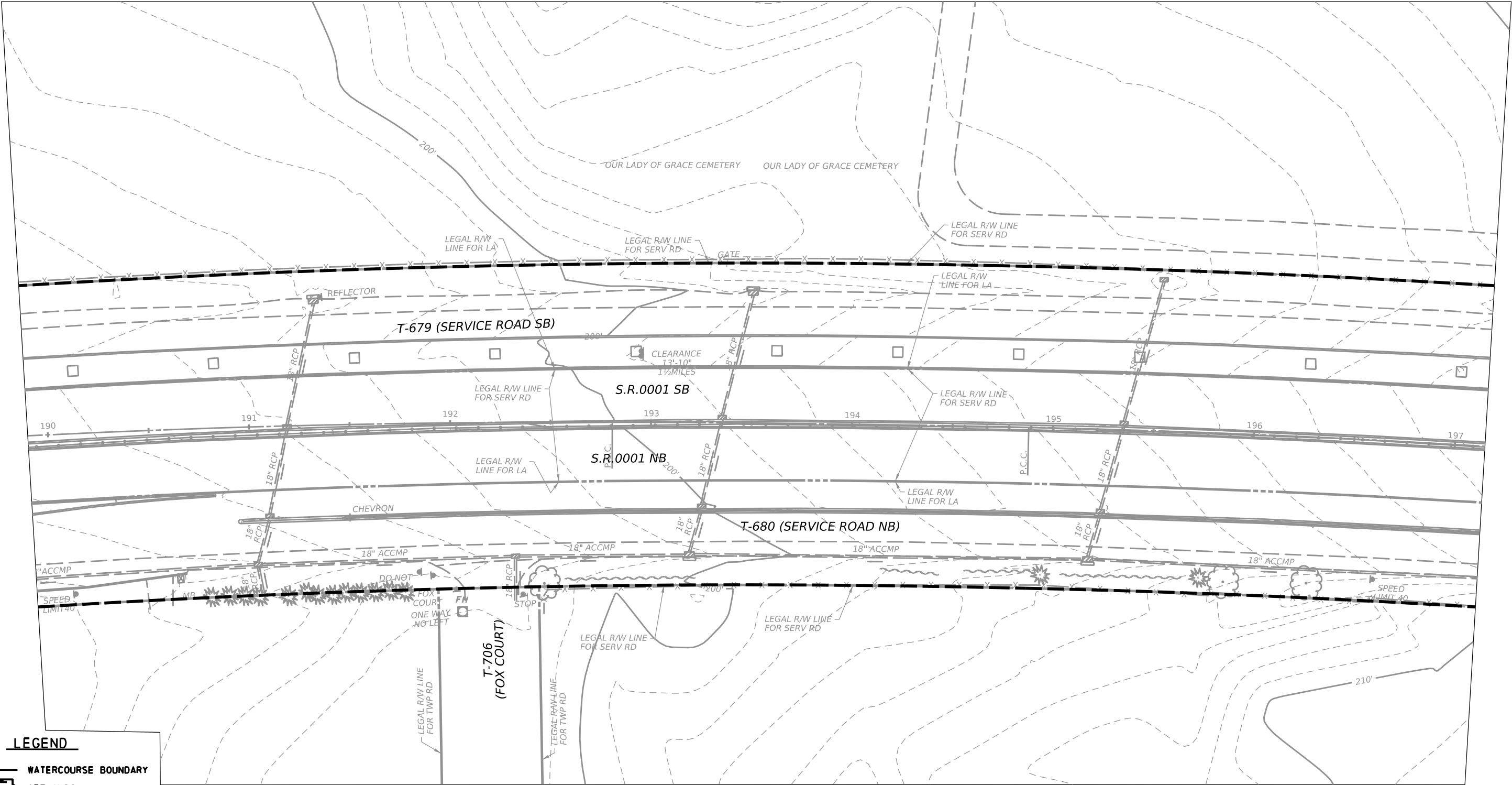
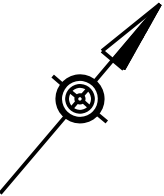
WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

\$FILES\$
\$DATE\$

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP08 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



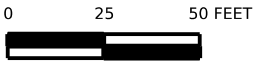
SEE PLAN SHEET WP07

SEE PLAN SHEET WP09

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

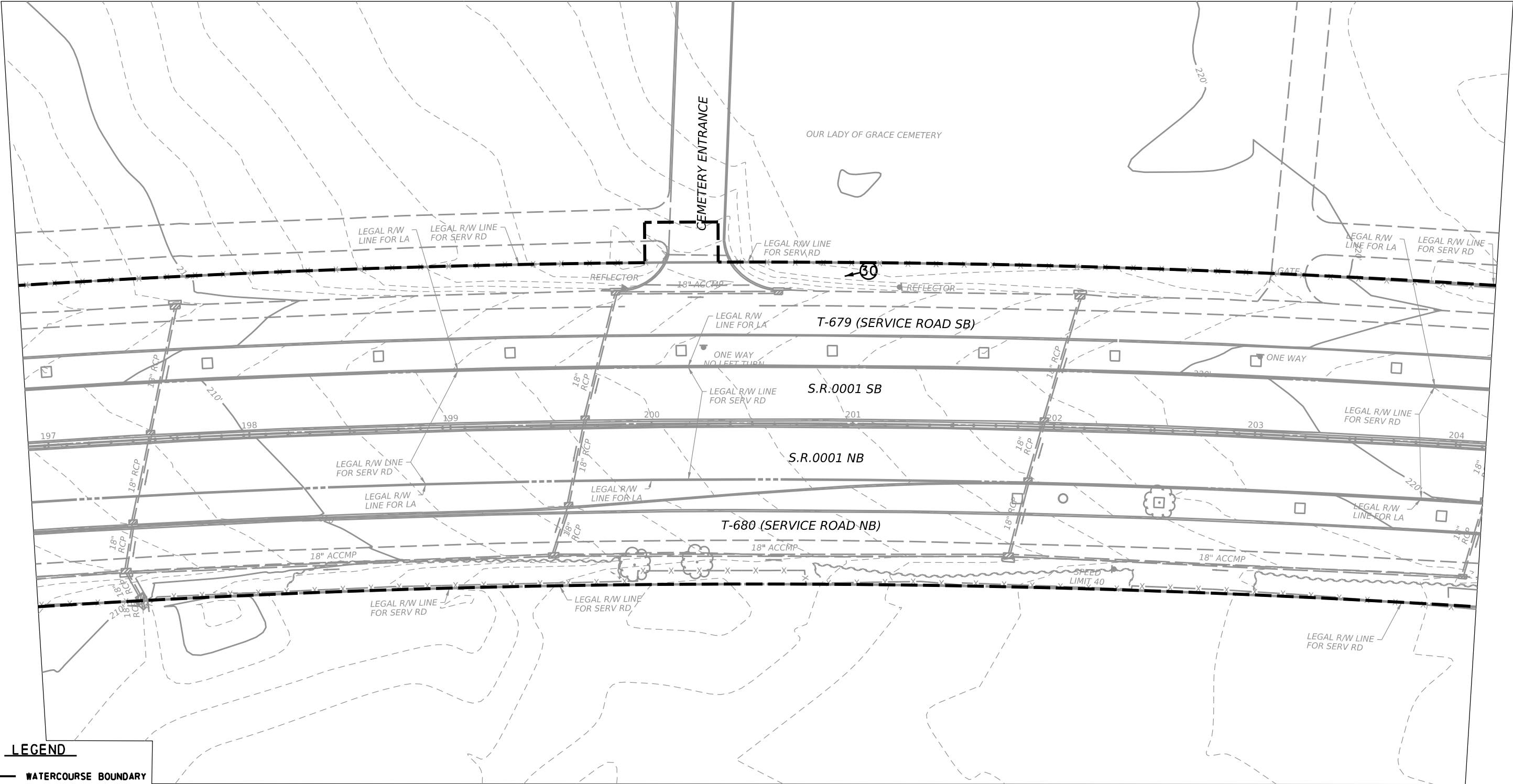
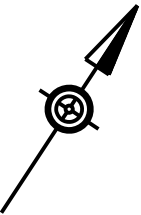
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP09 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



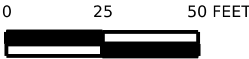
SEE PLAN SHEET WP08

SEE PLAN SHEET WP10

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

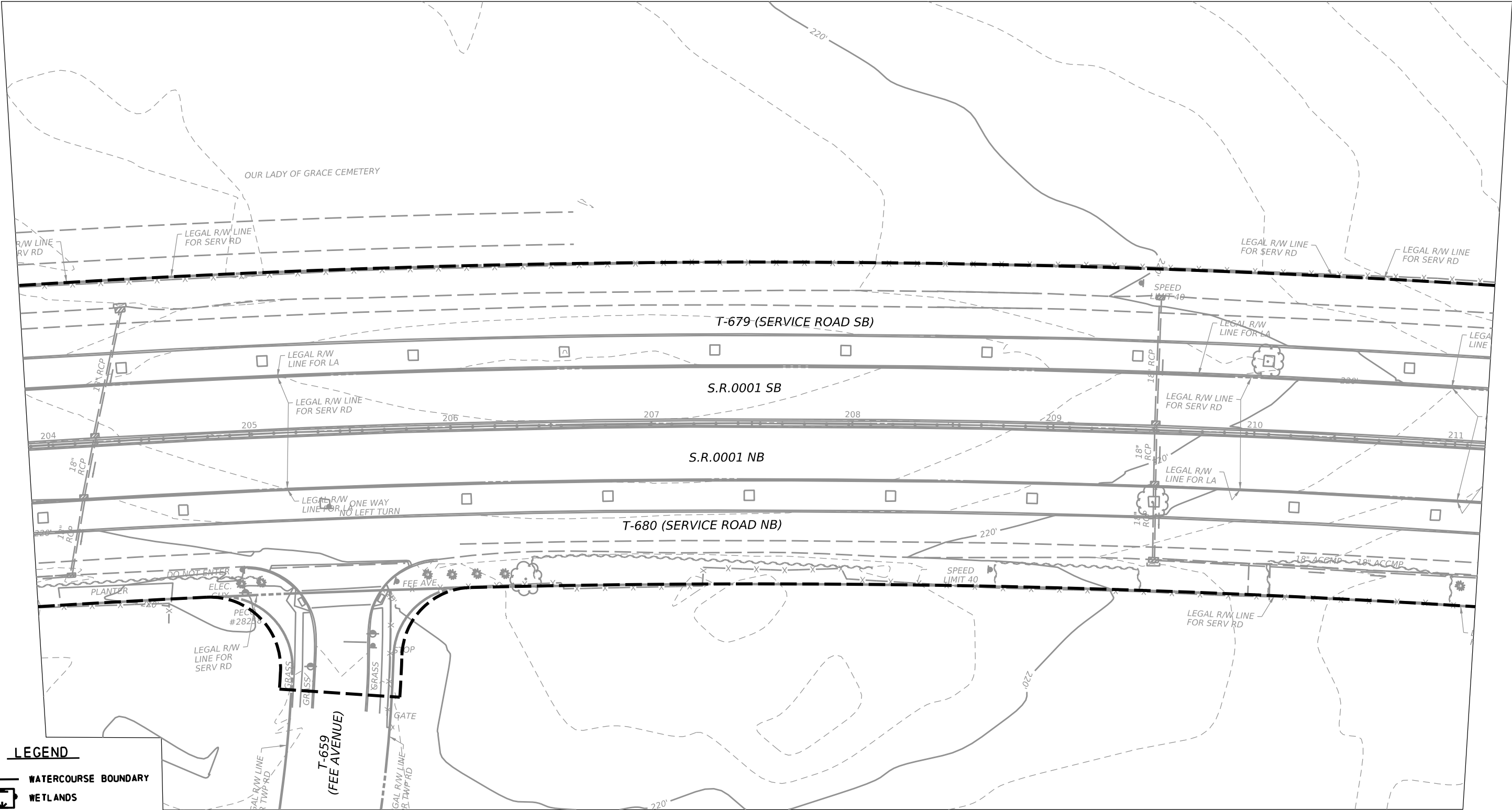
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

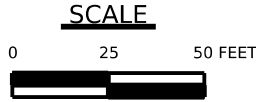
DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP10 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



SEE PLAN SHEET WP09

SEE PLAN SHEET WP11

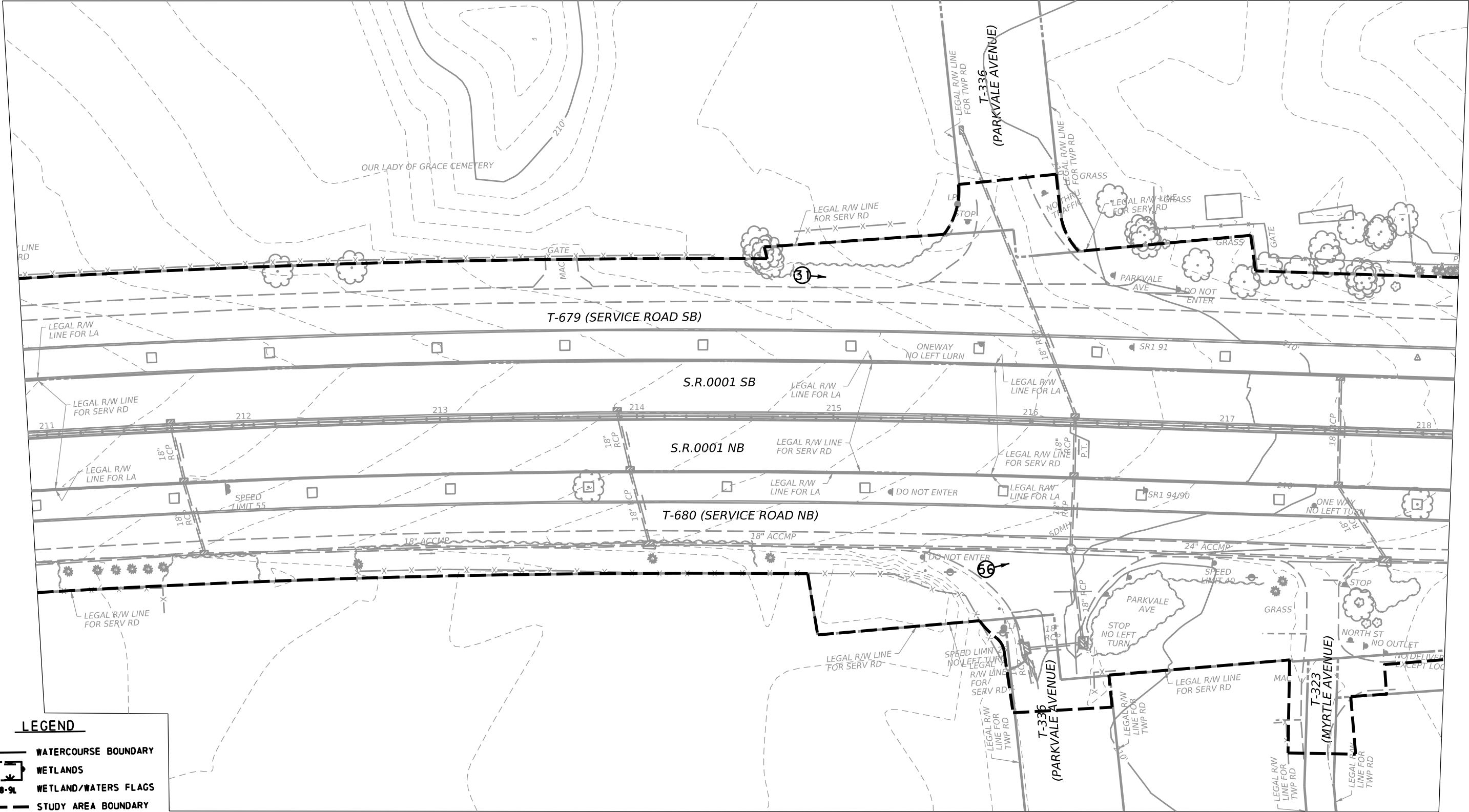
- LEGEND**
- WATERCOURSE BOUNDARY
 - WETLANDS
 - WETLAND/WATERS FLAGS
 - STUDY AREA BOUNDARY
 - EXISTING CONTOURS
 - ⊕ DATA POINT
 - ① PHOTO LOCATION/DIRECTION



**WETLAND AND WATERWAYS
DELINEATION PLAN**

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP11 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



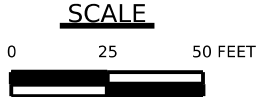
SEE PLAN SHEET WP10

SEE PLAN SHEET WP12

LEGEND

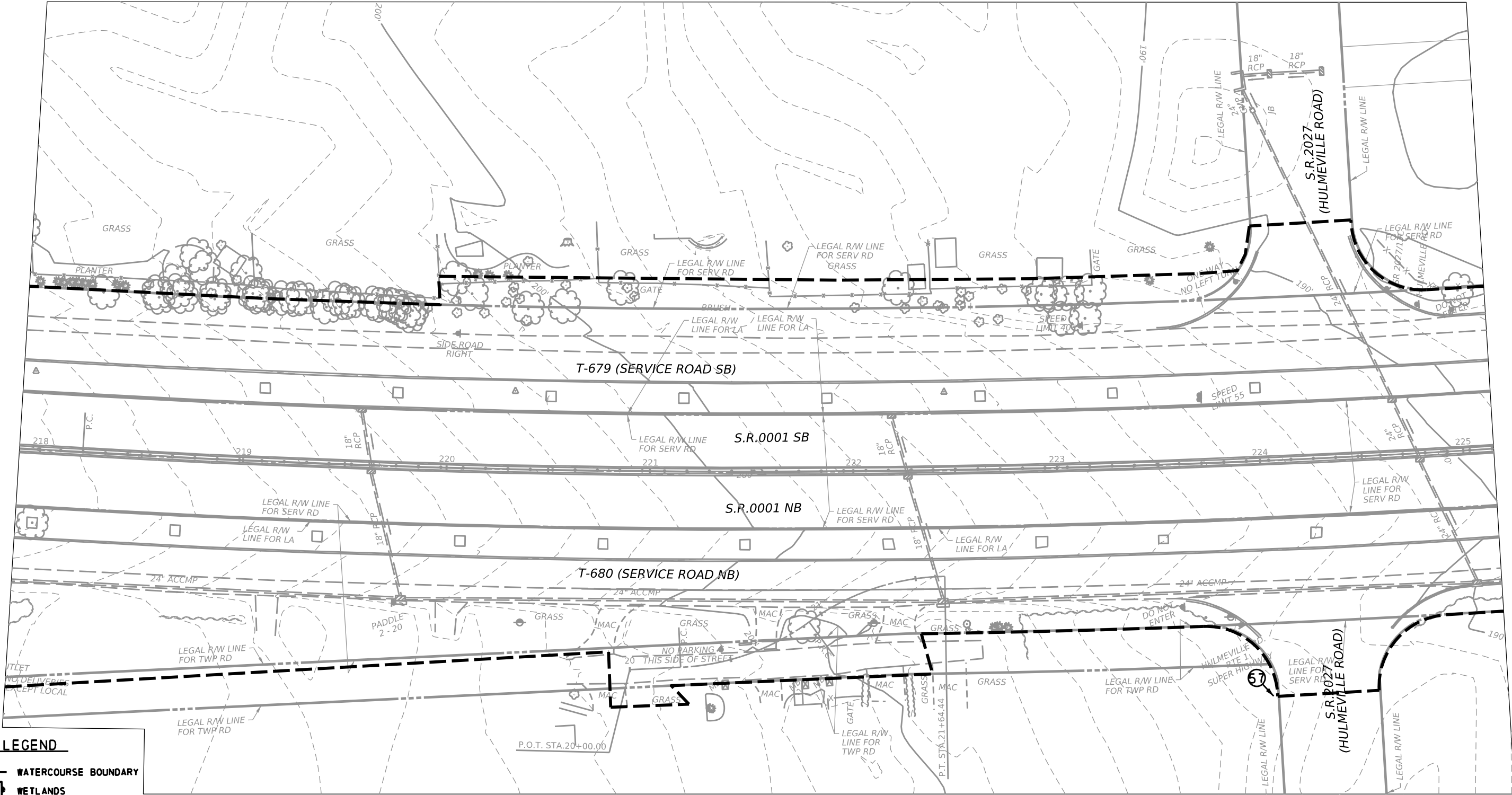
- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

WETLAND AND WATERWAYS
DELINEATION PLAN



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP12 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



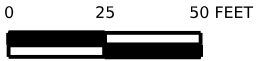
SEE PLAN SHEET WP11

SEE PLAN SHEET WP13

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

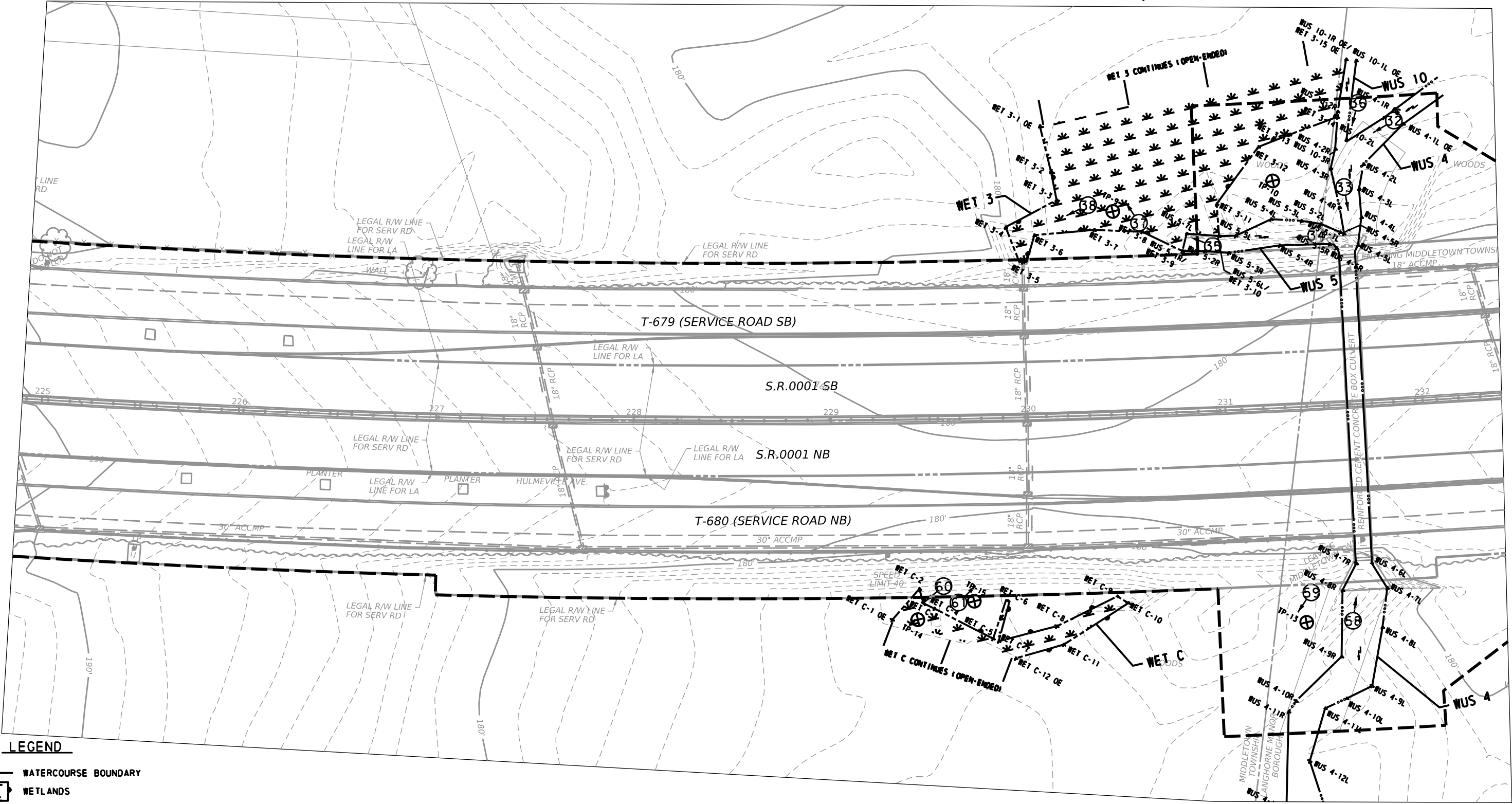
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP13 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE

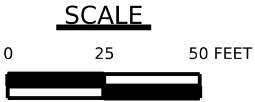


SEE PLAN SHEET WP12

SEE PLAN SHEET WP14

- LEGEND**
- WATERCOURSE BOUNDARY
 - WETLANDS
 - WETLAND/WATERS FLAGS
 - STUDY AREA BOUNDARY
 - EXISTING CONTOURS
 - DATA POINT
 - PHOTO LOCATION/DIRECTION

**WETLAND AND WATERWAYS
DELINEATION PLAN**



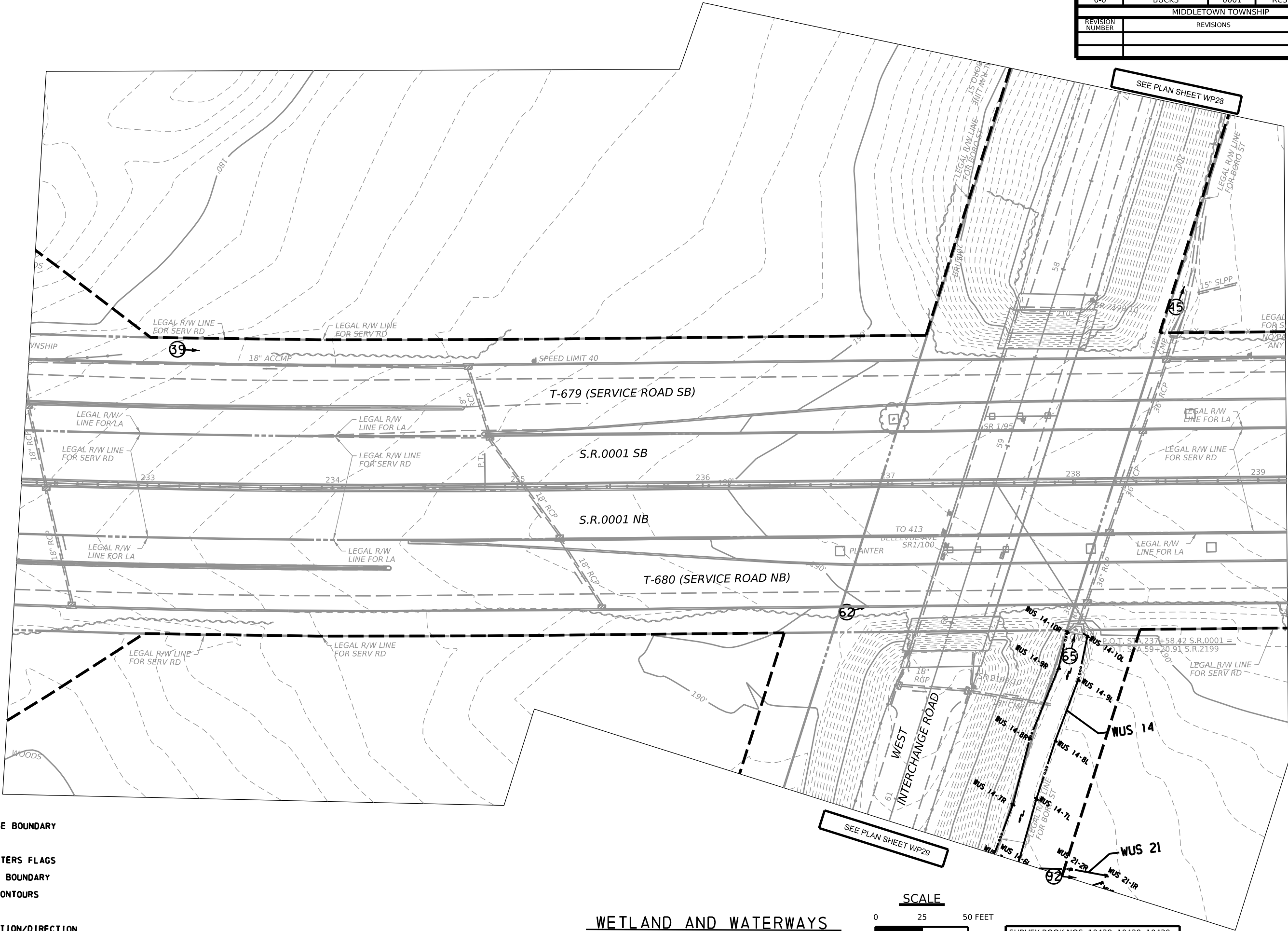
SURVEY BOOK NOS. 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, AND 10273

SEE PLAN SHEET WP29

\$FILES\$
\$DATES\$

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP14 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

WETLAND AND WATERWAYS
DELINEATION PLAN

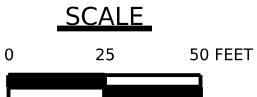
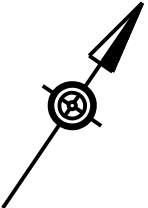
SCALE



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

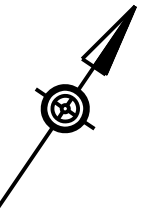
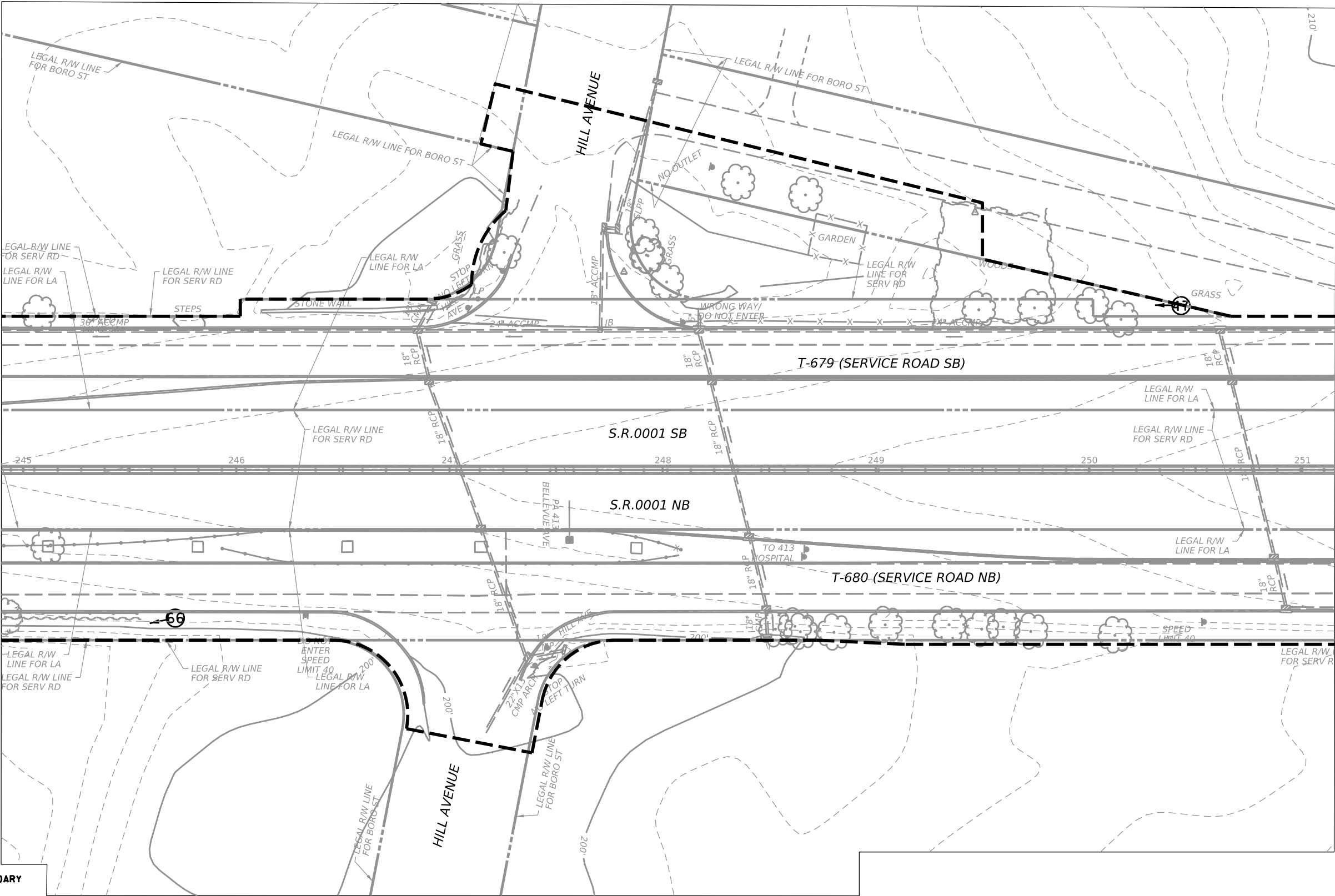
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP15 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP15 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP16 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



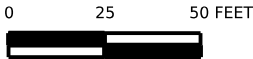
SEE PLAN SHEET WP15

SEE PLAN SHEET WP17

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

SCALE



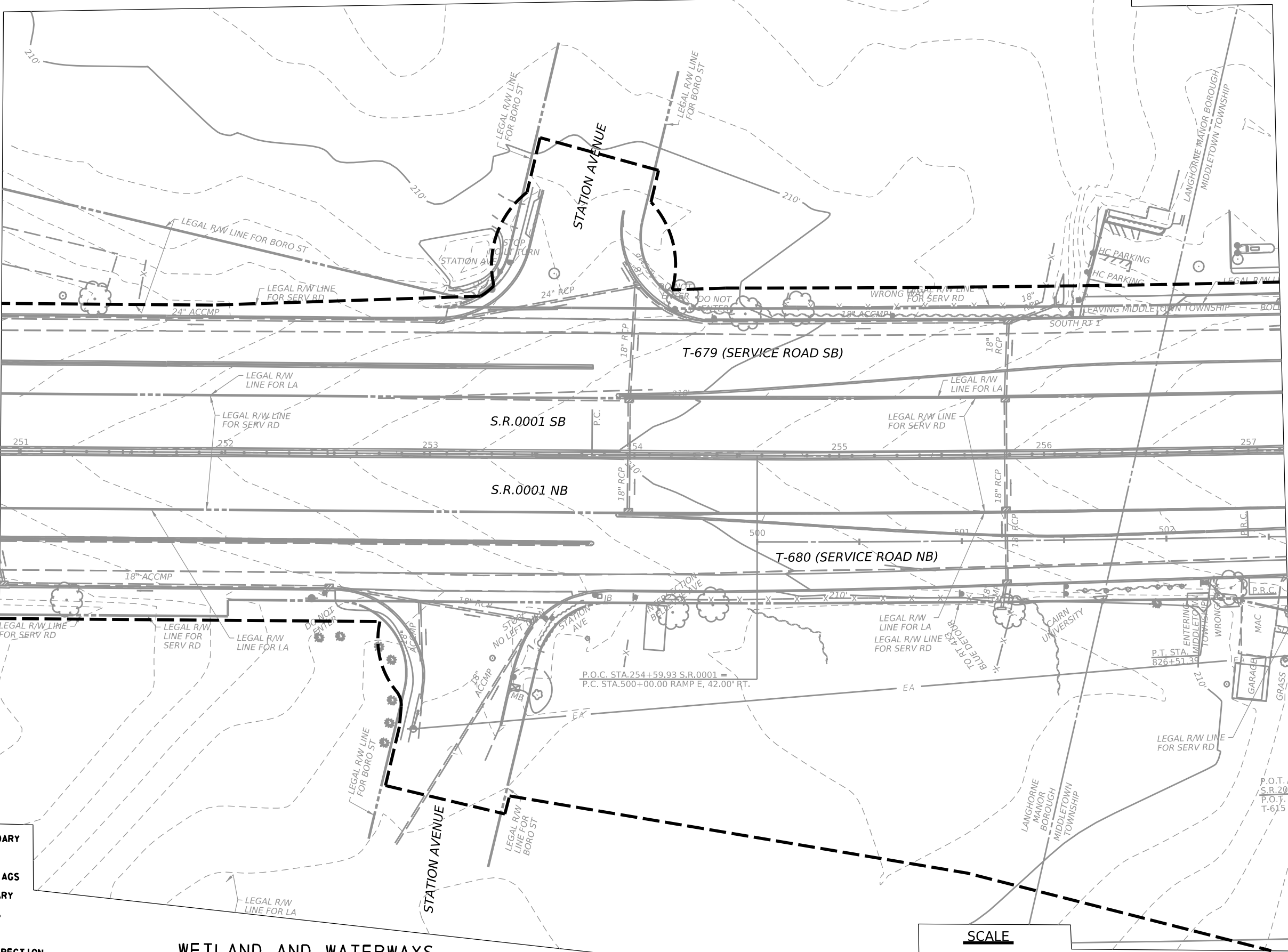
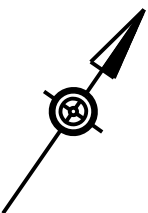
**WETLAND AND WATERWAYS
DELINEATION PLAN**

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

\$FILES\$
\$DATES\$

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP17 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SEE PLAN SHEET WP16

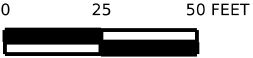
SEE PLAN SHEET WP18

LEGEND

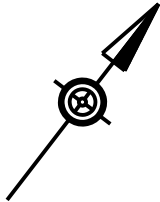
- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

WETLAND AND WATERWAYS
DELINEATION PLAN

SCALE



SURVEY BOOK NOS. 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, AND 10273

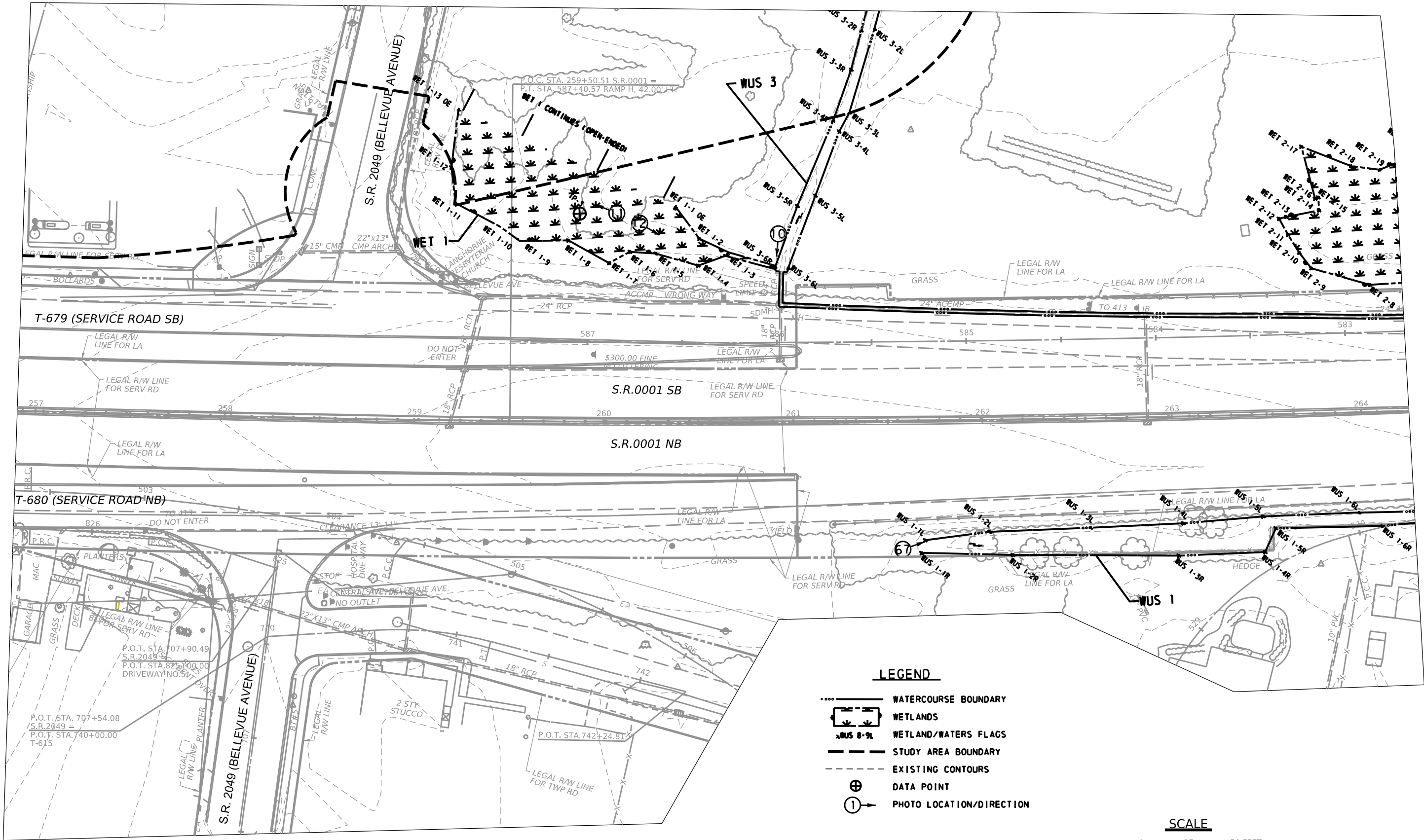


SEE PLAN SHEET WP42

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP18 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

SEE PLAN SHEET WP17

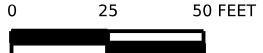
SEE PLAN SHEET WP19



LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① PHOTO LOCATION/DIRECTION

SCALE

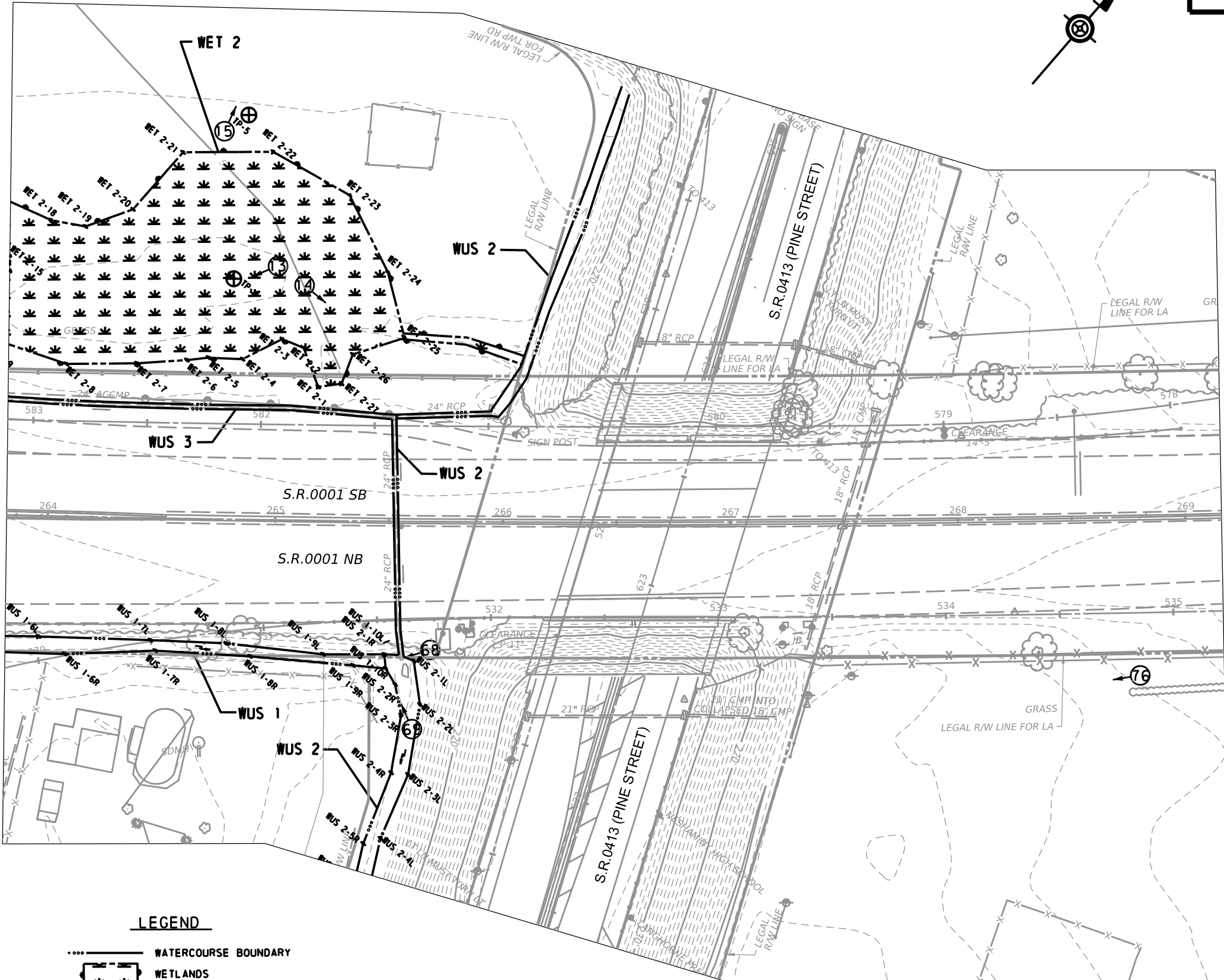
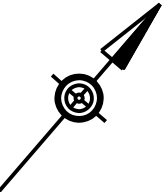


WETLAND AND WATERWAYS
DELINEATION PLAN

SEE PLAN SHEET WP30

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP19 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SCALE

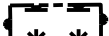
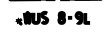


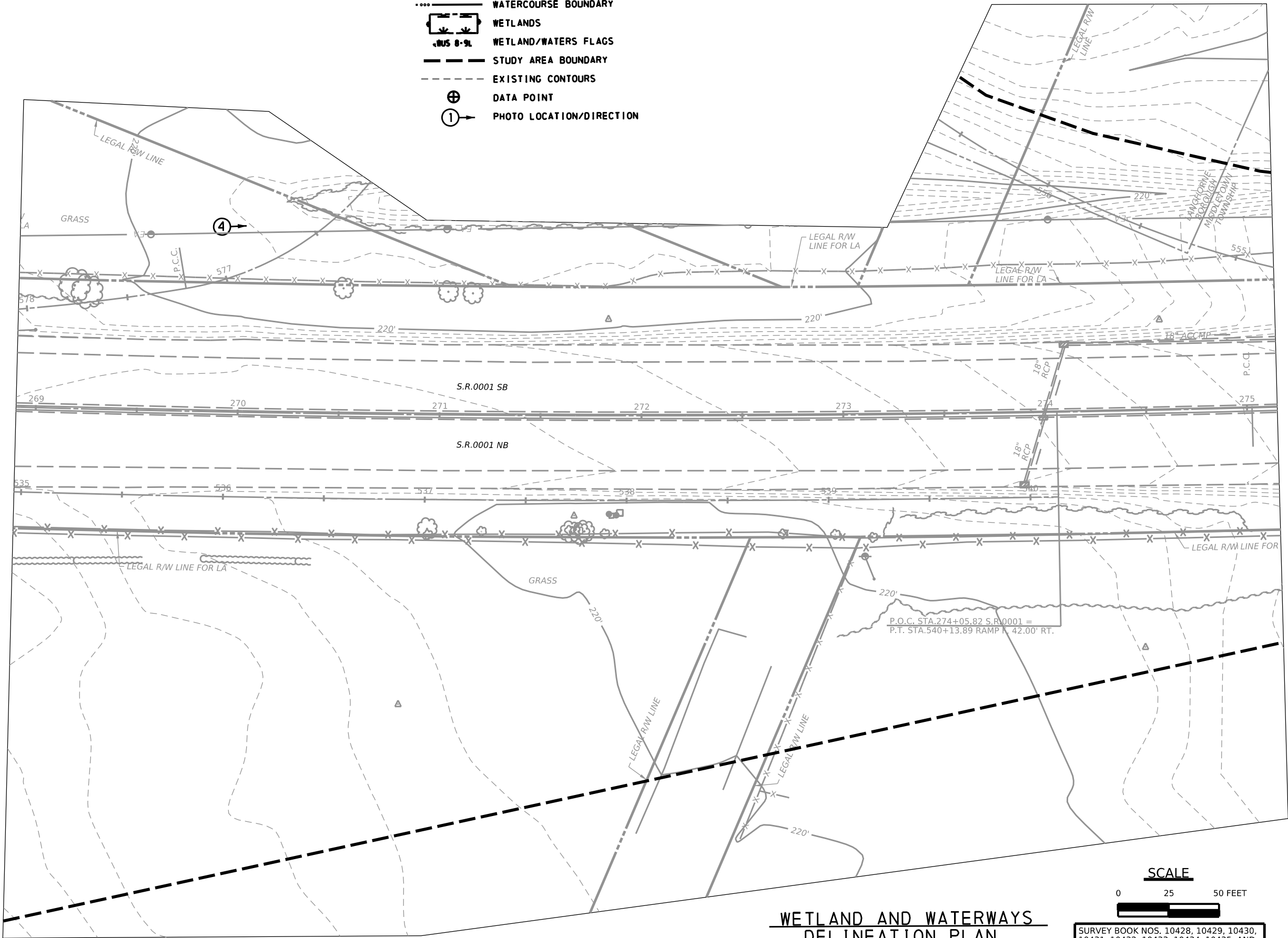
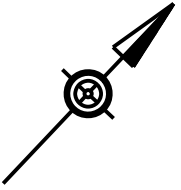
WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, AND 10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP20 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE

LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION



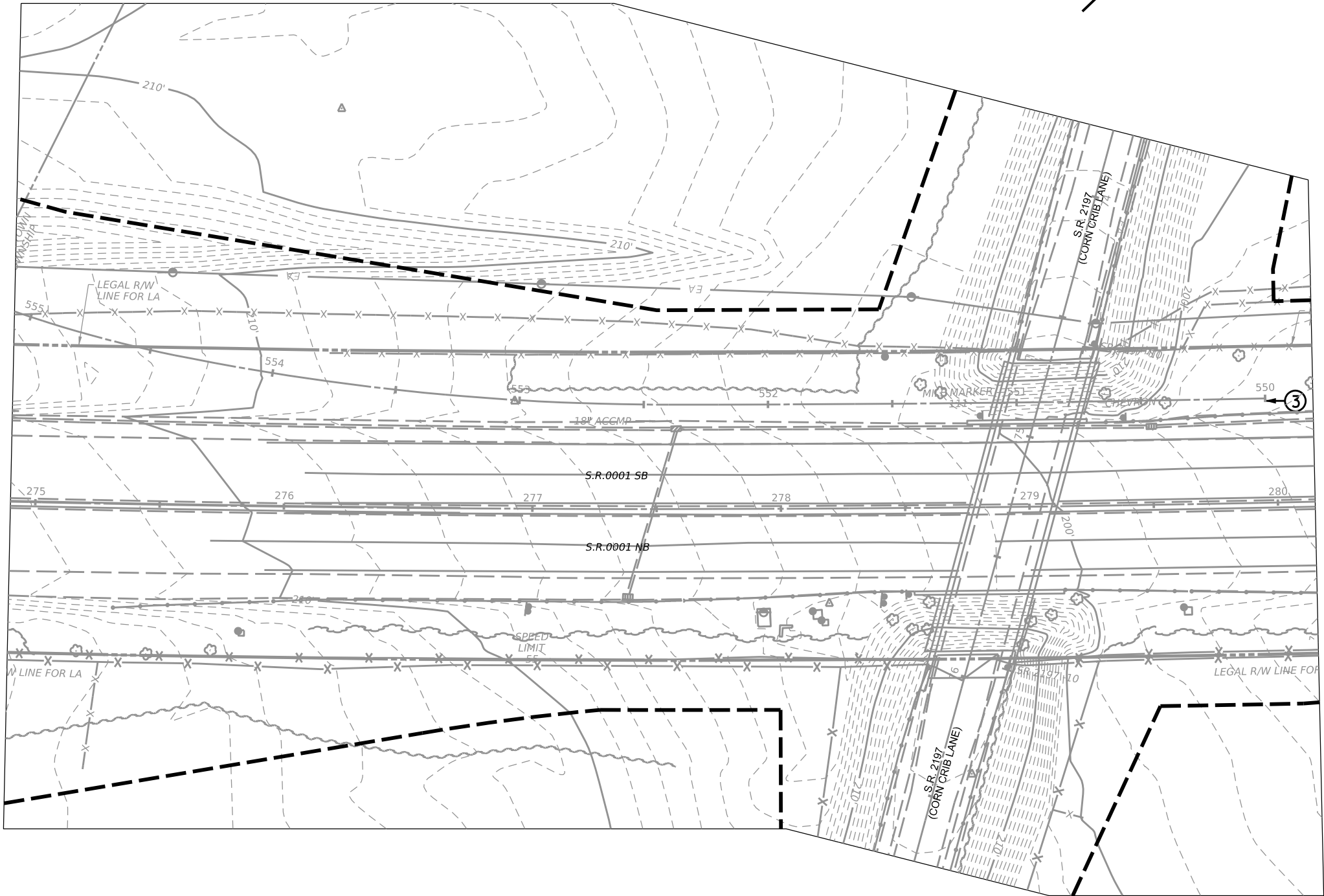
SEE PLAN SHEET WP19

SEE PLAN SHEET WP21

WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP21 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



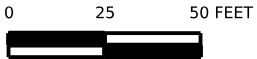
SEE PLAN SHEET WP20

SEE PLAN SHEET WP22

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

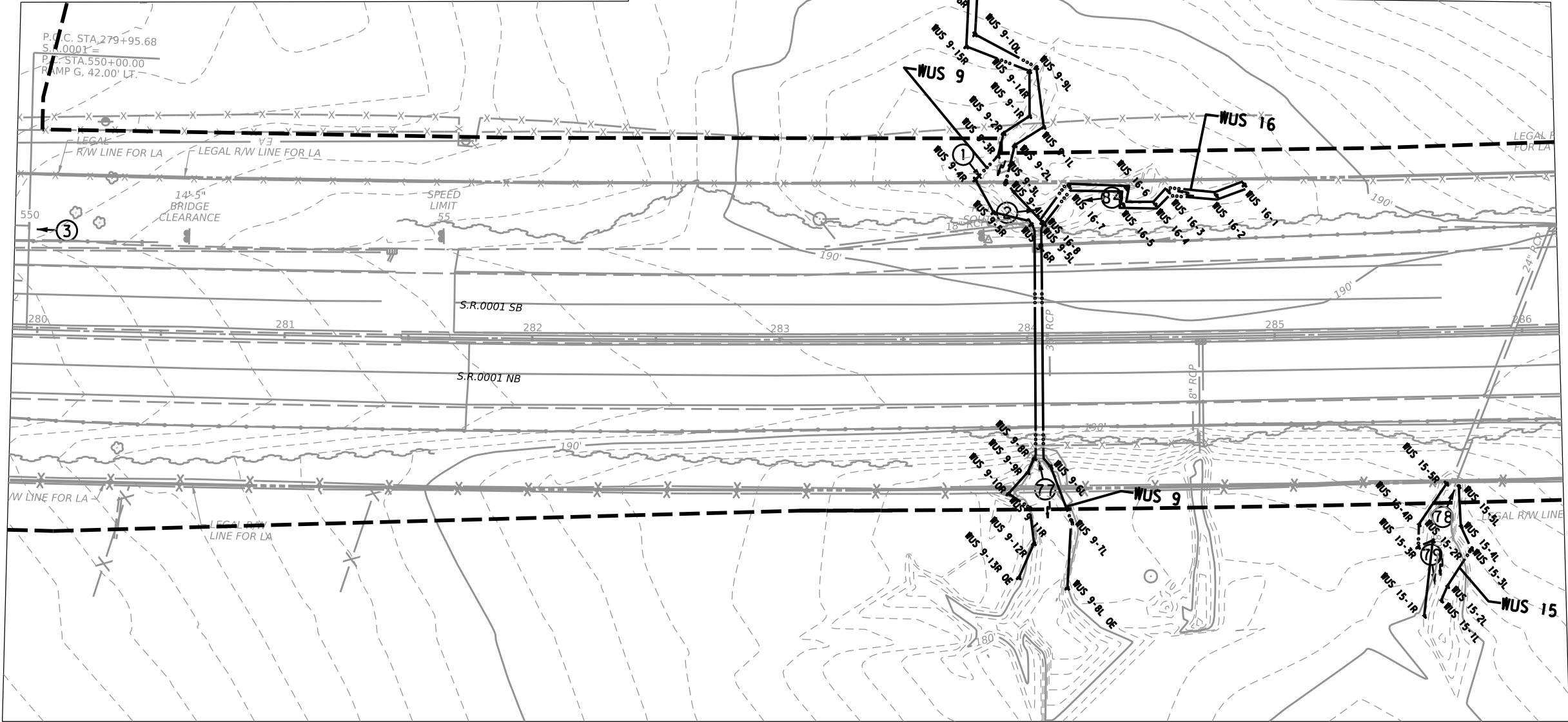
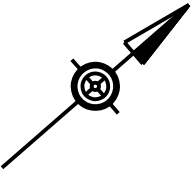
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP22 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



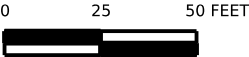
SEE PLAN SHEET WP21

SEE PLAN SHEET WP43

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

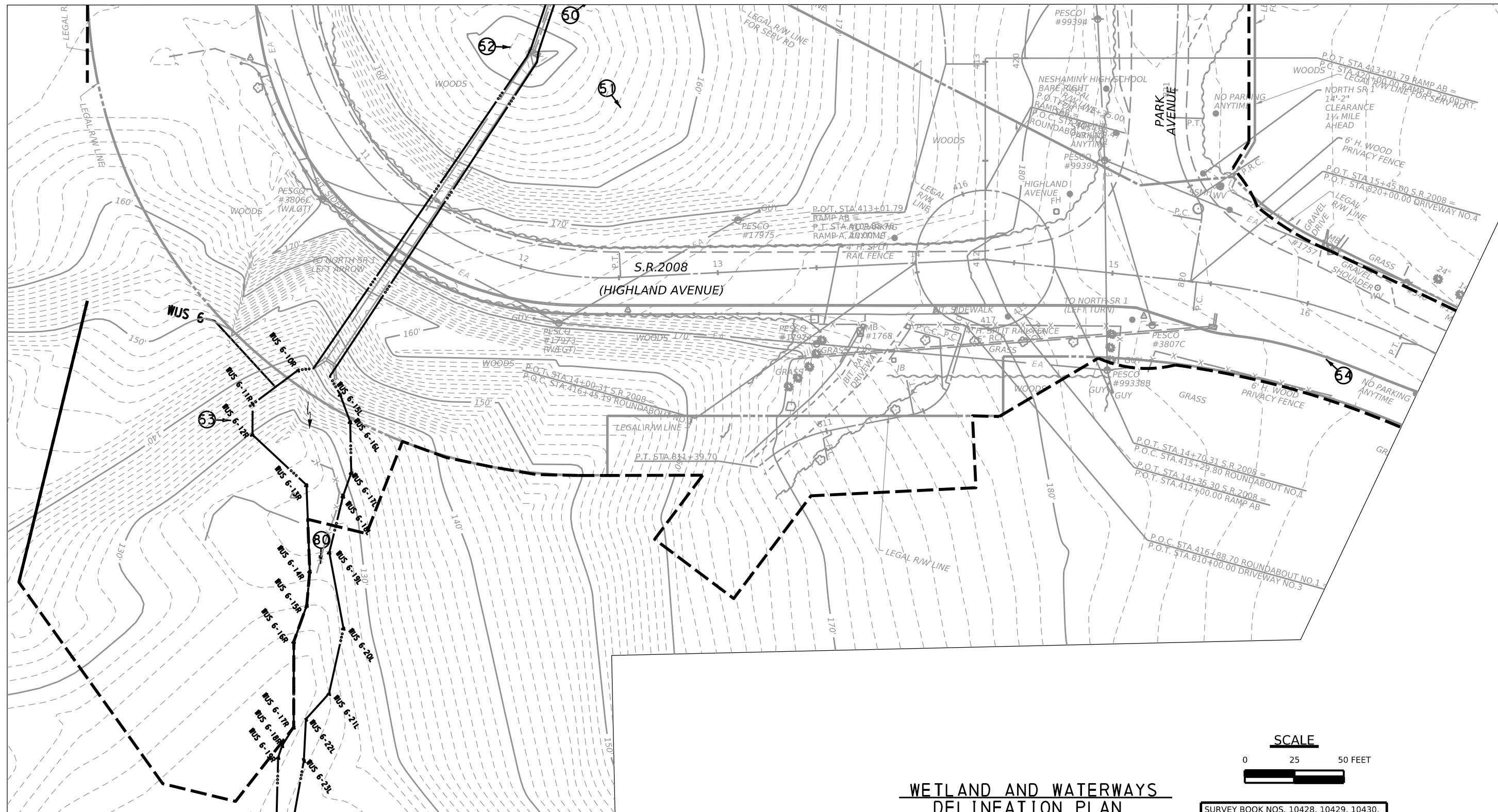
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

----	WATERCOURSE BOUNDARY
	WETLANDS
	WETLAND/WATERS FLAGS
----	STUDY AREA BOUNDARY
----	EXISTING CONTOURS
	DATA POINT
	PHOTO LOCATION/DIRECTION

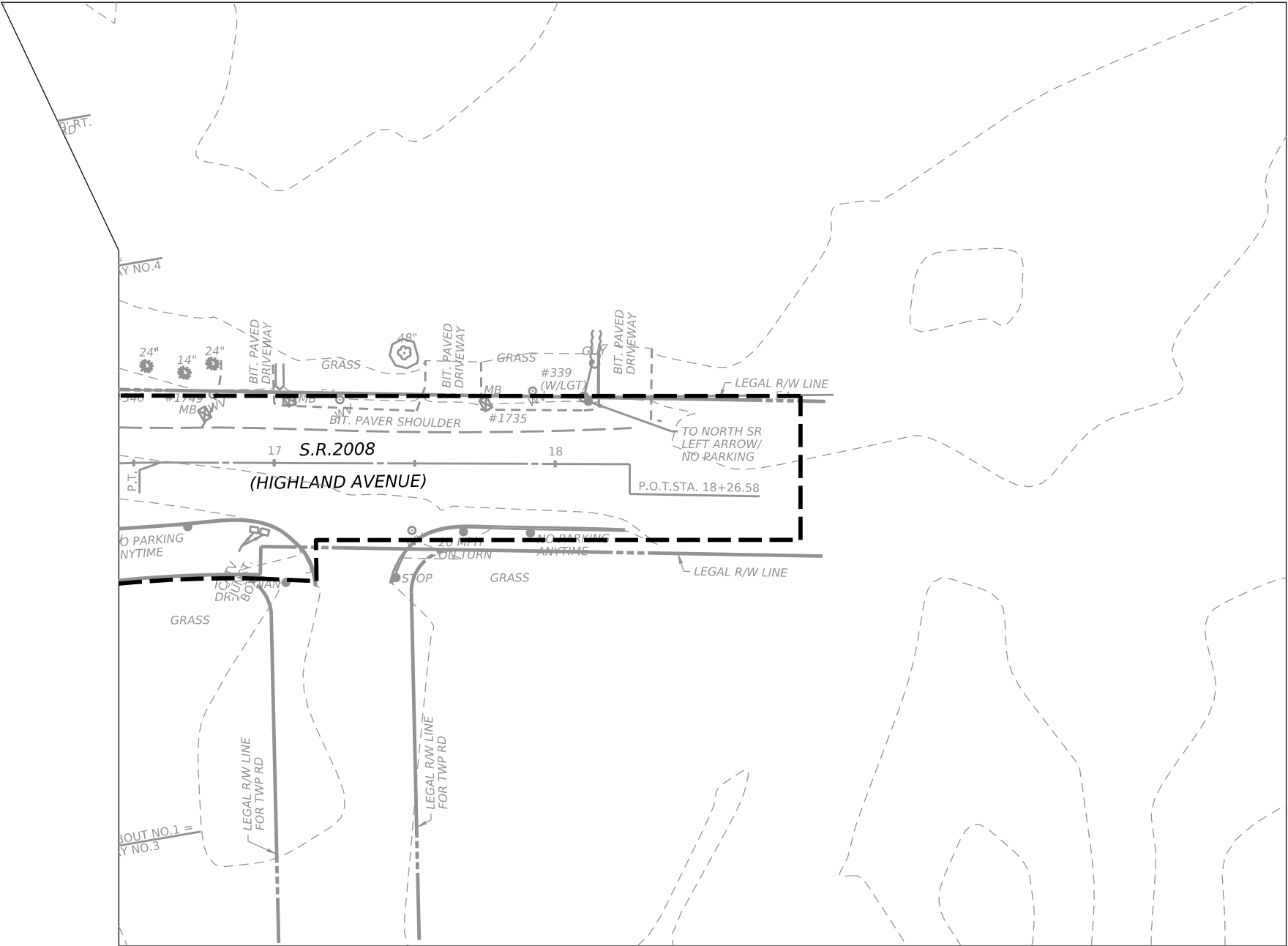


SEE PLAN SHEET WP26

\$FILE\$	
\$DATE\$	\$TIME\$

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP26 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

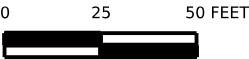


SEE PLAN SHEET WP25

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① PHOTO LOCATION/DIRECTION

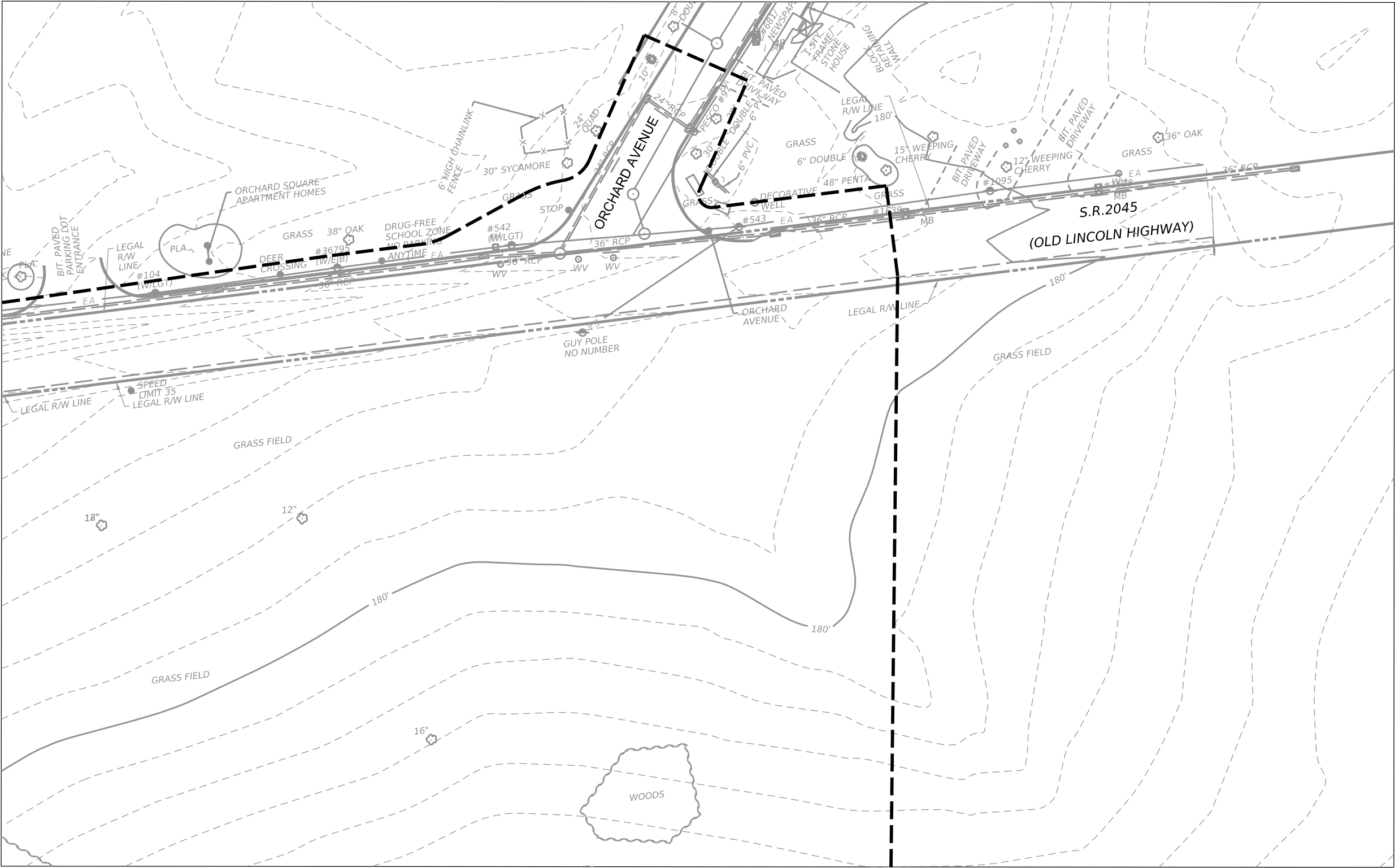
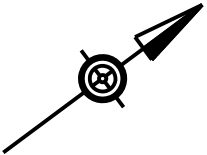
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP27 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SEE PLAN SHEET WP41

- LEGEND
- WATERCOURSE BOUNDARY

WETLANDS

WETLAND/WATERS FLAGS

STUDY AREA BOUNDARY

EXISTING CONTOURS

DATA POINT

PHOTO LOCATION/DIRECTION

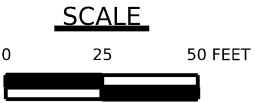
\$FILES\$
\$DATE\$

\$TIMES

SEE PLAN SHEET WP06

WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

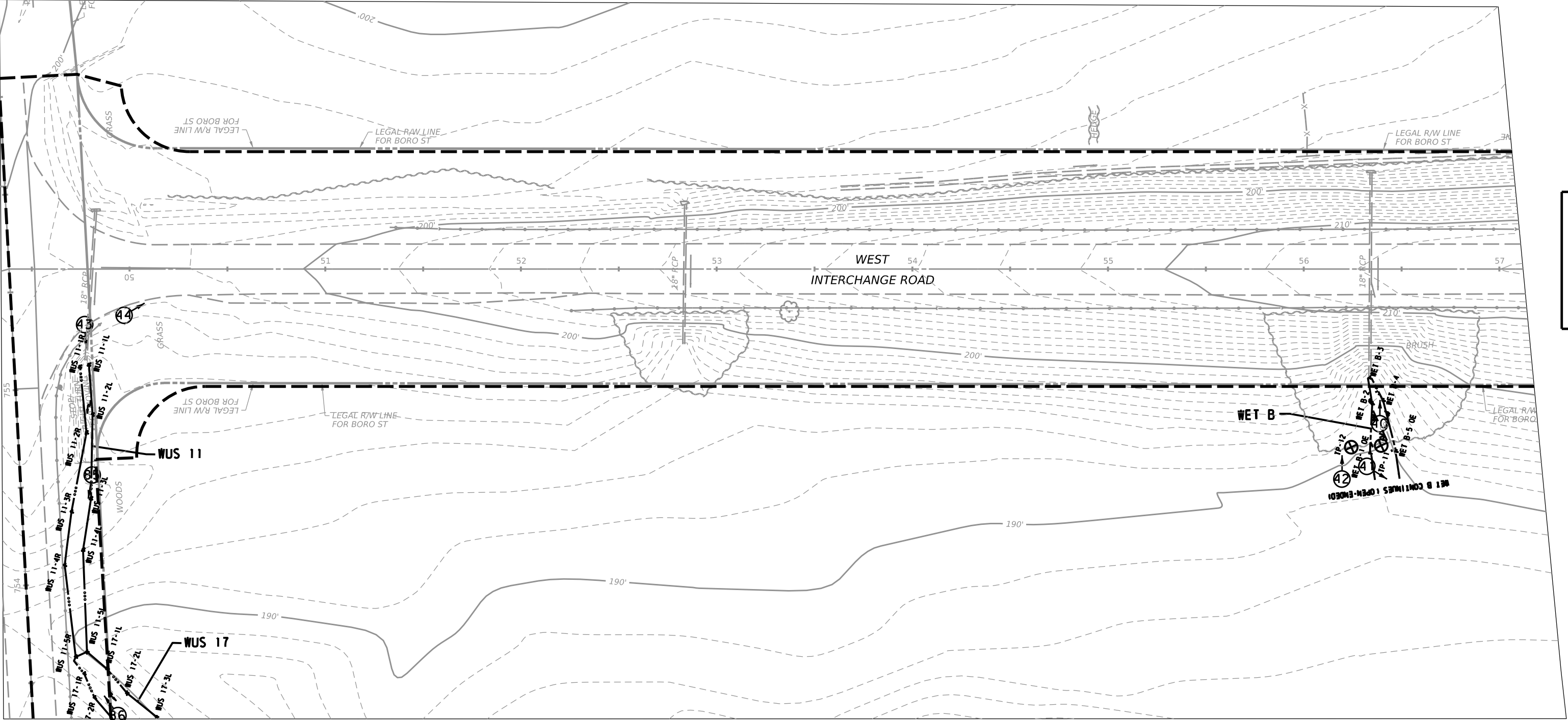


DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP28 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



LEGEND

- WATERCOURSE BOUNDARY
- [Symbol] WETLANDS
- [Symbol] WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

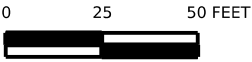


SEE PLAN SHEET WP14

SEE PLAN SHEET WP45

WETLAND AND WATERWAYS
DELINEATION PLAN

SCALE



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

\$FILES\$

\$DATES\$

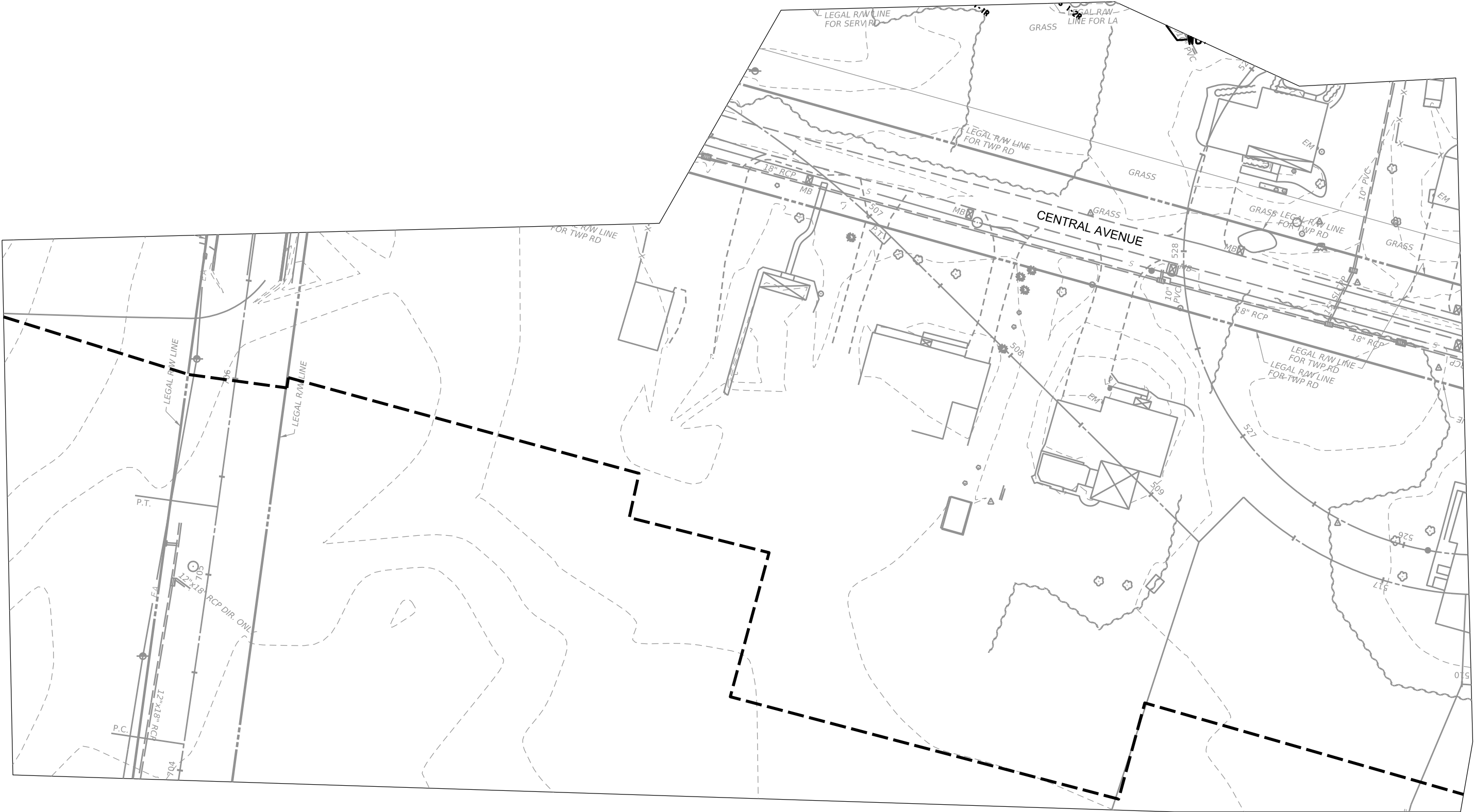
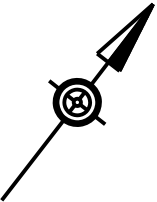
\$TIMES\$

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

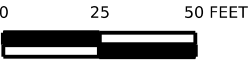
SEE PLAN SHEET WP18

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP30 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE



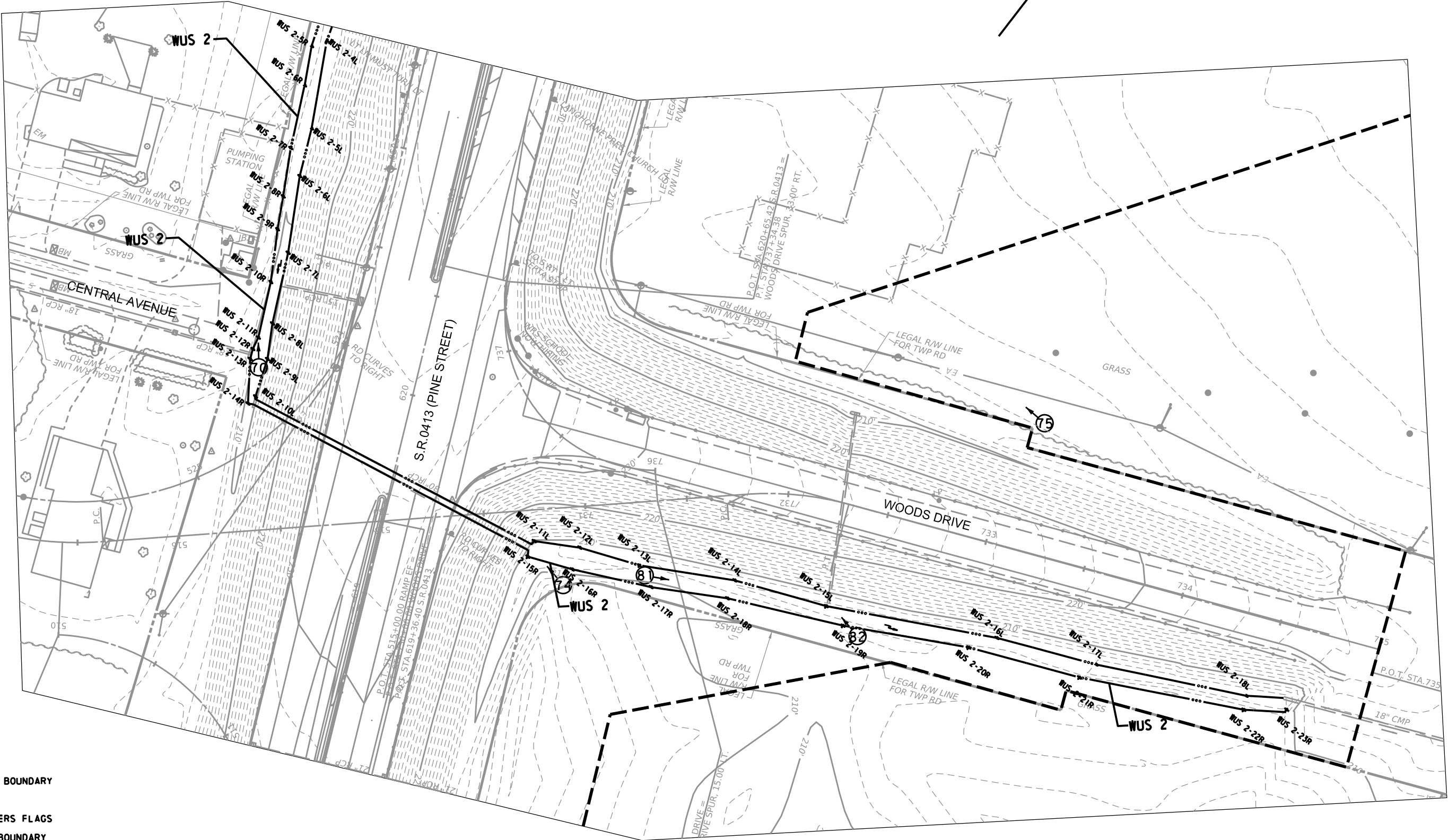
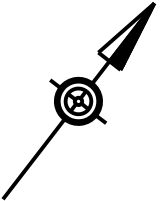
WETLAND AND WATERWAYS
DELINEATION PLAN

SCALE



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

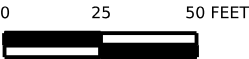
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP31 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

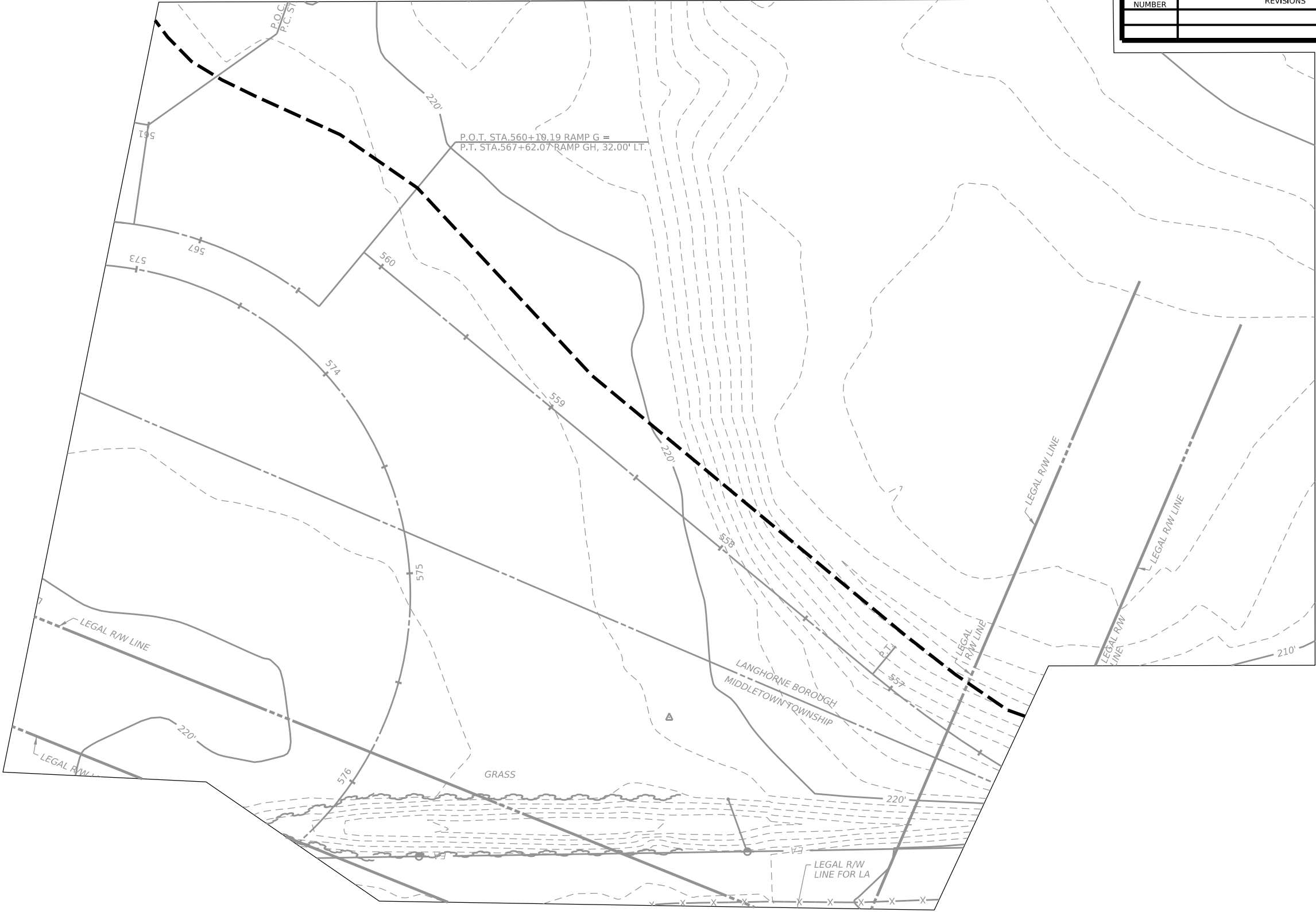
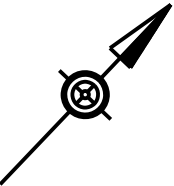
- Watercourse Boundary
- Wetlands
- Wetland/Waters Flags
- Study Area Boundary
- Existing Contours
- Data Point
- Photo Location/Direction

SCALE



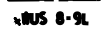
SURVEY BOOK NOS. 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, AND 10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP32 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

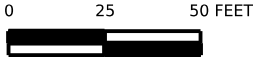


SEE PLAN SHEET WP33

LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

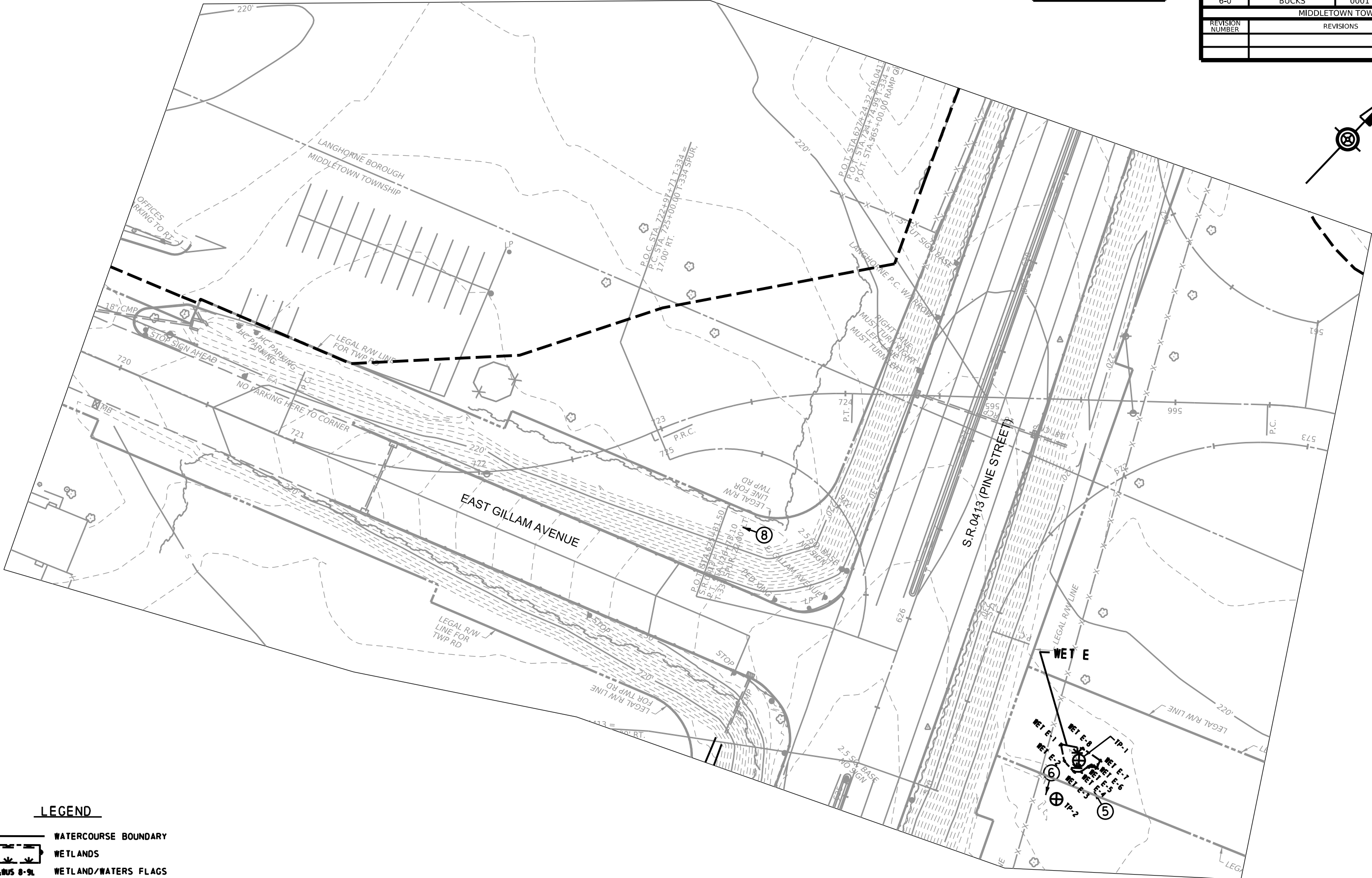
SEE PLAN SHEET WP20

\$FILES\$
\$DATE\$

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP33 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

SEE PLAN SHEET WP42

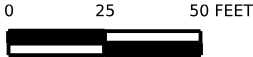


SEE PLAN SHEET WP32

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

SCALE

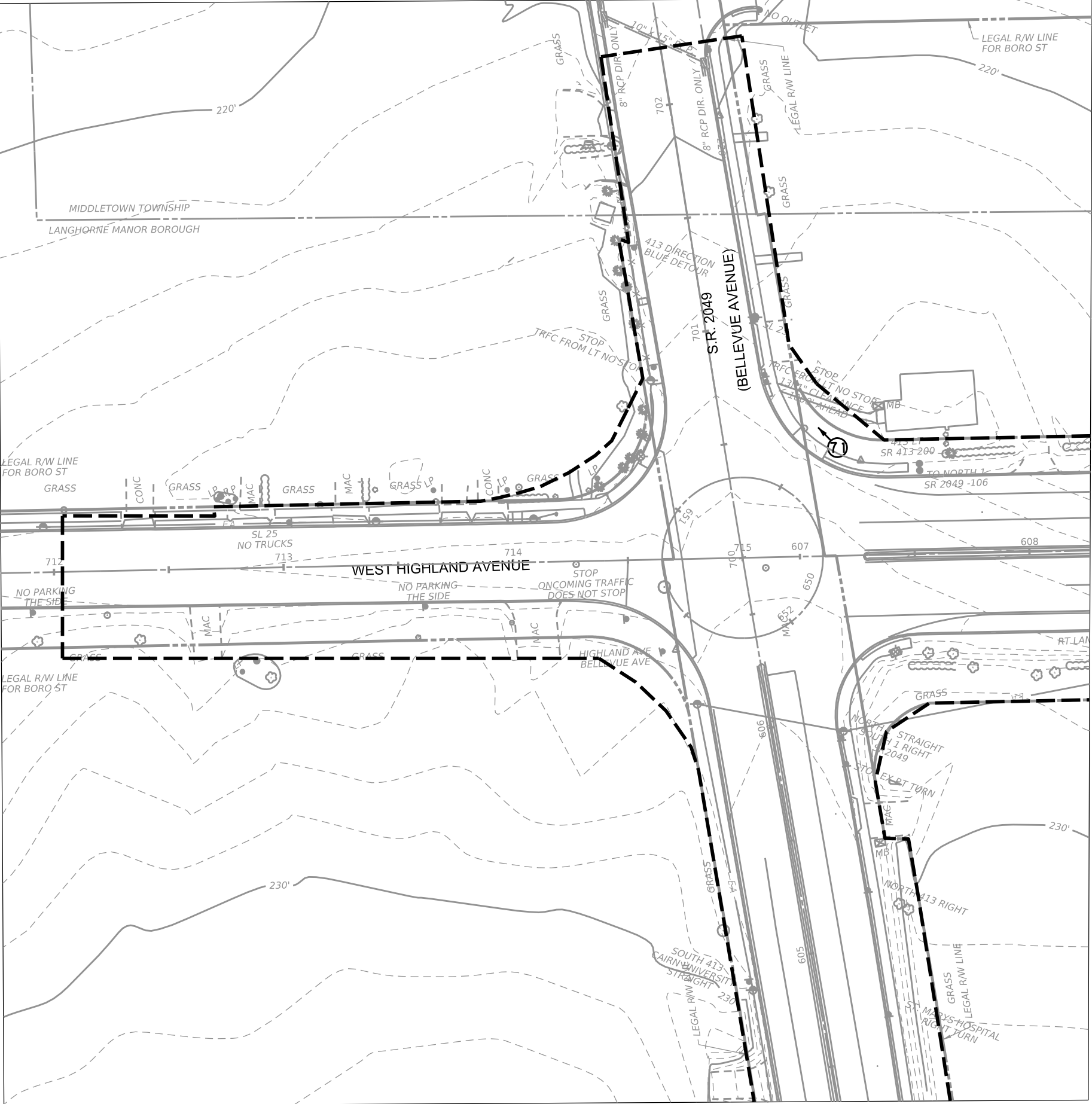


WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

SEE PLAN SHEET WP19

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP34 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



- LEGEND
- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

\$FILES\$

\$DATES\$

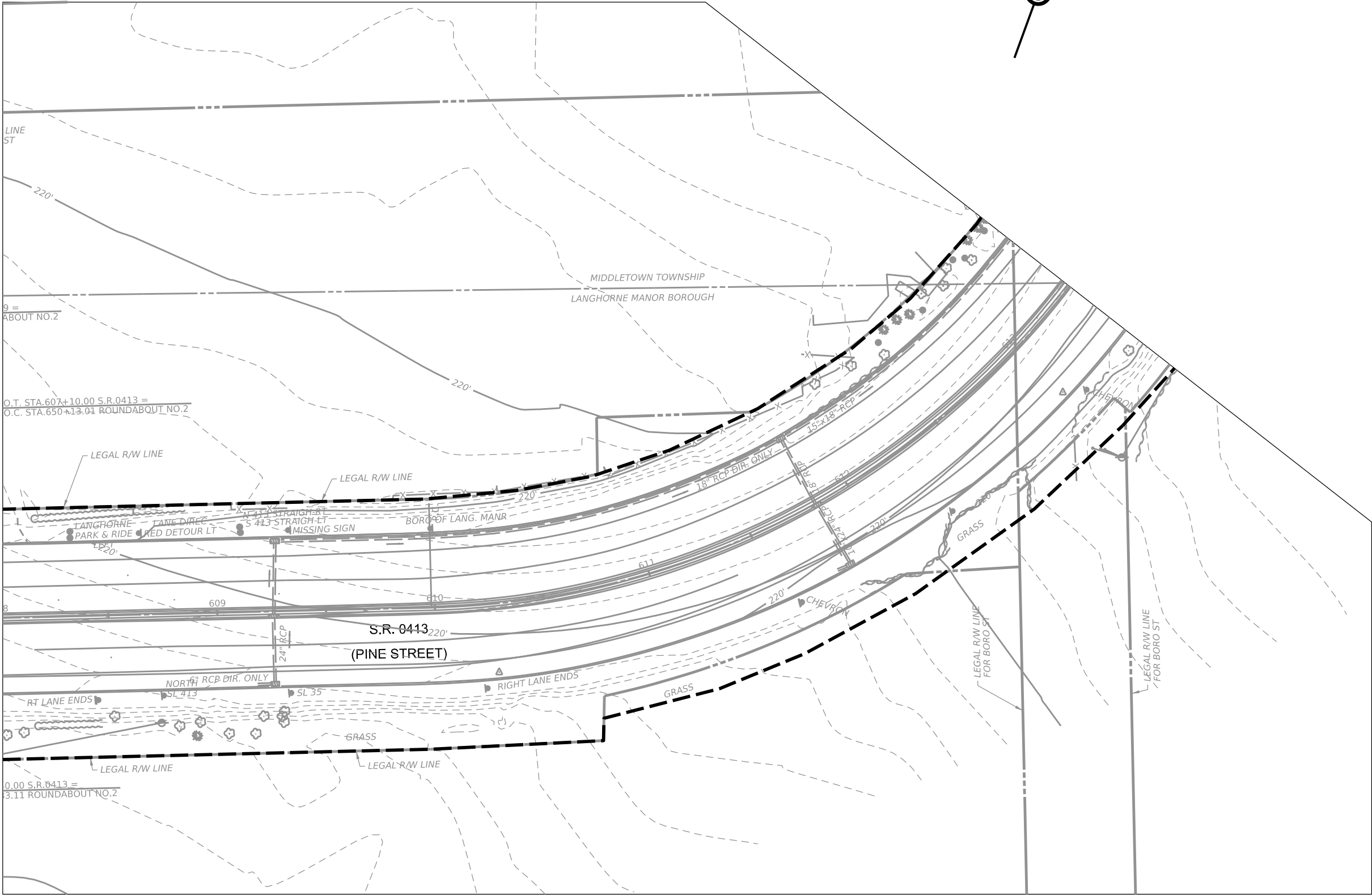
\$TIMES\$

SEE PLAN SHEET WP46

SURVEY BOOK NOS. 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, AND 10273

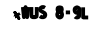
SEE PLAN SHEET WP35

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP35 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY
SEE PLAN SHEET WP36					

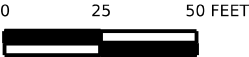


SEE PLAN SHEET WP34

LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

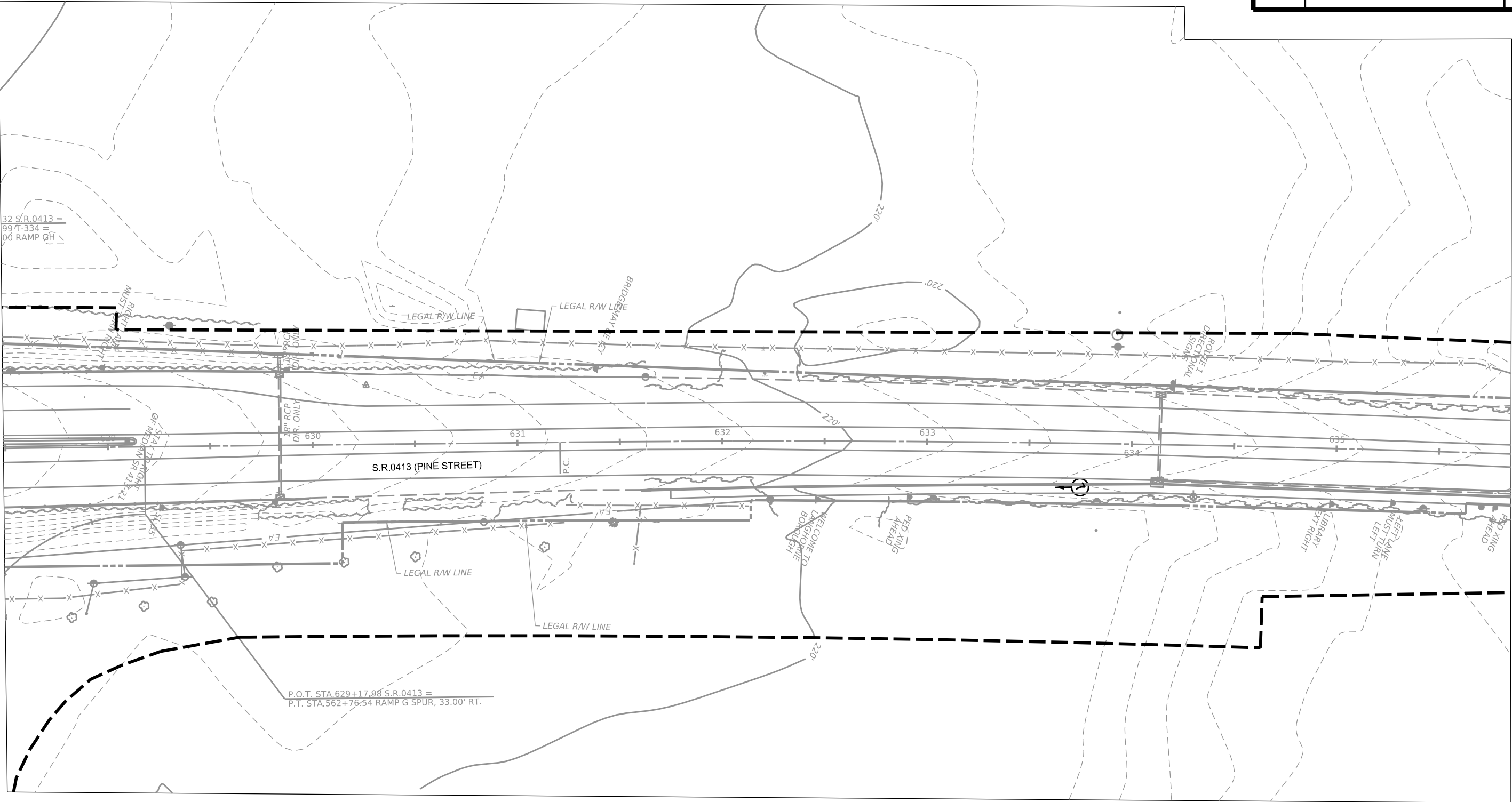
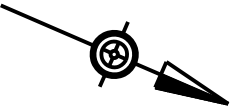
LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	0001	RC3	WP36 OF WP47
MIDDLETOWN TOWNSHIP				
REVISION NUMBER	REVISIONS			DATE BY



DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP37 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



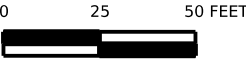
SEE PLAN SHEET WP33

SEE PLAN SHEET WP38

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

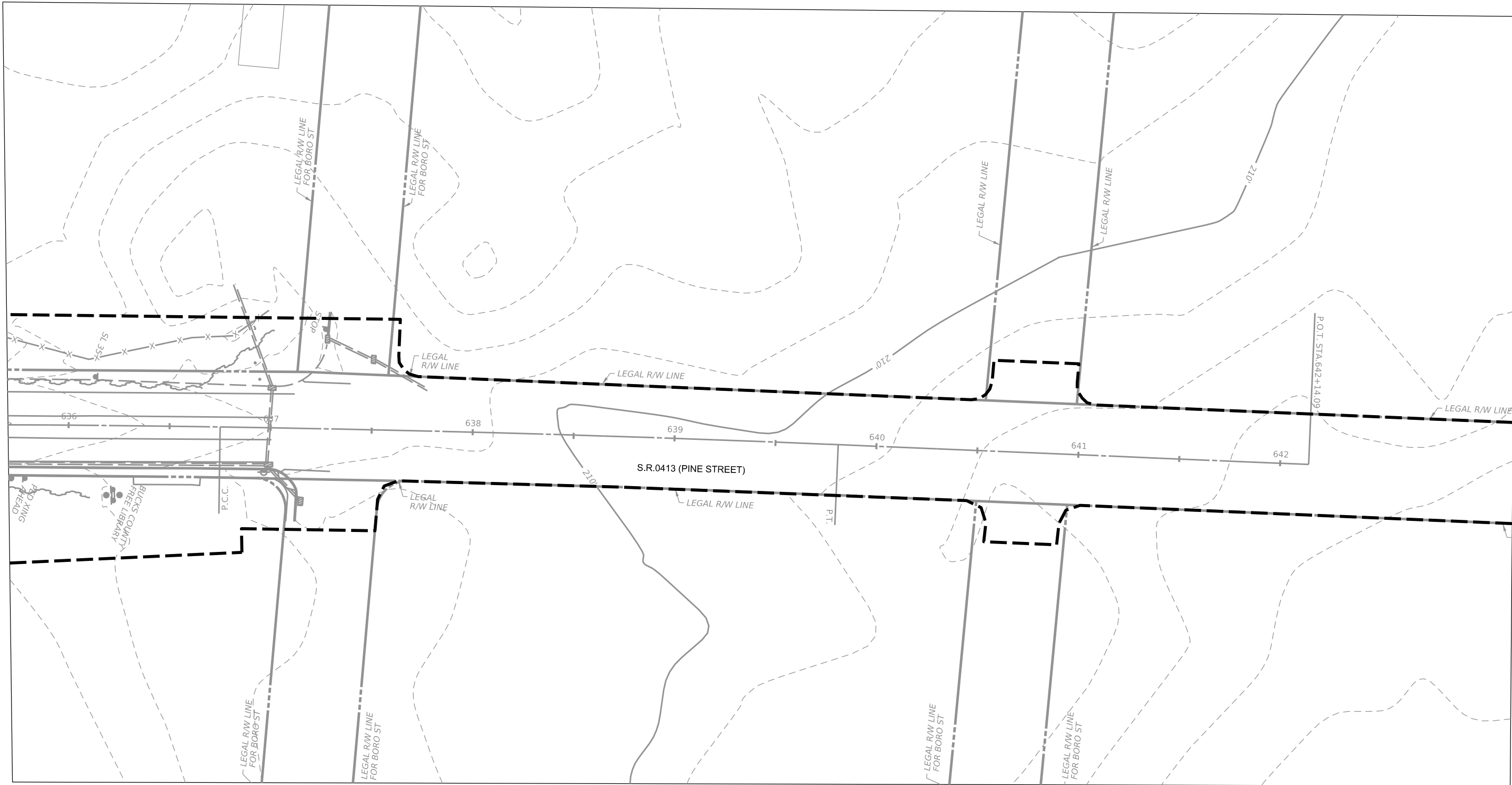
SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

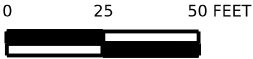
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP38 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

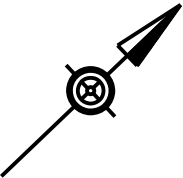
SEE PLAN SHEET WP37

SEE PLAN SHEET WP47

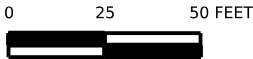
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP39 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION



SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP40 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

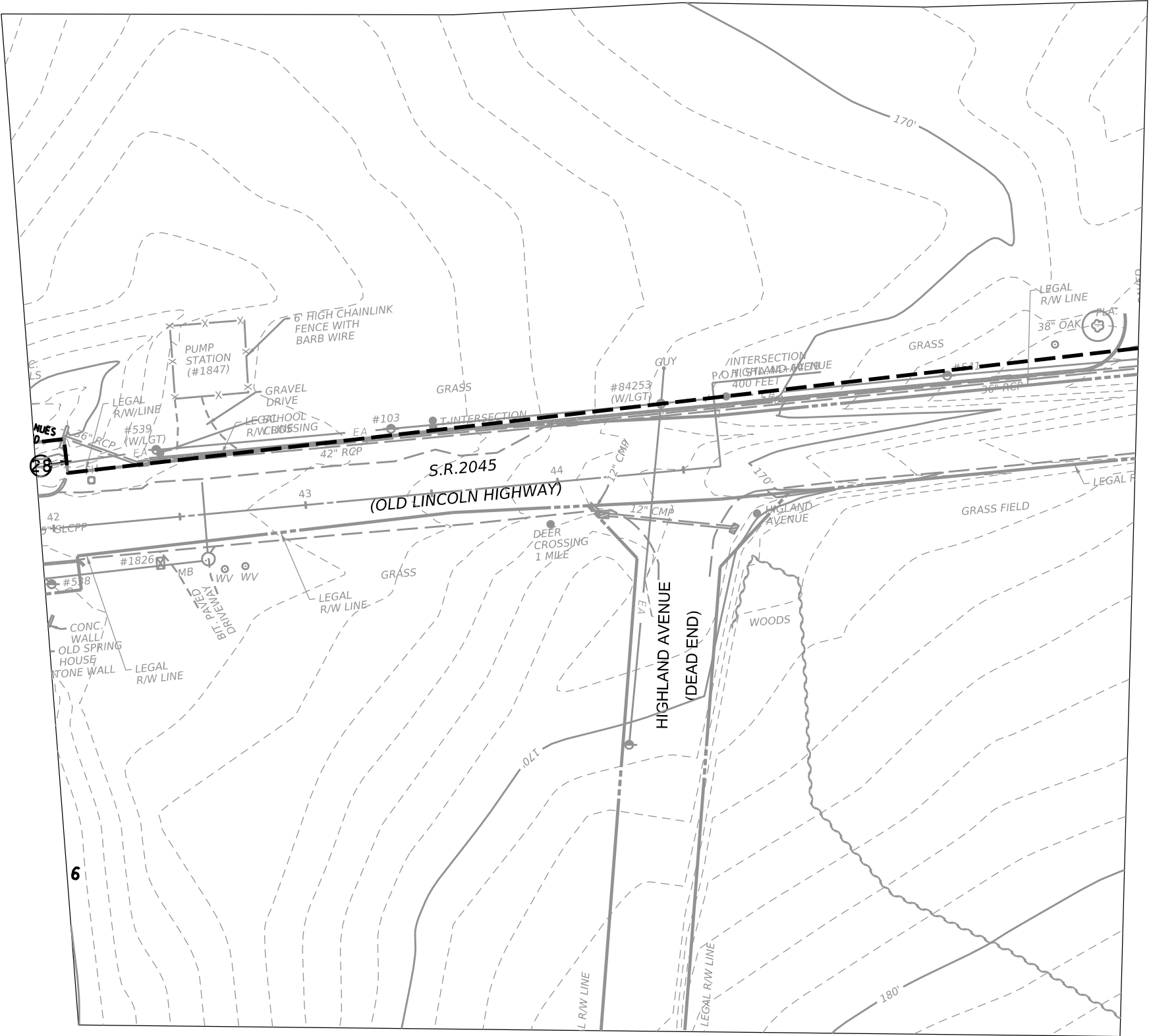
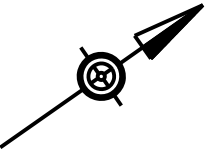
- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

**WETLAND AND WATERWAYS
DELINEATION PLAN**

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

SEE PLAN SHEET WP21

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP41 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



SEE PLAN SHEET WP24

SEE PLAN SHEET WP27

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

**WETLAND AND WATERWAYS
DELINEATION PLAN**

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

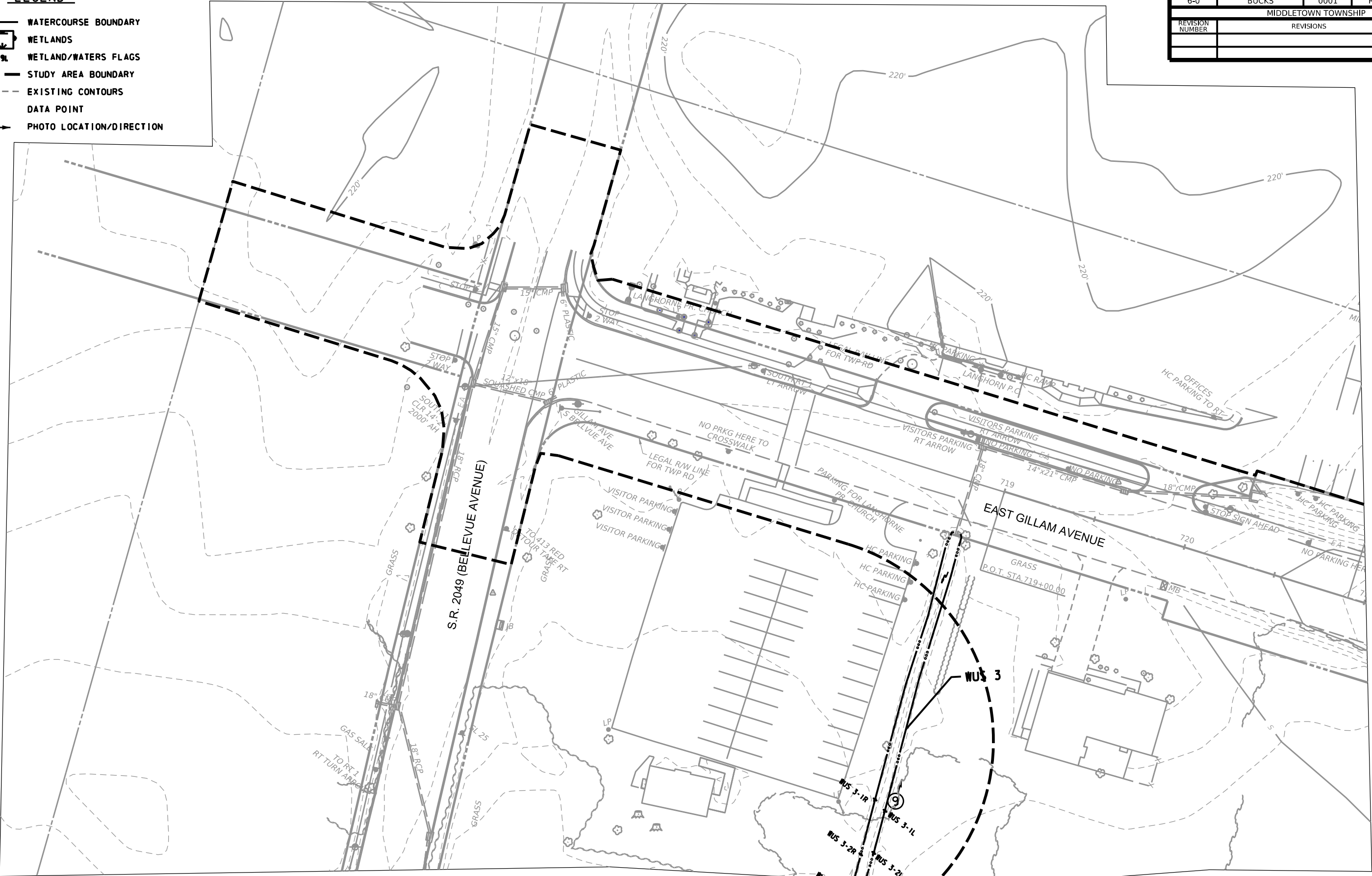
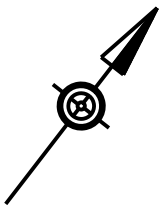
SEE PLAN SHEET WP05

\$FILES\$
\$DATE\$ \$TIMES\$

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP42 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

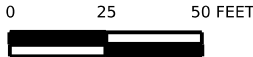
LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION



SEE PLAN SHEET WP33

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

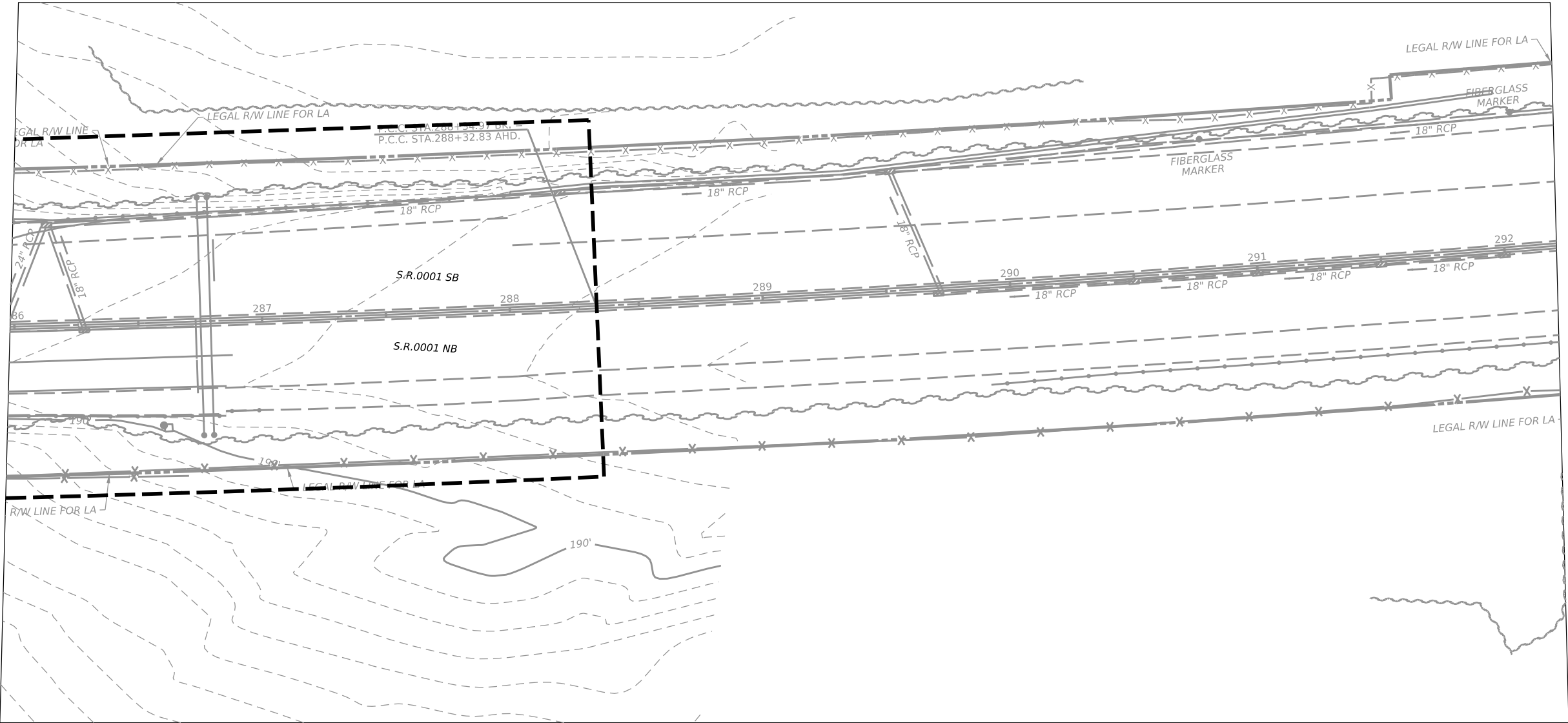
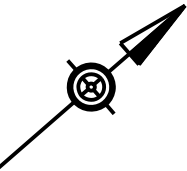
SEE PLAN SHEET WP18

\$FILES

\$DATES

\$TIMES

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP43 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

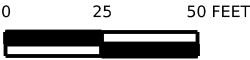


SEE PLAN SHEET WP22

LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

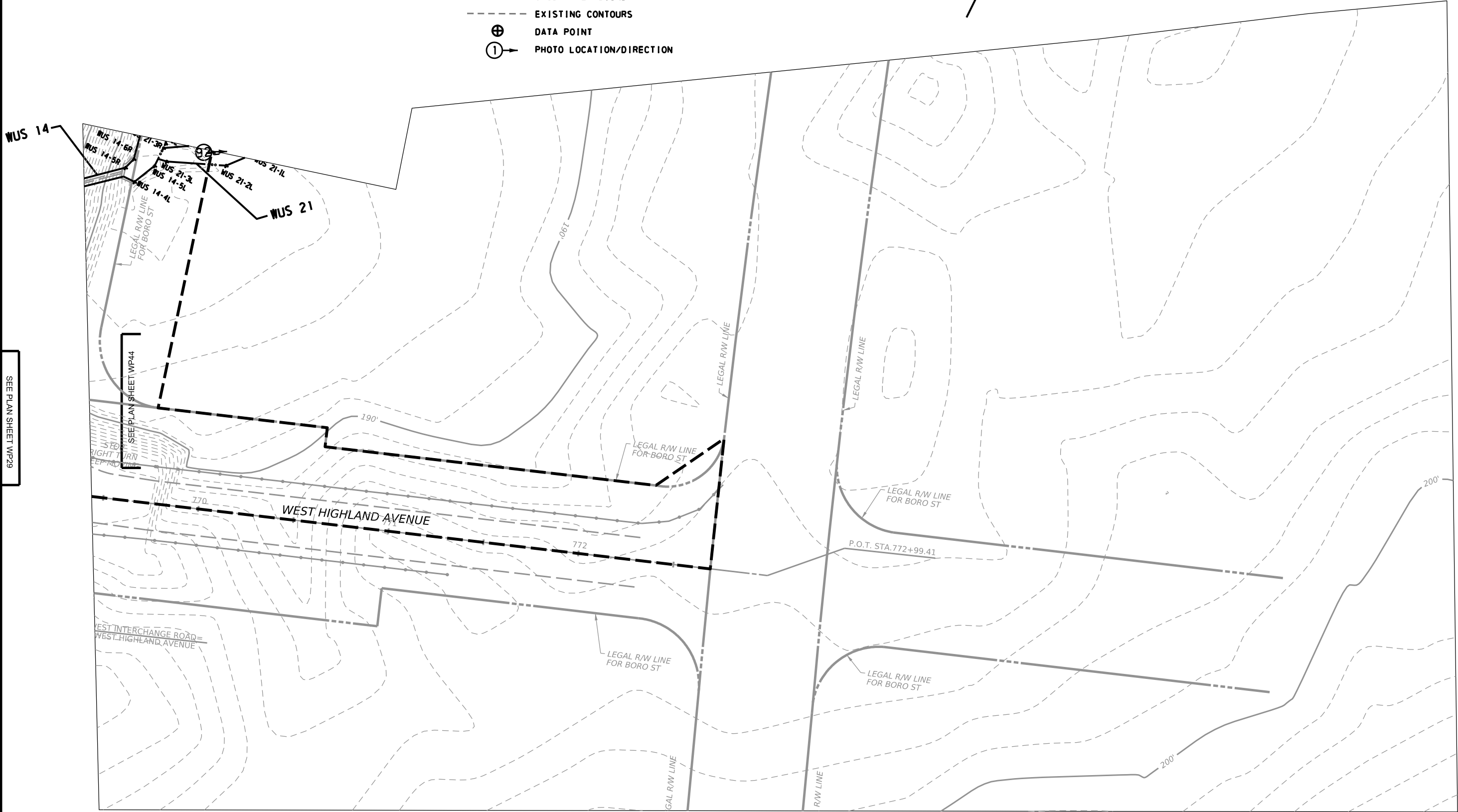
SEE PLAN SHEET WP14

SEE PLAN SHEET WP15

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP44 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

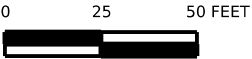
LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION



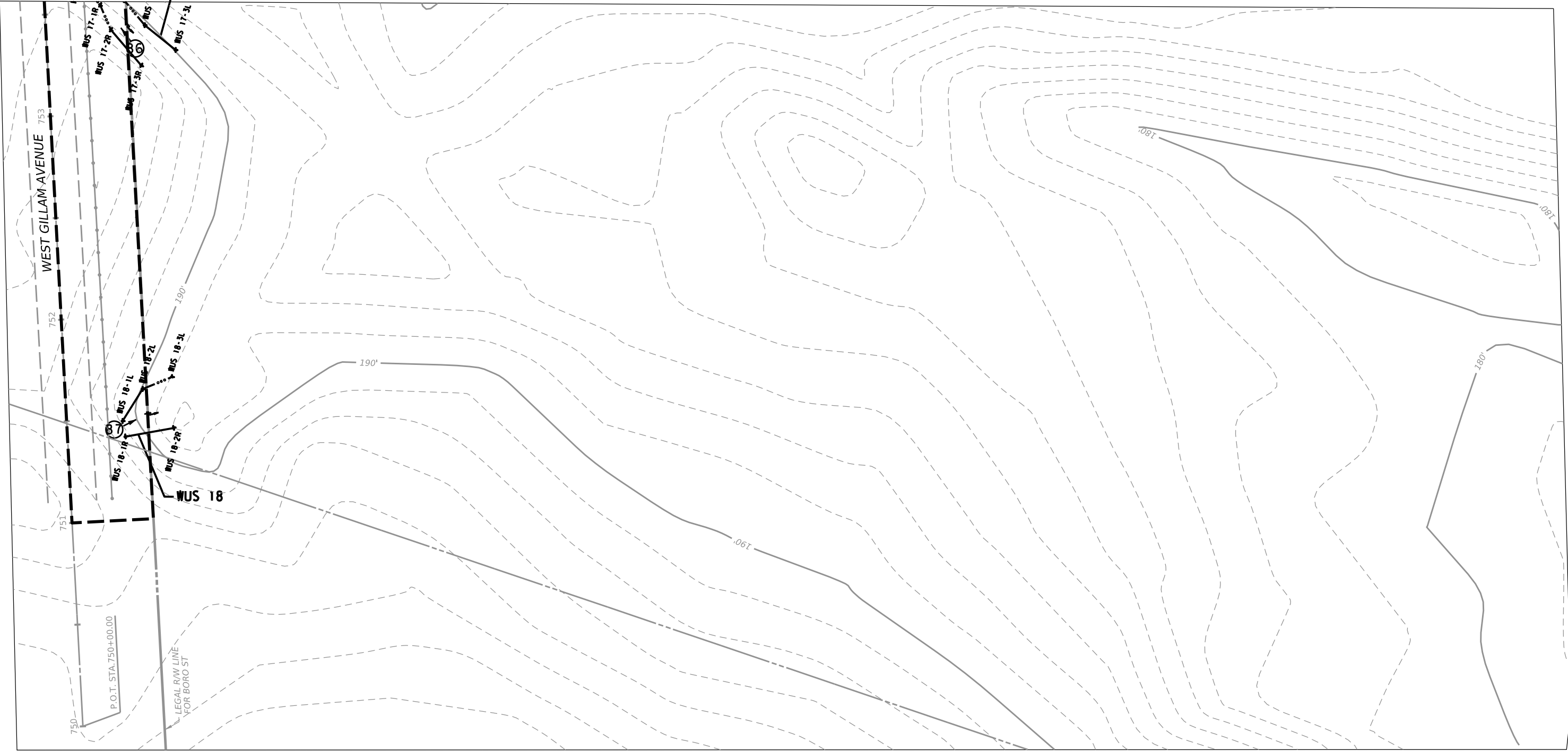
WETLAND AND WATERWAYS
DELINEATION PLAN

SCALE



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

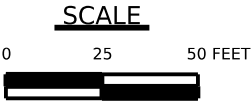
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP45 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

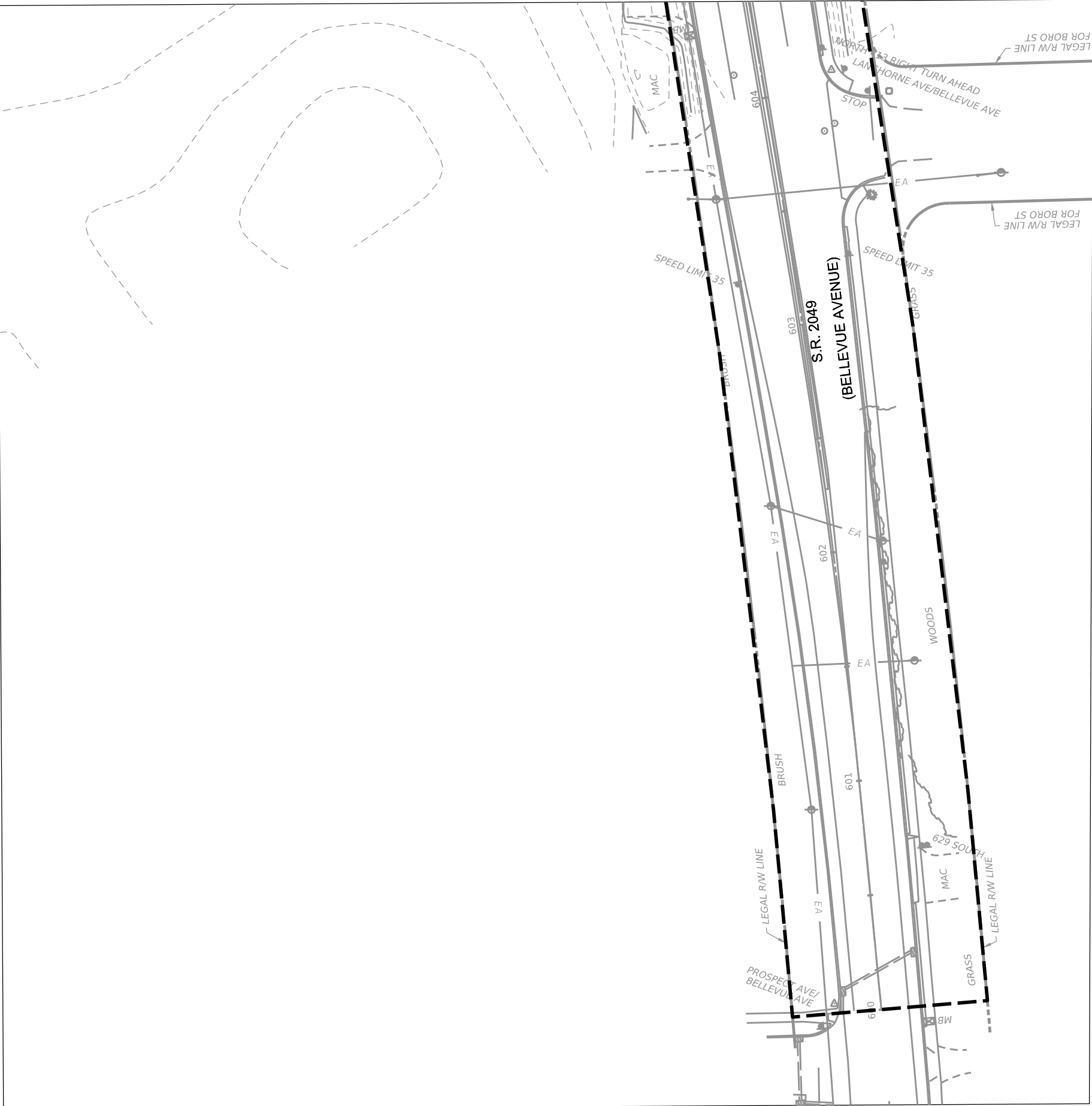
- WATERCOURSE BOUNDARY
- [Symbol] WETLANDS
- [Symbol] WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- - - EXISTING CONTOURS
- ⊕ DATA POINT
- ① → PHOTO LOCATION/DIRECTION

WETLAND AND WATERWAYS
DELINEATION PLAN



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP46 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY

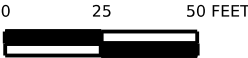


LEGEND

- WATERCOURSE BOUNDARY
- WETLANDS
- WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
- DATA POINT
- PHOTO LOCATION/DIRECTION

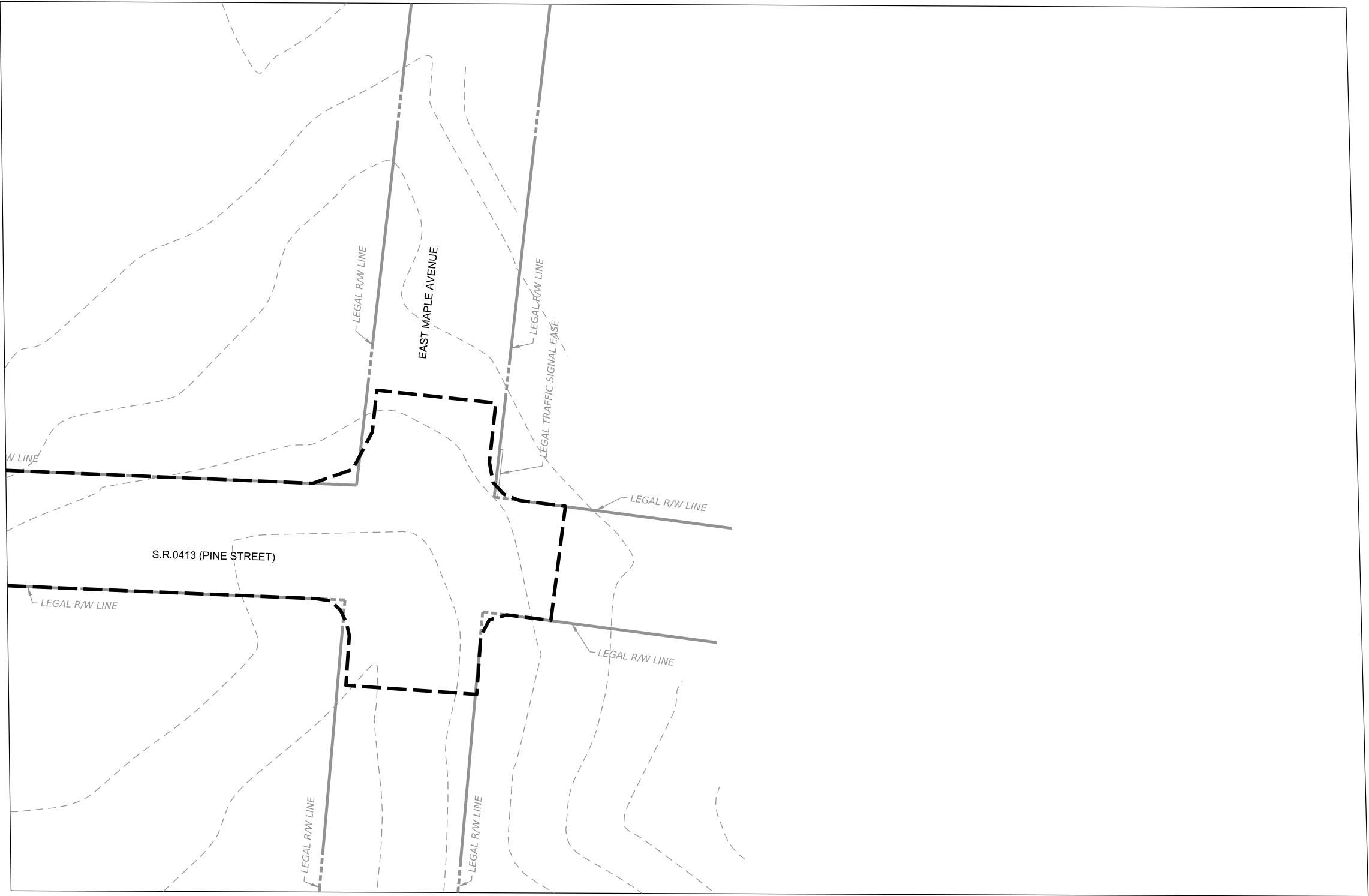
WETLAND AND WATERWAYS
DELINEATION PLAN

SCALE



SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

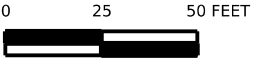
DISTRICT	COUNTY	ROUTE	SECTION	SHEET	
6-0	BUCKS	0001	RC3	WP47 OF WP47	
MIDDLETOWN TOWNSHIP					
REVISION NUMBER	REVISIONS			DATE	BY



LEGEND

- WATERCOURSE BOUNDARY
-  WETLANDS
-  WETLAND/WATERS FLAGS
- STUDY AREA BOUNDARY
- EXISTING CONTOURS
-  DATA POINT
-  PHOTO LOCATION/DIRECTION

SCALE



WETLAND AND WATERWAYS
DELINEATION PLAN

SURVEY BOOK NOS. 10428, 10429, 10430,
10431, 10432, 10433, 10434, 10435, AND
10273

SEE PLAN SHEET WP38