GROUNDWATER AND SURFACE WATER MONITORING REPORT FOR 2019
Former York Naval Ordnance Plant
1425 Eden Road, Springettsbury Township
York, Pennsylvania

Prepared for:

Former York Naval Ordnance Plant Remediation Team

July 13, 2020

Prepared by:

Groundwater Sciences Corporation
2601 Market Place, Suite 310
Harrisburg, Pennsylvania 17110

GROUNDWATER AND SURFACE WATER MONITORING REPORT FOR 2019
Former York Naval Ordnance Plant
1425 Eden Road, Springettsbury Township
York, Pennsylvania

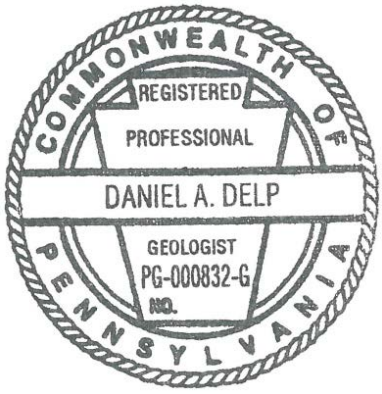
Prepared for:

Former York Naval Ordnance Plant Remediation Team

July 13, 2020

Prepared by:

Groundwater Sciences Corporation



Daniel A. Delp, P.E., P.G.
Senior Associate
Groundwater Sciences Corporation
July 13, 2020

Christopher D. O'Neil, P.G.
Senior Hydrogeologist
Groundwater Sciences Corporation
July 13, 2020

Table of Contents

Tables

Figures

Plates

Appendices

** - in portable document format (PDF) on the USB Drive attached to this report.*

LIST OF ACRONYMS AND ABBREVIATIONS

11DCA	1,1-dichloroethane
11DCE	1,1-dichloroethene
%D	percent difference
%R	percent recovery
%RSD	percent relative standard deviation
µg/L	micrograms per liter
amsl	above mean sea level
bgs	below ground surface
cfs	cubic feet per second
cis12DCE	cis-1,2-dichloroethene
COC	constituents of concern
CPA	Central Plant Area
DQA	data quality assessment
DQO	data quality objective
EDD	electronic data deliverables
FSP	Field Sampling Plan
fYNOP	former York Naval Ordnance Plant
gpm	gallons per minute
GSC	Groundwater Sciences Corporation
IS	internal standard
LCL	lower control limit
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MCL	maximum contaminant levels
MG	million gallons
MNA	monitored natural attenuation
MS/MSD	matrix spike/matrix spike duplicate
MSC	medium specific concentration
MTBE	methyl tertiary-butyl ether
NETT	North End of Test Track
NPA	North Plant Area
NPBA	Northern Property Boundary Area
NPDES	National Pollutant Discharge Elimination System
PADEP	Pennsylvania Department of Environmental Protection
Part 2 SRI	Part 2 Supplemental Groundwater Remedial Investigation
PCE	tetrachloroethene
pounds/MG	pounds per million gallons pumped
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation Recovery Act
RI	remedial investigation
RPD	relative percent difference
RRF	relative response factors
RSL	regional screening level

SDG	sample delivery group
SPA	South Plume Area
SPBA	Southern Property Boundary Area
SW-WPL	Southwest Corner of the West Parking Lot
TCA	1,1,1-trichloroethane
TCE	trichloroethene
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
VC	vinyl chloride
VI	vapor intrusion
VOCs	volatile organic compounds
WPL	West Parking Lot

EXECUTIVE SUMMARY

This report documents results of Site-wide groundwater and surface water monitoring conducted in January through December 2019 at the former York Naval Ordnance Plant (fYNOP or Site). The fYNOP is located north of the City of York, in Springettsbury Township, York County, Pennsylvania.

Groundwater and surface water monitoring were conducted according to the fYNOP Cleanup Plan submitted for regulatory review in November 2019 and approved by the Pennsylvania Department of Environmental Protection (PADEP) in February 2020. The scope of 2019 groundwater and surface water monitoring described in Section 10 of the Cleanup Plan replaces the previous scope of monitoring activities conducted for the Site. Objectives of the monitoring program are as follows:

- Conduct groundwater and extraction system monitoring to demonstrate the West Parking Lot (WPL) groundwater extraction system operates according to established parameters;
- Conduct groundwater and extraction system monitoring in the Southern Property Boundary Area (SPBA) to verify that a groundwater gradient exists from off-Site wells located along Canterbury Lane towards on-Site wells located in the SPBA;
- Conduct groundwater monitoring in monitored natural attenuation (MNA) areas to demonstrate stable or decreasing concentrations for constituents of concern (COC) through natural attenuation (Northern Property Boundary Area (NPBA), Eastern Site Perimeter, South-Central Site Area, SPBA, South Plume Area (SPA), Codorus Creek Levee, West Side of Codorus Creek, and Northern Site Perimeter);
- Conduct groundwater monitoring to demonstrate that off-Site migration of COCs above established limits does not occur in the NPBA;
- Conduct groundwater monitoring at MW-185 along Eastern Perimeter Road to demonstrate no potential risk of residential vapor intrusion (VI) exposure at this location; and
- Conduct surface water monitoring in Codorus Creek to verify compliance with PADEP surface water quality criteria.

The scope of monitoring includes collecting 145 samples for volatile organic compounds (VOC) analysis and one sample for metals analysis during monthly, quarterly, and annual sampling. Samples were collected from 70 wells, 12 surface water locations, and two groundwater extraction systems. Water levels were measured in 216 wells and two surface water locations.

Successful performance of the WPL system is linked to compliance with surface water quality criteria at points of application in Codorus Creek, as presented in the Cleanup Plan. Four rounds of monthly surface water monitoring were completed in 2019 (September through December 2019) according to Cleanup Plan requirements. Analytical results for 2019 samples reported detections of tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene (cis12DCE) in three groundwater discharge locations. COCs were not detected in samples from nine other surface water monitoring locations. These data will be presented and evaluated in a surface water sampling report to be prepared following completion of two years of monthly surface water monitoring. At the end of the two-year monitoring period, a shut-down test of the WPL extraction system will be conducted.

Yearly average 2019 pumping rates for the WPL groundwater extraction system exceed the rates presented in the analysis of system operations described in the Supplemental Remedial Investigation Report (Part 2 SRI) (261 gallons per minute (gpm) versus 220 gpm). Groundwater elevation and flow gradient data for the WPL in 2019 is consistent with past gradients discussed in the Part 2 SRI.

The yearly average 2019 pumping rate for the SPBA groundwater extraction system is similar to the average anticipated rate of groundwater flow in this area (6.9 gpm versus 7.1 gpm). Groundwater elevation and flow gradient data from 2019 during SPBA pumping confirms a groundwater gradient that slopes from off-Site wells located along Canterbury Lane toward on-Site wells located in the SPBA.

The Cleanup Plan requires a comparison between annual COC concentrations in groundwater from 45 MNA area wells and baseline COC concentrations established in the Part 2 SRI. In addition, the Plan requires an evaluation of COC concentration trends every 5 years and a verification that no off-Site migration of COCs occurs from MNA areas.

In 2019, COC concentrations are less than or equal to baseline concentrations in groundwater from 34 of the 45 MNA wells. The 2019 data set contains fewer samples with COC concentrations exceeding the regulatory standard than the baseline data set (17 versus 26). The results of comparing 2019 data to baseline and regulatory concentrations indicate a general improvement in

groundwater quality in MNA areas, except in the SPA area where an increase in PCE and TCE concentrations were recorded in groundwater from three of six wells sampled.

The Cleanup Plan also requires an annual evaluation of plume migration to confirm that off-Site migration north and west of the NPBA does not occur. Prior to the start of the 22-year operation of the NPBA groundwater extraction and treatment system in 1990, COCs were detected in former off-Site residential supply wells RW-2 and RW-4 north of the Site. Groundwater contours developed from September 2019 elevation data indicate that groundwater flow is southwest, away from RW-2 and RW-4. Laboratory analysis of groundwater samples from residential wells RW-2 and RW-4 reported detection of TCE in the RW-2 sample, only, at a concentration below the regulatory standard. These data indicate that the plume is not migrating northward off the Site.

A south-southwestern groundwater flow gradient exists in the western NPBA near MW-18S. Evaluation of analytical results of 2019 groundwater sampling in wells downgradient of MW-18S confirms low COC concentrations and demonstrates that COCs in groundwater are not migrating westward across the property line at levels of concern.

The Cleanup Plan requires annual monitoring to evaluate residential VI exposure risk for an off-Site building east of well MW-185 along the Eastern Site Perimeter. The PCE concentration in the 2019 groundwater sample from MW-185 (55 micrograms per liter (µg/L)) is below the PADEP VI residential screening value for PCE of 110 µg/L. Therefore, PCE in MW-185 groundwater does not pose a potential health risk from VI into the off-Site building to the east.

Monitoring in 2019 was completed consistent with the requirements in the Cleanup Plan. Performance goals for both the WPL and SPBA groundwater extraction and treatment systems were met. COC concentrations in 2019 samples indicate a general improvement of the groundwater quality in the MNA area wells based on a comparison to baseline concentrations and regulatory standards. Monitoring in the NPBA confirmed that northern and westward plume migration off the Site is not occurring. PCE in groundwater along the Eastern Site Perimeter does not pose a potential health risk off Site, east of MW-185.

1 INTRODUCTION

This report documents results of Site-wide groundwater and surface water monitoring conducted in January through December 2019 at the former York Naval Ordnance Plant (fYNOP or Site). The fYNOP is located north of the City of York, in Springettsbury Township, York County, Pennsylvania as shown on **Figure 1.0-1**. Site features and area designations at the fYNOP are illustrated on **Figure 1.0-2**.

1.1 Regulatory Framework

The 2019 monitoring activities were conducted in accordance with the fYNOP Cleanup Plan (GSC, 2019a) submitted to the United States Environmental Protection Agency (USEPA) and the Pennsylvania Department of Environmental Protection (PADEP) in November 2019. The Cleanup Plan presents a proposed remedy for the Site that combines engineering controls, institutional controls, and other remedial actions and obligations. The monitoring activities described in this report were completed prior to PADEP's approval of the Cleanup Plan, which occurred in February 2020. Groundwater and surface water monitoring are components of engineering controls and other remedial actions necessary to addresses requirements of the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) and Federal Resource Conservation Recovery Act (RCRA), under the One Cleanup Program established by a Memorandum of Agreement between USEPA Region 3 and PADEP.

The scope of groundwater and surface water monitoring activities contained in Section 10 of the Cleanup Plan and completed in 2019 (reported herein) replace the previous scope of monitoring activities performed according to the Groundwater and Surface Water Monitoring Plan (GSC, 2016). Section 10 of the Cleanup Plan describes activities conducted during the post-remediation care phase of the project and requires the following:

- Groundwater monitoring to demonstrate the WPL groundwater extraction system operates according to established parameters;
- Groundwater monitoring in the Southern Property Boundary Area (SPBA) to verify that a groundwater gradient exists from off-Site wells located along Canterbury Lane towards on-Site wells located in the SPBA;

- Groundwater sampling and analysis in monitored natural attenuation (MNA) areas of the Site to evaluate yearly reduction of constituents of concern (COCs) by comparing annual COC concentrations to baseline concentrations for COCs reported in the Supplemental Remedial Investigation Report (Part 2 SRI) (GSC, 2018). A full evaluation of monitoring results will be submitted to PADEP and USEPA as part of the five-year review; and
- Surface water monitoring to verify compliance with PADEP surface water quality criteria with results reported annually. An evaluation of monthly surface water data will be presented in a comprehensive report prepared following the completion of two years of surface water monitoring.

For MNA analysis, baseline concentrations for COCs were established in the Part 2 SRI using the most recent sampling data (2008 through 2015) for each MNA well. Groundwater chemicals considered Site COCs were established in the Part 2 SRI based on magnitude of chemical concentration, detection frequency, and potential for off-Site COC migration. Site COCs include chlorinated solvents (tetrachloroethene (PCE), trichloroethene (TCE), and 1,1,1-trichloroethane (TCA)), and volatile organic compound (VOC) degradation products (cis-1,2-dichloroethene (cis12DCE), vinyl chloride (VC), 1,1-dichloroethane (11DCA), and 1,1-dichloroethene (11DCE)). Hexavalent chromium, lead, benzene, ethylbenzene, methyl tertiary-butyl ether (MTBE), 1,4-dioxane, and cyanide were also detected in groundwater from Site monitoring wells. COCs in surface water are determined by magnitude of chemical concentration, detection frequency, and exceedances of the PADEP Title 25, Chapter 93 surface water quality criteria. Surface water COCs include PCE, TCE, and cis12DCE.

The scope and procedure for sampling, analysis, data evaluation, and reporting contained in this report will be used until Site closure is documented after post-remediation care is completed.

1.2 Scope of Report

The scope of work conducted during 2019 monitoring activities described in this report includes collection of groundwater elevation data, sampling of groundwater and surface water, and evaluation of collected data. The report presents monitoring objectives, performance of groundwater extraction systems, data collection activities, hydrogeologic conditions and flow, plume migration, and groundwater and surface water quality. A list of activities conducted, and references to the applicable sections of the Cleanup Plan, are as follows:

- Groundwater extraction system performance in the West Parking Lot (WPL); the area near extraction well CW-20 in the southwest corner of the WPL (Section 10.1.2 in the Cleanup Plan); and in the SPBA (Section 10.1.3 of the Cleanup Plan);
- MNA of COCs in groundwater in certain areas of the Site (Section 10.3.1.1 of the Cleanup Plan);
- Plume migration monitoring in the Northern Property Boundary Area (NPBA) (Section 10.3.1.2 of the Cleanup Plan);
- Exposure potential of vapor intrusion (VI) into an off-Site building from COCs in groundwater in the vicinity of MW-185 along the Eastern Site Perimeter (Section 10.3.1.1 of the Cleanup Plan); and
- Surface water monitoring in Codorus Creek (Section 10.3.2 of the Cleanup Plan).

1.3 Groundwater and Surface Water Monitoring Objectives

Groundwater and surface water monitoring objectives focus on periodic tracking of COC concentrations, COC movement in groundwater and surface water, and performance of groundwater extraction and treatment systems at the Site. Activities provided in the Cleanup Plan to meet monitoring objectives include collecting and analyzing groundwater elevation, chemical, and flow data to determine performance of groundwater extraction and treatment systems; comparing annual COC concentrations to Part 2 SRI baseline concentrations; and assessing plume migration. Surface water monitoring is required to verify continued compliance with surface water quality criteria in Codorus Creek affected by discharge of site-impacted groundwater. Monitoring objectives for environmental media in specific areas of the Site are provided in the Cleanup Plan as follows:

- Conduct groundwater extraction system and groundwater quality monitoring to determine effects of operating the WPL system on water quality in Codorus Creek;
- Conduct groundwater extraction system and groundwater quality monitoring to verify that a groundwater gradient exists from off-Site wells located along Canterbury Lane towards on-Site wells located in the SPBA;
- Conduct groundwater monitoring in MNA areas to demonstrate stable or decreasing COC concentrations through natural attenuation;
- Conduct groundwater monitoring in NPBA to demonstrate no off-Site migration of COCs above established limits;
- Conduct groundwater monitoring at MW-185 along the Eastern Perimeter Road to demonstrate no residential VI exposure; and
- Conduct surface water monitoring in Codorus Creek to verify continued compliance with surface water quality criteria.

1.4 Report Organization

This report is organized into six sections. The results of the 2019 groundwater and surface water monitoring are presented in Section 2. Section 3 provides an evaluation of the groundwater and surface water monitoring results. Conclusions are provided in Section 4. Section 5 includes the laboratory data quality assessment performed on the sampling results and Section 6 is a list of references.

2 GROUNDWATER AND SURFACE WATER MONITORING RESULTS

This Section presents a description of monitoring activities and results of Site-wide groundwater and surface water monitoring conducted in January through December 2019. These activities meet the monitoring requirements defined in the Cleanup Plan. Groundwater monitoring activities were conducted in WPL, SPBA, MNA, NPBA, and Codorus Creek areas of the Site. Surface water monitoring was performed in specific locations in Codorus Creek.

Groundwater and surface water monitoring procedures used to collect and analyze data are described in the Field Sampling Plan (FSP) (GSC, 2012) and the Quality Assurance Project Plan (QAPP), as revised periodically with written approval of PADEP and USEPA (GSC, 2014 and 2019b). Copies of the FSP and QAPP are available on the public website, https://yorksiteremedy.com.

2.1 Site-Wide Groundwater Elevations

Groundwater elevation data were collected to provide information regarding Site-wide groundwater flow gradients and performance of groundwater extraction systems. Vertical and lateral gradient information is used to evaluate COC migration and groundwater containment assessments.

Groundwater levels were measured on September 17, 2019, at 216 wells and two surface water locations at the Site. Water level measurement locations, measurement point reference elevations, and calculated water level elevations for the most recent four years of monitoring (2016 through 2019) are provided on **Table 2.1-1**. The 2019 data were used to develop potentiometric contours for the Site shown on **Plate 2.1-1**. At locations with multiple well screen depths, only the groundwater level elevation from the shallowest well (shown in blue font on the plate) was used to generate the contours. Water level elevations collected from wells screened below the shallow portion of the aquifer were not used because these data do not represent the water table surface elevation in the aquifer beneath the Site.

As shown on **Plate 2.1-1**, the shallow groundwater gradient across most of the Site trends westward towards Codorus Creek from a groundwater elevation “high” of approximately 530 feet above mean sea level (amsl) to a “low” of approximately 341 feet amsl. In the southeastern area of fYNOP, the

groundwater gradient direction is south toward the SPBA and then southwest from the SPBA toward U.S. Route 30.

Consistent with groundwater elevations measured prior to September 2019, the gradient in the sandstone bedrock aquifer beneath the eastern portion of the Site is relatively steep and the gradient in the carbonate bedrock aquifer in the western portion of the Site is relatively flat (GSC, 2018). Due to historically high levels of precipitation during late summer of 2018, water levels measured during the 2019 monitoring event in most wells were lower than those measured in 2018 (see **Table 2.1-1**).

As shown on **Plate 2.1-1**, potentiometric contours for the WPL indicate that groundwater flow from the WPL towards Codorus Creek is influenced by pumping from groundwater extraction wells CW-9, CW-13, CW-15A, CW-17, and CW-20. Pumping of these five wells creates a closed groundwater depression illustrated by the 338 feet amsl contour. The depression directs groundwater that normally flows westward towards Codorus Creek under non-pumping conditions to the extraction wells during pumping.

Pumping of CW-21, CW-22, and CW-23 by the SPBA system maintains a groundwater gradient that slopes from off-Site wells located along Canterbury Lane toward on-Site wells located in the SPBA. As shown on **Plate 2.1-1**, pumping of CW-21 and CW-22 forms a coalescing cone of depression on the water table surface that is indicated by the closed 340-foot and 350-foot amsl groundwater elevation contours. The pumping influence of CW-23 is less pronounced due to its lower pumping rate and lower transmissivity in this portion of the aquifer.

The lateral gradient in shallow groundwater in the NPBA is southwest from groundwater elevations of approximately 530 feet amsl to approximately 370 feet amsl. The September 2019 potentiometric contour configuration in the NPBA is similar to that generated from data collected in 2014 through 2018 (GSC, 2019c).

Vertical gradients similar to those recorded in 2018 (GSC, 2019d) were measured in multi-level well pairs in 2019 as presented on **Table 2.1-2**. Upward gradients were measured in 24 well pairs in the former Central Plant Area (CPA), Levee Area, Eastern Landfill, former North End Test Track (NETT), former North Plant Area (NPA), NPBA, SPA, SPBA, and WPL. Artesian flow occurs in

well MW-16D and well pair MW-18S and MW-18D in the NPBA. Downward vertical gradients are evident from elevation data in 14 well pairs located in the former CPA, Levee Area, Eastern Landfill, former NETT, former NPA, NPBA, SPA, SPBA, and WPL.

2.2 Groundwater Sampling and Analysis

Groundwater samples were collected from wells in the WPL, SPBA, and MNA areas at the Site. A total of 145 groundwater samples were collected in 2019 during monthly, quarterly, and annual monitoring. Samples from 70 wells were analyzed for VOCs and a sample in one well was analyzed for metals. **Table 2.2-1** provides information for wells sampled (type, depth, construction, geology, and sub-areas at the Site). Purge logs for sampling are included in **Appendix A**.

Analytical results of 2019 groundwater samples are summarized on **Table 2.2-2** (VOCs – MNA area wells), **Table 2.2-3** (VOCs – Technical Impracticability (TI) wells), and **Table 2.2-4** (total and available cyanide – MNA Area well MW-2). **Tables 2.2-2** and **2.2-4** (MNA area wells) include USEPA Maximum Contaminant Levels (MCLs), USEPA Regional Screening Levels (RSLs), and PADEP Statewide Health Standard residential and non-residential medium specific concentrations (MSCs) for comparison. The *regulatory standard* referenced in this report is the groundwater MSC that is equivalent to the MCL, or the RSL for regulated substances that do not have an MSC. Groundwater samples were analyzed for the project analyte list of VOCs in the QAPP using SW-846 Method 8260C; the sample from well MW-2 was analyzed for total and available cyanide using EPA Methods 9014 and OIA-1677, respectively. Laboratory Analytical reports for 2019 samples are in **Appendix B**. The laboratory data quality assessment (DQA) is described in Section 5.

2.2.1 WPL Extraction and Treatment System

Total VOCs and COCs were quantified in groundwater at two sampling intervals during WPL extraction and treatment system operation in 2019. Samples were collected monthly from combined extraction system inflow prior to treatment, and quarterly from individual wells that comprise each extraction system. Monthly combined groundwater flow data for performance analysis represent the monitoring period September through December 2019.

Monthly data are used to calculate VOC mass removed by extraction and treatment system and quarterly data are used to assess the quality of the aquifer affected by pumping. WPL extraction

wells include CW-9, CW-13, CW-15A, CW-17, and CW-20.. The list of COCs in WPL groundwater includes TCE, PCE, TCA, cis12DCE, 11DCA, 11DCE, and VC. Analyses of these data are contained in Section 3.

Figure 2.2-1 highlights the wells used to monitor WPL extraction system performance. Data concerning VOCs removed by the treatment system at specific extraction rates provide information for future evaluation of optimization of pumping rates, potential reduction in the number of wells operating, and future shut down of the systems.

Total VOC concentrations in monthly samples from combined groundwater flow from WPL extraction wells ranged from 700 micrograms per liter (µg/L) to 915 µg/L. As shown on **Table 2.2-5**, highest and lowest total VOC concentrations were detected in the October and December 2019 monthly samples, respectively. Quarterly groundwater samples from WPL extraction wells CW-9, CW-13, CW-15A, CW-17, and CW-20 contain TCE, PCE, TCA, cis12DCE, and 11DCE from five wells and 11DCA from four wells. Analytical results for COCs in WPL extraction well samples are as follows:

- TCE concentrations range from 12 µg/L at CW-9 to 4,000 µg/L at CW-15A;
- PCE concentrations range from 32 µg/L at CW-17 to 1,100 µg/L at CW-20;
- TCA concentrations range from 3.1 µg/L at CW-17 to 5,900 at CW-15A;
- The cis12DCE concentrations range from 11 µg/L at CW-9 to 5,600 µg/L at CW-15A;
- 11DCA concentrations range from 1.9 µg/L at CW-15A to 130 µg/L at CW-15A; and
- 11DCE concentrations range from 2 µg/L at CW-17 to 730 µg/L at MW-15A.

2.2.2 SPBA Extraction System

Total VOCs and COCs were quantified in groundwater at two sampling intervals during SPBA extraction and treatment system operation in 2019. Samples were collected monthly from combined extraction system inflow prior to treatment, and quarterly from individual wells that comprise each extraction system. Monthly combined groundwater flow data for performance analysis represent the monitoring period June through December 2019. One additional month of groundwater flow data was collected from the SPBA extraction and treatment system for analysis of system start-up performance in March 2019, as discussed in the Southern Property Boundary Area

Groundwater Extraction System Operation Effectiveness Report (SPBA Effectiveness Report, GSC, 2019e).

Monthly data are used to calculate VOC mass removed by extraction and treatment and quarterly data are used to assess the quality of the aquifer affected by pumping. SPBA extraction wells include CW-21, CW-22, and CW-23. The list of COCs in SPBA groundwater includes TCE and PCE. Analyses of these data are contained in Section 3.

Monitoring locations used to gauge SPBA pumping system performance are shown on **Figure 2.2-1**. These data also provide information for future evaluation of optimization of pumping rates, potential reduction in the number of wells operating, and future shut down of the system. According to the Cleanup Plan, a change to monitoring frequency may be proposed to PADEP and USEPA if, after two years of SPBA system operation, results demonstrate the goal of the SPBA extraction system is met.

Total VOC concentrations in 2019 monthly samples collected from the combined groundwater flow from SPBA extraction wells ranged from 163 µg/L to 255 µg/L. As shown on **Table 2.2-6**, highest and lowest Total VOC concentrations were detected in the June and August 2019 samples, respectively.

PCE and TCE concentrations in 2019 SPBA quarterly groundwater samples from extraction wells CW-21, CW-22, and CW-23 ranged from 23 µg/L to 430 µg/L and 0.82 J to 9.1 µg/L, respectively (concentrations highlighted in blue on **Figure 2.2-2**). Consistent with historic sampling results, CW-21 and CW-22 groundwater samples contained higher PCE and TCE concentrations than those measured in the CW-23 sample. PCE was detected at concentrations one to two orders of magnitude higher than TCE concentrations.

PCE and TCE concentrations in 2019 quarterly samples from Canterbury Lane monitoring wells MW-166, MW-167, and MW-168 ranged from 0.59 J to 14 µg/L and 0.71 J to 5.9 µg/L, respectively. PCE and TCE concentrations in quarterly samples from MW-166 and MW-168 were consistent with historic results. As shown on **Figure 2.2-2**, PCE and TCE concentrations at MW-167 were higher than concentrations in groundwater samples collected from MW-166 and MW-168.

PCE and TCE concentrations in the 2019 quarterly samples from MW-167 ranged from 3.6 to 14 µg/L and 1.6 to 5.9 µg/L, respectively.

2.2.3 CW-20 Area Sampling Results

In 2015, the WPL groundwater extraction system was modified to include pumping at extraction well CW-20 in the Southwest Corner of the West Parking Lot (SW-WPL) because testing in this area inferred a possible subsurface connection between CW-20 and sampling location COD-SW-17 in Codorus Creek. Testing indicated that pumping from CW-20 affects the deeper karst system in this area. Therefore, the Cleanup Plan included annual sampling of eleven monitoring wells constructed to various depths in the aquifer surrounding CW-20.

Groundwater samples are collected from well pairs around CW-20 that include MW-37S and MW-37D, MW-75S and MW-75D, MW-93S and MW-93D, and Waterloo™ multilevel well MW-136A (five sample ports that are screened in various depths intervals in the well) shown on **Figure 2.2-1**.

Figure 2.2-3 shows wells MW-37S, MW-37D, MW-75S, MW-75D, and multilevel well MW-136A in cross-section view, and PCE and TCE concentrations with depth in the aquifer. Analytical results for COCs in SW-WPL samples near CW-20 are as follows:

- TCE concentrations range from 14 µg/L at MW-136A (270 to 348 feet below ground surface (bgs)) to 12,000 µg/L at MW-136A (368.5 to 378 feet bgs);
- PCE concentrations range from 9.9 µg/L at MW-136A (270 to 348 feet bgs) to 20,000 µg/L at MW-75S;
- TCA concentrations range from undetected (at 5 µg/L) at MW-136A (270 to 348 feet bgs) to 190 J µg/L at MW-75S;
- The cis12DCE concentrations range from 11 µg/L at MW-37S to 20,000 µg/L at MW-136A (429 to 438.5 feet bgs);
- VC concentrations range from undetected (at 1 µg/L) at MW-93S to 37 J µg/L at MW-136A (441.5 to 467 feet bgs);
- 11DCA concentrations range from undetected (at 5 µg/L) to 7.5 J µg/L at MW-136A (441.5 to 467 feet bgs); and
- 11DCE concentrations range from undetected (at 5 µg/L) at MW-136A (270 to 348 feet bgs) to 12 J µg/L at MW-136A (441.5 to 467 feet bgs).

2.2.4 MNA Areas

The evaluation of MNA of COCs in groundwater at fYNOP includes annual sampling of 45 wells in MNA areas and the analysis of data to eventually demonstrate stable or decreasing COC concentrations through natural attenuation. Areas shown on **Figure 2.2-4** where MNA progress is evaluated include NPBA, Eastern Site Perimeter, South-Central Site Area, SPBA, SPA, Codorus Creek Levee, West Side of Codorus Creek, and Northern Site Perimeter. Analytical data from groundwater samples in the NPBA for off-Site former residential water supply wells RW-2 and RW-4 (Folk) in the MNA area is also reported in this subsection.

For purposes of the annual MNA evaluation presented in Section 3, the Cleanup Plan requires comparison between annual analytical data and baseline concentrations established in the Part 2 SRI and a comparison of the analytical data to regulatory standards.

Wells sampled and analyzed for VOCs and cyanide (one well) in MNA areas during annual monitoring are listed on **Table 2.2-1** and shown on **Figures 2.2-4 and 2.2-5** as follows:

- NPBA – Fourteen wells total: Ten on-Site monitoring wells (MW-3, MW-9, MW-12, MW-16S, MW-18S, MW-18D, MW-20S, MW-20M, MW-143S, and MW-143D), two on-Site inactive extraction wells (CW-1A and CW-2), and two off-Site residential supply wells north of Paradise Road (RW-2 and RW-4 (Folk)).
- Eastern Site Perimeter – Three wells total: On-Site wells MW-2, MW-14, and MW-65S; MW-2 was also sampled for total and available cyanide.
- South-Central Area – Eight wells total: Seven on-Site wells (MW-67S, MW-67D, MW-69, MW-79, MW-111, MW-112, and MW-115) around the Harley-Davidson manufacturing facility (Bldg3) and well MW-88 southwest of former Building 58 (Bldg58).
- SPBA – Seven wells total: One on-Site well (MW-22) and six off-Site wells (MW-108S, MW-108D, MW-165, MW-166, MW-167, and MW-168).
- SPA – Six wells total: One on-Site well in the south (MW-43D), four off-Site wells (MW-12 (Cole Steel), MW-150, GM-1D, and Cole D, and one off-Site well south of the SPBA along Old Arsenal Road (MW-110).
- Levee Area – One well pair total: Off-Site well pair W-101S and MW-101D in the southwest area of the Site.
- West Side of Codorus Creek – One well total: Off-Site Waterloo™ multilevel well MW-148A (two sample ports) on the west side of Codorus Creek.

- Northern Site Perimeter – Three wells total: On-Site wells MW-5, MW-6, and MW-82.

COCs in NPBA groundwater include TCE, PCE, and cis12DCE. Annual groundwater sample locations from fourteen NPBA wells are shown on **Figure 2.2-6**. The highest concentrations of TCE, PCE, and cis12DCE were detected in the MW-12 sample in the southcentral NPBA. Analytical results for COCs in NPBA groundwater samples are as follows:

- TCE concentrations range from undetected (at 1 µg/L) to 57 µg/L;
- PCE concentrations range from undetected (at 1 µg/L) to 3 J µg/L; and
- The cis12DCE concentrations range from undetected (at 1 µg/L) to 47 J µg/L.

COCs in Eastern Site Perimeter groundwater include TCE, PCE, and cyanide. TCE and PCE concentrations in annual groundwater samples from the three Eastern Site Perimeter wells are shown on **Plate 2.1-2**. Analytical results for COCs in Eastern Site Perimeter samples are as follows:

- TCE concentrations range from undetected (at 1 µg/L) to 17 µg/L.
- PCE concentrations range from 4.1 µg/L to 61 µg/L.

As shown on **Table 2.2-4**, both total and available cyanide (i.e., free cyanide and complexes that easily dissociate) were detected in the sample from MW-2 located in the southcentral portion of the Eastern Site Perimeter. The concentration of total cyanide in this sample exceeds the regulatory standard of 1.5 µg/L; the concentration of available cyanide was less than the regulatory standard of 200 µg/L.

COCs in South-Central Site Area groundwater include TCE, cis12DCE, VC, 11DCA, and 11DCE. Annual groundwater samples from eight South-Central Site Area wells are shown on **Plate 2.1-2**. Analytical results for COCs in samples of South-Central Site Area groundwater are as follows:

- TCE concentrations range from undetected (at 1 µg/L) to 9.4 µg/L;
- The cis12DCE concentrations range from undetected (at 1 µg/L) to 150 µg/L;
- VC concentrations range from undetected (at 1 µg/L) to 67 µg/L;
- 11DCA concentrations range from undetected (at 1 µg/L) to 20 µg/L; and
- 11DCE concentrations range from undetected (at 1 µg/L) to 3.1 µg/L.

COCs detected in SPBA groundwater include TCE and PCE. Annual groundwater samples from the seven SPBA wells are shown on **Plate 2.1-2**. Analytical results for COCs in 2019 SPBA samples are as follows:

- TCE concentrations range from undetected (at 1 µg/L) to 5.9 µg/L.
- PCE concentrations range from undetected (at 1 µg/L) to 14 µg/L

COCs in SPA groundwater include TCE, PCE, and cis12DCE. TCE and PCE concentrations in annual groundwater samples from the six SPA wells are shown on **Plate 2.1-2**. Analytical results for COCs in the SPA samples are as follows:

- TCE concentrations range from undetected (at 1 µg/L) to 46 µg/L;
- PCE concentrations range from undetected (at 1 µg/L) to 26 µg/L; and
- Cis12DCE concentrations range from undetected (at 1 µg/L) to 44 µg/L.

COCs in Codorus Creek Levee Area groundwater at well pair MW-101S and MW-101D include TCE, PCE, and cis12DCE. As shown on **Plate 2.1-2**, TCE and PCE concentrations in the groundwater samples from this well pair range from 1.2 µg/L (MW-101S) to 7.9 µg/L (MW-101D) and 4.4 µg/L (MW-101D) to 4.5 J µg/L (MW-101S), respectively; cis12DCE concentrations range from 1.2 µg/L (MW-101S) to 12 µg/L (MW-101D).

Along the West Side of Codorus Creek at Waterloo™ multilevel well MW-148A, no VOCs were detected in the groundwater samples from the two sample ports.

COCs in Northern Site Perimeter groundwater include TCE, PCE, and cis12DCE. As shown on **Plate 2.1-2**, TCE and PCE concentrations in groundwater samples from MW-5, MW-6, and MW-82 range from undetected (at 1 µg/L) to 1.9 µg/L at MW-82 and undetected (at 1 µg/L) to 1.1 µg/L at MW-82, respectively; cis12DCE concentrations range from undetected (at 1 µg/L) to 3.4 µg/L at MW-5.

2.2.5 VI Assessment at Eastern Site Perimeter Well MW-185

As described in the Revised Groundwater Human Health Risk Assessment (Groundwater RA) (NewFields, 2018), MW-185 was installed along the Eastern Site Perimeter as shown on **Figure 2.2-4** to determine the potential from VI exposure for an off-Site building located to the east of

MW-185. The Groundwater RA determined VI is not a human health risk based on concentrations of PCE in groundwater samples from MW-185.

The Cleanup Plan includes annual sampling of MW-185 to demonstrate no off Site VI exposure risk. As shown on **Table 2.2-3**, PCE was the only VOC detected in the 2019 groundwater sample from MW-185 at a concentration of 55 µg/L. An evaluation of the results is provided in subsection 3.5.

2.3 Surface Water Monitoring

Monitoring to verify that surface water quality parameters in Codorus Creek are met in accordance with Section 9.1.2.1 of the Cleanup Plan consists of monthly surface water sampling for VOCs. Background information for the scope of surface water monitoring is provided in Section 10.3.2 and Appendix E of the Cleanup Plan. The scope includes two years of monthly surface water monitoring followed by a report that presents an evaluation of monitoring data compared to PADEP Title 25, Chapter 93 surface water quality criteria. Surface water sampling locations are shown on **Figure 2.3-1**.

As stated in the Cleanup Plan, the WPL groundwater extraction system will be operated in its current configuration while its effect on Codorus Creek water quality is evaluated over a two-year period of monthly surface water monitoring. At the end of the two-year monitoring period, a shut-down test of the WPL extraction system will be conducted.

Table 2.3-1 provides the average flow in Codorus Creek based on published creek flow data from the United States Geologic Survey (USGS) for the date samples were collected. Flow in Codorus Creek on these dates ranged from 82 to 618 cubic feet per second (cfs). This flow is equal to or greater than normal creek flow of 113 cfs (i.e., harmonic mean flow - Q_h) and higher than low creek flow of 35 cfs (i.e., lowest 7-day average flow that occurs once every ten years - $Q_{7\text{-}10}$).

The first four rounds of monthly surface water monitoring were completed in September, October, November, and December, 2019. Samples were analyzed for VOCs from 12 locations along Codorus Creek shown on **Figure 2.3-1**. Three (3) locations of discrete groundwater discharge (COD-SW-15, COD-SW-17, and COD-SW-26) and nine (9) surface water monitoring locations

downstream of discharge locations (COD-SW-6, COD-SW-7, COD-SW-8, COD-SW-9, COD-SW-13, COD-SW-16, COD-SW-27, COD-SW-28, and COD-SW-29) were identified for sampling.

Table 2.3-2, presents analytical results for 2019 surface water samples that show one or more COCs detected in three groundwater discharge samples. TCE, PCE, and cis12DCE were detected in samples from COD-SW-15 and COD-SW-17, and PCE was detected in samples from COD-SW-26 as follows:

- TCE concentrations ranged from undetected (at 1 µg/L) to 1.6 µg/L;
- PCE concentrations ranged from undetected (at 1 µg/L) to 5.1 µg/L; and
- Cis12DCE concentrations ranged from undetected (at 1 µg/L) to 1.3 µg/L

COCs were not detected in the 2019 monthly samples from the nine surface water monitoring locations.

3 EVALUATION OF GROUNDWATER AND SURFACE WATER MONITORING RESULTS

This section contains an evaluation of 2019 data that includes water level measurements and chemical analysis of groundwater and surface water to determine the following:

- Performance of on-Site groundwater extraction systems in the WPL and SPBA;
- Progress of remediation of COCs in groundwater in specific areas of the Site designated for aquifer cleanup using MNA;
- Migration of the COC plume in the NPBA;
- Exposure potential of VI into an off-Site building from groundwater in the vicinity of MW-185 located near the Eastern Site Perimeter; and
- Quality of surface water in Codorus Creek.

Groundwater extraction and treatment system performance is evaluated based on objectives stated in the Cleanup Plan. For purposes of this annual evaluation of WPL and SPBA systems, performance is compared to historic flows and gradients induced by pumping.

The extraction component of the WPL system maintains a pumping rate that intercepts Site-impacted groundwater flowing westward toward Codorus Creek. To gauge performance, the WPL system flow rate is compared to the average annual flow rate (approximately 220 gallons per minute (gpm)) reported in the Part 2 SRI.

The SPBA groundwater extraction system pumps groundwater containing TCE and PCE at a rate to maintain a hydraulic gradient from off-Site areas toward the Site. This pumping rate is provided in the SPBA Effectiveness Report (GSC, 2019e) and approximates a 7.1 gpm yearly average.

The objective of the treatment component for both WPL and SPBA systems is to remove VOCs in each system influent to meet National Pollutant Discharge Elimination System (NPDES) discharge requirements after treatment. In addition, data concerning VOCs removed from the aquifer at specific extraction rates provide information for future evaluation of optimization of pumping rates, potential reduction in the number of wells operating, recommendations for well rehabilitation or replacement, and future shut down of the systems, when applicable.

MNA is proposed in the Cleanup Plan to meet the regulatory standard in the aquifer at designated Site wells. As required by the Cleanup Plan, MNA monitoring results are compared annually to baseline concentrations established in the Part 2 SRI. The most recent COC concentration data presented in the Part 2 SRI from samples collected between 2008 and 2015 were used for comparison. Yearly progress of remediation of COCs through MNA is also gauged by comparing COC concentrations in samples from MNA wells to regulatory standards. The long-term metric evaluated every five years is to demonstrate that COC concentration trends decline when above the regulatory standard or remain below the regulatory standard, once reached.

Groundwater elevation and analytical data from the NPBA is used to confirm that off-Site migration of COCs at unacceptable levels does not occur. This is accomplished by evaluating groundwater quality data and plotted flow gradients to determine the potential for plume migration off-Site.

Analytical results from groundwater sampling in MW-185 were evaluated to determine the potential for residential VI exposure for an off-Site building located east of MW-185 (NewFields, 2018). The metric for this analysis is to demonstrate that groundwater containing PCE at MW-185 does not exceed the PADEP VI residential screening value for PCE of 110 µg/L.

Data collected for water quality in a section of Codorus Creek was evaluated using PADEP Title 25, Chapter 93 surface water quality criteria applied at locations specified in the Cleanup Plan (points of application). After the two-year duration of monthly creek sampling, an evaluation of results using the methodology in the approved Cleanup Plan will be conducted. Therefore, a compliance evaluation of 2019 surface water quality data in Codorus Creek is not contained in this Report.

3.1 WPL Extraction and Treatment System Performance

Performance of the WPL groundwater extraction and treatment system is measured by VOC removal and ability to pump groundwater to intercept on-Site plumes. A detailed evaluation of yearly performance for the WPL system is presented in the Groundwater Extraction and Treatment System Annual Operations Report for the Period of January 1 through December 31, 2019 (HTG, 2020). The 2019 Annual Operations Report compared results of sampling and analysis of the combined flow (influent) from extraction wells and the effluent from the treatment system to

calculate mass of VOCs removed. Sufficient mass of VOCs must be removed to meet the discharge requirements in the NPDES permit for the treatment system.

The WPL groundwater extraction system has been operating since the early 1990s. The effectiveness of the extraction system was tested under a number of pumping scenarios and seasonal conditions described in Part 2 SRI. The testing demonstrated that the extraction system reduces mass flux of COCs in groundwater entering Codorus Creek from groundwater discharges.

The WPL extraction system has operated since February 2015 in its current pumping configuration. As reported in the Part 2 SRI, the system extracts Site-impacted groundwater from five wells (CW-9, CW-13, CW-15A, CW-17, and CW-20) at a combined flow rate of approximately 220 gpm. The layout of the extraction system is illustrated on **Figure 3.1-1**.

As stated in the Cleanup Plan, the WPL groundwater extraction system will be operated in its current configuration while surface water quality in Codorus Creek is monitored monthly over a two-year period. At the end of the two-year monitoring period, the WPL extraction system will be shut-down while monthly monitoring of surface water quality in Codorus Creek continues over a one-year period (a complete hydrologic cycle). The duration of the WPL groundwater extraction system shut-down will be based on the shutdown test results and recommendations in the Final Report.

3.1.1 VOC Mass Removal

The treatment component of the WPL system removes VOCs in the combined groundwater flow from five extraction wells to comply with NPDES discharge requirements. As discussed in the Cleanup Plan, monthly samples of the combined flow from extraction wells to the treatment system are collected to monitor mass removed by the treatment system.

Remedial action performance data for the first four months of WPL system monitoring (September through December 2019) are presented on **Table 2.2-5**. The table contains total VOC concentrations in samples of pumped groundwater, metered volume of groundwater extracted, and the sample collection date. Collected data were used to calculate VOC mass removed by the WPL system.

VOC mass removed from groundwater by the WPL system from September through December 2019 ranged from 63 to 93 pounds per month. The bar graph on **Figure 3.1-2** shows system performance data ranging from 8 pounds of VOC removed per million gallons pumped (pounds/MG) in September and October to 6 pounds/MG in December, 2019. This decrease is due to lower total VOC concentrations in groundwater from extraction wells during December sampling. The reduction in volume of groundwater pumped by the extraction system in September to October 2019 (12 MG per month) compared to November to December 2019 (11 MG per month) was due to excessive pump cycling caused by a faulty water level control. In mid-November 2019, the control was repaired and the CW-17 flow rate was gradually increased through December 2019 to maintain a drawdown in the well that could be achieved without excessive pump cycling.

3.1.2 Extraction Well Flow Rates

The Part 2 SRI reported that operation of the five WPL groundwater extraction wells in the current pumping configuration reduces VOC mass flux in groundwater to the creek. A total of 137 MG of groundwater were pumped by the WPL system in 2019 at an average flow rate of 261 gpm; the average monthly flow rate ranged from 240 gpm to 274 gpm. These data indicate that 2019 average flows exceed the combined system flow rate of 220 gpm reported in the Part 2 SRI for the WPL extraction system. Therefore, flow rates developed during pumping in 2019 are consistent with historic flows discussed in the Part 2 SRI.

Average monthly pumping rates from the WPL system were calculated based on flow meter readings recorded for each well. **Table 3.1-1** presents total gallons of groundwater pumped per month and average monthly pumping rates for the extraction system in 2019.

3.1.3 Groundwater Gradients Developed by Pumping

Equipotential contours developed from September 17, 2019 data represent pumping conditions in the WPL area (**Plate 2.1-1).** As shown on the Plate, pumping creates a groundwater depression around WPL extraction wells. This depression is illustrated by the 338 feet amsl contour that extends laterally from north of CW-17, southward to CW-13 and CW-9, and southwest from CW-9 to CW-20. The depression directs groundwater that normally flows westward towards Codorus Creek under non-pumping conditions to the extraction wells during pumping. The magnitude and

extent of gradients developed during pumping in 2019 are consistent with past gradients discussed in the Part 2 SRI.

3.2 SPBA System

Flow rate and gradient data collected during start-up and initial operation of the SPBA were presented in the SPBA Effectiveness Report (GSC, 2019e). Analysis of these data confirmed that extraction system pumping creates the necessary gradient in groundwater that slopes from Canterbury Lane toward the SPBA.

The SPBA Effectiveness Report also discussed discovery of a potential transient flow condition in the vicinity of MW-167, located along Canterbury Lane. Transient flow between the bedrock and the residuum may occur during extended periods of high precipitation and is potentially responsible for detected TCE and PCE concentrations in groundwater at MW-167. The results of quarterly monitoring to assess this condition at MW-167 are discussed in Subsection 3.2.4. According to the Cleanup Plan, a change to monitoring frequency may be proposed to PADEP and USEPA if, after two years of SPBA system operation, the results demonstrate the goal of the SPBA extraction system are met.

3.2.1 VOC Mass Removal

As discussed in the Cleanup Plan, monthly samples of the combined influent from CW-21, CW-22, and CW-23 are analyzed to comply with NPDES and to evaluate mass removed by treatment. Performance data for SPBA system operation in 2019 is shown on **Table 2.2-6**. Data for the first two months of system operation (November and December 2018) is included on the table for reference and completeness. The table presents total VOC concentrations in the system influent, metered groundwater volume extracted, and sample collection dates.

VOC mass removed from groundwater by the SPBA system from November 2018 through December 2019 ranged from 0.4 to 1.3 pounds per month. Ten pounds of VOCs were removed from groundwater by pumping 4.2 MG of groundwater by the SPBA system. Approximately 6.5 pounds, or 65 percent of total mass removed, occurred during the first six months of system operation (November 2018 through April 2019). The bar graph on **Figure 3.2-1** shows monthly groundwater volume pumped and a decrease in mass removal efficiency from four pounds/MG to

less than two pounds/MG. This decline was due to reduced VOC concentrations in groundwater extracted by pumping wells.

3.2.2 Extraction Well Flow Rates

Flow rates from three SPBA extraction wells are recorded to evaluate system performance as described in the Cleanup Plan. Flow rates from CW-21, CW-22, and CW-23 provide information for future evaluation of system optimization and whether rehabilitation of extraction wells is necessary to meet project objectives. Average daily pumping rates for the groundwater extraction system were calculated based on flow meter readings for each extraction well (**Figure 3.2-2)**. Total gallons pumped per day, average daily pumping rates, and temporary shutdown of any part of the system is included in **Appendix C**.

Flow rates indicate the SPBA system is operating as expected. Average daily pumping rates for CW-21, CW-22, and CW-23 from system startup in November 2018 through December 2019 were 4.3 gpm, 1.7 gpm, and 0.9 gpm, respectively. A total of 4.2 MG of groundwater were pumped from extraction wells during this period at an average rate of 6.9 gpm. This pumping rate is similar to the average rate established during the monitored startup of the extraction system (7.7 gpm) as discussed in the SPBA Effectiveness Report.

3.2.3 Groundwater Gradients Developed by Pumping

The Cleanup Plan objective for SPBA groundwater extraction is to maintain a hydraulic gradient from off-Site areas toward the Site; the objective is verified by evaluating quarterly water level elevation data from SPBA wells.

September 2019 water level elevation data on **Table 3.2-1** was used to generate equipotential contours for the SPBA shown on **Figures 3.2-3** and **3.2-4**. Graphs showing manual and continuous water level elevations are contained in **Appendix D**. A close-up view of the equipotential contours in the area of SPBA extraction wells is provided on **Figure 3.2-5**. September 2019 water level elevation data were also used to develop site-wide contours shown on **Plate 2.1-1**. The contours represent conditions in the SPBA after more than 11 months of sustained groundwater pumping.

Groundwater elevation contour data show a coalescing cone of depression around extraction wells CW-21 and CW-22 marked by the closed 340-foot and 350-foot amsl contours. Pumping influence at CW-23 is less pronounced due to a lower pumping rate. Flow lines on the figures represent a conceptual path of groundwater flow, and show that shallow groundwater containing PCE and TCE within the SPBA is being intercepted by pumping.

As discussed in the SPBA Effectiveness Report (GSC, 2019e), on-Site monitoring wells that measured pumping influence from each extraction well were paired with an important off-Site sentinel well located down-gradient of the extraction well during natural (non-pumping) flow conditions. Graphed water level elevation data from well groupings CW-21 and MW-166, CW-22 and MW-167, and CW-23 and MW-166 verify that off-Site gradients are sloping toward the SPBA during pumping as follows:

- **Figure 3.2-6** shows that water level elevations in MW-166 during CW-21 pumping were generally higher than water levels in wells being influenced by the pumping of CW-21 north of MW-166.
- **Figure 3.2-7** shows that water level elevations in MW-167 during CW-22 pumping were higher than water levels in wells being influenced by the pumping of CW-22 north of MW-167 except in MW-162 from May through December 2019. The higher water level in MW-162 is likely due to its construction in a zone of low permeability residuum where groundwater drains vertically downward into bedrock (GSC, 2019e). This condition will continue to be monitored during the operation of the SPBA groundwater extraction system in 2020. Recommendations to meet the groundwater gradient objective in this area of the SPBA will be provided in the next annual groundwater report if the condition at MW-162 persists. This includes consideration of potentially reconstructing (deepening) MW-162 similar to well MW-177R.
- **Figure 3.2-8** shows that water level elevations in MW-168 during CW-23 pumping were higher than water levels in all but one well being influenced by the pumping of CW-23 north of MW-168 (MW-163). Well MW-163 is a bedrock well where the upward groundwater flow component is likely accessed by well construction causing higher water levels than those measured in MW-168 (GSC, 2019e).

3.2.4 MW-167 Data Assessment

Although gradients indicate that shallow groundwater flow south from the SPBA is being controlled by pumping, analysis of the 2019 quarterly groundwater sample for monitoring well MW-167 reported detections of COCs ranging from 1.6 µg/L to 5.9 µg/L for TCE and 3.6 µg/L to 14 µg/L

for PCE. Transient flow between the bedrock and the residuum in the vicinity of MW-167 likely took place during record high precipitation events that occurred just months prior to start-up of the SPBA system. As shown on **Figure 2.2-2**, past results for TCE ranged from 1.7 µg/L to 20 µg/L; the highest value was recorded just prior to start-up of the SPBA system in the fall of 2018. This condition will continue to be monitored.

3.3 MNA Areas

The Cleanup Plan requires a comparison between annual COC concentrations in groundwater from 45 MNA area wells to baseline COC concentrations established in the Part 2 SRI; MNA progress is also gauged by comparing COC concentrations to regulatory standards. In addition, the Plan requires a 5-year evaluation of COC concentration trends and a verification that no off-Site migration of COCs occurs from MNA areas. For the trend analysis, a robust evaluation of COC concentrations using a Mann-Kendall statistical test (or another suitable method) will be performed to determine whether a downward trend supporting the MNA objective exists. Trend analysis will be used to determine if reasonable progress is being made to meet Cleanup Plan goals. Based on results, the need for further action or additional evaluations will be determined.

Table 3.3-1 contains 2019 COC concentrations in MNA area samples compared to regulatory standards and to baseline sample concentrations from the Part 2 SRI. The 45 well locations used to gauge MNA progress are shown on **Plate 2.1-2**.

COC concentrations in 2019 samples of NPBA groundwater are less than or equal to baseline concentrations in samples from 10 of 14 wells. Fewer number of 2019 groundwater samples than in the baseline data set contained COC concentrations above the regulatory standard (six versus nine).

COC concentrations in 2019 samples from three Eastern Site Perimeter wells are less than or equal to baseline concentrations. Samples from the same two wells (MW-2 and MW-65S) in the 2019 and baseline data sets contain COC concentrations exceeding the regulatory standard.

COC concentrations in 2019 samples collected from South-Central Site Area wells are less than or equal to baseline concentrations in groundwater from six of the eight wells sampled. A fewer number of 2019 samples than in the baseline data set is reported with COC concentrations above the regulatory standard (two versus six).

In 2019, COC concentrations in groundwater collected from seven SPBA wells are less than or equal to the baseline concentrations in six of the seven wells sampled. A fewer number of 2019 samples than baseline samples were reported with COC concentrations above the regulatory standard (one versus three).

COC concentrations in groundwater from SPA wells sampled in 2019 are less than or equal to baseline concentrations in three of six wells. Five samples with COC concentrations above the regulatory standard were reported in 2019 compared to four baseline samples. The greatest increase in COC concentrations between 2019 and baseline data were reported in the SPA where 2019 PCE concentrations exceed baseline concentrations in groundwater from one well (Cole D – 26 µg/L versus 3.8 µg/L) and TCE concentrations exceed baseline concentrations in groundwater from two wells (MW-150 - 46 µg/L versus 6.4 µg/L and MW-12 (Cole Steel) - 13 J µg/L versus 0.9 J µg/L).

COC concentrations in groundwater collected in 2019 from two Levee Area wells and two sample ports from one well located on the west side of Codorus Creek are less than or equal to baseline concentrations and regulatory standards in three of four wells sampled.

Of three wells sampled in 2019 from the Northern Site Perimeter, no samples contained COCs above either the baseline concentrations or the regulatory standards.

3.4 Plume Migration Assessment in NPBA

The Cleanup Plan requires an annual evaluation of plume movement in the NPBA to confirm that off-Site migration is not occurring to the north and west. Monitoring for off-Site migration of COCs is necessary because potential transient flow during high precipitation events was documented in the 2018 Annual Monitoring Progress Report for NPBA Extraction System Shutdown (GSC, 2019c).

Prior to the start of the 22-year operation of the NPBA groundwater extraction and treatment system in 1990, COCs were detected in off-Site residential supply wells north of the Site along Paradise Road. Even though the natural flow gradient in this area is southwest, past residential pumping presumably caused COC plume migration northward toward these residential wells. Once COCs were detected, potable use of the former residential supply wells was discontinued; however, RW-2

and RW-4 are still available for monitoring. COCs were also detected along the western border of the NPBA in samples from well MW-18S.

Data collected in the NPBA between 2013 (shut-down of the extraction and treatment system) and 2018 showed no significant rebound (i.e., upward trends in COC concentrations in groundwater).. Post-pumping flow gradients in the aquifer beneath the NPBA are to the southwest, away from residential properties to the north. In addition, a natural western gradient in the vicinity of MW-18S and MW-18D exists where groundwater from the NPBA has the potential to migrate off-Site based on aquifer data collected following shutdown of the NPBA system. Although the natural gradient in the aquifer parallels the property line and does not trend in an off-Site direction, the potential exists for anisotropic flow during large precipitation events and annual monitoring will continue in this area.

3.4.1 Potential for Northern Plume Migration Off Site

In 2018, groundwater elevation data indicated the potential for northern plume migration off Site based on higher water level elevations in CW-2 and MW-9 than in nearby off-Site well RW-2 (see graph on **Figure 3.4-1**). This condition, described in the 2018 NPBA Progress Report, was attributed to historically high levels of precipitation during late summer of 2018 when unusually high water levels in NPBA wells may have resulted in a short-term northward gradient toward off-Site well RW-2. However, the 2018 TCE concentration in the sample from RW-2 did not increase as a result. Therefore, the condition was thought to be transient related to a combination of historically high precipitation and anisotropy within the aquifer.

In 2019, the gradient documented in 2018 was not observed. The water level elevation in CW-2 was lower than that in RW-2 resulting in a southeastern gradient consistent with data plotted prior to 2018. Although the groundwater elevation in the vicinity of MW-9 (526.67) is slightly higher than that measured in RW-2 (526.24), the contour configuration in this area shows a much steeper gradient from MW-9 to CW-4 (516.63) and CW-3 (502.96), indicating flow to the southeast, away from RW-2 and RW-4.

In addition to groundwater flow gradients, groundwater chemistry data are used to determine plume migration. Analytical data from samples in RW-2 do not show increasing COC concentrations with

time, nor a spike in concentrations in 2019 samples. As shown on **Figure 2.2-6**, historic COC concentrations in groundwater from 2013 through 2019 following the shutdown of the NPBA system are similar. COCs remain undetected at RW-4 and only TCE is detected in groundwater samples from RW-2 at concentrations below the regulatory standard of 5 µg/l. Therefore, plume migration to the north is not indicated by COC data in samples from the former residential wells.

3.4.2 Potential for Western Plume Migration Off Site

A south-southwestern groundwater flow gradient exists in the area of MW-18S and MW-18D in the western portion of the NPBA (GSC, 2019c). This gradient, indicated by the blue groundwater flow path arrow shown on **Figure 2.2-6**, is nearly parallel to the property line in the vicinity of well pairs MW-18S and MW-18D, MW-142S and MW-142D, and MW-143S and MW-143D. With cis12DCE and TCE concentrations in the samples at MW-18S and MW-18D and anisotropic groundwater flow (preferential permeability) along bedding/cleavage planes, the potential exists for the western edge of the COC plume to extend across the property line.

The concentration of TCE in the September 2019 samples from MW-18S and MW-18D is approximately 3 µg/L. COC analytical results from samples in MW-142 and MW-143 well pairs reported no detection of TCE. These analytical results and consistent southwest lateral gradient from MW-18S and MW-18D to MW-142 and MW-143 indicate that COCs in groundwater do not migrate west from the Site.

3.5 VI Assessment at Eastern Site Perimeter Well MW-185

The Cleanup Plan includes annual monitoring to demonstrate no residential VI exposure risk for an off-Site building east of well MW-185 along the Eastern Site Perimeter. The PCE concentration in the 2019 groundwater sample from MW-185 of 55 µg/L is below the PADEP VI residential screening value for PCE of 110 µg/L. Therefore, the PCE in MW-185 groundwater does not pose a potential health risk.

3.6 Surface Water Monitoring

As discussed in Section 2, the first four rounds of monthly surface water monitoring were completed in 2019 to verify compliance with surface water quality criteria in Codorus Creek.

Analytical results for 2019 samples show COCs were not detected in samples from nine surface water monitoring locations and detections of PCE, TCE, and cis12DCE in three groundwater discharge locations (COD-SW-15, COD-SW-17, and COD-SW-26). Detected concentrations ranged from undetected (at 1 µg/L) to 5.1 µg/L (PCE), undetected (at 1 µg/L) to 1.6 µg/L (TCE), and undetected (at 1 µg/L) to 1.3 µg/L (cis12DCE). A surface water sampling report will be prepared following the completion of two years of monthly surface water monitoring.

4 CONCLUSIONS

In 2019, 145 samples were analyzed for VOCs and one sample was analyzed for metals during monthly, quarterly, and annual monitoring. Samples were collected from 70 wells, 12 surface water locations, and two groundwater extraction systems. Water levels were measured at 216 wells and two surface water locations.

Monitoring in 2019 was completed consistent with the requirements in the Cleanup Plan. Performance goals for both the WPL and SPBA groundwater extraction and treatment systems were met as follows:

- Yearly average pumping rates in 2019 for the WPL system exceed established rates developed in the Part 2 SRI (261 gpm versus 220 gpm) and are consistent with historic groundwater extraction from this area.
- The magnitude and extent of gradients developed during WPL pumping in 2019 are consistent with past gradients discussed in the Part 2 SRI for this area.
- The first four rounds of monthly Codorus Creek monitoring demonstrate successful performance of the WPL system by verifying compliance with surface water quality criteria at twelve points of application specified in the Cleanup Plan. A surface water sampling report will be prepared following completion of two years of monthly surface water monitoring.
- Yearly average pumping rates in 2019 for the SPBA system are similar to the average flow rate established during the monitored startup of the extraction system (6.9 gpm versus 7.7 gpm).
- Groundwater elevation and flow gradient data from 2019 during SPBA pumping confirms a groundwater gradient that slopes from off-Site wells located along Canterbury Lane toward on-Site wells located in the SPBA.
- The analytical results for groundwater from MW-167 reported detections of COCs in 2019 that range from 1.6 µg/L to 5.9 µg/L for TCE and 3.6 µg/L to 14 µg/L for PCE. Transient flow between the bedrock and the residuum in the vicinity of MW-167 likely occurred during record high precipitation prior to start-up of the SPBA system. This condition will continue to be monitored.
- The WPL and SPBA groundwater extraction and treatment systems removed sufficient VOC mass from the combined flow from extraction wells such that NPDES requirements were met in 2019. WPL system operation from September through December 2019 removed between 63 to 93 pounds of VOCs per month. The SPBA system removed between 0.4 to 1.3 pounds per month from November 2018 through December 2019.

The Cleanup Plan requires annual monitoring and evaluation of MNA progress by comparing yearly COC concentrations in groundwater to Part 2 SRI baseline concentrations, to generate data for a 5-year review where COC trends are evaluated, and to verify that no off-Site migration occurs. COC concentrations in 2019 samples indicate a general improvement of the groundwater quality in the vicinity of MNA area wells. In 2019, COC concentrations in 34 of the 45 samples from MNA wells are less than or equal to baseline concentrations. A fewer number of 2019 samples than baseline samples were reported with COC concentrations above the regulatory standard (17 versus 26).

The greatest increases in COC concentrations between 2019 and baseline data were reported in the SPA where 2019 PCE concentrations exceed baseline concentrations in groundwater from one well (Cole D – 26 µg/L versus 3.8 µg/L) and TCE concentrations exceed baseline concentrations in groundwater from two wells (MW-150 - 46 µg/L versus 6.4 µg/L and MW-12 (Cole Steel) - 13 J µg/L versus 0.9 J µg/L).

The Cleanup Plan requires annual evaluation of the plume in the NPBA to confirm that northern and westward migration off the Site does not occur. Monitoring results for off-Site migration of COCs in groundwater north and west from the NPBA indicate the following:

- Groundwater elevation contours developed from September 2019 data indicate that groundwater flow is southwest, away from RW-2 and RW-4. Analysis of groundwater samples from residential wells RW-2 and RW-4 reported only TCE detected from RW-2 at a concentration below the regulatory standard of 5 µg/l. The transient flow condition reported in 2018 was not observed in 2019. These data indicate that the plume is not migrating northward off the Site.
- A south-southwestern groundwater flow gradient exists in the western NPBA near MW-18S. A consistent southwest lateral gradient from MW-18S and MW-18D toward MW-142 and MW-143 well pair exists. The results of 2019 groundwater sampling directly downgradient of MW-18S (MW-142S and MW-142D and MW-143S and MW-143D) report very low COC concentrations (less than 1 µg/L) that indicate COCs in groundwater do not migrate westward at levels of concern.

The Cleanup Plan includes annual monitoring to demonstrate no residential exposure risk from VI for an off-Site building east of well MW-185 along the Eastern Site Perimeter. PCE at 55 µg/L in the 2019 groundwater sample from MW-185 is below the PADEP VI residential screening value for PCE of 110 µg/L. Therefore, PCE in MW-185 groundwater does not pose a potential health risk.

5 LABORATORY DATA QUALITY ASSESSMENT

Electronic data deliverables (EDDs) from the laboratory (Eurofins TestAmerica, Pittsburgh) are entered into the fYNOP database during the process of managing environmental chemistry data at the fYNOP Site. Groundwater Sciences Corporation (GSC) reviewed the data packages provided by the laboratory for groundwater and surface water samples in accordance with the QAPP and qualified individual sample results as necessary in the fYNOP database.

The DQA was performed by GSC on nine rounds of monthly and quarterly SPBA data from March through December 2019, on four rounds of monthly and quarterly WPL and surface water data from September to December 2019, and on data from the annual MNA area well sampling in September and October 2019. The laboratory DQA was performed in accordance with the quality assurance/quality control (QA/QC) program described in this section. Twenty-four sample delivery groups (SDGs) were generated for these groundwater and surface water samples. Data packages for the SDGs were reviewed for holding time exceedances of VOCs and cyanide (one sample), and for surrogate recoveries, and blank detections of VOCs as part of the general review of data packages. The laboratory case narratives for the SDGs were also reviewed.

The groundwater, surface water, and associated quality control (QC) blank samples were analyzed for VOCs and cyanide using approved methods specified in the QAPP. The GSC data validator conducted a complete validation of the VOC analytical data in the SDGs for compliance with QC criteria in accordance with Section B.2.8 of the QAPP using Technical Procedure TP-DM-300-7 (Rev. 3, June 2009). TP-DM-300-7 uses the following categories to address the data quality objectives (DQOs) of precision, accuracy, bias, representativeness, comparability, completeness, and sensitivity listed on Table A-4 of the QAPP as follows:

1. Review and verification of the laboratory case narrative;
2. Verification of sample reanalysis and secondary dilutions were used to assess the DQOs for comparability and sensitivity;
3. Holding time limits were used to assess the DQOs for representativeness and low bias;
4. Surrogate (System Monitoring Compound) percent recoveries (%R) for organic methods were used to assess the DQOs for accuracy and low/high bias;

5. Internal Standard (IS) area counts and retention times for organic methods were used to assess the DQO for accuracy;

6. Blank contamination (in method, field, equipment rinse, and trip blanks) was used to assess the DQOs for accuracy and high bias;

7. Relative Response Factors (RRFs) in initial calibration and continuing calibrations, Percent Relative Standard Deviation (%RSD) in initial calibrations, and Percent Difference (%D) in continuing calibrations were used to assess the DQOs for accuracy and low/high bias;

8. Matrix Spike and Matrix Spike Duplicate (MS/MSD), %R, and Relative Percent Difference (RPD) were used to assess the DQO for low/high bias;

9. Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD), %R, and RPD were used to assess the DQOs for precision, accuracy and low/high bias; and

10. Field duplicate samples were used to assess the DQO for precision at the frequency of one field duplicate per 20 environmental samples being analyzed for VOCs.

As defined by the DQOs, groundwater and surface water chemistry data and associated QC data were evaluated on these categories and qualified according to the outcome of the review. During the review, laboratory-applied data qualifiers such as "E" (estimated concentration outside the calibration limits) and "B" (analyte detected in the associated method blank) were evaluated. During verification, individual sample results were qualified as necessary to designate usability of the data toward meeting project objectives. Data qualifiers were applied based on deviations from the measurement performance criteria identified in TP-DM-300-7 and Table A-4 of the QAPP. The qualifiers used are defined as follows:

- U - The analyte was analyzed, but was not detected above the reported sample quantitation limit. These results are qualitatively acceptable;
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. Although estimated, these results are qualitatively acceptable; and
- UJ - The analyte was not detected above the reported sample quantitation limit. The reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. Although estimated, these results are qualitatively acceptable.

- R - The analyte result was rejected due to serious deficiencies in the ability to analyze the sample and/or meet QC criteria. The presence or absence of the analyte cannot be verified.

In accordance with TP-DM-300-7, the contents of the data packages and QA/QC results were compared to the requirements of the analytical method. GSC evaluated QC data reported by the laboratory against required precision and accuracy limits established in Table A-4 of the QAPP. Validation reports generated for the SDGs are presented on the table in **Appendix E**. This table lists only the analytical results qualified by the data validator that show the original laboratory qualifiers and reported values together with the final qualifiers (U, J, UJ, or R) and values applied by the validator. A detailed narrative on precision, accuracy, bias, representativeness, comparability, completeness, and sensitivity is provided in **Appendix F**.

In summary, the analytical results were acceptable as reported by the analytical laboratory with exceptions as follows:

- The %R for 10 reported analytes was outside LCS/LCSD control limits, and the results for 55 samples were qualified "J" or "UJ" based on LCS/LCSD %R acceptance criteria.
- MS/MSD results outside the QC limits for VOCs resulted in the qualification ("J" or "UJ") of 10 analytes in six samples due to the potential for high bias where the MS/MSD results were greater than the UCL, and the potential for low bias where the MS/MSD results were less than the lower control limit (LCL).
- Results from eight samples were qualified "J" or "UJ" based on surrogate %R criteria.
- Eighteen results for 1,4-dioxane were rejected ("R") due to the low RRF in the initial calibrations for this parameter. Seven results for 1,4-dioxane were rejected ("R") due to a low RRF in the continuing calibration. The requirement for RRF of less than 0.01 was not met for any sample where 1,4-dioxane was analyzed by SW-846 Method 8260C, because that method is not appropriate for quantifying 1,4-dioxane concentrations in aqueous samples. Note that these samples were analyzed prior to modifying the QAAP on August 28, 2019 to remove 1,4-dioxane from the project analyte list for VOCs using SW-846 Method 8260C in lieu of analyzing it using SW-846 Method 8270D low level (LL) (GSC, 2019b). Future analysis of groundwater samples for 1,4-dioxane will be completed using SW-846 Method 8270D LL to eliminate this issue.
- Six analytes in 32 samples were qualified as not detected and estimated ("UJ") based on continuing calibration verification (CCV) criteria.
- The results for one trip blank collected in November 2019 were rejected ("R") due to the sample having been analyzed outside the 12-hour tune window of SW-846 Method

8260C in order to meet the analytical holding time. Reanalysis was not possible due to insufficient sample volume remaining.

- VOC results from six samples were qualified "J" or "UJ" due to holding time exceedances with the potential for low bias. Analysis of the diluted (1000x) run for one of these six samples occurred within the holding time and two analyte detections from this diluted run were reported with qualification "J" or "UJ" because they were analyzed at a lesser serial dilution (100x) that captured low levels of VOCs that otherwise were lost in the higher 1000x dilution.

6 REFERENCES

GSC, 2012. Field Sampling Plan for Part 2 of the Supplemental Groundwater Remedial Investigation at the former York Naval Ordnance Plant in York, Pennsylvania, April.

GSC, 2014. Quality Assurance Project Plan, Former York Naval Ordnance Plant, 1425 Eden Road, York, Pennsylvania, Rev. 1 August.

GSC, 2016. Groundwater and Surface Water Monitoring Plan, Former York Naval Ordnance Plant, 1425 Eden Road, Springettsbury Township, York, Pennsylvania, September.

GSC, 2018. Supplemental Remedial Investigation Groundwater Report (Part 2) Former York Naval Ordnance Plant, August 2016 and Revised March 2018.

GSC, 2019a. Site-Wide Cleanup Plan, Former York Naval Ordnance Plant, 1425 Eden Road, Springettsbury Township, York, Pennsylvania, November.

GSC, 2019b. Modification to the Quality Assurance Project Plan, Former York Naval Ordnance Plant (fYNOP), York, Pennsylvania, August.

GSC, 2019c. 2018 Annual Monitoring Progress Report for the NPBA Extraction System Shutdown, Former York Naval Ordnance Plant, 1425 Eden Road, Springettsubry Township, York, Pennsylvania, April.

GSC, 2019d. Comprehensive Groundwater Monitoring Report for 2018, Former York Naval Ordnance Plant, 1425 Eden Road, Springettsbury Township, York, Pennsylvania, April.

GSC, 2019e. Southern Property Boundary Area Groundwater Extraction System Operation Effectiveness Report, Former York Naval Ordnance Plant, 1425 Eden Road, York, PA 17402, October.

HTG, 2020. Groundwater Extraction and Treatment System Annual Operations Report for the Period January 1 Through December 31, 2019, Former York Naval Ordnance Plant, March.

NewFields, 2018. Revised Groundwater Human Health Risk Assessment, Former York Naval Ordnance Plant, March.

Tables

TABLE 2.1-1
Site-Wide Water Level and Elevation Data (2016-2019)
Former York Naval Ordnance Plant - York, PA

		12/9/2016			10/16/2017			9/27/2018			9/17/2019		
		December 2016 Site Wide Water Levels			October 2017 Site Wide Water Levels			September 2018 Site Wide Water Levels			September 2019 Site Wide Water Levels		
Location	Site Type	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev
CW-1	Collection Well	570.07	44.09	525.98	570.07	40.28	529.79	570.07	34.21	535.86	570.07	41.85	528.22
CW-1A	Collection Well	568.28	40.41	527.87	568.28	36.93	531.35	568.28	29.95	538.33	568.28	38.28	530.00
CW-2	Collection Well	556.95	32.32	524.63	556.95	27.49	529.46	556.95	19.02	537.93	556.95	30.87	526.08
CW-3	Collection Well	518.66	18.42	500.24	518.66	16.22	502.44	518.66	13.29	505.37	518.66	15.70	502.96
CW-4	Collection Well	541.55	29.45	512.10	541.55	23.97	517.58	541.55	20.19	521.36	541.55	24.92	516.63
CW-5	Collection Well	470.34	19.55	450.79	470.34	18.70	451.64	470.34	4.95	465.39	470.34	19.06	451.28
CW-6	Collection Well	484.67	8.55	476.12	484.67	7.63	477.04	484.67	5.92	478.75	484.67	8.15	476.52
CW-7	Collection Well	573.78	43.42	530.36	573.78	38.19	535.59	573.78	29.91	543.87	573.78	40.37	533.41
CW-7A	Collection Well	573.91	45.48	528.43	573.91	41.38	532.53	573.91	33.23	540.68	573.91	43.08	530.83
CW-8	Abandoned Collection Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
CW-9	Collection Well	356.82	23.25	333.57	356.82	23.42	333.40	356.82	18.80	338.02	356.82	25.95	330.87
CW-13	Collection Well	358.85	31.00	327.85	358.85	35.75	323.10	358.85	34.85	324.00	358.85	35.58	323.27
CW-14	Monitoring Well	361.63	26.45	335.18	361.63	28.40	333.23	361.63	28.83	332.80	361.63	29.96	331.67
CW-15	Abandoned Collection \Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
CW-15A	Collection Well	360.11	28.58	331.53	360.11	35.82	324.29	360.11	34.30	325.81	360.11	35.15	324.96
CW-16	Abandoned Collection Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
CW-17	Collection Well	358.70	22.65	336.05	358.70	25.62	333.08	358.70	25.95	332.75	358.70	27.12	331.58
CW-18	Abandoned Collection Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
CW-19	Abandoned Collection Well	D	D	D	D	D	D	AB	AB	AB	AB	AB	AB
CW-20	Collection Well	361.49	74.93	286.56	NM	NM	NM	361.49	20.43	341.06	361.49	26.86	334.63
CW-21	Collection Well	NM	NM	NM	415.69	61.40	354.29	415.72	55.24	360.48	415.72	93.39	322.33
CW-22	Collection Well	NM	NM	NM	415.97	62.20	353.77	415.71	56.29	359.42	415.71	96.82	318.89
CW-23	Collection Well	NM	NM	NM	417.98	35.80	382.18	418.11	29.48	388.63	418.11	56.70	361.41
MPE-1	Monitoring Well	NM	NM	NM	415.88	47.29	368.59	415.88	37.49	378.39	415.88	49.09	366.79
MPE-2	Monitoring Well	NM	NM	NM	415.15	61.44	353.71	415.15	55.20	359.95	415.15	67.35	347.80
MPE-3	Monitoring Well	NM	NM	NM	417.65	35.16	382.49	417.65	29.80	387.85	417.65	43.32	374.33
MW-1	Monitoring Well	380.73	38.60	342.13	380.73	38.11	342.62	380.73	34.83	345.90	380.73	39.74	340.99
MW-2	Monitoring Well	508.88	72.06	436.82	508.88	66.60	442.28	508.88	61.85	447.03	508.88	68.74	440.14
MW-3	Monitoring Well	541.10	69.49	471.61	541.10	66.25	474.85	541.10	61.16	479.94	541.10	66.65	474.45
MW-5	Monitoring Well	369.71	26.56	343.15	369.71	25.36	344.35	369.71	20.79	348.92	369.71	25.92	343.79
MW-6	Monitoring Well	359.62	19.05	340.57	359.62	19.75	339.87	359.62	16.52	343.10	359.62	20.30	339.32
MW-7	Monitoring Well	359.48	24.27	335.21	359.48	26.55	332.93	359.48	25.56	333.92	359.48	27.00	332.48
MW-8	Monitoring Well	358.09	22.10	335.99	358.09	21.40	336.69	358.09	17.08	341.01	358.09	23.52	334.57
MW-9	Monitoring Well	558.78	34.14	524.64	558.78	30.74	528.04	558.78	25.24	533.54	558.78	32.11	526.67
MW-10	Monitoring Well	567.80	42.87	524.93	567.80	39.03	528.77	567.80	32.44	535.36	567.80	40.46	527.34
MW-11	Monitoring Well	563.08	27.41	535.67	563.08	24.57	538.51	563.08	20.92	542.16	563.08	27.30	535.78
MW-12	Monitoring Well	535.93	37.91	498.02	535.93	35.10	500.83	535.93	29.85	506.08	535.93	33.87	502.06
MW-14	Monitoring Well	519.54	35.23	484.31	519.54	32.81	486.73	519.54	28.87	490.67	519.54	34.26	485.28
MW-15	Monitoring Well	523.95	62.39	461.56	523.95	61.37	462.58	523.95	53.20	470.75	523.95	61.50	462.45
MW-16D	Monitoring Well	516.73	-2.55	519.28A	516.73	-6.52	523.25A	516.73	-9.94	526.67A	516.73	-2.36	519.09A
MW-16S	Monitoring Well	516.60	21.24	495.36	516.60	16.83	499.77	516.60	7.46	509.14	516.60	5.92	510.68
MW-17	Monitoring Well	456.86	16.37	440.49	456.86	14.64	442.22	456.86	11.79	445.07	456.86	14.92	441.94
MW-18D	Monitoring Well	464.52	-6.89	471.41A	464.52	-7.16	471.68A	464.52	-7.62	472.14A	464.52	-8.82	473.34A
MW-18S	Monitoring Well	464.52	-1.09	465.61A	464.52	-3.75	468.27A	464.52	-0.32	464.84A	464.52	-6.32	470.84A
MW-19	Monitoring Well	427.36	26.68	400.68	427.36	23.20	404.16	427.36	20.41	406.95	427.36	23.40	403.96
MW-20D	Monitoring Well	573.85	36.13	537.72	573.85	30.21	543.64	573.85	21.47	552.38	573.85	33.25	540.60
MW-20M	Monitoring Well	574.19	45.55	528.64	574.19	41.24	532.95	574.19	33.32	540.87	574.19	43.17	531.02
MW-20S	Monitoring Well	574.05	45.81	528.24	574.05	41.68	532.37	574.05	33.36	540.69	574.05	47.31	526.74
MW-22	Monitoring Well	447.57	69.39	378.18	447.57	61.22	386.35	447.57	55.89	391.68	447.57	64.10	383.47
MW-26	Monitoring Well	379.44	28.94	350.50	379.44	26.40	353.04	379.44	20.90	358.54	379.44	27.88	351.56
MW-27	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-28	Monitoring Well	366.78	24.79	341.99	366.78	24.38	342.40	366.78	20.90	345.88	366.78	26.32	340.46
MW-29	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-30	Monitoring Well	362.26	16.83	345.43	362.26	16.58	345.68	362.26	12.08	350.18	362.26	17.53	344.73
MW-31D	Monitoring Well	369.30	21.22	348.08	369.30	18.65	350.65	369.30	13.60	355.70	369.30	19.73	349.57
MW-31S	Monitoring Well	369.28	20.43	348.85	369.28	18.09	351.19	369.28	13.11	356.17	369.28	19.41	349.87
MW-32D	Monitoring Well	366.65	24.57	342.08	366.65	24.16	342.49	366.65	21.11	345.54	366.65	26.15	340.50
MW-32S	Monitoring Well	366.62	24.61	342.01	366.62	24.21	342.41	366.62	21.02	345.60	366.62	26.08	340.54
MW-33	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-34D	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-34S	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-35D	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-35S	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-36D	Monitoring Well	370.96	27.42	343.54	370.96	26.30	344.66	370.96	21.79	349.17	370.96	26.57	344.39
MW-36S	Monitoring Well	370.95	26.94	344.01	370.95	25.73	345.22	370.95	20.28	350.67	370.95	26.93	344.02
MW-37D	Monitoring Well	359.11	23.95	335.16	359.11	22.76	336.35	359.11	18.74	340.37	359.11	25.70	333.41
MW-37S	Monitoring Well	359.13	21.62	337.51	359.13	20.97	338.16	359.13	18.11	341.02	359.13	24.01	335.12
MW-38D	Monitoring Well	358.62	21.75	336.87	358.62	21.82	336.80	358.62	18.28	340.34	358.62	23.08	335.54
MW-39D	Monitoring Well	360.21	22.15	338.06	360.21	23.37	336.84	360.21	20.83	339.38	360.21	23.61	336.60
MW-39S	Monitoring Well	360.14	22.68	337.46	360.14	22.94	337.20	360.14	20.88	339.26	360.14	23.54	336.60
MW-40D	Monitoring Well	374.65	32.16	342.49	374.65	31.62	343.03	374.65	28.14	346.51	374.65	33.51	341.14
MW-40S	Monitoring Well	374.69	32.33	342.36	374.69	31.35	343.34	374.69	27.72	346.97	374.69	33.62	341.07
MW-43D	Monitoring Well	380.08	36.21	343.87	380.08	35.50	344.58	380.08	29.55	350.53	380.08	37.05	343.03
MW-43S	Monitoring Well	379.76	36.55	343.21	379.76	35.29	344.47	379.76	28.92	350.84	379.76	36.79	342.97
MW-45	Monitoring Well	360.57	18.53	342.04	360.57	18.45	342.12	360.57	16.59	343.98	360.57	20.28	340.29
MW-46	Monitoring Well	360.24	18.69	341.55	360.24	18.64	341.60	360.24	14.90	345.34	360.24	21.65	338.59
MW-47	Monitoring Well	360.45	19.32	341.13	360.45	20.47	339.98	360.45	17.91	342.54	360.45	22.57	337.88
MW-49D	Monitoring Well	360.45	17.94	342.51	360.45	17.97	342.48	360.45	14.43	346.02	360.45	18.96	341.49
MW-49S	Monitoring Well	360.44	17.88	342.56	360.44	17.95	342.49	360.44	14.34	346.10	360.44	18.60	341.84
MW-50D	Monitoring Well	363.36	23.93	339.43	363.36	24.21	339.15	363.36	22.20	341.16	363.36	25.81	337.55
MW-50S	Monitoring Well	363.42	22.84	340.58	363.42	24.42	339.00	363.42	21.53	341.89	363.42	26.90	336.52
MW-51D	Monitoring Well	363.11	26.98	336.13	363.11	27.85	335.26	363.11	26.33	336.78	363.11	28.26	334.85

TABLE 2.1-1
Site-Wide Water Level and Elevation Data (2016-2019)
Former York Naval Ordnance Plant - York, PA

		12/9/2016			10/16/2017			9/27/2018			9/17/2019		
		December 2016 Site Wide Water Levels			October 2017 Site Wide Water Levels			September 2018 Site Wide Water Levels			September 2019 Site Wide Water Levels		
Location	Site Type	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev
MW-51S	Monitoring Well	363.20	25.63	337.57	363.20	27.74	335.46	363.20	27.80	335.40	363.20	29.81	333.39
MW-53	Abandoned Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-54	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-55	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-56	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-57	Monitoring Well	362.30	19.14	343.16	362.30	19.14	343.16	362.30	15.41	346.89	362.30	20.73	341.57
MW-64D	Monitoring Well	416.43	64.43	352.00	416.43	62.09	354.34	416.43	55.70	360.73	416.43	64.80	351.63
MW-64S	Monitoring Well	D	D	D	416.34	38.45	377.89	416.34	32.49	383.85	416.34	40.32	376.02
MW-65D	Monitoring Well	546.80	51.12	495.68	546.80	48.73	498.07	546.80	46.02	500.78	546.80	49.08	497.72
MW-65S	Monitoring Well	546.82	52.09	494.73	546.82	49.80	497.02	546.82	47.39	499.43	546.82	50.10	496.72
MW-66D	Monitoring Well	506.92	43.56	463.36	506.92	40.78	466.14	506.92	35.83	471.09	506.92	40.98	465.94
MW-66S	Monitoring Well	506.73	41.70	465.03	506.73	39.50	467.23	506.73	34.64	472.09	506.73	39.79	466.94
MW-67D	Monitoring Well	446.26	-0.31	446.57	446.26	-0.76	447.02	446.26	-0.32	446.58	446.26	0.32	445.94
MW-67S	Monitoring Well	446.26	15.09	431.17	446.26	11.41	434.85	446.26	8.75	437.51	446.26	12.65	433.61
MW-68	Monitoring Well	458.06	8.47	449.59	458.06	7.23	450.83	458.06	4.25	453.81	458.06	7.23	450.83
MW-69	Monitoring Well	411.90	18.24	393.66	411.90	12.42	399.48	411.90	6.59	405.31	411.90	14.32	397.58
MW-70D	Monitoring Well	416.31	30.03	386.28	416.31	24.81	391.50	416.31	18.53	397.78	416.31	25.32	390.99
MW-70S	Monitoring Well	416.21	29.96	386.25	416.21	24.41	391.80	416.21	18.53	397.68	416.21	24.96	391.25
MW-74D	Monitoring Well	359.79	20.83	338.96	359.79	21.27	338.52	359.79	19.02	340.77	359.79	21.83	337.96
MW-74S	Monitoring Well	359.85	21.15	338.70	359.85	21.55	338.30	359.85	19.30	340.55	359.85	22.05	337.80
MW-75D	Monitoring Well	359.85	25.13	334.72	359.85	23.80	336.05	359.85	19.69	340.16	359.85	27.00	332.85
MW-75S	Monitoring Well	359.03	23.62	335.41	359.03	22.60	336.43	359.03	18.63	340.40	359.03	25.38	333.65
MW-77	Monitoring Well	379.48	27.82	351.66	379.48	24.41	355.07	379.48	21.08	358.40	379.48	27.17	352.31
MW-78	Monitoring Well	375.32	26.51	348.81	375.32	23.30	352.02	375.32	17.98	357.34	375.32	23.91	351.41
MW-79	Monitoring Well	375.84	22.61	353.23	375.84	24.15	351.69	375.84	19.07	356.77	375.84	25.58	350.26
MW-80	Monitoring Well	370.29	26.69	343.60	370.29	26.42	343.87	370.29	23.00	347.29	370.29	28.10	342.19
MW-81D	Monitoring Well	366.92	24.33	342.59	366.92	24.38	342.54	366.92	21.09	345.83	366.92	26.15	340.77
MW-81S	Monitoring Well	366.90	24.52	342.38	366.90	24.45	342.45	366.90	21.22	345.68	366.90	26.30	340.60
MW-82	Monitoring Well	382.18	39.13	343.05	382.18	37.84	344.34	382.18	33.33	348.85	382.18	38.37	343.81
MW-83	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-84	Monitoring Well	376.53	28.04	348.49	376.53	25.33	351.20	376.53	20.23	356.30	376.53	26.20	350.33
MW-85	Monitoring Well	371.54	21.13	350.41	371.54	17.45	354.09	371.54	2.45	369.09	371.54	14.10	357.44
MW-86D	Monitoring Well	406.56	14.99	391.57	406.56	9.61	396.95	406.56	7.51	399.05	406.56	10.48	396.08
MW-86S	Monitoring Well	406.50	20.22	386.28	406.50	8.65	397.85	406.50	7.07	399.43	406.50	11.65	394.85
MW-87	Monitoring Well	370.64	27.07	343.57	370.64	26.81	343.83	370.64	23.21	347.43	370.64	28.50	342.14
MW-88	Monitoring Well	367.93	25.79	342.14	367.93	25.30	342.63	367.93	23.83	344.10	367.93	27.06	340.87
MW-91	Monitoring Well	501.18	62.91	438.27	501.18	57.75	443.43	501.18	53.22	447.96	501.18	60.01	441.17
MW-92	Monitoring Well	476.87	93.87	383.00	476.87	86.94	389.93	476.87	80.71	396.16	476.87	89.15	387.72
MW-93D	Monitoring Well	360.14	22.60	337.54	360.14	23.90	336.24	360.14	19.12	341.02	360.14	24.60	335.54
MW-93S	Monitoring Well	360.76	22.86	337.90	360.76	22.26	338.50	360.76	19.61	341.15	360.76	25.36	335.40
MW-94	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-95	Monitoring Well	358.72	20.02	338.70	358.72	20.44	338.28	358.72	18.08	340.64	358.72	21.17	337.55
MW-96D	Monitoring Well	361.00	22.61	338.39	361.00	23.24	337.76	361.00	20.80	340.20	361.00	23.72	337.28
MW-96S	Monitoring Well	361.21	22.90	338.31	361.21	23.49	337.72	361.21	21.07	340.14	361.21	23.96	337.25
MW-97	Monitoring Well	357.39	21.20	336.19	357.39	21.05	336.34	357.39	18.96	338.43	357.39	20.82	336.57
MW-98D	Monitoring Well	361.41	21.80	339.61	361.41	22.00	339.41	361.41	19.62	341.79	361.41	22.12	339.29
MW-98I	Monitoring Well	360.78	22.11	338.67	360.78	22.02	338.76	360.78	19.71	341.07	360.78	22.42	338.36
MW-98S	Monitoring Well	360.77	22.00	338.77	360.77	21.92	338.85	360.77	19.89	340.88	360.77	22.41	338.36
MW-99D	Monitoring Well	359.91	20.54	339.37	359.91	20.45	339.46	359.91	18.51	341.40	359.91	21.04	338.87
MW-99S	Monitoring Well	360.37	21.06	339.31	360.37	20.91	339.46	360.37	19.01	341.36	360.37	21.50	338.87
MW-100D	Monitoring Well	362.14	22.60	339.54	362.14	22.45	339.69	362.14	20.46	341.68	362.14	23.73	338.41
MW-100I	Monitoring Well	361.81	22.32	339.49	361.81	22.19	339.62	361.81	20.14	341.67	361.81	23.48	338.33
MW-100S	Monitoring Well	362.28	22.79	339.49	362.28	22.60	339.68	362.28	20.65	341.63	362.28	23.89	338.39
MW-101D	Monitoring Well	356.22	16.90	339.32	356.22	16.75	339.47	356.22	14.92	341.30	356.22	17.59	338.63
MW-101S	Monitoring Well	356.54	17.29	339.25	356.54	17.15	339.39	356.54	15.41	341.13	356.54	17.13	339.41
MW-102D	Monitoring Well	405.23	19.32	385.91	405.23	14.09	391.14	405.23	7.80	397.43	405.23	19.69	385.54
MW-102S	Monitoring Well	405.41	46.81	358.60	405.41	41.58	363.83	405.41	34.41	371.00	405.41	41.95	363.46
MW-103D	Monitoring Well	401.61	25.00	376.61	401.61	20.22	381.39	401.61	15.32	386.29	401.61	21.21	380.40
MW-103S	Monitoring Well	402.00	23.22	378.78	402.00	18.21	383.79	402.00	13.57	388.43	402.00	19.02	382.98
MW-104	Monitoring Well	428.72	29.54	399.18	428.72	28.96	399.76	428.72	28.11	400.61	428.72	29.49	399.23
MW-105	Monitoring Well	362.05	23.65	338.40	362.05	23.77	338.28	362.05	21.85	340.20	362.05	23.73	338.32
MW-106	Monitoring Well	360.15	24.45	335.70	360.15	25.26	334.89	360.15	22.51	337.64	360.15	24.73	335.42
MW-107	Monitoring Well	363.56	24.06	339.50	363.56	23.82	339.74	363.56	22.21	341.35	363.56	24.81	338.75
MW-108D	Monitoring Well	426.35	28.52	397.83	426.35	23.13	403.22	426.35	14.58	411.77	426.35	25.13	401.22
MW-108S	Monitoring Well	425.46	42.70	382.76	425.46	23.34	402.12	425.46	18.79	406.67	425.46	34.38	391.08
MW-109D	Monitoring Well	389.12	37.57	351.55	389.12	35.81	353.31	389.12	30.99	358.13	389.12	37.10	352.02
MW-109S	Monitoring Well	388.39	37.88	350.51	388.39	36.12	352.27	388.39	31.25	357.14	388.39	37.37	351.02
MW-110	Monitoring Well	378.36	28.00	350.36	378.36	26.24	352.12	378.36	21.28	357.08	378.36	27.60	350.76
MW-111	Monitoring Well	433.63	31.61	402.02	433.63	25.67	407.96	433.63	19.51	414.12	433.63	27.13	406.50
MW-112	Monitoring Well	393.52	50.51	343.01	393.52	50.15	343.37	393.52	46.42	347.10	393.52	51.75	341.77
MW-113	Monitoring Well	371.02	27.38	343.64	371.02	27.19	343.83	371.02	23.49	347.53	371.02	28.38	342.64
MW-114	Monitoring Well	366.88	24.45	342.43	366.88	24.32	342.56	366.88	20.98	345.90	366.88	25.91	340.97
MW-115	Monitoring Well	373.30	23.71	349.59	373.30	23.92	349.38	373.30	20.54	352.76	373.30	24.83	348.47
MW-116	Monitoring Well	364.59	21.19	343.40	364.59	20.21	344.38	364.59	15.76	348.83	364.59	20.67	343.92
MW-117	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-118	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-119	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-120	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-121	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-122	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-123	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-124	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB

TABLE 2.1-1
Site-Wide Water Level and Elevation Data (2016-2019)
Former York Naval Ordnance Plant - York, PA

		12/9/2016			10/16/2017			9/27/2018			9/17/2019		
		December 2016 Site Wide Water Levels			October 2017 Site Wide Water Levels			September 2018 Site Wide Water Levels			September 2019 Site Wide Water Levels		
Location	Site Type	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev
MW-125	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-126	Monitoring Well	371.42	27.40	344.02	371.42	27.00	344.42	371.42	23.15	348.27	371.42	28.50	342.92
MW-127	Monitoring Well	371.55	28.00	343.55	371.55	27.69	343.86	371.55	23.66	347.89	371.55	29.39	342.16
MW-128	Monitoring Well	370.58	27.03	343.55	370.58	26.71	343.87	370.58	22.78	347.80	370.58	28.38	342.20
MW-129	Monitoring Well	361.20	17.00	344.20	361.20	17.16	344.04	361.20	12.91	348.29	361.20	19.20	342.00
MW-130	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-131	Monitoring Well	366.32	23.30	343.02	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-132	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-133	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-134	Monitoring Well	362.18	19.53	342.65	362.18	19.47	342.71	362.18	16.10	346.08	362.18	21.15	341.03
MW-135	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-136A	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-136A (270-348)	Waterloo Monitoring Well	NM	NM	NM	359.78	23.78	336.00	NM	NM	NM	359.78	10.45	349.33
MW-136A (356-356.5)	Waterloo Monitoring Well	NM	NM	NM	359.78	22.50	337.28	NM	NM	NM	NM	NM	NM
MW-136A (372.5-373)	Waterloo Monitoring Well	NM	NM	NM	359.78	22.06	337.72	NM	NM	NM	NM	NM	NM
MW-136A (434-434.5)	Waterloo Monitoring Well	NM	NM	NM	359.78	20.34	339.44	NM	NM	NM	NM	NM	NM
MW-136A (459.5-460)	Waterloo Monitoring Well	NM	NM	NM	359.78	18.78	341.00	359.78	15.45	344.33	NM	NM	NM
MW-137A	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (270-306)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (295.5-296)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (343-343.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (374.5-375)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (420-420.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-137A (434.5-435)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-138A	Monitoring Well	370.82	29.37	341.45	370.82	15.52	355.30	370.82	21.94	348.88	370.82	26.91	343.91
MW-139A	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (270-285)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (305-305.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (333.5-334)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (365-365.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (421.5-422)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-139A (454-454.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-140A	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-140A (209.5-210)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	361.20	7.50	353.70
MW-140A (285-285.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-140A (323.5-324)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-140A (372-372.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-140A (407.5-408)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-141A	Monitoring Well	416.96	54.05	362.91	416.96	45.88	371.08	416.96	43.12	373.84	416.96	50.43	366.53
MW-142D	Monitoring Well	437.78	16.92	420.86	437.78	15.07	422.71	437.78	12.11	425.67	437.78	15.68	422.10
MW-142S	Monitoring Well	437.44	3.20	434.24	437.44	2.66	434.78	437.44	0.56	436.88	437.44	3.33	434.11
MW-143D	Monitoring Well	403.71	12.60	391.11	403.71	9.14	394.57	403.71	3.71	400.00	403.71	9.96	393.75
MW-143S	Monitoring Well	403.56	40.74	362.82	403.56	34.87	368.69	403.56	26.53	377.03	403.56	36.02	367.54
MW-144	Monitoring Well	361.52	22.31	339.21	361.52	22.31	339.21	361.52	20.27	341.25	361.52	23.82	337.70
MW-145A	Monitoring Well	362.44	22.75	339.69	362.44	22.66	339.78	362.44	20.62	341.82	362.44	24.01	338.43
MW-146	Monitoring Well	362.39	22.71	339.68	362.39	22.55	339.84	362.39	20.72	341.67	362.39	23.16	339.23
MW-147A	Monitoring Well	361.25	21.25	340.00	361.25	20.96	340.29	361.25	19.01	342.24	361.25	21.91	339.34
MW-148A (72.5-73)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-148A (136-136.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-148A (218-218.5)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-150	Monitoring Well	NM	NM	NM	366.80	12.95	353.85	366.80	9.78	357.02	366.80	11.66	355.14
MW-151	Monitoring Well	374.11	26.45	347.66	374.11	25.92	348.19	374.11	20.59	353.52	374.11	28.84	345.27
MW-152 (0-10)	Waterloo Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-152 (23-23.5)	Waterloo Monitoring Well	NM	NM	NM	358.92	14.35	344.57	358.92	11.83	347.09	358.92	9.55	349.37
MW-152 (137.5-138)	Waterloo Monitoring Well	NM	NM	NM	358.92	15.67	343.25	358.92	12.63	346.29	358.92	16.11	342.81
MW-155	Monitoring Well	359.92	20.19	339.73	359.92	20.05	339.87	359.92	18.12	341.80	359.92	21.01	338.91
MW-156	Monitoring Well	353.53	14.21	339.32	353.53	13.85	339.68	353.53	11.78	341.75	353.53	15.65	337.88
MW-160	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
MW-161	Monitoring Well	415.92	64.17	351.75	415.92	61.74	354.18	415.92	55.31	360.61	415.92	64.32	351.60
MW-162	Monitoring Well	415.78	49.09	366.69	415.78	45.77	370.01	415.78	36.96	378.82	415.78	49.38	366.40
MW-163	Monitoring Well	419.41	42.86	376.55	419.41	34.66	384.75	419.41	32.91	386.50	419.41	37.83	381.58
MW-164	Monitoring Well	424.50	48.11	376.39	424.50	40.34	384.16	424.50	35.53	388.97	424.50	43.52	380.98
MW-165	Monitoring Well	419.41	49.28	370.13	419.41	44.50	374.91	419.41	36.96	382.45	419.41	47.00	372.41
MW-166	Monitoring Well	402.03	43.69	358.34	402.03	40.90	361.13	402.03	33.77	368.26	402.03	43.54	358.49
MW-167	Monitoring Well	399.07	38.88	360.19	399.07	33.34	365.73	399.07	18.48	380.59	399.07	34.01	365.06
MW-168	Monitoring Well	395.19	28.76	366.43	395.19	18.81	376.38	395.19	12.00	383.19	395.19	23.43	371.76
MW-169	Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	389.43	33.11	356.32
MW-170	Monitoring Well	385.60	30.48	355.12	385.60	25.31	360.29	385.60	20.15	365.45	385.60	28.58	357.02
MW-171	Monitoring Well	386.75	36.29	350.46	386.75	34.45	352.30	NM	NM	NM	386.75	35.76	350.99
MW-172	Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-173	Monitoring Well	381.57	28.17	353.40	381.57	20.87	360.70	381.57	12.56	369.01	381.57	21.72	359.85
MW-174	Monitoring Well	378.31	28.27	350.04	378.31	26.37	351.94	378.31	21.06	357.25	378.31	27.28	351.03
MW-175	Monitoring Well	376.18	26.62	349.56	376.18	24.91	351.27	376.18	19.56	356.62	376.18	26.48	349.70
MW-176	Monitoring Well	NM	NM	NM	415.46	51.94	363.52	415.46	51.46	364.00	D	D	D
MW-177R	Monitoring Well	NM	NM	NM	415.54	43.91	371.63	415.33	46.39	368.94	415.33	65.99	349.34
MW-178D	Monitoring Well	NM	NM	NM	414.81	60.61	354.20	414.81	54.51	360.30	414.81	80.92	333.89
MW-178S	Monitoring Well	NM	NM	NM	415.11	60.89	354.22	415.11	54.78	360.33	415.11	80.18	334.93
MW-179	Monitoring Well	NM	NM	NM	414.74	57.47	357.27	414.74	48.23	366.51	D	D	D
MW-180	Monitoring Well	NM	NM	NM	414.36	59.25	355.11	414.36	49.61	364.75	D	D	D
MW-181D	Monitoring Well	NM	NM	NM	414.91	53.85	361.06	414.91	48.34	366.57	414.91	58.49	356.42
MW-181S	Monitoring Well	NM	NM	NM	414.86	61.23	353.63	414.86	54.93	359.93	414.86	70.44	344.42
MW-182	Monitoring Well	NM	NM	NM	416.41	34.51	381.90	416.41	27.37	389.04	D	D	D

TABLE 2.1-1
Site-Wide Water Level and Elevation Data (2016-2019)
Former York Naval Ordnance Plant - York, PA

		12/9/2016			10/16/2017			9/27/2018			9/17/2019		
		December 2016 Site Wide Water Levels			October 2017 Site Wide Water Levels			September 2018 Site Wide Water Levels			September 2019 Site Wide Water Levels		
Location	Site Type	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev	MRP	DTW	GW Elev
MW-183	Monitoring Well	NM	NM	NM	417.14	34.81	382.33	417.14	28.39	388.75	417.14	46.25	370.89
MW-184D	Monitoring Well	NM	NM	NM	416.29	33.32	382.97	416.29	27.83	388.46	416.29	35.92	380.37
MW-184S	Monitoring Well	NM	NM	NM	416.19	46.61	369.58	416.19	36.04	380.15	416.19	50.90	365.29
MW-185	Monitoring Well	NM	NM	NM	514.13	69.23	444.90	514.13	65.16	448.97	514.13	70.84	443.29
Cole B	Monitoring Well	363.75	15.81	347.94	363.75	14.23	349.52	363.75	10.51	353.24	363.75	15.05	348.70
Cole D	Monitoring Well	370.15	19.61	350.54	370.15	16.11	354.04	370.15	9.93	360.22	370.15	20.35	349.80
Cole E deep	Monitoring Well	369.17	20.42	348.75	369.17	18.45	350.72	369.17	13.49	355.68	369.17	20.22	348.95
Cole E shallow	Monitoring Well	369.54	20.85	348.69	369.54	18.64	350.90	369.54	13.93	355.61	369.54	20.60	348.94
Cole F	Monitoring Well	370.39	21.73	348.66	370.39	19.63	350.76	370.39	15.11	355.28	370.39	21.48	348.91
Cole (Flush)	Monitoring Well	361.92	14.23	347.69	361.92	12.80	349.12	361.92	8.96	352.96	361.92	14.17	347.75
GM-1D	Monitoring Well	366.11	18.02	348.09	NM	NM	NM	366.11	12.58	353.53	366.11	17.72	348.39
MW-4 (Cole)	Monitoring Well	367.21	19.37	347.84	367.21	17.84	349.37	367.21	13.78	353.43	367.21	18.98	348.23
Cole Steel MW-12	Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	360.79	13.15	347.64
Ru-MW-1	Monitoring Well	389.05	38.69	350.36	389.05	35.60	353.45	389.05	29.24	359.81	389.05	36.66	352.39
Ru-MW-2	Monitoring Well	390.72	40.35	350.37	390.72	38.52	352.20	390.72	33.65	357.07	390.72	39.83	350.89
Ru-MW-3	Monitoring Well	395.23	44.87	350.36	NM	NM	NM	395.23	38.16	357.07	395.23	44.33	350.90
Ru-MW-4	Abandoned Monitoring Well	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB
Ru-MW-4R	Monitoring Well	NM	NM	NM	NM	NM	NM	394.07	36.14	357.21	394.07	43.24	350.83
Ru-MW-5	Monitoring Well	378.11	27.72	350.39	378.11	25.76	352.35	378.11	20.90	356.88	378.11	27.20	350.91
Ru-MW-6	Monitoring Well	382.68	32.34	350.34	382.68	30.45	352.23	382.68	25.80	356.88	382.68	31.77	350.91
Ru-MW-7	Monitoring Well	386.34	35.94	350.40	386.34	34.15	352.19	386.34	29.15	357.19	386.34	35.43	350.91
Ru-MW-8	Monitoring Well	384.10	33.72	350.38	384.10	31.80	352.30	NM	NM	NM	384.10	33.26	350.84
Ru-MW-9	Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Ru-MW-10	Monitoring Well	390.15	40.00	350.15	390.15	38.15	352.00	390.15	32.87	357.28	390.15	39.18	350.97
Ru-MW-100	Monitoring Well	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Ru-MW-101	Monitoring Well	390.60	40.99	349.61	390.60	38.44	352.16	390.60	33.54	357.06	390.60	39.69	350.91
Ru-MW-102	Monitoring Well	393.87	76.37	317.50	393.87	41.60	352.27	393.87	36.96	356.91	393.87	42.94	350.93
Ru-MW-103	Monitoring Well	389.28	38.89	350.39	389.28	36.81	352.47	389.28	32.21	357.07	389.28	38.31	350.97
Herman (S-7)	Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TATE (S-6)	Spring	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TATE (S-6) Staff Gauge	Staff Gauge	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
CODORUS 1	Bridge Surface Gauging Point	379.69	41.70	337.99	379.69	41.35	338.34	379.69	37.90	341.79	379.69	38.92	340.77
CODORUS 2	Staff Gauge	NM	NM	NM	341.63	0.92	340.23	NM	NM	NM	341.15	0.10	341.05
JOHNSON 1	Surface Water	380.32	6.07	374.25	380.32	6.14	374.18	380.32	5.96	374.36	380.32	6.23	374.09
JOHNSON 2	Surface Water	376.79	5.45	371.34	376.79	5.41	371.38	376.79	5.42	371.37	376.79	5.61	371.18
SCP MP-1 (High)	Water Level Measuring Point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
SCP MP-1 (Low)	Water Level Measuring Point	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
RW-2 (Flinchbaugh)	Residential Well	NM	NM	NA	548.46	21.24	527.22	548.27	16.78	531.49	548.27	22.03	526.24
RW-4 (Folk)	Residential Well	NM	NM	NM	575.93	37.93	538.00	575.93	30.02	545.91	575.93	39.65	536.28
RW-5 (Giambolvo)	Monitoring Well	375.54	31.62	343.92	375.54	31.32	344.22	375.54	28.71	346.83	375.54	33.34	342.20
RW-6 (Kinsley Well)	Monitoring Well	NM	NM	NM	NM	NM	NM	465.83	68.20	397.63	NM	NM	NM
SOFTAIL LIFT STATION	Abandoned Lift Station	396.62	24.80	371.82	392.60	27.35	369.27	AB	AB	AB	AB	AB	AB
WPL-SS-7	Monitoring Well	357.78	26.15	331.63	357.78	20.15	337.63	357.78	19.40	338.38	357.78	23.28	334.50
WPL-SS-8	Monitoring Well	364.40	25.07	339.33	364.40	25.76	338.64	364.40	23.66	340.74	364.40	26.76	337.64

Note: The staff gauge measurements are not depth to water measurements and is the water level on the gauge

Data Flags:

A: Artesian
AB: Abandoned
D: Location was dry
DTW: Depth to water measurement
NM: Not Measured
MRP: Measurement reference point elevation in feet above mean sea level (AMSL)
WL Elev: Water level elevation in feet AMSL

Table 2.1-2
Vertical Groundwater Gradient Data for September 17, 2019
Former York Naval Ordnance Plant - York, PA

Well Id	Elevation TOC (Ft. AMSL)	Open Interval (Ft.)	Mid-Point Screened Interval (Ft.)	Mid-Point Elevation (Ft. AMSL)	Difference Between Mid-Points	Depth to Water (Ft.)	Water Level Elevation (Ft. AMSL)	Difference Between Water Level Elevations.	Vertical Gradient (Ft./Ft.)
Former Central Plant Area (CPA)									
MW-32S	366.62	133-148	140.50	226.12	-67.47	26.08	340.54	0.04	-0.001
MW-32D	366.65	196-220	208.00	158.65		26.15	340.50		
MW-49S	360.44	134-158	146.00	214.44	-64.49	18.60	341.84	0.35	-0.005
MW-49D	360.45	201-220	210.50	149.95		18.96	341.49		
MW-81S	366.90	28-43	35.50	331.40	-23.48	26.30	340.60	-0.17	0.007
MW-81D	366.92	52-66	59.00	307.92		26.15	340.77		
Codorus Creek Levee									
MW-98S	360.77	58-68	63.00	297.77	-38.49	22.41	338.36	0.00	0.000
MW-98I	360.78	98-105	101.50	259.28	-47.37	22.42	338.36	-0.93	0.020
MW-98D	361.41	128-171	149.50	211.91		22.12	339.29		
MW-99S	360.37	57.8-74.3	66.05	294.32	-68.16	21.50	338.87	0.00	0.000
MW-99D	359.91	125.5-142	133.75	226.16		21.04	338.87		
MW-100S	362.28	45-51	48.00	314.28	-15.47	23.89	338.39	0.06	-0.004
MW-100I	361.81	60-66	63.00	298.81	-40.17	23.48	338.33	-0.08	0.002
MW-100D	362.14	93-114	103.50	258.64		23.73	338.41		
MW-101S	356.54	18-40	29.00	327.54	-66.82	17.13	339.41	0.78	-0.012
MW-101D	356.22	76-115	95.50	260.72		17.59	338.63		
Eastern Landfill Area									
MW-65S	546.82	71.3-86	78.65	468.17	-17.37	50.10	496.72	-1.00	0.058
MW-65D	546.80	89-103	96.00	450.80		49.08	497.72		
MW-66S	506.73	47.2-61.6	54.40	452.33	-36.11	39.79	466.94	1.00	-0.028
MW-66D	506.92	81.4-100	90.70	416.22		40.98	465.94		
MW-67S	446.26	12.8-31	21.90	424.36	-42.60	12.65	433.61	-12.33	0.289
MW-67D	446.26	58-71	64.50	381.76		0.32	445.94		
Former North End of Test Track (NETT)									
MW-70S	416.21	15.8-35	25.40	390.81	-51.00	24.96	391.25	0.26	-0.005
MW-70D	416.31	68-85	76.50	339.81		25.32	390.99		
MW-86S	406.50	10-32.5	21.25	385.25	-61.44	11.65	394.85	-1.23	0.020
MW-86D	406.56	67-98.5	82.75	323.81		10.48	396.08		
MW-102S	405.41	41-65	53.00	352.41	-34.18	41.95	363.46	-22.08	0.646
MW-102D	405.23	75-99	87.00	318.23		19.69	385.54		
MW-103S	402.00	62.3-87.5	74.90	327.10	-26.19	19.02	382.98	2.58	-0.099
MW-103D	401.61	94.7-106.7	100.70	300.91		21.21	380.40		
Former North Plant Area									
MW-31S	369.28	12-36	24.00	345.28	-49.48	19.41	349.87	0.30	-0.006
MW-31D	369.30	66-81	73.50	295.80		19.73	349.57		
MW-36S	370.95	18-41	29.50	341.45	-45.49	26.93	344.02	-0.37	0.008
MW-36D	370.96	67-83	75.00	295.96		26.57	344.39		
Northern Property Boundary Area (NPBA)									
MW-16S	516.60	98-110	104.00	412.60	-91.37	5.92	510.68	-8.41	0.092
MW-16D	516.73	190-201	195.50	321.23		-2.36	519.09		
MW-18S	464.52	45-65	55.00	409.52	-80.00	-6.32	470.84	-2.50	0.031
MW-18D	464.52	130-140	135.00	329.52		-8.82	473.34		
MW-20S	574.05	28-61	44.50	529.55	-33.86	47.31	526.74	-4.28	0.126
MW-20M	574.19	72-85	78.50	495.69	-80.84	43.17	531.02	-9.58	0.119
MW-20D	573.85	153-165	159.00	414.85		33.25	540.60		
MW-142S	437.44	56-70	63.00	374.44	-70.36	3.33	434.11	12.01	-0.171
MW-142D	437.78	122-145.4	133.70	304.08		15.68	422.10		
MW-143S	403.56	24-54.5	39.25	364.31	-86.30	36.02	367.54	-26.21	0.304
MW-143D	403.71	117.4-134	125.70	278.01		9.96	393.75		
South Plume Area (SPA)									
MW-40S	374.69	26-47	36.50	338.19	-54.04	33.62	341.07	-0.07	0.001
MW-40D	374.65	78-103	90.50	284.15		33.51	341.14		
MW-43S	379.76	19-48	33.50	346.26	-51.68	36.79	342.97	-0.06	0.001
MW-43D	380.08	79-92	85.50	294.58		37.05	343.03		
MW-152S	358.92	10-30	20.00	338.92	-141.25	9.55	349.37	6.56	-0.046
MW-152D	358.92	122.5-200	161.25	197.67		16.11	342.81		

Table 2.1-2
Vertical Groundwater Gradient Data for September 17, 2019
Former York Naval Ordnance Plant - York, PA

Well Id	Elevation TOC (Ft. AMSL)	Open Interval (Ft.)	Mid-Point Screened Interval (Ft.)	Mid-Point Elevation (Ft. AMSL)	Difference Between Mid-Points	Depth to Water (Ft.)	Water Level Elevation (Ft. AMSL)	Difference Between Water Level Elevations.	Vertical Gradient (Ft./Ft.)
Southern Property Boundary Area (SPBA)									
MW-64S	416.34	33-42	37.50	378.84	-34.91	40.32	376.02	24.39	-0.699
MW-64D	416.43	68-77	72.50	343.93		64.80	351.63		
MW-108S	425.46	22.9-55.1	39.00	386.46	-70.61	34.38	391.08	-10.14	0.144
MW-108D	426.35	72-149	110.50	315.85		25.13	401.22		
MW-109S	388.39	42.9-65	53.95	334.44	-39.32	37.37	351.02	-1.00	0.025
MW-109D	389.12	88-100	94.00	295.12		37.10	352.02		
MW-178S	415.11	72-84	78.00	337.11	-17.30	80.18	334.93	1.04	-0.060
MW-178D	414.81	90-100	95.00	319.81		80.92	333.89		
MW-181S	414.86	61-71	66.00	348.86	-30.45	70.44	344.42	-12.00	0.394
MW-181D	414.91	93-100	96.50	318.41		58.49	356.42		
MW-184S	416.19	51-59	55.00	361.19	-14.90	50.90	365.29	-15.08	1.012
MW-184D	416.29	66-74	70.00	346.29		35.92	380.37		
Northern - West Parking Lot (WPL)									
MW-39S	360.14	3-30	16.50	343.64	-59.93	23.54	336.60	0.00	0.000
MW-39D	360.21	53-100	76.50	283.71		23.61	336.60		
MW-50S	363.42	104-125	114.50	248.92	-49.06	26.90	336.52	-1.03	0.021
MW-50D	363.36	157-170	163.50	199.86		25.81	337.55		
MW-51S	363.20	34-51	42.50	320.70	-61.59	29.81	333.39	-1.46	0.024
MW-51D	363.11	88-120	104.00	259.11		28.26	334.85		
MW-74S	359.85	175-201	188.00	171.85	-47.06	22.05	337.80	-0.16	0.003
MW-74D	359.79	220-250	235.00	124.79		21.83	337.96		
MW-96S	361.21	27-39	33.00	328.21	-48.46	23.96	337.25	-0.03	0.001
MW-96D	361.00	75-87.5	81.25	279.75		23.72	337.28		
Southern - West Parking Lot (WPL)									
MW-37S	359.13	11-33	22.00	337.13	-111.02	24.01	335.12	1.71	-0.015
MW-37D	359.11	125-141	133.00	226.11		25.70	333.41		
MW-75S	359.03	151-190	170.50	188.53	-37.18	25.38	333.65	0.80	-0.022
MW-75D	359.85	200-217	208.50	151.35		27.00	332.85		
MW-93S	360.76	24-45	34.50	326.26	-113.47	25.36	335.40	-0.14	0.001
MW-93D	360.14	134.7-160	147.35	212.79		24.60	335.54		

Notes: A negative vertical gradient value indicates a downward vertical gradient.
A positive vertical gradient value indicates an upward vertical gradient.
Depth to water data collected on September 17, 2019.

Table 2.2-1
Groundwater and Surface Water Monitoring Information and Objectives
Former York Naval Ordnance Plant York, PA

Well Identification	Type	Status	Depth to Top of Open Interval (ft bgs)	Depth to Base of Open Interval (ft bgs)	Open Interval Length (ft)	Open Interval in Overburden or Bedrock	Site Location	Well Located Inside Technical Impractibility Boundary	2019 Groundwater and Surface Water Monitoring Objectives				
									Monitored Natural Attenuation (MNA) Area Wells	Plume Migration Assessment in NPBA	WPL and SPBA Groundwater Extraction System Performance	Vapor Intrusion (VI) Assessment at Eastern Perimeter Well MW-185	Surface Water
CW-1A	Collection Well	Inactive	29.0	74.0	45.0	Bedrock	NPBA		X				
CW-2	Collection Well	Inactive	48.0	150.0	102.0	Bedrock	NPBA		X				
CW-9	Collection Well	Active	47.0	50.0	3.0	Bedrock	SW-WPL	X			X		
CW-13	Collection Well	Active	59.6	70.0	10.4	Bedrock	WPL	X			X		
CW-15A	Collection Well	Active	18.0	68.0	50.0	Overburden and Bedrock	WPL	X			X		
CW-17	Collection Well	Active	32.0	65.0	33.0	Bedrock	NW-WPL	X			X		
CW-20	Collection Well	Active	205.0	215.0	10.0	Bedrock	SW-WPL	X			X		
CW-21	Collection Well	Active	49.5	100.0	50.5	Bedrock	SPBA	X			X		
CW-22	Collection Well	Active	64.0	100.0	36.0	Bedrock	SPBA	X			X		
CW-23	Collection Well	Active	34.0	61.0	27.0	Bedrock	SPBA	X			X		
MPE-1	Monitoring Well	Active	32.0	50.0	18.0	Overburden	SPBA	X					
MPE-2	Monitoring Well	Active	35.0	66.0	31.0	Overburden	SPBA	X					
MPE-3	Monitoring Well	Active	27.0	43.0	16.0	Overburden	SPBA	X					
MW-2	Monitoring Well	Active	46.0	121.0	75.0	Bedrock	Eastern Site Perimeter		X				
MW-3	Monitoring Well	Active	50.0	102.0	52.0	Bedrock	NPBA		X	X			
MW-5	Monitoring Well	Active	10.0	53.0	43.0	Overburden and Bedrock	Northern Site Perimeter		X				
MW-6	Monitoring Well	Active	7.0	40.0	33.0	Overburden and Bedrock	Northern Site Perimeter		X				
MW-7	Monitoring Well	Active	13.0	35.0	22.0	Overburden and Bedrock	WPL	X					
MW-8	Monitoring Well	Active	10.0	36.0	26.0	Overburden and Bedrock	WPL	X					
MW-9	Monitoring Well	Active	59.0	97.0	38.0	Bedrock	NPBA		X	X			
MW-12	Monitoring Well	Active	30.0	100.0	70.0	Bedrock	NPBA		X	X			
MW-14	Monitoring Well	Active	18.0	80.0	62.0	Bedrock	Eastern Site Perimeter		X				
MW-15	Monitoring Well	Active	40.0	120.0	80.0	Bedrock	EPBA	X					
MW-16S	Monitoring Well	Active	98.0	110.0	12.0	Bedrock	NPBA		X				
MW-18D	Monitoring Well	Active	130.0	140.0	10.0	Bedrock	NPBA		X				
MW-18S	Monitoring Well	Active	45.0	65.0	20.0	Bedrock	NPBA		X				
MW-19	Monitoring Well	Active	30.0	120.0	90.0	Bedrock	Former NETT	X					
MW-20M	Monitoring Well	Active	72.0	85.0	13.0	Bedrock	NPBA		X				
MW-20S	Monitoring Well	Active	28.0	61.0	33.0	Bedrock	NPBA		X				
MW-22	Monitoring Well	Active	30.0	100.0	70.0	Bedrock	SPBA		X				
MW-26	Monitoring Well	Active	7.0	60.0	53.0	Overburden	Former NETT	X					
MW-28	Monitoring Well	Active	8.0	55.0	47.0	Overburden and Bedrock	Former TCA Tank Area	X					
MW-30	Monitoring Well	Active	14.0	23.0	10.5	Overburden and Bedrock	WBldg 41	X					
MW-31D	Monitoring Well	Active	66.0	81.0	15.0	Bedrock	NBldg 41	X					
MW-32D	Monitoring Well	Active	196.0	220.0	24.0	Bedrock	Former TCA Tank Area	X					
MW-32S	Monitoring Well	Active	133.0	148.0	15.0	Bedrock	Former TCA Tank Area	X					
MW-36D	Monitoring Well	Active	67.0	83.0	16.0	Bedrock	WBldg 41	X					
MW-36S	Monitoring Well	Active	18.0	41.0	23.0	Overburden and Bedrock	WBldg 41	X					
MW-37D	Monitoring Well	Active	125.0	141.0	16.0	Bedrock	SW-WPL	X			X		
MW-37S	Monitoring Well	Active	11.0	33.0	22.0	Overburden and Bedrock	SW-WPL	X			X		
MW-38D	Monitoring Well	Active	80.0	103.0	23.0	Bedrock	WPL	X					
MW-39D	Monitoring Well	Active	53.0	100.0	47.0	Bedrock	NW-WPL	X					
MW-39S	Monitoring Well	Active	3.0	30.0	27.0	Overburden and Bedrock	NW-WPL	X					
MW-43D	Monitoring Well	Active	79.0	92.0	13.0	Bedrock	SPA		X				
MW-45	Monitoring Well	Active	6.0	38.0	32.0	Overburden and Bedrock	Former WBldg4	X					
MW-46	Monitoring Well	Active	6.0	39.0	33.0	Overburden and Bedrock	Former WBldg4	X					
MW-47	Monitoring Well	Active	12.0	56.0	44.0	Overburden	Former WBldg4	X					
MW-49D	Monitoring Well	Active	201.0	220.0	19.0	Bedrock	Former NBldg 4	X					
MW-49S	Monitoring Well	Active	134.0	158.0	24.0	Bedrock	Former NBldg 4	X					
MW-50D	Monitoring Well	Active	157.0	170.0	13.0	Bedrock	Former NBldg 4	X					
MW-50S	Monitoring Well	Active	104.0	125.0	21.0	Bedrock	Former NBldg 4	X					
MW-51D	Monitoring Well	Active	88.0	120.0	32.0	Bedrock	Former NBldg 4	X					
MW-51S	Monitoring Well	Active	34.0	51.0	17.0	Bedrock	Former NBldg 4	X					
MW-57	Monitoring Well	Active	25.0	35.0	10.0	Overburden	Former Bldg 58	X					
MW-64D	Monitoring Well	Active	68.0	77.0	9.0	Bedrock	SPBA	X					
MW-64S	Monitoring Well	Active	33.0	42.0	9.0	Overburden	SPBA	X					
MW-65S	Monitoring Well	Active	71.3	86.0	14.7	Bedrock	Eastern Site Perimeter		X				
MW-67D	Monitoring Well	Active	58.0	71.0	13.0	Bedrock	South-Central Site Area		X				
MW-67S	Monitoring Well	Active	12.8	31.0	18.2	Overburden	South-Central Site Area		X				
MW-69	Monitoring Well	Active	77.0	126.0	49.0	Bedrock	South-Central Site Area		X				
MW-70D	Monitoring Well	Active	68.0	85.0	17.0	Bedrock	Former NETT	X					
MW-70S	Monitoring Well	Active	15.8	35.0	19.2	Overburden	Former NETT	X					
MW-74D	Monitoring Well	Active	220.0	250.0	30.0	Bedrock	NW-WPL	X					
MW-74S	Monitoring Well	Active	175.0	201.0	26.0	Bedrock	NW-WPL	X					
MW-75D	Monitoring Well	Active	200.0	217.0	17.0	Bedrock	SW-WPL	X			X		
MW-75S	Monitoring Well	Active	151.0	190.0	39.0	Bedrock	SW-WPL	X			X		
MW-77	Monitoring Well	Active	35.0	67.0	32.0	Overburden	Petroleum Plume	X					
MW-79	Monitoring Well	Active	17.0	42.0	25.0	Overburden	South-Central Site Area		X				

Table 2.2-1
Groundwater and Surface Water Monitoring Information and Objectives
Former York Naval Ordnance Plant York, PA

Well Identification	Type	Status	Depth to Top of Open Interval (ft bgs)	Depth to Base of Open Interval (ft bgs)	Open Interval Length (ft)	Open Interval in Overburden or Bedrock	Site Location	Well Located Inside Technical Impractibility Boundary	2019 Groundwater and Surface Water Monitoring Objectives				
									Monitored Natural Attenuation (MNA) Area Wells	Plume Migration Assessment in NPBA	WPL and SPBA Groundwater Extraction System Performance	Vapor Intrusion (VI) Assessment at Eastern Perimeter Well MW-185	Surface Water
MW-80	Monitoring Well	Active	17.5	41.0	23.5	Overburden	Former Bldg 58	X					
MW-81S	Monitoring Well	Active	28.0	43.0	15.0	Overburden and Bedrock	CPA	X					
MW-81D	Monitoring Well	Active	52.0	66.0	14.0	Bedrock	CPA	X					
MW-82	Monitoring Well	Active	53.5	76.0	22.5	Bedrock	Northern Site Perimeter		X				
MW-86D	Monitoring Well	Active	67.0	98.5	31.5	Bedrock	Former NETT	X					
MW-86S	Monitoring Well	Active	10.0	32.5	22.5	Overburden	Former NETT	X					
MW-87	Monitoring Well	Active	67.0	98.0	31.0	Overburden and Bedrock	Former Bldg 58	X					
MW-88	Monitoring Well	Active	30.0	50.0	20.0	Bedrock	South-Central Site Area		X				
MW-91	Monitoring Well	Active	50.0	75.0	25.0	Bedrock	EPBA	X					
MW-92	Monitoring Well	Active	50.0	100.5	50.5	Bedrock	EPBA	X					
MW-93D	Monitoring Well	Active	134.7	160.0	25.3	Bedrock	SW-WPL	X			X		
MW-93S	Monitoring Well	Active	24.0	45.0	21.0	Bedrock	SW-WPL	X			X		
MW-96D	Monitoring Well	Active	75.0	87.5	12.5	Bedrock	NW-WPL	X					
MW-96S	Monitoring Well	Active	27.0	39.0	12.0	Bedrock	NW-WPL	X					
MW-97	Monitoring Well	Active	66.0	80.0	14.0	Bedrock	WPL	X					
MW-98D	Monitoring Well	Active	128.0	171.0	43.0	Bedrock	Levee Area	X					
MW-98I	Monitoring Well	Active	98.0	105.0	7.0	Bedrock	Levee Area	X					
MW-98S	Monitoring Well	Active	58.0	68.0	10.0	Bedrock	Levee Area	X					
MW-99D	Monitoring Well	Active	125.5	142.0	16.5	Bedrock	Levee Area	X					
MW-99S	Monitoring Well	Active	57.8	74.3	16.5	Bedrock	Levee Area	X					
MW-100D	Monitoring Well	Active	93.0	114.0	21.0	Bedrock	Levee Area	X					
MW-100I	Monitoring Well	Active	60.0	66.0	6.0	Bedrock	Levee Area	X					
MW-100S	Monitoring Well	Active	45.0	51.0	6.0	Bedrock	Levee Area	X					
MW-101D	Monitoring Well	Active	76.0	115.0	39.0	Bedrock	Levee Area		X				
MW-101S	Monitoring Well	Active	18.0	40.0	22.0	Overburden and Bedrock	Levee Area		X				
MW-102D	Monitoring Well	Active	75.0	99.0	24.0	Bedrock	Former NETT	X					
MW-102S	Monitoring Well	Active	41.0	65.0	24.0	Overburden	Former NETT	X					
MW-103D	Monitoring Well	Active	94.7	106.7	12.0	Bedrock	Former NETT	X					
MW-103S	Monitoring Well	Active	62.3	87.5	25.2	Overburden	Former NETT	X					
MW-104	Monitoring Well	Active	15.0	28.0	13.0	Overburden	Former NETT	X					
MW-106	Monitoring Well	Active	15.0	28.0	13.0	Overburden	WPL	X					
MW-107	Monitoring Well	Active	11.0	23.0	12.0	Overburden	SW-WPL	X					
MW-108D	Monitoring Well	Active	72.0	149.0	77.0	Bedrock	SPBA		X				
MW-108S	Monitoring Well	Active	22.9	55.1	32.2	Overburden	SPBA		X				
MW-110	Monitoring Well	Active	31.5	44.0	12.5	Bedrock	SPA		X				
MW-111	Monitoring Well	Active	82.0	149.0	67.0	Bedrock	South-Central Site Area		X				
MW-112	Monitoring Well	Active	97.5	120.0	22.5	Bedrock	South-Central Site Area		X				
MW-113	Monitoring Well	Active	125.0	151.0	26.0	Bedrock	Former Bldg 58	X					
MW-114	Monitoring Well	Active	90.0	143.7	53.7	Bedrock	Former CPA	X					
MW-115	Monitoring Well	Active	111.5	124.5	13.0	Bedrock	South-Central Site Area		X				
MW-116	Monitoring Well	Active	27.0	50.8	23.8	Overburden and Bedrock	NBldg 41	X					
MW-128	Monitoring Well	Active	49.0	24.0	25.0	Bedrock	Former Bldg 58	X					
MW-129	Monitoring Well	Active	40.0	24.0	16.0	Bedrock	Former Bldg 58	X					
MW-131	Monitoring Well	Active	24.0	22.0	2.0	Overburden and Bedrock	Former CPA	X					
MW-134	Monitoring Well	Active	42.0	23.0	19.0	Bedrock	Former WBldg2	X					
MW-136A (270-348)	Monitoring Well	Active	270.0	348.0	78.0	Bedrock	SW-WPL	X			X		
MW-136A (356-356.5)	Monitoring Well	Active	351.0	365.5	14.5	Bedrock	SW-WPL	X			X		
MW-136A (372.5-373)	Monitoring Well	Active	368.5	378.0	9.5	Bedrock	SW-WPL	X			X		
MW-136A (434-434.5)	Monitoring Well	Active	429.0	438.5	9.5	Bedrock	SW-WPL	X			X		
MW-136A (459.5-460)	Monitoring Well	Active	441.5	467.0	25.5	Bedrock	SW-WPL	X			X		
MW-137A (295.5-296)	Monitoring Well	Active	270.0	306.0	36.0	Bedrock	Former TCA Tank Area	X					
MW-137A (343-343.5)	Monitoring Well	Active	340.0	350.5	10.5	Bedrock	Former TCA Tank Area	X					
MW-137A (374.5-375)	Monitoring Well	Active	369.5	384.0	14.5	Bedrock	Former TCA Tank Area	X					
MW-137A (420-420.5)	Monitoring Well	Active	415.0	426.5	11.5	Bedrock	Former TCA Tank Area	X					
MW-137A (434.5-435)	Monitoring Well	Active	429.5	452.0	22.5	Bedrock	Former TCA Tank Area	X					
MW-138A	Monitoring Well	Active	260.0	320.0	60.0	Bedrock	Former Bldg 58	X					
MW-139A (305-305.5)	Monitoring Well	Active	295.0	325.5	30.5	Bedrock	Former NBldg4 - No flow	X					
MW-139A (333.5-334)	Monitoring Well	Active	328.5	357.0	28.5	Bedrock	Former NBldg4	X					
MW-139A (365-365.5)	Monitoring Well	Active	360.0	370.5	10.5	Bedrock	Former NBldg4	X					
MW-139A (421.5-422)	Monitoring Well	Active	416.5	426.0	9.5	Bedrock	Former NBldg4	X					
MW-139A (454-454.5)	Monitoring Well	Active	452.0	470.0	18.0	Bedrock	Former NBldg4	X					
MW-140A (209.5-210)	Monitoring Well	Active	205.0	215.0	10.0	Bedrock	Former EBldg2	X					
MW-140A (285-285.5)	Monitoring Well	Active	278.5	289.3	10.8	Bedrock	Former EBldg2	X					
MW-140A (323.5-324)	Monitoring Well	Active	318.5	326.0	7.5	Bedrock	Former EBldg2	X					
MW-140A (372-372.5)	Monitoring Well	Active	367.0	378.5	11.5	Bedrock	Former EBldg2	X					
MW-140A (407.5-408)	Monitoring Well	Active	402.5	416.0	13.5	Bedrock	Former EBldg2	X					
MW-141A	Monitoring Well	Active	200.0	100.0	100.0	Bedrock	SPBA	X					
MW-142D	Monitoring Well	Active	122.0	23.4	23.4	Bedrock	NPBA			X			
MW-142S	Monitoring Well	Active	56.0	14.0	14.0	Bedrock	NPBA			X			
MW-143D	Monitoring Well	Active	117.4	16.6	16.6	Bedrock	NPBA		X				

Table 2.2-1
Groundwater and Surface Water Monitoring Information and Objectives
Former York Naval Ordnance Plant York, PA

Well Identification	Type	Status	Depth to Top of Open Interval (ft bgs)	Depth to Base of Open Interval (ft bgs)	Open Interval Length (ft)	Open Interval in Overburden or Bedrock	Site Location	Well Located Inside Technical Impractibility Boundary	2019 Groundwater and Surface Water Monitoring Objectives				
									Monitored Natural Attenuation (MNA) Area Wells	Plume Migration Assessment in NPBA	WPL and SPBA Groundwater Extraction System Performance	Vapor Intrusion (VI) Assessment at Eastern Perimeter Well MW-185	Surface Water
MW-143S	Monitoring Well	Active	24.0	30.5	30.5	Overburden	NPBA		X				
MW-145A	Monitoring Well	Active	200.0	50.0	50.0	Bedrock	Levee Area	X					
MW-146	Monitoring Well	Active	13.0	12.0	12.0	Overburden	Levee Area	X					
MW-147A	Monitoring Well	Active	200.0	50.0	50.0	Bedrock	Levee Area	X					
MW-148A (72.5-73)	Monitoring Well	Active	67.0	78.0	11.0	Bedrock	West Side Codorus Creek		X				
MW-148A (136-136.5)	Monitoring Well	Active	130.0	140.5	10.5	Bedrock	West Side Codorus Creek		X				
MW-150	Monitoring Well	Active	147.5	200.0	52.5	Bedrock	SPA		X				
MW-155	Monitoring Well	Active	10.5	24.0	13.5	Bedrock	Levee Area	X					
MW-156	Monitoring Well	Active	4.0	22.0	18.0	Overburden	Levee Area	X					
MW-161	Monitoring Well	Active	53.0	65.7	12.7	Overburden	SPBA	X					
MW-162	Monitoring Well	Active	41.0	53.0	12.0	Overburden	SPBA	X					
MW-163	Monitoring Well	Active	32.8	55.0	22.2	Bedrock	SPBA	X					
MW-165	Monitoring Well	Active	47.5	70.5	23.0	Bedrock	SPBA		X				
MW-166	Monitoring Well	Active	39.0	52.0	13.0	Overburden	SPBA		X		X		
MW-167	Monitoring Well	Active	39.0	52.0	13.0	Overburden	SPBA		X		X		
MW-168	Monitoring Well	Active	28.5	42.0	13.5	Overburden	SPBA		X		X		
MW-176	Monitoring Well	Active	28.0	51.0	23.0	Overburden	SPBA	X					
MW-177R	Monitoring Well	Active	27.5	65.0	37.5	Overburden and Bedrock	SPBA	X					
MW-178D	Monitoring Well	Active	90.0	100.0	10.0	Bedrock	SPBA	X					
MW-178S	Monitoring Well	Active	72.0	84.0	12.0	Bedrock	SPBA	X					
MW-179	Monitoring Well	Active	36.0	66.0	30.0	Overburden	SPBA	X					
MW-180	Monitoring Well	Active	36.0	62.0	26.0	Overburden	SPBA	X					
MW-181D	Monitoring Well	Active	93.0	100.0	7.0	Bedrock	SPBA	X					
MW-181S	Monitoring Well	Active	61.0	71.0	10.0	Bedrock	SPBA	X					
MW-182	Monitoring Well	Active	27.0	39.0	12.0	Overburden	SPBA	X					
MW-183	Monitoring Well	Active	27.0	40.0	13.0	Overburden	SPBA	X					
MW-184D	Monitoring Well	Active	66.0	74.0	8.0	Bedrock	SPBA	X					
MW-184S	Monitoring Well	Active	51.0	59.0	8.0	Bedrock	SPBA	X					
MW-185	Monitoring Well	Active	55.9	77.5	21.6	Bedrock	EPBA	X				X	
PMW-X	Monitoring Well	Proposed	--	--	--	--	Northern Site Perimeter		X				
Cole D	Monitoring Well	Active	25.0	35.0	10.0	Overburden and Bedrock	SPA		X				
MW-12 (Cole Steel)	Monitoring Well	Active	16.0	50.0	34.0	Overburden and Bedrock	SPA		X				
GM-1D	Monitoring Well	Active	32.0	42.0	10.0	Overburden and Bedrock	SPA		X				
RW-2	Residential Well	Inactive	--	--	--	--	NPBA			X			
RW-4 (Folk)	Residential Well	Active	--	--	--	--	NPBA			X			
COD-SW-6	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-7	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-8	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-9	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-13	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-15	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-16	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-17	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-26	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-27	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-28	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X
COD-SW-29	Surface Water	Active	NA	NA	NA	NA	Codorus Creek						X

Notes:
COC - Constituents of concern
EPBA - Eastern Property Boundary Area
ft bgs - Feet below ground surface
NA - Not Applicable
MNA - Monitored natural attenuation
NETT - North End Test Track
NPA - North Plant Area
NPBA - Northern Property Boundary Area
NW-WPL - Northwest West Parking Lot
SPA - South Plume Area
SPBA - Southern Property Boundary Area
SW-WPL - Southwest West Parking Lot

Table 2.2-2
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - MNA Area
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	Cole Steel MW-12 10/4/19	MW-2 9/25/19	MW-3 9/30/19	MW-5 10/9/19	MW-6 10/9/19	MW-9 10/3/19	MW-12 10/1/19	MW-14 9/27/19	MW-16S 10/3/19	MW-18D 10/1/19	MW-18S 10/4/19	MW-20M 10/1/19	MW-20S 9/27/19	MW-22 9/25/19	MW-43D 10/11/19
TOTAL VOC																			
Total VOC					21.8	61	5.4	3.4	0	28.5	107	4.1	19.1	17	18.7	21	16.8	9.6	18.6
Volatile Organic Compound																			
1,1,1,2-Tetrachloroethane	70	70		0.57	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,1,1-Trichloroethane	200	200	200	8000	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,1,2,2-Tetrachloroethane	0.84	4.3		0.076	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,1,2-Trichloroethane	5	5	5	0.28	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,1-Dichloroethane	31	160		2.8	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,1-Dichloroethene	7	7	7	280	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ	1 U	1 U	1.0 U
1,2-Dibromoethane	0.05	0.05	0.05	0.0075	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,2-Dichloroethane	5	5	5	0.17	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,2-Dichloropropane	5	5	5	0.85	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
1,4-Dioxane	6.4	32		0.46															
2-Butanone	4000	4000		5600	5.0 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	5.0 U	10 U	5 U	5 U	5.0 U
2-Hexanone	63	260		38	5.0 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	5.0 U	10 U	5 U	5 U	5.0 U
4-Methyl-2-Pentanone	3300	9300		6300	5.0 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	5.0 U	10 U	5 U	5 U	5.0 UJ
Acetone	38000	110000		14000	5.0 U	25 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5 U	5.0 U	5.0 U	5.0 U	10 U	5 U	5 U	5.0 U
Acrylonitrile	0.72	3.7		0.052	20 U	100 U	20 U	20 U	20 U	20 U	100 U	20 U	20 U	20 U	20 U	40 U	20 U	20 U	20 U
Benzene	5	5	5	0.46	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Bromochloromethane	90	90		83	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 UJ	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Bromodichloromethane	80	80		0.13	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 UJ	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Bromoform	80	80		3.3	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Bromomethane	10	10		7.5	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 UJ	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Carbon Disulfide	1500	6200		810	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Carbon Tetrachloride	5	5	5	0.46	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Chlorobenzene	100	100	100	78	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Chlorodibromomethane	80	80		0.87	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Chloroethane	250	1200		21000	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Chloroform	80	80		0.22	1.0 U	5 U	1.2	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Chloromethane	30	30		190	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 UJ	1.0 U	1.0 U	2.0 UJ	1 U	1 U	1.0 U
cis-1,2-Dichloroethene	70	70	70	36	8.8	5 U	1.0 U	3.4	1.0 U	20	47 J	1 U	4.1	14	15	2.0 U	1 U	1 U	7.2
cis-1,3-Dichloropropene	7.3	34		0.47	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 UJ	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Ethylbenzene	700	700	700	1.5	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Methyl tert-butyl ether	20	20		14	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Methylene chloride	5	5		11	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 UJ	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Styrene	100	100	100	1200	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Tetrachloroethene	5	5	5	11	1.0 U	61	1.0 U	1.0 U	1.0 U	1.0 U	3.0 J	4.1	1.0 U	1.0 U	1.0 U	2.0 U	2.8	5.2	6.3
Toluene	1000	1000	1000	1100	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
trans-1,2-Dichloroethene	100	100	100	360	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
trans-1,3-Dichloropropene	7.3	34		0.47	1.0 U	5 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Trichloroethene	5	5	5	0.49	13 J	5 U	4.2	1.0 U	1.0 U	5.6 J	57	1 U	15	3	3.7 J	21	14	4.4	5.1
Vinyl Chloride	2	2	2	0.019	1.0 U	5 U	1.0 U	1.0 U	1.0 U	2.9 J	5.0 U	1 U	1.0 U	1.0 U	1.0 U	2.0 U	1 U	1 U	1.0 U
Xylenes (Total)	10000	10000	10000	190	2.0 U	10 U	2.0 U	2.0 U	2.0 U	2.0 U	10 U	2 U	2.0 U	2.0 U	2.0 U	4.0 U	2 U	2 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-2
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - MNA Area
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-65S 9/27/19	MW-67D 10/8/19	MW-67D Dup 10/8/19	MW-67S 10/8/19	MW-69 10/11/19	MW-79 10/10/19	MW-82 10/8/19	MW-88 10/10/19	MW-101D 10/14/19	MW-101S 10/14/19	MW-108D 9/24/19	MW-108S 9/25/19	MW-110 9/24/19	MW-110 Dup 9/24/19
TOTAL VOC																		
Total VOC					19.8	2.3	2.3	11	17.4	9.1	5.4	1	24.3	8.5	0.48	0	23.71	20
Volatile Organic Compound																		
1,1,1,2-Tetrachloroethane	70	70		0.57	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1,1-Trichloroethane	200	200	200	8000	1 U	1 U	1 U	4.9	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1,2,2-Tetrachloroethane	0.84	4.3		0.076	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1,2-Trichloroethane	5	5	5	0.28	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloroethane	31	160		2.8	1 U	1 U	1 U	1 U	1.0 U	2.9	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,1-Dichloroethene	7	7	7	280	1 U	1 U	1 U	1.2	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dibromoethane	0.05	0.05	0.05	0.0075	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dichloroethane	5	5	5	0.17	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,2-Dichloropropane	5	5	5	0.85	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
1,4-Dioxane	6.4	32		0.46														
2-Butanone	4000	4000		5600	5 U	5 U	5 U	5 U	5.0 U	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	10 U
2-Hexanone	63	260		38	5 U	5 U	5 U	5 U	5.0 U	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	10 U
4-Methyl-2-Pentanone	3300	9300		6300	5 U	5 U	5 U	5 U	5.0 UJ	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	10 U
Acetone	38000	110000		14000	5 U	5 U	5 U	5 U	5.0 U	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5 U	5 U	10 U
Acrylonitrile	0.72	3.7		0.052	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U
Benzene	5	5	5	0.46	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromochloromethane	90	90		83	1 U	1 U	1 U	1 UJ	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromodichloromethane	80	80		0.13	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromoform	80	80		3.3	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Bromomethane	10	10		7.5	1 U	1 U	1 U	1 UJ	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Carbon Disulfide	1500	6200		810	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Carbon Tetrachloride	5	5	5	0.46	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Chlorobenzene	100	100	100	78	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Chlorodibromomethane	80	80		0.87	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Chloroethane	250	1200		21000	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Chloroform	80	80		0.22	0.9 J	1.3	1.3	1.2	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Chloromethane	30	30		190	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
cis-1,2-Dichloroethene	70	70	70	36	1 U	1 U	1 U	1 UJ	8	6.2	2.4	1.0 U	12	1.2	1 U	1 U	1 U	2 U
cis-1,3-Dichloropropene	7.3	34		0.47	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Ethylbenzene	700	700	700	1.5	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Methyl tert-butyl ether	20	20		14	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Methylene chloride	5	5		11	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1.6	1 U	1 U	1 U	2 U
Styrene	100	100	100	1200	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Tetrachloroethene	5	5	5	11	1.9	1 U	1 U	1.5	1.0 U	1.0 U	1.1	1	4.4	4.5 J	0.48 J	1 U	23 J	20
Toluene	1000	1000	1000	1100	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
trans-1,2-Dichloroethene	100	100	100	360	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
trans-1,3-Dichloropropene	7.3	34		0.47	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Trichloroethene	5	5	5	0.49	17	1	1	2.2	9.4	1.0 U	1.9	1.0 U	7.9	1.2	1 U	1 U	0.71 J	2 U
Vinyl Chloride	2	2	2	0.019	1 U	1 U	1 U	1 U	1.0 U	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	2 U
Xylenes (Total)	10000	10000	10000	190	2 U	2 U	2 U	2 U	2.0 U	2.0 U	2 U	2.0 U	2 U	2 U	2 U	2 U	2 U	4 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-2
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - MNA Area
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-111 10/9/19	MW-112 10/8/19	MW-115 10/10/19	MW-142D 10/8/19	MW-142S 10/7/19	MW-143D 9/27/19	MW-143S 10/3/19	MW-148A 72.5 - 73 10/25/19	MW-148A 136 - 136.5 10/25/19	MW-150 10/4/19	MW-165 9/26/19	MW-166 3/29/19	MW-166 6/28/19	MW-166 9/25/19	MW-166 12/18/19
TOTAL VOC																			
Total VOC					2.7	0.71	283.1	0.97	7.5	1.1	4.11	0	0	90.9	6.9	2.46	1.63	2.79	1.34
Volatile Organic Compound																			
1,1,1,2-Tetrachloroethane	70	70		0.57	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,1,1-Trichloroethane	200	200	200	8000	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,1,2,2-Tetrachloroethane	0.84	4.3		0.076	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,1,2-Trichloroethane	5	5	5	0.28	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,1-Dichloroethane	31	160		2.8	1.0 U	1 U	20	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,1-Dichloroethene	7	7	7	280	1.0 U	1 U	3.1	1 U	1 U	1 U	1.0 UJ	1.0 U	1.0 U	0.90 J	1 U	1 U	1.0 U	1 U	1.0 U
1,2-Dibromoethane	0.05	0.05	0.05	0.0075	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,2-Dichloroethane	5	5	5	0.17	1.0 U	1 U	1.5	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,2-Dichloropropane	5	5	5	0.85	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
1,4-Dioxane	6.4	32		0.46												R	R		
2-Butanone	4000	4000		5600	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5 U	5.0 U
2-Hexanone	63	260		38	5.0 U	5 U	5.0 U	5 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5 UJ	5.0 U	5 U	5.0 U
4-Methyl-2-Pentanone	3300	9300		6300	5.0 U	5 U	5.0 UJ	5 U	5 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	5 UJ	5.0 U	5 U	5.0 U
Acetone	38000	110000		14000	5.0 U	5 U	4.2 J	5 U	5 U	5 U	3.6 J	5.0 U	5.0 U	5.0 U	5 U	5 U	5.0 U	5 U	5.0 UJ
Acrylonitrile	0.72	3.7		0.052	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	5	5	5	0.46	1.0 U	1 U	9.3	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Bromochloromethane	90	90		83	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Bromodichloromethane	80	80		0.13	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Bromoform	80	80		3.3	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Bromomethane	10	10		7.5	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Carbon Disulfide	1500	6200		810	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Carbon Tetrachloride	5	5	5	0.46	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Chlorobenzene	100	100	100	78	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Chlorodibromomethane	80	80		0.87	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Chloroethane	250	1200		21000	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Chloroform	80	80		0.22	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	0.84 J	1.0 U	0.66 J	1.0 U
Chloromethane	30	30		190	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 UJ
cis-1,2-Dichloroethene	70	70	70	36	2.7	1 U	150	0.97 J	7.5	1.1	1.0 U	1.0 U	1.0 U	44	1 U	1 U	1.0 U	1 U	1.0 U
cis-1,3-Dichloropropene	7.3	34		0.47	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Ethylbenzene	700	700	700	1.5	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Methyl tert-butyl ether	20	20		14	1.0 U	1 U	28	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Methylene chloride	5	5		11	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Styrene	100	100	100	1200	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Tetrachloroethene	5	5	5	11	1.0 U	1 U	1.0 U	1 U	1 U	1 U	0.51 J	1.0 U	1.0 U	1.0 U	3.6	0.7 J	0.75 J	0.83 J	0.63 J
Toluene	1000	1000	1000	1100	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
trans-1,2-Dichloroethene	100	100	100	360	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
trans-1,3-Dichloropropene	7.3	34		0.47	1.0 U	1 U	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Trichloroethene	5	5	5	0.49	1.0 U	0.71 J	1.0 U	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	46	3.3	0.92 J	0.88 J	1.3	0.71 J
Vinyl Chloride	2	2	2	0.019	1.0 U	1 U	67	1 U	1 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1 U	1 U	1.0 U	1 U	1.0 U
Xylenes (Total)	10000	10000	10000	190	2.0 U	2 U	2.0 U	2 U	2 U	2 U	2.0 U	2.0 U	2.0 U	2.0 U	2 U	2 U	2.0 U	2 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-2
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - MNA Area
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-167 3/29/19	MW-167 5/1/19	MW-167 6/28/19	MW-167 9/25/19	MW-167 12/18/19	MW-168 4/2/19	MW-168 6/28/19	MW-168 9/25/19	MW-168 12/18/19	CW-1A 9/27/19	CW-1A Dup 9/27/19	CW-2 10/1/19	Cole D 10/4/19	GM-1D 10/4/19	RW-2 10/2/19
TOTAL VOC																			
Total VOC					14.8	5.4	6	19.9	10.6	0.67	0.59	0	0	37.5	36.3	9	26	2.8	3.9
Volatile Organic Compound																			
1,1,1,2-Tetrachloroethane	70	70		0.57	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	200	200	200	8000	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	0.84	4.3		0.076	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	5	5	5	0.28	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 UJ	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	31	160		2.8	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	7	7	7	280	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 UJ
1,2-Dibromoethane	0.05	0.05	0.05	0.0075	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	5	5	5	0.17	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	5	5	5	0.85	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dioxane	6.4	32		0.46	R	R	R			R	R								
2-Butanone	4000	4000		5600	5 U	5 U	5.0 U	5 U	5.0 U	5 U	5.0 U	5 U	5.0 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	63	260		38	5 UJ	5 U	5.0 U	5 U	5.0 U	5 UJ	5.0 U	5 U	5.0 U	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	3300	9300		6300	5 UJ	5 U	5.0 U	5 U	5.0 U	5 UJ	5.0 U	5 U	5.0 U	10 UJ	10 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	38000	110000		14000	5 U	5 U	5.0 U	5 U	5.0 UJ	5 U	5.0 U	5 U	5.0 UJ	10 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U
Acrylonitrile	0.72	3.7		0.052	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	40 U	40 U	20 U	20 U	20 U	20 U
Benzene	5	5	5	0.46	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	90	90		83	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	80	80		0.13	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	80	80		3.3	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane	10	10		7.5	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 UJ	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Disulfide	1500	6200		810	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	5	5	5	0.46	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	100	100	100	78	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	80	80		0.87	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	250	1200		21000	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	80	80		0.22	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	30	30		190	1 U	1 U	1.0 U	1 U	1.0 UJ	1 U	1.0 U	1 U	1.0 UJ	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 UJ
cis-1,2-Dichloroethene	70	70	70	36	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.1	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	7.3	34		0.47	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 UJ	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	700	700	700	1.5	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl tert-butyl ether	20	20		14	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 UJ	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene chloride	5	5		11	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 UJ	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	100	100	100	1200	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	5	5	5	11	9.8	3.6	4.4	14	7.6	0.67 J	0.59 J	1 U	1.0 U	1.5 J	1.3 J	1.1	26	2.8	1.0 U
Toluene	1000	1000	1000	1100	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	100	100	100	360	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	7.3	34		0.47	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	5	5	5	0.49	5	1.8	1.6	5.9	3	1 U	1.0 U	1 U	1.0 U	36 J	35	6.8	1.0 U	1.0 U	3.9
Vinyl Chloride	2	2	2	0.019	1 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	1 U	1.0 U	2 U	2 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (Total)	10000	10000	10000	190	2 U	2 U	2.0 U	2 U	2.0 U	2 U	2.0 U	2 U	2.0 U	4 U	4 U	2.0 U	2.0 U	2.0 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-2
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - MNA Area
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	RW-4 Folk 9/30/19
TOTAL VOC					
Total VOC					0
Volatile Organic Compound					
1,1,1,2-Tetrachloroethane	70	70		0.57	1.0 U
1,1,1-Trichloroethane	200	200	200	8000	1.0 U
1,1,2,2-Tetrachloroethane	0.84	4.3		0.076	1.0 U
1,1,2-Trichloroethane	5	5	5	0.28	1.0 U
1,1-Dichloroethane	31	160		2.8	1.0 U
1,1-Dichloroethene	7	7	7	280	1.0 U
1,2-Dibromoethane	0.05	0.05	0.05	0.0075	1.0 U
1,2-Dichloroethane	5	5	5	0.17	1.0 U
1,2-Dichloropropane	5	5	5	0.85	1.0 U
1,4-Dioxane	6.4	32		0.46	
2-Butanone	4000	4000		5600	5.0 U
2-Hexanone	63	260		38	5.0 U
4-Methyl-2-Pentanone	3300	9300		6300	5.0 U
Acetone	38000	110000		14000	5.0 U
Acrylonitrile	0.72	3.7		0.052	20 U
Benzene	5	5	5	0.46	1.0 U
Bromochloromethane	90	90		83	1.0 U
Bromodichloromethane	80	80		0.13	1.0 U
Bromoform	80	80		3.3	1.0 U
Bromomethane	10	10		7.5	1.0 U
Carbon Disulfide	1500	6200		810	1.0 U
Carbon Tetrachloride	5	5	5	0.46	1.0 U
Chlorobenzene	100	100	100	78	1.0 U
Chlorodibromomethane	80	80		0.87	1.0 U
Chloroethane	250	1200		21000	1.0 U
Chloroform	80	80		0.22	1.0 U
Chloromethane	30	30		190	1.0 U
cis-1,2-Dichloroethene	70	70	70	36	1.0 U
cis-1,3-Dichloropropene	7.3	34		0.47	1.0 U
Ethylbenzene	700	700	700	1.5	1.0 U
Methyl tert-butyl ether	20	20		14	1.0 U
Methylene chloride	5	5		11	1.0 U
Styrene	100	100	100	1200	1.0 U
Tetrachloroethene	5	5	5	11	1.0 U
Toluene	1000	1000	1000	1100	1.0 U
trans-1,2-Dichloroethene	100	100	100	360	1.0 U
trans-1,3-Dichloropropene	7.3	34		0.47	1.0 U
Trichloroethene	5	5	5	0.49	1.0 U
Vinyl Chloride	2	2	2	0.019	1.0 U
Xylenes (Total)	10000	10000	10000	190	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-3
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - Wells Inside Technical Impractibility (TI) Boundary
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	MW-37D 10/11/19	MW-37S 10/11/19	MW-75D 10/14/19	MW-75D Dup 10/14/19	MW-75S 10/11/19	MW-93D 10/11/19	MW-93S 10/14/19	MW-136A 270 - 348 10/15/19	MW-136A 356 - 356.5 10/15/19	MW-136A 372.5 - 373 10/15/19	MW-136A 434 - 434.5 10/15/19	MW-136A 459.5 - 460 10/25/19	MW-185 9/26/19	CW-9 9/26/19	CW-9 10/25/19	CW-9 11/21/19
TOTAL VOC																
Total VOC	899.9	224.98	16340	16706	22760	123.4	338.6	573.9	10200	23400	20770	8123.1	55	503.5	396.3	405
Volatile Organic Compound																
1,1,1,2-Tetrachloroethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
1,1,1-Trichloroethane	24	13	130	140 J	190 J	5.0 U	27	5 U	50 U	100 UJ	130 U	10 UJ	5 U	25 UJ	20 J	19 J
1,1,2,2-Tetrachloroethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
1,1,2-Trichloroethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
1,1-Dichloroethane	5.0 U	3.1	100 U	19	200 U	5.0 U	1.2	5 U	50 U	100 UJ	130 U	7.5 J	5 U	3.1	2.5	25 UJ
1,1-Dichloroethene	4.9 J	0.88 J	100 U	26	200 U	5.0 U	1.6 J	5 U	50 U	100 UJ	130 U	12 J	5 U	3.4 J	1.8 J	25 UJ
1,2-Dibromoethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
1,2-Dichloroethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
1,2-Dichloropropane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
1,4-Dioxane																
2-Butanone	25 U	5.0 U	500 U	5 U	1000 U	25 U	5 U	25 U	250 U	500 UJ	630 U	50 UJ	25 U	13 U	10 U	130 UJ
2-Hexanone	25 U	5.0 U	500 U	5 U	1000 U	25 U	5 U	25 U	250 U	500 UJ	630 U	50 UJ	25 U	13 UJ	10 U	130 UJ
4-Methyl-2-Pentanone	25 UJ	5.0 UJ	500 U	5 U	1000 UJ	25 UJ	5 U	25 U	250 U	500 UJ	630 U	50 UJ	25 U	13 UJ	10 U	130 UJ
Acetone	25 U	5.0 U	500 UJ	5 U	1000 U	25 U	5 U	25 UJ	250 UJ	500 UJ	630 UJ	50 UJ	25 U	13 U	10 U	130 UJ
Acrylonitrile	100 U	20 U	2000 U	20 U	4000 U	100 U	20 U	100 U	1000 U	2000 UJ	2500 U	110 J	100 U	50 U	40 U	500 UJ
Benzene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Bromochloromethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Bromodichloromethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Bromoform	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Bromomethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Carbon Disulfide	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Carbon Tetrachloride	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Chlorobenzene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Chlorodibromomethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Chloroethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Chloroform	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	6.6 J	5 U	2.5 U	2.0 U	25 UJ
Chloromethane	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
cis-1,2-Dichloroethene	21	11	210	210 J	170 J	31	20	550	1600	7800	20000	7600 J	5 U	27	19	21 J
cis-1,3-Dichloropropene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Ethylbenzene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Methyl tert-butyl ether	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Methylene chloride	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1.8	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 U	2.0 U	25 UJ
Styrene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Tetrachloroethene	720	180	14000 J	14000 J	20000 J	38	240 J	9.9	1200	3600 J	130 U	10 UJ	55	370	310	310 J
Toluene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
trans-1,2-Dichloroethene	5.0 U	1.0 U	100 U	1.2	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 J	5 U	2.5 U	2.0 U	25 UJ
trans-1,3-Dichloropropene	5.0 U	1.0 U	100 U	1 U	200 U	5.0 U	1 U	5 U	50 U	100 UJ	130 U	10 UJ	5 U	2.5 UJ	2.0 U	25 UJ
Trichloroethene	130	17	2000	2300	2400	49	47	14	7400	12000	770	340 J	5 U	100 J	43	55 J
Vinyl Chloride	5.0 U	1.0 U	100 U	9.8	200 U	5.4	1 U	5 U	50 U	100 UJ	130 U	37 J	5 U	2.5 U	2.0 U	25 UJ
Xylenes (Total)	10 U	2.0 U	200 U	2 U	400 U	10 U	2 U	10 U	100 U	200 UJ	250 U	20 UJ	10 U	5 UJ	4.0 U	50 UJ

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-3
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - Wells Inside Technical Impractibility (TI) Boundary
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	CW-9 12/18/19	CW-13 9/26/19	CW-13 12/18/19	CW-15A 9/26/19	CW-15A 12/18/19	CW-17 9/26/19	CW-17 12/18/19	CW-20 9/26/19	CW-20 12/18/19	CW-21 3/28/19	CW-21 6/27/19	CW-21 9/26/19	CW-21 12/18/19	CW-22 3/28/19	CW-22 6/27/19	CW-22 9/26/19	CW-22 12/18/19
TOTAL VOC																	
Total VOC	290.9	568	401.3	17730	10942.9	183.7	83.1	1595	1114.3	439.1	233.2	263.5	231.6	182.6	122.9	113.3	100
Volatile Organic Compound																	
1,1,1,2-Tetrachloroethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,1,1-Trichloroethane	7.9	2.5 U	3.7	5900	3500	9.5	3.1	53 J	34	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,1,2,2-Tetrachloroethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,1,2-Trichloroethane	2.5 U	2.5 U	1.0 U	50 U	0.56 J	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,1-Dichloroethane	2.5 U	2.5 U	1.0 U	130	48	5.4	2	12	7	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
1,1-Dichloroethene	2.5 U	2 J	2.6	1100 J	730	6.8 J	2	10 J	5.3	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	10 U	6.0 U
1,2-Dibromoethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 U	6.0 U
1,2-Dichloroethane	2.5 U	2.5 U	1.0 U	50 U	1.9	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,2-Dichloropropane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
1,4-Dioxane										R	R			R	R		
2-Butanone	13 UJ	13 U	5.0 U	250 U	5.0 U	25 U	5.0 U	50 U	5 U	5 U	10 U	13 U	5.0 UJ	5 U	5.0 UJ	5 U	30 U
2-Hexanone	13 UJ	13 U	5.0 U	250 U	5.0 U	25 U	5.0 U	50 UJ	5 U	5 U	10 U	13 UJ	5.0 UJ	5 U	5.0 U	5 UJ	30 U
4-Methyl-2-Pentanone	13 UJ	13 U	5.0 U	250 U	5.0 U	25 U	5.0 U	50 UJ	5 U	5 UJ	10 U	13 UJ	5.0 UJ	5 UJ	5.0 U	5 UJ	30 U
Acetone	13 UJ	13 U	5.0 U	250 U	5.0 U	25 U	5.0 U	50 U	5 U	5 U	10 U	13 U	5.0 UJ	5 U	5.0 UJ	5 U	30 UJ
Acrylonitrile	50 U	50 U	20 U	1000 U	20 U	100 U	20 U	200 U	20 U	20 U	40 U	50 U	20 U	20 U	20 U	200 U	120 U
Benzene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Bromochloromethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Bromodichloromethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Bromoform	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Bromomethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Carbon Disulfide	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Carbon Tetrachloride	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Chlorobenzene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Chlorodibromomethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Chloroethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Chloroform	2.5 U	2.5 U	1.0 U	50 U	0.78 J	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Chloromethane	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1 U	1 U	2.0 U	2.5 U	1.0 UJ	1 U	1.0 UJ	1 UJ	6.0 UJ
cis-1,2-Dichloroethene	11	380	230	5600	3400	38	17	50	28	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
cis-1,3-Dichloropropene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Ethylbenzene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Methyl tert-butyl ether	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Methylene chloride	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
Styrene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Tetrachloroethene	260	120	120	1000	960	58	32 F1	1100	830	430	230	260	230	180	120	110 J	100
Toluene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
trans-1,2-Dichloroethene	2.5 U	2.5 U	1.0 U	50 U	1.7	5 U	1.0 U	10 U	1.0 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 U	1 U	6.0 U
trans-1,3-Dichloropropene	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 UJ	1.0 U	1 U	2.0 U	2.5 UJ	1.0 U	1 U	1.0 U	1 UJ	6.0 U
Trichloroethene	12	66	45	4000	2300	66	27 F1	370 J	210	9.1	3.2	3.5 J	1.6	2.6	2.9	3.3 J	6.0 U
Vinyl Chloride	2.5 U	2.5 U	1.0 U	50 U	1.0 U	5 U	1.0 U	10 U	1 U	1 U	2.0 U	2.5 U	1.0 U	1 U	1.0 UJ	1 U	6.0 U
Xylenes (Total)	5.0 U	5 U	2.0 U	100 U	2.0 U	10 U	2.0 U	20 UJ	2.0 U	2 U	4.0 U	5 UJ	2.0 U	2 U	2.0 U	2 UJ	12 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-3
Groundwater Analytical Data Summary - Volatile Organic Compounds (VOCs) - Wells Inside Technical Impractibility (TI) Boundary
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	CW-23 3/28/19	CW-23 6/27/19	CW-23 9/26/19	CW-23 12/18/19
TOTAL VOC				
Total VOC	23	30.82	42	37
Volatile Organic Compound				
1,1,1,2-Tetrachloroethane	1 U	1.0 U	2 U	1.0 U
1,1,1-Trichloroethane	1 U	1.0 U	2 U	1.0 U
1,1,2,2-Tetrachloroethane	1 U	1.0 U	2 U	1.0 U
1,1,2-Trichloroethane	1 U	1.0 U	2 U	1.0 U
1,1-Dichloroethane	1 U	1.0 U	2 U	1.0 U
1,1-Dichloroethene	1 U	1.0 U	2 U	1.0 U
1,2-Dibromoethane	1 U	1.0 U	2 U	1.0 U
1,2-Dichloroethane	1 U	1.0 U	2 U	1.0 U
1,2-Dichloropropane	1 U	1.0 U	2 U	1.0 U
1,4-Dioxane	R	R		
2-Butanone	5 U	5.0 U	10 U	5.0 UJ
2-Hexanone	5 U	5.0 U	10 U	5.0 UJ
4-Methyl-2-Pentanone	5 UJ	5.0 U	10 U	5.0 UJ
Acetone	5 U	5.0 U	10 U	5.0 UJ
Acrylonitrile	20 U	20 U	40 U	20 U
Benzene	1 U	1.0 U	2 U	1.0 U
Bromochloromethane	1 U	1.0 U	2 U	1.0 U
Bromodichloromethane	1 U	1.0 U	2 U	1.0 U
Bromoform	1 U	1.0 U	2 U	1.0 U
Bromomethane	1 U	1.0 U	2 U	1.0 U
Carbon Disulfide	1 U	1.0 U	2 U	1.0 U
Carbon Tetrachloride	1 U	1.0 U	2 U	1.0 U
Chlorobenzene	1 U	1.0 U	2 U	1.0 U
Chlorodibromomethane	1 U	1.0 U	2 U	1.0 U
Chloroethane	1 U	1.0 U	2 U	1.0 U
Chloroform	1 U	1.0 U	2 U	1.0 U
Chloromethane	1 U	1.0 U	2 U	1.0 UJ
cis-1,2-Dichloroethene	1 U	1.0 U	2 U	1.0 U
cis-1,3-Dichloropropene	1 U	1.0 U	2 U	1.0 U
Ethylbenzene	1 U	1.0 U	2 U	1.0 U
Methyl tert-butyl ether	1 U	1.0 U	2 U	1.0 U
Methylene chloride	1 U	1.0 U	2 U	1.0 U
Styrene	1 U	1.0 U	2 U	1.0 U
Tetrachloroethene	23	30	42	37
Toluene	1 U	1.0 U	2 U	1.0 U
trans-1,2-Dichloroethene	1 U	1.0 U	2 U	1.0 U
trans-1,3-Dichloropropene	1 U	1.0 U	2 U	1.0 U
Trichloroethene	1 U	0.82 J	2 U	1.0 U
Vinyl Chloride	1 U	1.0 U	2 U	1.0 U
Xylenes (Total)	2 U	2.0 U	4 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-4
Groundwater Analytical Data Summary - Cyanide - MNA Area Well MW-2
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-2 4/29/86	MW-2 7/22/86	MW-2 1/29/92	MW-2 6/22/93	MW-2 7/13/94	MW-2 10/27/95	MW-2 7/17/96	MW-2 999.99 10/22/97	MW-2 999.99 12/9/98	MW-2 999.99 9/21/99	MW-2 999.99 3/20/00
Cyanide															
Cyanide, Free	200	200	200	1.5		12	16	20	5 U	2800	1700	1500	200	300	356
Cyanide, Total	200	200		1.5	1060	1040	1500	120	1900	2800	1700	1500	1600	2300	10.1

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-4
Groundwater Analytical Data Summary - Cyanide - MNA Area Well MW-2
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-2 999.99 3/30/00	MW-2 999.99 6/21/01	MW-2 999.99 6/14/02	MW-2 999.99 6/4/03	MW-2 999.99 6/10/04	MW-2 999.99 6/21/05	MW-2 999.99 6/23/06	MW-2 443.73 6/28/07	MW-2 5/8/08	MW-2 9/17/08	MW-2 6/24/09	MW-2 6/25/10
Cyanide																
Cyanide, Free	200	200	200	1.5	360	852	43	247	220	280	11	14	100 J	100 J	100 J	45
Cyanide, Total	200	200		1.5	10	3920	1470	1670	1000	490	1390	1280	1300	930	980	660

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-4
Groundwater Analytical Data Summary - Cyanide - MNA Area Well MW-2
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	PA MSC UA R (ug/L)	PA MSC UA NR (ug/L)	Federal MCL (ug/L)	EPA RSL (ug/L)	MW-2 6/29/11	MW-2 9/3/13	MW-2 10/14/14	MW-2 10/26/17	MW-2 9/25/19
Cyanide									
Cyanide, Free	200	200	200	1.5	2 U	12	2 U	6.9	33
Cyanide, Total	200	200		1.5	670	370	590	360	270

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.2-5

WPL Groundwater Extraction System Remedial Action Performance Data for September through December 2019
Former York Naval Ordnance Plant - York, PA

Month/Year	Sample Date	Total VOC Concentration in Micrograms Per Liter (µg/L)	Volume of Groundwater Pumped per Month (gallons) (2)	Volume of Groundwater Pumped per Month (MG)	Total VOC Mass Removed per Period (pounds)	Removal Efficiency per Month (pounds/MG)
Sep-19	9/26/2019	909	11,664,954	12	89	8
Oct-19	10/25/2019	915	12,128,669	12	93	8
Nov-19	11/26/2019	779	10,538,941	11	69	7
Dec-19	12/18/2019	700	10,718,801	11	63	6
TOTALS			45,051,365		312	

Notes:
(1) Monthly total VOC concentrations were calculated based on the analytical results of water samples collected at the groundwater treatment building. Two samples were collected each month, one from the combined flow from extraction wells CW-7, CW-13, CW-15A, and CW-20 and another from CW-9.
(2) The volume of groundwater pumped in November and December 2019 were lower than September and October 2019 because of reduced flow at CW-17.

Table 2.2-6

SPBA Groundwater Extraction System Performance Data for November 2018 through December 2019

Former York Naval Ordnance Plant - York, PA

Month/Year	Sample Date	Total VOC Concentration in micrograms per liter (µg/L)	Volume of Groundwater Pumped per Month (gallons)	Volume of Groundwater Pumped per Month (MG)	Total VOC Mass Removed per Month (pounds)	Removal Efficiency per Month (pounds/MG)
Nov 18	11/1/2018	486	329,645	0.3	1.3	4.1
Dec 18	12/20/2018	447	350,555	0.4	1.3	3.7
Jan 19	Sample Not Collected	441	351,409	0.4	1.3	3.7
Feb 19	Sample Not Collected	312	301,638	0.3	0.8	2.6
Mar 19	3/28/2019	310	354,531	0.4	0.9	2.6
Apr 19	Sample Not Collected	319	315,465	0.3	0.8	2.7
May 19	Sample Not Collected	163	336,669	0.3	0.5	1.4
Jun 19	6/27/2019	163	269,914	0.3	0.4	1.4
Jul 19	8/2/2019	195	290,966	0.3	0.5	1.6
Aug 19	8/23/2019	255	280,187	0.3	0.6	2.1
Sep 19	9/26/2019	213	251,634	0.3	0.4	1.8
Oct 19	10/25/2019	223	250,306	0.3	0.5	1.9
Nov 19	11/21/2019	170	267,888	0.3	0.4	1.4
Dec 19	12/18/2019	192	281,476	0.3	0.5	1.6
TOTALS			4,232,283		10	

Notes:

(1) The volume of groundwater pumped in November 2018 includes groundwater pumped on October 31, 2018.

(2) Monthly total VOC concentrations for November/December 2018 and March 2018 were calculated based on analytical results of samples from CW-21, CW-22, and CW-23 and the average pumping rates when the samples were collected. Concentrations for months where samples were not collected are based on the results of the most recent sample. Concentrations for June through December 2019 are based on the analytical results for samples of the combined flow from the three extraction wells.

Table 2.3-1
Monthly Surface Water Monitoring Information
Former York Naval Ordnance Plant - York, PA

Monthly Surface Water Sample Collection Date	Sample Description	West Parking Lot (WPL) Groundwater Extraction System Pumping Rate (gpm)	Average Daily Stream Gauge Height (feet)	Average Daily Stream Gauge Discharge (cfs)
09/23/19	Month 1	270	1.7	82
10/24/19	Month 2	277	1.9	130
11/21/19	Month 3	230	1.8	107
12/18/19	Month 4	242	3.1	618

Notes:

gpm - gallons per minute

cfs - cubic feet per second

WPL groundwater extraction system pumping rates provided by Hydro-Terra Group

Stream Gauge Location - USGS 01575585 Codorus Creek at Pleasureville, PA (https://waterdata.usgs.gov/).

Table 2.3-2
Surface Water Analytical Data Summary - Volatile Organic Compounds (VOCs)
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	COD-SW-13 9/23/19	COD-SW-13 10/24/19	COD-SW-13 11/21/19	COD-SW-13 12/18/19	COD-SW-15 9/23/19	COD-SW-15 10/24/19	COD-SW-15 Dup 11/21/19	COD-SW-15 11/21/19	COD-SW-15 12/18/19	COD-SW-16 9/23/19	COD-SW-16 10/24/19	COD-SW-16 11/21/19	COD-SW-16 12/18/19	COD-SW-17 10/9/19	COD-SW-17 10/24/19
TOTAL VOC															
Total VOC	0	0	0	0	4.65	4.87	0	4.55	4.69	0	0	0	0	5.19	6
Volatile Organic Compound															
1,1,1,2-Tetrachloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 UJ	1.0 UJ	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 UJ
1,1,2-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dioxane															
2-Butanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 UJ	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	5 U	5.0 U	5.0 U	5.0 UJ	5 U	5.0 U	5.0 UJ	5.0 U	5.0 UJ	5 U	5.0 U	5.0 U	5.0 UJ	5.0 U	5.0 U
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	1 U	1.0 U	1.0 UJ	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U
Bromomethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Disulfide	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroform	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	0.79 J	0.97 J	1.0 UJ	0.86 J	0.83 J	1 U	1.0 U	1.0 U	1.0 U	0.99 J	1.3
cis-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methyl tert-butyl ether	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene chloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1 U	1.0 U	1.0 U	1.0 U	2.9	2.6	1.0 UJ	2.7	3	1 U	1.0 U	1.0 U	1.0 U	3	3.1
Toluene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1 U	1.0 U	1.0 U	1.0 U	0.96 J	1.3	1.0 UJ	0.99 J	0.86 J	1 U	1.0 U	1.0 U	1.0 U	1.2	1.6
Vinyl Chloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylenes (Total)	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 UJ	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.3-2
Surface Water Analytical Data Summary - Volatile Organic Compounds (VOCs)
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	COD-SW-17 11/21/19	COD-SW-17 12/18/19	COD-SW-17 Dup 12/18/19	COD-SW-26 9/23/19	COD-SW-26 10/24/19	COD-SW-26 11/21/19	COD-SW-26 12/18/19	COD-SW-27 9/23/19	COD-SW-27 10/24/19	COD-SW-27 11/21/19	COD-SW-27 12/18/19	COD-SW-28 9/23/19	COD-SW-28 10/24/19	COD-SW-28 11/21/19	COD-SW-28 12/18/19
TOTAL VOC															
Total VOC	6.3	2	0	5.1	5.18	4.7	1	5.4	1.2	0	0	0	0	0	0
Volatile Organic Compound															
1,1,1,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,4-Dioxane															
2-Butanone	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
2-Hexanone	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
Acetone	5.0 U	5.0 UJ	5.0 UJ	5 U	5.0 U	5.0 U	5.0 UJ	5.4 J	5.0 U	5.0 U	5.0 UJ	5 U	5.0 U	5.0 U	5.0 UJ
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1 U	1.0 U	1.0 UJ	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Carbon Disulfide	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloroform	1.0 U	1.0 U	1.0 U	1 U	0.98 J	1.0 U	1.0 U	1 U	1.2	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloromethane	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Methyl tert-butyl ether	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Methylene chloride	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	3.8	2	1.0 U	5.1	4.2	4.7	1	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1.5	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Xylenes (Total)	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.3-2
Surface Water Analytical Data Summary - Volatile Organic Compounds (VOCs)
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	COD-SW-29 9/23/19	COD-SW-29 10/24/19	COD-SW-29 11/21/19	COD-SW-29 12/18/19	COD-SW-6 9/23/19	COD-SW-6 10/24/19	COD-SW-6 11/21/19	COD-SW-6 12/18/19	COD-SW-7 9/23/19	COD-SW-7 10/24/19	COD-SW-7 11/21/19	COD-SW-7 12/18/19	COD-SW-8 9/23/19	COD-SW-8 10/24/19	COD-SW-8 11/21/19	COD-SW-8 12/18/19
TOTAL VOC																
Total VOC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volatile Organic Compound																
1,1,1,2-Tetrachloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U	1 U	1.0 UJ	1.0 U	1.0 U
1,1,2-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
1,4-Dioxane																
2-Butanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
2-Hexanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U
Acetone	5 U	5.0 U	5.0 U	5.0 UJ	5 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 UJ	5 U	5.0 U	5.0 U	5.0 UJ
Acrylonitrile	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Benzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromoform	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Bromomethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Carbon Disulfide	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloroethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 UJ	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloroform	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Chloromethane	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Methyl tert-butyl ether	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Methylene chloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Styrene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Toluene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U	1 U	1.0 U	1.0 U	1.0 U
Xylenes (Total)	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 2.3-2
Surface Water Analytical Data Summary - Volatile Organic Compounds (VOCs)
Former York Naval Ordnance Plant - York, PA

Location/ID Depth (ft.) Sample Date Parameter	COD-SW-9 9/23/19	COD-SW-9 10/24/19	COD-SW-9 11/21/19	COD-SW-9 12/18/19
TOTAL VOC				
Total VOC	0	0	0.9	0
Volatile Organic Compound				
1,1,1,2-Tetrachloroethane	1 U	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1 U	1.0 UJ	1.0 U	1.0 U
1,1,2-Trichloroethane	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U
1,2-Dibromoethane	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1 U	1.0 U	1.0 U	1.0 U
1,4-Dioxane				
2-Butanone	5 U	5.0 U	5.0 U	5.0 U
2-Hexanone	5 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	5 U	5.0 U	5.0 U	5.0 U
Acetone	5 U	5.0 U	5.0 U	5.0 UJ
Acrylonitrile	20 U	20 U	20 U	20 U
Benzene	1 U	1.0 U	1.0 U	1.0 U
Bromochloromethane	1 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1 U	1.0 U	1.0 U	1.0 U
Bromoform	1 U	1.0 U	1.0 U	1.0 U
Bromomethane	1 U	1.0 U	1.0 U	1.0 U
Carbon Disulfide	1 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	1 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	1 U	1.0 U	1.0 U	1.0 U
Chlorodibromomethane	1 U	1.0 U	1.0 U	1.0 U
Chloroethane	1 U	1.0 U	1.0 U	1.0 U
Chloroform	1 U	1.0 U	1.0 U	1.0 U
Chloromethane	1 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	1 U	1.0 U	1.0 U	1.0 U
Methyl tert-butyl ether	1 U	1.0 U	1.0 U	1.0 U
Methylene chloride	1 U	1.0 U	1.0 U	1.0 U
Styrene	1 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1 U	1.0 U	1.0 U	1.0 U
Toluene	1 U	1.0 U	0.90 J	1.0 U
trans-1,2-Dichloroethene	1 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	1 U	1.0 U	1.0 U	1.0 U
Trichloroethene	1 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1 U	1.0 U	1.0 U	1.0 U
Xylenes (Total)	2 U	2.0 U	2.0 U	2.0 U

Blank results = analyte not analyzed. U = Not detected. J = Organics; estimated. Inorganics; blank contamination.

Table 3.1-1

2019 West Parking Lot (WPL) Groundwater Extraction System Flow Data
Former York Naval Ordnance Plant - York, PA

Year	Month	WPL Total	WPL Average Monthly Flow Rate (GPM)
2019	January	11,741,030	263
	February	10,501,870	260
	March	11,591,734	260
	April	11,408,626	264
	May	11,783,785	264
	June	11,849,646	274
	July	11,461,978	257
	August	11,626,085	260
	September	11,664,954	270
	October	12,128,669	272
	November	10,538,941	244
	December	10,718,801	240
Total/Average Flow		137,016,119	261

Table 3.2-1

SPBA Water Level Measurement and Elevation Data

Former York Naval Ordnance Plant - York, PA

Location	Measurement Reference Point Elevation (feet amsl)	Pumping Conditions 1/16/2019		Pumping Conditions 3/28/2019		Pumping Conditions 4/1/2019		Pumping Conditions 6/26/2019		Pumping Conditions 9/17/2019		Pumping Conditions 12/16/2019	
		DTW (feet btoc)	GW Elevation (feet amsl)	DTW (feet btoc)	GW Elevation (feet amsl)	DTW (feet btoc)	GW Elevation (feet amsl)	DTW (feet btoc)	GW Elevation (feet amsl)	DTW (feet btoc)	GW Elevation (feet amsl)	DTW (feet btoc)	GW Elevation (feet amsl)
MW-2	508.88	60.31	448.57	NM	NA	NM	NA	64.23	444.65	68.74	440.14	66.31	442.57
MW-15	523.95	49.98	473.97	NM	NA	NM	NA	60.97	462.98	61.50	462.45	60.82	463.13
MW-22	447.57	53.71	393.86	NM	NA	NM	NA	58.11	389.46	64.10	383.47	62.27	385.30
MW-64S	416.34	34.20	382.14	NM	NA	NM	NA	38.00	378.34	40.32	376.02	40.11	376.23
MW-64D	416.43	57.95	358.48	NM	NA	NM	NA	61.65	354.78	64.80	351.63	64.16	352.27
MW-91	501.18	52.12	449.06	NM	NA	NM	NA	65.69	435.49	60.01	441.17	56.96	444.22
MW-92	476.87	77.82	399.05	NM	NA	NM	NA	82.95	393.92	89.15	387.72	87.95	388.92
MW-108S	425.46	18.30	407.16	NM	NA	NM	NA	27.60	397.86	34.38	391.08	34.85	390.61
MW-108D	426.35	14.52	411.83	NM	NA	NM	NA	21.48	404.87	25.13	401.22	23.90	402.45
MW-109S	388.39	32.25	356.14	NM	NA	NM	NA	34.62	353.77	37.37	351.02	36.54	351.85
MW-109D	389.12	31.91	357.21	NM	NA	NM	NA	34.30	354.82	37.10	352.02	36.08	353.04
MW-110	378.36	22.34	356.02	NM	NA	NM	NA	24.78	353.58	27.60	350.76	26.57	351.79
MW-141A	416.96	43.73	373.23	NM	NA	NM	NA	46.71	370.25	50.43	366.53	49.97	366.99
MW-161	415.92	57.51	358.41	NM	NA	NM	NA	61.20	354.72	64.32	351.60	63.84	352.08
MW-162	415.78	39.02	376.76	NM	NA	36.74	379.04	44.40	371.38	49.38	366.40	49.11	366.67
MW-163	419.41	30.13	389.28	NM	NA	NM	NA	32.35	387.06	37.83	381.58	35.82	383.59
MW-164	424.50	35.17	389.33	NM	NA	NM	NA	37.88	386.62	43.52	380.98	39.13	385.37
MW-165	419.41	37.30	382.11	NM	NA	NM	NA	41.86	377.55	47.00	372.41	39.40	380.01
MW-166	402.03	34.58	367.45	32.61	369.42	NM	NA	39.51	362.52	43.54	358.49	44.02	358.01
MW-167	399.07	17.30	381.77	13.44	385.63	NM	NA	23.94	375.13	34.01	365.06	36.45	362.62
MW-168	395.19	11.64	383.55	NM	NA	10.52	384.67	15.31	379.88	23.43	371.76	17.12	378.07
MW-169	389.43	20.13	369.30	NM	NA	NM	NA	26.87	362.56	33.11	356.32	34.00	355.43
MW-170	385.60	15.45	370.15	NM	NA	NM	NA	19.89	365.71	28.58	357.02	28.80	356.80
MW-171	386.75	30.22	356.53	NM	NA	NM	NA	32.94	353.81	35.76	350.99	34.81	351.94
MW-172	385.03	23.29	361.74	NM	NA	NM	NA	NM	NA	NM	NA	30.52	354.51
MW-173	381.57	11.57	370.00	NM	NA	NM	NA	15.58	365.99	21.72	359.85	24.45	357.12
MW-174	378.31	20.98	357.33	NM	NA	NM	NA	22.00	356.31	27.28	351.03	26.80	351.51
MW-175	376.18	21.00	355.18	NM	NA	NM	NA	23.14	353.04	26.48	349.70	24.81	351.37
MW-176	415.46	51.53	363.93	NM	NA	NM	NA	DRY	NM	DRY	NM	DRY	NM
MW-177R	415.33	57.90	357.43	NM	NA	56.74	358.59	64.87	350.46	65.99	349.34	66.08	349.25
MW-178S	415.11	76.00	339.11	NM	NA	NM	NA	79.05	336.06	80.18	334.93	83.14	331.97
MW-178D	414.81	75.75	339.06	NM	NA	NM	NA	78.75	336.06	80.92	333.89	83.12	331.69
MW-179	414.74	55.95	358.79	NM	NA	NM	NA	63.48	351.26	DRY	NM	DRY	NM
MW-180	414.36	57.40	356.96	NM	NA	NM	NA	65.07	349.29	DRY	NM	DRY	NM
MW-181S	414.86	64.01	350.85	NM	NA	NM	NA	68.45	346.41	70.44	344.42	70.87	343.99
MW-181D	414.91	51.44	363.47	NM	NA	NM	NA	54.78	360.13	58.49	356.42	57.75	357.16
MW-182	416.41	41.70	374.71	NM	NA	NM	NA	44.58	371.83	DRY	NM	DRY	NM
MW-183	417.14	41.48	375.66	NM	NA	NM	NA	41.67	375.47	46.25	370.89	46.83	370.31
MW-184S	416.19	44.94	371.25	NM	NA	41.64	374.55	48.10	368.09	50.90	365.29	50.39	365.80
MW-184D	416.29	27.85	388.44	NM	NA	NM	NA	30.69	385.60	35.92	380.37	34.06	382.23
MW-185	514.13	64.20	449.93	NM	NA	NM	NA	67.52	446.61	70.84	443.29	68.28	445.85
MPE-1	415.88	45.42	370.46	NM	NA	NM	NA	49.06	366.82	49.09	366.79	49.19	366.69
MPE-2	415.15	64.25	350.90	NM	NA	NM	NA	66.35	348.80	67.35	347.80	67.55	347.60
MPE-3	417.65	41.52	376.13	NM	NA	NM	NA	41.97	375.68	43.32	374.33	43.33	374.32
CW-21	415.72	95.23	320.49	95.10	320.62	NM	NA	95.52	320.20	93.39	322.33	96.27	319.45
CW-22	415.71	96.85	318.86	97.00	318.71	NM	NA	96.84	318.87	96.82	318.89	96.75	318.96
CW-23	418.11	57.63	360.48	57.10	361.01	NM	NA	56.69	361.42	56.70	361.41	56.75	361.36

Notes:

NM - Not measured

NA - Not applicable

DTW - Depth to water

GW - Groundwater

amsl - Above mean sea level

DRY - No water in well (groundwater elevation < total well depth in feet amsl (MW-176 < 363.51, MW-179 < 346.77, MW-180 < 346.85, and MW-182 < 370.34))

Table 3.3-1
Comparison of 2019 MNA Area Well Groundwater Sample Analytical Results to Baseline Results in Part 2 SRI
Former York Naval Ordnance Plant York, PA

MNA Area Well Identification	2019 Annual MNA Area Groundwater Sample Analytical Results					Baseline Groundwater Sample Analytical Results from Part 2 SRI		
	COC Exceeded in Sample	Detected Concentration (µg/L)	Regulatory Standard (µg/L)	Detected Concentration is Less Than or Equal to Regulatory Standard	Detected Concentration is Greater Than Regulatory Standard	Sample Date	COC Exceeded in Sample	Detected Concentration (µg/L)
Northern Property Boundary Area (NPBA)								
MW-3	No Exceedance	-	-	✓	-	9/21/2015	TCE	31
MW-9	TCE	5.6 J	5	✓	-	9/22/2015	TCE	29
	VC	2.9 J	2	✓	-		VC	5
MW-12	PCE	3 J	5	✓	-	9/22/2015	PCE	6.4
	TCE	57	5	-	✓		TCE	120
MW-16S	PCE	1 U	5	✓	-	9/23/2015	PCE	6.7
	TCE	15	5	-	✓		TCE	5.6
MW-18S	No Exceedance	-	-	✓	-	9/25/2015	TCE	11
MW-18D	No Exceedance	-	-	✓	-	9/24/2015	TCE	9.5
MW-20S	TCE	14	5	-	✓	9/24/2015	TCE	81
MW-20M	TCE	21	5	-	✓	9/30/2015	TCE	13
MW-143S	No Exceedance	-	-	✓	-	9/30/2015	No Exceedance	-
MW-143D	No Exceedance	-	-	✓	-	9/30/2015	No Exceedance	-
CW-1A	TCE	36 J	5	-	✓	10/6/2015	TCE	28
CW-2	TCE	6.8	5	-	✓	10/7/2015	TCE	4.9
RW-2	No Exceedance	-	-	✓	-	9/16/2015	No Exceedance	-
RW-4 (Folk)	No Exceedance	-	-	✓	-	9/16/2015	No Exceedance	-
Eastern Site Perimeter								
MW-2	PCE	61	5	-	✓	10/14/2014	PCE	69
	TCE	5 U	5	✓	-		TCE	8.8
	Cyanide, Total	270	1.5	-	✓		Cyanide, Total	590
MW-14	No Exceedance	-	-	✓	-	4/24/2008	No Exceedance	-
MW-65S	TCE	17	5	-	✓	5/8/2008	TCE	99
South-Central Site Area								
MW-67S	No Exceedance	-	-	✓	-	5/6/2008	TCE	29
MW-67D	No Exceedance	-	-	✓	-	5/6/2008	TCE	40
MW-69	TCE	9.4	5	-	✓	7/2/2009	TCE	3.3 J
MW-79	No Exceedance	-	-	✓	-	6/22/2009	No Exceedance	-
MW-88	No Exceedance	-	-	✓	-	9/28/2015	PCE	26
							TCE	16
MW-111	No Exceedance	-	-	✓	-	6/30/2010	TCE	30
MW-112	No Exceedance	-	-	✓	-	6/23/2010	TCE	6.3
MW-115	Benzene	9.3	5	-	✓	7/1/2010	Benzene	1.5 J
	cis12DCE	150	70	-	✓		cis12DCE	240
	11DCA	20	2.8	-	✓		11DCA	97
	11DCE	3.1	7	✓	-		11DCE	10
	MTBE	28	14	-	✓		MTBE	10 U
	VC	67	2	-	✓		VC	50

Table 3.3-1
Comparison of 2019 MNA Area Well Groundwater Sample Analytical Results to Baseline Results in Part 2 SRI
Former York Naval Ordnance Plant York, PA

MNA Area Well Identification	2019 Annual MNA Area Groundwater Sample Analytical Results					Baseline Groundwater Sample Analytical Results from Part 2 SRI		
	COC Exceeded in Sample	Detected Concentration (µg/L)	Regulatory Standard (µg/L)	Detected Concentration is Less Than or Equal to Regulatory Standard	Detected Concentration is Greater Than Regulatory Standard	Sample Date	COC Exceeded in Sample	Detected Concentration (µg/L)
Southern Property Boundary Area (SPBA)								
MW-22	PCE	5.2	5	✓	-	9/29/2015	PCE	13
	TCE	4.4	5	✓	-		TCE	13
MW-108S	No Exceedance	-	-	✓	-	10/22/2014	No Exceedance	-
MW-108D	No Exceedance	-	-	✓	-	10/21/2014	No Exceedance	-
MW-165	No Exceedance	-	-	✓	-	4/10/2015	PCE	7.4
							TCE	16
MW-166	No Exceedance	-	-	✓	-	10/2/2015	No Exceedance	-
MW-167	PCE	14	5	-	✓	10/2/2015	PCE	7.4
	TCE	5.9	5	✓	-		TCE	1 U
MW-168	No Exceedance	-	-	✓	-	10/2/2015	No Exceedance	-
South Plume Area (SPA)								
MW-43D	PCE	6.3	5	-	✓	10/23/2014	PCE	7.6
	TCE	5.1	5	✓	-		TCE	12
Cole D	PCE	26	5	-	✓	10/24/2014	PCE	3.8
MW-12 (Cole Steel)	TCE	13 J	5	-	✓	10/24/2014	TCE	0.9 J
GM-1D	No Exceedance	-	-	✓	-	10/21/2014	PCE	9.7
MW-110	PCE	23	5	-	✓	10/1/2015	PCE	80
MW-150	TCE	46	5	-	✓	10/27/2014	TCE	6.4
Levee Area								
MW-101S	No Exceedance	-	-	✓	-	10/13/2014	PCE	5.4
							TCE	6.8
MW-101D	TCE	7.9	5	-	✓	10/13/2014	TCE	6.8
							VC	2.4
West Side of Codorus Creek								
MW-148A (72.5-73)	No Exceedance	-	-	✓	-	10/28/2014	No Exceedance	-
MW-148A (136-136.5)	No Exceedance	-	-	✓	-	10/28/2014	No Exceedance	-
Northern Site Perimeter								
MW-5	No Exceedance	-	-	✓	-	6/18/2009	No Exceedance	-
MW-6	No Exceedance	-	-	✓	-	6/16/2009	No Exceedance	-
MW-82	No Exceedance	-	-	✓	-	9/28/2015	TCE	8.3

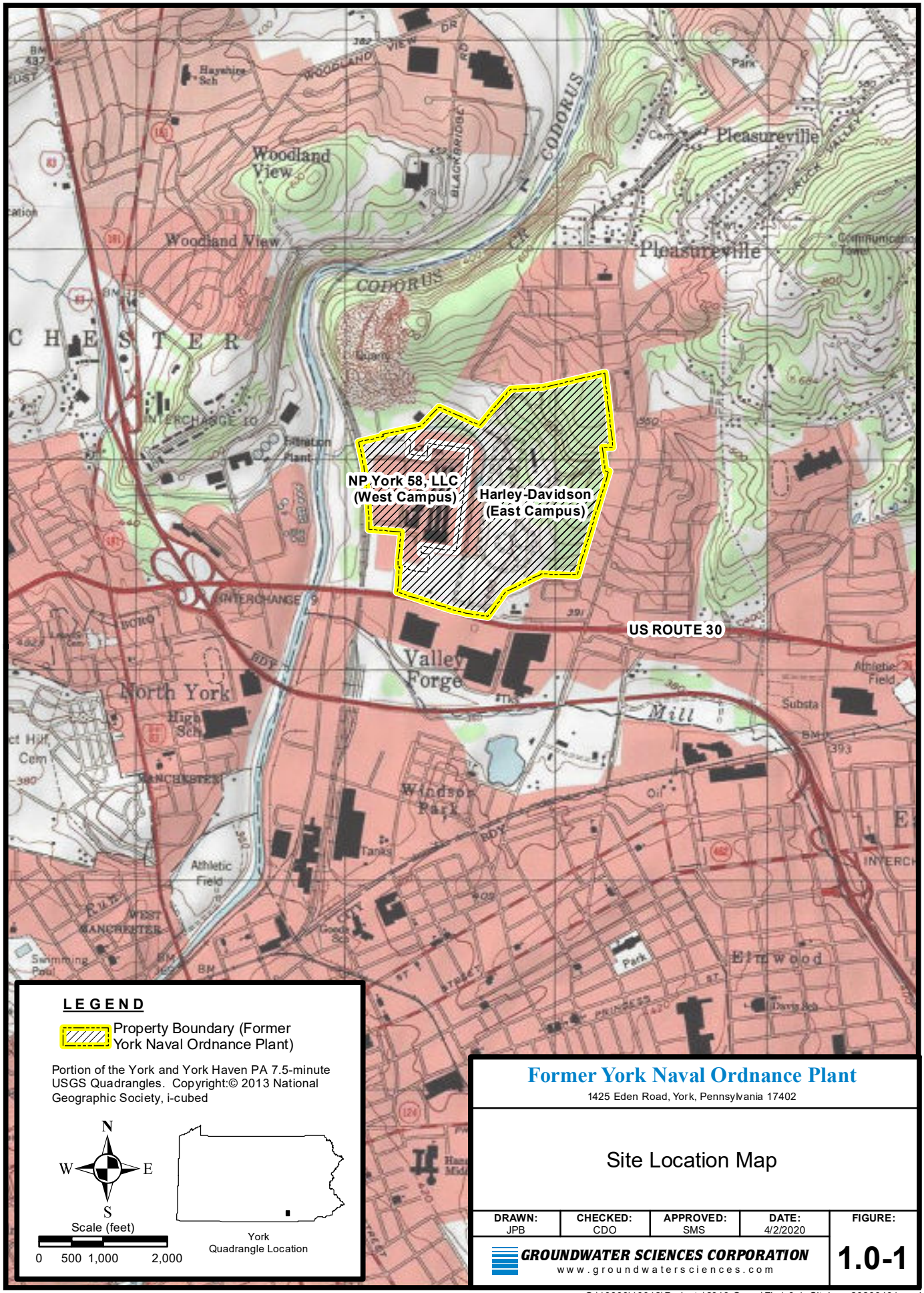
Notes:

COC - constituent of concern
J - estimated concentration
MNA - monitored natural attenuation
Part 2 SRI - Supplemental Groundwater Remedial Investigation Report
U - undetected
µg/L - micrograms per liter
Regulatory Standard - PADEP groundwater MSC, equivalent to the USEPA MCL, or the USEPA RSL for regulated substances that do not have an MCL

cis12DCE - cis-1,2-dichloroethene
11DCA - 1,1-dichloroethane
11DCE - 1,1-dichloroethene
MTBE - methyl tertiary butyl ether
PCE - tetrachloroethene

TCA - 1,1,1-trichlorethane
TCE - trichloroethene
VC - vinyl chloride

Figures



LEGEND

Property Boundary (Former York Naval Ordnance Plant)

Portion of the York and York Haven PA 7.5-minute USGS Quadrangles. Copyright:© 2013 National Geographic Society, i-cubed

Former York Naval Ordnance Plant

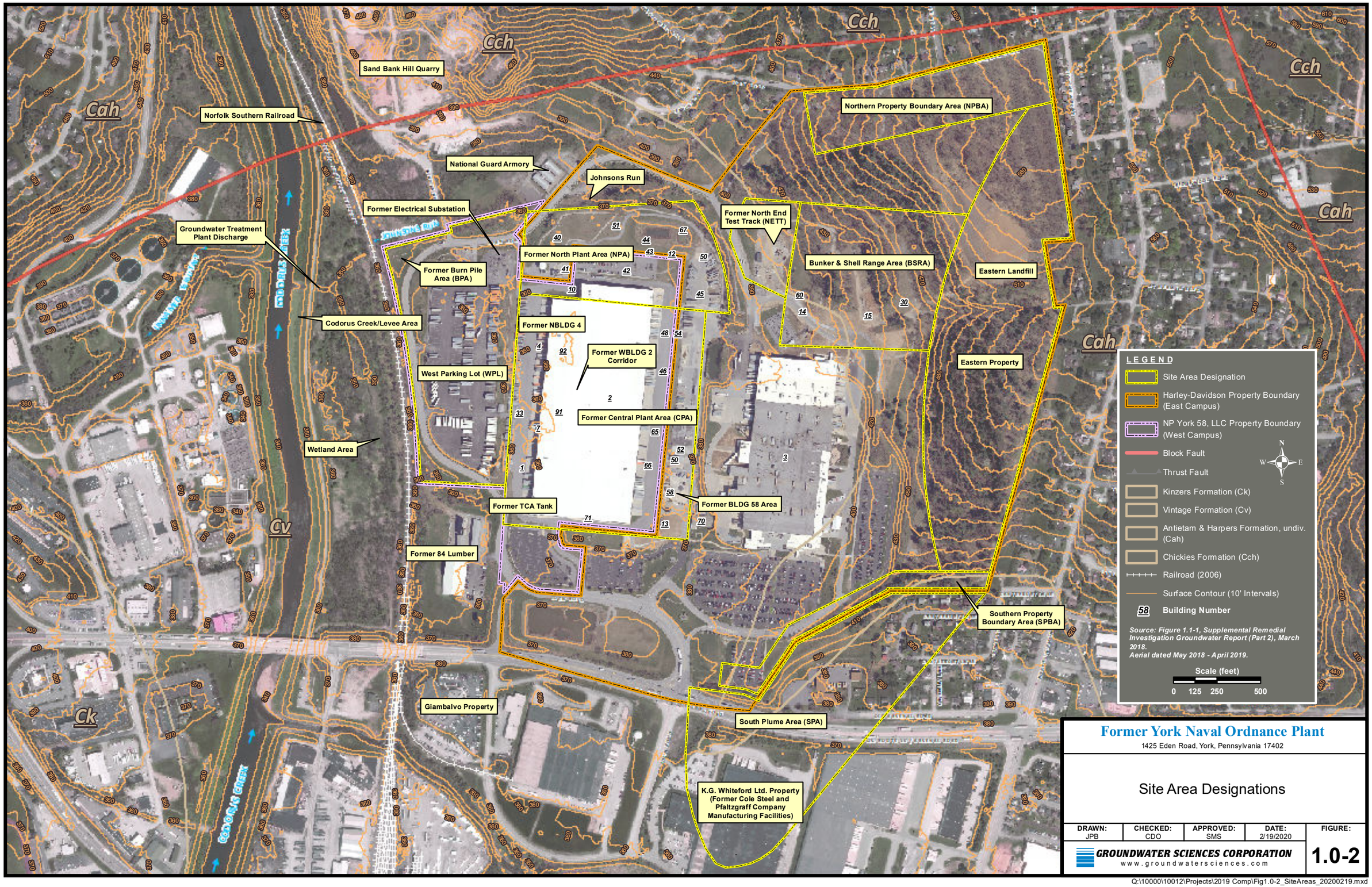
1425 Eden Road, York, Pennsylvania 17402

Site Location Map

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	4/2/2020	1.0-1

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig1.0-1_SiteLoc_20200401.mxd



Former York Naval Ordnance Plant

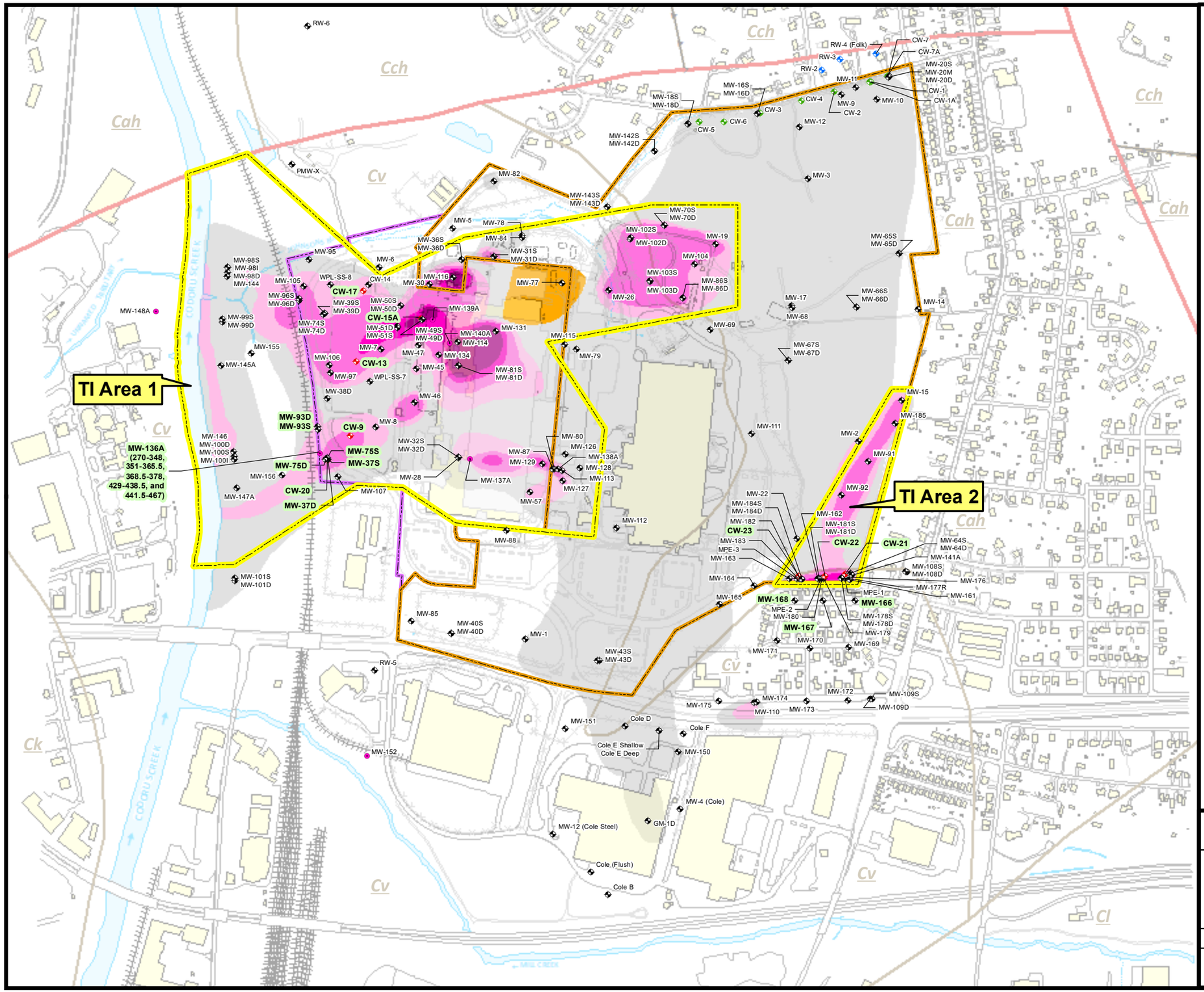
1425 Eden Road, York, Pennsylvania 17402

Site Area Designations

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	2/19/2020	1.0-2

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig1.0-2_SiteAreas_20200219.mxd



LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Monitoring Well
- Residential Well
- Waterloo™ Monitoring Well
- Technical Impracticability (TI) Boundary
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Block Fault
- Thrust Fault
- Ledger Formation (Cl)
- Kinzers Formation (Ck)
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Chickies Formation (Cch)
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Paved Road
- Railroad
- Curb or Walkway
- Fenceline
- Existing Stream
- Existing Water Feature
- TCE/PCE Concentration >5 <50 µg/L
- TCE/PCE Concentration >50 <100 µg/L
- TCE/PCE Concentration >100 <500 µg/L
- TCE/PCE Concentration >500 <1,000 µg/L
- TCE/PCE Concentration >1,000 <10,000 µg/L
- TCE/PCE Concentration >10,000 µg/L
- Petroleum Plume
- CW-20 Post-Remediation Care Plan (PRCP) Groundwater Monitoring Location

N W E S

NOTES:
1) TCE/PCE plumes are from the Part 2 SRI for groundwater (GSC, 2018). Concentrations are for the shallow portion of the aquifer (defined as any well monitoring groundwater within approximately 75 feet of the ground surface).
2) Proposed monitoring well (PMW-X) is to be installed and the location is approximate (to be determined based on site access and other considerations).
3) Open intervals for Waterloo™ monitoring well MW-136A sample ports are shown in feet below ground surface.

Scale (feet)
0 150 300 600

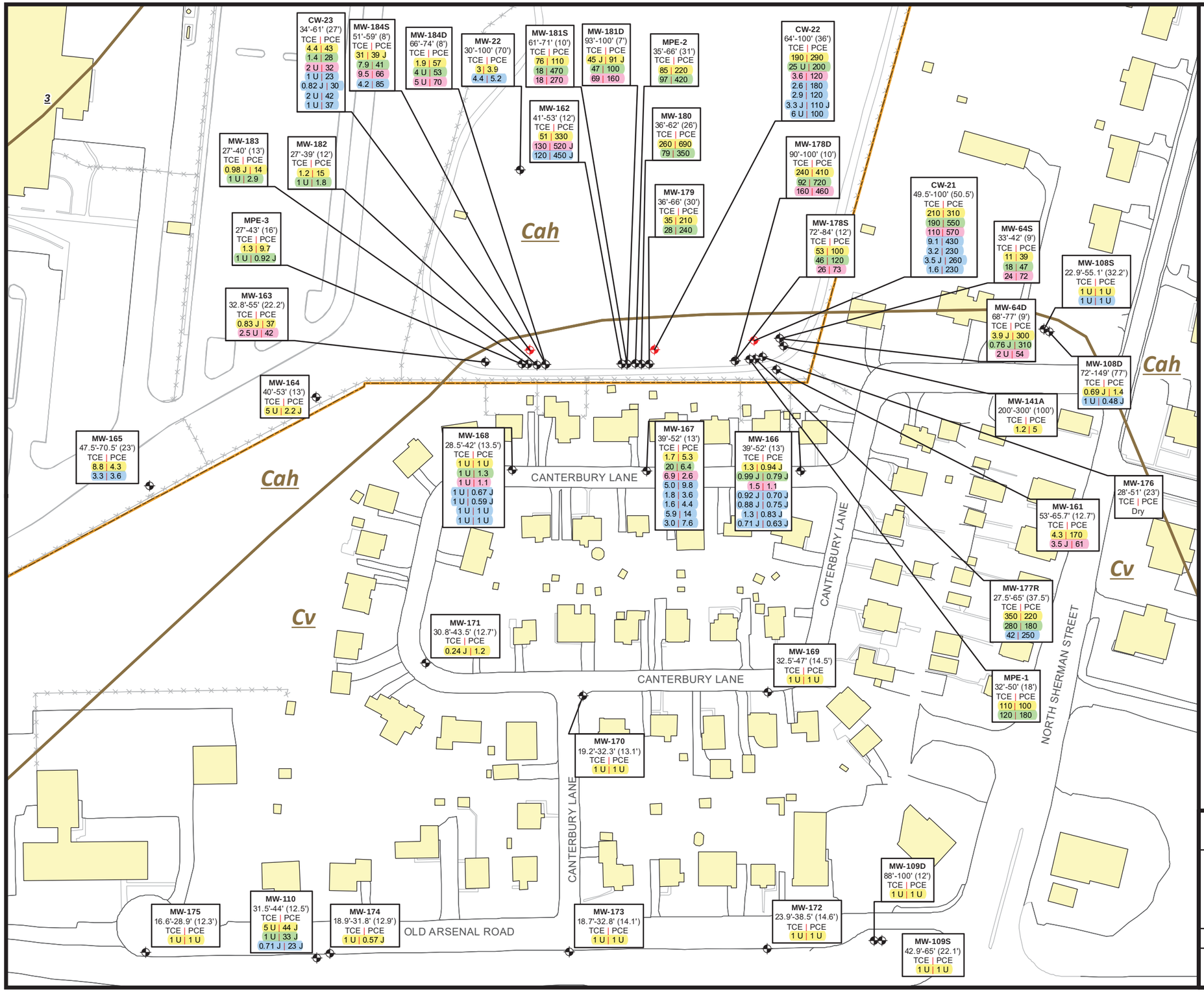
Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

Monitoring Locations for WPL and SPBA Groundwater Extraction System Performance

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	2.2-1

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-1_WPLandSPBA_GWextractsys_20200611.mxd



N
W E
S

LEGEND

- Active Extraction Well
- Monitoring Well
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Harley-Davidson Property Boundary (East Campus)
- Existing Building
- Paved Road
- Curb or Walkway
- Fenceline

Location ID
Top of Open Interval FtBGS - Bottom of Open Interval FtBGS (Open Interval Thickness)
Trichloroethene (TCE) | Tetrachloroethylene (PCE)
2017 Comprehensive Sampling Event or 2017 SPBA Background Event (August through October 2017)
2018 Comprehensive Event or 2018 SPBA Pre-Startup Event (September and November 2018)
2018 SPBA System Operation Samples (December 2018)
2019 SPBA System Operation Samples (March, April, May, June, September, and December 2019)

NOTES:
1) J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
2) U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.
3) TCE and PCE resullts are reported in micrograms per liter (µg/L).

Scale (feet)
0 30 60 120

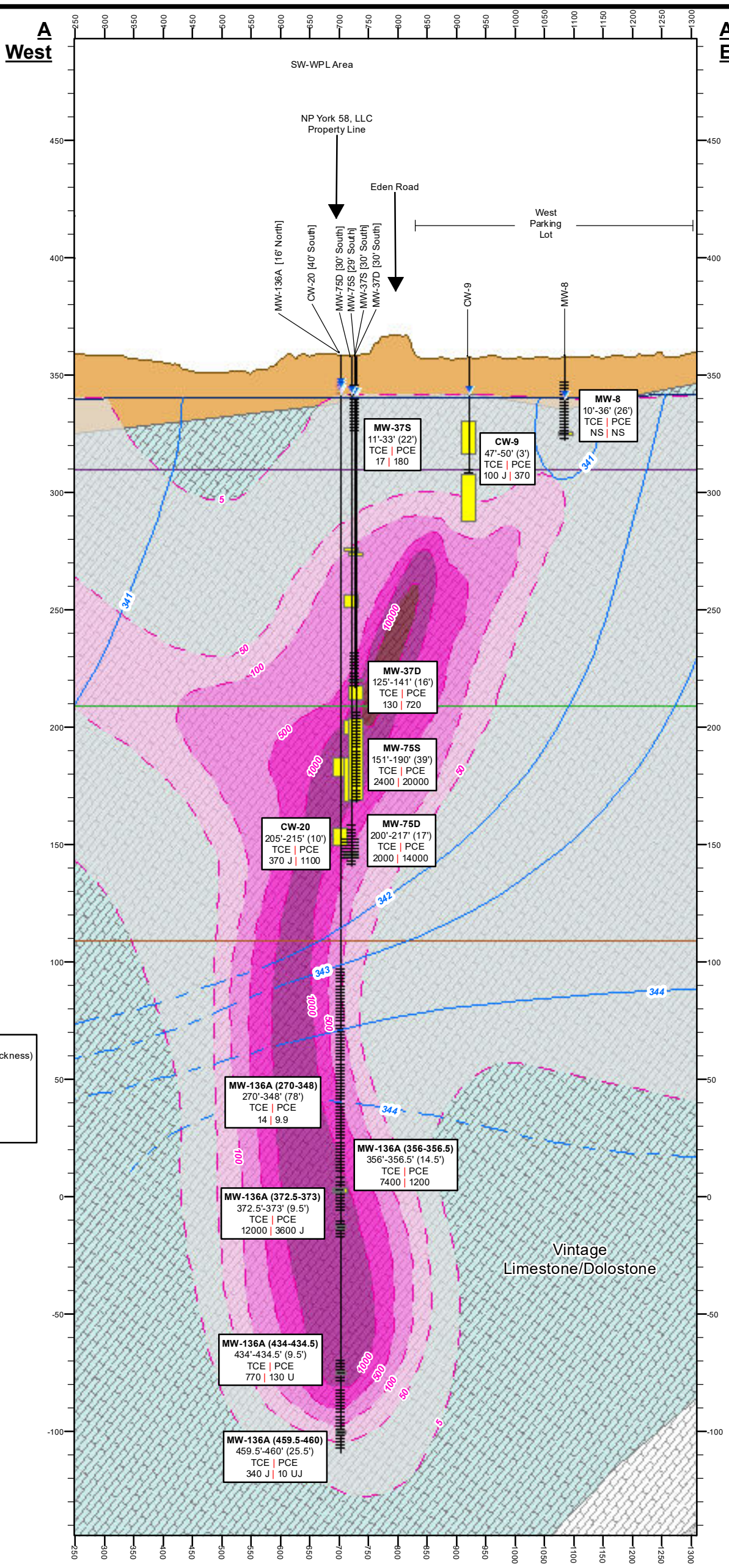
Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

SPBA TCE and PCE Groundwater Data (2017 through 2019)

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
CSL	CDO	DAD	6/11/2020	2.2-2

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-2_SPBA_TCEPCE2017-19_20200611.mxd



LEGEND

- Water Level
- Piezometric Contour
- Piezometric Contour (Inferred)
- Water Table
- Well
- Open Interval
- 110' AMSL
- 210' AMSL
- 310' AMSL
- Void
- Phyllitic Dolostone
- Limestone/Dolostone
- Sandstone/Quartzite
- Quartzite
- Marble
- Overburden
- TCE Concentration >5 <50 ppb
- TCE Concentration >50 <100 ppb
- TCE Concentration >100 <500 ppb
- TCE Concentration >500 <1,000 ppb
- TCE Concentration >1,000 <10,000 ppb
- TCE Concentration >10,000 ppb

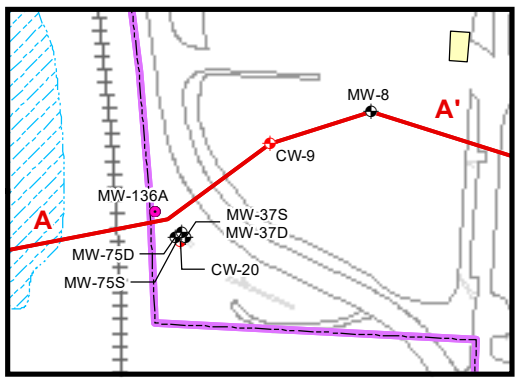
Location ID
Top of Open Interval FtBGS - Bottom of Open Interval FtBGS (Open Interval Thickness)
Trichloroethene and Tetrachloroethylene
2019 Annual Sampling Event
(NS = Not Sampled)
(J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample)
(U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit)

NOTE:
Piezometric contours and TCE concentration shading are from Figure 3.1-5 (Cross Section A-A' - TCE Plume) in the Supplemental Remedial Investigation Groundwater Report (Part 2), dated March 2018.

Scale: 1" = 50' (Vertical) and 1" = 200' (Horizontal)
Vertical Exaggeration 4X

Cross Section Location Map

Scale: 1" = 300'



LEGEND

- Active Extraction Well
- Monitoring Well
- Waterloo Monitoring Well
- Cross Section Transect
- NP York 58, LLC Property Boundary (West Campus)
- Existing Building
- Wetland Boundary (2006)
- Railroad
- Road, Curb or Walkway

N, W, E, S

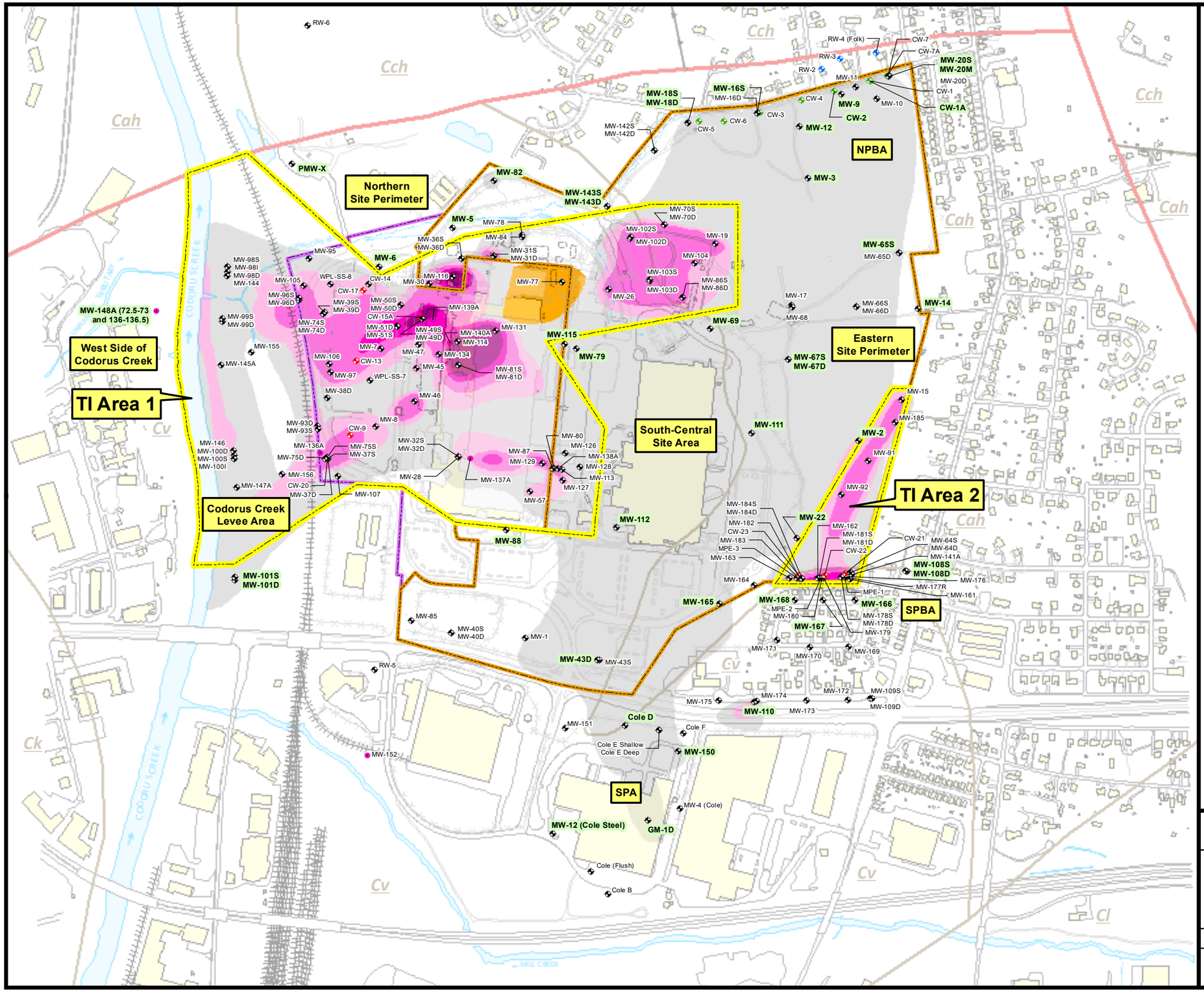
Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

Cross Section A-A' Showing 2019 TCE and PCE Concentrations in CW-20 Area Well Samples

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
CSL	CDO	SMS	6/11/2020	2.2-3

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-3_CrossSectAA_TCE_20200611.mxd



LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Monitoring Well
- Residential Well
- Waterloo™ Monitoring Well
- Technical Impracticability (TI) Boundary
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Block Fault
- Thrust Fault
- Ledger Formation (Cl)
- Kinzers Formation (Ck)
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Chickies Formation (Cch)
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Paved Road
- Railroad
- Curb or Walkway
- Fenceline
- Existing Stream
- Existing Water Feature
- TCE/PCE Concentration >5 <50 µg/L
- TCE/PCE Concentration >50 <100 µg/L
- TCE/PCE Concentration >100 <500 µg/L
- TCE/PCE Concentration >500 <1,000 µg/L
- TCE/PCE Concentration >1,000 <10,000 µg/L
- TCE/PCE Concentration >10,000 µg/L
- Petroleum Plume
- MW-112 Post-Remediation Care Plan (PRCP) Groundwater Monitoring Location

N W E S

NOTES:
1) TCE/PCE plumes are from the Part 2 SRI for groundwater (GSC, 2018). Concentrations are for the shallow portion of the aquifer (defined as any well monitoring groundwater within approximately 75 feet of the ground surface).
2) Proposed monitoring well (PMW-X) is to be installed and the location is approximate (to be determined based on site access and other considerations).
3) Open intervals for Waterloo™ monitoring well MW-148A sample ports are shown in feet below ground surface.
4) Monitored natural attenuation (MNA) will be used for resource restoration outside of TI boundaries at the site.

Scale (feet)
0 150 300 600

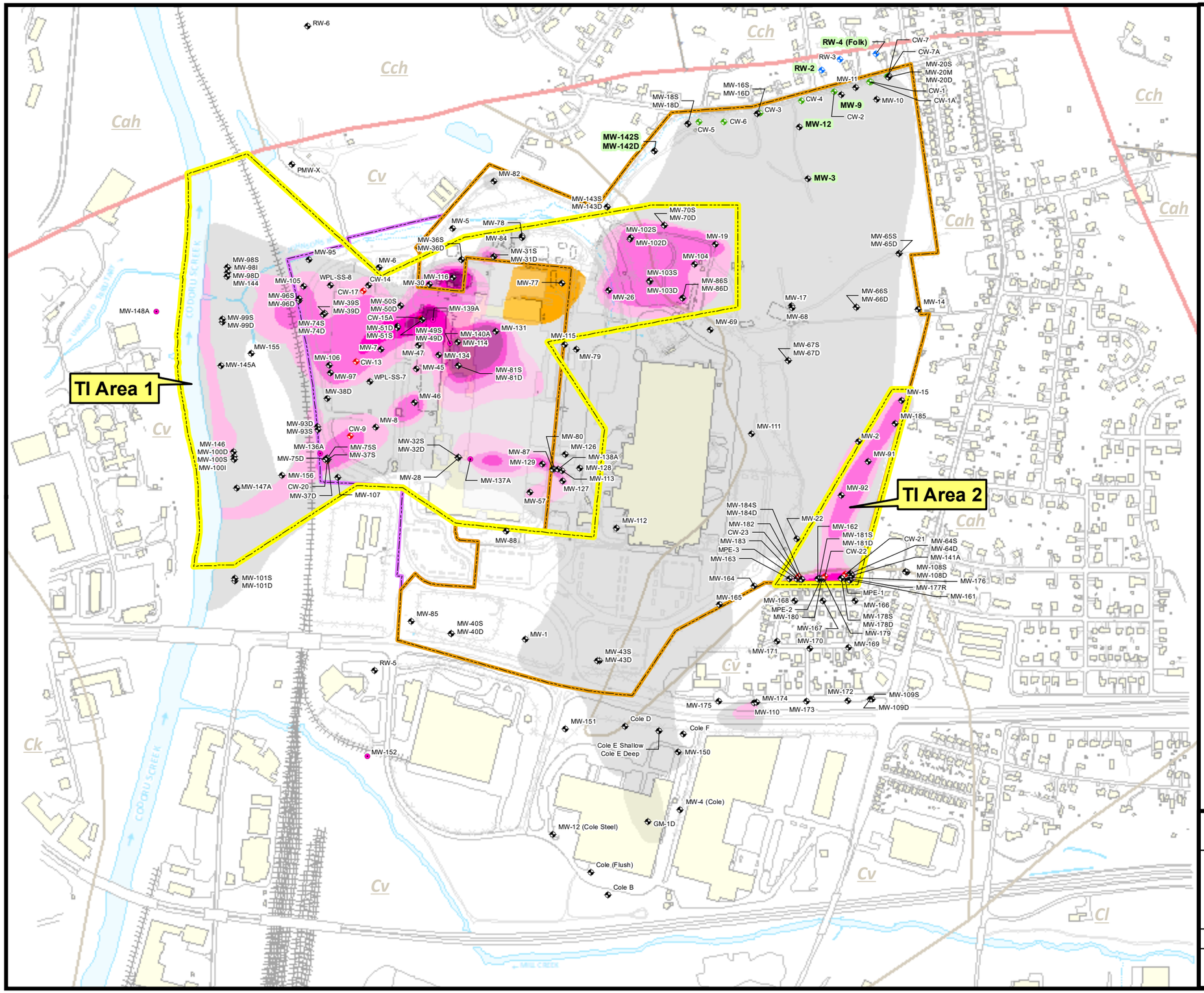
Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

MNA Area Monitoring Locations

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	2.2-4

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-4_COCsWithinTI_20200611.mxd



LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Monitoring Well
- Residential Well
- Waterloo™ Monitoring Well
- Technical Impracticability (TI) Boundary
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Block Fault
- Thrust Fault
- Ledger Formation (Cl)
- Kinzers Formation (Ck)
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Chickies Formation (Cch)
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Paved Road
- Railroad
- Curb or Walkway
- Fenceline
- Existing Stream
- Existing Water Feature
- TCE/PCE Concentration >5 <50 µg/L
- TCE/PCE Concentration >50 <100 µg/L
- TCE/PCE Concentration >100 <500 µg/L
- TCE/PCE Concentration >500 <1,000 µg/L
- TCE/PCE Concentration >1,000 <10,000 µg/L
- TCE/PCE Concentration >10,000 µg/L
- Petroleum Plume
- MW-12 Post-Remediation Care Plan (PRCP) Groundwater Monitoring Location

N W E S

NOTES:
1) TCE/PCE plumes are from the Part 2 SRI for groundwater (GSC, 2018). Concentrations are for the shallow portion of the aquifer (defined as any well monitoring groundwater within approximately 75 feet of the ground surface).
2) Proposed monitoring well (PMW-X) is to be installed and the location is approximate (to be determined based on site access and other considerations).

Scale (feet)
0 150 300 600

Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

Monitoring Locations for Plume Migration in the NPBA

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	2.2-5

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-5_NPBAandOffSite_20200611.mxd

(Well)
Location ID
Top of Open Interval FtBGS - Bottom of Open Interval FtBGS (Open Interval Thickness)
Groundwater Elevation in FtAMSL (September 2019) Used for Contouring
Groundwater Elevation in FtAMSL (September 2019) Not Used for Contouring
NM = Water level not measured
Trichloroethene (TCE) and Tetrachloroethylene (PCE)
2008 RI Round 1 Event
2013 Comprehensive Sampling Event
2014 Comprehensive Sampling Event
2015 Comprehensive Sampling Event
2016 Comprehensive Sampling Event
2017 Comprehensive Sampling Event
2018 Comprehensive Sampling Event
2019 Comprehensive Sampling Event
NS = Not Sampled
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
(-) = Open interval unknown.

S-6-Tate Spring
(-)
NM

Herman (S-7)
(-)
NM

Cch

Cah

Cv

EDEN ROAD

FADING WAY

RW-2
(-)
526.24'
TCE | PCE
2 | 1 U
1.9 | 1 U
3.1 | 1 U
3.8 | 1 U
3.7 | 1 U
3.4 | 1 U
2.2 | 1 U
3.9 | 1 U

CW-1A
29'-74' (45')
530'
TCE | PCE
52 | 0.79 J
26 | 1.7
31 | 2.8
28 | 1.9
56 | 2.3
53 | 1.8
41 | 1.8
36 J | 1.5 J

RW-4 (Folk)
(-)
536.28'
TCE | PCE
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U

MW-20M
72'-85' (13')
531.02'
TCE | PCE
30 | 0.36 J
18 | 1 U
0.85 J | 1 U
13 | 0.30 J
4.6 | 0.52 J
32 J | 0.48 J
20 | 0.74 J
21 | 2 U

MW-20S
28'-61' (33')
526.74'
TCE | PCE
950 | 29
90 | 2.7 J
110 J | 5.8 J
81 | 3.8
48 | 4.3
32 | 2.6
130 | 17
14 | 2.8

MW-18S
45'-65' (20')
470.84'
TCE | PCE
1200 | 50 U
45 | 5 U
5.5 | 1 U
11 | 1 U
1.2 | 1 U
4.1 | 1 U
6.8 | 1 U
3.7 J | 1 U

MW-16S
98'-110' (12')
510.68'
TCE | PCE
19 J | 310
19 J | 450
9.3 | 110
5.6 | 6.7
6.2 | 48
7.7 J | 1.7 J
20 | 1.1
15 | 1 U

MW-142D
122'-145.4' (23.4')
422.10'
TCE | PCE
NS | NS
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U

MW-18D
130'-140' (10')
473.34'
TCE | PCE
1400 | 1.3
42 | 5 U
8.1 | 1 U
9.5 | 1 U
5.5 | 1 U
3.8 | 1 U
6.6 | 1 U
3 | 1 U

MW-142S
56'-70' (14')
434.11'
TCE | PCE
NS | NS
0.15 J | 1 U
1 U | 1 U
0.15 J | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U

MW-143S
24'-54.5' (30.5')
367.54'
TCE | PCE
NS | NS
3 | 1.1
1.9 | 0.84 J
2.2 | 1 U
1.3 | 0.76 J
1.1 | 0.57 J
1.1 | 0.55 J
1 U | 0.51 J

MW-143D
117.4'-134' (16.6')
393.75'
TCE | PCE
NS | NS
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U
1 U | 1 U

MW-16D
(190-201)
519.09A

MW-12
30'-100' (70')
502.06'
TCE | PCE
56 | 2.1
130 | 4.7 J
90 J | 5.4 J
120 | 6.4
93 | 4.3
61 | 2.7
67 | 4.1
57 | 3.0 J

CW-2
48'-150' (102')
526.08'
TCE | PCE
22 | 0.89 J
6.3 | 3
14 | 1.4
4.9 | 3.2
15 | 0.97 J
10 | 0.91 J
12 | 1.3
6.8 | 1.1

MW-9
59'-97' (38')
526.67'
TCE | PCE
150 | 2.2 J
44 | 5 U
41 J | 0.22 J
29 | 1 U
19 | 1 U
20 | 1 U
27 | 1 U
5.6 J | 1 U

MW-3
50'-102' (52')
474.45'
TCE | PCE
39 | 0.35 J
32 | 0.47 J
31 | 0.33 J
31 | 0.39 J
28 | 0.54 J
32 | 1 U
18 | 1 U
4.2 | 1 U

MW-82 (53.5-76) 343.81
MW-78 (7.5-39) 351.41
MW-84 (67-98) 350.33
MW-31S (12-36) 349.87
MW-31D (66-81) 349.57
MW-4
MW-53
MW-52
MW-121
MW-123
MW-119
JOHNSON 2 (-) 371.18
MW-71S
MW-71D
MW-102S (41-65) 363.46
MW-102D (75-99) 385.54
MW-70D (68-85) 390.99
MW-70S (15.8-35) 391.25
MW-19 (30-120) 403.96
MW-104 (15-28) 399.23
MW-65S (71.3-86) 496.72
MW-65D (89-103) 497.72
MW-20D (153-165) 540.60
RW-1
CW-3 (20-203) 502.96
CW-4 (63-150) 516.63
CW-5 (18.5-83) 451.28
CW-6 (30-145) 476.52
MW-11 (20-74) 535.78
CW-1 (68-175) 528.22
CW-7 (61-150) 533.41
CW-7A (34-66) 530.83
MW-10 (78-120) 527.34

LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Monitoring Well
- Residential Well
- Abandoned Well
- Spring
- Surface Water
- Groundwater Contour (10-Foot Interval; Feet AMSL)
- Groundwater Contour (2-Foot Interval; Feet AMSL)
- Groundwater Flow Path (Isotropic Aquifer)
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Block Fault
- Thrust Fault
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Antietam & Harpers Formation, undiv. (Cah)
- Chickies Formation (Cch)
- Vintage Formation (Cv)
- Existing Stream
- Existing Water Feature
- Paved Road
- Curb or Walkway
- Fenceline

MW-20S (28-61) 540.69 Location ID, Screened or Open Interval (Feet BGS), Groundwater Elevation (Feet AMSL), Used in Contouring
MW-20M (72-85) 540.87 Location ID, Screened or Open Interval (Feet BGS), Groundwater Elevation (Feet AMSL), Not Used in Contouring

NOTES:
AMSL- Above mean sea level
BGS - Below Ground Surface
A - Artesian
NM - Groundwater Level Not Measured
Well screen intervals for RW-2 and RW-4 shown as (-) are unknown.

WELL ID
PCE
TCE
Concentration (µg/L)
Time

Scale (feet)
0 87.5 175 350

N W E S

Former York Naval Ordnance Plant

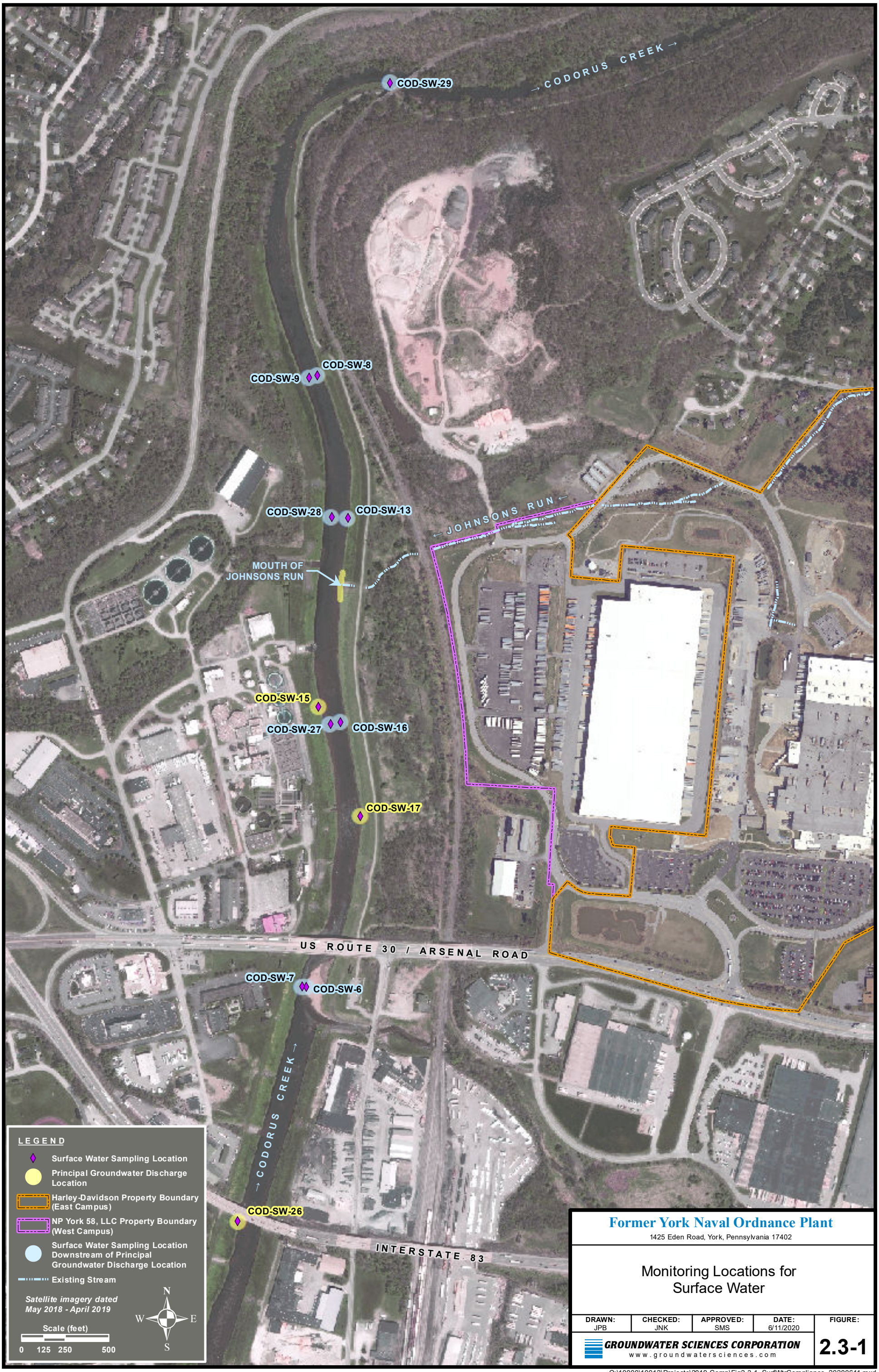
1425 Eden Road, York, Pennsylvania 17402

TCE and PCE Groundwater Monitoring Results in NPBA

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	2.2-6

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.2-6_NPBA_20200611.mxd



Former York Naval Ordnance Plant

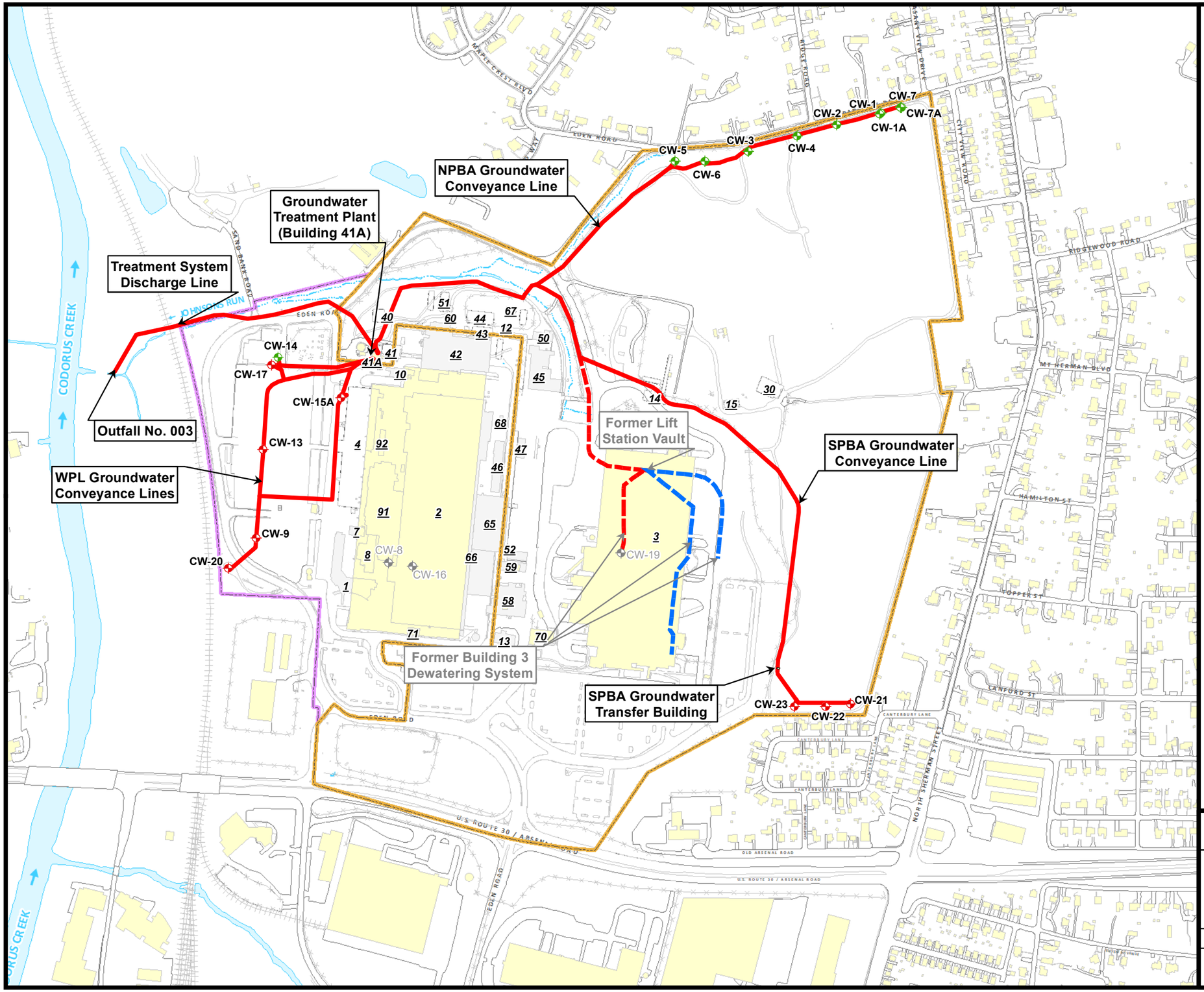
1425 Eden Road, York, Pennsylvania 17402

Monitoring Locations for Surface Water

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	JNK	SMS	6/11/2020	2.3-1

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig2.3-1_SurfWtrCompliance_20200611.mxd



N
W E
S

LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Abandoned Extraction Well
- Groundwater Treatment System Conveyance Line
- Former Groundwater Treatment System Conveyance Line
- Former Building 3 Groundwater Dewatering System Interceptor Trench
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Buildings_20190808
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Existing Stream
- Existing Water Feature
- Paved Road
- Railroad
- Curb or Walkway
- Fenceline

NOTE:
The Building 3 lift station vault and the dashed portions of the Building 3 dewatering system lines have been abandoned.

Map Sources:
Harley-Davidson Motor Company Operations, Inc. (York, PA; "New Factory York Site Utility Plan", dated Oct. 5, 2011).
Hydro-Terra Group (Westminster, MD; HD-SPBA-GW SITE PLAN - GSC.dwg, undated).
Leidos (Reston, VA; "Groundwater Treatment System Location", dated Feb. 13, 2011, updated Jan. 5, 2017).

Scale (feet)
0 125 250 500

Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

fYNOP Groundwater Extraction and Treatment System Map

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	2/19/2020	3.1-1

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig3.1-1_GWsystemSite_20200219.mxd

Figure 3.1-2
WPL Groundwater Extraction System Remedial Action Performance Data (September through December 2019)
Former York Naval Ordnance Plant - York, PA

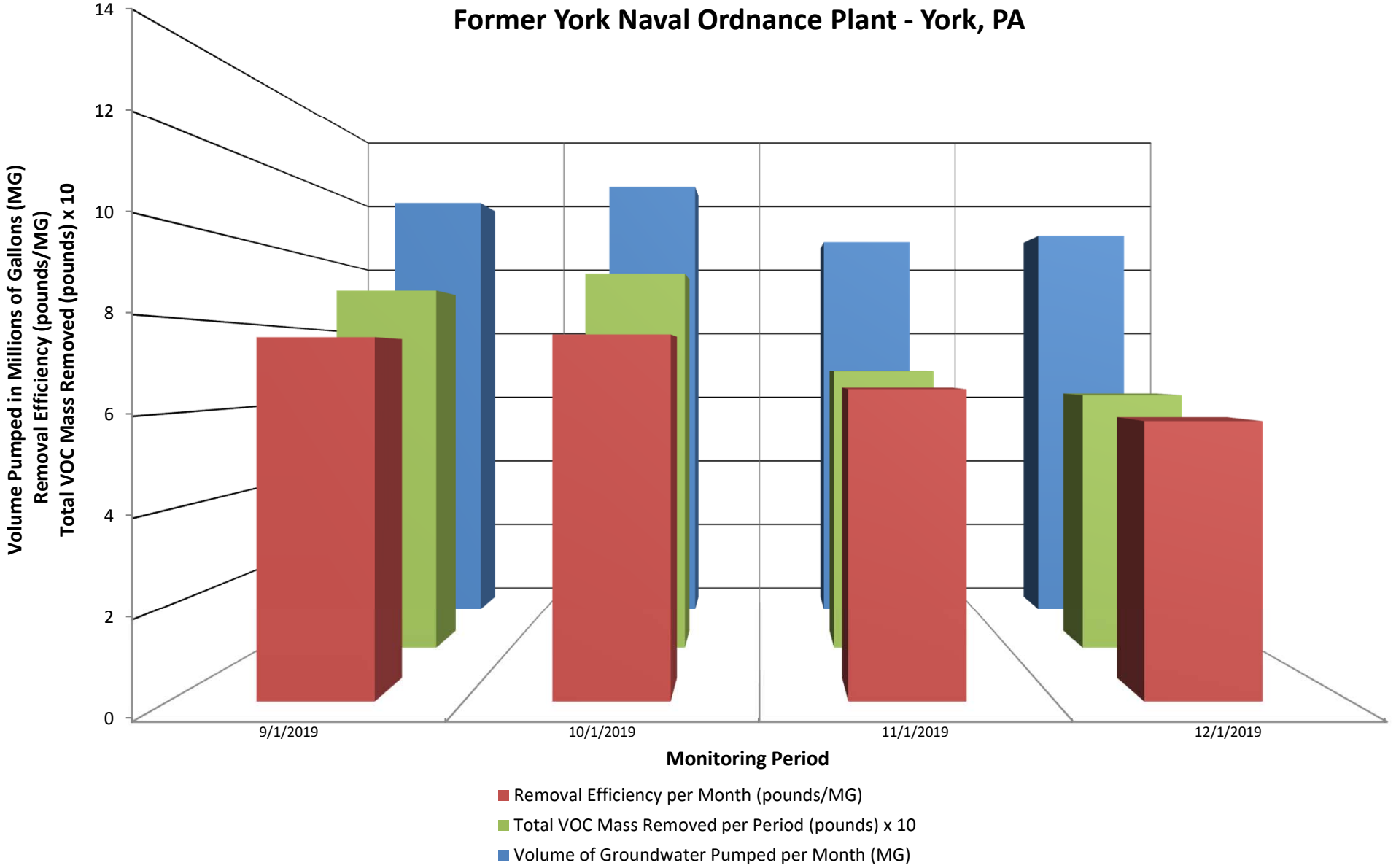


Figure 3.2-1
SPBA Remedial Action Performance Data for November 2018 through December 2019
Former York Naval Ordnance Plant - York, PA

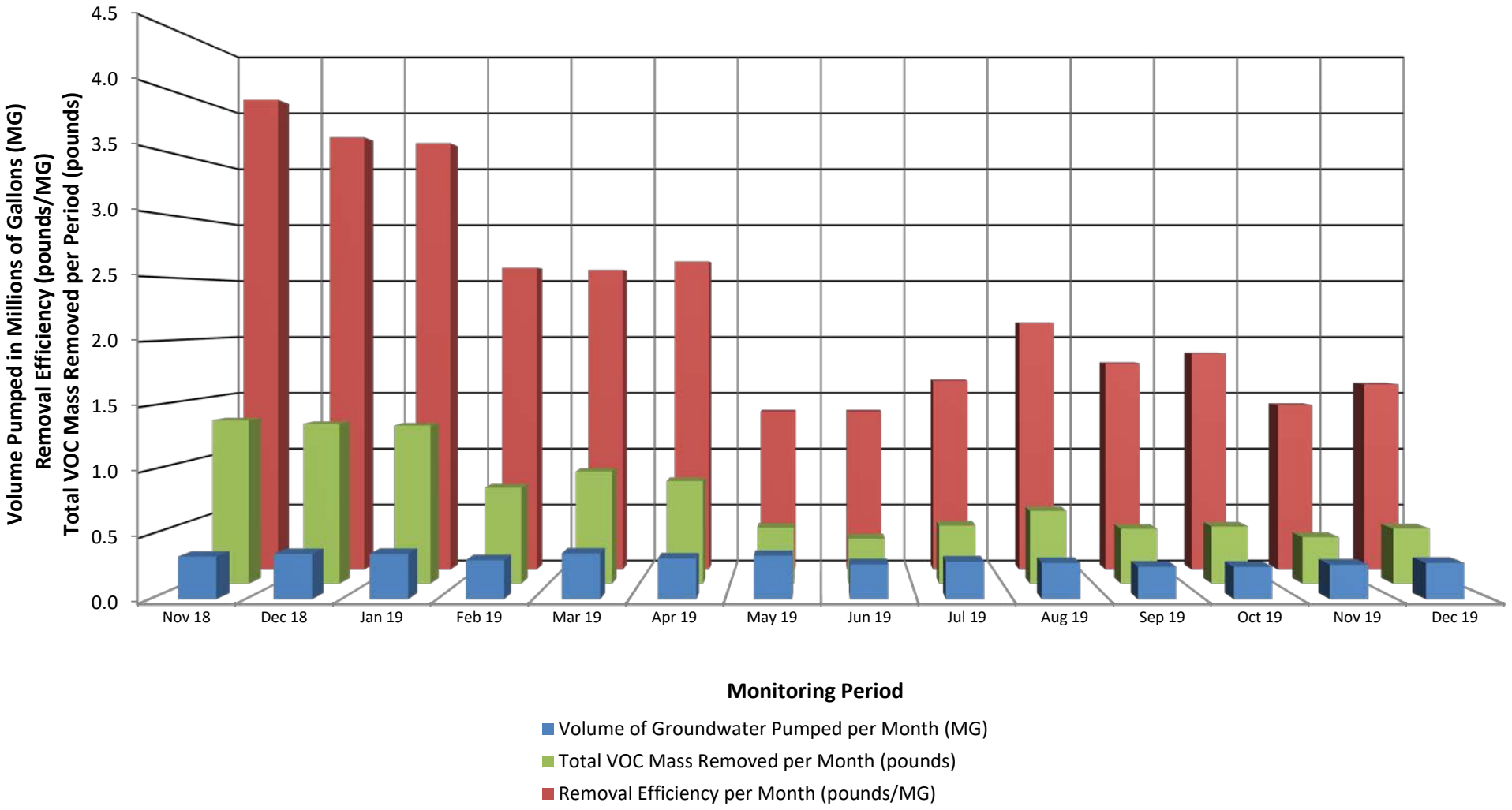
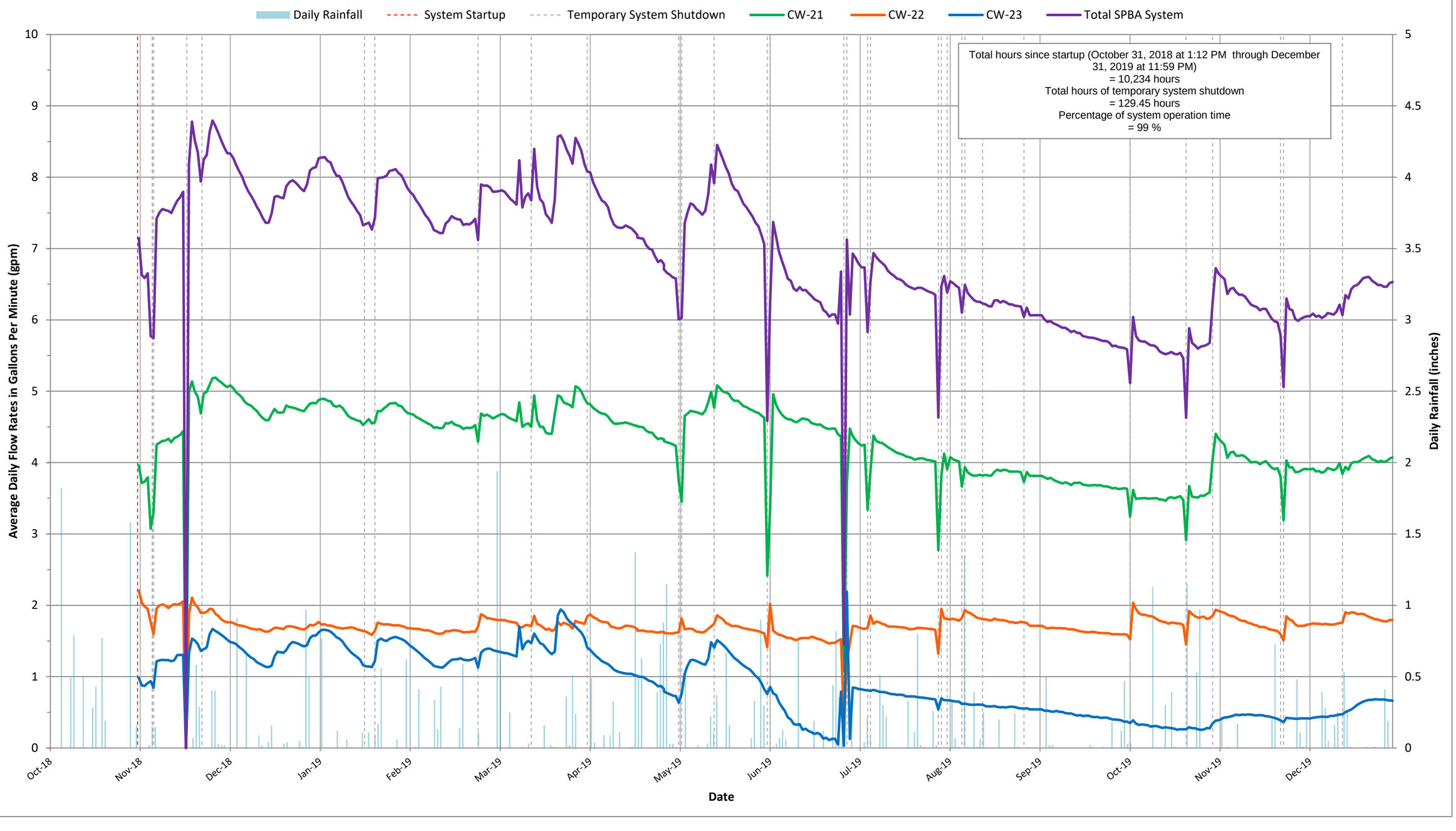
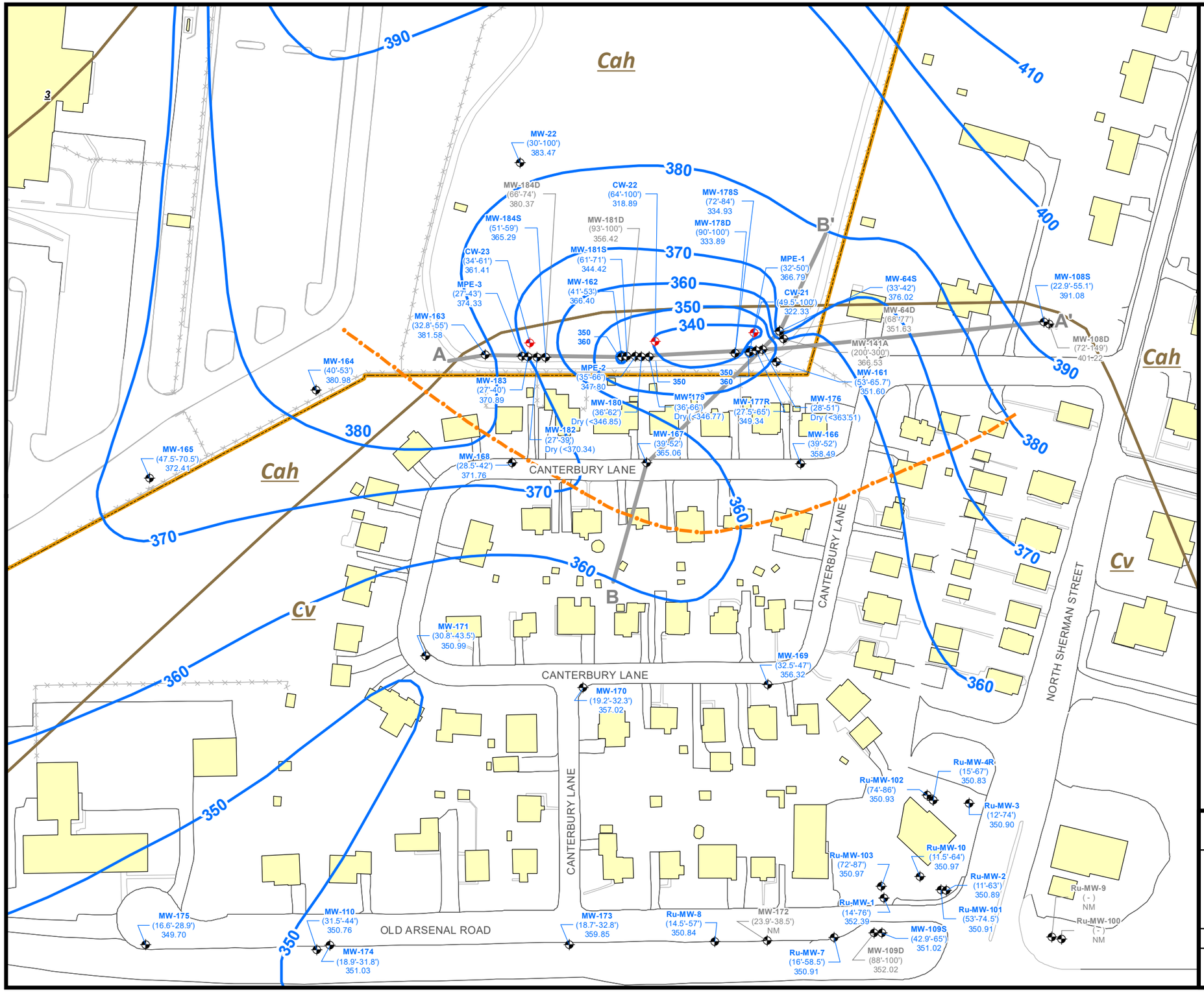


Figure 3.2-2
SPBA Groundwater Extraction System Average Daily Flow Rates
Former York Naval Ordnance Plant - York, PA





N
W E
S

LEGEND

- Active Extraction Well
- Monitoring Well
- Groundwater Elevation Contour (feet AMSL)
- Limit of Capture
- Inferred Direction of Groundwater Flow
- Cross Section Transect
- Harley-Davidson Property Boundary (East Campus)
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Existing Building
- Paved Road
- Curb or Walkway
- Fenceline

MW-108S (22.9'-55.1') 400.07 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL); Used in Contouring

MW-108D (72'-149') 405.91 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL); Not Used in Contouring

NOTE:
1) Water levels measured on 9/17/2019.
2) Groundwater elevations are in feet above mean sea level (AMSL).
3) NM = water level not measured.
4) DRY = no water in well.
5) Open intervals are shown below well designations in feet below ground surface.
6) Extraction well pumping rates in gallons per minute (gpm) on September 17, 2019 were: CW-21 (4 gpm), CW-22 (2 gpm), and CW-23 (0.5 gpm).

Scale (feet)
0 30 60 120

Former York Naval Ordnance Plant

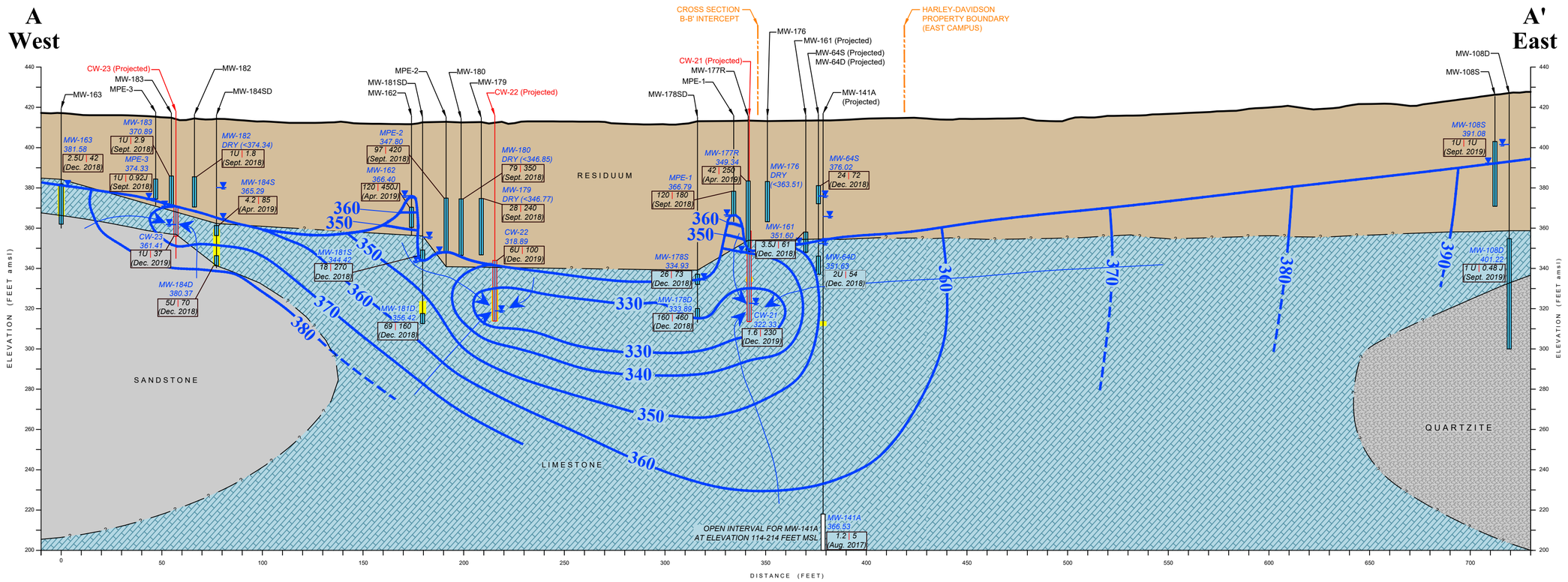
1425 Eden Road, York, Pennsylvania 17402

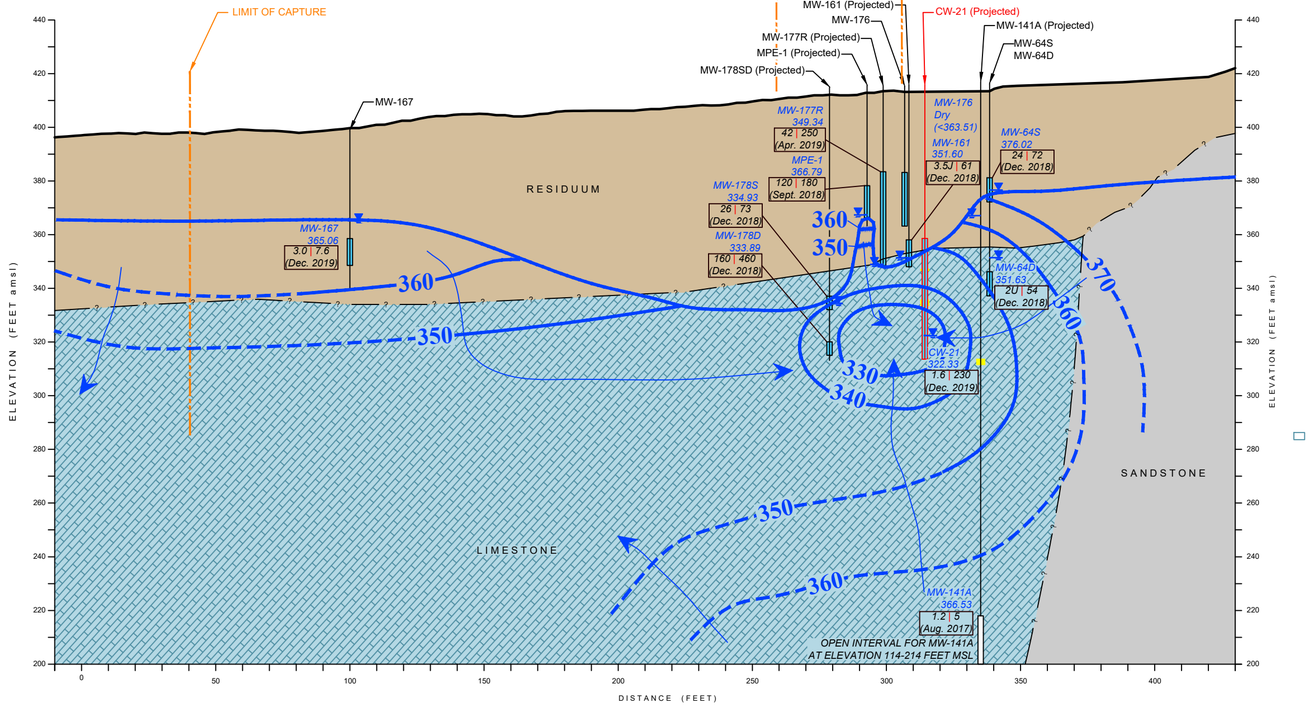
SPBA Water Table Contour Map for Pumping Conditions on September 17, 2019

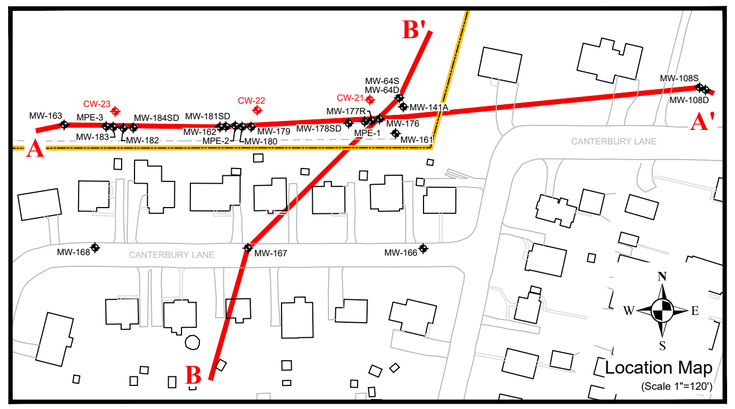
DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	3.2-3

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig3.2-3_SPBA_GWE_20190917_rev2.mxd







LEGEND

- Existing Grade
- Monitoring Well
- Screened Interval
- Inferred Stratigraphy
- Piezometric Level (feet amsl) (Projected Value) (DRY = No Water In Well)
- Water Level Elevation and Contour (feet amsl) (Dashed Where Inferred)
- Direction of Groundwater Flow (Inferred)
- Void

LOCATION MAP LEGEND

- Active Groundwater Extraction Well
- Monitoring Well
- Harley-Davidson Property Boundary (East Campus)
- Cross Section Transect

NOTES:

1. MW-161 is projected from 25' south, and does not encounter limestone as depicted on the sections.
2. TCE | PCE results are posted in boxes in micrograms per liter (µg/L). The results are from the most recent sample collected from the well.
3. J = the analyte was positively identified; the associated numerical valve is the approximate concentration of the analyte in the sample.
4. U = the analyte as analyzed for but was not detected above the reported sample authorization limit.

Horizontal Scale
0 20' 40'

Vertical Scale
0 20' 40'

No Vertical Exaggeration

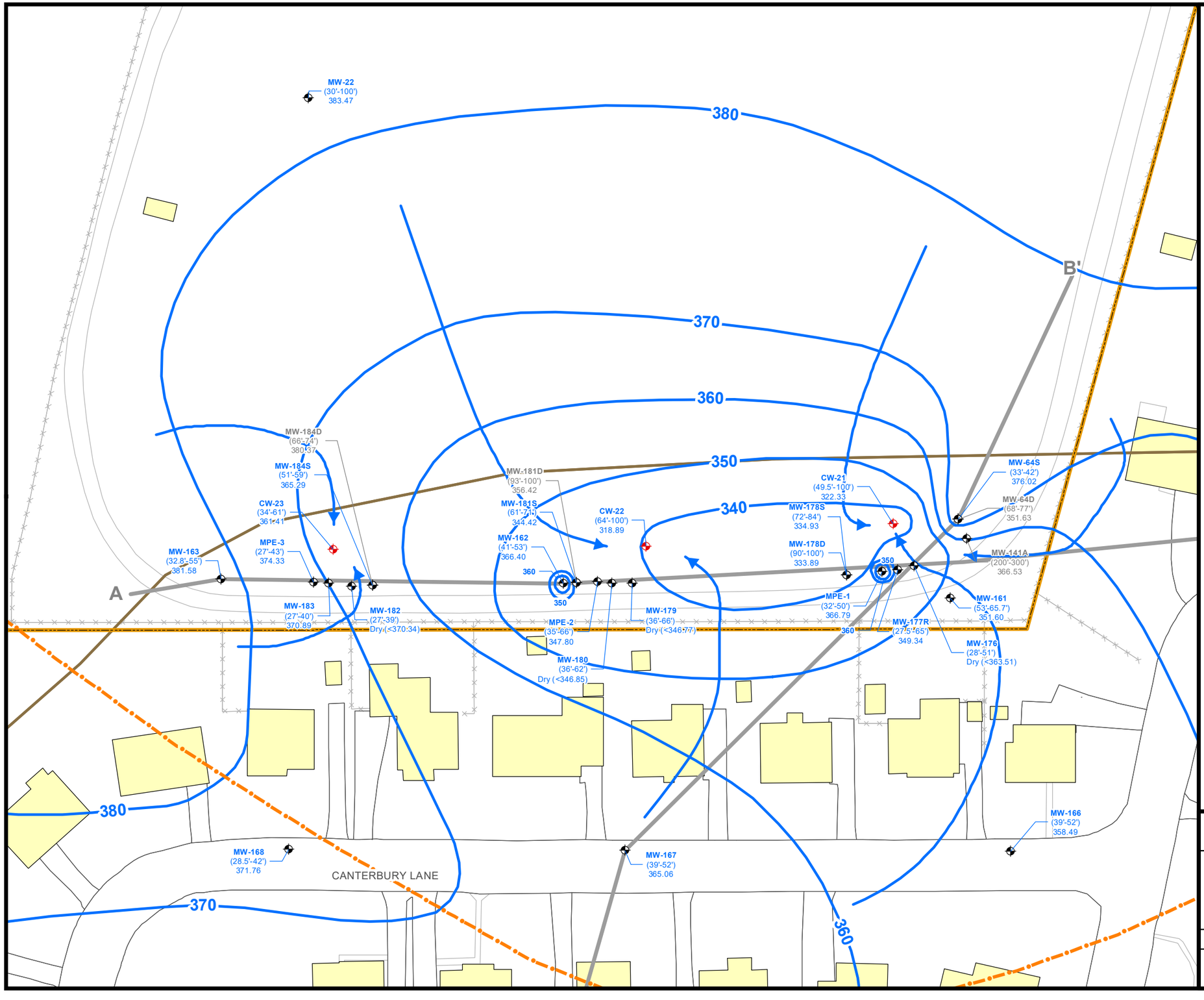
Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

Cross Sections A-A' and B-B' Showing Piezometric Contours and TCE/PCE Concentrations Under Pumping Conditions (September 17, 2019)

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB/KA	CDO	SMS	6/11/2020	3.2-4

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Data\CAD\10012CS20.dwg / 1_AABB_PumpingGWE0919



N
W E
S

LEGEND

- Active Extraction Well
- Monitoring Well
- GWE_20190917 (Ru-MW-4R only)
- Groundwater Elevation Contour (feet AMSL)
- Limit of Capture
- Inferred Direction of Groundwater Flow
- Cross Section Transect
- Harley-Davidson Property Boundary (East Campus)
- Vintage Formation (Cv)
- Antietam & Harpers Formation, undiv. (Cah)
- Existing Building
- Paved Road
- Curb or Walkway
- Fenceline

MW-108S (22.9'-55.1') 400.07 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL) Used in Contouring

MW-108D (72'-149') 405.91 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL) Not Used in Contouring

NOTE:
1) Water levels measured on 9/17/2019.
2) Groundwater elevations are in feet above mean sea level (AMSL).
3) NM = water level not measured.
4) DRY = no water in well.
5) Open intervals are shown below well designations in feet below ground surface.
6) Extraction well pumping rates in gallons per minute (gpm) on September 17, 2019 were: CW-21 (4 gpm), CW-22 (2 gpm), and CW-23 (0.5 gpm).

Scale (feet)
0 12.5 25 50

Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

SPBA Water Table Contour Map
September 17, 2019

DRAWN:	CHECKED:	APPROVED:	DATE:	FIGURE:
JPB	CDO	SMS	6/11/2020	3.2-5

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

Q:\10000\10012\Projects\2019 Comp\Fig3.2-5_SPBA_GWE_20190917detail_rev2.mxd

Figure 3.2-6
SPBA Water Level Elevation Tracking - CW-21 Area Wells (Pumping Conditions) Former York Naval Ordnance Plant

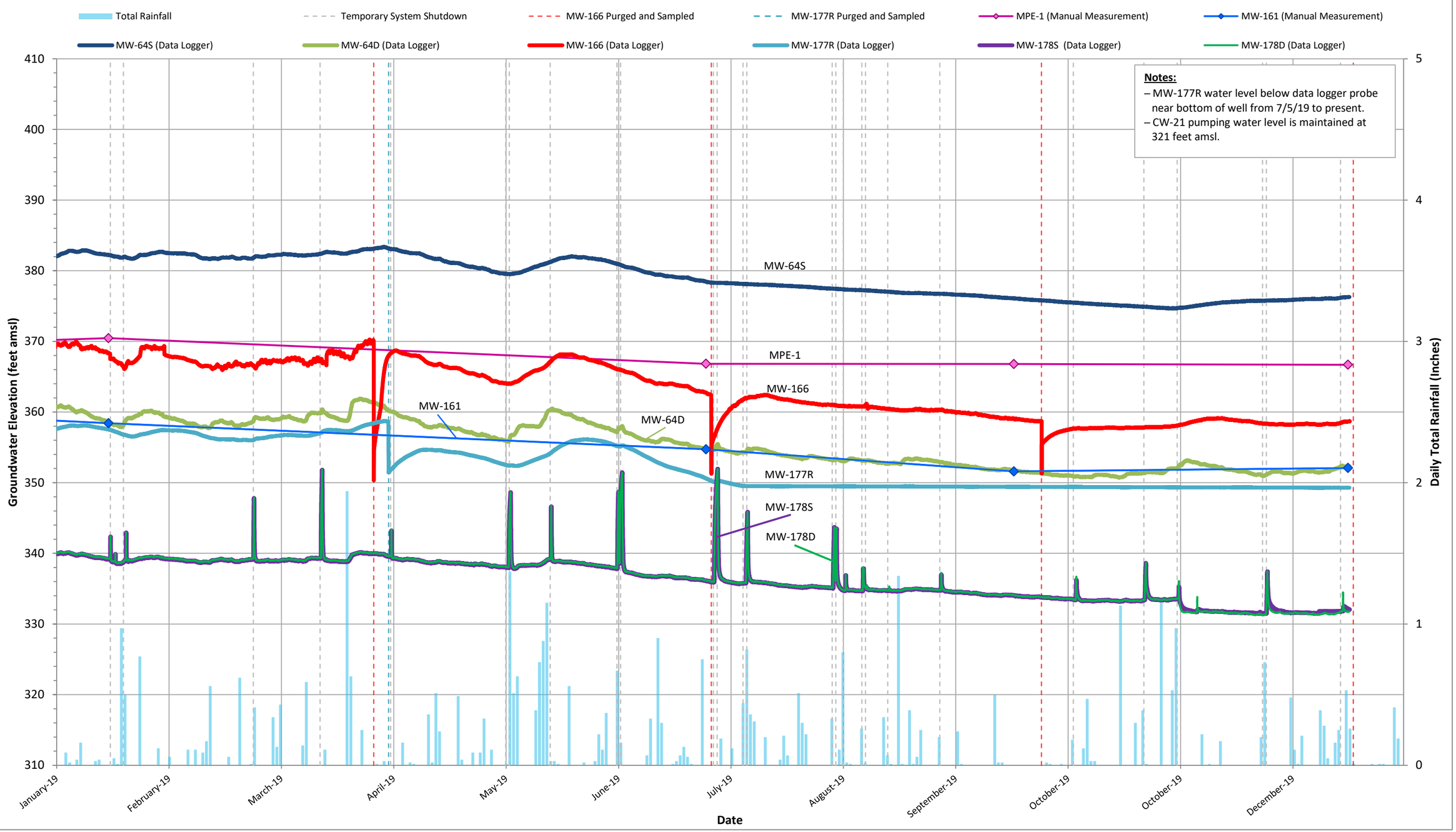


Figure 3.2-7
SPBA Water Level Elevation Tracking - CW-22 Area Wells (Pumping Conditions) Former York Naval Ordnance Plant

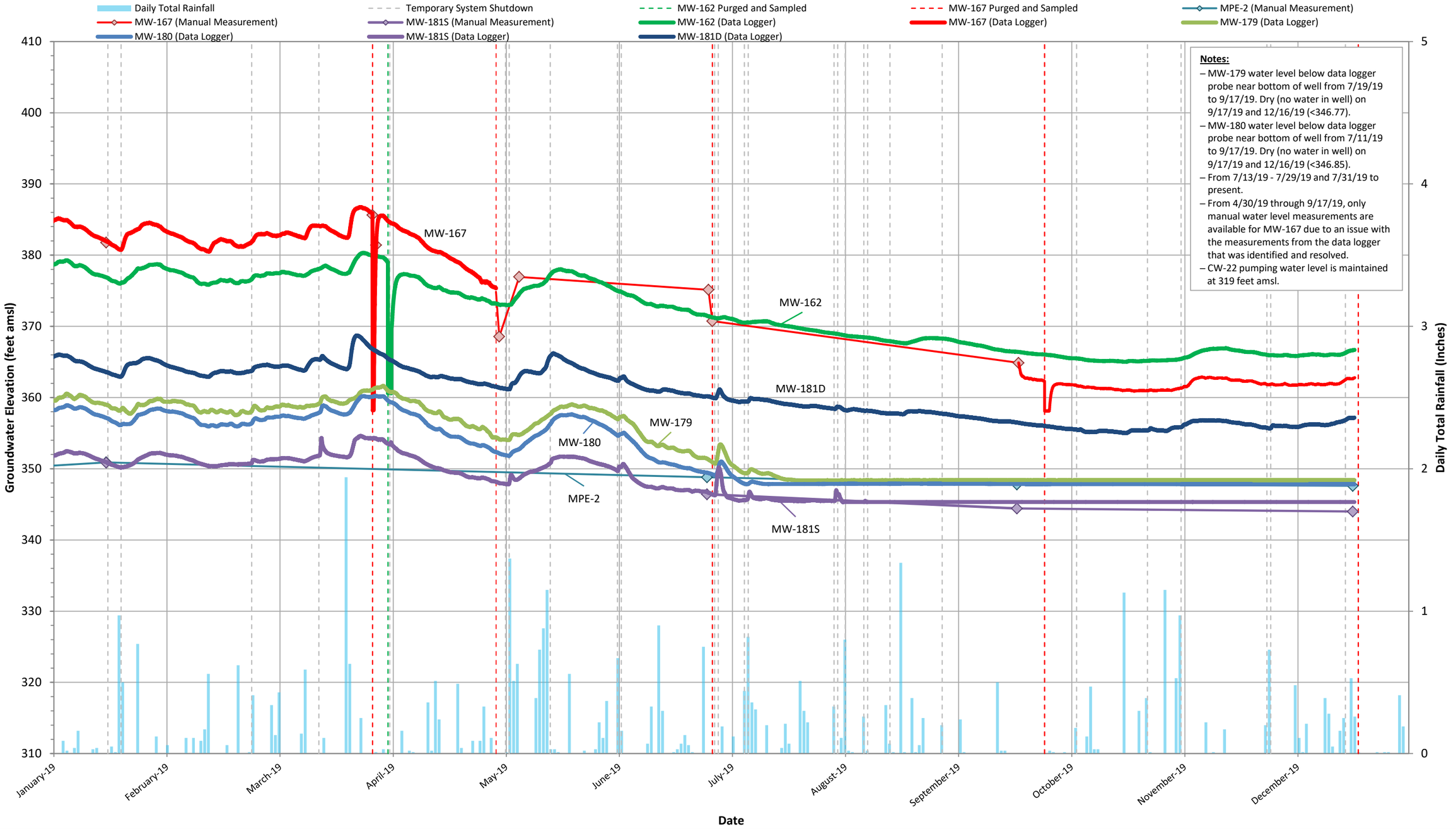


Figure 3.2-8
SPBA Water Level Elevation Tracking - CW-23 Area Wells (Pumping Conditions) Former York Naval Ordnance Plant

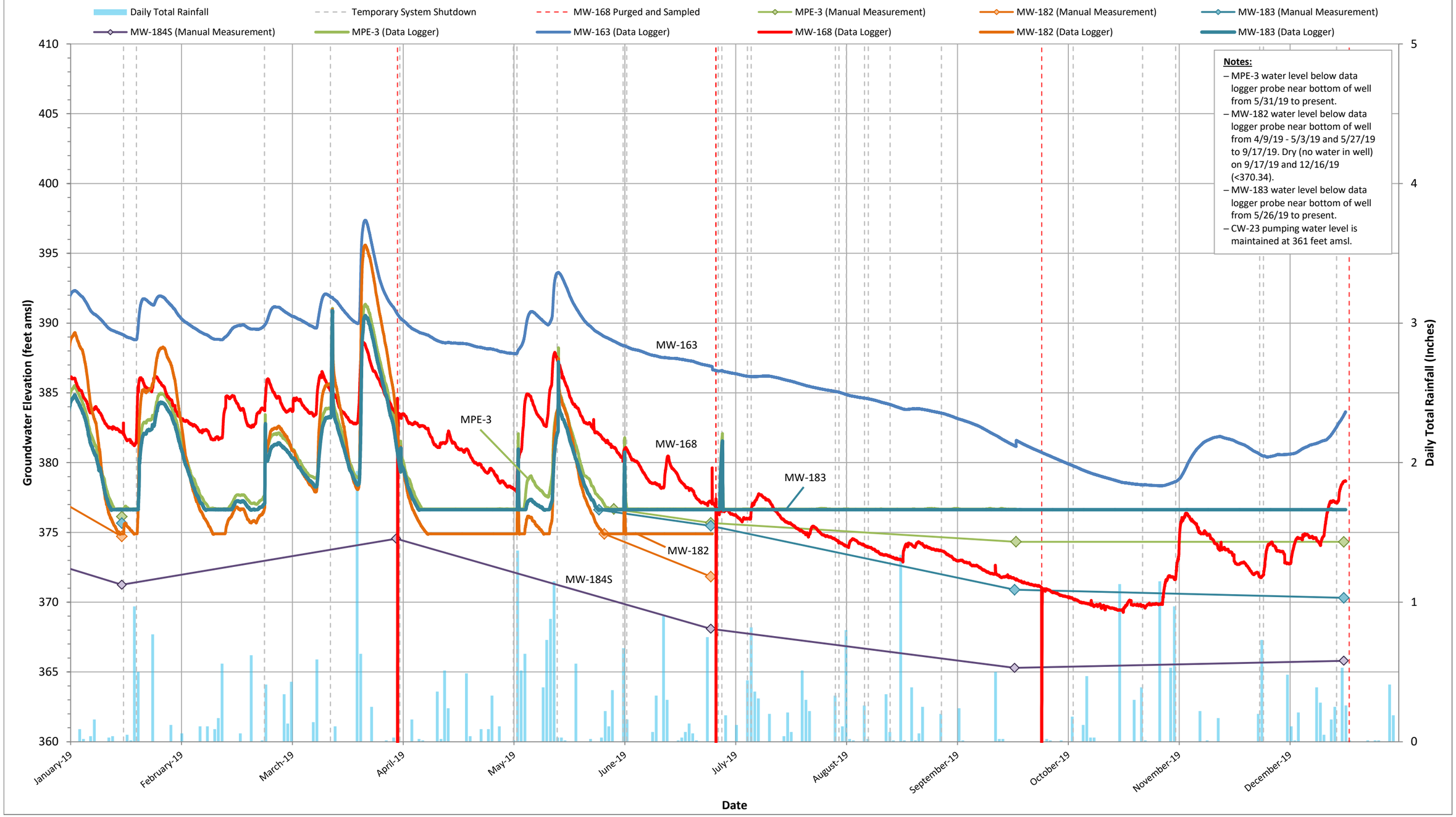
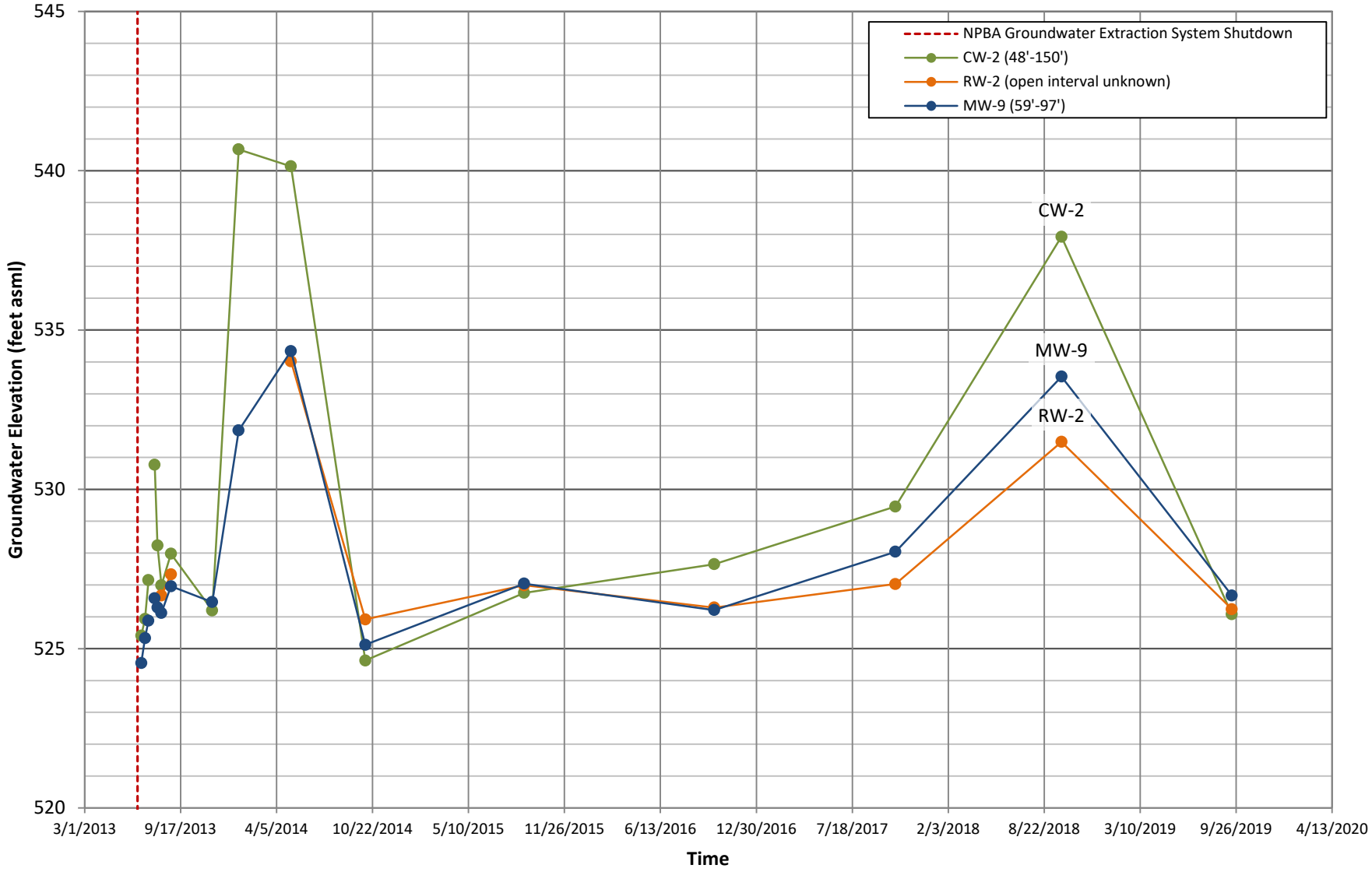


Figure 3.4-1
NPBA Post-Shutdown Water Level Elevations for Former
Off-Site Residential Supply Well RW-2 and On-Site Wells CW-2 and MW-9
Former York Naval Ordnance Plant



Plates

Northern Property Boundary Area (NPBA)

Former North End of Test Track (NETT)

Former IWTP

Former North Building 4 Area

Former West Building 2 Corridor

West Parking Lot (WPL)

Former TCA Tank Area

Former Building 58 Area

Levee Area

South West West Parking Lot (SW WPL)

Southern Property Boundary Area (SPBA)

Eastern Perimeter Road

Giambalvo Property

South Plume Area (SPA)

K.G. Whiteford Ltd. Property
(i.e., the Former Cole Steel and Pfaltzgraff Company Manufacturing Facilities)

ABANDONED QUARRY

SAND BANK HILL QUARRY

CODORUS CREEK

MILL CREEK

MAPLE CREST BLVD

EDEN ROAD

FADING WAY

CHRONISTER STREET

PLEASANT VIEW DRIVE

RIDGE ROAD

SAND BANK ROAD

CANTERBURY LANE

SHERMAN STREET

COPPER ST

SOFTAIL LIFT STATION

U.S. ROUTE 30 / ARSENAL ROAD

INTERSTATE 83

Cch

Cv

Cah

Cl

LEGEND

- Active Extraction Well
- Inactive Extraction Well
- Monitoring Well
- Residential Well
- Abandoned Well
- Spring
- Surface Water
- Water Level Measuring Point
- Bridge Surface Gauging Point
- Abandoned Lift Station
- Staff Gauge
- Waterloo Monitoring Well
- Groundwater Contour (10-Foot Interval; Feet AMSL)
- Inferred Groundwater Contour (10-Foot Interval; Feet AMSL)
- Groundwater Contour (2-Foot Interval; Feet AMSL)
- Groundwater Depression (10-Foot Interval; Feet AMSL)
- Groundwater Depression (2-Foot Interval; Feet AMSL)
- Harley-Davidson Property Boundary (East Campus)
- NP York 58, LLC Property Boundary (West Campus)
- Existing Building
- Demolished/Slab Remains
- Demolished/Slab Removed
- Block Fault
- Thrust Fault
- Antietam & Harpers Formation, undiv. (Cah)
- Chickies Formation (Cch)
- Kinzers Formation (Ck)
- Vintage Formation (Cv)
- Existing Stream
- Existing Water Feature
- Existing Quarry
- Paved Road
- Railroad
- Curb or Walkway
- Fenceline
- Surface Contour (2' Intervals)
- MW-20S (28-61) 531.67 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL) Used in Contouring
- MW-20M (72-85) 532.33 — Location ID; Screened or Open Interval (Feet BGS); Groundwater Elevation (Feet AMSL) Not Used in Contouring

Scale (feet): 0 50 100 150 300

NOTES:
1) AMSL- Above mean sea level.
2) BGS - Below Ground Surface
3) A - Artesian
4) NM - Groundwater Level Not Measured
5) Well screen intervals shown as (-) are unknown.
6) There are two different groundwater elevation contour intervals on the map: 10-foot intervals for the eastern portion of the site and 2-foot intervals for the western portion of the site. The change occurs west of the 350' groundwater elevation contour.

Well ID	Average Pumping Rate (gpm) on September 17, 2019
NPBA Extraction Wells (Inactive)	0
CW-9	50
CW-13	35
CW-15A	5
CW-17	89
CW-20	89
TOTAL WPL	**268**
CW-21	4
CW-22	2
CW-23	0.5
TOTAL SPBA	**6.5**

Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402

Groundwater Elevation Contour Map for September 17, 2019

DRAWN:	CHECKED:	APPROVED:	DATE:	PLATE:
JPB	CSO	SMS	6/10/2020	2.1-1

GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com

G:\15000\15012\Projects\2019 Comp\Plate2.1-1_Sitewide_GWcont_20190917.mxd

Former York Naval Ordnance Plant
1425 Eden Road, York, Pennsylvania 17402
TCE and PCE
Groundwater Monitoring Results
in MNA Areas
DRAWN: JPB
CHECKED: CDO
APPROVED: SMS
DATE: 6/10/2020
PLATE: 2.1-2
GROUNDWATER SCIENCES CORPORATION
www.groundwatersciences.com
Q:\10000\10012\Projects\2019 Comp\Plate2.1-2_Sitewide_GWcontCHEM_20190917.mxd
TI AREA 1
TI AREA 2
CODORUS CREEK
SAND BANK HILL QUARRY
West Side of Codorus Creek
Levee Area
Northern Site Perimeter
Former IWTP
Former North Building 4 Area
Former West Building 2 Corridor
West Parking Lot (WPL)
South West West Parking Lot (SW WPL)
Former TCA Tank Area
Former Building 58 Area
Former North End of Test Track (NETT)
Northern Property Boundary Area (NPBA)
Eastern Site Perimeter
South-Central Site Area
Southern Property Boundary Area (SPBA)
Giambalvo Property
South Plume Area (SPA)
K.G. Whiteford Ltd. Property
(i.e., the Former Cole Steel and Pfaltzgraff Company Manufacturing Facilities)
MILL CREEK
INTERSTATE 83
U.S. ROUTE 30 / ARSENAL ROAD
EDEN ROAD
CHRONISTER STREET
MAPLE CREST BLVD
FADING WAY
SAND BANK ROAD
ABANDONED QUARRY
Cah
Cch
Cv
Cl
LEGEND
Active Extraction Well
Inactive Extraction Well
Monitoring Well
Residential Well
Abandoned Well
Spring
Surface Water
Water Level Measuring Point
Bridge Surface Gauging Point
Abandoned Lift Station
Staff Gauge
Waterloo Monitoring Well
Groundwater Contour (10-Foot Interval; Feet AMSL)
Inferred Groundwater Contour (10-Foot Interval; Feet AMSL)
Groundwater Contour (2-Foot Interval; Feet AMSL)
Groundwater Depression (10-Foot Interval; Feet AMSL)
Groundwater Depression (2-Foot Interval; Feet AMSL)
Technical Impracticability (TI) Boundary
Harley-Davidson Property Boundary (East Campus)
NP York 58, LLC Property Boundary (West Campus)
Existing Building
Demolished/Slab Remains
Demolished/Slab Removed
Block Fault
Thrust Fault
Antietam & Harpers Formation, undiv. (Cah)
Chickies Formation (Cch)
Kinzers Formation (Ck)
Vintage Formation (Cv)
Existing Stream
Existing Water Feature
Existing Quarry
Paved Road
Railroad
Curb or Walkway
Fenceline
MW-20S (28-61) 531.67
Location ID
Screened or Open Interval (Feet BGS)
Groundwater Elevation (Feet AMSL)
Used in Contouring
MW-20M (72-85) 532.33
Location ID
Screened or Open Interval (Feet BGS)
Groundwater Elevation (Feet AMSL)
Not Used in Contouring
Scale (feet)
0 50 100 150 300
WELL ID
PCE
TCE
Concentration (µg/L)
Time
(Well)
Location ID
Top of Open Interval FtBGS - Bottom of Open Interval FtBGS (Open Interval Thickness)
Groundwater Elevation in FtAMSL (September 2019) Used for Contouring
Groundwater Elevation in FtAMSL (September 2019) Not Used for Contouring
NM = Water level not measured
Trichloroethene (TCE) and Tetrachloroethylene (PCE)
2008 RI Round 1 Event
2013 Comprehensive Sampling Event
2014 Comprehensive Sampling Event
2015 Comprehensive Sampling Event
2016 Comprehensive Sampling Event
2017 Comprehensive Sampling Event
2018 Comprehensive Sampling Event
2019 Comprehensive Sampling Event
NS = Not Sampled
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
(-) = Open interval unknown.
NOTES:
1) AMSL- Above mean sea level.
2) BGS - Below Ground Surface
3) A - Artesian
4) NM - Groundwater Level Not Measured
5) Well screen intervals shown as (-) are unknown.
6) There are two different groundwater elevation contour intervals on the map: 10-foot intervals for the eastern portion of the site and 2-foot intervals for the western portion of the site. The change occurs west of the 350' groundwater elevation contour.

Appendix A

Groundwater and Surface Water Purge Logs*

** - in portable document format (PDF) on the USB Drive attached to this report.*

Appendix B

Laboratory Analytical Reports for 2019 Samples*

** - in portable document format (PDF) on the USB Drive attached to this report.*

Appendix C

SPBA Groundwater Extraction System Pumping Data*

** - in portable document format (PDF) on the USB Drive attached to this report.*

Appendix D

SPBA Water Level Elevation Graphs*

** - in portable document format (PDF) on the USB Drive attached to this report.*

Appendix E

Data Validation Reports*

** - in portable document format (PDF) on the USB Drive attached to this report.*

Appendix F

Data Validation Narrative

Laboratory Data Validation Narrative

Media samples were collected in 2019 in accordance with a comprehensive quality assurance/quality control (QA/QC) program. Twenty-four sample delivery groups (SDGs) were generated for 199 samples that were collected from March 29, 2019 through December 18, 2019. The total includes 37 QC blank samples consisting of five equipment rinse blanks, five field blanks, and 20 trip blanks. Seven duplicate samples were also collected and are included in the total. (One duplicate sample was analyzed twice but only one set of reported duplicate results was used.)

All samples were analyzed for VOCs by SW-846 Method 8260C as specified in the QAPP (GSC, 2012b and 2014a).

GSC systematically reviewed the 24 SDGs for compliance with QC criteria in accordance with Section B.2.8 of the QAPP. The GSC data validators conducted a complete data validation on these SDGs using SAIC Technical Procedure TP-DM-300-7 (Rev. 3, June 2009) and based on the following categories:

1. Review and verification of the laboratory case narrative;
2. Verification of sample reanalysis and secondary dilutions;
3. Holding time limits;
4. Surrogate (System Monitoring Compound) percent recoveries (%R) for organic methods;
5. Internal Standard (IS) area counts and retention times for organic methods;
6. Blank contamination (in method, field, equipment rinse and trip blanks);
7. Relative Response Factors (RRFs) in initial calibration and continuing calibrations, Percent Relative Standard Deviation (%RSD) in initial calibrations, and Percent Difference (%D) in continuing calibrations;
8. Matrix Spike and Matrix Spike Duplicate (MS/MSD) Percent Recovery (%R) and Relative Percent Difference (RPD);
9. Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD) %R and RPD.

The laboratory case narratives were also reviewed for all SDGs. The contents of the data packages and QA/QC results were compared to the requirements of the requested analytical method, SW-846 Method 8260C. GSC evaluated QC data reported by the laboratory against required precision and accuracy limits established in Table A-4 of the QAPP. The validation reports that were generated are presented in **Appendix E** and include qualifiers added by the data validator.

Consistent with the data quality requirements as defined in the data quality objectives (DQOs) on Table A-4 of the QAPP, project data and associated QC data were evaluated on these categories and qualified according to the outcome of the review. During the review, laboratory-applied data qualifiers such as "E" (estimated concentration outside the calibration limits) and "B" (analyte detected in the associated method blank) were evaluated, defined and explained. During verification, individual sample results were qualified as necessary to designate usability of the data toward meeting project objectives. The qualifiers that were used are defined as follows:

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit. These results are qualitatively acceptable.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. Although estimated, these results are qualitatively acceptable.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. Although estimated, these results are qualitatively acceptable.

R - The analyte result was rejected due to serious deficiencies in the ability to analyze the sample and/or meet QC criteria. The presence or absence of the analyte cannot be verified.

Data qualifiers were applied based on deviations from the measurement performance criteria identified in TP-DM-300-7 and Table A-4 of the QAPP.

A secondary stage of validation occurred following completion of the initial validation for a discrete sampling event. Individual equipment rinse blanks, trip blanks, and field blanks were associated

with the corresponding environmental samples. These field QC blanks were evaluated using the same criteria as method blanks, and the associated environmental samples were qualified accordingly.

The following sections address the laboratory chemical analysis program implemented for the 2019 sampling events. The project DQOs are summarized in the following sections and include a review of precision, accuracy, bias, representativeness, comparability, completeness, and sensitivity.

Precision

Precision was assessed using the analysis of LCS/LCSDs and duplicate samples. MS/MSDs were also evaluated but data was not qualified based solely on MS/MSD results, except for the specific environmental sample that was spiked for the MS/MSD analysis.

LCS/LCSDs were evaluated based on %R results. The %R for 10 reported analytes was outside LCS/LCSD control limits, and the results for 55 samples were qualified "J" or "UJ" based on LCS/LCSD %R acceptance criteria.

MS/MSD results greater than the upper control limit (UCL) or less than the lower control limit (LCL) affected 10 analytes in six samples. The results were qualified as estimated ("J" or "UJ"); however, as noted above, data for this project was not qualified based solely on MS/MSD results.

Field duplicate samples were used to assess intralaboratory precision and were collected by filling multiple sample containers from the same sampling device during sampling events at a frequency of at least one duplicate sample per 20 media samples. Seven duplicate samples were collected, which is five percent of the 143 unique groundwater and surface water samples that were collected. The duplicate samples were assigned blind field identification numbers by the sampler and were analyzed by SW-846 Method 8260C.

Comparative results for a portion of the data from the duplicate samples are shown on the following table. In accordance with Section A.7.2.1 of the QAPP, the relative percent difference (RPD) between the results for the primary sample and duplicate sample was calculated for the two VOCs with the highest detections in each well. The duplicate result was non-detect ("U" or "UJ") for several parameters that were detected at low levels in the analysis if the primary sample; in these

cases, the RPD could not be calculated and is shown as "NA" on the following table. None of the calculated RPD results exceeds the data quality objective (DQO) for precision (<30 RPD) in the volatile organics analysis of a field duplicate sample. This DQO is specified on Table A-4 of the QAPP.

Comparison of Intralaboratory Duplicate Sample Results
(Two Highest Detections per Location)

Location	Date	Parameter	Primary Result (µg/L)	Duplicate Result (µg/L)	Relative Difference (%)
MW-162	04/02/19	Tetrachloroethene	450 J	590	27%
		Trichloroethene	120	100	18%
COD-SW-15	11/21/19	Tetrachloroethene	2.7	1.0 UJ	NA
		Trichloroethene	0.99 J	1.0 UJ	NA
COD-SW-17	12/18/19	Tetrachloroethene	2.0	1.0 UJ	NA
		no other reported detections			
CW-1A	09/27/19	Tetrachloroethene	1.5 J	1.3 J	14%
		Trichloroethene	36 J	35	3%
MW-110	09/24/19	Tetrachloroethene	23 J	20	14%
		Trichloroethene	0.71 J	2 U	NA
MW-67D	10/08/19	Trichloroethene	1	1	0%
		Chloroform	1.3	1.3	0%
MW-75D	10/14/19	Tetrachloroethene	14000 J	14000 J	0%
		Trichloroethene	2000	2300	14%

NA = Not applicable; cannot be calculated due to one of the results being a non-detect ("U" or "UJ").

Based on criteria including the results of the calculations, the parameters analyzed and reported, the absolute differences given sample dilutions, concentration levels, and professional judgment, the duplicate results do not show variations that indicate a serious lack of precision in the analytical results.

Based on an evaluation of %R for LCS/LCSDs and RPDs for duplicate samples, the overall precision of samples collected for the project appears to be acceptable. As a result, the laboratory DQO for precision was met.

Accuracy

Analytical accuracy was measured through the use of LCSs, surrogates, internal standards, initial and continuing instrument calibrations, serial dilutions, method blanks, and field QC blanks (trip blanks, field blanks, and equipment rinse blanks).

The first type of QC sample used to assess data accuracy is the LCS and/or LCSD sample. As noted in the discussion of precision, the LCS and/or LCSD percent recoveries are acceptable with the exception of 10 analytes in 55 samples that were qualified as estimated ("J"), or as not detected and estimated ("UJ").

The second QC measure used to assess the accuracy of the data is the surrogate %R for VOCs. Sample results were qualified as estimated ("J" or "UJ") if the associated surrogate %R was less than the LCL. Detected organic sample results were qualified as estimated ("J") if the associated surrogate %R was greater than the UCL. Non-detected organic sample results were qualified as rejected ("R") if the associated surrogate %R was less than 10 percent. Results from eight samples were qualified based on surrogate %R criteria.

Internal standards were added to calibration standards, environmental samples, and QC blanks in accordance with SW-846 method requirements. Data was qualified based on area counts and retention times being outside the control limits. No data was qualified based on internal standard criteria.

Initial calibration of each analytical instrument was completed in accordance with SW-846 method requirements for all analyses. Data was qualified based on RRFs and %RSDs being outside the control limits. Fifteen results for 1,4-dioxane were rejected ("R") due to the use of an unsuitable analytical method with low RRF in the initial calibration. All of these results were from samples collected in March, April, and May 2019.

Continuing calibration verification (CCV) of each instrument was completed in accordance with SW-846 method requirements for all analyses. Organic sample results were qualified as estimated ("J" or "UJ") if the associated CCV was less than the LCL. Detected organic sample results were qualified as estimated ("J") and non-detected sample results were qualified "UJ" if the associated

CCV was greater than the UCL. Six analytes in 32 samples were qualified as not detected and estimated ("UJ") based on CCV criteria; four of the six affected analytes are ketones which can be more prone to continuing calibration issues than chlorinated alkanes and alkenes. Seven results for 1,4-dioxane were rejected ("R") due to a low RRF in the continuing calibration; all of these results are from samples collected in June 2019.

All of the results for one trip blank collected in November 2019 were rejected due to the sample having been analyzed outside the 12-hour tune window of SW-846 Method 8260C in order to meet the analytical holding time. Unfortunately, the missed tune requires that the analytical data be rejected ("R"-flagged) and reanalysis was not possible due to insufficient sample volume remaining.

Method blanks were analyzed with each batch (SDG) of samples in accordance with SW-846 Method 8260C. No data was qualified based on method blank contamination.

During activities conducted as part of the groundwater monitoring program at fYNOP, field QC blanks were collected to assess the potential effects of various components of field activities on the analytical results. Field QC samples were obtained to determine the degree of cross-contamination, verify successful decontamination procedures, or determine the effects of media heterogeneity on results. Equipment rinse blanks and field blanks provide a way of measuring the degree of cross-contamination, decontamination efficiency, and other potential error that can be introduced from sources other than the sample. Field sample results associated with contaminants found in field QC blanks are considered non-detect ("U") if the concentrations are less than ten times the level found in the associated blank for common laboratory contaminants such as acetone and methylene chloride, and less than five times the level found in the associated blank for other contaminants.

Five equipment rinse blanks and five field blanks were collected during the 2019 sampling events. The QAPP specifies the collection of one equipment rinse blank and one field blank per 20 environmental samples being analyzed for VOCs. This 5% specification was based on the total number of groundwater samples that were collected (95 samples) and does not include field QC samples, surface water samples, or influent/effluent samples.

VOCs were detected in field and rinse blanks sourced from deionized and ideally organic-free water. Toluene was detected in three field blanks and was detected at similar concentrations in

three corresponding rinse blanks. Similarly, acetone was detected in one field blank and in one corresponding rinse blank. However, neither toluene nor acetone was detected in any of the associated environmental samples. Methylene chloride, a common laboratory contaminant, was detected at a very low level (1 ug/L) in one equipment rinse blank but was not detected in any environmental sample collected after the rinse blank was collected. Therefore, groundwater, surface water, and other analytical results from environmental samples were not qualified as non-detect ("U") due to rinse blank or field blank contamination.

Supporting QC information cited above was qualitatively evaluated with respect to the analytical accuracy DQO. All data is acceptable as qualified except for (1) the 1,4-dioxane results that were rejected due to the use of an unsuitable analytical method with low RRF in the initial or continuing calibration, and (2) the single trip blank that was rejected due to a missed 12-hour tune window. Based on the evaluation of the LCSs, surrogate recoveries, internal standards, initial and continuing instrument calibrations, serial dilutions, method blank, and field QC blank results, the laboratory accuracy is deemed acceptable and the analytical DQO for accuracy has been met except as noted.

Based on an evaluation of the compounds and elements detected in the field QC blanks, overall field accuracy is deemed acceptable. Consequently, the field DQO for accuracy has been fulfilled.

Bias

Bias is the systematic or persistent distortion of a measurement process causing errors in one direction. Data conditions that imply a potential for high bias in the sample result include:

1. Detection of a target compound in an associated method blank, trip blank, field blank, or equipment rinse blank,
2. A surrogate recovery greater than the acceptable range for a specific compound's analytical analogue,
3. A CCV sample recovery greater than the acceptable range for a specific compound, and
4. A LCS/LCSD or MS/MSD recovery greater than the acceptable range for a specific compound.

Similarly, data conditions that imply a potential for low bias in the sample result include:

1. Analysis of the sample outside the holding time (i.e., 14 days for preserved VOCs),
2. A CCV sample recovery less than the acceptable range for a specific compound, and
3. A LCS/LCSD or MS/MSD recovery less than the acceptable range for a specific compound.

High analytical bias was evaluated by reviewing blank detections, low analytical bias was evaluated by reviewing holding times, and both high and low analytical biases were evaluated by analysis of LCS/LCSD and MS/MSD samples, and CCV sample recoveries. The laboratory analyzed LCS/LCSD samples for each SDG, and analyzed MS/MSD samples as appropriate. Acceptance criteria for LCS/LCSD and MS/MSD measurements are expressed as a percent recovery and are specified in Table A-4 of the QAPP.

No VOC results were qualified "U" (not detected) due to method blank detections with the potential for high bias. No VOC detections were qualified "U" due to trip blank contamination with the potential for high bias. VOC results from six unique samples were qualified "J" or "UJ" due to holding time exceedances with the potential for low bias. Analysis of the diluted (1000x) run for one of these six samples occurred within the holding time and two analyte detections from this diluted run were reported without data qualification; the out-of-hold results for the other analytes were reported (with qualification "J" or "UJ") because they were analyzed at a lesser serial dilution (100x) that captured low levels of VOCs that otherwise were lost in the higher 1000x dilution.

As noted in the discussion of precision, the LCS/LCSD results were within the QC limits with the exception of 10 analytes in 55 samples that were qualified as estimated. MS/MSD results outside the QC limits for VOCs resulted in the qualification of 10 analytes in six samples due to the potential for high bias where the MS/MSD results were greater than the UCL, and the potential for low bias where the MS/MSD results were less than the LCL.

Based on a review of the results, the data conditions implying a potential for low or high bias in a sample have been addressed by validation and resulting qualification of the analytical data using the following flags: "U", "J", "UJ" and "R" (rejected). Note: Both "UJ" and "R" are unique validation qualifiers whereas "U" and "J" can be either laboratory qualifiers or validation qualifiers.

Representativeness

Representativeness was satisfied by verifying that the QAPP was properly followed, that proper sampling techniques were used, that proper analytical procedures were followed, and that analytical holding times of the samples were not exceeded. If holding times are greater than two times the method-required holding time, then the sample results are rejected ("R") for non-detects and are qualified as estimated ("J") for detects. Although VOC results from nine samples were qualified due to holding time exceedances, no sample results were rejected due to missed holding times. Based on an evaluation of sample precision and accuracy, the samples collected in 2019 are considered to be representative of the environmental conditions at the time of sampling.

Comparability

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is achieved through the use of established and approved sample collection techniques and analytical methods, consistency in the basis of analysis (wet weight vs. dry weight, volume vs. mass, etc.), consistency in reporting units, and analysis of standard reference materials.

Data comparability is achieved by using standard units of measure. The use of EPA-approved methods to collect and analyze samples, along with instruments calibrated against Standard Analytical Reference Materials (SARM), which are National Institute for Standards and Technology (NIST)-traceable standards, also aids comparability.

Based on the precision and accuracy assessment presented above and the use of EPA-approved methods, the data collected during the 2019 sampling events is considered to be comparable to data collected using similar EPA-approved methods.

Completeness

Completeness measures the quantity of valid data generated from the laboratory analysis and sampling processes. For data to be valid, all acceptance criteria must be fulfilled, including accuracy and precision, analytical methods must be followed, and each data point must be validated satisfactorily. Results from the 2019 sampling events that have been qualified for reasons of

completeness have limited impact on the data quality. The DQOs (Table A-4 of the QAPP) were set at 90 percent for analytical laboratory completeness. Based on the evaluation of the laboratory QC results, the data exceeded 90 percent completeness and are deemed useful for assessing results and developing recommendations.

Results that have been flagged or qualified "U", "UJ", or "J" for various reasons encountered minor analytical problems, and have limited impact on the data quality.

Sensitivity

Sensitivity requirements were specified as the minimum required reporting levels for VOCs listed in Table A-6 of the QAPP. For example, a review of non-detect reporting limit data exceedances due to serial dilution by the analytical laboratory shows that for TCE, only two of the non-detects were such that the laboratory reporting limit exceeded 5 micrograms per liter (µg/L), the applicable regulatory standard for TCE. In contrast, vinyl chloride, where the reporting limits were most affected by serial dilution, showed 25 non-detect results with laboratory reporting limits greater than 2 µg/L, the applicable regulatory standard for vinyl chloride. (The reporting limits ranged from 2.5 µg/L to 130 µg/L in those samples.) Otherwise, the reporting limit criteria were met, with the exception of those samples that required serial dilution due to matrix interferences or elevated concentrations of target compounds. Therefore, the analytical DQO for sensitivity was met with exceptions as noted.