Final April 2014
Long-Term Monitoring
Data Summary Report

AOC 9 (SD-62)
Former Griffiss Air Force Base
Rome, New York

Contract No. W912DQ-09-D-3013

January 2015

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Draft
April 2014 Long-Term Monitoring Data Summary Report,
AOC 9, Former Griffiss Air Force Base, Rome, New York

October 2014

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Table of Contents

Section **Page**

1 Introduction 1-1
1.1 Purpose of Investigation 1-1
1.2 AOC 9 Site Description 1-2
1.3 AOC 9 Previous Investigation Background 1-4
1.4 AOC 9 Remedial Design and Monitoring Summary 1-6

2 AOC 9 Long-Term Monitoring Activities 2-1
2.1 Scope of Work 2-1
2.1.1 Groundwater Sampling 2-2
2.1.2 Surface Water Sampling 2-2
2.1.3 Groundwater Elevation Measurements 2-2
2.1.4 Well Inspections and Maintenance 2-2
2.2 Equipment Decontamination 2-3
2.3 Investigation Derived Waste 2-3
2.4 Quality Assurance/Quality Control 2-3
2.5 Work Plan Deviations 2-4
2.6 PermeOx Injection Pre-Design Sampling Summary 2-4

3 AOC 9 Long-Term Monitoring Findings 3-1
3.1 April 2014 Long-Term Monitoring 3-1
3.1.1 Groundwater Sampling Results 3-1
3.1.2 Surface Water Sampling Results 3-3
3.1.3 Trend Analysis 3-3
3.1.4 MAROS Evaluation 3-7
3.1.5 April 2014 Summary 3-8
3.1.6 PermeOx Pre-Design Sampling Summary 3-9
3.2 PermeOx® Injection and Dissolved Oxygen Monitoring Summary 3-9

4 Effectiveness of Remedy 4-1
4.1 Recommendations 4-2

5 References 5-1

Table of Contents (cont.)

Appendix		Page
A	Final Performance Monitoring Data Summary Report Figures	A-1
B	Daily Activity Forms	B-1
C	Sampling Forms	C-1
D	Photolog	D-1
E	Well Status Log and Maintenance Summary	E-1
F	Analytical Data	F-1
G	Data Usability Summary Report	G-1
H	MAROS	G-1
I	Inventory of Injection Wells	G-1
J	PeremOx® Injection Documents	G-1

List of Tables

Table		Page
1-1	AOC 9 Groundwater Cleanup Goals/Remedial Action Objectives	1-8
2-1	AOC 9 Long-Term Monitoring, Groundwater and Surface Water Sample Summary, Former Griffiss Air Force Base, Rome, New York	2-5
2-2	AOC 9 Long-Term Monitoring Groundwater Elevation Data, Former Griffiss Air Force Base, Rome, New York	2-6
2-3	PermeOx Injection Pre-Design Sampling Results	2-7
3-1	AOC 9 April 2014 Long-Term Monitoring, Summary of Positive Results for Groundwater Samples	3-11
3-2	AOC 9 April 2014 Long-Term Monitoring, Summary of Positive Results for Surface Water Samples	3-14
3-3	AOC 9 Historic Groundwater Sample Results	3-15
3-4	AOC 9 Historic Surface Water Sample Results	3-35

List of Figures

Figure		Page
1-1	AOC 9, Former Griffiss Air Force Base, Rome, New York	1-9
2-1	Long-Term Monitoring Sample Location Map	2-9
2-2	AOC 9: Groundwater Contour Map - April 1, 2014	2-11
3-1	April 2014 Long-Term Monitoring Total Volatile Organic Compound Concentrations in Groundwater and Surface Water	3-37
3-2a	AOC9 Remedial Monitoring, Chlorobenzene Plume (July 2010 through April 2012)	3-39
3-2b	AOC 9 Remedial Monitoring, Chlorobenzene Plume (September 2012 through April 2014)	3-41
3-3a	AOC 9 Remedial Monitoring, TCE Plume (July 2010 through April 2012)	3-43
3-3b	AOC 9 Remedial Monitoring, TCE Plume (September 2012 through April 2014)	3-45
3-4a	AOC 9 Remedial Monitoring, Total DCB Plume (July 2010 through April 2012)	3-47
3-4b	AOC 9 Remedial Monitoring, Total DCB Plume (September 2012 through April 2014)	3-49
3-5	G009-MW01 Trend Analysis	3-51
3-6	G009-MW02 Trend Analysis	3-52
3-7	AOC9-MW06 Trend Analysis	3-53
3-8	AOC9-MW14 Trend Analysis	3-54
3-9	AOC9-MW15 Trend Analysis	3-55
3-10	AOC9-MW17 Trend Analysis	3-56
3-11	AOC9-MW18 Trend Analysis	3-57
3-12	AOC9-MW19 Trend Analysis	3-58

List of Abbreviations and Acronyms

AFCEC	Air Force Civil Engineering Center
AOC 9	Area of Concern 9
BGS	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	contaminant of concern
DCB	dichlorobenzene
DCE	dichloroethylene
DO	dissolved oxygen
DUSR	Data Usability Summary Report
EEEPC	Ecology and Environment Engineering, P.C.
EPA	(United States) Environmental Protection Agency
ERPIMS	Environmental Restoration Program Information Management System
ESI	Expanded Site Investigation
FID	flame ionization detector
Griffiss AFB	former Griffiss Air Force Base
MAROS	Monitoring and Remediation Optimization System Software Version 2.2
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MW	monitoring well

List of Abbreviations and Acronyms (cont.)

NYSDEC	New York State Department of Environmental Conservation
ORP	oxidation reduction potential
Parsons	Parsons Government Services, Inc.
PCE	tetrachloroethylene
PDI	Predesign Investigation
PDI 2	second predesign investigation
PID	photoionization detector
QA	quality assurance
QC	quality control
RAO	remedial action objective
SI	Supplemental Investigation
SW	surface water
TCE	trichloroethylene
USACE	United States Army Corps of Engineers
VOC	volatile organic compound
WSA	Weapons Storage Area

1 Introduction

Ecology and Environment Engineering, P.C. (EEEPC), under contract to Parsons Government Services, Inc. (Parsons), which is under contract to the U.S. Army Corps of Engineers (USACE) Kansas City District (Contract No. W912DQ-09-D-3013) performed the second round of long-term groundwater and surface water monitoring at Area of Concern 9 (AOC 9) of the former Griffiss Air Force Base (Griffiss AFB) in Rome, New York, on April 1 to 3, 2014 (see Figure 1-1). The previous first round of long-term groundwater and surface water monitoring was provided under separate cover in the *Final April 2013 Long-Term Monitoring Data Summary Report* (EEEPC 2014). The previous four rounds of performance groundwater and surface water monitoring were provided under separate cover in the *Final May 2011 and October 2011 Performance Monitoring Data Summary Report*, and the *Final April and September 2012 Performance Monitoring Data Summary Report* (EEEPC 2013b, and 2013a). The results of the second round of long-term monitoring are presented in Section 2. The second round of long-term monitoring data is discussed in Section 3. In addition, figures from the first round of long-term groundwater and surface water monitoring, and four rounds of performance monitoring sampling are provided in Appendix A for comparison purposes.

1.1 Purpose of Investigation

The three-phased groundwater monitoring program consists of baseline, performance, and long-term monitoring of volatile organic compound (VOC) levels in the groundwater and in Six Mile Creek. A phased approach is consistent with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) response action process. Monitoring well data are screened against the most stringent of either the New York State Department of Environmental Conservation (NYSDEC) Class GA groundwater criteria or the United States Environmental Protection Agency (EPA) maximum contaminant levels (MCLs) (NYSDEC 2009; EPA 2006), which also represent the remedial action objectives (RAOs) established in the *Final Record of Decision* for this project (EEEPC 2010a). For the contaminants of concern (COCs) at AOC 9, the NYSDEC Class GA criteria for groundwater are the more stringent of the screening criteria (see Table 1-1). Surface water samples are screened against the NYSDEC Class C freshwater fish propagation standards and guidance values (NYSDEC 2009).

The baseline sampling conducted from July 27 to 29, 2010, consisted of groundwater sampling of eight monitoring wells (G009-MW01, G009-MW02, AOC9-

MW05, MW06, MW14, MW15, MW17, and MW18) and surface water sampling of three locations (AOC9-SW01, SW02, and SW03). These groundwater and surface water samples were analyzed to establish baseline VOC concentrations in the groundwater plume and Six Mile Creek before remediation began (EEEPC 2010c).

The performance monitoring was conducted to evaluate the short-term effectiveness of the remediation efforts with a total of four sampling events over two years (May 2011, October 2011, April 2012, and September 2012). The performance monitoring consisted of groundwater sampling of five monitoring wells (AOC9-MW06, MW14, MW15, MW17, and MW19) and surface water sampling of three locations (AOC9-SW01, SW02, and SW03).

The long-term effectiveness of the remediation efforts will be monitored during the long-term monitoring with annual sampling events. The long-term monitoring consists of groundwater sampling of nine monitoring wells (G009-MW01, G009-MW02, AOC9-MW05, MW06, MW14, MW15, MW17, MW18, and MW19) and surface water sampling of three locations (AOC9-SW01, SW02, and SW03). This second sampling event is identified as the April 2014 long-term monitoring.

Following the first three years of annual long-term monitoring, it is anticipated that monitoring will continue on an every-other-year basis until concentrations of hazardous substances in groundwater are below the RAOs. Once the RAOs have been achieved, monitoring will continue until three consecutive rounds of sampling indicate that the concentrations of groundwater contaminants remain below RAOs (for a total of four consecutive sampling rounds). At that point, the Air Force will petition the regulatory agencies for no further action. Modeling performed during evaluation of the remedial alternatives for AOC 9 indicated that the total duration of the remedial action would likely span 11 years beginning in November 2013 with the completion of the remedial action (EEEPC 2010d).

1.2 AOC 9 Site Description

AOC 9 is a grass-covered area approximately 1,500 feet long and 650 feet wide located in the southwest portion of the inactive Weapons Storage Area (WSA; see Figure 1-1). The site is part of a strip of land that lies between an airplane runway to the southwest and extends into the Weapons Storage Area (WSA) to the northeast. Perimeter Road runs through the site and Six Mile Creek borders the southwestern edge of the site.

The area comprising AOC 9 was originally farmland in the 1930s before the base was constructed. In the 1940s and 1950s, the first landfill for the base was established beneath the northern portion of the WSA extending south between Perimeter Road and Six Mile Creek. Aerial photographs show that the landfill was active between 1943 and 1957 but no later than 1960. The type of material buried at this site is unknown; however, it is reported that large quantities of the landfill material were removed during construction of the WSA.

Two munitions storage bunkers were erected between Perimeter Road and Six Mile Creek in the early 1950s. One of the bunkers (also referred to as igloos) was removed in the late 1970s or early 1980s (before 1981), and the other bunker was removed in 1992. Although the bunkers were initially used for munitions storage, they were later used to store hazardous materials.

The site's status was changed from "Area of Interest" to "Area of Concern" in 1998 when groundwater samples collected during the Expanded Site Investigation (ESI) were found to contain chlorinated solvents at concentrations exceeding NYSDEC Class GA standards and EPA MCLs (EPA 2006; NYSDEC 2009).

AOC 9 is currently inactive and access is somewhat restricted by Perimeter Road Gates 4 and 11. The southern portion of this area is expected to remain vacant in the future, acting as a buffer zone between the runway and future development in adjacent areas. The northern portion of the site extends into the former WSA boundary and is expected to be zoned as a nonresidential, industrial area.

The ground surface at AOC 9 slopes gently downward toward Six Mile Creek. Groundwater flows southwest toward the creek. Depth to groundwater is approximately 10 to 12 feet but is closer to the ground surface between Perimeter Road and Six Mile Creek. There are several locations in this area where shallow groundwater discharges to the surface. Three intermittent drainageways that discharge to Six Mile Creek exist on the southern portion of the site.

Debris (e.g., glass, slag, bricks, ceramics, cinderblocks, asphalt, concrete, wire, and metal) encountered during test pit excavations in the southern portion of the former landfill (south of the WSA) accounted for less than 1% by volume of excavated material. The lack of waste materials observed from the test pit excavations support reports that the contents of the former WSA landfill had been removed before the WSA was built.

Prior to excavation of the contaminant source area, a contaminated groundwater plume (chlorobenzene, trichloroethylene [TCE], dichloroethylene [DCE]) extended downgradient from AOC 9 for approximately 1,500 feet and covered approximately 14.6 acres. The lateral extent of the plume was approximately 400 feet and the vertical extent range was from ground surface to approximately 20 feet below ground surface (BGS). The leading edge of the plume had reached Six Mile Creek.

The contaminated aquifer is composed of silty-fine to medium-grained sands with little coarse sand with discontinuous gravel seams. North of Perimeter Road, the aquifer is found in an interval from approximately 3 to 28 feet BGS. South of Perimeter Road there is less overburden and the aquifer extends from 1 to 18 feet BGS. A thin till layer above the Utica Shale bedrock underlies the aquifer, but contamination has not been detected in the bedrock.

1.3 AOC 9 Previous Investigation Background

In 1997, an ESI was performed (E & E 1998). The main objective of the ESI was to investigate the nature and extent of environmental contamination from historical releases at the site in order to determine whether any remedial action was necessary to prevent potential threats to human health and the environment arising from exposure to site conditions.

The ESI included the installation and sampling of four permanent monitoring wells. Analytical results indicated the presence of benzene, chlorobenzene, cis-1,2-DCE, 1,2-dichlorobenzene (DCB), 1,3-DCB, 1,4-DCB, tetrachloroethylene (PCE), and TCE in one or more wells in concentrations that exceeded screening criteria. Several metals, including aluminum, iron, manganese, and potassium, were also detected in concentrations that exceeded screening criteria in one or more wells.

In 2000, a Supplemental Investigation (SI) was performed. A total of 88 Geoprobe and six Hydropunch groundwater screening samples were collected from 45 locations. Twenty-six of the 45 locations were vertically profiled (i.e., up to three samples were collected from different depths at the same location). In addition, four new monitoring wells were installed and sampled, and four existing monitoring wells were resampled. Analytical results for the Geoprobe/samples indicated the presence of 16 VOCs at levels exceeding the most stringent criteria. Analytical results for the monitoring wells indicated the presence of 14 VOCs and five metals at concentrations exceeding the most stringent screening criteria.

In 2002, a second SI was performed to collect additional data to further delineate the chlorinated hydrocarbon plume and determine if petroleum hydrocarbons were present within the groundwater. A total of 56 Geoprobe groundwater screening samples were collected from 14 locations. Eleven of the 14 locations were vertically profiled (i.e., up to five samples were collected from different depths at the same location). Analytical results for the Geoprobe samples indicated the presence of 15 VOCs at levels exceeding the most stringent screening criteria.

Based on these results, the overall shape of the contaminant plume at that time appeared to be linear and oriented northeast/southwest (approximately 850 feet long) with a relatively narrow center. The downgradient portion appeared to be the widest due to natural dispersion and the change in direction of groundwater flow in proximity to the creeks. Subsequent investigations provided additional data to better define the entire plume.

During the SI, five test pits were excavated to the water table and groundwater samples were collected to determine if petroleum hydrocarbons were present within the groundwater. Analytical results indicated that there was no significant petroleum hydrocarbon contamination in the test pit samples.

During the first predesign investigation (PDI) conducted in September through November 2006 by EEEPC, four additional groundwater monitoring wells (MWs; AOC9-MW14 through MW17) were installed at the site. Twenty-three different VOCs were detected in at least one of the groundwater samples collected during this investigation. The highest concentrations of total VOCs (1,2-DCB, 1,4-DCB, chlorobenzene, and benzene) were detected in presumed upgradient wells MW14 and MW15 at 2,082 micrograms per liter (µg/L) and 1,989 µg/L, respectively. These concentrations at presumed upgradient wells prompted further investigation and a potential source of groundwater contamination was found in the soil upgradient of Six Mile Creek and Perimeter Road. Two additional PDIs were conducted to determine the extent and nature of this source.

The second predesign investigation (PDI 2) was performed in February through April 2007. This study included the installation of 25 temporary monitoring wells and identified areas containing significantly higher levels of chlorobenzene and related compounds east of Building 913. Monitoring wells TW39 and TW32 had chlorobenzene concentrations of 14,400 µg/L and 8,580 µg/L, respectively. These concentrations were five to 10 times higher than the highest concentrations historically detected at AOC 9.

A third predesign investigation (Additional PDI) was performed in June through October 2007 to better define the plume and further identify the potential soil contaminant source area. During this investigation, a total of 56 new temporary monitoring wells were installed around the site. Twenty-two different VOCs were detected in the groundwater samples collected from the temporary monitoring wells at concentrations exceeding the groundwater standards. The highest total VOC concentrations were detected in groundwater samples collected from temporary wells TW45 (3,100 µg/L), TW71 (3,300 µg/L), and TW100 (3,400 µg/L). In addition, 42 boreholes were installed in the soil and soil cores were screened continuously with a photoionization detector and flame ionization detector (PID/FID) from ground surface to refusal (in the glacial till layer, approximately between 20 and 30 feet BGS). Samples were taken at depth intervals where the highest PID/FID readings were measured. Twelve VOCs (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-DCB, 1,3-DCB, 1,4-DCB, chlorobenzene, ethylbenzene, naphthalene, n-butylbenzene, n-propylbenzene, sec-butylbenzene, and toluene) were detected at concentrations exceeding screening criteria in the soil samples collected from the 42 soil borings. The highest total VOC concentrations were detected in soil samples collected from boreholes SB01 (1,100 milligrams/kilogram [mg/kg]) and SB12 (1,600 mg/kg) with chlorobenzenes representing the largest fraction of VOCs. The sample results and field observations indicated that there was a 6-foot-thick gray to black smear zone of contamination at the top of the saturated zone, which is located at depths ranging from 8 to 17 feet BGS.

Based on the above PDIs, the soil east of Building 913 was identified as the source of the AOC 9 groundwater contamination.

Baseline sampling was conducted at AOC 9 from July 27 to July 29, 2010, to establish baseline VOC concentrations in the groundwater plume and Six Mile Creek, before the remedial action (source excavation) began on September 1, 2010 and are presented in the *Final Baseline Monitoring Data Summary Report, AOC 9 Former Griffiss Air Force Base, Rome, New York* (EEEPC 2010c). Baseline sampling consisted of sampling eight monitoring wells (G009-MW01, G009-MW02, AOC9-MW05, MW06, MW14, MW15, MW17, and MW18) and three surface water (SW) locations (AOC9-SW01, SW02, and SW03). Groundwater and surface water samples were analyzed for VOCs (EPA Method SW8260B).

Twenty-one VOCs, including chlorobenzene; 1,2-DCB; 1,4-DCB; TCE; PCE; and several petroleum compounds including benzene, toluene, ethylbenzene, and xylene (BTEX) were detected in the groundwater samples collected. Eleven of the contaminants were detected in at least one sample at concentrations exceeding NYSDEC Class GA Groundwater standards. The highest total VOC concentrations were detected in monitoring wells MW14 (2,100 µg/L), MW15 (1,700 µg/L), and MW17 (890 µg/L). Monitoring wells MW14, MW15, and MW17 are located in the center of the plume downgradient of the contaminant source area (see Figure 1-2 in Appendix A).

A comparison of baseline analytical results to the historical analytical results indicated that the AOC 9 groundwater plume had, in general, remained relatively stable. Based on the analytical results obtained from monitoring wells MW01 and MW02, the plume did not appear to have widened south of Perimeter Road, nor does the leading edge of the plume appear to have continued to advance based on the analytical results obtained from monitoring wells MW05 and MW06. Surface water sample results obtained from sample locations SW01, SW02, and SW03 have also been relatively consistent. The upstream location (SW01) has had total VOC concentrations ranging from non-detect to 1.78 µg/L. The location where the center of the groundwater contaminant plume intersects Six Mile Creek (SW02) has had total VOC concentrations ranging from non-detect to 5 µg/L, and sample location SW03, at the downstream edge of the groundwater plume's intersection with Six Mile Creek has had total VOC concentrations ranging from non-detect to 4 µg/L.

1.4 AOC 9 Remedial Design and Monitoring Summary

The remedial design included removal of the source area through excavation of contaminated soil, which was completed in December 2010, treatment of contaminated groundwater using chemical oxidation, which was completed in November 2013, and land use controls (EEEPC 2010d). Additionally, three groundwater and surface water monitoring phases, baseline sampling, performance monitoring, and long-term monitoring, will be performed in conjunction with the remedial action as described in the *Final Work Plan Baseline, Performance, and Long-Term Monitoring at AOC 9* (EEEPC 2010e). Baseline sampling was conducted to provide a snapshot of the groundwater contaminant levels prior to implementation of the remedial action for comparison to the groundwater monitoring, which will be performed after the remedial action. The May 2011, October 2011, April 2012, and

September 2012 performance monitoring events were performed to evaluate the short-term effectiveness of the remediation efforts; by confirming the downward trend during the first two years following excavation, and determining which of the RAOs have been or have not been achieved, for each of the monitoring wells sampled. The long-term monitoring will be performed to monitor the long-term effectiveness of the remediation efforts. The first and second long-term monitoring events were completed in April 2013 and April 2014, respectively.

As described in the work plan, a total of eight sampling events are currently planned: one baseline sampling, four biannual performance monitoring, and three annual long-term monitoring. However, following the first three years of annual long-term monitoring, it is anticipated that monitoring will continue on an every-other-year basis until concentrations of hazardous substances in groundwater are below RAOs. After reaching the RAOs, the monitoring will again be performed until three consecutive rounds of sampling indicate that the concentrations of groundwater contaminants remain below the RAOs, allowing for unrestricted use of the site (EEEPC 2010e). If an increasing trend in contaminants of concern concentration is identified in any monitoring well or surface water sampling location (e.g., three consecutive monitoring events showing a statistically increasing trend), the Air Force will propose to the EPA and NYSDEC that additional action be performed. Additional oxidant injections or additional excavations may be executed without requiring either an Explanation of Significant Differences or Record of Decision amendment (EEEPC 2010a).

Additional activities at this site included installation and development of two new permanent monitoring wells (AOC9-MW18 and MW19). Monitoring well MW18 was installed by Parsons, prior to the baseline sampling, east of the treatment area and serves as an upgradient well (see Figure 2-1 for well locations). Total VOC concentration during baseline sampling in MW18 was 3.2 µg/L. The remedial action at AOC 9 was conducted following the installation of MW18. Well MW19 was installed in the spring 2011, prior to the May 2011 performance sampling, following the remedial excavation in the eastern portion of the groundwater contaminant source area at the location of former temporary well TW39, to function as a former source area well (see Figure 2-1 for well locations). The screened interval in MW19 targets the interval previously screened by temporary well TW39 (9.3 to 19.3 feet BGS), which contained a total VOC concentration of 21,610 µg/L. MW19 was constructed with a 10-foot (0.01-inch slot) PVC screen in accordance with USACE protocols.

All existing monitoring wells were surveyed by the subcontractor, LaFave White & McGivern, during previous investigations to obtain horizontal locations and vertical elevations of each monitoring well. The surveys utilized the existing benchmarks located on Griffiss AFB and are in the New York Central NAD 83 State Plane coordinate system. Horizontal measurements and vertical measurements were obtained to accuracy of 0.001 foot and 0.01 foot, respectively.

Table 1-1 AOC 9 Groundwater Cleanup Goals/Remedial Action Objectives

Contaminants of Concern[a]	Groundwater Cleanup Goal[b] (µg/L)
1,2-Dichlorobenzene	3
1,2-Dichloroethane	0.6
1,2,4-Trimethylbenzene	5
1,3,5-Trimethylbenzene	5
1,3-Dichlorobenzene	3
1,4-Dichlorobenzene	3
Acetone	50
Benzene	1
Chlorobenzene	5
cis-1,2-Dichloroethylene	5
Ethylbenzene	5
Isopropylbenzene	5
Methylene Chloride	5
Naphthalene	10
n-Butylbenzene	5
n-Propylbenzene	5
o-Xylene	5
sec-Butylbenzene	5
Trichloroethylene	5
tert-Butylbenzene	5
Tetrachloroethylene	5
Vinyl Chloride	2
Xylene (Total)	5

Notes:

[a] From the *Final Record of Decision for Area of Concern 9 (SD-62)* (EEEPC 2010a).

[b] New York State Department of Environmental Conservation (NYSDEC 2009) Class GA groundwater standard.

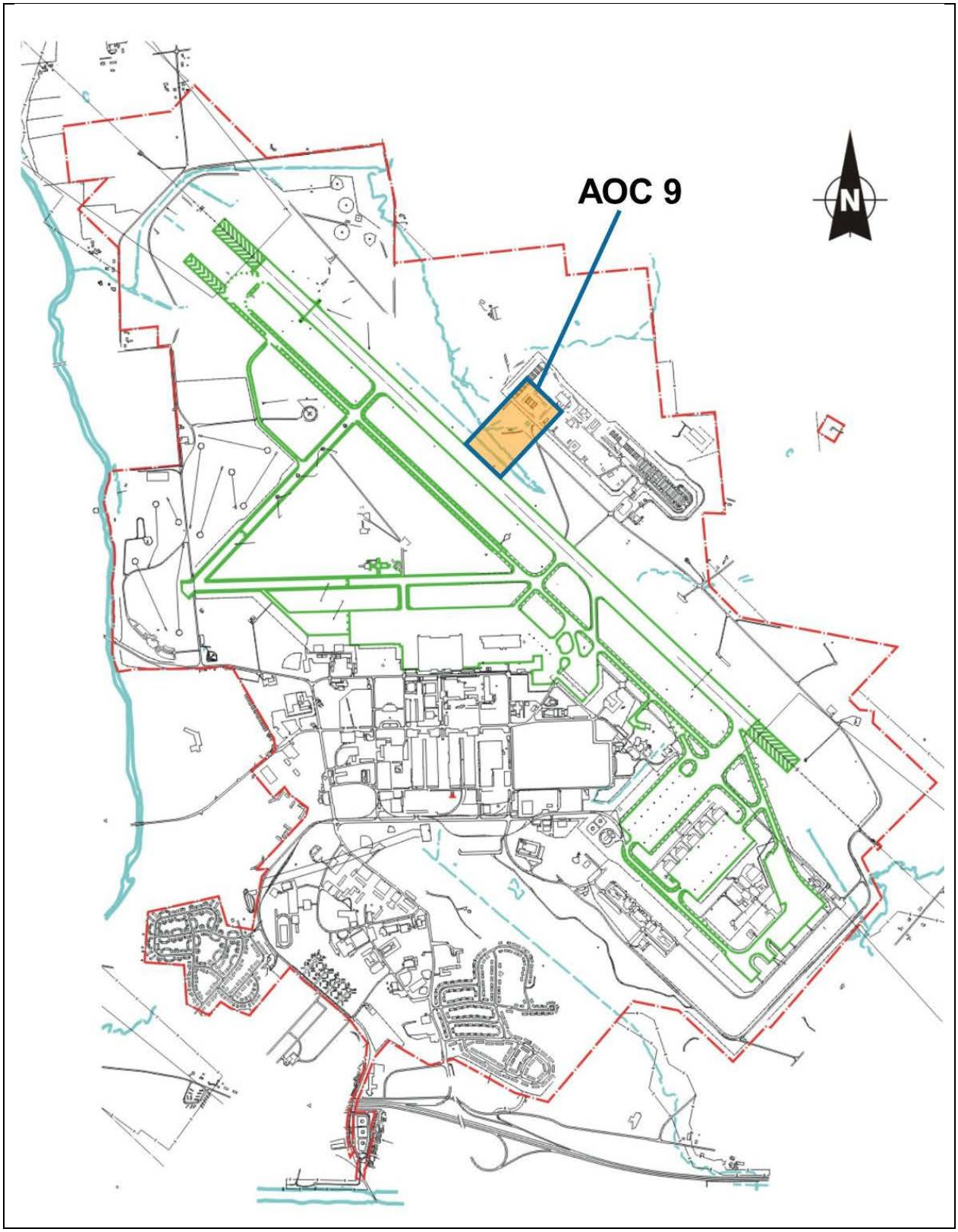


Figure 1-1 AOC 9, Former Griffiss Air Force Base, Rome, New York

2 AOC 9 Long-Term Monitoring Activities

This section presents the field activities performed during the AOC 9 April 2014 long-term monitoring (see Appendix B, Daily Activity Forms). The work performed at AOC 9 described in this report was performed in accordance with the work plan (EEEPC 2010e), with minor deviations from the work plan described in Section 2.5.

2.1 Scope of Work

April 2014 long-term sampling was conducted at AOC 9 in accordance with the work plan as described in Section 1.4 (EEEPC 2010e). Long-term sampling consisted of sampling nine monitoring wells (G009-MW01, MW02, AOC9-MW05, MW06, MW14, MW15, MW17, MW18, and MW19) and three surface water locations (AOC9-SW01, SW02, and SW03; see Figure 2-1):

- Wells MW01 and MW02 were sampled to monitor the width of the contaminant plume and the effectiveness of the remedial action in the lateral portions of the plume.
- Wells MW05 and MW06 were sampled as sentinel wells to evaluate the stability of the leading edge of the contaminant plume and to monitor the effectiveness of the remedial action in the area downgradient of the remedial action treatment area.
- Wells MW14, MW15, and MW17 were sampled to monitor the effectiveness of the remedial action in the center of the plume in the area being treated during the remedial action and downgradient of the treatment area.
- Well MW18 was sampled to monitor contaminant concentrations upgradient of the groundwater plume.
- Well MW19 was sampled to monitor the effectiveness of the remedial action in the center of the former source area, following completion of the source area excavation.
- Surface water sample locations SW01 through SW03 were sampled to monitor contaminant concentrations within Six Mile Creek.

April 2014 long-term sampling results, in conjunction with the results from the previous four performance monitoring and first (April 2013) long-term sampling events will be used to continue to evaluate the effectiveness of the remediation efforts. Sampling was conducted from April 1 to 3, 2014.

2.1.1 Groundwater Sampling

Groundwater samples were collected from MW01, MW02, MW05, MW06, MW14, MW15, MW17, MW18, and MW19 and analyzed by Katahdin Analytical Services, located in Scarborough, Maine. Groundwater samples were analyzed for VOCs (EPA Method SW8260B), in accordance with the *Final Work Plan, Baseline, Performance, and Long-Term Monitoring at AOC 9* (EEEPC 2010e). Prior to collection of the groundwater samples, a minimum of three well volumes of groundwater was purged from each well using EPA low-flow procedures. The wells were purged and sampled with a pump/controller and dedicated bladder pumps and associated tubing. Field parameters (i.e., turbidity, pH, temperature, conductivity, oxidation reduction potential [ORP], and dissolved oxygen [DO]) were collected and recorded on groundwater sampling forms during purging. The completed groundwater sampling forms are provided in Appendix C and a complete list of samples collected is provided in Table 2-1. Static water levels were also measured and recorded for each monitoring well listed on Table 2-2 to create a current groundwater contour map (see Figure 2-2). A photograph of each groundwater sample collected is provided in Appendix D in accordance with USACE protocols.

2.1.2 Surface Water Sampling

Surface water samples were collected from SW01 through SW03, and analyzed by Katahdin Analytical Services. Surface water samples were analyzed for VOCs (EPA Method SW8260B), in accordance with the work plan (EEEPC 2010e). The samples were collected by filling a dedicated sample jar with water directly from Six Mile Creek, then transferring the creek water to pre-preserved approved sample containers, leaving no head space. Field parameters (i.e., turbidity, pH, temperature, conductivity, ORP, and DO) were collected and recorded during sampling. The completed surface water sampling forms are provided in Appendix C and a complete list of samples collected is provided in Table 2-1.

2.1.3 Groundwater Elevation Measurements

Groundwater elevations were collected in accordance with the work plan (EEEPC 2010e) by measuring the depth to water at 16 locations (see Table 2-2) using an electronic water level indicator to measure the static water levels from the top of the casing at each location. However, a groundwater elevation could not be collected from monitoring well MW-02 during the April 2014 long-term monitoring due to ice in the well. These measurements were used to create groundwater contour maps for each event (see Figure 2-2).

2.1.4 Well Inspections and Maintenance

During groundwater elevation measurements, inspections were performed at each permanent well location and recorded on the well status log. The well status log

provides a listing of all work completed and additional maintenance tasks that need to be performed (see Appendix E). Well maintenance activities were previously completed by Parsons on May 1 to 3, 2013 (EEEPC 2014). The additional well maintenance tasks that remain to be performed will be completed by Parsons during a future field event.

2.2 Equipment Decontamination

Equipment decontamination was performed in accordance with the work plan (EEEPC 2010e).

Groundwater and surface water field testing instruments were decontaminated by rinsing the water level indicator, flow-through cell and pH, temperature, conductivity, DO, and ORP probes with deionized water between each use.

2.3 Investigation Derived Waste

Investigation-derived water was handled in accordance with the work plan (EEEPC 2010e). Purge water generated during groundwater sampling was collected in 5-gallon buckets and field-screened with a PID to evaluate if it was contaminated. PID readings were taken directly from the surface of the collected purge water. No PID readings above zero parts per million were detected from the field screening of the purge water; therefore, water was discharged to the ground adjacent to the sampled well.

2.4 Quality Assurance/Quality Control

Quality assurance/quality control (QA/QC) samples were collected in accordance with the work plan (EEEPC 2010e). Analytical data have been validated for samples collected as part of this investigation. Raw data and the Data Usability Summary Report (DUSR) are presented in Appendices F and G, respectively.

Field QC samples included two groundwater duplicates and one trip blank during the April 2014 sampling event. Duplicate samples provide insight as to the homogeneity of the sample matrix and establish a degree of confidence that the sample represents site conditions. Field duplicates were collected at the rate of one duplicate per 10 original samples (10%); therefore, two duplicates were collected for the nine ground and three surface water samples collected. The field duplicate collected during April 2014 showed good precision.

A trip blank was collected to establish that the transport of sample containers to and from the field did not result in the contamination of the sample from external sources. No compounds were detected in the trip blank for the April 2014 sampling event.

A few sample results were qualified “J” as estimated because of minor calibration deviations, laboratory control sample recovery and matrix spike recoveries. Some results that are deemed to be estimated are reported to be above the site clean-up goals, therefore, no significant impact of data usability is deemed to have oc-

curred. Other results that are in the range of site clean-up goals could impact usability of the results to evaluate whether concentrations exceed site clean-up goals. The results should be usable with supporting data, trend analysis, and evaluation of laboratory error.

2.5 Work Plan Deviations

For the April 2014 sampling event, groundwater measurements were only collected from the 16 permanent monitoring wells on site. Measurements were not taken at temporary wells or piezometers as called for in the work plan, as many of them were removed during the remedial excavation. Approval for this change was received from the USACE prior to the start of the previous performance monitoring sampling rounds; therefore, a field adjustment form was not generated.

In addition, a groundwater elevation could not be collected from monitoring well MW-02 during the April 2014 long-term monitoring due to ice in the well.

There were no other deviations to the work plan during the April 2014 sampling event.

2.6 PermeOx Injection Pre-Design Sampling Summary

The PermeOx injection was chosen for two reasons: it creates an oxygen-rich environment, which allows for chlorobenzene reduction through aerobic microbe degradation; and it is more persistent, allowing it to treat the site over a one-year period. Pre-design sampling was completed in May 2013 for use in designing the injection mixture. Groundwater samples were collected from MW-14 and MW-19 and a soil sample was collected near MW-14. Results of this sampling are presented in Table 2-3.

Based on these results it was determined that PermeOx injected within the 100-parts per billion total VOC contour immediately downgradient of the source area would be the preferred treatment method.

Table 2-1 AOC 9 Long-Term Monitoring, Groundwater and Surface Water Sample Summary, Former Griffiss Air Force Base, Rome, New York

Monitoring Well			Analyses
Sample Number	Screen Interval (feet BGS)	Comment	TCL VOCs – SW8260B
April 2014 Long-Term Monitoring			
G009-MW01LTM040314	4.0-9.0	MS/MSD	X
G009-MW02LTM040214	4.0-9.0		X
AOC9-MW05LTM040214	4.0-14.0		X
AOC9-MW06LTM040214	4.2-14.2		X
AOC9-MW14LTM040214	14.0-24.0		X
AOC9-MW15LTM040314	9.0-14.0		X
AOC9-MW17LTM040314	9.0-14.0		X
AOC9-MW17/DLTM040314	9.0-14.0	Duplicate	X
AOC9-MW18LTM040214	9.0-19.0		X
AOC9-MW19LTM040214	9.0-19.0		X
AOC9-MW19/DLTM040214	9.0-19.0	Duplicate	X
AOC9-SW01LTM040114	-		X
AOC9-SW02LTM040214	-		X
AOC9-SW03LTM040214	-		X
AOC9-TB1-040114	-	Trip Blank	X

Key:

AOC = area of Concern
BGS = below ground surface
/D = duplicate
MS/MSD = matrix spike/matrix spike duplicate
TB = trip blank
TCL = target compound list
VOCs = volatile organic compounds

Table 2-2 AOC 9 Long-Term Monitoring Groundwater Elevation Data, Former Griffiss Air Force Base, Rome, New York

Monitoring Well ID	Date	Ground Surface Elevation (feet AMSL)	Water Level (feet bgs)	Water Level Elevation (feet AMSL)	Comments
April 2014 Long-Term Monitoring					
G009-MW01	4/1/2014	492.67	1.68	490.99	
G009-MW02	4/1/2014	494.54	4.33	490.21	
G009-MW03	4/1/2014	485.1	NM	NM	Water level measurement could not be collected due to ice in monitoring well.
G009-MW04	4/1/2014	483.97	8.42	475.55	
AOC9-MW05	4/1/2014	482.72	3.79	478.93	
AOC9-MW06	4/1/2014	482.57	5.49	477.08	
AOC9-MW07	4/1/2014	483.25	3.94	479.31	
AOC9-MW08	4/1/2014	514.28	9.59	504.69	
AOC9-MW12	4/1/2014	509.09	3.70	505.39	
AOC9-MW13	4/1/2014	508.53	5.35	503.18	
AOC9-MW14	4/1/2014	519.05	15.38	503.67	
AOC9-MW15	4/1/2014	500.04	2.58	497.46	
AOC9-MW16	4/1/2014	497.31	2.46	494.85	
AOC9-MW17	4/1/2014	487.51	3.18	484.33	
AOC9-MW18	4/1/2014	527.84	14.21	513.63	
AOC9-MW19	4/1/2014	523.38	9.26	514.12	

Key:

AMS = above mean sea level
AOC = Area of Concern
BGS = Below Ground Surface
MW = Monitoring Well
NA = not available
NM = Not Measured

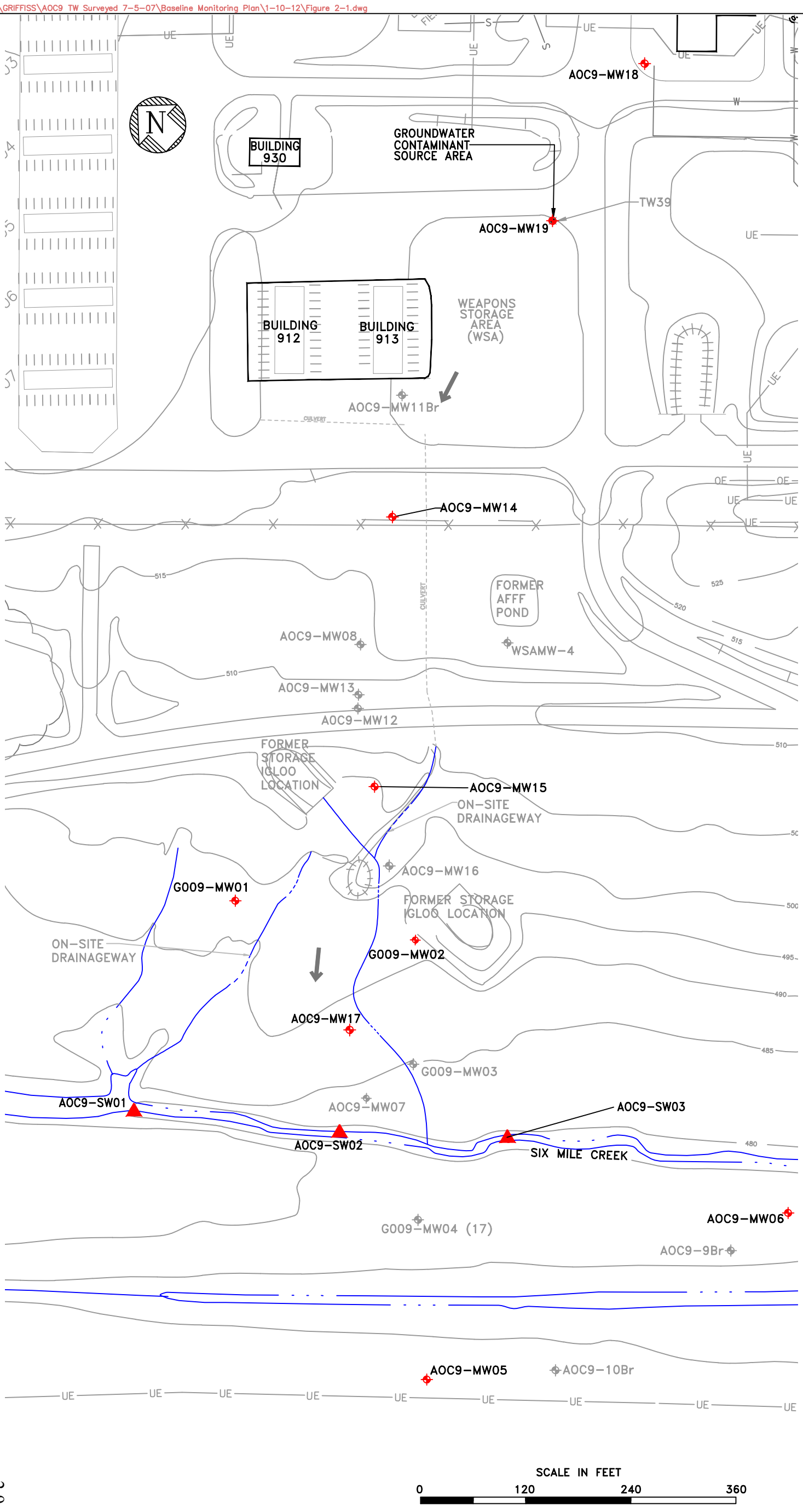
Table 2-3 PermeOx Injection Pre-Design Sampling Results

Parameter	Units	AOC9-MW14 05/02/13	AOC9-MW19 05/02/13	GAFB-AOC9-SS001 05/02/13
Alkalinity	mg/L	220	300	-
Chemical Oxygen Demand	mg/L	10 U	10 U	-
Dissolved Oxygen	mg/L	6.6	7.4	-
Ferrous Iron	mg/L	0.053 J	0.05 U	-
Hardness	mg/L	200	180	-
Oxidation-Reduction Potential (ORP)	mV	241	276	-
Total Biochemical Oxygen Demand	mg/L	20.71	0.81 J	-
Total Organic Carbon (TOC)	mg/L	2.6	3.2	-
pH (laboratory)	pH	7.7	7.4	-
TOC in Soil	µg/gdrywt	-	-	910
Total Solids	%	-	-	95

Key:

- = not applicable
% = percent
J = estimated value
mg/L = milligram per liter
mV = millivolt
U = non-detect
µg/gdrywt = microgram per gram dry weight

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\1-10-12\Figure 2-1.dwg



LEGEND

- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- AOC9-MW14 — LONG-TERM MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- GROUNDWATER FLOW DIRECTION
- SURFACE WATER SAMPLING LOCATIONS
- TW39 — TEMPORARY MONITORING WELL

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.

SCALE IN FEET

0 120 240 360

2-9

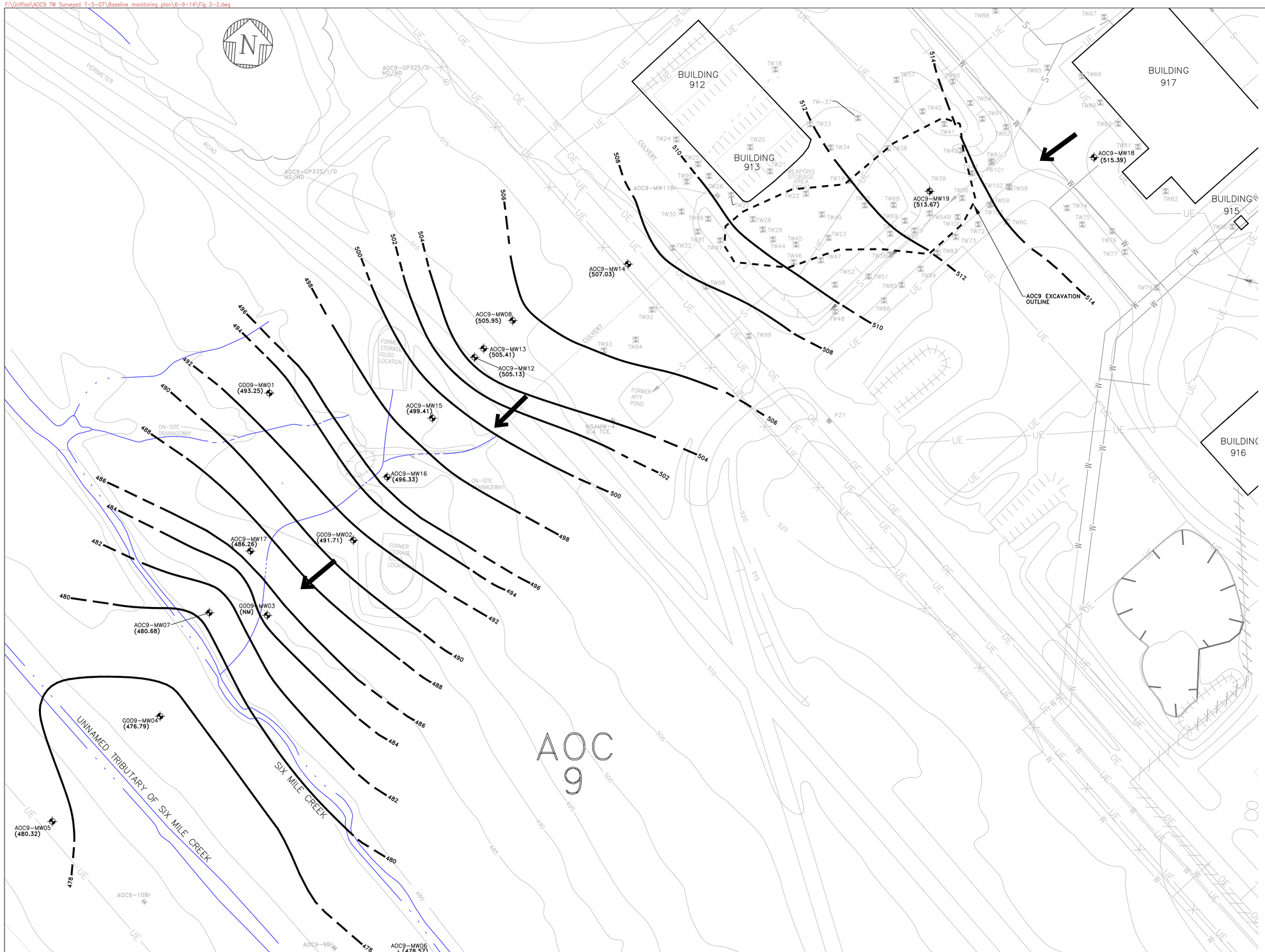
FORMER GRIFFISS AFB
AOC 9 SITE
ROME, NEW YORK

Prepared by:
ecology and environment engineering p.c.
In association with:
parsons

DRAWING TITLE:
AOC 9
LONG-TERM MONITORING
SAMPLE LOCATION MAP

FIGURE 2-1

F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline monitoring plan\6-9-14\Fig 2-2.dwg



LEGEND

- FENCE
- TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- UE — UNDERGROUND ELECTRIC
- W — WATER LINE
- S — SANITARY SEWER
- OE — OVERHEAD ELECTRIC
- ABANDONED UNDERGROUND ELECTRIC
- AMSL — ABOVE MEAN SEA LEVEL
- 476 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- DIRECTION OF GROUNDWATER FLOW
- G009-MW01 — PERMANENT MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
- TW44 — TEMPORARY MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- (517.35) — APRIL 8, 2013 GROUNDWATER ELEVATION (FEET AMSL)
- (NM) — NOT MEASURED

NOTE:
1. GROUNDWATER ELEVATIONS WERE COLLECTED ON 4/1/2014.
2. NO GROUNDWATER ELEVATION COLLECTED AT G009-MW03 DUE TO ICE IN WELL.

GRIFFISS AFB
AOC 9 SITE
ROME, NEW YORK

Prepared by: ecology and environment engineering p.c.

In Association with: parsons

DRAWING TITLE:
AOC 9: GROUNDWATER CONTOUR MAP
APRIL 1, 2014

FIGURE 2-2

3 AOC 9 Long-Term Monitoring Findings

This section presents the results from the April 2014 long-term monitoring conducted at AOC 9 at the former Griffiss AFB in Rome, New York, as described in Section 2.

The AOC 9 April 2014 long-term monitoring was intended to evaluate the long-term effectiveness of the remediation efforts on VOC concentrations in the groundwater and Six Mile Creek. The AOC 9 April 2014 long-term monitoring groundwater data are screened against the most stringent of either the NYSDEC Class GA groundwater criteria or the EPA MCLs. For groundwater COCs at AOC 9, the NYSDEC Class GA criteria are the more stringent of the screening criteria. Surface water data is screened against the NYSDEC Class C freshwater fish propagation standards and guidance values. Data collected during the AOC 9 April 2014 long-term monitoring have been provided by the laboratory in Environmental Restoration Program Information Management System (ERPIMS)-compatible format. The April 2014 long-term monitoring data were added to the Air Force database (ERPIMS) on August 6, 2014.

3.1 April 2014 Long-Term Monitoring

3.1.1 Groundwater Sampling Results

Eleven groundwater samples (includes two duplicate samples) were collected from nine monitoring wells and analyzed for VOCs (EPA Method SW8260B) by Katahdin Analytical Services. The purpose of the water sampling was to evaluate VOC concentrations within the contaminant plume following the remedial excavation activities. The water samples were collected between April 1 and 3, 2014.

Groundwater samples were collected from monitoring wells screened predominately in very fine to medium grained sand at depths ranging from 4 to 24 feet BGS and constructed with either a 5-foot or a 10-foot (2-inch diameter, 0.01-inch slot) PVC screen. Each sample was analyzed for VOCs (EPA Method SW8260B) as described in Section 2. A summary of the positive analytical results for April 2014 long-term groundwater samples is presented in Table 3-1. Historical groundwater sampling results are presented in Table 3-3. Figure 2-1 shows the locations of the monitoring wells.

The completed groundwater sampling forms are provided in Appendix C; the complete analytical data are included on compact disk (CD) in Appendix F; a

complete list of samples collected is provided in Table 2-1; and Figure 3-1 shows the locations of the monitoring wells with total VOC contaminant concentrations.

The primary COCs for AOC 9 include; chlorobenzene, 1,2-DCB, 1,4-DCB, and TCE, which constitute approximately 96% of the total VOCs detected on-site within the center line of the plume. Figure 3-1 illustrates the total VOC concentrations in groundwater based on the analytical data obtained during the April 2014 long-term monitoring event and the historical geoprobe data that was used to generate the non-detect contour lines.

Source Area Well (MW19)

Five VOCs were detected in the groundwater sample collected at MW19. However, only chlorobenzene (22 µg/L) exceeded NYSDEC Class GA groundwater standards.

Upgradient Well (MW18)

No contaminants were detected in the groundwater samples collected at MW18.

Center Line of Plume (Downgradient of Source Area) Wells (MW14, MW15, and MW17)

Twelve VOCs, including the four primary COCs, chlorobenzene, TCE, and 1,2-DCB, and 1,4-DCB were detected in the groundwater samples collected. Five of the contaminants exceeded the NYSDEC Class GA groundwater standards. Chlorobenzene, 1,2-DCB, and 1,4-DCB exceeded the screening criteria in all three monitoring wells. TCE (16 µg/L) only exceeded the screening criteria in MW17. Benzene (1.5 µg/L) only exceeded the screening criteria in MW15. The highest total VOC concentrations were detected in monitoring wells MW17 (230 µg/L) and MW15 (340 µg/L) during this April 2014 sampling event.

Sentinel (Downgradient) Wells (MW05 and MW06)

No contaminants were detected in the groundwater sample collected at MW05. TCE (0.77 µg/L), a primary COC, was the only contaminant detected at MW06, however it did not exceed the screening criteria.

Lateral Wells (MW01 and MW02)

Two primary contaminants of concern, 1,2-DCB (0.44 µg/L) and TCE (0.34 µg/L) were detected at MW01. No contaminants exceeded the screening criteria. No contaminants were detected in the groundwater sample collected at MW02.

Groundwater Elevation Measurements

Groundwater elevations were collected in accordance with the work plan by measuring the depth to water at 16 locations (see Table 2-2) using a water level indicator to measure the static water levels from the top of the casing at each location. These measurements were used to create a groundwater contour map (see Figure 2-2).

Based on these data, the groundwater on-site flows generally to the southwest from the vicinity of Building 917, through the AOC 9 contaminant source area, and ultimately towards Six Mile Creek. The depth to groundwater and direction of groundwater flow has remained consistent following the excavation and back-fill of the contaminant source area, while exhibiting typical seasonal variations.

3.1.2 Surface Water Sampling Results

Three surface water samples were collected from Six Mile Creek (SW01, SW02, SW03) and analyzed for VOCs (EPA Method SW8260B) by Katahdin Analytical Services. The purpose of the surface water samples collected was to establish April 2014 long-term monitoring VOC concentrations within Six Mile Creek following the remedial excavation activities. The surface water samples were collected on April 1, 2014.

Figure 2-1 shows the location of the surface water sampling locations and Figure 3-1 shows the total VOC contaminants in surface water based on analytical data obtained from this sampling event.

One VOC was detected in the surface water samples collected during this investigation (see Table 3-2). Acetone was detected in surface water samples SW01 (3.4J µg/L) and SW02 (2.6J µg/L). There is no screening criteria for acetone.

The completed surface water sampling forms are provided in Appendix C, the complete analytical data are included on CD in Appendix F, a complete list of samples collected is provided in Table 2-1, a summary of the positive analytical results for the surface water samples is presented in Table 3-2, and Figure 3-1 shows the locations of the surface water sample locations with acetone concentrations.

3.1.3 Trend Analysis

Available historic data collected from monitoring wells MW01, MW02, MW05, MW06, MW014, MW15, MW17, MW18, and MW19 and surface water sample locations SW01, SW02, and SW03 are provided in Tables 3-3 and 3-4, respectively. Data collected in 2003 during the groundwater treatability study, during which Fenton's reagent was injected into the groundwater in the vicinity of monitoring well MW08, have not been included in the historical data summary tables as the analytical results were impacted by the treatability study.

However, available data for each sample location, excluding MW05 as it is historically non-detect for all sampling events, have been plotted on trend graphs and are provided in Figures 3-5 through 3-12. Data from the earliest sampling event identified on Table 3-3 to the current sampling event is provided for all wells. MW19 was first sampled during the May 2011 performance monitoring event, although data from TW39 (temporary well previously at the same location and screened over the same depth below ground surface as the current permanent monitoring well) is provided on Table 3-3 under the 2006 sampling event. The

trend graphs show total VOC concentration for each sampling event and a discussion of the changes observed is described below.

Source Area Well (MW19)

Initial high contaminant concentrations detected at this location, prior to the remedial excavation, dropped significantly after excavation was completed and TVOCs have stabilized at less than 100 µg/L. MW19, installed following the remedial excavation, was first sampled during the first performance monitoring event. The total VOC concentration detected during that first performance sampling in May 2011 was 31 µg/L. The total VOC concentration in MW19 increased during both the second and third rounds of performance monitoring, 42 µg/L and 57 µg/L, respectively, before showing a slight decrease in total VOC concentration (43 µg/L) during the fourth round of performance monitoring in September 2012. During the first round of long-term monitoring, MW19 had an increase in total VOC concentrations (69 µg/L). During this second round of long-term monitoring, MW19 decreased in total VOC concentrations (36 µg/L) (see Figure 3-12).

Upgradient Well (MW18)

MW18, installed prior to the remedial excavation and baseline sampling, was first sampled during the baseline event. MW18 was not sampled as part of the performance monitoring program. The total VOC concentration detected during the baseline event in July 2010 was 3.2 µg/L. During the first round of long-term monitoring, MW18 decreased in total VOC concentrations to non-detect. During this second round of long-term monitoring, total VOC concentrations remained non-detect (see Figure 3-11).

Center Line of Plume (Downgradient of Source Area) Wells (MW14, MW15, and MW17)

Initial high contaminant concentrations in MW14 dropped significantly following the remedial excavation and continue to drop to a TVOC concentration of less than 50 µg/L, potentially due to the PermeOx injections performed in November 2013. MW14 continues to show a decrease in concentration in all four primary COCs since baseline sampling in July 2010. Since baseline sampling at MW14 in July 2010; chlorobenzene has decreased in concentration from 1,400 to 31 µg/L, 1,2-DCB has decreased from 130 to 4.8 µg/L, 1,4-DCB has decreased from 87 to 4.7 µg/L, and TCE has decreased from 28 to non-detect. The total VOC concentration in MW14 decreased from 2,100 µg/L during baseline sampling to 41 µg/L during this second long-term monitoring sampling event.

Three primary COCs (chlorobenzene, 1,2-DCB, and 1,4-DCB) exceeded the screening criteria during this April 2014 performance monitoring event. However, they have all decreased in concentration from the first long-term monitoring to the second long-term monitoring sampling event (chlorobenzene 250 µg/L to 31 µg/L; 1,2-DCB 26 µg/L to 4.8 µg/L; and 1,4-DCB 22 µg/L to 4.7µg/L) (see Figure 3-8).

MW15 has shown a decrease in concentration in three of the primary COCs since baseline sampling. Chlorobenzene has decreased in concentration from 1,300 to 270 µg/L, 1,4-DCB has decreased from 64 to 19 µg/L, and 1,2-DCB decreased from 55 to 40 µg/L. TCE also decreased in concentration since baseline sampling from 2.0 to 0.83 µg/L, but there was a slight increase from the first long-term monitoring event 0.78 µg/L to this second long-term monitoring event 0.83 µg/L. The total VOC concentrations at MW15 decreased from 1,700 to 340 µg/L (see Figure 3-9).

MW15 increased in concentration in all of the primary COCs from the fourth performance monitoring sampling event to the first long-term monitoring event. However, the concentrations of the primary COCs (and total VOC concentrations) have decreased from the first long-term monitoring event to this second long-term monitoring event.

MW15 has shown a decrease in concentration in three of the primary COCs, with all three exceeding the screening criteria since the first long-term monitoring event in April 2013. Chlorobenzene has decreased in concentration from 380 to 270 µg/L, 1,4-DCB has decreased from 24 to 19 µg/L, and 1,2-DCB has decreased from 73 to 40 µg/L. However, although remaining below the screening criteria, TCE has increased slightly from 0.78 to 0.83 µg/L. At the same time, total VOC concentrations at MW15 decreased from 490 to 340 µg/L (see Figure 3-9).

MW17 has shown a decrease in concentration in two of the primary COCs since baseline sampling in July 2010. Chlorobenzene has decreased in concentration from 760 to 150 µg/L and 1,4-DCB has decreased from 38 to 10 µg/L. TCE and 1,2-DCB have shown fluctuations in concentration since baseline sampling. Over the same time period, total VOC concentrations at MW17 decreased from 890 to 230 µg/L.

MW17 has shown a decrease in concentration in all four of the primary COCs, with all four exceeding the screening criteria since the first long-term monitoring event in April 2013. Chlorobenzene has decreased in concentration from 180 to 150 µg/L, 1,4-DCB has decreased from 12 to 10 µg/L, and 1,2-DCB has decreased from 60 to 49 µg/L. However, TCE has increased slightly from 15 to 16 µg/L. At the same time, total VOC concentrations at MW17 decreased from 270 to 230 µg/L. Historically, total VOC concentrations in MW17 have fluctuated, but an overall decrease can be observed since baseline sampling in July 2010 on Figure 3-10.

Sentinel (Downgradient) Wells (MW05 and MW06)

Total VOC concentrations have remained non-detect in MW05 for all sampling events.

Total VOC concentrations detected at MW06 were 1.0 µg/L during the baseline sampling. Total VOC concentrations have fluctuated within MW06 during the

performance monitoring sampling rounds, from a high of 6.9 µg/L detected during the second performance monitoring event to non-detect during the third performance monitoring event. Since the first long-term monitoring event, total VOC concentrations have decreased from 1.2 to 0.77 µg/L (see Figure 3-7).

Lateral Wells (MW01 and MW02)

MW01 and MW02 were sampled during the baseline sampling performed in July 2010, although they were not included in the performance monitoring sampling performed from May 2011 through September 2012. Sampling of MW01 and MW02 resumed in April 2013 as part of the long-term monitoring program.

MW01 has shown a decrease in total VOC concentration since baseline sampling, 1.4 to 0.78 µg/L, although MW01 was not sampled as part of performance monitoring sampling. Historically, an overall decrease in total VOC concentrations can be observed since the initial sampling at MW01 in 1997 (see Figure 3-5).

MW02 has shown a decrease in total VOC concentration since baseline sampling, 0.70 to non-detect, although it was not sampled as part of performance monitoring sampling. Historically, total VOC concentrations in MW02 have shown some slight fluctuations, but an overall decrease can be observed since sampling in 2004 (see Figure 3-6).

Surface Water (SW01, SW02, and SW03)

Total VOC concentrations detected during baseline sampling at surface water locations SW01, SW02, and SW03 were non-detect, 5.2 µg/L, and 3.6 µg/L, respectively. During the performance monitoring events surface water sample results showed fluctuations in total VOC concentrations (see Table 3-4). Since the first long-term monitoring event surface water sample results have increased from non-detect to 3.4 µg/L at SW01, non-detect to 2.6 µg/L at SW02, and 0.81 µg/L to non-detect at SW03. Acetone was the only VOC detected during this second long-term monitoring event in SW01 (3.4 µg/L) and SW02 (2.6 µg/L). There is no screening criteria for acetone. Historically, the only primary COC to exceed the screening criteria was chlorobenzene (9.0 µg/L), detected at SW02 during the second performance monitoring event.

Trend Analysis Summary

Overall, the April 2014 long-term monitoring analytical results indicate that the AOC 9 total VOC concentration is decreasing in comparison to the 2010 baseline sampling, performance monitoring results, and April 2013 long-term monitoring results. The plume appears the have also decreased in size compared to the first long-term monitoring event results, although there are some slight increases in concentrations during this second long-term monitoring event downgradient of the source area. The chlorobenzene plume overall, has decreased in size and concentration (see Figure 3-2). The TCE plume has remained relatively stable (see Figure 3-3). The total DCB plume has also decreased in overall total VOC concentration and size of the plume (see Figure 3-4). Based on the analytical results obtained from monitoring wells MW05 and MW06, the leading edge of the plume

has remained stable. The analytical results from monitoring wells, MW01 and MW02 show that the plume has not expanded laterally. The analytical results from MW18 indicate that there are no contamination sources located upgradient of the excavated former source area. The contaminant concentrations in MW19 may be attributed to residual contamination immediately upgradient of the excavation area reaching the vicinity of the well. Additional historical data are tabulated and trend graphs are provided in Section 3.3. A comparison of April 2014 long-term analytical results to the baseline, performance monitoring, 2014 long-term monitoring, and historical analytical results indicates that the AOC 9 groundwater plume has generally continued to show a decrease in total VOC concentration and size. The plume has decreased in size from 14.6 acres at baseline sampling to 9.7 acres during this sampling round. Figures 3-2 through 3-4 show the changes in plume size based on the concentrations of the primary COCs.

3.1.4 MAROS Evaluation

The historical and long-term sampling results collected at AOC 9 were analyzed for statistical trend analyses using the Air Force Civil Engineering Center (AFCEC's) Monitoring and Remediation Optimization System Software (MAROS) Version 2.2 program to assess trends in contaminant concentrations along the observed plume and evaluate the effectiveness of the remedy implemented at the site (see Appendix H). Currently, long-term monitoring at the site consists of sampling for VOCs at nine wells along the center line and edges of the plume. These wells include: MW01, MW02, MW05, MW06, MW14, MW15, MW17, MW18, and MW19. Additional well data was added to the program for MW01, MW02, and MW05 as necessitated by the program to fully perform plume computations; MAROS requires input of data for a minimum of six well locations with at least four sampling events to perform several of the analyses. These three additional well data sets will also provide historical reference of the plume concentrations and further delineate the plume in MAROS. Figures 3-5 through 3-12 are trend graphs for wells MW01, MW02, MW06, MW14, MW15, MW17, MW18, and MW19. A trend graph was not completed for MW05, as total VOC concentration has historically always been non-detect.

Model input required by MAROS included analytical results for each sampling event as observed at individual well locations, coordinates of each well, estimates of current plume geometry (e.g., length and width), aquifer characteristics (e.g., seepage velocity, porosity, and thickness) and the type of treatment implemented at the source location.

Several trend analyses were performed in the model for the primary COCs: 1,2-DCB, 1,4-DCB, chlorobenzene, and TCE. Output results from the MAROS evaluations are attached (see Appendix H), showing the Mann-Kendall Statistics, Linear Regression, Statistical Trend, Spatial Moment Analysis and Plume Analysis Summaries. Mann-Kendall will be the analysis used for evaluating the treatment effectiveness for AOC 9; this is the most common statistical approach in the MAROS program used for groundwater assessment applications as it is a nonparametric analysis that accounts for the assumptions made for the plume geometry

and aquifer characteristics and does not assume a statistical distribution (i.e., normal distribution) of the groundwater data. Most groundwater data is not distributed normally, due to the problem of left censoring (no values recorded below the detection limit) and the occasional very high concentration, orders of magnitude above the detection limit.

The statistical analysis performed using the Mann-Kendall model indicates that concentrations of chlorobenzene and 1,4-DCB are decreasing within the wells (MW14 and MW15) downgradient of the former source area. 1,2-DCB also shows a decreasing trend in MW14, while 1-4-DCB shows a decreasing trend in MW17 (see Appendix H). The model indicates 1,2-DCB remains stable in MW15, MW17, and MW19, while 1,4-DCB remains stable in MW19. Chlorobenzene is decreasing in MW17 and remains stable in MW06. The model indicates that PCE remains stable in MW17, while all other wells were non-detect. TCE is decreasing in MW01 and remains stable in MW15. TCE was either non-detect or no trend in the remaining wells. Overall, the Mann-Kendall model does indicate a downward trend within the contaminant plume immediately downgradient of the groundwater remediation area, and does not indicate any increasing trends for the primary COCs at any well. Additionally, this is supported by the spatial moment analysis. The zeroth moment or the total mass of the plume indicates that all contaminants are decreasing or stable. The first moment indicates that the center of the mass is moving downward, which suggests that clean water combined with the PermeOx injection is flushing COCs downgradient. Lastly, the second moment suggests that the plume is not spreading significantly in the x- or y-directions (see Appendix H). Long-term monitoring of the site, in accordance with the work plan, is necessary to fully examine the effectiveness of the AOC 9 remedial action and to further evaluate potential migration of contaminants.

3.1.5 April 2014 Summary

The April 2014 long-term sampling conducted at AOC 9 consists of groundwater and surface water sampling and analysis to evaluate the VOC concentrations in the groundwater plume and Six Mile Creek following the remedial excavation activities.

Eleven groundwater (including two duplicates) and three surface water samples were collected from the nine monitoring wells and Six Mile Creek, and analyzed for VOCs (EPA Method SW8260B) by Katahdin Analytical Services. Figure 2-1 shows the sampling locations and Figure 3-1 shows the total VOC contaminant concentrations in groundwater and surface water based on the analytical data obtained during this monitoring event.

A comparison of April 2014 long-term analytical results to the baseline and historical analytical results indicates that the AOC 9 VOC concentrations have generally continued to decrease (see Table 3-3). Based on the analytical results obtained from monitoring wells MW05 and MW06, the plume appears to have remained stable along the leading edge. Monitoring wells MW01 and MW02 indi-

cated that the plume has not expanded laterally. MW19 results indicate the plume has decreased in concentration within the vicinity of the source area for total DCBs, chlorobenzene, and TCE. The results obtained from MW14, MW15, and MW17 indicate that total VOC concentrations within the plume have continued to decrease in VOC concentrations further downgradient from the source area.

Surface water sample results obtained from sample location SW03 were non-detect for all VOCs. Both SW01 and SW02 had acetone concentrations during this long-term sampling. There is no screening level for acetone. However, all other primary COCs are non-detect within surface water samples during this April 2014 long-term monitoring event.

Overall, wells MW02, MW06, and MW14 have shown contaminant concentrations that have decreased since the baseline sampling. Wells MW05 and MW18 have remained non-detect since the baseline sampling. MW01, MW15, MW17, and MW19 have shown contaminant concentrations that have increased slightly since the first long-term sampling event, but remain significantly decreased from the baseline levels.

The next round of sampling, the third round of long-term monitoring, will take place in the spring of 2015, to monitor the long-term effectiveness of the remedial efforts. No changes to the approved long-term monitoring plan are proposed at this time.

3.1.6 PermeOx Pre-Design Sampling Summary

The PermeOx injection was chosen for two reasons: it creates an oxygen-rich environment, which allows for chlorobenzene reduction through aerobic microbe degradation; and it is more persistent, allowing it to treat the site over a one-year period. Pre-design sampling was completed in May 2013 for use in designing the injection mixture. Groundwater samples were collected from MW-14 and MW-19 and a soil sample was collected near MW-14. Results of this sampling are presented in Table 2-3.

3.2 PermeOx® Injection and Dissolved Oxygen Monitoring Summary

PermeOx® Injection Summary

Based on the results of the PermeOx injection pre-design sampling described in Section 2.6, it was determined that PermeOx injected within the 100 parts per billion total VOC contour immediately downgradient of the source area would be the preferred treatment method. A total of 9,981 pounds of PermeOx® Plus was mixed with 5,971 gallons of water and injected via 53 temporary injection points installed to a depth of approximately 15 to 25 feet within the treatment area between November 5 and November 18, 2013, to enhance aerobic bioremediation of the contaminated groundwater plume. The slurry was injected at each location using a grout pump located on a geoprobe rig. The complete details of the PermeOx injection are provided as a separate document, *Remedial Action Work*

Plan Addendum Area of Concern 9 Injection Former Griffiss Air Force Base Rome, New York (Parsons 2013). The injection targeted the area immediately downgradient of the former source area to ensure that the downward trend in groundwater contaminants continues. PermeOx® Plus is a time-release grade of calcium peroxide made by FMC Corporation that adds oxygen to the groundwater. Injections were performed in general accordance with the Remedial Action Work Plan Addendum (Parsons 2013).

Prior to installing the temporary injection points on July 30, 2013, Parsons prepared an Inventory of Injection Wells form on behalf of the United States Air Force Real Property Agency and submitted it to the EPA as a part of the Underground Injection Control. A copy of the submittal is presented as Appendix I.

The injections were performed in the south western portion of the remedial excavation area immediately downgradient of the former source area and located between MW-14 and MW-19 using a standard geoprobe rig. A figure depicting the injection areas from the Remedial Action Work Plan Addendum is presented in Appendix J. A summary of the PermeOx® injections and quantities is also provided as Appendix J.

Dissolved Oxygen Monitoring

Parsons conducted performance monitoring of the PermeOx® Plus injections in 2014 to measure DO levels in the groundwater. The evidence of DO (approximately 0.5 ppm or higher) is sufficient to demonstrate that the microbe oxygen demand has been met.

Five on-site groundwater monitoring wells are being monitored quarterly for DO content using a YSI ProODO Optical DO meter to evaluate the impact of the November 2013 injections. DO readings were taken at MW-19, which is in the excavation; MW-18, which upgradient of the excavation zone; and MW-08, MW-12, and MW-14, which are downgradient of the injection zone. The results obtained using the YSI meter were correlated with the results obtained using a flow-through sampling cell and membrane electrode. The current procedure for the direct reading DO includes purging the monitoring well until a stable reading is obtained. The DO level in MW-14 (immediately downgradient of the PermeOx injection zone) increased from 0.1 mg/L in October 2013 (pre-injection) to 3.3 mg/L in April 2014 indicating that oxygen is being released into the groundwater. DO readings before and after injections are presented as Appendix J.

Table 3-1 AOC 9 April 2014 Long-Term Monitoring, Summary of Positive Results for Groundwater Samples
Former Griffiss Air Force Base; Rome, NY

Analyte	Sample ID: Date: Screening Criteria [1]	G009-MW01LTM040314 04/03/14	G009-MW02LTM040214 04/02/14	AOC9-MW05LTM040214 04/02/14	AOC9-MW06LTM040214 04/02/14
VOCs by Method SW8260B (µg/L)					
1,2-DICHLOROBENZENE	3	**0.44 J**	U	U	U
1,3-DICHLOROBENZENE	3	U	U	U	U
1,4-DICHLOROBENZENE	3	U	U	U	U
BENZENE	1	U	U	U	U
CHLOROBENZENE	5	U	U	U	U
CIS-1,2-DICHLOROETHYLENE	5	U	U	U	U
ISOPROPYLBENZENE	5	U	U	U	U
SEC-BUTYLBENZENE	5	U	U	U	U
T-BUTYLBENZENE	5	U	U	U	U
TETRACHLOROETHYLENE	5	U	U	U	U
TRICHLOROETHYLENE	5	**0.34 J**	U	U	**0.77 J**
VINYL CHLORIDE	2	U	U	U	U
TOTAL VOCs	NA	**0.78 J**	**ND**	**ND**	**0.77 J**

Key:

J = Estimated value

U = Not detected

UJ = Not detected/estimated detection limit

µg/L = Micrograms per liter

VOCs = Volatile organic compounds

* Designates field duplicate sample

Notes:

1. New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

2. Shaded cells exceed the screening value.

3. Bold values denote positive hits.

Table 3-1 AOC 9 April 2014 Long-Term Monitoring, Summary of Positive Results for Groundwater Samples
Former Griffiss Air Force Base; Rome, NY

Analyte	Sample ID: Date: Screening Criteria [1]	AOC9-MW14LTM040214 04/02/14	AOC9-MW15LTM040314 04/03/14	AOC9-MW17LTM040314 04/03/14	AOC9-MW17/DLTM040314* 04/03/14
VOCs by Method SW8260B (µg/L)					
1,2-DICHLOROBENZENE	3	**4.8**	**40**	**49**	**48**
1,3-DICHLOROBENZENE	3	**0.34 J**	**1.6**	**0.79 J**	**0.88 J**
1,4-DICHLOROBENZENE	3	**4.7**	**19**	**10**	**10**
BENZENE	1	U	**1.5**	**0.77 J**	**0.75 J**
CHLOROBENZENE	5	**31**	**270**	**150**	**150**
CIS-1,2-DICHLOROETHYLENE	5	**0.23 J**	**0.75 J**	**2.7**	**2.7**
ISOPROPYLBENZENE	5	U	**1.6**	U	U
SEC-BUTYLBENZENE	5	U	**1.3**	U	U
T-BUTYLBENZENE	5	U	**0.39 J**	U	U
TETRACHLOROETHYLENE	5	U	U	**1.8**	**1.5**
TRICHLOROETHYLENE	5	U	**0.83 J**	**16**	**15**
VINYL CHLORIDE	2	U	**0.74 J**	**1.0 J**	**1.1 J**
TOTAL VOCs	NA	**41 J**	**340 J**	**230 J**	**230 J**

Key:

J = Estimated value

U = Not detected

UJ = Not detected/estimated detection limit

µg/L = Micrograms per liter

VOCs = Volatile organic compounds

* Designates field duplicate sample

Notes:

1. New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

2. Shaded cells exceed the screening value.

3. Bold values denote positive hits.

Table 3-1 AOC 9 April 2014 Long-Term Monitoring, Summary of Positive Results for Groundwater Samples
Former Griffiss Air Force Base; Rome, NY

Analyte	Sample ID: Date: Screening Criteria (1)	AOC9-MW18LTM040214 04/02/14	AOC9-MW19LTM040214 04/02/14	AOC9-MW19/DLTM040214* 04/02/14
VOCs by Method SW8260B (µg/L)				
1,2-DICHLOROBENZENE	3	U	**1.0**	**1.3**
1,3-DICHLOROBENZENE	3	U	U	U
1,4-DICHLOROBENZENE	3	U	**1.5**	**1.7**
BENZENE	1	U	**0.50 J**	**0.65 J**
CHLOROBENZENE	5	U	**22**	**29**
CIS-1,2-DICHLOROETHYLENE	5	U	**1.7**	**2.1**
ISOPROPYLBENZENE	5	U	U	U
SEC-BUTYLBENZENE	5	U	U	U
T-BUTYLBENZENE	5	U	U	U
TETRACHLOROETHYLENE	5	U	U	U
TRICHLOROETHYLENE	5	U	U	**0.29 J**
VINYL CHLORIDE	2	U	**0.64 J**	**0.80 J**
TOTAL VOCs	NA	**ND**	**27 J**	**36 J**

Key:

J = Estimated value

U = Not detected

UJ = Not detected/estimated detection limit

µg/L = Micrograms per liter

VOCs = Volatile organic compounds

* Designates field duplicate sample

Notes:

1. New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.

2. Shaded cells exceed the screening value.

3. Bold values denote positive hits.

Table 3-2 AOC 9 April 2014 Long-Term Monitoring; Summary of Positive Results for Surface Water Samples
Former Griffiss Air Force Base; Rome, NY

Analyte	Sample ID: Date: Screening Criteria [1]	AOC9-SW01LTM040114 04/01/14	AOC9-SW02LTM040214 04/01/14	AOC9-SW03LTM040214 04/01/14
VOCs by Method SW8260B (µg/L)				
ACETONE	50	**3.4 J**	**2.6 J**	U
TOTAL VOCs	NA	**3.4 J**	**2.6 J**	**ND**

Key:

J = Estimated value

U = Not detected

µg/L = Micrograms per liter

VOCs = Volatile organic compounds

Notes:

1. New York State Department of Environmental Conservation, Technical and Operational Guidance Series Memorandum #1.1.1: *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*, 1998 (with updates), Class GA Groundwater Standards and Guidance Values.
2. Shaded cells exceed the screening value.
3. Bold values denote positive hits.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
G009-MW01	5	1,1-Dichloroethene	U	U	U	-	U	-	-	-	-	UJ	UJ
	3	1,2-Dichlorobenzene	U	**0.36**	**0.6**	-	**0.80 J**	-	-	-	-	**.42 J**	**0.44 J**
	0.6	1,2-Dichloroethane	U	U	U	-	U	-	-	-	-	U	U
	5	1,2,4-Trimethylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	5	1,3,5-Trimethylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	3	1,3-Dichlorobenzene	NA	U	U	-	U	-	-	-	-	U	U
	3	1,4-Dichlorobenzene	U	U	U	-	U	-	-	-	-	U	U
	5	4-Chlorotoluene	NA	U	U	-	NA	-	-	-	-	U	U
	1	Benzene	U	U	U	-	U	-	-	-	-	U	U
	5	Chlorobenzene	U	U	U	-	U	-	-	-	-	U	U
	5	cis-1,2-Dichloroethylene	U	U	**0.123**	-	U	-	-	-	-	UJ	U
	NA	Cyclohexane	NA	NA	NA	-	U	-	-	-	-	U	U
	5	Ethylbenzene	U	U	U	-	U	-	-	-	-	U	U
	5	Isopropylbenzene (Cumene)	NA	U	U	-	U	-	-	-	-	U	U
	NA	Methylcyclohexane	NA	NA	NA	-	U	-	-	-	-	U	U
	5	Methylene Chloride	U	U	U	-	U	-	-	-	-	U	U
	NA	m-p-Xylene	NA	U	U	-	U	-	-	-	-	U	U
	10	Naphthalene	NA	U	U	-	U	-	-	-	-	U	UJ
	5	n-Butylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	5	n-Propylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	NA	U	U	-	U	-	-	-	-	U	U
	5	p-Isopropyltoluene	NA	NA	NA	-	U	-	-	-	-	U	U
	5	sec-Butylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	5	Styrene	U	U	U	-	U	-	-	-	-	U	U
	5	t-Butylbenzene	NA	U	U	-	U	-	-	-	-	U	U
	5	Tetrachloroethylene (PCE)	U	U	U	-	U	-	-	-	-	U	U
	5	Toluene	U	U	U	-	U	-	-	-	-	U	U
	5	Trans-1,2-Dichloroethene	NA	U	U	-	U	-	-	-	-	U	U
	5	Trichloroethylene (TCE)	U	**0.87**	**0.88**	-	**0.60 J**	-	-	-	-	**0.46 J**	**0.34 J**
	2	Vinyl Chloride	U	U	U	-	U	-	-	-	-	U	U
	NA	Total VOCs	0	**1.2**	**1.6**	-	**1.4**	-	-	-	-	**0.88**	**0.78**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L) 12/18/97 to 12/19/97 Ref 1	5/8/00 to 5/25/00 Ref 2	9/7/04 to 9/9/04 Ref 3	10/23/06 to 11/13/06 Ref 4	7/27/10 to 7/29/10 E & E 2010 AOC 9 Baseline Sampling	5/17/11 to 5/18/11 E & E 2011 AOC 9 Performance Sampling Event 1	10/24/11 to 10/25/11 E & E 2011 AOC 9 Performance Sampling Event 2	4/16/12 to 4/17/12 E & E 2012 AOC 9 Performance Sampling Event 3	9/25/12 to 9/26/12 E & E 2012 AOC 9 Performance Sampling Event 4	4/8/13 to 4/10/13 E & E 2013 AOC 9 Long-Term Sampling Event 1	4/1/14 to 4/3/14 E & E 2014 AOC 9 Long-Term Sampling Event 2
G009-MW02	5	1,1-Dichloroethene	U	U	U	U	U	-	-	-	-	UJ	U
	3	1,2-Dichlorobenzene	U	U	U	U	U	-	-	-	-	U	U
	0.6	1,2-Dichloroethane	U	U	U	U	U	-	-	-	-	U	U
	5	1,2,4-Trimethylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	5	1,3,5-Trimethylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	3	1,3-Dichlorobenzene	NA	U	U	U	U	-	-	-	-	U	U
	3	1,4-Dichlorobenzene	U	U	U	U	U	-	-	-	-	U	U
	5	4-Chlorotoluene	NA	U	U	U	NA	-	-	-	-	U	U
	1	Benzene	U	U	U	U	U	-	-	-	-	U	U
	5	Chlorobenzene	U	U	U	U	U	-	-	-	-	U	U
	5	cis-1,2-Dichloroethylene	U	U	U	U	U	-	-	-	-	UJ	U
	NA	Cyclohexane	NA	NA	NA	NA	U	-	-	-	-	U	U
	5	Ethylbenzene	U	U	U	U	U	-	-	-	-	U	U
	5	Isopropylbenzene (Cumene)	NA	U	U	U	U	-	-	-	-	U	U
	NA	Methylcyclohexane	NA	NA	NA	NA	U	-	-	-	-	U	U
	5	Methylene Chloride	U	U	U	U	U	-	-	-	-	U	U
	NA	m-p-Xylene	NA	U	U	U	U	-	-	-	-	U	U
	10	Naphthalene	NA	U	U	U	U	-	-	-	-	U	UJ
	5	n-Butylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	5	n-Propylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	NA	U	U	U	U	-	-	-	-	U	U
	5	p-Isopropyltoluene	NA	NA	NA	U	U	-	-	-	-	U	U
	5	sec-Butylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	5	Styrene	U	U	U	U	U	-	-	-	-	U	U
	5	t-Butylbenzene	NA	U	U	U	U	-	-	-	-	U	U
	5	Tetrachloroethylene (PCE)	U	U	U	U	U	-	-	-	-	U	U
	5	Toluene	U	U	U	U	U	-	-	-	-	U	U
	5	Trans-1,2-Dichloroethene	NA	U	U	U	U	-	-	-	-	U	U
	5	Trichloroethylene (TCE)	U	**0.89**	**1.8**	**0.61 J**	**0.70 J**	-	-	-	-	**0.36 J**	U
	2	Vinyl Chloride	U	U	U	U	U	-	-	-	-	U	U
	NA	Total VOCs	0	**0.89**	**1.8**	**0.61**	**0.70**	-	-	-	-	**0.36**	0

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW05	5	1,1-Dichloroethene	-	U	U	U	U	-	-	-	-	UJ	U
	3	1,2-Dichlorobenzene	-	U	U	U	U	-	-	-	-	U	U
	0.6	1,2-Dichloroethane	-	U	U	U	U	-	-	-	-	U	U
	5	1,2,4-Trimethylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	1,3,5-Trimethylbenzene	-	U	U	U	U	-	-	-	-	U	U
	3	1,3-Dichlorobenzene	-	U	U	U	U	-	-	-	-	U	U
	3	1,4-Dichlorobenzene	-	U	U	U	U	-	-	-	-	U	U
	5	4-Chlorotoluene	-	U	U	U	NA	-	-	-	-	U	U
	1	Benzene	-	U	U	U	U	-	-	-	-	U	U
	5	Chlorobenzene	-	U	U	U	U	-	-	-	-	U	U
	5	cis-1,2-Dichloroethylene	-	U	U	U	U	-	-	-	-	UJ	U
	NA	Cyclohexane	-	NA	NA	NA	U	-	-	-	-	U	U
	5	Ethylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	Isopropylbenzene (Cumene)	-	U	U	U	U	-	-	-	-	U	U
	NA	Methylcyclohexane	-	NA	NA	NA	U	-	-	-	-	U	U
	5	Methylene Chloride	-	U	U	U	U	-	-	-	-	U	U
	NA	m-p-Xylene	-	U	U	U	U	-	-	-	-	U	U
	10	Naphthalene	-	U	U	U	U	-	-	-	-	U	UJ
	5	n-Butylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	n-Propylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	U	U	U	U	-	-	-	-	U	U
	5	p-Isopropyltoluene	-	NA	NA	U	U	-	-	-	-	U	U
	5	sec-Butylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	Styrene	-	U	U	U	U	-	-	-	-	U	U
	5	t-Butylbenzene	-	U	U	U	U	-	-	-	-	U	U
	5	Tetrachloroethylene (PCE)	-	U	U	U	U	-	-	-	-	U	U
	5	Toluene	-	U	U	U	U	-	-	-	-	U	U
	5	Trans-1,2-Dichloroethene	-	U	U	U	U	-	-	-	-	U	U
	5	Trichloroethylene (TCE)	-	U	U	U	U	-	-	-	-	U	U
	2	Vinyl Chloride	-	U	U	U	U	-	-	-	-	U	U
	NA	Total VOCs	-	0	0	0	0	-	-	-	-	0	0

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW06	5	1,1-Dichloroethene	-	U	U	-	U	U	U	U	U	UJ	U
	3	1,2-Dichlorobenzene	-	U	U	-	U	U	U	U	U	U	U
	0.6	1,2-Dichloroethane	-	U	U	-	U	U	U	U	U	U	U
	5	1,2,4-Trimethylbenzene		U	U	-	U	U	U	U	U	U	U
	5	1,3,5-Trimethylbenzene	-	U	U	-	U	U	U	U	U	U	U
	3	1,3-Dichlorobenzene	-	U	U	-	U	U	U	U	U	U	U
	3	1,4-Dichlorobenzene	-	U	U	-	U	U	U	U	U	U	U
	5	4-Chlorotoluene	-	U	U	-	NA	U	U	U	U	U	U
	1	Benzene	-	U	U	-	U	U	U	U	U	U	U
	5	Chlorobenzene	-	U	U	-	U	UJ	**0.90 J**	U	U	U	U
	5	cis-1,2-Dichloroethylene	-	U	U	-	U	U	U	U	U	UJ	U
	NA	Cyclohexane	-	NA	NA	-	U	U	U	U	U	U	U
	5	Ethylbenzene	-	U	U	-	U	U	U	U	U	U	U
	5	Isopropylbenzene (Cumene)	-	U	U	-	U	U	U	U	U	U	U
	NA	Methylcyclohexane	-	NA	NA	-	U	U	U	U	U	U	U
	5	Methylene Chloride	-	U	U	-	U	U	U	U	U	U	U
	NA	m-p-Xylene	-	U	U	-	U	U	U	U	U	U	U
	10	Naphthalene	-	U	U	-	U	U	**3.0**	U	U	U	UJ
	5	n-Butylbenzene	-	U	U	-	U	U	U	U	U	U	U
	5	n-Propylbenzene	-	U	U	-	U	U	**2.0**	U	U	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	U	U	-	U	U	U	U	U	U	U
	5	p-Isopropyltoluene	-	NA	NA	-	U	U	U	U	U	U	U
	5	sec-Butylbenzene	-	U	U	-	U	U	U	U	U	U	U
	5	Styrene	-	U	U	-	U	U	U	U	U	U	U
	5	t-Butylbenzene	-	U	U	-	U	U	U	U	U	U	U
	5	Tetrachloroethylene (PCE)	-	U	U	-	U	U	U	U	U	U	U
	5	Toluene	-	U	U	-	U	U	U	U	U	U	U
	5	Trans-1,2-Dichloroethene	-	U	U	-	U	U	U	U	U	U	U
	5	Trichloroethylene (TCE)	-	**0.85**	**1.8**	-	**1.0**	**1.0**	**1.0**	U	**1.4**	**1.2**	**0.77 J**
	2	Vinyl Chloride	-	U	U	-	U	U	U	U	U	U	U
	NA	Total VOCs	-	**0.85**	**1.8**	-	**1.0**	**1.0**	**6.9**	0	**1.4**	**1.2**	**0.77**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L) 12/18/97 to 12/19/97 Ref 1	5/8/00 to 5/25/00 Ref 2	9/7/04 to 9/9/04 Ref 3	10/23/06 to 11/13/06 Ref 4	7/27/10 to 7/29/10 E & E 2010 AOC 9 Baseline Sampling	5/17/11 to 5/18/11 E & E 2011 AOC 9 Performance Sampling Event 1	10/24/11 to 10/25/11 E & E 2011 AOC 9 Performance Sampling Event 2	4/16/12 to 4/17/12 E & E 2012 AOC 9 Performance Sampling Event 3	9/25/12 to 9/26/12 E & E 2012 AOC 9 Performance Sampling Event 4	4/8/13 to 4/10/13 E & E 2013 AOC 9 Long-Term Sampling Event 1	4/1/14 to 4/3/14 E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW14	5	1,1-Dichloroethene	-	-	-	U	**0.70 J**	U	U	U	U	UJ	U
	3	1,2-Dichlorobenzene	-	-	-	**170**	**130**	**76**	**40**	**22 J**	**24**	**26**	**4.8**
	0.6	1,2-Dichloroethane	-	-	-	U	U	U	U	U	U	U	U
	5	1,2,4-Trimethylbenzene	-	-	-	**220**	**180**	**15**	**1.0**	U	U	**4.0**	U
	5	1,3,5-Trimethylbenzene	-	-	-	**79**	**64**	U	U	U	U	U	U
	3	1,3-Dichlorobenzene	-	-	-	**7.6**	**6.0**	**4.0**	**2.0**	**1.1**	**1.3**	**1.5**	**0.34 J**
	3	1,4-Dichlorobenzene	-	-	-	**110**	**87**	**53**	**34**	**20**	**21**	**22**	**4.7**
	5	4-Chlorotoluene	-	-	-	**0.33 J**	NA	U	U	U	U	U	U
	1	Benzene	-	-	-	**3.5**	**19**	**1.0**	**1.0**	**0.43 J**	**0.94 J**	**0.99 J**	U
	5	Chlorobenzene	-	-	-	**1700**	**1400**	**950 J**	**350**	**200**	**190**	**250 J**	**31**
	5	cis-1,2-Dichloroethylene	-	-	-	**2.7**	**23**	**2.0**	**2.0**	**1.6**	**2.4**	**1.4 J**	**0.23 J**
	NA	Cyclohexane	-	-	-	NA	**22**	**12**	**1.0**	U	**0.55 J**	**2.4**	U
	5	Ethylbenzene	-	-	-	**21**	**10**	**7.0**	**1.0**	**0.28 J**	**0.37 J**	**1.5**	U
	5	Isopropylbenzene (Cumene)	-	-	-	**17**	**14**	**11**	**3.0**	**0.58 J**	**0.93 J**	**3.3**	U
	NA	Methylcyclohexane	-	-	-	NA	**46 J**	**17**	**2.0**	**0.55 J**	**1.3**	**4.5**	U
	5	Methylene Chloride	-	-	-	U	NA	U	U	U	U	U	U
	NA	m-p-Xylene	-	-	-	**68**	**50**	**11**	**0.70 J**	U	U	U	U
	10	Naphthalene	-	-	-	**51**	**27**	**4.0**	U	U	U	U	UJ
	5	n-Butylbenzene	-	-	-	**4.3**	**4.0**	**2.0**	**2.0 J**	**0.33 J**	**0.46 J**	**1.4**	U
	5	n-Propylbenzene	-	-	-	**15**	**14**	**8.0**	**3.0**	**0.70 J**	**1.0**	**2.6**	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	-	-	**5.9**	**5.0**	**0.30 J**	U	U	U	**0.27 J**	U
	5	p-Isopropyltoluene	-	-	-	**5.5**	**5.0**	U	U	U	U	U	U
	5	sec-Butylbenzene	-	-	-	**8.3**	**7.0**	**4.0**	**3.0**	**0.75 J**	**1.0**	**1.9**	U
	5	Styrene	-	-	-	U	U	U	U	U	U	U	U
	5	t-Butylbenzene	-	-	-	**3.2**	**2.0**	**2.0**	**1.0**	U	**0.32 J**	**0.73 J**	U
	5	Tetrachloroethylene (PCE)	-	-	-	U	UJ	U	U	U	U	U	U
	5	Toluene	-	-	-	**0.75 J**	**3.0**	U	U	U	U	U	U
	5	Trans-1,2-Dichloroethene	-	-	-	U	**2.0**	U	U	U	U	UJ	U
	5	Trichloroethylene (TCE)	-	-	-	**4.8**	**28**	**2.0**	**2.0**	U	**1.2**	**1.0**	U
	2	Vinyl Chloride	-	-	-	**1.6**	**17**	**1.0 J**	**1.0 J**	U	**0.83 J**	U	U
	NA	Total VOCs	-	-	-	**2500**	**2100**	**1200**	**450**	**250**	**250**	**330**	**41**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW15	5	1,1-Dichloroethene	-	-	-	U	**0.40 J**	U	U	U	U	UJ	U
	3	1,2-Dichlorobenzene	-	-	-	**60 J**	**55**	**74**	**26**	**19**	**31**	**73**	**40**
	0.6	1,2-Dichloroethane	-	-	-	U	U	U	U	U	U	U	U
	5	1,2,4-Trimethylbenzene	-	-	-	**8.0 J**	**35**	**0.90 J**	U	U	U	U	U
	5	1,3,5-Trimethylbenzene	-	-	-	**10 J**	**18**	U	U	U	U	U	U
	3	1,3-Dichlorobenzene	-	-	-	**8.0 J**	**6.0**	**5.0**	**2.0**	**1.3**	**1.8**	**2.4**	**1.6**
	3	1,4-Dichlorobenzene	-	-	-	**110**	**64**	**58**	**28**	**17**	**19**	**24**	**19**
	5	4-Chlorotoluene	-	-	-	U	NA	U	U	U	U	U	U
	1	Benzene	-	-	-	**12 J**	**26**	**1.0**	**2.0**	**1.4**	**2.8**	**0.94 J**	**1.5**
	5	Chlorobenzene	-	-	-	**1900**	**1300**	**990 J**	**390**	**320**	**290**	**380 J**	**270**
	5	cis-1,2-Dichloroethylene	-	-	-	U	**10**	**2.0**	**0.40 J**	**0.80**	**0.65 J**	**0.63 J**	**0.75 J**
	NA	Cyclohexane	-	-	-	NA	**50**	**2.0**	**0.60 J**	U	**0.67 J**	U	U
	5	Ethylbenzene	-	-	-	U	**12**	**3.0**	**0.70 J**	U	UJ	U	U
	5	Isopropylbenzene (Cumene)	-	-	-	**12 J**	**22**	**7.0**	**2.0**	**1.4**	**2.0 J**	**2.0**	**1.6**
	NA	Methylcyclohexane	-	-	-	NA	**40 J**	**6.0**	**0.60 J**	U	U	U	U
	5	Methylene Chloride	-	-	-	**87**	U	U	U	U	U	U	U
	NA	m-p-Xylene	-	-	-	U	**11**	**0.70 J**	U	U	U	U	U
	10	Naphthalene	-	-	-	U	U	**0.40 J**	U	U	U	U	UJ
	5	n-Butylbenzene	-	-	-	U	**3.0**	**2.0**	**0.50 J**	U	**0.23 J**	**1.2**	U
	5	n-Propylbenzene	-	-	-	U	**8.0**	**5.0**	U	U	U	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	-	-	U	**2.0**	U	U	U	U	U	U
	5	p-isopropyltoluene	-	-	-	U	**0.70 J**	U	U	U	U	U	U
	5	sec-Butylbenzene	-	-	-	U	**7.0**	**6.0**	**2.0**	**1.1**	**1.5**	**2.1**	**1.3**
	5	Styrene	-	-	-	U	**2.0**	U	U	U	U	U	U
	5	t-Butylbenzene	-	-	-	U	**3.0**	**1.0**	**1.0**	**0.42 J**	**0.53 J**	**0.58 J**	**0.39 J**
	5	Tetrachloroethylene (PCE)	-	-	-	U	UJ	U	U	U	U	U	U
	5	Toluene	-	-	-	U	**2.0**	**0.30 J**	U	U	U	U	U
	5	Trans-1,2-Dichloroethene	-	-	-	U	**0.30 J**	U	U	U	U	U	U
	5	Trichloroethylene (TCE)	-	-	-	U	**2.0**	**2.0**	**0.40 J**	U	**0.34 J**	**0.78 J**	**0.83 J**
	2	Vinyl Chloride	-	-	-	U	**14**	**0.50 J**	**0.70 J**	**1.6 J**	**2.5**	U	**0.74 J**
	NA	Total VOCs	-	-	-	**2200**	**1700**	**1100**	**460**	**360**	**350**	**490**	**340**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW17	5	1,1-Dichloroethene	-	-	-	U	U	U	U	U	U	UJ	U
	3	1,2-Dichlorobenzene	-	-	-	**66**	**50**	**44**	**69**	**67**	**91**	**60**	**49**
	0.6	1,2-Dichloroethane	-	-	-	**0.68**	**0.40 J**	U	**0.40 J**	U	U	U	U
	5	1,2,4-Trimethylbenzene	-	-	-	U	U	U	U	U	U	U	U
	5	1,3,5-Trimethylbenzene	-	-	-	U	U	U	U	U	U	U	U
	3	1,3-Dichlorobenzene	-	-	-	**1.5**	**3.0**	**2.0**	**2.0**	**0.91 J**	**1.7**	**1.1**	**0.79 J**
	3	1,4-Dichlorobenzene	-	-	-	**17**	**38**	**24**	**26**	**15**	**22**	**12**	**10**
	5	4-Chlorotoluene	-	-	-	U	NA	U	U	U	U	U	U
	1	Benzene	-	-	-	**2.6**	**4.0**	**5.0**	**6.0 J**	**1.6**	**1.6**	**0.94 J**	**0.77 J**
	5	Chlorobenzene	-	-	-	**250**	**760**	**450 J**	**540**	**270**	**300**	**180**	**150**
	5	cis-1,2-Dichloroethylene	-	-	-	**12**	**5.0**	**5.0**	**4.0**	**3.9**	**5.2**	**3.0 J**	**2.7**
	NA	Cyclohexane	-	-	-	NA	**2.0**	**3.0**	**0.70 J**	U	U	U	U
	5	Ethylbenzene	-	-	-	U	**0.80 J**	**0.40 J**	**1.0 J**	U	U	U	U
	5	Isopropylbenzene (Cumene)	-	-	-	**0.25 J**	**2.0**	**2.0 J**	**2.0 J**	U	U	U	U
	NA	Methylcyclohexane	-	-	-	NA	**0.60 J**	**1.0**	U	U	U	U	U
	5	Methylene Chloride	-	-	-	U	U	U	U	U	U	U	U
	NA	m-p-Xylene	-	-	-	U	U	U	U	U	U	U	U
	10	Naphthalene	-	-	-	U	U	U	**3.0**	U	U	U	UJ
	5	n-Butylbenzene	-	-	-	U	U	U	U	U	U	U	U
	5	n-Propylbenzene	-	-	-	U	U	U	**2.0**	U	U	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	-	-	U	U	U	U	U	U	U	U
	5	p-Isopropyltoluene	-	-	-	U	U	U	U	U	U	U	U
	5	sec-Butylbenzene	-	-	-	**0.33 J**	**1.0 J**	**0.80 J**	**0.60 J**	U	U	U	U
	5	Styrene	-	-	-	U	U	U	U	U	U	U	U
	5	t-Butylbenzene	-	-	-	**0.26 J**	**0.60 J**	**0.50 J**	U	U	U	U	U
	5	Tetrachloroethylene (PCE)	-	-	-	**3.0**	**2.0 J**	**0.90 J**	**2.0**	**4**	**2.2**	**1.8**	**1.8**
	5	Toluene	-	-	-	**0.39 J**	U	U	U	U	U	U	U
	5	Trans-1,2-Dichloroethene	-	-	-	U	**0.90 J**	**1.0**	U	U	**0.62 J**	U	U
	5	Trichloroethylene (TCE)	-	-	-	**19**	**14**	**12**	**14**	**20**	**19**	**15**	**16**
	2	Vinyl Chloride	-	-	-	**0.92 J**	**4.0**	**4.0**	**3.0**	**1.2 J**	**2.5 J**	U	**1.0 J**
	NA	Total VOCs	-	-	-	**370**	**890**	**560**	**680**	**380**	**450**	**270**	**230**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L)										
			12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
			Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW18	5	1,1-Dichloroethene	-	-	-	-	U	-	-	-	-	UJ	U
	3	1,2-Dichlorobenzene	-	-	-	-	**0.20 J**	-	-	-	-	U	U
	0.6	1,2-Dichloroethane	-	-	-	-	U	-	-	-	-	U	U
	5	1,2,4-Trimethylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	1,3,5-Trimethylbenzene	-	-	-	-	U	-	-	-	-	U	U
	3	1,3-Dichlorobenzene	-	-	-	-	U	-	-	-	-	U	U
	3	1,4-Dichlorobenzene	-	-	-	-	U	-	-	-	-	U	U
	5	4-Chlorotoluene	-	-	-	-	NA	-	-	-	-	U	U
	1	Benzene	-	-	-	-	U	-	-	-	-	U	U
	5	Chlorobenzene	-	-	-	-	**3.0**	-	-	-	-	U	U
	5	cis-1,2-Dichloroethylene	-	-	-	-	U	-	-	-	-	UJ	U
	NA	Cyclohexane	-	-	-	-	U	-	-	-	-	U	U
	5	Ethylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	Isopropylbenzene (Cumene)	-	-	-	-	U	-	-	-	-	U	U
	NA	Methylcyclohexane	-	-	-	-	UJ	-	-	-	-	U	U
	5	Methylene Chloride	-	-	-	-	U	-	-	-	-	U	U
	NA	m-p-Xylene	-	-	-	-	U	-	-	-	-	U	U
	10	Naphthalene	-	-	-	-	U	-	-	-	-	U	UJ
	5	n-Butylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	n-Propylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	-	-	-	U	-	-	-	-	U	U
	5	p-Isopropyltoluene	-	-	-	-	U	-	-	-	-	U	U
	5	sec-Butylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	Styrene	-	-	-	-	U	-	-	-	-	U	U
	5	t-Butylbenzene	-	-	-	-	U	-	-	-	-	U	U
	5	Tetrachloroethylene (PCE)	-	-	-	-	UJ	-	-	-	-	U	U
	5	Toluene	-	-	-	-	U	-	-	-	-	U	U
	5	Trans-1,2-Dichloroethene	-	-	-	-	U	-	-	-	-	UJ	U
	5	Trichloroethylene (TCE)	-	-	-	-	U	-	-	-	-	U	U
	2	Vinyl Chloride	-	-	-	-	U	-	-	-	-	U	U
	NA	Total VOCs	-	-	-	-	**3.2**	-	-	-	-	0	0

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1]	Parameter	Analytical Results by Sample Date(s) (µg/L) 12/18/97 to 12/19/97 Ref 1	5/8/00 to 5/25/00 Ref 2	9/7/04 to 9/9/04 Ref 3	10/23/06 to 11/13/06 Ref 4	7/27/10 to 7/29/10 E & E 2010 AOC 9 Baseline Sampling	5/17/11 to 5/18/11 E & E 2011 AOC 9 Performance Sampling Event 1	10/24/11 to 10/25/11 E & E 2011 AOC 9 Performance Sampling Event 2	4/16/12 to 4/17/12 E & E 2012 AOC 9 Performance Sampling Event 3	9/25/12 to 9/26/12 E & E 2012 AOC 9 Performance Sampling Event 4	4/8/13 to 4/10/13 E & E 2013 AOC 9 Long-Term Sampling Event 1	4/1/14 to 4/3/14 E & E 2014 AOC 9 Long-Term Sampling Event 2
AOC9-MW19 [2]	5	1,1-Dichloroethene	-	-	-	-	-	U	U	U	U	UJ	U
	3	1,2-Dichlorobenzene	-	-	-	**4930**	-	**6.0**	**6.0**	**3.8**	**5.4**	**2.1**	**1.3**
	0.6	1,2-Dichloroethane	-	-	-	-	-	U	U	U	U	U	U
	5	1,2,4-Trimethylbenzene	-	-	-	**170**	-	U	U	U	U	U	U
	5	1,3,5-Trimethylbenzene	-	-	-	**90**	-	U	U	U	U	U	U
	3	1,3-Dichlorobenzene	-	-	-	**100**	-	U	U	U	U	U	U
	3	1,4-Dichlorobenzene	-	-	-	**1380**	-	**3.0**	**4.0**	**4.5 J**	**4.4**	**3.0**	**1.7**
	5	4-Chlorotoluene	-	-	-	U	-	U	U	U	U	U	U
	1	Benzene	-	-	-	**90**	-	U	**0.40 J**	**0.90 J**	U	**2.0**	**0.65 J**
	5	Chlorobenzene	-	-	-	**14400**	-	**18 J**	**14**	**33**	**31**	**58**	**29**
	5	cis-1,2-Dichloroethylene	-	-	-	U	-	**3.0**	**15**	**12**	**1.4**	**3.2 J**	**2.1**
	NA	Cyclohexane	-	-	-	-	-	U	U	U	U	U	U
	5	Ethylbenzene	-	-	-	U	-	U	U	U	UJ	U	U
	5	Isopropylbenzene (Cumene)	-	-	-	U	-	U	U	U	UJ	U	U
	NA	Methylcyclohexane	-	-	-	-	-	U	U	U	U	U	U
	5	Methylene Chloride	-	-	-	U	-	U	U	U	U	U	U
	NA	m-p-Xylene	-	-	-	**85**	-	U	U	U	U	U	U
	10	Naphthalene	-	-	-	**230**	-	U	U	U	U	U	UJ
	5	n-Butylbenzene	-	-	-	U	-	U	U	U	U	U	U
	5	n-Propylbenzene	-	-	-	U	-	U	U	U	U	U	U
	5	o-Xylene (1,2-Dimethylbenzene)	-	-	-	**75**	-	U	U	U	U	U	U
	5	p-Isopropyltoluene	-	-	-	U	-	U	U	U	U	U	U
	5	sec-Butylbenzene	-	-	-	U	-	U	U	U	U	U	U
	5	Styrene	-	-	-	-	-	U	U	U	U	U	U
	5	t-Butylbenzene	-	-	-	U	-	U	U	U	U	U	U
	5	Tetrachloroethylene (PCE)	-	-	-	U	-	U	U	U	U	U	U
	5	Toluene	-	-	-	**60**	-	U	U	U	U	U	U
	5	Trans-1,2-Dichloroethene	-	-	-	U	-	U	U	U	U	UJ	U
	5	Trichloroethylene (TCE)	-	-	-	U	-	**0.50 J**	**0.50 J**	U	**0.30 J**	**0.55 J**	**0.29 J**
	2	Vinyl Chloride	-	-	-	U	-	**0.60 J**	**2.0**	**2.9**	**U**	U	**0.80 J**
	NA	Total VOCs	-	-	-	**21610**	-	**31**	**42**	**57**	**43**	**69**	**36**

Key and References at the end of Table.

Table 3-3 AOC 9 Historic Groundwater Sample Results

Well Number	Screening Criteria [1] Parameter	Analytical Results by Sample Date(s) (µg/L)										
		12/18/97 to 12/19/97	5/8/00 to 5/25/00	9/7/04 to 9/9/04	10/23/06 to 11/13/06	7/27/10 to 7/29/10	5/17/11 to 5/18/11	10/24/11 to 10/25/11	4/16/12 to 4/17/12	9/25/12 to 9/26/12	4/8/13 to 4/10/13	4/1/14 to 4/3/14
		Ref 1	Ref 2	Ref 3	Ref 4	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2

Key:
J = Estimated concentration.
U = Analyte not detected.
mg/L = Micrograms per liter.
- = Well was not Sampled
NA = Not Applicable.

0.411 J	Bolded values denote positive hits (detections).
14.9	Shaded values denote hits exceeding the NYSDEC standard.

Note:
[1] New York State Department of Environmental Conservation, Class GA Groundwater Standards and Guidance Values.
[2] Data presented under Reference 4 for MW19 is the most recent sampling data for TW39, which was in the same location as MW19. These results are presented for comparison.

References:
(1) E & E. July 1998. Draft Report for Expanded Site Investigation and Confirmatory Sampling of Areas of Interest and Drywell/Wastewater-Related Systems
(2) E & E. August 2001. AOC 9: Weapons Storage Area (WSA) Landfill Supplemental Investigation Final data Summary Report.
(3) FPM Group. February 2005. Groundwater Monitoring Report.
(4) FPM Group. August 2007. Baseline and PDI2 Sampling Final Monitoring Report.

Key and References at the end of Table.

Table 3-4 AOC 9 Historic Surface Water Sample Results

Surface Water Sample Number	Screening Criteria[1]	Parameter	Analytical Results by Sample Date(s) (µg/L)									
			11/4/97	5/10/00	11/13/06	7/27/10	5/17/11	10/24/11	4/16/12	9/25/12	4/8/2013	4/1/2014
			Ref 1	Ref 2	Ref 3	E & E 2010 AOC 9 Baseline Sampling	E & E 2011 AOC 9 Performance Sampling Event 1	E & E 2011 AOC 9 Performance Sampling Event 2	E & E 2012 AOC 9 Performance Sampling Event 3	E & E 2012 AOC 9 Performance Sampling Event 4	E & E 2013 AOC 9 Long-Term Sampling Event 1	E & E 2014 AOC 9 Long-Term Sampling Event 2
SW01[2]	5	Chlorobenzene	U	**0.85 J**	U	U	**0.60 J**	U	U	U	U	U
	NA	1,2-DCB	NA	U	U	U	U	U	U	U	U	U
	NA	1,4-DCB	NA	U	U	U	U	U	U	U	U	U
	5	Total DCB	NA	U	U	U	U	U	U	U	U	U
	NA	Acetone	U	NA	**1.8 J**	U	U	U	**2.5 J**	U	U	**3.4 J**
	NA	cis-1,2-Dichloroethene	U	U	**U**	U	U	**0.40 J**	U	U	UJ	U
	NA	Tetrachloroethene	U	U	**U**	U	U	**1.0 J**	U	U	U	U
	NA	Trichloroethene	U	U	**U**	U	U	**0.70 J**	U	U	U	U
	NA	Total VOCs	0	**0.85**	**1.8**	0	**0.60 J**	**2.1 J**	**2.5 J**	0	0	**3.4 J**
SW02[3]	5	Chlorobenzene	U	**0.84**	**4.0**	**3.0**	**2.0 J**	**9.0**	U	U	U	U
	NA	1,2-DCB	NA	**0.41 J**	**0.29 J**	**0.20 J**	U	**0.30 J**	U	U	U	U
	NA	1,4-DCB	NA	U	**0.26 J**	U	U	**0.40 J**	U	U	U	U
	5	Total DCB	NA	**0.41 J**	**0.55 J**	**0.20 J**	U	**0.70 J**	U	U	U	U
	NA	Acetone	U	NA	**1.8 J**	**2.0 J**	U	U	**3.2 J**	**2.4 J**	U	**2.6 J**
	NA	Total VOCs	0	**1.3**	**4.5**	**5.2**	**2.0 J**	**9.7 J**	**3.2 J**	**2.4 J**	0	**2.6 J**
SW03[4]	5	Chlorobenzene	U	**0.24 J**	**1.2**	**3.0**	**2.0 J**	**2.0**	U	U	U	U
	NA	1,2-DCB	NA	U	**0.12 J**	**0.30 J**	**0.20 J**	**0.20 J**	U	U	**0.45 J**	U
	NA	1,4-DCB	NA	U	U	**0.30 J**	U	U	U	U	U	U
	5	Total DCB	NA	U	**0.12 J**	**0.60 J**	**0.20 J**	**0.20 J**	U	U	U	U
	NA	Acetone	U	NA	**1.9 J**	U	U	U	**2.9 J**	U	U	U
	NA	Naphthalene	U	U	U	U	U	U	U	U	**0.36 J**	U
	NA	Total VOCs	0	**0.24**	**1.3**	**3.6**	**2.2 J**	**2.2 J**	**2.9 J**	0	**0.81 J**	0

Key:
J = Estimated concentration.
U = Analyte not detected.
mg/L = Micrograms per liter.
NA = Not Applicable.

0.411 J	Bolded values denote positive hits (detections).
14.9	Shaded values denote hits exceeding the NYSDEC standard.

Note:
[1] New York State Department of Environmental Conservation, Class C Freshwater Fish Propagation Standards and Guidance Values.
[2] SW01 is labeled as SW05 in Reference 1; SW01 is labeled as SW09 in Reference 2
[3] SW02 is labeled as SW07 in Reference 1; SW02 is labeled as SW10 in Reference 2
[4] SW03 is labeled as SW06 in Reference 1; SW03 is labeled as SW11 in Reference 2

References:
(1) E & E. July 1998. Draft Report for Expanded Site Investigation and Confirmatory Sampling of Areas of Interest and Drywell/Wastewater-Related Systems
(2) E & E. August 2001. AOC 9: Weapons Storage Area (WSA) Landfill Supplemental Investigation Final data Summary Report
(3) FPM Group. August 2007. Baseline and PDI2 Sampling Final Monitoring Report.

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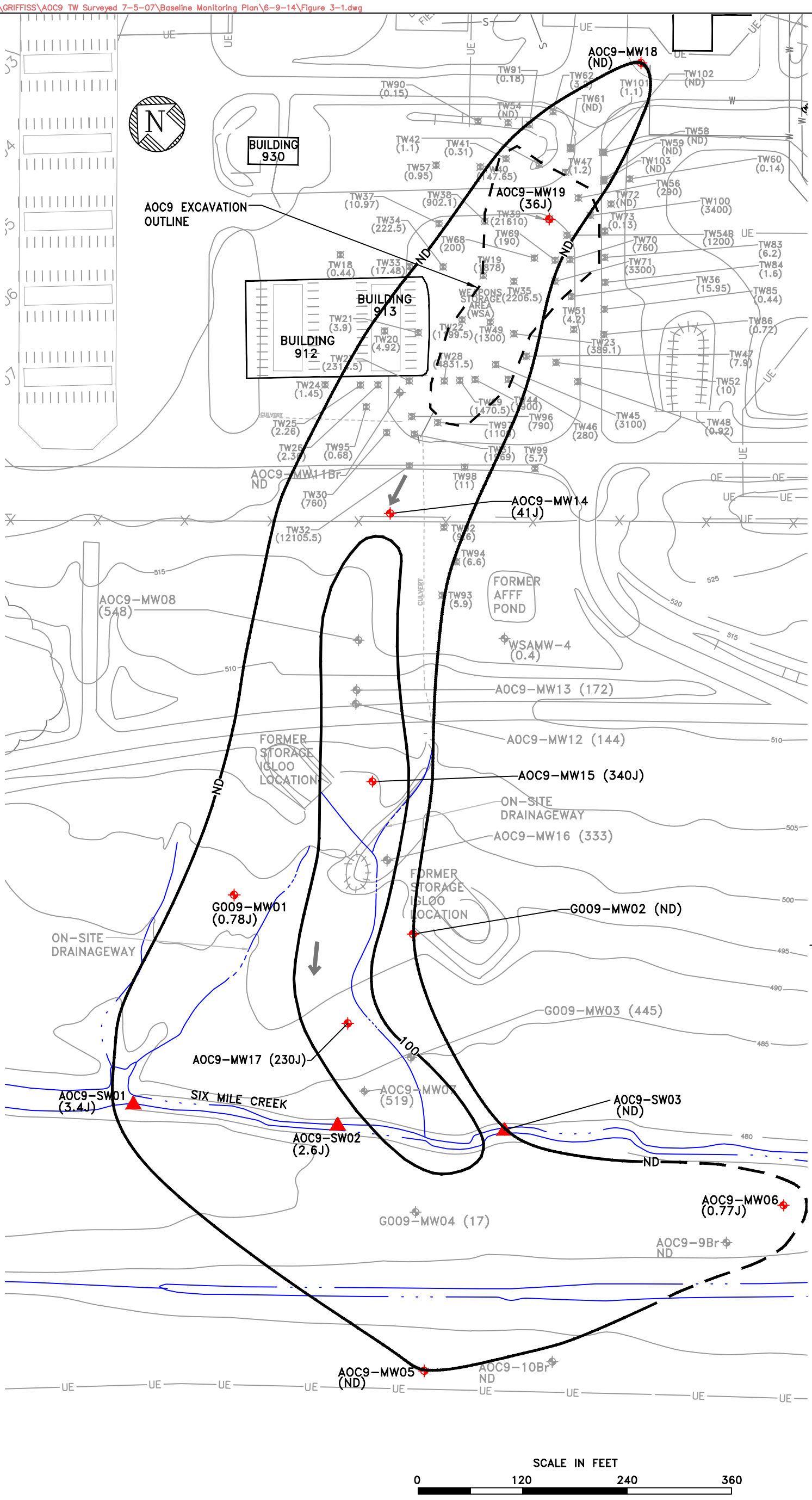

LEGEND

- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- ND — NOT DETECTED
- 10000 — TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
- AOC9-MW14 — LONG-TERM MONITORING WELL SAMPLE LOCATION
- AOC9-MW08 (548) — EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
- (31) — APRIL 2013 LONG-TERM SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
- → GROUNDWATER FLOW DIRECTION
- ▲ SURFACE WATER SAMPLING LOCATIONS
- TW99 (5.7) — 2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:
   - AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
   - BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
   - MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

FORMER GRIFFISS AFB
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In association with:
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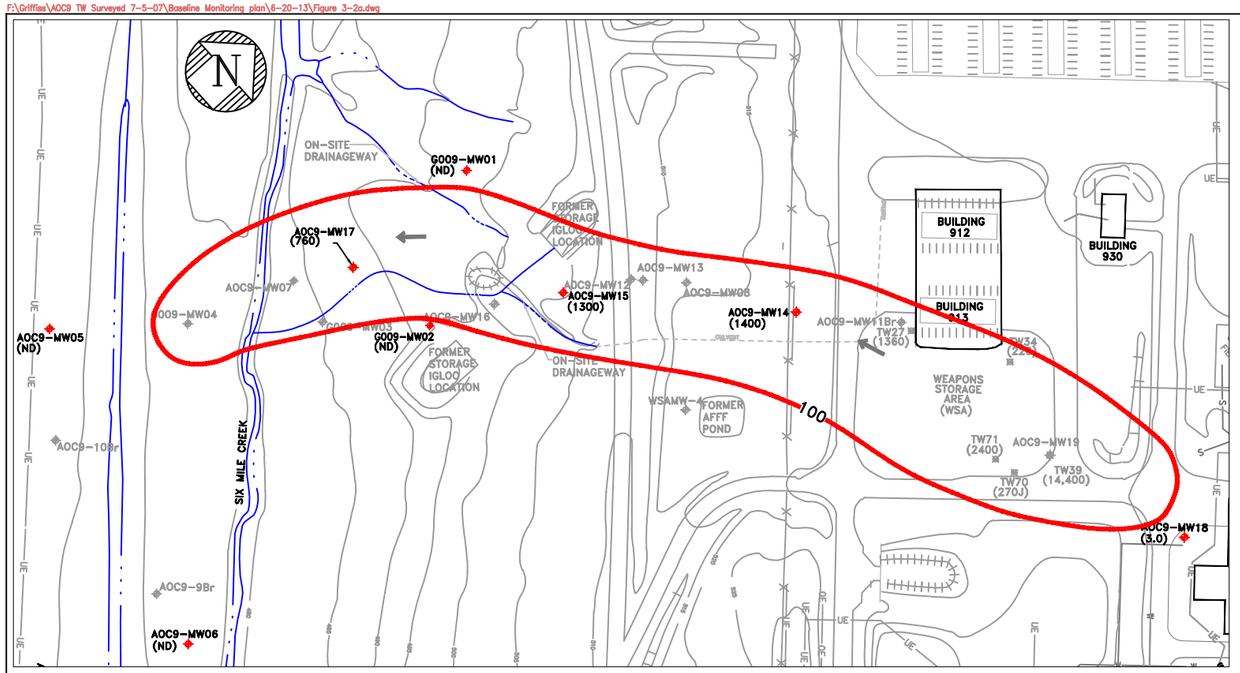
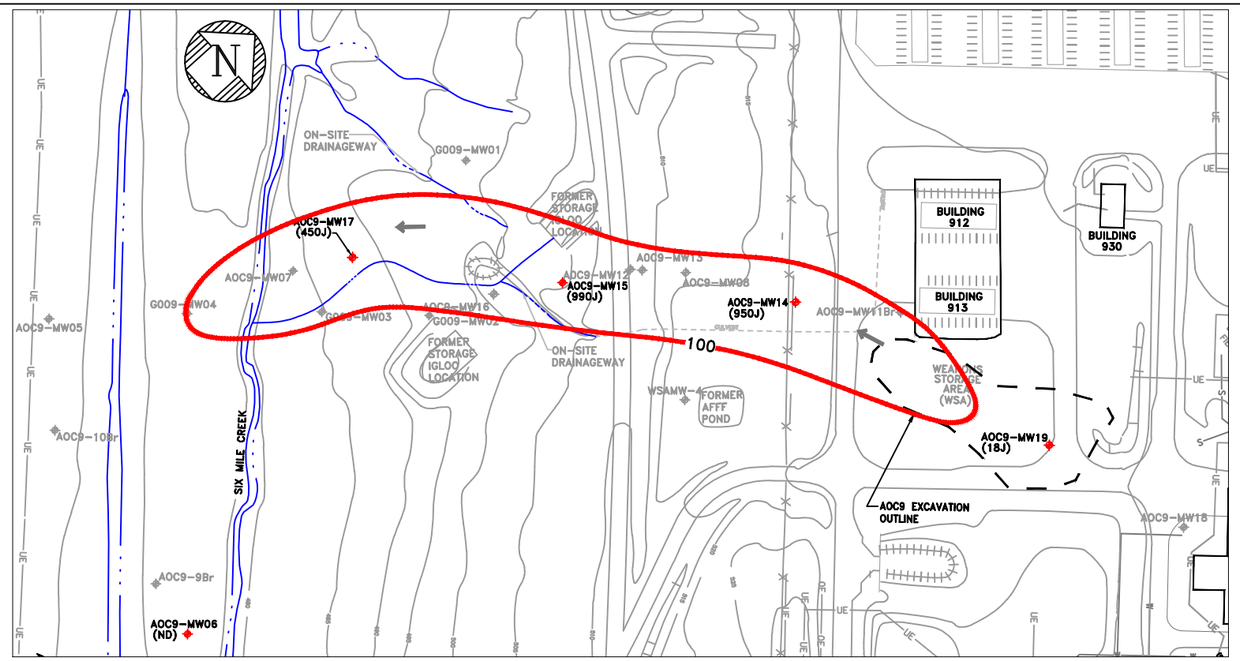
APRIL 2014 LONG-TERM MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 3-1

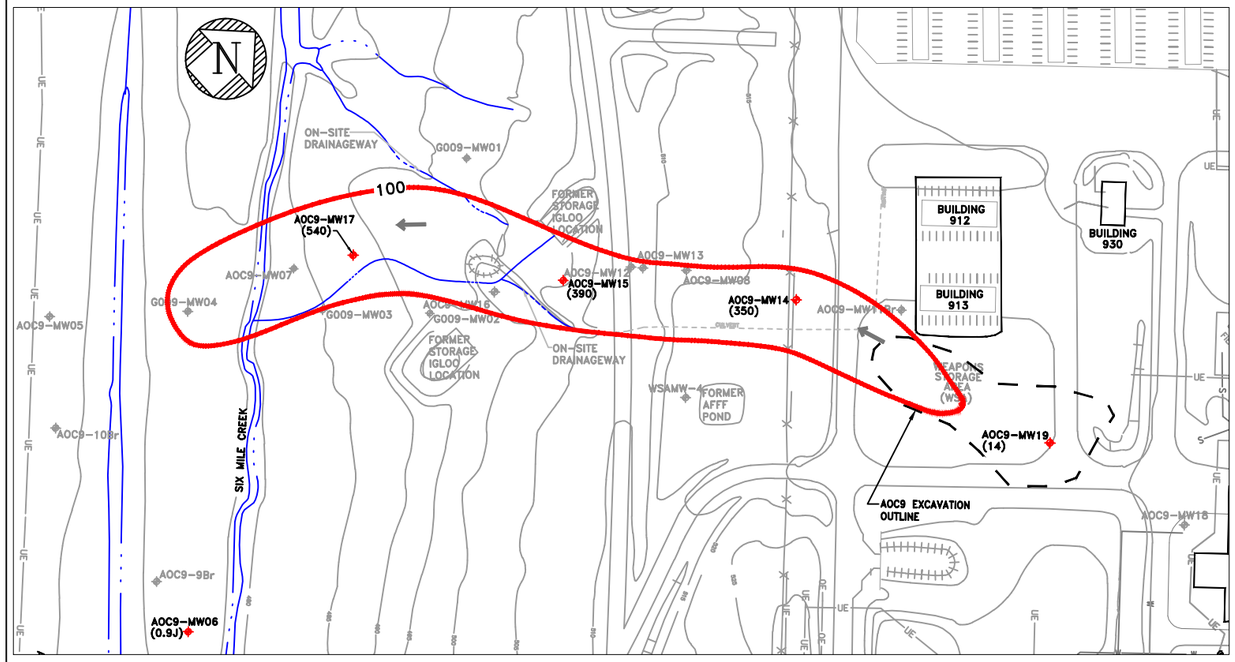
F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline Monitoring plan\6-20-13\Figure 3-2a.dwg



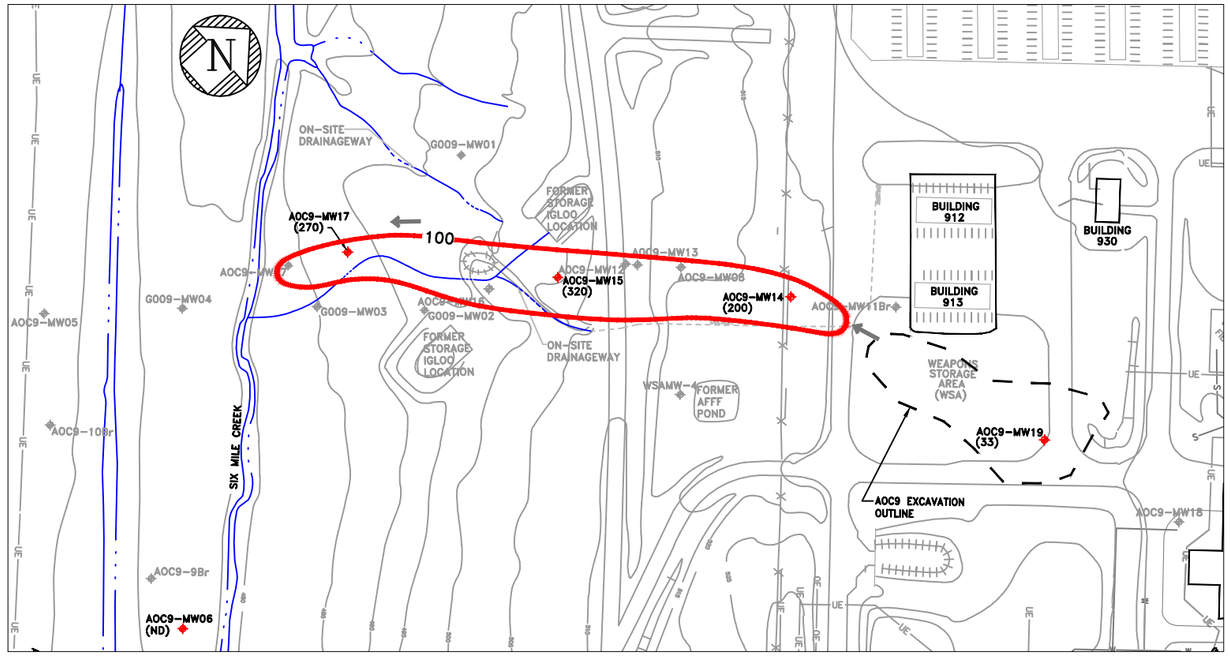
BASELINE SAMPLING JULY 2010



PERFORMANCE MONITORING MAY 2011



PERFORMANCE MONITORING OCTOBER 2011



PERFORMANCE MONITORING APRIL 2012

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 100 — CHLOROBENZENE PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — CHLOROBENZENE IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

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NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

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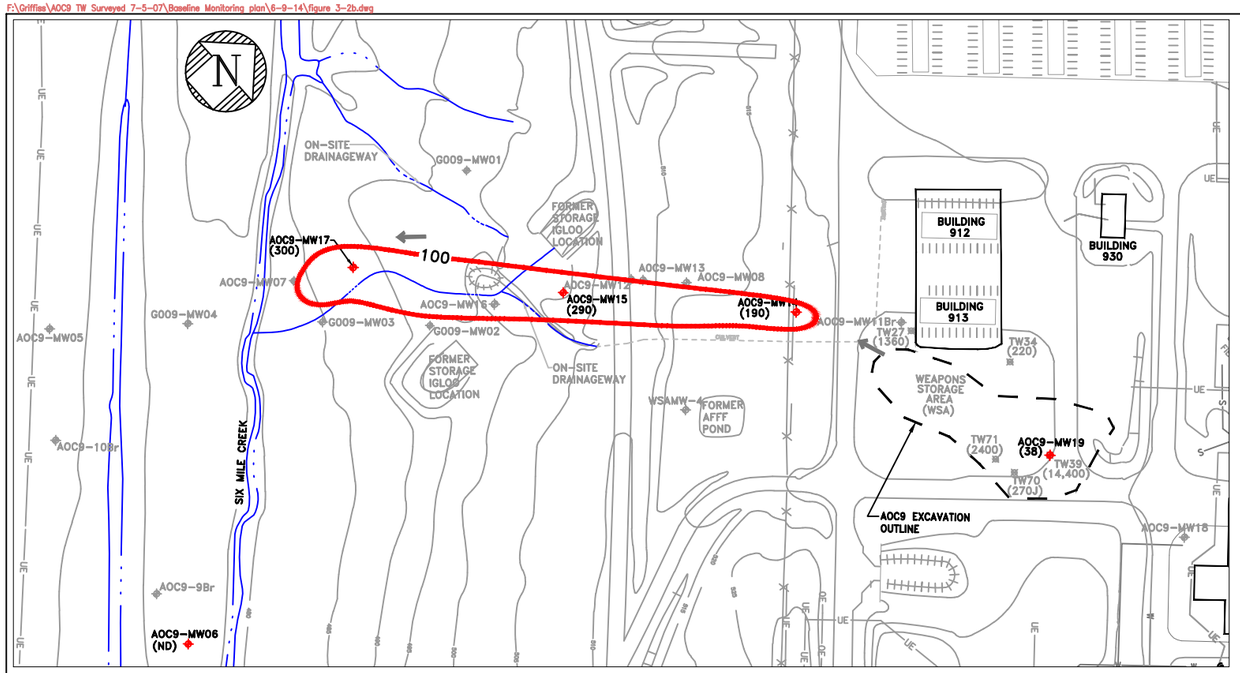
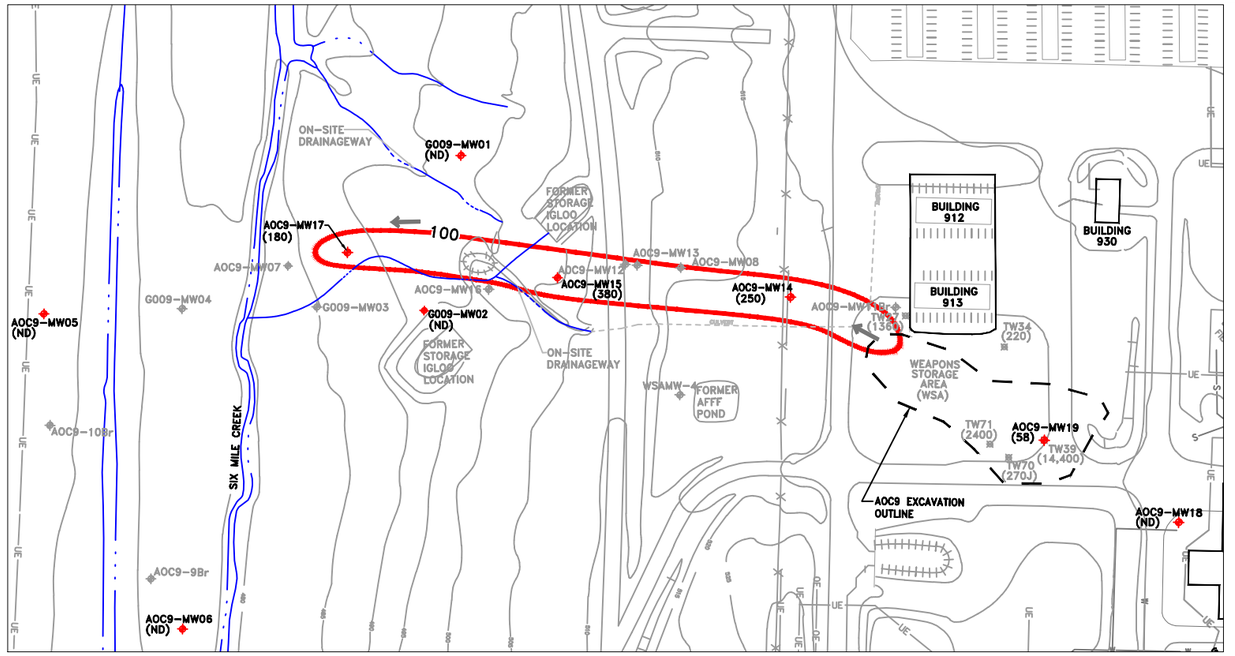
FIGURE 3-2a

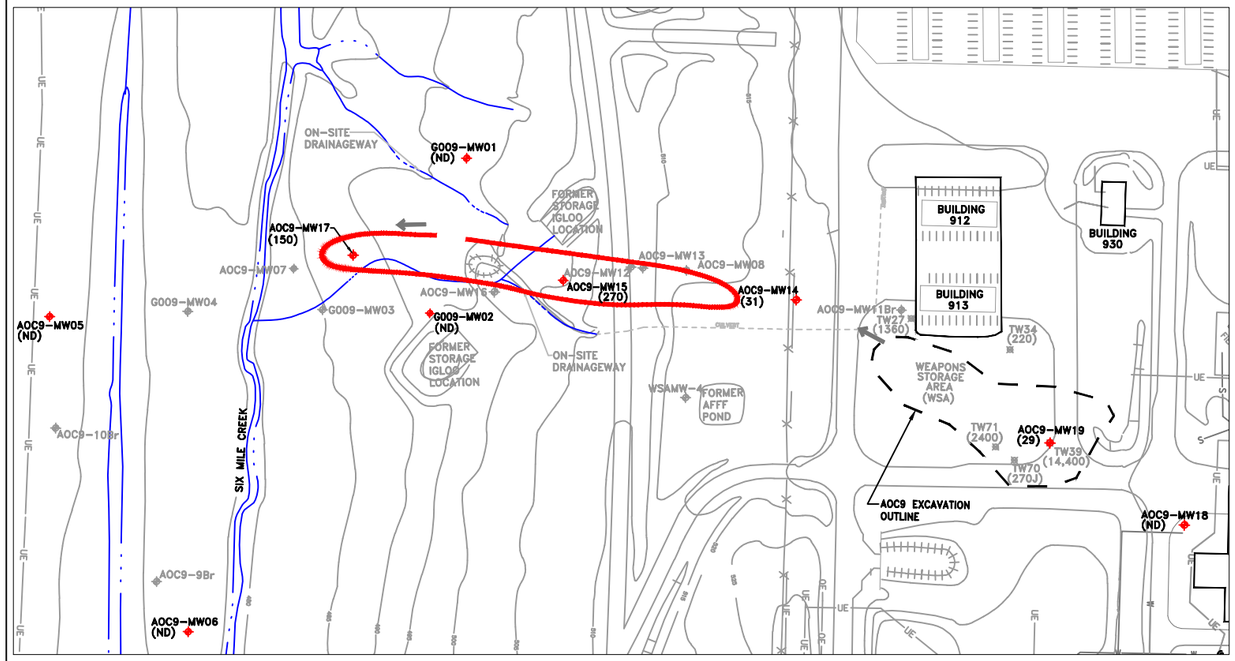
F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline Monitoring plan\6-9-14\figure 3-2b.dwg



PERFORMANCE MONITORING SEPTEMBER 2012



LONG-TERM MONITORING APRIL 2013



LONG-TERM MONITORING APRIL 2014

RESERVED FOR FUTURE SAMPLING EVENT

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 100 — CHLOROBENZENE PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — CHLOROBENZENE IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

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NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

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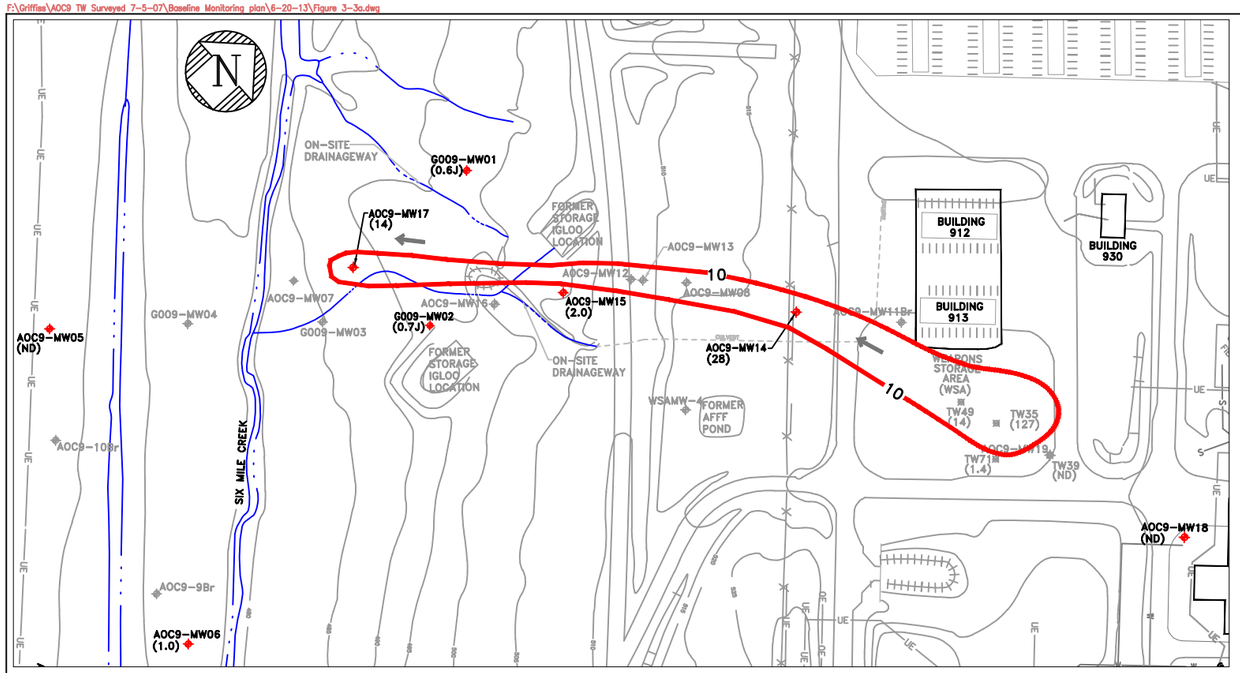
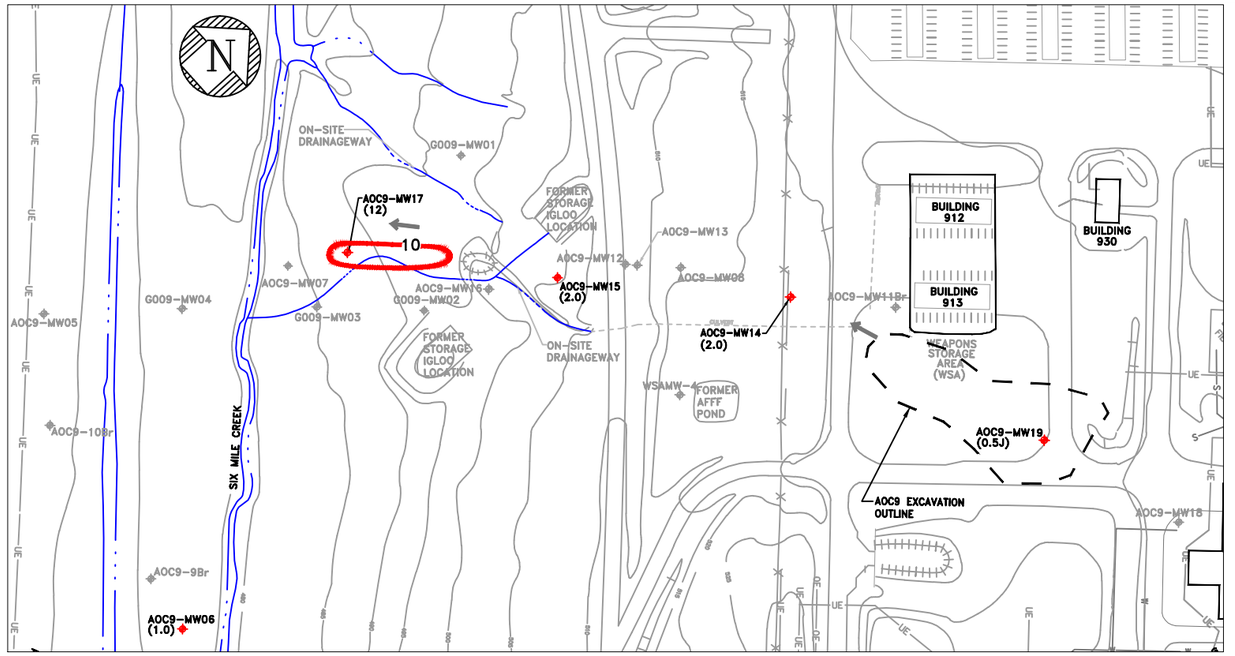
CHLOROBENZENE PLUME

FIGURE 3-2b

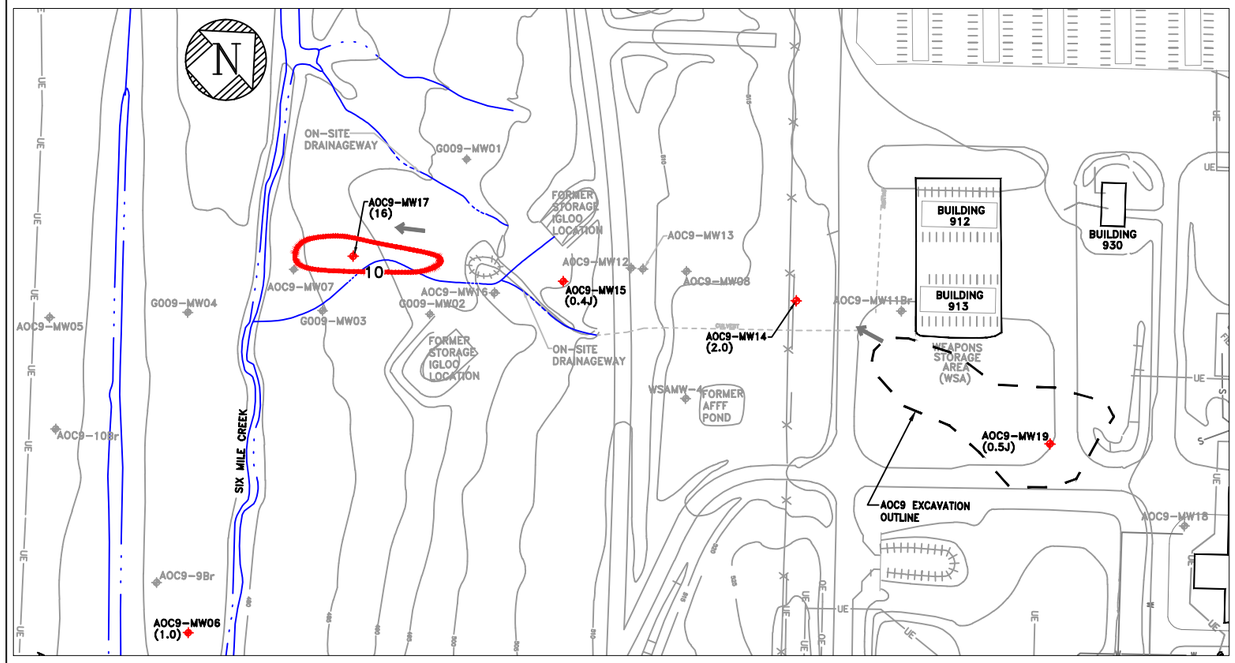
F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline Monitoring plan\6-20-13\Figure 3-3a.dwg



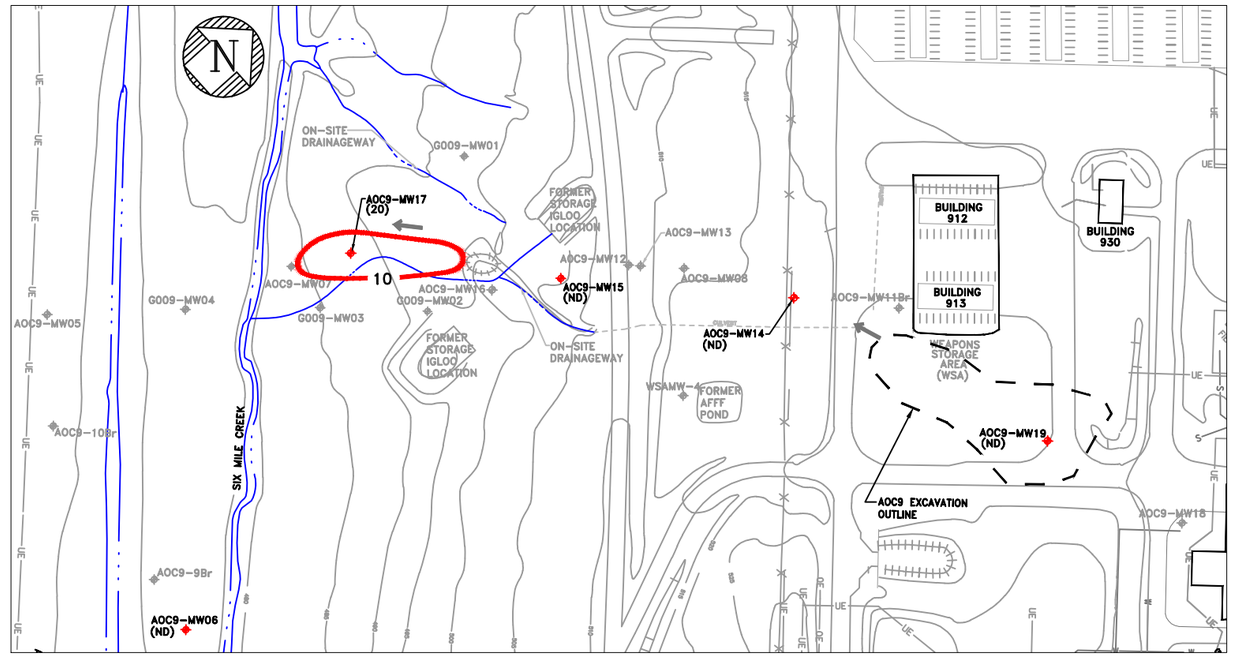
BASELINE SAMPLING JULY 2010



PERFORMANCE MONITORING MAY 2011



PERFORMANCE MONITORING OCTOBER 2011



PERFORMANCE MONITORING APRIL 2012

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 10 — TCE PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — TCE IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

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NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

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FIGURE 3-3a

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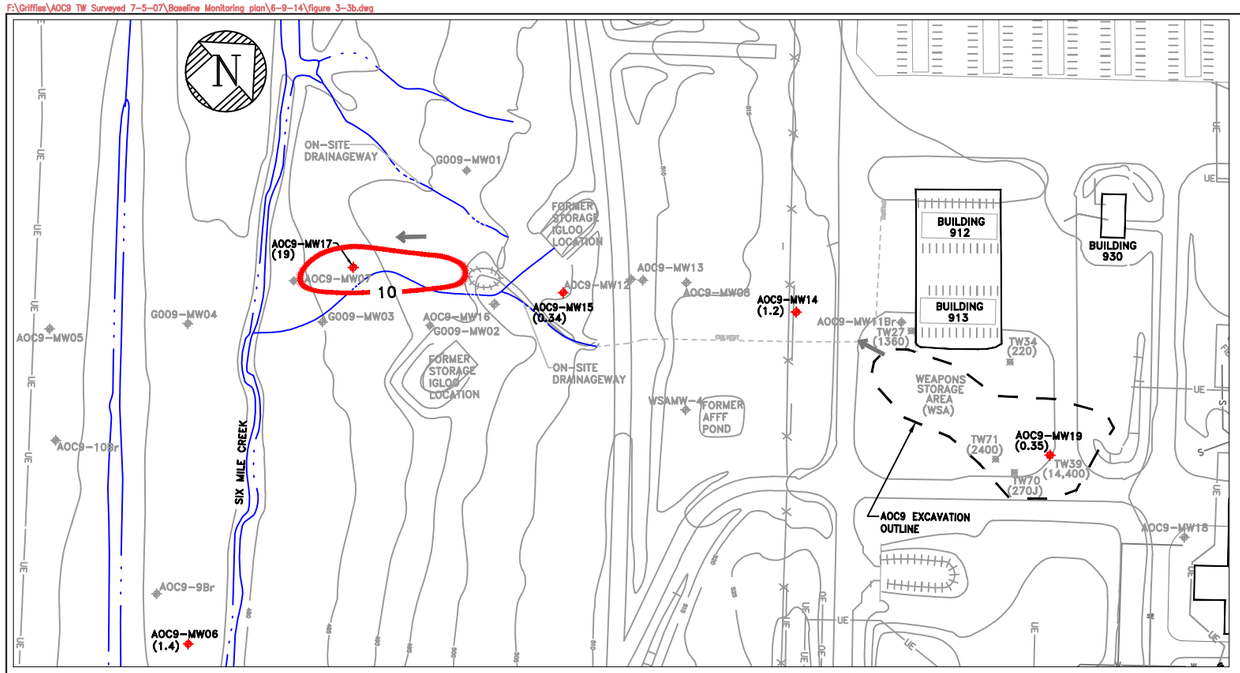
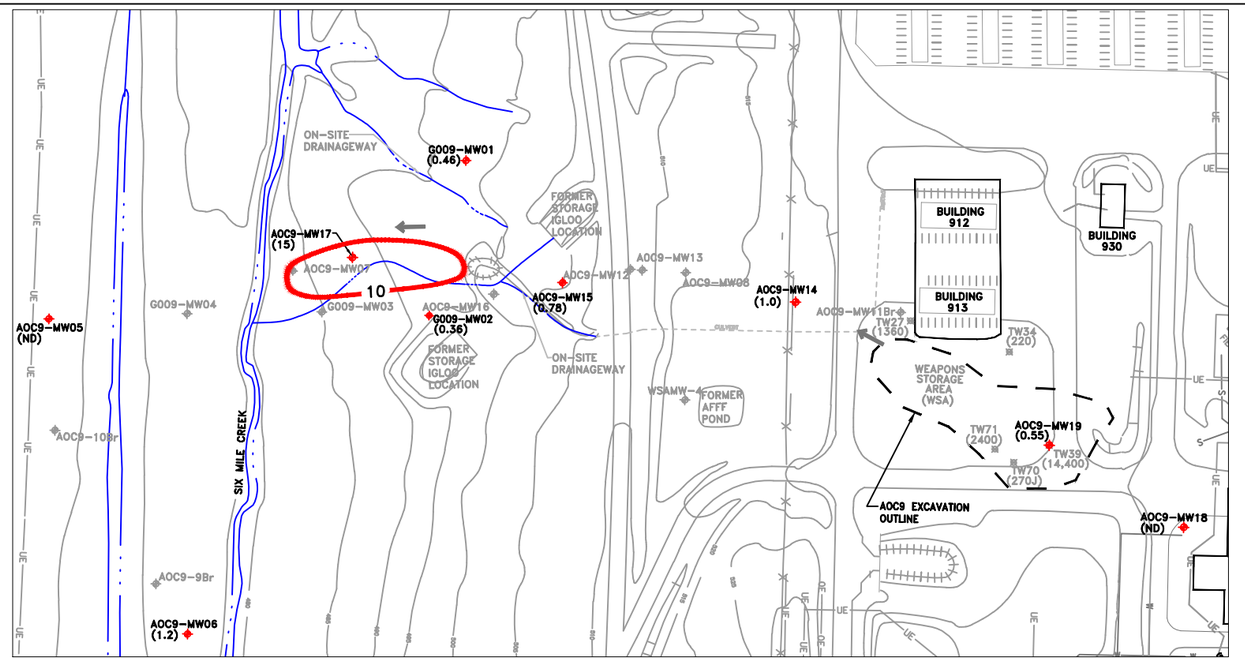
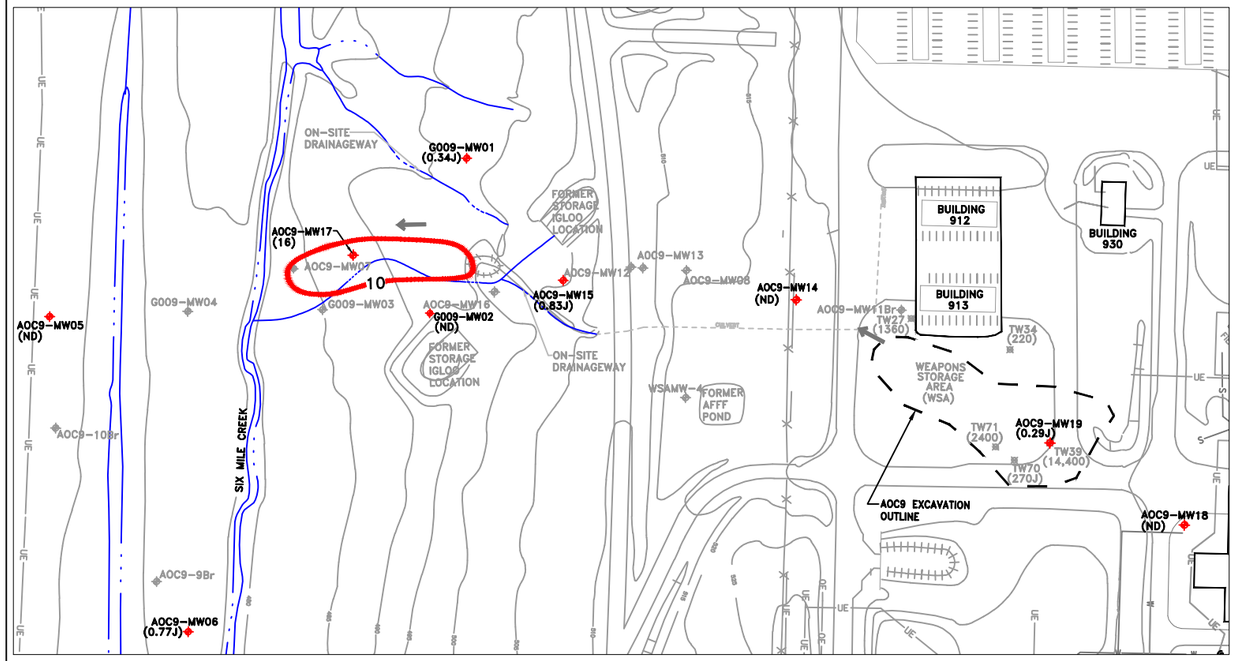


PERFORMANCE MONITORING SEPTEMBER 2012



LONG-TERM MONITORING APRIL 2013



LONG-TERM MONITORING APRIL 2014

RESERVED FOR FUTURE SAMPLING EVENT

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 10 — TCE PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — TCE IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

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NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

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DRAWING TITLE:
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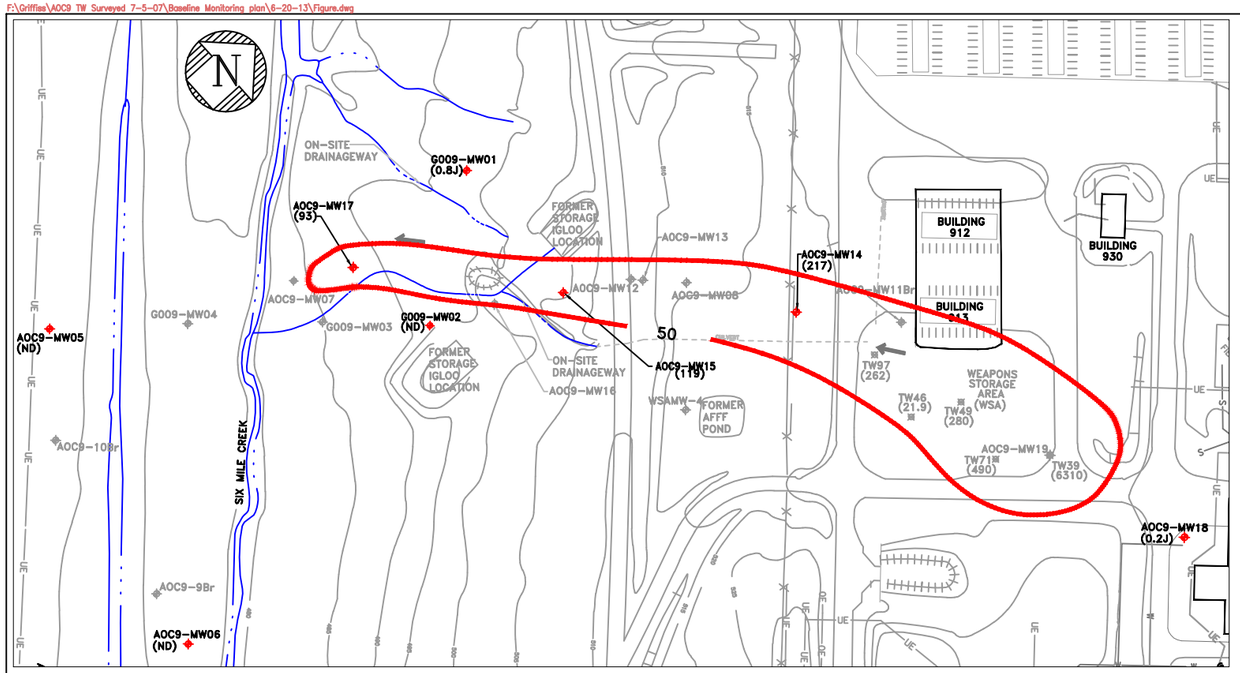
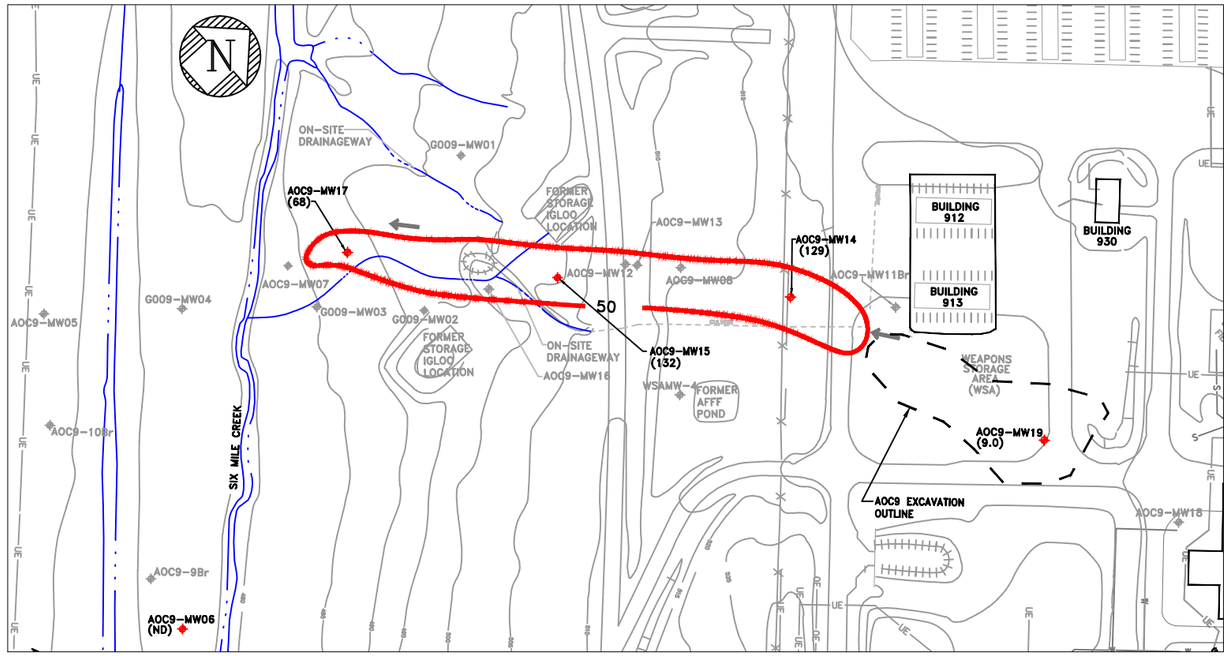
REMEDIAL MONITORING
TCE PLUME

FIGURE 3-3b

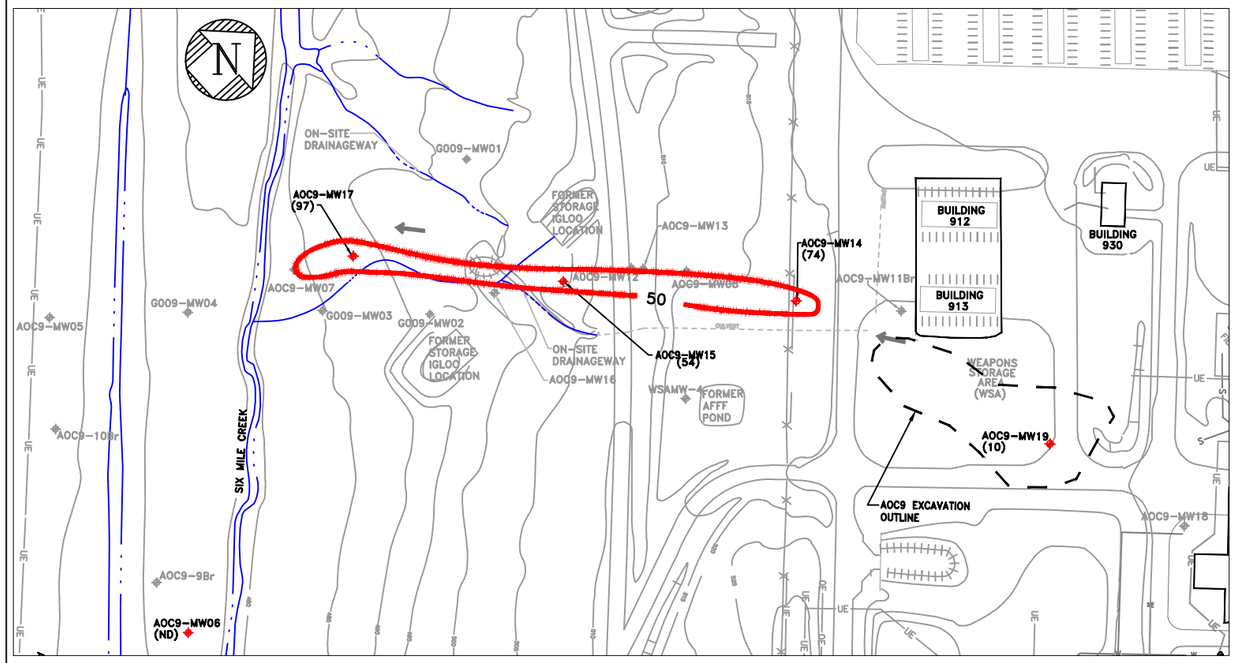
F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline Monitoring plan\6-20-13\Figure.dwg



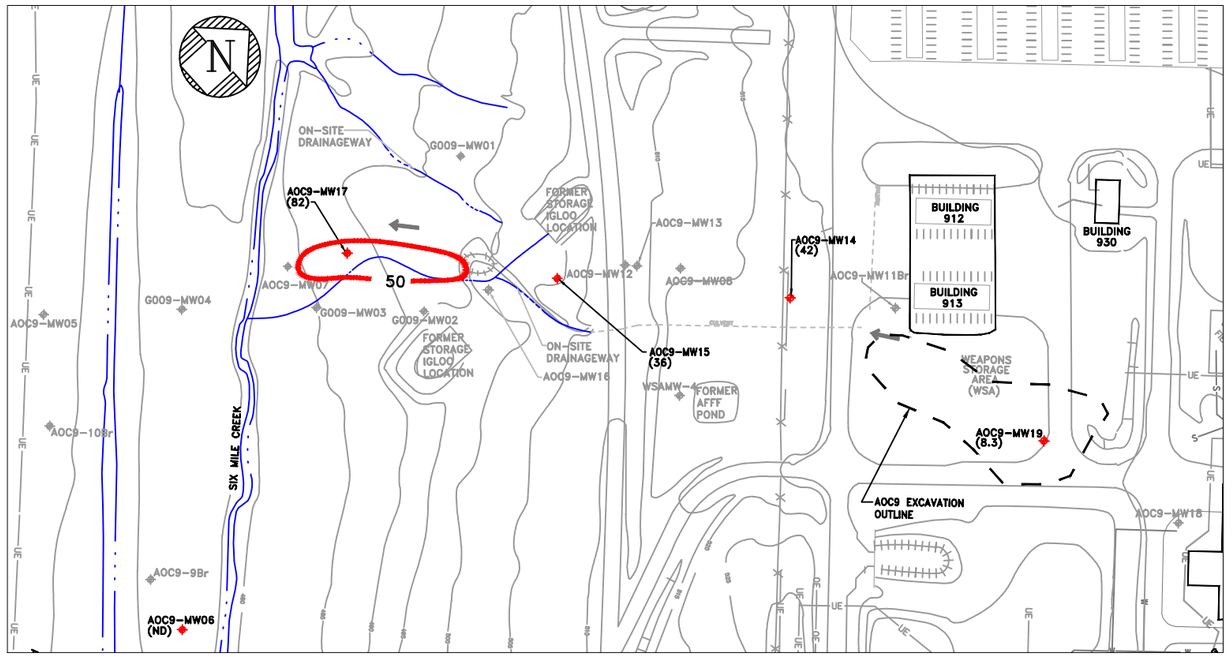
BASELINE SAMPLING JULY 2010



PERFORMANCE MONITORING MAY 2011



PERFORMANCE MONITORING OCTOBER 2011



PERFORMANCE MONITORING APRIL 2012

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 50 — TOTAL DCB PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — TOTAL DCB IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

GRIFFISS AFB OBGW SITES
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NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

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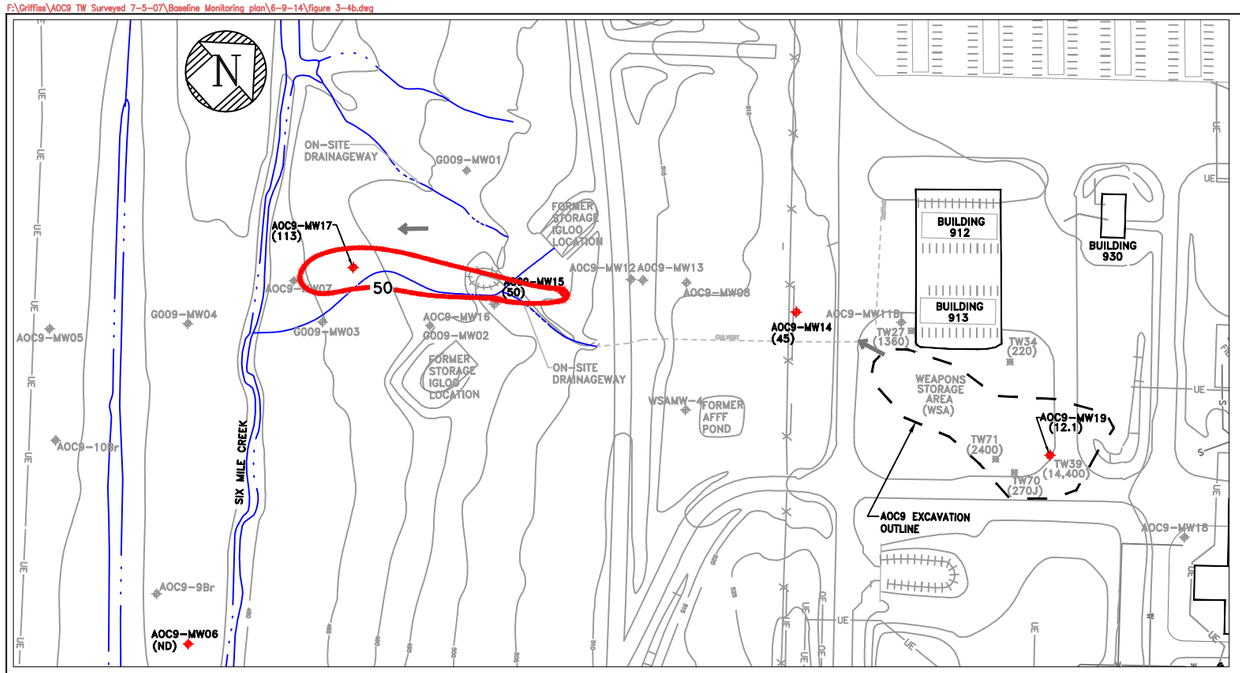
In Association with: parsons

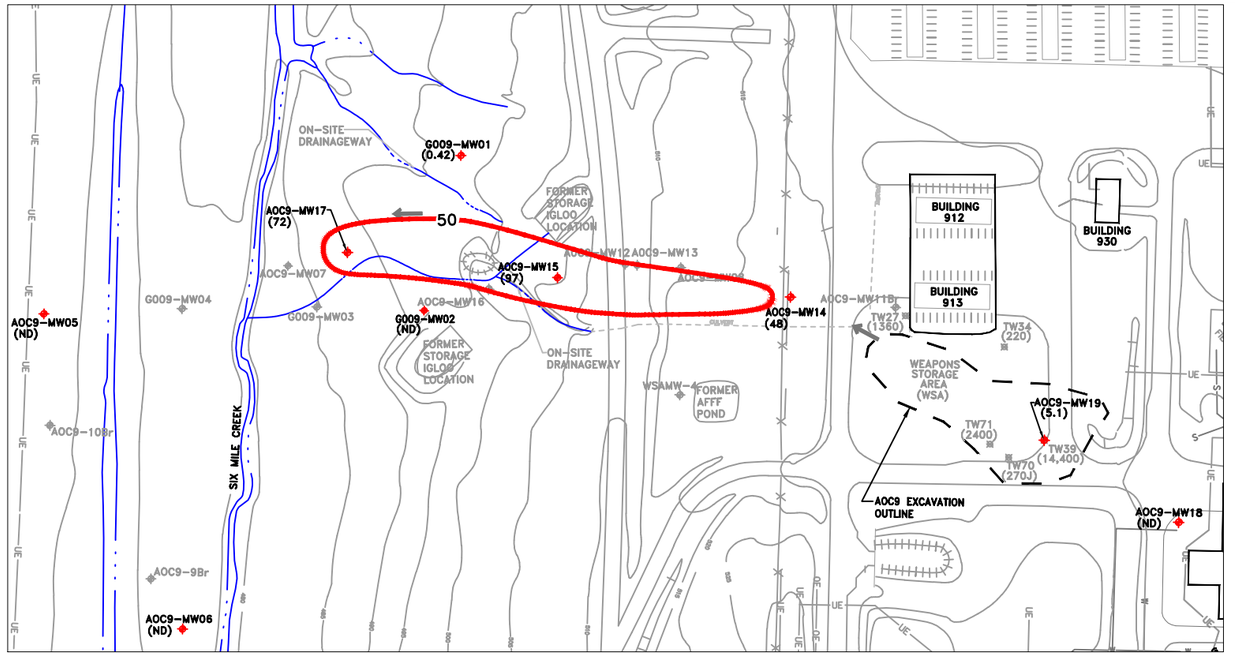
DRAWING TITLE:
AOC 9
REMEDIAL MONITORING
TOTAL DCB PLUME

FIGURE 3-4a

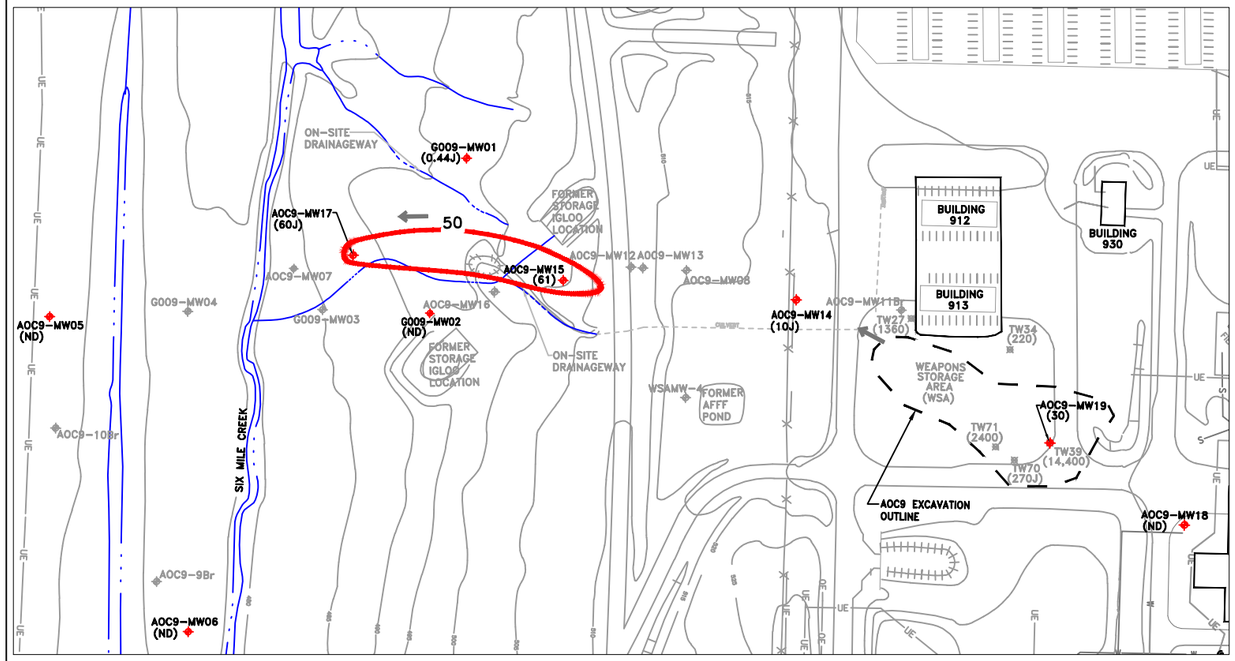
F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline Monitoring plan\6-9-14\figure 3-4b.dwg



PERFORMANCE MONITORING SEPTEMBER 2012



LONG-TERM MONITORING APRIL 2013



LONG-TERM MONITORING APRIL 2014

RESERVED FOR FUTURE SAMPLING EVENT

LEGEND

- AOC9-MW14 — BASELINE MONITORING WELL SAMPLE LOCATION
- EXISTING WELL
- 50 — TOTAL DCB PLUME CONTOUR IN PARTS PER BILLION
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- GROUNDWATER FLOW DIRECTION
- (0.5J) — TOTAL DCB IN PARTS PER BILLION
- TW39 — PREDESIGN INVESTIGATION TEMPORARY MONITORING WELL
- (ND) — NOT DETECTED

SCALE IN FEET
0 200 400 600

GRIFFISS AFB OBGW SITES
AOC 9 SITE
ROME, NEW YORK

NOTE: HISTORICAL MONITORING WELL DATA WAS USED TO ESTIMATE CONTOUR LINES WHEN NEW DATA WAS NOT AVAILABLE (SEE FIG 1-2).

Prepared by: ecology and environment engineering p.c.

In Association with: parsons

DRAWING TITLE:
AOC 9
REMEDIAL MONITORING
TOTAL DCB PLUME

FIGURE 3-4b

Figure 3-5 G009-MW01 Trend Analysis

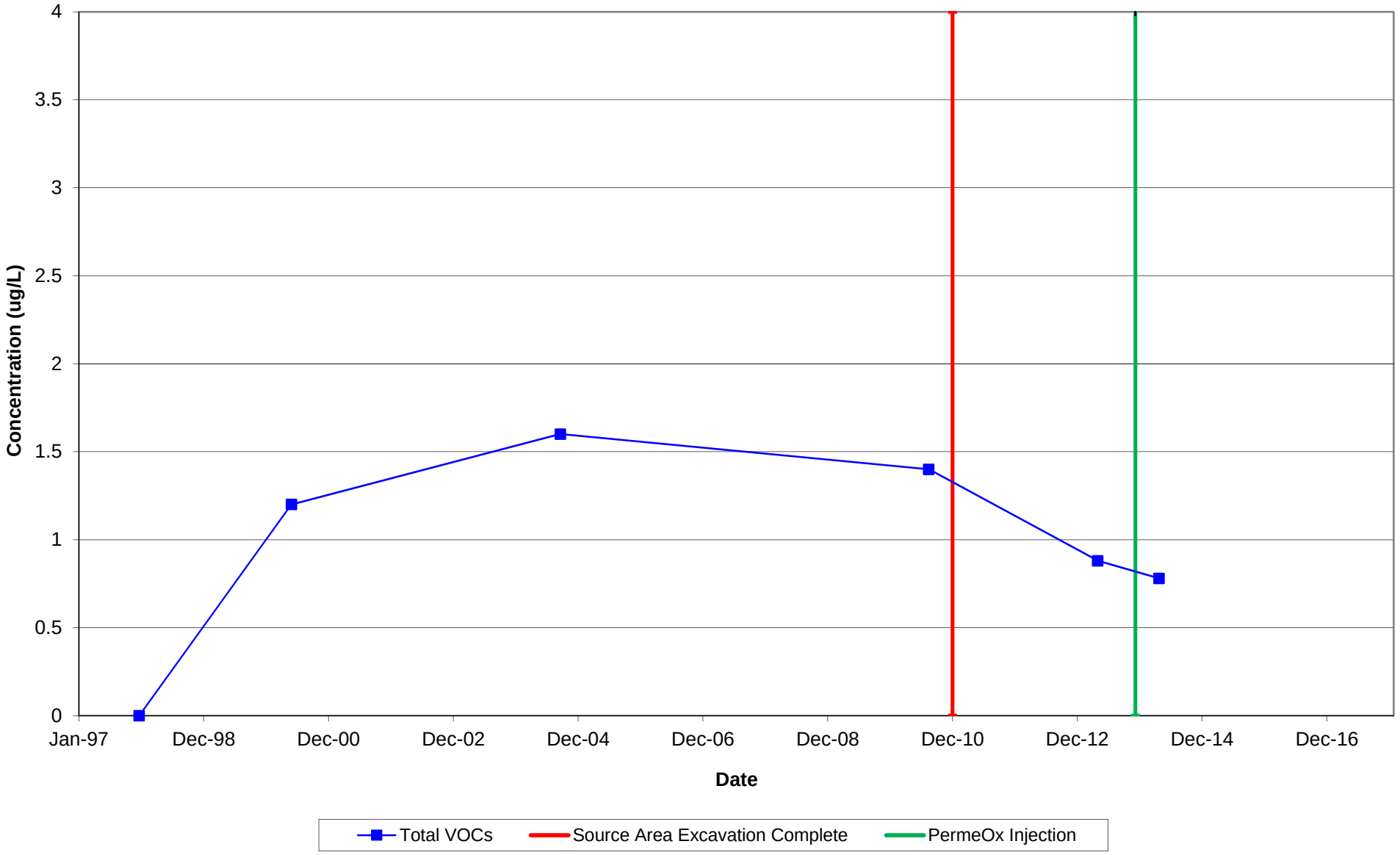


Figure 3-6 G009-MW02 Trend Analysis

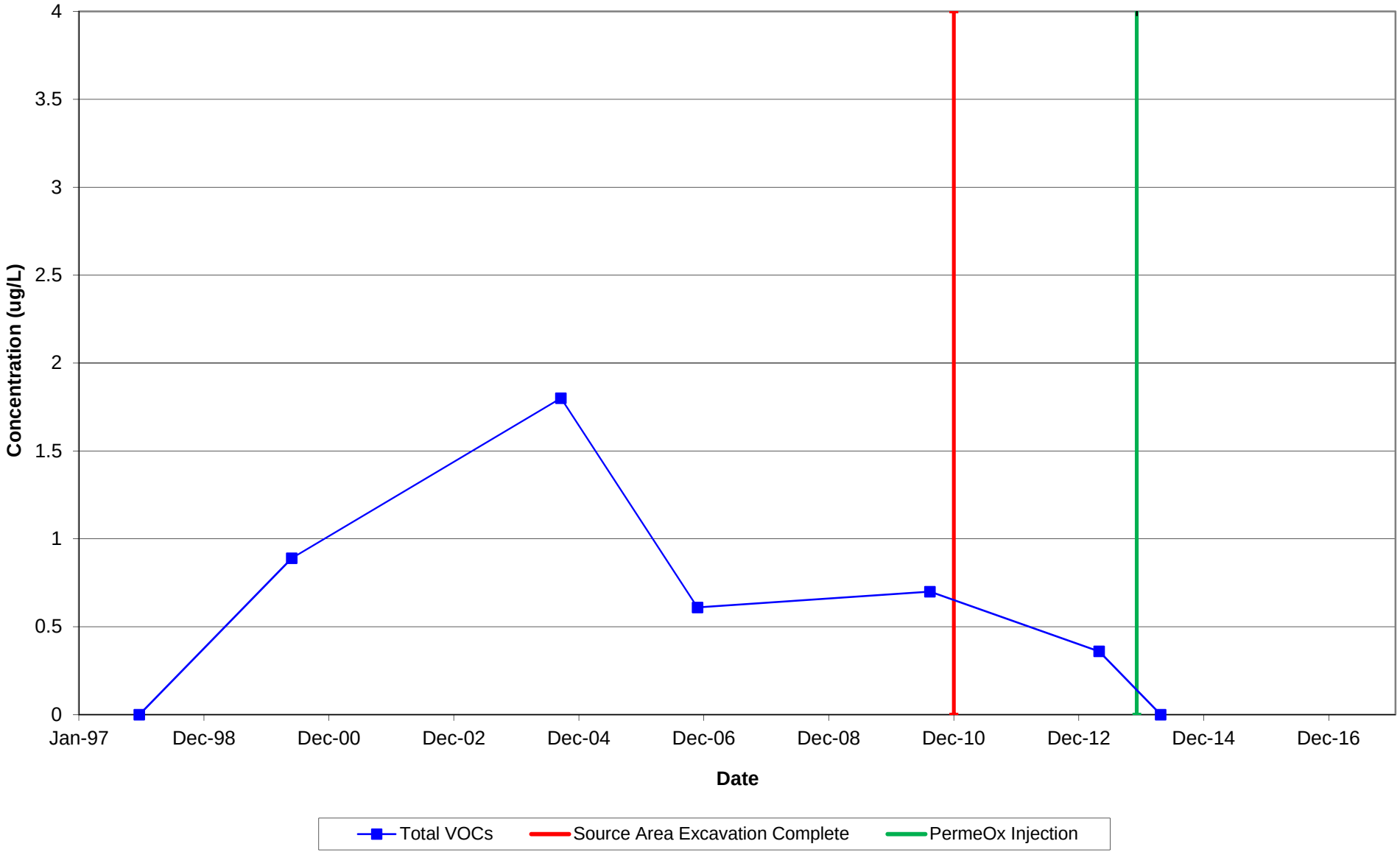


Figure 3-7 AOC9-MW06 Trend Analysis

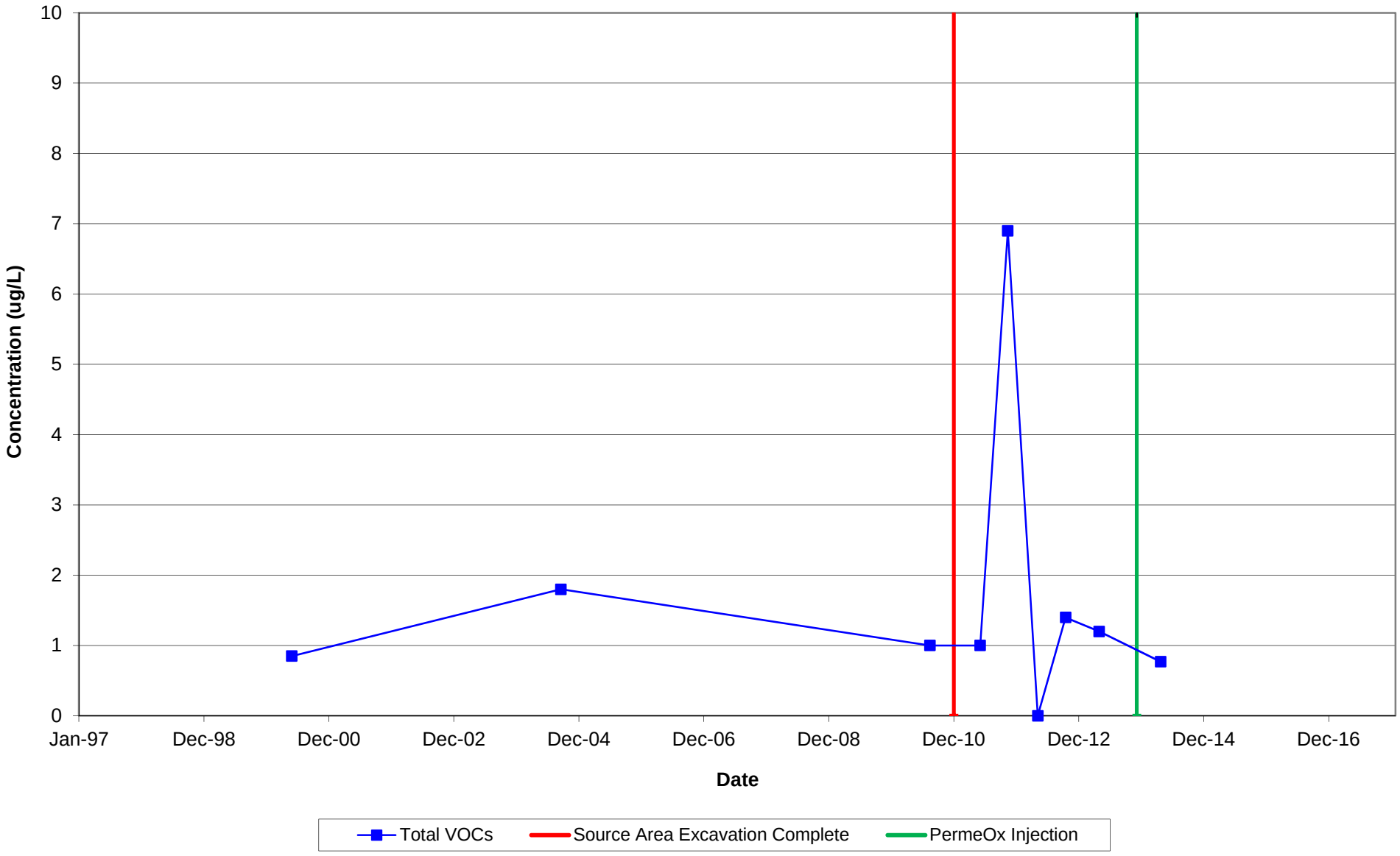


Figure 3-8 AOC9-MW14 Trend Analysis

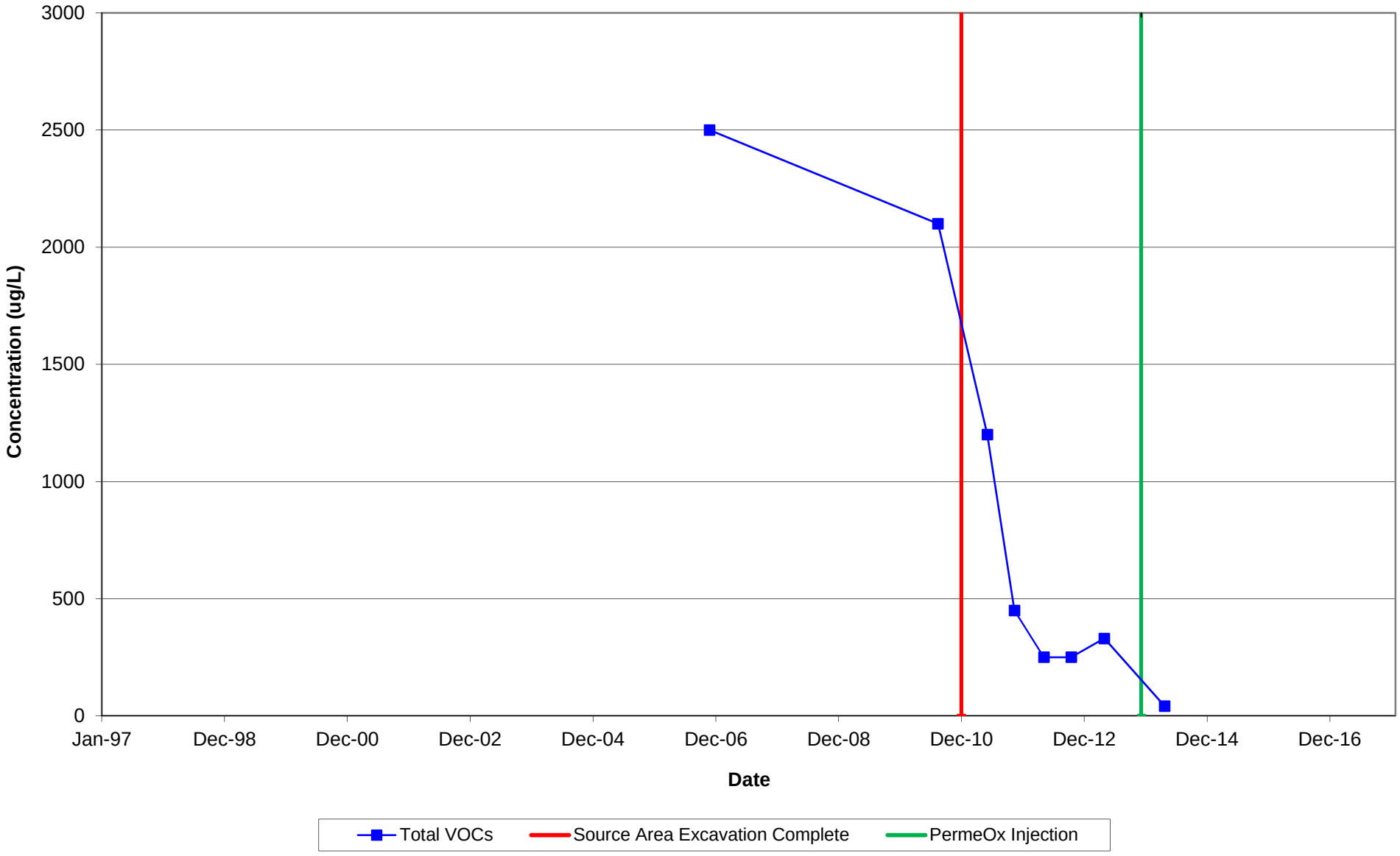


Figure 3-9 AOC9-MW15 Trend Analysis

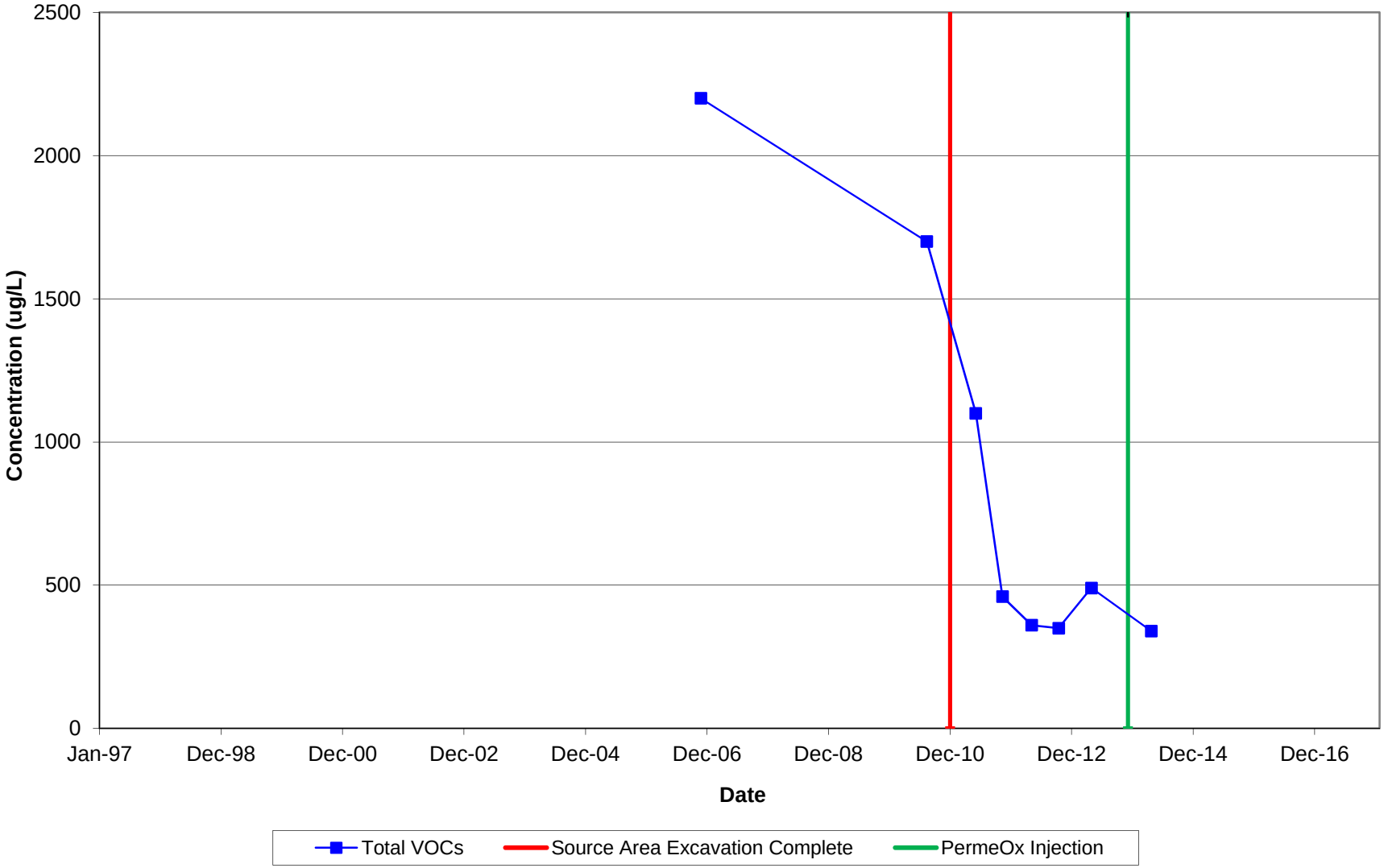


Figure 3-10 AOC9-MW17 Trend Analysis

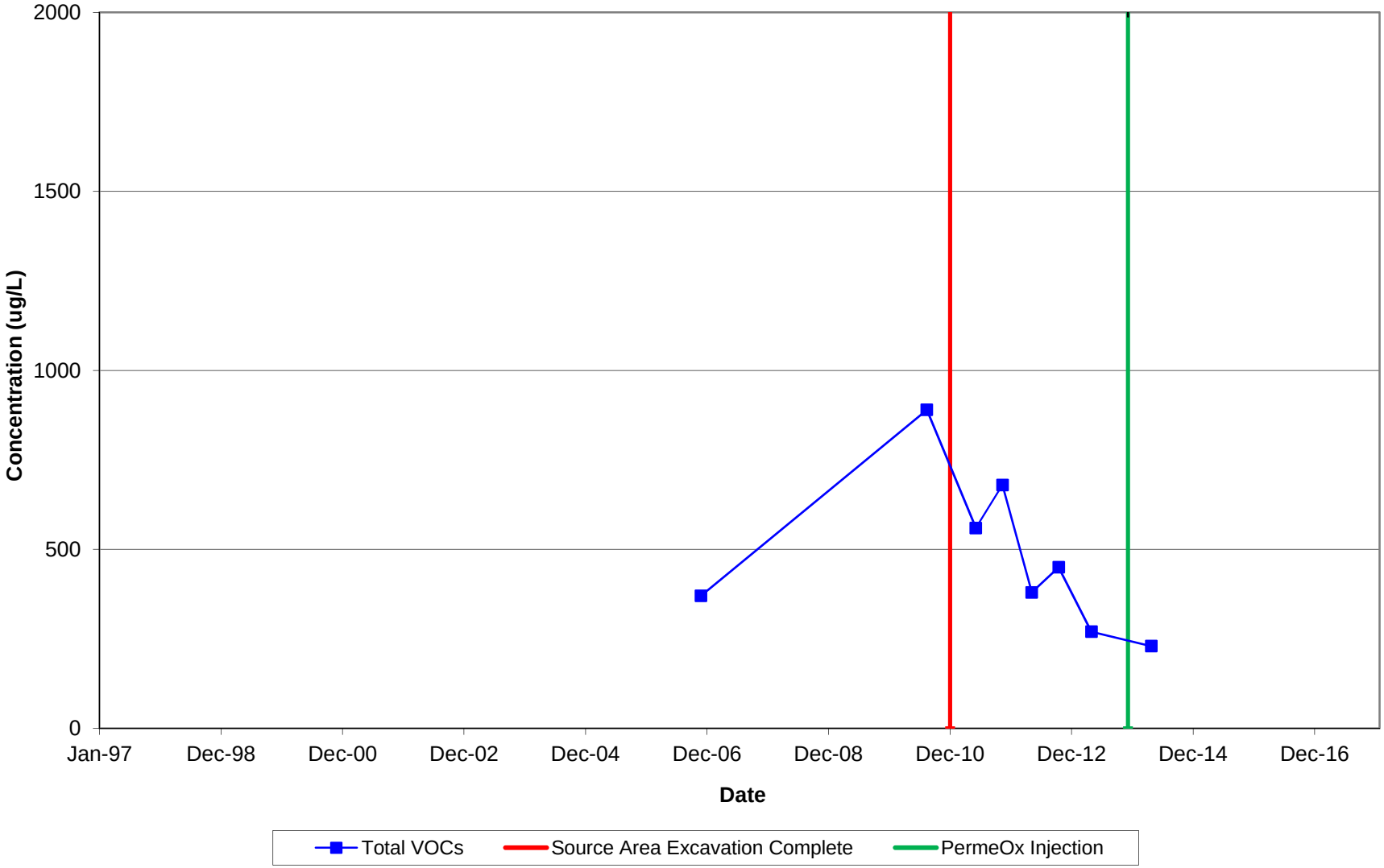


Figure 3-11 AOC9-MW18 Trend Analysis

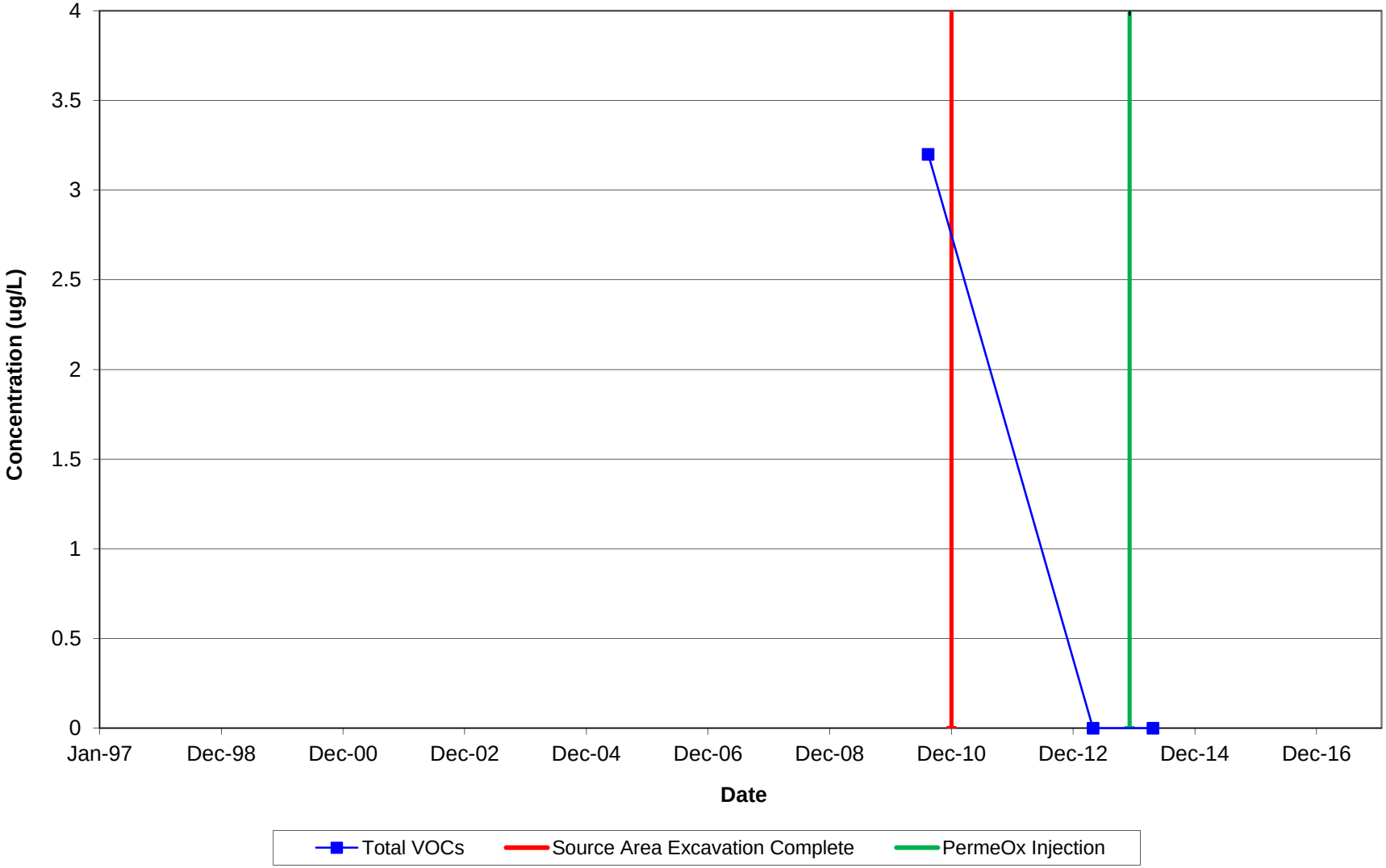
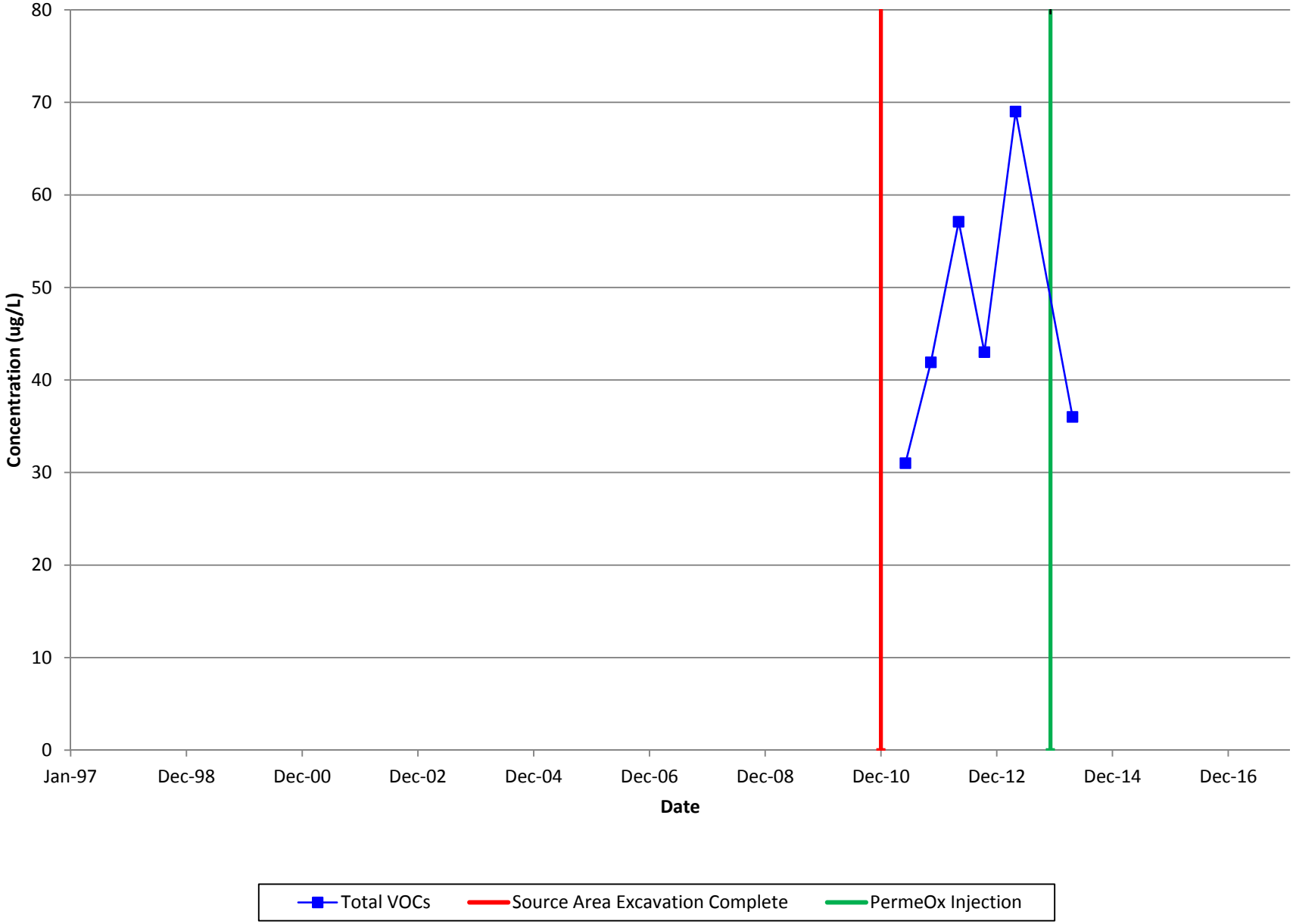


Figure 3-12 AOC9-MW19 Trend Analysis



4 Effectiveness of Remedy

Since baseline sampling, the center line of plume monitoring wells (MW14, MW15, and MW17) have seen a significant reduction in total VOC contamination concentration with only some slight seasonal variations. Downgradient wells MW05 and MW06 continue to be below RAOs. The lateral wells, MW01 and MW02, and the upgradient well, MW18, have shown a decrease in concentration since baseline sampling. The source area concentrations have decreased since the excavation and continue to show some seasonal variation with concentrations remaining less than 100 µg/L at MW19.

Based on the significant reductions seen in VOC concentrations in source area well MW19 and within the centerline of the contaminant plume in comparison to sample data collected prior to the remedial excavation, and the stability of the leading edge of the plume as indicated by the VOC concentrations obtained from MW06, the AOC 9 groundwater remedy has been effective during this long-term monitoring period.

Long-term monitoring will occur with an annual sampling event planned for spring of 2015. Nine wells (MW-01, MW-02, MW-05, MW-06, MW-14, MW-15, MW-17, MW-18, and MW-19) and three surface water locations (SW-01, SW-02, and SW-03) will be sampled as part of long-term monitoring.

The performance of the remedy will continue to be monitored through long-term monitoring to evaluate the groundwater chemistry and contamination biodegradation and/or migration. Monitoring will be ongoing according to the following schedules:

- Long-term monitoring is planned for the spring of 2015. Nine wells (MW-01, MW-02, MW-05, MW-06, MW-14, MW-15, MW-17, MW-18, and MW-19) and three surface water locations (SW-01, SW-02, and SW-03) will be sampled as part of long-term monitoring.
- The performance of the PermeOx injections will be monitored by sampling at MW-14, which is immediately downgradient of the injection zone. Sampling will occur quarterly for the remainder of 2014 (no quarterly sampling planned in 2015) to measure the concentration of DO in the groundwater. The evidence of DO (approximately 0.5 ppm or higher) is sufficient to demonstrate that the microbe oxygen demand has been met.

In accordance with the Record of Decision, monitoring of the groundwater plume and treatment performance will be performed by the Air Force until RAOs are achieved, i.e., until four consecutive sampling rounds are below the remediation goals listed in Table 2-1.

It is anticipated that a report will be prepared in late 2014 supporting a recommendation that the site has met operating properly and successfully criteria. A CERCLA five-year review of the site will be completed in 2015.

4.1 Recommendations

No changes to the approved long-term monitoring plan sampling protocols or locations are proposed at this time.

5 References

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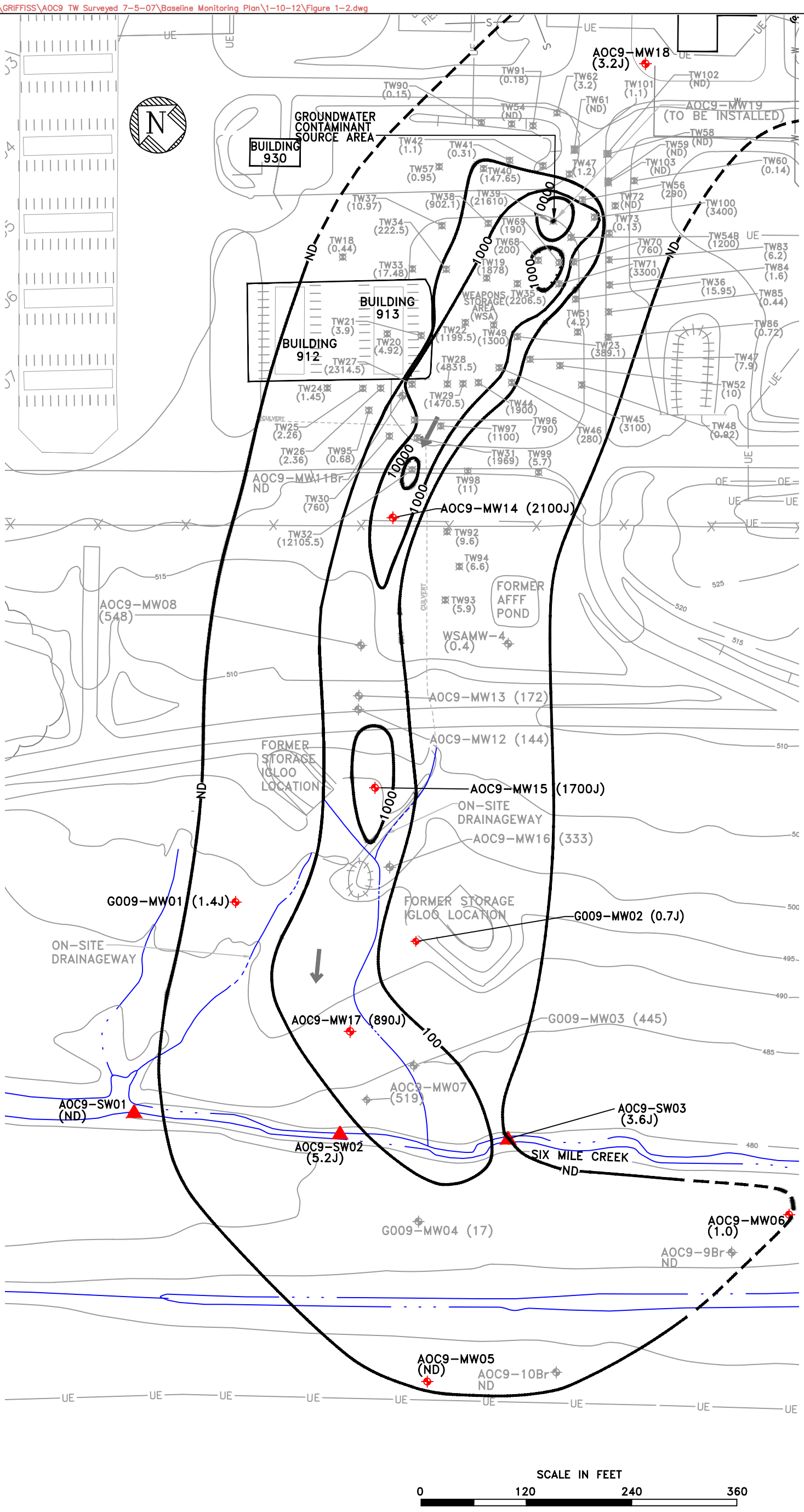
A

Final Performance Monitoring Data Summary Report Figures

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\1-10-12\Figure 1-2.dwg



LEGEND

525	TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
ND	NOT DETECTED
10000	TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
AOC9-MW14	BASELINE MONITORING WELL SAMPLE LOCATION
AOC9-MW08 (548)	EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
(140)	2010 BASELINE SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
→	GROUNDWATER FLOW DIRECTION
▲	SURFACE WATER SAMPLING LOCATIONS
TW99 (5.7)	2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

NOTES:

1. MONITORING WELL AOC9-MW19 WAS INSTALLED AFTER THE BASELINE MONITORING AND REMEDIAL EXCAVATION WERE PERFORMED.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:

- AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
- BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
- MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

SCALE IN FEET

0 120 240 360

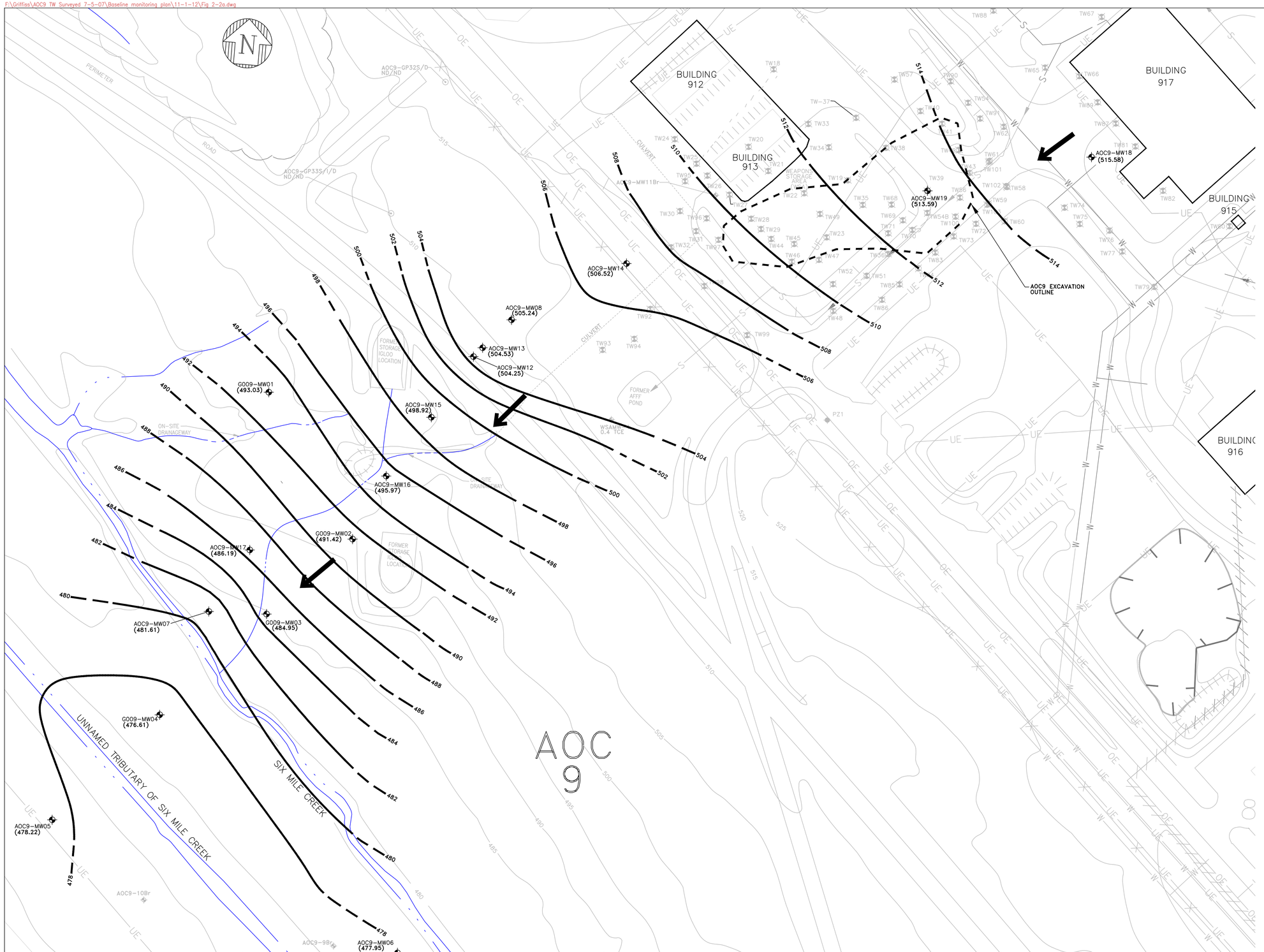
FORMER GRIFFISS AFB
AOC 9 SITE
ROME, NEW YORK

Prepared by:
ecology and environment engineering p.c.
In association with:
parsons

DRAWING TITLE: AOC 9
2010 BASELINE MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 1-2

F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline monitoring plan\11-1-12\Fig 2-2a.dwg



LEGEND

- FENCE
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- UE — UNDERGROUND ELECTRIC
- W — WATER LINE
- S — SANITARY SEWER
- OE — OVERHEAD ELECTRIC
- ABANDONED UNDERGROUND ELECTRIC
- AMSL — ABOVE MEAN SEA LEVEL
- 476 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- DIRECTION OF GROUNDWATER FLOW
- G009-MW01 — PERMANENT MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
- TW44 — TEMPORARY MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- (517.35) — APRIL 16, 2012 GROUNDWATER ELEVATION (FEET AMSL)

NOTE:
1. GROUNDWATER ELEVATIONS WERE COLLECTED ON 4/16/2012.

60 0 60 120
SCALE: 1"=60'

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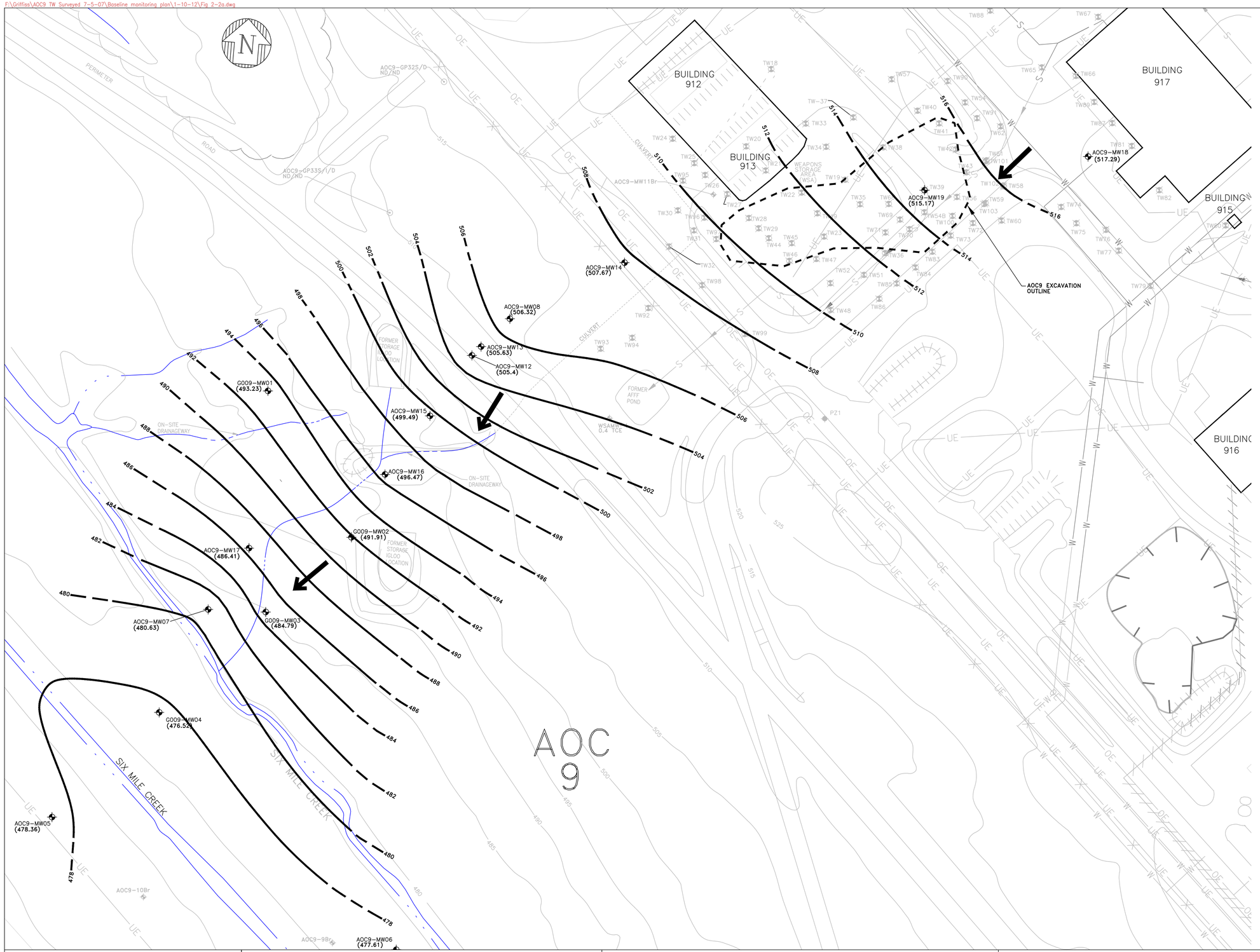
DRAWING TITLE:
AOC 9: GROUNDWATER CONTOUR MAP
APRIL 16, 2012

FIGURE 2-2a

F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline monitoring plan\1-10-12\Fig 2-2a.dwg



LEGEND

X	FENCE
525	TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
UE	UNDERGROUND ELECTRIC
W	WATER LINE
S	SANITARY SEWER
OE	OVERHEAD ELECTRIC
	ABANDONED UNDERGROUND ELECTRIC
AMSL	ABOVE MEAN SEA LEVEL
476	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
	DIRECTION OF GROUNDWATER FLOW
G009-MW01	PERMANENT MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
TW44	TEMPORARY MONITORING WELL LOCATION
PZ-1	PIEZOMETER LOCATION
(517.35)	MAY 17, 2011 GROUNDWATER ELEVATION (FEET AMSL)

NOTE:
1. GROUNDWATER ELEVATIONS WERE COLLECTED ON 5/17/2011.

60 0 60 120
SCALE: 1"=60'

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AOC 9 SITE
ROME, NEW YORK

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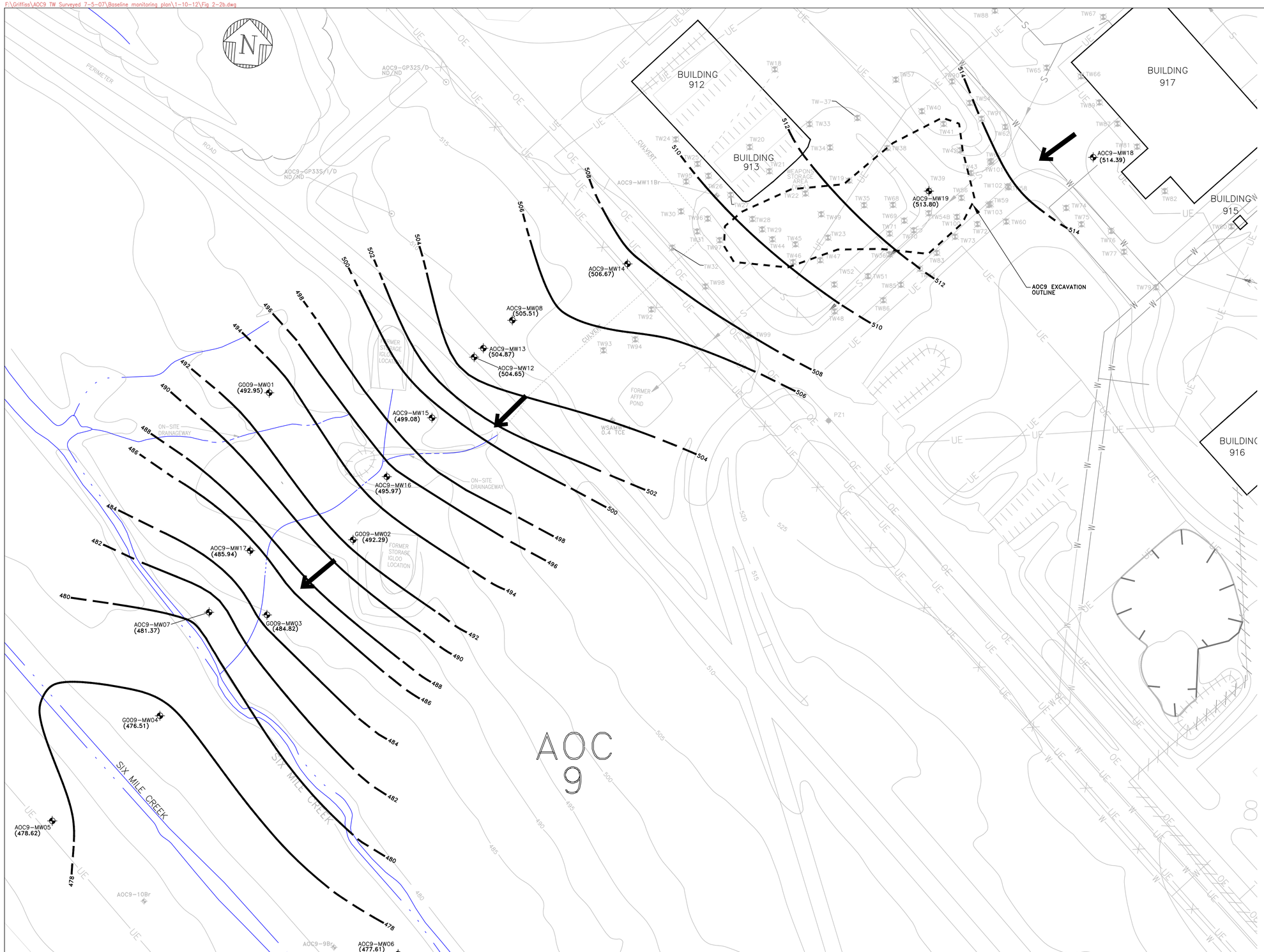
DRAWING TITLE:
AOC 9: GROUNDWATER CONTOUR MAP
MAY 17, 2011

FIGURE 2-2a

F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline monitoring plan\1-10-12\Fig 2-2b.dwg



LEGEND

X	FENCE
525	TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
UE	UNDERGROUND ELECTRIC
W	WATER LINE
S	SANITARY SEWER
OE	OVERHEAD ELECTRIC
	ABANDONED UNDERGROUND ELECTRIC
AMSL	ABOVE MEAN SEA LEVEL
476	GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
	DIRECTION OF GROUNDWATER FLOW
G009-MW01	PERMANENT MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
TW44	TEMPORARY MONITORING WELL LOCATION
PZ-1	PIEZOMETER LOCATION
(517.35)	MAY 17, 2011 GROUNDWATER ELEVATION (FEET AMSL)

NOTE:
1. GROUNDWATER ELEVATIONS WERE COLLECTED ON 10/24/2011.

60 0 60 120
SCALE: 1"=60'

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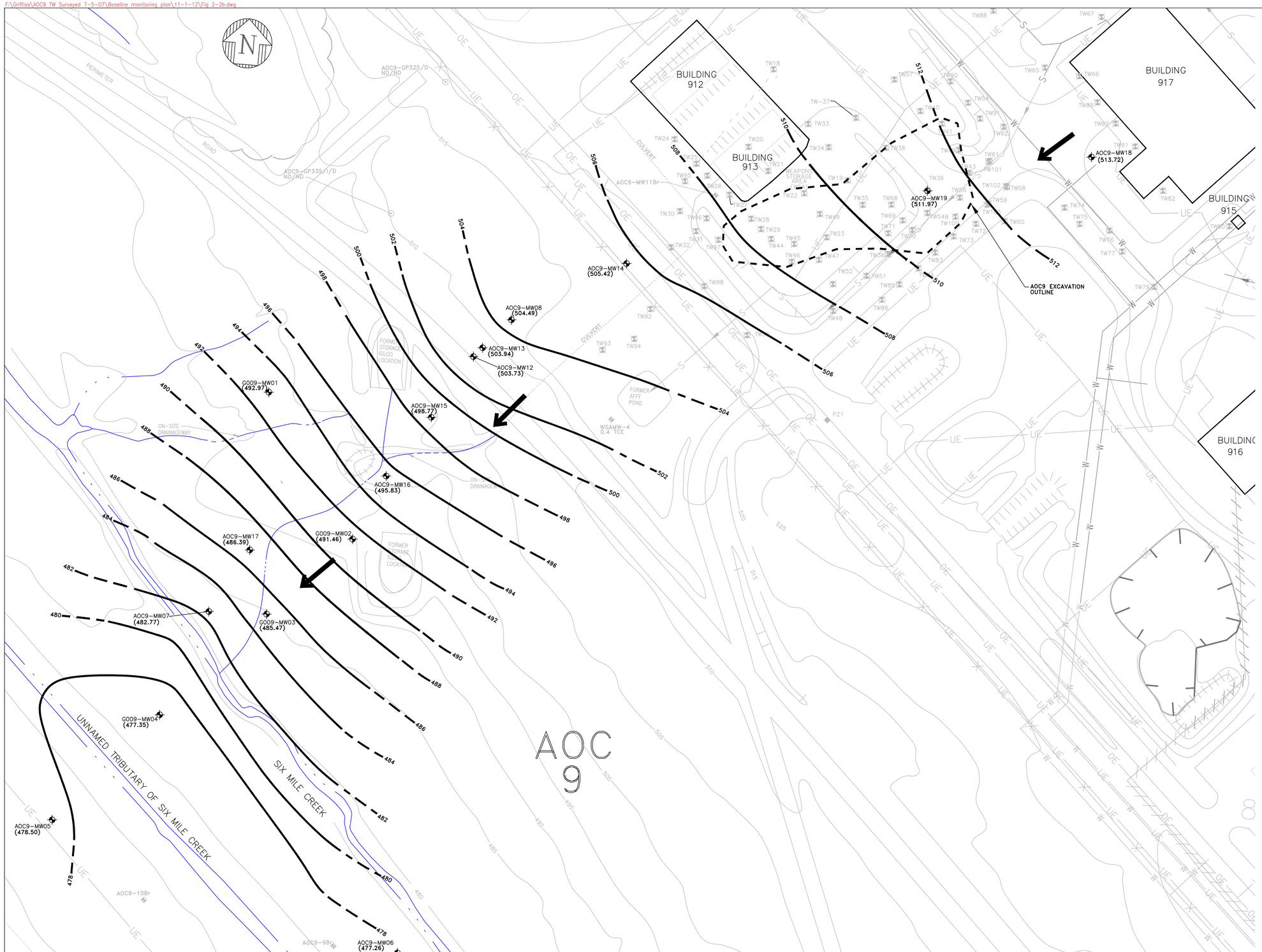
AOC 9: GROUNDWATER CONTOUR MAP
OCTOBER 24, 2011

FIGURE 2-2b

F:\Griffiss\AOC9 TW Surveyed 7-5-07\Baseline monitoring plan\11-1-12\Fig 2-2b.dwg



LEGEND

- FENCE
- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- UE — UNDERGROUND ELECTRIC
- W — WATER LINE
- S — SANITARY SEWER
- OE — OVERHEAD ELECTRIC
- ABANDONED UNDERGROUND ELECTRIC
- AMSL — ABOVE MEAN SEA LEVEL
- 476 — GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- DIRECTION OF GROUNDWATER FLOW
- G009-MW01 — PERMANENT MONITORING WELL LOCATION WITH GROUNDWATER ELEVATION
- TW44 — TEMPORARY MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- (517.35) — SEPTEMBER 25, 2012 GROUNDWATER ELEVATION (FEET AMSL)

NOTE:
1. GROUNDWATER ELEVATIONS WERE COLLECTED ON 9/25/2012.

60 0 60 120

SCALE: 1"=60'

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AOC 9 SITE
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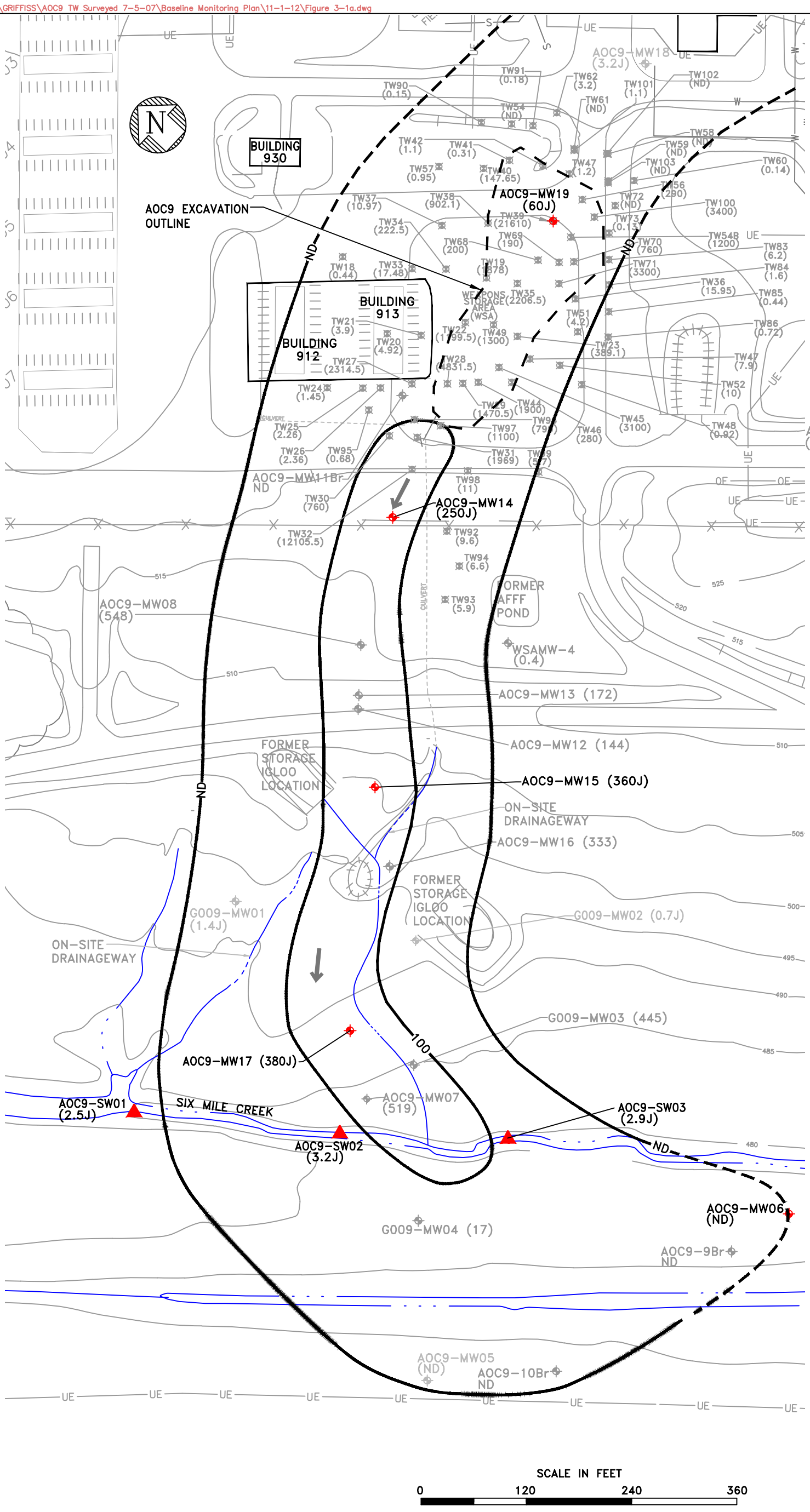
AOC 9: GROUNDWATER CONTOUR MAP
SEPTEMBER 25, 2012

FIGURE 2-2b

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\11-1-12\Figure 3-1a.dwg



LEGEND

- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- ND — NOT DETECTED
- 10000 — TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
- AOC9-MW14 — PERFORMANCE MONITORING WELL SAMPLE LOCATION
- AOC9-MW08 (548) — EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
- (31) — APRIL 2012 PERFORMANCE SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
- → GROUNDWATER FLOW DIRECTION
- ▲ SURFACE WATER SAMPLING LOCATIONS
- TW99 (5.7) — 2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

SCALE IN FEET
0 120 240 360

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:
   - AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
   - BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
   - MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

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AOC 9 SITE
ROME, NEW YORK

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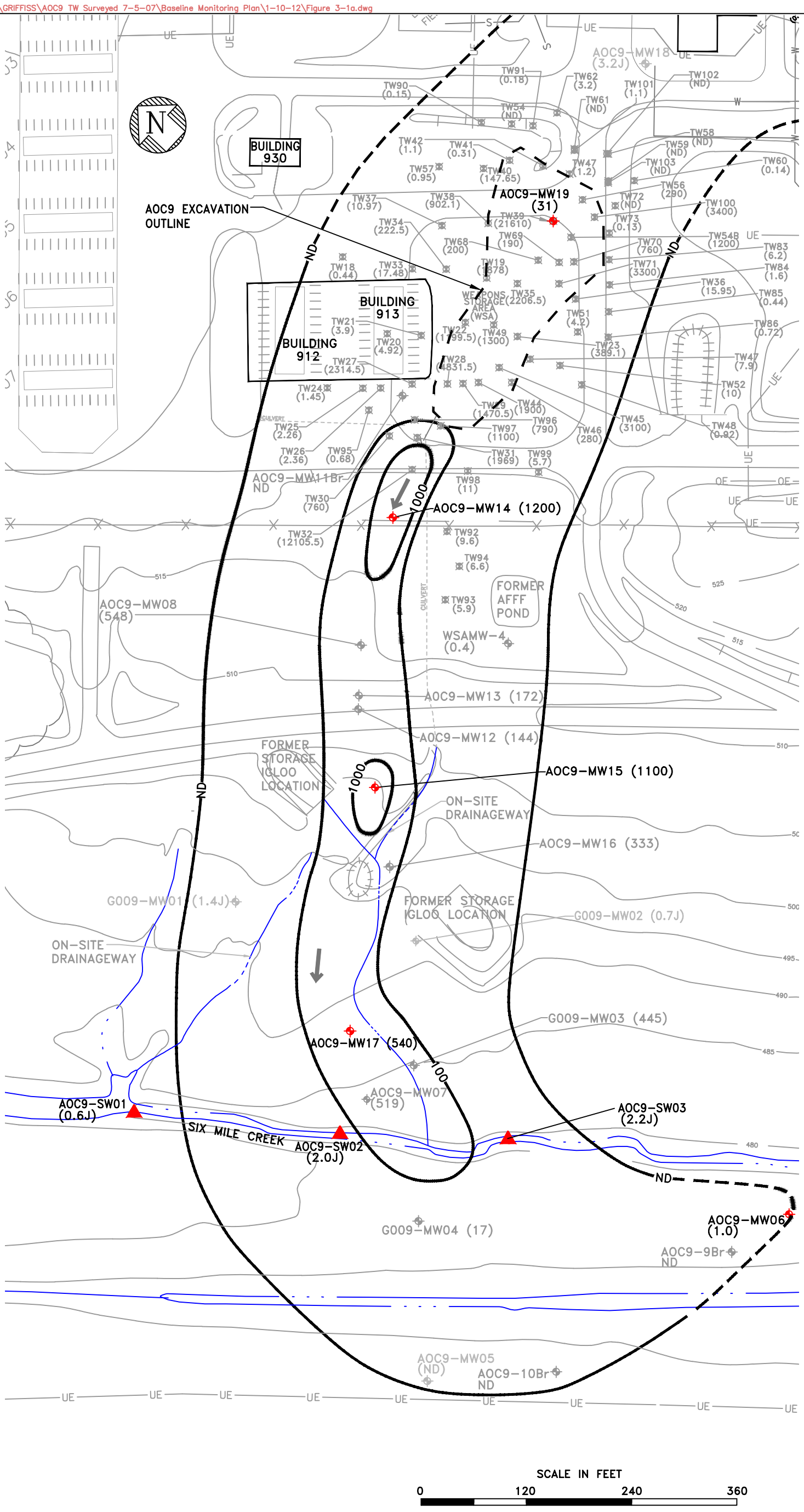
In association with:
parsons

DRAWING TITLE: AOC9
APRIL 2012 PERFORMANCE MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 3-1a

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\1-10-12\Figure 3-1a.dwg



SCALE IN FEET

0 120 240 360

LEGEND

- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- ND — NOT DETECTED
- 10000 — TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
- AOC9-MW14 — PERFORMANCE MONITORING WELL SAMPLE LOCATION
- AOC9-MW08 (548) — EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
- (31) — MAY 2011 PERFORMANCE SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
- → GROUNDWATER FLOW DIRECTION
- ▲ SURFACE WATER SAMPLING LOCATIONS
- TW99 (5.7) — 2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:
   - AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
   - BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
   - MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

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AOC 9 SITE
ROME, NEW YORK

Prepared by:
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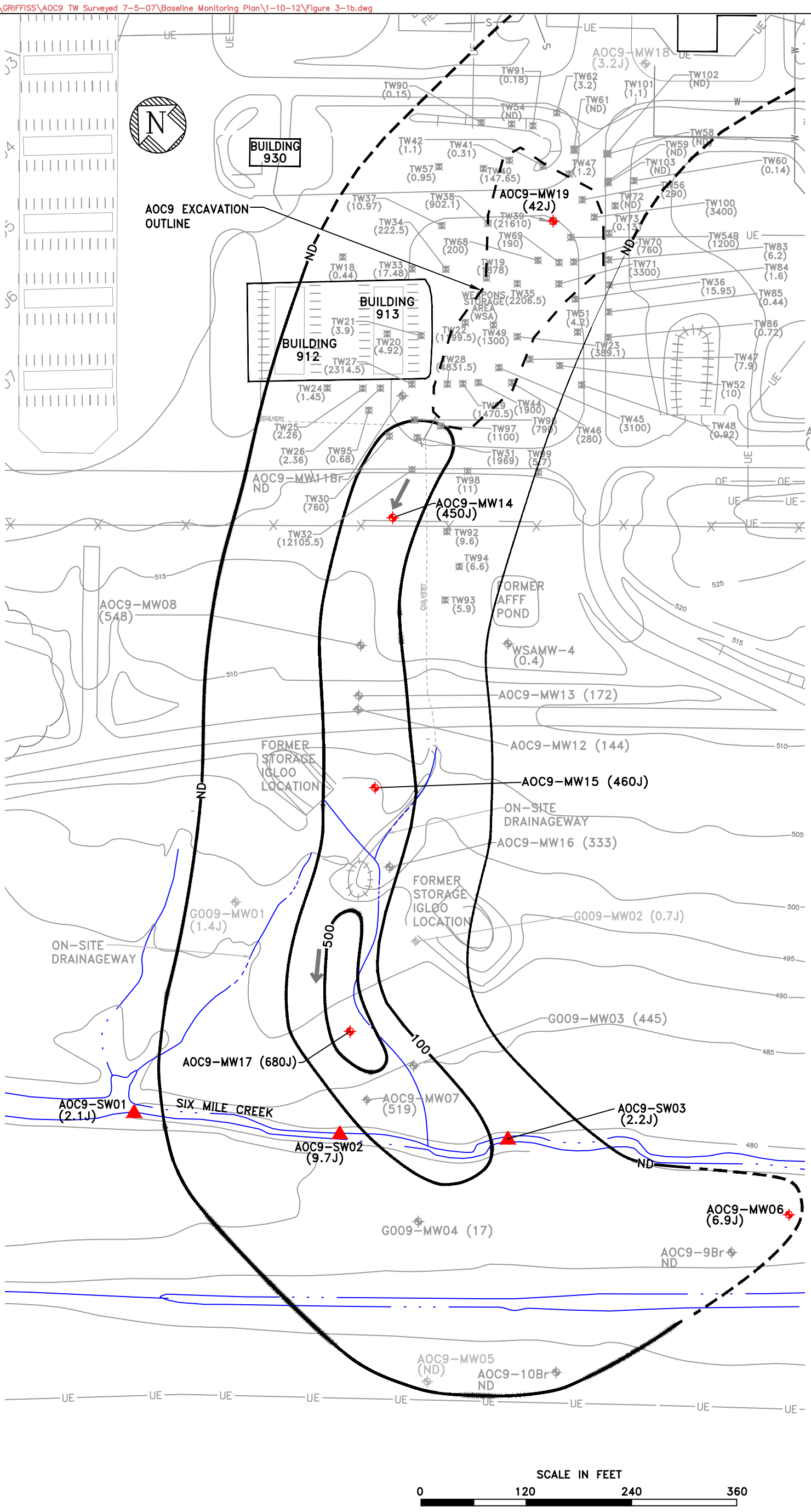
In association with:
parsons

DRAWING TITLE: AOC9
MAY 2011 PERFORMANCE MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 3-1a

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\1-10-12\Figure 3-1b.dwg



LEGEND

525	TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
ND	NOT DETECTED
10000	TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
AOC9-MW14	PERFORMANCE MONITORING WELL SAMPLE LOCATION
AOC9-MW08 (548)	EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
(31)	OCTOBER 2011 PERFORMANCE SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
→	GROUNDWATER FLOW DIRECTION
▲	SURFACE WATER SAMPLING LOCATIONS
TW99 (5.7)	2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

SCALE IN FEET
0 120 240 360

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:
   - AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
   - BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
   - MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

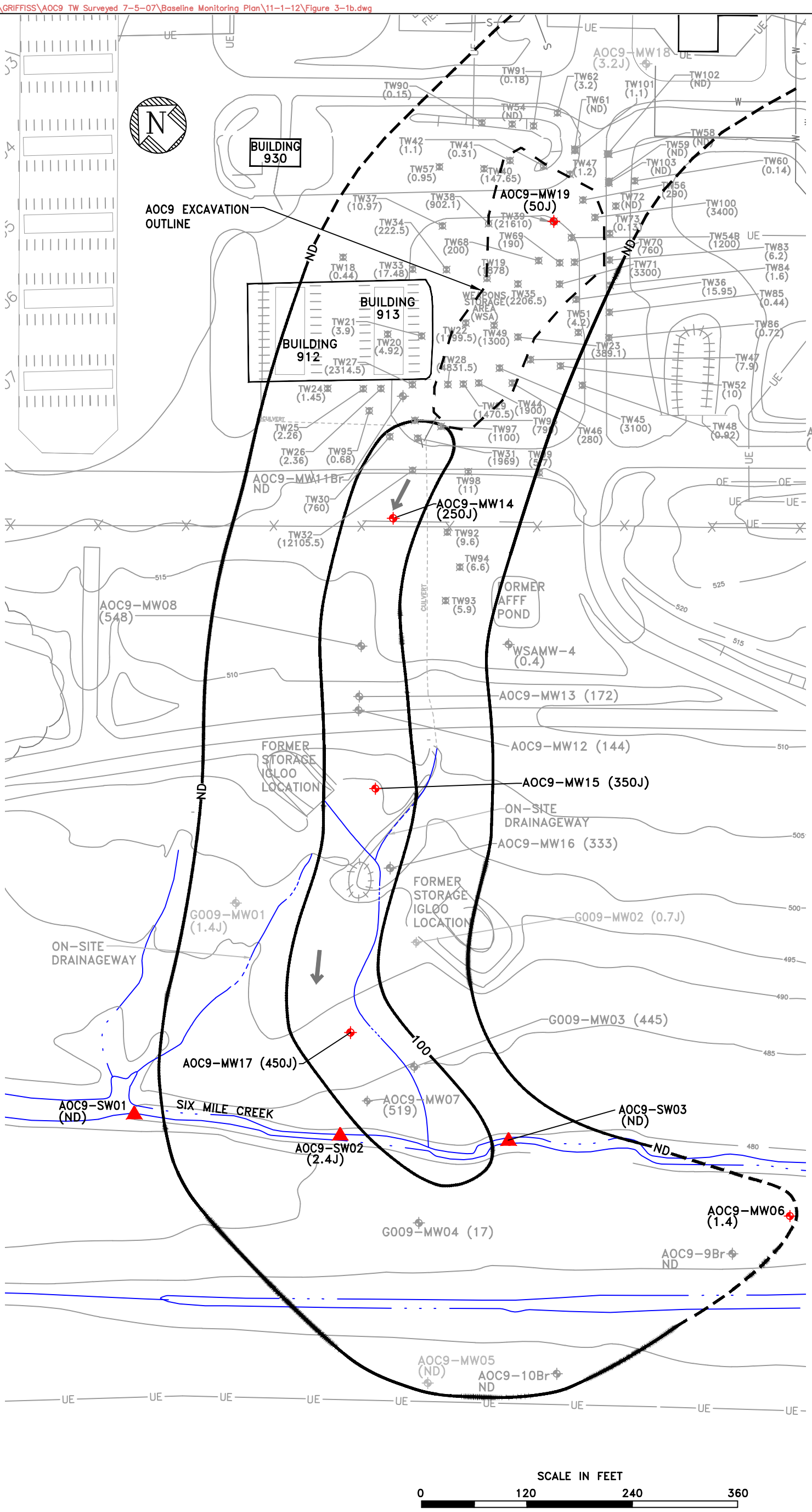
FORMER GRIFFISS AFB
AOC 9 SITE
ROME, NEW YORK

Prepared by:
ecology and environment engineering p.c.
In association with:
parsons

DRAWING TITLE: AOC9
OCTOBER 2011 PERFORMANCE MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 3-1b

F:\GRIFFISS\AOC9 TW Surveyed 7-5-07\Baseline Monitoring Plan\11-1-12\Figure 3-1b.dwg



LEGEND

- 525 — TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- ND — NOT DETECTED
- 10000 — TOTAL VOC CONTOUR IN ug/L (DASHED WHERE INFERRED)
- AOC9-MW14 — PERFORMANCE MONITORING WELL SAMPLE LOCATION
- AOC9-MW08 (548) — EXISTING WELL WITH HISTORIC TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L), SEE NOTES BELOW
- (31) — SEPTEMBER 2012 PERFORMANCE SAMPLING TOTAL VOC CONCENTRATION IN GROUNDWATER AND SURFACE WATER (ug/L)
- → GROUNDWATER FLOW DIRECTION
- ▲ SURFACE WATER SAMPLING LOCATIONS
- TW99 (5.7) — 2006 AND 2007 PREDESIGN TEMPORARY MONITORING WELL TOTAL VOC CONCENTRATION IN GROUNDWATER (ug/L)

SCALE IN FEET
0 120 240 360

NOTES:

1. MONITORING WELL AOC9-MW19 IS A NEW WELL INSTALLED IN THE PLUME SOURCE AREA AFTER THE AOC9 GROUNDWATER REMEDY WAS COMPLETED, AND PRIOR TO PERFORMANCE MONITORING. AOC9-MW19 WAS INSTALLED AT THE LOCATION OF TEMPORARY WELL TW-39, WHICH CONTAINED 21,610 ug/L OF TOTAL VOCs IN GROUNDWATER.
2. WHEN DUPLICATE SAMPLES ARE COLLECTED, THE HIGHEST VALUE OBTAINED IS USED ON THIS FIGURE.
3. TOTAL VOC CONCENTRATIONS IN GROUNDWATER FOR:
   - AOC9-MW03, MW04, MW07, MW08 MW12, AND MW16 ARE SAMPLES COLLECTED DURING THE ON-BASE GROUNDWATER BASELINE SAMPLING IN 2006.
   - BEDROCK MONITORING WELLS AOC9-9Br, 10Br, AND 11Br ARE FROM SAMPLES COLLECTED DURING THE BEDROCK GROUNDWATER STUDY IN 2002.
   - MONITORING WELLS AOC9-MW13 AND WSAMW-4 ARE FROM SAMPLES COLLECTED IN 2004 DURING BASEWIDE GROUNDWATER MONITORING.

FORMER GRIFFISS AFB
AOC 9 SITE
ROME, NEW YORK

Prepared by:
ecology and environment engineering p.c.
In association with:
parsons

DRAWING TITLE: AOC9
SEPTEMBER 2012 PERFORMANCE MONITORING TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN GROUNDWATER AND SURFACE WATER

FIGURE 3-1b

B Daily Activity Forms

Daily Activity Summary	
Date: 04/01/2014	**Report No.: 01**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Partly cloudy, low 40s (F)**

Personnel	Hrs.	Affiliation	Personnel	Hrs.	Affiliation
Ben Cole	10.0	E&E			
Larry Roedl	10.0	E&E			

Summary of Activities		
Equipment	**AOC/Task**	**Activities Performed**
Water level indicator	Water level measurements	Measure depth to water in wells
PID	Screen well water, head-space	Screen wells and purge water
YSI water quality meter, Lamotte 2020 turbidimeter	Measure wa-ter quality	Measure water quality parameters
Geocontrol flow controller	Purge and sample wells	Control pump flow rate

Daily Activity Summary	
Date: 04/01/2014	**Report No.: 01**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Partly cloudy, low 40s (F)**

Field Tests Performed (Sample's, Field Screening, Chemical testing, Etc.)
Screened well water and headspace for organic vapors with PID; sampled surface water locations SW-01, SW-02, SW-03. Measured water levels in wells.
Work Delays (Due To Weather, Maintenance, Breakdowns, Waiting For Decisions)
Did not measure water level in wells MW-08 and MW-12 because Parsons was pumping and measuring DO at these wells. Will measure water levels at these wells first thing next work day.
Problems Encountered And Deviations From Work Plan
None.
Written And Verbal Instruction By The Government
None.
Safety Issues
None.
Planned Activities For Next Work Day
Purge and sample monitoring wells.
Remarks: (Visitors, Completion Of field Work At An AOC, Etc.)
Small beaver dam observed upstream of SW-02 location.
Parsons D. Dolph met with E&E field team briefly in afternoon to cover safety and work plan topics.

Ben Cole 4/2/14

Site Manager Date

Daily Activity Summary	
Date: 04/02/2014	**Report No.: 02**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Clear, 40s (F)**

Personnel	Hrs.	Affiliation	Personnel	Hrs.	Affiliation
Ben Cole	13.0	E&E			
Larry Roedl	12.0	E&E			

Summary of Activities		
Equipment	**AOC/Task**	**Activities Performed**
Water level indicator	Water level measurements	Measure depth to water in wells
PID	Screen well water, head-space	Screen wells and purge water
YSI water quality meter, Lamotte 2020 turbidimeter	Measure wa-ter quality	Measure water quality parameters
Geocontrol flow controller	Purge and sample wells	Control pump flow rate

Daily Activity Summary	
Date: 04/02/2014	**Report No.: 02**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Clear, 40s (F)**

Field Tests Performed (Sample's, Field Screening, Chemical testing, Etc.)
Purged and sampled wells MW-02, MW-05, MW-06, MW-14, MW-18, and MW-19.
Screened well water and head space for organic vapors with PID
Work Delays (Due To Weather, Maintenance, Breakdowns, Waiting For Decisions)
None.
Problems Encountered And Deviations From Work Plan
Altered order of well sampling to prioritize wells MW-14, MW-18 and MW-19 and allow Parsons to measure dissolved oxygen in these wells today, after sample collection.
Written And Verbal Instruction By The Government
E&E Meyers consulted with ACOE and received approval prior to alteration of sample collection order.
Safety Issues
None.
Planned Activities For Next Work Day
Complete purge and sample collection from remaining wells.
Remarks: (Visitors, Completion Of field Work At An AOC, Etc.)
Parsons D. Dolph measured dissolved oxygen at wells MW14, MW18 and MW19 after collection of groundwater samples from these wells.

Ben Cole 4/2/2014

Site Manager Date

Daily Activity Summary	
Date: 04/03/2014	**Report No.: 03**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Clear, 40s (F)**

Personnel	Hrs.	Affiliation	Personnel	Hrs.	Affiliation
Ben Cole	10.0	E&E			
Larry Roedl	10.0	E&E			

Summary of Activities

Equipment	AOC/Task	Activities Performed
Water level indicator	Water level measurements	Measure depth to water in wells
PID	Screen well water, head-space	Screen wells and purge water
YSI water quality meter, Lamotte 2020 turbidimeter	Measure wa-ter quality	Measure water quality parameters
Geocontrol flow controller	Purge and sample wells	Control pump flow rate

Daily Activity Summary	
Date: 04/03/2014	**Report No.: 03**
Project Name: AOC 9 Baseline, Performance, and Long Term Monitoring, Former Griffiss AFB	**Weather: Clear, 40s (F)**

Field Tests Performed (Sample's, Field Screening, Chemical testing, Etc.)
Purged and sampled wells MW-01, MW-15, and MW-17.
Screened well water and head space for organic vapors with PID
Work Delays (Due To Weather, Maintenance, Breakdowns, Waiting For Decisions)
None.
Problems Encountered And Deviations From Work Plan
None.
Written And Verbal Instruction By The Government
None.
Safety Issues
None.
Planned Activities For Next Work Day
Field portion of this task is complete.
Remarks: (Visitors, Completion Of field Work At An AOC, Etc.)
None.

Ben Cole 4/3/2014

Site Manager Date

C Sampling Forms

Surfacewater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: NA
Sample Date: 9/1/14
Sampling Device: clean jar by hand
Well Depth (feet TOIC): NA
Screen Interval (feet BGS): NA
Casing Inner Diameter (inches): NA
Initial PID Reading (ppm): NA

Sample ID: AOC9-SW01LTM040114
Sample Time: 1350
Sample Tubing: NA
Sample Turbidity (NTUs): 3.93
Initial Water Level (Feet TOIC): NA
Final Water Level (feet TOIC): NA
Casing Type: NA

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1350	6.88	5.6	0.133	3.93	NA	185.6	NA	NA	NA	

9/1/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Surfacewater Sampling Form

Surfacewater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: NA
Sample Date: 4/1/14
Sampling Device: clean jar by hand
Well Depth (feet TOIC): NA
Screen Interval (feet BGS): NA
Casing Inner Diameter (inches):NA
Initial PID Reading (ppm): NA

Sample ID: AOC9-SW02 LTM 040114
Sample Time: 1330
Sample Tubing: NA
Sample Turbidity (NTUs): 4.05
Initial Water Level (Feet TOIC):NA
Final Water Level (feet TOIC):NA
Casing Type: NA

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1330	6.67	6.7	0.118	4.05	NA	193.7	NA	NA	NA	

4/1/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Surfacewater Sampling Form

Surfacewater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: NA
Sample Date: 4/1/14
Sampling Device: clean jar by hand
Well Depth (feet TOIC): NA
Screen Interval (feet BGS): NA
Casing Inner Diameter (inches):NA
Initial PID Reading (ppm): NA

Sample ID: ~~AOC9-LTM~~ (3) AOC9-SW03LTM040114
Sample Time: 1305
Sample Tubing: NA 4
Sample Turbidity (NTUs): 4.97
Initial Water Level (Feet TOIC):NA
Final Water Level (feet TOIC):NA
Casing Type: NA

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1305		7.6			NA		NA	NA	NA	
1305	6.18	7.6	0.135	4.97		207.8				

4/1/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Surfacewater Sampling Form

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW01
Sample Date: 4/3/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 9.0
Screen Interval (feet BGS): 4-9
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): B6

Sample ID: G009-MW01LTM040314
Sample Time: 0857
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 0.06
Initial Water Level (Feet TOIC): 1.78
Final Water Level (feet TOIC): 2.40
Casing Type: PVC

mS/cm

Time	pH	Temperature (°C)	Conductivity (~~µs/cm~~ mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (~~gallons~~ L)	Comments
0810	6.66	6.1	0.338	0.91	3.10	203.6	2.10	.4	—	
6815	6.75	6.3	0.340	0.35	2.13	200.2	2.25	.4	~~4l~~ 2l	
0820	7.03	6.3	0.341	0.04	1.39	194.2	2.40	.4	4l	
0825	7.15	6.4	0.342	0.05	1.15	189.5	2.40	.4	6l	
0830	7.29	6.5	0.343	0.00	0.91	187.7	2.40	.4	8l	
0835	7.39	6.6	0.343	0.03	0.70	181.0	2.40	.4	10l	
0840	7.43	6.7	0.344	0.09	0.60	180.3	2.40	.4	12l	
0845	7.48	6.7	0.344	0.06	0.79	179.4	2.40	.4	14l	
0850	7.50	6.7	0.344	0.05	0.45	179.5	2.40	.4	16l	
0855	7.50	6.7	0.344	0.06	0.96	179.6	2.40	.4	18l	
								sample flow rate 200 mL/min.		approx

4/3/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

MS/MSD

Figure 3-4 Groundwater Sampling Form

9 - 1.78 = 7.22 × .163 = 1.18 gal / well vol
= 3.5 gal = 3 well vol
× 3.78 = 13.4 liters

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW02
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 14
Screen Interval (feet BGS): 4-14
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): 36

Sample ID: ~~AOC9~~ GOO9-MW02LTM040214
Sample Time: 1817
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 0.77
Initial Water Level (Feet TOIC): 4.41
Final Water Level (feet TOIC): 5.11
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1715	13.81	4.2	0.325	25.4	6.02	159.0	5.05	300 ml	–	Started, disassembled
1730	8.53	4.5	0.367	11.83	4.56	66.4	4.95	.300	4.5 l	and checked
1735	8.08	4.3	0.364	4.03	7.16	97.0	5.10	0.30	6 l	mixed, reset.
1740	8.01	4.3	0.366	4.04	7.02	94.6	5.10	0.3	7.5 l	flow thru cell, pH
1745	7.18	4.3	0.368	3.41	6.88	86.7	5.10	0.3	9 l	
1750	7.08	4.3	0.367	2.97	6.85	82.8	5.12	0.3	10.5 l	
1755	7.02	4.3	0.369	1.92	4.52	79.4	5.11	0.3	12 l	
1800	6.97	4.3	0.370	1.55	5.15	77.4	5.11	0.3	13.5 l	
1805	6.92	4.3	0.371	1.23	5.21	74.6	5.13	0.3	15 l	
1810	6.91	4.3	0.372	0.98	5.30	73.4	5.11	0.3	16.5 l	
1815	6.89	4.2	0.372	0.77	5.29	72.9	5.11	0.3	18 l	
								sample flow rate approx 200mL/m.		

4/2/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Groundwater Sampling Form

$\frac{14 - 4.41}{9.59} \times .163 = 1.56$ gal = 1 vol
4.7 gal = 3 vol
18 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: AOC9-MW05
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 14.0
Screen Interval (feet BGS): 4-14.0
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): BG

Sample ID: AOC9-MW05LTM040214
Sample Time: 1000
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 1.79
Initial Water Level (Feet TOIC): 4.25
Final Water Level (feet TOIC): 5.24
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
0830	5.95	3.0	0.181	4.99	9.58	304.8	4.72	0.2	~~1~~ litres	
0835	5.73	2.9	0.118	5.50	8.32	299.5	5.02	0.2	~~2 l~~ 1l	
0840	5.70	2.9	0.112	4.14	7.92	292.0	5.14	0.2	~~4 l~~ 2l	
0845	5.75	3.0	0.109	3.31	7.67	285.1	5.14	0.2	3 l	
0850	5.80	3.2	0.106	~~2.15~~ 2.61	7.57	279.9	5.16	0.2	4 l	
0855	5.83	3.3	0.105	2.15	7.58	275.7	5.20	0.2	5 l	
0900	5.90	3.4	0.104	2.20	7.56	268.7	5.20	0.2	6 l	
0905	5.99	3.4	0.104	1.89	7.53	263.1	5.21	0.2	7 l	
0910	6.01	3.4	0.103	1.90	7.52	258.0	5.24	0.2	8 l	
0915	6.05	3.5	0.103	1.36	7.48	258.1	5.24	0.2	9 l	
0920	6.07	3.5	0.104	1.97	7.45	255.7	5.24	0.2	10 l	
0925	6.09	3.6	0.103	1.52	7.43	253.0	5.24	0.2	11 l	
0930	6.10	3.6	0.104	1.36	7.48	251.9	5.24	0.2	12 l	
0935	6.11	3.6	0.104	1.48	7.44	249.9	5.24	0.2	13 l	
0940	6.13	3.6	0.105	1.11	7.41	248.9	5.24	0.2	14 l	
0945	6.13	3.5	0.106	1.81	7.40	246.1	5.24	0.2	15 l	
0950	6.14	3.6	0.106	1.77	7.39	245.9	5.24	0.2	16 l	
0955	6.14	3.6	0.105	1.79	7.43	244.7	5.24	0.2	17 l	

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DQ = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

4/2/14

Sample flow rate 200 mL/m.

Figure 3-4 Groundwater Sampling Form

14
- 4.25
9.75 x 0.163 = 1.5 gal = 1 vol
4.5 " = 3 vol
17 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: AOC9-MW06
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 14-2
Screen Interval (feet BGS): 4-2-14-2
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): BG

Sample ID: AOC9-MW06LTM040214
Sample Time: 1212
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 4.27
Initial Water Level (Feet TOIC): 5.25
Final Water Level (feet TOIC): 5.31
Casing Type: PVC

← ms/cm

Time	pH	Temperature (°C)	Conductivity (ms/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1050	8.50	5.8	0.300	10.65	6.70	223.7	6.86	0.4	- liters	
1055	8.59	5.6	0.292	24.2	11.21	222.2	5.43	0.2	2 l	
1100	9.04	5.9	~~4/1/14 205.5~~ 0.320	12.7	10.38	205.2	5.31	0.2	3 l	
1105	7.74	6.0	0.311	14.5	8.65	201.9	5.31	0.2	4 l	
1110	7.43	6.0	0.320	14.4	4.97	198.6	5.32	0.2	5 l	
1115	8.26	6.2	0.316	13.1	5.28	195.9	5.31	0.2	6 l	
1120	9.30	5.9	0.315	11.57	5.64	196.3	5.31	0.2	7 l	
1125	9.61	6.0	0.311	9.96	5.40	196.3	5.31	0.2	8 l	
1130	7.09	6.1	0.311	10.11	7.00	196.9	5.31	0.2	9 l	
1135	9.64	6.0	0.307	7.93	5.76	195.4	5.31	0.2	10 l	
1140	9.61	5.9	0.311	8.64	4.90	193.4	5.31	0.2	11 l	
1145	9.59	6.1	0.309	5.89	4.45	191.3	5.31	0.2	12 l	
1150	9.55	6.1	0.309	5.64	4.39	192.4	5.31	0.2	13 l	
1155	9.57	6.2	0.308	6.50	4.40	189.8	5.31	0.2	14 l	
1200	9.60	6.2	0.308	6.37	4.40	190.3	5.31	0.2	15 l	
1205	9.61	6.2	0.307	6.52	4.36	189.1	5.31	0.2	16 l	
1210	9.61	6.3	0.306	~~4/1/14 0.884.27~~	4.43	188.7	5.31	0.2	17 l	

4/2/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

sample flow rate 200 ml/m.

Figure 3-4 Groundwater Sampling Form

14-2
- 5.25
8.95 × .163 = 1.46 g
= 4.4 g / 16.5 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW14
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 24.0
Screen Interval (feet BGS): 14-24
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): Bz

Sample ID: AOC9-MW14LTM040214
Sample Time: 1447
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 8.15
Initial Water Level (Feet TOIC): 13.80
Final Water Level (feet TOIC): 13.79
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (mS/cm) (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1350	9.61	8.9	0.035	65	13.28	112.4	13.80	0.8	~litres	
1355	8.89	8.9	0.040	59	12.35	109.0	13.79	0.4	4l	
1400	8.05	9.1	0.015	67.5	9.88	98.0	~~13.79~~ 13.80 4/2/14	0.4	6l	
1405	7.75	9.1	0.017	62.5	9.33	92.5	13.80	0.4	10l	
1410	8.53	9.0	0.022	48.1	8.93	97.4	13.79	0.4	12l	
1415	9.58	9.1	0.010	35.3	8.43	97.6	13.79	0.4	14l	
1420	11.33	9.0	0.022	27.7	7.83	106.4	13.79	0.4	16l	
1425	11.77	9.1	0.012	20.7	7.55	107.0	13.79	0.4	18l	
1430	11.54	9.1	0.019	15.5	7.15	109.6	13.79	0.4	20l	
1435	11.42	9.1	0.017	11.5	6.84	99.6	13.79	0.4	22l	
1440	11.61	9.1	0.017	11.87	6.61	102.3	13.79	0.4	24l	
1445	11.54	9.1	0.020	8.15	6.54	102.1	13.79	0.4	26 l	

4/2/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

sample flow rate approx 200 mL/m.

Figure 3-4 Groundwater Sampling Form

$\frac{24 - 13.8}{10.2} \times 0.163 = 1.66$ gal = 1 vol
5 gal = 18.8 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW15
Sample Date: 4/3/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 14
Screen Interval (feet BGS): 9-14
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): BG

Sample ID: A009-MW15-LTM040314
Sample Time: 1227
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 2.59
Initial Water Level (Feet TOIC): 2.64
Final Water Level (feet TOIC): 2.65
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (ms/cm) (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1135	7.57	6.2	0.402	19.5	10.55	81.9	2.64	1 lpm	—	pulled pump to check lines due to air in line
1145	7.18	6.6	0.487	11.16	0.63	-57.4	2.72	0.4 lpm	5 l	
1150	7.24	6.7	0.493	10.51	0.56	-63.6	2.65	0.4	7 l	
1155	7.19	6.7	0.487	7.99	0.22	-72.3	2.65	0.4	9 l	
1200	7.24	6.8	0.488	5.50	0.18	-74.7	2.65	0.4	11 l	
1205	7.24	6.8	0.490	3.88	0.17	-76.8	2.65	0.4	13 l	
1210	7.24	6.8	0.491	2.75	0.19	-77.0	2.65	0.4	15 l	
1215	7.24	6.8	0.492	4.54	0.17	-77.6	2.65	0.4	17 l	
1220	7.24	6.8	0.491	2.76	0.16	-77.9	2.65	0.4	19 l	
1225	7.24	6.8	0.491	2.59	0.17	-77.6	2.65	0.4	21 l	
								Sample flow rate approx 200 mL/m.		

4/3/14

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Groundwater Sampling Form

14-2.64
= 11.36 x .163
= 1.85 gal/vol
3 vol = 5.56 gal
= 21 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW17
Sample Date: 4/3/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 19
Screen Interval (feet BGS): 9-19
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): BG

Sample ID: AOC9 - MW17LTM040314 and field dup AOC9-MW17DLTM040314
Sample Time: 1112
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 3.74
Initial Water Level (Feet TOIC): 3.26
Final Water Level (feet TOIC): 4.00
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
0930	7.44	4.5	0.325	15.86	8.36	211.5	3.26	0.2	—	
0935	7.46	5.3	0.320	9.31	4.80	181.6	3.75	0.2	1 l	
0940	7.54	5.8	0.318	10.48	2.96	38.5	4.00	0.2	2 l	
0945	7.55	5.8	0.318	11.26	2.70	33.0	4.00	0.2	3 l	
0950	7.57	6.0	0.318	9.91	1.87	-5.3	4.00	0.2	4 l	
0955	7.58	6.1	0.318	7.81	1.63	-16.6	4.00	0.2	5 l	
1000	7.58	6.2	0.319	6.06	1.32	-23.4	4.00	0.2	6 l	
1005	7.59	6.0	0.321	5.42	0.83	-35.7	4.00	0.2	7 l	
1010	7.58	6.1	0.320	5.14	0.79	-35.8	4.00	0.2	8 l	
1015	7.56	6.1	0.320	4.97	0.69	-36.4	4.00	0.2	9 l	
1020	7.58	6.1	0.321	5.36	0.53	-40.7	4.00	0.2	10 l	
1025	7.58	6.1	0.321	4.59	0.41	-43.2	4.00	0.2	11 l	
1030	7.58	6.1	0.322	4.82	0.37	-44.5	4.00	0.2	12 l	
1035	7.58	6.1	0.323	4.92	0.35	-44.2	4.00	0.2	13 l	
1040	7.57	6.4	0.323	4.95	0.29	-46.9	4.00	0.2	14 l	
1045	7.57	6.4	0.323	4.82	0.30	-45.9	4.00	0.2	15 l	
1050	7.58	6.5	0.324	4.61	0.26	-47.0	4.00	0.2	16 l	
1055	7.59	6.5	0.325	4.53	0.25	-47.1	4.00	0.2	17 l	
1100	7.59	6.5	0.325	3.62	0.22	-48.0	4.00	0.2	18 l	

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

field dup

Figure 3-4 Groundwater Sampling Form

14 - 3.26 = 10.74 x .163 = 1.75 gal = 1 vol
Page 1 of 2
5.25 gal = 3 vol
= 19.85 l

Groundwater Sampling Form

Well No.: MW17 ms/cm **Date:** 4/3/14

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (Gallons)	Comments
1105	7.58	6.5	0.324	4.07	0.23	-47.9	4.00	0.2	19L	
1110	7.58	6.5	0.324	3.74	0.22	-48.1	4.00	0.2	20L	
						4/3/14				
								Sample flow rate approx 200 mL/m.		

Key:

°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Groundwater Sampling Form

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: mw18
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 19
Screen Interval (feet BGS): 9-19
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): 86

Sample ID: AOC9 - mw18 LTM 040214
Sample Time: 1647
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 10.0
Initial Water Level (Feet TOIC): 14.19
Final Water Level (feet TOIC): 14.21
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume (gallons)	Comments
1615	7.45	9.1	0.262	12.9	80.6	148.8	14.21	.25	—	
1620	7.16	9.1	0.256	10.49	6.36	163.6	14.21	.25	2.25 l	
1625	7.05	9.1	0.257	9.20	5.39	171.8	14.21	.25	4.5 l	
1630	7.05	9.1	0.257	10.29	4.91	174.3	14.21	.25	6.75 l	
1635	7.05	9.1	0.257	10.60	4.79	175.1	14.21	.25	9 l	
1640	7.04	9.1	0.257	11.40	4.66	176.3	14.21	.25	11.25 l	
1645	7.02	9.1	0.255	10.0	4.56	178.9	14.21	.25	13.5 l	
					4/2/14					
								sample	flow rate	approx 250 ml/m

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

Figure 3-4 Groundwater Sampling Form

19
- 14.19
4.81 x .163 = .78 gal = 1 vol
2.35 gal = 3 vol
= 9 l

Groundwater Sampling Form

Project: AOC 9 Baseline, Performance, Long Term Monitoring
Site: AOC 9-Former Griffiss Air Force Base
Well No.: MW 19
Sample Date: 4/2/14
Sampling Device: QED T1200 bladder pump
Well Depth (feet TOIC): 19
Screen Interval (feet BGS): 9-19
Casing Inner Diameter (inches): 2
Initial PID Reading (ppm): B6

Sample ID: AOC9-MW 19 LTM 040214
Sample Time: 1552 AOC9-MW19/D LTM040214
Sample Tubing: QED teflon-lined polyethylene
Sample Turbidity (NTUs): 13.2
Initial Water Level (Feet TOIC): 9.26
Final Water Level (feet TOIC): 9.32
Casing Type: PVC

Time	pH	Temperature (°C)	Conductivity (µs/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Water Level (ft TOIC)	Flow Rate (LPM)	Purge Volume ~~(gallons)~~ L	Comments
1500	6.60	7.8	0.030	95	12.90	51.3	9.26	450 mL	-	
1510	6.52	7.7	0.024	26	12.98	82.5	9.34	.45	2.25 l	
1515	6.46	7.9	0.022	70.5	11.41	101.1	9.37	.45	4.5 l	
1520	6.62	7.9	0.682	41.6	4.53	87.8	9.32	.45	6.75 l	
1525	6.68	7.9	0.627	32.3	5.08	84.8	9.32	.45	9 l	
1530	6.73	8.0	0.590	24.1	5.38	86.6	9.32	.45	11.25 l	
1535	6.79	8.0	0.550	19.7	5.73	87.3	9.32	.45	14 l	
1540	6.80	8.1	0.547	16.1	5.76	88.3	9.32	.45	16.25 l	
1545	6.80	8.1	0.523	13.1	5.88	89.8	9.32	.45	18.50 l	
1550	6.82	8.1	0.535	13.2	5.95	89.0	9.32	.45	20.75	
1										
					4/2/14			sample flow rate	approx 250 mL/m	

Key:
°C = Degrees centigrade.
BGS = Below ground surface.
DO = Dissolved Oxygen
LPM = Liters per minute
mg/L = Milligrams per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric turbidity unit.
NTU = Nephelometric turbidity unit.
ORP = Redox potential
ppm = Parts per million.
PVC = Polyvinyl chloride.
TOIC = Top of inner (PVC) casing.

field duplicate

Figure 3-4 Groundwater Sampling Form

19
- 9.26
9.74 x .163 = 1.59 gal
3 vol = 4.76 gal
18 l

1 vol

D Photolog

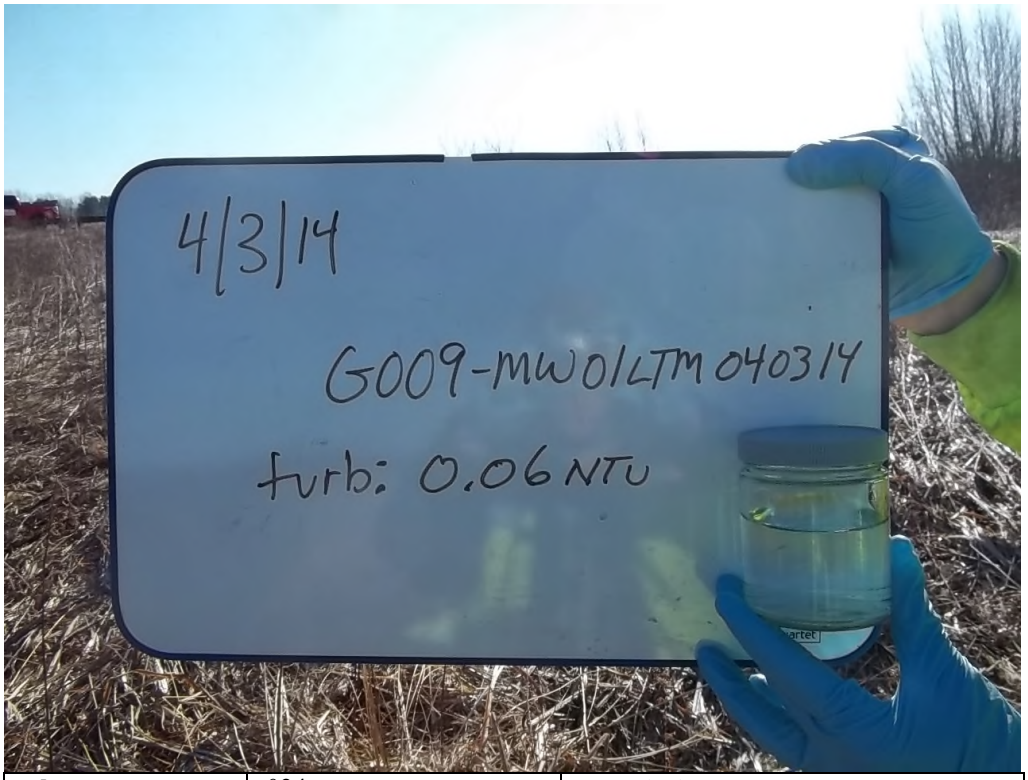


Photo No.:	024	**Description:** Sample: G009-MW01LTM040314 Time Collected: 08:57
Date:	4/3/2014	
Photographer:	B. Cole	

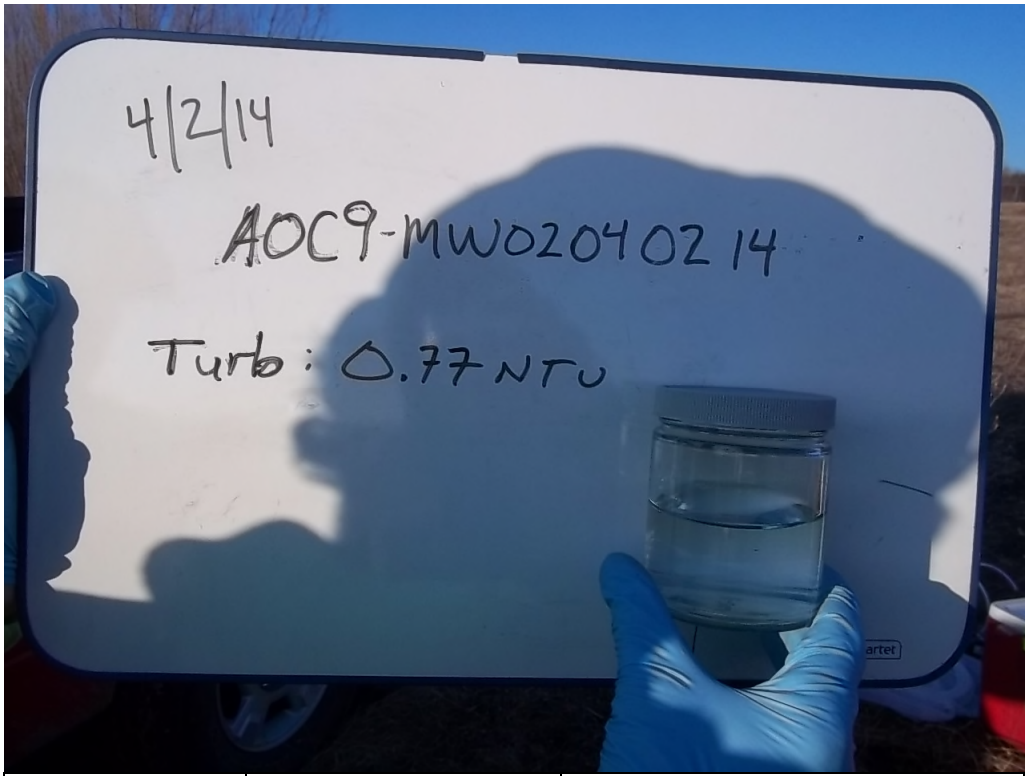


Photo No.:	022	**Description:** Sample: G009-MW02LTM040214 (photo incorrectly identifies sample ID) Time Collected: 18:17
Date:	4/2/2014	
Photographer:	B. Cole	

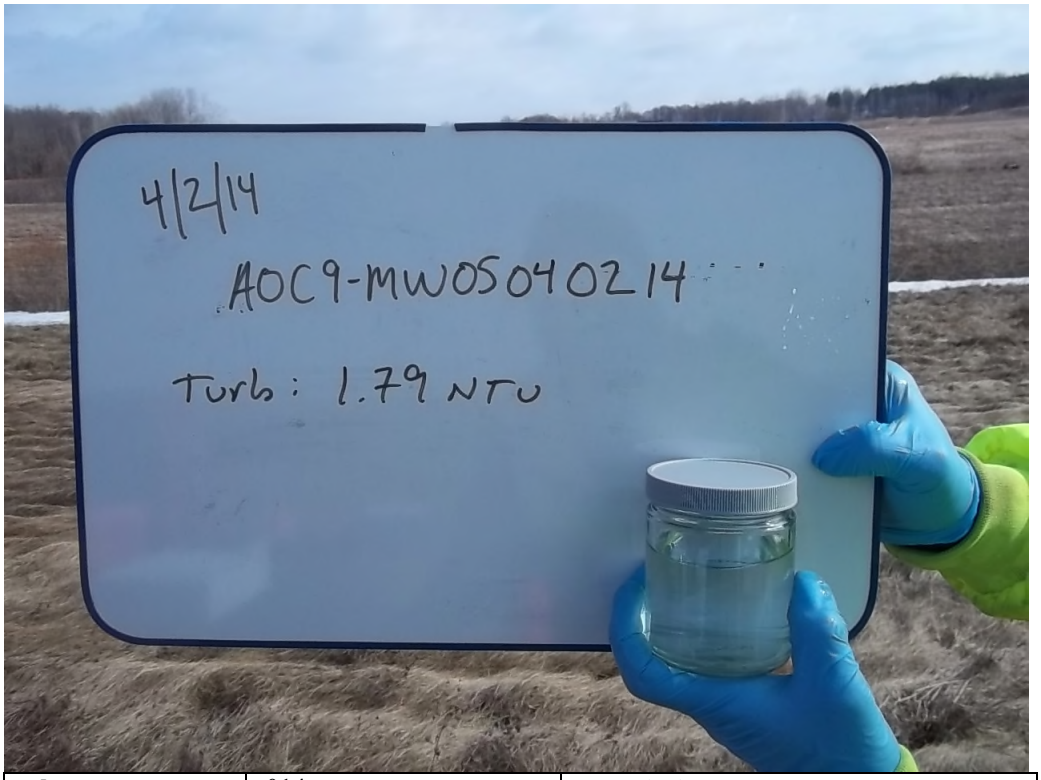


Photo No.:	014	**Description:** Sample: AOC9-MW05LTM040214 Time Collected: 10:00
Date:	4/2/2014	
Photographer:	B. Cole	

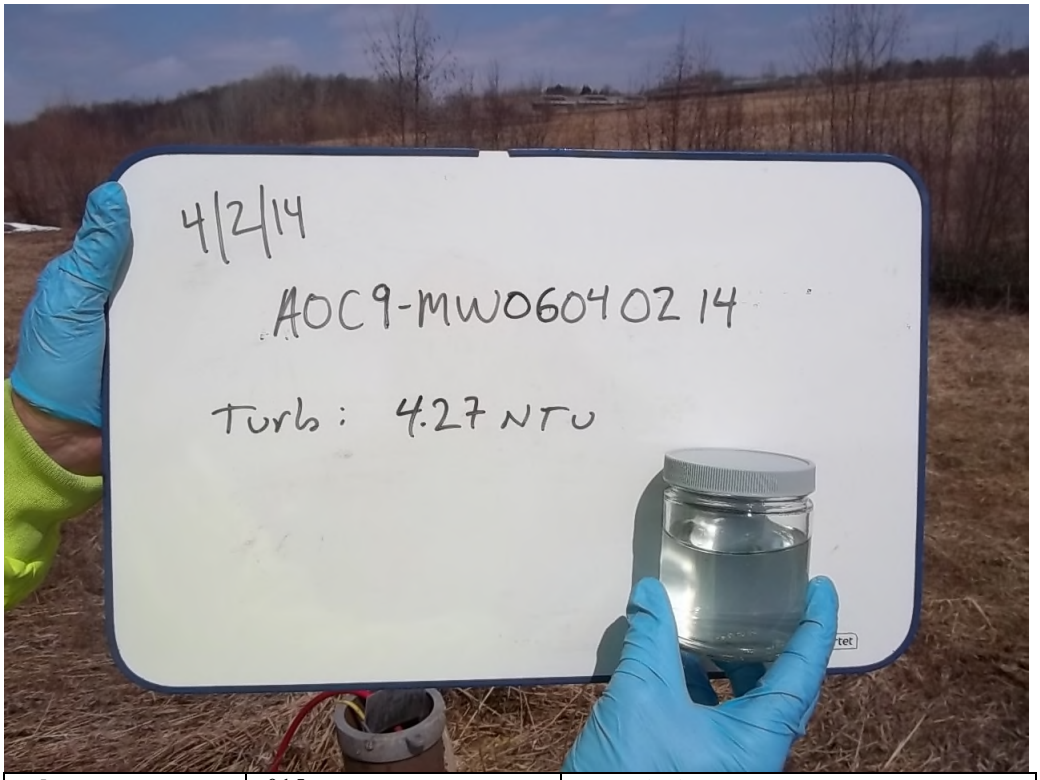


Photo No.:	015	**Description:** Sample: AOC9-MW06LTM040214 Time Collected: 12:12
Date:	4/2/2014	
Photographer:	B. Cole	

Photo No.:	017	**Description:** Sample: AOC9-MW14LTM040214 Time Collected: 14:47
Date:	4/2/2014	
Photographer:	B. Cole	

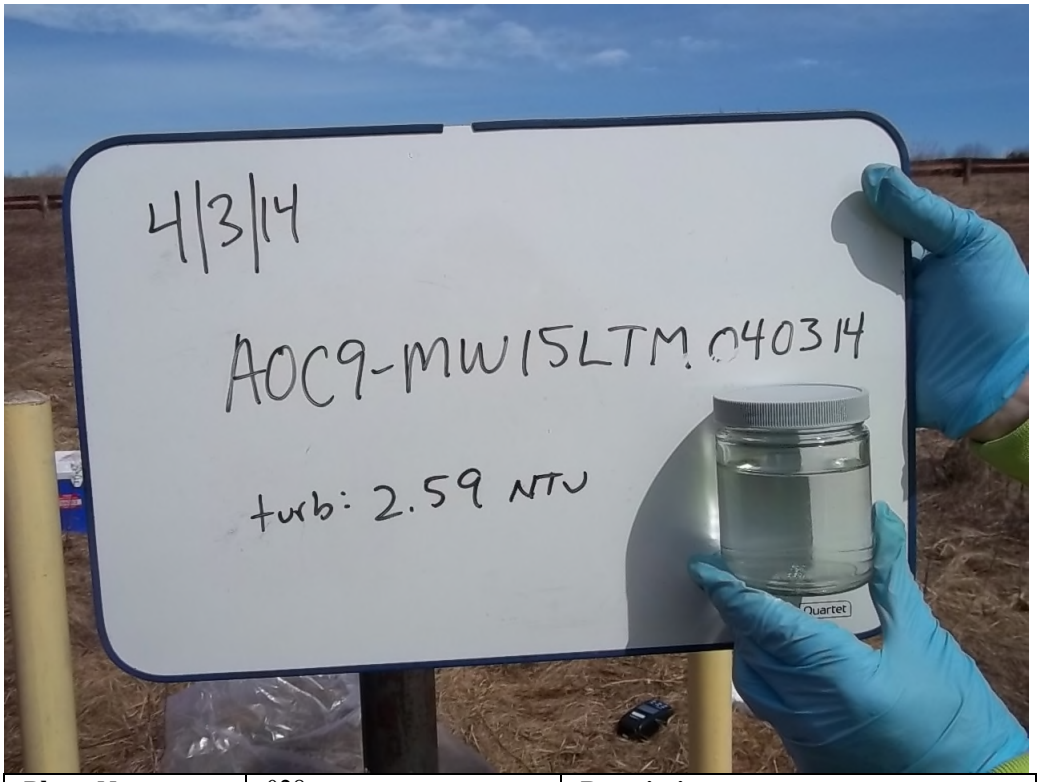


Photo No.:	028	**Description:** Sample: AOC9-MW15LTM040314 Time Collected: 12:27
Date:	4/3/2014	
Photographer:	B. Cole	

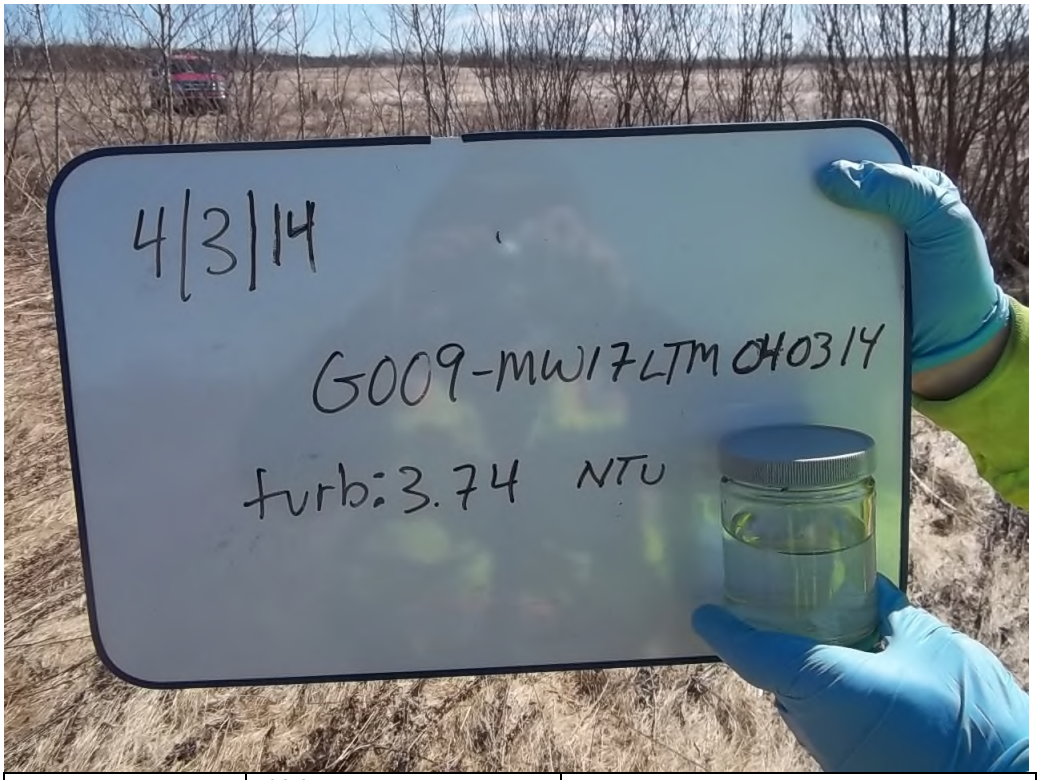


Photo No.:	026	**Description:** Sample: AOC9-MW17LTM040314 Time Collected: 11:12
Date:	4/3/2014	
Photographer:	B. Cole	

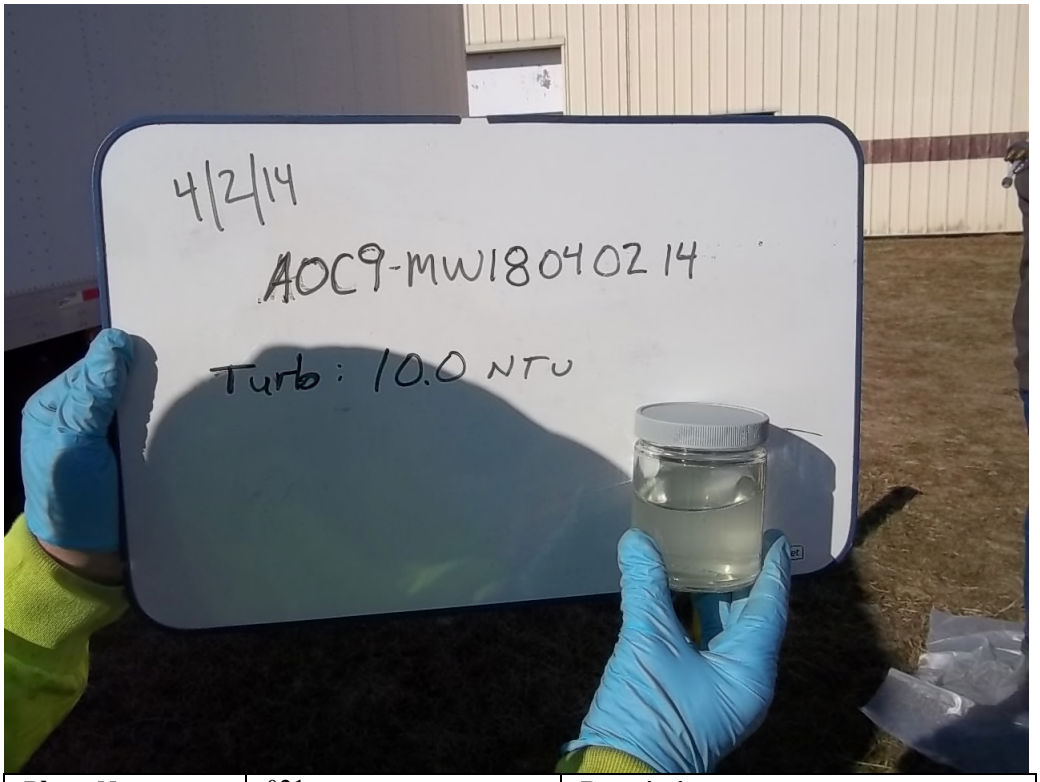


Photo No.:	021	**Description:** Sample: AOC9-MW18LTM040214 Time Collected: 16:47
Date:	4/2/2014	
Photographer:	B. Cole	

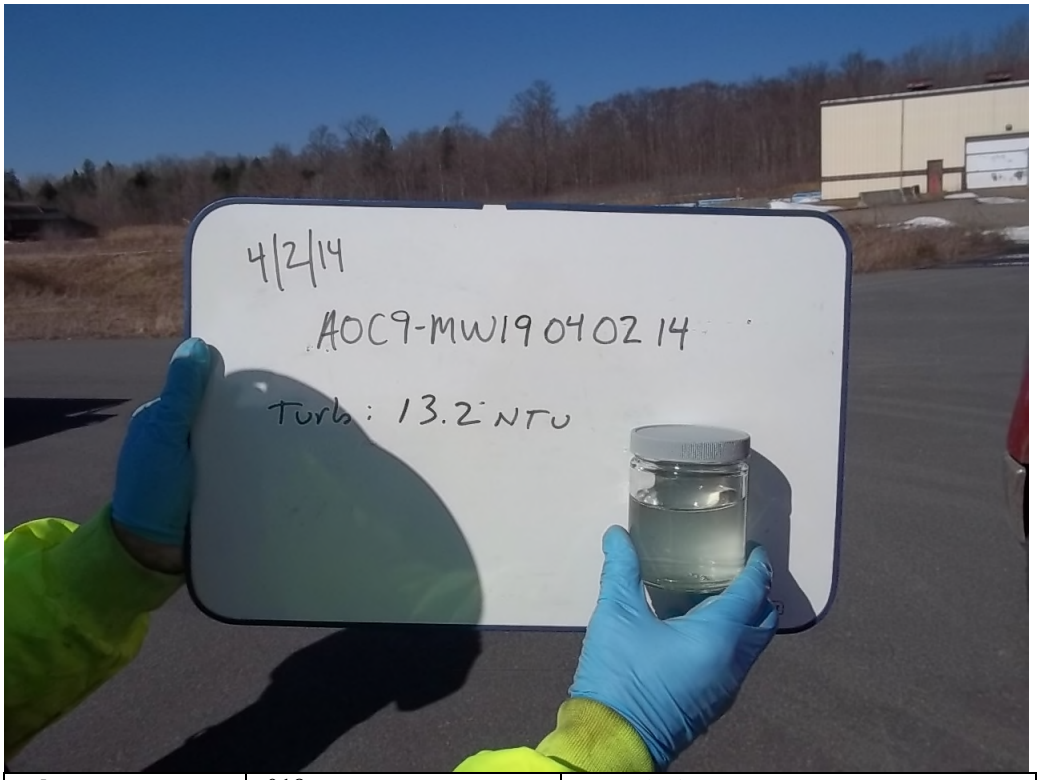


Photo No.:	018	**Description:** Sample: AOC9-MW19LTM040214 Time Collected: 15:52
Date:	4/2/2014	
Photographer:	B. Cole	

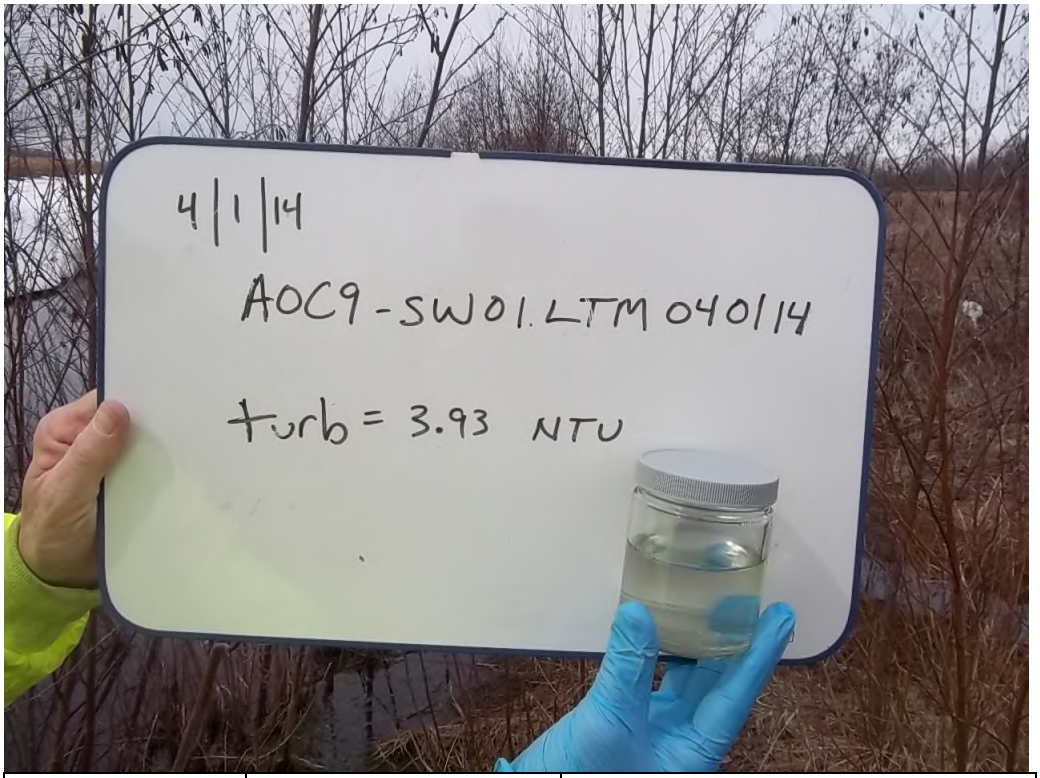


Photo No.:	012	**Description:** Sample: AOC9-SW01LTM040114 Time Collected: 13:50
Date:	4/1/2014	
Photographer:	B. Cole	

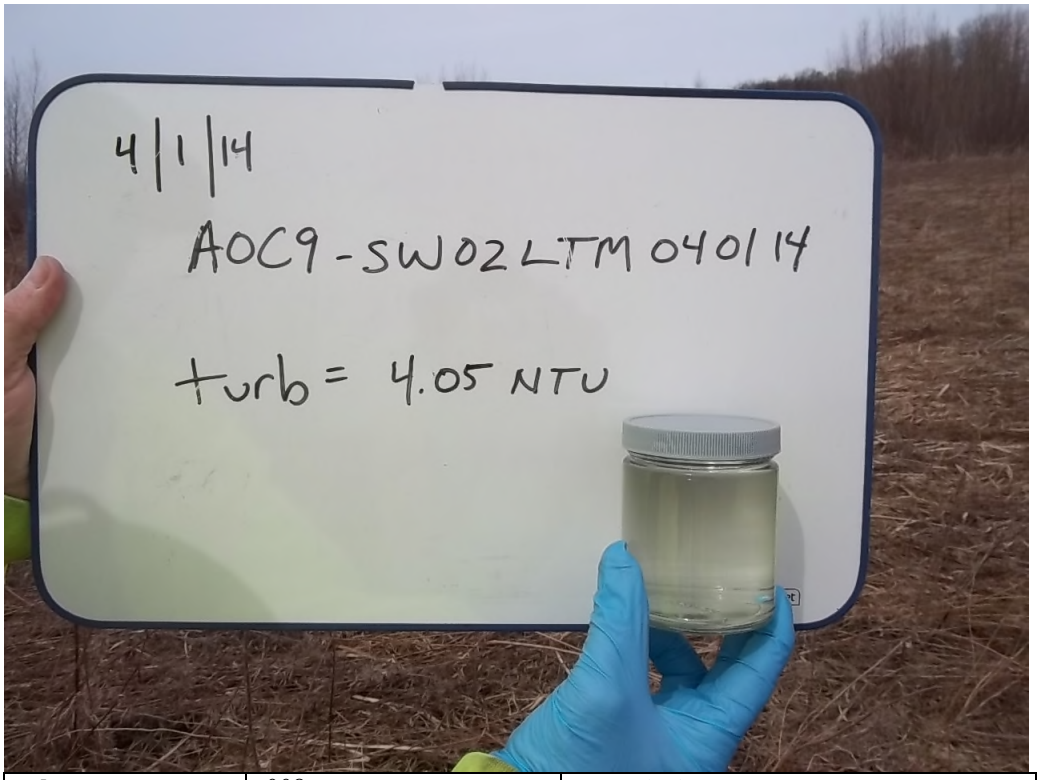


Photo No.:	008	**Description:**
Date:	4/1/2014	Sample: AOC9-SW02LTM040114
Photographer:	B. Cole	Time Collected: 13:30

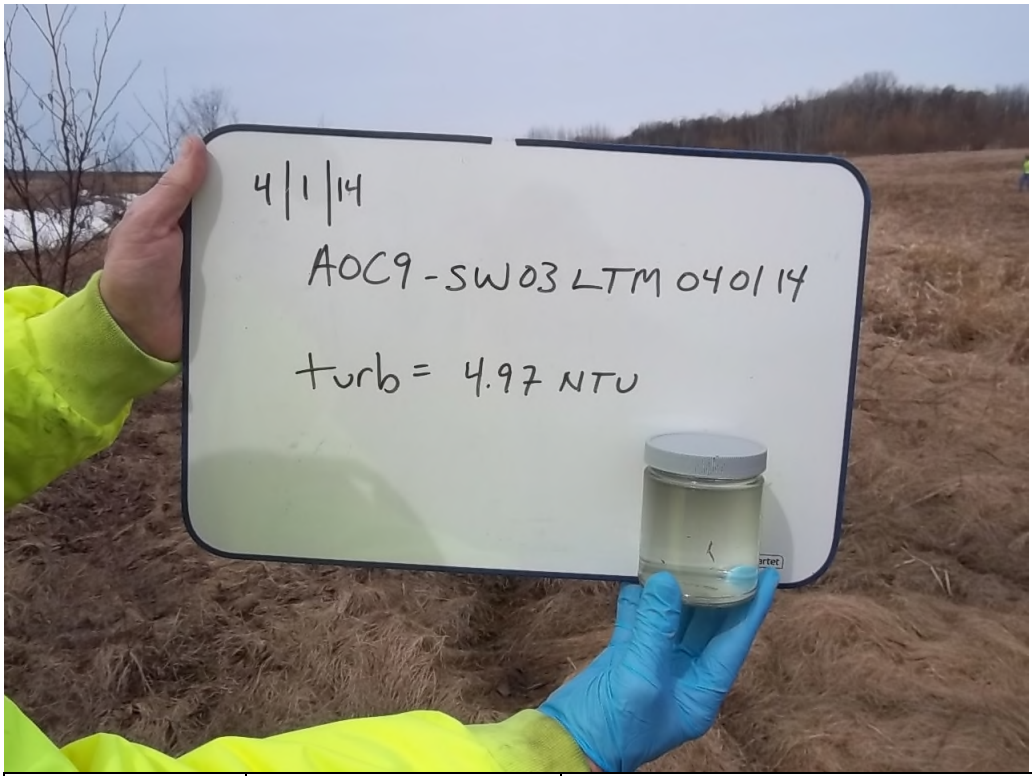


Photo No.:	004	**Description:**
Date:	4/1/2014	Sample: AOC9-SW03LTM040114
Photographer:	B. Cole	Time Collected: 13:05

E Well Status Log and Maintenance Summary

GRIFFISS AFB AOC 9 NETWORK WELLS
STATUS APRIL 2014

AOC 9											Date: 4/1/2014	
Well Name	**Well Type**	**Screened Groundwater Zone**	**Screen Interval (ft MSL)**	**Well Condition**							**Comments**	**Actions Planned**
				Bollards or flush mount	**Bollard Condition**	**Well Plate / Well Identification**	**Pad Condition**	**Lock**	**Well Cap**	**Dedicated Pump Condition**		
G009-MW01	Stick Up	Shallow	4.0-9.0 ft bgs	bollards	F	G	NA	G	G	G	Bollards leaning, pad not visible due to overgrown vegetation.	Remove vegetation from well pad.
G009-MW02	Stick Up	Shallow	4.0-9.0 ft bgs	bollards	G	G	G	G	G	G	--	None at this time. Continue to monitor during future sampling events.
G009-MW03	Stick Up	Shallow	4.0-9.0 ft bgs	bollards	G	G	G	G	G	NA	One bollard is missing. Ice prevented water level probe from measuring well.	None at this time. Continue to monitor during future sampling events.
G009-MW04	Stick Up	Shallow	6.7-16.7 ft bgs	bollards	G	G	G	G	G	NA	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW05	Flush Mount	Shallow	4.0-14.0 ft bgs	flush mount	NA	NA	G	NA	G	G	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW06	Stick Up	Shallow	4.2-14.2 ft bgs	bollards	G	G	G	G	G	G	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW07	Stick Up	Shallow	4.2-9.2 ft bgs	bollards	F	G	G	G	G	NA	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW08	Stick Up	Shallow	15.4-20.4 ft bgs	bollards	G	G	G	G	G	NA	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW12	Flush Mount	Shallow	10.0-20.0 ft bgs	flush mount	NA	G	G	NA	G	NA	Well has no identification.	Add identification label/tag to well.
AOC9-MW13	Stick Up	Shallow	10.0-20.0 ft bgs	bollards	G	G	G	G	G	NA	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW14	Stick Up	Shallow	14.0-24.0 ft bgs	bollards	G	NA	G	G	G	G	Well has no identification.	Add identification label/tag to well.
AOC9-MW15	Stick Up	Shallow	9.0-14.0 ft bgs	bollards	G	NONE	G	G	G	G	Well has no identification. Wrote ID on well cap. Added a new lock.	Add identification label/tag to well.
AOC9-MW16	Stick Up	Shallow	9.0-14.0 ft bgs	bollards	G	NONE	G	G	G	NA	--	None at this time. Continue to monitor during future sampling events.
AOC9-MW17	Stick Up	Shallow	9.0-14.0 ft bgs	bollards	G	NONE	G	G	G	G	Well has no identification. Wrote ID on well cap. Added a new lock.	Add identification label/tag to well.
AOC9-MW18	Stick Up	Shallow	9.0-19.0 ft bgs	bollards	G	NONE	G	G	G	G	Well has no identification.	Add identification label/tag to well.
AOC9-MW19	Flush Mount	Shallow	9.0-19.0 ft bgs	flush mount	NA	F	G	P	P	G	Curb box is filled with water and the j-plug is broken.	Install new lock and j-plug.
Surface Water												
AOC9-SW01	--	--	--	--	--	NA	--	--	--	--	Repainted stake.	None at this time. Continue to monitor during future sampling events.
AOC9-SW02	--	--	--	--	--	NA	--	--	--	--	Repainted stake. Observed small beaver dam upstream.	None at this time. Continue to monitor during future sampling events.
AOC9-SW03	--	--	--	--	--	NA	--	--	--	--	No markerobserved, replaced stake.	None at this time. Continue to monitor during future sampling events.

bgs = below ground surface
TBD = To Be Determined. Regarding pump condition, well has not been sampled in over two years. Regarding Pad Condition, pads are overgrown by vegetation and will be inspected next sampling round.
F = Fair
G = Good
NA = Not applicable
P = Poor

Signed: Ben Cole Date: 4/2/14

F

Analytical Data

The analytical data are provided in the attached CD.

G Data Usability Summary Report

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

The analytical data provided by the laboratory were reviewed for precision, accuracy, and completeness per NYSDEC Division of Environmental Remediation Guidance for the Development of DUSRs (June 1999). Specific criteria for QC limits were obtained from the Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories Version 5.0. Compliance with the project QA program is indicated on the in the checklist and tables. Any major or minor concerns affected data usability are summarized listed below. The checklist and tables also indicate whether data qualification is required and/or the type of qualifier assigned.

Reference:

ProjectID	Lab Work Order	Laboratory Report
EE-003186-0001-006	SH2111	Katahdin Analytical Services

Table 1 – Sample Listing Summary

Lab Sample ID	Client Sample ID	Matrix	Sample Date	MS/MSD	ID Corrections
SH2111-1	AOC9-TB1-040114	WQ	4/01/14		
SH2111-2	AOC9-SW01LTM040114	WS	4/01/14		
SH2111-3	AOC9-SW02LTM040214	WS	4/02/14		
SH2111-4	AOC9-SW03LTM040214	WS	4/02/14		
SH2111-5	AOC9-MW05LTM040214	WG	4/02/14		
SH2111-6	AOC9-MW06LTM040214	WG	4/02/14		
SH2111-7	AOC9-MW14LTM040214	WG	4/02/14		
SH2111-8	AOC9-MW19LTM040214	WG	4/02/14		
SH2111-9	AOC9-MW18LTM040214	WG	4/02/14		
SH2111-10	G009-MW02LTM040214	WG	4/02/14		
SH2111-11	G009-MW01LTM040314	WG	4/03/14	MS/MSD	
SH2111-12	AOC9-MW17LTM040314	WG	4/03/14		
SH2111-13	AOC9-MW17DLTM040314	WG	4/03/14		AOC9-MW17/DLTM040314
SH2111-14	AOC9-MW19DLTM040214	WG	4/02/14		AOC9-MW19/DLTM040214
SH2111-15	AOC9-MW15LTM040314	WG	4/03/14		

Table 1A – Sample Test Summary

Lab Work Orders	Matrix	Test Method	Test Name	Number of Samples
SH2111	WQ	SW8260B	VOCs – by GC/MS	1
SH2111	WS	SW8260B	VOCs – by GC/MS	3
SH2111	WG	SW8260B	VOCs – by GC/MS	11

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

General Sample Information	
Do Samples and Analyses on COC check against Lab Sample Tracking Form?	Yes Note: Some of the client IDs on the Chain of Custody exceeded the 19-character limit of the Katahdin Analytical Information Management System. Therefore, the middle character "/" in the client IDs for SH2111-13 and -14 were omitted on all forms.
Did coolers arrive at lab between 2 and 6°C and in good condition as indicated on COC and Cooler Receipt Form?	Yes
Frequency of Field QC Samples Correct? Field Duplicate - 1/20 samples Trip Blank - Every cooler with VOCs waters only Equipment Blank - 1/ set of samples per day?	Yes 1 Trip Blank 2 Field Duplicates 1 MS/MSD Equipment Blank Not Required
All ASP Forms complete?	No – AFCEE/DoD reporting format.
Case narrative present and complete?	Yes
Any holding time violations (See table below)?	No

The following tables are presented at the end of this DUSR and provided summaries of results outside QC criteria.

- Method Blanks Results (Table 2)
- Surrogates Outside Limits (Table 3)
- MS/MSD Outside Limits (Table 4)
- LCS Outside Limits (Table 5)
- Re-analysis Results (Table 6)
- Field Duplicate Results (Table 7)

Go to Tables List

Volatile Organics by GC/MS	
Description	**Notes and Qualifiers**
Any compounds present in method, trip and field blanks (see Table 2)?	No
For samples, if results are <5 times the blank or < 10 times blank for common laboratory contaminants then "U" flag data. Qualification also applies to TICs.	No results qualified.
Surrogate for method blanks and LCS within limits?	Yes
Surrogate for samples and MS/MSD within limits? (See Table 3). All samples should be re-analyzed for VOCs? Matrix effects should be established.	Yes
Laboratory QC frequency one blank and LCS with each batch and one set of MS/MSD per 20 samples?	Yes

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

Volatile Organics by GC/MS	
Description	**Notes and Qualifiers**
MS/MSD within QC criteria (see Table 4)? If out and LCS is compliant, then J flag positive data in original sample due to matrix?	No. See Table 4. N-Propylbenzene exceeded the acceptance criteria in both the MS and MSD. The analyte was not detected in the parent sample; therefore, no qualification was required. Thirty-seven analytes were recovered above the acceptance criteria in the MSD. This is an indication of a laboratory spiking error rather than a matrix issue since analyte recoveries were acceptable in the MS. The LCS recoveries were acceptable and no qualification was required. Additionally, nine analytes failed RPD due to the elevated MSD recoveries. No qualifications were required.
LCS within QC criteria (see Table 5)? If out, and the recovery high with no positive values, then no data qualification is required.	No. See Table 5. 1,2,3-Trichlorobenzene was recovered low in LCS WG140967-1; however, the analyte was not detected in the associated samples. The non-detect results were qualified UJ as estimated.
Do internal standards areas and retention time meet criteria? If not was sample re-analyzed to establish matrix (see Table 6)?	Yes
Is initial calibration for target compounds <20 %RSD or curve fit?	Yes. The independent check standard recoveries exceeded criteria for acetone, 2-butanone, 4-methyl-2-pentanone, and 2-hexanone. No qualifications were made on this basis.
Is continuing calibration for target compounds < 20.5%D.	No Naphthalene and 1,2,3-trichlorobenzene exceeded the DoD QSM acceptance limits criteria in CV file C6402. The analytes were not detected in the associated samples. The results were qualified UJ as estimated. Chloroethane, acetone, 1,1,1-trichloroethane, and 1,2,3-trichlorobenzene exceeded the DoD QSM acceptance limits criteria in CV file C6455. The analytes were not detected in the associated samples. The results were UJ qualified as estimated.
Were any samples re-analyzed or diluted (see Table 6)? For any sample re-analysis and dilutions is only one reportable result by flagged?	Yes. One result was reported. Sample AOC9-MW15LTM040314 was dilute due to chlorobenzene exceeding the calibration curve. Only the chlorobenzene value was reported from the dilution analysis.
For TICs are there any system related compounds that should not be reported?	N/A
Do field duplicate results show good precision for all compounds except TICs (see Table 7)?	Yes.

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

Summary of Concerns
• Recoveries of a few analytes in one LCS and two CCV were outside acceptance criteria. The compounds were project compounds of concern, but they were not detected in the samples. The associated results were qualified UJ as estimated and there is no impact on data usability. • The analyte recoveries in the MSD were systematically higher than the MS indicating an analytical problem rather than a matrix issue. All the recoveries in the associated MS and LCS were acceptable and no qualifications are required. There is no impact on data usability.

Table 2 - List of Positive Results for Blank Samples
None

Table 2A - List of Samples Qualified for Method Blank Contamination
None

Table 2B - List of Samples Qualified for Field Blank Contamination
None

Table 3 - List of Samples with Surrogates outside Control Limits
None

Table 4 - List MS/MSD Recoveries and RPDs outside Control Limits

Method	Parent Sample	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.
SW8260B	SH2111-11	MS	N-PROPYLBENZENE	ND	50	121	1	83	121	None
SW8260B	SH2111-11	MSD	CHLOROETHANE	ND	50	164	1	53	157	None
SW8260B	SH2111-11	MSD	1,1-DICHLOROETHENE	ND	50	129	1	88	127	None
SW8260B	SH2111-11	MSD	CARBON DISULFIDE	ND	50	131	1	71	129	None
SW8260B	SH2111-11	MSD	METHYL TERT-BUTYL ETHER	ND	100	129	1	81	125	None
SW8260B	SH2111-11	MSD	2-BUTANONE	ND	50	143	1	71	132	None
SW8260B	SH2111-11	MSD	1,1,1-TRICHLOROETHANE	ND	50	130	1	77	129	None
SW8260B	SH2111-11	MSD	CARBON TETRACHLORIDE	ND	50	139	1	87	126	None
SW8260B	SH2111-11	MSD	BENZENE	ND	50	124	1	86	116	None
SW8260B	SH2111-11	MSD	1,2-DICHLOROBENZENE	ND	50	134	1	81	125	None
SW8260B	SH2111-11	MSD	TRICHLOROETHENE	0.34J	50	124	1	79	121	None
SW8260B	SH2111-11	MSD	1,2-DICHLOROPROPANE	ND	50	132	1	84	118	None
SW8260B	SH2111-11	MSD	BROMODICHLOROMETHANE	ND	50	135	1	85	122	None
SW8260B	SH2111-11	MSD	CIS-1,3-DICHLOROPROPENE	ND	50	122	1	83	119	None
SW8260B	SH2111-11	MSD	4-METHYL-2-PENTANONE	ND	50	147	1	83	122	None
SW8260B	SH2111-11	MSD	TOLUENE	ND	50	122	1	84	118	None
SW8260B	SH2111-11	MSD	1,1,2-TRICHLOROETHANE	ND	50	133	1	84	115	None
SW8260B	SH2111-11	MSD	2-HEXANONE	ND	50	135	1	80	124	None

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

Method	Parent Sample	Sample Type	Analyte	Orig. Result	Spike Amount	Rec.	Dil Fac	Low Limit	High Limit	Sample Qual.
SW8260B	SH2111-11	MSD	DIBROMOCHLOROMETHANE	ND	50	130	1	85	119	None
SW8260B	SH2111-11	MSD	1,2-DIBROMOETHANE	ND	50	126	1	84	116	None
SW8260B	SH2111-11	MSD	CHLOROBENZENE	ND	50	128	1	89	113	None
SW8260B	SH2111-11	MSD	ETHYLBENZENE	ND	50	119	1	88	113	None
SW8260B	SH2111-11	MSD	M+P-XYLENES	ND	100	128	1	88	116	None
SW8260B	SH2111-11	MSD	O-XYLENE	ND	50	133	1	90	116	None
SW8260B	SH2111-11	MSD	STYRENE	ND	50	125	1	88	117	None
SW8260B	SH2111-11	MSD	BROMOFORM	ND	50	132	1	86	117	None
SW8260B	SH2111-11	MSD	1,1,2,2-TETRACHLOROETHANE	ND	50	127	1	79	121	None
SW8260B	SH2111-11	MSD	1,3-DICHLOROBENZENE	ND	50	125	1	86	110	None
SW8260B	SH2111-11	MSD	1,4-DICHLOROBENZENE	ND	50	113	1	86	111	None
SW8260B	SH2111-11	MSD	1,2-DICHLOROBENZENE	0.44J	50	121	1	86	112	None
SW8260B	SH2111-11	MSD	1,2-DIBROMO-3-CHLOROPROPANE	ND	50	129	1	67	124	None
SW8260B	SH2111-11	MSD	BROMOCHLOROMETHANE	ND	50	123	1	85	117	None
SW8260B	SH2111-11	MSD	1,2,4-TRIMETHYLBENZENE	ND	50	120	1	83	118	None
SW8260B	SH2111-11	MSD	4-CHLOROTOLUENE	ND	50	129	1	81	122	None
SW8260B	SH2111-11	MSD	N-PROPYLBENZENE	ND	50	142	1	83	121	None
SW8260B	SH2111-11	MSD	P-ISOPROPYLTOLUENE	ND	50	131	1	88	121	None
SW8260B	SH2111-11	MSD	SEC-BUTYLBENZENE	ND	50	136	1	82	122	None
SW8260B	SH2111-11	MSD	TERT-BUTYLBENZENE	ND	50	132	1	84	121	None

Method	Parent Sample	Analyte	Dil Fac	Unit	RPD	RPD Limit	Qualifier	Sample Type
SW8260B	SH2111-11	FREON-113	1	µg/L	21	20	None	MS/MSD
SW8260B	SH2111-11	METHYL ACETATE	1	µg/L	23	20	None	MS/MSD
SW8260B	SH2111-11	METHYL TERT-BUTYL ETHER	1	µg/L	25	20	None	MS/MSD
SW8260B	SH2111-11	2-BUTANONE	1	µg/L	23	20	None	MS/MSD
SW8260B	SH2111-11	METHYLCYCLOHEXANE	1	µg/L	24	20	None	MS/MSD
SW8260B	SH2111-11	4-METHYL-2-PENTANONE	1	µg/L	21	20	None	MS/MSD

Method	Parent Sample	Analyte	Dil Fac	Unit	RPD	RPD Limit	Qualifier	Sample Type
SW8260B	SH2111-11	BROMOFORM	1	µg/L	21	20	None	MS/MSD
SW8260B	SH2111-11	1,2-DIBROMO-3-CHLOROPROPANE	1	µg/L	22	20	None	MS/MSD
SW8260B	SH2111-11	1,4-DIOXANE	1	µg/L	30	20	None	MS/MSD

Table 5 - List LCS Recoveries outside Control Limits

Sample ID	Analyte	Method	Rec.	Low Limit	High Limit	No. of Affected Samples	Samp Qual
WG140967-1	1,2,3-TRICHLOROBENZENE	SW8260B	67.6	70	122	5	UJ

Table 6 –Samples that were Reanalyzed

Sample ID	Lab ID	Method	Sample Type	Action
AOC9-MW15LTM040314	SH2111-15	SW8260B	Dilution	Chlorobenzene exceeded the calibration curve. Only chlorobenzene was reported from the dilution analysis.

Table 7 – Summary of Field Duplicate Results

Method	Analyte	Unit	Matrix	PQL	AOC9-MW17LTM040314	AOC9-MW17DLTM040314	RPD	RPD Rating	Samp Qual
SW8260B	Vinyl Chloride	ug/L	Water	2.0	1.0	1.1	9.5%	Good	None
SW8260B	cis-1,2-Dichloroethene	ug/L	Water	1.0	2.7	2.7	0.0%	Good	None
SW8260B	Benzene	ug/L	Water	1.0	0.77	0.75	2.6%	Good	None
SW8260B	Trichloroethene	ug/L	Water	1.0	16	15	6.5%	Good	None
SW8260B	Tetrachloroethene	ug/L	Water	1.0	1.8	1.5	18.2%	Good	None
SW8260B	Chlorobenzene	ug/L	Water	1.0	150	150	0.0%	Good	None
SW8260B	1,3-Dichlorobenzene	ug/L	Water	1.0	0.79	0.88	10.8%	Good	None
SW8260B	1,4-Dichlorobenzene	ug/L	Water	1.0	10	10	0.0%	Good	None
SW8260B	1,2-Dichlorobenzene	ug/L	Water	1.0	49	48	2.1%	Good	None

Data Usability Summary Report	Project: Griffiss AFB Long-Term Monitoring
Date Completed: May 01, 2014	Completed by: Lynne Kalmbach; Marcia M. Galloway

Method	Analyte	Unit	Matrix	PQL	AOC9-MW19LTM040214	AOC9-MW19DLTM040214	RPD	RPD Rating	Samp Qual
SW8260B	Vinyl Chloride	ug/L	Water	2.0	0.64	0.80	22.2%	Good	None
SW8260B	cis-1,2-Dichloroethene	ug/L	Water	1.0	1.7	2.1	21.1%	Good	None
SW8260B	Benzene	ug/L	Water	1.0	0.50	0.65	26.1%	Good	None
SW8260B	Trichloroethene	ug/L	Water	1.0	ND	0.29	NC		
SW8260B	Chlorobenzene	ug/L	Water	1.0	22	29	27.5%	Good	None
SW8260B	1,4-Dichlorobenzene	ug/L	Water	1.0	1.5	1.7	12.5%	Good	None
SW8260B	1,2-Dichlorobenzene	ug/L	Water	1.0	1.0	1.3	26.1%	Good	None

Key:
A = Analyte
NC = Not Calculated
ND = Not Detected
PQL = Practical Quantitation Limit
RPD = Relative Percent Difference
TIC = Tentatively Identified Compound

H MAROS

MAROS Site Results

Project: Former Griffiss AFB

User Name: Mfronckowiak

Location: Rome

State: New York

User Defined Site and Data Assumptions:

Hydrogeology and Plume Information:

Groundwater Seepage Velocity: 87.5 ft/yr

Current Plume Length: 1140 ft

Current Plume Width 400 ft

Number of Tail Wells: 7

Number of Source Wells: 1

Down-gradient Information:

Distance from Edge of Tail to Nearest:

Down-gradient receptor: 1 ft

Down-gradient property: 1 ft

Distance from Source to Nearest:

Down-gradient receptor: 1140 ft

Down-gradient property: 1140 ft

Source Information:

Source Treatment: In-situ Biodegradation

NAPL is not observed at this site.

Data Consolidation Assumptions:

Time Period: 12/18/1997 **to** 4/3/2014
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Plume Information Weighting Assumptions:

Consolidation Step 1. Weight Plume Information by Chemical
Summary Weighting: Weighting Applied to All Chemicals Equally
Consolidation Step 2. Weight Well Information by Chemical
Well Weighting: No Weighting of Wells was Applied.
Chemical Weighting: No Weighting of Chemicals was Applied.

Note: These assumptions were made when consolidating the historical montoring data and lumping the Wells and COCs.

1. Compliance Monitoring/Remediation Optimization Results:

Preliminary Monitoring System Optimization Results: Based on site classification, source treatment and Monitoring System Category the following suggestions are made for site Sampling Frequency, Duration of Sampling before reassessment, and Well Density. These criteria take into consideration: Plume Stability, Type of Plume, and Groundwater Velocity.

COC	Tail Stability	Source Stability	Level of Effort	Sampling Duration	Sampling Frequency	Sampling Density
1,2-DICHLOROBENZENE	PD	PD	L	Continue remediation mechanism unitl reach stable trend or	No Recommendation	27
1,4-DICHLOROBENZENE	D	S	L	Remove treatment system if previously reducing concentation	No Recommendation	27
CHLOROBENZENE	D	NT	M	Remove treatment system if previously reducing concentation	No Recommendation	27
TETRACHLOROETHYLENE(PCE)	D	ND		Continue remediation mechanism unitl reach stable trend or	No Recommendation	27
TRICHLOROETHYLENE (TCE)	S	NT	M	Remove treatment system if previously reducing concentation	No Recommendation	27

Note:

Plume Status: (I) Increasing; (PI)Probably Increasing; (S) Stable; (NT) No Trend; (PD) Probably Decreasing; (D) Decreasing

Design Categories: (E) Extensive; (M) Moderate; (L) Limited (N/A) Not Applicable, Insufficient Data Available

Level of Monitoring Effort Indicated by Analysi Moderate

2. Spatial Moment Analysis Results:

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,2-DICHLOROBENZENE	2.73	3	53.6%	NT
	1,4-DICHLOROBENZENE	2.79	3	53.6%	NT
	CHLOROBENZENE	2.92	3	53.6%	NT
	TETRACHLOROETHYLENE(PCE)	2.78	5	57.1%	NT
	TRICHLOROETHYLENE (TCE)	2.76	5	57.1%	NT
1st Moment: Distance to Source					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A
2nd Moment: Sigma XX					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A
2nd Moment: Sigma YY					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.40 **Saturated Thickness:** Uniform: 20 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

MAROS Linear Regression Statistics Summary

Project: Former Griffiss AFB

User Name: Mfronckowiak

Location: Rome

State: New York

Time Period: 12/18/1997 **to** 4/3/2014
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend
1,2-DICHLOROBENZENE									
AOC9-MW05	T	3.0E-03	3.0E-03	5.3E-19	Yes	0.0E+00	0.00	0.0%	ND
AOC9-MW06	T	3.0E-03	3.0E-03	4.6E-19	Yes	0.0E+00	0.00	100.0%	ND
AOC9-MW14	T	6.2E-02	3.3E-02	5.9E-02	No	-1.2E-03	0.96	99.7%	D
AOC9-MW15	T	4.7E-02	4.8E-02	2.1E-02	No	-1.7E-04	0.45	75.2%	S
AOC9-MW17	T	6.2E-02	6.3E-02	1.5E-02	No	-1.2E-05	0.24	54.0%	S
AOC9-MW19	S	4.3E-03	4.9E-03	2.3E-03	No	-1.5E-03	0.53	98.6%	D
G009-MW01	T	9.3E-04	5.0E-04	1.0E-03	No	-1.7E-04	1.10	86.4%	NT
G009-MW02	T	3.0E-03	3.0E-03	4.7E-19	Yes	0.0E+00	0.00	100.0%	ND
1,4-DICHLOROBENZENE									
AOC9-MW05	T	3.0E-03	3.0E-03	5.3E-19	Yes	0.0E+00	0.00	0.0%	ND
AOC9-MW06	T	3.0E-03	3.0E-03	4.6E-19	Yes	0.0E+00	0.00	100.0%	ND
AOC9-MW14	T	4.4E-02	2.8E-02	3.7E-02	No	-1.0E-03	0.84	99.7%	D
AOC9-MW15	T	4.2E-02	2.6E-02	3.3E-02	No	-7.5E-04	0.78	99.8%	D
AOC9-MW17	T	2.1E-02	2.0E-02	9.1E-03	No	-2.0E-04	0.44	82.4%	S
AOC9-MW19	S	3.6E-03	3.5E-03	1.3E-03	No	-6.2E-04	0.36	88.9%	S
G009-MW01	T	3.0E-03	3.0E-03	4.8E-19	Yes	0.0E+00	0.00	100.0%	ND
G009-MW02	T	3.0E-03	3.0E-03	4.7E-19	Yes	0.0E+00	0.00	100.0%	ND
CHLOROBENZENE									
AOC9-MW05	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	0.0%	ND
AOC9-MW06	T	4.5E-03	5.0E-03	1.4E-03	No	-4.6E-05	0.30	63.6%	S
AOC9-MW14	T	6.3E-01	3.0E-01	6.3E-01	No	-1.3E-03	1.00	99.5%	D
AOC9-MW15	T	7.3E-01	3.9E-01	6.1E-01	No	-8.2E-04	0.83	99.8%	D
AOC9-MW17	T	3.6E-01	2.9E-01	2.1E-01	No	-2.2E-04	0.57	78.5%	S
AOC9-MW19	S	3.2E-02	3.1E-02	1.6E-02	No	8.2E-04	0.50	89.9%	NT
G009-MW01	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
G009-MW02	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
TETRACHLOROETHYLENE(PCE)									
AOC9-MW05	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	0.0%	ND
AOC9-MW06	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
AOC9-MW14	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
AOC9-MW15	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
AOC9-MW17	T	2.2E-03	2.0E-03	9.2E-04	No	-1.3E-04	0.42	71.5%	S
AOC9-MW19	S	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
G009-MW01	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND
G009-MW02	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	100.0%	ND

Project: Former Griffiss AFB **User Name:** Mfronckowiak

Location: Rome **State:** New York

Well	Source/ Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend
TRICHLOROETHYLENE (TCE)									
TRICHLOROETHYLENE (TCE)									
AOC9-MW05	T	5.0E-03	5.0E-03	0.0E+00	Yes	0.0E+00	0.00	0.0%	ND
AOC9-MW06	T	1.6E-03	1.0E-03	1.3E-03	No	3.6E-05	0.85	60.8%	NT
AOC9-MW14	T	6.1E-03	3.4E-03	9.0E-03	No	-4.4E-04	1.47	79.6%	NT
AOC9-MW15	T	2.0E-03	1.4E-03	1.9E-03	No	-7.6E-04	0.95	94.1%	PD
AOC9-MW17	T	1.6E-02	1.6E-02	2.9E-03	No	-3.1E-05	0.18	62.9%	S
AOC9-MW19	S	1.2E-03	5.0E-04	1.9E-03	No	-8.2E-04	1.56	71.9%	NT
G009-MW01	T	1.4E-03	7.3E-04	1.8E-03	No	-3.3E-04	1.32	98.6%	D
G009-MW02	T	2.0E-03	8.8E-04	2.1E-03	No	-1.2E-04	1.01	72.4%	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Non-detect (ND); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); COV = Coefficient of Variation

MAROS Mann-Kendall Statistics Summary

Project: Former Griffiss AFB
User Name: Mfronckowiak
Location: Rome
State: New York

Time Period: 12/18/1997 **to** 4/3/2014
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
1,2-DICHLOROBENZENE								
AOC9-MW05	T	3	0	0.00	0	0.0%	Yes	ND
AOC9-MW06	T	9	0	0.00	0	46.0%	Yes	ND
AOC9-MW14	T	8	8	0.96	-22	99.8%	No	D
AOC9-MW15	T	8	8	0.45	-4	64.0%	No	S
AOC9-MW17	T	8	8	0.24	0	45.2%	No	S
AOC9-MW19	S	6	6	0.53	-8	89.8%	No	S
G009-MW01	T	6	5	1.10	-3	64.0%	No	NT
G009-MW02	T	7	0	0.00	0	43.7%	Yes	ND
1,4-DICHLOROBENZENE								
AOC9-MW05	T	3	0	0.00	0	0.0%	Yes	ND
AOC9-MW06	T	9	0	0.00	0	46.0%	Yes	ND
AOC9-MW14	T	8	8	0.84	-22	99.8%	No	D
AOC9-MW15	T	8	8	0.78	-19	98.9%	No	D
AOC9-MW17	T	8	8	0.44	-16	96.9%	No	D
AOC9-MW19	S	6	6	0.36	-2	57.0%	No	S
G009-MW01	T	6	0	0.00	0	42.3%	Yes	ND
G009-MW02	T	7	0	0.00	0	43.7%	Yes	ND
CHLOROBENZENE								
AOC9-MW05	T	3	0	0.00	0	0.0%	Yes	ND
AOC9-MW06	T	9	1	0.30	0	46.0%	No	S
AOC9-MW14	T	8	8	1.00	-24	99.9%	No	D
AOC9-MW15	T	8	8	0.83	-24	99.9%	No	D
AOC9-MW17	T	8	8	0.57	-14	94.6%	No	PD
AOC9-MW19	S	6	6	0.50	7	86.4%	No	NT
G009-MW01	T	6	0	0.00	0	42.3%	Yes	ND
G009-MW02	T	7	0	0.00	0	43.7%	Yes	ND
TETRACHLOROETHYLENE(PCE)								
AOC9-MW05	T	3	0	0.00	0	0.0%	Yes	ND
AOC9-MW06	T	9	0	0.00	0	46.0%	Yes	ND
AOC9-MW14	T	8	0	0.00	0	45.2%	Yes	ND
AOC9-MW15	T	8	0	0.00	0	45.2%	Yes	ND
AOC9-MW17	T	8	8	0.42	-6	72.6%	No	S
AOC9-MW19	S	6	0	0.00	0	42.3%	Yes	ND
G009-MW01	T	6	0	0.00	0	42.3%	Yes	ND
G009-MW02	T	7	0	0.00	0	43.7%	Yes	ND

Project: Former Griffiss AFB

User Name: Mfronckowiak

Location: Rome

State: New York

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
TRICHLOROETHYLENE (TCE)								
TRICHLOROETHYLENE (TCE)								
AOC9-MW05	T	3	0	0.00	0	0.0%	Yes	ND
AOC9-MW06	T	9	8	0.85	1	50.0%	No	NT
AOC9-MW14	T	8	6	1.47	-8	80.1%	No	NT
AOC9-MW15	T	8	6	0.95	-10	86.2%	No	S
AOC9-MW17	T	8	8	0.18	4	64.0%	No	NT
AOC9-MW19	S	6	5	1.56	-4	70.3%	No	NT
G009-MW01	T	6	5	1.32	-13	99.2%	No	D
G009-MW02	T	7	5	1.01	-6	76.4%	No	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)- Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Spatial Moment Analysis Summary

Project: Former Griffiss AFB
Location: Rome
User Name: Mfronckowiak
State: New York

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (Kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
1,2-DICHLOROBENZENE							
12/18/1997	0.0E+00						2
5/15/2000	0.0E+00						4
9/5/2004	0.0E+00						1
9/7/2004	0.0E+00						2
11/1/2006	0.0E+00						4
7/28/2010	7.2E-01	1,133,840	1,181,559	727	4,246	10,747	6
5/17/2011	0.0E+00						5
10/24/2011	0.0E+00						5
4/16/2012	0.0E+00						1
4/17/2012	0.0E+00						4
9/25/2012	0.0E+00						1
9/26/2012	0.0E+00						4
4/9/2013	6.9E-01	1,133,765	1,181,466	845	15,215	24,385	7
4/10/2013	0.0E+00						1
4/2/2014	0.0E+00						5
4/3/2014	0.0E+00						3
1,4-DICHLOROBENZENE							
12/18/1997	0.0E+00						2
5/15/2000	0.0E+00						4
9/5/2004	0.0E+00						1
9/7/2004	0.0E+00						2
11/1/2006	0.0E+00						4
7/28/2010	7.4E-01	1,133,833	1,181,574	723	4,604	12,803	6
5/17/2011	0.0E+00						5
10/24/2011	0.0E+00						5
4/16/2012	0.0E+00						1
4/17/2012	0.0E+00						4
9/25/2012	0.0E+00						1
9/26/2012	0.0E+00						4
4/9/2013	4.9E-01	1,133,764	1,181,496	826	14,671	26,895	7
4/10/2013	0.0E+00						1
4/2/2014	0.0E+00						5
4/3/2014	0.0E+00						3
CHLOROBENZENE							
12/18/1997	0.0E+00						2
5/15/2000	0.0E+00						4
9/5/2004	0.0E+00						1

Project: Former Griffiss AFB

Location: Rome

User Name: Mfronckowiak

State: New York

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
CHLOROBENZENE							
9/7/2004	0.0E+00						2
11/1/2006	0.0E+00						4
7/28/2010	5.3E+00	1,133,847	1,181,587	703	3,117	11,265	6
5/17/2011	0.0E+00						5
10/24/2011	0.0E+00						5
4/16/2012	0.0E+00						1
4/17/2012	0.0E+00						4
9/25/2012	0.0E+00						1
9/26/2012	0.0E+00						4
4/9/2013	2.6E+00	1,133,797	1,181,531	778	12,273	23,492	7
4/10/2013	0.0E+00						1
4/2/2014	0.0E+00						5
4/3/2014	0.0E+00						3
TETRACHLOROETHYLENE(PCE)							
12/18/1997	0.0E+00						2
5/15/2000	0.0E+00						4
9/5/2004	0.0E+00						1
9/7/2004	0.0E+00						2
11/1/2006	0.0E+00						4
7/28/2010	2.0E-01	1,133,801	1,181,546	765	6,282	14,803	6
5/17/2011	0.0E+00						5
10/24/2011	0.0E+00						5
4/16/2012	0.0E+00						1
4/17/2012	0.0E+00						4
9/25/2012	0.0E+00						1
9/26/2012	0.0E+00						4
4/9/2013	2.9E-01	1,133,735	1,181,465	867	14,728	27,543	7
4/10/2013	0.0E+00						1
4/2/2014	0.0E+00						5
4/3/2014	0.0E+00						3
TRICHLOROETHYLENE (TCE)							
12/18/1997	0.0E+00						2
5/15/2000	0.0E+00						4
9/5/2004	0.0E+00						1
9/7/2004	0.0E+00						2
11/1/2006	0.0E+00						4
7/28/2010	1.2E-01	1,133,822	1,181,554	743	5,937	13,616	6
5/17/2011	0.0E+00						5
10/24/2011	0.0E+00						5
4/16/2012	0.0E+00						1
4/17/2012	0.0E+00						4

Project: Former Griffiss AFB

Location: Rome

User Name: Mfronckowiak

State: New York

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (kg)	Xc (ft)	Yc (ft)	Source Distance (ft)	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells
TRICHLOROETHYLENE (TCE)							
9/25/2012	0.0E+00						1
9/26/2012	0.0E+00						4
4/9/2013	1.5E-01	1,133,644	1,181,341	1,018	10,706	20,407	7
4/10/2013	0.0E+00						1
4/2/2014	0.0E+00						5
4/3/2014	0.0E+00						3

Project: Former Griffiss AFB

Location: Rome

User Name: Mfronckowiak

State: New York

Moment Type	Constituent	Coefficient of Variation	Mann-Kendall S Statistic	Confidence in Trend	Moment Trend
Zeroth Moment: Mass					
	1,2-DICHLOROBENZENE	2.73	3	53.6%	NT
	1,4-DICHLOROBENZENE	2.79	3	53.6%	NT
	CHLOROBENZENE	2.92	3	53.6%	NT
	TETRACHLOROETHYLENE(PCE)	2.78	5	57.1%	NT
	TRICHLOROETHYLENE (TCE)	2.76	5	57.1%	NT
1st Moment: Distance to Source					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A
2nd Moment: Sigma XX					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A
2nd Moment: Sigma YY					
	1,2-DICHLOROBENZENE	0.00	0	0.0%	N/A
	1,4-DICHLOROBENZENE	0.00	0	0.0%	N/A
	CHLOROBENZENE	0.00	0	0.0%	N/A
	TETRACHLOROETHYLENE(PCE)	0.00	0	0.0%	N/A
	TRICHLOROETHYLENE (TCE)	0.00	0	0.0%	N/A

Note: The following assumptions were applied for the calculation of the Zeroth Moment:

Porosity: 0.40 **Saturated Thickness:** Uniform: 20 ft

Mann-Kendall Trend test performed on all sample events for each constituent. Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events).

Note: The Sigma XX and Sigma YY components are estimated using the given field coordinate system and then rotated to align with the estimated groundwater flow direction. Moments are not calculated for sample events with less than 6 wells.

MAROS Statistical Trend Analysis Summary

Project: Former Griffiss AFB

Location: Rome

User Name: Mfronckowiak

State: New York

Time Period: 12/18/1997 **to** 4/3/2014

Consolidation Period: No Time Consolidation

Consolidation Type: Median

Duplicate Consolidation: Average

ND Values: Detection Limit

J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
1,2-DICHLOROBENZENE								
AOC9-MW05	T	3	0	3.0E-03	3.0E-03	Yes	ND	ND
AOC9-MW06	T	9	0	3.0E-03	3.0E-03	Yes	ND	ND
AOC9-MW14	T	8	8	6.2E-02	3.3E-02	No	D	D
AOC9-MW15	T	8	8	4.7E-02	4.8E-02	No	S	S
AOC9-MW17	T	8	8	6.2E-02	6.3E-02	No	S	S
AOC9-MW19	S	6	6	4.3E-03	4.9E-03	No	S	D
G009-MW01	T	6	5	9.3E-04	5.0E-04	No	NT	NT
G009-MW02	T	7	0	3.0E-03	3.0E-03	Yes	ND	ND
1,4-DICHLOROBENZENE								
AOC9-MW05	T	3	0	3.0E-03	3.0E-03	Yes	ND	ND
AOC9-MW06	T	9	0	3.0E-03	3.0E-03	Yes	ND	ND
AOC9-MW14	T	8	8	4.4E-02	2.8E-02	No	D	D
AOC9-MW15	T	8	8	4.2E-02	2.6E-02	No	D	D
AOC9-MW17	T	8	8	2.1E-02	2.0E-02	No	D	S
AOC9-MW19	S	6	6	3.6E-03	3.5E-03	No	S	S
G009-MW01	T	6	0	3.0E-03	3.0E-03	Yes	ND	ND
G009-MW02	T	7	0	3.0E-03	3.0E-03	Yes	ND	ND
CHLOROBENZENE								
AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW06	T	9	1	4.5E-03	5.0E-03	No	S	S
AOC9-MW14	T	8	8	6.3E-01	3.0E-01	No	D	D
AOC9-MW15	T	8	8	7.3E-01	3.9E-01	No	D	D
AOC9-MW17	T	8	8	3.6E-01	2.9E-01	No	PD	S
AOC9-MW19	S	6	6	3.2E-02	3.1E-02	No	NT	NT
G009-MW01	T	6	0	5.0E-03	5.0E-03	Yes	ND	ND
G009-MW02	T	7	0	5.0E-03	5.0E-03	Yes	ND	ND
TETRACHLOROETHYLENE(PCE)								
AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW06	T	9	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW14	T	8	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW15	T	8	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW17	T	8	8	2.2E-03	2.0E-03	No	S	S

MAROS Statistical Trend Analysis Summary

Well	Source/ Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
TETRACHLOROETHYLENE(PCE)								
AOC9-MW19	S	6	0	5.0E-03	5.0E-03	Yes	ND	ND
G009-MW01	T	6	0	5.0E-03	5.0E-03	Yes	ND	ND
G009-MW02	T	7	0	5.0E-03	5.0E-03	Yes	ND	ND
TRICHLOROETHYLENE (TCE)								
AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	ND	ND
AOC9-MW06	T	9	8	1.6E-03	1.0E-03	No	NT	NT
AOC9-MW14	T	8	6	6.1E-03	3.4E-03	No	NT	NT
AOC9-MW15	T	8	6	2.0E-03	1.4E-03	No	S	PD
AOC9-MW17	T	8	8	1.6E-02	1.6E-02	No	NT	S
AOC9-MW19	S	6	5	1.2E-03	5.0E-04	No	NT	NT
G009-MW01	T	6	5	1.4E-03	7.3E-04	No	D	D
G009-MW02	T	7	5	2.0E-03	8.8E-04	No	NT	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); No Detectable Concentration (NDC)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Plume Analysis Summary

Project: Former Griffiss AFB
Location: Rome
User Name: Mfronckowiak
State: New York

Time Period: 12/18/1997 **to** 4/3/2014
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: Detection Limit
J Flag Values : Actual Value

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
1,2-DICHLOROBENZENE											
	AOC9-MW05	T	3	0	3.0E-03	3.0E-03	Yes	N/A	N/A	N/A	N/A
	AOC9-MW06	T	9	0	3.0E-03	3.0E-03	Yes	ND	ND	N/A	N/A
	AOC9-MW14	T	8	8	6.2E-02	3.3E-02	No	D	D	N/A	N/A
	AOC9-MW15	T	8	8	4.7E-02	4.8E-02	No	S	S	N/A	N/A
	AOC9-MW17	T	8	8	6.2E-02	6.3E-02	No	S	S	N/A	N/A
	AOC9-MW19	S	6	6	4.3E-03	4.9E-03	No	S	D	N/A	N/A
	G009-MW01	T	6	5	9.3E-04	5.0E-04	No	NT	NT	N/A	N/A
	G009-MW02	T	7	0	3.0E-03	3.0E-03	Yes	ND	ND	N/A	N/A
1,4-DICHLOROBENZENE											
	AOC9-MW05	T	3	0	3.0E-03	3.0E-03	Yes	N/A	N/A	N/A	N/A
	AOC9-MW06	T	9	0	3.0E-03	3.0E-03	Yes	ND	ND	N/A	N/A
	AOC9-MW14	T	8	8	4.4E-02	2.8E-02	No	D	D	N/A	N/A
	AOC9-MW15	T	8	8	4.2E-02	2.6E-02	No	D	D	N/A	N/A
	AOC9-MW17	T	8	8	2.1E-02	2.0E-02	No	D	S	N/A	N/A
	AOC9-MW19	S	6	6	3.6E-03	3.5E-03	No	S	S	N/A	N/A
	G009-MW01	T	6	0	3.0E-03	3.0E-03	Yes	ND	ND	N/A	N/A
	G009-MW02	T	7	0	3.0E-03	3.0E-03	Yes	ND	ND	N/A	N/A
CHLOROBENZENE											
	AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	N/A	N/A	N/A	N/A
	AOC9-MW06	T	9	1	4.5E-03	5.0E-03	No	S	S	N/A	N/A
	AOC9-MW14	T	8	8	6.3E-01	3.0E-01	No	D	D	N/A	N/A

Project: Former Griffiss AFB **User Name:** Mfronckowiak

Location: Rome **State:** New York

Constituent	Well	Source/ Tail	Number of Samples	Number of Detects	Average (mg/L)	Median (mg/L)	All Samples "ND" ?	Mann-Kendall	Linear Regression	Modeling	Empirical
CHLOROBENZENE											
	AOC9-MW15	T	8	8	7.3E-01	3.9E-01	No	D	D	N/A	N/A
	AOC9-MW17	T	8	8	3.6E-01	2.9E-01	No	PD	S	N/A	N/A
	AOC9-MW19	S	6	6	3.2E-02	3.1E-02	No	NT	NT	N/A	N/A
	G009-MW01	T	6	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	G009-MW02	T	7	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
TETRACHLOROETHYLENE(PCE)											
	AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	N/A	N/A	N/A	N/A
	AOC9-MW06	T	9	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	AOC9-MW14	T	8	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	AOC9-MW15	T	8	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	AOC9-MW17	T	8	8	2.2E-03	2.0E-03	No	S	S	N/A	N/A
	AOC9-MW19	S	6	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	G009-MW01	T	6	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
	G009-MW02	T	7	0	5.0E-03	5.0E-03	Yes	ND	ND	N/A	N/A
TRICHLOROETHYLENE (TCE)											
	AOC9-MW05	T	3	0	5.0E-03	5.0E-03	Yes	N/A	N/A	N/A	N/A
	AOC9-MW06	T	9	8	1.6E-03	1.0E-03	No	NT	NT	N/A	N/A
	AOC9-MW14	T	8	6	6.1E-03	3.4E-03	No	NT	NT	N/A	N/A
	AOC9-MW15	T	8	6	2.0E-03	1.4E-03	No	S	PD	N/A	N/A
	AOC9-MW17	T	8	8	1.6E-02	1.6E-02	No	NT	S	N/A	N/A
	AOC9-MW19	S	6	5	1.2E-03	5.0E-04	No	NT	NT	N/A	N/A
	G009-MW01	T	6	5	1.4E-03	7.3E-04	No	D	D	N/A	N/A
	G009-MW02	T	7	5	2.0E-03	8.8E-04	No	NT	NT	N/A	N/A

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

Inventory of Injection Wells

PARSONS

301 Plainfield Rd., Suite 350 • Syracuse, New York 13212 • (315) 451-9560 • Fax: (315) 451-9570

Letter of Transmittal

July 30, 2013

USEPA Region 2
Main Regional Office
290 Broadway
New York, NY 10007-1866

Subject: Inventory of Injection Wells
Former Griffiss Air Force Base
Rome, NY 13440

To Whom It May Concern:

Please find enclosed the "Inventory of Injection Wells" EPA Form 7520-16 (OMB No. 2040-0042) and the required additional information prepared on the behalf of the United States Air Force Real Property Agency. These aquifer remediation wells are part of the remediation activities at the former Griffiss Air Force Base.

Please feel free to contact me at 315-451-9560 or at john.lanier@parsons.com if you have any questions or require additional information.

Sincerely,

John H. Lanier

John H. Lanier

Project Manager

Enclosure

cc: Ms. Cathy Jerrard
Ms. Nanci Higginbotham
Project File: 746809

Type or print all information. See reverse for instructions. OMB No. 2040-0042 Approval Expires 1/31/05

INVENTORY OF INJECTION WELLS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF GROUND WATER AND DRINKING WATER

(This information is collected under the authority of the Safe Drinking Water Act)

1. DATE PREPARED *(Year, Month, Day)*: 13-07-30

2. FACILITY ID NUMBER:

PAPERWORK REDUCTION ACT NOTICE

The public reporting burden for this collection of information is estimated at about 0.5 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, and to the Office of Management and Budget, Paperwork Reduction Project, Washington, DC 20503.

3. TRANSACTION TYPE *(Please mark one of the following)*

- [ ] Deletion
- [ ] First Time Entry
- [✓] Entry Change
- [ ] Replacement

4. FACILITY NAME AND LOCATION

A. NAME *(last, first, and middle initial)*: GRIFFISS AIR FORCE BASE

B. STREET ADDRESS/ROUTE NUMBER: GRIFFISS AIR FORCE BASE

C. LATITUDE

DEG	MIN	SEC
43	14	1.7016

D. LONGITUDE

DEG	MIN	SEC
-75	24	25.3002

E. TOWNSHIP/RANGE

TOWNSHIP	RANGE	SECT	1/4 SECT

F. CITY/TOWN: ROME

G. STATE: NY

H. ZIP CODE: 13440

I. NUMERIC COUNTY CODE: 065

J. INDIAN LAND *(mark "x")*: [ ] Yes [X] No

5. LEGAL CONTACT:

A. TYPE *(mark "x")*: [ ] Owner [x] Operator

B. NAME *(last, first, and middle initial)*: MCDERMOTT, MICHAEL

C. PHONE *(area code and number)*: (315) 356-0810

D. ORGANIZATION: AIR FORCE CIVIL ENGINEER CENTER

E. STREET/P.O. BOX: 706 BROOKS ROAD

F. CITY/TOWN: ROME

G. STATE: NY

H. ZIP CODE: 13441

I. OWNERSHIP *(mark "x")*

- [ ] PRIVATE
- [ ] PUBLIC
- [ ] SPECIFY OTHER
- [ ] STATE
- [x] FEDERAL

6. WELL INFORMATION:

A. CLASS AND TYPE		B. NUMBER OF WELLS		C. TOTAL NUMBER OF WELLS	D. WELL OPERATION STATUS				
		COMM	NON-COMM		UC	AC	TA	PA	AN
4	R	0	67	67	53	6	8		
				0					
				0					
				0					
				0					
				0					
				0					

COMMENTS *(Optional)*:

KEY:

DEG = Degree
MIN = Minute
SEC = Second

SECT = Section
1/4 SECT = Quarter Section

COMM = Commercial
NON-COMM = Non-Commercial

AC = Active
UC = Under Construction
TA = Temporarily Abandoned
PA = Permanently Abandoned and Approved by State
AN = Permanently Abandoned and not Approved by State

USEPA REGION II
ADDITIONAL INFORMATION FOR COMPLETING INVENTORY OF INJECTION WELLS UPDATE
UICID: 08NY06508014

Updates are underlined.

Brief description characterizing your facility and the types of activities conducted:

The former GAFB is located in Oneida County, New York, and is approximately two miles northeast of the city of Rome in central New York State. The base property covers approximately 3,540 acres and is situated in the relatively broad valley of the Mohawk River at an elevation of 504 feet above mean sea level (AMSL).

Griffiss Air Force Base, originally named Rom Air Depot was activated on February 1, 1942, with the mission of storage, maintenance, and shipment of material for the U.S. Army Air Corps. Upon creation of the Air Force in 1947, the depot was renamed Griffiss AFB.

Griffiss AFB was designated for realignment under the Base Realignment and Closure Act in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995.

On July 22, 1987, the base was listed on the United States Environmental Protection Agency (USEPA) National Priority List, which brought the installation under the federal facilities provisions of Section 120 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In August 1990, the Air Force, the USEPA, and the New York State Department of Environmental Conseravtion (NYSDEC) entered a Federal Facilities Agreement (FFA) for environment remediation at a number of sites at the former GAFB.

As part of the USEPA and NYSDEC Records of Decision (ROD), Remedial Design Work Plan (RDWP), Remedial Action Work Plans (RAWP), and RAWP Addendum, two (2) On-Base Groundwater (OGBW) Remediation sites have underground injections wells which are used as part of remediation activities. A third site, Area of Concern (AOC) 9, also requires the use of underground injection as part of the remediation activities. The remedy for the Landfill 6 Site and the Building 817/WSA Site is enhanced bioremediation. Additional injection activities are required for enhanced bioremediation at these locations. The remedy for AOC 9 includes excavation and offsite disposal of source material followed by injection to enhance bioremediation of residual contamination.

Brief description of what you use each of your injection well(s) for:

The aquifer remediation injection wells are used as part of a selected remedy for enhanced bioremediation. This is intended to increase biodegradation of the contaminants. These remedies consist of a vegetable oil emulsion injected into six existing injection wells for Landfill 6 and eight existing temporary wells at Building 817/WSA and injection of a calcium peroxide solution into 53 temporary well points at AOC 9.

Brief description of the types of fluids that enter, or have the potential to enter, each of the injection wells:

In June 2008, the U.S. Air Force Real Property Agency received authorization to inject at 6 injection wells approximately 1,200 gallons per well of a vegetable oil emulsion for enhanced bioremediation of contamination at Landfill 6. Eight injection wells at Building 817/WSA were authorized to inject

approximately 3,100 gallons per well of a vegetable oil emulsion to enhance bioremediation of contamination. This authorization was in accordance with the Underground Injection Control wells authorized by rule, pursuant to 40 CFR 144.24. (reference UICID: 08NY0658014; Article Number: 7005 3110 0000 5928 8399).

In August 2010, a second vegetable oil injection at Landfill 6 was approved by NYSDEC and USEPA under the site ROD. This injection event utilized the 6 injection wells at Landfill 6. Approximately 1,200 gallons of emulsified oil were injected into each well. A second injection at 8 injection wells at Building 817/WSA was also authorized by NYSDEC and USEPA. Approximately 6,000 gallons of a vegetable oil emulsion were injected into each well. USEPA was provided notice of these activities in accordance with the Underground Injection Control wells rule.

A third vegetable oil injection at the 6 injection wells at Landfill 6 is planned for October 2013 in accordance with the site ROD. The scope of the injection will be similar to the two previous injections at the site. An addendum to the RAWP is being prepared and will be submitted to NYSDEC and USEPA for approval.

At the AOC 9 site excavation and offsite disposal of the contaminated source material was completed in 2010 in accordance with the requirements of the ROD. The selected remedy for site also requires a down-gradient chemical injection to address residual contamination within the site groundwater. This work is planned for October 2013. The scope of this injection includes the injection of approximately 4,800 gallons of calcium peroxide solution into 53 temporary well points. A RAWP for this scope of work is currently being prepared and will be submitted to NYSDEC and USEPA for approval.

J

PeremOx® Injection Documents

GAFB AOC-9 SITE PERMEOX INJECTION SUMMARY
NOVEMBER 2013
INJECTION VOLUMES PER LOCATION

Location (Date)	Vol. Water (Gal.)	Vol. PermeOx (Lbs)
A-1 (11/7/13)	113	189
A-2 (11/7/13)	113	189
A-3 (11/6/13)	**159	**265
A-4 (11/6/13)	*88	*146
A-5 (11/6/13)	*59	*98
B-1 (11/5/13)	113	189
B-2 (11/5/13)	113	189
B-3 (11/5/13)	113	189
B-4 (11/7/13)	**135	**227
B-5 (11/6/13)	**132	**220
B-6 (11/6/13)	**130	**217
C-1 (11/7/13)	113	189
C-2 (11/8/13)	113	189
C-3 (11/7/13)	**132	**225
C-4 (11/7/13)	**135	**225
C-5 (11/6/13)	*46	*77
C-6 (11/11/13)	113	189
D-1 (11/12/13)	113	189
D-2 (11/12/13)	113	189
D-3 (11/12/13)	113	189
D-4 (11/12/13)	113	189
D-5 (11/12/13)	**143	**238
D-6 (11/11/13)	113	189
E-1 (11/8/13	**132	**220
E-2 (11/8/13)	*80	*133
E-3 (11/8/13)	**128	**213
E-4 (11/8/13)	113	189
E-5 (11/11/13)	*83	*138
E-6 (11/8/13)	113	189

Location (Date)	Vol. Water (Gal.)	Vol. PermeOx (Lbs)
F-1 (11/13/13)	*78	*130
F-2 (11/13/13)	113	189
F-3 (11/13/13)	113	189
F-4 (11/13/13)	113	189
F-5 (11/13/13)	113	189
F-6 (11/13/13)	113	189
G-1 (11/13/13)	113	189
G-2 (11/14/13)	**130	**216
G-3 (11/14/13)	113	189
G-4 (11/14/13)	113	189
G-5 (11/14/13)	113	189
G-6 (11/14/13)	113	189
H-1 (11/14-15/13)	113	189
H-2 (11/15/13)	113	189
H-3 (11/15/13)	113	189
H-4 (11/15/13)	113	189
H-5 (11/18/13)	113	189
H-6 (11/18/13)	113	189
J-1 (11/15/13)	113	189
J-2 (11/14/13)	113	189
J-3 (11/15/13)	113	189
J-4 (11/15/13)	113	189
J-5 (11/18/13)	113	189
J-6 (11/18/13	113	189
Total Volumes	5971 Gals	9981 lbs

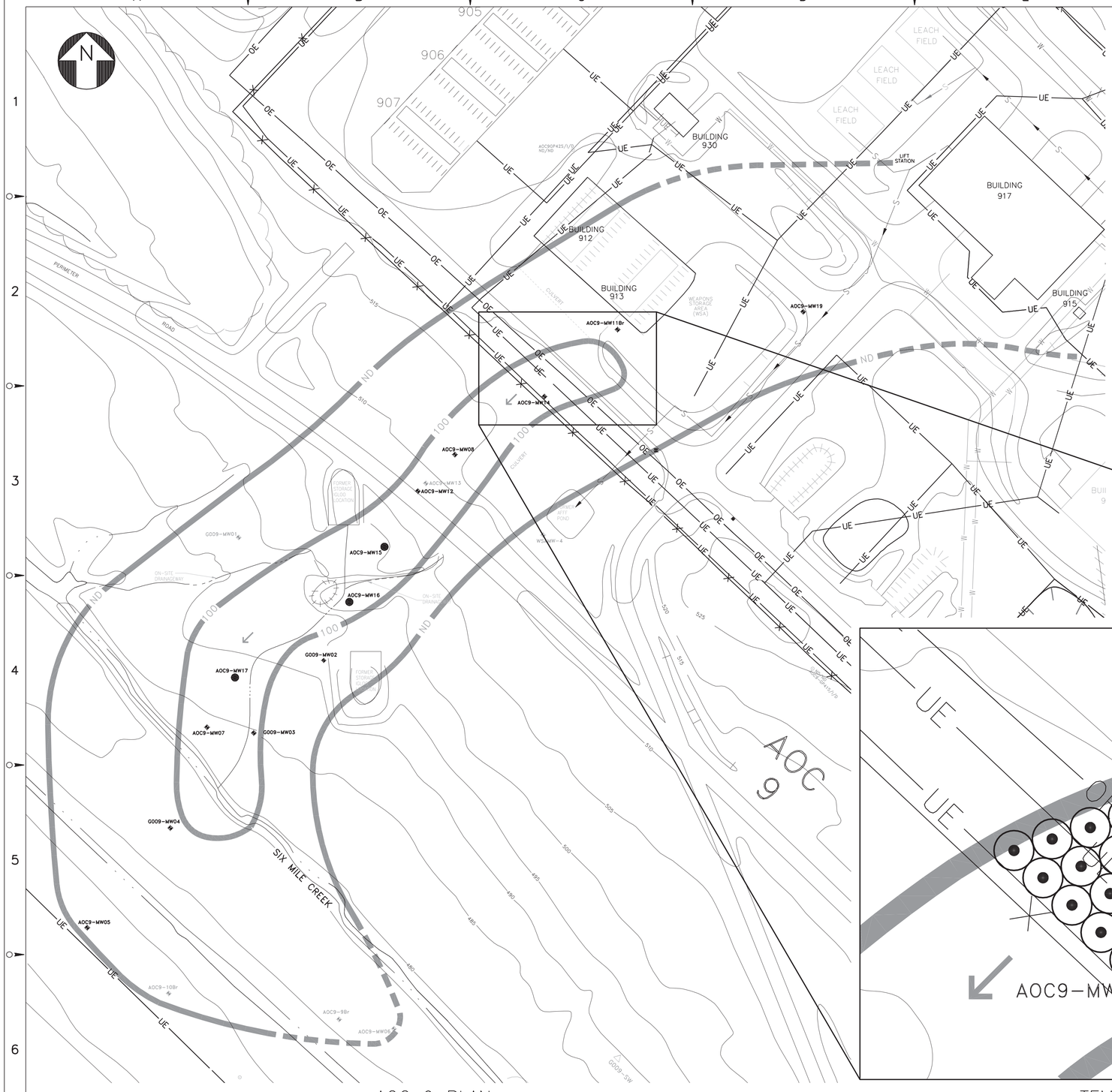
* Volume injected less than target volume due to excessive mounding at ground surface or leakage around injection rod
** Volume injected exceeded for the target volume to make up for lesser amount injected at a nearby location

		April 2014	Dec 2013	Oct 2013**	Mar 2013*	Sep 2012*	Mar 2012*
AOC-9-MW-18	400' Upgradient of injection zone	3.0	3.0	0.9	8.0		
AOC-9-MW-19	In the excavation zone 250' upgradient of injection	6.0	5.1	1.0	5.0	4.9	5.0
AOC-9-MW-14	Immediately downgradient of injection zone	3.3	2.0	0.1	0.1	0.4	0.2
AOC-9-MW-08	140' downgradient of injection zone	2.0	1.3	2.0	2.0		
AOC-9-MW-12	220' downgradient of injection zone	1.0	0.9	2.1	2.0		

Notes:

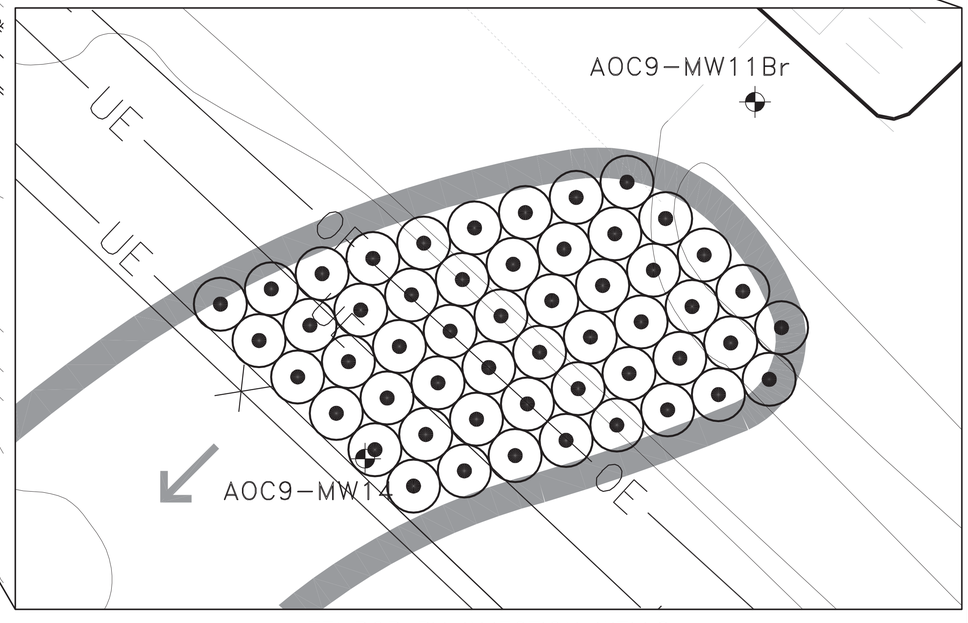
* Historical DO readings from performance monitoring events taken using a flow-through sampling cell and membrane electrode.

** Baseline readings using YSI meter were made without purging the wells. This method was modified to include well purging for the Dec 2013 and Apr 2014 monitoring.



AOC 9 PLAN

SCALE: 1"- 80''



TEMPORARY INJECTION WELLS

SCALE: 1"- 20''

LEGEND

- FENCE
- TOPOGRAPHIC CONTOUR LINE (CONTOUR INTERVAL = 5 FT)
- UNDERGROUND ELECTRIC
- WATER LINE
- SANITARY SEWER
- OVERHEAD ELECTRIC
- ABANDONED UNDERGROUND ELECTRIC
- ND — NOT DETECTED
- TOTAL VOLATILE ORGANIC COMPOUNDS IN ug/L (DASHED WHERE INFERRED)
- AOC9-MW01 — PERMANENT MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- TEMPORARY INJECTION POINT

20 10 0 20 40
SCALE: 1"=20'

80 0 80 160
SCALE: 1"=80'

NO.	DESCRIPTION	DATE	DRAWN	CHK'D	APPV'D
A	ISSUED FOR xxxxx	5/24/13	JHG	MBB	

DRAWN BY	JHG	DATE	5/24/13
CHECKED BY	MBB	DATE	5/24/13
APPROVED BY	xxx	DATE	5/24/13
PROJECT MGR.	xxx	DATE	5/24/13

SEAL

PARSONS
ENVIRONMENT AND INFRASTRUCTURE

OFFICE
301 PLAINFIELD ROAD
SYRACUSE, NY 13212
(315) 451-9560

JOB 747054

WBS 66000

PROJECT TITLE
AREA OF CONCERN 9
GROUND WATER
REMEDIAL DESIGN
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

DRAWING TITLE
AOC 9 SITE PLAN

SCALE: AS NOTED

DRAWING NO. 747054-C-001

REV. A

FILE NAME: P:\747054 AOC 9 GRIFFISS\CAD\FIGURES\AOC 9- RAMP\BASE DWGS FROM EE\747054-C-001.DWG
PLOT DATE: 6/17/2013 9:20 AM PLOTTED BY: GOLDYHAWT, JAMES

GENERAL:

1. THE REMEDY FOR AOC 9 CONSISTS OF TREATMENT OF CONTAMINATED GROUNDWATER USING IN-SITU CHEMICAL OXIDATION AND LAND USE CONTROLS.
2. LOCATIONS OF EXISTING ROADWAYS, STRUCTURES, AND BUILDINGS SHOWN ON THE DRAWINGS ARE APPROXIMATE. ACTUAL LOCATIONS SHALL BE FIELD-VERIFIED PRIOR TO THE COMMENCEMENT OF WORK.
3. SITE FEATURES AND TOPOGRAPHY PROVIDED BY WOOLPERT CONSULTANTS ON SEPTEMBER 1, 1998 AND FEBRUARY 11, 1999, RESPECTIVELY.
4. UTILITY INFORMATION IS APPROXIMATE. ALL UTILITY LOCATIONS SHALL BE FIELD VERIFIED PRIOR TO START OF FIELD ACTIVITIES.
5. CONTACT DIG SAFELY NEW YORK AT 1-(800)-962-7962 OR 811 TO LOCATE UNDERGROUND UTILITIES A MINIMUM OF 48 HOURS PRIOR TO START OF FIELD ACTIVITIES.
6. DO NOT PROCEED WITH ANY UTILITY INTERRUPTIONS WITHOUT PRIOR WRITTEN APPROVAL FROM THE PROPERTY OWNER.
7. COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS, US ARMY CORPS OF ENGINEERS MANUAL EM 385-1-1, SEPTEMBER 15, 2008 EDITION, AND PROTECTION HUMAN HEALTH AND ENVIRONMENT.
8. SECURE ALL REQUIRED APPLICATIONS, PERMITS, EASEMENTS, PERMISSIONS, LETTERS, AGREEMENTS, RIGHT-OF-WAY AND CERTIFICATIONS AS NECESSARY FOR THE COMPLETION OF THE WORK.
9. COORDINATE WITH GRIFFISS AIRPARK FLIGHT PERSONNEL AND APPLICABLE PROPERTY OWNERS ON A DAILY BASIS TO OBTAIN ACCESS AND APPROVAL FOR WORK TO BE PERFORMED.
10. CONTACT THE CITY OF ROME PUBLIC WORKS DEPARTMENT A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF WATER FROM A FIRE HYDRANT.
11. PROVIDE ALL TEMPORARY FACILITIES REQUIRED TO COMPLETE THE WORK.
12. PROVIDE AND MAINTAIN ALL REQUIRED TEMPORARY TRAFFIC CONTROLS, BARRIERS, ENCLOSURES REQUIRED TO COMPLETE THE WORK.
13. COMPLY WITH ALL APPLICABLE LAWS AND REQUIREMENTS, INCLUDING NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION DER 10.

CHEMICAL OXIDATION:

1. THE MIXING AND INJECTION SYSTEM PIPING, EQUIPMENT VALVES, ETC., SHALL BE CHEMICALLY AND PHYSICALLY COMPATIBLE WITH THE SUBSTRATE USED DURING INJECTION ACTIVITIES.
2. ALL INJECTION CHEMICALS WILL BE PURCHASED BY PARSONS AND PROVIDED BY FMC CORPORATION.
3. MIX CHEMICALS ONSITE WHEN NEEDED IN SEPARATE CONTAINERS, AND INJECT IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
4. DURING INJECTION MONITOR DOWN GRADIENT WELLS, PRESSURES, FLOW RATES, SUBSTRATE VOLUMES, AND NEARBY MONITORING WELLS AND MANHOLES. INJECTION PRESSURES SHALL NOT EXCEED ALLOWABLE PRESSURES FOR THE MATERIALS.
5. MONITOR ADJACENT MONITORING WELLS FOR MOUNDING. IF SIGNIFICANT MOUNDING IS OBSERVED, REDUCE FLOW RATES TO LIMIT MOUNDING.
6. THE SEQUENCE OF INJECTION LOCATIONS SHALL BE DETERMINED IN THE FIELD.

SITE RESTORATION:

1. ALL AREAS DISTURBED DURING PERFORMANCE OF THE WORK, INCLUDING BUT NOT LIMITED TO ASPHALT, SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
2. PROTECT ALL RESTORED AREAS FROM EROSION AND DAMAGE UNTIL SURFACE IS STABILIZED.
3. CONTRACTOR SHALL REPAIR OR REPLACE ANY RESTORED AREAS DAMAGED WITHIN 6 MONTHS OF PROJECT COMPLETION.
4. RESTORE ALL GRADES TO MAINTAIN EXISTING SURFACE WATER DRAINAGE PATTERNS.
5. IMPORTED TOPSOIL SHALL BE ORGANIC LOAM, WELL DRAINED, HOMOGENOUS AND MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   a. PH BETWEEN 4.5 AND 7
   b. FREE OF ANY VEGETATION (ESPECIALLY INVASIVE SPECIES), DEBRIS OR OTHER OBJECTIONABLE MATERIALS.
   c. FREE OF ANY STONES OR PARTICLES GREATER THAN 1".
6. IN AREAS OF SOIL DISTURBANCE, PLACE 3" OF TOPSOIL ON EARTH FILL AND APPLY GRASS SEED AT A MINIMUM OF 3 POUNDS/1,000 SQUARE FEET. PROTECT NEWLY SEEDED AREAS FROM TRAFFIC AND EROSION. MAINTAIN ADEQUATE SOIL MOISTURE CONDITIONS UNTIL YOUNG PLANTS ARE WELL ESTABLISHED.
7. GRASS SEED SHALL BE A MIXTURE OF 30% ANNUAL RYEGRASS AND 70% PERENNIAL RYEGRASSES.
8. SOW GRASS SEED EVENLY BY HAND, HYDROSEED OR SEED SPREADER ON DRY OR MODERATELY DRY SOIL.
9. FERTILIZER SHALL BE A COMMERCIAL-GRADE 5-10-5 MIXTURE.
10. APPLY FERTILIZER IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DIRECTIONS.

TABLE 1 – PERMEOX SLURRY MIXTURE & INJECTION VOLUMES	
ANTICIPATED RADIUS OF INFLUENCE	6 FEET
TOTAL MASS OF PERMEOX REQUIRED	10,000 LBS
CONCENTRATION OF PERMEOX SLURRY	20% (BY WEIGHT)
TOTAL VOLUME OF WATER REQUIRED	4,794 GALLONS
TOTAL VOLUME OF SLURRY TO INJECT	5,992 GALLONS
NUMBER OF INJECTION POINTS	53
MASS OF PERMEOX (PER LOCATION)	189 LBS
VOLUME OF PERMEOX (PER LOCATION)	113 GALLONS

NOTE:

INJECTION VOLUMES BASED ON PERMEOX MANUFACTURERS RECOMMENDATION.

NO.	DESCRIPTION	DATE	DRAWN	CHK'D	APPV'D
A	ISSUED FOR xxxxx	5/24/13	JHG	MBB	

DRAWN BY JHG	DATE 5/24/13	SEAL	
CHECKED BY MBB	DATE 5/24/13		
APPROVED BY xxx	DATE 5/24/13		
PROJECT MGR. xxx	DATE 5/24/13		

PARSONS
ENVIRONMENT AND INFRASTRUCTURE

OFFICE
301 PLAINFIELD ROAD
SYRACUSE, NY 13212
(315) 451-9560

JOB 747054

WBS 66000

PROJECT TITLE
AREA OF CONCERN 9
GROUND WATER
REMEDIAL DESIGN
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

DRAWING TITLE
AOC 9 SITE
SPECIFICATIONS, LEGEND,
& ABBREVIATIONS

SCALE
AS NOTED

DRAWING NO.
747054-C-002

REV.
A

FILE NAME: P:\747054 AOC 9 GRIFFISS\CAD\FIGURES\AOC 9- RAMP\BASE DWGS FROM EE\747054-C-001.DWG
PLOT DATE: 6/17/2013 11:28 AM PLOTTED BY: GOLDTHWAIT, JAMES