Interim Site Characterization Report

Sunoco Pipeline LP Twin Oaks-Newark 14-inch Diameter Pipeline Release

Upper Makefield Township, Bucks County, Pennsylvania
PADEP eFACTS Primary Facility Number - 881609

Prepared for:
Sunoco Pipeline LP
525 Fritztown Road
Sinking Spring, PA 19608

Prepared by:
Verdantas LLC
2550 Interstate Drive, Ste #303
Harrisburg, PA 17110

Verdantas Project No: 34328

September 2, 2025

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J. Neil Ketchum, P.G.
Verdantas LLC

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1. Introduction

Verdantas LLC ("Verdantas") has prepared this Interim Site Characterization Report ("ISCR") on behalf of Sunoco Pipeline LP ("SPLP") for submission to the Pennsylvania Department of Environmental Protection ("PADEP") pursuant to the Administrative Order issued to SPLP by PADEP on March 6, 2025 ("Administrative Order"), and the Proposed Implementation Schedule prepared by SPLP and submitted to PADEP on March 14, 2025, revised on April 10, 2025, and approved by PADEP on April 14, 2025.

This ISCR summarizes activities that SPLP has completed and plans to complete to characterize environmental conditions associated with the release of petroleum product, namely Jet-A, from a section of the 14-inch diameter Twin Oaks – Newark Pipeline ("pipeline") in the Mt. Eyre Manor neighborhood of Upper Makefield Township ("Township"), Bucks County, Pennsylvania. The location of the release and the surrounding area are shown on portions of the Lambertville and Pennington 7.5-minute quadrangle maps issued by the United States Geological Survey ("USGS") and provided as **Figure 1-1**.

SPLP discovered the release of petroleum products from a sleeved section of the pipeline on January 31, 2025, and SPLP immediately notified PADEP of the release. SPLP promptly initiated and continues to perform investigation and remediation activities related to the pipeline release.

More specifically, SPLP immediately began planning and implementing its cleanup activities and submitted a Notice of Intent to Remediate ("NIR") to PADEP on February 13, 2025. The NIR provided notice to PADEP and the Township of SPLP's intent to remediate soil and groundwater impacts resulting from the pipeline release to the residential statewide health standard under the Land Recycling and Environmental Remediation Standards Act ("Act 2"). PADEP acknowledged receipt of the NIR on February 15, 2025, and by letter dated February 19, 2025.

On February 18, 2025, PADEP issued a Notice of Violation ("NOV") concerning the pipeline release that included a request for certain information. SPLP provided the requested information in a letter response dated March 5, 2025. The response to the NOV included tabulated results and laboratory reports for soil, well water, and well head screening; waste disposal documentation; light non-aqueous phase liquid ("LNAPL") gauging and recovery information; geophysical results from surface and borehole surveys; and work plans for planned investigation activities.

On March 6, 2025, PADEP issued the Administrative Order. The Administrative Order requires SPLP to implement certain interim remedial measures within the Mt. Eyre Manor neighborhood topographic watershed plus a minimum 500-foot buffer, an area that SPLP established before the issuance of the Administrative Order as the focus for investigation and remediation efforts. The Administrative Order also requires the submittal of certain reports to PADEP. In particular, the Administrative Order required SPLP to implement certain interim remedial measures that included:

1. supplying bottled water to certain properties;
2. installing point-of-entry treatment ("POET") systems at certain properties;

3. sampling and maintaining POET systems at certain properties;
4. daily reporting of certain information to PADEP;
5. submitting laboratory reports for property well sampling;
6. submitting an Interim Remedial Action Plan; and
7. submitting a Vapor Intrusion Investigation Progress Report.

The Administrative Order also required SPLP to complete certain longer-term remediation activities that included:

1. remediating the release in accordance with the remediation standards of Act 2;
2. submitting a Proposed Implementation Schedule;
3. submitting a Site Characterization Work Plan;
4. completing site characterization activities;
5. submitting an Interim Site Characterization Report;
6. submitting a Remedial Action Plan;
7. submitting an Act 2 Final Report;
8. submitting periodic Remedial Action Progress Reports; and
9. submitting a Public Involvement Plan.

SPLP has implemented and continues to implement interim remedial measures in the Administrative Order. The Interim Remedial Action Plan was submitted to the PADEP on March 19, 2025. A letter of deficiency for the Interim Remedial Action Plan was received by SPLP on April 9, 2025, and SPLP submitted a response to this letter of deficiency on April 16, 2025. On May 9, 2025, PADEP issued a letter approving the Interim Remedial Action Plan.

The Vapor Intrusion Progress Report was submitted to PADEP on April 2, 2025, and a revised Vapor Intrusion Progress Report that addressed PADEP comments received by SPLP on April 30, 2025, was submitted to PADEP on June 14, 2025. PADEP approved the Vapor Intrusion Progress Report in a letter dated August 15, 2025.

SPLP has implemented and continues to implement the longer-term remediation activities in the Administrative Order in accordance with the Proposed Implementation Schedule that was submitted to PADEP on March 14, 2025, revised on April 10, 2025 in response to PADEP's comment letter dated April 8, 2025, and ultimately approved by PADEP on April 14, 2025. The Site Characterization Work Plan was submitted on April 18, 2025. SPLP revised this plan to address public and PADEP comments received on May 18, 2025, and resubmitted the work plan on June 27, 2025. Public comments on the revised Site Characterization Work Plan were received by SPLP on July 30, 2025. On August 14, 2025, SPLP provided PADEP responses to the public comments on the revised Site Characterization Work Plan. On August 29, 2025, PADEP approved the revised Site Characterization Work Plan.

1.1 Purpose and Objectives

This ISCR is intended to satisfy the requirements of the Administrative Order. While the Administrative Order directs SPLP to remediate the impacts of the pipeline release in accordance with the remediation standards of Act 2, a Site Characterization Report or ISCR is not a defined or required report within the Act 2 framework. Site Characterization Reports are part of the Title 25 Chapter 245 regulations related to the Administration of the Storage Tank and Spill Prevention Act and are also referenced in Title 25 Chapter 78(a).66 related to environmental protection performance standards for spills and releases at unconventional oil and gas wells. Neither of these regulations are applicable to the pipeline release.

The Administrative Order defined the purpose of the ISCR as:

> *describing the interim characterization of the nature, extent, direction, rate of movement, volume and composition of regulated substances released into the environment from the Pipeline Release in accordance with the remediation standard(s) of Act 2.*

The purpose of the ISCR was further explained in PADEP's April 8, 2025, letter of deficiency for the Proposed Implementation Schedule as:

> *to define, in a substantial measure but not completely, the nature, extent, direction, rate of movement, volume and composition of contamination in affected environmental media. The interim site characterization report should establish the information known, relevant data gaps, plans for further characterization, and the ability of the data to support development of remedial actions.*

PADEP's April 8, 2025 letter also required that SPLP submit the ISCR within 180-days of PADEP's issuance of the Administrative Order (i.e., by September 2, 2025). The 180-day timeframe is not required by PADEP's regulations nor is it tied to the completion of the work described in Site Characterization Work Plan. SPLP is currently in the process of implementing the activities outlined in the revised Site Characterization Work Plan.

Given the ongoing nature of the characterization activities (e.g., the recent approval of the Site Characterization Work Plan identifying the initial characterization steps), SPLP notes that additional investigation will be needed before a remedial action plan can be developed. In particular, and consistent with the language of PADEP's April 8, 2025, letter, the purpose of the ISCR is to define conditions relating to the pipeline release "in substantial measure but not completely" and using the "information known," while also identifying the "relevant data gaps" and "plans for future characterization."

1.2 Organization of Report

The remainder of this report is organized into the following five sections:

- Section 2 presents background information, including a description of the investigation area and its setting.

- Section 3 describes the scope of the characterization activities performed to supplement the previous investigation and remediation activities.
- Section 4 provides the findings of the characterization activities, including descriptions of geologic and hydrogeologic findings, nature and extent of contamination, and recommendations for additional characterization activities.
- Section 5 provides an overview of the results from ongoing interim remedial measures.
- Section 6 contains references.

2. Background

This section of the ISCR provides an overview of background information including a description of the area around the location of the release and its physical setting.

2.1 Release Location and Surrounding Area Description

The release occurred from a section of the pipeline located on a private residential lot on the western edge of the Mt. Eyre Manor neighborhood. The location of the release is on the west side of Glenwood Drive between the intersections of Glenwood Drive with Walker Road and Spencer Road ("Release Location"). An aerial photographic map showing the Release Location and features of the surrounding area is provided as **Figure 2-1**.

The Release Location and surrounding area are in a rural/residential portion of Upper Makefield Township. The area surrounding the Mt. Eyre Manor neighborhood includes a mix of forested, agricultural, recreational (golf course) and less densely developed residential parcels.

The properties in the Mt. Eyre Manor neighborhood are served by potable[1] water supply wells and on-lot septic systems.

2.2 Topography and Drainage

Regional ground surface topography in the area around the Release Location is depicted on the USGS topographic map provided as **Figure 1-1**. As shown on **Figure 1-1**, the area is located in a gently rolling landscape to the west of the Delaware Canal and the Delaware River. The Release Location is approximately 4,100 feet (0.78 miles) west of the Delaware Canal and 5,600 feet (just over one mile) west of the Delaware River.

Ground surface elevation at the Release Location is approximately 224 feet above mean sea level ("AMSL") and the elevation of the Delaware Canal is approximately 45 feet AMSL while the Delaware River is approximately 24 feet AMSL.

As stated previously, the Administrative Order required SPLP to conduct certain activities within the Mt. Eyre Manor neighborhood topographic watershed plus a minimum 500-foot buffer. The 500-foot buffer to the topographic watershed area was established by SPLP before the issuance of the Administrative Order as the focus for investigation and remediation efforts, and was derived from the publicly available 2006-2008 light detection and ranging ("LiDAR") data for the area (portions of panels 36002760PAS and 36002770PAS) using the watershed algorithm in Surfer by Golden Software. The topographic watershed area and the buffer are depicted on **Figure 2-1**. Note that the Release Location and surrounding area are situated along a topographic high to the north of Dyers Creek and its tributaries, to the west of an unnamed tributary to the Delaware Canal, and to the south of Houghs Creek and its tributaries. These surface water bodies have

[1] The term "potable" was used as a modifier by PADEP in the NOV and the Administrative Order to refer to wells on private properties used to supply water to residential buildings. That definition is used in this document to maintain continuity between the NOV and Administrative Order and the descriptions of activities performed by SPLP.

been identified on **Figure 2-1**. In this topographic setting, the use of different elevation datasets, breaklines, or watershed delineation algorithms may lead to differences in the precise location of the topographic divide between the surface water catchment areas.[2] This is one of the reasons that SPLP adopted a 500-foot buffer around the topographic watershed (i.e., to be conservative and as a margin of safety).

Both the unnamed tributary to the Delaware Canal to the east of the Release Location and Dyers Creek to the south of the Release Location ultimately discharge into the Delaware Canal and surface water flow in the Canal then continues to the Delaware River.

2.3 Soils

The mapped soils in the vicinity of the Mt. Eyre Manor neighborhood are predominantly derived from Triassic mudstone and calcareous mudstone parent materials, resulting in moderately well-drained profiles. (USDA, 2023). A soil map is provided as **Figure 2-2**.

According to the United States Department of Agriculture ("USDA") Web Soil Survey, the Mt. Eyre Manor neighborhood is almost entirely comprised of Urban land – Penn complex, 0-8% slopes (UxB). This map unit consists of a gently sloping mix of urban land (areas covered by buildings, roads, and other structures) and Penn soils, which are well-drained soils formed in residuum from shale and siltstone.

2.4 Regional Geology

The Release Location and surrounding area are located within the Gettysburg Newark-Lowland Section of the Piedmont Physiographic Province. This region is characterized by gently dipping sedimentary rocks that were faulted and tilted during the formation of the Newark Rift Basin. A geologic map of the area is included as **Figure 2-3** (DCNR, 2025).

The bedrock underlying the area consists of theTriassic-aged Lockatong Formation. Literature on regional geologic conditions describes the Lockatong Formation as a dark-gray to black argillite (hardened mudstone) having some zones of black shale and locally thin layers of impure limestone and calcareous shale (Geyer and Wilshusen, 1982 and Greenman, 1955).

The upper beds of gray argillite are extensively interbedded with dark red argillite. The rocks are evenly bedded and very fine grained; coarse-grained sediments are almost totally lacking except in the lower beds which are transitional with the underlying Stockton lithofacies (Greenman, 1955). The reference section for the Lockatong Formation is along the Delaware River between Point Pleasant and Lumberville, Bucks County, Pennsylvania, approximately 15 miles northwest of the Release Location (Geyer and Wilshusen, 1982).

The bedrock in this region generally strikes northeast-southwest and dips to the northwest at about 12 degrees. This regional structure is interrupted by faults, and further deformed by

[2] The Release Location is mapped by the USGS StreamStats web application within the watershed of Dyers Creek (specifically an unnamed tributary to Dyers Creek that runs along the north side of Mr. Eyre Road and joins Dyers Creek approximately one-half mile to the southeast of the Release Location).

transverse folds, reflecting the complex tectonic history of the basin (Morin et al., 2000). Although no mapped fractures or faults are present in the immediate vicinity of the Release Location, a syncline (valley-shaped bedrock structures) is mapped approximately five and a half miles to the west (Pennsylvania DCNR, 2025).

Within the Lockatong Formation, bedding is described as moderately developed, flaggy to thick, with joints forming a blocky pattern. These joints are typically closely spaced, steeply dipping, and open, which facilitates secondary porosity (Geyer and Wilshusen, 1982).

According to USGS literature the predominant fracture strike is north 50 degrees east (N50E), approximately parallel to bedding, with shallow fractures dipping 10 degrees northwest (Lewis, 1992). Deeper fractures have similar strike, but have nearly vertical dip (Morin et al., 2000).

A geophysical survey conducted in the Lockatong Formation and Brunswick Group in Lansdale, Pennsylvania (Morin et al., 2000), identified two distinct structural zones that may reflect different mechanical responses to basin extension:

- Shallow Zone (above 125 meters): Dominated by gently dipping bedding plane partings that strike N46E and dip northwest at approximately 11 degrees.
- Deeper Zone (below 125 meters): Characterized by numerous subvertical fractures orthogonal to the bedding planes that share the same strike (N46E) but dip steeply to the southeast at approximately 77 degrees.

2.5 Regional Hydrogeology

Regional groundwater flow is expected to be generally eastward, influenced by the presence of the Delaware River, the dominant groundwater discharge feature in the area.

The hydrogeologic behavior of the Lockatong Formation is similar to that of crystalline bedrock, with low primary porosity and groundwater movement occurring primarily through fractures and joints that have developed due to faulting, jointing, and weathering processes. Groundwater is present under water-table conditions within these secondary openings (Greenman, 1955).

The Lockatong Formation has limited capacity to store and transmit water, and fracture orientation and connectivity play a significant role in groundwater flow (Sloto et al., 1994). Wells drilled into this formation often intersect multiple fractures, each potentially exhibiting different hydraulic heads (Sloto et al., 1994). Wells aligned along the strike of the formation show more hydraulic connections than wells separated perpendicular to strike even if the head difference across strike is greater. Wells separated along strike tend to encounter the same water-bearing zones at similar depths, while wells separated across strike do not (Ibid.). Cones of depression for pumping wells are usually elliptical, with the long axis aligned parallel to strike (Ibid.).

Vecchioli et al. (1969) reported that during aquifer tests in the overlying, but hydrogeologically connected and similar, Brunswick Shale, observation wells aligned along strike experienced much greater drawdowns (by orders of magnitude) and hydraulic connectivity than those across strike. Lewis (1992) (AWRA Monograph 17) stated that in the Triassic basin rocks, groundwater flow “is not necessarily perpendicular to lines of equal head but may be skewed in the direction of strike." Groundwater flow is strongly anisotropic along the NE–SW trending structural fabric (roughly N50E).

According to Morin et al. (2000), fluid flow and the primary hydrologic characteristics of this aquifer are controlled by fractures, the productivity is confined to the upper 260 feet of the aquifer; and, correspondingly, most groundwater flow is channeled through the shallow-dipping features (Morin et al., 2000).

The median yield for domestic water supply wells in the Lockatong Formation in Bucks County is approximately 15 gallons per minute (Bird, 1998).

The hydrogeologic implications of the two distinct structural zones described in the Regional Geology section above are as follows (interpreted from Morin, 2000):

- Shallow Zone (above 400 meters): The gently dipping bedding plane partings likely act as preferential pathways for groundwater flow. Because they are shallow dipping and relatively continuous, water can move more easily along these planes, especially in the direction of strike (N46E).
- Deeper Zone (below 400 meters): The high-angle fractures, which dip steeply southeast, may allow vertical movement of groundwater. These fractures can connect deeper aquifers to shallower zones or even to the surface, potentially influencing recharge and contaminant transport.

3. Characterization

SPLP initiated characterization activities as part of its investigation into the potential pipeline release (before it was discovered) and continued those activities following the confirmation of the release. On March 19, 2025, SPLP submitted the Interim Remedial Action Plan to PADEP which summarized activities performed as of that date. Additional planned investigation and characterization activities were described in the Site Characterization Work Plan submitted to PADEP on April 18, 2025, and the revised Site Characterization Work Plan submitted to PADEP on June 27, 2025.

As stated in the Site Characterization Work Plan, site characterization is an iterative process, with each activity informing and refining the scope of subsequent investigations. The planned tasks described in the Site Characterization Work Plan represent the initially proposed characterization efforts. These activities were designed to advance the process of delineating the nature, extent, direction, rate of movement, volume, and composition of petroleum products released from the pipeline. Characterization activities are ongoing, and the submittal of this report does not indicate that characterization is now complete. Most of the activities described in the Site Characterization Work Plan have been completed; however, as of the date of submission of the ISCR, some activities have not yet been completed and some data from completed characterization activities has not yet been received and/or processed.

Most of the work described in this section of the ISCR was performed by other consultants for SPLP in accordance with individual sampling and analysis plans or work plans previously submitted to PADEP. Because this ISCR is an interim report, prepared before completion of the characterization activities, there may be minor discrepancies in reporting that may need to be corrected or clarified in future submissions.

3.1 Property Information Compilation

Publicly available data regarding water supply wells, septic systems, sand mounds, and sub-grade structures (e.g., basements, crawl spaces, sumps, radon systems) in the area of the Release Location were reviewed. Sources included the Pennsylvania Groundwater Well Information System (“PAGWIS”), county and Township land development records, and visual observations from public rights of way. Additional property-specific data were collected during field activities at private properties, as permitted by owners. For privacy purposes, property-specific information is not included in this report except to the extent that the information is necessary to evaluate other data.

3.2 Passive Soil Gas Investigation

In February and March, 2025, a passive soil gas investigation was performed by Groundwater and Environmental Services, Inc. (“GES”) in a portion of the Mt. Eyre Manor neighborhood to the east of the Release Location. The procedures used and the results of that investigation were documented in the Passive Soil Gas Summary Report (April 11, 2025), included as **Appendix A**, that was submitted to PADEP on April 15, 2025. The purpose of the investigation was to evaluate subsurface areas for evidence of volatile organic compound ("VOC") impacts. Note that passive soil gas sampling is an investigative technique and not a direct characterization method. The soil gas sampled during this survey is not specifically regulated under Act 2 and there are no applicable published regulatory screening values or standards for shallow soil gas samples.

Forty-six passive soil gas collectors were installed along five generally north-south trending transects between the northern and southern legs of Glenwood Drive to the east of the Release Location. After the one-week deployment period, each collector was retrieved, sealed, and returned to Beacon Environmental of Forest Hill, Maryland, for analysis for the VOCs listed on the PADEP jet fuel and unleaded gasoline shortlists for petroleum products ("Short List VOCs") – specifically benzene; toluene; ethylbenzene; xylenes (total); cumene (also known as isopropylbenzene); naphthalene; 1,2,4-trimethylbenzene ("124-TMB"); 1,3,5-trimethylbenzene ("135-TMB"); methyl tert-butyl ether ("MTBE"); 1,2-dichloroethane ("12-DCA") (also known as ethylene dichloride or EDC); and 1,2-dibromomethane ("12-DBA") (also known as ethylene dibromide or EDB).

3.3 Geophysical Investigations

As part of the initial release investigation activities, RETTEW Field Services ("RETTEW") identified aerial photographic, remote sensing, and topographic linear features ("linears") using publicly available information sources. The aerial photographic and topographic linears identified by the initial survey generally agree with existing published literature for fracture orientation in the area (averaging roughly N50E).

Between February 20, 2025, and July 1, 2025, electrical resistivity imaging ("ERI") and seismic refraction geophysical surveys were conducted by RETTEW in a portion of the Mt. Eyre Manor neighborhood around and to the east of the Release Location. A copy of the Electrical Resistivity Imaging and Seismic Refraction Report (July 30, 2025, rev. August 7, 2025) is included as **Appendix B**. Copies of ERI and seismic geophysical information collected on private property were provided to individual property owners.

The purpose of the ERI survey was to detect and delineate underground electrically conductive semi-planar features that could represent water-bearing fractures or bedding plane partings. The purpose of the seismic refraction survey was to produce a top-of-rock elevation map of the area.

RETTEW also performed borehole geophysical logging of three domestic water supply wells (108 Spencer Road (February 17 and 18, 2025), a well on Glenwood Drive (February 10, 2025), and a well on Walker Road (June 24 and 27, 2025)) and the four recovery wells (June 10 and 11, 2025). These results are provided in the Borehole Logging Survey Residential Well Reports and the Borehole Logging Survey Glenwood Recovery Wells Reports, included in **Appendix B**.

3.4 LNAPL Assessment and Recovery

This section of the ISCR provides an overview of the activities that SPLP has performed to delineate and remove LNAPL associated with the pipeline release. As described more fully below, those activities include the installation of recovery wells, packer testing on recovery wells, gauging in water supply wells, and ultraviolet ("UV") light assessments.

3.4.1 Recovery Well Installation and Packer Testing

Recovery wells were installed to facilitate the removal of LNAPL associated with the pipeline release. The locations of the recovery wells were informed by the geophysical surveys and by the distribution of LNAPL observations and analytical results from the potable water supply well sampling. The locations of the recovery wells are shown on **Figure 3-1** and well logs are included in **Appendix C**.

Between March 18 and 21, 2025, RW-1 was installed on a property on Spencer Road in accordance with SPLP's Recovery Well Installation Work Plan (version 1.0 (March 14, 2025)) included in **Appendix D**. RW-1 is approximately 72 feet deep and is cased from the ground surface to approximately 25 feet.

Recovery wells RW-2, RW-3, and RW-4 were installed between May 20, 2025, and May 24, 2025, in accordance with SPLP's Recovery Well Installation Work Plan (April 22, 2025 and revised May 6, 2025) included in **Appendix D**. RW-2 is approximately 63 feet deep and is cased from the ground surface to approximately ten feet. RW-3 is approximately 65 feet deep and is cased from the ground surface to approximately ten feet. RW-4 is approximately 60 feet deep and is cased from the ground surface to approximately ten feet.

Packer testing was performed on recovery wells RW-1, RW-2, and RW-3 to derive aquifer parameters such as specific capacity and transmissivity, to collect water level measurements and groundwater samples from discrete intervals within the well, and to evaluate drawdown in nearby potable and/or recovery wells for the development of the interim remedial measures used for recovery of LNAPL from the pipeline release.[3]

3.4.2 LNAPL Gauging

LNAPL was observed in certain potable water supply wells during the potable water supply well monitoring and sampling described in Section 3.6. Liquid level gauging of six potable water supply wells (two wells on Glenwood Drive, one well on Walker Road, and three wells on Spencer Road) and four recovery wells is ongoing. The location and the frequency of the gauging were selected in consultation with PADEP and have changed over time in consultation with PADEP. Since the installation of the monitoring wells (described in Section 3.6), daily gauging (Monday through Friday) in monitoring wells has also been performed.

Gauging is performed with an electronic conductance-type interface probe capable of detecting LNAPL thicknesses of approximately 0.01 feet. The depth to LNAPL and the depth to water is

[3] Recovery well RW-4 was found not to have any notable fractures for isolation during a packer test. Further, there has been no LNAPL observed in RW-4 and recent sampling results indicate that groundwater quality meets Statewide health standards for the target compound list. Therefore, no packer testing was performed for RW-4.

measured in each well and recorded. The thickness of the LNAPL layer is then calculated by subtracting the depth to LNAPL from the depth to water.

3.4.3 Ultraviolet Light Assessments

RW-1, the potable water supply well at 108 Spencer Road, and a potable water supply well on Walker Road, were logged using an optical televiewer equipped with ultraviolet (“UV”) imaging capabilities. The logging was conducted in accordance with the UV Logging Plan, which is included in Borehole Logging Reports found in **Appendix B**. The UV logging aimed to identify specific product-bearing fractures that might be producing LNAPL. RW-1 and the 108 Spencer well were logged on April 3, 2025, and the Walker Road well was logged on June 27, 2025.

3.4.4 LNAPL Recovery

LNAPL recovery is generally not considered a characterization activity, but information about SPLP’s LNAPL recovery is included in this report because the rate of recovery and changes in the rate of recovery over time may inform the characterization activities. LNAPL recovery efforts and plans for additional activities were described in the Interim Remedial Action Plan submitted March 19, 2025, and SPLP’s April 16, 2025 Response to Letter of Deficiency for the Interim Remedial Action Plan. Additional interim remedial actions or interim remedial measures are being evaluated.

LNAPL recovery activities were initiated immediately by SPLP upon discovery of the pipeline release. LNAPL in soil and weathered bedrock material was removed as part of the soil excavation at the Release Location described below in Section 3.5.2. Active and passive LNAPL recovery has been performed in the recovery wells where LNAPL is present. LNAPL recovery has also been performed in five potable water supply wells (two wells on Glenwood Drive, one well on Walker Road, and two wells on Spencer Road). A summary of the LNAPL recovery activities is provided in Section 5 of this ISCR.

3.5 Soil Characterization

Soil characterization activities completed include initial soil screening with a photoionization detector (“PID”) along the pipeline; excavating impacted soil at the Release Location; collecting post-excavation soil samples; and advancing, scanning, and sampling of soil from borings. Each of these activities are described below.

3.5.1 Initial Soil Screening

Beginning the week of January 20, 2025, and continuing through the week of January 27, 2025, SPLP inspected the pipeline right of way, located the pipeline center line, and used a T-bar that was inserted to the top and down both sides of the pipeline to create holes through which a PID was inserted to monitor for the presence of VOCs (results were included as Attachment 1 of the Interim Remedial Action Plan). This screening process was used to investigate the potential release from the pipeline. The soil screening was completed in over 1,000 locations and included both vegetated and paved areas of the pipeline right of way.

3.5.2 Soil Excavation

The pipeline was excavated along Glenwood Drive and the release was discovered on January 31, 2025. On February 2, 2025, SPLP removed impacted soils in the immediate vicinity of the Release Location and subsequently (between February 3, 2025, and February 11, 2025) excavated an adjoining area along the pipeline. The excavation extended from ground surface, beneath the pipeline, and to or into weathered bedrock (approximately seven feet below grade). The soil excavation area has been depicted on **Figure 3-2**. Groundwater was not encountered during the excavation activities.

On February 4, 2025, eight post-excavation soil samples (PE-1 through PE-8) were collected in a biased fashion (i.e., in the locations of the highest observed PID readings along the exposed excavation sidewalls and bottom). On February 11, 2025, following the additional excavation along the pipeline, eight more post-excavation soil samples (PE-9 through PE-16) were collected, using the same biased method, at the bottom and sidewalls of the exposed expanded excavation. Post-excavation soil sample locations are shown on **Figure 3-2**.

The post-excavation soil samples were analyzed by Eurofins Lancaster Laboratories Environmental Testing, LLC (“Eurofins”), of Lancaster, Pennsylvania. for the substances listed on the PADEP jet fuel and unleaded gasoline shortlists for petroleum products (“Short List Substances”) – specifically benzene; toluene; ethylbenzene; xylenes (total); cumene; naphthalene; 124-TMB; 135-TMB; MTBE; 12-DCA; 12-DBA; and lead.

Approximately 276 tons of petroleum-impacted soil was excavated, removed from the Release Location, staged at SPLP’s Fort Mifflin Terminal, and properly disposed of at the Conestoga Landfill. Manifests for the transportation and disposal of the excavated soil and weathered bedrock, laboratory analytical results from waste characterization samples, and other soil disposal documentation are included as **Appendix F**.

3.5.3 Reconnaissance Soil Boring Investigation

Along with the initial excavation activities, on February 3, 2025, eight reconnaissance soil borings (SB-1 through SB-8) were installed along Glenwood Drive along the pipeline path (**Figure 3-3**). Direct-push drilling technology was used to advance the soil borings, and the borings were extended to direct-push refusal (interpreted to be weathered bedrock), which was encountered at depths ranging from four to nine feet below ground surface. The borings were screened with a PID for the potential presence of VOCs. Boring logs with the PID measurements are included in **Appendix C**.

As shown on boring logs, PID readings were only detected in one boring (SB-8) which was located closest to the Release Location. This boring had a PID reading of 51 parts per million volume (“ppmv”) at a depth of 6.5 feet, and a PID reading of 19.5 ppmv at a depth of seven feet, which was the total depth of the boring at direct-push refusal.

3.5.4 Soil Boring Investigation Around Former Excavation

SPLP conducted additional soil sampling around the perimeter of the excavated area to confirm the post-excavation sampling results and to further evaluate soil because laboratory reporting limits for one analyte (12-DBA) were greater than the SHS MSCs. On June 17, 2025, GES advanced fourteen direct-push borings within the pipeline right of way around the former excavation. This work was performed in accordance with the Soil Characterization Work Plan (June 4, 2025) included in **Appendix G** and submitted to PADEP.

The locations of the fourteen soil borings installed in this area (SS-1 through SS-14), the extent of the former excavation, and the locations of the post-excavation soil samples are depicted on **Figure 3-4**. Borings were advanced with a track-mounted direct-push drilling rig operated by Parratt-Wolff, Inc. of East Syracuse, New York (with an office in Watsontown, Pennsylvania).

Borings were advanced to direct-push refusal which was below the weathered bedrock surface at depths ranging five to eight feet below ground surface. Recovered soil was screened with a PID to screen for the presence of separate-phase petroleum products.

One laboratory analytical sample was collected from each soil boring. The depth of the sampling interval was based on observations made during the boring advancement. Samples were generally collected at the interval with the greatest PID response. If there were no indications of petroleum impact, the laboratory analytical sample was collected from the deepest soil interval recovered from the boring. Logs for each soil boring are included in **Appendix C**.

The laboratory analytical samples were analyzed for the Short List Substances by Pace Analytical Laboratory ("Pace") of Westborough, Massachusetts.

3.5.5 Recovery Well Soil Sampling

Soil samples were collected during the installation of the four recovery wells (discussed in Section 3.4) in accordance with the Recovery Well Installation Work Plans (**Appendix D**) submitted to PADEP. The purpose of the soil sampling was to assess soil quality in the borings where recovery wells were constructed. On March 18, 2025, three soil samples were collected from the RW-1 boring and between May 19 and 20, 2025, one sample was collected from each of the borings for RW-2, RW-3, and RW-4. The locations of the recovery wells are depicted on **Figure 3-1**. Boring logs for the recovery wells are included as **Appendix C**.

The laboratory analytical samples were analyzed for the Short List Substances by Pace.

3.6 Groundwater Characterization

SPLP initiated groundwater evaluation activities in January 2025, prior to the confirmation of the pipeline release. Multiple tasks have been completed for groundwater characterization including:

- potable water supply well sampling;
- direct water column sampling and gauging in potable water supply wells (external well-head sampling);
- recovery well installation, gauging, and sampling; and

- monitoring well installation, gauging, and sampling.

As stated previously, full characterization is not yet complete. Characterization activities are ongoing and the planned tasks in the approved Site Characterization Work Plan have not yet been completed and some of the data from completed activities have not yet been received. A comprehensive presentation and analysis of groundwater characterization results will be provided following completion of the delineation of the groundwater impacts from the pipeline release.

The following sections describe the groundwater characterization activities that have been conducted to date.

3.6.1 Potable Water Supply Well Monitoring and Sampling

SPLP initiated potable water supply well monitoring and sampling on January 23, 2025, (before the confirmation of the pipeline release) and monitoring and sampling have been ongoing since that time. Monitoring and sampling that has been conducted since February 16, 2025, has been performed in accordance with the Potable Water Sampling and Analysis Plan (version 1.0 (February 16, 2025), version 1.1 (February 28, 2025), version 1.2 (March 8, 2025), version 1.3 (May 30, 2025) and version 1.4 (July 24, 2025)). These plans were submitted to the PADEP and are included in **Appendix H**.

The general objectives of the potable water supply well monitoring and sampling are:

- to conduct air monitoring of water sample headspace and potable well water headspace, as accessible, as screening for VOCs; and
- to collect water samples from domestic potable wells to evaluate potential impacts to potable water related to refined petroleum products, including jet fuel, and their potential constituents.

Note that as of August 15, 2025, SPLP has facilitated, or reimbursed property owners for, the installation of 181 point-of-entry treatment ("POET") systems. POET systems or other systems for the treatment of VOCs were pre-existing at 16 properties. The locations of the existing POET systems are shown on **Figure 3-5**.

Potable well water monitoring and sampling was initially performed at wells located within one mile of the Release Location at the owner's request. Since May 30, 2025, potable well water monitoring and sampling has been focused on domestic potable wells within the identified Mt. Eyre Manor neighborhood topographic watershed plus a 500-foot buffer. Monitoring/sampling events are conducted in accordance with the frequency structure outlined in the Potable Water Sampling and Analysis Plan and as requested by the property owner and/or SPLP personnel.

The potable well water monitoring and sampling includes headspace air monitoring with a PID of water obtained from each water sampling location (including both influent and effluent sources as applicable) and the water column in the well (as accessible). Pre-treatment and post-treatment water samples are collected (as applicable) from the water supply lines at the residence following a minimum five-minute system flush. During each water sampling event, observations of separation-phase liquid (e.g., LNAPL) and/or odors (or lack thereof) are also made. Water samples are collected in laboratory-supplied sample containers and submitted to Pace for analysis of Short List Substances by drinking water methods.

As of August 15, 2025, 1,289 water samples have been collected from 363 individual potable wells. Sample results have been received for 1,278 of the collected samples. The locations of the monitored and sampled potable water supply wells are shown on **Figure 3-6**.

3.6.2 Direct Potable Supply Well Water Sampling

The samples discussed in Section 3.6.1, were collected from sampling points after the domestic well pump and inside the home in accordance with the Potable Water Sampling and Analysis Plan. There were also two sampling events during which samples were collected directly from the water column in potable water supply wells.

3.6.2.1 Potable Well Water Split Sampling

Split sampling of well water alongside environmental consultants retained by property owners was performed at 49 wells between March 10, 2025, and April 11, 2025. The split sampling was performed in accordance with the Sampling and Analysis Plan (SAP) for Well Water Split Sampling (version 1.0 (March 12, 2025) and version 1.1 (April 1, 2025)) provided in **Appendix I**. The objectives of the well water split sampling were:

- To conduct side-by-side air monitoring of external wellhead headspace screening for VOCs; and
- To collect split samples of water from domestic potable water supply wells.

The split samples were collected from domestic potable water supply wells in accordance with the sampling schedule provided by the consultants retained by the property owners. At each sampling event, SPLP's consultant (Stantec) observed the opening and closing of each well by the property owner's consultant. Stantec also collected an air monitoring reading of the well headspace using a PID and collected a split sample of the well water using a single-use bailer. Stantec also documented observations of separate-phase liquid (e.g., LNAPL) and/or odor (or lack thereof) from the well water including whether a sheen was observed.

The water split samples were collected in laboratory-supplied containers and submitted to Pace for analysis of the Short List VOCs by drinking water methods.

3.6.2.2 External Well Water Sampling

On March 24, 27, and 28, 2025, GES collected samples from the potable water supply wells at three locations in accordance with the Well Water Sampling and Analysis Plan (version 1.0 (March 20, 2025)) provided in **Appendix I**. One of the locations was a property along Bruce Road that was split sampled alongside and at the request of PADEP. The other two locations were potable water supply wells along Spencer Road near the location of RW-1. The objectives of the external well water sampling were:

- To conduct air monitoring of external wellhead headspace as screening for VOCs; and

- To collect water samples from external well water to evaluate potential impacts to domestic well water related to jet fuel and its potential constituents.

Headspace measurements of the external well head were collected using a PID and visual observations of the well water were made from samples collected using a single-use bailer or peristaltic pump and single-use tubing. Observations of separate-phase liquids (e.g., LNAPL) and/or odor (or lack thereof) were documented.

Water samples for analytical testing were collected using a no-purge groundwater sampling device, single-use bailer, or peristaltic pump and single-use tubing. Samples were collected in laboratory-supplied containers and submitted to Pace for analysis of Short List Substances by drinking water methods.

3.6.3 Monitoring Well Installation

Fourteen initial monitoring wells were proposed in the revised Site Characterization Work Plan submitted on June 27, 2025 (i.e., paired shallow and deep monitoring wells at seven locations depicted on Figure 10 of the work plan). The exact locations of the wells were modified based on additional data collected after the submission of the Site Characterization Work Plan and discussions with public and private property owners. Communication regarding monitoring well locations has been ongoing with PADEP and the Township through weekly meetings, weekly reports, and Township permit applications. Selection of monitoring well locations was informed by the ERI and fracture trace analysis discussed above and by the observed distribution of LNAPL and detected concentrations in the potable water supply wells.

As of August 22, 2025, 16 monitoring wells have been installed and four additional monitoring wells are currently being installed. The locations of these wells are shown on **Figure 3-7**. Phase 1 monitoring well installations included three paired shallow and deep wells to the west of the Release Location on a vacant parcel owned by the Township (MW-1S, MW-1D, MW-2S, MW-2D, MW-3S, and MW-3D), a pair of shallow and deep wells on the southern portion of Glenwood Drive (MW-4S, MW-4D), and a pair of shallow and deep wells installed along the northern portion of Glenwood Drive (MW-5S and MW-5D). The number of monitoring wells on the vacant parcel owned by the Township was expanded from one set in the Site Characterization Work Plan to three sets following review of the expanded ERI survey. These monitoring wells were installed in accordance with the Monitoring Well Installation Plan (July 18, 2025) provided in **Appendix J**.

Phase 2 monitoring well installations included a pair of shallow and deep wells on the southern portion of Glenwood Drive (MW-6S and MW-6D), a pair of shallow and deep wells on Walker Road (MW-7S and MW-7D), and a pair of shallow and deep wells on Spencer Road (MW-8S and MW-8D). Note that wells MW-8S and MW-8D were originally proposed to be located along Glenwood Drive at the intersection of Spencer Road but were moved slightly eastward on Spencer Road to be at the intersection of two inferred fracture traces identified by the geophysical survey. One well pair (MW-7S and 7D) were not proposed in the Site Characterization Work Plan but were added following review of the expanded ERI survey. These monitoring wells were installed in accordance with the Monitoring Well Installation Plan (Phase 2) dated July 24, 2025 provided in **Appendix J**.

Phase 3 monitoring well installations are underway with the installation of two sets of paired shallow and deep wells (MW-9S, MW-9D, MW-10S, and MW-10D) on Spencer Road to the east of monitoring wells MW-8S and MW-8D. These wells were proposed in the Site Characterization Work Plan, but their locations were moved to the east along Spencer Road following review of the expanded ERI survey. These wells are being installed in accordance with the Monitoring Well Installation Work Plan (Phase 3) dated August 18, 2025 provided in **Appendix J**.

Locations for additional monitoring wells at locations between Walker Road and Spencer Road are also currently being evaluated.

Two monitoring wells were installed at each identified location – one shallow (approximately 40 feet deep) and one deep (approximately 75 feet deep) to provide information about vertical hydraulic gradients and to account for potential groundwater chemistry differences in the monitored zones. The total depth of the deeper monitoring wells was informed by the UV evaluations described in Sections 3.4 and 4.3 which did not detect the presence of LNAPL-bearing geologic features below approximately 45 feet.

Monitoring well logs for the completed wells are included as **Appendix C**.

3.7 Potential Vapor Intrusion Evaluation

SPLP is evaluating the potential vapor intrusion of VOCs from soil, groundwater, and LNAPL into inhabited buildings in accordance with the Vapor Intrusion Progress Report submitted in accordance with the Administrative Order. As stated previously, the revised Vapor Intrusion Progress Report was approved by PADEP on August 15, 2025. A summary of the vapor intrusion evaluation activities is provided below.

To protect the privacy of homeowners, the discussion of vapor intrusion sampling provided below does not include references to specific addresses and the locations have not been depicted on a map.

3.7.1 Indoor Air Sampling

According to Appendix IV-C of the PADEP Land Recycling Program Technical Guidance Manual (“TGM”):

> *Indoor air sampling is performed when the potential for VI exists through other lines of evidence, and other investigative tools are not able to eliminate the VI pathway.*

and

> *When compared to other investigative tools available, indoor air sampling represents the most direct measure of exposure due to the VI [vapor intrusion] pathway however, it also can be heavily influenced by background conditions.*

Out of an abundance of caution, SPLP initiated the potential vapor intrusion evaluation for the pipeline release with indoor air sampling to directly evaluate the potential exposure pathway.

Indoor air sampling was completed at six residences on Glenwood Drive, Walker Road, and Spencer Road. Sampling was conducted in accordance with the procedures in the Indoor Air Sampling and Analysis Plan provided in **Appendix K**. Two rounds of indoor air sampling were conducted at the six residences:

- Round 1: February 25–26 and March 15–16, 2025
- Round 2: April 8–9 and April 21–22, 2025.

Samples were collected from the basement, first floor, and outdoor areas using 1.4-liter evacuated stainless steel canisters over a 24-hour sampling period. Indoor air samples were analyzed for Short List VOCs, hexane and cyclohexane via USEPA Method TO-15.

3.7.2 Sub-Slab Soil Gas Sampling

To supplement the indoor air sampling described above, sub-slab soil gas sampling was performed at the six residences. Sampling was performed in accordance with the Sub-Slab Soil Gas Sampling Plan provided in **Appendix L**.

Sub-slab soil gas samples were collected from stainless steel implants installed through the basement slabs of the residences. Two sub-slab soil gas samples were collected from each residence. Samples were collected in 2.7-liter evacuated stainless steel canisters over an approximately 15-minute sampling period. The first round of sub-slab soil gas samples was collected on June 12, 2025, and July 2, 2025, and the second round of samples was collected on August 15-16, 2025.

Based on the criteria in the Vapor Intrusion Progress Report, thirteen additional residences were identified by SPLP for vapor intrusion evaluation. Sub-slab soil gas samples were collected at ten of these properties as described above and in accordance with the Sub-Slab Soil Gas Sampling Plan. Access for sampling has not yet been obtained from the property owner at one location and at two locations the physical conditions in the basement did not allow for sub-slab soil gas sampling.

The first round of sub-slab soil gas samples was collected at these additional residences on July 18-22, 2025, and August 14, 2025, and the second round of sub-slab soil gas samples is planned for at least 45 days after the initial round. Sub-slab soil gas samples were analyzed for Short List VOCs, hexane, and cyclohexane via USEPA Method TO-15.

3.8 Surface Water Assessment

SPLP developed the Visual Assessment Plan for surface water that is provided in **Appendix M.** Starting February 18, 2025, SPLP's environmental consultant, CTEH LLC ("CTEH"), conducted daily visual, olfactory, and PID assessments of surface waterbodies near the Release Location. These assessments included nine locations on the Delaware Canal, the Delaware River, and nearby streams, at publicly accessible locations. Additionally, three upstream locations were identified for observation if product or a sheen were observed downstream. On June 1, 2025, the observation frequency was reduced from daily to weekly. Photographs are taken to document each location during each assessment. The visual assessment locations are shown on **Figure 3-8**, and listed below:

- VA01: Delaware Canal – at pipeline crossing
- VA02: Delaware Canal – at mouth of unnamed creek
- VA03: Delaware Canal – at mouth of Dyers Creek
- VA04: Delaware Canal – at Lock 7
- VA05: Delaware Canal – at waste gate upstream of 1799 House
- VA06: Delaware River – on New Jersey side of I-295 bridge
- VA07: Delaware River – on Pennsylvania side of I-295 bridge
- VA08: Delaware River – at Yardley Boat Ramp
- VA09: Delaware River – at pipeline crossing/Houghs Creek
- VA10: Delaware Canal – upstream, at Washington Crossing Road
- VA11: Delaware River – upstream, on Pennsylvania side of Washington Crossing Bridge
- VA12: Delaware River – upstream, on New Jersey side of Washington Crossing Bridge

In addition, SPLP developed and is implementing the Surface Water Sampling and Analysis Plan provided in **Appendix L**. Surface water samples are collected along the Delaware Canal and the Delaware River, at six publicly accessible locations shown on **Figure 3-8**, including two upstream locations used to evaluate background concentrations. The six locations are:

- W001: Delaware Canal – upstream at Washington Crossing Road
- 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 at these locations has occurred weekly since March 16, 2025. At the time of this report, 20 weekly sampling events have occurred. Surface water sampling is ongoing and will continue until surface water sampling results and groundwater assessment data confirm that potential impacts to surface water do not exist, or until other information indicates that the potential for impacts to surface water have been eliminated.

Surface water monitoring for field parameters is conducted during each sample collection event and includes the analysis of the following parameters: temperature, pH, conductivity, dissolved oxygen, and turbidity. Observations of product, sheen, and odor (or lack thereof) are made at each sampling location. Surface water samples are analyzed for Short List VOCs (excluding 12-DBA) and total petroleum hydrocarbons reported as gasoline range organics (“GRO”) and diesel range organics (“DRO”).

4. Characterization Findings and Recommendations

This section of the ISCR describes the findings of the characterization activities conducted to date and presents certain recommended additional characterization activities. Because this ISCR is an interim report, prepared before completion of the characterization activities, results of some ongoing and recent work performed by other consultants were reported in tables and figures that have been incorporated directly into this report. Therefore, there may be minor discrepancies in reporting that may need to be corrected or clarified in future submissions. Additionally, most of the analytical laboratory results reported in this document have not yet been validated, and therefore, are subject to change.

4.1 Geology

Geological information was obtained from a review of publicly available literature summarized in Section 2.4 and 2.5 of this report, and from geophysical investigations and observations from borings as described in Section 3.

4.1.1 Geophysical Survey and Logging Findings

The following excerpt from the July 30, 2025, rev. August 7, 2025, geophysical report attached in **Appendix B** summarizes the findings of the geophysical investigation work. Figure references in this excerpt refer to the figures in the geophysical report.

> ***Figures 4*** *through* ***10*** *provide side-by-side comparisons of the ERI and seismic results for Profiles 0 through 6, respectively. Careful examination of the ERI profiles supports the interpretation of low-resistivity features as possible fractures. There are underground utilities (electric and communication) generally parallel to the roadways and offset from them by 5 to 15 feet. Ten (10) of the inferred fractures have surficial traces within about 20 feet of roadways. Twenty-nine (29) are not near roadways. In addition, the ERI profiles are nearly perpendicular to the utilities parallel to Glenwood, Spencer and Walker making the ERI measurements nearly immune to utility interference. There is clear utility interference on the northern end of Profile 6 from presumed utilities, and as is standard practice, these data were culled from the inversion and interpretation (see* ***Figure 10****).*
>
> *Further support for the interpretation of the ERI anomalies as possible water-bearing fractures comes from the general correlation of ERI anomalies with seismic anomalies; i.e., zones where competent rock is locally slightly deeper (blue symbols on the seismic profiles in* ***Figures 4-10****). This is consistent with deeper weathering of the rock surface along fractures. On the seismic profiles, it is apparent that rock is shallowest (thinnest blue unconsolidated layer) in the northwest of the site and deepens to the south and east. The shallowest rock is about six (6) feet deep, and the deepest is approximately 42 feet deep.*

*The individual ERI anomalies are mapped onto the profile traces/electrode lines in **Figure 11**. On **Figure 12**, these anomalies have been connected by lines representing possible fracture traces. These connections were made by experienced geophysicists following these rules:*

- *Inferred traces (yellow-dashed lines) must be sub-parallel to the structural grain (known from photo/topo linear analysis and borehole geophysical logging) wherever possible.*
- *Inferred traces must connect as many anomalies as possible without crossing an ERI profile where there is no anomaly.*
- *Any anomaly must be connected to at least one other anomaly on an adjacent profile.*
- *Any inferred fracture trace must be defined by a minimum of three anomalies, unless it is oriented such that a two-anomaly line "misses" the next adjacent profile.*
- *Anomalies can be used to define one or more traces (i.e., they could represent intersections of fractures).*

*The numbers on the eastern end of each inferred possible fracture on **Figure 12** represent the number of anomalies that the trace continuously connects without crossing a profile with no anomaly in the proper location. The best-defined ("6") trace crosses the site almost exactly following the dominant fracture orientation/groundwater flow direction that was drawn months prior to the geophysical surveys based on the available literature, aerial photo and topo analysis, and the early detections of LNAPL in domestic wells. Three other inferred traces that are labelled just south of the "6" trace are labelled 4, 5, and 5. Because these cross Profile 6 on the end where data were culled to remove cultural interference (i.e., signal related to human infrastructure), they could easily be labelled "5", "6" and "6" since the anomalies that were dismissed as cultural interference could actually represent fracture anomalies, or were masked by the interference, but are truly present. These anomaly alignments/inferred fractures have now been ground-truthed by recovery wells on Glenwood Drive that were sited to intercept them, and now produce LNAPL. Note that none of the inferred fracture traces lie uniformly 5 to 15 feet from a roadway edge – suggesting that they are unlikely to be utility artifacts.*

*Since many possible lines could be drawn, some of the fractures drawn on **Figure 12** according to the rules above may yield false positives (i.e., not actually a fracture). In addition, these fractures (which are much more laterally extensive than the photo/topo linears on **Figure 1**) may represent averages of fracture swarms composed of many closely spaced fractures too small to be resolved individually.*

***Figure 12** also provides a rose diagram (top left inset) depicting the azimuths of planar features recorded in geophysical televiewer logging of three domestic wells*

> *and four recovery wells. The azimuths of photo/topo linears, and the ERI anomaly alignments are depicted on rose diagrams inset at the lower right of* ***Figure 12****. These diagrams show a consistent pattern that matches the overall fracture trend (light blue line on* ***Figure 1****.)*
>
> ***Figure 13*** *provides a top-of-bedrock elevation map based on interpolating elevations of the 9,500 fps* [feet per second] *Vp* [P-wave velocity] *contours from* ***Figures 4-10****. The highest bedrock elevations are in the northwest of the site (north of Spencer Road on both sides of Glenwood Drive). From there, bedrock elevations decline to the south and east, with the deepest rock where Spencer Road meets Crestwood Road. In the vicinity of the LNAPL release on the west side of Glenwood Drive north of Walker Road, the widely-spaced contours indicate a relatively level bedrock surface.*
>
> ***Figure 14*** *provides an interpolated seismic cross section along the suspected dominant/overall trend that was recognized in early 2025 (light blue line in* ***Figures 1, 11,*** *and* ***13****). No actual seismic profile was recorded along this trend, but the vertical velocity profiles from each actual profile where it crosses the trend were compiled and interpolated to produce this virtual seismic profile.*

The inferred ERI anomaly alignments (inferred fracture traces) from Figure 12 of the RETTEW report have been depicted in **Figure 4-1** of this report. These inferred fracture traces were used to inform the placements for the initial recovery wells and monitoring wells discussed in Section 3.

The top-of-bedrock map from the seismic refraction survey is reproduced as **Figure 4-2** of this report. As discussed in the geophysical report, the top-of-bedrock surface was based on the interpolated elevation of a specific seismic velocity (P-wave velocity of 9,500 feet per second which is classified as non-rippable siltstone for the D-9 excavator chart in the Caterpillar Company “Handbook of Ripping”). This is one of the standard generic velocities used to infer the competent, in-place bedrock surface. Regional soil and geologic information show that soils in the area are developed from in-place weathering of the bedrock. In these settings, the interface between soil or unconsolidated materials and competent bedrock is gradational. The specific boundary between “soil” and “bedrock” is often defined by the purpose for the determination (e.g., rippability of material by a certain type of excavator or ability for advancement by a certain type of boring equipment). Therefore, differences between the “depth to bedrock” from boring observations and geophysical methods are expected and neither set of results should be viewed as “right” or “wrong” (they are based on different criteria and are used for different purposes). The seismic refraction survey information supplements excavation and boring advancement observations and these data are being and will continue to be used to evaluate physical hydrogeologic and chemistry data.

4.1.2 Observations from Borings

The depth to bedrock or weathered bedrock from boring and excavation observations across the investigated area ranges from three feet in RW-3 to 34 feet in MW-7S. Boring logs for the soil borings, recovery wells, and monitoring wells show varying thicknesses of residual soils transitioning to argillite bedrock which is consistent with the published literature.

4.2 Hydrogeology

Groundwater in the investigation area occurs as a result of infiltration of precipitation and flow from regional recharge at topographically higher areas to the west. The Delaware River is generally considered to be a regional groundwater discharge zone and the Release Location is generally considered to be in a local-scale recharge zone.

The water table is generally located in the bedrock or weathered bedrock within the investigation area. Groundwater flow occurs primarily within the saturated fractures in the bedrock.

4.2.1 Groundwater Level Measurements in Monitoring and Recovery Wells

Table 4-1 presents a summary of depth-to-groundwater measurements and corresponding potentiometric surface elevations collected during the characterization activities to date. Depths to groundwater measured in shallow monitoring wells ranged from about 3.5 to 30 feet (MW-5S and MW-7S, respectively). Depths to groundwater measured in the deep monitoring wells ranged from about 18.5 to greater than 65 feet (MW-3D and MW-8D, respectively). Depths to groundwater measured in the four recovery wells ranged from about 12 to 43 feet (RW-4 and RW-1, respectively).

Water level gauging in the recovery and monitoring wells is ongoing and additional monitoring wells are currently being installed (Phase 3) or are being evaluated.

4.2.2 Inferred Groundwater Flow Directions and Vertical Hydraulic Gradients

As stated previously, groundwater flow is expected to be eastward based on regional recharge-discharge relationships. Groundwater flow is expected to be toward the northeast based on the geologic and hydrogeologic literature. Limited gauging data from the 16 monitoring wells have been collected since their installation. Groundwater elevations for each of the shallow monitoring wells were recorded on August 13, 2025, and are depicted on **Figure 4-3**. As shown on **Figure 4-3**, equipotential contours (contour lines of equal head) indicate a lateral hydraulic gradient in the hydrostratigraphic interval monitored by the shallow monitoring wells to the southeast.

As stated previously, groundwater flow in the bedrock aquifer beneath the investigation area is generally controlled by the distribution of fractures. Therefore, the direction of groundwater flow is not likely to be perpendicular to equipotential contour lines as would be the case in other hydrogeological settings.

Groundwater elevations for the deep monitoring wells and the recovery wells have not yet been evaluated. However, based on the general distribution of depths to water in the paired shallow and deep well pairs, there appears to be a downward vertical gradient which would be consistent with topographic setting in a local recharge area and the operation of domestic potable water supply wells in the neighborhood.

4.2.3 Recovery Well Packer Testing Findings

Packer testing results were documented in two reports (Downhole Packer Test Report and Packer and Pump Test Report (RW-2 and RW-3)) which are included as **Appendix N**.

Pumping at RW-2 yielded associated influence (drawdown) of approximately 0.9 feet at a certain water supply well on Walker Road, located approximately 66 feet east of RW-2, suggesting a hydraulic connection consistent with the inferred fracture traces, but did not result in discernable drawdown or influence at any other wells. Pumping at RW-3 produced a modest drawdown of less than 0.2 feet at RW-4, located 66 ft to the north, but no influence at either RW-2 or the Walker Road water supply well.

4.3 Extent of LNAPL

As stated in Section 3.4, SPLP initiated LNAPL recovery activities immediately upon discovery of the pipeline release. LNAPL in soil and weathered bedrock material was removed as part of the soil excavation at the Release Location described in Sections 3.5.2, 4.4.2, and 4.4.3. There is no evidence of LNAPL present in unconsolidated or soil materials around the Release Location.

As is described in Sections 3.8 and 4.7, periodic visual observations, initially collected daily and then weekly, have not detected sheen (with the exception of biogenic sheen) or odor at any of the surface water assessment locations.

As described in Section 3.4.2, liquid level gauging of six potable water supply wells (two wells on Glenwood Drive, one well on Walker Road, and three wells on Spencer Road) and four recovery wells is ongoing. The location and the frequency of the gauging were developed in consultation with PADEP and has changed over time in consultation with PADEP. Gauging and recovery data are included in **Appendix E**.

Figure 4-4 identifies the six potable water supply well locations where LNAPL has been detected historically along with the three recovery wells where LNAPL has been observed. As shown on the top portion of **Figure 4-4**, the locations with historical detections of LNAPL are generally located at and to the east/northeast (within 1,250 feet) of the Release Location. LNAPL observed at one property on Spencer Road did not appear to be Jet-A product based on the visual appearance and odor of the recovered LNAPL. Rather the LNAPL at that location appeared to be a different petroleum product. Also, LNAPL has not been observed at that location since January 29, 2025.

Recent detections (August 11 and 12, 2025) of LNAPL have been limited to the one potable water supply well on Walker Road and two of the recovery wells (RW-2 and RW-3) on Glenwood Drive adjacent to the Release Location. As shown on the bottom portion of **Figure 4-4**, the locations with recent detections of LNAPL are located at and to the east (within approximately 150 feet) of the release location. Note that LNAPL has not been observed in any of the 16 installed monitoring wells.

The Borehole Logging Report (**Appendix B**) states that UV logging results from the potable water supply wells at 108 Spencer Road and on Walker Road, as well as the recovery wells on Glenwood Drive (RW-2, RW3, RW-4) detected LNAPL-producing fractures or open bedding planes in the interval between 10 and 45 feet below ground surface. Deeper fluorescence responses to UV light are spotty (i.e., they do not extend around the circumference of the borehole) and are related to adhesion of LNAPL droplets to the borehole walls when the water level in the well is drawn down. There is no evidence that LNAPL is present in open fractures or bedding planes deeper than 45 feet.

Active and passive LNAPL recovery have been performed from the recovery wells where LNAPL is present. LNAPL recovery activities have also been conducted at a potable water supply well on Walker Road. These recovery activities are summarized in Section 5 of this ISCR.

The decrease in the number of locations with detected LNAPL (from eight down to three) and the decreased thickness of encountered LNAPL in those fewer locations suggest that the lateral extent of LNAPL is shrinking.

4.4 Extent of Contamination in Soil

Soil investigation and characterization activities were completed by SPLP to define the nature and extent of Short List Substances in soils. These activities included passive soil gas screening, post-excavation soil sampling, soil sampling from soil borings around the excavated area, and soil sampling at recovery well locations.

4.4.1 Passive Soil Gas Results

The results of the passive soil gas investigation are reported in the Passive Soil Gas Summary Report included as **Appendix A**. The investigation showed that detectable concentrations of analyzed VOCs were more prevalent closer to the Release Location. Overall, the detected concentrations were generally very low and did not indicate the presence of a significant subsurface VOC source in the investigation area.

4.4.2 Post-Excavation Soil Sampling Results

As described in Section 3.5.2, sixteen post-excavation soil samples were collected in connection with the soil excavation activities surrounding the pipeline release. Reported sample concentrations and field screening PID results have been tabulated in **Table 4-2** along with the PADEP statewide health standard (“SHS”) medium-specific concentrations (“MSCs”) for unsaturated, residential soil in a used aquifer setting. Laboratory analytical reports are included as **Appendix O**.

As shown in **Table 4-2**, several analyzed substances were detected at concentrations above the SHS MSC in samples PE-1 (naphthalene, 124-TMB, and 135-TMB) and PE-7 (124-TMB and 135-TMB) collected from the bottom of the excavation. Reporting limit concentrations for benzene and 1,2-DCA in sample PE-1 and 12-DBA in all samples except for PE-2 were greater than the SHS MSCs for those substances.

In summary, results from the post-excavation soil sampling showed relatively low concentrations of analyzed substances. Specifically, detected concentrations in only two of the 16 samples (less than 25%) were greater than the SHS MSC and no detected concentration was greater than ten times the SHS MSC.

Note that the bottom or base of the excavation was in the weathered bedrock zone at or near the limit of rippability for the equipment used for excavation work around the pipeline. Soil boring work around the excavation (discussed below) also showed direct-push refusal at similar depths to the excavation bottom. Based on these findings, no soil remains beneath the excavated area.

4.4.3 Excavation Area Soil Boring Results

As described in Section 3.5.4, fourteen direct-push soil borings were advanced around the perimeter of the excavated area to confirm the post-excavation sampling results and to further evaluate soil because the laboratory reporting limits for 12-DBA in most post-excavation soil samples were greater than the SHS MSCs. Reported sample concentrations and field screening PID results have been tabulated in **Table 4-2** along with the PADEP SHS MSCs for unsaturated, residential soil in a used aquifer setting. Laboratory analytical reports are included as **Appendix O**.

As shown in **Table 4-2**, no reported concentrations in the samples collected from the soil borings contained analyzed substances at concentrations greater than the SHS MSC. The reporting limit for 1,2-DBA in three of the 14 samples was greater than the SHS MSC. There were no detections of 1,2-DBA in the other 11 soil samples which had laboratory reporting limits less than one-tenth of the SHS MSC.

4.4.4 Recovery Well Soil Boring Results

As described in Section 3.5.5, soil samples were collected during installation of the recovery wells to assess soil quality in the borings where recovery wells were constructed. Reported sample concentrations and field screening PID results have been tabulated in **Table 4-2** along with the PADEP SHS MSCs for unsaturated, residential soil in a used aquifer setting. Laboratory analytical reports are included as **Appendix O**.

As shown in **Table 4-2**, no reported concentrations in the samples collected from the recovery well soil borings contained analyzed substances at concentrations greater than the SHS MSC.

4.4.5 Soil Characterization Conclusions and Recommendations

Multiple iterations of soil characterization have been performed around the Release Location following the excavation and off-site disposal of impacted soil and weathered bedrock. Soil characterization data show that the soil contamination associated with the pipeline release has been delineated and remediated with the interim remedial soil excavation. Samples PE-1 and PE-7 showed detected concentrations of Short List Substances above the SHS MSCs but these samples are located at the limit of rippability in the weathered bedrock zone. Reporting limits for 12-DBA in the post-excavation soil samples were greater than the SHS MSC. However, the sampling results from the soil borings around the excavation showed no detections of 12-DBA and the reporting limits for 11 of the 14 samples were below the SHS MSC indicating that 12-DBA is not present in the soil at the release location. No additional soil characterization or remediation in the area of the Release Location is necessary.

4.5 Extent of Contamination in Groundwater

Groundwater investigation and characterization activities were undertaken by SPLP to define the nature and extent of Short List Substances in groundwater. These activities included potable water supply well screening and sampling, recovery well sampling, and monitoring well sampling.

As stated previously, full characterization is not yet complete. The following discussion presents the interim groundwater characterization results, conclusions, and recommendations for additional groundwater characterization activities.

4.5.1 Potable Water Supply Well Screening and Direct Sampling

As described in Section 3.6.1, SPLP conducts potable water supply well screening with a PID and also conducted direct water well sampling in certain potable wells. These data have been and will continue to be used to inform the review of other groundwater and vapor intrusion sampling data and to inform additional planned groundwater characterization activities. Because potable water supply wellhead screening and direct potable supply well water sampling results will not be used for the purposes of demonstrating compliance under Act 2, they are not discussed in detail below.

4.5.2 Potable Water Supply Well Sampling Results

Sampling results from potable water supply wells in fractured rock aquifers generally represent an average (weighted based on the hydraulic gradient and transmissivity of each fracture) concentration of the water from each of the water-bearing fractures intercepted by the well. As stated in Section 3.6.1, potable water supply well sampling was conducted to evaluate potential impacts to potable water related to refined petroleum products. However, the distribution of analyzed substances may provide information that informs the groundwater characterization.

As of August 15, 2025, 1,289 water samples have been collected from 363 individual potable wells. Sample results have been received for 1,278 of the collected samples. The locations of the monitored and sampled potable water supply wells are shown on **Figure 3-6.** Sampling results have been tabulated in Table 1 of the Daily Summary Progress Report provided to PADEP on August 15, 2025, and included as **Appendix P**. Summary statistics from the potable water supply well sampling are included in the summary table on the first page of the Daily Summary Progress Report in **Appendix P**. Laboratory reports for all potable water supply well sampling have been provided to each respective homeowner and also to PADEP.

As shown in **Appendix P**, the historical aggregate of untreated water samples collected from 311 of the 363 sampled potable water supply wells have had no detectable concentrations of analyzed VOCs. Historically, samples of untreated water from six (6) tested wells showed detected concentrations of analyzed VOCs above the SHS MSCs while samples from 20 tested wells showed detected concentrations of analyzed VOCs below the SHS MSCs. In addition, samples from 26 tested wells showed estimated concentrations (i.e., “J” values) of analyzed VOCs below the reporting limit (which is also below the applicable SHS MSC) but above the method detection limit. The locations of these historical aggregate VOC detections are shown on **Figure 4-5**.

As of August 15, 2025, the most recent untreated water sample collected from 346 of the 363 sampled potable water supply wells have had no detectable concentrations of analyzed VOCs. The most recent sample of untreated water from three (3) tested wells showed detected concentrations of analyzed VOCs above the SHS MSCs. The most recent sample of untreated water from nine (9) tested wells showed detected concentrations of analyzed VOCs below the SHS MSCs. In addition, the most recent samples from five (5) tested wells showed estimated concentrations (i.e., “J” values) of analyzed VOCs below the reporting limit (which is also below the applicable SHS MSC) but above the method detection limit. The locations of these “recent” VOC detections are shown on **Figure 4-6**.

It is important to note that the Short List VOCs are not unique to Jet-A product and include certain substances that are not present in Jet-A product (e.g., MTBE). Therefore, detections of a Short List VOC at any particular location do not necessarily indicate that the potable water supply well has been impacted by the pipeline release.

As shown on **Figures 4-5** and **4-6** the recent and historical locations of the VOC detections at concentrations above the SHS MSC are located at and to the immediate northeast (within approximately 1,250 feet) of the Release Location. This distribution of elevated VOC concentrations in a northeast-southwest trend and clustered to the east of the Release Location conforms to the regional hydrogeological information. Recent and historical VOC detections at concentrations below the SHS MSC, including concentrations of VOCs less than the reporting limit but greater than the method detection limit (i.e., “J” values), do not appear to be distributed in an obvious pattern and include certain substances that are not in Jet-A product. Accordingly, some of these detections are likely unrelated to the pipeline release. Additional characterization data from monitoring wells will be used to further evaluate the distribution of VOCs in potable water supply wells.

Differences between the historical and recent VOC concentrations may provide information related to the fate and transport of analyzed substances in the aquifer. Assuming that the historical and recent detections of analyzed VOCs at concentrations above the SHS MSC are related to the pipeline release, the decrease in the number of wells with detections above the SHS MSC over time suggests that the potential impacts from the release are decreasing over time. A full fate and transport analysis will be conducted using the data from monitoring wells after the groundwater characterization has been completed.

As stated previously, POET systems have been installed at all properties with detections of Short List VOCs at concentrations above the SHS MSCs to eliminate the potential exposure pathways of ingestion, inhalation, and direct contact.

Potable water supply well samples are also being analyzed for dissolved lead because it is included in the Short List Substances. Lead is a naturally-occurring substance that is frequently detected in residential drinking water supplies due to the presence of lead in plumbing fixtures and plumbing solder, especially in homes built before 1991 (PADEP Lead in Drinking Water webpage).

Historical and recent lead concentrations are depicted on **Figures 4-7** and **4-8**, respectively. As shown on these figures, concentrations of dissolved lead in potable water supply wells do not appear to be distributed in an obvious pattern and the recent sampling results around the Release Location do not show elevated concentrations of dissolved lead. These observations suggest that detections of lead in the potable water supply wells are unrelated to the pipeline release. Additional characterization data from monitoring wells will be used to further evaluate the distribution of lead in potable water supply wells.

4.5.3 Recovery and Monitoring Well Sampling Results

As described in Sections 3.4.1 and 3.6.3, SPLP has installed four recovery wells and 16 groundwater monitoring wells (eight shallow and deep well pairs).

Each recovery well has been sampled multiple times and each monitoring well has been sampled once. Sampling results have been tabulated in **Table 4-3**. Laboratory reports for recovery well and monitoring well sampling are included in **Appendix Q**.

As shown in **Table 4-3**, 12 samples have been collected from the recovery wells. Analyzed VOCs were detected in all 12 of these samples. In samples collected from RW-1 and RW-4, analyzed VOC detected concentrations were below the SHS MSCs. In samples collected from RW-2 and RW-3, several analyzed VOCs were detected at concentrations at or above the SHS MSCs, including benzene, naphthalene, 124-TMB, and 135-TMB.

As shown in **Table 4-3**, samples collected from 12 of the 16 sampled monitoring wells have no detectable concentrations of analyzed VOCs. None of the samples showed detected concentrations of analyzed VOCs above the SHS MSCs. Samples from two (2) monitoring wells showed detected concentrations of analyzed VOCs below the SHS MSCs (MW-6S and MW-6D). In addition, samples from two (2) monitoring wells showed estimated concentrations (i.e., “J” values) of analyzed VOCs below the reporting limit (which is also below the applicable SHS MSC) but above the method detection limit (MW-1D and MW-3D).

4.5.4 Groundwater Characterization Recommendations

Additional water level gauging is planned to evaluate dynamic hydraulic gradients that may not be discernable in daily well gauging (e.g., fluctuations caused by pumping of potable water supply wells) and to further characterize groundwater flow in the investigation area. Following completion of the initial round of groundwater sampling in the monitoring wells, a water level study will be conducted using datalogging pressure transducers in the 20 monitoring wells. SPLP’s consultants are currently developing a work plan for that study.

Single-well aquifer testing is planned for the 20 monitoring wells to obtain estimates of the aquifer hydraulic conductivity at each well. SPLP’s consultants are currently developing a work plan for pulse testing and pulse testing data analysis.

SPLP will evaluate the need for additional monitoring well installation, monitoring well sampling, water level data collection, and aquifer testing following the analysis of the monitoring well analytical data, the water level study, and the pulse testing results. SPLP anticipates that groundwater monitoring (liquid level gauging) and sampling will be implemented (at least quarterly) following the collection of the initial sampling rounds in the monitoring wells.

4.6 Potential Vapor Intrusion Evaluation

Indoor air and sub-slab soil gas sampling was performed at six residences (Phase 1), and sub-slab soil gas sampling was performed at an additional ten residences (Phase 2) in the Mt. Eyre Manor neighborhood. As stated in Section 3.7, the original Phase 2 sampling plan included 13 additional residences. However, access for sampling has not yet been obtained from the property owner at one location and at two locations the physical conditions in the basement did not allow for sub-slab soil gas sampling.

To protect the privacy of homeowners that allowed sampling to be performed, the discussion of vapor intrusion results below does not include references to specific addresses. Laboratory reports and summary tables have been provided to PADEP, Pennsylvania Department of Health, and to individual property owners.

4.6.1 Vapor Intrusion Sampling Results at Phase 1 Locations

Table 4-4 provides a summary of the two indoor air sampling rounds at the six residences that were sampled as Phase 1 of the vapor intrusion evaluation. As shown in **Table 4-4**, some analyzed substances (benzene, ethylbenzene, xylenes, naphthalene, 124-TMB, and 12-DCA) were detected in certain indoor air samples at concentrations greater than one-tenth of the PADEP residential SHS indoor air screening value.

As stated in Section 3.7, sub-slab soil gas sampling was conducted at these six residences to supplement the indoor air sampling data. **Table 4-5** provides a summary of the two sub-slab soil gas sampling rounds at the six Phase 1 residences. As shown in **Table 4-5**, some analyzed substances (12-DCA and 12-DBA) were detected in certain sub-slab soil gas samples at concentrations greater than one-tenth of the PADEP residential SHS sub-slab soil gas screening value. **Table 4-7** provides a summary of outdoor air sampling results associated with the sub-slab soil gas sampling events.

4.6.2 Sub-Slab Soil Gas Sampling Results at Phase 2 Locations

Table 4-6 provides a summary of the first round sub-slab soil gas sampling at ten additional residences. As shown in **Table 4-6**, 12-DBA was detected in one of the sub-slab soil gas samples at a concentration greater than one-tenth of the PADEP residential SHS sub-slab soil gas screening value. The second round of sub-slab soil gas sampling at these additional properties is being scheduled for no sooner than 45 days after the first round of sampling. **Table 4-7** provides a summary of outdoor air sampling results associated with the sub-slab soil gas sampling events.

4.6.3 Vapor Intrusion Discussion and Recommendations

The two rounds of Phase 1 and one round of Phase 2 sub-slab soil gas sampling results show that the only analytes detected at concentrations above one-tenth the PADEP residential SHS sub-slab soil gas screening value were 12-DCA and 12-DBA. These two VOCs are not constituents of or additives to Jet-A product, suggesting an influence from conditions unrelated to the pipeline release. The two rounds of indoor air sampling results show detections of some analyzed substances (benzene, ethylbenzene, xylenes, naphthalene, 124-TMB, and 12-DCA) in certain indoor air samples at concentrations greater than one-tenth of the PADEP residential SHS indoor air screening value. The differences in the detected analytes and the concentrations of detected analytes between sub-slab soil gas samples and indoor air samples suggest that conditions unrelated to the pipeline release affected the indoor air sampling. Evaluations of the laboratory data, field protocols, and the quality assurance and quality control data (e.g., outdoor air and duplicate samples) are being performed.

Following the receipt and analysis of the planned sub-slab soil gas sampling, SPLP will complete the evaluation of the Phase 1 and Phase 2 vapor intrusion sampling results and evaluate the need for additional investigation of potential vapor intrusion in accordance with the PADEP TGM.

4.7 Surface Water Sampling Results

Visual assessments were conducted daily (with exceptions of some weekends) from February 18, 2025, through June 1, 2025, and have been conducted weekly since June 1, 2025. An example visual assessment report is included in **Appendix R**.

Surface water samples have been collected weekly since March 16, 2025. The laboratory results through July 27, 2025, are tabulated in **Appendix R**. The sampling locations are shown on **Figure 3-8**.

Visual observations, initially collected daily and then weekly, have not detected sheen (with the exception of biogenic sheen) or odor at any of the observation locations.

Surface water sampling results are compared to background (upstream) concentrations and to screening values established by the PADEP and USEPA. Specifically, results are compared to the Criteria Maximum Concentration for Fish and Aquatic Life and the Human Health Criteria, as outlined in the Water Quality Criteria for Toxic Substances established by the Commonwealth of Pennsylvania in Title 25 Chapter 93: Water Quality Standards (25 Pa. Code § 93.8c). Results are also compared to the Biological Technical Assistance Group (“BTAG”) Screening Values (Freshwater Screening Benchmarks) established by USEPA Region 3.

There were no detections of constituents at concentrations above screening levels. Three constituents: GRO, DRO, and toluene were occasionally detected in background (i.e., upstream) samples and downstream sampling locations at similar concentrations. These data indicate that these detections are unrelated to the pipeline release.

5. Overview of Interim Remedial Progress

As discussed in Section 3.4.4, LNAPL recovery activities were initiated immediately by SPLP upon discovery of the pipeline release. An estimated 644 gallons of product were removed with the soil and weathered bedrock material as part of the soil excavation at the Release Location described in Section 3.5.2. Active and passive LNAPL recovery have been performed from the recovery wells RW-2 and RW-3. LNAPL recovery has also been performed in five potable water supply wells (two wells on Glenwood Drive, one well on Walker Road, and two wells on Spencer Road). The LNAPL recovery information from recovery and potable water supply wells is included in the "Comments" column of the gauging data tables in **Appendix E** and is summarized in the "Site remediation activities performed" table in the August 15, 2025 Daily Report to PADEP included as **Appendix P**.

As shown in the summary table in the Daily Report, over 338 gallons of LNAPL have been removed from recovery wells and potable water supply wells. The majority of this LNAPL (approximately 182 gallons) has been recovered from the recovery wells (RW-2 and RW-3). LNAPL recovery efforts at these wells were initiated in late May and early June 2025. The remaining LNAPL was recovered from the five potable water supply wells described above and nearly all of the removed LNAPL from these potable water supply wells was recovered from the well on Walker Road (approximately 118 gallons).

A graph depicting the total LNAPL recovery from all of the recovery and potable water supply wells is provided as **Figure 5-1**. As shown on **Figure 5-1**, LNAPL recovery from wells began in February 2025 from potable water supply wells on Spencer Road and Walker Road. Following the initial recovery at these locations, the daily recovery rate dropped below approximately two or three gallons per day until the beginning of April 2025 when the rate dropped to around one gallon per day or less. The recovery rate increased back to between two and three gallons per day with the initiation of recovery from RW-3 in late May 2025. In early June 2025, recovery was initiated at RW-2 and the total daily rate of recovery generally ranged between one and six gallons per day. A general decrease in recovery rate has been evident since mid-July 2025.

A graph depicting the LNAPL recovery from the potable water supply well on Walker Road is provided as **Figure 5-2**. As shown on **Figure 5-2**, daily recovery rate from this well in February and March 2025 was generally between 0.5 and 2 gallons per day. In April and May, the recovery rate from this well decreased and was generally between 0 and 1 gallon per day. In June 2025, the recovery rate from this well increased back to 2 gallons per day. This increase correlates to the timing of the borehole testing in the three recovery wells along Glenwood Drive. The recovery rate from this well has generally declined since early June 2025 and is now at or near 0 gallons per day.

A graph depicting the LNAPL recovery from RW-2 is provided as Figure 5-3. As shown on Figure 5-3, the daily recovery rate from this well generally ranges between 0.5 and 3.5 gallons per day. The recovery rate is now generally between 0.5 and 1 gallon per day.

A graph depicting the LNAPL recovery from RW-3 is provided as Figure 5-4. As shown on Figure 5-4, the daily recovery rate from this well increased from the end of May (around 0.5 gallons per day) to mid-June 2025 (as high as 4.75 gallons per day). The recovery rate from this well has generally declined since mid-June 2025 and the rate has been less than 0.5 gallons per day in the month of August.

As stated in Section 3.4.4, additional LNAPL recovery interim remedial actions or interim remedial measures are being evaluated. Any significant modification to the current LNAPL recovery activities or any additional LNAPL recovery activities will be reported to PADEP in revised or amended interim remedial action plan.

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