Appendix M

Surface Water Assessment Plans

Appendix M.1

Surface Water Sampling and Analysis Plan

Version 1.0

March 15, 2025

UPPER MAKEFIELD RESPONSE
WASHINGTON CROSSING, PENNSYLVANIA
SURFACE WATER SAMPLING AND ANALYSIS PLAN (SW-SAP)

Version 1.0

Prepared on Behalf of:
Energy Transfer LP

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March 15, 2025

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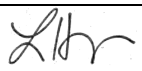
Reviewed by:	Lisa Howes, CTEH		3/15/2025
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1.0 Introduction and Purpose

This Surface Water Sampling and Analysis Plan (SW-SAP) was prepared by CTEH, LLC (CTEH) on behalf of Energy Transfer LP (Energy Transfer) in relation to the Upper Makefield Response in Washington Crossing, Pennsylvania. A leak from a pipeline that transports refined petroleum products, including jet fuel, was identified in January 2025. The GPS coordinates for the approximate location of the release site (hereinafter referred to as Site) are: 40.271184, -74.875953. A map of the incident location is provided in Attachment A.

The objectives of the environmental investigation and proposed sampling include:

1. The collection of surface water samples to delineate extent and nature of potential impact related to the incident; and
2. The collection of background samples to determine a baseline and develop the range of potential background concentrations for comparative purposes and to distinguish between target analytes related to this incident and non-related target analytes.

2.0 Health and Safety

CTEH sampling personnel will review and adhere to the site-specific Health and Safety Plan. Sampling and documentation activities will be conducted only under weather and other environmental conditions that do not create an unsafe working environment.

3.0 Data Quality Objectives

The data collected during field activities will be used to assess potential exposures to surface water related to jet fuel and its potential constituents and to evaluate the potential impacts to human and environmental health related to these constituents.

A strategic planning approach based on scientific method will be employed for data collection activities providing a systematic procedure to ensure the type, quantity and quality of data used in decision-making will be appropriate for the intended application. All samples will be submitted to the analytical laboratory for a Level II data quality package. Additionally, 10% of samples may be submitted to the analytical laboratory for a Level IV data quality package.

4.0 Surface Water Monitoring and Sampling

4.1 Surface Water Monitoring

Monitoring will be conducted at surface water sampling locations using a Horiba multi-parameter water quality meter, or equivalent. Surface water monitoring will be conducted concurrently with sample collection and will include the following parameters:

- Temperature (°C)
- pH (0-14 standard units)
- Conductivity (Siemens/meter)
- Dissolved Oxygen (milligrams/liter)
- Turbidity (NTU)

Observations of product, sheen, and odor (or lack thereof) will be made at each surface water sampling location (e.g., visual observation of separate phase liquids, color, and clarity; character and strength of odor). Observations, along with other details about the sampling event, will be recorded electronically using a hand-held data collection device and/or recorded in a log dedicated to this project. The water quality meters in use on this project will be calibrated daily and in accordance with the manufacturer's specifications.

4.2 Surface Water Sampling Methodology and Analysis

Surface water samples will be decanted directly into laboratory supplied sample containers appropriate for the intended analysis and submitted to Pace Analytical (Pace) in Westborough, Massachusetts for laboratory analysis as presented in **Table 1**. Target analytes are the following VOCs: benzene, toluene, ethylbenzene, total xylenes, m/p-xylene, o-xylene, methyl tert-butyl ether (also known as methyl tertiary butyl ether or MTBE), (1-methylethyl)benzene (also known as isopropyl benzene), naphthalene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and 1,2-dichloroethane (also known as ethylene dichloride or EDC); and total petroleum hydrocarbons (TPH) reported as diesel range organics (DRO) and gasoline range organics (GRO).

Water quality parameters will be recorded for each surface water sample in accordance with Section 4.1. Surface water sampling may also involve the collection of water at various depths.

Table 1 Surface Water Sampling Analysis Summary

Analysis	Method	Sample Container	Preservative	Hold Time
Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics (GRO)	US EPA Method 8015	2 x 40 mL HCl VOA vials	HCl to pH < 2; Ice, maintained at 0-6°C	7 days to extraction
Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO)	US EPA Method 8015	2 x 500 mL amber container	Ice, maintained at 0-6°C	14 days
Volatile Organic Compounds (VOCs)[1]	US EPA Method 8260	3 x 40mL HCl VOA vials	HCl to pH < 2; Ice, maintained at 0-6°C	14 days

1: benzene, toluene, ethylbenzene, total xylenes, m/p-xylene, o-xylene, methyl tert-butyl ether (MTBE), naphthalene, isopropyl benzene, 1,2,5-trimethylbenzene, 1,2,4-trimethylbenzene, 1,2-dichloroethane (EDC)

4.3 Location and Frequency

Surface water samples will be collected from surface water bodies near and downstream from the Site. Samples collected upstream from the Site will be used to evaluate background concentrations.

Initial sampling locations shall be locations that provide safe, public access, including the following (also shown in **Attachment B**):

- W001: Delaware Canal – upstream at Washington Crossing
- W002: Delaware Canal – at pipeline crossing
- W003: Delaware Canal – at mouth of unnamed creek
- W004: Delaware Canal – at mouth of Dyers Creek
- W005: Delaware River – upstream at Washington Crossing Bridge
- W006: Delaware River – at pipeline crossing/Houghs Creek

Sampling locations may be added, removed, or edited based on a review of the preliminary results and/or a change in operational areas and activities.

Surface water samples will be collected once per week. Additional sampling may occur after rainfall events totaling >1" over a 24-hour period and following observations of product, sheen or odor on/near a water body. Surface water samples will be collected until the risk to surface water is reduced to an acceptable level to Energy Transfer and relevant agencies.

5.0 Screening Levels

Sampling results will be compared to background concentrations and EPA Region III Biological Technical Assistance Group (BTAG) Freshwater Screening Benchmarks[1]. If water sampling results indicate that concentrations of target analytes are below their respective background concentrations or screening values, no further action will be required. Exceedances of risk-based screening levels do not necessarily indicate the existence of a health or ecological concern. If exceedances are observed, additional site-investigation(s), including but not limited to additional sampling, may be performed.

6.0 Sample Handling Procedures

Samples will be placed in laboratory-supplied sample containers, appropriate for the intended analysis, labeled, and immediately placed in a cooler on ice pending laboratory analysis. Samples will be packaged, labeled, retained on ice, and documented in an area which is free of impact and provides for secure storage. Custody seals will be placed on each sample containing cooler, and chain-of-custody procedures will be maintained from the time of sample collection until arrival at the laboratory to protect sample integrity. Shipping or transporting of samples to the laboratory will be done within a timeframe that meets recommended holding times.

[1] https://www.epa.gov/sites/default/files/2015-09/documents/r3_btag_fw_benchmarks_07-06.pdf

7.0 Sample Labeling

Sample containers will be clearly labeled with the following information:

- Unique sample identification;
- Sample Type (discrete or composite, sediment and/or soil samples only);
- Sampler name or initials;
- Date sample collected;
- Time sample collected; and
- Analysis to be performed.

Acceptable QA designations include MS/MSD (1 per 20 samples by media), rinsate blank (RB) only when using non-dedicated sampling equipment, duplicates (1 per 10 samples by media), and field blanks (once daily).

8.0 Quality Assurance

Sampling will be carried out in conjunction with a well-defined quality assurance (QA) program. The goal of the field QA program is to document that samples are collected without the effects of accidental cross- or systematic contamination and refers to the sampling, analysis, and data validation procedures for generating valid and defensible data. To provide QA for the proposed sampling event, the following sampling, analysis, and data validation procedures may be performed as deemed necessary by the CTEH project manager, project technical director, or environmental lead in accordance with sampling equipment and activities:

Table 2 Quality Control Sample Summary

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria
Trip Blank (TB), matrix matched[1]	VOCs	One set of vials per cooler	Accuracy / Bias / Contamination	Target analyte(s) detected in the associated project samples must have concentrations <1/2 the LOQ
Field Blank[2], co-located	All	One daily	Accuracy / Bias / Contamination	
Field Duplicate, co-located	All	One per 10 field samples per matrix	Precision / Representativeness	If both the original and duplicate results are ≥ 5× LOQ, the RPD is recommended to be ≤ 30%* for aqueous samples. If either the original and duplicate results are < 5× LOQ, the difference should be ≤ the LOQ for aqueous samples

Matrix Spike / Matrix Spike Duplicate[3], co-located	All, excluding pH	One per 20 field samples per matrix	Accuracy / Bias / Contamination / Representativeness	Accuracy and precision criteria as documented by the laboratory
Rinsate Blank[4]	All	One per 10 field samples per matrix; or one daily	Accuracy / Bias / Contamination	
Cooler Temperature Blank[5]	Temperature only	One per cooler	Representativeness	Upon arrival at the laboratory, samples may not exceed 6°C and aqueous samples may not be frozen. For samples received the same day of collection, evidence of cooling must be present. During laboratory storage, samples must be maintained at a temperature between 0°C and 6°C. Samples must not be frozen, with the exception of water-preserved VOC samples, which must be frozen within 48 hours of collection.

[1]TBs will be included in bottle shipments from the laboratory. Aqueous TBs will be prepared using VOC-free water in a 40mL preserved VOA vial with no headspace. At the sampling site, a TB will be packed in each cooler containing VOC samples and shipped to the laboratory with the site samples and required documentation (e.g., chain-of-custody form).
[2]Water used for FBs will be target analyte-free water provided by the laboratory. At the sampling site, when ready to collect an FB, the FB water provided by the laboratory will be opened, along with a corresponding empty bottle also provided by the laboratory. The FB water will be poured into the empty (receiving) sample bottle, the cap will be closed, and this filled bottle will be labeled as the FB. The FB will be packed and shipped to the laboratory with the site samples and required documentation (e.g., COC form).
[3]Known quantities of the method analytes are added to this preserved field sample in the laboratory. The MS is processed and analyzed exactly like a sample to determine whether the sample matrix contributes bias to the analytical results. The background concentrations of the analytes in the sample matrix must be determined in a separate sample extraction, and the measured values in the MS must be corrected for background concentrations.
[4]In the event of reusing equipment and needing to decontaminate in the field, rinsate blank would be collected for any sample equipment using target analyte-free water. Equipment rinsate blanks would be collected if the sampling equipment or sample bottles are not certified clean by the vendor or laboratory providing the equipment.
[5]Samples requiring thermal preservation must be placed on ice upon collection. If no temperature blank is provided, a representative sample container from each cooler will be used to measure the temperature (with an infrared thermometer).

8.1 Field Calibration

Instruments used in the field as part of this sampling event are anticipated to consist of water quality meters, pH meters, conductivity meters, GPS units, digital cameras, and handheld data collection devices such as tablets/smart phones. Equipment requiring calibration will be maintained daily in accordance with manufacturer recommendations and instruction. Operators of each piece of equipment are responsible

for maintaining (including proper battery charge) and operating this equipment such that it conforms to each respective manufacturer's specifications.

8.2 Trip Blanks

Trip blanks identify contamination in on-site sample handling and transportation. They are prepared by the laboratory and travel with samples to and from the laboratory to ensure that analyte or compound detections in investigative samples are not a result of contamination during the handling or sampling process prior to analysis. One trip blank will be placed in each sample-containing cooler prior to transport to the laboratory for VOC analysis. Additional trip blanks may be included at the discretion of the CTEH project manager, project technical director, or environmental lead.

8.3 Field Blank Samples

Field blank samples identify on-site contamination in sample collection, handling, and analysis. Field blanks will be prepared by providing a set of samples containers filled with distilled water (preferably provided by the laboratory) prepared in the field. The submitted field blank will be submitted such that the laboratory is not aware that it is a blank (i.e., the sample ID will not identify it as a "blank" for any specific sample location). At least one field blank will be collected each day field samples are collected.

8.4 Field Duplicate Sample

For approximately every ten samples collected in the field, one field duplicate will be collected and submitted for laboratory analyses to verify the reproducibility of the sampling methods. Field duplicates will be collected at the same time and location as the parent sample and will be submitted as a separate sample to the laboratory for analysis consistent with the proscribed analyses. The submitted duplicate will be submitted such that the laboratory is not aware that it is a duplicate (i.e., the sample ID will not identify it as a "duplicate" for any specific sample location).

8.5 Field Split Samples

Split sampling is a technique where multiple samples are collected from the same location at the same time and then sent to separate laboratories for analysis. Split sampling may facilitate sampling across multiple parties (i.e. stakeholders and regulatory agencies) and/or may be collected to determine accuracy of the data being reported. Field split samples may be collected at the discretion of representatives of the regulatory agency or Incident Command.

8.6 Matrix Spike/Matrix Spike Duplicate Samples

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples refer to field samples spiked with the analytes of interest prior to being analyzed at the laboratory to gauge the quality of analysis. Approximately one in twenty samples will be analyzed as MS/MSD samples.

8.7 Laboratory Quality Assurance

Laboratory quality control procedures will be conducted in a manner consistent with relevant State and federal regulatory guidance. Deliverables will contain the supporting documentation necessary for data validation. Internal laboratory quality control checks will include method blanks, matrix spikes (and matrix spike duplicates), surrogate samples, calibration standards, and laboratory control standards (LCSs).

8.8 Data Verification/Validation

Third-party data verification/validation will be performed by Environmental Standards, Inc. Data verification/validation will include, at a minimum, sample holding times, accuracy, precision, contamination of field-generated or laboratory method blanks, and surrogate compound recovery. Accuracy will be determined by evaluating LCS and MS recovery. Precision will be determined by evaluating laboratory and field duplicate samples.

Level II data verification will be performed on 100% of the samples. Additionally, Level IV data validation will be performed on approximately 10% of the samples. The components of data verification/validation are summarized in **Table 3**.

Table 3. Summary of Data Verification/Validation Levels

Data Verification/ Validation Level	Definition
Level I	Sample data reporting only
Level II	Complete QC, including data blanks, spikes, duplicates (including matrix spike duplicates), laboratory control samples, relative percent difference (RPD), and percent recovery
Level III	Items listed in Level 2 plus QC limits and QA batch cross-reference table
Level IV	Items listed in Levels 2 and 3, including sample raw data and chromatograms

9.0 Decontamination Procedures

Decontamination procedures refer to the steps taken to minimize the potential for offsite contamination and cross-contamination between individual sampling locations. Prior to collecting any sample, the following decontamination procedures will be undertaken: non-disposable sampling equipment such as stainless-steel dippers which come into contact with sampling media will be decontaminated using a bristled brush and a solution comprised of a laboratory grade, non-phosphate detergent (e.g., Alconox or Liquinox) and deionized water. Depending on ancillary activities being conducted for the response to this release, the decontamination of sampling equipment will be conducted over poly sheeting at the sample location or in a nearby designated area. The sampling equipment to be decontaminated will first be placed in a container with detergent solution and thoroughly washed using a bristled brush. The items will then

rinsed at least three times with clean distilled water. Following the initial rinsing, the item will be visually inspected prior to a final rinsing. Rinse waters will be collected in a container such as a 5-gallon bucket and transported to central collection area for proper disposal. Containers will be closed with a lid during transport to avoid splashing and loss of rinse water. Decontaminated items will be wrapped in clean aluminum foil for transit to the next sampling location.

Nitrile gloves will be worn by sampling personnel and changed between activities at each discrete sample collection location. Previously worn nitrile gloves will be discarded in appropriate waste receptacles for personal protective equipment (PPE).

10.0 Waste Disposal

Decontamination fluids and contaminated PPE will be containerized and collected at the designated on-site waste staging area. All waste produced on-site will be managed and disposed of in a manner consistent with regulatory guidelines and requirements.

All produced waste on-site will be managed and disposed of in a manner consistent with regulatory guidelines and requirements.

11.0 Data Analysis

Validated water sampling results will be used to evaluate the potential impacts to surface water related to jet fuel and its potential constituents. Water sampling results will be reviewed for the presence/absence of target analytes and, if a target analyte is detected, the concentration of the analyte will be compared to relevant screening levels. Background concentrations of target analytes may be determined by evaluating the results of water samples collected at upgradient, cross-gradient, or upstream of the incident site, or by obtaining publicly available data to determine historic background concentration. The results of laboratory analyses will be provided to Energy Transfer.

12.0 Records Management

Records management refers to the procedures for generating, controlling, and archiving project-specific records and records of field activities. Project records, particularly those that are anticipated to be used as evidentiary data, directly support current or ongoing technical studies and activities, and provide historical evidence needed for later reviews and analyses, will be legible, identifiable, retrievable, and protected against damage, deterioration, and loss on a centralized electronic database. Handwritten records will be written in indelible ink. Records may include, but are not limited to, the following: bound field notebooks on pre-numbered pages, sample collection forms, personnel qualification and training forms, sample location maps, equipment maintenance and calibration forms, chain-of custody forms, maps and drawings, transportation and disposal documents, reports issued as a result of the work, procedures used, correspondences, and any deviations from the procedural records. Documentation

errors will be corrected by drawing a single line through the error so that it remains legible and writing the correction adjacent to the error; the change will be initialed by the responsible individual, along with the date of change.

Appendix A: Site Location

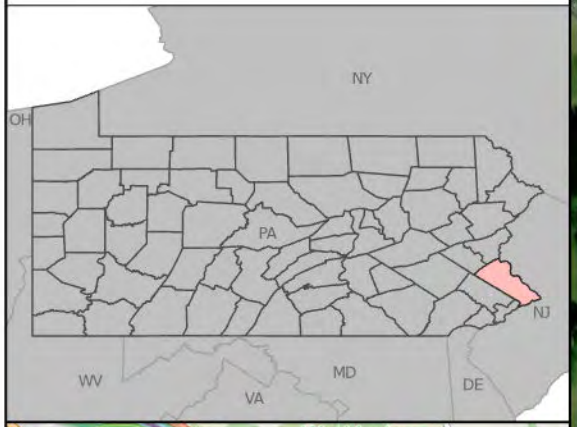
CTEH®

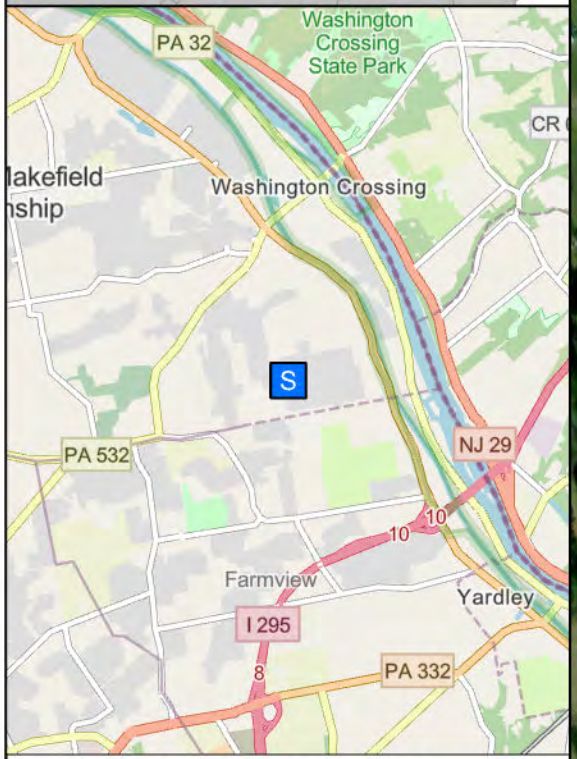
Upper Makefield Response

Incident Location

Washington Crossing, PA | Bucks County

PROJ-051861





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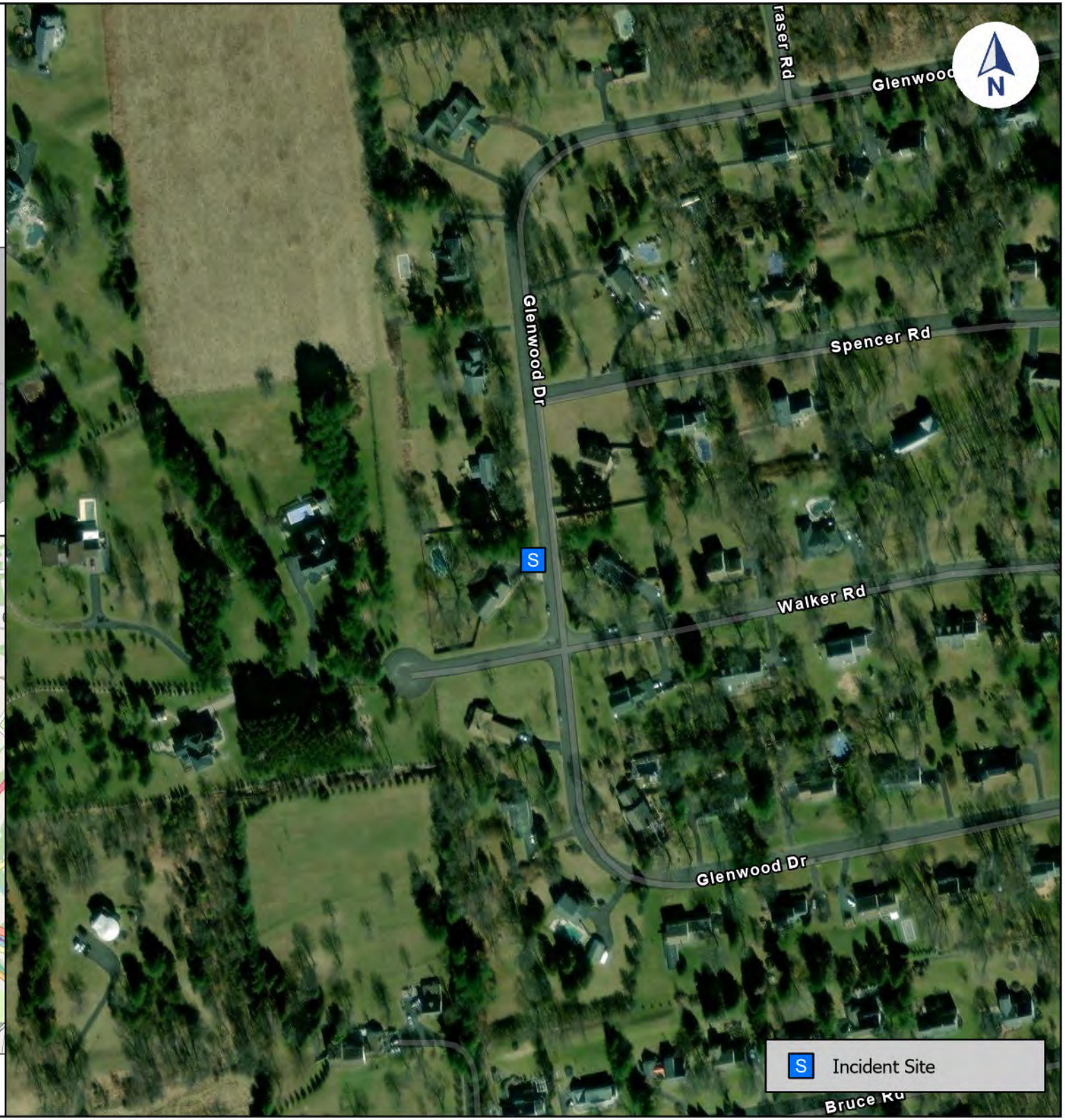
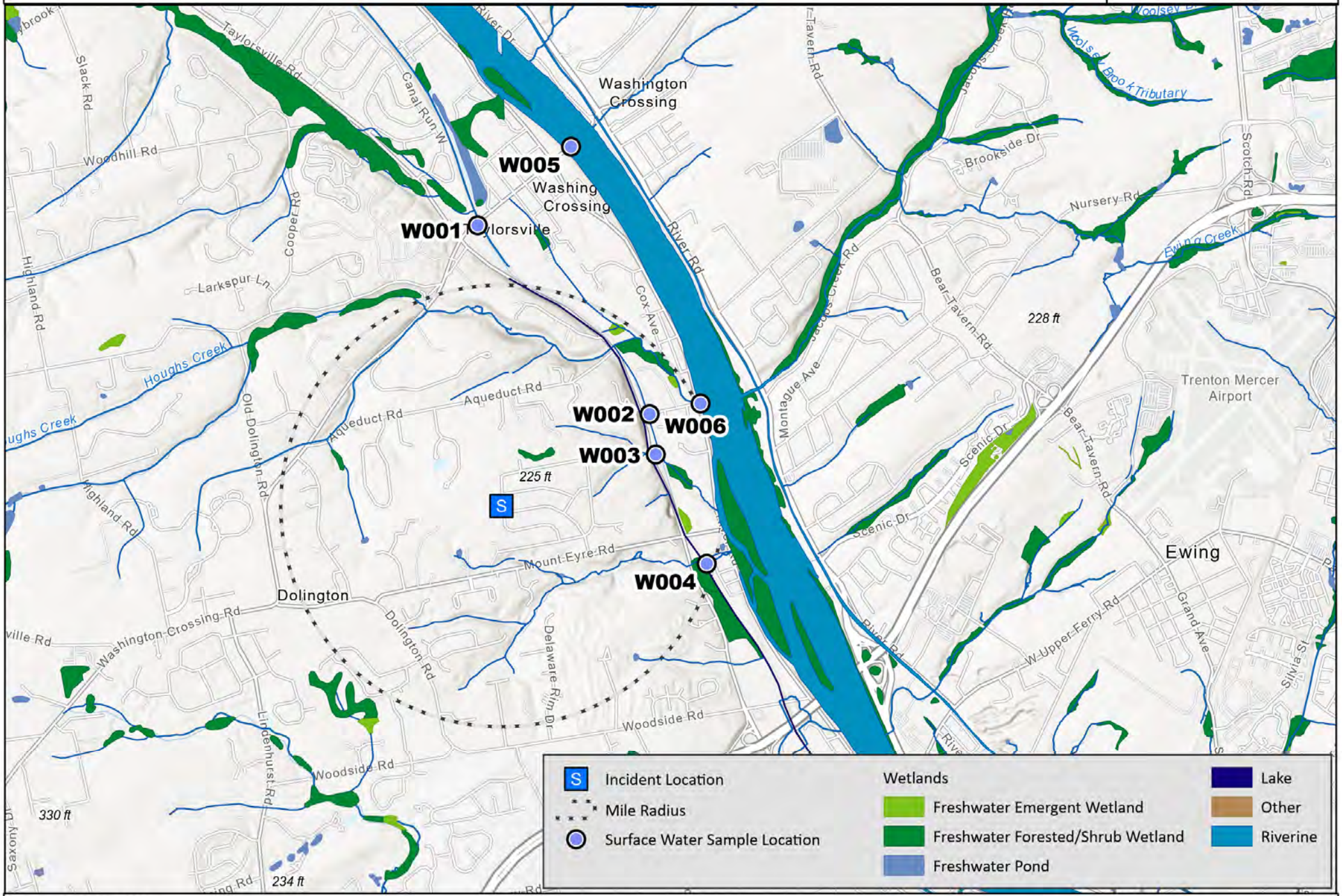


Appendix B: Initial Surface Water Sample Locations

CTEH® Upper Makefield Response | Proposed Surface Water Sample Location Map

Project: PROJ-051861
Client: Energy Transfer Partners
City: Washington Crossing, PA
County: Bucks



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