Appendix J.2

Monitoring Well Installation Work Plan (Phase 2)

July 24, 2025

Note: Attachments not included

Sunoco Pipeline LP

Monitoring Well Installation Work Plan (Phase 2)

Mt. Eyre Manor Neighborhood, Washington Crossing, PA 18977

Upper Makefield Township
Bucks County, PA

July 24, 2025

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Attachment 1 – Standard Operating Procedures
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Attachment 3 – County Health Department Well Permit Application
Attachment 4 – Drilling Water Source
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Acronyms and Abbreviations

bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Total Xylenes
DEP	Pennsylvania Department of Environmental Protection
DOT	Pennsylvania Department of Transportation
EDB	1,2-Dibromoethane
EDC	1,2-Dichloroethane
GES	Groundwater & Environmental Services, Inc.
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
LNAPL	Light Non-Aqueous Phase Liquid
MTBE	Methyl tert-butyl ether
NAD	North American Datum
NAVD	North American Vertical Datum
NRCS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
PID	Photoionization Detector
SPLP	Sunoco Pipeline LP
TOC	Top-of-Casing
TMB	Trimethylbenzene
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1 General

Groundwater & Environmental Services, Inc. (GES), on behalf of Sunoco Pipeline LP (SPLP), has prepared this *Monitoring Well Installation Work Plan (Phase 2) for Glenwood Drive, Washington Crossing, PA 18977* for monitoring well installation in the Mt. Eyre Neighborhood, Upper Makefield Township, Bucks County, Pennsylvania. The objective of this Work Plan is to install monitoring wells in various locations in the Project Area, Washington Crossing, PA 18977 as further described herein.

All activities will be performed in accordance with GES Standard Operating and Health and Safety Procedures. Drilling activities outlined in this plan will be conducted between the hours of 9:00 am and 5:00 pm, Monday through Friday. The tasks of this investigation are detailed below. A Pennsylvania-licensed and GES-approved driller will be contracted to perform the work on-site. All work will be performed by qualified GES staff and will be approved by a Pennsylvania-licensed Professional Geologist.

1.1 Site Overview

The Site is situated in a rural residential area in Upper Makefield Township, Bucks County, Pennsylvania at geographic coordinates 40.27033, -74.87508. In January 2025, SPLP identified a release of petroleum hydrocarbons (jet fuel) from the Twin Oaks – Newark 14-inch diameter pipeline, which was subsequently exposed for repairs. During the initial rapid response, light non-aqueous phase liquid (LNAPL) from the release was detected on groundwater and Site investigation and remediation efforts were initiated. A Site Characterization Work Plan was submitted to the Pennsylvania Department of Protection (PADEP) on April 18, 2025. Following receipt of PADEP and public comments, a revised Site Characterization Work Plan was submitted to the PADEP on June 24, 2025. This Monitoring Well Installation Work Plan provides procedures and additional details regarding the installation of monitoring wells.

1.2 Site Geology

According to Pennsylvania Geologic Survey mapping of the area, the bedrock formation beneath the Project Area is the Triassic-aged Lockatong Formation. The Lockatong Formation is described in Geyer and Wilshusen (1982) as dark gray to black argillite having some zones of black shale and locally, thin layers of impure calcareous shale. The primary porosity and permeability of the weathered and un-weathered rock in the Lockatong Formation are described as low, with joint openings providing secondary porosity.

2 Monitoring Well Installation

2.1 Pre-Drilling Protocol

The Pennsylvania One-Call Public Utility mark-out service (PA One-Call) will be contacted prior to performing any subsurface investigative activities at the Site to mark-out of public utilities. The PA One-Call service identifies the locations of the subsurface public utilities (electric, natural gas, water, telephone, etc.), but not the private utilities for which they are not responsible.

Each borehole will be hand-cleared via vacuum excavation or other hand tools to a minimum depth of five feet below ground surface (bgs) or refusal to ensure the borehole is clear of potential unidentified utilities or other subsurface features. The borehole shall be cleared a minimum of two inches in diameter larger than the drill bit to be used to allow for visual inspection of potential obstructions. Soil will be routinely screened with a photoionization detector (PID) during utility clearing activities and the GES scientist will characterize the soil according to the Unified Soil Classification System (USCS) by recording the color, composition, and moisture content on a drilling log. The GES Standard Operating Procedure (SOP) for subsurface clearance protocol is included in **Attachment 1**.

2.2 Soil Sampling

Up to two soil samples from each borehole may be collected for submittal for laboratory analysis using low-level methanol sampling test kits to document soil quality at the boring location. A soil sample may be collected if soil screening elicits a PID response (anything greater than 20 parts per million-volume). The GES SOPs for soil sampling and soil screening are included in **Attachment 1**.

The soil samples will be transported under proper chain-of-custody documentation to Pace Laboratories. Soil samples will be analyzed for the PADEP Leaded / Unleaded gasoline / Aviation Fuel parameters benzene, toluene, ethylbenzene, and total xylenes (BTEX), methyl tert-butyl ether (MTBE), isopropylbenzene, naphthalene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, 1,2-dichloroethane (EDC), and ,2-dibromoethane (EDB) via United States Environmental Protection Agency (USEPA) Method 8260D, and total lead USEPA Method 6010. The laboratory accreditation is provided as **Attachment 2**.

2.3 Well Installation

A well installation permit application has been submitted to Bucks County Department of Health (**Attachment 3**). The well permit from Upper Makefield Township is pending. The general well installation scope of work is summarized as follows:

- The drilling technique will be air rotary.
- During drilling activities, the GES scientist, under the supervision of a Pennsylvania Licensed Professional Geologist, will characterize the soil according to the USCS by recording the color, composition, moisture content, and lithology on a drilling log. The rock cuttings will also be characterized in the same nature.
- Soil/drill cuttings will be screened with a PID at various intervals to determine the relative presence or absence of volatile organic compounds (VOCs) and visual observations for

the presence or absence of petroleum product / sheen. Groundwater produced during the drilling will also be observed for the presence or absence of petroleum product / sheen.

- A containment area will be set up at each borehole to contain drilling fluids prior to the start of the drilling. A vacuum truck will be on-site during all drilling to remove drilling fluids during the work. In the event that petroleum product is encountered during the drilling, the vacuum truck will be capable of extraction and off-site disposal.
- The monitoring wells will be finished as flush mount wells with an 8-inch diameter, traffic-rated steel, bolt-down cover. The PVC casing inside the traffic box will also be fitted with a water-tight locking gripper plug to prevent incursion of surface water into the well.
- A 2-foot by 2-foot concrete pad will be constructed around the flush mount well covers at each well location and will be sloped to match the surface grade to allow for runoff of surface water and preserve the integrity of the surrounding surface.
- Water from an approved source will be utilized during drilling, if necessary. The source of the water is from a municipal water source.
- Upon completion, the driller will submit the drilling records to the Pennsylvania Department of Conservation and Natural Resources. Additionally, a detailed drilling log will be prepared by GES which will be reviewed by a Pennsylvania licensed Professional Geologist that is supervising the work.

GES SOPs for well drilling and well development are included in **Attachment 1**. A schematic of the approximate well construction is included in **Figure 2**.

2.4 Domestic Supply Well Monitoring

Nearby domestic supply wells located on Glenwood Drive, Walker Road, and Spencer Road will be monitored during the drilling activities outlined in this plan, if landowner consent and access is provided. Liquid level data and PID readings will be recorded for each domestic well monitored, if the wellhead is accessible. An interface probe and a PID will be used to record liquid level data and wellhead screening multiple times from various domestic well locations on adjacent properties. In addition, water may be collected from various domestic well locations on a routine basis with a bailer for visual inspection if the PID wellhead screening is greater than 10 parts per million (ppm). However, it should be noted that due to spacers and/ or wire guards existing in certain domestic wells, a bailer may not be deployed for visual inspection. Additionally, during drilling, potable wells on adjacent properties will be gauged with an interface probe every 2-4 hours, if landowner consent and access is provided. Data obtained from domestic well monitoring will be documented accordingly. SOPs for water level gauging and visual inspections are in **Attachment 1**. This method of monitoring will provide real time data and if there is adverse influence observed, immediate changes during the drilling operations can be made (i.e., reduce air flow or stop work is needed).

2.5 Air and Noise Monitoring

Outdoor air monitoring and noise monitoring will be implemented at properties in the Mt. Eyre Manor neighborhood during the drilling activities outlined in this plan. Air monitoring and sampling and noise monitoring will generally occur along the perimeter of the Properties, primarily between

the area where monitoring well installation activities will occur (the work area) and nearby residences. The objectives and scope are more fully detailed in the Air and Noise Monitoring Plan for Well Installation included in **Attachment 5**.

2.6 Surveying

The elevation and location of the newly installed monitoring wells will initially be recorded using a hand-held GPS unit. Following the well installation activities, a professional surveyor licensed in the Commonwealth of Pennsylvania will collect the horizontal datum utilizing the Pennsylvania State Plane Coordinates, North American Datum (NAD) 83, South Zone recorded to the nearest 0.1 foot and the vertical ground surface and top-of-casing (TOC) elevations utilizing North American Vertical Datum (NAVD) 88 recorded to the nearest 0.01 foot.

2.7 Well Development Procedures

The newly installed monitoring wells will be properly developed based upon the groundwater conditions encountered, typically 24 hours after the surface pad and outer protective casing are installed. Monitoring wells will be developed by the drilling contractor during installation to remove the residual materials remaining in the well after installation has been completed, and to try to re-establish the natural hydraulic flow conditions which may have been disturbed by well construction, around the immediate vicinity of the well. Liquids produced during well development will be managed as noted in Section 2.8. The SOP for well development is in **Attachment 1**.

2.8 Investigation-Derived Waste Management

Construction debris, soil, and drill-cuttings generated during well installation activities will be containerized in Pennsylvania Department of Transportation (DOT)-approved, steel 55-gallon drums for disposal in accordance with the Waste Management Plan dated February 26, 2025. A vacuum truck will be on-Site to assist with the removal of groundwater and / or petroleum product from the containment area. The vacuum truck will take the waste off-site to a designated facility at the completion of the well installation. All available laboratory analytical data will be provided to prepare the waste profile for the vacuum truck, which will be signed as Generator Knowledge. All waste generated during well installation activities will be transported off-Site for disposal at a PADEP permitted waste facility as outlined in Waste Management Plan (**Attachment 6**).

2.9 Health, Safety, and Security

All field activities will be conducted in accordance with the site-specific Health and Safety Plan (HASP) prepared by GES for this site (**Attachment 7**). GES personnel engaged in on-Site activities will have the training necessary to perform each of the prescribed tasks. Familiarity with the guidance documents and standards listed below is required prior to engaging in on-Site activities:

- Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (OSHA 29CFR1910.120)

- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985) (NIOSH/OSHA/USCG/EPA)
- Health and Safety Requirements for Employees Engaged in Field Activities (EPA Order 1440.2)

Safety measures will be implemented to manage traffic and pedestrian flow during well installation activities, including contracting a traffic control flagger team. Road opening permits will be obtained prior to commencement of the well installations. Clear and safe routes of personnel ingress and egress will be established by work zone separation, visibility, signage, barriers (including sound barriers), training, and communication. A Traffic Control Plan is included as **Attachment 8**.

A clearly demarcated work zone will be utilized to restrict unauthorized access. The only personnel that should be in the immediate work zone near the drill rig are the drilling company and GES support personnel. Warning signs that indicate potential hazards and safety protocols, as well as emergency contact information, will be posted at prominent locations at the work zone. All other personnel near the work zone must remain at least 10 feet away from the immediate work area in the event that person does not have the proper training certifications or personal protective equipment (i.e., steel toe boots, hearing protection, etc.). Crossing into the immediate work area is considered a breach of security.

Daily health, safety, and security meetings will be conducted to review training, standard operating procedures, job hazard analysis, work scopes, and hazard communication. The equipment will remain staged at the borehole until drilling is complete. All equipment within the work zone will be secured overnight to prevent theft or unauthorized use. The vacuum truck will depart site each day.

3 References

Geyer, A.R., and J.P. Wilshusen. 1982. *Engineering Characteristics of the Rocks of Pennsylvania, Second Edition*, Pennsylvania Geologic Survey, Harrisburg, PA.

United States Department of Agriculture, Natural Resources Conservation Service. September 26, 2023. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Figures

0 125 250 500 Feet

1 Inch = 250 Feet

Legend

- Proposed Monitoring Wells - First Phase
- Proposed Monitoring Wells - Second Phase
- Recovery Well
- Inferred Fracture Trace (from ERI) and Number of Constraining Anomalies
- Extrapolation of Inferred Fracture Trace
- Sound Barriers

Proposed locations are tentative, based on current information, and the location of each monitoring well will be finalized as new information is obtained.

Phase 2 - Twp. Roadway

Fraser Road

Glenwood Drive

Spencer Road

RW-1

RW-2

RW-3

RW-4

Crestwood Road

Bruce Road

Walker Road

Glenwood Drive

Notes:
The aerial photo was acquired through the Esri Imagery Web Service.
Aerial photography dated 2024.
Inferred Fracture Traces were provided by RETTEW Field Services, Inc.

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July 2025

Twin Oaks – Newark 14"-Diameter Pipeline-
LNAPL Incident: Site Characterization Work Plan

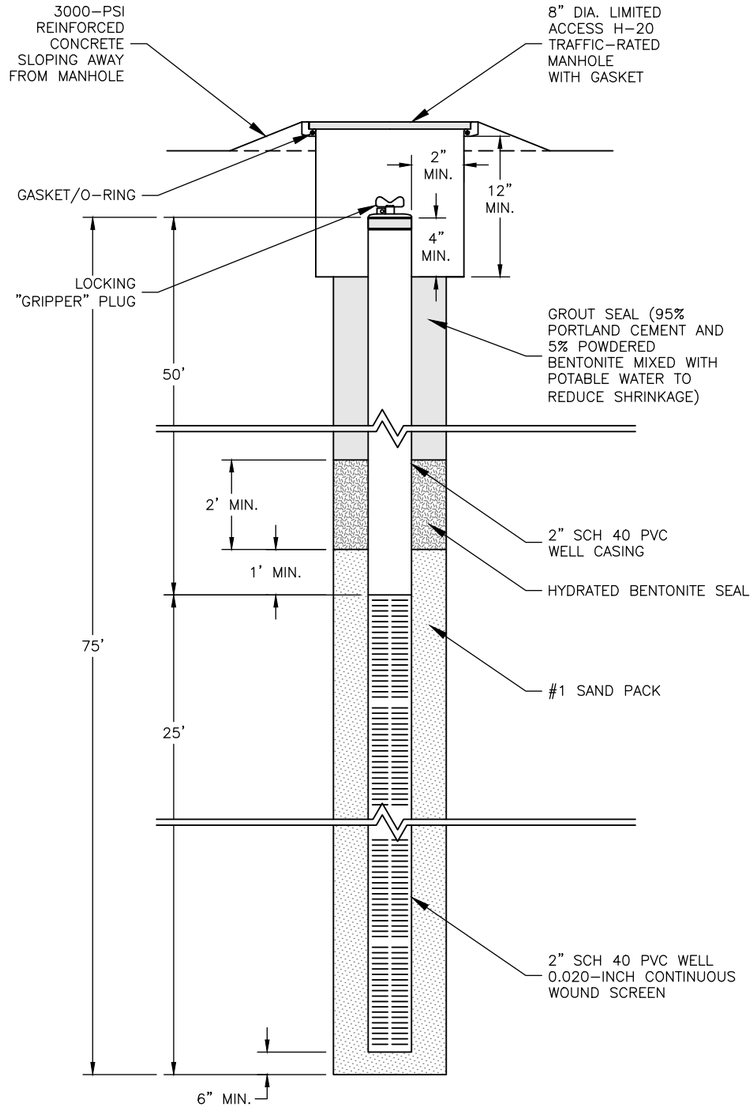
Preliminary Draft Proposed Monitoring Wells

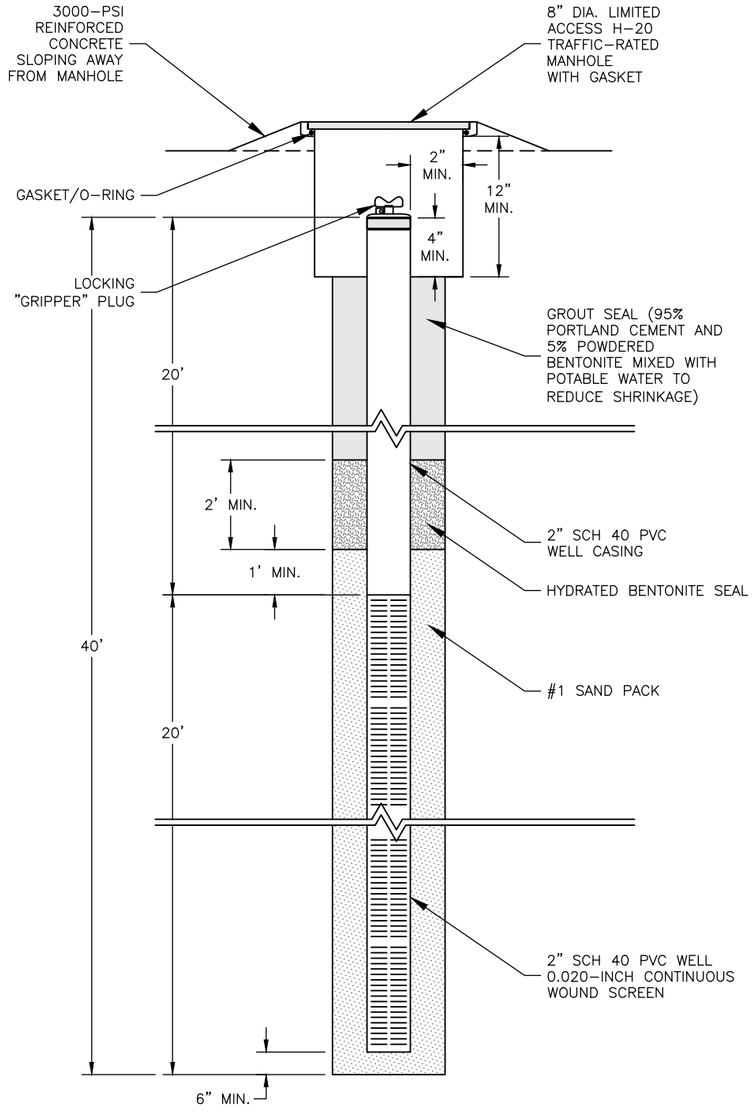
Upper Makefield Township
Bucks County, Pennsylvania

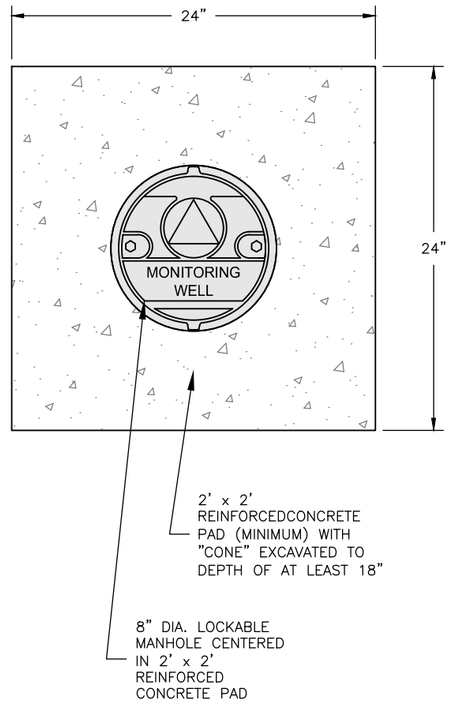
1

Produced Using Esri's ArcGIS Software

File Location: Z:\Project Files\EA-FZ\Energy T2\34328 - ET Sunoco Upper Makefield Twp. Pipeline\GIS\34328_Revised07172025_ProposedWells_PrelimDraft.mxd Edited: 7/17/2025 User: bmoriarty







NOTE: ORIGINAL DETAIL DRAWINGS PROVIDED BY GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

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Twin Oaks - Newark 14" Diameter Pipeline
LNAPL Incident: Site Characterization Work Plan

Monitoring Well Pair Detail (Flush Mount Construction)

Upper Makefield Township
Bucks County, Pennsylvania

Project Number	006.0000034328
Date	07/16/2025
Author	JPB
Scale	Not to Scale
Figure	2