REMEDIAL ACTION COMPLETION REPORT
SOUTH DISTRICT WORK CENTER
1851 SOUTH 34TH STREET
PHILADELPHIA, PENNSYLVANIA 19145

PADEP Facility ID: 51-3000
Leidos Project 303167.TM.100039.1000.0100

Prepared for:

Verizon Pennsylvania, LLC
966 South Matlack Street
West Chester, PA 19382

April 2015

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1.0 INTRODUCTION

On behalf of Verizon Pennsylvania, LLC (Verizon), Leidos, Inc. (Leidos), formerly the company Science Applications International Corporation (SAIC), has prepared this Remedial Action Completion Report (RACR) for the South District Work Center (Site) in accordance with the Pennsylvania Storage Tank Spill and Prevention Act (Act 32) and 25 Pennsylvania Code §245.313.

The Site is located in Philadelphia, Pennsylvania (see **Figure 1**). Verizon completed extensive work at the Site to satisfy the requirements of 25 PA Code §245, Subchapter D. The results of these activities confirm that Verizon has demonstrated attainment of a combination of the Statewide Health Standard (SHS), the Site Specific Standard (SSS), and the Background Standard (BGS) for residual petroleum hydrocarbons in soil, groundwater, and soil vapor in accordance with the Land Recycling and Environmental Remediation Standards Act (Act 2) and the requirements of 25 PA Code §250, Subchapter G, Demonstration of Attainment.

1.1 Objectives

The purpose of this RACR is to present the methods and results of the site characterization and remedial actions conducted at the Site to demonstrate attainment of the selected standards and to request Relief of Liability (ROL) for the selected contaminants as afforded by Act 2. In addition, this RACR serves as the final quarterly Remedial Action Progress Report (RAPR), summarizing site activities conducted during the fourth quarter of 2014.

1.2 Background

In February 2011, environmental due diligence performed at the Site, in association with a potential real estate transaction, documented the presence of petroleum hydrocarbons in the subsurface. Verizon notified the Pennsylvania Department of Environmental Protection (PADEP) of the observed contamination in February 2011. On March 24, 2011, PADEP issued a Notice of Violation (NOV) under Section 1310 of Act 32 based upon the existence of former underground storage tanks (USTs) at the Site. In response, Verizon began site characterization activities in March 2011. **Appendix A** includes a copy of the NOV and pertinent communications with PADEP.

Results of initial site characterization activities were presented in a Site Characterization Report (SCR) dated November 23, 2011. PADEP approved the SCR on February 10, 2012 (**Appendix A)**. Additional characterization activities were conducted concurrent with SCR preparation and after the SCR was submitted. These additional activities were summarized in the Remedial Action Plan (RAP) dated March 2012, and a RAP Addendum dated May 2012. The RAP indicated the Site would be remediated in accordance with SSS. However, based on the data from the ongoing characterization activities, as presented in the May 2012 RAP Addendum and subsequent discussions with PADEP (**Appendix A**), Verizon elected to pursue demonstration of attainment of the BGS in accordance with 25 PA Code §250, Subchapter B (Background Standard) and Subchapter G (Demonstration of Attainment). On June 6, 2012, Verizon submitted a letter to PADEP indicating that Verizon intended to pursue the BGS for site groundwater utilizing eight quarterly sampling events to demonstrate attainment. PADEP approved the RAP and subsequent addenda in a letter dated June 11, 2012 (**Appendix A**). Verizon began quarterly sampling in August 2012.

On April 11, 2013, Verizon and Leidos met with PADEP to discuss the Site (**Appendix A**). Based on the discussions during the meeting, Verizon and Leidos decided to pursue an accelerated sampling schedule in accordance with the provisions of Pennsylvania Code Title 25§250.707a(x). In a letter dated May 22, 2013, Leidos outlined the accelerated sampling that included eight sampling events for 2013. In a letter dated May 28, 2013, PADEP approved the accelerated schedule (**Appendix A**). The purpose of the accelerated sampling schedule was to expedite the demonstration of attainment of the BGS.

After completing the eight accelerated sampling events, the submission of a RACR with demonstration of attainment of the BGS was postponed due to the following:

- At the completion of the accelerated sampling program, Verizon learned that several new wells (N-140 through N-146) were installed at the adjacent refinery property south of Verizon’s existing wells MW-13, MW-14, and MW-15. The refinery is owned by Philadelphia Energy Solutions (PES), formerly Sunoco, Inc. (Sunoco). At the time, data from these new wells was not available to Verizon, but it was assumed that the data would enhance understanding of the nature of contamination and groundwater flow.

- Dissolved lead, benzo[a]pyrene, and benzo[b]fluoranthene concentrations slightly exceeded the statistical requirements for demonstration of the BGS via the accelerated sampling schedule, requiring selection of alternative standards.

Given the results of the accelerated sampling program and the new PES wells, Verizon elected to conduct an additional year of quarterly groundwater sampling to demonstrate attainment of the applicable remedial standards. Verizon continued quarterly groundwater sampling with events conducted in April, June, September, and December 2014. Results of the quarterly sampling were presented in RAPRs submitted to PADEP. Results of the December 2014 event are presented in this RACR.

Data provided by PES for wells N-140 through N-146 indicated that the presence of contamination on the PES site was more widespread than previously assumed. Furthermore, gauging data confirmed the regional groundwater gradient established by previous characterization activities. The summation of data collected to date indicate widespread presence of Light Non-Aqueous Phase Liquid (LNAPL) and associated dissolved phase petroleum hydrocarbon contaminants across the PES property and the Site. Hydraulic data confirm a regional gradient trending from the PES property toward the Site. Furthermore, data demonstrate that subsurface contamination (LNAPL and dissolved phase) from the PES property has migrated onto the Site. Therefore, Verizon has prepared this RACR to demonstrate attainment of the applicable remedial standards.

1.3 Report Structure

Section 2 provides a summary of the site setting, including the location, topography, soils, geology, and land use. Section 3 presents the site characterization and remedial actions conducted at the Site in general chronologic order. Section 4 presents a Conceptual Site Model (CSM) which concisely describes the observed contamination within the hydrogeologic framework and discusses the migration of contamination. Section 5 lists the selected remedial standards. Section 6 documents how the BGS was established for the Site, including identification of reference wells, determination of groundwater gradient, and selection of the BGS for each selected parameter. Section 7 presents and discusses a fate and transport assessment for selected parameters. Section 8 presents and discusses the contaminant pathway evaluation. Section 9 presents a demonstration of attainment by media for pertinent contaminants. Section 10 presents a proposed Post-Remediation Care Plan (PRCP).

2.0 SITE SETTING

This section presents the site location and discusses the local topography, climate, soils, geology, and water usage information.

2.1 Site Location

The 3.4-acre site is located at 1851 South 34th Street in Philadelphia, Philadelphia County, Pennsylvania 19145 (**Figure 1**). The tax parcel ID number is 77-3-6-250-05. The Site is a roughly rectangular parcel bound by roadways and industrial and commercial properties. In December 2008, the Site was professionally surveyed by First Order, LLC. Details from the site survey are included on **Figure 2**.

The southeastern portion of the Site is occupied by a 0.6-acre single-story masonry building that includes office areas and a garage that is used for vehicle storage and maintenance. There are also three small buildings used for equipment storage on the northeast portion of the Site. The majority of the Site is asphalt-covered and is used for vehicle parking and equipment storage. The northern portion of the Site is an empty, vegetated lot with an approximate area of 0.3 acres. A 50-foot-wide drainage right-of-way (former Mifflin Street) transects the central portion of the Site (**Figure 2**). The entire property is surrounded and secured by a chain-link fence with barbed wire. Access to the Site is via a gate on South 34th Street.

The following is a description of the area immediately surrounding the Site:

- North – Vare Avenue, Route 76 (Schuylkill Expressway), and commercial/industrial/ residential properties.
- South – Maiden Lane and PES Refinery North Yard Area of Concern 8.
- West – South 34th Street and commercial/industrial properties.
- East – Vare Avenue, Route 76 (Schuylkill Expressway), and commercial/industrial properties.

Historical records indicate that prior to 1940, the Site was partially undeveloped and partially residential (ATC Associates Inc. [ATC], 2009). After approximately 1941, the Site was reportedly used as a landfill. Between 1956 and 1965, the Site was developed to include office buildings and garages. In 1967, a 550-gallon waste oil UST (Tank 002) was installed. Around 1974, the Site was developed into its current configuration and, in 1976, a 10,000-gallon gasoline UST (Tank 001) was installed (**Figure 2**). Tanks 001 and 002 were removed in June 1991. A new 10,000-gallon gasoline UST (Tank 003) was installed at the same location as the former Tank 001. Tank 003 was decommissioned and removed in February 2011.

Based on Philadelphia zoning information obtained from the City of Philadelphia's website (http://www.philaplanning.com/) the property is zoned G-2 (general industrial) and is located within the Grays Ferry Industrial District. Future use of the Site is expected to remain as general industrial. The Site is connected to public water and sewer. There are no known schools, daycare facilities, or hospitals adjacent to the Site. The nearest schools are located about 600 feet north of the Site on the opposite side of Route 76 (Schuylkill Expressway).

2.2 Topography, Surface Water, and Climate

The ground surface at the Site is relatively level with elevations ranging from approximately 28 to 34 feet above mean sea level (amsl). The regional topography slopes gently toward the south and west. The Schuylkill River is the closest water body to the Site, approximately 2,000 feet to the west, and it flows toward the south (**Figure 1**). Storm water within the property is conveyed by a storm sewer system.

Climate data for Philadelphia from http://www.climate-zone.com/ indicate the average annual rainfall is 41.4 inches and the average annual snowfall is 20.4 inches. The average high temperature is in July and is 86.1 degrees Fahrenheit (^{o}F), and the average low temperature is in January and is 22.8^{o}F. The annual average wind speed is 9.5 miles per hour and comes predominantly from the northwest, west, and southwest.

2.3 Soils and Geology

Soil at the Site is mapped as Urban Land (UB) by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) (**Figure 3**). The SCS describes UB as land so altered by earth moving or so obscured by buildings or other structures that the original soils cannot be identified (http://websoilsurvey.nrcs.usda.gov/).

Surficial geology at the Site is mapped by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey (DCNR, BTGS) as the Trenton Gravel (Qt) (**Figure 4**). The Trenton Gravel is described as gray to pale reddish-brown, gravelly sand, interbedded with sand and clay-silt layers (Geyer and Wilshusen, 1982; and Berg and Dodge, 1981).

2.4 Groundwater Use Information

Public water is supplied to the Site and surrounding area by the Philadelphia Water Department (PWD). A water supply pipeline is present along the northeast side of the Site on Vare Avenue (**Figure 2**). PWD obtains water for the water system from surface water sources (i.e., Schuylkill River and Delaware River). The PWD does not obtain any drinking water from groundwater sources (i.e., wells). PWD is also responsible for treating wastewater (sewage) and managing Philadelphia's storm water systems. Wastewaters are treated in one of three wastewater treatment plants using secondary treatment before being discharged to the Delaware and Schuylkill Rivers. Biosolids from the wastewater treatment system are processed in a recycling facility. Further information about PWD can be found on their website at www.phila.gov/water/index.html.

No public or private water supply wells were observed by Leidos at or in the immediate vicinity of the Site during site reconnaissance activities. A records database search was conducted as part of the Phase I Environmental Site Assessment (ESA). The database search did not identify any public supply wells within a one-mile-radius of the Site (ATC, 2009). Leidos also reviewed the Pennsylvania Geological Survey's (PGS) Groundwater Information System (PaGWIS). No public or private water supply wells were listed within a one-mile-radius of the Site.

There are no known ordinances that prohibit the installation of a well by a private party. The installation of a well, however, would have to be performed in accordance with all applicable licensing and permitting requirements.

3.0 HISTORIC SITE CHARACTERIZATION ACTIVITIES

Provided below is a chronological summary of the site characterization activities conducted at the Site prior to the March 24, 2011, NOV. Additional details related to the activities, including copies of the pertinent reports, figures, tables, and appendices, are presented in the November 2011 SCR.

3.1 1991 UST Removal

On June 4, 1991, Tank 001 (10,000-gallon gasoline UST) and Tank 002 (550-gallon waste oil UST) were removed. Tank 003 (10,000-gallon gasoline UST) was later installed at the location of Tank 001. The approximate locations of the USTs are illustrated on **Figure 2**. The removal of Tanks 001 and 002 is documented in the Versar Pre-Closure Report dated September 10, 1991 (Versar, 1991).

The scope Versar's investigation included tank removal, soil excavation, soil screening, and soil sample collection. During the excavation, Versar noted glass bottles, metal scraps, and debris characteristic of made land and potential previous site use as a landfill. Versar utilized a photoionization detector (PID) to screen the soils and noted volatile organic compound (VOC) concentrations ranging from 2 to 200 parts per million (ppm) in the Tank 001 excavation, and 0 to 4 ppm in the Tank 002 excavation. The highest concentrations were found in the vicinity of the gasoline dispenser associated with Tank 001. Visual evidence of contamination was not observed below Tank 001 at approximately 11 feet below grade (fbg), or at the final excavation depth of approximately 13 fbg. However, there was visual evidence of contamination below the dispenser at a depth of approximately 2 fbg; therefore, the area beneath the dispenser was excavated to a depth of approximately 13 fbg. During excavation below the dispenser, no visual evidence of contamination was noted at approximately 10 or 13 fbg. During excavation of Tank 002, several holes were observed in the surface of the tank, and contamination was visible in the pit. The concrete anchor pad below Tank 002 was removed, and the excavation was extended to a depth of approximately seven feet. Approximately 361 cubic yards (yd^3) of soil was removed during the excavation of Tank 001 and the dispenser, and approximately 67 yd^3 of soil was removed during the excavation of Tank 002.

Following excavation, Versar collected and submitted nine samples for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total recoverable petroleum hydrocarbons (TRPH). The results of the laboratory analyses are discussed in the Pre-Closure Report (Versar, 1991), as well as the Groundwater Technology, Inc. (GTI) letter report dated July 30, 1991. BTEX concentrations in the samples collected below Tank 001 ranged from non-detect to 65.9 micrograms per kilogram (µg/kg). TRPH concentrations ranged from non-detect to 1,500 milligrams per kilogram (mg/kg). The soils in areas of elevated BTEX concentrations were excavated, and a sample was collected from below the dispenser at a depth of approximately 10 fbg. Analytical results from the sample below the dispenser indicated a total BTEX concentration of 4.7 µg/kg and a TRPH concentration of 218 mg/kg. Versar and GTI both concluded that field observations and analytical results indicated that the potentially impacted soils associated with Tank 001 were removed by the excavation activities (Versar, 1991; and GTI, 1991). At the completion of soil excavation at Tank 001, and upon approval from PADEP, a new 10,000-gallon gasoline UST (Tank 003) was installed at the same location.

Total BTEX concentrations in the samples collected below Tank 002 ranged from 7.1 µg/kg to 542 µg/kg, and TRPH concentrations ranged from 274 mg/kg to 1,170 mg/kg. Based on the results and field observations, Versar concluded that a release had occurred from Tank 002 and that excavation had not removed all the impacted soils (Versar, 1991).

Subsequent to the removal of Tanks 001 and 002, GTI was retained to further investigate the subsurface contamination related to Tank 002 (GTI, 1991). On June 7, 1991, GTI extended the Tank 002 excavation to approximately 8 feet, removing approximately 100 yd^3. In addition, GTI collected four soil samples from a depth of approximately 11 fbg. The samples were submitted for laboratory analysis of BTEX and TRPH at the following ranges: aliphatic hydrocarbons, aromatic hydrocarbons, gasoline, mineral spirits, kerosene, jet fuel, diesel fuel, fuel oil #6, and lubricating oil.

Total BTEX was not detected in samples and TRPH, consistent with lubricating oil, was detected in one sample at a concentration of 1,800 mg/kg. On June 14, 1991, GTI collected three additional soil samples to confirm the identification of lubricating oil and to assess the vertical extent of contamination. The samples were collected from depths of approximately 11.5 fbg, 13.5 fbg, and 15 fbg. The samples, SS-5 through SS-7, were submitted for laboratory analysis of BTEX and TRPH. Laboratory results indicated detections of total BTEX ranging from 180 µg/kg to 1,260 µg/kg, and TRPH as petroleum wax ranging from non-detect to 700 mg/kg. Based on the sample results, GTI concluded that contamination remained at depths up to approximately 15 fbg (GTI, 1991). On June 17, 1991, before additional excavation could occur, the excavation was backfilled due to threat of structural instability of the adjacent building. Therefore, GTI proposed to install soil borings in the vicinity of Tank 002 to assess the extent of contamination.

On September 25, 1991, GTI advanced four soil borings in the area of Tank 002. The purpose of the investigation was to determine the extent, if any, of hydrocarbon contamination in the soils adjacent to the excavated area and to determine whether further remedial action was necessary. Each boring was advanced to a depth of 20 feet using a rotary drilling rig equipped with an 8-inch-diameter hollow-stem auger. Continuous soil samples were collected with a split-barrel sampler at two foot intervals and screened with a flame ionization detector (FID). Two samples were collected from each boring and submitted for laboratory analysis of total petroleum hydrocarbons (TPH) and BTEX. Details of the soil boring investigation are presented in the February 21, 1992, report by GTI.

None of the borings encountered groundwater. GTI noted that the subsurface materials encountered during excavation and soil boring were composed entirely of fill material and are consistent with historic use of the Site as a landfill. Analytical results of soil samples indicated TPH concentrations below laboratory detection limits for hydrocarbons in the range of gasoline, mineral spirits, kerosene, diesel, fuel oil #6, and lubricating oil. However, analytical results indicated the presence of other hydrocarbons not in the ranges listed. Total BTEX concentrations in soil ranged from 200 µg/kg (2 fbg) to 5,700 µg/kg (18 to 20 fbg). GTI concluded that the observed subsurface contamination was not consistent with releases from either Tanks 001 or 002. GTI further concluded that the contamination is more likely attributable to historical site use as a landfill or the presence of contaminated fill material. GTI's conclusions were based on the presence of lubricating oil at approximately seven fbg below Tank 002 and the lack of lubricating oil at greater depths. Furthermore, GTI stated that the horizontal and vertical extent of hydrocarbons in SB-1 through SB-4, as well as previous samples, is not consistent with a release from Tank 002 (GTI, 1992).

On August 21, 1995, PADEP issued a letter to the site owner (Bell Atlantic Network Services, Inc.) indicating that no further action was required regarding Tanks 001 and 002. The letter indicates that PADEP reviewed the GTI report and other pertinent data and concluded that the observed contamination was not related to the USTs.

3.2 2009 Phase I Environmental Site Assessment

On January 16, 2009, ATC submitted a Phase I ESA to Verizon (ATC, 2009). The ESA was conducted in general conformance with the scope and limitations of American Society for Testing and Materials (ASTM) Standard Practice E 1527-05. The ESA identified the following recognized environmental conditions (REC), historical recognized environmental conditions (HREC), and potential environmental concerns (PEC):

- The former USTs (Tanks 001 and 002) were considered to represent HRECs.
- The former use as a landfill was considered to be a REC.
- The adjacent PES refinery was labeled a PEC.
- The historical uses of the adjacent properties as gasoline filling stations, auto body repair facilities, and oil refineries were labeled PECs.
- The concrete patches within the garage area are indicative of former hydraulic lifts and are labeled as PECs.
- Two monitoring wells (WO-MW-1 and WO-MW-2) were observed in the vicinity of Tank 002. No information was available regarding these wells at the time of the ESA, so they were considered to be PECs.
- The potential for asbestos-containing material in the building was considered to be a PEC.
- The potential for lead-based paint was considered to be a PEC.

The monitoring wells mentioned above (WO-MW-1 and WO-MW-2) were abandoned by ATC on March 12, 2009. ATC reported total well depths of 7.33 fbg and 8.5 fbg. Information about when and why these wells were installed was not provided in the available records; however, given their shallow depth and location above the water table, it is believed they were not groundwater monitoring wells. In addition to the concerns listed above, the ESA provides a comprehensive compilation of available site records and historical information. Based on the available data, it appears that the Site was formerly used as a landfill and that former or adjacent site use included auto repair facilities and gasoline filling stations.

3.3 2010 Phase II Environmental Site Assessment

On May 12, 2010, a tank tightness test was performed on Tank 003 by Crompco, LLC (Crompco). Testing confirmed the integrity of Tank 003. The tightness testing was conducted, along with the Phase II activities described below, to establish baseline conditions as part of a proposed property transaction.

On June 17, 2010, Langan Engineering and Environmental Services (Langan) submitted a Phase II ESA to Verizon (Langan, 2010). The Phase II ESA was conducted to confirm the absence of soil impacts near Tank 003. The Phase II ESA included advancing four soil borings with a Geoprobe® to a depth of approximately 15 feet in the area surrounding Tank 003. All samples were scanned with a PID. Soil samples were collected and submitted for laboratory analysis of the PADEP short list of petroleum products (short list) for leaded and unleaded gasoline parameters.

Analytical results indicated no analytes were present in the samples at concentrations greater than the PADEP SHS Medium Specific Concentrations (MSCs). Benzene was detected at sample SB-3 (10 to 10.5 fbg) at a concentration of 3.9 µg/kg, and methyl tertiary-butyl ether (MTBE) was detected at SB-3 (4.4 µg/kg) and sample SB-4 (1.7 µg/kg at 13.5 to 14.0 fbg); however, these concentrations are well below the SHS MSCs. Langan concluded that Tank 003 did not impact the surrounding soils. In addition, Langan noted extensive fill material at each boring.

3.4 2011 UST Closure

On February 3, 2011, Leidos oversaw the removal and decommissioning of Tank 003. Details of the removal are contained within the UST Closure Report submitted to PADEP on March 11, 2011 (Leidos, 2011). The removal activities included field inspection, soil screening with a PID, and the collection of seven soil samples. Contamination was not apparent during UST removal, and the laboratory analysis of the seven soil samples determined that concentrations of regulated substances were less than MSCs. No unleaded gasoline UST parameters were detected in four of the seven soil samples, including the sample collected beneath the dispenser, the samples collected along the east and southeast portion of the excavation, and the sample collected along the northwest portion of the excavation. The sample collected from the northeast portion of the excavation between the former tank and dispenser, contained a detection of MTBE (0.102 mg/kg) below the PADEP residential soil-to-groundwater MSC (2 mg/kg). The two samples collected from the southwest and west portions of the excavation, contained detections of unleaded gasoline UST parameters; however, all detected concentrations were less than SHS MSCs. Based on field observations and analytical results, a release from Tank 003 was not evident. Additional information related to the excavation and closure of Tank 003 is presented in the UST Closure Report (Leidos, 2011).

3.5 2011 Environmental Due Diligence

In February 2011, as part of environmental due diligence in association with a potential real estate transaction, monitoring wells MW-1 through MW-4 were installed by Synergy Environmental, Inc. (Synergy) on behalf of the potential buyer (**Figure 5**). The investigation activities documented the presence of petroleum hydrocarbons in the subsurface. In response, Verizon notified the PADEP of the observed contamination in February 2011. On March 24, 2011, PADEP issued a NOV of Section 1310 of Act 32. Because of the presence of the USTs, previous releases, and soil impacts, PADEP processed the Site according to Act 32.

The due diligence conducted by Synergy included installation, development, and sampling of monitoring wells MW-1 through MW-4. No soil samples were submitted for laboratory analysis. During installation and development, Synergy noted LNAPL at MW-2 and MW-3. On February 7, 2011, Synergy measured LNAPL thicknesses of 0.79 feet and 0.51 feet at MW-2 and MW-3, respectively. No LNAPL was detected at MW-1 or MW-4.

On February 17, 2011, Synergy collected groundwater samples from MW-1 through MW-4. Samples were submitted to Accutest Laboratories (Accutest) for analysis of VOCs, semi-volatile organic compounds (SVOCs), and lead. In addition, LNAPL samples from MW-2 and MW-3 were submitted for parafin, iso-parafin, aromatics, naphthenics, and olefins (PIANO) analysis. The PIANO analysis is used to determine the relative age, composition, degree of weathering, and liquid formulation of petroleum products.

Results of the laboratory analyses indicated concentrations of multiple petroleum-related compounds above MSCs at MW-2 and MW-3. No compounds were detected above method detection limits at MW-1. Several compounds were detected at concentrations less than MSCs at MW-4. Results of the PIANO analysis indicated that the samples from MW-2 and MW-3 were of similar composition and were determined to be moderately weathered gasoline-range hydrocarbons. Based on the findings of the due diligence activities, Verizon retained Leidos to begin site characterization activities and to respond to the NOV from PADEP.

Following the March 2011 NOV, Verizon conducted multiple site characterization activities to support the SCR submitted in November 2011. The activities included well gauging and product recovery, LNAPL analysis, well installation (MW-5 through MW-15), groundwater sampling, soil sampling, slug testing, soil gas sampling point installation (SG-1 through SG-3, and SGSP-1 through SGSP-6), soil gas sampling, and site surveying. The findings and conclusions of the site characterization activities, by media, are presented in the following subsections.

3.6 Site-Wide Soil Characterization

Subsurface data were collected during installation of wells MW-1 through MW-16 and during the activities discussed above. MW-1 through MW-4 were installed in February 2011, MW-5 through MW-9 were installed in May 2011, MW-10 through MW-15 were installed in September 2011, and MW-16 was installed in February 2012. **Figure 5** presents the well locations.

Each well was installed with a rotary drilling rig equipped with an eight-inch-diameter hollow-stem auger. Continuous soil samples were collected with a split-barrel sampler at two-foot intervals and screened with a PID. Soil samples were collected from each boring and submitted for laboratory analysis of short list parameters (leaded and unleaded gasoline). Details of the soil sampling were presented in the SCR.

Lithologic data indicate that the Site is underlain by extensive fill material ranging in thickness from 23 feet at MW-13 to 33 feet at MW-11. Composition of the fill material indicates portions and/or all the Site was formerly used as a landfill. Beneath the fill material, the primary aquifer material is a light gray gravelly sand to light gray silty sand with interbedded fine-grained sediments present at various intervals across the Site. **Appendix B** includes lithologic logs for the Site and cross-sections of the site lithology.

Laboratory analytical results indicate several VOC detections; however all detected concentrations were less than the nonresidential SHS soil-to-groundwater and direct contact MSC and less than the nonresidential screening value for vapor intrusion. Lead was detected at concentrations less than the nonresidential direct contact SHS MSC but greater than the nonresidential soil-to-groundwater SHS MSC at MW-6 (5 to 7 fbg), MW-9 (5 to 7 fbg), MW-10 (5 to 6 fbg and 20 to 22 fbg), and MW-11 (10 to 12 fbg). However, deeper samples at MW-6, MW-9, and MW-11 contained lead at concentrations less than the nonresidential direct contact SHS and the nonresidential soil-to-groundwater SHS MSC. Although the concentration of lead at MW-10 in the soil sample from 20 to 22 fbg was greater than the nonresidential soil-to-groundwater SHS MSC, lead has not been detected in groundwater samples from MW-10 at concentrations greater than the non-residential SHS MSC over 12 sampling events.

Soil sampling data do not indicate a source of petroleum hydrocarbons present in the soils at the Site. In particular, soil samples from MW-6 (location of Tank 002) at depths of 9 to 11 fbg and 21 to 23 fbg do not contain short list parameters at concentrations greater than the non-residential SHS MSC for the soil-to-groundwater pathway. The source of lead is likely attributable to historic site use as a landfill. **Appendix C** presents the soil sample analytical results.

3.7 File Review of PES Refinery

On February 28, 2012, Leidos visited the PADEP office in Norristown, Pennsylvania, to conduct a file review and obtain information regarding the adjacent PES property. During the file review, Leidos learned that, as part of a consent order between PADEP and PES, PES is required to prepare Quarterly Remediation Status Reports (Status Reports) for impacted areas on the refinery. Upon review of the reports, Leidos noted that on May 26, 2011, PES conducted a site-wide groundwater gauging event. This gauging coincided with gauging activities conducted on the Verizon site.

Tables of monitoring well construction information, survey data, and well gauging records were presented in the Status Reports, as well as in the 2004 Current Conditions Report and Comprehensive Remedial Plan, and the 2008 Site Characterization Report: AOI 8. Coordinates for the PES wells and Verizon wells were surveyed using Pennsylvania State Plane South, with reference to the North American Datum of 1983 (NAD83) and the North American Vertical

Datum of 1988 (NAVD88). Therefore, Leidos used the PES well gauging data from May 26, 2011, in conjunction with data from the Verizon site from the same date, to prepare a groundwater contour map (**Figure 7**). The combined contour map indicated the groundwater gradient slopes from the PES property toward the Verizon site. This finding was extremely significant because it indicated that the regional groundwater trends toward the Site from the PES property. Additional details regarding groundwater characterization and gradient are presented in the following sections.

3.8 Groundwater Characterization

Site groundwater was characterized via a combination of activities including: well installation, groundwater gauging, LNAPL recovery, LNAPL analysis, groundwater sampling, and slug testing. The following sections present and summarize the groundwater characterization activities conducted at the Site.

3.8.1 Monitoring Well Installation

Soil and groundwater conditions at the Site were characterized through the installation and sampling of 16 monitoring wells (MW-1 through MW-16) and a review of available data from the adjacent PES property. Monitoring wells MW-1 through MW-4 were installed by Synergy as part of the environmental due diligence discussed in Section 3.5. Monitoring wells MW-5 through MW-16 were installed under the supervision of Leidos between May 2011 and February 2012. Each well was installed with a rotary drilling rig equipped with an eight-inch-diameter hollow-stem auger. Continuous soil samples were collected with a split-barrel sampler at two-foot intervals and screened with a PID or FID. Soil samples were collected from MW-5 through MW-16 and submitted for laboratory analysis of short list parameters (leaded and unleaded gasoline). Details of the soil sampling were presented in the SCR and are also discussed in Section 3.6.

The wells were constructed using two-inch-diameter polyvinyl chloride (PVC) casing and screen. A sand pack was emplaced around the well screen to approximately two feet above the screen. A two-foot minimum bentonite seal was placed above the sand pack and the remainder of the annulus was sealed with a bentonite grout. Total well depths range from approximately 30 fbg to 35 fbg. The location and elevation of each monitoring well, including ground surface and top of inner casing elevation, were surveyed by a Pennsylvania-licensed professional surveyor. Information on the construction and gauging of the wells is summarized in **Table 1** and on the logs in **Appendix B**.

3.8.2 Well Gauging

Leidos initiated well gauging events in March 2011, and continued collecting gauging data through December 2014. Initial gauging events were conducted in response to the NOV and in support of the SCR and RAP. Several initial events were conducted independent of groundwater sampling events. Gauging events conducted after the RAP were conducted to support demonstration of attainment of the BGS and were conducted concurrent with groundwater sampling events.

Gauging events utilized an interface probe and/or a water level indicator to measure the depth to LNAPL and water surface. Initially the monitoring well network included only MW-1 through MW-4 (**Figure 5**); however, the monitoring well network expanded over time as new wells were installed and as access was provided to wells on PES property. **Appendix C** includes the results of well gauging activities conducted between February 2011 and April 2012, and **Table 2** presents the results of the well gauging conducted between August 2012 and December 2014 (i.e., demonstration of attainment period).

Early gauging events that utilized a smaller monitoring network indicated a shallow hydraulic gradient from the Site toward the PES property. However, later gauging events that included a broader monitoring network indicate that the regional gradient trends from the PES property toward the Site. Because the regional gradient indicated groundwater flows from the PES property toward the Site, Verizon elected to pursue the BGS for site groundwater.

Per instructions received from PADEP on May 30, 2012 (**Appendix A**), and as indicated in the RAP, demonstration of attainment of the BGS required at least four groundwater elevation gauging events from a comprehensive monitoring network including wells MW-1 through MW-16, and multiple wells on PES property. To meet this requirement, six gauging events were conducted between August 2012 and March 2014, which included the comprehensive monitoring network. Additional gauging events were conducted which included only wells MW-1 through MW-16. The first comprehensive gauging event was conducted on August 14, 2012.

Subsequent events were conducted on November 14, 2012, February 12, 2013, April 4, 2013, May 13, 2013, and March 7, 2014. Groundwater contours from the comprehensive gauging events are presented in **Figures 8** through **13**. As shown in the figures, the regional groundwater elevation contours indicate a gradient from the PES property toward the Site. The groundwater elevation contours form an elongated bowl-shaped low area with an axis that extends from the southwest to the northeast (i.e., from N-145 toward MW-16). The configuration of the groundwater contours indicates that the regional groundwater flow is toward the northeast.

3.8.3 LNAPL Recovery

In addition to the well gauging discussed above, Leidos conducted routine LNAPL recovery events between March 2011 and April 2012. LNAPL recovery was conducted as an interim remedial action in response to the NOV and to aid in site characterization in support of the SCR and RAP. Per instructions received from PADEP on May 30, 2012 (**Appendix A**), and as indicated in the RAP, LNAPL recovery was terminated in April 2012 pursuant to demonstration of attainment of the BGS.

Five LNAPL recovery events were conducted between March 21, 2011, and April 1, 2011. Subsequent recovery events were conducted weekly and later reduced to biweekly frequency. LNAPL recovery was conducted following well gauging events. LNAPL was recovered via stainless steel open-top bailers and/or absorbent socks. The volume of recovered LNAPL was measured and then transferred into 55-gallon steel drums within secondary containment. Recovery was attempted at each well where LNAPL was detected. LNAPL has been detected at MW-2, MW-3, MW-5, MW-6, MW-7, MW-10, MW-13, MW-14, and MW-15; however, the presence and thickness of LNAPL in several wells has fluctuated over time. For instance, LNAPL has only been detected on one occasion at MW-10, and LNAPL is often not detected at MW-3, MW-5, MW-6, and MW-7. In contrast, LNAPL is consistently detected at MW-2, MW-13, MW-14, and MW-15.

The largest cumulative volume of LNAPL has been recovered from MW-15 (1.21 gallons) followed by MW-14 (0.41 gallons), and MW-5 (0.40 gallons). **Appendix C** includes LNAPL recovery data tables and a chart of cumulative LNAPL recovery volumes.

3.8.4 Groundwater Elevation Monitoring

To enhance the understanding of the shallow unconsolidated groundwater system underlying the Site, Leidos utilized a series of data logging pressure transducers to continuously monitor the groundwater elevations in select monitoring wells over the course of a week. The objectives of the investigation were to:

- Document short-duration groundwater level fluctuations over time.
- Assess the potential for tidal influence.
- Allow a detailed comparison of concurrent groundwater level fluctuations in four wells across the Site (MW-1, MW-2, MW-6, and MW-10).
- Evaluate the response of the aquifer to a precipitation event.

On February 6, 2012, Solinst Levelogger® Gold data logging pressure transducers were installed at MW-1, MW-2, MW-6, and MW-10. The transducers were programmed to record groundwater levels once every 10 minutes (144 measurements per day). Concurrently, a Solinst Barologger was installed at the Site and programmed to record barometric pressure once every 10 minutes. The transducers were retrieved from the wells on February 13, 2012. Data from the transducers were processed with the Solinst Levelogger® 3.4 software program to compensate for barometric pressure effects.

Results of the groundwater elevation monitoring indicated groundwater elevations at MW-1, MW-2, MW-6, and MW-10 exhibited minor (less than 0.17 feet) fluctuations. The observed fluctuations were not sufficient to alter the general hydraulic gradients across the Site. Wells MW-2, MW-6, and MW-10 exhibited very similar groundwater elevation trends. The trend at MW-1 was slightly different than the other wells; however, the magnitude of fluctuation was minor. Tidal influences were not observed in the data and evidence of local groundwater extraction was not apparent. The wells displayed an observable response to a precipitation event (0.22 inches) with groundwater elevation increases of: 0.04 feet at MW-1, 0.16 feet at MW-2, 0.15 feet at MW-6, and 0.12 feet at MW-10. **Appendix D** includes a graph of the groundwater elevation monitoring data.

3.8.5 Groundwater Sampling and Analysis

Verizon initiated groundwater sampling in May 2011 to aid in site characterization. Subsequent site characterization sampling events were conducted in June 2011, September 2011, and March 2012. Following approval of the RAP, groundwater quarterly sampling events were initiated and were conducted to support demonstration of attainment of selected remedial standards. During the first two demonstration of attainment quarterly sampling events, wells containing LNAPL were not sampled because the conditions of the RAP approval stipulated that LNAPL recovery was to cease. However, PADEP later clarified that samples were required from site wells regardless of the presence of LNAPL. Therefore, during subsequent events, LNAPL was bailed prior to well purging and sample collection.

The well sampling and gauging network included wells MW-1 through MW-16. Each well was gauged with an interface probe to assess the presence and thickness of LNAPL, and to determine the depth to groundwater. In the event that LNAPL was detected, a decontaminated, open-top, stainless steel bailer or a dedicated submersible pump was used to bail LNAPL to facilitate sample collection. LNAPL was removed, as feasible, until a measureable thickness could not be detected. A clean, high density polyethylene bailer or dedicated submersible pump was then used to remove approximately three well volumes and to collect a sample.

For wells at which LNAPL was not detected, a clean, submersible pump and dedicated tubing were used to purge at least three well volumes, in general accordance with the PADEP *Groundwater Monitoring Guidance Manual* (2001). All purge water and bailed LNAPL was placed in 55-gallon steel drums pending transportation and disposal at an approved disposal facility. Following well purging, a sample was collected. One trip blank, one rinse blank, and two duplicate samples were also collected for quality assurance purposes. All samples were submitted to Eurofins Lancaster Laboratories, Inc. for analysis of short list (leaded and unleaded gasoline) parameters using United States Environmental Protection Agency (USEPA) Method 8260B. In addition, samples from MW-2, MW-3, MW-5, MW-6, MW-8, MW-13, MW-14, and MW-15 were analyzed for short list UMO parameters using USEPA Methods 5030B/8270B, 8270C, and 200.8.

Quarterly sampling events continued through March 2013, when PES contacted Verizon and Leidos and requested access to sample and gauge site wells. Verizon granted access to PES and in April 2013, Leidos conducted a groundwater monitoring event in conjunction with PES. The event included wells MW-1 through MW-16. Later, on April 11, 2013, Verizon and Leidos met with PADEP to discuss the Site. Based on the discussions in the meeting, Verizon elected to pursue an accelerated sampling schedule in accordance with the provisions of Pennsylvania Code Title 25§250.707a(x). In a letter dated May 22, 2013, Leidos outlined an accelerated sampling schedule that included eight sampling events in 2013. PADEP approved the accelerated schedule in a letter dated May 28, 2013 (**Appendix A**).

After completing the eight accelerated sampling events, the submission of a RACR was postponed due to the following:

- Verizon learned that PES installed several new wells (N-140 through N-146) south of Verizon's existing wells MW-13, MW-14, and MW-15. At the time, data from these new wells was not available to Verizon, but it was assumed that the data would enhance understanding of the nature of contamination and groundwater flow.
- Dissolved lead, benzo[a]pyrene, and benzo[b]fluoranthene concentrations slightly exceeded the statistical requirements for demonstration of the BGS via the accelerated sampling schedule, requiring selection of alternative standards.

Given the results of the accelerated sampling program and the new PES wells, Verizon elected to conduct an additional year of quarterly groundwater sampling to demonstrate attainment of the applicable remedial standards. Verizon continued quarterly groundwater sampling with events conducted in April, June, September, and December 2014. Results of the quarterly sampling were presented in RAPRs submitted to PADEP. Results of the December 2014 event are presented in this RACR. In total, 18 sampling events (including site characterization events) were conducted on the following dates:

1. May 2011 (Site characterization event)
2. June 2011 (Site characterization event)
3. September 2011 (Site characterization event)
4. March 2012 (Site characterization event)
5. August 2012 (Demonstration of attainment quarterly event)
6. November 2012 (Demonstration of attainment quarterly event)
7. February 2013 (Demonstration of attainment quarterly event)

8. April 2013 (Demonstration of attainment accelerated schedule)
9. May 2013 (Demonstration of attainment accelerated schedule)
10. June 2013 (Demonstration of attainment accelerated schedule)
11. August 2013 (Demonstration of attainment accelerated schedule)
12. September 2013 (Demonstration of attainment accelerated schedule)
13. November 2013 (Demonstration of attainment accelerated schedule)
14. December 2013 (Demonstration of attainment accelerated schedule)
15. April 2014 (Demonstration of attainment quarterly event)
16. June 2014 (Demonstration of attainment quarterly event)
17. September 2014 (Demonstration of attainment quarterly event)
18. December 2014 (Demonstration of attainment quarterly event)

Results of the site characterization groundwater sampling events are presented in **Appendix C**, and results of the demonstrations of attainment sampling events are presented in **Table 3**. During the December 2014 event, LNAPL was detected at MW-2, MW-5, MW-7, MW-13, MW-14, and MW-15. As shown in **Figure 14**, LNAPL thickness was greatest in wells MW-13 (0.48 feet), MW-14 (0.70 feet), and MW-15 (0.75 feet) located on PES property. LNAPL thickness at MW-2 was 0.38 feet, 0.07 feet at MW-5, and 0.13 feet at MW-7. Highlights of the December 2014 analytical results include the following:

- No compounds were detected above the PADEP MSC in the samples collected from MW-1, MW-4, or MW-12.
- No compounds were detected at concentrations greater than the PADEP default nonresidential volatilization to indoor air screening value.
- Benzene was detected in the samples from MW-2, MW-3, MW-5, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11, MW-13, MW-14, MW-15, and MW-16 at concentrations greater than the MSC (5 micrograms per liter [µg/L]).
- MTBE was detected in the duplicate sample from MW-6 at concentrations (21 µg/L) greater than the MSC (20 µg/L). The other sample collected from MW-6 had an MTBE concentration of 19 µg/L.
- Naphthalene was detected in the samples from MW-2, MW-3, MW-5, MW-6, MW-7, MW-10, MW-13, MW-14, MW-15, and MW-16 at concentrations greater than the MSC (100 µg/L).

- 1,2,4-Trimethylbenzene (1,2,4-TMB) was detected in the samples from MW-13, MW-14 Dup, and MW-16 at concentrations greater than the MSC (62 µg/L).
- 1,3,5-TMB was detected in the samples from MW-2, MW-5, MW-6, MW-7, MW-10, MW-13, MW-14, MW-15, and MW-16 at concentrations greater than the MSC (53 µg/L).
- SVOCs including: benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, and/or chrysene were detected in the samples from MW-2, MW-6, MW-8, MW-13, MW-14, and MW-15 at concentrations greater than the applicable MSCs.
- Dissolved lead was not detected at a concentration greater than the MSC (5 milligrams per liter [mg/L]) in any of samples.
- The highest concentration of benzene (960 µg/L) was detected in the sample from MW-2. The highest concentration of MTBE (21 µg/L) was detected in the duplicate sample collected from MW-6. The highest concentration of naphthalene (980 µg/L) was detected in the sample collected from MW-6. The highest concentration of 1,2,4-TMB (440 µg/L) was detected in the sample collected from MW-16. The highest concentration of 1,3,5-TMB (680 µg/L) was detected in the duplicate sample collected from MW-14.
- **Figure 15** presents a map with posted analytical detections.

Groundwater gauging data from the December 2014 event are consistent with previous groundwater gauging events. LNAPL was detected in several wells, with the largest LNAPL thickness occurring at the wells on PES property. Previous investigations indicate that the LNAPL detected at wells MW-13 through MW-15 is similar in composition to the LNAPL detected at MW-2, MW-3, and MW-5. Data provided by PES from March and June 2014 indicate detection of LNAPL at N-140, N-143, N-145, and N-146, and indicate that the LNAPL plume covers a much larger area than previously assumed. Assuming the LNAPL detected at N-140, N-143, N-145, and N-146 is a similar composition to the LNAPL detected in other site wells, the LNAPL plume is estimated to encompass more than 2.75 acres with approximately 0.18 acre on Verizon property, 2.32 acres on PES property, and the remainder in the right-of-way (**Figure 13**).

Beginning with the February 2013 event, a total of 12 monitoring events have been conducted at the Site to demonstrate attainment of remedial standards. Events were also conducted in August and November 2012, however samples were not collected from wells containing LNAPL. Sample results and well gauging indicate dissolved phase and LNAPL contamination in groundwater across the Site and the adjacent PES property. The distribution and extent of LNAPL, in conjunction with the regional hydraulic gradient, indicate that the LNAPL is migrating onto the Site from the PES property. Similarly, site characterization data indicate that the observed dissolved-phase contamination is primarily derived from the LNAPL and is migrating onto the Site from the PES property.

3.8.6 LNAPL Sampling and Analysis

LNAPL sampling and analysis was conducted on three occasions. In February 2011, samples were collected from MW-2 and MW-3; in September 2011, samples were collected from MW-5 and MW-15; and in January 2015, samples were collected from MW-2, MW-5, MW-13, MW-14, MW-15, N-143, N-145, and N-146. The LNAPL samples were submitted to SPL Laboratories, in Houston, Texas, for PIANO analysis. The PIANO analyses from 2011 were presented and discussed in the SCR; the laboratory results from January 2015 are included as **Appendix E**.

PIANO analyses indicate that LNAPL present at MW-2, MW-3, MW-5, MW-13, MW-14, MW-15, and N-145 are consistent with weathered gasoline and that samples from N-143 and N-146 are consistent with commingled lube oil and diesel range organics. Review of the analyses coupled with groundwater flow and sampling data indicate that the LNAPL which extends from N-145 to the Site consists of similar constituents and represents a continuous LNAPL plume. Based on groundwater flow and sampling data, it is also concluded that the lube oil and diesel range organic LNAPL present at N-143 and N-146 commingles with the weathered gasoline LNAPL and extends to the Site.

3.9 Surface Geophysical Survey

Between December 19 and 22, 2011, Leidos conducted geophysical surveys to screen the subsurface for unknown buried metallic anomalies that may be of environmental interest (e.g., USTs, buried metallic debris). The surveys were performed in the accessible portions of the property, including inside the garage area, the grass area in the northern portion of the Site, and the parking areas. Surveying was conducted inside the east and west bays of the main building; however, the effectiveness of the survey was limited (i.e., masked) by the reinforced concrete floor. Areas with semi-permanent structures (storage sheds, pipe racks, etc.) were not surveyed due to access. The area immediately southeast of MW-6 was not accessible due to a waste storage roll-off container.

Based on the results, Leidos identified nine anomalies, seven of which warranted further investigation using ground-penetrating radar (GPR). GPR was used to screen the anomalies to determine if they exhibit parabolic-shaped reflections characteristic of USTs or drums. Results of the geophysical survey did not indicate the presence of any buried drums or USTs. **Appendix F** includes figures from the geophysical surveys.

3.10 Vapor Intrusion Assessment

To assess the potential for vapor intrusion, Leidos installed three soil gas sampling points (SG-1, SG-2, and SG-3) and six sub-slab sampling points (SGSP-1 through SGSP-6). Samples were collected in June 2011, September 2011, and December 2012. Leidos also collected six rounds of indoor air quality (IAQ) samples on the following dates:

1. November 15, 2012
2. December 11, 2012
3. February 13, 2013
4. March 14, 2013
5. May 16, 2013
6. November 21, 2013

In addition to the sampling, Leidos conducted an assessment of the Site heating ventilation and air conditioning (HVAC) system. Leidos provided the results of the assessment to Verizon in a letter dated October 11, 2013 (**Appendix G**). The following sections present and discuss the vapor intrusion assessment activities.

3.10.1 Soil Gas Sampling

Nine soil gas sample points (SG-1 through SG-3 and SGSP-1 through SGSP-6) were installed at the Site (**Figure 6**). SG-1 through SG-3 were installed on June 23, 2011. SGSP-1 through SGSP-6 were installed between September 22 and 27, 2011. SG-1, SG-2, and SG-3 were installed using a Geoprobe® rig. SGSP-6 was installed using a digging bar to break through the asphalt and a bucket auger to bore through the unconsolidated materials to the desired depth. SG-1 through SG-3 and SGSP-6 were constructed with 0.5 feet of 1-inch-diameter PVC screen and approximately 5 feet of 1-inch-diameter PVC riser pipe. The screens were installed at a depth of approximately 5.5 feet to 6.0 fbg. A tight-fitting cap was placed at the bottom of each sample point. The borehole annulus was filled with sand around the screen and a bentonite/grout seal from the top of the sand to the ground surface. The top of each point was fitted with a compression plug. The sample points were completed at grade within a flush-mount manhole cover set in concrete.

SGSP-1 through SGSP-5 are sub-slab soil gas sampling points installed within the footprint of the building. These points were installed by coring through the concrete (approximately 1.5 foot thick). A bucket auger was then used to advance through the unconsolidated materials to an approximate depth of 2.0 feet. The sample points were constructed using 1-inch-diameter PVC with a 0.5-foot screen section and approximately 1.5 feet of riser. A tight-fitting cap was placed at the bottom of each sample point. The borehole annulus was filled with sand around the screen and a bentonite/grout seal from the top of the sand to the ground surface. The top of each point was sealed with a compression plug. The sample points were completed at grade within flush-mount manhole cover set in concrete. Boring logs for all of the soil gas and sub-slab soil gas points are presented in **Appendix B**.

Soil gas sampling events were conducted at the Site on June 2011, September 2011, and December 2012. Results of the June and September 2011 events were presented in the SCR, and results of the December 2012 event were presented in the March 2013 RAPR. Before collecting the samples, the soil gas sample points were purged of three to five volumes of air using a battery-powered, low-flow pump to remove stagnate air. After purging, soil gas samples were collected using laboratory-provided, evacuated, six-liter stainless steel Summa® canisters connected to the sample points via dedicated disposable Teflon®-lined plastic tubing. The Summa® canisters were fitted with a flow-control device calibrated to collect a 6-liter sample over a 30-minute period at a rate of less than 200 milliliters per minute (mL/min). In addition, a plastic container (i.e., shroud) was placed over the sampling apparatus, and helium was introduced into the shroud while the samples were being collected. One upwind ambient air sample was also collected during the sampling to assess background conditions. The Summa® canisters and a completed chain-of-custody form were submitted to a laboratory for the analysis of PADEP short list parameters (leaded and unleaded gasoline) in accordance with USEPA Method TO-15 and helium.

During the June 2011 sampling event, benzene was detected in the sample from SG 1 at a concentration of 23,000 micrograms per cubic meter (µg/m^3), which was greater than the nonresidential MSC for soil gas (1,100 µg/m^3). No other leaded or unleaded gasoline parameters were detected in the samples collected from SG-1, SG-2, or SG-3. Low concentrations of helium (i.e., less than 20 percent) were also detected in the samples. Toluene (3.0 µg/m^3) and total xylenes (1.0 µg/m^3) were detected in the ambient air sample. The concentrations of toluene and xylenes detected in the ambient air sample were less than the nonresidential MSCs for indoor air of 1,200 µg/m^3 and 300 µg/m^3, respectively.

During the September 2011 sampling event, samples were collected from SG-1, SG-2, SG-3, SGSP-1, SGSP-2, SGSP-3, SGSP-4, SGSP-5, and SGSP-6. No leaded or unleaded gasoline parameters were detected in the samples collected from SG-2, SG 3, SGSP-3, or SGSP-5. Several parameters were detected in SGSP-1 and SPSG-2 at concentrations less than nonresidential MSCs for soil gas. Benzene was detected in SG-1 (14,000 µg/m^3), SGSP-4 (1,900 µg/m^3), and SGSP-6 (4,500 µg/m^3) at concentrations greater than the nonresidential MSC for soil gas (1,100 µg/m^3). Toluene (1.4 µg/m^3) and total xylenes (0.85 µg/m^3) were detected in the ambient air sample. The concentrations of toluene and xylenes detected in the ambient air sample were less than the nonresidential MSCs for indoor air of 1,200 µg/m^3 and 300 µg/m^3, respectively.

During the December 2012 sampling event, samples were collected from SG-1, SG-2, SG-3, SGSP-1, SGSP-3, SGSP-4, SGSP-5, and SGSP-6. Sampling point SGSP-2 was damaged during Site repair work conducted by Verizon prior to sampling; therefore, a sample was not collected from SGSP-2. Multiple compounds were detected in the soil gas samples at low concentrations. There were no concentrations detected above the PADEP indoor air MSC for non-residential soil gas screening criteria in any of the soil gas samples collected during the December 2012 event. No compounds were detected above the respective laboratory detection limits in the samples from SG-2, SGSP-4, and SGSP-6. Multiple compounds were detected in the ambient sample at concentrations below the PADEP indoor air MSC.

Table 4 lists the results of the soil gas sampling events. Based upon the results of the soil gas sampling, the following statements are provided:

- A soil gas investigation was performed in accordance with the PADEP guidance document entitled *Vapor Intrusion into Buildings from Groundwater and Soil* under the Act 2 SHS.
- During one of three sampling events, benzene was detected at SG-1, SGSP-4, and SGSP-6 at concentrations greater than the nonresidential MSC for soil gas of 1,100 µg/m^3.
- Several parameters were detected at SGSP-1 and SGSP-2 at concentrations less than nonresidential MSCs for soil gas.

3.10.2 Indoor Air Quality Assessment

Leidos also collected six rounds of IAQ samples on the following dates:

1. November 15, 2012
2. December 11, 2012
3. February 13, 2013
4. March 14, 2013
5. May 16, 2013
6. November 21, 2013

Results and summary of the IAQ sampling from November 15, 2012, December 11, 2012, February 13, 2013, March 14, 2013, and May 16, 2013, were summarized in RAPs dated December 21, 2012, March 21, 2013, and July 1, 2013. Results of November 21, 2013, were not previously reported, and are described herein.

IAQ sampling included three indoor locations and ambient outdoor sampling. Descriptions of the sample locations are as follows:

- **Main Office**: The main office area is located in the north central portion of the Site building. The main office area is approximately 30 by 30 feet and is divided into three offices approximately 15 by 10 feet, a conference area approximately 26 by 15 feet, a supply closet, and an entranceway. The IAQ sample was collected from the conference area along the western wall bordering the garage bay area of the building.

- **Lunch Room**: The lunch room is located in the central portion of the Site building. The lunch room is accessible from the western and eastern garage bay areas. The lunch room measures approximately 36 by 30 feet. The lunch room has several tables, a sink, vending machines, and a supply closet. The IAQ sample was collected from the south central portion of the lunch room.
- **Southwest Office**: The southwest office is located in the southwestern corner of the Site building near SGSP-3 and MW-5. The southwest office measures approximately 12 by 10 feet and has a desk, several shelves, a closest, and a wall-mounted air conditioner. The IAQ sample was collected atop the desk in the center portion of the office.
- **Ambient North**: The ambient sample was collected near the north central entrance to the Site building, between MW-10 and MW-12.
- **Ambient South**: This sample was collected along the south wall of the main building between the two garage bays and between MW-1 and MW-5. (*Not collected during November and December 2012 events*).

Prior to the sampling, a building survey was conducted to assess conditions and identify potential sources of indoor air contamination. Potential sources of indoor air contamination were removed as feasible. In addition, building doors and windows were opened to ventilate the building for approximately three hours, where feasible. The doors and windows were then closed for approximately 48 hours prior to the sampling. Vehicles, engines, etc., were not operated inside the building while it was closed or during the sampling event.

The IAQ samples and the ambient air sample were collected in pre-cleaned, laboratory-provided evacuated six-liter Summa® canisters placed within the breathing zone (i.e., three to five feet above grade). The canisters were equipped with a vacuum gauge and a dedicated flow control device calibrated to collect a continuous sample over approximately eight hours at a flow rate less than 20 mL/min. Vacuum measurements from the Summa® canisters were documented before, during, and after sample collection. Following sample collection, the canisters were submitted to a Pennsylvania-certified laboratory for analysis via Method TO-15 for short list leaded/unleaded parameters.

IAQ sample results are presented in **Table 5**. Results indicate detections of 1,2,4-TMB, ethylene dibromide, 1,3,5-TMB, benzene, and naphthalene at concentrations greater than the PADEP non-residential standard at the ambient and indoor sampling locations. Given the Site's multiple garage bays, its proximity to the highway (Route 76), its proximity to nearby refineries, and the detections in the ambient samples, it is likely that the concentrations detected inside the building are derived from external or background sources. It is assumed that the compounds detected in IAQ samples are derived from ambient air, vehicle traffic, site operations, and potential emissions from gasoline-powered equipment.

3.10.3 HVAC System Assessment

The IAQ issues observed at the Site appeared to be linked to ambient air entering the office areas. Therefore, Leidos conducted an assessment of the HVAC system to determine potential strategies to address the IAQ issues.

Leidos conducted a site survey on September 26, 2013, to assess the HVAC system and determine methods to optimize the system with the goal of improving IAQ. During the site survey, Leidos staff noted three roof top units (RTUs) that serve the office space through ceiling diffusers and registers. At the time the first five rounds of IAQ samples were collected, two of the RTUs were not functioning correctly. Instead, a large portable air-handling unit (Air Rover Portable Air Conditioning) was installed in the lunch room. In July 2013, two new RTUs were installed, but one older unit remains. The new RTUs have approximately five-ton capacities and are manufactured by York. The existing RTU has a similar capacity, but is an older York model.

Leidos staff noted that the garage bays and supply areas contain unit heaters and louvered roof exhaust fans. Curtain heaters were not noted at the roll doors. A small wall exhaust fan and vent was observed emptying into the garage from an office/storage area. In addition, standalone air conditioners were noted in at least two locations. Based on the assessment, Leidos concluded that multiple pathways exist which allow poor quality ambient air and air from the garage bays to enter the indoor areas.

Leidos proposed several strategies to restrict the movement of air from the garages and outdoor areas into the office area. In addition, Leidos proposed several measures to improve the air quality as it enters the building and as it circulates throughout the office space. Leidos recommended an additional round of IAQ sampling to evaluate the impact of the two new RTUs.

Leidos also recommended further evaluation of the new RTUs to determine whether they can support the installation of photo-catalyst, activated charcoal, or HEPA filters. Obvious breaches in the walls, ceiling, and floors of the office spaces should be sealed to block air entry. During the interim period of investigation, Leidos recommended that chrysanthemums be placed throughout the building to help clean the air. For the offices served by the older RTU, it was recommended to install room air cleaning equipment.

Results of the November 2013 IAQ sampling event indicated reduced contaminant concentrations; however, naphthalene was detected at concentrations greater than the PADEP non-residential standard in the Ambient South (22 $\mu g/m^3$), Main Office (16 $\mu g/m^3$), and Southwest Office (18 $\mu g/m^3$) samples. It is concluded that the IAQ concentrations are indicative of poor ambient air quality and insufficient filtration/HVAC performance, and are not derived from vapor intrusion from subsurface contamination. This conclusion is supported by the soil gas sampling results, the HVAC assessment, and IAQ sampling results.

3.11 Ecological Screening

Per 25 PA Code §250.201-204 and §250.404.c(2), screening of potential ecological receptors is not required under the BGS or under the SSS provided that no exposure pathways exist and that no remedy is required or proposed. Furthermore, subsurface contamination observed at the Site does not pose an unacceptable risk to potential ecological (terrestrial) receptors based upon the following evaluation criteria:

- The Site is developed for commercial use.
- The current and anticipated future use of the Site is non-residential (commercial).
- The ground surface is almost entirely covered with buildings, asphalt paving, concrete, etc., which prevent exposure by terrestrial receptors.
- Surface soil is not impacted; the release impacted subsurface soils.
- Terrestrial receptors are not directly exposed to groundwater.
- There are no known threatened or endangered species at the Site.

- There are no bodies of surface water on or immediately adjacent to the Site. The closest surface water body (Schuylkill River) is over 2,000 feet away.
- The local groundwater gradient is very low and there are no nearby groundwater users or discharge locations (i.e., springs and seeps).

4.0 CONCEPTUAL SITE MODEL

Based upon the site characterization activities and the data presented above, Leidos has developed a Conceptual Site Model (CSM) to concisely describe the current understanding of the Site. The CSM presented below is intended to summarize the nature and extent of contamination at the Site and to discuss the contaminant source and transport.

The subsurface in the vicinity of the Site is composed of extensive fill material underlain by unconsolidated sediments of the Trenton Gravel formation. A shallow unconfined groundwater system is present across the area and straddles the fill material and Trenton Gravel. Groundwater flow in the shallow system occurs through the highly heterogeneous materials of the fill and Trenton Gravel. Extensive groundwater elevation monitoring data indicate that the regional groundwater flow trends toward the north to northeast and includes an area of low hydraulic gradient between the Site and the PES property. The area of low hydraulic gradient is attributable to the aquifer material heterogeneity and differential surface water infiltration.

The contamination observed at the Site is attributable to a release or series of releases of LNAPL and related compounds on the PES property. The LNAPL and associated dissolved phase contaminants have migrated across the PES property to the Site and have also accumulated along the area of low hydraulic gradient. The LNAPL migrates with groundwater flow and continually feeds the dissolved phase plume. The LNAPL and dissolved phase plume migrate toward the north-northeast and may stagnate in the low hydraulic gradient area before spreading north-northeast across the Site. Residual contamination from the excavation and removal of former Tank 002 located at the Site near MW-6 may have contributed to groundwater contamination; however the amount of contribution is overwhelmed by the vast extent of LNAPL and dissolved phase contamination from the PES property.

5.0 REMEDIATION STANDARDS

This section identifies the remediation standards selected for each applicable compound for each media. Details regarding the demonstration of attainment of the selected remediation standard are presented in subsequent sections.

5.1 Soil

Based on site characterization activities performed to date, benzene, toluene, ethylbenzene, xylenes, isopropylbenzene (cumene), MTBE, naphthalene, 2-methylnaphthalene, 1,2-dibromoethane (ethylene dibromide), 1,2-dichloroethane, 1,2,4-TMB, and 1,3,5-TMB have been detected in one or more soil samples. None of these compounds, however, were detected at concentrations greater than the nonresidential MSCs for direct contact, soil-to-groundwater, or the default nonresidential screening values for vapor intrusion. Lead was detected at concentrations greater than the nonresidential MSC for the soil-to-groundwater pathway of 450 mg/kg in soil samples collected from MW-6 at 5 to 7 fbg (1,500 mg/kg), MW-9 at 5 to 7 fbg (550 mg/kg), MW-10 at 5 to 6 fbg and 20 to 22 fbg (710 mg/kg and 560 mg/kg, respectively), and MW-11 at 10 to 12 fbg (1,300 mg/kg). The source of the lead detected in the soil samples is most likely related to historic land-filling activities and subsurface fill material.

Based on the site characterization data, the SHS is selected for VOCs in soil and the SSS is selected for lead in soils.

5.2 Groundwater

Based on site characterization data collected to date, it is apparent that a combination of remedial standards is required for the detected contaminants. Several compounds meet the non-residential SHS, several meet the BGS, and the remaining compounds meet a SSS. The following list presents the selected remedial standard per compound:

- Statewide Health Standard (SHS)
    - Ethylene dibromide (1,2-dibromoethane) = 0.05 µg/L
    - 1,2-dichloroethane = 5 µg/L
    - MTBE = 20 µg/L

  - Lead = 5 µg/L
- Background Standard (BGS)
  - Benzene
  - Ethylbenzene
  - Isopropylbenzene (Cumene)
  - Naphthalene
  - Toluene
  - 1,2,4-TMB
  - 1,3,5-TMB
  - Xylene
- Site Specific Standard (SSS)
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Chrysene
  - Indeno(1,2,3-cd)pyrene
  - Pyrene

6.0 BACKGROUND STANDARD

Utilization of the BGS is dependent upon establishing the regional groundwater flow and the background reference well water quality. The following sections document the regional groundwater flow and reference well water quality.

6.1 Groundwater Flow

Six comprehensive groundwater gauging events were conducted at the Site on the following dates: August 14, 2012, November 14, 2012, February 12, 2013, April 4, 2013, May 13, 2013, and March 7, 2014. Groundwater contours from the comprehensive gauging events are presented in **Figures 8** through **13**. As shown in the figures, the regional groundwater elevation contours indicate a gradient from the PES property toward the Site. The configuration of the groundwater contours indicates that the regional groundwater flow is toward the north-northeast.

6.2 Reference Well Water Quality

Wells MW-13, MW-14, and MW-15 were selected as the reference wells based on groundwater flow direction and recommendations from PADEP (**Appendix A**). In accordance with 25 PA Code §250.707(a), the BGS was determined for each compound by selecting the highest concentration recorded at the reference well during groundwater sampling conducted between February 2013 and December 2014 (total of 12 sampling events). The following lists the BGS per compound and lists the sampling date when the maximum concentration was detected.

- Benzene: 1,500 µg/L, detected at MW-14 on February 13, 2013
- Ethylbenzene: 570 µg/L, detected at MW-14 on August 6, 2013
- Cumene: 200 µg/L, detected at MW-14 on August 6, 2013
- Naphthalene: 2,100 µg/L, detected at MW-13 on November 5, 2013
- Toluene: 320 µg/L, detected at MW-14 on September 18, 2013
- 124-TMB: 750 µg/L, detected at MW-13 on November 5, 2013
- 135-TMB: 1,800 µg/L, detected at MW-13 on November 5, 2013
- Xylenes: 2,100 µg/L, detected at MW-13 on November 5, 2013

7.0 PATHWAY EVALUATION

To demonstrate attainment of the remediation standards discussed above, Leidos utilized available site data to conduct a risk exposure pathway evaluation focused on the following potential contaminant pathways:

- Soil direct contact
- Soil-to-groundwater
- Vapor Intrusion
- Groundwater to drinking water and surface water

Results of the evaluation, in conjunction with soil and groundwater use restrictions, indicate that there are no complete pathways from impacted soil and groundwater to any current or future potential receptors.

7.1 Soil Direct Contact Pathway

Onsite exposure to constituents in surface soils via direct or indirect exposure pathways by any potential receptor is not expected because surface soils are not known to be impacted. Moreover, the Site is predominantly covered with asphalt and buildings. Future exposure conditions would be the same as those for current conditions. The potential for offsite exposure to constituents in surface soils via fugitive dust also would not occur because surface soils are not known to be impacted, and the Site is primarily covered by paving, buildings, and vegetation.

The potential for onsite exposure to constituents in subsurface soils would only affect construction/utility workers. Employees, maintenance workers, delivery personnel, and visitors would not be exposed to subsurface soils. Exposure to subsurface soils by construction/utility workers could occur via incidental ingestion of soils, dermal contact, and the inhalation of dust. Construction/utility workers would be exposed while performing onsite activities. Direct exposure (i.e., via ingestion or dermal contact) to impacted surface soils or indirect exposure to fugitive dust by employees, maintenance workers, delivery personnel, and visitors is not expected to be significant because detected concentrations were less than nonresidential MSCs for soils.

The potential for offsite exposure to constituents in subsurface soils via fugitive dust is considered to be low. Dust could be generated during construction activities that involve soil excavation. Prevailing winds could carry the dust offsite where receptors could be exposed via inhalation. The potential for receptors to be exposed to fugitive dust of substances in track-out during excavation activities would not be significant because standard work practices and regulations minimize or eliminate the potential for offsite migration.

7.2 Soil-to-Groundwater Pathway

Lead was the only parameter detected in soil at concentrations greater than the soil-to-groundwater SHS. Lead was detected in soils at concentrations greater than the soil-to-groundwater SHS (450 mg/kg) at MW-6, MW-9, MW-10, and MW-11. Soil samples were collected from three depths at each well location. Samples from MW-6, MW-9, and MW-11 indicate that lead concentrations do not exceed the soil-to-groundwater SHS at deeper depths. Thus, it is assumed that lead in soil at these locations has not impacted groundwater. At MW-10, samples were collected from 5 to 6 fbg, 10 to 12 fbg, and 20 to 22 fbg. The samples from 5 to 6 fbg and 20 to 22 fbg contained lead at concentrations (710 mg/kg and 560 mg/kg, respectively) greater than the soil-to-groundwater SHS. However, lead has not been detected in groundwater samples from MW-10 at concentrations greater than the SHS. Therefore, it is concluded that the soil-to-groundwater pathway is not complete.

7.3 Vapor Intrusion Pathway

As discussed in Section 3.10, several rounds of samples have been collected from soil gas sampling points, sub-slab sampling points, and indoor air locations. In addition, the Site HVAC system has been examined. Data indicate that the vapor intrusion pathway is not complete. Measures detailed in the PRCP below will assure that the vapor pathway remains incomplete in the future under the current facility use, or alternative uses.

7.4 Groundwater to Drinking Water and Surface Water Pathway

Currently, groundwater at the Site is not used for drinking purposes, and there is no direct exposure. In addition, there are no bodies of surface water on or in the immediate vicinity of the Site, nor is there any agricultural use of groundwater at or in the vicinity of the Site. The water table also is deeper than most common excavations; therefore, construction workers should not come in contact with groundwater. Although there are no known ordinances prohibiting the construction of a well, installation of a water supply well would require local and/or PADEP approval. Installation of a supply well is extremely unlikely and approval of such a well is even less likely. Therefore, direct exposure to groundwater is not a complete pathway.

The closest surface water body is the Schuylkill River, located greater than 2,000 feet away. Based on the distance to the river and the shallow hydraulic gradient, contaminants observed onsite are not expected to impact the river. Ecological receptors are not expected to be exposed to constituents in surface soils via direct and indirect exposure routes, including the ingestion of vegetation or biota, because surface soils are not known to be impacted. In addition, the Site is an industrial complex, and only transient or opportunistic species (e.g., reptiles, birds, small mammals) are expected to be present. The Site is not maintained to attract or provide habitat for ecological receptors. No aquatic organisms are expected to be exposed because there are no bodies of surface water in the immediate vicinity of the Site.

7.5 Ecological Receptors

As discussed in Section 3.11 the subsurface contamination observed at the Site does not pose an unacceptable risk to potential ecological (terrestrial) receptors based upon the following evaluation criteria:

- The Site is developed for commercial use.
- The current and anticipated future use of the Site is non-residential (commercial).
- The ground surface is almost entirely covered with buildings, asphalt paving, concrete, etc., which prevent exposure by terrestrial receptors.
- Surface soil is not impacted; the release impacted subsurface soils.
- Terrestrial receptors are not directly exposed to groundwater.
- There are no known threatened or endangered species at the Site.
- There are no bodies of surface water on or immediately adjacent to the Site. The closest surface water body (Schuylkill River) is over 2,000 feet away.
- The local groundwater gradient is very low and there are no nearby groundwater users or discharge locations (i.e., springs and seeps).

8.0 DEMONSTRATION OF ATTAINMENT

The following sections present the selected remediation standards per media and discuss how the applicable remedial standards are attained at the Site.

8.1 Attainment of Soil Standards

As indicated above, benzene, toluene, ethylbenzene, xylenes, isopropylbenzene (cumene), MTBE, naphthalene, 2-methylnaphthalene, 1,2-dibromoethane (ethylene dibromide), 1,2-dichloroethane, 1,2,4-TMB, and 1,3,5-TMB were detected at concentrations less than the nonresidential MSCs for direct contact, soil-to-groundwater, and default nonresidential screening values for vapor intrusion. Hence, site soils meet the SHS for the VOCs on the short list of unleaded/leaded parameters.

Lead was detected at concentrations greater than the nonresidential MSC for the soil-to-groundwater pathway of 450 mg/kg in soil samples collected from MW-6 at 5 to 7 fbg (1,500 mg/kg), MW-9 at 5 to 7 fbg (550 mg/kg), MW-10 at 5 to 6 fbg and 20 to 22 fbg (710 mg/kg and 560 mg/kg, respectively), and MW-11 at 10 to 12 fbg (1,300 mg/kg). Soil samples from MW-6, MW-9, and MW-11 indicate that lead concentrations do not exceed the soil-to-groundwater SHS at deeper depths. Thus, it is concluded that the lead concentration in soil at these locations has not impacted groundwater. At MW-10, samples were collected from 5 to 6 fbg, 10 to 12 fbg, and 20 to 22 fbg. The samples from 5 to 6 fbg and 20 to 22 fbg contained lead at concentrations (710 mg/kg and 560 mg/kg) greater than the soil-to-groundwater SHS. However, lead has not been detected in groundwater samples from MW-10 at concentrations greater than the SHS. Since the maximum detected concentration (710 mg/kg) of lead at MW-10 did not cause an exceedance of the groundwater SHS at MW-10, it is concluded that a SSS of 710 mg/kg is protective of human health and the environment.

8.2 Attainment of Groundwater Standards

As indicated above, a combination of remedial standards are applicable to site groundwater. The following sections demonstrate attainment of the selected standards.

8.2.1 Statewide Health Standard

Per PA Code §250.704a, demonstration of attainment of the SHS must be made at the point of compliance (POC). PA Code §250.302a defines the POC for SHS as "the property boundary that existed at the time the contamination was discovered." Based on the regional gradient indicated in **Figures 7** through **13,** the POC for groundwater is the north and northeastern boundary of the Site (i.e., MW-12, MW-16, and MW-4). As indicated in Section 5.2, the SHS is selected for the detected concentrations: ethylene dibromide, 1,2-dichloroethane, MTBE, and lead. As listed in **Table 2**, the detected concentrations of ethylene dibromide, 1,2-dichloroethane, and MTBE are less than the respective non-residential SHS at the POC wells.

The detected concentrations of lead at MW-4 and MW-12 are less than the non-residential SHS. The concentrations of lead at MW-16 range from 5.7 to 0.00026 µg/L compared to the non-residential SHS for lead of 5 µg/L. Seventy-five percent of the samples collected over the most recent eight quarters meet the non-residential SHS and none of the samples are greater than ten times the SHS (**Table 2**). Specifically, the following lists the applicable sampling dates and lead concentrations:

- April 3, 2013, lead = 5.7 µg/L
- June 26, 2013, lead = 5.0 µg/L
- September 19, 2013, lead = 2.6 µg/L
- December 20, 2013, lead = 3.2 µg/L
- April 17, 2014, lead = 2.1 µg/L
- June 25, 2014, lead = 0.00048 µg/L
- September 15, 2014, lead = 0.00026 µg/L
- December 4, 2014, lead = 0.00053 µg/L

Based on the most recent eight quarters of data, lead concentrations meet the non-residential SHS at the POC wells.

8.2.2 Background Standard

As discussed above, sampling and monitoring data indicate that offsite contamination from the adjacent PES property has migrated onto the Site. Data indicate that the detected concentrations of benzene, ethylbenzene, cumene, naphthalene, toluene, 1,2,4-TMB, 1,3,5-TMB, and xylenes at the Site are less than the background concentrations detected at the offsite reference wells MW-13, MW-14, and MW-15. Per PA Code §250.704a, demonstration of attainment of the BGS must be made at the POC. PA Code §250.302a defines the POC for the BGS as "throughout the contaminant plume, including areas of the plume that are outside the property boundary, as determined by the site characterization." As indicated in **Table 2**, the detected concentrations of benzene, ethylbenzene, cumene, naphthalene, toluene, 1,2,4-TMB, 1,3,5-TMB, and xylenes are less than the BGS at all site wells during every sampling event. Therefore, it is concluded that the BGS is attained at the Site for benzene, ethylbenzene, cumene, naphthalene, toluene, 1,2,4-TMB, 1,3,5-TMB, and xylenes.

8.2.3 Site Specific Standard

The SVOCs included on the short list for parameters were detected at MW-5 and MW-6 at concentrations greater than the SHS and also at concentrations greater than observed at the background reference wells (i.e., greater than the BGS). Therefore, a SSS is proposed to address the detected SVOCs.

Fate and transport modeling was performed for the SVOCs detected at concentrations greater than the SHS and BGS at MW-5 and MW-6. Modeling utilized the revised Quick Domenico® (QD) model to estimate the potential concentrations of the SVOC in groundwater at the downgradient POC. The model is available on the PADEP Land Recycling Program website and is a Microsoft Excel® spreadsheet application of *An Analytical Model for Multidimensional Transport of a Decaying Contaminant Species*, by P.A. Domenico (Journal of Hydrology, 91 [1987], pp 49-58). The model calculates the concentration of a substance at any time and distance downgradient of a continuous source area of known size. The model allows for the three-dimensional dispersion, first-order decay, and retardation.

The following input parameters were used in the model:

Source – The maximum SVOC concentrations were observed at MW-6. To provide a conservative estimate, the source was modelled as 15 percent greater than the maximum observed concentrations. The source is assumed be at stable concentrations.

Chemicals of Concern (COCs) and Source Concentrations – The following list of SVOCs were modeled using concentrations approximately 15 percent greater than the maximum concentration detected at MW-6 on December 20, 2013:

- Benzo(a)anthracene = 345 µg/L
- Benzo(a)pyrene = 102 µg/L
- Benzo(b)fluoranthene = 150 µg/L
- Benzo(g,h,i)perylene = 30 µg/L
- Chrysene = 265 µg/L
- Indeno(1,2,3-cd)pyrene = 31 µg/L
- Pyrene = 1380 µg/L

Distance to Location of Concern (X) – The distance from MW-6 to the calibration well, MW-16, at the north-northeastern property boundary is approximately 348 feet.

Longitudinal Dispersivity (α_x) – A value of 34.8 feet was used based on guidance provided by PADEP in the *User's Manual for the Quick Domenico Groundwater Fate-and-Transport Model* (2014). The manual recommends using the formula, $\alpha_x = 0.1 * X$, where X is the distance to location of concern.

Transverse Dispersivity (α_y) – A value of 3.48 was used based upon the formula, $\alpha_y = \alpha_x /10$, as per the manual recommendations.

Vertical Dispersivity (α_z) – A value of 0.001 was used per the manual recommendations.

λ (day^{-1}) – Values for the decay constant (λ) were obtained from Chapter 250, Appendix A, Table 5A, of the Pennsylvania Code. The following λ values were used:

- Benzo[a]anthracene – 0.00052 day^{-1}
- Benzo[a]pyrene – 0.0006575 day^{-1}

- Benzo[b]fluoranthene – 0.00057534 day^{-1}
- Benzo[g,h,i]perylene – 0.00052 day^{-1}
- Chrysene – 0.000356 day^{-1}
- Indeno[1,2,3-cd]pyrene – 0.00046575 day^{-1}
- Pyrene – 0.00019178 day^{-1}

Source Width – A source width of 40 feet was used based upon site data.

Source Thickness – A source thickness of 20 feet was used based upon site data.

Time – A time of 10,950 days or 30 years was utilized.

Hydraulic Conductivity (K) – An average hydraulic conductivity of 194 feet per day was derived from site aquifer testing and presented in the November 2011 SCR.

Hydraulic Gradient – A hydraulic gradient of 0.0014 foot per foot was used based upon an average gradient over the attainment sampling period using regional groundwater elevation data.

Effective Porosity – An effective porosity of 0.30 was used based upon the recommended porous media value provided in the PADEP's User's Manual for the Quick Dominico® Groundwater Fate-and-Transport Model.

Bulk Density – A default value of 1.7 grams per cubic centimeter (g/cm^3) was used for the model, as recommended in the Manual.

Organic Carbon Partition Coefficient (K_{oc}) – Values for the organic carbon partition coefficient (K_{oc}) were obtained from Chapter 250, Appendix A, Table 5A, of the Pennsylvania Code. The following K_{oc} values were used for the model:

- Benzo[a]anthracene – 350,000 L/kg
- Benzo[a]pyrene – 910,000 L/kg
- Benzo[b]fluoranthene – 550,000 L/kg
- Benzo[g,h,i]perylene – 2,800,000 L/kg

- Chrysene – 490,000 L/kg
- Indeno[1,2,3-cd]pyrene – 31,000,000 L/kg
- Pyrene – 68,000 L/kg

Fractional Organic Carbon (f_{oc}) – A value of 0.002 was used per the recommended range of values specified in the Manual.

The estimated concentrations at the POC for each COC are as follows:

- Benzo[a]anthracene – 0 µg/L (MSC – 3.6 µg/L)
- Benzo[a]pyrene – 0 µg/L (MSC – 0.2 µg/L)
- Benzo[b]fluoranthene – 0 µg/L (MSC – 1.2 µg/L)
- Benzo[g,h,i]perylene – 0 µg/L (MSC – 0.26 µg/L)
- Chrysene – 0 µg/L (MSC – 1.9 µg/L)
- Indeno[1,2,3-cd]pyrene – 0 µg/L (MSC – 3.6 µg/L)
- Pyrene – 0 µg/L (MSC – 130 µg/L)

The predicted concentrations for each SVOC at the POC are less than the SHS MSCs. Model output data and figures are presented in **Appendix H**.

Fate and transport modeling of the SVOCs indicate that the observed SVOC concentrations at MW-6 are not anticipated to migrate to the POC. The modeled SVOCs each have relatively high K_{oc} values which retard the migration of these contaminants. Based on the fate and transport modeling and the lack of potential receptors, it is concluded that the SSS listed above are protective of human health and the environment and, furthermore, that the data demonstrate attainment of the selected SSS for the SVOCs.

9.0 POST-REMEDIATION CARE PLAN

The Site is subject to the following activity and use limitations, by which Verizon and each subsequent owner of the Site or property shall abide:

- Environmental Covenant: An environmental covenant/deed restriction shall be instituted for the Site. An example covenant is included as **Appendix I**.
- Disturbance of Soil: Verizon and/or its successors or assigns shall not, and shall not allow any other person to, excavate impacted soils in the source area except pursuant to a plan approved by PADEP.
- Use of Groundwater: Verizon and its successors or assigns shall not use the groundwater located beneath the Site for potable, domestic, or agricultural water supply purposes, unless such use is approved by PADEP.
- Future Construction. Verizon and its successors or assigns shall evaluate and address potential vapor intrusion pathways for any future construction of enclosed structures on the Site within 100 feet of the source area.

10.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are presented based upon the site characterization and remedial actions conducted at the Site.

10.1 Conclusions

- The Site use is nonresidential and is located in an area that is currently zoned for industrial use. Groundwater at and in the vicinity of the Site is not currently used for drinking or any other known purpose. Drinking water is supplied to the area by the PWD. Future use of the Site is expected to remain nonresidential.
- Subsurface conditions at the Site were characterized by collecting and analyzing soil, groundwater, LNAPL, soil gas, and IAQ samples and performing hydraulic tests.
- The Site geology is heterogeneous, unconsolidated materials composed primarily of fill material underlain by gravelly sand.
- The depth to groundwater is approximately 25 fbg. The regional groundwater elevation contours indicate a gradient from the adjacent PES property toward the Site. The groundwater elevation contours form an elongated bowl-shaped low area with a centerline that extends roughly southwest-northeast from N-145 toward MW-16. The configuration of the groundwater contours indicate that the regional groundwater flow is toward the northeast and that groundwater may stagnate in the bowl-shaped low area between the PES property and the Site.
- There have been no known releases to surface soils at the Site.
- Groundwater sampling indicates various VOCs associated with petroleum hydrocarbons are present in groundwater samples at concentrations greater than the nonresidential SHS for groundwater. The detected concentrations, however, were less than the default nonresidential screening values for vapor intrusion.
- LNAPL was detected across an extensive area including portions of the Site and the adjacent PES property. The LNAPL plume is estimated to encompass more than 2.75 acres with approximately 0.18 acre onsite, 2.32 acres on PES property, and the remainder in the right-of-way.
- LNAPL samples were collected from wells onsite and on PES property and analyzed by forensic methods to determine its composition. The analysis determined the LNAPL samples from MW-2, MW-3, MW-5, MW-13, MW-14, MW-15, and N-145 are consistent

with weathered gasoline and that samples from N-143 and N-146 are consistent with commingled lube oil and diesel range organics. Review of the analyses coupled with groundwater flow and sampling data indicate that the LNAPL which extends from N-145 to the Site consists of similar constituents and represents a continuous LNAPL plume.

- Thirty soil samples were collected for laboratory analysis during monitoring well installations. Lead was the only regulated substance detected in the soil samples at a concentration greater than the non-residential MSC for the soil-to-groundwater pathway. No organic or inorganic substances were detected at concentrations greater than the nonresidential MSCs for direct contact (2 to 15 fbg) or the default screening values for vapor intrusion. Thus, the collection and analysis of soil samples did not identify a source of petroleum hydrocarbons at the Site.
- Potential sources at the Site include historical landfill operations, releases from adjacent properties (e.g., the PES property to the south and west), and the three former USTs (Tanks 001, 002, and 003).
- Contaminated soils were removed from the subsurface at Tanks 001 and 002 during remedial activities performed at the Site in 1991. Residual contamination was detected in the excavation of Tank 002 and contaminated soils were removed; however, it could not be completely remediated because excavation activities began to potentially jeopardize the structural integrity of the building. A release from Tank 003 was not apparent during the Phase II investigation in June 2010 or during the removal of Tank 003 in February 2011. It is unlikely that Tanks 001 or 003 are the source of groundwater contamination and LNAPL at the Site. The residual contamination in the excavation of Tank 002 is a potential source of contamination; however, the residual concentrations are overshadowed by the vast LNAPL and dissolved phase plume derived from the adjacent PES property.
- Soil gas and IAQ sampling indicate that the vapor intrusion pathway is not complete. IAQ sampling indicated presence of VOC in indoor air; however ambient sampling and HVAC assessment indicate that the source of VOCs is poor ambient air quality and ineffective building ventilation. Measures have been taken to address the IAQ.
- There are no known sensitive habitats or species at the Site, and there are no known ecological impacts associated with the Site.
- Site data support demonstration of attainment of a combination of remedial standards including SHS, BGS, and SSS. Site soils are demonstrated to meet the SHS and SSS. Site groundwater is demonstrated to attain the SHS, BGS, and SSS.

- Site data indicate that the observed groundwater contamination is primarily derived from migration of contaminants from the PES property. Subsurface fill material and residual contamination from Tank 002 may also contribute to observed contamination.

10.2 Recommendations

Based on the findings discussed above, impact to all relevant media has been determined. Further site characterization and remedial action is not warranted. Due to the incomplete contaminant pathways to soil, soil vapor, groundwater, drinking water, and surface water, now and as assured in the future by the PRCP, Verizon is eligible for the liability relief afforded by Act 2 for the residual petroleum contaminants present in soil and groundwater. Leidos recommends that all groundwater monitoring wells and soil gas sampling points at the Site be abandoned by a qualified Pennsylvania-licensed well driller.

11.0 REFERENCES

Pennsylvania Department of Environmental Protection (PADEP) (2001). "Groundwater Monitoring Guidance Manual." PADEP. Document Number 383-3000-001.

United States Environmental Protection Agency (USEPA) (1996). "Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells." USEPA revision 2.

FIGURES

TABLES

APPENDIX A

PADEP Correspondence

APPENDIX B

Boring Logs and Cross-Sections

APPENDIX C

Site Characterization Data

APPENDIX D

Groundwater Elevation Monitoring Data

APPENDIX E

January 2015 LNAPL Sampling Data

APPENDIX F

Geophysical Survey Figures

APPENDIX G

HVAC System Assessment Report

APPENDIX H

Fate and Transport Modeling Results

APPENDIX I

Example Environmental Covenant

Table 1
Monitoring Well Construction Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Location	Completion Date	Coordinates		Elevations (ft amsl)							Depths				
		Northing	Easting	Ground Surface	Top of Inner Casing	Total Depth	Top of Screen	Bottom Screen	Top Sand Pack	Bottom Sand Pack	Total Depth	Top of Screen	Bottom Screen	Top Sand Pack	Bottom Sand Pack
MW-1	2/1/11	227,736.57	2,683,499.90	32.83	32.53	2.16	22.16	2.16	24.83	2.16	30.37	10.37	30.37	8.00	30.37
MW-2	2/2/11	227,840.13	2,683,289.39	34.00	33.60	4.38	24.38	4.38	26.00	4.38	29.22	9.22	29.22	8.00	29.22
MW-3	2/2/11	227,930.05	2,683,266.45	32.98	32.65	2.29	22.29	2.29	24.98	2.29	30.36	10.36	30.36	8.00	30.36
MW-4	2/3/11	228,205.65	2,683,376.35	35.20	34.91	-0.16	19.84	-0.16	22.20	-0.16	35.07	15.07	35.07	13.00	35.07
MW-5	5/23/11	227,806.95	2,683,343.61	33.94	33.60	1.22	11.22	1.22	13.56	1.22	32.38	22.38	32.38	20.38	32.38
MW-6	5/23/11	227,888.56	2,683,351.67	34.82	34.45	2.24	12.24	2.24	14.61	2.24	32.21	22.21	32.21	20.21	32.21
MW-7	5/23/11	227,863.07	2,683,239.30	34.05	33.57	0.21	10.21	0.21	12.69	0.21	33.36	23.36	33.36	21.36	33.36
MW-8	5/23/11	227,957.48	2,683,326.34	34.04	33.63	1.51	11.51	1.51	13.92	1.51	32.12	22.12	32.12	20.12	32.12
MW-9	5/23/11	228,061.56	2,683,311.83	33.47	33.08	0.88	10.88	0.88	13.27	0.88	32.20	22.20	32.20	20.20	32.20
MW-10	9/14/11	228,034.64	2,683,406.91	34.86	34.48	1.98	11.98	1.98	13.36	1.98	32.50	22.50	32.50	21.50	32.50
MW-11	9/13/11	228,106.85	2,683,447.14	35.54	35.20	2.70	12.70	2.70	14.04	2.70	32.50	22.50	32.50	21.50	32.50
MW-12	9/14/11	227,990.72	2,683,543.61	36.02	35.57	2.06	12.06	2.06	13.51	2.06	33.51	23.51	33.51	22.51	33.51
MW-13	9/19/11	227,831.91	2,683,096.31	N/A	25.59	0.44	10.44	0.44	11.44	0.44	25.15	15.15	25.15	14.15	25.15
MW-14	9/16/11	227,757.11	2,683,256.02	33.18	35.27	-0.04	9.96	-0.04	8.87	-0.04	35.31	25.31	35.31	24.31	35.31
MW-15	9/15/11	227,732.23	2,683,308.92	33.06	35.03	0.23	10.23	0.23	10.09	0.23	34.80	24.80	34.80	22.97	34.80
MW-16	2/29/12	228,192.60	2,683,530.41	39.73	39.54	5.54	15.54	5.54	17.73	4.54	34.00	24.00	34.00	22.00	35.00
SG-1	6/23/11	227,841.26	2,683,301.95	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.00	5.50	6.00	5.50	6.00
SG-2	6/23/11	227,870.81	2,683,324.79	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.00	5.50	6.00	5.50	6.00
SG-3	6/23/11	227,891.77	2,683,359.85	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6.00	5.50	6.00	5.50	6.00
SGSP-1	9/22/11	227,789.19	2,683,518.26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00
SGSP-2	9/22/11	227,917.32	2,683,539.83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00
SGSP-3	9/22/11	227,816.11	2,683,400.86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00
SGSP-4	9/22/11	227,954.53	2,683,413.25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00
SGSP-5	9/22/11	227,929.45	2,683,395.72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00
SGSP-6	9/22/11	228,070.02	2,683,437.35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.00	1.50	2.00	1.50	2.00

Notes
ft asml: Feet above mean sea level
Horizontal Datum: Pennsylvania State Plane Coordinates NAD 83 - South Zone
Vertical Datum: NAVD 88
Monuments Used: NGS "NJGC" (CORS 96) (EPOCH 2002.0) (GEOID 09)

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
MW-1	**8/15/12**	30.37	NP	22.79	0.00	32.53	9.74
	11/14/12	30.37	NP	22.80	0.00	32.53	9.73
	2/12/13	30.37	NP	22.74	0.00	32.53	9.79
	4/4/13	30.37	NP	22.80	0.00	32.53	9.73
	5/13/13	30.37	NP	22.86	0.00	32.53	9.67
	6/26/13	30.37	NP	22.40	0.00	32.53	10.13
	8/6/13	30.37	NP	21.94	0.00	32.53	10.59
	9/18/13	30.37	NP	21.79	0.00	32.53	10.74
	11/5/13	30.37	NP	22.19	0.00	32.53	10.34
	12/18/13	30.37	NP	22.57	0.00	32.53	9.96
	3/7/14	30.37	NP	21.85	0.00	32.53	10.68
	4/16/14	30.37	NP	21.77	0.00	32.53	10.76
	6/24/14	30.37	NP	21.62	0.00	32.53	10.91
	9/15/14	30.37	NP	21.96	0.00	32.53	10.57
	12/4/14	30.37	NP	22.55	0.00	32.53	9.98
MW-2	**8/15/12**	29.22	26.85	27.08	0.23	33.60	6.6948
	11/14/12	29.22	26.82	26.95	0.13	33.60	6.75
	2/12/13	29.22	27.02	27.65	0.63	33.60	6.43
	4/4/13	29.22	27.50	27.85	0.35	33.60	6.02
	5/13/13	29.22	27.22	27.92	0.70	33.60	6.22
	6/26/13	29.22	26.55	26.86	0.31	33.60	6.98
	8/6/13	29.22	25.78	26.04	0.26	33.60	7.76
	9/18/13	29.22	25.74	26.10	0.36	33.60	7.78
	11/5/13	29.22	26.46	27.06	0.60	33.60	7.00
	12/18/13	29.22	26.95	27.49	0.54	33.60	6.53
	3/7/14	29.22	25.94	26.06	0.12	33.60	7.63
	4/16/14	29.22	25.62	25.70	0.08	33.60	7.96
	6/24/14	29.22	25.00	25.03	0.03	33.60	8.59
	9/15/14	29.22	25.69	25.83	0.14	33.60	7.88
	12/4/14	29.22	26.34	26.72	0.38	33.60	7.17
MW-3	**8/15/12**	30.36	NP	25.88	0.00	32.65	6.77
	11/14/12	30.36	NP	25.74	0.00	32.65	6.91
	2/12/13	30.36	NP	26.15	0.00	32.65	6.50
	4/4/13	30.36	26.40	26.62	0.22	32.65	6.20
	5/13/13	30.36	26.30	26.70	0.40	32.65	6.26
	6/26/13	30.36	25.53	25.70	0.17	32.65	7.08
	8/6/13	30.36	24.80	24.86	0.06	32.65	7.84
	9/18/13	30.36	24.80	24.82	0.02	32.65	7.85
	11/5/13	30.36	25.55	25.60	0.05	32.65	7.09
	12/18/13	30.36	25.98	26.30	0.32	32.65	6.60
	3/7/14	30.36	NP	24.92	0.00	32.65	7.73
	4/16/14	30.36	NP	24.60	0.00	32.65	8.05
	6/24/14	30.36	NP	24.00	0.00	32.65	8.65
	9/15/14	30.36	NP	24.70	0.00	32.65	7.95
	12/4/14	30.36	NP	25.36	0.00	32.65	7.29
MW-4	**8/15/12**	35.07	NP	27.92	0.00	34.91	6.99
	11/14/12	34.07	NP	27.78	0.00	34.91	7.13
	2/12/13	35.07	NP	28.25	0.00	34.91	6.66
	4/4/13	35.07	NP	28.46	0.00	34.91	6.45
	5/13/13	35.07	NP	28.43	0.00	34.91	6.48
	6/26/13	35.07	NP	27.71	0.00	34.91	7.20
	8/6/13	35.07	NP	26.91	0.00	34.91	8.00
	9/18/13	35.07	NP	26.85	0.00	34.91	8.06
	11/5/13	35.07	NP	27.60	0.00	34.91	7.31
	12/18/13	35.07	NP	28.06	0.00	34.91	6.85
	3/7/14	35.07	NP	26.88	0.00	34.91	8.03
	4/16/14	35.07	NP	26.40	0.00	34.91	8.51
	6/24/14	35.07	NP	27.90	0.00	34.91	7.01

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
	9/15/14	35.07	NP	26.63	0.00	34.91	8.28
	12/4/14	35.07	NP	27.28	0.00	34.91	7.63
MW-5	**8/15/12**	32.38	NP	26.90	0.00	33.60	6.7
	11/14/12	32.38	NP	26.46	0.00	33.60	7.14
	2/12/13	32.38	NP	27.16	0.00	33.60	6.44
	4/4/13	32.38	NP	27.48	0.00	33.60	6.12
	5/13/13	32.38	NP	27.40	0.00	33.60	6.20
	6/26/13	32.38	NP	26.61	0.00	33.60	6.99
	8/6/13	32.38	25.77	26.05	0.28	33.60	7.77
	9/18/13	32.38	25.70	26.19	0.49	33.60	7.79
	11/5/13	32.38	26.41	27.15	0.74	33.60	7.02
	12/18/13	32.38	26.84	26.95	0.11	33.60	6.73
	3/7/14	32.38	25.91	25.99	0.08	33.60	7.67
	4/16/14	32.38	25.58	25.84	0.26	33.60	7.96
	6/24/14	32.38	24.93	25.10	0.17	33.60	8.63
	9/15/14	32.38	25.68	25.86	0.18	33.60	7.88
	12/4/14	32.38	26.35	26.42	0.07	33.60	7.23
MW-6	**8/15/12**	32.21	27.63	27.86	0.23	34.45	6.7648
	11/14/12	32.21	NP	27.52	0.00	34.45	6.93
	2/12/13	32.21	27.90	28.12	0.22	34.45	6.50
	4/4/13	32.21	28.18	28.40	0.22	34.45	6.22
	5/13/13	32.21	28.00	28.60	0.60	34.45	6.31
	6/26/13	32.21	27.31	27.60	0.29	34.45	7.07
	8/6/13	32.21	NP	25.92	0.00	34.45	8.53
	9/18/13	32.21	26.56	26.65	0.09	34.45	7.87
	11/5/13	32.21	27.30	27.53	0.23	34.45	7.10
	12/18/13	32.21	27.75	28.05	0.30	34.45	6.63
	3/7/14	32.21	NP	26.71	0.00	34.45	7.74
	4/16/14	32.21	26.39	26.45	0.06	34.45	8.05
	6/24/14	32.21	25.75	25.81	0.06	34.45	8.69
	9/15/14	32.21	26.46	26.48	0.02	34.45	7.99
	12/4/14	32.21	NP	27.16	0.00	34.45	7.29
MW-7	**8/15/12**	33.36	NP	26.82	0.00	33.57	6.75
	11/14/12	33.36	NP	26.65	0.00	33.57	6.92
	2/12/13	33.36	NP	27.09	0.00	33.57	6.48
	4/4/13	33.36	NP	27.40	0.00	33.57	6.17
	5/13/13	33.36	27.20	27.85	0.65	33.57	6.22
	6/26/13	33.36	26.46	26.82	0.36	33.57	7.03
	8/6/13	33.36	25.71	25.92	0.21	33.57	7.81
	9/18/13	33.36	25.67	26.06	0.39	33.57	7.81
	11/5/13	33.36	26.44	26.81	0.37	33.57	7.04
	12/18/13	33.36	26.93	27.20	0.27	33.57	6.58
	3/7/14	33.36	NP	25.88	0.00	33.57	7.69
	4/16/14	33.36	25.55	25.72	0.17	33.57	7.98
	6/24/14	33.36	24.92	25.07	0.15	33.57	8.62
	9/15/14	33.36	25.61	25.86	0.25	33.57	7.90
	12/4/14	33.36	26.32	26.45	0.13	33.57	7.22
MW-8	**8/15/12**	32.12	NP	26.80	0.00	33.63	6.83
	11/14/12	32.12	NP	26.65	0.00	33.63	6.98
	2/12/13	32.12	NP	27.07	0.00	33.63	6.56
	4/4/13	32.12	NP	27.38	0.00	33.63	6.25
	5/13/13	32.12	NP	27.30	0.00	33.63	6.33
	6/26/13	32.12	NP	26.51	0.00	33.63	7.12
	8/6/13	32.12	NP	25.76	0.00	33.63	7.87
	9/18/13	32.12	NP	25.72	0.00	33.63	7.91
	11/5/13	32.12	NP	26.47	0.00	33.63	7.16
	12/18/13	32.12	NP	27.26	0.00	33.63	6.37
	3/7/14	32.12	NP	25.84	0.00	33.63	7.79

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
	4/16/14	32.12	NP	25.48	0.00	33.63	8.15
	6/24/14	32.12	NP	24.90	0.00	33.63	8.73
	9/15/14	32.12	NP	25.60	0.00	33.63	8.03
	12/4/14	32.12	NP	26.30	0.00	33.63	7.33
MW-9	**8/15/12**	32.20	NP	26.20	0.00	33.08	6.88
	11/14/12	32.20	NP	26.10	0.00	33.08	6.98
	2/12/13	32.20	NP	26.48	0.00	33.08	6.60
	4/4/13	32.20	NP	26.76	0.00	33.08	6.32
	5/13/13	32.20	NP	26.70	0.00	33.08	6.38
	6/26/13	32.20	NP	25.95	0.00	33.08	7.13
	8/6/13	32.20	NP	25.16	0.00	33.08	7.92
	9/18/13	32.20	NP	25.15	0.00	33.08	7.93
	11/5/13	32.20	NP	25.88	0.00	33.08	7.20
	12/18/13	32.20	NP	26.36	0.00	33.08	6.72
	3/7/14	32.20	NP	25.25	0.00	33.08	7.83
	4/16/14	32.20	NP	24.87	0.00	33.08	8.21
	6/24/14	32.20	NP	26.27	0.00	33.08	6.81
	9/15/14	32.20	NP	25.00	0.00	33.08	8.08
	12/4/14	32.20	NP	25.65	0.00	33.08	7.43
MW-10	**8/15/12**	32.50	NP	27.60	0.00	34.48	6.88
	11/14/12	32.50	NP	27.42	0.00	34.48	7.06
	2/12/13	32.50	NP	27.87	0.00	34.48	6.61
	4/4/13	32.50	NP	28.13	0.00	34.48	6.35
	5/13/13	32.50	NP	28.08	0.00	34.48	6.40
	6/26/13	32.50	NP	27.34	0.00	34.48	7.14
	8/6/13	32.50	NP	26.56	0.00	34.48	7.92
	9/18/13	32.50	NP	26.49	0.00	34.48	7.99
	11/5/13	32.50	NP	27.25	0.00	34.48	7.23
	12/18/13	32.50	NP	27.24	0.00	34.48	7.24
	3/7/14	32.50	NP	26.61	0.00	34.48	7.87
	4/16/14	32.50	NP	26.23	0.00	34.48	8.25
	6/24/14	32.50	NP	25.65	0.00	34.48	8.83
	9/15/14	32.50	NP	26.34	0.00	34.48	8.14
	12/4/14	32.50	NP	27.02	0.00	34.48	7.46
MW-11	**8/15/12**	32.50	NP	28.25	0.00	35.20	6.95
	11/14/12	32.50	NP	28.10	0.00	35.20	7.10
	2/12/13	32.50	NP	28.53	0.00	35.20	6.67
	4/4/13	32.50	NP	28.80	0.00	35.20	6.40
	5/13/13	32.50	NP	28.74	0.00	35.20	6.46
	6/26/13	32.50	NP	28.02	0.00	35.20	7.18
	8/6/13	32.50	NP	27.22	0.00	35.20	7.98
	9/18/13	32.50	NP	27.16	0.00	35.20	8.04
	11/5/13	32.50	NP	27.90	0.00	35.20	7.30
	12/18/13	32.50	NP	28.39	0.00	35.20	6.81
	3/7/14	32.50	NP	27.22	0.00	35.20	7.98
	4/16/14	32.50	NP	26.84	0.00	35.20	8.36
	6/24/14	32.50	NP	26.24	0.00	35.20	8.96
	9/15/14	32.50	NP	26.95	0.00	35.20	8.25
	12/4/14	32.50	NP	27.63	0.00	35.20	7.57
MW-12	**8/15/12**	33.51	NP	28.50	0.00	35.57	7.07
	11/14/12	33.51	NP	28.46	0.00	35.57	7.11
	2/12/13	33.51	NP	28.80	0.00	35.57	6.77
	4/4/13	33.51	NP	29.00	0.00	35.57	6.57
	5/13/13	33.51	NP	28.94	0.00	35.57	6.63
	6/26/13	33.51	NP	28.25	0.00	35.57	7.32
	8/6/13	33.51	NP	27.34	0.00	35.57	8.23
	9/18/13	33.51	NP	26.84	0.00	35.57	8.73
	11/5/13	33.51	NP	27.82	0.00	35.57	7.75

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
	12/18/13	33.51	NP	28.60	0.00	35.57	6.97
	3/7/14	33.51	NP	26.85	0.00	35.57	8.72
	4/16/14	33.51	NP	26.60	0.00	35.57	8.97
	6/24/14	33.51	NP	26.15	0.00	35.57	9.42
	9/15/14	33.51	NP	26.75	0.00	35.57	8.82
	12/4/14	33.51	NP	27.65	0.00	35.57	7.92
MW-13	**8/15/12**	25.15	18.77	19.32	0.55	25.59	6.69
	11/14/12	25.15	18.65	19.04	0.39	25.59	6.85
	2/12/13	25.15	19.05	19.82	0.77	25.59	6.36
	4/4/13	25.15	19.24	19.98	0.74	25.59	6.18
	5/13/13	25.15	19.20	20.05	0.85	25.59	6.19
	6/26/13	25.15	18.47	18.95	0.48	25.59	7.01
	8/6/13	25.15	17.71	18.14	0.43	25.59	7.78
	9/18/13	25.15	17.70	18.37	0.67	25.59	7.74
	11/5/13	25.15	18.41	19.20	0.79	25.59	7.00
	12/18/13	25.15	18.91	19.60	0.69	25.59	6.52
	3/7/14	25.15	17.85	18.15	0.30	25.59	7.67
	4/16/14	25.15	17.63	17.97	0.34	25.59	7.88
	6/24/14	25.15	16.95	17.42	0.47	25.59	8.53
	9/15/14	25.15	17.57	18.12	0.55	25.59	7.89
	12/4/14	25.15	18.35	18.83	0.48	25.59	7.13
MW-14	**8/15/12**	35.31	28.49	29.10	0.61	35.27	6.63
	11/14/12	35.31	28.33	28.55	0.22	35.27	6.89
	2/12/13	35.31	28.72	29.40	0.68	35.27	6.39
	4/4/13	35.31	28.88	29.85	0.97	35.27	6.17
	5/13/13	35.31	28.65	29.90	1.25	35.27	6.33
	6/26/13	35.31	28.16	28.75	0.59	35.27	6.97
	8/6/13	35.31	27.41	27.94	0.53	35.27	7.74
	9/18/13	35.31	27.38	28.09	0.71	35.27	7.73
	11/5/13	35.31	28.10	29.00	0.90	35.27	6.96
	12/18/13	35.31	28.60	29.47	0.87	35.27	6.47
	3/7/14	35.31	27.53	27.96	0.43	35.27	7.64
	4/16/14	35.31	27.28	27.70	0.42	35.27	7.89
	6/24/14	35.31	26.65	27.10	0.45	35.27	8.52
	9/15/14	35.31	27.27	27.86	0.59	35.27	7.86
	12/4/14	35.31	28.00	28.70	0.70	35.27	7.11
MW-15	**8/15/12**	34.80	28.19	29.10	0.91	35.03	6.62
	11/14/12	34.80	28.08	28.76	0.68	35.03	6.79
	2/12/13	34.80	28.42	29.45	1.03	35.03	6.36
	4/4/13	34.80	28.65	29.70	1.05	35.03	6.14
	5/13/13	34.80	27.60	28.60	1.00	35.03	7.20
	6/26/13	34.80	27.91	28.55	0.64	35.03	6.97
	8/6/13	34.80	27.14	27.74	0.60	35.03	7.75
	9/18/13	34.80	27.13	27.91	0.78	35.03	7.72
	11/5/13	34.80	27.88	28.83	0.95	35.03	6.93
	12/18/13	34.80	28.35	29.31	0.96	35.03	6.46
	3/7/14	34.80	27.31	27.66	0.35	35.03	7.64
	4/16/14	34.80	27.00	27.58	0.58	35.03	7.90
	6/24/14	34.80	26.38	26.95	0.57	35.03	8.52
	9/15/14	34.80	27.02	27.72	0.70	35.03	7.85
	12/4/14	34.80	27.75	28.50	0.75	35.03	7.11
	8/15/12	34.00	NP	32.56	0.00	39.54	6.98
	11/14/12	34.00	NP	32.41	0.00	39.54	7.13
	2/12/13	34.00	NP	32.86	0.00	39.54	6.68
	4/4/13	34.00	NP	33.10	0.00	39.54	6.44
	5/13/13	34.00	NP	33.05	0.00	39.54	6.49
	6/26/13	34.00	NP	33.35	0.00	39.54	6.19
	8/6/13	34.00	NP	31.55	0.00	39.54	7.99

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
MW-16	**9/18/13**	34.00	NP	31.47	0.00	39.54	8.07
	11/5/13	34.00	NP	32.20	0.00	39.54	7.34
	12/18/13	34.00	NP	32.71	0.00	39.54	6.83
	3/7/14	34.00	NP	31.55	0.00	39.54	7.99
	4/16/14	34.00	NP	31.14	0.00	39.54	8.40
	6/24/14	34.00	NP	30.10	0.00	39.54	9.44
	9/15/14	34.00	NP	31.22	0.00	39.54	8.32
	12/4/14	34.00	NP	31.92	0.00	39.54	7.62
N-1	**8/15/12**	NM	NP	15.9	0.00	24.69	8.79
	11/14/12	21.9	NP	14.42	0.00	24.69	10.27
	2/12/13	21.9	NP	11.52	0.00	24.69	13.17
	5/13/13	21.9	NP	12.75	0.00	24.69	11.94
	3/7/14	21.90	NP	9.75	0.00	22.27	12.52
N-3	**8/15/12**	23.05	NP	16.64	0.00	26.66	10.02
	11/14/12	23.05	NP	15.51	0.00	26.66	11.15
	2/12/13	23.05	NP	14.81	0.00	26.66	11.85
	5/13/13	23.05	NP	16.92	0.00	26.66	9.74
	3/7/14	23.05	NP	15.86	0.00	26.66	10.80
N-4	**8/15/12**	47.3	NP	19.53	0.00	26.36	6.83
	11/14/12	47.3	NP	19.47	0.00	26.36	6.89
	2/12/13	47.3	NP	20.03	0.00	26.36	6.33
	5/13/13	47.3	NP	20.1	0.00	26.36	6.26
	3/7/14	47.30	NP	18.77	0.00	26.36	7.59
N-05	**8/15/12**	NM	NP	10.53	0.00	25.96	15.43
	11/14/12	14.95	NP	9.3	0.00	25.96	16.66
	2/12/13	14.95	NP	9.12	0.00	25.96	16.84
	5/13/13	14.95	NP	9.6	0.00	25.96	16.36
	3/7/14	14.95	NP	8.35	0.00	25.96	17.61
N-06	**8/15/12**	NM	NP	13.63	0.00	31.05	17.42
	11/14/12	19.3	NP	12.07	0.00	31.05	18.98
	2/12/13	19.3	NP	12.07	0.00	31.05	18.98
	5/13/13	19.3	NP	12.84	0.00	31.05	18.21
	3/7/14	19.30	NP	11.39	0.00	31.05	19.66
N-08	**8/15/12**	NM	NP	26.72	0.00	37.61	10.89
	11/14/12	32.6	NP	26.7	0.00	37.61	10.91
	2/12/13	32.6	NP	26.75	0.00	37.61	10.86
	5/13/13	32.6	NP	26.9	0.00	37.61	10.71
	3/7/14	32.60	NP	25.97	0.00	37.61	11.64
N-09	**3/7/14**	78.00	NP	34.15	0.00	38.21	4.06
N-10	**8/15/12**	NM	NP	6.12	0.00	19.96	13.84
	11/14/12	10	NP	4.9	0.00	19.96	15.06
	2/12/13	10	NP	4.08	0.00	19.96	15.88
	5/13/13	10	NP	5.53	0.00	19.96	14.43
	3/7/14	10.00	NP	3.96	0.00	19.96	16.00
N-11	**8/15/12**	NM	NP	19.1	0.00	29.74	10.64
	11/14/12	22.9	NP	18.78	0.00	29.74	10.96
	2/12/13	22.9	NP	18.57	0.00	29.74	11.17
	5/13/13	22.9	NP	18.86	0.00	29.74	10.88
	3/7/14	22.90	NP	17.85	0.00	29.74	11.89
N-12	**8/15/12**	NM	NP	16.68	0.00	27.19	10.51
	11/14/12	20.15	NP	16.45	0.00	27.19	10.74
	2/12/13	20.15	NP	16.5	0.00	27.19	10.69
	5/13/13	20.15	NP	16.65	0.00	27.19	10.54
	3/7/14	20.15	NP	NM	0.00	27.19	NM

Table 2
Groundwater Gauging Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Well ID	Date Sampled	Total Well Depth (fbtoc)	Depth to LNAPL (fbtoc)	Depth to Groundwater (fbtoc)	LNAPL Thickness (ft)	TOC Elevation (ft amsl)	Groundwater Elevation (ft amsl)
N-13	**3/7/14**	50.00	NP	20.12	0.00	26.77	6.65
N-14	**11/14/12**	25.85	21.60	22.9	1.30	31.99	10.08
	2/12/13	25.85	21.62	22.55	0.93	31.99	10.15
	5/13/13	25.85	NM	NM	NM	31.99	NM
	3/7/14	25.85	21.07	21.09	0.02	31.99	10.92
N-15	**11/14/12**	24.7	NP	21.32	0.00	29.35	8.03
	2/12/13	24.7	NP	21.35	0.00	29.35	8.00
	5/13/13	24.7	NM	NM	NM	29.35	NM
	3/7/14	24.70	NP	20.77	0.00	29.35	8.58
N-98	**8/15/12**	32.15	NP	24.25	0.00	34.53	10.28
	11/14/12	32.15	NP	24.25	0.00	34.53	10.28
	2/12/13	32.15	NP	24.3	0.00	34.53	10.23
	5/13/13	32.15	NP	24.4	0.00	34.53	10.13
	3/7/14	32.15	NP	23.52	0.00	34.53	11.01
N-99	**11/14/12**	27.25	NP	19.78	0.00	28.26	8.48
	2/12/13	27.25	NP	20.55	0.00	28.26	7.71
	5/13/13	27.25	NM	NM	NM	28.26	NM
	3/7/14	27.25	NP	19.29	0.00	28.26	8.97
N-100	**8/15/12**	NM	NP	19.1	0.00	27.01	7.91
	11/14/12	21.95	NP	19.2	0.00	27.01	7.81
	2/12/13	21.95	NP	19.24	0.00	27.01	7.77
	5/13/13	21.95	NP	19.32	0.00	27.01	7.69
	3/7/14	21.95	NP	18.28	0.00	27.01	8.73
N-101	**8/15/12**	NM	NP	16.61	0.00	27.15	10.54
	11/14/12	24.9	NP	16.85	0.00	27.15	10.30
	2/12/13	24.9	NP	16.66	0.00	27.15	10.49
	5/13/13	24.9	NP	16.72	0.00	27.15	10.43
	3/7/14	24.90	NP	16.08	0.00	27.15	11.07
N-102	**11/14/12**	31.6	22.70	23.65	0.95	33.21	10.28
	2/12/13	31.6	22.77	23.74	0.97	33.21	10.21
	5/13/13	31.6	NM	NM	NM	33.21	NM
	3/7/14	31.60	22.20	22.99	0.79	33.21	10.82
N-106	**8/15/12**	NM	NP	10.87	0.00	23.03	12.16
	11/14/12	20.85	NP	10.82	0.00	23.03	12.21
	2/12/13	20.85	NP	9.45	0.00	23.03	13.58
	5/13/13	20.85	NP	20.8	0.00	23.03	2.23
	3/7/14	20.85	NP	7.72	0.00	23.03	15.31
N-140	**3/7/14**	NM	NP	17.43	0.00	26.74	9.31
N-141	**3/7/14**	NM	NP	13.73	0.00	24.39	10.66
N-142	**3/7/14**	NM	NP	27.07	0.00	34.56	7.49
N-143	**3/7/14**	NM	NP	22.45	0.00	33.02	10.57
N-144	**3/7/14**	NM	NP	26.44	0.00	34.28	7.84
N-145	**3/7/14**	NM	18.30	18.98	0.68	25.99	7.53
N-146	**3/7/14**	NM	17.78	17.80	0.02	26.31	8.53

Notes:
fbtoc = feet below top of casing
ft = feet
amsl = above mean sea level
NP = no product (LNAPL) detected

Table 2
Groundwater Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

		Volatile Organic Compounds (VOCs)											**Semi-Volatile Organic Compounds (SVOCs)**							**Metals**
Well ID	Date Sampled	Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		**1,500**	**0.033**	**0**	**570**	**200**	**16**	**2,100**	**320**	**750**	**1,800**	**2,100**	**29**	**16**	**13**	**10**	**37**	**7**	**100**	**6.9**
Max Site Concentration		**1,000**	**0.03**	**17**	**320**	**180**	**48**	**1,900**	**280**	**440**	**820**	**1,600**	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	**31**
PADEP MSCs - Nonresidential		5	**0.05**	**5**	**700**	**3,500**	**20**	100	**1,000**	62	53	**10,000**	3.6	0.2	1.2	0.26	1.9	3.6	**130**	5
MW-1	8/16/12	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	2.0	ND (0.5)	1.0	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.00034)
	11/15/12	0.8 J	ND (0.0095)	ND (0.5)	0.7 J	3	ND (0.5)	3 J	0.6 J	ND (0.5)	2 J	2.0	NA	NA	NA	NA	NA	NA	NA	ND (0.047)
	2/13/13	ND (1.0)	ND (0.029)	ND (1.0)	ND (1.0)	1 J	ND (1.0)	ND (4)	ND (1.0)	ND (2.0)	ND (2.0)	0.7 J	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	4/4/13	ND (1.0)	ND (0.029)	ND (1.0)	ND (1.0)	0.7 J	ND (1.0)	ND (4)	ND (1.0)	ND (2)	0.7 J	0.8 J	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	5/13/13	0.6 J	ND (0.029)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (4.0)	ND (1.0)	ND (2.0)	ND (2.0)	1	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	6/27/13	ND (0.5)	ND (0.0099)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	9/19/13	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	0.7 J	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	11/6/13	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	3	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.13 J
	12/20/13	0.8 J	ND (0.0097)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	1	NA	NA	NA	NA	NA	NA	NA	0.12 J
	4/17/14	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.0850
	6/25/14	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.0850
	9/15/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
	12/4/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1 J	N.D.	N.D.	0.5 J	0.5 J	NA	NA	NA	NA	NA	NA	NA	N.D.
MW-2	8/16/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/14/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/13/13	**1,000**	ND (0.029)	ND (10)	280	110	19	**930**	200	23	**230**	610	**10**	**5 J**	**5 J**	**4 J**	**10**	**4 J**	40	**31**
	4/4/13	**970**	ND (0.029)	ND (5.0)	310	120	18	**800**	180	20	**200**	600	1 J	ND (5.0)	ND (5.0)	ND (5.0)	1 J	ND (5.0)	4 J	ND (1.0)
	5/14/13	**990**	ND (0.029)	ND (10)	310	140	19	**790**	210	22	**240**	620	**23**	**7**	**11**	**2 J**	**19**	2 J	120	ND (1.0)
	6/28/13	**960**	ND (0.01)	ND (3.0)	220	79	15	**590**	180	11	**110**	440	2 J	**1 J**	1 J	ND (1.0)	**3 J**	ND (1.0)	9	ND (0.085)
	8/7/13	**920**	ND (0.0094)	ND (10)	230	97	15 J	**680**	160	11 J	**130**	450	**9 J**	**6 J**	**6 J**	**4 J**	**9 J**	3 J	37	ND (0.085)
	9/18/13	**980**	ND (0.0098)	ND (5)	300	170	**20**	**960**	180	18 J	**210**	610	**7**	**3 J**	**4 J**	**2 J**	**9**	2 J	28	ND (0.085)
	11/5/13	**970**	ND (0.0094)	ND (5)	210	92	**21**	**540**	160	10 J	**120**	410	**6**	**4 J**	**3 J**	**2 J**	**8**	2 J	23	0.20 J
	12/20/13	**980**	ND (0.0098)	ND (10)	320	180	**27**	**1,000**	180	20 J	**210**	640	**13**	**7**	**7**	**3 J**	**17**	3 J	55	0.089 J
	4/17/14	**990**	ND (0.0096)	ND (5)	290	150	**27**	**900**	190	18 J	**200**	590	**13**	**7**	**7**	**4 J**	**15**	2 J	48	0.089J
	6/24/14	**860**	N.D.	N.D.	160	73	**32**	**620**	160	10 J	**110**	380	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2 J	N.D.
	9/15/14	**630**	N.D.	N.D.	240	180	**23**	**590**	140	15 J	**170**	450	**6**	**3**	**3**	**2**	**7**	1.0	24.0	N.D.
	12/4/14	**960**	N.D.	N.D.	170	67	16	**570**	190	9 J	**97**	420	1	**0.4 J**	0.4 J	0.2 J	0.9	0.2 J	3	N.D.
MW-3	8/16/12	**44**	ND (0.0096)	**17**	240	150	16.0	**560**	140	15.0	93	440	0.5	**0.3**	0.4	0.2	0.63	0.1	2.5	0.000049
	11/15/12	**24**	ND (0.0096)	ND (3.0)	140	37	ND (3.0)	**260**	140	5 J	20	280	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.3 J	ND (0.047)
	2/13/13	**22**	ND (0.029)	ND (5.0)	130	37	ND (5.0)	**220**	120	8 J	18	260	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.2 J	ND (1.0)
	4/4/13	**26**	ND (0.029)	ND (1.0)	130	54	2.0	**160**	120	5.0	26	250	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	2 J	ND (1.0)
	5/14/13	**26**	ND (0.029)	ND (5.0)	170	86	ND (5.0)	**270**	140	8 J	41	320	0.7	**0.3 J**	0.3 J	0.2 J	0.7	0.2 J	3.0	ND (1.0)
	6/28/13	**26**	ND (0.01)	ND (5.0)	160	90	ND (5.0)	**270**	120	7 J	37	290	0.5 J	**0.2 J**	0.3 J	0.1 J	0.6	ND (0.1)	2.0	ND (0.085)
	8/7/13	**24**	ND (0.0096)	ND (5.0)	190	110	6 J	**330**	120	9 J	44	340	0.6	**0.3 J**	0.3 J	0.2 J	0.7	0.1 J	3.0	ND (0.085)
	9/18/13	**31**	ND (0.010)	ND (5)	140	110	ND (5)	**230**	110	6 J	38	230	3 J	**1 J**	1 J	ND (1)	**4 J**	ND (1)	13	0.18 J
	11/5/13	**23**	ND (0.0096)	ND (5)	180	95	ND (5)	**330**	140	7 J	39	280	**4 J**	**2 J**	**2 J**	**1 J**	**4 J**	1 J	14	0.11 J
	12/20/13	**26**	ND (0.0097)	ND (3)	170	110	3 J	**320**	140	6 J	33	290	**8**	**3 J**	**5 J**	**2 J**	**8**	2 J	30	0.16 J
	4/17/14	**28**	ND (0.0094)	ND (5)	140	170	ND (5)	**270**	120	8 J	44	260	**5**	**3**	**3**	**2 J**	**5**	0.9 J	27	0.15 J
	6/25/14	**23**	N.D.	N.D.	130	38	6	**260**	120	4 J	16	250	0.2 J	N.D.	0.1 J	N.D.	0.2 J	N.D.	0.9	N.D.
	9/15/14	**23**	N.D.	N.D.	120	35 J	N.D.	**190**	120	N.D.	14 J	220	0.2 J	0.1 J	0.2 J	N.D.	0.3 J	N.D.	1.0	0.000085 J
	12/4/14	**24**	N.D.	N.D.	110	30	N.D.	**190**	97	4 J	12	200	0.2 J	N.D.	N.D.	N.D.	0.3 J	N.D.	3	N.D.
	8/15/12	ND (0.5)	ND (0.0097)	ND (0.5)	0.9	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	0.6	93	440	NA	NA	NA	NA	NA	NA	NA	0.840000
	11/14/12	ND (0.5)	ND (0.0096)	ND (0.5)	0.6 J	ND (0.5)	ND (1.0)	ND (1.0)	ND (0.5)	0.6 J	ND (0.5)	2	NA	NA	NA	NA	NA	NA	NA	ND (0.047)

Table 2
Groundwater Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

		Volatile Organic Compounds (VOCs)											**Semi-Volatile Organic Compounds (SVOCs)**							**Metals**
Well ID	Date Sampled	Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		**1,500**	**0.033**	**0**	**570**	**200**	**16**	**2,100**	**320**	**750**	**1,800**	**2,100**	**29**	**16**	**13**	**10**	**37**	**7**	**100**	**6.9**
Max Site Concentration		**1,000**	**0.03**	**17**	**320**	**180**	**48**	**1,900**	**280**	**440**	**820**	**1,600**	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	**31**
PADEP MSCs - Nonresidential		5	**0.05**	**5**	**700**	**3,500**	**20**	100	**1,000**	62	53	**10,000**	3.6	0.2	1.2	0.26	1.9	3.6	**130**	5
MW-4	2/12/13	ND (1.0)	ND (0.029)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (4)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	4/3/13	ND (1.0)	ND (0.029)	ND (1.0)	ND (1.0)	ND (2)	ND (1.0)	ND (4)	ND (1.0)	0.6 J	ND (2)	2	NA	NA	NA	NA	NA	NA	NA	0.088 J
	5/13/13	ND (1.0)	ND (0.029)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (4.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	6/26/13	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	9/19/13	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.30 J
	11/6/13	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.12 J
	12/20/13	ND (0.5)	ND (0.0097)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.20 J
	4/16/14	ND (0.5)	ND (0.0094)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.44 J
	6/25/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
	9/15/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
	12/4/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.5 J	NA	NA	NA	NA	NA	NA	NA	N.D.
MW-5	8/16/12	**930**	ND (0.015)	ND (5.0)	210	81	10.0	**420**	240	34.0	**420**	720	0.6	**0.3**	0.3	0.2	0.7	0.1	2.6	ND (0.00034)
	11/15/12	**1000**	ND (0.0096)	ND (5.0)	99	36	ND (0.5)	**290**	200	6 J	**210**	540	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.2 J	ND (0.047)
	2/13/13	**380**	ND (0.029)	ND (10)	59	21	ND (10)	**180**	89	ND (20)	**130**	240	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.1 J	ND (1.0)
	4/4/13	**320**	ND (0.029)	ND (5.0)	48	16	ND (5.0)	**150**	71	3 J	**100**	140	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)
	5/13/13	**290**	ND (0.03)	ND (10)	51	16 J	ND (10)	**170**	72	ND (20)	**110**	150	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.1 J	ND (1.0)
	6/27/13	**340**	ND (0.0098)	ND (3.0)	51	14	ND (3.0)	**140**	82	3 J	**89**	180	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.085)
	8/7/13	**290**	ND (0.0095)	ND (5.0)	81	44	6 J	**240**	71	11 J	**270**	240	0.3 J	**0.2 J**	0.1 J	0.2 J	0.2 J	0.1 J	1.0	ND (0.085)
	9/18/13	**440**	ND (0.010)	ND (0.5)	170	69	2	**480**	110	12	**550**	300	**9**	**5 J**	**4 J**	**2 J**	**9**	ND (1)	41	ND (0.085)
	11/5/13	**230**	ND (0.0094)	ND (5)	110	48	ND (5)	**280**	73	11 J	**270**	220	**12**	**7**	**6**	**4 J**	**16**	3 J	49	0.092 J
	12/20/13	**230**	ND (0.010)	ND (5)	170	99	ND (5)	**590**	83	23	**580**	350	**39 J**	**24 J**	**23 J**	ND (10)	**52**	ND (10)	**150**	0.11 J
	4/17/14	**310**	ND (0.095)	ND (5)	150	71	ND (5)	**520**	96	21	**420**	300	**7.0**	**4 J**	**4 J**	**3 J**	**8.0**	1 J	29	0.11 J
	6/24/14	**150**	N.D.	N.D.	140	70	N.D.	**370**	55	37	**470**	250	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	6 J	0.000090 J
	9/15/14	**330**	N.D.	N.D.	130	79	6 J	**370**	100	22	**480**	280	0.5 J	**0.3 J**	0.2 J	0.2 J	0.7	0.1 J	2.0	N.D.
	12/4/14	**430**	N.D.	N.D.	64	27	7	**180**	140	4 J	**180**	270	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2 J	N.D.
MW-5 Dup	8/16/12	**960**	ND (0.015)	ND (5.0)	270	120	9.0	**540**	280	56.0	**620**	940	0.4	**0.2**	0.2	0.2	0.5	0.1	2.0	ND (0.00034)
	11/15/12	**650**	ND (0.0096)	ND (5.0)	81	29	ND (0.5)	**240**	160	5 J	**170**	440	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.2 J	ND (0.047)
MW-6	8/16/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/15/12	**650**	ND (0.0096)	ND (5.0)	190	38	13.0	**960**	210	11 J	340	860	1.0	**0.3 J**	0.6	0.1 J	0.9	0.2 J	7.0	ND (0.047)
	2/13/13	**630**	0.018 J	ND (10)	190	55	**20**	**1,300**	180	22	**640**	1,000	**18**	**6**	**7**	**2 J**	**16**	2 J	91	ND (1.0)
	4/4/13	**530**	ND (0.028)	ND (20)	170	49	15 J	**1,200**	170	16 J	**500**	840	**5**	**2 J**	**3 J**	ND (5.0)	**5 J**	ND (5.0)	31	ND (1.0)
	5/14/13	**570**	ND (0.029)	ND (10)	210	47	9 J	**1,000**	210	16 J	**410**	900	3 J	**1 J**	1 J	ND (6.0)	**3 J**	ND (6.0)	11	ND (1.0)
	6/27/13	**510**	ND (0.01)	ND (3.0)	220	65	9	**1,900**	180	22	**540**	960	**41**	**12**	**16**	**4 J**	**34**	3 J	**190**	ND (0.085)
	8/7/13	**530**	ND (0.0096)	ND (5.0)	190	43	10 J	**1,100**	210	13 J	**360**	840	0.7	**0.3 J**	0.3 J	0.1 J	0.6	ND (0.1)	4.0	ND (0.085)
	9/18/13	**610**	ND (0.0099)	ND (5)	250	89	**25**	**1,700**	200	34	**820**	1,200	**10**	**3 J**	**5 J**	**1 U**	**9**	ND (1)	58	ND (0.085)
	11/5/13	**600**	0.015 J	ND (5)	200	64	**23**	**1,300**	180	23	**560**	900	**22**	**7**	**9**	**2 J**	**19**	2 J	110	ND (0.085)
	12/20/13	**540**	ND (0.0099)	ND (5)	180	62	17	**1,700**	170	20 J	**500**	850	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	0.091 J
	4/17/14	**560**	0.020 J	ND (3)	160	53	**48**	**1,400**	160	20	**490**	750	**59**	**17**	**25**	**5**	**48**	**5**	**250**	0.11 J
	6/24/14	**490**	0.023 J	N.D.	190	58	**38**	**1,600**	140	37	**510**	660	**62**	**19**	**29**	**5 J**	**51**	**6 J**	**320**	N.D.
	9/15/14	**530**	N.D.	N.D.	150	40	**39**	**1,200**	180	19 J	**410**	690	**7.0**	**2.0**	**3.0**	**0.7**	**6.0**	0.6	39.0	N.D.
	12/4/14	**530**	N.D.	N.D.	170	36	19	**980**	210	8 J	**330**	760	0.8	**0.3 J**	0.3 J	N.D.	0.7	N.D.	4	N.D.
	5/14/13	**570**	ND (0.028)	ND (10)	240	66	10 J	**1,100**	210	18 J	**570**	1,000	**20**	**7**	**9**	**2 J**	**18**	2 J	110	ND (1.0)

Table 2
Groundwater Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

		Volatile Organic Compounds (VOCs)											Semi-Volatile Organic Compounds (SVOCs)							Metals
Well ID	Date Sampled	Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		**1,500**	**0.033**	**0**	**570**	**200**	**16**	**2,100**	**320**	**750**	**1,800**	**2,100**	**29**	**16**	**13**	**10**	**37**	**7**	**100**	**6.9**
Max Site Concentration		**1,000**	**0.03**	**17**	**320**	**180**	**48**	**1,900**	**280**	**440**	**820**	**1,600**	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	**31**
PADEP MSCs - Nonresidential		5	**0.05**	**5**	**700**	**3,500**	**20**	100	**1,000**	62	53	**10,000**	3.6	0.2	1.2	0.26	1.9	3.6	**130**	5
MW-6 Dup	6/27/13	**550**	ND (0.0099)	ND (3.0)	250	78	8	**1,100**	200	28	**680**	1,000	**25**	**8**	**13**	**2**	**21**	2	120	ND (0.085)
	8/7/13	**560**	ND (0.0096)	ND (5.0)	210	48	7 J	**1,200**	220	13 J	**440**	930	0.8	**0.3 J**	0.4 J	ND (0.1)	0.7	ND (0.1)	4.0	ND (0.085)
	9/18/13	**580**	ND (0.0098)	ND (5)	240	86	**26**	**1,500**	180	33	**770**	1,100	**11**	**4 J**	**5**	**1 U**	**9**	ND (1)	62	ND (0.085)
	11/5/13	**590**	ND (0.0096)	ND (5)	210	73	**21**	**1,400**	180	25	**640**	940	**34**	**10**	**14**	**4 J**	**29**	**4 J**	**170**	0.19 J
	12/20/13	**590**	ND (0.010)	ND (5)	190	66	**22**	**1,800**	180	22	**540**	890	**200**	**58**	**90**	**17**	**160**	**19**	**840**	0.20 J
	4/17/14	**570**	0.011 J	ND (3)	200	75	**47**	**1,400**	180	27	**700**	920	**62**	**19**	**27**	**5**	**49**	**6**	**270**	0.086 J
	6/24/14	**490**	0.028 J	N.D.	200	62	**39**	**1,800**	140	41	**550**	670	**38**	**13**	**19**	**4 J**	**34**	**4 J**	**210**	N.D.
	9/15/14	**490**	N.D.	N.D.	140	39	**39**	**1,300**	160	22	**440**	650	**4.0**	**1.0**	**2.0**	**0.4 J**	**3.0**	0.4 J	22	N.D.
	12/4/14	**500**	N.D.	N.D.	170	41	**21**	**920**	210	5 J	**320**	730	0.7	**0.2 J**	0.3 J	N.D.	0.6	N.D.	4	N.D.
MW-7	8/16/12	**140**	ND (0.0096)	ND (5.0)	190	61	ND (5.0)	**470**	110	9.0	**110**	210	NA	NA	NA	NA	NA	NA	NA	ND (0.00034)
	11/15/12	**110**	ND (0.0096)	ND (3.0)	68	25	ND (3.0)	**180**	77	ND (3.0)	22	130	NA	NA	NA	NA	NA	NA	NA	0.065 J
	2/13/13	**84**	ND (0.029)	ND (1.0)	71	13	ND (1.0)	**140**	54	2 J	19	95	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	4/4/13	**80**	ND (0.029)	ND (1.0)	56	10	ND (1.0)	**100**	46	1 J	15	76	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	5/14/13	**180**	ND (0.029)	ND (5.0)	120	45	ND (5.0)	**380**	110	6 J	**54**	250	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	6/28/13	**200**	ND (0.0095)	ND (5.0)	130	58	ND (5.0)	**500**	99	7 J	**78**	270	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	**250**	ND (0.0095)	ND (10)	230	130	ND (10)	**850**	150	ND (10)	**180**	490	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	9/18/13	**270**	ND (0.0099)	ND (0.5)	170	110	3	**530**	150	14	**110**	420	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	11/5/13	**230**	ND (0.0094)	ND (5)	210	110	ND (5)	**560**	140	13 J	**140**	380	NA	NA	NA	NA	NA	NA	NA	0.16 J
	12/20/13	**170**	ND (0.0097)	ND (5)	110	60	ND (5)	**480**	110	7J	**81**	270	NA	NA	NA	NA	NA	NA	NA	0.092 J
	4/17/14	**140**	0.03	ND (3)	110	56	3 J	**400**	99	7 J	**78**	210	NA	NA	NA	NA	NA	NA	NA	0.086 J
	6/24/14	**150**	0.021 J	N.D.	96	32	8 J	**270**	100	N.D.	41	160	NA	NA	NA	NA	NA	NA	NA	N.D.
	9/15/14	**100**	N.D.	N.D.	34	19 J	N.D.	**190**	57	N.D.	**57**	110	NA	NA	NA	NA	NA	NA	NA	N.D.
	12/4/14	**82**	N.D.	N.D.	48	12	3	**140**	57	2	34	81	NA	NA	NA	NA	NA	NA	NA	N.D.
MW-7 DUP	4/4/13	**82**	ND (0.03)	ND (1.0)	56	9	ND (1.0)	**100**	46	1 J	15	75	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
MW-8	8/16/12	**26**	ND (0.0096)	ND (3.0)	22	46	4.0	81	9	ND (3.0)	**62**	27	0.2	ND (0.08)	0.1	ND (0.08)	0.2	ND (0.08)	1.0	ND (0.35)
	11/15/12	**17**	ND (0.0096)	ND (1.0)	7	21	2.0	**21**	6	ND (1.0)	11	11	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.3 J	0.15 J
	2/13/13	**10**	ND (0.029)	ND (5.0)	5	19	ND (5.0)	14 J	6	ND (10)	7 J	8	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.2 J	ND (1.0)
	4/4/13	**20**	ND (0.029)	ND (5.0)	6	18	4 J	13 J	8	ND (10)	8 J	6	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.2 J	0.077 J
	5/13/13	**31**	ND (0.029)	ND (10)	ND (10)	11 J	ND (10)	ND (40)	8 J	ND (20)	12 J	12	0.2 J	0.1 J	0.3 J	0.1 J	0.3 J	ND (0.5)	0.7	ND (1.0)
	6/27/13	**29**	ND (0.0098)	2.0	4	14	3	4	8	ND (0.5)	8	9	0.3 J	**0.2 J**	0.6	0.2 J	0.7	0.2 J	1.0	ND (0.085)
	8/7/13	**34**	ND (0.0096)	ND (0.5)	6.0	18	6.0	12	9.0	ND (0.5)	9.0	10	ND (0.1)	ND (0.1)	0.2 J	0.1 J	0.2 J	ND (0.1)	0.4 J	ND (0.085)
	9/19/13	**35**	ND (0.0098)	ND (0.5)	8	22	11	20	13	ND (0.5)	14	12	ND (0.1)	ND (0.1)	0.1 J	ND (0.1)	0.1 J	ND (0.1)	0.3 J	0.98 J
	11/6/13	**39**	ND (0.0096)	ND (0.5)	7	21	2	14	16	ND (0.5)	10	10	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.2 J	0.15 J
	12/20/13	**19**	ND (0.0097)	ND (3)	9	18	ND (3)	17 J	15	ND (3)	11	11	ND (0.1)	0.1 J	0.3 J	0.1 J	0.2 J	ND (0.1)	0.5	0.15 J
	4/17/14	**13**	ND (0.0095)	ND (0.5)	9	19	2	12	6	ND (0.5)	8	12	ND (0.1)	ND (0.1)	0.2 J	ND (0.1)	0.2 J	ND (0.1)	0.4 J	ND (0.085)
	6/25/14	**12**	N.D.	N.D.	9	16	0.5 J	15	5	0.5 J	9	10	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
	9/15/14	4 J	N.D.	N.D.	5 J	12	N.D.	N.D.	N.D.	N.D.	3 J	6	0.2 J	**0.2 J**	0.4 J	0.2 J	0.3 J	0.2 J	0.6	N.D.
	12/4/14	**11**	N.D.	N.D.	8	21	N.D.	8	5	0.8 J	6	15	0.2 J	**0.2 J**	0.3 J	0.2 J	0.3 J	0.1 J	0.6	N.D.
	8/16/12	**28**	ND (0.0096)	ND (0.5)	7	40	ND (0.5)	18	11	2.0	10	49	NA	NA	NA	NA	NA	NA	NA	ND (0.34)
	11/14/12	**16**	ND (0.0095)	ND (0.5)	7	41	ND (0.5)	10	7	2 J	11	32	NA	NA	NA	NA	NA	NA	NA	ND (0.047)
	2/12/13	**14**	ND (0.029)	ND (1.0)	8	36	ND (1.0)	9	7	5	9	27	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	4/3/13	**14**	ND (0.029)	ND (5.0)	7	31	ND (5.0)	26	8	ND (10)	11	43	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	5/13/13	**11**	ND (0.029)	ND (5.0)	7	25	ND (5.0)	16 J	7	ND (10)	10 J	37	NA	NA	NA	NA	NA	NA	NA	ND (1.0)

Well ID	Date Sampled	Volatile Organic Compounds (VOCs)											Semi-Volatile Organic Compounds (SVOCs)							Metals
		Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		**1,500**	**0.033**	**0**	**570**	**200**	**16**	**2,100**	**320**	**750**	**1,800**	**2,100**	**29**	**16**	**13**	**10**	**37**	**7**	**100**	**6.9**
Max Site Concentration		**1,000**	**0.03**	**17**	**320**	**180**	**48**	**1,900**	**280**	**440**	**820**	**1,600**	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	**31**
PADEP MSCs - Nonresidential		5	**0.05**	**5**	**700**	**3,500**	**20**	100	**1,000**	62	53	**10,000**	3.6	0.2	1.2	0.26	1.9	3.6	**130**	5
MW-9	6/27/13	**7**	ND (0.0098)	ND (3.0)	4 J	25	ND (3.0)	ND (5.0)	4 J	ND (3.0)	6 J	15	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	**6**	ND (0.0096)	ND (0.5)	3.0	28	ND (0.5)	2 J	2.0	0.9 J	4.0	8.0	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	9/19/13	**18**	ND (0.0097)	ND (0.5)	6	42	ND (0.5)	5	6	1 J	8	21	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	11/6/13	**19**	ND (0.0096)	ND (0.5)	5	32	ND (0.5)	7	8	ND (0.5)	5	14	NA	NA	NA	NA	NA	NA	NA	0.092 J
	12/20/13	**7**	ND (0.0098)	ND (3)	5	26	ND (3)	6 J	4 J	ND (3)	6 J	21	NA	NA	NA	NA	NA	NA	NA	0.10 J
	4/17/14	**16**	ND (0.0096)	ND (0.5)	3	28	ND (0.5)	4	4	0.8 J	3	17	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	6/25/14	**19**	N.D.	N.D.	3	31	N.D.	4	5	0.8 J	3	14	NA	NA	NA	NA	NA	NA	NA	N.D.
	9/15/14	**23**	N.D.	N.D.	4	33	N.D.	5	7	1 J	2	16	NA	NA	NA	NA	NA	NA	NA	N.D.
	12/4/14	**19**	N.D.	N.D.	4	30	N.D.	6	7	1 J	3	14	NA	NA	NA	NA	NA	NA	NA	N.D.
MW-10	8/16/12	**530**	ND (0.0096)	ND (3.0)	110	43	ND (3.0)	**220**	210	46	**300**	750	NA	NA	NA	NA	NA	NA	NA	0.20
	11/14/12	**550**	ND (0.0096)	ND (5.0)	110	32	ND (5.0)	**210**	220	34	**200**	660	NA	NA	NA	NA	NA	NA	NA	0.69 J
	2/12/13	**540**	ND (0.029)	ND (5.0)	110	34	ND (5.0)	**190**	210	34	**210**	710	NA	NA	NA	NA	NA	NA	NA	1.7
	4/3/13	**500**	ND (0.029)	ND (10)	99	32	ND (10)	**190**	200	33	**190**	610	NA	NA	NA	NA	NA	NA	NA	1.0
	5/13/13	**560**	ND (0.029)	ND (10)	120	34	ND (10)	**210**	230	36	**210**	710	NA	NA	NA	NA	NA	NA	NA	1.9
	6/27/13	**470**	ND (0.01)	ND (3.0)	85	29	ND (3.0)	**140**	160	30	**170**	570	NA	NA	NA	NA	NA	NA	NA	0.32 J
	8/6/13	**450**	ND (0.0097)	ND (5.0)	76	29	ND (5.0)	**150**	140	31	**170**	510	NA	NA	NA	NA	NA	NA	NA	0.20 J
	9/19/13	**510**	ND (0.0097)	ND (3)	94	31	ND (3)	**200**	180	32	**200**	630	NA	NA	NA	NA	NA	NA	NA	1.3
	11/6/13	**480**	ND (0.0095)	ND (5)	83	28	ND (5)	**170**	170	28	**170**	570	NA	NA	NA	NA	NA	NA	NA	0.86 J
	12/20/13	**490**	0.015 J	ND (3)	90	31	ND (3)	**170**	180	31	**190**	630	NA	NA	NA	NA	NA	NA	NA	1.9
	4/10/14	**400**	0.012 J	ND (5)	71	26	ND (5)	**180**	130	28	**170**	480	NA	NA	NA	NA	NA	NA	NA	0.58 J
	6/25/14	**470**	0.015 J	N.D.	81	27	N.D.	**190**	160	28	**170**	540	NA	NA	NA	NA	NA	NA	NA	0.00029 J
	9/15/14	**450**	N.D.	N.D.	82	29	N.D.	**170**	150	27	**160**	560	NA	NA	NA	NA	NA	NA	NA	0.00012 J
	12/4/14	**400**	N.D.	N.D.	85	31	N.D.	**180**	150	31	**200**	560	NA	NA	NA	NA	NA	NA	NA	0.00046 J
MW-11	8/15/12	**9**	ND (0.0097)	ND (5.0)	18	39	ND (5.0)	ND (10)	8	12.0	40	71	NA	NA	NA	NA	NA	NA	NA	0.30
	11/14/12	**5**	ND (0.0096)	ND (0.5)	6	20	ND (0.5)	ND (1)	3	4.0	9	29	NA	NA	NA	NA	NA	NA	NA	1.10
	2/12/13	**6**	ND (0.029)	ND (5.0)	6	20	ND (5.0)	ND (20)	4 J	4 J	11	28	NA	NA	NA	NA	NA	NA	NA	0.87 J
	4/3/13	**5**	ND (0.029)	ND (1.0)	6	20	ND (1.0)	ND (4)	3	4	10	25	NA	NA	NA	NA	NA	NA	NA	0.31 J
	5/13/13	4 J	ND (0.03)	ND (5.0)	3 J	17	ND (5.0)	ND (20)	ND (5.0)	3 J	6 J	17	NA	NA	NA	NA	NA	NA	NA	0.93 J
	6/26/13	4 J	ND (0.01)	ND (3.0)	3 J	11	ND (3.0)	ND (5.0)	ND (3.0)	3 J	5 J	16	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	**5**	ND (0.0097)	ND (3.0)	4 J	14	ND (3.0)	ND (5.0)	3 J	ND (3.0)	6 J	19	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	9/19/13	**7**	ND (0.0098)	ND (0.5)	5	14	ND (0.5)	ND (1)	4	4	9	28	NA	NA	NA	NA	NA	NA	NA	0.13 J
	11/6/13	**6**	0.011 J	ND (3)	6	15	ND (3)	ND (5)	4 J	3 J	8 J	26	NA	NA	NA	NA	NA	NA	NA	0.83 J
	12/20/13	**5**	ND (0.0096)	ND (3)	4 J	14	ND (3)	ND (5)	3 J	ND (3)	6 J	19	NA	NA	NA	NA	NA	NA	NA	0.80 J
	4/17/14	**10**	ND (0.0095)	ND (1)	4	12	ND (1)	ND (2)	4	3 J	9	28	NA	NA	NA	NA	NA	NA	NA	0.18 J
	6/25/14	**10**	N.D.	N.D.	5	15	N.D.	N.D.	5	3	10	32	NA	NA	NA	NA	NA	NA	NA	0.00016 J
	9/15/14	**8**	N.D.	N.D.	5	15	N.D.	N.D.	4 J	3 J	9 J	29	NA	NA	NA	NA	NA	NA	NA	0.00046 J
	12/4/14	**9**	N.D.	N.D.	7	21	N.D.	2 J	5	5	13	42	NA	NA	NA	NA	NA	NA	NA	0.00075 J
MW-12	8/16/12	**15**	ND (0.0096)	ND (0.5)	5	4	0.6	8	7	5.0	12	35	NA	NA	NA	NA	NA	NA	NA	ND (0.34)
	11/14/12	**1**	ND (0.0093)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	0.6 J	ND (0.5)	0.6 J	2	NA	NA	NA	NA	NA	NA	NA	ND (0.047)
	2/12/13	ND (1.0)	ND (0.028)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (4)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	4/3/13	3	ND (0.028)	ND (1.0)	1.0	ND (2)	ND (1.0)	1 J	2.0	0.5 J	2 J	6	NA	NA	NA	NA	NA	NA	NA	0.078 J
	5/13/13	0.8 J	ND (0.029)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (4.0)	ND (1.0)	ND (2.0)	0.8 J	1	NA	NA	NA	NA	NA	NA	NA	ND (1.0)
	6/27/13	0.7 J	ND (0.0098)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	0.6 J	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	8/6/13	0.6 J	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	0.7 J	NA	NA	NA	NA	NA	NA	NA	ND (0.085)

Table 2
Groundwater Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

		Volatile Organic Compounds (VOCs)											Semi-Volatile Organic Compounds (SVOCs)							Metals
Well ID	Date Sampled	Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		1,500	0.033	0	570	200	16	2,100	320	750	1,800	2,100	29	16	13	10	37	7	100	6.9
Max Site Concentration		1,000	0.03	17	320	180	48	1,900	280	440	820	1,600	300	89	130	24	230	27	1,200	31
PADEP MSCs - Nonresidential		5	0.05	5	700	3,500	20	100	1,000	62	53	10,000	3.6	0.2	1.2	0.26	1.9	3.6	130	5
MW-12	9/19/13	1 J	ND (0.0097)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	0.8 J	NA	NA	NA	NA	NA	NA	NA	ND (0.085)
	11/6/13	1 J	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	0.7 J	2	NA	NA	NA	NA	NA	NA	NA	0.21 J
	12/20/13	1	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	0.5J	ND (0.5)	ND (0.5)	1	NA	NA	NA	NA	NA	NA	NA	0.14 J
	4/16/14	ND (0.5)	ND (0.0096)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	NA	NA	NA	NA	NA	NA	NA	0.11 J
	6/25/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
	9/15/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
	12/4/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	N.D.
MW-13	8/15/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/14/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/13/13	160	ND (0.029)	ND (5.0)	100	75	ND (5.0)	980	150	310	870	1,300	3	2	2	1	4	1	10	6.9
	4/4/13	320	ND (0.029)	ND (5.0)	140	96	ND (5.0)	720	150	270	870	1,300	1	1	1	0.4 J	1	0.3 J	4	ND (1.0)
	5/14/13	310	ND (0.028)	ND (10)	230	150	ND (10)	1,200	220	450	1,200	1,700	6	4 J	3 J	2 J	7	1 J	18	ND (1.0)
	6/26/13	210	ND (0.01)	ND (5.0)	180	74	ND (5.0)	740	200	400	580	1,600	6	4 J	3 J	2 J	7	1 J	17	ND (0.085)
	8/6/13	230	ND (0.0097)	ND (5.0)	170	86	ND (5.0)	930	170	360	800	1,300	1.0	0.9	0.9	0.5 J	2.0	0.4 J	4.0	ND (0.085)
	9/18/13	410	ND (0.0098)	ND (5)	250	120	ND (5)	1,200	190	530	1,000	1,600	2	1	1	0.5 J	2	0.4 J	6	ND (0.085)
	11/5/13	480	0.017 J	ND (10)	350	190	ND (10)	2,100	220	750	1,800	2,100	2	1	1	0.9	3	0.7	7	ND (0.085)
	12/20/13	220	ND (0.0097)	ND (5)	190	100	ND (5)	970	190	440	680	1,400	2	1	2	0.7	3	0.5	7	0.11 J
	4/16/14	260	ND (0.0096)	ND (5)	130	91	ND (5)	1300	140	220	790	890	4 J	3 J	3 J	2 J	5.0	1 J	12.0	0.11J
	6/24/14	280	N.D.	N.D.	150	70	N.D.	460	230	290	300	1,600	6 J	4 J	4 J	2 J	7 J	N.D.	14	0.00021 J
	9/16/14	280	N.D.	N.D.	110	61	N.D.	330	190	250	230	1,200	6.0	4.0	4.0	2.0	8.0	1.0	19.0	N.D.
	12/5/14	280	0.010 J	N.D.	150	55	N.D.	640	220	240	250	1,400	8	5	5	3 J	11	2 J	25	N.D.
MW-14	8/15/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/14/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/13/13	1,500	ND (0.029)	ND (10)	350	110	12	1,200	220	120	590	800	0.9	0.4 J	0.4 J	0.3 J	1	0.2 J	3	ND (1.0)
	4/4/13	1,200	ND (0.029)	ND (10)	500	140	11	1,100	260	110	640	1,000	1 J	ND (6)	ND (6)	ND (6)	1 J	ND (6)	5 J	ND (1.0)
	5/14/13	1,300	ND (0.029)	ND (10)	370	98	11	700	270	57	440	820	0.7	0.3 J	0.2 J	0.2 J	0.5 J	ND (0.5)	2	ND (1.0)
	6/26/13	820	ND (0.01)	ND (10)	260	78	ND (10)	650	180	48	380	580	2.0	1	1	0.5 J	2	0.3 J	7	ND (0.085)
	8/6/13	800	ND (0.0097)	ND (10)	570	200	13 J	1,400	230	220	1,100	1,400	6.0	3.0	3.0	2.0	7.0	1.0	23	ND (0.085)
	9/18/13	1,100	ND (0.0099)	ND (5)	320	71	7 J	650	230	89	340	780	1	0.8	0.7	0.3 J	2	0.2 J	5	ND (0.085)
	11/5/13	960	ND (0.0096)	ND (5)	390	91	ND (5)	700	220	140	470	930	10	6	5 J	3 J	13	3 J	36	ND (0.085)
	12/20/13	860	ND (0.0097)	ND (5)	290	78	ND (5)	720	190	85	350	700	1	0.7	0.9	0.5	2	0.5 J	5	0.44 J
	4/16/14	760	ND (0.0095)	ND (0.5)	300	95	4	770	200	110	460	770	8.0	4 J	4 J	3 J	10.0	1 J	30.0	0.088 J
	6/24/14	810	N.D.	N.D.	220	62	6	610	170	69	330	580	5 J	4 J	3 J	N.D.	6 J	N.D.	18	N.D.
	9/16/14	600	N.D.	N.D.	130	36 J	N.D.	330	130	21 J	130	320	3.0	2.0	2.0	1.0	4.0	0.8	12.0	N.D.
	12/5/14	500	N.D.	N.D.	160	44	5	410	100	37	190	360	3 J	2 J	2 J	1 J	4 J	N.D	13	N.D.
MW-14 Dup	2/13/13	1,400	ND (0.029)	ND (10)	340	88	16	890	240	79	420	750	0.5 J	0.2 J	0.2 J	0.1 J	0.5 J	ND (0.1)	2	ND (1.0)
	5/14/13	1,400	ND (0.029)	ND (5.0)	300	73	10	540	250	46	310	670	0.5 J	0.3 J	0.2 J	0.2 J	0.4 J	ND (0.5)	2	ND (1.0)
	6/26/13	920	ND (0.01)	ND (10)	280	84	ND (10)	660	200	48	420	650	1.0	1	0.5 J	0.4 J	1	0.2 J	4	ND (0.085)
	9/18/13	1,000	ND (0.0099)	ND (1)	260	100	9	550	320	120	230	610	ND (1)	1 U	ND (1)	ND (1)	2 J	ND (1)	5 J	ND (0.085)
	11/5/13	890	ND (0.0096)	ND (5)	350	79	ND (5)	730	210	120	420	860	7	4 J	3 J	2 J	9	2 J	24	0.11J
	12/20/13	930	ND (0.0098)	ND (10)	340	100	ND (10)	880	200	110	480	810	0.3 J	0.2 J	0.2 J	ND (0.1)	0.4 J	ND (0.1)	1	0.26 J
	4/16/14	740	ND (0.0096)	ND (0.5)	280	87	4	710	180	110	380	710	15	9.0	8.0	5 J	18.0	4 J	52.0	0.11 J
	6/24/14	780	N.D.	N.D.	310	110	N.D.	870	180	130	630	820	3 J	2 J	2 J	N.D.	4 J	N.D.	11	N.D.
	9/16/14	670	N.D.	N.D.	160	38 J	N.D.	380	140	38 J	160	400	4.0	2.0	2.0	1.0	6.0	0.9 J	16.0	N.D.

Table 2
Groundwater Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

		Volatile Organic Compounds (VOCs)											Semi-Volatile Organic Compounds (SVOCs)							Metals
Well ID	Date Sampled	Benzene	1,2-Dibromo-ethane (Ethylene Dibromide)	1,2-Dichloro-ethane	Ethyl-benzene	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether (MTBE)	Naph-thalene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Xylenes (Total)	Benzo[a]-anthra-cene	Benzo[a]-pyrene	Benzo[b]-fluor-anthene	Benzo-[g,h,i]-perylene	Chrysene	Indeno-[1,2,3-cd]-pyrene	Pyrene	Dissolved Lead
Background Concentration		**1,500**	**0.033**	**0**	**570**	**200**	**16**	**2,100**	**320**	**750**	**1,800**	**2,100**	**29**	**16**	**13**	**10**	**37**	**7**	**100**	**6.9**
Max Site Concentration		**1,000**	**0.03**	**17**	**320**	**180**	**48**	**1,900**	**280**	**440**	**820**	**1,600**	**300**	**89**	**130**	**24**	**230**	**27**	**1,200**	**31**
PADEP MSCs - Nonresidential		5	**0.05**	**5**	**700**	**3,500**	**20**	100	**1,000**	62	53	**10,000**	3.6	0.2	1.2	0.26	1.9	3.6	**130**	5
	12/5/14	**320**	N.D.	N.D.	370	110	5 J	**920**	130	**150**	**680**	930	**4 J**	**2 J**	**2 J**	**1 J**	**5 J**	N.D	15	N.D.
MW-15	8/15/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	11/14/12	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
	2/13/13	**130**	0.033	ND (20)	180	58	ND (20)	**540**	88	36 J	**170**	410	2	**1**	**1**	**0.8**	**3**	0.6	9	ND (1.0)
	4/4/13	**160**	ND (0.029)	ND (1.0)	200	55	6	**430**	100	24	**110**	440	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	2 J	ND (1.0)
	5/14/13	**170**	ND (0.029)	ND (20)	190	55	ND (20)	**480**	99	37 J	**170**	400	**6**	**4**	**3**	**2 J**	**8**	1 J	24	ND (1.0)
	6/26/13	**170**	ND (0.0096)	ND (3.0)	210	57	6	**390**	110	35	**150**	420	**6**	**3 J**	**2 J**	**2 J**	**8**	ND (1.0)	21	ND (0.085)
	8/6/13	**210**	ND (0.0095)	ND (5.0)	380	130	9 J	**820**	130	**62**	**350**	580	0.7	**0.4 J**	0.5 J	**0.3 J**	1.0	0.2 J	3.0	ND (0.085)
	9/18/13	**240**	ND (0.0099)	ND (5)	330	95	6 J	**730**	130	42	**250**	460	2 J	**1 U**	ND (1)	**1 U**	**2 J**	ND (1)	7	ND (0.085)
	11/5/13	**300**	ND (0.0096)	ND (5)	500	190	ND (5)	**1,100**	170	**99**	**620**	740	**29**	**16**	**13**	**10**	**37**	**7**	100	0.17 J
	12/20/13	**240**	ND (0.0097)	ND (10)	450	150	ND (10)	**1,200**	140	**73**	**410**	670	3 J	**2 J**	**2 J**	ND (0.1)	**4 J**	ND (0.1)	11	ND (0.085)
	4/16/14	**280**	ND (0.0095)	ND (5)	300	88	ND (5)	**960**	120	41	**340**	470	**12**	**7.0**	**7.0**	**4 J**	**15.0**	3 J	46.0	ND (0.085)
	6/24/14	**180**	N.D.	N.D.	210	44	N.D.	**530**	81	19 J	**120**	210	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.3 J	0.00022 J
	9/16/14	**190**	N.D.	N.D.	210	47	N.D.	**460**	71	18 J	**110**	250	N.D.	N.D.	N.D.	N.D.	0.1 J	N.D.	0.5 J	N.D.
	12/5/14	**270**	0.023 J	N.D.	250	77	5 J	**720**	82	45	**300**	340	2	**1**	0.9	**0.5**	**2**	0.4 J	7	N.D.
MW-15 DUP	4/4/13	**160**	ND (0.029)	ND (1.0)	210	58	6	**440**	100	26	**120**	450	1	**0.4 J**	0.4 J	0.2 J	1	0.1 J	3	ND (1.0)
	8/6/13	**210**	ND (0.0097)	ND (5.0)	350	120	9 J	**810**	130	60	**320**	550	1.0	**0.6**	0.6	**0.4 J**	1.0	0.2 J	4.0	ND (0.085)
MW-16	8/15/12	**15**	ND (0.0096)	ND (1.0)	200	7	ND (1.0)	**120**	130	**310**	**98**	1100	NA	NA	NA	NA	NA	NA	NA	3.70
	11/14/12	**11**	ND (0.0096)	ND (3.0)	210	9 J	ND (3.0)	**160**	67	**360**	**120**	1200	NA	NA	NA	NA	NA	NA	NA	4.50
	2/12/13	**11**	ND (0.029)	ND (5.0)	210	8 J	ND (5.0)	**140**	44	**370**	**110**	1,300	NA	NA	NA	NA	NA	NA	NA	**5.3**
	4/3/13	**14**	ND (0.029)	ND (5.0)	190	7 J	ND (5.0)	**130**	43	**300**	**100**	1,100	NA	NA	NA	NA	NA	NA	NA	**5.7**
	5/13/13	**14**	ND (0.029)	ND (1.0)	160	8	ND (1.0)	**140**	40	**300**	**120**	980	NA	NA	NA	NA	NA	NA	NA	**5.7**
	6/26/13	**12**	ND (0.0098)	ND (3.0)	180	6 J	ND (3.0)	**110**	31	**290**	**92**	1,000	NA	NA	NA	NA	NA	NA	NA	**5**
	8/6/13	**11**	ND (0.0096)	ND (3.0)	150	6 J	ND (3.0)	**110**	28	**270**	**86**	830	NA	NA	NA	NA	NA	NA	NA	**5.1**
	9/19/13	**5**	ND (0.0098)	ND (0.5)	62	2	ND (0.5)	**43**	12	**95**	32	330	NA	NA	NA	NA	NA	NA	NA	2.6
	11/6/13	**20**	ND (0.0096)	ND (3)	180	7 J	ND (3)	**130**	50	**290**	**97**	940	NA	NA	NA	NA	NA	NA	NA	2.6
	12/20/13	**25**	ND (0.0096)	ND (3)	180	8 J	ND (3)	**130**	52	**270**	**99**	970	NA	NA	NA	NA	NA	NA	NA	3.2
	4/17/14	ND (0.5)	ND (0.0094)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	0.6 J	ND (0.5)	2	NA	NA	NA	NA	NA	NA	NA	2.1
	6/25/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	0.00048 J
	9/15/14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	NA	NA	NA	NA	NA	NA	NA	0.00026 J
	12/4/14	**29**	N.D.	N.D.	280	9 J	N.D.	**170**	160	**440**	**130**	1,600	NA	NA	NA	NA	NA	NA	NA	0.00053 J

Notes
All Units Reported in Micrograms per Liter (µg/L)
Shading indicates the concentration is in exceedence of the selected standard
ND = Not Detected at Listed Reporting Limit
PADEP = Pennsylvania Department of Environmental Protection

Table 4
Soil Gas Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Volatile Organic Compounds (VOCs)	PADEP Nonresidential MSCs for Soil Gas*	SG - 1	SG - 1	SG - 1	SG - 2	SG - 2
		6/29/2011	9/27/2011	12/12/12	6/29/2011	9/27/2011
Benzene	1,100	23,000	14,000	420 J	ND (1,300)	ND (5,200)
1,2-Dibromoethane (Ethylene Dibromide)	37	ND (3,100)	ND (13,000)	ND (310)	ND (3,100)	ND (12,000)
1,2-Dichloroethane	310	ND (1,600)	ND (6700)	ND (160)	ND (1,600)	ND (6,500)
Ethylbenzene	7,300	ND (1,700)	ND (7,100)	440 J	ND (1,700)	ND (7,000)
Isopropylbenzene (Cumene)	110,000	ND (2,000)	ND (8100)	ND (200)	ND (2,000)	ND (8,000)
Methyl tert-butyl ether (MTBE)	31,000	ND (1,400)	ND (5900)	ND (140)	ND (1,400)	ND (5,800)
Naphthalene	880	ND (5,200)	ND (22000)	ND (420)	ND (5,200)	ND (21,000)
Toluene	120,000	ND (1,500)	ND (6,200)	440 J	ND (1,500)	ND (6,100)
1,2,4-Trimethylbenzene	1,700	ND (2,000)	ND (8,100)	ND (200)	ND (2,000)	ND (8,000)
1,3,5-Trimethylbenzene	1,700	ND (2,000)	ND (8100)	ND (200)	ND (2,000)	ND (8,000)
Xylene, o-	--	ND (1,700)	ND (7,100)	250 J	ND (1,700)	ND (7,000)
Xylenes (Total)	30,000	ND (1,700)	ND (7,100)	1,090	ND (1,700)	ND (7,000)
m/p-Xylene	--	ND (1,700)	ND (7,100)	840 J	ND (1,700)	ND (7,000)

NOTES:

All units reported in micrograms per cubic meter (µg/m3)

-- = PADEP does not have an Indoor Air Criteria for this compound

* = Soil Gas MSCs are based upon the Nonresidential Indoor Air MSC divided by a transfer factor of 0.01

BOLD WITH SHADING = Concentration is Greater than the PADEP Nonresidential MSC for Soil Gas

MSC = Medium Specific Concentration

ND = Not Detected at Listed Reporting Limit

PADEP = Pennsylvania Department of Environmental Protection

Table 4
Soil Gas Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

SG - 2	SG - 3	SG - 3	SG - 3	Ambient	Ambient	Ambient	Ambient	SGSP-1	SGSP-1	SGSP-2	SGSP-3
12/12/12	6/29/2011	9/27/2011	12/12/12	6/29/2011	9/27/2011	12/12/12	12/11/12	9/27/11	12/11/12	9/27/2011	9/27/2011
ND (640)	ND (64)	ND (970)	8.9	ND (0.6)	ND (0.058)	0.85 J	2.4 J	ND (0.64)	4.7	3.6	ND (1,100)
ND (1,500)	ND (150)	ND (2,300)	3.9 J	ND (2.0)	ND (0.14)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (2,700)
ND (810)	ND (81)	ND (1,200)	ND (0.81)	ND (0.8)	ND (0.13)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (0.81)	ND (1,400)
ND (870)	ND (87)	ND (1,300)	24	ND (0.9)	ND (0.096)	ND (0.87)	2.8 J	1.2	7.6	6.6	ND (1,500)
ND (980)	ND (98)	ND (1,500)	3.6 J	ND (1.0)	ND (0.15)	ND (0.98)	ND (0.98)	ND (0.98)	ND (0.98)	1.2	ND (1,800)
ND (720)	ND (72)	ND (1,100)	ND (0.72)	ND (0.7)	ND (0.058)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (0.72)	ND (1,300)
ND (2,100)	ND (260)	ND (4,000)	58	ND (3.0)	ND (0.45)	ND (2.1)	6.6 J	ND (2.6)	6 J	3.1	ND (4,700)
ND (750)	ND (75)	ND (1,100)	3.6 J	3	1.4	0.83 J	1.7 J	2.9	8.4	23	ND (1,300)
ND (980)	ND (98)	ND (1,500)	28	ND (1.0)	ND (0.26)	ND (0.98)	2.1 J	2	8.2	23	ND (1,800)
ND (980)	ND (98)	ND (1,500)	19	ND (1.0)	ND (0.25)	ND (0.98)	1.4 J	ND (0.98)	4.3 J	8.4	ND (1,800)
ND (870)	ND (87)	ND (1,300)	43	ND (0.9)	ND (0.096)	1.1 J	4.9	2.1	13	13	ND (1,500)
ND (870)	ND (87)	ND (1,300)	109	1	0.9	3.3	13.6	6.4	36	43	ND (1,500)
ND (870)	ND (87)	ND (1,300)	66	1	0.9	2.2 J	8.7	4.3	23	30	ND (1,500)

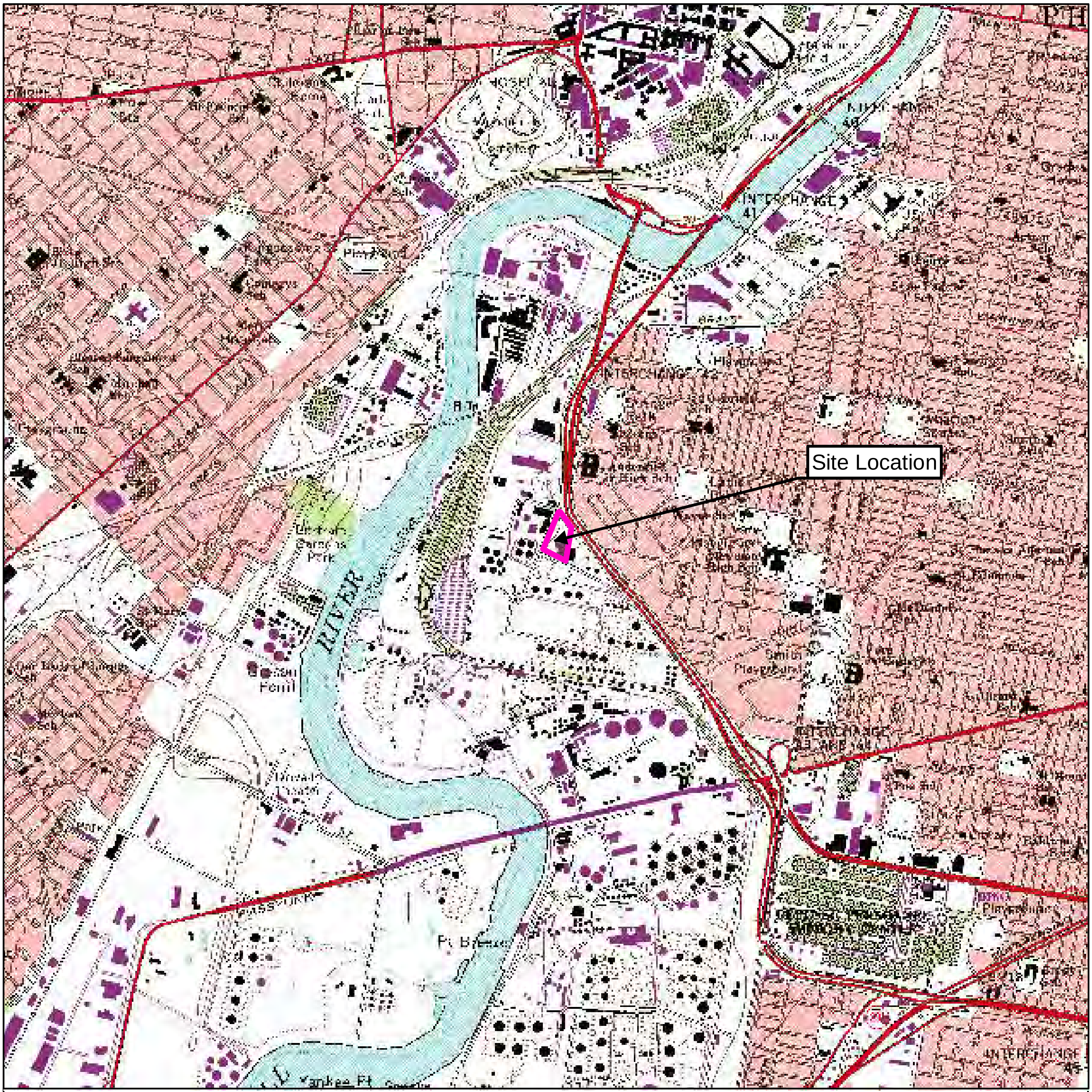
Table 4
Soil Gas Analytical Results
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

SGSP-3	SGSP-4	SGSP-4	SGSP-5	SGSP-5	SGSP-6	SGSP-6
12/11/12	9/27/2011	12/11/12	9/27/2011	12/11/12	9/27/2011	12/11/12
390	1,900	ND (640	ND (13)	6.3 J	4,500	ND (1,300)
ND (150)	ND (4,600)	ND (1,500)	ND (30)	ND (3.1)	ND (6,400)	ND (3,100)
ND (81)	ND (2,400)	ND (810)	ND (16)	2.6 J	ND (3,400)	ND (1,600)
160 J	ND (2,600)	ND (870)	ND (17)	9	ND (3,600)	ND (1,700)
ND (98)	ND (2,900)	ND (980)	ND (19)	ND (2.0)	ND (4,100)	ND (2,000)
ND (72)	ND (2,200)	ND (720)	ND (14)	ND (1.4)	ND (3,000)	ND (1,400)
ND (210)	ND (7,800)	ND (2,100)	ND (52)	9.3 J	ND (11,000)	ND (4,200)
280 J	ND (2,300)	ND (750)	ND (15)	3.8 J	ND (3,100)	ND (1,500)
ND (98)	ND (2,900)	ND (980)	ND (19)	8.4 J	ND (4,100)	ND (2,000)
ND (98)	ND (2,900)	ND (980)	ND (19)	5.5 J	ND (4,100)	ND (2,000)
100 J	ND (2,600)	ND (870)	ND (17)	15	ND (3,600)	ND (1,700)
350	ND (2,600)	ND (870)	ND (17)	41	ND (3,600)	ND (1,700)
250 J	ND (2,600)	ND (870)	ND (17)	26	ND (3,600)	ND (1,700)

Table 5
Indoor Air Quality Data
Verizon-South District Work Center
1851 South 34th Street, Philadelphia, Pennsylvania
PADEP Facility I.D. No. 51-3000

Location	Date Sampled	1,2,4-Trimethyl-benzene	1,2-Dibromo-ethane	1,2-Dichloro-ethane	1,3,5-Trimethyl-benzene	Benzene	Cumene	Ethyl-benzene	Methyl tert-Butyl Ether	Naph-thalene	Toluene	m/p-Xylene	o-Xylene	Total Xylenes
PADEP Medium Specific Concentration	**Residential**	**8.3**	**0.095**	**0.81**	**8.3**	**2.7**	**540**	**19**	**81**	**4.2**	**560**	**na**	**na**	**140**
	Non-Residential	17	0.37	3.1	17	11	1100	73	310	8.8	1200	na	na	300
Ambient North	**11/15/12**	**10**	**2.2 J**	ND	8.2	2.2 J	1.8 J	**28**	ND	**7.3 J**	7.8	75	42	117
	12/11/12	2.1 J	ND	ND	1.4 J	2.4 J	ND	2.8 J	ND	**6.6 J**	1.7 J	8.7	4.9	13.6
	2/13/13	7.3	ND	ND	4.8 J	1.3 J	1.3 J	7.7	ND	**5 J**	3.9	20	13	33
	3/14/13	**37**	**3.6 J**	ND	**26**	0.71 J	5.8	17	ND	**95**	2.4 J	53	38	91
	5/16/13	**34**	**5.4 J**	ND	**24**	**3.8**	5.4	**36**	ND	**21**	14	86	55	**141**
	11/21/13	1.1 J	ND	ND	ND	1.1 J	ND	1.2 J	ND	ND	2.7 J	2.7 J	1.8 J	4.3 J
Ambient South	**2/13/13**	1.6 J	ND	ND	1.1 J	1.2 J	ND	2.7 J	ND	ND	3.4 J	7.3	4.6	11.9
	3/14/13	2.8 J	ND	ND	2.1 J	0.72 J	ND	1.9 J	ND	3.4 J	1.1 J	6.9	3.6 J	10.5
	5/16/13	1.1 J	ND	ND	ND	**2.9 J**	ND	1.9 J	ND	ND	2.9 J	5.3	3.1 J	8.4 J
	11/21/13	**8.3**	ND	ND	4.3 J	0.89 J	ND	3.8 J	ND	**22.0**	3.1 J	11.0	7.5	18.5
Lunch Room	**11/15/12**	7.9	ND	ND	6.4	2.6 J	1.4 J	**21**	ND	**5.2 J**	9.8	58	32	90
	12/11/12	**22**	**2.1 J**	ND	**16**	**9.9**	3.1 J	**21**	ND	**47**	5.1	57	39	96
	2/13/13	1.1 J	ND	ND	N.D.	1.3 J	N.D.	1.6 J	ND	N.D.	3 J	4.1 J	2.5 J	6.6 J
	3/14/13	7.5	ND	ND	5.8	0.71 J	1.3 J	4.6	ND	**6.2 J**	1.5 J	15	10	25
	5/16/13	ND	ND	ND	ND	1.2 J	ND	ND	ND	ND	2.2 J	ND	ND	ND
	11/21/13	2 J	ND	ND	ND	1.4 J	ND	1.7 J	ND	3.1 J	3.8	4.4	2.6 J	7.0 J
Main Office	**11/15/12**	1.6 J	ND	ND	1.2 J	1.5 J	ND	6.5	ND	ND	4.9	19	9.3	28.3
	12/11/12	**14**	ND	ND	**10**	**10**	2.2 J	18	ND	**14**	5.7	50	33	83
	2/13/2013	3.1 J	ND	ND	1.7 J	2.5 J	ND	3.4 J	ND	ND	6.3	9.7	6	15.7
	3/14/13	**11**	ND	ND	7.3	1 J	1.7 J	6.9	ND	**6.3 J**	2.4 J	22	16	38
	5/16/13	**43**	**8.7**	ND	**28**	**4.7**	6.9	**42**	ND	**88**	19	99	65	**164**
	11/21/13	**9.1**	ND	ND	4.9	2 J	ND	4 J	ND	**16**	7.3	12.0	7.7	19.7
Southwest Office	**11/15/12**	3.5 J	ND	ND	1.9 J	2.2 J	ND	8.2	ND	ND	7.4	23	11	34
	12/11/12	**22**	ND	ND	**15**	**14**	3.2 J	**23**	ND	**23**	11	64	41	105
	2/13/13	**15**	**1.6 J**	ND	**10**	**3.9**	2.9 J	15	ND	**12**	12	40	25	65
	3/14/13	**24**	ND	ND	**15**	2.4 J	2.8 J	10	ND	**44**	4.5	31	22	53
	5/16/13	3.2 J	ND	ND	ND	**7.1**	ND	2.6 J	ND	ND	18	9.3	3.1 J	12.4 J
	11/21/13	**11**	ND	ND	5.5	**3.5**	1.4 J	7.3	ND	**18**	16.0	21.0	11.0	32.0

Notes
BOLD WITH SHADING = Concentration is greater than the PADEP MSC for Nonresidential Indoor Air
ND = Not Detected at listed reporting limit.
PADEP = Pennsylvania Department of Environmental Protection
J = Estimated value. The results is greater than or equal to the method detection limit and less than the limit of quantitation.
All Concentrations expressed in micrograms per cubic meter ($\mu g/m^3$)

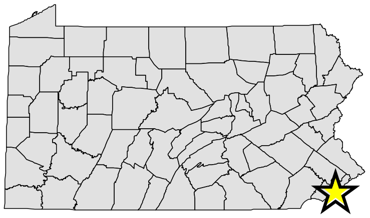


Legend

Verizon Property Boundary

N

2,000 1,000 0 2,000
Feet



Source Imagery:
USGS Philadelphia Quadrangle 1994
PASDA FTP
Projection: UTM Zone 18, NAD 83

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1851 South 34th Street,
Philadelphia, PA

Site Location Map

drawn JWS	checked MDM	approved MDM	figure no.
date 3/13/13	date 3/13/13	date 3/13/13	1
job no.		file no. Fig 1-Site Loc Map.mxd	

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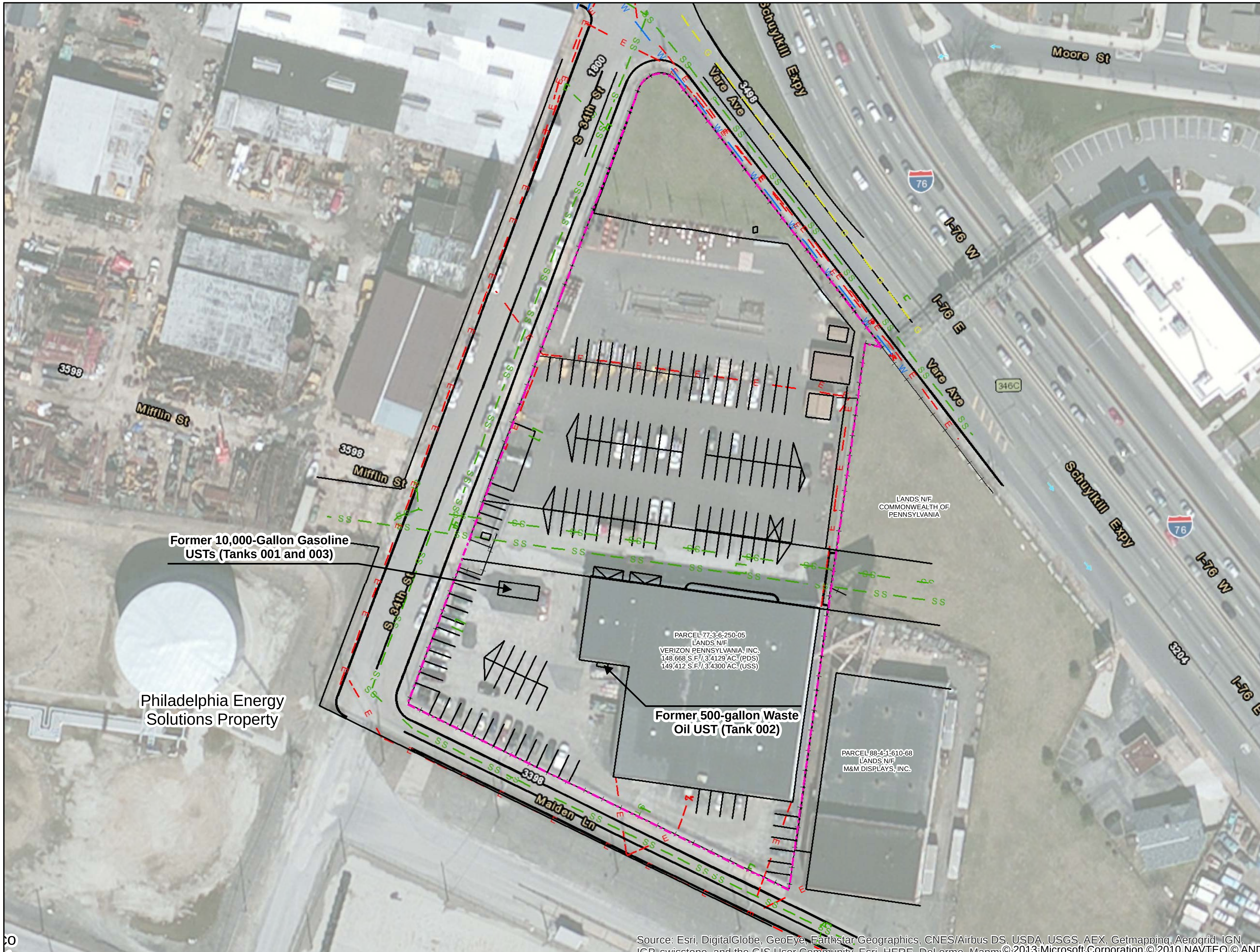
Path: G:\Verizon\South District PA\Projects\Fig 1-Site Location Map.mxd



Legend

- E — Electric Utility
- SS — Sanitary Sewer Utility
- ST — Storm Sewer Utility
- G — Gas Utility
- W — Water Utility
- Fence
- Verizon Property Boundary
- Site Feature

Source Data:
Site Features Surveyed by First Order, LLC (12/2008)
and by Dennis W Sklar, Inc. (3/2012).
Projection: NAD83 StatePlane Pennsylvania South Feet

80 40 0 80 Feet

1 inch = 80 feet

N

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1851 South 34th Street,
Philadelphia, PA

Site Map

drawn	TAY	checked	MDM	approved		figure no. 2
date	02/25/2015	date	02/25/2015	date		
job no.	303167.TM.100039.1000.0100			file no.	Fig 02 - Site Map	

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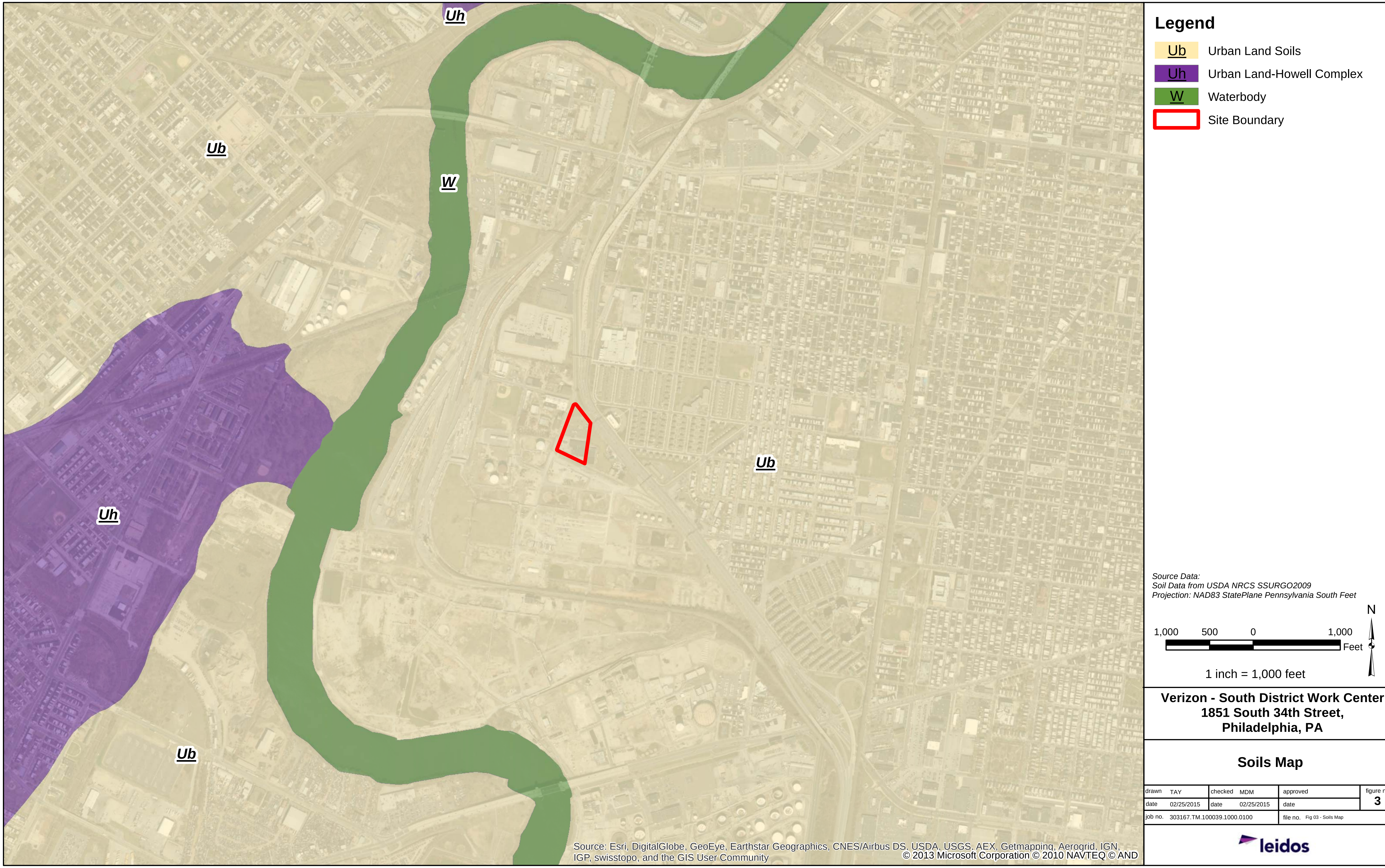
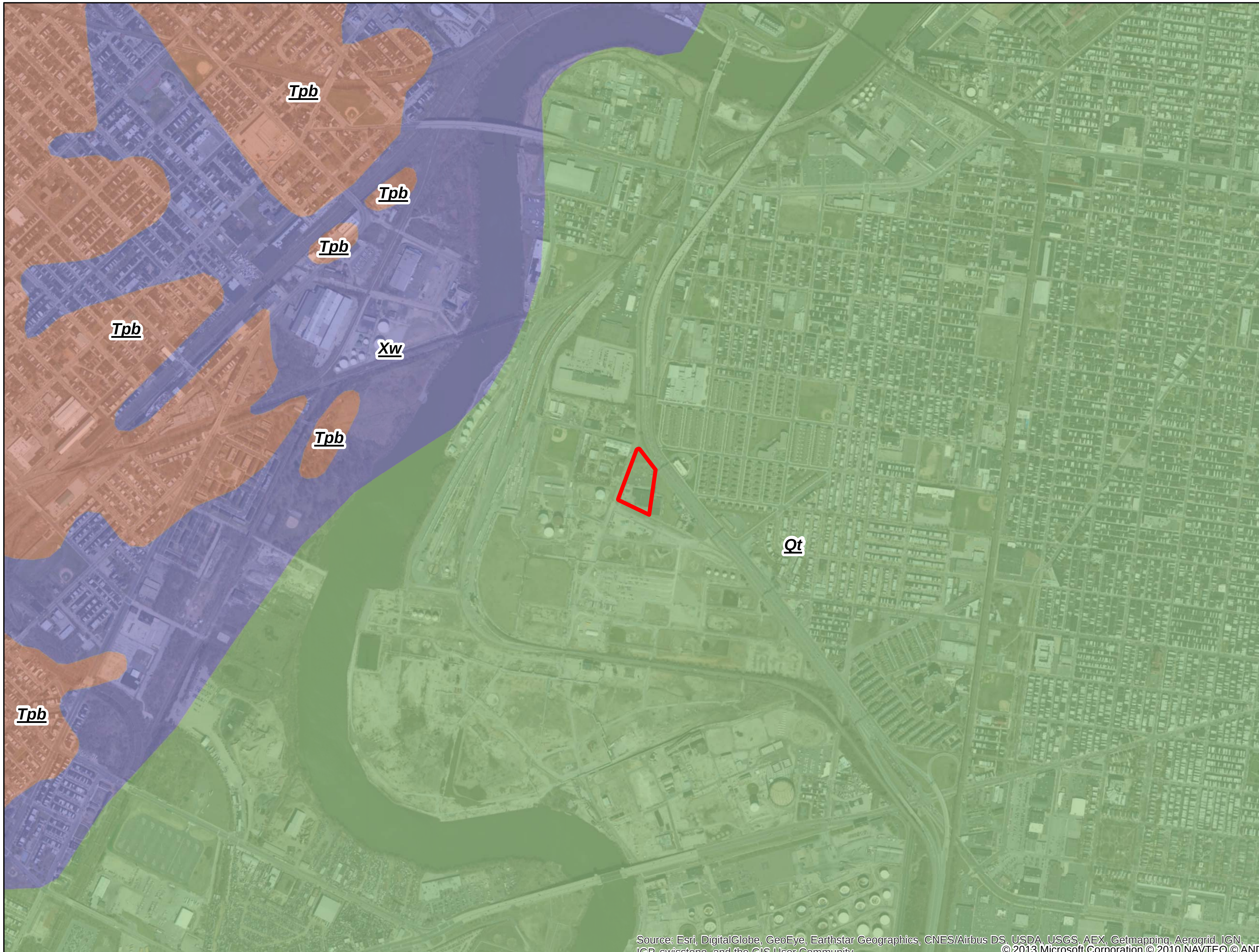


Path: G:\Verizon\South District PA\Projects\Fig 03 - Soils Map.mxd



Legend

- Qt — Trenton Gravel Formation
- Tpb — Pensauken and Bridgeton Formations, undifferentiated
- Xw — Wissahickon Formation
- Site Boundary

Source Data:
Geology from DCNR 2001 Bedrock Geology of PA
Projection: NAD83 StatePlane Pennsylvania South Feet

1,000 500 0 1,000 Feet

N

1 inch = 1,000 feet

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Geology Map

drawn TAY	checked MDM	approved	figure no.
date 02/25/2015	date 02/25/2015	date	4
job no. 303167.TM.100039.1000.0100		file no. Fig 04 - Geology Map	

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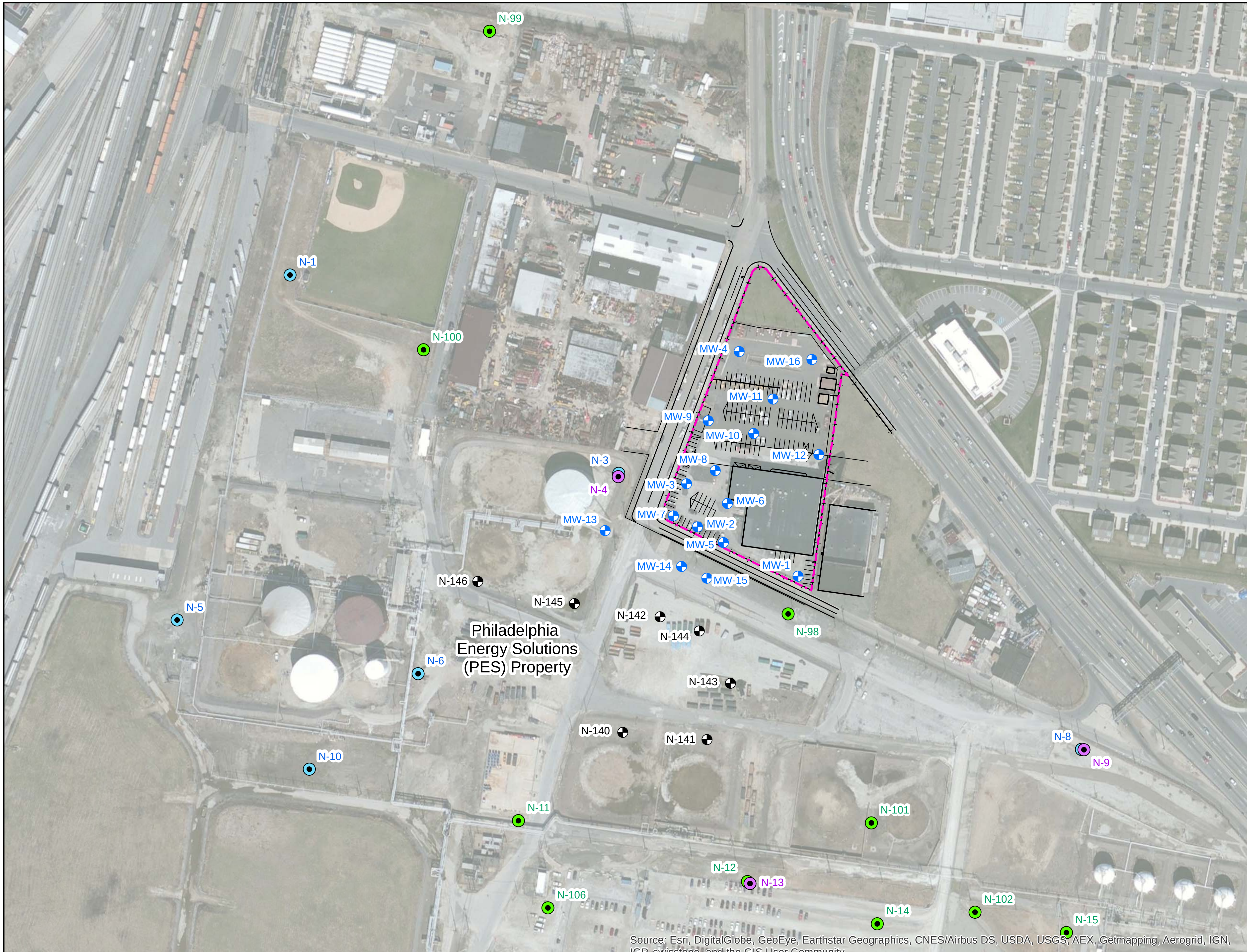
Path: G:\Verizon\South District PA\Projects\Fig 04 - Geology Map.mxd



Legend

- Monitoring Well Installed 2014
- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary

Source Data:
Philadelphia Energy Solutions Data:
Sunoco Inc. (R&M) (July 28, 2011) Remediation Status Report: Philadelphia Refinery, Second Quarter 2011.
Projection: NAD83 StatePlane Pennsylvania South Feet

N

200 100 0 200 Feet

1 inch = 200 feet

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Well Location Map

drawn TAY	checked MDM	approved	figure no.
date 10/22/2014	date 10/22/2014	date	5
job no. 303167.TM.100039.1000.0100		file no. VZ-PES_Well_Location	

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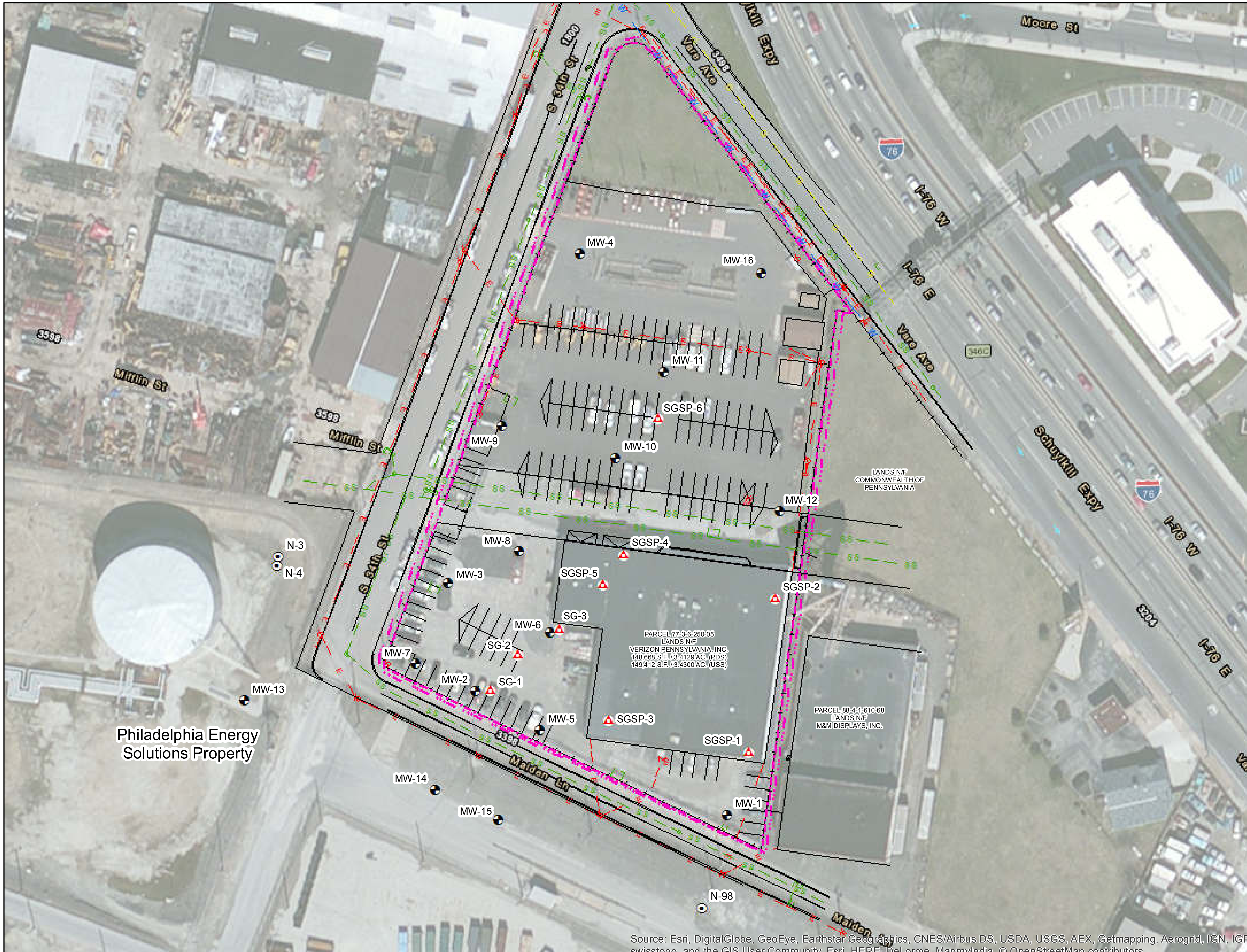

Legend

- Monitoring Well
- Soil Gas Sample Point
- Monitoring Well (Installed by PES)
- Estimated Site Boundary
- E — Electric Utility
- Fence
- G — Gas Utility
- Verizon Property Boundary
- SS — Sanitary Sewer Utility
- ST — Storm Sewer Utility
- W — Water Utility

Source Imagery:
USGS Philadelphia Quadrangle 1994
Site Features Surveyed by First Order, LLC (12/2008)
and by Dennis W. Sklar, Inc. (3/2012)
Projection: NAD83 StatePlane Pennsylvania South Feet

N

80 40 0 80 Feet

1 inch = 80 feet

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Soil Gas Sampling Location Map

drawn TAY	checked MDM	approved	figure no.
date 02/25/2015	date 02/25/2015	date	6
job no. 303167.TM.100039.1000.0100		file no. Soil Gas Sampling	

leidos

Path: G:\Verizon\South District PA\Projects\2012\Soil Gas Sampling.mxd

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 — Groundwater Elevation in feet above mean sea level (AMSL)
- NA — Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * — Value Not Included in Contouring

Source Data:
Sunoco Data: Sunoco Inc. (R&M) (July 28, 2011) Remediation Status Report: Philadelphia Refinery, Second Quarter 2011.
Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

Verizon - South District Work Center
1851 South 34th Street,
Philadelphia, PA

Groundwater Elevation Contour Map
May 26, 2011

drawn JWS	checked MDM	approved CDO	figure no.
date 02/25/2015	date 02/25/2015	date 02/25/2015	7
job no.		file no. VZ-Sunoco_GW_Cont_May2011	

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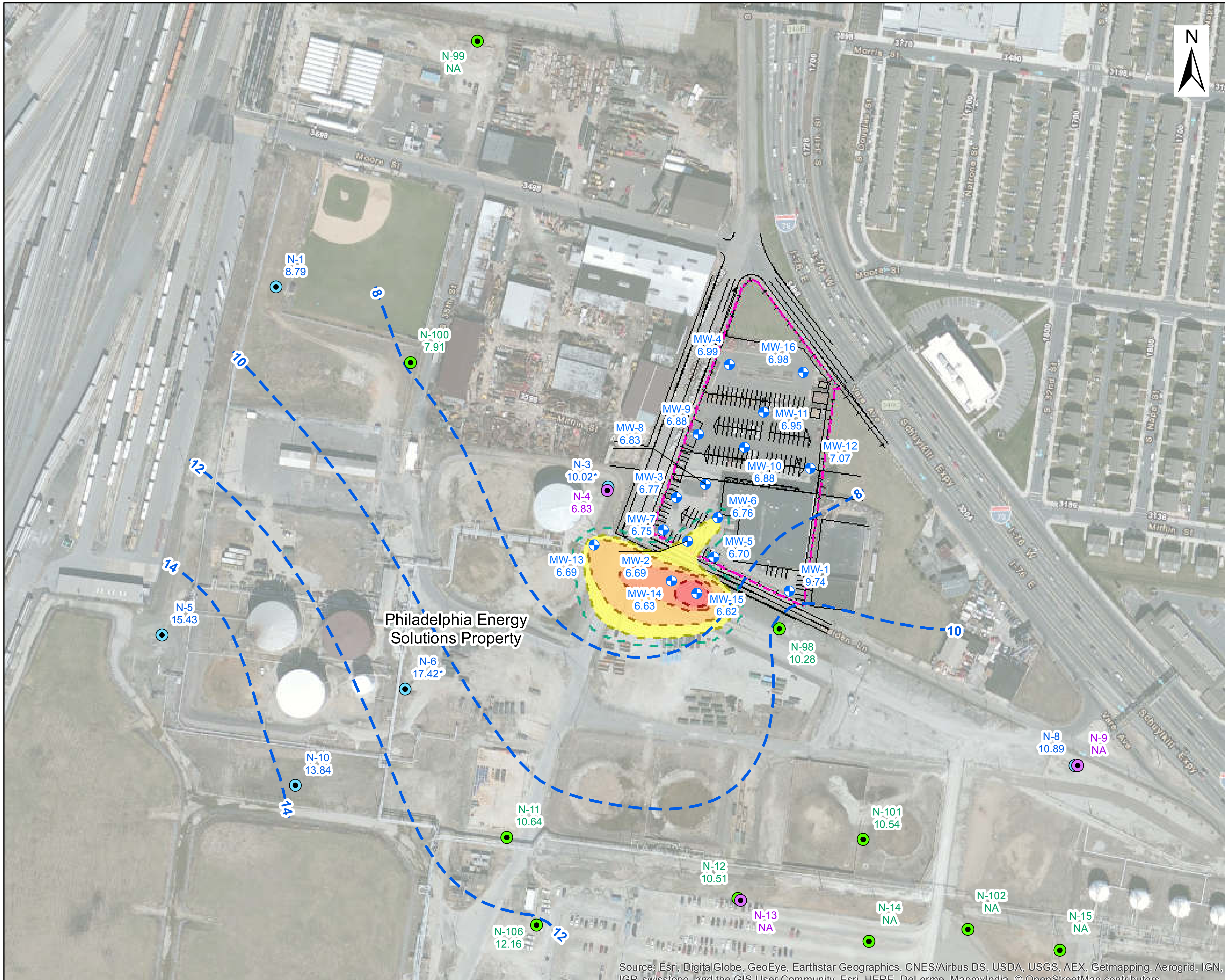

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 — Groundwater Elevation in feet above mean sea level (AMSL)
- NA — Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * — Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft
- 0.8 ft

Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

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1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - August 15, 2012

drawn	JWS	checked	MDM	approved		figure no.
date	10/1/12	date	10/1/12	date		8
job no.				file no.	GW-LNAPL_Cont_Aug2012	

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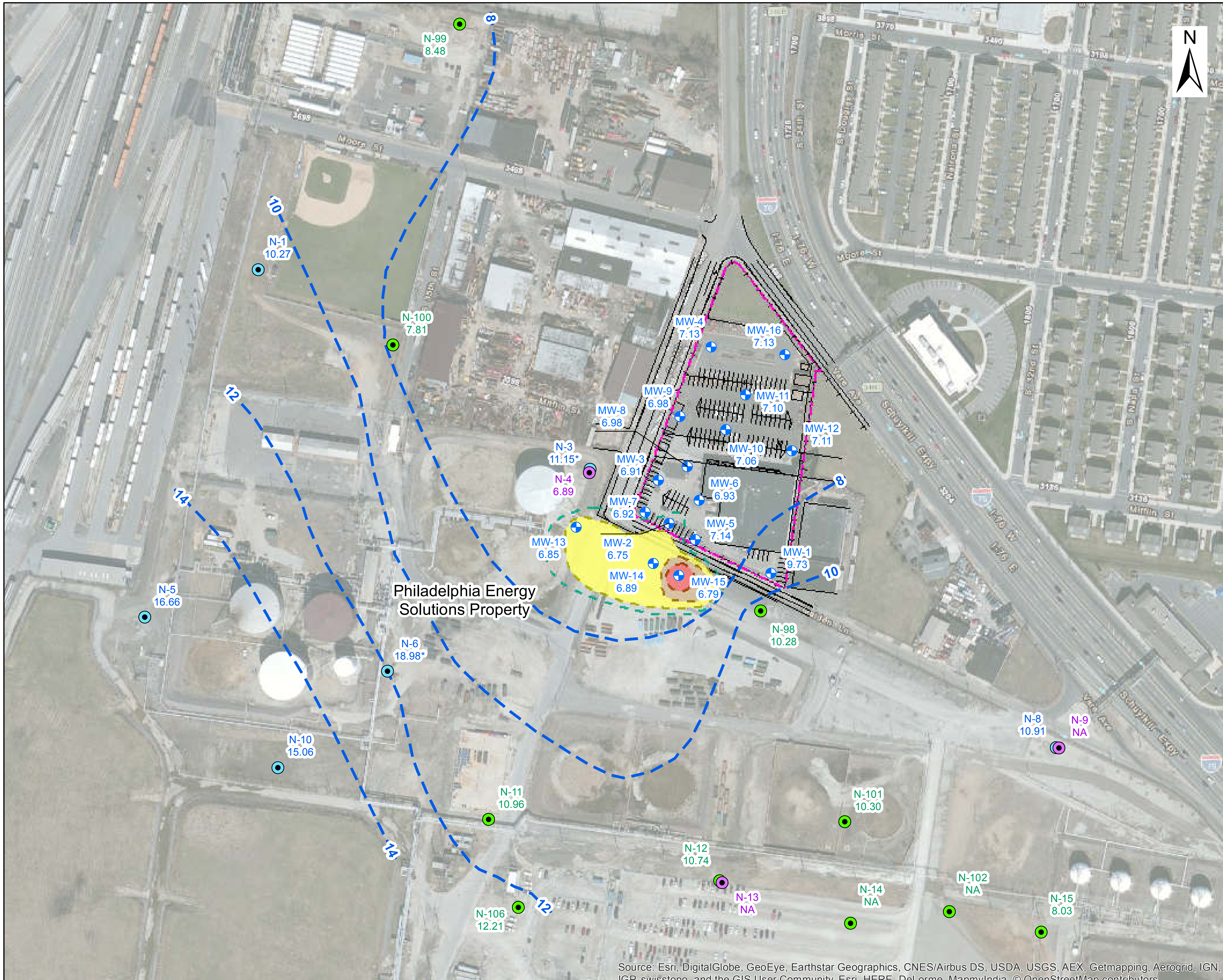

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 Groundwater Elevation in feet above mean sea level (AMSL)
- NA Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft

Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

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1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - November 14, 2012

drawn	JWS	checked	MDM	approved		figure no.
date	12/21/12	date	12/21/12	date		9
job no.				file no.	GW-LNAPL_Cont_Nov2012	

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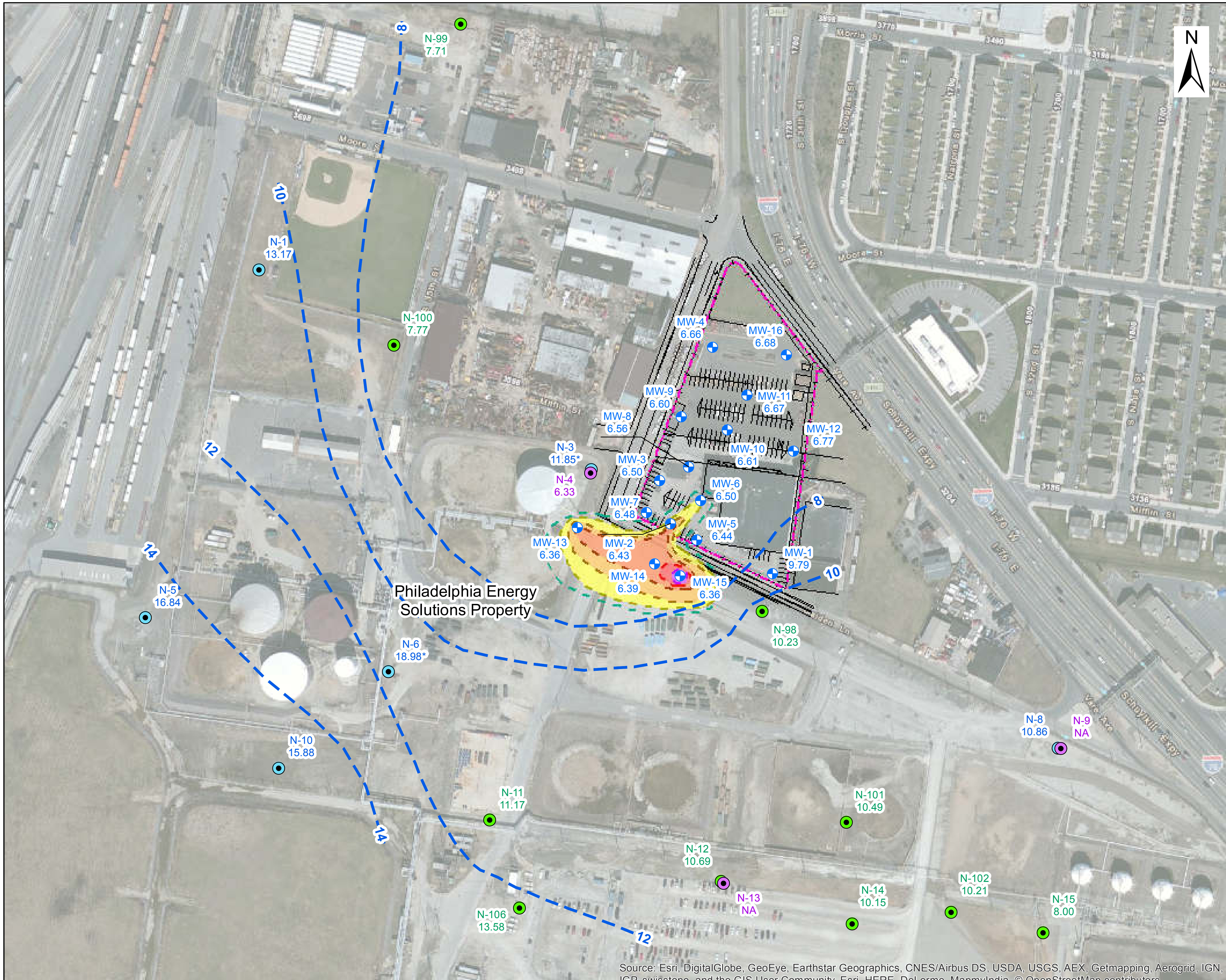

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 — Groundwater Elevation in feet above mean sea level (AMSL)
- NA — Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * — Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft
- 0.8 ft
- 1.0 ft

Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

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1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - February 12, 2013

drawn	JWS	checked	MDM	approved		figure no.
date	3/1/13	date	3/4/13	date		10
job no.				file no.	GW-LNAPL_Cont_Feb2013	

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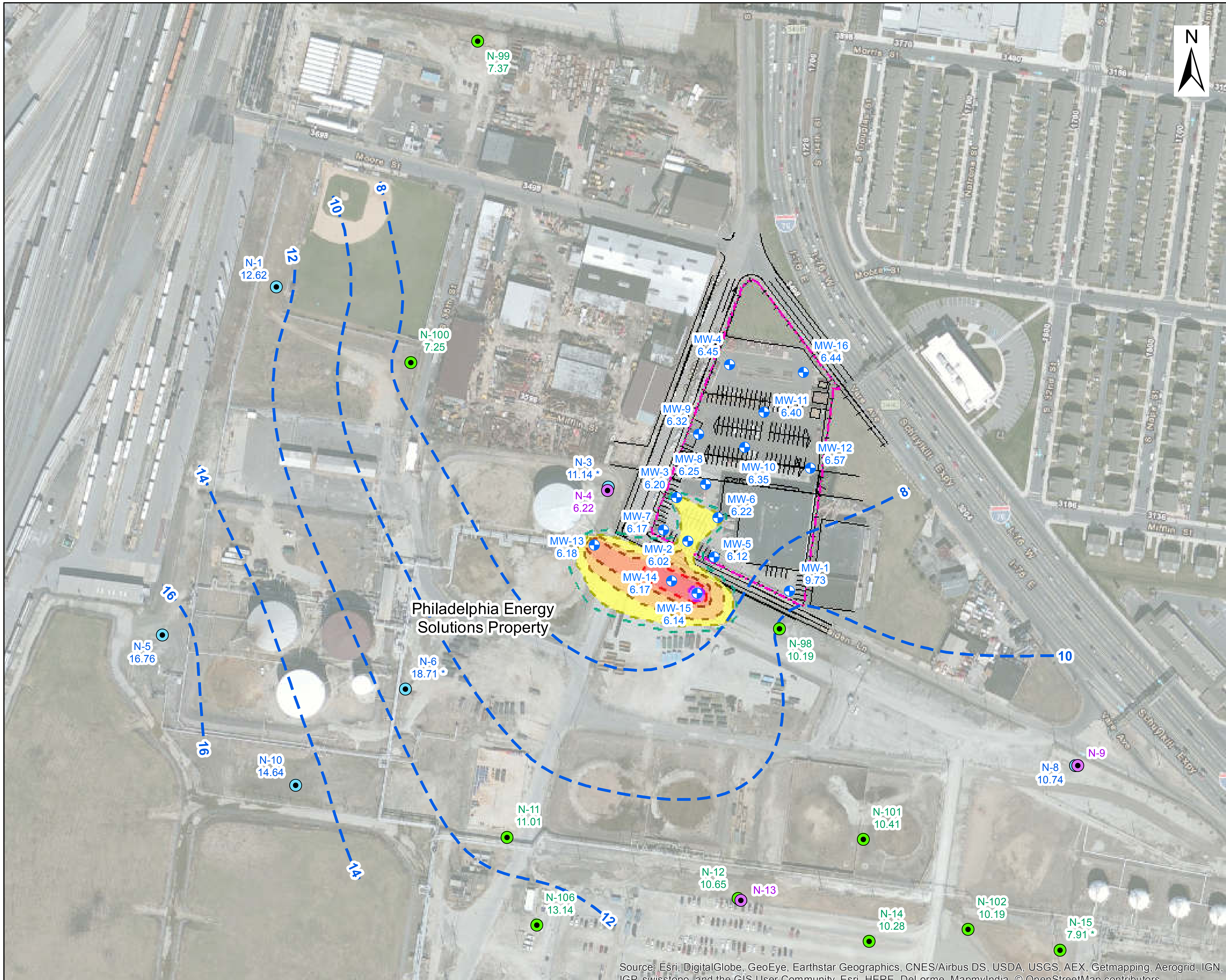

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 Groundwater Elevation in feet above mean sea level (AMSL)
- NA Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft
- 0.8 ft
- 1.0 ft

Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

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1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - April 4, 2013

drawn	JWS	checked	MDM	approved		figure no.
date	6/13/13	date	6/13/13	date		11
job no.				file no.	GW-LNAPL_Cont_Apr2013	

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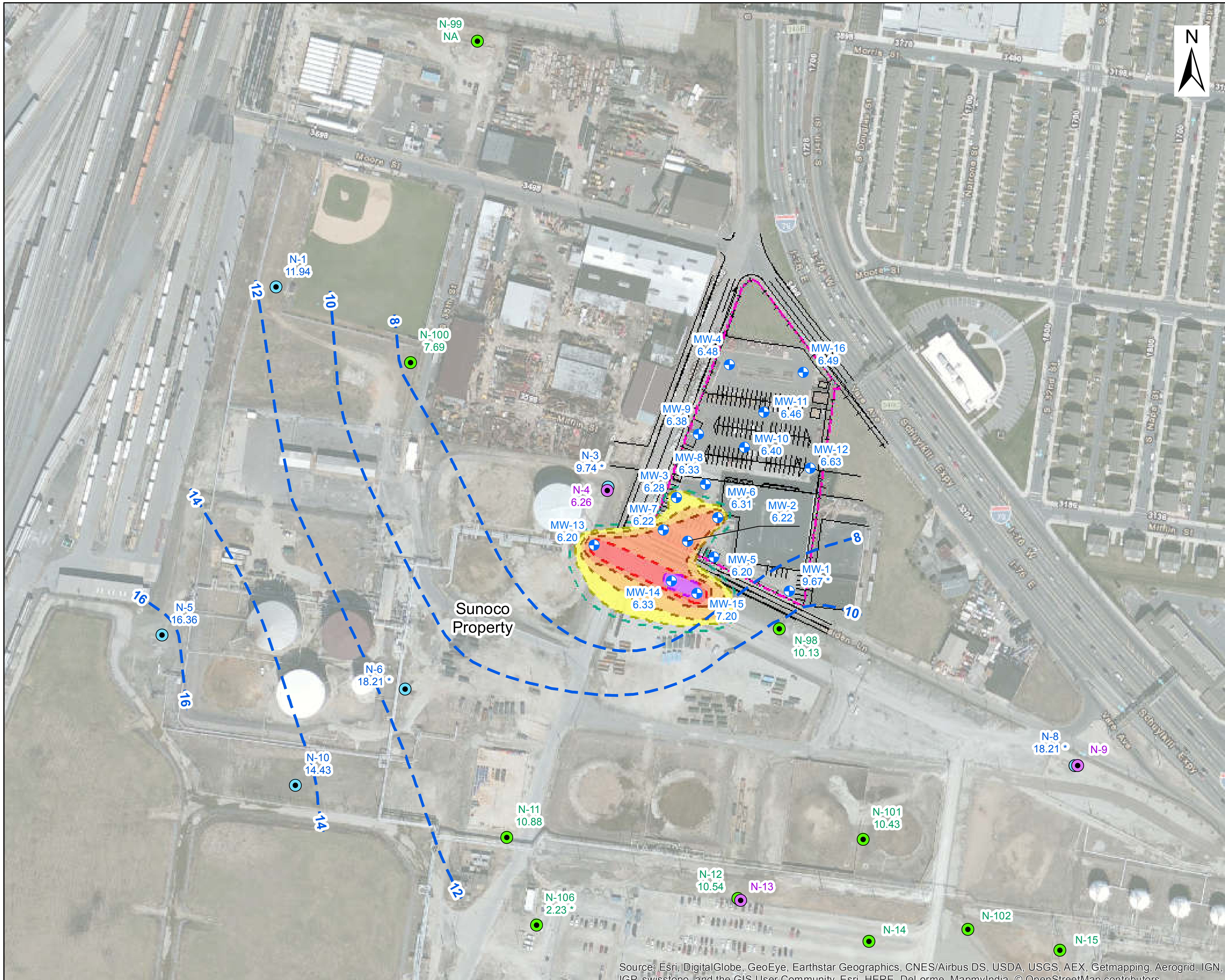

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 74.95 — Groundwater Elevation in feet above mean sea level (AMSL)
- NA — Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * — Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft
- 0.8 ft
- 1.0 ft

Projection: UTM Zone 18, NAD 83

200 100 0 200 Feet

1 inch = 200 feet

Verizon - South District Work Center
1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - May 13, 2013

drawn JWS	checked MDM	approved	figure no.
date 6/17/13	date 6/17/13	date	12
job no.		file no. GW-LNAPL_Cont_May2013	

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Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 17.61 — Groundwater Elevation in feet above mean sea level (AMSL)
- 0.35 — LNAPL thickness in feet
- NA — Not Available
- Groundwater Elevation Contour in feet AMSL (Dashed where inferred)
- * — Value Not Included in Contouring

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0.0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft

Projection: NAD 1983 StatePlane Pennsylvania South Feet

200 100 0 200 Feet

1 inch = 200 feet

Verizon - South District Work Center
1851 South 34th Street,
Philadelphia, PA

Groundwater Contour and LNAPL Thickness Isocontour Map - March 7, 2014

drawn	TAY	checked	MDM	approved		figure no.
date	04/09/2014	date	04/10/2014	date		13
job no.	303167.TM.100039.1000.0100			file no.	VZ-Sunoco_GW-LNAPL_Cont_2014	

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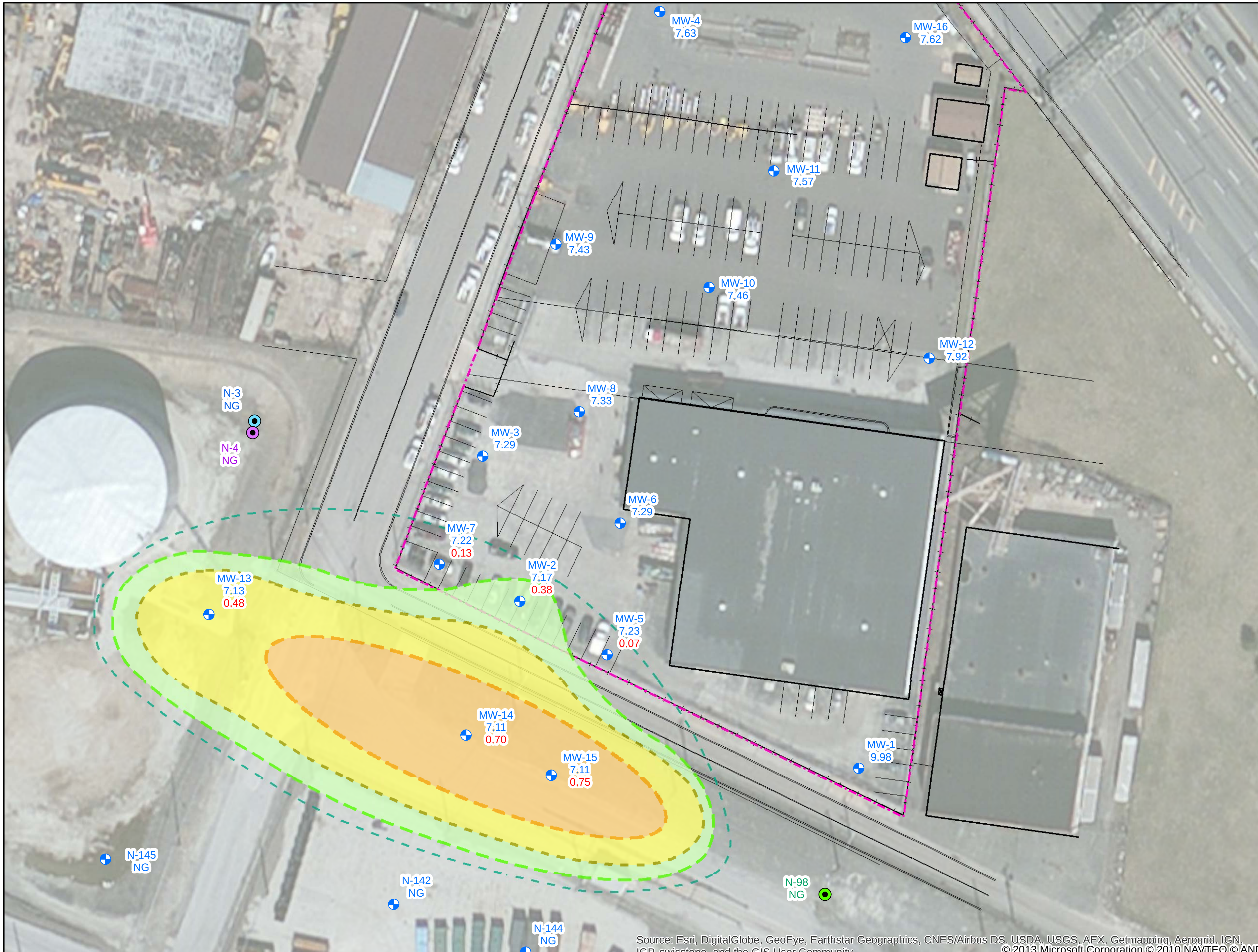

Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary
- 7.11 - Groundwater Elevation in feet above mean sea level (AMSL)
- 0.70 - LNAPL Thickness in Feet for wells with LNAPL Observed
- NG - Not Gauged

Light Non-Aqueous Phase Liquid (LNAPL) Thickness in feet Isocontour

- 0 ft
- 0.2 ft
- 0.4 ft
- 0.6 ft

Source Data:
Projection: NAD83 StatePlane Pennsylvania South Feet

N

60 30 0 60 Feet

1 inch = 60 feet

Verizon - South District Work Center
1851 South 34th Street,
Philadelphia, PA

Groundwater Elevation and LNAPL Thickness Map - December, 2014

drawn	TAY	checked	MDM	approved		figure no.
date	12/22/2014	date	12/22/2014	date		14
job no.	303167.TM.100039.1000.0100			file no.	VZ_LNAPL_Dec2014	

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Legend

- Shallow Site Monitoring Well
- Shallow Zone Monitoring Well (Installed by PES)
- Intermediate Zone Monitoring Well (Installed by PES)
- Deep Zone Monitoring Well (Installed by PES)
- Fence
- Verizon Property Boundary

Well ID	
Sample Date	Act 2 MSCs
Benzene	5
Ethylbenzene	700
Methyl tert-butyl ether	20
Naphthalene	100
1,2,4-Trimethylbenzene	62
1,3,5-Trimethylbenzene	53

46 - Bold red text indicates concentration is greater than the PADEP MSCs for Groundwater in Nonresidential Used Aquifer (Act 2 MSCs)

ND - Not Detected at listed Reporting Limit

All concentrations are reported in micrograms per liter (µg/L)

Source Data:
Projection: NAD83 StatePlane Pennsylvania South Feet

60 30 0 60 Feet

1 inch = 60 feet

N

Verizon - South District Work Center
1851 South 34th Street,
Philadelphia, PA

Groundwater Chemistry Map
December 2014

drawn TAY	checked MDM	approved	figure no.
date 12/22/2014	date 12/22/2014	date	15
job no. 303167.TM.100039.1000.0100		file no. VZ-PES_Chem_Dec2014	

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