Draft

Facility-Wide Groundwater Monitoring Program
RVAAP-66 Facility-Wide Groundwater
Annual Report for 2017

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

March 30, 2018

Contract Number: W9133L-14-D-0008
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Prepared for:

National Guard Bureau

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The TEC-WESTON Joint Venture (JV) is submitting this Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Annual Report for 2017 in accordance with Contract Number W9133L-14-D-0008, Task Order Number 0003, to provide Groundwater and Environmental Investigation Services for the RVAAP-66 Facility-Wide Groundwater Area of Concern (AOC) at the Former Ravenna Army Ammunition Plant (RVAAP); now known as Camp Ravenna Joint Military Training Center (Camp Ravenna) in Portage and Trumbull Counties, Ohio.

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

TEC-Weston Joint Venture (JV) has completed the Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Annual Report for 2017. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumption; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing National Guard Bureau policy.

3/29/2017

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Study/Design Team Leader

3/29/2017

Jim Brackett, TEC-Weston JV — Date
Independent Technical Review Team Leader

Significant concerns and the explanation of the resolutions are as follows:

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ARNG = Army National Guard
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LIST OF ACRONYMS/ABBREVIATIONS

%	percent
µg/L	microgram per liter
amsl	above mean sea level
AOC	Area of Concern
ARNG	Army National Guard
Camp Ravenna	Camp Ravenna Joint Military Training Center
COPC	constituent of potential concern
DoD	U.S. Department of Defense
ELAP	Environmental Laboratory Accreditation Program
EPA	U.S. Environmental Protection Agency
EQM	Environmental Quality Management, Inc.
ft bgs	feet below ground surface
ft/day	feet per day
ft/ft	foot per feet
ft/year	feet per year
FWCUG	Facility-Wide Cleanup Goal
FWGW	Facility-Wide Groundwater
FWGWMP	Facility-Wide Groundwater Monitoring Program
FWSAP	Facility-Wide Sampling and Analysis Plan
GSI	groundwater/surface water interface
IDW	investigation-derived waste
INRMP	Integrated Natural Resources Management Plan
JV	Joint Venture
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantitation
MCL	Maximum Contaminant Level
MDL	method detection limit
mg/L	milligrams per liter
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate

NGB	National Guard Bureau
NTU	nephelometric turbidity unit
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PCB	polychlorinated biphenyl
PVC	polyvinyl chloride
PWS	Performance Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-trazine
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
RPD	Relative Percent Difference
RQL	Ramsdell Quarry Landfill
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant
s.u.	Standard pH Units
SAIC	Science Applications International Corporation
SDG	sample delivery group
SM	Standard Method
SVOC	semi-volatile organic compound
TEC-Weston JV	TEC-Weston Joint Venture
THQ	total hazard quotient
TR	target cancer risk
U.S.	United States
USP&FO	United States Property and Fiscal Officer for Ohio
Vista	Vista Sciences Corporation
VOC	volatile organic compound

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EXECUTIVE SUMMARY

The TEC-Weston Joint Venture (TEC-Weston JV) is submitting this Facility-Wide Groundwater (FWGW) Annual Report for 2017 in accordance with the Performance Work Statement (PWS), Contract Number W9133L-14-D-0008, Task Order Number 0003, to provide Groundwater and Environmental Investigation Services for the RVAAP-66 Facility-Wide Groundwater Area of Concern (AOC) at the Former Ravenna Army Ammunition Plant (RVAAP), now known as Camp Ravenna Joint Military Training Center (Camp Ravenna) in Portage and Trumbull Counties, Ohio.

The United States (U.S.) Army and the Ohio Environmental Protection Agency (Ohio EPA) finalized the Facility-Wide Groundwater Monitoring Program (FWGWMP) Plan in 2004, and initiated the plan in April 2005 with quarterly sampling of the FWGWMP monitoring wells. The current monitoring well network consists of 299 wells, including 5 Resource Conservation and Recovery Act (RCRA) wells, which are sampled on a semiannual basis (Portage Environmental, 2004). In 2012, the FWGWMP was modified from quarterly to semiannual sampling; however, all newly installed monitoring wells are initially sampled for four consecutive quarters (Environmental Quality Management, Inc. [EQM], 2012a). The current FWGWMP, as amended, includes the sampling of 96 monitoring wells, 5 of which are the RCRA wells. An additional 13 wells were sampled for the purposes of the metals background study being conducted in association with the FWGW Remedial Investigation (RI).

The following tasks were performed at Camp Ravenna as part of the 2017 monitoring program under the FWGWMP Plan:

- Performed groundwater sampling of selected wells during January, April, July, and December 2017. A portion of the FWGW RI wells sampled in January 2017 were intended for sampling in Fall 2016, but were inaccessible or had insufficient groundwater for sampling during that event. Nine of the wells proposed for sampling in the Addendum for 2017 were not sampled due to dry conditions, insufficient groundwater levels, or elevated turbidity in one or both of the April and December 2017 events.
- Gauged depth to water levels at 295 of the 299 Camp Ravenna monitoring wells prior to the April 2017 sampling event. Depth to water was not measured from four of the 299 wells

because water levels were below the top of permanently installed sampling pumps. The water level measurements were used to generate potentiometric maps for each aquifer.

- Inspected all monitoring wells during sampling and water level gauging events to determine if maintenance was needed.
- Performed laboratory analyses and data validation for the samples collected during the January, April, and December 2017 monitoring events.
- Prepared the requisite investigation-derived waste (IDW) characterization and disposal reports.
- Prepared the April and July 2017 (Draft) semiannual groundwater sampling event report.
- Redeveloped four monitoring wells identified with elevated turbidity readings during 2016 FWGWMP sampling. LL4mw-194 exhibited continuing high turbidity levels after redevelopment and was not sampled in 2017. Monitoring well FWGmw-011 will require redevelopment in 2018 based on continued high turbidity levels observed during the April and December 2017 sampling events.
- Five monitoring wells installed in 2016 as part of the FWGW RI along the Camp Ravenna property boundary, south of State Route 5, were sampled to determine if contamination exists beyond the facility perimeter fence and, if present, if there is a potential to migrate off-post.

Based on the findings from the 2017 sampling events, the generalized groundwater flow directions across Camp Ravenna are from west to east, as determined during prior years. Organic constituents in groundwater samples exceeding screening criteria were detected in the three uppermost aquifers (unconsolidated, Homewood Sandstone, Upper Sharon) and within six localized areas. Constituents exceeding screening criteria included explosives and propellants, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), Aroclor-1254, total phosphorus, cyanide, hexavalent chromium, and various metals. The metals data will be screened as part of the ongoing FWGW RI Report and Ohio EPA approval of the background study, which is also a part of the FWGW RI. Time-trend graphs for most of the groundwater constituents detected above screening criteria depict flat or decreasing trends; however, a limited number of the explosives and propellants, cyanide, SVOCs, and VOCs show increasing trends. Several wells had first occurrence constituent detections over screening levels, primarily Aroclor 1254, cyanide, and SVOCs.

Groundwater elevation data from the September 2017 gauging event were used to create potentiometric surface maps of the unconsolidated, Homewood Sandstone, Upper Sharon, and Basal Sharon Conglomerate aquifers. Where applicable, these maps depict groundwater-surface water interface (GSI) interpretations made based on available topographic and groundwater elevation data. The overall flow direction across Camp Ravenna is toward the east; however, variations exist where the aquifers (unconsolidated and Upper Sharon) are in direct hydraulic communication with the local stream system. Portions of these streams are likely groundwater discharge zones. Areas of mounded groundwater are identified in the unconsolidated, Homewood, and Upper Sharon aquifers where radial flow is evident. The vertical hydraulic gradients calculated at well clusters across Camp Ravenna predominantly indicate the potential for downward vertical flow. A detailed review of vertical gradients and the effect of shale units acting as aquiclude layers between water bearing zones, in part based on data collected in association with the installation and sampling of groundwater monitoring wells installed in 2016, will be provided in the pending FWGW RI Report.

The groundwater analytical data reported from the 2017 sampling events are compared to Facility-Wide Cleanup Goals (FWCUGs) and/or Maximum Contaminant Levels (MCLs), or U.S. Environmental Protection Agency (EPA) Tapwater Regional Screening Levels (RSLs). Metals data were compared to RSLs. Following approval of a background study by the Ohio EPA, metals data will be fully evaluated as part of the pending FWGW RI Report. The following summarizes the screening criteria exceedances of contaminants detected in 2017 in the FWGWMP and background study monitoring wells:

- VOCs: carbon tetrachloride, chloroform, and/or ethylbenzene were detected above current screening levels at well LL10mw-003, which is screened in the Homewood Aquifer, and at FWGmw-022 and FWGmw-023, which are screened in the Upper Sharon Sandstone
- SVOCs: detected above current screening levels include benz(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd), and nitrobenzene. Wells with SVOC detections above screening levels (not all exceedance constituents were detected in all wells) include: LL10mw-003, BKGmw-022, and BKGmw-023 in the Homewood Aquifer; NTAmw-119 and DETmw-003 in the Unconsolidated Aquifer; LL12mw-183, LL1mw-089, and

RQLmw-007 in the Upper Sharon Aquifer; BKGmw-024 and BKGmw-025 in the Basal Sharon Conglomerate.

- Explosives and propellants: Seventeen monitoring wells sampled for these constituents had concentrations reported above screening criteria. Explosive/propellants were detected above screening levels in each of the three shallow aquifers and included: RDX; 2-Amino-4,6-dinitrotoluene; 4-Amino-2,6-dinitrotoluene; 2,4,6-Trinitrotoluene; Nitrobenzene; 1,3-Dinitrobenzene; 2,4-Dinitrotoluene; 3-Nitrotoluene.
- Aroclor-1254 was reported above screening levels in samples collected from the following wells: BKGmw-023 in the Homewood Aquifer; FWGmw-021 and FWGmw-022 in the Upper Sharon Aquifer; FWGmw-018, FWGmw-019, and BKGmw-025 in the Basal Sharon Conglomerate.
- Pesticides were not detected above screening criteria.
- Inorganics: Aluminum, antimony, arsenic, cadmium, cobalt, cyanide, iron, manganese, nickel, thallium, and/or vanadium were detected in 56 shallow aquifer and Basal Sharon Conglomerate monitoring wells at concentrations above screening criteria. The screening criterion for each of these constituents is the corresponding RSL.
- Hexavalent chromium: FWGmw-024 was the only well with a detection of hexavalent chromium in samples collected during 2017. The reported concentration exceeded the current screening level for hexavalent chromium. This well is located along State Route 5 south of the Load Line 2 AOC.
- Cyanide: Cyanide and/or free cyanide were detected above screening criteria in 31 wells during 2017. Each of the shallow aquifers had detections of cyanide over current screening levels, including 2 of the 4 RCRA wells sampled as part of the 2017 FWGWMP (DET-4 contained insufficient groundwater for sampling during both events): DET-3 (Open Demolition Area #2 AOC) and RQLmw-007 (Ramsdell Quarry Landfill AOC). In addition, cyanide was analyzed as part of the ongoing RI in several other monitoring wells.

Six distinct areas impacted by organic compounds in groundwater (where 2017 groundwater constituents results exceed screening criteria) were identified in the upper three aquifers (unconsolidated, Homewood Sandstone, and Upper Sharon aquifers). The six areas include:

- The Fuze and Booster Quarry Landfill/Ponds AOC (first area) and the Load Line 10 AOC (second area). Contaminants above screening levels in these adjacent portions of Camp Ravenna include explosives at FBQmw-174. VOCs and/or SVOCs are present at LL10mw-003, FWGmw-022, and FWGmw-023. Groundwater flow is from topographic highs of the Homewood aquifer radially toward the surrounding unconsolidated aquifer present at lower topographic elevations. Because these areas are underlain in part by the Mercer Member and Sharon Member shales, the vertical migration of shallow groundwater contamination to deeper aquifers is anticipated to be inhibited by these shales.
- The Load Line 1, Load Line 2, and Load Line 3 AOCs (third area). Contaminants above screening levels in this portion of Camp Ravenna include explosives at multiple well locations within each of the AOCs; SVOCs at LL1mw-089; and Aroclor-1254 at FWGmw-021. The radial flow pattern in the central portion of each of the AOC areas indicates explosive contaminants potentially migrate in all directions. Direction of groundwater flow is to the east from LL1mw-089 and to the south from FWGmw-021. Well FWGmw-021, installed along State Route 5 as part of the FWGW RI, had slight exceedances in April and July 2017 sampling, but the concentrations declined over the year and were below screening criteria in samples collected in December 2017. VOCs and SVOCs were not reported above screening criteria in these AOCs.
- The Open Demolition Area #2 and Winklepeck Burning Grounds AOCs (fourth area). Contaminants (RDX, metals, and cyanide) exceeding screening criteria in the unconsolidated aquifer are interpreted to potentially migrate toward the east and to a number of converging streams that are likely groundwater discharge zones.
- In the Ramsdell Quarry Landfill AOC (fifth area). RDX was detected during the 2017 sampling events in one or more wells in this AOC at concentrations below the screening criteria. RDX is limited in extent, based on a downgradient well. 3-Nitrotoluene reported in the April 2017 event sample collected from FWGmw-011 is a low, estimated value just above its screening criteria.
- The NACA Test Area AOC (sixth area). A low concentration of an SVOC is likely to be limited in extent to the vicinity of well NTAmw-119.

During Basal Sharon Conglomerate aquifer sampling, two SVOCs were reported above screening criteria in samples collected from two background wells (BKGmw-024 and BKGmw-025)

installed in 2016 at the northwestern property boundary. The SVOC concentrations are low, estimated levels and are not in the area of any known contaminant source areas associated with historical land use at Camp Ravenna. Aroclor-1254 was reported in samples from three wells installed in the Basal Sharon Conglomerate, including BKGmw-025, Load Line 10 AOC well FWGmw-019, and FWGmw-018, located at the southeastern property boundary. Groundwater sampling conducted in 2017 from collocated wells installed within the shallow aquifers and the Basal Sharon Conglomerate aquifer suggest that groundwater contamination in the shallow aquifers has generally not migrated vertically into the deeper water bearing zone, except for the Load Line 10 AOC where a connection between the Upper Sharon Sandstone and Basal Sharon Conglomerate may exist based on results from well FWGmw-019 and FWGmw-022 (Load Line 10 AOC).

The extent of metals detected above screening criteria is widespread across Camp Ravenna and across each of the aquifers. The background concentrations for metals will be recalculated during the ongoing FWGW RI, and an evaluation of metals concentrations representing a release to groundwater requiring additional assessment will be conducted once the background study is completed.

Time-trend graphs were prepared for select wells representing a mix of organic constituents regularly included in the semiannual program, generally with at least one constituent that exceeded screening criteria in at least one of the 2017 sampling events (some constituents without 2017 sampling program exceedances were graphed to provide comparison to 2015 or 2016 results over screening levels). The following summarizes where concentration trends were found to be increasing:

- Explosives and propellants: Five wells were identified to have increasing or potentially increasing trends of explosives and propellants, including FBQmw-174 (Fuze and Booster Quarry AOC), LL1mw-084 (Load Line 1 AOC), LL2mw-059 (Load Line 2 AOC), LL2mw-267 (Load Line 2 AOC), and RQLmw-008 (Ramsdell Quarry Landfill AOC).
- VOCs: Carbon tetrachloride and chloroform have increasing trends in L10mw-003 (Load Line 10 AOC).

- Hexavalent chromium: Hexavalent chromium was not detected in LL3mw-244 (Load Line 3 AOC) in 2017; however, the graphed detection limits of 20 µg/L in 2016 and 2017 gives the appearance of an increasing trend, when the trend is likely to be flat.
- Cyanide: Increasing trends are indicated for DET-3 and DET-4 (Open Demolition Area #2 AOC).

Based on the analytical results from 2017 groundwater sampling and the interpretation of groundwater flow from April 2017 water elevation monitoring, the potential for contaminant migration across Camp Ravenna is generally west to east. However, localized groundwater mounding, combined with the presence of impacted groundwater, indicates radial contaminant migration is occurring.

Five new monitoring wells installed along the Camp Ravenna property boundary south of Load Line 2, Load Line 3, and Load Line 12 as part of the FWGW RI in 2016 (FWGmw-017, FWGmw-018, FWGmw-020, FWGmw-021, and FWGmw-024) were sampled for explosives/propellants and total inorganics, including cyanide, PCBs, pesticides, SVOCs, and VOCs. FWGmw-017 and FWGmw-018 are screened in the Basal Sharon Conglomerate aquifer, and FWGmw-020, FWGmw-021, and FWGmw-024 are screened in the Upper Sharon Sandstone aquifer. Based on the southerly groundwater flow in this area, the possibility exists that groundwater contaminants could migrate off of Camp Ravenna property to the south. The following summarizes the screening criteria exceedances of contaminants detected in these five wells during 2017:

- Organics: 2-amino-4,6-dinitrotoluene (FWGwm-021); 4-amino-2,6-dinitrotoluene (FWGwm-021); Aroclor-1254 (FWGmw-021 and FWGmw-018).
- Inorganics: arsenic (all wells); hexavalent chromium (FWGwm-024); cobalt (all wells); iron (FWGmw-020, FWGmw-021, and FWGmw-024); manganese (all wells); and total cyanide (FWGmw-021).
- No pesticides were detected in these five wells.

Groundwater sampling activities proposed for 2018 will be determined based on conclusions provided in Section 5.0 and incorporated in the pending *Facility-Wide Groundwater Monitoring Program Addendum for 2018* (TEC-Weston, 2018a).

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1.0 BACKGROUND

1.1 PROJECT BACKGROUND

In 2004, the United States (U.S.) Army and the Ohio Environmental Protection Agency (Ohio EPA) finalized the *Facility-Wide Groundwater Monitoring Program Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio* (Portage Environmental, 2004) for the Former Ravenna Army Ammunition Plant (RVAAP), now known as Camp Ravenna Joint Military Training Center (Camp Ravenna). The Facility-Wide Groundwater Monitoring Program (FWGWMP) was initiated in April 2005 with quarterly sampling of 36 FWGWMP monitoring wells. The five Resource Conservation and Recovery Act (RCRA) wells were incorporated into the FWGWMP after May 2005 and were sampled semiannually.

The FWGWMP Plan includes, by reference, the Facility-Wide Sampling and Analysis Plan (FWSAP), Site Safety and Health Plan, and Quality Assurance Project Plan (QAPP) addenda. Additional details pertaining to the performance of field and laboratory activities are contained in the *Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (Science Applications International Corporation [SAIC], 2011). As described in the FWGWMP Plan, the initial monitoring program consisted of sampling 36 monitoring wells and 5 RCRA wells. Fourteen of these wells were identified as "Background Wells," and the remaining wells were located at various Areas of Concern (AOCs) at Camp Ravenna.

The *Facility-Wide Groundwater Monitoring Program Plan RVAAP-66 Facility-Wide Groundwater Addendum* (Environmental Quality Management, Inc. [EQM], 2012a) prescribed the installation of 38 additional Remedial Investigation (RI) monitoring wells to complete the hydrogeologic system and contaminant fate-and-transport modeling. The 38 new wells were sampled quarterly until at least four quarters of data were obtained from each location. The five RCRA wells remained on a semiannual sampling schedule.

As a supplement to the FWGWMP Groundwater Addendum, EQM submitted the *Facility-Wide Groundwater Monitoring Program Plan RVAAP-66 Facility-Wide Groundwater Semiannual Monitoring Addendum* (EQM, 2012b), which proposed that the Facility-Wide Groundwater (FWGW) monitoring schedule be modified from quarterly to semiannually (January and July

events only). New RI wells remained on a quarterly sampling schedule, beginning in April 2012. The semiannual well network eliminated wells that provided redundancy or minimal information on groundwater quality or fate-and-transport migration. A subset of the well network was selected in association with or paired with several of the RI wells to assess horizontal and/or vertical contaminant distribution, provide upgradient data for the various site-wide models, identify potential exit pathway wells, and provide continued monitoring of the five RCRA wells at the site. Forty-two wells were selected as part of the semiannual well network.

The *Facility-Wide Groundwater Monitoring Program Plan RVAAP-66 Additional Well Installation Addendum* (EQM, 2013) proposed that the FWGW monitoring well network schedule be modified. Wells were selected that exhibited constituents of potential concern (COPCs), and wells were eliminated that were redundant or provided minimal information on groundwater quality or fate-and-transport migration.

The *Final Remedial Investigation Work Plan for Groundwater and Environmental Services for RVAAP-66 Facility-Wide Groundwater, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties* (RIWP; TEC-Weston Joint Venture [TEC-Weston JV], 2016a) serves as a supplement to the FWGWMP Plan. The RIWP discussed the subset of existing monitoring wells at Camp Ravenna that were to be monitored in 2016 and the COPCs that were to be evaluated at each selected well. This document superseded the *Final Facility-Wide Groundwater Monitoring Program Plan Semiannual Groundwater Monitoring Addendum for 2015* (EQM, 2015); however, the proposed monitoring program remained the same as the 2015 monitoring program. Forty-six existing wells were identified for semiannual sampling in May and November 2016 to evaluate potential off-site migration along with potential source area attenuation and temporal fluctuations.

The *Final Facility-Wide Groundwater Monitoring Addendum for 2017*, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio (TEC-Weston JV, 2017) was prepared to supplement the FWGWMP Plan and discussed monitoring wells at Camp Ravenna that were to be monitored in 2017 and the COPCs that were to be evaluated at each selected well. This document superseded the Semiannual Monitoring Addendum for 2016 that was submitted in the RIWP. Ninety-six previously installed wells and new wells installed in 2016 at the former RVAAP were identified for FWGWMP semiannual or continued FWGW RI sampling in 2017 to evaluate

potential off-site migration and potential source area attenuation and temporal fluctuations. An additional 13 wells were sampled for the purposes of the metals background study being conducted in associated with the FWGW RI. Nine of the wells proposed for sampling in the Addendum for 2017 were not sampled due to dry conditions, insufficient groundwater levels for sampling, or elevated turbidity in one or both of the April and December events.

1.2 REPORT ORGANIZATION

This Annual Report for 2017 describes four FWGWMP and FWGW RI sampling events that took place in 2017. The report incorporates by reference and provides additional detail on sampling activities described in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Report for April and July 2017 Sampling Events Camp Ravenna, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b).

This Annual Report for 2017 was prepared in accordance with the Camp Ravenna Submission Format Guidelines, Version 21 (Vista Sciences Corporation [Vista], 2015). The report organization is as follows:

- Section 1.0 – Background. This section describes the project background, presents the facility description, and identifies changes made to the FWGWMP in 2017. The 2018 scope of work for the FWGWMP will be provided for stakeholder review and approval in the pending *Facility-Wide Groundwater Monitoring Addendum for 2018* (TEC-Weston JV, 2018a).
- Section 2.0 – 2017 Monitoring Program. This section identifies the scope of work completed during the 2017 FWGWMP, including the monitoring wells sampled, the analytes by monitoring well, and the monitoring well inspection results.
- Section 3.0 – 2017 Monitoring Results. This section presents groundwater elevations measured during the 2017 semiannual sampling events and includes potentiometric surface maps for each of the site aquifers. This section also presents the groundwater chemistry analytical results from both 2017 semiannual sampling events.
- Section 4.0 – Discussion. This section presents a discussion of the analytical results, focusing on the COPCs detected above screening criteria. The discussion incorporates figures to illustrate the extent of contamination, and along with aquifer flow characteristics,

identifies likely migration pathways and illustrates where there may be a potential for COPCs to migrate off-site. Time-trend graphs are included to illustrate how concentrations of select COPCs are changing over time. This section also includes a discussion of turbidity and pH conditions and presents the groundwater modeling approach that is being incorporated into future FWGW reports.

- Section 5.0 – Conclusions and Recommendations. This section summarizes the pertinent findings from the 2017 groundwater sampling events and describes the monitoring wells to be sampled during 2018 as part of the FWGWMP Addendum for 2018.
- Section 6.0 – References.
- Tables and figures are included after Section 6.0.

This Annual Report for 2017 includes seven appendices as follows:

- Appendix A Reporting Limits in Excess of Screening Criteria
- Appendix B Laboratory Data and Validation Reports
- Appendix C Time-Trend Graphs
- Appendix D Field Forms and Notes (Provided on Compact Disc)
- Appendix E Investigation-Derived Waste (IDW) Characterization and Disposal Report
- Appendix F Comment Response Table and Correspondence
- Appendix G Monitoring Well Logs and Construction Details

1.3 FACILITY DESCRIPTION

The former RVAAP, now known as Camp Ravenna, located in northeastern Ohio within Portage and Trumbull Counties, is approximately 3 miles east/northeast of the City of Ravenna and 1 mile north/northwest of the City of Newton Falls. The facility is approximately 11 miles long and 3.5 miles wide. The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garret, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north; and State Route 534 to the east. In addition, the facility is surrounded by the communities of Windham, Garrettsville, Charlestown, and Wayland. A site location map is provided as **Figure 1-1**.

Administrative accountability for the entire 21,683-acre facility has been transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and the property subsequently licensed to

the Ohio Army National Guard (OHARNG) for use as a military training site, Camp Ravenna. The RVAAP restoration program involves cleanup of former production/operational areas throughout the facility related to former activities conducted on site.

1.4 SITE GEOLOGY

Surface geology at Camp Ravenna generally consists of glacial till deposits from the Wisconsinan glacial advance, with occasional outcrops of bedrock of the Pottsville formation. The surface of the eastern two-thirds of the Camp Ravenna property is composed of the clay-rich and relatively impermeable Hiram Till and associated outwash plain. The western one-third is covered by the Lavery Till, a silty, sandy material with a few cobbles and sporadic boulders (Winslow and White, 1966).

Pre-glacial valleys were deepened by scouring and subsequently buried during two minor glacial advances and retreats. The first advance occurred over the entire installation, depositing the Lavery Till at a thickness of 20 to 40 feet. The second advance covered only the eastern two-thirds of Camp Ravenna depositing the Hiram Till (Kammer, 1982). The Hiram Till consists of 12 percent (%) sand, 41% silt, and 47% illite and chlorite clay minerals, and ranges in depth from 5 to 15 feet below ground surface (ft bgs). The Hiram Till overlies thin beds of sandy outwash material in the far northeastern corner of the facility. The till thickness throughout the property ranges from less than 3 feet in some locations to approximately 45 feet (Author unknown, 1998; as cited in the Integrated Natural Resources Management Plan [INRMP]).

The uppermost bedrock underlying Camp Ravenna (**Figure 1-2**) consists of several units of the Pottsville Formation of Pennsylvanian age. **Figure 1-3** is a cross-section location map, and **Figures 1-4** and **1-5** present cross-sections trending east-west and north-south, respectively, which illustrate the geology underlying Camp Ravenna. The Pottsville Formation varies in composition from coarse, permeable sandstones to impermeable shales (Winslow and White, 1966). The Sharon Member - Sandstone/Conglomerate Unit, the lowest unit of the Pottsville Formation, is a highly porous, loosely cemented, permeable, cross-bedded, frequently fractured, and weathered sandstone, which is locally conglomeratic. Historical documents variably refer to the Sharon Member – Sandstone/Conglomerate as the upper and lower Sharon, along with the Sharon Sandstone and the Basal Sharon Conglomerate, where these grain sizes have been clearly

identified. The conglomerate portion of the Sharon Member – Sandstone/Conglomerate most often occurs within the lower (deeper) portions of the unit. Thin shale lenses occur in the upper portion of the unit. The Sharon Member - Shale is a gray to black sandy to micaceous shale, containing thin coal, underclay, and sandstone lenses. Above the shale is the Mercer Member of the Pottsville Formation, which consists of silty to carbonaceous shale with abundant thin, discontinuous sandstone lenses in the upper portion. Regionally, the Mercer Member also has been noted to contain interbeds of coal. The Homewood Sandstone Member is the uppermost unit of the Pottsville Formation. It typically occurs as a caprock on bedrock highs in the subsurface and ranges from well-sorted, coarse-grained, white quartzose sandstone to a tan, poorly sorted, clay-bonded, micaceous, medium- to fine-grained sandstone. Thin shale layers are prevalent in the Homewood Member as indicated by a darker gray shade of color (Winslow and White, 1966). The Pottsville Formation is underlain by Mississippian-age shale of the Cuyahoga Formation.

1.5 SITE HYDROGEOLOGY

The sandstone units of the Pottsville Formation are the major aquifers in the region. These aquifers can exist under artesian conditions and are typically confined above by glacial drift or shale. Within this formation, the Sharon Member – Sandstone/Conglomerate Unit is the most productive of these units and is the major bedrock aquifer in northeastern Ohio. A 1982 study reported that of the 71 groundwater wells that had been installed at the installation, 57 were completed in the Sharon Conglomerate, indicated by the study to be inclusive of the entire Sandstone/Conglomerate Unit of the Sharon Member, rather than the Basal Sharon Conglomerate aquifer currently described for Camp Ravenna. Data from the 1982 study indicated that the thickness of the Sharon Conglomerate ranges from 44 to 177 feet, and the average well depth at Camp Ravenna is approximately 155 feet, with a range between 83 and 261 feet (Kammer, 1982).

Throughout Camp Ravenna, average depth to groundwater is as deep as 50 ft bgs, with static water levels occurring between 958 and 1,184 feet above mean sea level (amsl) (Kammer, 1982). However, groundwater has been encountered at much shallower depths in the upper unconsolidated aquifer across the property. Groundwater flows from bedrock highs in the western portion of the property toward stream valleys in the eastern portion. These latter areas act as discharge areas, as indicated by the static water levels in monitoring wells across the installation (Kammer, 1982).

Groundwater occurs within the unconsolidated deposits in many areas of the facility. The thickness of the unconsolidated interval at the facility ranges from thin to absent in the eastern and northeastern portions of the facility to an estimated 150 feet in the central portion of the facility. Because of the heterogeneous nature of the unconsolidated glacial material, groundwater flow patterns are difficult to determine.

Groundwater in the unconsolidated aquifer predominantly flows in an eastward direction; however, the unconsolidated zone shows numerous local flow variations influenced by topography and stream drainage patterns, with preferential flow along pathways (e.g., sand seams, channel deposits, or other stratigraphic discontinuities) having higher permeabilities than surrounding clay or silt-rich material. The local variations in flow direction suggest: (1) groundwater in the unconsolidated deposits is generally in direct hydraulic communication with surface water, and (2) surface water drainage ways may also act as groundwater discharge locations. In addition, topographic ridges between surface water drainage features act as groundwater divides in the unconsolidated deposits.

In the region of Camp Ravenna, groundwater recharge occurs via surface streams and surface infiltration of precipitation along root zones, desiccation cracks, partings within the soil column, and general percolation through sand and gravel within buried valleys. Two large buried valleys occur southwest and northwest of the facility; wells in the unconsolidated aquifers in these valleys can yield up to 1,600 gallons per minute.

The majority of Camp Ravenna is comprised of clay-rich glacial tills with low permeabilities and underlying bedrock formations with extremely variable, but relatively low, permeabilities. Typical yields from wells reported in the 1982 study as penetrating the “Sharon Conglomerate” range from 5 to 200 gallons per minute; yields from the overlying unconsolidated sediments are usually considerably lower. In addition, the thickness and permeability of the bedrock water-bearing formations at Camp Ravenna vary considerably and have a strong effect on well yields, transmissivity, and hydraulic conductivity (Kammer, 1982).

Review of regional geology maps (Winslow and White, 1996) and historical monitored formation interval designations at Camp Ravenna during preparation of the FWGW RIWP indicated the certain groundwater monitoring wells in the area of the Fuze and Booster Quarry, including Load

Lines 5 through 10, were likely incorrectly identified to be installed within the Homewood Sandstone formation. Site stratigraphic column descriptions collected during the installation of new monitoring wells in this portion of post as part of the currently ongoing FWGW RI will be used to evaluate the lithology for these AOCs. Results of the lithologic review, the indicated effect of low-permeability shale units on groundwater vertical migration, and any recommended revisions to monitored formation designations for groundwater wells in this portion of Camp Ravenna will be included in the pending RI report.

1.6 PROJECT DESCRIPTION

The 2017 groundwater monitoring was a continuation of monitoring activities conducted at Camp Ravenna since 2005 under the FWGWMP Plan. The following tasks were performed in accordance with specifications contained in the RIWP, the FWGWMP Plan Addendum, and the FWSAP:

- Performed groundwater sampling of selected wells during January, April, July, and December 2017. Wells intended for sampling as part of the 2017 FWGWMP are identified in **Table 1-1** and include RCRA wells, FWGWMP wells, and a limited number of FWGW RI wells. Wells included in January 2017 event were identified for sampling in the *Final FWGW RIWP* (TEC-Weston JV, 2016a). The RCRA wells are located in the Ramsdell Quarry Landfill AOC (RQLmw-007, RQLmw-008, and RQLmw-009) and the Open Demolition Area #2 AOC (DET-3 and DET-4). The FWGWMP wells provide a characterization of current groundwater quality in primary contaminant source areas and provide a basis for determining the potential mobility of groundwater contaminants. FWGWMP well locations and sampling frequency are formally identified in the current year Groundwater Monitoring Addendum. A portion of the FWGW RI wells sampled in January 2017 were intended for sampling in Fall 2016, but were inaccessible or had insufficient groundwater for sampling during that event.
- Gauged depth to water levels at 295 of the 299 Camp Ravenna monitoring wells prior to the April 2017 sampling event. The water level measurements were used to generate potentiometric maps for each aquifer.
- Performed laboratory analyses and data validation for the collected samples.
- Prepared the requisite investigation-derived waste (IDW) characterization and disposal reports.

- Prepared the April and July 2017 (Draft) semiannual groundwater sampling event report dated January 22, 2018, as indicated in Subsection 1.2.
- Inspected all monitoring wells during sampling and water level gauging events to determine if maintenance was needed.
- Five monitoring wells installed in 2016 as part of the FWGW RI along the Camp Ravenna property boundary, south of State Route 5, were sampled to determine if contamination exists beyond the facility perimeter fence and if present if there is a potential to migrate off-post and are discussed in Section 4.0.

1.7 CHANGES TO THE FWGWMP IN 2017

Ninety-six wells, including 11 new wells that were installed in 2016 at the former RVAAP were identified for FWGWMP semiannual or continued RI sampling in 2017 to evaluate potential off-site migration and potential source area attenuation and temporal fluctuations. Monitoring well logs and construction details for wells installed in 2016 are provided in **Appendix G**. The following changes to the FWGWMP were conducted in 2017:

- Existing wells added to the FWGWMP semiannual sampling: CPBmw-008, CBPmw-009, EBGmw-125, EBGmw-131, FBQmw-171, FBQmw-172, FBQmw-175, FBQmw-176, FWGmw-010, FWGmw-013, LL1mw-080, LL1mw-081, LL2mw-264, LL3mw-234, LL3mw-237, LL4mw-193, LL7mw-006, LL10mw-005, LL11mw-005, LL12mw-183, NTAmw-117, NTAmw-118, RQLmw-014, and RQLmw-016.
- Newly installed wells added to the FWGWMP semiannual sampling: FWGmw-017, FWGmw-018, FWGmw-019, FWGmw-020, FWGmw-021, FWGmw-022, FWGmw-023, FWGmw-024, LL1mw-089, LL2mw-272, and NTAmw-120.
- Wells sampled as part of the 2016 FWGWMP that were not sampled in 2017: SCFmw-002 (replaced by new well FWGmw-018), LL2mw-060, LL2mw-271 (replaced by new well FWG-mw024), LL3mw-238, and LL3mw-241.
- Wells sampled in Spring 2017 for the purposes of the continuing FWGW RI: BKGmw-008, B12mw-011, B12mw-012, LL1mw-063, LL2mw-270, LL3mw-236, LL4mw-194, LL4mw-200, LL5mw-001, LL6mw-001, LL6mw-002, LL6mw-006, FBQmw-166, LNWmw-026, NTAmw-116, MBSmw-004, MBSmw-006, RQLmw-017, and WBGmw-015.

- Eight of the wells proposed for sampling in the Addendum for 2017 were not sampled due to dry conditions or insufficient groundwater levels for sampling in one or both of the April and December events (see Section 2.4).
- LL4mw-194 was reported with continued elevated turbidity levels after redevelopment in April 2017 and was not sampled in 2017.
- Thirteen additional wells were sampled during 2017 in support of the FWGW RI background study.

1.7.1 Monitoring Wells Installed and Abandoned

No monitoring wells were installed or abandoned during the 2017 events. Monitoring wells to be abandoned will be identified during later stages of the FWGW RI, and abandonment will occur only after concurrence by the Ohio EPA.

1.8 CHANGES TO THE FWGWMP IN 2018

The proposed FWGWMP groundwater sampling for 2018 will be included in a FWGWMP Addendum for 2018. The Addendum will include proposed FWGWMP wells related to recommendations provided in Section 5.0. The 2018 FWGWMP groundwater sampling program will include semiannual groundwater sampling events currently scheduled for April/May and October/November 2018.

2.0 2017 MONITORING PROGRAM

The following subsections summarize the activities completed during 2017 as they relate to the FWGWMP. The primary activities were groundwater elevation monitoring, well inspections, evaluation of sedimentation, turbidity, and pH, and groundwater sampling. **Appendix D** includes purge logs, development logs, log books, and chains-of-custody for the December 2017 sampling event. The purge logs, log books, calibration logs, daily reports, and chains-of-custody for the April and July 2017 sampling events are included in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Report for April and July 2017 Sampling Events Camp Ravenna, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b).

2.1 GROUNDWATER ELEVATION MONITORING

Water level measurements were obtained in accordance with procedures in Section 5.4.3.1 of the FWSAP (SAIC, 2011) and the *Final FWGW RIWP* (TEC-Weston JV, 2016a). The monitoring well locations are presented on **Figures 2-1** through **2-3**. A comprehensive facility-wide gauging event was conducted in April 2017.

Depth to water measurements were obtained only at the sampled monitoring wells for the January, July, and December 2017 events. The depth to water in each monitoring well was measured from the top of the inner casing-level indicator for wells without a dedicated pump. Dedicated pumps were not removed from the wells to obtain depth to water in the cases where water was below the top of the pump or depth to bottom measures. Depth to water and calculated groundwater elevations from the site-wide April 2017 water-level gauging event are presented in **Table 2-1**. Well construction details are also presented in **Table 2 1**. For the April 2017 comprehensive measurement event, April 17 through May 4, 2017, depth to water from the top of the inner casing was measured in 295 of 299 FWGWMP wells. Depth to water was not measured from wells B12mw-011, B12mw-012, LL1mw-063, and RQLmw-017 during the April 2017 comprehensive gauging event because water levels were below the top of permanently installed sampling pumps. Depth to water was measured from the 12 of the 15 wells sampled during the July 2017 sampling that event. Wells FWGmw-019, FWGmw-022, and FWGmw-023 had water levels greater than 100 feet, the limit of the water level indicator used during the event. During the December 2017 sampling event, 81 of the 92 wells sampled were gauged. The water level was below the top of the

pump at the following 11 wells: B12mw-012, BKGmw-015, BKGmw-021, DETmw-004, FBQmw-174, LL1mw-063, LL1mw-083, LL1mw-084, LL7mw-001, RQLmw-008, and WBGmw-009. Water level measurements collected during the April and July 2017 groundwater sampling events are presented on the purge logs included in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Semi-Annual Report for April and July 2017 Sampling Events Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b). Water level measurements collected during groundwater sampling in January and December 2017 are on the purge logs included in **Appendix D**.

2.2 MONITORING WELL INSPECTION AND REPAIRS – 2017

Each monitoring well was inspected at the time of its water-level measurement during the April 2017 comprehensive water level measurement event. Well inspection notes from April 2017 are included in **Appendix D**. Recommendations for well maintenance based on well inspections include the following:

- BKGmw-006 - Repair the concrete pad and replace the rusted stickup
- BKGmw-010 – Replace the hinge
- BKGmw-012 – Replace the hinge
- BKGmw-013 – Replace polyvinyl chloride (PVC) well cap with sealable, compression cap
- BKGmw-016 – Replace pad, hinge, and reset loose bollard
- BKGmw-019 – Replace PVC well cap with sealable, compression cap
- BKGmw-020 – Replace PVC well cap with sealable, compression cap
- CPmw-005 – Replace concrete pad
- DA2mw-110 – Consider replacing heaved concrete pad
- DA2mw-111 – Consider replacing heaved concrete pad and oil or replace stickup lid hinge
- DA2mw-113 – Oil or replace stickup lid hinge
- FBQmw-177 – Consider replacing heaved concrete pad

- FWGmw-007 – Replace concrete pad and reset loose bollard
- FWGmw-016 – Replace concrete pad
- FWGmw-023 – Paint well name on well
- LL1mw-065 – Reset loose bollard
- LL1mw-089 – Reset four loose bollards
- LL4mw-197 – Reset leaning bollard
- LL5mw-001 – Paint bollards
- LL5mw-002 – Paint bollards
- LL5mw-003 – Paint and reset bollards
- LL5mw-004 – Paint bollards
- LL5mw-005 – Paint bollards
- LL6mw-007 – Replace concrete pad
- LL6mw-009 – Paint bollards and well
- LL7mw-001 – Paint bollards
- LL7mw-002 – Paint bollards and well
- LL7mw-003 – Paint bollards and well
- LL7mw-004 – Paint bollards and well
- LL7mw-005 – Paint bollards
- LL7mw-006 – Paint bollards and well
- LL10mw-004 – Consider replacing cracked pad
- LL11mw-002 – Replace well vault bolts
- LL11mw-004 – Replace one well vault bolt
- LL11mw-012 – Replace concrete pad
- LNWmw-025 – Replace bollards

- LNWmw-027 – Replace bollards and replace one well vault bolt
- MBS-004 – Consider resetting or replacing pad
- NTAmw-109 – Stabilize or reset casing in pad
- NTAmw-119 – Replace cracked pad
- RQLmw-006 – Replace loose pad
- WBGmw-005 – Grease hinge
- WBGmw-009 – Repair or replace hinge
- WBGmw-010 – Replace pad
- WBGmw-012 – Reset one bollard
- WBGmw-013 – Repaint
- WBGmw-014 – Consider replacing pad

2.3 SEDIMENTATION AND TURBIDITY

The sediment accumulation footages and the well-bottom descriptions for 114 of the 299 monitoring wells are presented in **Table 2-1**. The remaining wells without sediment accumulation data have dedicated pumps installed in the casing that prevents measuring the total depth of the well. The total depth measurements were recorded during the April 2017 comprehensive gauging event. Most wells have less than 0.20 foot of accumulated sediment; however, 33 of the 114 wells had a sediment thickness of 0.20 foot or greater. The majority of these 33 wells and wells that had little to no sediment accumulation had a soft well bottom observed during gauging.

Several anomalous readings were noted in the *Final Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Annual Report for 2015* (TEC-Weston JV, 2016b) regarding sediment accumulation calculations for wells EBGmw-131, FBQmw-172, and LL8mw-005. These were 49.69, 14.37, and 10.14 feet, respectively. These large sediment accumulation calculations from 2015 were likely associated with incorrect readings and/or data entry errors. A depth to bottom measurement was not collected for EBGmw-131 during September 2016 or April 2017 because a pump is installed in the well; however, sediment accumulation measurements from September 2016 data for FBQmw-172 and LL8mw-005 for 2016 were 0.07 and 0.55 feet

respectively. The sediment accumulation reading from April 2017 for LL8mw-005 was 0.32, which confirms that the 2015 reading for LL8mw-005 was anomalous. Well FBQmw-172 has a pump installed in it; therefore, a total depth reading could not be obtained during the April 2017 event.

Wells exhibiting potentially anomalous estimates of sediment accumulation during the April 2017 event include LL3mw-240 (9.76 feet of sediment) and LL12mw-113 (4.21 feet). LL3mw-240 had a measured sediment accumulation of 0.00 foot during the September 2016 gauging event. LL12mw-113 had an identical measured sediment accumulation (4.21 feet) during the September 2016 gauging event. The sediment accumulation in LL3mw-240 is likely an anomaly due to a poor reading or data entry error and will be verified during the next comprehensive gauging event. The accumulation in LL12mw-113 is confirmed by the April 2017 reading.

Table 2-2 presents the turbidity readings measured during the 2016 and 2017 sampling events. These are the final turbidity readings collected prior to sampling each of the wells for the respective sampling event. Turbidity readings ranged from 0.00 to 1,000 Nephelometric turbidity units (NTUs) in the April 2017 comprehensive sampling event. Only 11 of the 117 readings from the April 2017 sampling event were greater than 10 NTUs.

In a continued effort to minimize turbid samples, low-flow purging and sampling techniques are being used. Dedicated bladder pumps and tubing are installed in 185 of the 299 total wells. Based on the November 2016 sampling, four wells (FBQmw-175, FWGmw-002, FWGmw-011, and LL4mw-194) with turbidity values in excess of 10 NTUs were redeveloped prior to sampling during the April 2017 sampling event. Following redevelopment, turbidity values for FBQmw-175, FWGmw-002, and FWGmw-011 in April 2017 were 305, 25.9, and 133 NTUs, respectively. FBQmw-175 returned an error reading during the April 2017 sampling event. Turbidity values for FBQmw-175, FWGmw-002, and FWGmw-011 during the December 2017 sampling event were 89.70, 23.10, and 27.70 NTUs, respectively, displaying a decrease in turbidity from the April 2017 sampling event. LL4mw-194 was redeveloped in April 2017, but was not sampled during any sampling event in 2017. During redevelopment, the final turbidity result was over the upper range limit of the field monitoring instrument, which represents a value greater than 1,000 NTUs.

2.4 MONITORING WELL SAMPLING EVENTS

2.4.1 January 2017

The January 2017 FWGWMP sampling event was performed from January 10–17, 2017. A total of 15 monitoring wells were sampled, including one of the five RCRA wells (RQLmw-009). The results of the January 2017 sampling event also are presented in Section 3 and further discussed in Section 4 of this report.

2.4.2 April 2017

The April 2017 FWGWMP sampling event was performed April 17 through May 4, 2017. During the event, 101 monitoring wells were sampled. This includes four of the five RCRA wells (RQLmw-007, RQLmw-008, RQLmw-009, and DETmw-003). Four FWGWMP wells (B12mw-012, DETmw-004 [RCRA well], LL1mw-063, and LL4mw-194) could not be sampled during the April 2017 event because of insufficient water volume. The results of the April 2017 sampling events are reported in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Semi-Annual Report for April and July 2017 Sampling Events Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b). The results of this sampling event are summarized in Section 3.0 and further discussed in Section 4.0 of this report.

2.4.3 July 2017

The July 2017 FWGWMP sampling event was performed from July 31 through August 9, 2017. Fifteen FWGWMP monitoring wells were sampled during the event. No RCRA wells were included in the sampling. The results of the April 2017 sampling events are reported in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Semi-Annual Report for April and July 2017 Sampling Events Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b). The results of the July 2017 sampling event are presented in Section 3.0 and further discussed in Section 4.0 of this report.

2.4.4 December 2017

The December 2017 FWGWMP sampling event was performed from December 1 through 7, 2017. A total of 84 of the 299 monitoring wells were sampled, including four of the five RCRA wells (RQLmw-007, RQLmw-008, RQLmw-009, and DETmw-003). Eight of the FWGWMP wells

planned for sampling in December were observed with insufficient groundwater for sampling: B12mw-012, DETmw-004, FBQmw-174, LL1mw-063, LL1mw-083, LL1mw-084, LL7mw-001, and SCFmw-004. The results of the December 2017 sampling event are presented in Section 3.0 and further discussed in Section 4.0 of this report.

2.5 LABORATORY ANALYSIS AND DATA VALIDATION

FWGWMP samples were submitted to TestAmerica, Inc. laboratories in Sacramento, California, Denver, Colorado, and Canton, Ohio, for analysis. The data were validated by qualified personnel on the TEC-Weston JV team in accordance with the project specifications included in the QAPP. The laboratory data packages and the data validation reports are provided in **Appendix B**.

2.6 INVESTIGATION-DERIVED WASTE

IDW reports were prepared for the liquid waste generated during the January, April, July, and December 2017 sampling events. Purge and decontamination water was collected at each well location and transferred to 55-gallon drums. Instruments and equipment were decontaminated after purging and sampling each monitoring well. Minimal IDW volume was generated because of the use of dedicated sampling equipment. Pending disposal of the IDW, the IDW fluids are stored in 55-gallon drums at Building 1036 and inspected on a weekly basis. IDW reports dated March 9, 2017 (January Event) and December 19, 2017 (December Event), are included in **Appendix E**. IDW reports dated June 15, 2017 and September 8, 2017 are included in *the Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Semi-Annual Report for April and July 2017 Sampling Events Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b). IDW from all events were classified as non-hazardous waste for waste disposal purposes. IDW from the April 2017 sampling event was properly transported and disposed of on August 17, 2017. IDW from the January 2017 sampling event was properly transported and disposed of on January 27 2017. IDW from the December 2017 event was transported and disposed on December 21, 2017. IDW from the July 2017 sampling event was determined to be nonhazardous and is awaiting proper transport and disposal while being inspected on a weekly basis.

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3.0 2017 MONITORING RESULTS

3.1 GROUNDWATER ELEVATIONS

Groundwater elevations for 295 of the 299 FWGW monitoring wells are presented in **Table 2-1**. Potentiometric surface maps were created using these groundwater elevations and are presented as **Figures 3-1** through **3-4**. These figures show the potentiometric surfaces of the unconsolidated, Homewood, Upper Sharon, and Basal Sharon Conglomerate aquifers. These depictions include groundwater-surface water interface (GSI) interpretations made based on available topographic and groundwater elevation information; staff gauges in surface water bodies are not available. The remainder of this subsection discusses the groundwater flow directions in each of the aquifers, vertical and horizontal flow gradients, and potential off-site migration pathways.

3.1.1 Horizontal Gradients and Flow Velocities

<u>Unconsolidated Aquifer</u>

Figure 3-1 illustrates the potentiometric surface of the unconsolidated aquifer. Groundwater in the unconsolidated aquifer predominantly flows in an easterly direction with local, radial, and/or southerly flow components. Variations in flow direction are associated with the influence of local streams, topographic elevation changes, and the presence/absence of the unconsolidated matrix materials. The streams are likely discharge locations for the unconsolidated aquifer, as shown on **Figure 3 1**. Where the unconsolidated aquifer is absent, the Homewood Formation or the Sharon Sandstone is the uppermost aquifer, as shown on **Figure 3-1** with a hatched pattern. The Homewood Formation and Sharon Sandstone are in direct hydraulic communication with the unconsolidated aquifer, where present.

Horizontal hydraulic gradients were calculated for the unconsolidated aquifer at the three locations shown on **Figure 3-1**. The gradients range from 0.011 to 0.025 feet per foot (ft/ft). Using average porosity values from previous Shelby tube samples and average hydraulic conductivity values derived from rising head/falling head tests conducted on 10 wells in November 2012, groundwater velocities were calculated along the three gradients at rates of 0.049 foot per day (ft/day) to 0.11 ft/day (18 to 40 feet per year [ft/year]). **Table 3-1** summarizes the horizontal hydraulic

gradient and groundwater velocity data for the various aquifers using the April 2017 groundwater elevation measurement data.

Homewood Formation

Figure 3-2 illustrates the potentiometric surface of the Homewood Formation, with an overall southerly to southeasterly groundwater flow direction; however, local radial flow patterns are evident. Groundwater elevations shown on **Figure 3-2** in the Fuze and Booster Quarry Landfill/Ponds area show a mounded pattern resulting in a radial flow pattern.

Horizontal hydraulic gradients were calculated for the Homewood Sandstone aquifer at the three locations shown on **Figure 3-2**. The gradients ranged from 0.005 to 0.021 ft/ft. Using average porosity values from previous core samples and average hydraulic conductivity values derived from hydraulic testing (slug testing) conducted on two Homewood Sandstone aquifer wells in November 2012, groundwater velocities were calculated along the three gradients at rates of approximately 0.29 ft/day to 1.2 ft/day (105 to 439 ft/year), as shown in **Table 3-1**. Review of the comprehensive groundwater hydraulic conductivity and permeability testing data set for Camp Ravenna will be conducted during the ongoing FWGW RI to determine facility-wide ranges of key hydrogeology parameters applicable to the Homewood Sandstone aquifer. The FWGW RI will also provide a review and confirmation of monitored zone formation designations for well locations in the Fuze and Booster Quarry and Load Lines 5 through 10 AOCs. This will include an evaluation of intervening shale layers indicated to be functioning as an aquitard between the upper most saturated sandstone intervals (i.e., the Homewood and/or Massillon Formations) and the Upper Sharon Sandstone aquifer in this portion of Camp Ravenna.

Sharon Sandstone (Upper Sharon)

Figure 3-3 illustrates the potentiometric surface of the Sharon Sandstone aquifer (also referred to as the Upper Sharon). Groundwater in the Sharon Sandstone aquifer flows generally toward the east; however, an area of higher groundwater elevations forming a mound is observed in the eastern portion of Camp Ravenna. This mounding effect is centered in the Load Line 2 area as depicted with a radial flow pattern on **Figure 3-3**. The Sharon Sandstone aquifer is in direct hydraulic communication with the unconsolidated aquifer for much of its extent in the central and eastern portions of Camp Ravenna. Where streams have incised and eroded the unconsolidated sediments

across this area, the Sharon Sandstone aquifer is in direct hydraulic communication with the local stream system. Portions of these streams are likely groundwater discharge zones for the Sharon Sandstone aquifer. **Figure 3-3** shows this interconnection where the potentiometric lines intersect the streams.

Horizontal hydraulic gradients were calculated for the Sharon Sandstone aquifer at the three locations shown on **Figure 3-3**. The gradients range from 0.013 to 0.028 ft/ft. Using average porosity values from previous core samples and average hydraulic conductivity values derived from hydraulic testing (slug testing) conducted on two Sharon Sandstone aquifer wells in November 2012, groundwater velocities were calculated along the three gradients at rates of 1.6 ft/day to 3.4 ft/day (571 to 1,231 ft/year), as shown in **Table 3-1**.

<u>Basal Sharon Conglomerate</u>

The deepest aquifer zone monitored at Camp Ravenna is the Basal Sharon Conglomerate, which occurs within the basal portions of the Sharon Member - Sandstone/Conglomerate Unit. Groundwater flow in the Basal Sharon Conglomerate is generally northeastward, as illustrated on **Figure 3-4**; however, local flow direction may vary from almost northerly to southeasterly. A horizontal hydraulic gradient (0.0058 ft/ft) was calculated for the Basal Sharon Conglomerate, as illustrated on **Figure 3-4**. Using porosity values obtained from previous cores in the upper Sharon and a hydraulic conductivity value obtained from literary sources for sandstone formations, a groundwater velocity of 0.016 ft/day (6 ft/year) was estimated, as shown in **Table 3-1**. It is likely that hydraulic conductivity values for the Basal Sharon Conglomerate are higher than the value presented in the literature (based on actual well yields); therefore, the value presented in **Table 3-1** may underestimate the groundwater velocity in this aquifer zone.

3.1.2 Vertical Gradients

To evaluate the potential for groundwater to flow vertically within or between aquifers, groundwater elevations were evaluated at well clusters. A well cluster consists of two wells located within 20 feet of one another and screened in different aquifers. New wells have been installed and have been nested with previously existing or other new well installations screened in the overlying water bearing zones.

Table 3-2 presents the well clusters evaluated, the April 2017 groundwater elevations, the elevation of the midpoint of each well's screened interval, and the calculated vertical hydraulic gradients. The vertical gradient at a well cluster is calculated by dividing the difference in groundwater elevations (head) by the distance between screen midpoints. A negative vertical gradient indicates an upward gradient, and a positive vertical gradient indicates a downward gradient.

Unconsolidated and Homewood Aquifers

One well cluster was evaluated for the potential of vertical flow between the unconsolidated and Homewood aquifers. As shown in **Table 3-2**, the calculated gradient for the well cluster in the Load Line 6 AOC is 0.007 ft/ft downwards. The magnitude of this vertical gradient is negligible and indicates vertical groundwater flow between the unconsolidated and Homewood aquifers is limited.

Unconsolidated and Upper Sharon Sandstone Aquifers

Seven well clusters screened in the unconsolidated and Upper Sharon Sandstone aquifers were evaluated to determine vertical flow potential between these aquifers. In one of these seven well clusters, the flow direction was upward from the Upper Sharon Sandstone to the unconsolidated aquifer. The well cluster with the upward flow direction is located in the Erie Burning Grounds AOC, located in the northeast portion of Camp Ravenna.

The five remaining well clusters evaluated show a downward vertical gradient from the unconsolidated aquifer to the Upper Sharon Sandstone aquifer. In one of these well clusters (FWGmw-015 and FWGmw-016), a shale layer is present between the unconsolidated aquifer and the Upper Sharon Sandstone, as evidenced in the boring log for FWGmw-016. Based on the geologic map (**Figure 1-2**), these wells are located near the local, eastern extent of the Sharon Member Shale Unit. Hydraulic communication/downward groundwater flow at this location is influenced by the shale, which may locally act as an aquitard; however, the effectiveness of the shale to act as an aquitard is limited in areal extent.

Unconsolidated and Basal Sharon Conglomerate Aquifers

Groundwater elevations in two well clusters were evaluated to estimate the vertical gradient between the unconsolidated and the Basal Sharon Conglomerate aquifers. As shown in **Table 3-2**, one well cluster shows a downward gradient and one shows an upward gradient.

An upward vertical gradient was present in the eastern portion of Camp Ravenna, close to the southern property boundary at well SCFmw-004. Artesian conditions indicated by historical gauging measurements and recent field observations for SCFmw-004 will be evaluated as part of ongoing monitoring. New paired well installations advanced during the RI will support evaluation of vertical gradient between the Upper Sharon Sandstone and Basal Sharon Conglomerate aquifers in this portion of Camp Ravenna.

At the western-most Basal Sharon Conglomerate well (SCFmw-001), the head difference between the upper aquifers and the Basal Sharon Conglomerate was in excess of 80 to 90 feet. This is an area where the Mercer Member (shale), the Massillon Sandstone, and the Sharon Member are indicated to be present. Shales within the Mercer Member and the Sharon Member – Shale Unit are likely to act as aquitards, locally inhibiting flow between the unconsolidated and Homewood aquifers to the Basal Sharon Conglomerate. A vertical gradient was not calculated for this portion of the post based on the presumed presence of shale layers functioning as a localized aquitard and the current lack of groundwater elevation data for the Upper Sharon Sandstone aquifer. The presence and hydraulic confining effect of these shale units in the area of SCFmw-001 will be evaluated as part of the ongoing FWGW monitoring.

To the east of SCFmw-001, where the Homewood, Massillon Sandstone, and the Mercer Member have been eroded, the difference in groundwater elevations and the vertical gradient between the Basal Sharon Conglomerate and overlying aquifers is significantly less. This is shown on **Table 3-2** by the LL12mw-247 and SCFmw-002 well cluster. The ongoing FWGW monitoring will further evaluate the potential for vertical migration to the Basal Sharon Conglomerate from overlying water bearing units. Investigation activities conducted in 2016 included nested monitoring well installations within the Upper Sharon Sandstone and Basal Sharon Conglomerate aquifers in the areas where the Homewood aquifer is present and monitored by previously existing wells.

Upper Sharon Sandstone and Basal Sharon Conglomerate Aquifers

Three well clusters screened in the Upper Sharon Sandstone and Basal Sharon Conglomerate were evaluated to determine vertical flow potential between these aquifers. In two of these well clusters, the flow direction was downward from the Upper Sharon Sandstone to the Basal Sharon Conglomerate aquifer. One of the well clusters is located in the Load Line 2 AOC near the Camp Ravenna boundary. The second well cluster is located in the Load Line 10 AOC, located in the eastern portion of Camp Ravenna. The third well cluster, which exhibited an upward vertical gradient, is in the Load Line 12 AOC near the Camp Ravenna boundary. As shown on **Table 3-2**, the vertical gradients at all three well clusters are relatively small, ranging from -0.003 to 0.013 ft/ft, indicating that vertical flow between the Upper Sharon Sandstone and Basal Sharon Conglomerate aquifers is limited.

3.2 DATA VALIDATION

Data validation results for samples collected during the April 2017 monitoring event are discussed in the *Draft Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Semi-Annual Report for April and July 2017 Sampling Events Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2018b). Sampling data from the July 2017 monitoring event conducted by the USACE has not been validated yet. The validation results will be provided in the next FWGWMP-related report to be submitted to OEPA after they are received. This subsection summarizes the results of the data validation performed on groundwater samples and quality control (QC) sample data for sampling events conducted in January and December 2017. TestAmerica-Denver performed all analyses except for Method 7196A (hexavalent chromium), which was performed by TestAmerica-Canton, and nitroguanidine and nitrocellulose, which were performed by TestAmerica-Sacramento. The validator noted TestAmerica-Canton does not hold U.S. Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) accreditation for hexavalent chromium, and TestAmerica-Denver does not hold DoD ELAP accreditation for free cyanide. The lack of DoD accreditation does not affect the usability of the data for current purposes.

Samples were analyzed for volatiles by Method SW846 8260B, semivolatiles by method 8270D, polycyclic aromatic hydrocarbons (PAHs) by 8270D SIM, pesticides by 8081B, polychlorinated

biphenyls (PCBs) by 8082A, explosives by 8330B, metals/mercury by 6010C/6020A/7470, total cyanide by 9012B, hexavalent chromium by 7196A, nitroguanidine by modified 8330, perchlorate by 6860, alkalinity by 2320B, nitrocellulose by WS-WC-0050, sulfide by 9034, chloride/sulfate/nitrate/nitrite by 9056A, and free cyanide by 4500 CN I Standard Method (SM). Results are reported in laboratory sample delivery groups (SDGs) 240-88739-1 (hexavalent chromium only), 240-88785-1 (hexavalent chromium only), 240-88812-1 (hexavalent chromium), 240-88815-1 (hexavalent chromium), 240-88885-1 (hexavalent chromium only), 240-88967-1 (hexavalent chromium only), 240-89062-1 (hexavalent chromium), 240-89104-1 (hexavalent chromium only), 280-104206-1, 280-104281-1, 280-104281-2 (free cyanide only), 280-104320-1, 104384-1, 104384-2 (free cyanide only), 104483-1, 104483-2 (free cyanide only), 104552-1, 104552-2 (free cyanide only), 92979-1 (includes 92982, 92983, 93047), and 93104-1, and are presented in **Appendix B**. The U.S. Environmental Protection Agency (EPA) Stage 2B validation was performed by qualified chemists on the TEC-Weston JV team (all SDGs except 280-104384-1, which was validated by Laboratory Data Consultants). Data validation reports are presented in **Appendix B**.

The data were reviewed using guidance and QC criteria documented in the *Final Remedial Investigation Work Plan for Groundwater and Environmental Services for RVAAP-66 Facility-Wide Groundwater, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio, Appendix A: Sampling Analysis Plan, A.2: Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP), Attachment A: Data Validation Evaluation Sheets* (TEC-Weston JV, 2016a). The guidance and quality assurance (QA)/QC criteria are based on the DoD Quality Systems Manual (QSM), Version 5.0; USEPA National Functional Guidelines for Organic Data Review (EPA, 2014a) and USEPA National Functional Guidelines for Inorganic Data Review (EPA, 2014b); and analytical methods and professional judgment. See **Appendix B** (data validation reports) for further details on specific data quality issues that are summarized in this section. Field QC samples, including trip blanks, field duplicates, and matrix spike/matrix spike duplicates (MS/MSDs), were collected at the frequency specified in the UFP-QAPP (TEC-Weston JV, 2016a). Trip blanks were collected at a frequency of one per cooler with volatile organic compound (VOC) samples. Field duplicates were generally collected at or exceeding the 10 % frequency of collection criterion (see additional discussion below). MS/MSD pairs were collected at or exceeding the 5% frequency of collection criterion (except for the wet chemistry analyses of

sulfide [two samples] and nitrate and nitrite [seven samples] where no MS/MSD were performed). During data validation, qualifiers were assigned to assist in proper data interpretation. If values are estimated, data may be used for site evaluation purposes; however, reasons for data qualification should be taken into consideration when interpreting sample concentrations. Data that have been rejected (R) should not be used for any purpose. Results with no qualifiers meet all data quality goals as outlined in the UFP-QAPP. The data were reviewed and validated by calculating Relative Percent Difference (RPD) between spiked sample recoveries according to the USEPA National Functional Guidelines for Organic Data Review (EPA, 2014a) and USEPA National Functional Guidelines for Inorganic Data Review (EPA, 2014b). SW-846 Methods were used for characterization of chemical constituents other than nitrate/nitrite. SW-846 Methods recommend using the actual spiked sample concentrations to calculate RPD values. The laboratory calculated RPDs based on the SW-846 Methods; however, the spiked sample concentrations varied because of sample aliquot sizes, which led to variations in the spike concentrations. Calculating RPDs from spiked sample concentrations (rather than recoveries) results in poor precision that is not necessarily indicative of the data quality. Comparing spike recoveries during validation was a better indicator of analytical precision.

Field duplicate sampling represented a minimum of 10% of the total number of normal environmental samples for contaminant constituents analyzed during the January 2017 and December 2017 events, with exceptions including free cyanide by Method 4500 CN I SM (no field duplicate collected for the seven samples), sulfide by Method 9034 (no field duplicate for two samples), and sulfate/chloride/nitrate/nitrite by 9056A (no field duplicate for seven nitrate/nitrite and four sulfate/chloride samples). Of the constituents covered by these tests, only free cyanide and nitrate been detected to date above current screening levels.

No major deviations from the planned data collection field event were encountered; therefore, the usability of the data was not impacted. Thirty data points were rejected; however, 99.5% of the data was determined to be usable or usable as qualified for their intended purposes (see **Table 3-3**). The following data qualifiers were used by the data validators when qualifications were required:

- U = UNDETECTED - the analyte was analyzed for but not detected, or was qualified as undetected by the validator due to associated method blank contamination.

- J = ESTIMATED - the identification of the analyte is acceptable, but the QA criteria indicate that the quantitative values may be outside the normal expected range of precision (i.e., the quantitative value is estimated).
- UJ = UNDETECTED ESTIMATED - a combination of the U and J qualifiers, which indicate that the analyte is not present. The reported value is considered to be an estimated reporting limit.
- R = REJECTED - data are considered to be rejected and shall not be used. This flag denotes the failure of QC criteria so that it cannot be determined if the analyte is present or absent from the sample.

The data validation reports discuss the application of U, J, UJ, and R validation flags, including the sample results qualified and a detailed description of the anomaly or outlier (see **Appendix B**). Data were qualified based on holding time exceedances, volatile headspace, initial and continuing calibration not meeting, blank contamination, spike and surrogate recoveries outside QC limits, field duplicate/laboratory duplicate RPDs above QC limits, and %RPD between column results (explosives) exceeding less than 40% criteria. Data qualifiers applied through the data validation process for detected constituents are included in **Table 3-5**. Rejected data, compounds qualified as undetected (U) due to method/trip blank contamination, and non-detected data reported at values that are above the limit of detection (LOD) presented in the UFP-QAPP, are summarized below by SDGs.

- SDG 280-92979-1: 8260B – Acetone was qualified as undetected (U) at the limit of quantitation (LOQ) in sample FMGmw-500-011217-GW due to trip blank contamination.
- SDG 280-92979-1: 8260B – The following compounds were rejected (R) in parent sample FWGmw-023-011217 due to low MS recoveries: hexachlorocyclopentadiene (0%), benzoic acid (0%), 2,4-dinitrophenol (0%), 2-chlorophenol (8%, RPD 160), 4-nitrophenol (7%, RPD 175), and phenol (9%, RPD 156). Note: because MSD recoveries met criteria, professional judgment could have been applied and estimated these compounds.
- SDG 280-92979-1: In the laboratory control sample (LCS) for Method 8270D, hexachlorocyclopentadiene did not meet criteria and the results were rejected (R) for the samples collected at FWGmw-023, NTAmw-120, and LL2mw-272.

- SDG 280-104281-1: Semivolatile organic compounds (SVOC) benz(a)anthracene, chrysene, and phenanthrene were qualified as undetected (U) at the LOQ in samples NTAmw-120-120417 and NTAmw-119-120417-GW; and fluoranthene was qualified as undetected (U) at the LOQ in samples NTAmw-120-120417, NTAmw-119120417-GW, FWGmw-024-120217-GW, FWGmw-021-120217-GW, and FWGmw-020-120217-GW due to method blank contamination.
- SDG 280-104281-1: Metals – Zinc was qualified as undetected (U) at the LOQ in samples NTAmw-120-120417-GW, FWGmw-007-120417-GW, and FWGmw-015-1204176-GW due to method blank contamination. Total cyanide was qualified as undetected (U) at the LOQ in samples FBQmw-171-120417-GW, FWGmw-021-120217-GW, and FWGmw-018-120217-GW due to method blank contamination. Chloride was qualified as undetected (U) at the LOQ in samples FBQmw-171-120417-GW and FBQmw-175-120417-GW due to method blank contamination.
- SDG 280-104320-1: Benz(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene results in all samples were qualified as undetected (U) at the LOQ due to method blank contamination.
- SDG 280-104320-1: Pesticide sample FWGmw-022-120517-GW was re-extracted outside of holding time resulting in all results being estimated (UJ). The laboratory concentrated this sample to final volume of 1 milliliter (mL) rather than method 5 mL due to sample matrix resulting in elevated reporting limits.
- SDG 280-104320-1: Metals (iron, manganese, and lead) were qualified as undetected (U) in several samples due to method blank contaminations.
- SDG 280-104384-1: PAHs benz(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene were qualified as undetected (U) at the LOQ in sample LL12mw-183-120617-GW due to method blank contamination.
- SDG 280-104384-1: Several metal analytes were qualified as undetected (U) at the LOQ in several samples due to method blank contamination.
- SDG 280-104483-1: Several PAH compounds in two samples were qualified as undetected (U) at the LOQ due to method blank contamination.
- SDG 280-104483-1: Several metal analytes were qualified as undetected (U) at the LOQ in several samples due to method blank contamination.

- SDG 280-104483-1: All 16 explosive compounds were rejected (R) in parent sample LL2mw-272-120717-GW (104483-4) due to poor MS recoveries.
- SDG 280-104552-1: VOC 2,4-dinitrophenol was rejected (R) in samples RQLmw-009-120717-GW, RQLmw-007-120717-GW, and RQLmw-011-120717-GW due to low LCS recoveries.

3.3 GROUNDWATER QUALITY RESULTS

3.3.1 Screening Criteria

The groundwater data were screened in part using the approach presented in the *Facility-Wide Groundwater Monitoring Program Plan RVAAP-66 Facility-Wide Groundwater Semiannual Monitoring Addendum* (EQM, 2012b). The approach listed in Subsection 2.6 of that document prescribes groundwater data are to be screened against background values, facility-wide cleanup goals (FWCUGs) and/or maximum contaminant levels (MCLs), or regional screening levels (RSLs). The FWCUGs are listed in Tables 5-8 through 5-10 in the *Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio*, dated March 23, 2010 (SAIC, 2010). Although background levels for metals constituents are presented in this report, the Ohio EPA has questioned the validity of the background levels. Therefore, a comparison of groundwater data to background levels has not been conducted for the 2017 data.

Therefore, 2017 FWGWMP groundwater data are compared to screening criteria as follows:

- Step 1: Screen data against the FWCUGs – The most stringent of the non-carcinogenic and carcinogenic groundwater FWCUGs for the National Guard Trainee, Resident Farmer Adult, and Resident Farmer Child were used to screen the data. If this most stringent FWCUG was less than the maximum contaminant level (MCL) for a given chemical, the MCL was used for screening purposes. If a chemical concentration was less than the FWCUG (or MCL, as applicable), that chemical was not considered to be an exceedance of screening criteria. If a chemical concentration was equal to or greater than the FWCUG (or MCL), then the chemical was considered to be an exceedance of screening criteria. If a chemical does not have a FWCUG, the chemical was compared against the RSL, as follows in Step 2.

- Step 2 – Screen applicable data against the EPA RSLs for tap water. If a chemical concentration was equal to or greater than its RSL, then the chemical was considered to be an exceedance of screening criteria. If a chemical does not have either an FWCUG or RSL, a cleanup goal may need to be developed in coordination with Ohio EPA.

The applicable screening criteria are listed in **Table 3-4**, including the FWCUGs, MCLs, and RSLs. The cleanup goal or regulatory limit chosen for screening purposes is highlighted in this table. The chosen screening criteria are also presented on **Table 3-5**, which presents the FWGWMP monitoring well results.

3.4 GROUNDWATER ANALYTICAL RESULTS

The groundwater analytical results for detected constituents in the 96 FWGWMP wells and for the additional thirteen wells sampled for the FWGW RI background study are presented in **Table 3-5**. These tables present the groundwater results by analyte group (e.g., VOCs, SVOCs) and indicate the AOC and aquifer associated with each monitoring well, as applicable. The tables also include the appropriate screening criteria and identify data that are equal to or in excess of the screening criteria.

3.4.1 Non-Detect Results Above Screening Criteria

Appendix A includes tables which show the analytical data with reporting limits exceeding screening criteria for monitoring wells included in the FWGWMP and sampled for the purposes of the metals background study. The constituents identified on these tables include 9 explosives/propellants, 10 metals, hexavalent chromium, cyanide, 3 pesticides, 7 polychlorinated biphenyls (PCB) aroclors, 27 SVOCs, and 8 VOCs. The 2017 groundwater data were compared to Facility-Wide Cleanup Goals (FWCUGs), where available. If a constituent did not have a FWGUG, the data was screened against the most stringent of the Maximum Contaminant Level (MCL) or Regional Screening Level (RSL) for tap water. The RSLs used for comparison were selected using a total hazard quotient (THQ) =0.1, and a target cancer risk (TR) =10E-06.

3.5 pH MONITORING

As part of each sampling event, field parameter readings of pH are collected during the purging and well stabilization process. The final pH readings obtained during purging, just prior to

sampling, are included in **Table 3-5.** The typical pH range for naturally occurring groundwater is approximately 5.0 to 9.0 standard units (s.u.). The pH levels outside of the typical pH range are highlighted in **Table 3-5** and are discussed below. This subsection also identifies and discusses the monitoring wells where historical pH levels have been measured at levels outside of the typical pH range. Trend graphs for pH readings at wells identified in the FWGWMP Addendum for 2017 (TEC-Weston JV, 2017) for evaluation of pH through characterization of potentially related groundwater geochemistry parameters are provided as **Figures 3-5** through **3-8**.

Monitoring wells exhibiting pH levels, outside of the typical groundwater pH range, in one or both 2017 sampling rounds, include BKGmw-016, LL1mw-086, LL1mw-083, RQLmw-011, RQLmw-013, LL11mw-005, FWGmw-010, and LL1mw-089. Of these, only LL1mw-086, LL1mw-083, RQLmw-011, and RQLmw-013 were included in the expanded groundwater geochemistry sampling in 2017.

Field pH readings of 9.34 s.u. and 10.51 s.u., in LL1mw-086 were measured above 9.0 s.u. during the April and December 2017 sampling events. The readings in LL1mw-086 are generally consistent with the range of field readings collected at the well since 2012 (see **Figure 3-6**). Field readings in 2017 represent a drop from the historical high reading at LL1mw-086 of 13.07 s.u. in May 2016

A field pH reading of 4.67 s.u. in LL1mw-083 was measured below 5.0 s.u. during the April 2017 sampling event; the well was dry during the December 2017 event. The reading in LL1mw-083 is consistent with previous field readings collected since 2005 that have all been below 5.0 s.u. (see **Figure 3-7**).

A below range field reading of 4.28 s.u. was reported at RQLmw-011 during the April 2017 sampling event. A normal range reading of 6.02 was logged during the December 2017 sampling event. These results are consistent with readings of 5.7 s.u. in November 2016 and 4.28 in May 2016 (see **Figure 3-8**). Readings for this well have historically been below 5.0 with the exceptions noted above and during October sampling events in 2009 and 2010.

A below normal range field reading of 3.87 s.u. was reported at RQLmw-013 during the December 2017 sampling event. A normal range reading of 5.16 was recorded during the April 2017 sampling

event. Readings for this well have historically been below 5.0 with the exception of the May 2017 sampling event that was slightly above 5.0 (see **Figure 3-8**).

Monitoring wells FBQmw-174 and RQLmw-012 have previously exhibited pH levels out of normal range (see **Figures 3-5** and **3-8**). FBQmw-174 was measured for pH during the May 2017 sampling event and was found to be within the normal pH range, consistent with results from the May 2016 sampling event. Historically, the pH readings from FBQmw-174 have fluctuated between slightly above and slightly below 5.0. RQLmw-012 was measured for pH during the May and December 2017 sampling events and was found to be within the typical pH range.

Monitoring wells LL1mw-083 (**Figure 3-7**), RQLmw-011, and RQLmw-013 (**Figure 3-8**) continue to exhibit low pH levels below 5.0 s.u., and monitoring well LL1mw-086 exhibits pH levels above and below 9.0 s.u. (**Figure 3-6**).

The pH level in monitoring well FWGmw-002 (**Figure 3-6**) has only been measured greater than 9.0 s.u. once, in January 2013, at a level of 9.38 s.u., with pH levels less than 9.0 s.u. before and after January 2013. Also provided on **Figure 3-6**, FWGmw-0011 has been within the typical groundwater pH range with the exception of a pH greater than 9.0 measured in 2016 and a pH less than 5.0 measured in 2013.

The pH level in monitoring wells FBQmw-171 and FBQmw-175 were measured with a pH less than 5.0 s.u. prior to 2009 and since then, have been within the typical groundwater pH range (see **Figure 3-5**). LL1mw-084 has been within the typical groundwater pH range with the exception of a pH less than 5.0 measured in 2015 (**Figure 3-7**).

A field reading slightly under normal range was recorded at BKGmw-016 during the April 2017 sampling event. Readings collected during a follow up sample collected later in the April event and during the December 2017 event were within normal range.

A field reading of 4.42 s.u. measured from FWGmw-010 was below 5.0 during the April 2017 sampling event, but a normal range reading of 5.17 was recorded during the December 2017 sampling event. A field reading of 4.60 s.u. was recorded at LL11mw-005 during the December 2017 sampling event. The April 2017 reading at LL11mw-005 was 6.01. Field readings below

normal range at FWGmw-010 and LL11mw-005 were not identified as observations requiring additional review in the FWGWMP Addenda for 2016 or 2017.

Field pH readings of 4.43 s.u. and 4.51 s.u. in LL1mw-089 were measured below 5.0 s.u. during the January and April 2017 sampling events. LL1mw-089 was a new RI installation in 2016 and has only been sampled four times to date.

Twelve FWGWMP monitoring wells were selected to be analyzed for alkalinity during the 2017 sampling events: FBQmw-171, FBQmw-174, FBQmw-175, FWGmw-002, LL1mw-083, LL1mw-084, LL1mw-086, LL1mw-088, LL1mw-089, RQLmw-011, RQLmw-012, RQLmw-013, and RQLmw-014. Although pH trend graphs and 2017 field readings for LL1mw-088 and RQLmw-014 are within normal range, alkalinity/geochemistry testing was conducted for samples collected from these wells based on their proximity to out-of-normal range wells. Alkalinity results ranged from ND to 7,200 milligrams per liter (mg/L) during the spring (April/May) sampling event and ND to 290 mg/L during the December event.

In addition to alkalinity, sulfate, nitrate and hexavalent chromium analyses were also performed on 10 wells: FBQmw-171, FBQmw-174, FBQmw-175, FWGmw-003, LL1mw-083, LL1mw-084, RQLmw-011, RQLmw-012, RQLmw-013, and RQLmw-014.

Alkalinity results for the 12 monitoring wells and results of the sulfate, nitrate, and hexavalent chromium analyses are presented in **Table 3-5**. Graphs of historical pH ranges for the 12 monitoring wells sampled for alkalinity during the 2017 samplings events are presented on **Figures 3-5** through **3-8**.

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4.0 DISCUSSION

This provides a discussion of analytical results for the 107 total wells sampled in 2017, including wells sampled for the purposes of the FWGW RI and background study. The data are presented in **Table 3-5,** which includes highlighted values identifying concentrations detected at or in excess of the screening criteria. **Figures 4-1** through **4-6** illustrate the exceedances by contaminant group (e.g., VOCs, SVOCs, explosives, inorganics). These figures present exceedances detected in samples collected from the unconsolidated, Homewood Sandstone, and Sharon Sandstone aquifer monitoring wells. The term "shallow aquifers" is used hereafter to refer to these three units together, for map reference purposes. **Figure 4-7** illustrates exceedances detected in samples collected from the Basal Sharon Conglomerate monitoring wells.

4.1 VOCs – SHALLOW AQUIFERS

Figure 4-1 presents VOC exceedances in the shallow aquifers. Exceedances of carbon tetrachloride, chloroform, and/or ethylbenzene were reported above laboratory method detection limits (MDLs) in samples collected from 3 of the 20 shallow aquifer monitoring wells sampled for VOCs during the January, April, and December 2017 sampling events. These samples were collected from LL10mw-003, which is screened in the Homewood Sandstone, and from FWGmw-022 and FWGmw-023, which are screened in the Upper Sharon Sandstone. No other exceedances of VOCs were detected in the FWGWMP monitoring wells screened in the shallow aquifers sampled in 2017.

4.2 SVOCs – SHALLOW AQUIFERS

Figure 4-2 presents the SVOC exceedances in the shallow aquifers. Exceedances of benz(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and/or nitrobenzene were detected at concentrations above laboratory MDLs in samples collected from 9 of the 56 shallow aquifer wells sampled for SVOCs in 2017. Concentrations exceeding SVOC screening levels were reported in samples collected from wells screened in each of the three shallow aquifers. Wells with SVOC detections above screening levels (not all exceedance constituents were detected in all wells) include:

Station	Monitored Aquifer
LL10mw-003	Homewood
BKGmw-022	Homewood
BKGmw-023	Homewood
NTAmw-119	Unconsolidated
DETmw-003	Unconsolidated
LL12mw-183	Upper Sharon
LL1mw-089	Upper Sharon
RQLmw-007	Upper Sharon

No other exceedances of SVOCs were detected in the FWGWMP monitoring wells screened in the shallow aquifers sampled in 2017.

4.3 EXPLOSIVES AND PROPELLANTS – SHALLOW AQUIFERS

Figure 4-3 shows the exceedances of explosives and propellants detected above screening criteria in 2017. Seventeen of the 57 monitoring wells sampled for these constituents had concentrations reported above screening criteria. Explosive/propellants detected above screening levels included: hexahydro-1,3,5-trinitro-1,3,5-trazine (RDX); 2-amino-4,6-dinitrotoluene; 4-amino-2,6-dinitrotoluene; 2,4,6-trinitrotoluene; nitrobenzene; 1,3-dinitrobenzene; 2,4-dinitrotoluene; 3-nitrotoluene. Wells with explosives/propellants detections above screening levels (not all exceedance constituents were detected in all wells) include:

Station	Monitored Aquifer
DET-003	Unconsolidated
FBQmw-174	Homewood
FWGmw-011	Unconsolidated
FWGmw-021	Upper Sharon
LL1mw-080	Upper Sharon
LL1mw-081	Upper Sharon
LL1mw-083	Upper Sharon
LL1mw-084	Upper Sharon
LL2mw-059	Upper Sharon
LL2mw-267	Upper Sharon
LL3mw-237	Upper Sharon
LL3mw-244	Upper Sharon
LL3mw-246	Upper Sharon
LL7mw-006	Homewood
RQLmw-008	Upper Sharon

Station	Monitored Aquifer
WBGmw-006	Upper Sharon
WBGmw-009	Unconsolidated

Most of the exceedances are located in the eastern portion of Camp Ravenna within distinct AOCs; however, four of the monitoring wells with exceedances are located east of Greenleaf Road within AOCs.

4.4 PESTICIDES AND PCBs – SHALLOW AQUIFERS

Figure 4-4 illustrates PCB exceedances in the shallow aquifers. PCB exceedances of Aroclor-1254 were reported in samples collected from 3 of the 27 shallow aquifer wells sampled during the 2017 sampling events. No other PCBs were detected during sampling events conducted in 2017. Pesticides detected in samples collected in 2017 include Endosulfan 1 and Delta-BHC, which do not have current USEPA screening levels. Wells with Aroclor-1254 detections above screening levels include:

Station	Monitored Aquifer
BKGmw-023	Homewood
FWGmw-021	Upper Sharon
FWGmw-022	Upper Sharon

4.5 INORGANICS – SHALLOW AQUIFERS

Figures 4-5 and **4-6** illustrate the exceedances of inorganic constituents detected in 2017. The inorganics include metals (including hexavalent chromium) and cyanide. Of the 61 shallow aquifer monitoring wells sampled for total metals (excluding cyanide), inorganic constituents exceeded screening criteria in 49 wells. The inorganic constituents detected above screening criteria include aluminum, antimony, arsenic, cadmium, hexavalent chromium, cobalt, iron, lead, manganese, nickel, phosphorous, thallium, and vanadium. The screening criteria for each of these metals, presented in **Tables 3-4** and **Table 3-5**, is the corresponding RSL. As noted above, the background FWCUGs are not used to evaluate metals data. A background study is being conducted as part of the ongoing FWGW RI, and will be the basis to recalculate new FWCUGs for metals. Once established, groundwater metals data will be compared against the revised FWCUGs. Wells with metals constituent detections above screening levels (not all exceedance constituents were detected in all wells) include:

Station	Monitored Aquifer
BKGmw-005	Unconsolidated
BKGmw-006	Upper Sharon
BKGmw-008	Upper Sharon
BKGmw-016	Unconsolidated
BKGmw-017	Unconsolidated
BKGmw-021	Unconsolidated
BKGmw-022	Homewood
BKGmw-023	Homewood
DA2mw-115	Upper Sharon
DET-003	Unconsolidated
FWGmw-004	Unconsolidated
FWGmw-005	Homewood
FWGmw-007	Unconsolidated
FWGmw-011	Unconsolidated
FWGmw-012	Upper Sharon
FWGmw-015	Unconsolidated
FWGmw-016	Upper Sharon
FWGmw-020	Upper Sharon
FWGmw-021	Upper Sharon
FWGmw-022	Upper Sharon
FWGmw-023	Upper Sharon
FWGmw-024	Upper Sharon
LL10mw-005	Homewood
LL12mw-185	Unconsolidated
LL12mw-187	Unconsolidated
LL12mw-242	Unconsolidated
LL12mw-245	Unconsolidated
LL12mw-247	Unconsolidated
LL1mw-064	Unconsolidated
LL1mw-065	Unconsolidated
LL1mw-084	Upper Sharon
LL1mw-086	Unconsolidated
LL1mw-087	Unconsolidated
LL1mw-088	Unconsolidated
LL1mw-089	Unconsolidated
LL2mw-059	Upper Sharon
LL2mw-267	Upper Sharon
LL2mw-272	Upper Sharon
LL7mw-001	Homewood
NTAmw-119	Unconsolidated

Station	Monitored Aquifer
NTAmw-120	Upper Sharon
RQLmw-007	Upper Sharon
RQLmw-008	Upper Sharon
RQLmw-009	Upper Sharon
WBGmw-006	Unconsolidated
WBGmw-009	Unconsolidated
WBGmw-020	Upper Sharon
WBGmw-021	Upper Sharon

Cyanide was analyzed from samples collected from 50 shallow aquifer monitoring wells in 2017, including 10 locations tested for total cyanide and free cyanide concentrations. Total cyanide or free cyanide results exceeded its screening criteria in samples collected from 28 shallow aquifer wells. Cyanide exceedances are presented on **Figure 4-5** and **Figure 4-6**. Additional discussion regarding cyanide results for RCRA wells included in the FWGWMP is provided in Section 4.9.6. Wells with cyanide detections over screening levels include (* - indicates locations also sampled for free cyanide):

Station	Monitored Aquifer
BKGmw-008	Upper Sharon
BKGmw-022	Homewood
CPBmw-009	Upper Sharon
DA2mw-115	Upper Sharon
DETmw-003	Unconsolidated
EBGmw-125*	Unconsolidated
FBQmw-172*	Homewood
FBQmw-176	Unconsolidated
FWGmw-013	Upper Sharon
FWGmw-020	Upper Sharon
FWGmw-021	Upper Sharon
FWGmw-022	Upper Sharon
FWGmw-023	Upper Sharon
LL11mw-005*	Unconsolidated
LL12mw-183	Upper Sharon
LL12mw-185	Unconsolidated
LL12mw-247*	Unconsolidated
LL1mw-084*	Upper Sharon
LL1mw-089	Upper Sharon
LL2mw-264	Upper Sharon

Station	Monitored Aquifer
LL2mw-272	Upper Sharon
LL4mw-193*	Unconsolidated
LL4mw-200	Unconsolidated
LL6mw-001	Unconsolidated
LL7mw-001	Homewood
MBSmw-004	Unconsolidated
NTAmw-118*	Unconsolidated
RQLmw-012*	Upper Sharon

The 2017 sampling program included characterization of nitrates at 25 shallow aquifer monitoring wells. Of the wells reported with detectable concentrations, results for two unconsolidated aquifer well locations were over current screening levels: LL12mw-185 and LL12mw-187.

RQLmw-007 was the only FWGWMP well characterized for phosphorous during 2017. Samples from the April and December sampling events exceeded current screening levels.

4.6 RI MONITORING WELLS – STATE ROUTE 5

The analytical results of the five new wells installed in 2016 along the Camp Ravenna southern property boundary south of State Route 5 are discussed below. Monitoring wells FWGmw-017 and FWGmw-018 are screened in the Basal Sharon Conglomerate, and monitoring wells FWGmw-020, FWGmw-021, and FWGmw-024 are screened in the Sharon Sandstone. **Figures 4-3, 4-4, 4-5**, and **4-7** illustrate the exceedances of organic and inorganic constituents detected in these five wells.

- Organics: 2-amino-4,6-dinitrotoluene (FWGwm-021); 4-amino-2,6-dinitrotoluene (FWGwm-021); Aroclor-1254 (FWGmw-021 and FWGmw-018).
- Inorganics: arsenic (all State Route 5 wells); hexavalent chromium (FWGwm-024); cobalt (all State Route 5 wells); iron (FWGmw-020, FWGmw-021, and FWGmw-024); manganese (all State Route 5 wells); and total cyanide (FWGmw-021).
- No pesticides were detected in these five wells.

4.7 SUMMARY – SHALLOW AQUIFERS

As depicted on **Figure 4-1** through **4-6**, a small number of VOCs, SVOCs, and PCBs were detected in 9 monitoring wells at levels exceeding screening criteria. Explosives and propellants were

detected in 15 monitoring wells above screening criteria. **Figure 4-8** presents the locations where organic constituents exceeded screening criteria and also presents isoconcentration contours of the explosives and propellants, SVOC, pesticide, PCB, or VOC constituents. The contours are based on the sum of the organic concentrations detected at each monitoring well found to have an exceedance of these constituents in 2017. The sum of concentrations include detections throughout 2017 sampling. The total rounded sum of concentrations is presented at each monitoring well on **Figure 4-8**.

Based on the depiction of isoconcentration contours on **Figure 4-8**, it is apparent that six distinct areas of Camp Ravenna were identified as impacted by organic constituents in the shallow aquifers in 2017. One additional area in the Basal Sharon Conglomerate is discussed in Section 4.8.

The first area is in the vicinity of the Fuze and Booster Quarry Landfill/Ponds AOC, where several constituents (explosives/propellants) exceeded screening criteria in Homewood Sandstone aquifer monitoring well FBQmw-174, and VOCs (ethylbenzene and chloroform) exceeded screening criteria in the Upper Sharon Sandstone aquifer monitoring well FWGmw-023. The flow direction in this area is interpreted to be easterly to southeasterly. In these directions of groundwater flow, downgradient monitoring wells in the shallow aquifers did not have any exceedances. Additionally, well LL7mw-001, which is interpreted to be slightly downgradient and cross-gradient of well FBQmw-174, also did not have exceedances. The area of impact, based on these findings, is limited in extent.

The second area of Camp Ravenna exhibiting organic impacts above screening criteria is based on data collected from monitoring wells LL10mw-003, and FWGmw-022, located in the Load Line 10 AOC. Exceedances of two VOCs (chloroform and carbon tetrachloride), one SVOC (nitrobenzene), and PCBs (Aroclor-1254) were reported in the Load Line 10 AOC. Based on the relatively low concentrations of constituents reported in this AOC, it is likely that the extent of groundwater impact is localized and there is no indication of downgradient migration from this area.

As depicted on **Figure 4-8**, the Load Line 1, Load Line 2, and Load Line 3 area (third area) exhibits the greatest extent of impacted groundwater. Several explosives and propellants, two SVOCs, and PCBs were detected above screening criteria in this area. Based on the similarity of constituents,

it is probable that the area within the isoconcentration contours constitutes one contiguous groundwater plume. As shown on **Figure 4-8**, each of the explosive and propellant, SVOC, and PCB impacts to groundwater were detected in the Upper Sharon Sandstone aquifer. VOCs were not detected above screening criteria in any Upper Sharon Sandstone wells in this area. Several explosives and propellants and PCBs (Aroclor-1254) were reported at the southern boundary of Camp Ravenna in this area. Monitoring well samples from the unconsolidated aquifer did not have any exceedances for organic constituents in this area. The Upper Sharon Sandstone groundwater flow direction in this area of Camp Ravenna is radial, as shown on **Figure 3-3**.

The fourth area where organic constituents impact groundwater above screening criteria encompasses portions of the Open Demolition Area #2 and Winklepeck Burning Grounds AOCs. The only constituent detected above screening criteria in this area is RDX, detected in unconsolidated aquifer monitoring wells WBGmw-006 and WBGmw-009. Groundwater generally flows toward the east/southeast in this area. Based on the relatively low RDX concentrations detected in the monitoring well samples from this area, RDX contamination is limited in areal extent and is not continuous toward the southeast (to the third area of contamination encompassing the Load Line 1, Load Line 2, and Load Line 3 AOCs). The distance to this third area of contamination is approximately 2 miles.

The fifth area where organic constituents impact groundwater above screening criteria encompasses the Ramsdell Quarry Landfill AOC. SVOCs were detected above screening criteria in four Upper Sharon Sandstone aquifer monitoring wells in this AOC. One explosive/propellant also was reported above screening criteria in a May 2017 sample but was not detected above laboratory MDLs in December 2017 sampling. Groundwater flow is generally toward the east in this area. Based on the relatively low SVOC and explosive/propellant concentrations detected in the monitoring well samples from this area, SVOC and explosive/propellant contamination is interpreted to be limited in areal extent, and is not continuous toward the east and southeast.

The sixth area is located in the NACA Test Area AOC where one SVOC, benz(a)anthracene, was detected above screening criteria in NTAmw-119, screened in the unconsolidated aquifer. Groundwater flow in this area is generally southerly. Benzo(b)fluoranthene was detected at concentrations less than 1 microgram per liter (µg/L); therefore, no isoconcentration is depicted

on **Figure 4-8**. Based on the relatively low concentrations of SVOCs detected in this well, it is likely that the extent of groundwater impact is localized.

The extent of inorganic constituents detected above screening criteria in 2017 is widespread across the entire site, and inorganics are detected in all of the shallow aquifers. The background FWCUGs for total metals will be recalculated during the ongoing FWGW monitoring, and a more precise evaluation of metals exceedances will be conducted once the background study is completed.

4.8 BASAL SHARON CONGLOMERATE

As listed in **Table 1-1,** Basal Sharon Conglomerate FWGWMP monitoring wells shown on **Figure 4-7** were sampled for VOCs, a subset of SVOCs, explosives and propellants, pesticides, PCBs, and metals in 2017. As indicated in **Table 3-5** and shown on **Figures 4-7**, numerous metals, Aroclor-1254, and SVOCs benz(a)anthracene and benzo(b)fluoranthene were detected above screening criteria in these FWGWMP wells. Metals exceeding screening levels are widespread across the Basal Sharon Conglomerate aquifer and reported in each of the seven wells set in the aquifer. The metals detected above screening criteria may be associated with naturally occurring conditions and will be further evaluated following completion of the background study. SVOCs were limited to background wells BKGmw-024 and BKGmw-025 at the northwest corner of Camp Ravenna boundary, are low concentrations, and appear to be limited in extent. Aroclor-1254 appears to be widespread but at low concentrations in three of the eight wells in this aquifer sampled during 2017 (BKGmw-025, FWGmw-018, and FWGmw-019). BKGmw-025 is located on the far western boundary of Camp Ravenna. FWGmw-019 is located between the Load Line 9 and Load Line 10 AOCs. Groundwater in the Basal Sharon Conglomerate aquifer flows to the east in both of these areas (see **Figure 3-4**).

Monitoring wells FWGmw-017 (metals constituents above screening levels) and FWGmw-018 (Aroclor-1254 and metals above screening levels), installed at the southern boundary of Camp Ravenna south of the Load Line 2 and Load Line 12 AOCs, respectively, show some potential for contamination to migrate off of Camp Ravenna. Groundwater in this area and in the Basal Sharon Conglomerate aquifer flows to the east-southeast as shown on **Figure 3-4**.

4.9 TIME TRENDS

Graphs were prepared for select wells representing a mix of organic constituents regularly included in the semiannual program, generally with at least one constituent that exceeded screening criteria in at least one of the 2017 sampling events (some constituents without 2017 sampling program exceedances were graphed to provide comparison to 2015 or 2016 results over screening levels). Concentrations of each of these constituents were graphed by monitoring well and class of analyte (i.e., explosives, VOCs, SVOCs, pesticides, hexavalent chromium, and cyanide) using analytical results from each well's first sampling event through 2017. The graphs present more than one constituent, as applicable, and include linear trend lines for each constituent with at least four detected results. Non-detect results are included in the graphs and are plotted as the reporting limit. A "first detection" threshold line is included for well locations that have been graphed with an extended initial period prior to a detection of the indicated constituent. **Appendix C** includes the graphs.

The following subsections summarize the findings of the graphs.

4.9.1 Explosives and Propellants

The time-trend graphs in **Appendix C** indicate that in most of the monitoring wells where exceedances were detected in 2016, the concentration trend is downward or flat. Increasing concentration trends were observed in the following four monitoring wells:

- FBQmw-174 (Fuze and Booster Quarry AOC) – the trend line for 2,4-dinitrotoluene indicates an increasing trend as a result of the plotting of a non-detect sample result with an elevated detection limit for the April 2017. FBQmw-174 was not sampled during the December 2017 sampling event due to insufficient groundwater volume.
- LL1mw-084 (Load Line 1 AOC) – 4-amino-2,6-dinitrotoluene shows an overall increasing trend over the past 18 years with concentrations recently detected over 30 µg/L and a maximum detection of 36 µg/L. Concentrations have been decreasing since 2014.
- LL2mw-059 (Load Line 2 AOC) – 2,4-dinitrotoluene shows a slightly increasing trend over the past 20 years; however, concentrations typically have been less than 0.5 µg/L. The maximum detection of 0.86 µg/L occurred in 2007. 1,3-dinitrotoluene also exhibits a

slightly increasing trend over its sample history, with a constituent maximum concentration of 0.2 µg/L reported for April 2017. This well is located south of Load Line 2 and upgradient of other wells without exceedances in 2017 sample results.

- LL2mw-267 (Load Line 2 AOC) – 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene show increasing concentration trends over the past 16 years; however, concentrations for each of these constituents are relatively low, with maximum detections ranging from 1.7 to 2.1 µg/L occurring in 2007.
- RQLmw-008 (Ramsdell Quarry Landfill AOC): Historical results for 1,3-dinitrotoluene and RDX were below detection limits from the well's initial sampling in 1998 until 2015 (1,3-dinitrotoluene) and 2016 for RDX. One detection over screening levels has been reported for each of these constituents since July 2015. Both constituents had non-detect results samples collected in 2017.

4.9.2 VOCs

VOC concentrations exceeding screening criteria in 2017 were reported in samples collected from FWGmw-019, FWGmw-022, FWGmw-023, and LL10mw-003, located in the Load Line 10 AOC. FWGmw-019, FWGmw-022, and FWGmw-023 were installed in 2016 as part of the FWGW RI and have insufficient detections to support trend graph analysis. Each of the wells was reported with chloroform concentrations above screening levels in at least one sample collected since its initial sampling. The time-trend graph for LL10mw-003 in **Appendix C** shows an increasing trend of carbon tetrachloride and chloroform concentrations. Carbon tetrachloride has exceeded its screening criteria four times, with the constituent maximum concentration reported for December 2017 event sampling results. Chloroform has been consistently detected above its screening criteria from July 2012 through both times it was sampled in 2017.

4.9.3 SVOCs

Benz(a)anthracene, benzo(b)fluoranthene or nitrobenzene were reported above screening levels in sampled collected during 2017 at BKGmw-022, BKGmw-023, BKGmw-024, BKGmw-025, DET-003, LL1mw-089, LL10mw-003, RQLmw-007, and NTAmw-119 (not all constituents were detected in each well). The majority of the detections were at estimated concentrations below the analytical method reporting limit, but above the screening criteria. The 2017 SVOC detections

were generally the first time each of these constituents was reported for their respective wells, with the following exceptions.

- BKGmw-023: benz(a)anthracene has been detected in two of four samples collected to date, with a maximum concentration of 0.019 µg/L reported in 2016.
- LL12mw-183: benz(a)anthracene has been detected in 3 of 18 samples collected to date, with a maximum concentration of 0.14 µg/L reported in 2004.
- DETmw-003: benzo(b)fluoranthene has been detected in 2 of 24 samples collected to date, with a maximum concentration of 0.12 µg/L reported in 2013.

A trend analysis cannot be performed based on the limited number of detections for these constituents at each well. Each of the wells will be sampled for SVOCs in 2018.

4.9.4 Pesticides and PCBs

Aroclor-1254 was the only PCB detected above screening levels in 2017. The constituent was reported at FWGmw-019, FWGmw-018, FWGmw-022, FWGmw-021, BKGmw-023, and BKGmw-025. Each of these detections was the first for each of the wells. A trend analysis cannot be performed based on the limited number of detections for these constituents at each well. Each of the wells will be sampled for PCBs in 2018. Pesticides were not detected above screening levels at any well in 2017.

4.9.5 Hexavalent Chromium

FWGmw-024 was the only well with a detection of hexavalent chromium in samples collected during 2017. It is an RI well that was installed in 2016 and has only one detection for this constituent in the three times it has been sampled to date for hexavalent chromium. Because the RSL for hexavalent chromium is less than the LOD, any detections are exceedances. A trend analysis cannot be performed based on the limited number of detections at the well.

Hexavalent chromium has been consistently detected above this screening criteria in samples from monitoring well LL3mw-244; with detections of hexavalent chromium ranging from 0.143 to 0.361 µg/L. Hexavalent chromium was not detected in this well in 2017; however, the graphed detection limits of 20 µg/L in 2016 and 2017 give the appearance of an increasing trend, when the trend is likely to be flat. Development of a potential background value for hexavalent chromium

is being evaluated as part of the RI. Hexavalent chromium results for background study wells were non-detect in samples collected in 2017. Once an appropriate screening level value is approved by the Ohio EPA, hexavalent chromium detections will be re-evaluated and included in the pending RI Report.

4.9.6 Cyanide

Cyanide and/or free cyanide were detected above screening criteria in 31 wells sampled in 2017, including 4 of the 5 RCRA monitoring wells regularly sampled as part of the FWGWMP. A complete list of wells with results exceeding screening levels can be found in Section 4.5. Of the wells with detected concentrations over screening levels in 2017, only DET-3 and RQLmw-007 have four or more detections over their respective sampling history. Trend graphs for historical results (total cyanide only) were prepared for the five of the RCRA wells regardless of the total number of reported detections or if they had reported detected concentrations in 2017. A discussion of the currently indicated trends for cyanide results is provided in the following bullets:

- DET-3 (Open Demolition Area #2 AOC) – The trend line shows an upward trend in this well. Cyanide was detected in April and December 2017 events with both concentrations above screening criteria. Cyanide had not been detected in this well from its initial sampling in 2001 until 2016.
- DET-4 (Open Demolition Area #2 AOC) – DET-4 had insufficient groundwater volume for sampling during both 2017 semiannual monitoring events. Cyanide was detected for the first time in November 2016 with a concentration above screening criteria. Previously, cyanide had not been detected in this well since sampling began in 2001.
- RQLmw-007 (Ramsdell Quarry Landfill AOC) - Cyanide has been sampled 32 times beginning in July 1998. Cyanide has been detected 10 times since April 2007, with each detection exceeding screening criteria. Both samples collected in 2017 had non-detect results. The time-trend graph in **Appendix C** is based on data collected from May 2006 through 2017 and shows a downward trend.
- RQLmw-008 (Ramsdell Quarry Landfill AOC) - Cyanide has been detected only twice since data collection began in 1998. Detection occurred in May and November 2016 at concentrations above screening criteria. Both samples collected in 2017 had non-detect results.

- RQLmw-009 (Ramsdell Quarry Landfill AOC) - Cyanide has been detected only once in this monitoring well since data collection began in 1998. The only detection occurred in May 2016 at a concentration above screening criteria.

4.10 HORIZONTAL FLOW AND POTENTIAL MIGRATION PATHWAYS

Based on the potentiometric surface maps provided as **Figures 3-1** through **3-4** and the locations of groundwater screening criteria exceedances, the preliminary and generalized extent of groundwater impacts by organic constituents related to historical releases at Camp Ravenna is limited to the areas depicted on **Figure 4-8**. This figure also includes arrows depicting the general flow direction of the upper aquifers nearest the areas of contamination.

The general groundwater flow direction across Camp Ravenna is from west to east; however, there are many localized areas where flow direction varies, including groundwater mounds where radial flow occurs, in the unconsolidated and Homewood Sandstone aquifers in the western portion of Camp Ravenna, and in the Upper Sharon Sandstone aquifer in the eastern portion of Camp Ravenna. Shallow groundwater flow at many areas of the site is influenced by GSI conditions along streams.

Three of the impacted groundwater areas illustrated with isoconcentration contours on **Figure 4-8** are located proximal to groundwater mounding areas (the Fuze and Booster Quarry Landfill/Ponds AOC, the Load Line 10 AOC, and the Load Line 1, Load Line 2, and Load Line 3 AOCs area). In the Fuze and Booster Quarry Landfill/Ponds and Load Line 10 AOCs, flow is from topographic highs of the Homewood aquifer radially toward the surrounding unconsolidated aquifer present at lower topographic elevations. Because this area is underlain by the Mercer Member and/or the Sharon Member – Shale, the vertical migration of shallow groundwater contamination to deeper aquifers is anticipated to be limited.

At the Load Line 1, Load Line 2, and Load Line 3 AOCs, groundwater contamination is limited to the Upper Sharon Sandstone monitoring wells. The radial flow pattern in this area indicates contaminants could migrate in all directions. The stream system located west and northwest of this area is a likely area of groundwater discharge. The potential for impacted groundwater underlying the AOCs to migrate to this stream system will be evaluated during the RI. With the exception of

one PCB Aroclor-1254 exceedance reported in the December 2017 samples collected from well FWGmw-018, concentrations of organic constituents detected above screening levels at the southern boundary of these AOCs were estimated values ("J" flagged) above FWCUGs but below RSLs. Monitoring wells LL2mw-059 and LL3mw-244 had reported detections of explosives exceeding screening levels and are located along the southern property boundary of Camp Ravenna. Well LL2mw-059 is delineated at the boundary by well FWGmw-024 that was installed in 2016. Explosives were not reported above detection limits in the sample collected from FWGmw-024. Well FWGmw-021 was installed in 2016 to delineate well LL3mw-244 closer to the property boundary. During the April 2017 sampling event, LL3mw-244 had reported detections of explosives exceeding screening levels; however, in samples collected in December 2017, concentrations of explosives were below screening levels. Future monitoring in 2018 will continue to evaluate the concentrations at the property boundary.

In the area of impacted groundwater within the Open Demolition Area #2 and Winklepeck Burning Grounds AOCs, contaminants exceeding screening criteria in the unconsolidated aquifer are interpreted to potentially migrate toward the east, in the direction of a number of converging streams. The potential for these streams to receive groundwater discharge from these AOCs will be evaluated as part of the RI.

Flow in and around the Ramsdell Quarry Landfill AOC is toward the east-northeast as shown on **Figure 3-3**. The explosive RDX has been identified above screening criteria in this area; however, RDX has not been detected in downgradient well FWGmw-012. The SVOCs in this area were each detected at very low concentrations, and it is not likely that these constituents would migrate a significant distance without attenuation to below screening criteria. 3-Nitrotoluene, an explosive/propellant, was reported just above screening levels in unconsolidated aquifer well FWGmw-011. Groundwater flow in the unconsolidated aquifer in this area flows to the northeast; although there are no monitoring wells delineating the 3-nitrotoluene exceedance in this well, the low concentration was estimated and expected to be limited in extent. The distance from the property boundary also suggests that it is unlikely it would migrate a significant distance from this

well without attenuation to below screening criteria before it reaches the Camp Ravenna property boundary to the east.

Groundwater flow in the unconsolidated aquifer, in vicinity of well NTAmw-119 (NACA Test Area AOC), is interpreted to be southerly, as shown on **Figure 3-1**. Based on the low concentration of benzo(b)fluoranthene detected in NTAmw-119, it is not likely that contamination would migrate a significant distance from this well without attenuation to below screening criteria. The pending RI will evaluate the extent of impacts and contaminant migration potential in this area, including potential effects of natural attenuation processes on contaminant fate and transport.

Organic constituents identified above screening levels in the Basal Sharon Conglomerate monitoring well samples as part of the 2017 sampling included SVOCs benz(a)anthracene and benzo(b)fluoranthene and PCB Aroclor-1254. Previous monitoring in 2016 did not identify any organic constituents above screening levels. The SVOCs reported at background wells BKGmw-024 and BKGmw-025 are not associated with any known releases related to historical activities at Camp Ravenna. Additionally, two VOCs and three SVOCs detected above screening criteria in the Basal Sharon Conglomerate at monitoring well FWGmw-017 in November 2016 were below screening criteria or not detected above laboratory MDLs during 2017 sampling. The PCB Aroclor-1254 was reported in well FWGmw-018 at the southern boundary of Camp Ravenna.

Previous monitoring in 2016 did not identify any organic constituents above screening levels. The additional monitoring wells installed in the Basal Sharon Conglomerate aquifer in 2016 and subsequent 2017 sampling confirmed that contaminated groundwater was generally not migrating from the shallow aquifers to the deeper water bearing zone. The exception is the Load Line 10 AOC, where FWGmw-022 (screened in the Upper Sharon) and FWGmw-019 (screened in the Basal Sharon Conglomerate) both have chloroform and Aroclor-1254 above screening criteria. Vertical gradient between those wells was shown to be in the downward direction based on groundwater elevations measured during the April 2017 sampling event.

4.11 TURBIDITY

Elevated turbidity readings have been measured in many of the Camp Ravenna monitoring wells. Mitigation efforts to reduce elevated turbidity in groundwater samples were implemented in 2016 in conjunction with the FWGW RI. The primary approach to reduce turbidity was installation of

permanent bladder pumps in the monitoring wells to be sampled on a regular basis. This eliminates the need to lower and raise equipment in the well, which can readily disturb the sediment at the bottom of the well. As part of the ongoing FWGW monitoring, wells will be selected for redevelopment to remove accumulated sediment and fines from the filter packs. Four wells (FBQmw-175, FWGmw-002, FWGmw-011, and LL4mw-194) with turbidity values in excess of 10 NTUs were redeveloped in April 2017 prior to the April 2017 sampling event. These efforts should result in reduced turbidity readings, leading to more representative groundwater samples.

Redevelopment for monitoring wells, as stated in the RIWP, will occur if one of the following criteria is met:

- Monitoring wells with turbidity levels between 10 and 20 NTUs require redevelopment if there is greater than 0.5 foot of sedimentation in the bottom of the well, all previous rounds showed exceedingly high NTU, and the well is a non-producer (i.e., low yield).
- Turbidity was greater than 20 NTUs, unless turbidity was less than 10 NTUs in the three previous rounds and unless the well is located within a naturally high turbidity water bearing zone/aquifer.

Based on the above criteria, FWGmw-011 met the first and second conditions above during the April and December 2017 sampling events and will require redevelopment in 2018.

4.12 GROUNDWATER MODELING

As presented in the *Final FWGW RIWP* (TEC-Weston JV, 2016a), a numerical groundwater model has been developed for the site. This model will continue to be refined during the RI and will ultimately be used to evaluate contaminant fate and transport, including potential off-site migration of contaminants. Once refined, fully calibrated, and verified, the groundwater model will be used to make predictive simulations for presentation in reports such as annual monitoring reports, using current groundwater chemistry and flow data.

4.13 ASSESSMENT OF GROUNDWATER REMEDIAL ACTION EFFECTIVENESS

Groundwater remedial actions have not been conducted at Camp Ravenna. Contaminant source removals through soil excavations have been implemented to reduce groundwater impacts.

Following the completion of the FWGW RI and Feasibility Study, a determination will be made whether remedial actions are warranted for groundwater.

5.0 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the work completed and the pertinent findings from the 2017 FWGWMP monitoring events conducted at Camp Ravenna. The recommendations indicate future activities to be performed regarding groundwater monitoring. The entire groundwater monitoring well network is defined in the 2017 FWGWMP Addendum.

5.1 CONCLUSIONS

- In accordance with the *Final Facility-Wide Groundwater Monitoring Addendum for 2017, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio* (TEC-Weston JV, 2017), four rounds of groundwater sampling were conducted in January, April, July, and December 2017. Ninety-six previously installed wells and new wells installed in 2016 at the former RVAAP were identified for FWGWMP semiannual or continued FWGW RI sampling in 2017 to evaluate potential off-site migration and potential source area attenuation and temporal fluctuations. An additional 14 wells were sampled for the purposes of the metals background study being conducted in association with the FWGW RI.
- Four FWGWMP wells (B12mw-012, DETmw-004 [RCRA well], LL1mw-063, and LL4mw-194) could not be sampled during the April 2017 event because of insufficient water volume or elevated turbidity (LL4mw-194). Eight of the FWGWMP wells planned for sampling in December were observed with insufficient groundwater for sampling: B12mw-012, DETmw-004, FBQmw-174, LL1mw-063, LL1mw-083, LL1mw-084, LL7mw-001, and SCFmw-004.
- A comprehensive round of water elevation and well depth measurements was conducted at the 295 Camp Ravenna monitoring wells in April 2017, including FWGW RI and background wells newly installed in the Upper Sharon Sandstone or Basal Sharon Conglomerate aquifers in 2016. Depth to water measurements were not collected at 4 of the 299 wells due to water below the top of dedicated pumps.
- Based on the well inspection conducted in April 2017, repairs are needed for a number of monitoring wells, including replace cracked well pads, repainting, and resetting bollards and wells.

- Accumulated sediment was evaluated for each of the 114 wells that did not have a dedicated pump installed (and, therefore, total depth could not be measured). Of the 114 wells evaluated, 33 had sediment accumulation greater than 0.20 foot. A calculated sediment accumulation of 9.76 feet in LL3mw-240 is likely an anomaly due to a poor reading or data entry error and will be verified during the next comprehensive gauging event. The accumulation of 4.21 feet of sediment in LL12mw-113 identified in 2016 was confirmed by the April 2017 reading and should be considered for redevelopment should it be added to the FWGWMP sampling program.
- Four wells (FBQmw-175, FWGmw-002, FWGmw-011, and LL4mw-194) with turbidity values in excess of 10 NTUs, were redeveloped in April 2017 prior to the April 2017 sampling event. The final turbidity result during redevelopment of LL4mw-94 was over the turbidity instrument reading range, which represents a value greater than 1,000 NTUs. As such, LL4mw-194 was not sampled during any sampling event in 2017.
- Monitoring well FWGmw-011 will require redevelopment in 2018 based on continued high turbidity levels observed during the April and December 2017 sampling events.
- The potentiometric surface map for the unconsolidated aquifer generally indicates flow from west to east; however, local variations in flow are influenced by the various stream systems across Camp Ravenna. Groundwater linear velocities in the unconsolidated aquifer are estimated to range from 18 to 4.0 ft/year.
- The potentiometric surface map for the Homewood Sandstone aquifer shows a southerly to southeasterly groundwater flow direction; however, local radial flow patterns are evident. Groundwater linear velocities in the Homewood are estimated to range from 105 to 439 ft/year.
- The potentiometric surface map for the Sharon Sandstone aquifer shows flow is generally toward the east; however, an area of higher groundwater elevations forming a mound is observed in the eastern portion of Camp Ravenna. Groundwater velocities in the Sharon Sandstone are estimated to range from 571 to 1,231 ft/year.
- The potentiometric surface map for the Basal Sharon Conglomerate aquifer shows flow is generally northeastward to eastward, with local flow directions interpreted to range from northerly to southeasterly. Groundwater velocity in the Basal Sharon Conglomerate is

estimated to be 6 ft/year; however, this value may be underestimated based on known well yields.

- Vertical hydraulic gradients were calculated and determined to be predominantly downward. Upward vertical gradients were identified in two well clusters between the Sharon Sandstone and unconsolidated aquifers and in a well cluster between the Sharon Sandstone and Basal Sharon Conglomerate aquifers.
- The pH monitoring conducted in 2017 identified eight monitoring wells exhibiting pH levels, outside of the typical groundwater pH range, in one or both FWGMP semi-annual sampling rounds, include BKGmw-016, LL1mw-086, LL1mw-083, RQLmw-011, RQLmw-013, LL11mw-005, FWGmw-010, and LL1mw-089. Four of these wells have historically had pH levels outside of this range. Field readings below normal range at FWGmw-010 and LL11mw-005 were not identified as observations requiring additional review in the FWGWMP Addenda for 2016 or 2017. LL1mw-089 was a new RI installation in 2016 and has only been sampled four times to date. Readings collected at BKGmw-016 during a follow up sample collected later in the April event and during the December 2017 event were within normal range.
- Analytical data obtained from the groundwater samples collected from the FWGWMP and RI monitoring wells in 2017 were compared against screening criteria, which consist of FWCUGs, MCLs, and RSLs. FWCUGs for metals were not used for metals analysis. Following approval of a background study by the Ohio EPA, metals data will be fully evaluated as part of the pending FWGW RI Report.
- Analytes detected in the shallow aquifers at concentrations above screening criteria in at least one of the 2017 sampling events include VOCs, SVOCs, explosives and propellants, PCBs, metals (including hexavalent chromium), and cyanide. Pesticides were not detected above screening criteria in 2017.
- VOCs were found to impact groundwater in three wells (LL10mw-003, screened in the Homewood Sandstone, and FWGmw-022 and FWGmw-023, screened in the Upper Sharon Sandstone) during the January, April, and December 2017 sampling events.
- SVOCs were found to impact groundwater in eight FWGWMP and background study shallow aquifer monitoring wells and were widespread across Camp Ravenna. All SVOC results, except for one exceedance of nitrobenzene in Load Line 10 AOC well LL10mw-

003, were above FWCUGs but below RSLs. Two of the wells with reported concentrations above screening levels were Homewood Aquifer background wells installed in 2016 at the northwest (upgradient) boundary of the property and are not known to be potentially impacted by historical activities at Camp Ravenna. The majority of the SVOC detections were at estimated concentrations below the analytical method reporting limit, but above the screening criteria.

- Explosives and propellant constituents were identified as impacting groundwater in five distinct areas (**Figure 4-8**). These areas include, or are in the vicinity of, the Fuze and Booster Quarry Landfill/Ponds AOC, Load Line 7, Ramsdell Quarry Landfill, Open Demolition Area #2 and the Winklepeck Burning Grounds AOCs, and the Load Line 1, Load Line 2, and Load Line 3 AOCs.
- Aroclor-1254 was the only PCB detected above screening levels in 2017. The constituent was reported at FWGmw-019, FWGmw-018, FWGmw-022, FWGmw-021, BKGmw-023, and BKGmw-025. Each of these detections was the first for each of the wells.
- Pesticides were not detected above screening levels at any well in 2017.
- Metals were detected above screening criteria in 56 of the 68 monitoring wells sampled (including shallow aquifer and Basal Sharon Conglomerate wells). A complete discussion of metals detections and exceedances will be developed once the background study is completed and new FWCUGs are established.
- Hexavalent chromium was detected above screening levels in groundwater samples in one FWGW well, FWGmw-024, located south of Load Line 2 AOC along the southeastern Camp Ravenna boundary.
- Cyanide and/or free cyanide were detected above screening criteria in a total of 31 shallow aquifer and Basal Sharon Conglomerate wells sampled in 2017, including 1 of the 5 RCRA monitoring wells regularly sampled as part of the FWGWMP. Concentration trend analysis of cyanide in DET-3 indicates an upward trend. The other wells reported with concentrations over screening levels in 2017 had insufficient reported detections for trend analysis. Additional sampling event results will help determine if these detections represent new, increasing trends. Organic analytes detected in the Basal Sharon Conglomerate aquifer, at concentrations above screening criteria in at least one of the 2017 sampling events, include SVOCs and PCBs (Aroclor-1254); however, the SVOCs were

only detected in two of the new background wells and at low estimated concentrations. Aroclor-1254 was reported above screening criteria in three wells scattered across Camp Ravenna. VOCs, explosives, and pesticides were not detected above screening criteria in 2017.

- Antimony, arsenic, cobalt, manganese, thallium, and cyanide were the inorganic constituents with reported concentrations above screening criteria in the samples collected from the Basal Sharon Conglomerate aquifer.
- PCB Aroclor-1254 was reported in Basal Sharon Conglomerate aquifer well FWGmw-018 at the southeastern boundary of Camp Ravenna.
- Previous to the December 2017 sampling, Aroclor-1254 was last detected in samples collected in 2008 at the Load Line 12 AOC and at the Open Detonation Area No. 2 AOC. No other AOCs have reported detections of Aroclor-1254 in the currently available dataset for each. PCBs other than Aroclor-1254 have not been detected in samples collected during 2016 or 2017 as part of the FWGWMP or RI. Other PCBs historically detected at Camp Ravenna include Aroclor-1248 and Aroclor-1242. In each case, detected PCBs make up less than 5% of the combined site historical PCB test results at each AOC where they have been reported. All historical detections have been less than one microgram per liter. Each monitoring well with an Aroclor-1254 detection in 2017 has been recommended for sampling as part of the 2018 FWGMP. Evaluation of the frequency of detection of PCB constituents, contaminant distribution in groundwater and potential sources of PCBs historically reported at Camp Ravenna will be included in the RI.
- Time-trend graphs were prepared for select wells representing a mix of organic constituents regularly included in the semi-annual program, generally with at least one constituent that exceeded screening criteria in at least one of the 2017 sampling events. Five wells were identified to have increasing or potentially increasing trends of explosives and propellants, including FBQmw-174, LL1mw-084, LL2mw-059, LL2mw-267, and RQLmw-008.
- The two VOCs detected above screening criteria, carbon tetrachloride and chloroform, show increasing trends in well L10mw-003. Carbon tetrachloride has exceeded its screening criteria four times, with the constituent maximum concentration reported for December 2017 event sampling results. Chloroform has been consistently detected above its screening criteria from July 2012 through both times it was sampled in 2017.

- FWGmw-024 was the only well with a detection of hexavalent chromium in samples collected during 2017. It is an RI well that was installed in 2016 and has only one detection for this constituent in the three times it has been sampled to date for hexavalent chromium. Hexavalent chromium has consistently been detected above its screening criteria in samples from monitoring well LL3mw-244, located south of the Load Line 3 AOC, near the southern Camp Ravenna property boundary; however, hexavalent chromium was not detected in this well in 2017.
- Six general areas of organic-impacted groundwater are identified in the Upper Sharon Aquifer at Camp Ravenna, based on the 2017 groundwater sampling (as follows):
  - The Fuze and Booster Quarry Landfill/Ponds AOC (first area) and the Load Line 10 AOC (second area) – Flow is from topographic highs of the Homewood aquifer radially toward the surrounding unconsolidated aquifer present at lower topographic elevations. As these areas are underlain in part by the Mercer Member and Sharon Member shales, the vertical migration of shallow groundwater contamination to deeper aquifers is anticipated to be inhibited by these shales. However, this disconnect is not confirmed based on sample results from Upper Sharon Sandstone well FWGmw-022 and Basal Sharon Conglomerate well FWGmw-019 both having reported concentrations of chloroform and Aroclor-1254 exceeding screening criteria.
  - The Load Line 1, Load Line 2, and Load Line 3 AOCs (third area) – The radial flow pattern in these areas indicates contaminants could migrate in all directions. The potential for impacted groundwater underlying these AOCs to migrate to stream systems located to the west and to the northwest will be evaluated in the RI. Wells LL2mw-059 and LL3mw-244, located at the Camp Ravenna property boundary, historically and in 2017 had explosives and propellants exceeding screening criteria; however, based on 2017 data collected from downgradient wells FWGmw-021 and FWGmw-024, it appears less likely that explosive constituents may be migrating off of Camp Ravenna. Well FWGmw-024, downgradient of LL2mw-059, did not have explosives reported above screening criteria in 2017. Well FWGmw-021, downgradient of LL3mw-244, had slight exceedances in April and July 2017 sampling, but the concentrations declined over the year and were below screening criteria in

samples collected in December 2017. VOCs and SVOCs were not reported above screening criteria in these AOCs.

  - The Open Demolition Area #2 and Winklepeck Burning Grounds AOCs (fourth area) – Contaminants (RDX, metals, and cyanide) exceeding screening criteria in the unconsolidated aquifer are interpreted to potentially migrate toward the east. The potential for impacted groundwater underlying these AOCs to discharge to downgradient surface water features will be evaluated in the RI.
  - In the Ramsdell Quarry Landfill AOC (fifth area) – RDX was detected in one or more wells in this AOC. RDX is limited in extent, based on a downgradient well. 3-Nitrotoluene reported in the April 2017 event sample collected from FWGmw-011 is a low, estimated value just above its screening criteria.
  - The NACA Test Area AOC (sixth area) – A low concentration of an SVOC is likely to be limited in extent to the vicinity of well NTAmw-119.

- Basal Sharon Conglomerate Aquifer Sampling – Two SVOCs were reported above screening criteria in samples collected from two background wells (BKGmw-024 and BKGmw-025) installed in 2016 at the northwestern property boundary. The SVOC concentrations are low, estimated levels and expected to be limited in extent. PCB Aroclor-1254 was reported in samples from three wells, including BKGmw-025, Load Line 10 AOC well FWGmw-019, and FWGmw-018, located at the southeastern property boundary. The SVOCs and PCB constituent reported at one or both of the two background wells are not associated with any known releases related to historical activities at Camp Ravenna. Although the PCB concentrations are relatively low, there is some potential that the contamination in FWGmw-018 could migrate beyond the property boundary.
- Groundwater sampling conducted in 2017 from the shallow aquifers and the Basal Sharon Conglomerate aquifer suggest that no groundwater contamination in the shallow aquifers has migrated vertically into the deeper water bearing zone, except for the Load Line 10 AOC where a connection between the Upper Sharon Sandstone and Basal Sharon Conglomerate may exist based on results from well FWGmw-019 and FWGmw-022.
- Five new monitoring wells installed along the Camp Ravenna property boundary south of Load Line 2, Load Line 3, and Load Line 12 as part of the FWGW RI in 2016 (FWGmw-017, FWGmw-018, FWGmw-020, FWGmw-021, and FWGmw-024) were sampled for

explosives/propellants and total inorganics, including cyanide, PCBs, pesticides, SVOCs, and VOCs. FWGmw-017 and FWGmw-018 are screened in the Basal Sharon Conglomerate aquifer, and FWGmw-020, FWGmw-021, and FWGmw-024 are screened in the Upper Sharon Sandstone aquifer. Based on the southerly groundwater flow in this area, the possibility exists that groundwater contaminants could migrate off of Camp Ravenna property to the south. Screening criteria exceedances of contaminants detected in these five wells during 2017 include:

- Organics: 2-amino-4,6-dinitrotoluene (FWGwm-021); 4-amino-2,6-dinitrotoluene (FWGwm-021); Aroclor-1254 (FWGmw-021 and FWGmw-018).
- Inorganics: arsenic (all wells); hexavalent chromium (FWGwm-024); cobalt (all wells); iron (FWGmw-020, FWGmw-021, and FWGmw-024); manganese (all wells); and total cyanide (FWGmw-021).

5.2 RECOMMENDATIONS

The proposed FWGW sampling plan for 2018 will be presented in the pending *Draft Facility-Wide Groundwater Monitoring Addendum for 2018* (TEC-Weston JV, 2018a). The 2018 FWGWMP will generally include sampling of wells identified with one or more screening level exceedances in 2017 or 2016. Additionally, the 2018 FWGWMP will include critical migration exit pathway well points and vertical delineation well pairs sampled during 2017. Wells planned for the 2017 FWGWMP, but observed with insufficient groundwater levels to support sampling, will also be included in the 2018 program.

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FIGURES

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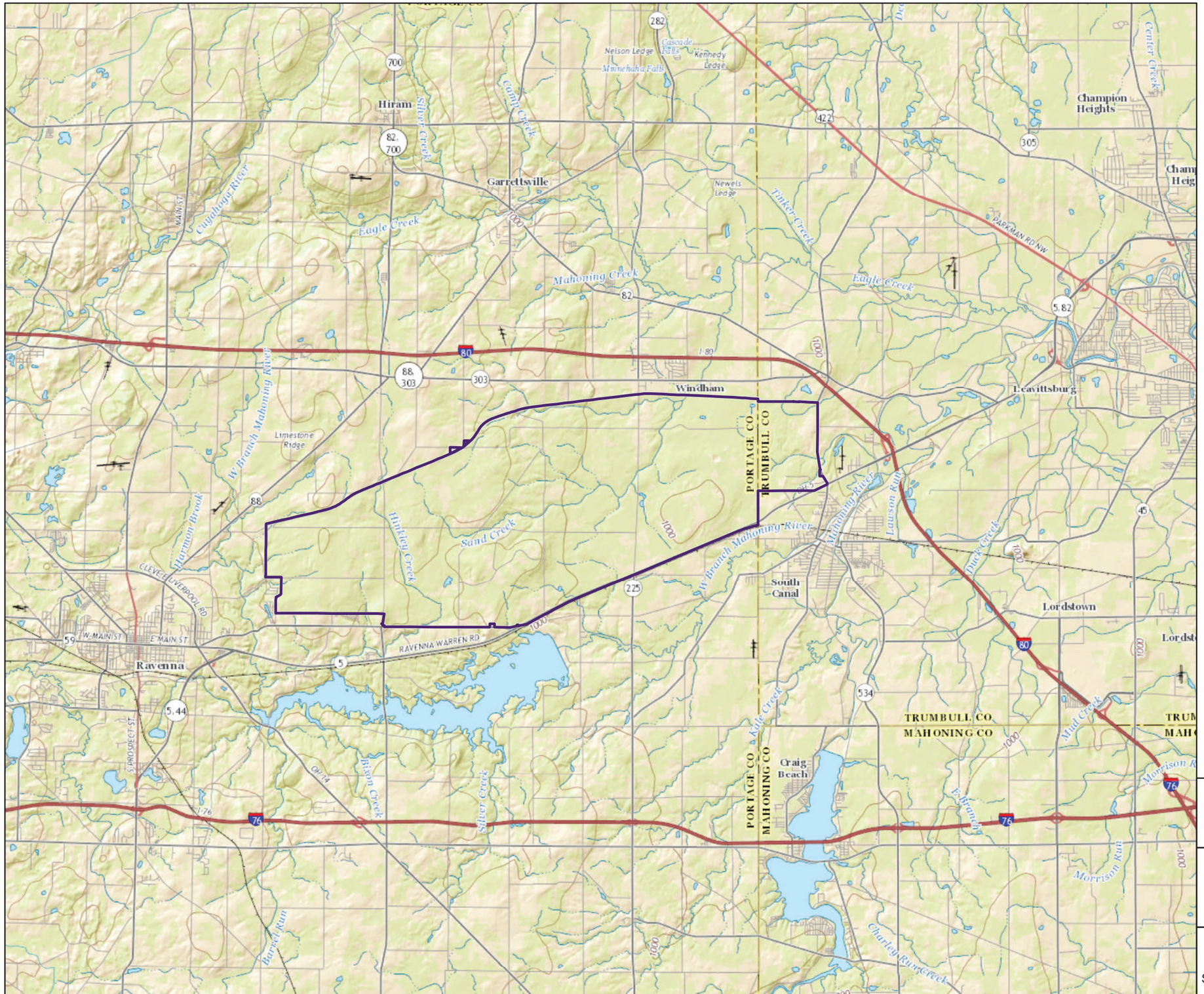

Overview Map

Legend

Camp Ravenna Property Line

Notes:
- Basemap Source: ESRI Map Service - USGSTopo

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0 1 2 3 4 Miles

1:126,720
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

SITE LOCATION MAP

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 1-1

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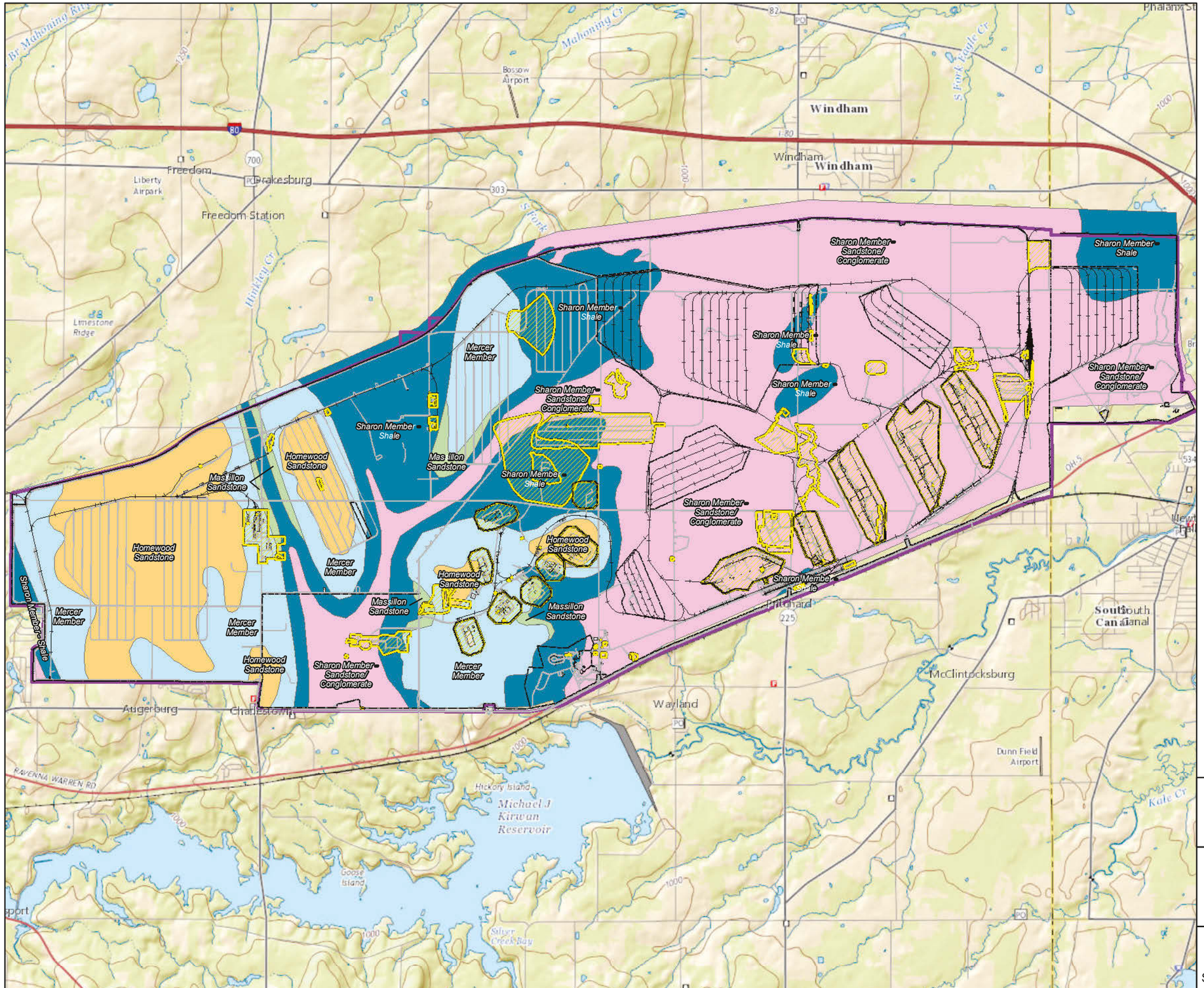

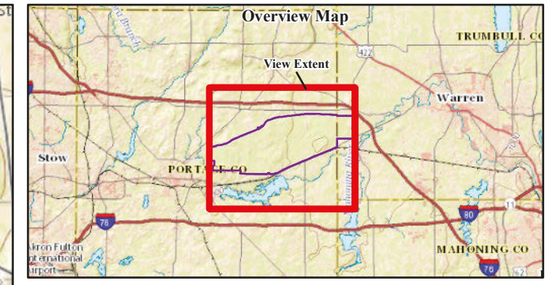

Legend

Geology Formation

- Homewood Sandstone
- Mercer Member
- Massillon Sandstone
- Sharon Member - Shale
- Sharon Member - Sandstone/Conglomerate
- Fenceline
- Roads
- Railroad
- Buildings
- AOCs
- Camp Ravenna Property Line

Notes:
- Basemap Source: ESRI Map Sservice - USGSTopo

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1:60,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

SURFACE GEOLOGY MAP

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 1-2

Draft

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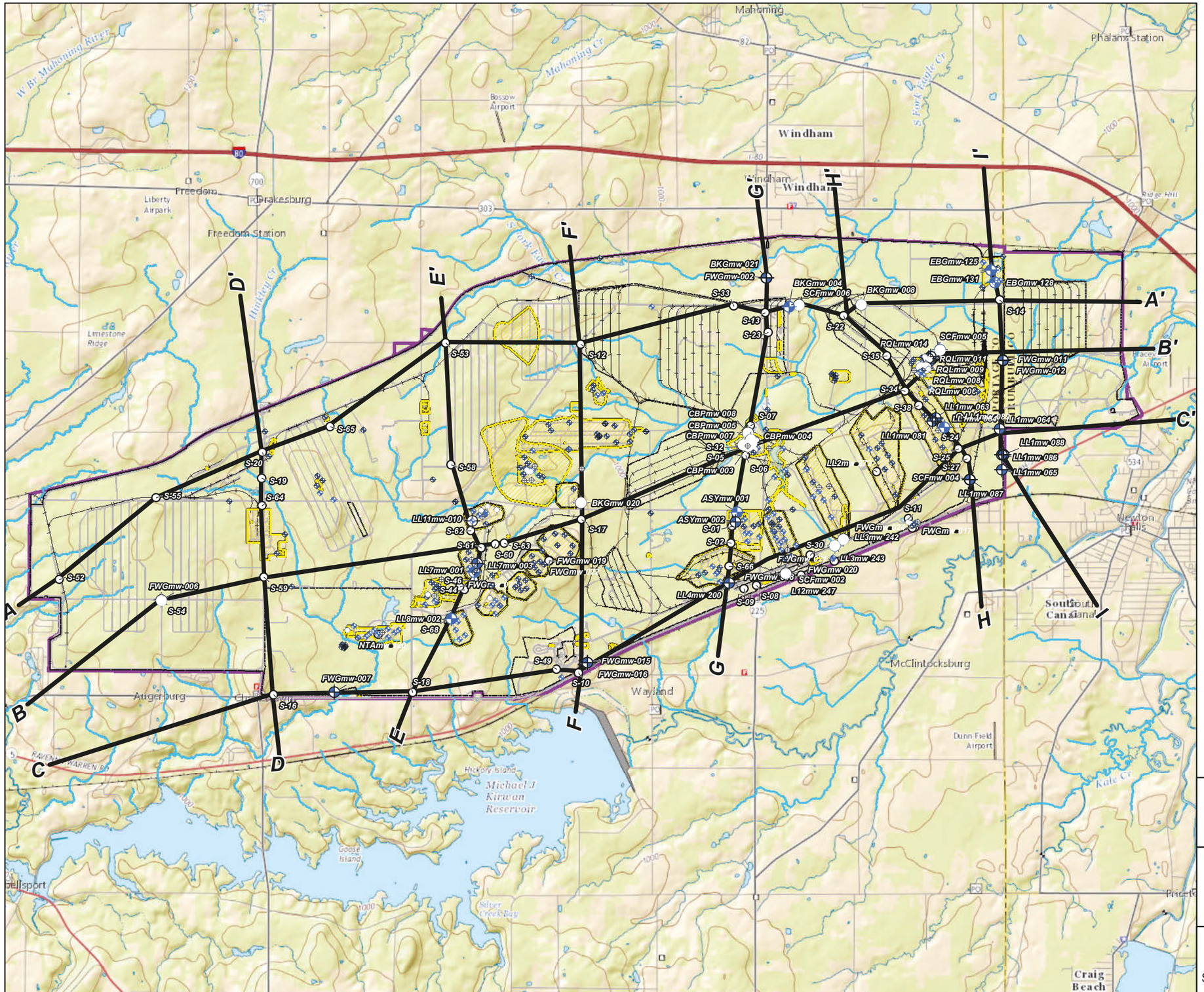

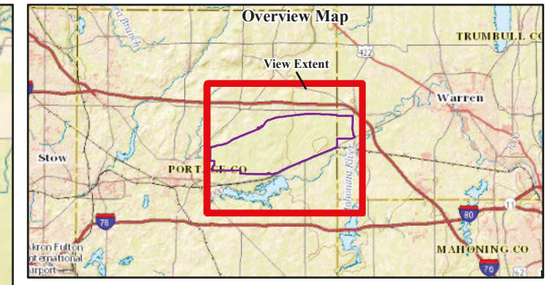

Legend

- Line of Section
- Monitor Well Location Used in Cross-Section
- Other Input Used for Cross Section
- Other Monitor Well Location
- AOCs
- Camp Ravenna Property Line
- Fenceline
- Roads
- Railroad
- Streams

Notes:
- Basemap Source: ESRI Map Sservice - USGSTopo

N

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NAD83 UTM Zone 17N

TEC-Weston Joint Venture

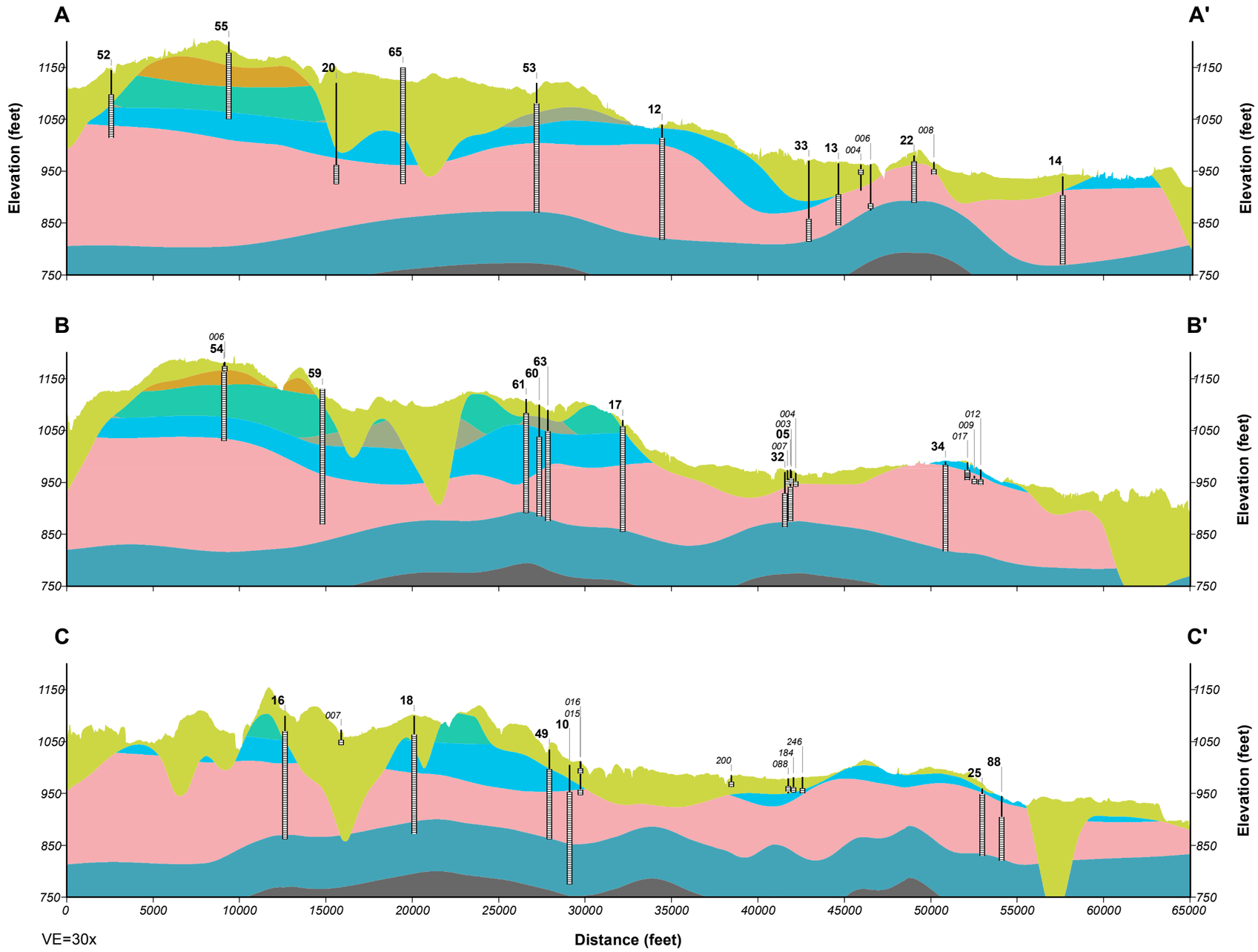
LINE OF SECTION MAP

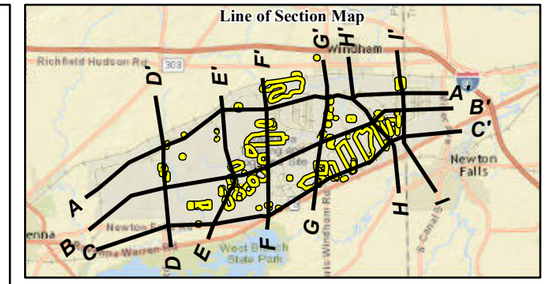
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 1-3

Draft

Path: I:\GIS Project Files\15363_Cardno Weston Services\Ravenna\GIS\MXDs\Annual_Reports\2016_GW_Final\Fig_1_03_Line_of_Section_v20170110.mxd, 1/10/2017 4:16:24 PM, herrinm





Legend

- AOC boundary
- Lines of Section

Site Wells

- Leader
- Casing
- Screen

Geology

- Unconsolidated
- Homewood Sandstone Member
- Mercer Member
- Massillon Sandstone Member
- Sharon Member, Shale Unit
- Sharon Member, Sandstone/Conglomerate Unit
- Cuyahoga Group
- Berea Sandstone

Pottsville Formation

Notes:
- Former production well IDs are **bold**
- Site wells are *italicized* and have had the AOC prefix removed for clarity

TEC-Weston Joint Venture

EAST-WEST CROSS SECTIONS (A-C)

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 1-4

Draft

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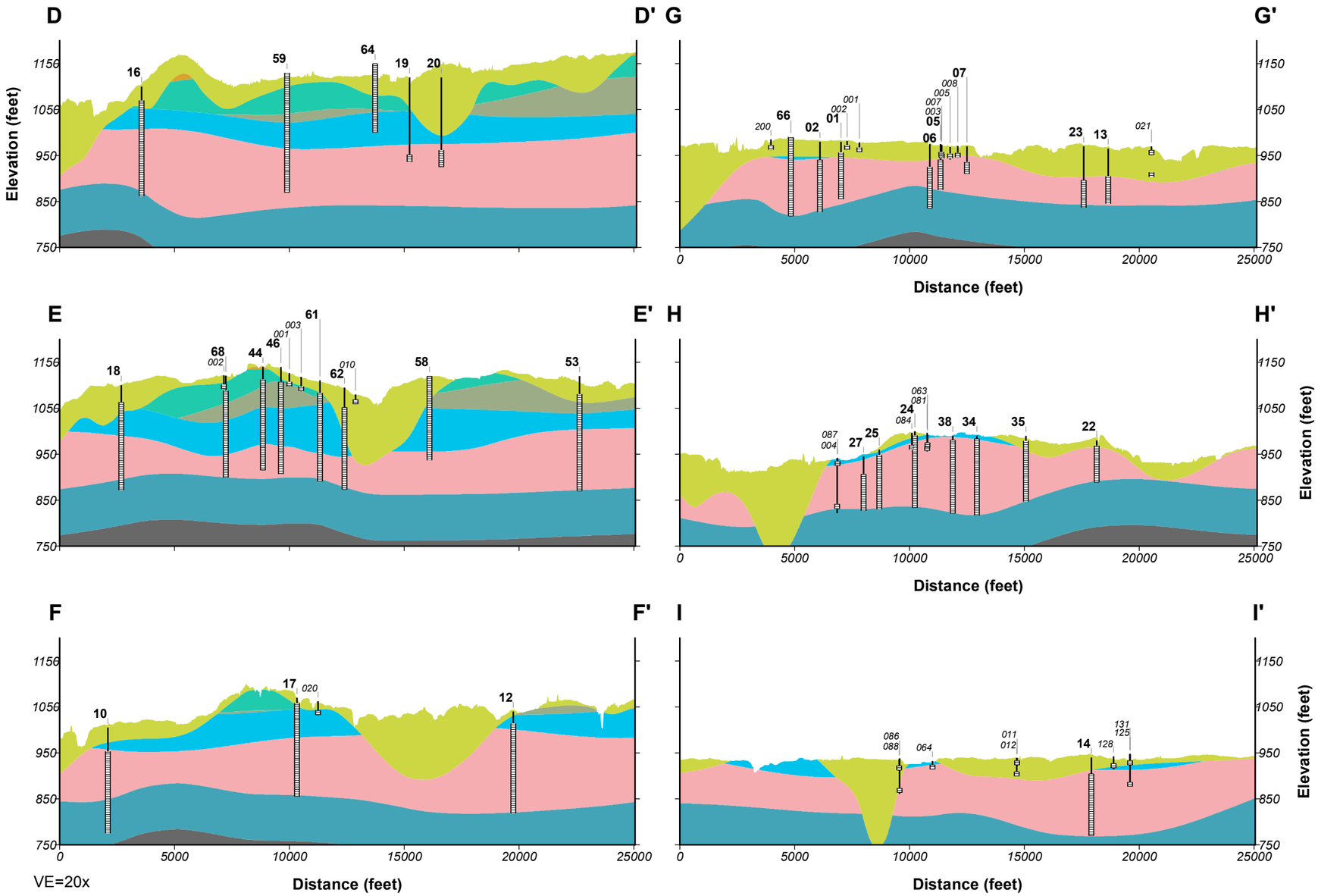

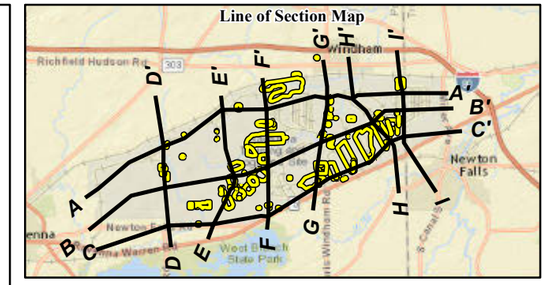

Legend

- AOC boundary
- Lines of Section

Site Wells

- Leader
- Casing
- Screen

Geology

- Unconsolidated
- Homewood Sandstone Member
- Mercer Member
- Massillon Sandstone Member
- Sharon Member, Shale Unit
- Sharon Member, Sandstone/Conglomerate Unit

Pottsville Formation

- Cuyahoga Group
- Berea Sandstone

Notes:
- Former production well IDs are **bold**
- Site wells are *italicized* and have had the AOC prefix removed for clarity

TEC-Weston Joint Venture

NORTH-SOUTH CROSS SECTIONS (D-I)

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 1-5

Draft

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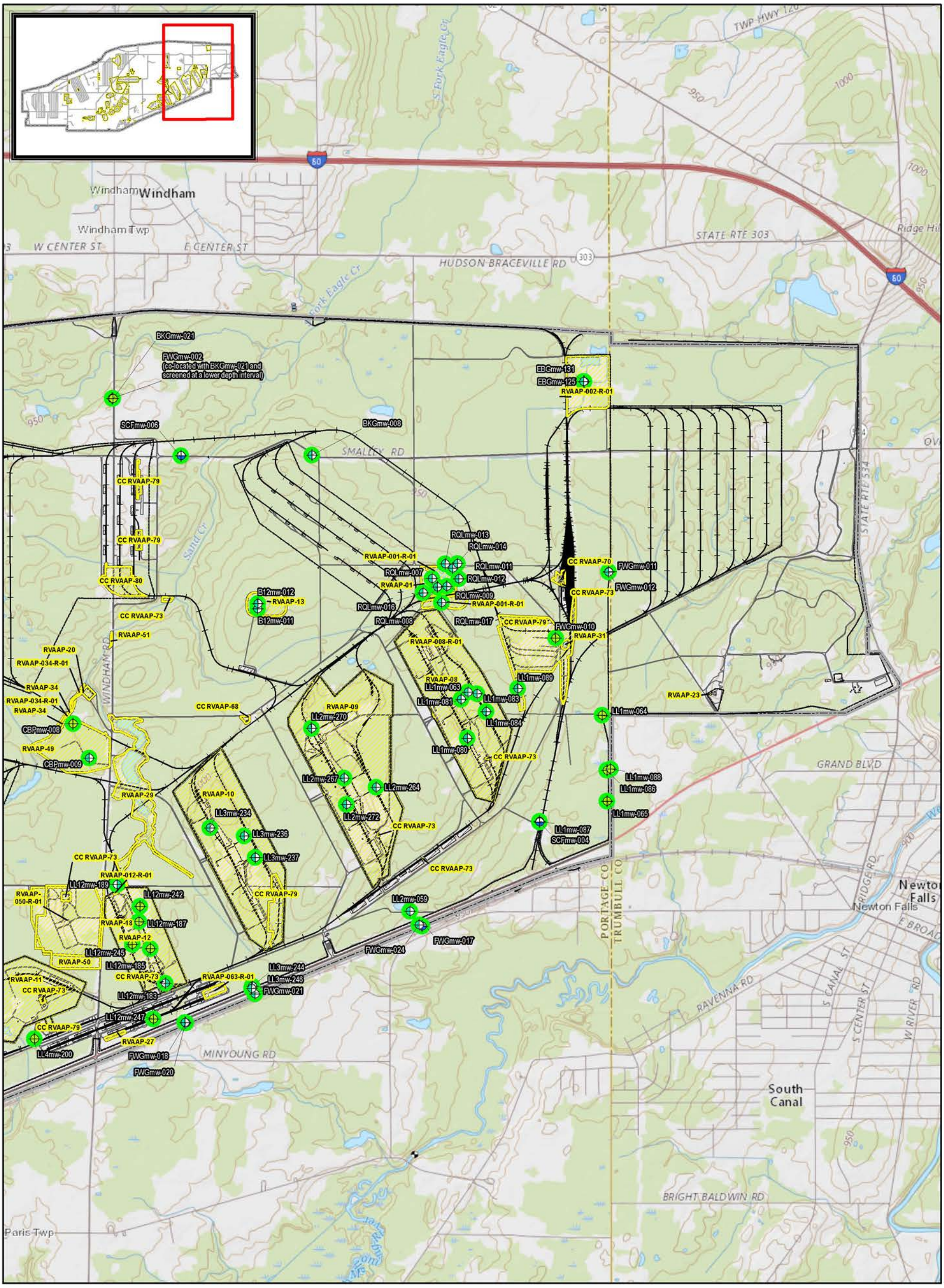


Legend

- Groundwater Station (Unconsolidated Unit)
- Groundwater Station (Homewood)
- Groundwater Station (Sharon Sandstone)
- Groundwater Station (Sharon Shale)
- Groundwater Station (Sharon Cong.)
- 2017 FWGWMP or RI Sampling Well Location
- Camp Ravenna Boundary
- AOCs/MRSs

N

0 1,300 2,600 3,900 5,200 Feet

1 " = 2,500 ft
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

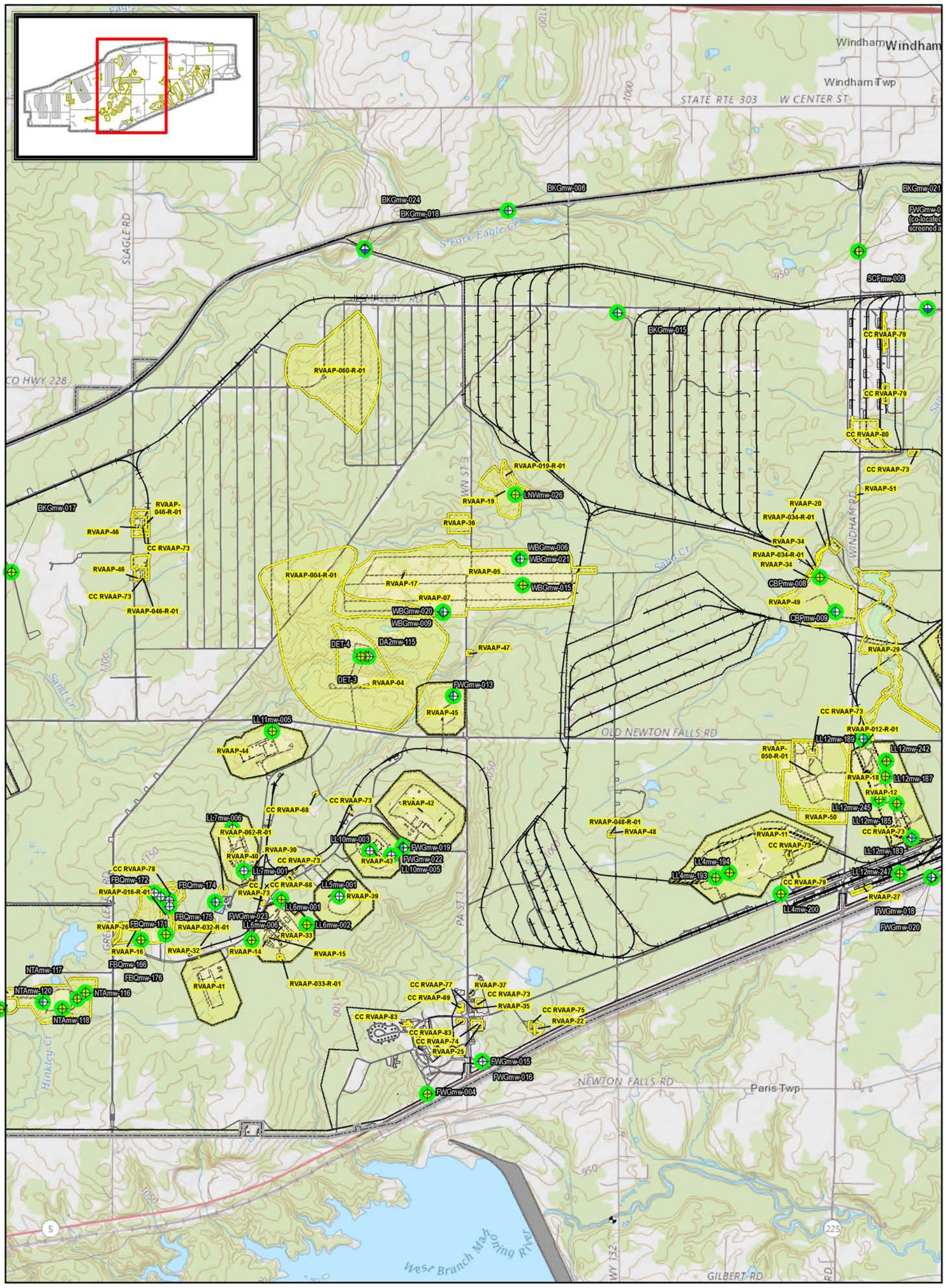
2017 FWGWMP AND RI WELLS - EAST RVAAP

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 2-1

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Work_Plans\RI_WP_FINAL\Fig_1_1-3-3_2017_RI_Sample_Locations.mxd, 01/09/2018 6:11:09 PM, jiua



Legend

- Groundwater Station (Unconsolidated Unit)
- Groundwater Station (Homewood)
- Groundwater Station (Sharon Sandstone)
- Groundwater Station (Sharon Shale)
- Groundwater Station (Sharon Cong.)
- 2017 FWGWMP or RI Sampling Well Location
- Camp Ravenna Boundary
- AOCs/MRSs

N

0 1,300 2,600 3,900 5,200 Feet

1 " = 2,490 ft
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

2017 FWGWMP AND RI WELLS - CENTRAL RVAAP

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 2-2

DRAFT

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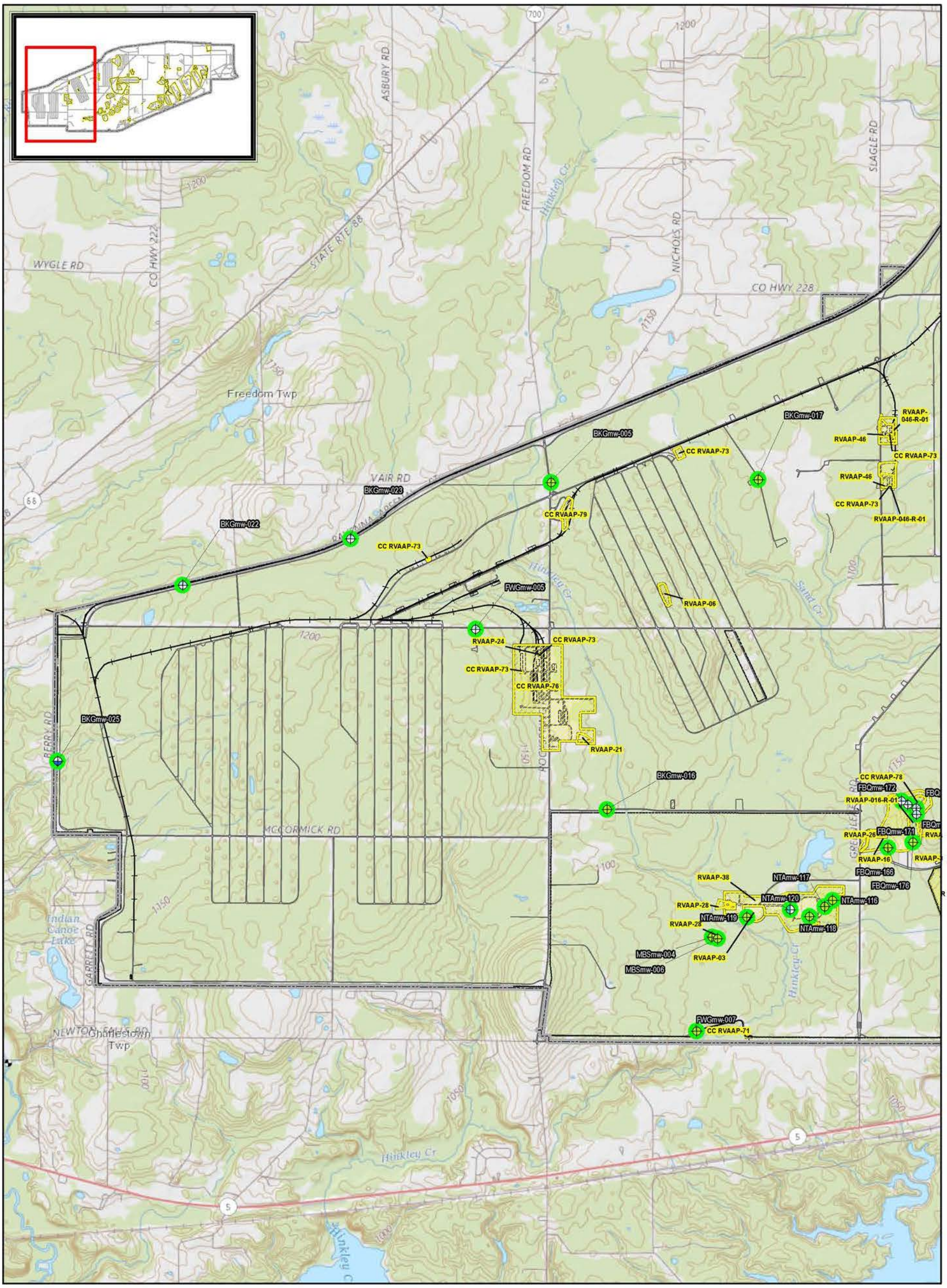

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Legend

- Groundwater Station (Unconsolidated Unit)
- Groundwater Station (Homewood)
- Groundwater Station (Sharon Sandstone)
- Groundwater Station (Sharon Shale)
- Groundwater Station (Sharon Cong.)
- 2017 FWGWMP or RI Sampling Well Location
- Camp Ravenna Boundary
- AOCs/MRSs

N

0 1,300 2,600 3,900 5,200 Feet

1 " = 2,490 ft
NAD83 UTM Zone 17N

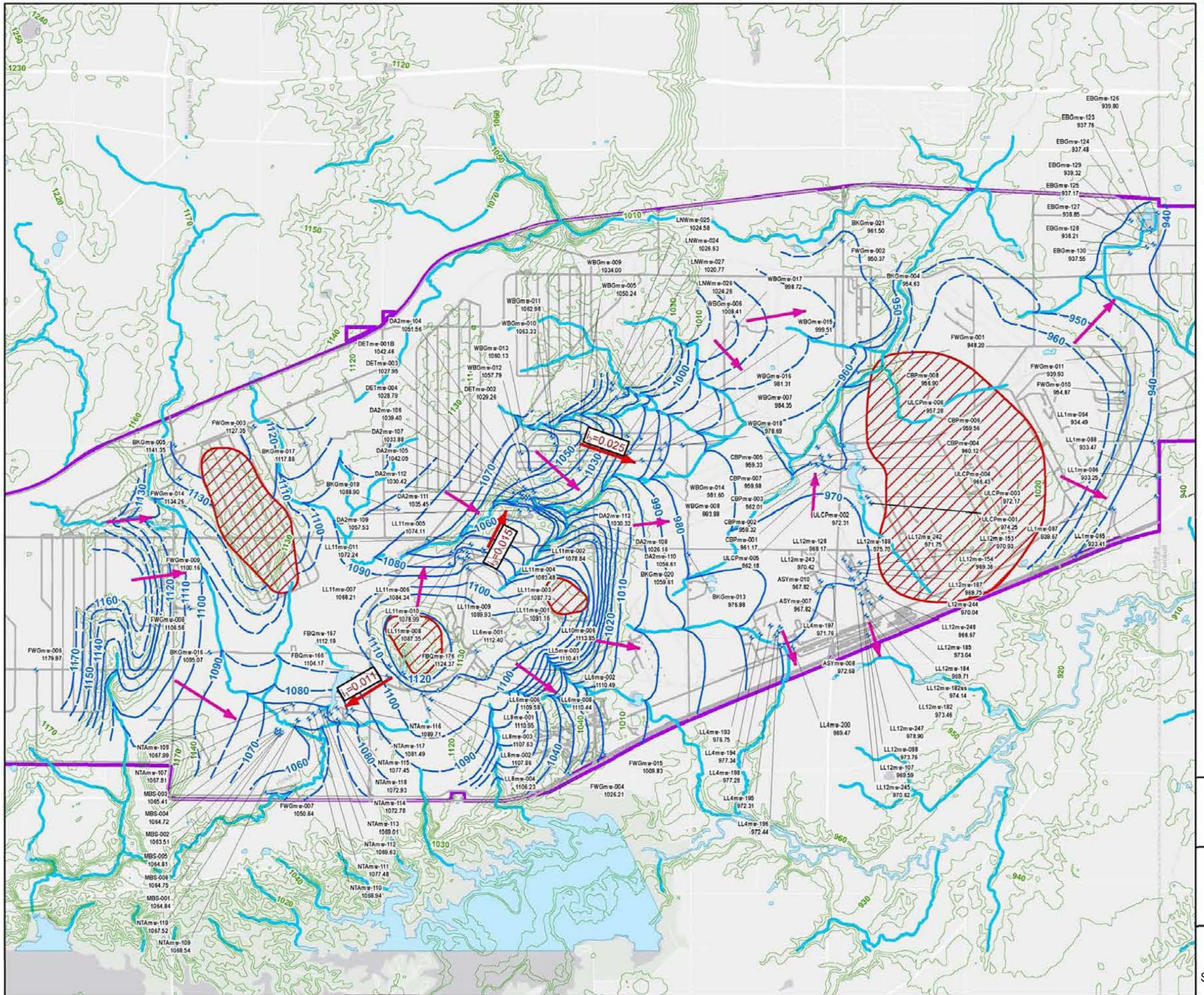
TEC-Weston Joint Venture

2017 FWGWMP AND RI WELLS - WEST RVAAP

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 2-3

DRAFT



Legend

- Unconsolidated Well
- Measured Elevation Contours
- Inferred Elevation Contours
- Direction Of Flow
- i1 = Hydraulic Gradient
- Roads
- Creeks and Streams
- Unconsolidated Aquifer Not Present (See Notes Below)
- Camp Ravenna Property

Notes:
- NM = Not Measured
- Potentiometric Surfaces based on data collected in April 2017
- Basemap Sources: ESRI Map Services - Canvas/World_Light_Gray_Base and World_Street_Map
- Unconsolidated Aquifer indicated to not be present, based on the Facility-Wide Groundwater Monitoring Program Annual Report for 2015

N

0 4,000 8,000 Feet

1:48,000
NAD83 UTM Zone 17N

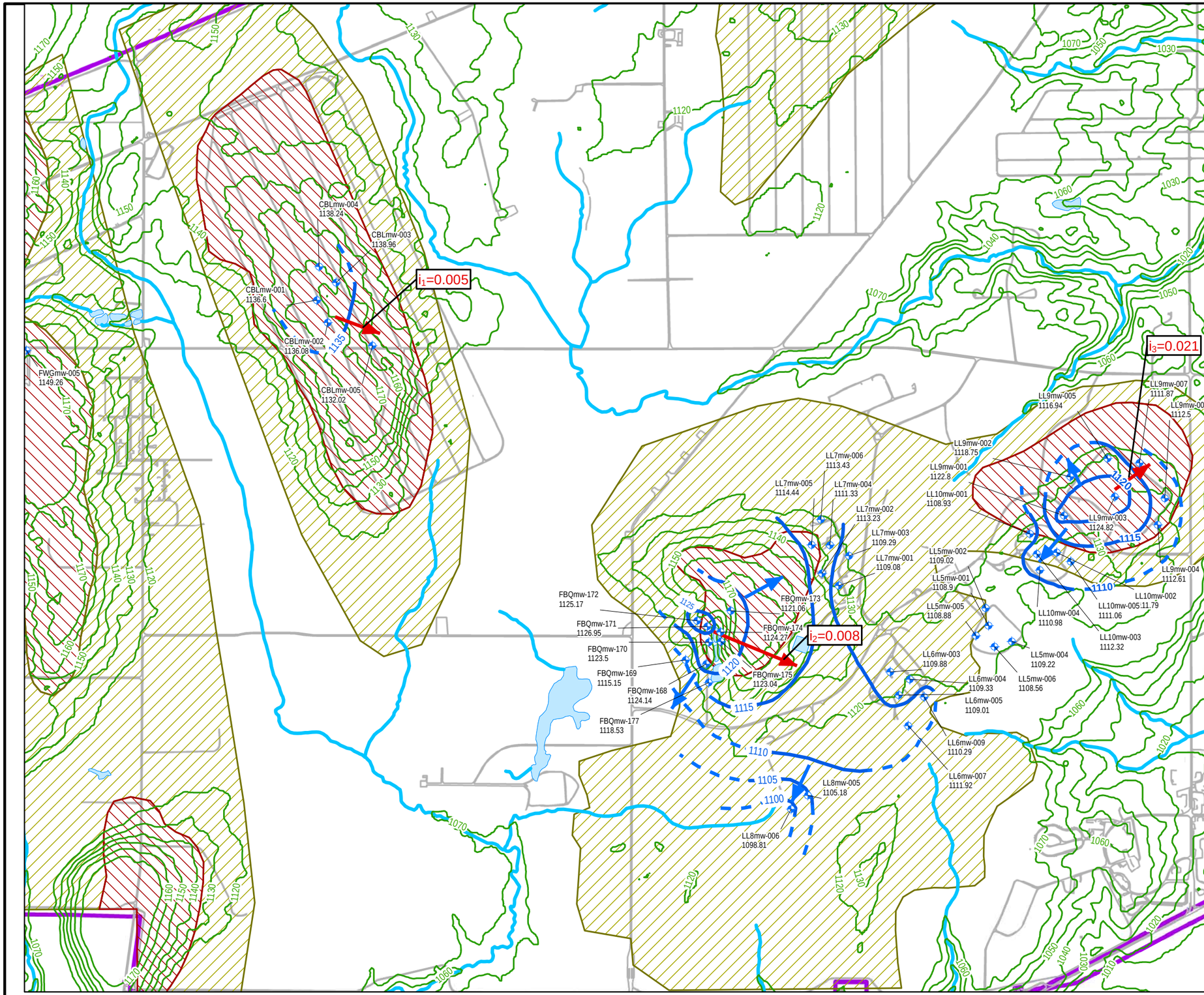
TEC-Weston Joint Venture

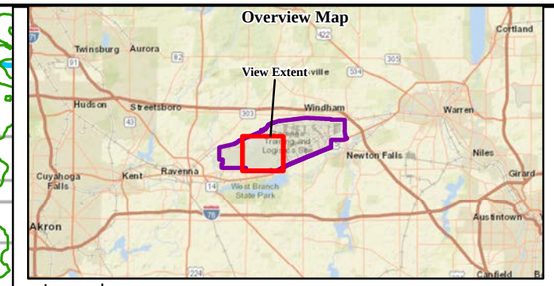
POTENTIOMETRIC SURFACE MAP
UNCONSOLIDATED AQUIFER
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-1

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_3_01 Potentiometric Surface Map - Unconsolidated Aquifer Apr 2017_rev1.mxd, 12/14/2017 9:19:27 AM, liua





Legend

- Upper Bedrock Aquifer Well Locations
- Direction Of Flow
- i1 = Hydraulic Gradient (ft/ft)
- Roads
- Creeks and Streams
- Elevation Contours (Feet)
- Camp Ravenna Property Line

Geology Formation

- Homewood Sandstone Member
- Mercer Member

Notes:
1. Potentiometric Surfaces were prepared based on data collected in April 2017.
2. All wells presented are installed within the upper contact saturated zone of the initial bedrock formation, reported in previously prepared documents as the Homewood Sandstone.
3. Groundwater elevations measured in April 2017 at BKGmw-022 (not present in map view), BKGmw-023 (not present in map view) and FWGmw-005 were not used in preparation of potentiometric surface contours based on their distance (i.e., greater than 4,500 feet) from current AOCs/MRSs being monitored for groundwater contamination and from the next closest wells installed in the Homewood formation.

- Basemap Sources: ESRI Map Services - Canvas/World_Light_Gray_Base and World_Street_Map
- Surface Elevation Contours - USDA

N

0 1,600 3,200 Feet

1:19,200
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

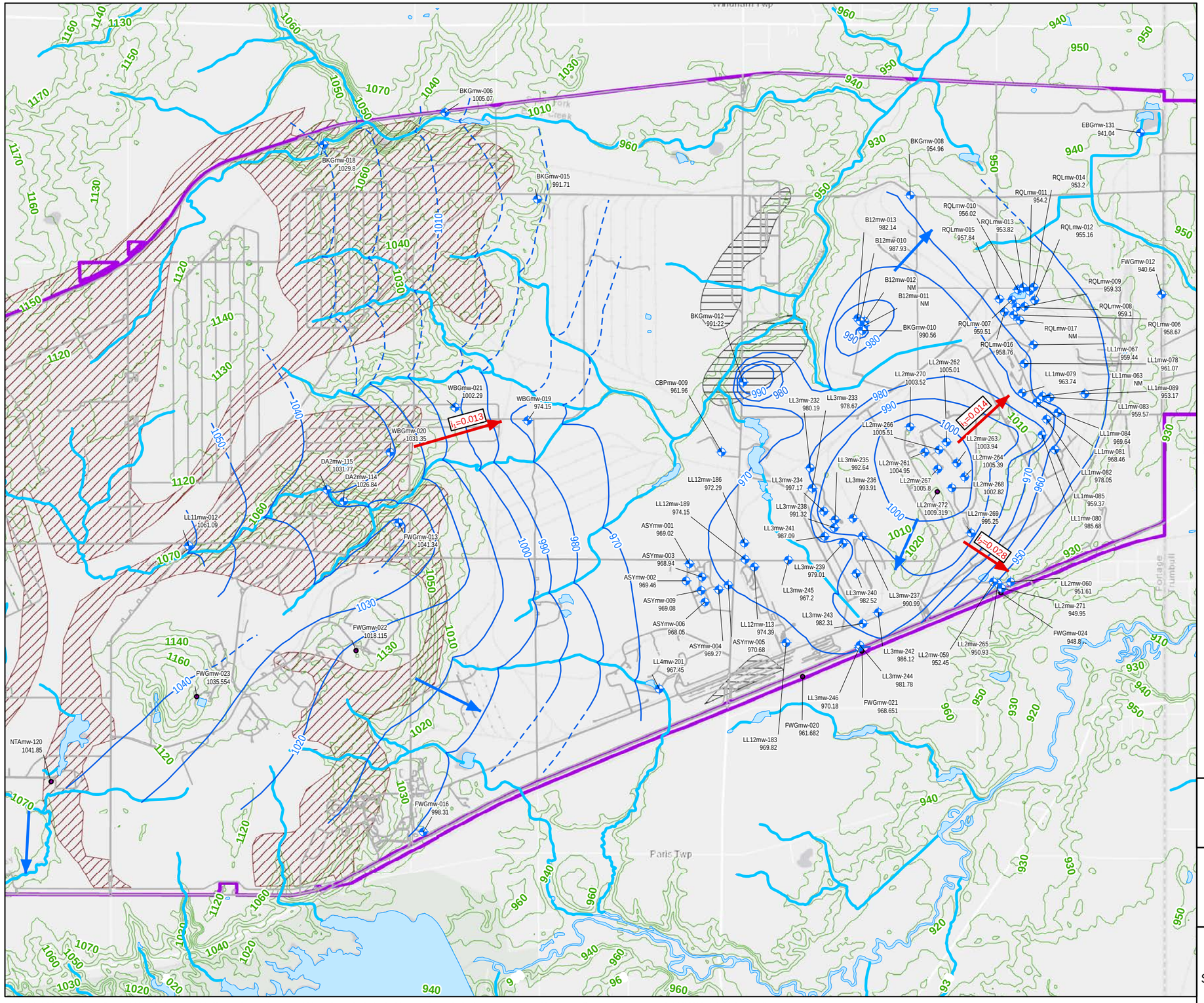
POTENTIOMETRIC SURFACE MAP
HOMEWOOD SANDSTONE AQUIFER

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-2

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_3_02 Potentiometric Surface Map - Homewood Sandstone Aquifer Apr 2017.mxd, 02/20/2018 10:01:08 PM, liua



Legend

- Upper Sharon Sandstone Well Location
- FWGW RI Wells Installed in 2016
- Upper Sharon Sandstone Contour Intervals
- Upper Sharon Sandstone Inferred Contour Intervals
- Direction Of Flow
- i1 = Hydraulic Gradient (ft/ft)
- Creeks and Streams
- Roads
- Camp Ravenna Property Line
- Upper Sharon Sandstone Shale Lens
- Sharon Member - Shale Unit

Notes:
- NM = Not Measured
- FWGW RI - Facility-Wide Groundwater Remedial Investigation
- Potentiometric Surfaces based on data collected April 2017
- Basemap Sources: ESRI Map Services - Canvas/World_Light_Gray_Base and World_Street_Map
- Surface Elevation Contours - USDA

N

0 3,000 6,000 Feet

1:36,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

POTENTIOMETRIC SURFACE MAP
UPPER SHARON SANDSTONE AQUIFER
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-3

DRAFT

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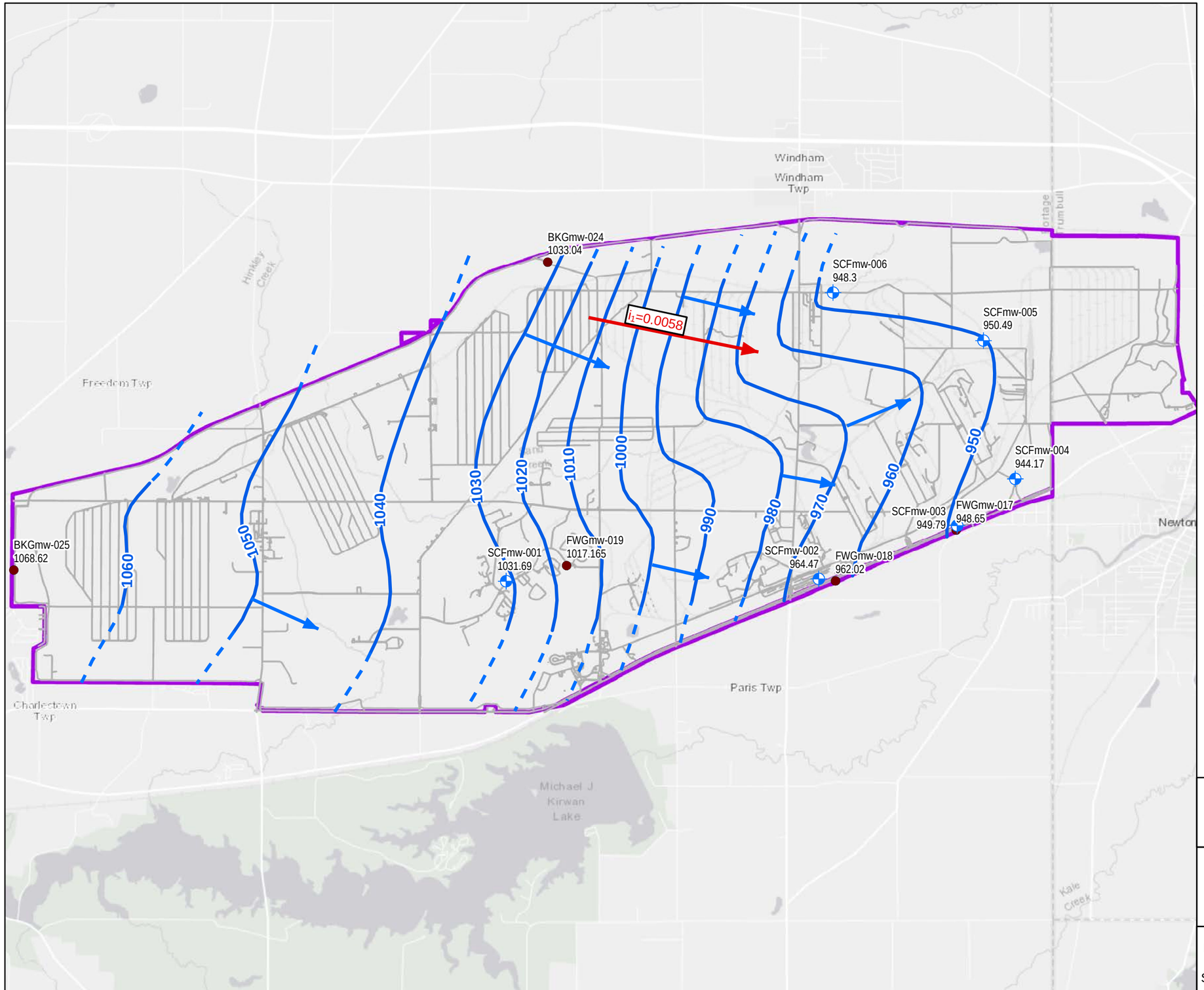


Legend

- Basal Sharon Conglomerate Well Location
- FWGW RI Wells Installed in 2016
- Basal Sharon Conglomerate Contours - 10ft Interval
- Direction Of Flow
- i1 = Hydraulic Gradient (ft/ft)
- Roads
- Camp Ravenna Property Line

Notes:
- FWGW RI = Facility-Wide Groundwater Remedial Investigation
- Potentiometric Surfaces based on data collected in April 2017
- Basemap Sources: ESRI Map Services - Canvas/World_Light_Gray_Base and World_Street_Map
- Surface Elevation Contours - USDA

N

0 5,000 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

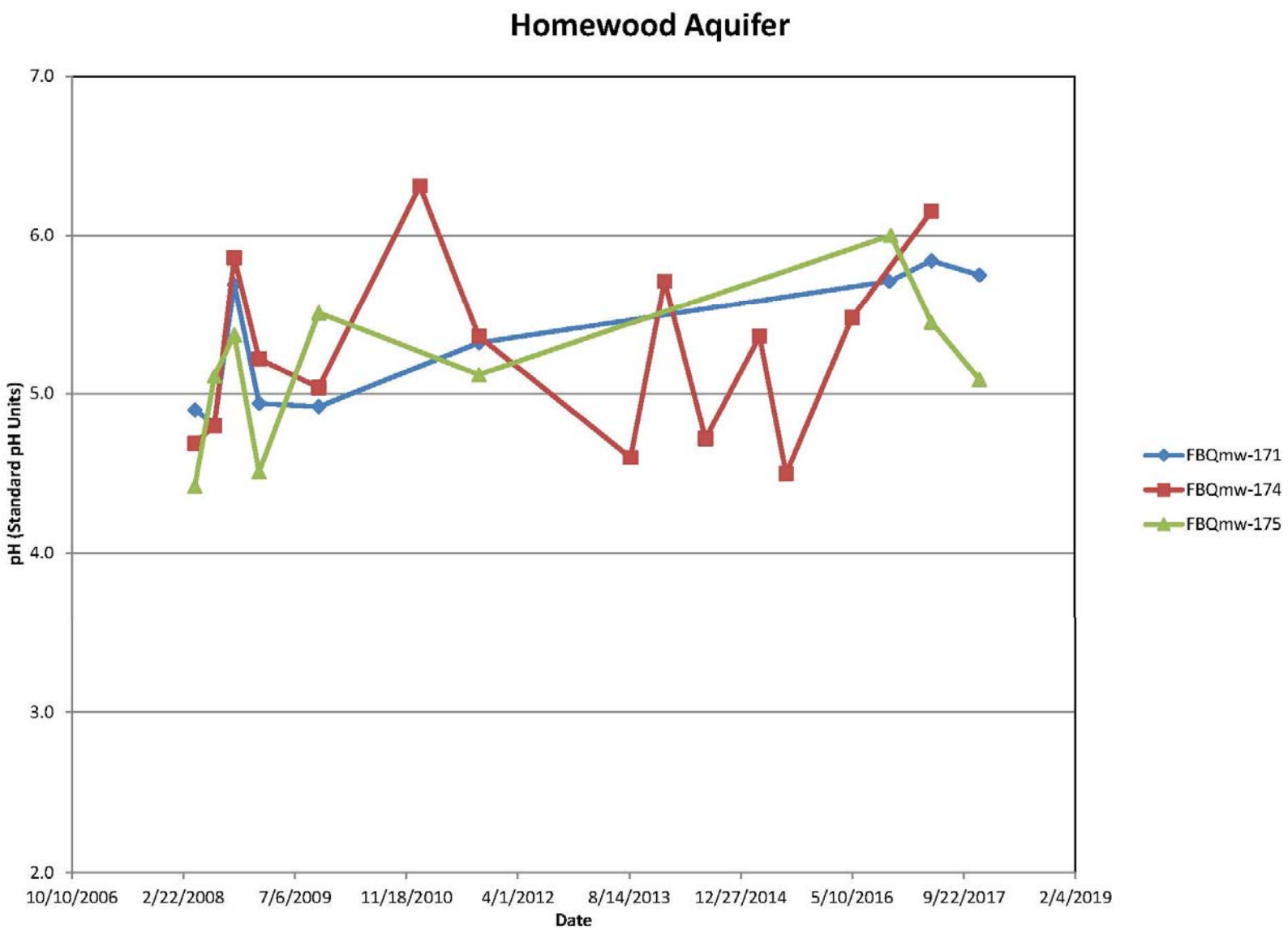
TEC-Weston Joint Venture

POTENTIOMETRIC SURFACE MAP
BASAL SHARON CONGLOMERATE AQUIFER
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-4

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_3_04 Potentiometric Surface Map - Lower Sharon (Conglomerate) Aquifer Apr 2017.mxd, 02/22/2018 9:39:01 PM, liua

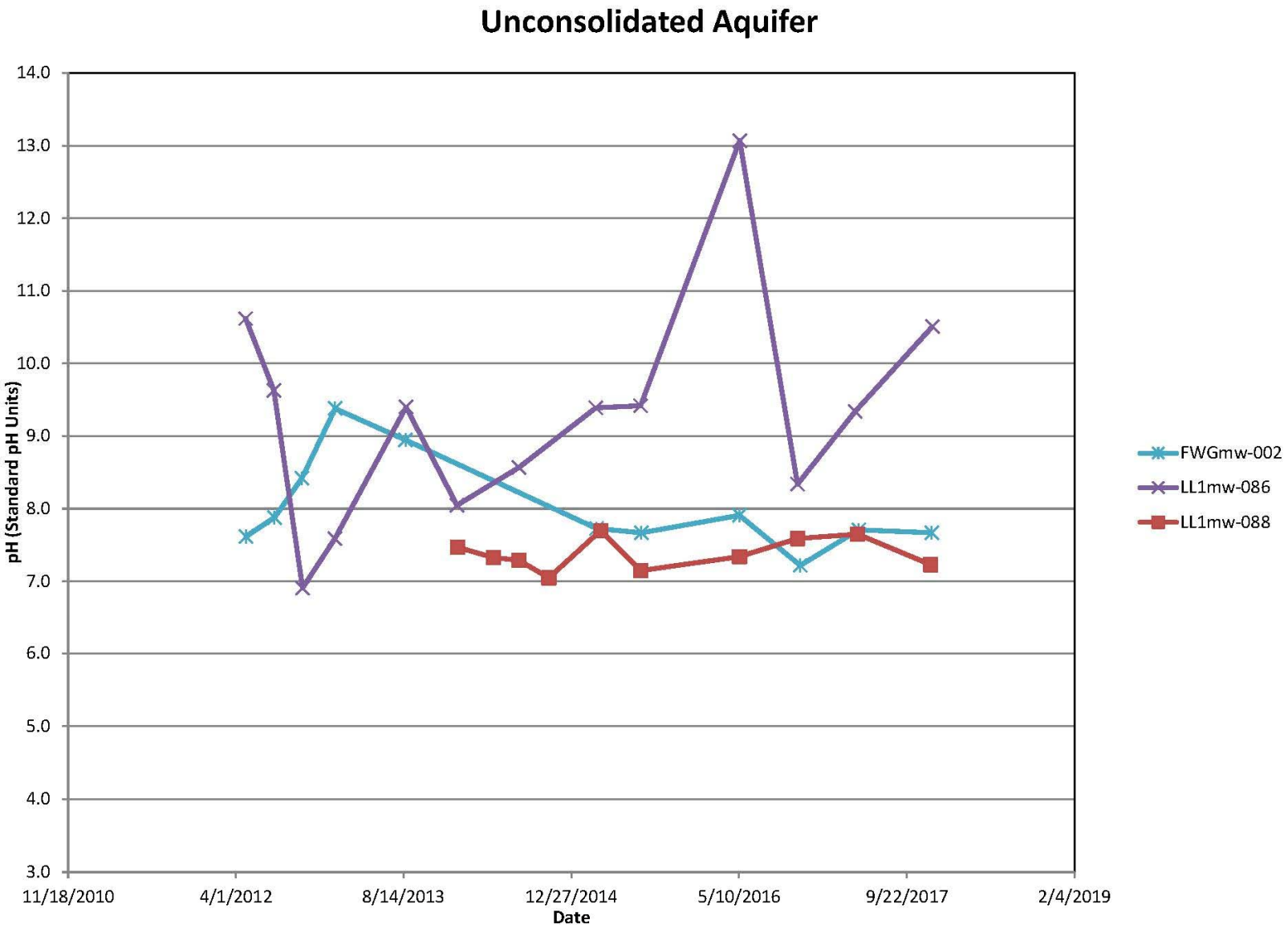


TEC-Weston Joint Venture

pH LEVELS
WELLS FBQmw-171, FBQmw-174, and FBQmw-175
Groundwater and Environmental Investigation Services
For RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-5

DRAFT

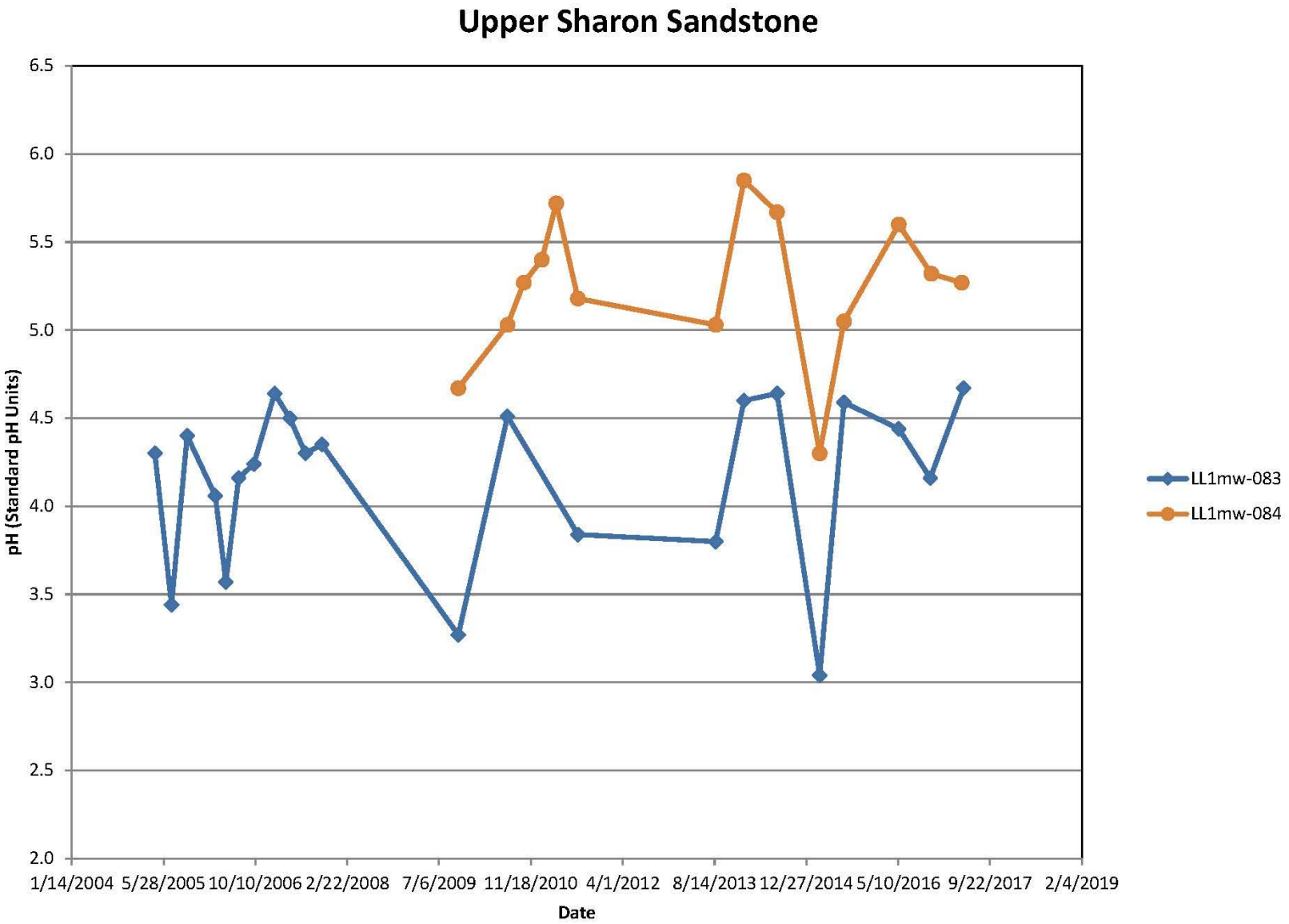


TEC-Weston Joint Venture

pH LEVELS
WELLS FWGmw-002, LL1mw-086, and LL1mw-088
Groundwater and Environmental Investigation Services
For RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-6

DRAFT

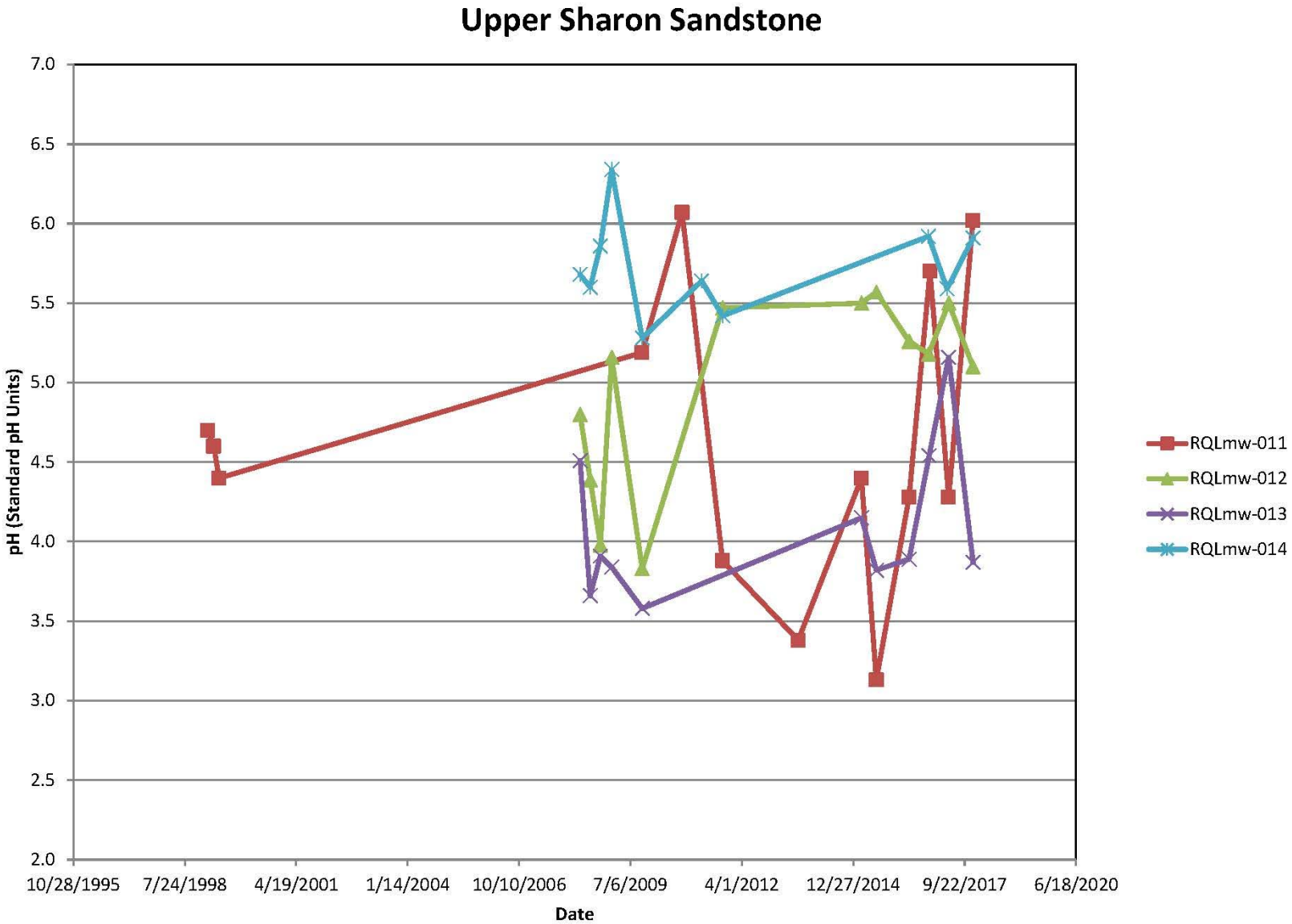


TEC-Weston Joint Venture

pH LEVELS
WELLS LL1mw-083 and LL1mw-084
Groundwater and Environmental Investigation Services
For RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-7

DRAFT

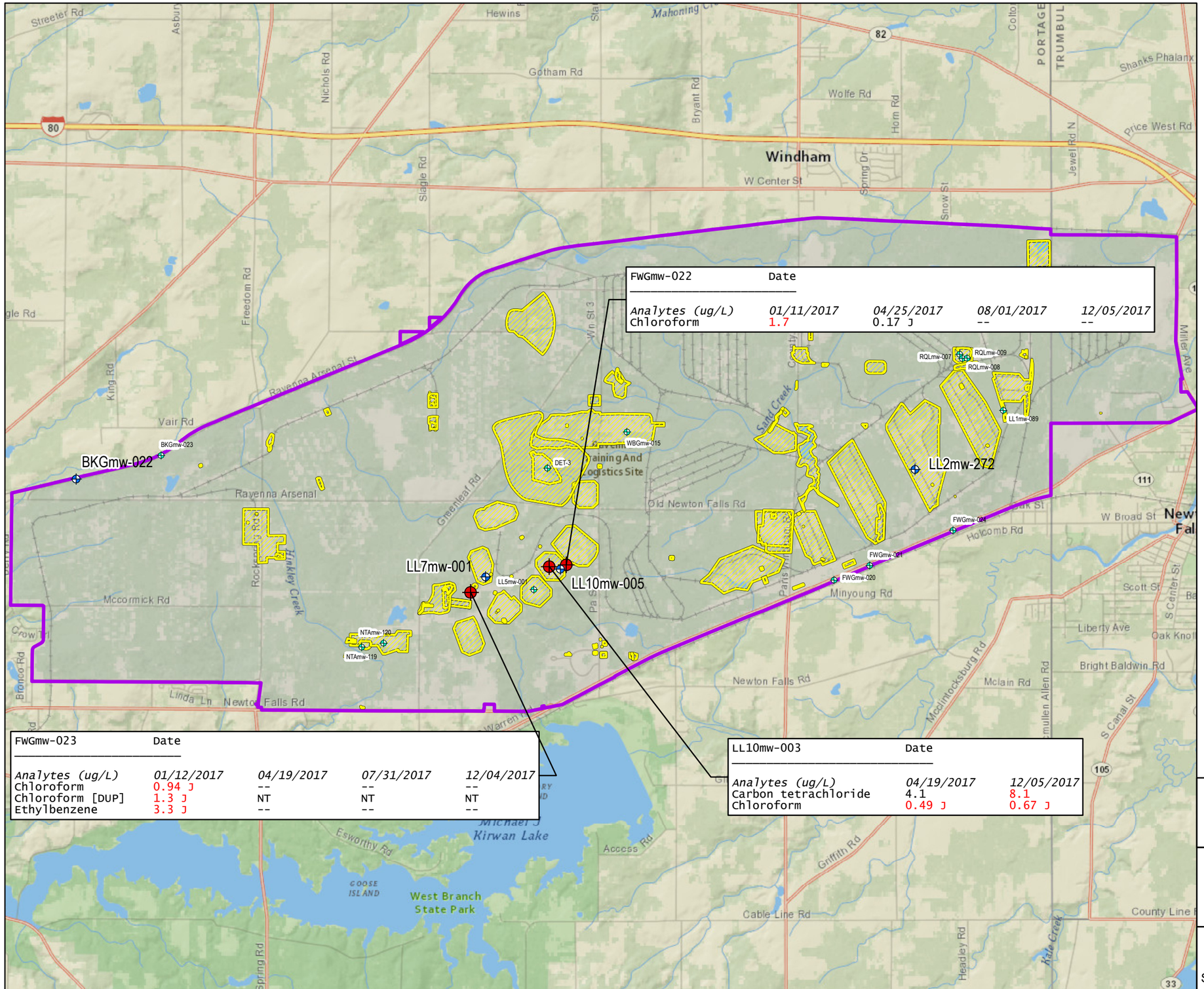


TEC-Weston Joint Venture

pH LEVELS
WELLS RQLmw-011, RQLmw-012, RQLmw-013, and RQLmw-014
Groundwater and Environmental Investigation Services
For RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 3-8

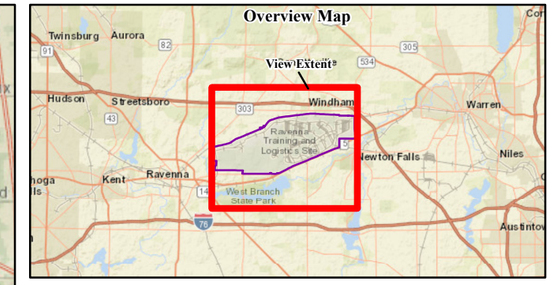
DRAFT



FWGmw-022	Date			
Analytes (ug/L)	*01/11/2017*	*04/25/2017*	*08/01/2017*	*12/05/2017*
Chloroform	1.7	0.17 J	--	--

FWGmw-023	Date			
Analytes (ug/L)	*01/12/2017*	*04/19/2017*	*07/31/2017*	*12/04/2017*
Chloroform	0.94 J	--	--	--
Chloroform [DUP]	1.3 J	NT	NT	NT
Ethylbenzene	3.3 J	--	--	--

LL10mw-003	Date	
Analytes (ug/L)	*04/19/2017*	*12/05/2017*
Carbon tetrachloride	4.1	8.1
Chloroform	0.49 J	0.67 J



Legend

- 2017 Groundwater Sample Location with VOC Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All VOC Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with VOC Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
- Only results exceeding site specfic screening levels are shown
- Shallow Aquifers = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
-- analyte not detected, limit of detection above screening level
- ug/l = micrograms per liter
- J = estimated result
- NT = not tested
- VOCs - volatile organic compounds
- Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

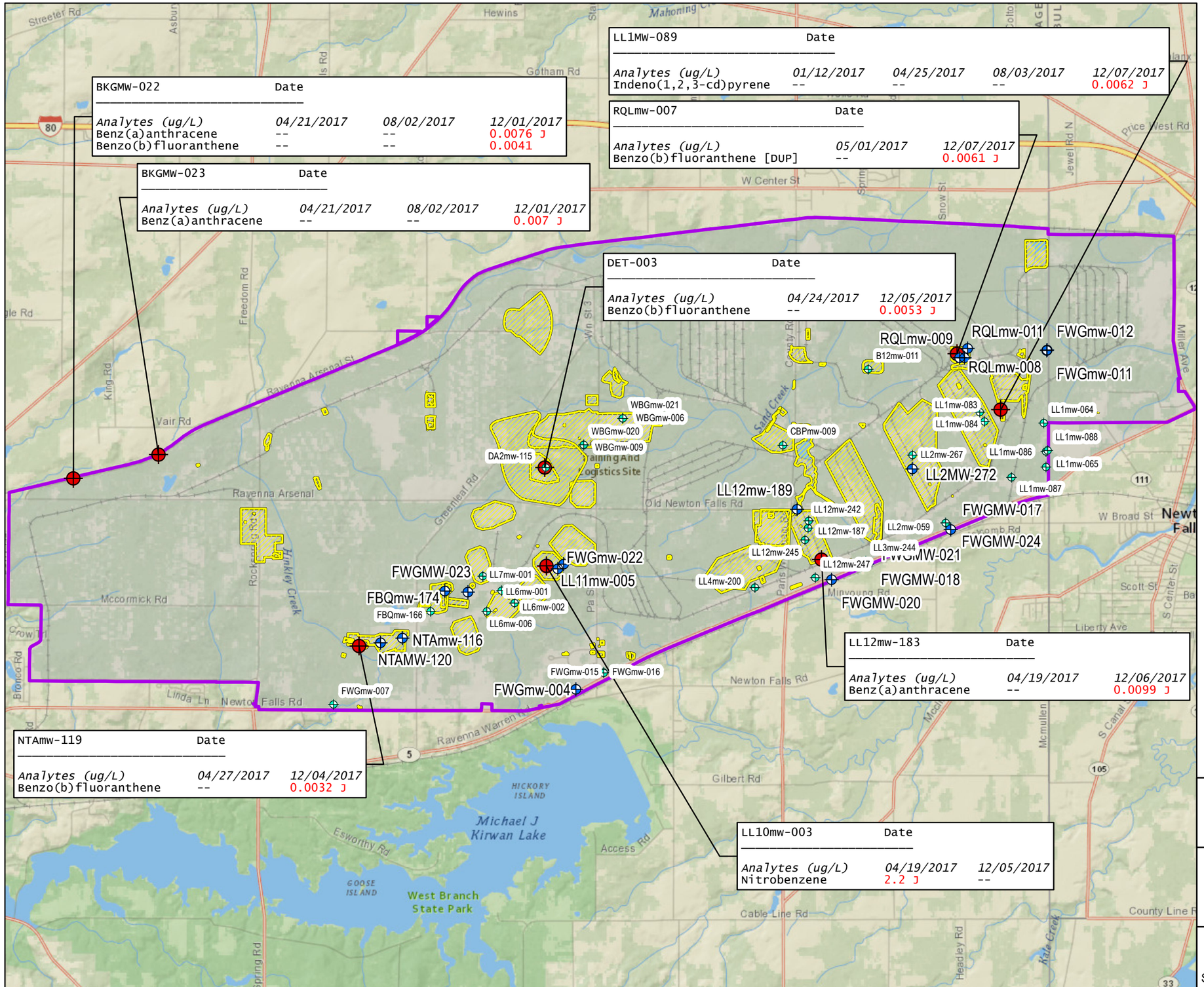
TEC-Weston Joint Venture

EXCEEDANCES - VOCS
2017 - SHALLOW AQUIFERS
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-1

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_4-01_UZ_Exceeds_VOCs_2017AR_Draft_rev2.mxd, 02/26/2018 10:07:19 AM, liua



BKGMW-022	Date		
Analytes (ug/L)	04/21/2017	08/02/2017	12/01/2017
Benz(a)anthracene	--	--	0.0076 J
Benzo(b)fluoranthene	--	--	0.0041

BKGMW-023	Date		
Analytes (ug/L)	04/21/2017	08/02/2017	12/01/2017
Benz(a)anthracene	--	--	0.007 J

LL1MW-089	Date			
Analytes (ug/L)	01/12/2017	04/25/2017	08/03/2017	12/07/2017
Indeno(1,2,3-cd)pyrene	--	--	--	0.0062 J

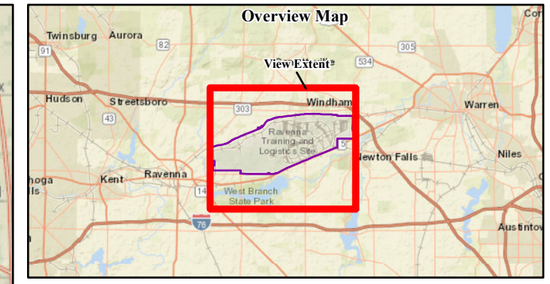
RQLmw-007	Date	
Analytes (ug/L)	05/01/2017	12/07/2017
Benzo(b)fluoranthene [DUP]	--	0.0061 J

DET-003	Date	
Analytes (ug/L)	04/24/2017	12/05/2017
Benzo(b)fluoranthene	--	0.0053 J

LL12mw-183	Date	
Analytes (ug/L)	04/19/2017	12/06/2017
Benz(a)anthracene	--	0.0099 J

NTAmw-119	Date	
Analytes (ug/L)	04/27/2017	12/04/2017
Benzo(b)fluoranthene	--	0.0032 J

LL10mw-003	Date	
Analytes (ug/L)	04/19/2017	12/05/2017
Nitrobenzene	2.2 J	--



Legend

- 2016 Groundwater Sample Location with SVOCs Results Greater than Site Specific Screening Levels
- 2016 Groundwater Sample Location with All SVOCs Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with SVOC Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
- Only results exceeding site specfic screening levels are shown
- Shallow Aquifers = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
- -- analyte not detected, limit of detection above screening level
- ug/l = micrograms per liter
- J = estimated result
- SVOCs = semi-volatile organic compounds
- Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

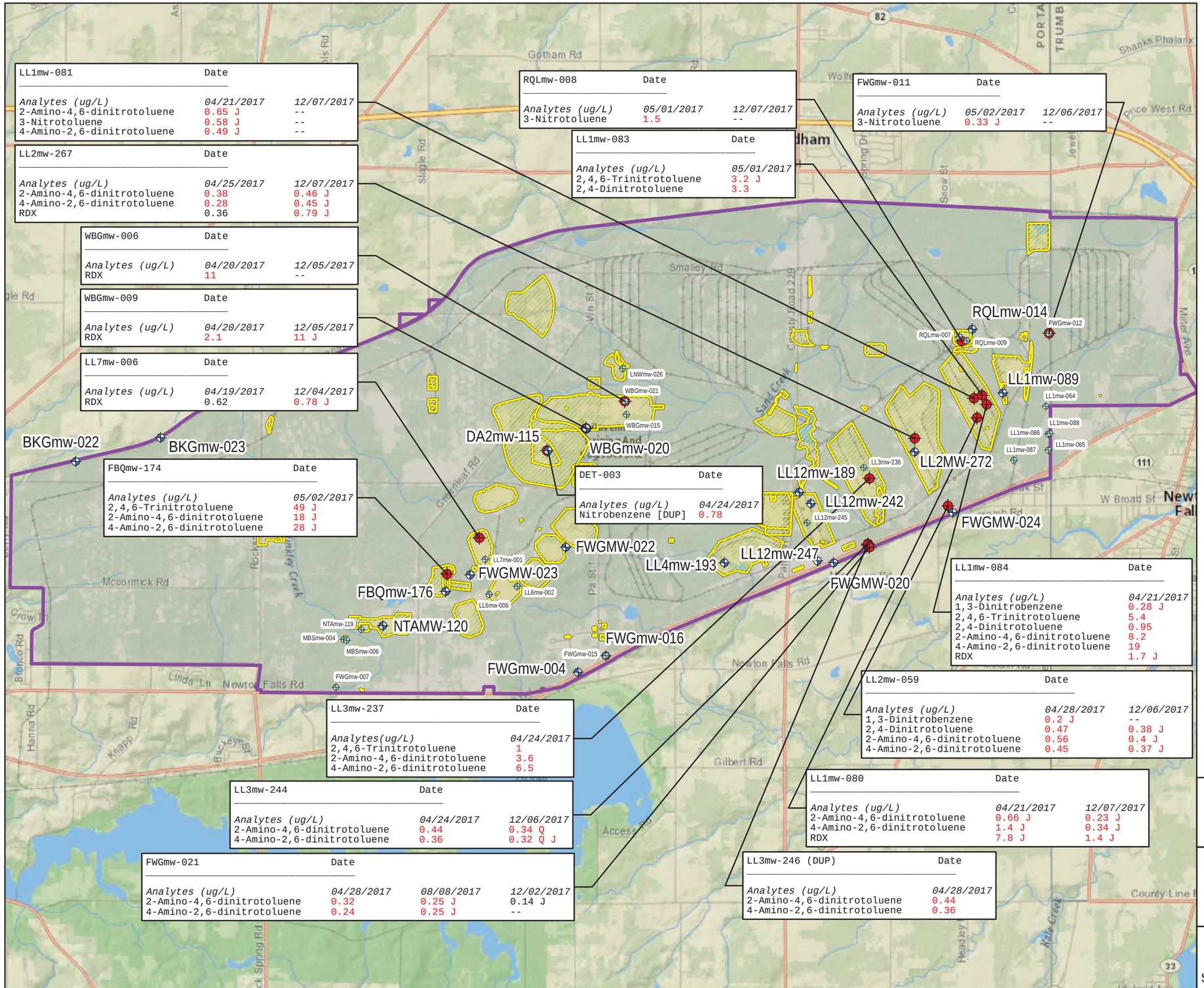
TEC-Weston Joint Venture

EXCEEDANCES - SVOCS
2017 - SHALLOW AQUIFERS
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-2

DRAFT

Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_4-02_UZ_Exceeds_SVOCs_2017AR_Draft_rev2.mxd, 02/26/2018 11:52:44 AM, liua



LL1mw-081	Date	
Analytes (ug/L)	*04/21/2017*	*12/07/2017*
2-Amino-4,6-dinitrotoluene	0.65 J	--
3-Nitrotoluene	0.58 J	--
4-Amino-2,6-dinitrotoluene	0.49 J	--

LL2mw-267	Date	
Analytes (ug/L)	*04/25/2017*	*12/07/2017*
2-Amino-4,6-dinitrotoluene	0.38	0.46 J
4-Amino-2,6-dinitrotoluene	0.28	0.45 J
RDX	0.36	0.79 J

WBGmw-006	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
RDX	11	--

WBGmw-009	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
RDX	2.1	11 J

LL7mw-006	Date	
Analytes (ug/L)	*04/19/2017*	*12/04/2017*
RDX	0.62	0.78 J

FBQmw-174	Date
Analytes (ug/L)	*05/02/2017*
2,4,6-Trinitrotoluene	49 J
2-Amino-4,6-dinitrotoluene	18 J
4-Amino-2,6-dinitrotoluene	28 J

RQLmw-008	Date	
Analytes (ug/L)	*05/01/2017*	*12/07/2017*
3-Nitrotoluene	1.5	--

LL1mw-083	Date
Analytes (ug/L)	*05/01/2017*
2,4,6-Trinitrotoluene	3.2 J
2,4-Dinitrotoluene	3.3

FWGmw-011	Date	
Analytes (ug/L)	*05/02/2017*	*12/06/2017*
3-Nitrotoluene	0.33 J	--

LL3mw-237	Date
Analytes(ug/L)	*04/24/2017*
2,4,6-Trinitrotoluene	1
2-Amino-4,6-dinitrotoluene	3.6
4-Amino-2,6-dinitrotoluene	6.5

LL3mw-244	Date	
Analytes (ug/L)	*04/24/2017*	*12/06/2017*
2-Amino-4,6-dinitrotoluene	0.44	0.34 Q
4-Amino-2,6-dinitrotoluene	0.36	0.32 Q J

FWGmw-021	Date		
Analytes (ug/L)	*04/28/2017*	*08/08/2017*	*12/02/2017*
2-Amino-4,6-dinitrotoluene	0.32	0.25 J	0.14 J
4-Amino-2,6-dinitrotoluene	0.24	0.25 J	--

LL1mw-084	Date
Analytes (ug/L)	*04/21/2017*
1,3-Dinitrobenzene	0.28 J
2,4,6-Trinitrotoluene	5.4
2,4-Dinitrotoluene	0.95
2-Amino-4,6-dinitrotoluene	8.2
4-Amino-2,6-dinitrotoluene	19
RDX	1.7 J

LL2mw-059	Date	
Analytes (ug/L)	*04/28/2017*	*12/06/2017*
1,3-Dinitrobenzene	0.2 J	--
2,4-Dinitrotoluene	0.47	0.38 J
2-Amino-4,6-dinitrotoluene	0.56	0.4 J
4-Amino-2,6-dinitrotoluene	0.45	0.37 J

LL1mw-080	Date	
Analytes (ug/L)	*04/21/2017*	*12/07/2017*
2-Amino-4,6-dinitrotoluene	0.66 J	0.23 J
4-Amino-2,6-dinitrotoluene	1.4 J	0.34 J
RDX	7.8 J	1.4 J

LL3mw-246 (DUP)	Date
Analytes (ug/L)	*04/28/2017*
2-Amino-4,6-dinitrotoluene	0.44
4-Amino-2,6-dinitrotoluene	0.36

Legend

- 2017 Groundwater Sample Location with Explosives Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All Explosives Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with Explosive Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
- Only results exceeding site specfic screening levels are shown
- Shallow Aquifers = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
-- analyte not detected, limit of detection above screening level
- ug/l = micrograms per liter
- J = estimated result
- Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

EXCEEDANCES - EXPLOSIVES
2017 - SHALLOW AQUIFERS
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-3

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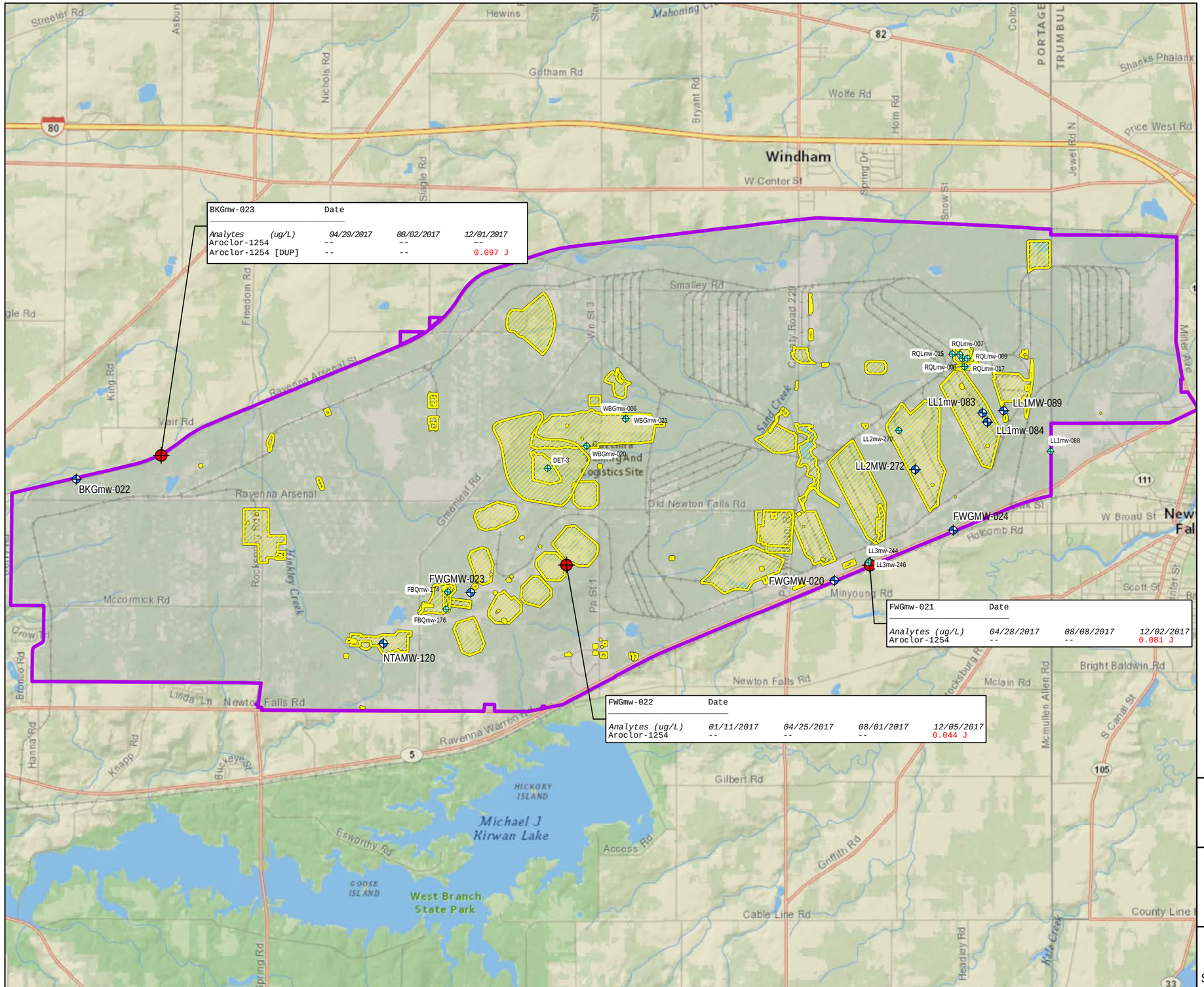
Path: C:\gis\GIS_Project_Files\15363_NGB\Ravenna\GIS\MXDs\Annual_Reports\2017_GW_Final\Fig_4-03_UZ_Exceeds_Explosives_2017AR_Draft_rev2.mxd, 02/26/2018 10:48:13 AM, liua



Legend

- 2017 Groundwater Sample Location with Pesticides/PCBs Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All Pesticides/PCBs Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with Pesticides/PCBs Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
- Only results exceeding site specfic screening levels are shown
- Shallow Aquifers = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
-- analyte not detected, limit of detection above screening level
- ug/l = micrograms per liter
- J = estimated result
- PCBs = polychlorinated biphenyls
- Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

EXCEEDANCES - PESTICIDES/PCBS
2017 - SHALLOW AQUIFERS
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-4

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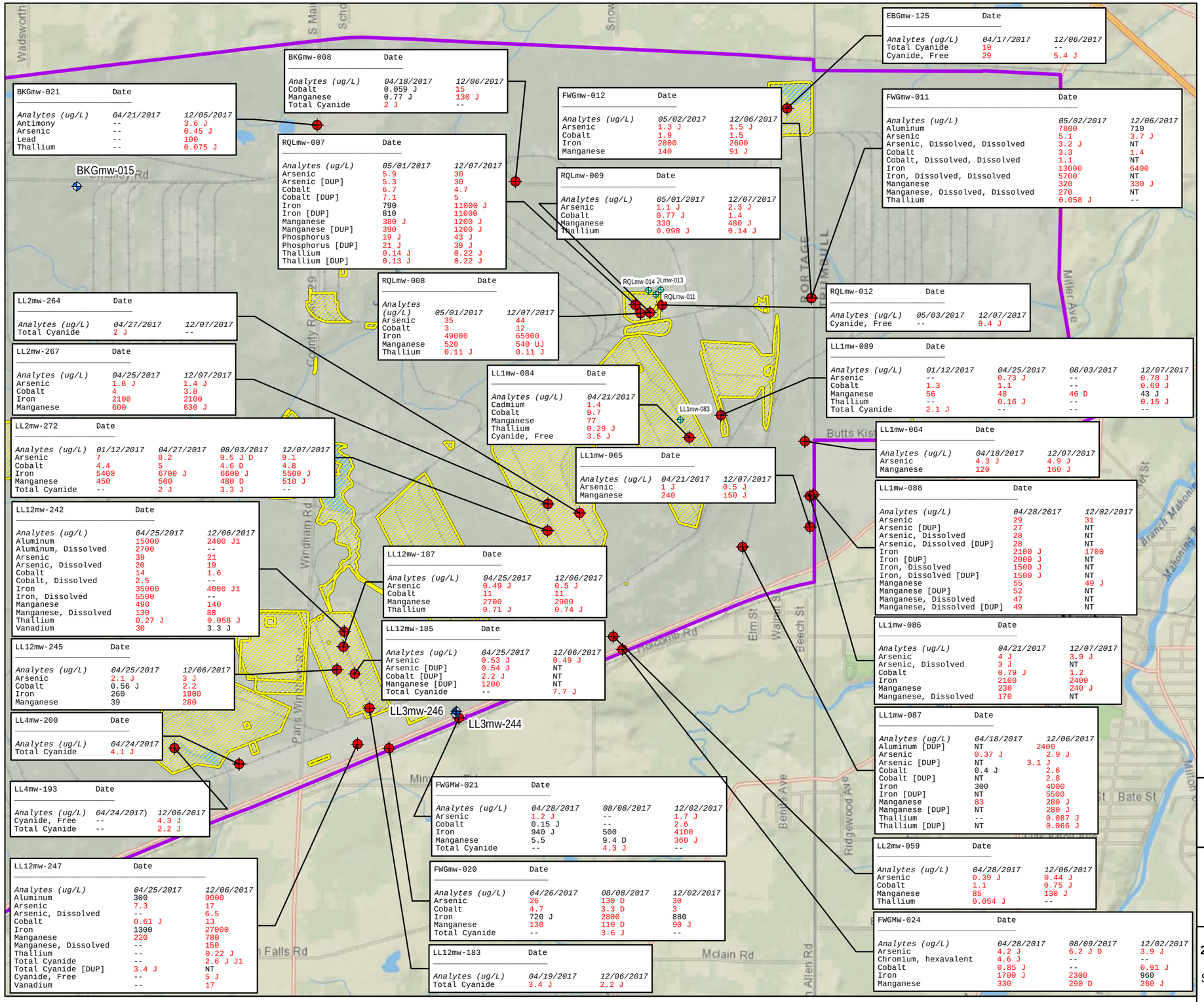

BKGmw-021	Date	
Analytes (ug/L)	*04/21/2017*	*12/05/2017*
Antimony	--	3.6 J
Arsenic	--	0.45 J
Lead	--	100
Thallium	--	0.075 J

BKGmw-008	Date	
Analytes (ug/L)	*04/18/2017*	*12/06/2017*
Cobalt	0.059 J	15
Manganese	0.77 J	130 J
Total Cyanide	2 J	--

RQLmw-007	Date	
Analytes (ug/L)	*05/01/2017*	*12/07/2017*
Arsenic	5.9	30
Arsenic [DUP]	5.3	30
Cobalt	6.7	4.7
Cobalt [DUP]	7.1	5
Iron	790	11000 J
Iron [DUP]	810	11000
Manganese	380 J	1200 J
Manganese [DUP]	390	1200 J
Phosphorus	19 J	43 J
Phosphorus [DUP]	21 J	39 J
Thallium	0.14 J	0.22 J
Thallium [DUP]	0.13 J	0.22 J

FWGmw-012	Date	
Analytes (ug/L)	*05/02/2017*	*12/06/2017*
Arsenic	1.3 J	1.5 J
Cobalt	1.9	1.5
Iron	2800	2600
Manganese	140	91 J

RQLmw-009	Date	
Analytes (ug/L)	*05/01/2017*	*12/07/2017*
Arsenic	1.1 J	2.3 J
Cobalt	0.77 J	1.4
Manganese	330	480 J
Thallium	0.098 J	0.14 J

RQLmw-008	Date	
Analytes (ug/L)	*05/01/2017*	*12/07/2017*
Arsenic	35	44
Cobalt	3	12
Iron	49000	65000
Manganese	520	540 UJ
Thallium	0.11 J	0.11 J

LL2mw-264	Date	
Analytes (ug/L)	*04/27/2017*	*12/07/2017*
Total Cyanide	2 J	--

LL2mw-267	Date	
Analytes (ug/L)	*04/25/2017*	*12/07/2017*
Arsenic	1.8 J	1.4 J
Cobalt	4	3.8
Iron	2100	2100
Manganese	600	630 J

LL2mw-272	Date			
Analytes (ug/L)	*01/12/2017*	*04/27/2017*	*08/03/2017*	*12/07/2017*
Arsenic	7	8.2	9.5 J D	9.1
Cobalt	4.4	5	4.6 D	4.8
Iron	5400	6700 J	6600 J	5500 J
Manganese	450	500	480 D	510 J
Total Cyanide	--	2 J	3.3 J	--

LL12mw-242	Date	
Analytes (ug/L)	*04/25/2017*	*12/06/2017*
Aluminum	15000	2400 J1
Aluminum, Dissolved	2700	--
Arsenic	39	21
Arsenic, Dissolved	20	19
Cobalt	14	1.6
Cobalt, Dissolved	2.5	--
Iron	35000	4000 J1
Iron, Dissolved	5500	--
Manganese	490	140
Manganese, Dissolved	130	88
Thallium	0.27 J	0.058 J
Vanadium	30	3.3 J

LL12mw-245	Date	
Analytes (ug/L)	*04/25/2017*	*12/06/2017*
Arsenic	2.1 J	3 J
Cobalt	0.56 J	2.2
Iron	260	1900
Manganese	39	280

LL4mw-200	Date
Analytes (ug/L)	*04/24/2017*
Total Cyanide	4.1 J

LL4mw-193	Date	
Analytes (ug/L)	*04/24/2017)*	*12/06/2017*
Cyanide, Free	--	4.3 J
Total Cyanide	--	2.2 J

LL12mw-247	Date	
Analytes (ug/L)	*04/25/2017*	*12/06/2017*
Aluminum	300	9000
Arsenic	7.3	17
Arsenic, Dissolved	--	6.5
Cobalt	0.61 J	13
Iron	1300	27000
Manganese	220	780
Manganese, Dissolved	--	150
Thallium	--	0.22 J
Total Cyanide	--	2.6 J J1
Total Cyanide [DUP]	3.4 J	NT
Cyanide, Free	--	5 J
Vanadium	--	17

LL1mw-084	Date
Analytes (ug/L)	*04/21/2017*
Cadmium	1.4
Cobalt	9.7
Manganese	77
Thallium	0.29 J
Cyanide, Free	3.5 J

LL1mw-065	Date	
Analytes (ug/L)	*04/21/2017*	*12/07/2017*
Arsenic	1 J	0.5 J
Manganese	240	150 J

LL12mw-187	Date	
Analytes (ug/L)	*04/25/2017*	*12/06/2017*
Arsenic	0.49 J	0.5 J
Cobalt	11	11
Manganese	2700	2900
Thallium	0.71 J	0.74 J

LL12mw-185	Date	
Analytes (ug/L)	*04/25/2017*	*12/06/2017*
Arsenic	0.53 J	0.49 J
Arsenic [DUP]	0.54 J	NT
Cobalt [DUP]	2.2 J	NT
Manganese [DUP]	1200	NT
Total Cyanide	--	7.7 J

FWGMW-021	Date		
Analytes (ug/L)	*04/28/2017*	*08/08/2017*	*12/02/2017*
Arsenic	1.2 J	--	1.7 J
Cobalt	0.15 J	--	2.6
Iron	940 J	500	4100
Manganese	5.5	9.4 D	360 J
Total Cyanide	--	4.3 J	--

FWGmw-020	Date		
Analytes (ug/L)	*04/26/2017*	*08/08/2017*	*12/02/2017*
Arsenic	26	130 D	30
Cobalt	4.7	3.3 D	3
Iron	720 J	2800	880
Manganese	130	110 D	90 J
Total Cyanide	--	3.6 J	--

LL12mw-183	Date	
Analytes (ug/L)	*04/19/2017*	*12/06/2017*
Total Cyanide	3.4 J	2.2 J

EBGmw-125	Date	
Analytes (ug/L)	*04/17/2017*	*12/06/2017*
Total Cyanide	19	--
Cyanide, Free	29	5.4 J

FWGmw-011	Date	
Analytes (ug/L)	*05/02/2017*	*12/06/2017*
Aluminum	7800	710
Arsenic	5.1	3.7 J
Arsenic, Dissolved, Dissolved	3.2 J	NT
Cobalt	3.3	1.4
Cobalt, Dissolved, Dissolved	1.1	NT
Iron	13000	6400
Iron, Dissolved, Dissolved	5700	NT
Manganese	320	330 J
Manganese, Dissolved, Dissolved	270	NT
Thallium	0.058 J	--

RQLmw-012	Date	
Analytes (ug/L)	*05/03/2017*	*12/07/2017*
Cyanide, Free	--	9.4 J

LL1mw-089	Date			
Analytes (ug/L)	*01/12/2017*	*04/25/2017*	*08/03/2017*	*12/07/2017*
Arsenic	--	0.73 J	--	0.78 J
Cobalt	1.3	1.1	--	0.69 J
Manganese	56	48	46 D	43 J
Thallium	--	0.16 J	--	0.15 J
Total Cyanide	2.1 J	--	--	--

LL1mw-064	Date	
Analytes (ug/L)	*04/18/2017*	*12/07/2017*
Arsenic	4.3 J	4.9 J
Manganese	120	160 J

LL1mw-088	Date	
Analytes (ug/L)	*04/28/2017*	*12/02/2017*
Arsenic	29	31
Arsenic [DUP]	27	NT
Arsenic, Dissolved	28	NT
Arsenic, Dissolved [DUP]	28	NT
Iron	2100 J	1700
Iron [DUP]	2000 J	NT
Iron, Dissolved	1500 J	NT
Iron, Dissolved [DUP]	1500 J	NT
Manganese	55	49 J
Manganese [DUP]	52	NT
Manganese, Dissolved	47	NT
Manganese, Dissolved [DUP]	49	NT

LL1mw-086	Date	
Analytes (ug/L)	*04/21/2017*	*12/07/2017*
Arsenic	4 J	3.9 J
Arsenic, Dissolved	3 J	NT
Cobalt	0.79 J	1.2
Iron	2100	2400
Manganese	230	240 J
Manganese, Dissolved	170	NT

LL1mw-087	Date	
Analytes (ug/L)	*04/18/2017*	*12/06/2017*
Aluminum [DUP]	NT	2400
Arsenic	0.37 J	2.9 J
Arsenic [DUP]	NT	3.1 J
Cobalt	0.4 J	2.6
Cobalt [DUP]	NT	2.8
Iron	300	4000
Iron [DUP]	NT	5500
Manganese	83	280 J
Manganese [DUP]	NT	280 J
Thallium	--	0.087 J
Thallium [DUP]	NT	0.066 J

LL2mw-059	Date	
Analytes (ug/L)	*04/28/2017*	*12/06/2017*
Arsenic	0.39 J	0.44 J
Cobalt	1.1	0.75 J
Manganese	85	130 J
Thallium	0.054 J	--

FWGMW-024	Date		
Analytes (ug/L)	*04/28/2017*	*08/09/2017*	*12/02/2017*
Arsenic	4.2 J	6.2 J D	3.9 J
Chromium, hexavalent	4.6 J	--	--
Cobalt	0.85 J	--	0.91 J
Iron	1700 J	2300	960
Manganese	330	290 D	260 J

Legend

- 2017 Groundwater Sample Location with Inorganics Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All Inorganics Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with Inorganics Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
Results in RED exceed site specfic screening levels
Upper Aquifer = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
ug/l = micrograms per liter
-- analyte not detected, limit of detection above screening level
D = The reported value is from a dilution
J = estimated result
NT - not tested
Basemap Source: ESRI Map Service - National Geographic World Map

N

0 1,250 2,500 3,750 5,000 Feet

1:30,590
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

EXCEEDANCES - INORGANICS
2017-SHALLOW AQUIFERS (EAST PORTION)
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-5

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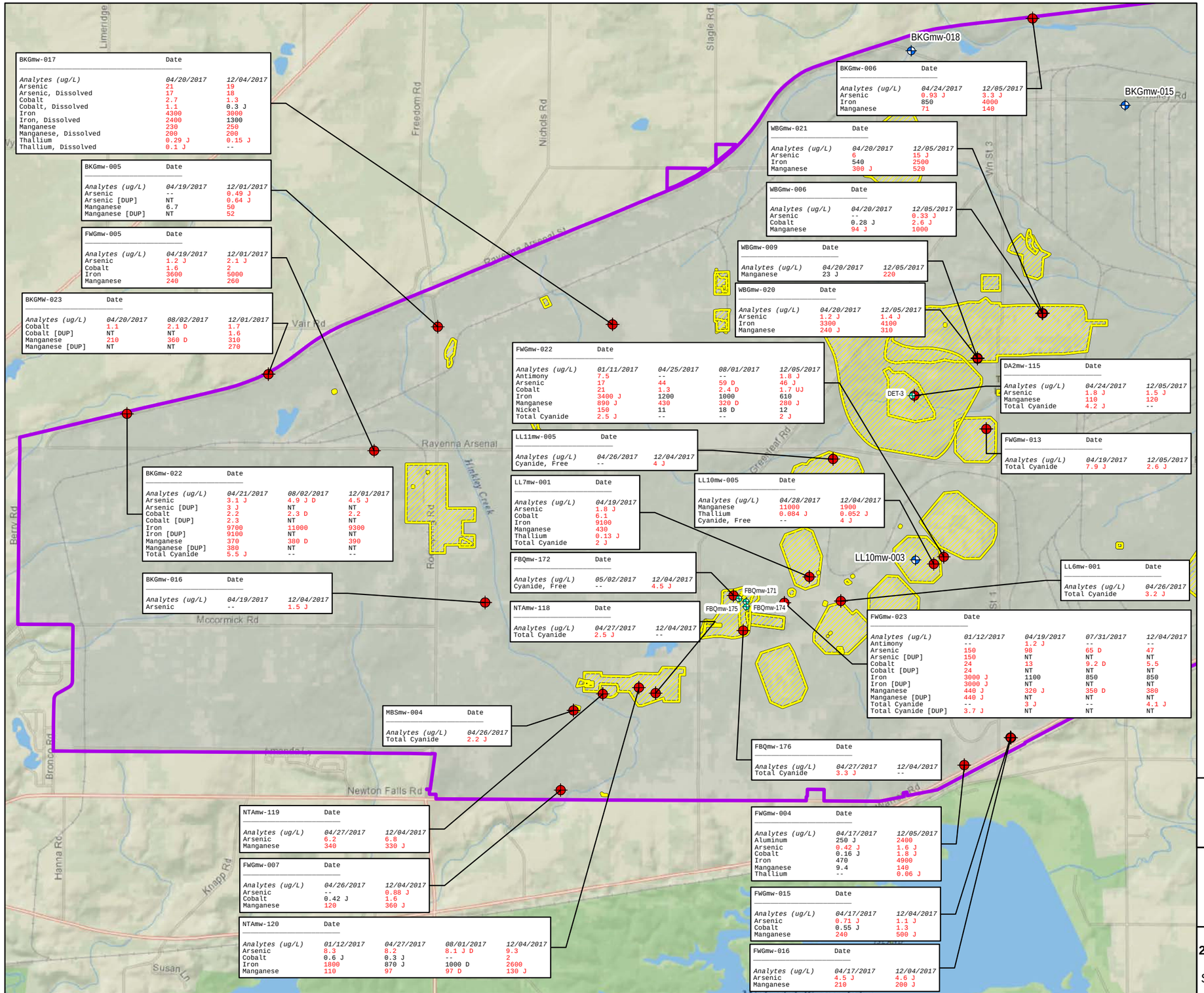


BKGmw-017	Date	
Analytes (ug/L)	*04/20/2017*	*12/04/2017*
Arsenic	21	19
Arsenic, Dissolved	17	18
Cobalt	2.7	1.3
Cobalt, Dissolved	1.1	0.3 J
Iron	4300	3000
Iron, Dissolved	2400	1300
Manganese	230	250
Manganese, Dissolved	200	200
Thallium	0.29 J	0.15 J
Thallium, Dissolved	0.1 J	--

BKGmw-005	Date	
Analytes (ug/L)	*04/19/2017*	*12/01/2017*
Arsenic	--	0.49 J
Arsenic [DUP]	NT	0.64 J
Manganese	6.7	50
Manganese [DUP]	NT	52

FWGmw-005	Date	
Analytes (ug/L)	*04/19/2017*	*12/01/2017*
Arsenic	1.2 J	2.1 J
Cobalt	1.6	2
Iron	3600	5000
Manganese	240	260

BKGMW-023	Date		
Analytes (ug/L)	*04/20/2017*	*08/02/2017*	*12/01/2017*
Cobalt	1.1	2.1 D	1.7
Cobalt [DUP]	NT	NT	1.6
Manganese	210	360 D	310
Manganese [DUP]	NT	NT	270

BKGmw-022	Date		
Analytes (ug/L)	*04/21/2017*	*08/02/2017*	*12/01/2017*
Arsenic	3.1 J	4.9 J D	4.5 J
Arsenic [DUP]	3 J	NT	NT
Cobalt	2.2	2.3 D	2.2
Cobalt [DUP]	2.3	NT	NT
Iron	9700	11000	9300
Iron [DUP]	9100	NT	NT
Manganese	370	380 D	390
Manganese [DUP]	380	NT	NT
Total Cyanide	5.5 J	--	--

BKGmw-016	Date	
Analytes (ug/L)	*04/19/2017*	*12/04/2017*
Arsenic	--	1.5 J

MBSmw-004	Date
Analytes (ug/L)	*04/26/2017*
Total Cyanide	2.2 J

NTAmw-119	Date	
Analytes (ug/L)	*04/27/2017*	*12/04/2017*
Arsenic	6.2	6.8
Manganese	340	330 J

FWGmw-007	Date	
Analytes (ug/L)	*04/26/2017*	*12/04/2017*
Arsenic	--	0.88 J
Cobalt	0.42 J	1.6
Manganese	120	360 J

NTAmw-120	Date			
Analytes (ug/L)	*01/12/2017*	*04/27/2017*	*08/01/2017*	*12/04/2017*
Arsenic	8.3	8.2	8.1 J D	9.3
Cobalt	0.6 J	0.3 J	--	2
Iron	1800	870 J	1000 D	2600
Manganese	110	97	97 D	130 J

BKGmw-006	Date	
Analytes (ug/L)	*04/24/2017*	*12/05/2017*
Arsenic	0.93 J	3.3 J
Iron	850	4000
Manganese	71	140

WBGmw-021	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
Arsenic	6	15 J
Iron	540	2500
Manganese	300 J	520

WBGmw-006	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
Arsenic	--	0.33 J
Cobalt	0.28 J	2.6 J
Manganese	94 J	1000

WBGmw-009	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
Manganese	23 J	220

WBGmw-020	Date	
Analytes (ug/L)	*04/20/2017*	*12/05/2017*
Arsenic	1.2 J	1.4 J
Iron	3300	4100
Manganese	240 J	310

FWGmw-022	Date			
Analytes (ug/L)	*01/11/2017*	*04/25/2017*	*08/01/2017*	*12/05/2017*
Antimony	7.5	--	--	1.8 J
Arsenic	17	44	59 D	46 J
Cobalt	21	1.3	2.4 D	1.7 UJ
Iron	3400 J	1200	1000	610
Manganese	890 J	430	320 D	280 J
Nickel	150	11	18 D	12
Total Cyanide	2.5 J	--	--	2 J

DA2mw-115	Date	
Analytes (ug/L)	*04/24/2017*	*12/05/2017*
Arsenic	1.8 J	1.5 J
Manganese	110	120
Total Cyanide	4.2 J	--

FWGmw-013	Date	
Analytes (ug/L)	*04/19/2017*	*12/05/2017*
Total Cyanide	7.9 J	2.6 J

LL11mw-005	Date	
Analytes (ug/L)	*04/26/2017*	*12/04/2017*
Cyanide, Free	--	4 J

LL7mw-001	Date
Analytes (ug/L)	*04/19/2017*
Arsenic	1.8 J
Cobalt	6.1
Iron	9100
Manganese	430
Thallium	0.13 J
Total Cyanide	2 J

LL10mw-005	Date	
Analytes (ug/L)	*04/28/2017*	*12/04/2017*
Manganese	11000	1900
Thallium	0.084 J	0.052 J
Cyanide, Free	--	4 J

FBQmw-172	Date	
Analytes (ug/L)	*05/02/2017*	*12/04/2017*
Cyanide, Free	--	4.5 J

NTAmw-118	Date	
Analytes (ug/L)	*04/27/2017*	*12/04/2017*
Total Cyanide	2.5 J	--

LL6mw-001	Date
Analytes (ug/L)	*04/26/2017*
Total Cyanide	3.2 J

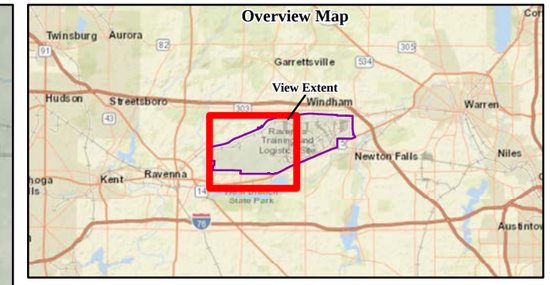
FWGmw-023	Date			
Analytes (ug/L)	*01/12/2017*	*04/19/2017*	*07/31/2017*	*12/04/2017*
Antimony	--	1.2 J	--	--
Arsenic	150	98	65 D	47
Arsenic [DUP]	150	NT	NT	NT
Cobalt	24	13	9.2 D	5.5
Cobalt [DUP]	24	NT	NT	NT
Iron	3000 J	1100	850	850
Iron [DUP]	3000 J	NT	NT	NT
Manganese	440 J	320 J	350 D	380
Manganese [DUP]	440 J	NT	NT	NT
Total Cyanide	--	3 J	--	4.1 J
Total Cyanide [DUP]	3.7 J	NT	NT	NT

FBQmw-176	Date	
Analytes (ug/L)	*04/27/2017*	*12/04/2017*
Total Cyanide	3.3 J	--

FWGmw-004	Date	
Analytes (ug/L)	*04/17/2017*	*12/05/2017*
Aluminum	250 J	2400
Arsenic	0.42 J	1.6 J
Cobalt	0.16 J	1.8 J
Iron	470	4900
Manganese	9.4	140
Thallium	--	0.06 J

FWGmw-015	Date	
Analytes (ug/L)	*04/17/2017*	*12/04/2017*
Arsenic	0.71 J	1.1 J
Cobalt	0.55 J	1.3
Manganese	240	500 J

FWGmw-016	Date	
Analytes (ug/L)	*04/17/2017*	*12/04/2017*
Arsenic	4.5 J	4.6 J
Manganese	210	200 J



Legend

- 2017 Groundwater Sample Location with Inorganics Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All Inorganics Results Below Site Specific Screening Levels
- 2017 Groundwater Sample Location with Inorganics Results all Non-detect
- AOCs
- Camp Ravenna Property Line

Notes:
Results in RED exceed site specfic screening levels
Upper Aquifer = Unconsolidated, Homewood, Upper Sharon Sandstone and Sharon Shale Units
ug/l = micrograms per liter
-- analyte not detected, limit of detection above screening level
D = reported value is from a dilution
J = estimated result
NT = not tested
Basemap Source: ESRI Map Service - National Geographic World Map

N

0 1,250 2,500 3,750 5,000 Feet

1:36,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

EXCEEDANCES - INORGANICS
2017-SHALLOW AQUIFERS (WEST PORTION)
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-6

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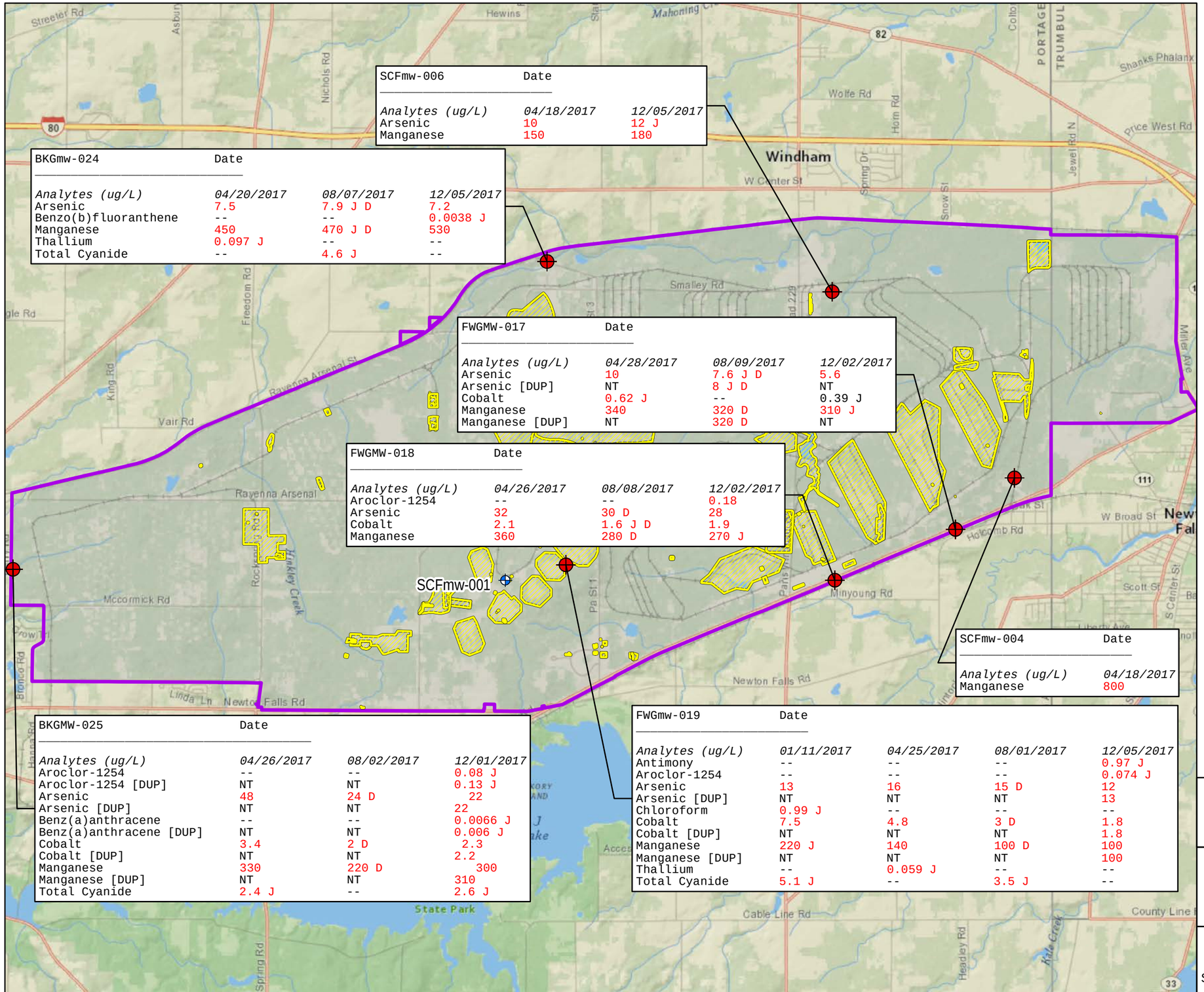

SCFmw-006

Analytes (ug/L)	04/18/2017	12/05/2017
Arsenic	10	12 J
Manganese	150	180

BKGmw-024

Analytes (ug/L)	04/20/2017	08/07/2017	12/05/2017
Arsenic	7.5	7.9 J D	7.2
Benzo(b)fluoranthene	--	--	0.0038 J
Manganese	450	470 J D	530
Thallium	0.097 J	--	--
Total Cyanide	--	4.6 J	--

FWGMW-017

Analytes (ug/L)	04/28/2017	08/09/2017	12/02/2017
Arsenic	10	7.6 J D	5.6
Arsenic [DUP]	NT	8 J D	NT
Cobalt	0.62 J	--	0.39 J
Manganese	340	320 D	310 J
Manganese [DUP]	NT	320 D	NT

FWGMW-018

Analytes (ug/L)	04/26/2017	08/08/2017	12/02/2017
Aroclor-1254	--	--	0.18
Arsenic	32	30 D	28
Cobalt	2.1	1.6 J D	1.9
Manganese	360	280 D	270 J

SCFmw-004

Analytes (ug/L)	04/18/2017
Manganese	800

BKGMW-025

Analytes (ug/L)	04/26/2017	08/02/2017	12/01/2017
Aroclor-1254	--	--	0.08 J
Aroclor-1254 [DUP]	NT	NT	0.13 J
Arsenic	48	24 D	22
Arsenic [DUP]	NT	NT	22
Benz(a)anthracene	--	--	0.0066 J
Benz(a)anthracene [DUP]	NT	NT	0.006 J
Cobalt	3.4	2 D	2.3
Cobalt [DUP]	NT	NT	2.2
Manganese	330	220 D	300
Manganese [DUP]	NT	NT	310
Total Cyanide	2.4 J	--	2.6 J

FWGmw-019

Analytes (ug/L)	01/11/2017	04/25/2017	08/01/2017	12/05/2017
Antimony	--	--	--	0.97 J
Aroclor-1254	--	--	--	0.074 J
Arsenic	13	16	15 D	12
Arsenic [DUP]	NT	NT	NT	13
Chloroform	0.99 J	--	--	--
Cobalt	7.5	4.8	3 D	1.8
Cobalt [DUP]	NT	NT	NT	1.8
Manganese	220 J	140	100 D	100
Manganese [DUP]	NT	NT	NT	100
Thallium	--	0.059 J	--	--
Total Cyanide	5.1 J	--	3.5 J	--

Legend

- 2017 Groundwater Sample Location with Inorganics Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with All Inorganics Results Below Site Specific Screening Levels
- AOCs
- Camp Ravenna Property Line

Notes:
- Only results exceeding site specfic screening levels are shown
-- Analyte not sampled or not detected
- ug/l = micrograms per liter
- D = The reported value is from a dilution
- J = estimated result
NT = not tested
- Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

EXCEEDANCES
2017 - BASAL SHARON CONGLOMERATE
Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-7

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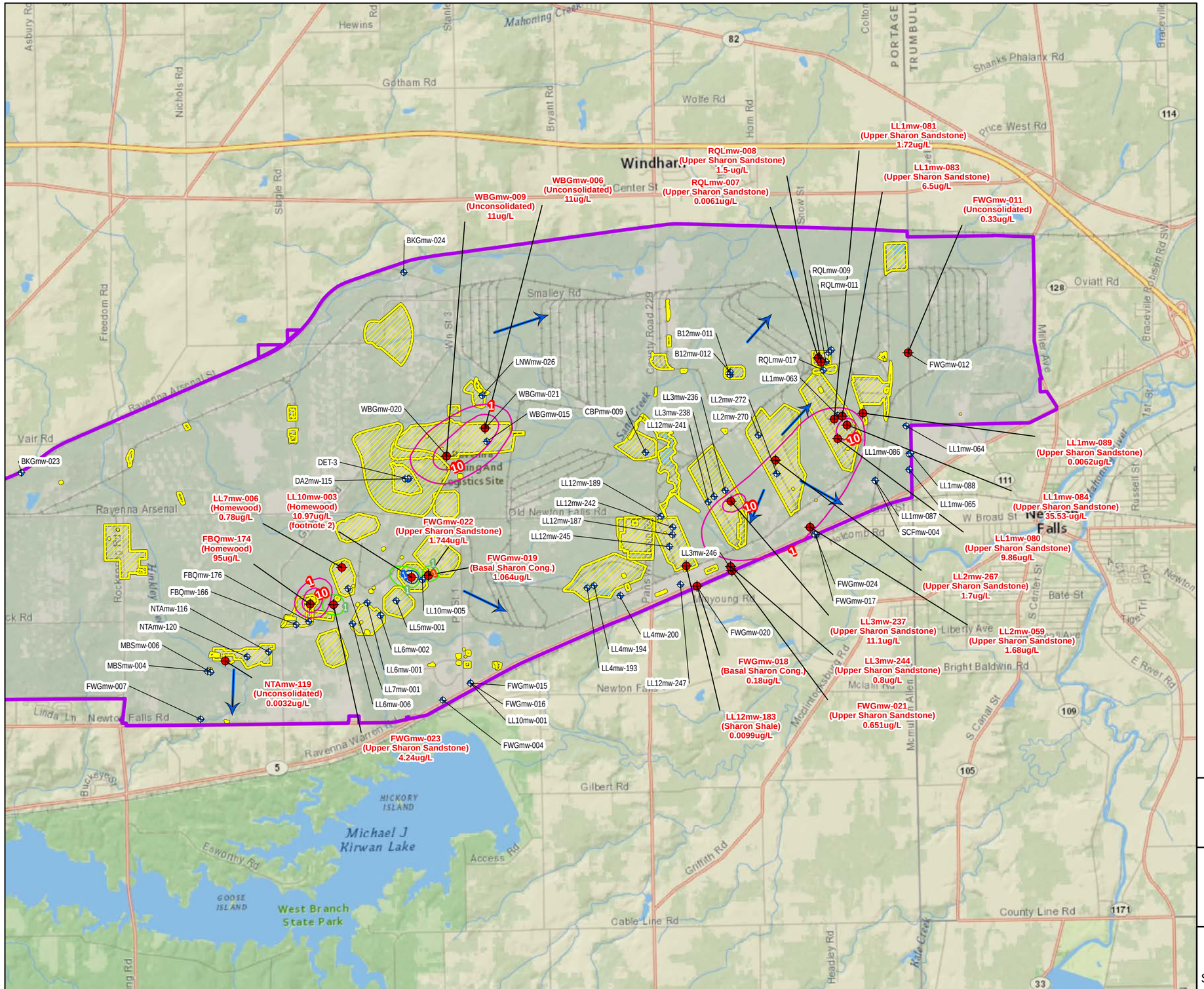

Legend

- 2017 Groundwater Sample Location with Organic Results Greater than Site Specific Screening Levels
- 2017 Groundwater Sample Location with Organic Results below Site Specific Screening Levels
- Combination of Explosives and/or Propellants Isoconcentration Contours (ug/L)
- VOC and/or PCBs Isoconcentration Contours (ug/L)
- SVOC Isoconcentration Contours (ug/L)
- Basal Sharon Conglomerate Isoconcentration Contours (ug/L)
- Generalized Groundwater Flow Direction
- AOCs
- Camp Ravenna Property Line

Notes:

1. The isocontours shown are based on the sum of the maximum individual result concentrations of the detected explosive, propellant, VOC, and/or SVOC constituents detected in 2017. The rounded sum is presented for each well, which, in 2017, was found to have an exceedance of an explosive, propellant, VOC, SVOC, or PCB screening criteria. Isocontours represent ug/L.
2. The combined contaminant mass over screening levels at well LL10mw-003 is 10.97 ug/L, however contours have been prepared dividing results into VOC and SVOC totals which are both less than 10 ug/L.
3. Only 1 and 10 ug/L isoconcentration contours are shown.

- ug/l = micrograms per liter

Basemap Source: ESRI Map Service - National Geographic World Map

N

0 2,500 5,000 7,500 10,000 Feet

1:60,000
NAD83 UTM Zone 17N

TEC-Weston Joint Venture

2017 EXTENT OF EXCEEDANCES ORGANICS

Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater
Former Ravenna Army Ammunition Plant
Ravenna, Ohio

Figure: 4-8

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TABLES

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Table 1-1
2017 Groundwater Analytes by Well

WELL ID	VOCs	SVOCs				PCBs	Explosives/ Propellants	Pesticides	Cyanide	Metals	Hexavalent Chromium	Nitrate	Other
		Nitro-aromatics	Phthalates	Phenols	PAHs								
B12mw-011 [4]			X		X								
BKGmw-005										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-006										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-008									X	X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-015										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-016										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-017										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-018										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-021										X	X	X [10]	Alkalinity/Anions/Cations
BKGmw-022 [2]	X	X	X	X	X	X	X	X	X	X	X	X [9,10]	Alkalinity/Anions/Cations; Perchlorate
BKGmw-023 [2]	X [11]	X	X	X	X	X	X	X	X	X	X	X [9,10]	Alkalinity/Anions/Cations; Perchlorate
BKGmw-024 [2]	X	X	X	X	X	X	X	X	X	X	X	X [9,10]	Alkalinity [9]/Anions [9]/Cations; Perchlorate
BKGmw-025 [2]	X [11]	X	X	X	X	X	X	X	X	X	X [9]	X [9,10]	Alkalinity [9]/Anions [9]/Cations; Perchlorate
CBPmw-008									X				
CBPmw-009			X [10]						X				
DA2mw-115			X				X		X	X			
DET-003	X [8]	X	X	X	X	X	X	X	X	X			
EBGmw-125									X				
EBGmw-131									X				
FBQmw-166 [4]			X						X				
FBQmw-171									X		X	X [10]	Alkalinity/Anions [8]/Cations
FBQmw-172									X				
FBQmw-174 [4]			X				X	X			X	X	Alkalinity/Anions/Cations
FBQmw-175											X	X [10]	Alkalinity/Anions [8]/Cations
FBQmw-176							X [8]	X [10]	X				
FWGmw-002													Alkalinity
FWGmw-004			X				X			X			
FWGmw-005										X	X	X [10]	Alkalinity/Anions/Cations
FWGmw-007			X				X			X			
FWGmw-010									X				
FWGmw-011			X				X			X			
FWGmw-012			X				X			X			
FWGmw-013									X				
FWGmw-015			X				X			X			
FWGmw-016			X				X			X			
FWGmw-017 [2]	X	X	X	X	X	X	X	X	X	X	X [9]		Perchlorate
FWGmw-018 [2]	X	X	X	X	X	X	X	X	X	X	X [9]		Perchlorate
FWGmw-019 [1]	X	X [7]	X	X	X	X	X	X	X	X	X [7,9]		Perchlorate [7]
FWGmw-020 [2]	X	X	X	X	X	X	X	X	X	X	X [9]		Perchlorate

Table 1-1
2017 Groundwater Analytes by Well

WELL ID	VOCs	SVOCs				PCBs	Explosives/ Propellants	Pesticides	Cyanide	Metals	Hexavalent Chromium	Nitrate	Other
		Nitro-aromatics	Phthalates	Phenols	PAHs								
FWGmw-021 [2]	X	X	X	X	X	X	X	X	X	X	X [9]		Perchlorate
FWGmw-022 [1]	X	X [7]	X	X	X	X	X	X	X	X	X [7,9]		Perchlorate [7]
FWGmw-023 [1]	X	X	X	X	X	X	X	X	X	X	X		Perchlorate [7]
FWGmw-024 [2]	X	X [10]	X	X [10]	X	X	X	X	X	X	X		Perchlorate
LL1mw-064			X				X			X			
LL1mw-065			X				X			X			
LL1mw-080							X						
LL1mw-081							X		X				
LL1mw-083 [4]			X				X	X			X	X	Alkalinity/Anions/Cations
LL1mw-084 [4]			X			X	X	X	X	X	X	X	Alkalinity/Anions/Cations
LL1mw-086			X				X			X			Alkalinity
LL1mw-087			X				X			X			
LL1mw-088			X				X	X		X			Alkalinity
LL1mw-089 [1]	X	X [7]	X	X	X	X	X	X	X	X	X [7,9]		Alkalinity [7,8,9]; Perchlorate [7]
LL2mw-059			X				X			X			
LL2mw-264									X				
LL2mw-267			X				X			X			
LL2mw-270 [4]						X							
LL2mw-272 [1]	X	X [7]	X	X	X	X	X	X	X	X	X [7,9]		Perchlorate [7]
LL3mw-234									X				
LL3mw-236 [4]							X		X				
LL3mw-237							X						
LL3mw-244 [6]			X [7]			X [8,10]	X [7]	X [7]		X [7]	X [7]		
LL3mw-246 [6]			X [7]			X [8,10]	X [7]			X [7]			Perchlorate [7]
LL4mw-193							X [10]		X				
LL4mw-200 [4]					X				X				
LL5mw-001 [4]	X												
LL6mw-001 [4]			X						X				
LL6mw-002 [4]		X	X	X	X		X		X				
LL6mw-006 [4]			X				X		X				
LL7mw-001 [4]	X		X				X		X	X			
LL7mw-006							X						
LL10mw-003	X	X	X							X			
LL10mw-005	X	X	X	X	X				X	X			
LL11mw-005									X				
LL12mw-183					X				X				
LL12mw-185									X	X [10]		X	
LL12mw-187			X							X		X	
LL12mw-189 [4]					X		X		X				

Table 1-1
2017 Groundwater Analytes by Well

WELL ID	VOCs	SVOCs				PCBs	Explosives/ Propellants	Pesticides	Cyanide	Metals	Hexavalent Chromium	Nitrate	Other
		Nitro-aromatics	Phthalates	Phenols	PAHs								
LL12mw-242			X				X			X		X	
LL12mw-245			X				X			X		X	
LL12mw-247			X				X		X	X	X	X	
LNWmw-026 [4]							X						
MBSmw-004 [4]							X		X				
MBSmw-006 [4]							X		X				
NTAmw-116 [4]					X								
NTAmw-117									X				
NTAmw-118									X				
NTAmw-119	X	X	X		X		X			X			
NTAmw-120 [1]	X	X [7]	X	X	X	X	X	X	X	X	X [7,9]		Perchlorate [7]
RQLmw-007	X		X	X	X	X	X	X	X	X			Phosphorous
RQLmw-008	X		X	X	X	X	X	X	X	X			
RQLmw-009 [6]	X [7]		X [7]	X [7]	X [7]	X	X [7]	X [7]	X [7]	X [7]			
RQLmw-011		X	X	X	X						X	X [10]	Alkalinity/Anions [8]/Cations
RQLmw-012									X		X	X [10]	Alkalinity/Anions [8]/Cations
RQLmw-013											X	X [10]	Alkalinity/Anions [8]/Cations
RQLmw-014							X				X	X [10]	Alkalinity/Anions/Cations
RQLmw-015 [3]						X							
RQLmw-016									X				
RQLmw-017 [4]						X							
SCFmw-001 [3]	X	X	X	X	X	X	X		X				
SCFmw-004 [4]			X				X	X		X			
SCFmw-006										X	X	X [10]	Alkalinity/Anions/Cations
WBGmw-006 [6]			X [7]			X [10]	X [7]			X [7]			
WBGmw-009			X				X			X			
WBGmw-015 [5]	X						X		X				
WBGmw-020 [6]			X [7]			X [10]	X [7]			X [7]			
WBGmw-021 [6]			X [7]			X [10]	X [7]			X [7]			

Notes:
1 - Wells installed in 2016 as part of the Facility-Wide Groundwater Remedial Investigation and sampled in January, April/May, July/August, and December 2017.
Hexavalent chromium, nitroguanidine, nitrocellulose, and perchlorate were not sampled in January 2017 at these wells.
2 - Wells installed in 2016 as part of the Facility-Wide Groundwater Remedial Investigation and sampled in April/May, July/August, and December 2017.
3 - Wells installed prior to 2016 and sampled in January 2017 only.
4 - Wells installed prior to 2016 and sampled in April/May 2017 only.
5 - Wells installed prior to 2016 and sampled in January and April/May 2017 only.
6 - Wells installed prior to 2016 and sampled in January, April/May, and December 2017 only.
7 - Constituent group not tested for in January 2017
8 - Constituent group not tested for in April/May 2017
9 - Constituent group not tested for in July/August 2017
10 - Constituent group not tested for in December 2017
11 - Methylene Chloride not tested for in August 2017

Table 2-1
Well Construction Details, Groundwater Elevations, and Depth to Bottom Measurements

RVAAP Area	Well ID	Ohio State Plane Easting	Ohio State Plane Northing	Ground Elevation (ft, AMSL)	Total Drilled Depth (ft, BGS)	TOC Elevation (ft, AMSL)	Well Head Type[1]	Monitored Zone	Top of Screen (ft, BGS)	Bottom of Screen (ft, BGS)	Bottom of Inner Casing Plug or End Cap (ft, BGS)	Stickup height (ft, AGS)	Reported Bottom of Inner Casing (ft, BTOC)	Depth to Water - January 2017 (ft, BTOC)	Groundwater Elevation - January 2017 (ft, AMSL)	Depth to Water - April 2017 (ft, BTOC)	Groundwater Elevation - April 2017 (ft, AMSL)	Measured Bottom of Inner Casing - April 2017 (ft, BTOC)	Sediment Accumulation - April 2017 (ft)	Description of Bottom	Depth to Water - July 2017 (ft, BTOC)	Groundwater Elevation - July 2017 (ft, AMSL)	Depth to Water - December 2017 (ft, BTOC)	Groundwater Elevation - December 2017 (ft, AMSL)
Atlas Scrap Yard	ASYmw-001	2366260.85	558404.04	978.40	22.0	981.13	A	Sharon	11.0	21.0	21.0	2.73	23.73	NM	NM	12.11	969.02	23.19	0.54	Hard	NM	NM	NM	NM
	ASYmw-002	2366170.86	557887.86	982.00	20.0	985.24	A	Sharon	10.0	19.5	19.5	3.24	22.74	NM	NM	15.78	969.46	22.97	0.00	Soft	NM	NM	NM	NM
	ASYmw-003	2366651.49	558015.94	979.70	21.5	982.21	A	Sharon	11.0	21.0	21.0	2.51	23.51	NM	NM	13.27	968.94	23.54	0.00	Soft	NM	NM	NM	NM
	ASYmw-004	2367166.04	557640.81	977.10	27.8	979.66	A	Sharon	17.0	27.0	27.0	2.56	29.56	NM	NM	10.39	969.27	NM[4]	--	--	NM	NM	NM	NM
	ASYmw-005	2367448.16	557783.01	977.60	25.0	979.80	A	Sharon	14.0	24.0	24.0	2.20	26.20	NM	NM	9.12	970.68	NM[4]	--	--	NM	NM	NM	NM
	ASYmw-006	2366746.73	557257.72	980.20	27.0	983.01	A	Sharon	16.0	26.0	26.0	2.81	28.81	NM	NM	14.96	968.05	29.0	0.00	Hard	NM	NM	NM	NM
	ASYmw-007	2366834.49	556818.08	981.40	28.0	984.16	A	Unconsolidated	16.0	26.0	26.0	2.76	28.76	NM	NM	16.34	967.82	29.0	0.00	Soft	NM	NM	NM	NM
	ASYmw-008	2367475.07	557087.66	976.20	26.0	978.85	A	Unconsolidated	15.0	25.0	25.0	2.65	27.65	NM	NM	6.17	972.68	27.2	0.41	Soft	NM	NM	NM	NM
	ASYmw-009	2366631.94	557603.68	979.90	22.0	982.70	A	Sharon	11.5	21.5	21.5	2.80	24.30	NM	NM	13.62	969.08	24.3	0.02	Soft	NM	NM	NM	NM
	ASYmw-010	2366985.37	557270.61	978.20	28.0	981.05	A	Unconsolidated	17.0	27.0	27.0	2.85	29.85	NM	NM	13.23	967.82	NM[4]	--	--	NM	NM	NM	NM
Building 1200-Dilution/Settling Pond	B12mw-010	2371292.81	565827.43	1,002.72	21.0	1,005.92	A	Sharon	10.0	20.0	20.0	3.20	23.20	NM	NM	17.99	987.93	22.95	0.25	Hard	NM	NM	NM	NM
	B12mw-011	2371416.15	565687.82	1,003.76	24.7	1,006.70	A	Sharon	14.0	24.0	24.0	2.94	26.94	NM	NM	NM[3]	NM[3]	NM[4]	--	--	NM	NM	NM	NM
	B12mw-012	2371430.41	565828.01	1,003.43	22.3	1,006.32	A	Sharon	12.0	22.0	22.0	2.89	24.89	NM	NM	NM[3]	NM[3]	NM[4]	--	--	NM	NM	NM[3]	NM
	B12mw-013	2371221.00	565904.00	1,001.80	22	1,004.48	A	Sharon	11.5	21.5	21.8	2.68	24.48	NM	NM	22.34	982.14	24.28	0.20	Hard	NM	NM	NM	NM
Background	BKGmw-004	2368852.97	569464.76	965.16	19.5	967.66	A	Unconsolidated	9.2	19.2	19.5	2.50	22.00	NM	NM	13.03	954.63	NM[4]	--	--	NM	NM	NM	NM
	BKGmw-005	2340835.86	562288.45	1,149.44	19.0	1,151.94	A	Unconsolidated	8.2	18.2	18.5	2.50	21.00	NM	NM	10.59	1141.35	NM[4]	--	--	NM	NM	15.35	1136.59
	BKGmw-006	2358643.96	571910.47	1,026.38	35.1	1,028.88	A	Sharon	24.7	34.7	35.1	2.50	37.60	NM	NM	23.81	1005.07	NM[4]	--	--	NM	NM	25.33	1003.55
	BKGmw-008	2372741.08	569654.23	970.40	25.0	972.90	A	Sharon	14.7	24.7	25.0	2.50	27.50	NM	NM	17.94	954.96	NM[4]	--	--	NM	NM	21.00	951.9
	BKGmw-010	2371372.86	565540.54	1,003.80	22.0	1,006.18	A	Sharon	8.9	18.9	19.2	2.38	21.58	NM	NM	15.62	990.56	22.08	0.00	Hard	NM	NM	NM	NM
	BKGmw-012	2367795.23	563918.86	997.57	59.8	1,000.07	A	Sharon	38.6	59.6	59.8	2.50	62.30	NM	NM	8.85	991.22	62.56	0.00	Hard	NM	NM	NM	NM
	BKGmw-013	2361627.39	558269.16	986.59	25.5	989.09	A	Unconsolidated	15.2	25.2	25.5	2.50	28.00	NM	NM	12.11	976.98	28.0	0.00	Soft	NM	NM	NM	NM
	BKGmw-015	2361482.22	569339.87	1,037.90	51.0	1,040.40	A	Sharon	30.1	50.1	50.4	2.50	52.90	NM	NM	48.69	991.71	NM[4]	--	--	NM	NM	NM[3]	NM
	BKGmw-016	2342407.08	553983.50	1,098.42	19.0	1,100.92	A	Unconsolidated	8.4	18.5	18.6	2.50	21.10	NM	NM	5.85	1095.07	NM[4]	--	--	NM	NM	8.22	1092.7
	BKGmw-017	2346115.35	562452.04	1,132.80	34.8	1,135.30	A	Unconsolidated	23.2	33.3	33.6	2.50	36.10	NM	NM	17.42	1117.88	NM[4]	--	--	NM	NM	21.63	1113.67
	BKGmw-018	2354993.91	570873.35	1,043.06	24.7	1,045.56	A	Sharon	14.5	24.5	24.7	2.50	27.20	NM	NM	15.76	1029.80	NM[4]	--	--	NM	NM	16.86	1028.7
	BKGmw-019	2349882.14	559864.55	1,108.24	34.0	1,110.74	A	Unconsolidated	23.0	33.0	33.2	2.50	35.70	NM	NM	21.84	1088.90	35.69	0.01	Soft	NM	NM	NM	NM
	BKGmw-020	2357856.24	558756.24	1,065.00	30.7	1,067.50	A	Unconsolidated	20.5	30.5	30.7	2.50	33.20	NM	NM	7.89	1059.61	33.32	0.00	Hard	NM	NM	NM	NM
	BKGmw-021	2367622.95	571016.75	972.16	19.0	974.66	A	Unconsolidated	7.7	17.8	18.1	2.50	20.60	NM	NM	13.16	961.50	NM[4]	--	--	NM	NM	NM[3]	NM
	BKGmw-022	559378.40	2331517.26	1164.62	38.00	1167.32	A	Homewood	27.5	37.5	37.5	2.50	40.00	NM	NM	14.00	1153.32	NM[4]	--	--	15.90	1151.42	15.80	1151.521
	BKGmw-023	560638.87	2335771.51	1181.07	44.00	1183.62	A	Homewood	33.5	43.5	43.5	2.70	46.20	NM	NM	5.13	1178.49	NM[4]	--	--	6.71	1176.91	8.70	1174.923
	BKGmw-024	570728.76	2355029.69	1041.19	164.00	1043.78	A	Sharon Cong.	146.3	156.3	156.3	2.55	158.85	NM	NM	10.74	1033.04	NM[4]	--	--	10.82	1032.96	11.82	1031.957
	BKGmw-025	554845.62	2328408.97	1107.99	282.50	1110.60	A	Sharon Cong.	267.0	277.0	277.0	2.59	279.59	NM	NM	41.98	1068.62	NM[4]	--	--	43.35	1067.25	43.10	1067.504
C-Block Quarry	CBLmw-001	2343657.08	559403.12	1,178.50	50.0	1,181.08	A	Homewood	39.0	49.0	49.0	2.58	51.58	NM	NM	44.48	1136.60	NM[4]	--	--	NM	NM	NM	NM
	CBLmw-002	2343845.22	559044.48	1,172.50	45.3	1,175.24	A	Homewood	34.5	44.5	44.5	2.74	47.24	NM	NM	39.16	1136.08	NM[4]	--	--	NM	NM	NM	NM
	CBLmw-003	2343970.00	559695.52	1,172.22	44.0	1,175.06	A	Homewood	33.0	43.0	43.0	2.84	45.84	NM	NM	36.10	1138.96	NM[4]	--	--	NM	NM	NM	NM
	CBLmw-004	2343688.76	559951.58	1,172.08	45.0	1,174.84	A	Homewood	34.0	44.0	44.0	2.76	46.76	NM	NM	36.60	1138.24	NM[4]	--	--	NM	NM	NM	NM
	CBLmw-005	2344572.00	558686.00	1,155.60	31.0	1,158.10	A	Homewood	22.0	30.0	30.3	2.50	32.80	NM	NM	26.08	1132.02	32.37	0.43	Soft	NM	NM	NM	NM
Central Burn Pits	CBPmw-001	2367095.37	561616.01	972.71	32.3	975.84	A	Unconsolidated	21.8	31.8	31.8	3.13	34.93	NM	NM	14.67	961.17	NM[4]	--	--	NM	NM	NM	NM
	CBPmw-002	2367295.66	561865.83	967.33	30.0	970.04	A	Unconsolidated	19.5	29.5	29.5	2.71	32.21	NM	NM	10.72	959.32	NM[4]	--	--	NM	NM	NM	NM
	CBPmw-003	2366768.68	561944.14	972.04	25.0	974.67	A	Unconsolidated	14.5	24.5	24.5	2.63	27.13	NM	NM	12.66	962.01	30.26	0.00	Soft	NM	NM	NM	NM
	CBPmw-004	2366978.80	562123.80	968.58	27.5	971.13	A	Unconsolidated	17.0	27.0	27.0	2.55	29.55	NM	NM	11.01	960.12	NM[4]	--	--	NM	NM	NM	NM
	CBPmw-005	2366919.66	562311.88	968.83	25.0	971.59	A	Unconsolidated	14.5	24.5	24.5	2.76	27.26	NM	NM	12.26	959.33	27.49	0.00	Soft	NM	NM	NM	NM
	CBPmw-006	2367243.68	562311.87	965.01	23.0	967.64	A	Unconsolidated	12.5	22.5	22.5	2.63	25.13	NM	NM	8.09	959.55	NM[4]	--	--	NM	NM	NM	NM
	CBPmw-007	2366512.62	562006.41	973.47	30.0	976.37	A	Unconsolidated	19.5	29.5	29.5	2.90	32.40	NM	NM	16.39	959.98	31.98	0.42	Soft	NM	NM	NM	NM
	CBPmw-008	2366757.21	562668.84	970.57	25.5	973.19	A	Unconsolidated	15.0	25.0	25.0	2.62	27.62	NM	NM	16.29	956.90	NM[4]	--	--	NM	NM	19.51	953.68
	CBPmw-009	2367174.00	561797.00	969.90	65	972.48	A	Sharon	54.0	64.0	64.3	2.58	66.88	NM	NM	10.52	961.96	NM[4]	--	--	NM	NM	13.49	958.99
Upper and Lower Cobbs Ponds	CPmw-001	2368948.81	560440.91	975.46	16.0	975.26	F	Unconsolidated	5.5	15.5	15.5	N/A	15.50	NM	NM	1.01	974.25	NM[4]	--	--	NM	NM	NM	NM
	CPmw-002	2368239.23	560311.26	972.72	16.0	972.31	F	Unconsolidated	5.5	15.5	15.5	N/A	15.50	NM	NM	0.00	972.31	15.08	0.42	Soft	NM	NM	NM	NM
	CPmw-003	2368796.49	560676.30	973.27	18.5	972.92	F	Unconsolidated	8.0	18.0	18.0	N/A	18.00	NM	NM	0.75	972.17	NM[4]	--	--	NM	NM	NM	NM
	CPmw-004	2368674.31	561843.46	978.51	20.0	981.20	A	Unconsolidated	9.5	19.5	19.5	2.69	22.19	NM	NM	9.53	971.67	22.64	0.00	Hard	NM	NM	NM	NM
	CPmw-005	2367900.41	561846.78	970.71	40.0	973.58	A	Unconsolidated	29.5	39.5	39.5	2.87	42.37	NM	NM	11.40	962.18	43.33	0.00	Hard	NM	NM	NM	NM
	CPmw-006	2367727.13	562830.13	962.97	18.5	965.13	A	Unconsolidated	8.0	18.0	18.0	2.16	20.16	NM	NM	7.85	957.28	NM[4]	--	--	NM	NM	NM	NM

Table 2-1
Well Construction Details, Groundwater Elevations, and Depth to Bottom Measurements

RVAAP Area	Well ID	Ohio State Plane Easting	Ohio State Plane Northing	Ground Elevation (ft, AMSL)	Total Drilled Depth (ft, BGS)	TOC Elevation (ft, AMSL)	Well Head Type[1]	Monitored Zone	Top of Screen (ft, BGS)	Bottom of Screen (ft, BGS)	Bottom of Inner Casing Plug or End Cap (ft, BGS)	Stickup height (ft, AGS)	Reported Bottom of Inner Casing (ft, BTOC)	Depth to Water - January 2017 (ft, BTOC)	Groundwater Elevation - January 2017 (ft, AMSL)	Depth to Water - April 2017 (ft, BTOC)	Groundwater Elevation - April 2017 (ft, AMSL)	Measured Bottom of Inner Casing - April 2017 (ft, BTOC)	Sediment Accumulation - April 2017 (ft)	Description of Bottom	Depth to Water - July 2017 (ft, BTOC)	Groundwater Elevation - July 2017 (ft, AMSL)	Depth to Water - December 2017 (ft, BTOC)	Groundwater Elevation - December 2017 (ft, AMSL)
Open Demolition Area #2	DA2mw-104	2354773.79	561129.59	1,070.82	27.0	1,073.89	A	Unconsolidated	16.3	26.3	26.5	3.07	29.57	NM	NM	22.33	1051.56	NM[4]	--	--	NM	NM	NM	NM
	DA2mw-105	2354557.62	560572.58	1,042.66	14.0	1,045.34	A	Unconsolidated	8.3	13.3	13.5	2.68	16.18	NM	NM	3.29	1042.05	NM[4]	--	--	NM	NM	NM	NM
	DA2mw-106	2354848.85	560560.49	1,041.19	16.0	1,043.79	A	Unconsolidated	8.3	15.3	15.5	2.60	18.10	NM	NM	4.39	1039.40	16.89	1.21	Hard	NM	NM	NM	NM
	DA2mw-107	2354924.29	560480.05	1,039.18	15.0	1,041.63	A	Unconsolidated	8.8	13.8	14.0	2.45	16.45	NM	NM	7.75	1033.88	NM[4]	--	--	NM	NM	NM	NM
	DA2mw-108	2355604.43	560181.78	1,029.92	15.0	1,032.36	A	Unconsolidated	9.3	14.3	14.5	2.44	16.94	NM	NM	6.20	1026.16	NM[4]	--	--	NM	NM	NM	NM
	DA2mw-109	2354793.14	559897.89	1,068.66	24.0	1,071.29	A	Unconsolidated	11.3	21.3	21.5	2.63	24.13	NM	NM	13.76	1057.53	24.64	0.00	Soft	NM	NM	NM	NM
	DA2mw-110	2355195.91	559927.02	1,061.39	20.0	1,063.78	A	Unconsolidated	9.3	19.3	19.5	2.39	21.89	NM	NM	7.17	1056.61	22.44	0.00	Soft	NM	NM	NM	NM
	DA2mw-111	2354728.33	560222.94	1,039.63	12.6	1,042.12	A	Unconsolidated	7.1	12.1	12.3	2.49	14.79	NM	NM	6.67	1035.45	14.87	0.00	Hard	NM	NM	NM	NM
	DA2mw-112	2355018.98	560378.36	1,034.87	15.0	1,037.44	A	Unconsolidated	8.8	13.8	14.0	2.57	16.57	NM	NM	7.02	1030.42	17.14	0.00	Hard	NM	NM	NM	NM
	DA2mw-113	2355153.13	560394.81	1,034.51	14.0	1,037.11	A	Unconsolidated	8.3	13.3	13.5	2.60	16.10	NM	NM	6.79	1030.32	16.40	0.00	Hard	NM	NM	NM	NM
	DA2mw-114	2355785.00	560109.00	1,029.50	19.5	1,031.90	A	Sharon Shale	9.16	19.16	19.46	2.40	21.86	NM	NM	5.06	1026.84	21.87	0.00	Soft	NM	NM	NM	NM
	DA2mw-115	2355269.00	560459.00	1,035.40	44.0	1,038.08	A	Sharon	33.75	43.75	44.05	2.68	46.73	NM	NM	6.31	1031.77	NM[4]	--	--	NM	NM	7.80	1030.28
	DETmw-001B	2354959.47	560820.03	1,064.35	39.0	1,065.85	A	Unconsolidated	34.0	39.0	39.0	1.50	40.50	NM	NM	23.39	1042.46	38.61	1.89	Hard	NM	NM	NM	NM
	DETmw-002	2355360.33	560664.71	1,060.24	39.0	1,061.24	A	Unconsolidated	34.0	39.0	39.0	1.00	40.00	NM	NM	31.98	1029.26	42.02	0.00	Soft	NM	NM	NM	NM
	DETmw-003	2355204.94	560456.10	1,035.81	15.0	1,036.81	A	Unconsolidated	7.0	12.0	12.0	1.00	13.00	NM	NM	8.86	1027.95	NM[4]	--	--	NM	NM	9.57	1027.24
	DETmw-004	2355072.36	560454.22	1,037.68	11.0	1,038.68	A	Unconsolidated	6.0	11.0	11.0	1.00	12.00	NM	NM	9.89	1028.79	NM[4]	--	--	NM	NM	NM[3]	NM
Erie Burning Grounds	EBGmw-123	2380049.21	571747.04	945.59	32.0	947.82	A	Unconsolidated	21.0	31.0	31.5	2.23	33.73	NM	NM	10.06	937.76	NM[4]	--	--	NM	NM	NM	NM
	EBGmw-124	2380030.24	571618.07	939.02	32.0	941.39	A	Unconsolidated	20.0	30.0	30.5	2.37	32.87	NM	NM	3.91	937.48	32.63	0.24	Hard	NM	NM	NM	NM
	EBGmw-125	2379679.20	571655.63	947.55	25.0	949.89	A	Unconsolidated	14.0	24.0	24.5	2.34	26.84	NM	NM	12.72	937.17	NM[4]	--	--	NM	NM	13.48	936.41
	EBGmw-126	2380307.31	572348.81	938.20	28.0	940.61	A	Unconsolidated	15.2	25.2	25.5	2.41	27.91	NM	NM	0.81	939.80	NM[4]	--	--	NM	NM	NM	NM
	EBGmw-127	2380172.16	571083.61	940.21	30.0	943.07	A	Unconsolidated	19.0	29.0	29.5	2.86	32.36	NM	NM	4.22	938.85	32.88	0.00	Hard	NM	NM	NM	NM
	EBGmw-128	2379892.79	570970.32	942.47	28.0	945.13	A	Unconsolidated	15.0	25.0	25.3	2.66	27.96	NM	NM	6.92	938.21	NM[4]	--	--	NM	NM	NM	NM
	EBGmw-129	2379240.52	572035.68	941.97	29.0	944.36	A	Unconsolidated	16.0	26.0	26.0	2.39	28.39	NM	NM	5.04	939.32	30.99	0.00	Hard	NM	NM	NM	NM
	EBGmw-130	2379220.69	570695.61	941.18	26.0	944.00	A	Unconsolidated	15.2	25.2	25.5	2.82	28.32	NM	NM	6.45	937.55	28.48	0.00	Hard	NM	NM	NM	NM
	EBGmw-131	2379666.00	571655.00	947.50	71.0	950.08	A	Sharon	60.5	70.5	70.8	2.58	73.38	NM	NM	9.04	941.04	NM[4]	--	--	NM	NM	12.30	937.78
Fuze and Booster Quarry Landfill/Ponds	FBQmw-166	2349584.33	553123.86	1,104.87	16.0	1,108.86	A	Unconsolidated	5.5	15.5	15.5	3.99	19.49	NM	NM	4.69	1104.17	NM[4]	--	--	NM	NM	NM	NM
	FBQmw-167	2349675.45	553556.12	1,112.05	18.0	1,115.90	A	Unconsolidated	5.0	15.0	15.0	3.85	18.85	NM	NM	3.71	1112.19	NM[4]	--	--	NM	NM	NM	NM
	FBQmw-168	2350066.87	553620.85	1,131.27	19.5	1,133.91	A	Homewood	9.0	19.0	19.0	2.64	21.64	NM	NM	9.77	1124.14	NM[4]	--	--	NM	NM	NM	NM
	FBQmw-169	2349730.90	553681.21	1,117.36	16.0	1,120.58	A	Homewood	5.0	15.0	15.0	3.22	18.22	NM	NM	5.43	1115.15	18.19	0.03	Hard	NM	NM	NM	NM
	FBQmw-170	2350102.41	553975.40	1,139.67	30.5	1,142.26	A	Homewood	20.0	30.0	30.0	2.59	32.59	NM	NM	18.76	1123.50	32.81	0.00	Hard	NM	NM	NM	NM
	FBQmw-171	2350072.44	554230.93	1,140.49	30.0	1,143.55	A	Homewood	18.0	28.0	28.0	3.06	31.06	NM	NM	16.60	1126.95	NM[4]	--	--	NM	NM	23.77	1119.78
	FBQmw-172	2349907.37	554322.17	1,145.71	33.0	1,150.09	A	Homewood	20.0	30.0	30.0	4.38	34.38	NM	NM	24.92	1125.17	NM[4]	--	--	NM	NM	30.87	1119.22
	FBQmw-173	2350449.01	554491.35	1,162.43	50.0	1,165.94	A	Homewood	29.5	49.5	49.5	3.51	53.01	NM	NM	44.88	1121.06	NM[4]	--	--	NM	NM	NM	NM
	FBQmw-174	2350289.81	554142.44	1,135.78	22.5	1,139.97	A	Homewood	12.0	22.0	22.0	4.19	26.19	NM	NM	15.70	1124.27	NM[4]	--	--	NM	NM	NM[3]	NM
	FBQmw-175	2350297.98	553989.24	1,137.16	22.5	1,140.73	A	Homewood	12.0	22.0	22.0	3.57	25.57	NM	NM	17.69	1123.04	NM[4]	--	--	NM	NM	NM[3]	NM
	FBQmw-176	2350219.45	553273.33	1,129.57	21.5	1,131.91	A	Unconsolidated	11.0	21.0	21.0	2.34	23.34	NM	NM	7.54	1124.37	NM[4]	--	--	NM	NM	12.42	1119.49
	FBQmw-177	2350112.18	553321.94	1,125.73	22.5	1,128.57	A	Homewood	12.0	22.0	22.0	2.84	24.84	NM	NM	10.04	1118.53	24.75	0.09	Soft	NM	NM	NM	NM
Facility-Wide Groundwater	FWGmw-001	2368321.00	565739.00	953.60	17.5	956.62	A	Unconsolidated	7	17	17.3	3.02	20.32	NM	NM	8.42	948.20	20.03	0.29	Hard	NM	NM	NM	NM
	FWGmw-002	2367606.00	571015.00	970.60	71.0	973.10	A	Unconsolidated	57	67	67.3	2.50	69.80	NM	NM	22.73	950.37	NM[4]	--	--	NM	NM	24.22	948.88
	FWGmw-003	2344042.00	563118.00	1,129.40	19.0	1,131.96	A	Unconsolidated	8.5	18.5	18.8	2.56	21.36	NM	NM	4.61	1127.35	21.32	0.04	Soft	NM	NM	NM	NM
	FWGmw-004	2356970.00	549319.00	1,034.50	20.0	1,037.15	A	Unconsolidated	9.5	19.5	19.8	2.65	22.45	NM	NM	10.94	1026.21	NM[4]	--	--	NM	NM	16.15	1021
	FWGmw-005	2338973.00	558510.00	1,167.50	29.5	1,170.10	A	Homewood	19.25	29.25	29.55	2.60	32.15	NM	NM	20.84	1149.26	NM[4]	--	--	NM	NM	23.40	1146.7
	FWGmw-006	2335421.00	553142.00	1,181.90	18.0	1,184.33	A	Unconsolidated	7.5	17.5	17.8	2.43	20.23	NM	NM	4.36	1179.97	19.33	0.90	Soft	NM	NM	NM	NM
	FWGmw-007	2344785.00	548356.00	1,072.80	30.0	1,075.41	A	Unconsolidated	19.5	29.5	29.8	2.61	32.41	NM	NM	24.57	1050.84	NM[4]	--	--	NM	NM	25.35	1050.06
	FWGmw-008	2341569.00	555735.00	1,109.00	21.0	1,111.61	A	Unconsolidated	10	20	20.3	2.61	22.91	NM	NM	5.03	1106.58	21.82	1.09	Soft	NM	NM	NM	NM
	FWGmw-009	2341998.00	556784.00	1,099.50	18.5	1,102.14	A	Unconsolidated	8	18	18.3	2.64	20.94	NM	NM	1.98	1100.16	20.41	0.53	Soft	NM	NM	NM	NM
	FWGmw-010	2379060.00	565077.00	959.50	17.3	962.15	A	Unconsolidated	6	16	16.3	2.65	18.95	NM	NM	7.28	954.87	NM[4]	--	--	NM	NM	NM[3]	NM
	FWGmw-011	2380390.00	566801.00	939.00	17.5	941.61	A	Unconsolidated	6	16	16.3	2.61	18.91	NM	NM	1.68	939.93	17.64	1.27	Soft	NM	NM	3.73	937.88
	FWGmw-012	2380389.00	566790.00	938.90	40.0	941.39	A	Sharon Shale	29.5	39.5	39.8	2.49	42.29	NM	NM	0.75	940.64	NM[4]	--	--	NM	NM	3.42	937.97
	FWGmw-013	2357460.00	559483.00	1,057.10	34.5	1,059.51	A	Sharon	24	34	34.3	2.41	36.71	NM	NM	18.17	1041.34	NM[4]	--	--	NM	NM	23.79	1035.72
	FWGmw-014	2341064.00	560957.00	1,135.00	18.5	1,137.57	A	Unconsolidated	8.25	18.25	18.55	2.57	21.12	NM	NM	3.31	1134.26	21.15	0.00	Soft	NM	NM	NM	NM
	FWGmw-015	2358353.00	550179.00	1,012.10	26.0	1,014.51	A	Unconsolidated	13.5	23.5	23.8	2.41	26.21	NM	NM	4.68	1009.83	NM[4]	--	--	NM	NM	10.45	1004.06
	FWGmw-016	2358364.00	550171.00	1,011.90	65.0	1,014.39	A	Sharon	54.5	64.5	64.8	2.49	67.29	NM	NM	16.08	998.31	NM[4]	--	--	NM	NM	18.75	995.64
	FWGmw-017	557518.22	2375792.88	958.53	148.00	961.26	A	Sharon Cong.	133.5	143.5	143.5	2.73	146.23	NM	NM	12.61	948.65	NM[4]	--	--	13.21	948.05	14.40	946.856
	FWGmw-018	554933.24	2369793.44	981.12	154.00	984.03	A	Sharon Cong.	136.2	146.2	146.2	2.91	149.11	NM	NM	22.01	962.02	NM[4]	--	--	22.40	961.63	24.57	959.462
	FWGmw-019	555486.89	2356265.25	1,129.58	240.00	1,132.23	A	Sharon Cong.	224.5	234.5	234.5	2.65	237.15	117.00	1015.225	115.06	1017.17	NM[4]	--	--	>100	NA	117.41	1014.815
	FWGmw-020	554944.12	2369769.12	981.73	45.70	984.58	A	Sharon	34.7	44.7	44.7	2.85	47.55	NM	NM	22.90	961.68	NM[4]	--	--	23.33	961.25	25.40	959.182
	FWGmw-021	555708.43	2371551.33	984.88	44.90	987.97	A	Sharon	34.4	44.4	44.4	3.09	47.49	NM	NM	19.32	968.65	NM[4]	--	--	22.26	965.71	25.46	962.511
	FWGmw-022	555466.61	2356276.69	1,129.61	165.00	1,132.31	A	Sharon	153.8	163.8	163.8	2.70	166.50	116.19	1016.115	114.19	1018.12	NM[4]	--	--	>100	NA	116.65	1015.655
	FWGmw-023	553999.50	2351494.36	1,149.66	215.00	1,152.37	A	Sharon	203.5	213.5	213.5	2.71	216.21	118.25	1034.124	116.82	1035.55	NM[4]	--	--	>100	NA	118.75	1033.624
	FWGmw-024	557546.23	2375717.99	960.30	35.00	963.16	A	Sharon	23.70	33.70	33.70	2.86	36.56	NM	NM	14.32	948.84	NM[4]	--	--	14.94	948.22	16.15	947.006

Table 2-1
Well Construction Details, Groundwater Elevations, and Depth to Bottom Measurements

RVAAP Area	Well ID	Ohio State Plane Easting	Ohio State Plane Northing	Ground Elevation (ft, AMSL)	Total Drilled Depth (ft, BGS)	TOC Elevation (ft, AMSL)	Well Head Type[1]	Monitored Zone	Top of Screen (ft, BGS)	Bottom of Screen (ft, BGS)	Bottom of Inner Casing Plug or End Cap (ft, BGS)	Stickup height (ft, AGS)	Reported Bottom of Inner Casing (ft, BTOC)	Depth to Water - January 2017 (ft, BTOC)	Groundwater Elevation - January 2017 (ft, AMSL)	Depth to Water - April 2017 (ft, BTOC)	Groundwater Elevation - April 2017 (ft, AMSL)	Measured Bottom of Inner Casing - April 2017 (ft, BTOC)	Sediment Accumulation - April 2017 (ft)	Description of Bottom	Depth to Water - July 2017 (ft, BTOC)	Groundwater Elevation - July 2017 (ft, AMSL)	Depth to Water - December 2017 (ft, BTOC)	Groundwater Elevation - December 2017 (ft, AMSL)
Load Line 1	LL1mw-063	2376841.36	563650.53	992.20	27.4	994.84	A	Sharon	17.1	27.1	27.4	2.64	30.04	NM	NM	NM[3]	NM[3]	NM[4]	--	--	NM	NM	NM[3]	NM
	LL1mw-064	2380286.97	563118.74	932.32	18.4	935.10	A	Unconsolidated	8.0	18.0	18.4	2.78	21.18	NM	NM	0.61	934.49	NM[4]	--	--	NM	NM	4.15	930.95
	LL1mw-065	2380452.00	560916.92	941.53	20.5	944.41	A	Unconsolidated	10.2	20.2	20.5	2.88	23.38	NM	NM	11.00	933.41	NM[4]	--	--	NM	NM	15.20	929.21
	LL1mw-067	2376545.30	565201.14	977.55	22.8	980.36	A	Sharon	12.8	22.5	22.8	2.81	25.61	NM	NM	20.92	959.44	25.79	0.00	Hard	NM	NM	NM	NM
	LL1mw-078	2376275.85	564623.87	993.40	38.7	995.84	A	Sharon	28.7	38.2	38.7	2.44	41.14	NM	NM	34.77	961.07	42.04	0.00	Soft	NM	NM	NM	NM
	LL1mw-079	2376228.31	563739.63	995.30	29.5	997.87	A	Sharon	29.5	38.9	39.5	2.57	42.07	NM	NM	34.13	963.74	42.00	0.07	Hard	NM	NM	NM	NM
	LL1mw-080	2376845.07	562479.73	993.70	19.5	996.27	A	Sharon	9.5	19.0	19.5	2.57	22.07	NM	NM	10.59	985.68	NM[4]	--	--	NM	NM	17.67	978.6
	LL1mw-081	2376672.66	563462.73	996.40	39.4	998.92	A	Sharon	29.4	38.9	39.4	2.52	41.92	NM	NM	30.46	968.46	NM[4]	--	--	NM	NM	36.70	962.22
	LL1mw-082	2376977.38	562956.86	1,003.70	39.0	1,006.45	A	Sharon	28.9	38.5	39.0	2.75	41.75	NM	NM	28.40	978.05	41.56	0.19	Hard	NM	NM	NM	NM
	LL1mw-083	2377074.80	563612.75	992.80	39.3	995.20	A	Sharon	29.1	38.6	39.3	2.40	41.70	NM	NM	35.63	959.57	NM[4]	--	--	NM	NM	NM[3]	NM
	LL1mw-084	2377316.02	563160.44	996.40	37.0	998.73	A	Sharon	26.7	36.3	37.0	2.33	39.33	NM	NM	29.09	969.64	NM[4]	--	--	NM	NM	NM[3]	NM
	LL1mw-085	2377246.94	562046.25	994.30	42.1	996.84	A	Sharon	32.2	41.6	42.1	2.54	44.64	NM	NM	37.47	959.37	45.29	0.00	Hard	NM	NM	NM	NM
	LL1mw-086	2380437.00	561714.00	938.00	75.0	940.63	A	Unconsolidated	64.5	74.5	74.8	2.63	77.43	NM	NM	7.38	933.25	NM[4]	--	--	NM	NM	11.12	929.51
	LL1mw-087	2378732.00	560375.00	941.80	17.5	944.32	A	Unconsolidated	7	17	17.3	2.52	19.82	NM	NM	4.65	939.67	NM[4]	--	--	NM	NM	9.60	934.72
	LL1mw-088	2380525.00	561746.00	936.30	24	938.63	A	Unconsolidated	13.9	23.9	24.51	3.00	27.51	NM	NM	5.16	933.47	NM[4]	--	--	NM	NM	9.15	929.48
	LL1mw-089	2378139.92	563639.31	977.54	37	980.29	A	Unconsolidated	26.5	36.5	36.50	2.75	39.25	28.14	952.149	27.12	953.17	NM[4]	--	--	25.58	954.71	28.20	952.089
Load Line 2	LL2mw-059	2375453.00	558020.00	964.33	19.5	966.67	A	Unconsolidated	9.3	19.1	19.5	2.34	21.84	NM	NM	14.22	952.45	NM[4]	--	--	NM	NM	16.39	950.28
	LL2mw-060	2375978.00	558022.00	958.93	18.3	961.57	A	Sharon	8.1	17.9	18.3	2.64	20.94	NM	NM	9.96	951.61	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-261	2373317.81	561898.25	1,009.55	22.5	1,011.40	A	Sharon	9.8	19.8	20.0	1.85	21.85	NM	NM	6.45	1004.95	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-262	2373970.79	562219.87	1,011.12	21.2	1,012.62	A	Sharon	10.6	20.6	20.8	1.50	22.30	NM	NM	7.61	1005.01	22.73	0.00	Hard	NM	NM	NM	NM
	LL2mw-263	2374289.51	561591.19	1,009.42	22.2	1,011.47	A	Sharon	10.8	20.8	21.0	2.05	23.05	NM	NM	7.53	1003.94	23.50	0.00	Hard	NM	NM	NM	NM
	LL2mw-264	2374532.00	561173.60	1,010.10	20.5	1,011.88	A	Sharon	9.8	19.8	20.0	1.78	21.78	NM	NM	6.49	1005.39	NM[4]	--	--	NM	NM	10.98	1000.9
	LL2mw-265	2375594.06	557972.91	959.47	22.5	961.24	A	Sharon	11.8	21.8	22.0	1.77	23.77	NM	NM	10.31	950.93	24.50	0.00	Hard	NM	NM	NM	NM
	LL2mw-266	2373744.03	561981.86	1,014.09	20.5	1,016.28	A	Sharon	9.8	19.8	20.0	2.19	22.19	NM	NM	10.77	1005.51	22.79	0.00	Soft	NM	NM	NM	NM
	LL2mw-267	2373715.04	561393.22	1,012.81	20.5	1,014.81	A	Sharon	9.8	19.8	20.0	2.00	22.00	NM	NM	9.01	1005.80	NM[4]	--	--	NM	NM	12.89	1001.92
	LL2mw-268	2374157.30	560831.04	1,015.47	28.8	1,017.28	A	Sharon	17.3	27.3	27.5	1.81	29.31	NM	NM	14.46	1002.82	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-269	2374756.07	559484.12	1,009.49	28.0	1,011.62	A	Sharon	17.1	27.1	27.3	2.13	29.43	NM	NM	16.37	995.25	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-270	2372858.41	562655.93	1,009.93	20.5	1,010.18	A	Sharon	9.8	19.8	20.0	0.25	20.25	NM	NM	6.66	1003.52	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-271	2375714.00	557827.00	958.70	24	961.19	A	Sharon	14.6	24.6	24.8	3	27.80	NM	NM	11.24	949.95	NM[4]	--	--	NM	NM	NM	NM
	LL2mw-272	560599.71	2373808.49	1015.00	30.00	1017.80	A	Sharon	19.2	29.2	29.2	3	32.00	9.72	1008.079	8.48	1009.32	NM[4]	--	--	12.90	1004.90	13.80	1003.999
Load Line 3	LL3mw-232	2369862.96	561365.91	998.59	37.8	1,000.41	A	Sharon	26.8	36.8	37.0	1.82	38.82	NM	NM	20.22	980.19	39.85	0.00	Soft	NM	NM	NM	NM
	LL3mw-233	2369934.52	560750.41	1,002.47	31.1	1,004.36	A	Sharon	20.1	30.1	30.3	1.89	32.19	NM	NM	25.69	978.67	31.84	0.35	Soft	NM	NM	NM	NM
	LL3mw-234	2370297.47	560058.89	1,004.47	20.5	1,006.56	A	Sharon	9.8	19.8	20.0	2.09	22.09	NM	NM	9.39	997.17	NM[4]	--	--	NM	NM	11.14	995.42
	LL3mw-235	2370642.47	559812.63	1,008.05	21.2	1,009.94	A	Sharon	10.1	20.1	20.3	1.89	22.19	NM	NM	17.30	992.64	23.04	0.00	Hard	NM	NM	NM	NM
	LL3mw-236	2371178.58	559866.75	1,008.94	25.5	1,011.17	A	Sharon	13.8	23.8	24.0	2.23	26.23	NM	NM	17.26	993.91	NM[4]	--	--	NM	NM	NM	NM
	LL3mw-237	2371475.00	559328.09	1,003.57	23.9	1,005.57	A	Sharon	12.7	22.7	22.9	2.00	24.90	NM	NM	14.58	990.99	NM[4]	--	--	NM	NM	21.76	983.81
	LL3mw-238	2370625.34	559569.06	1,004.75	20.7	1,006.91	A	Sharon	10.5	20.5	20.7	2.16	22.86	NM	NM	15.59	991.32	NM[4]	--	--	NM	NM	NM	NM
	LL3mw-239	2370895.01	559101.39	1,001.70	35.7	1,003.50	A	Sharon	24.9	34.9	35.0	1.80	36.80	NM	NM	24.49	979.01	NM[4]	--	--	NM	NM	NM	NM
	LL3mw-240	2371309.57	558204.34	1,005.60	35.5	1,007.52	A	Sharon	24.4	34.4	34.6	1.92	36.52	NM	NM	25.00	982.52	26.76	9.76	Soft	NM	NM	NM	NM
	LL3mw-241	2370332.80	559298.09	992.41	23.8	994.65	A	Sharon	12.7	22.7	22.9	2.24	25.14	NM	NM	7.56	987.09	NM[4]	--	--	NM	NM	NM	NM
	LL3mw-242	2371993.30	557034.21	997.39	20.5	999.32	A	Sharon	9.8	19.8	20.0	1.93	21.93	NM	NM	13.20	986.12	22.59	0.00	Hard	NM	NM	NM	NM
	LL3mw-243	2371532.61	556688.92	989.36	24.5	991.16	A	Sharon	13.8	23.8	24.0	1.80	25.80	NM	NM	8.85	982.31	NM[4]	--	--	NM	NM	NM	NM
	LL3mw-244	2371456.00	556033.00	986.20	45	988.78	A	Sharon	34.5	44.5	44.8	2.58	47.38	15.08	973.7	7.00	981.78	NM[4]	--	--	NM	NM	19.13	969.65
	LL3mw-245	2369249.00	558573.00	978.70	47	981.24	A	Sharon	36.5	46.5	46.8	2.54	49.34	NM	NM	14.04	967.20	49.38	0.00	Soft	NM	NM	NM	NM
	LL3mw-246	2371441.00	555969.00	986.50	43	988.84	A	Sharon	32.8	42.8	43.0	2.75	45.75	23.40	965.44	18.66	970.18	NM[4]	--	--	NM	NM	25.10	963.74
Load Line 4	LL4mw-193	2364237.44	554959.74	980.88	21.9	982.92	A	Unconsolidated	11.3	21.3	21.5	2.04	23.54	NM	NM	6.17	976.75	NM[4]	--	--	NM	NM	8.20	974.72
	LL4mw-194	2364584.76	555088.18	981.87	22.0	983.76	A	Unconsolidated	11.3	21.3	21.5	1.89	23.39	NM	NM	6.42	977.34	NM[4]	--	--	NM	NM	NM	NM
	LL4mw-195	2365198.84	555045.69	980.83	21.0	982.59	A	Unconsolidated	10.3	20.3	20.5	1.76	22.26	NM	NM	10.28	972.31	22.87	0.00	Soft	NM	NM	NM	NM
	LL4mw-196	2365297.28	555212.59	982.56	20.0	984.55	A	Unconsolidated	9.2	19.2	19.4	1.99	21.39	NM	NM	12.11	972.44	21.88	0.00	Soft	NM	NM	NM	NM
	LL4mw-197	2365385.95	555396.55	983.79	21.7	985.46	A	Unconsolidated	10.8	20.8	21.0	1.67	22.67	NM	NM	13.70	971.76	NM[4]	--	--	NM	NM	NM	NM
	LL4mw-198	2364991.12	555440.99	981.61	22.0	983.42	A	Unconsolidated	10.3	20.3	20.5	1.81	22.31	NM	NM	6.14	977.28	21.82	0.49	Soft	NM	NM	NM	NM
	LL4mw-199	2365421.66	554621.06	975.20	22.0	977.28	A	Unconsolidated	10.3	20.3	20.5	2.08	22.58	NM	NM	7.47	969.81	NM[4]	--	--	NM	NM	NM	NM
	LL4mw-200	2365904.12	554579.72	985.97	23.5	987.93	A	Unconsolidated	12.6	22.6	23.0	1.96	24.96	NM	NM	18.36	969.57	NM[4]	--	--	NM	NM	NM	NM
	LL4mw-201	2365417.00	554607.00	975.90	67	978.02	A	Sharon	56.5	66.5	66.8	NA	66.80	NM	NM	10.57	967.45	NM[4]	--	--	NM	NM	NM	NM
Load Line 5	LL5mw-001	2354625.07	554319.25	1,125.00	24.0	1,127.92	A	Homewood	14.0	24.0	24.0	2.92	26.92	NM	NM	19.02	1108.90	NM[4]	--	--	NM	NM	NM	NM
	LL5mw-002	2354571.52	554604.01	1,125.80	25.0	1,128.68	A	Homewood	15.0	25.0	25.0	2.88	27.88	NM	NM	19.66	1109.02	NM[4]	--	--	NM	NM	NM	NM
	LL5mw-003	2354964.47	554535.41	1,124.70	21.0	1,127.70	A	Unconsolidated	11.0	21.0	21.0	3.00	24.00	NM	NM	17.29	1110.41	24.03	0.00	Soft	NM	NM	NM	NM
	LL5mw-004	2355006.44	554073.73	1,122.90	22.4	1,125.81	A	Homewood	12.0	22.0	22.0	2.91	24.91	NM	NM	16.59	1109.22	25.38	0.00	Soft	NM	NM	NM	NM
	LL5mw-005	2354422.02	554152.73	1,126.50	27.8	1,129.42	A	Homewood	17.0	27.0	27.0	2.92	29.92	NM	NM	20.54	1108.88	29.69	0.23	Soft	NM	NM	NM	NM
	LL5mw-006	2354730.78	553984.82	1,125.10	24.5	1,128.00	A	Homewood	14.0	24.0	24.0	2.90	26.90	NM	NM	19.44	1108.56	NM[4]	--	--	NM	NM	NM	NM

Table 2-1
Well Construction Details, Groundwater Elevations, and Depth to Bottom Measurements

RVAAP Area	Well ID	Ohio State Plane Easting	Ohio State Plane Northing	Ground Elevation (ft, AMSL)	Total Drilled Depth (ft, BGS)	TOC Elevation (ft, AMSL)	Well Head Type[1]	Monitored Zone	Top of Screen (ft, BGS)	Bottom of Screen (ft, BGS)	Bottom of Inner Casing Plug or End Cap (ft, BGS)	Stickup height (ft, AGS)	Reported Bottom of Inner Casing (ft, BTOC)	Depth to Water - January 2017 (ft, BTOC)	Groundwater Elevation - January 2017 (ft, AMSL)	Depth to Water - April 2017 (ft, BTOC)	Groundwater Elevation - April 2017 (ft, AMSL)	Measured Bottom of Inner Casing - April 2017 (ft, BTOC)	Sediment Accumulation - April 2017 (ft)	Description of Bottom	Depth to Water - July 2017 (ft, BTOC)	Groundwater Elevation - July 2017 (ft, AMSL)	Depth to Water - December 2017 (ft, BTOC)	Groundwater Elevation - December 2017 (ft, AMSL)
Load Line 6	LL6mw-001	2353153.23	554214.84	NA	18.0	1,124.16	F	Unconsolidated	7.0	17.0	17.0	0.00	17.00	NM	NM	11.76	1112.40	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-002	2353820.09	553589.88	NA	23.0	1,129.36	F	Unconsolidated	12.5	22.5	22.5	0.00	22.50	NM	NM	18.87	1110.49	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-003	2353048.68	553544.34	NA	23.4	1,125.38	A	Homewood	12.5	22.5	22.5	3.35	25.85	NM	NM	15.5	1109.88	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-004	2353368.79	553431.82	NA	23.0	1,125.39	A	Homewood	12.5	22.5	22.5	2.58	25.08	NM	NM	16.06	1109.33	24.59	0.49	Soft	NM	NM	NM	NM
	LL6mw-005	2353194.52	553170.76	NA	19.9	1,120.47	A	Homewood	9.5	19.5	19.5	2.96	22.46	NM	NM	11.46	1109.01	21.99	0.47	Soft	NM	NM	NM	NM
	LL6mw-006	2352419.15	553165.28	NA	20.0	1,124.37	A	Unconsolidated	7.0	17.0	17.0	0.00	17.00	NM	NM	14.79	1109.58	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-007	2353354.89	552677.17	NA	20.0	1,115.62	F	Homewood	9.5	19.5	19.5	0.00	19.50	NM	NM	3.70	1111.92	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-008	2353616.00	553154.00	1,121.30	17.8	1,124.15	A	Unconsolidated	7.2	17.2	17.5	2.85	20.35	NM	NM	13.71	1110.44	NM[4]	--	--	NM	NM	NM	NM
	LL6mw-009	2353604.00	553149.00	1,121.40	39.5	1,123.75	A	Homewood	29	39	39.3	2.35	41.65	NM	NM	13.46	1110.29	41.56	0.09	Soft	NM	NM	NM	NM
Load Line 7 Pink	LL7mw-001	2352192.91	554925.77	1,126.90	30.0	1,129.64	A	Homewood	19.5	29.5	29.5	2.74	32.24	NM	NM	20.56	1109.08	NM[4]	--	--	NM	NM	NM[3]	NM
Waste Water Treatment	LL7mw-002	2351918.23	555126.55	1,126.70	26.5	1,129.55	A	Homewood	15.0	25.0	25.0	2.85	27.85	NM	NM	16.32	1113.23	27.25	0.60	Soft	NM	NM	NM	NM
	LL7mw-003	2352351.04	555417.04	1,118.23	31.5	1,120.84	A	Homewood	21.0	31.0	31.0	2.61	33.61	NM	NM	11.55	1109.29	33.62	0.00	Soft	NM	NM	NM	NM
	LL7mw-004	2352035.20	555581.14	1,123.30	29.5	1,126.32	A	Homewood	19.5	29.5	29.5	3.02	32.52	NM	NM	14.99	1111.33	32.41	0.11	Soft	NM	NM	NM	NM
	LL7mw-005	2351741.47	555581.80	1,133.30	28.2	1,135.87	A	Homewood	18.0	28.0	28.0	2.57	30.57	NM	NM	21.43	1114.44	NM[4]	--	--	NM	NM	NM	NM
	LL7mw-006	2351879.92	555990.59	1,120.70	28.0	1,123.56	A	Homewood	17.5	27.5	27.5	2.86	30.36	NM	NM	10.13	1113.43	NM[4]	--	--	NM	NM	15.60	1107.96
Load Line 8	LL8mw-001	2351666.10	552607.06	1,118.69	24.0	1,121.46	A	Unconsolidated	14.0	24.0	24.0	2.77	26.77	NM	NM	10.51	1110.95	NM[4]	--	--	NM	NM	NM	NM
	LL8mw-002	2351010.33	552408.18	1,121.67	30.4	1,124.51	A	Unconsolidated	20.0	30.0	30.0	2.84	32.84	NM	NM	16.65	1107.86	32.71	0.13	Soft	NM	NM	NM	NM
	LL8mw-003	2351359.25	552231.14	1,116.30	21.0	1,119.05	A	Unconsolidated	10.5	20.5	20.5	2.75	23.25	NM	NM	11.42	1107.63	23.06	0.19	Hard	NM	NM	NM	NM
	LL8mw-004	2351261.83	551807.58	1,112.73	20.5	1,115.75	A	Unconsolidated	10.0	20.0	20.0	3.02	23.02	NM	NM	9.52	1106.23	22.79	0.23	Hard	NM	NM	NM	NM
	LL8mw-005	2351748.32	551522.48	1,112.51	24.0	1,115.73	A	Homewood	14.0	24.0	24.0	3.22	27.22	NM	NM	10.55	1105.18	26.90	0.32	Soft	NM	NM	NM	NM
	LL8mw-006	2351483.58	551296.77	1,114.33	24.2	1,117.17	A	Homewood	14.0	24.0	24.0	2.84	26.84	NM	NM	18.36	1098.81	27.16	0.00	Soft	NM	NM	NM	NM
Load Line 9	LL9mw-001	2355817.04	556125.81	NA	21.6	1,134.62	A	Homewood	10.5	20.5	20.5	2.78	23.28	NM	NM	11.82	1122.80	23.39	0.00	Soft	NM	NM	NM	NM
	LL9mw-002	2355907.76	556755.11	NA	21.0	1,127.30	A	Homewood	10.0	20.0	20.0	2.42	22.42	NM	NM	8.55	1118.75	22.81	0.00	Hard	NM	NM	NM	NM
	LL9mw-003	2356635.21	556445.31	NA	22.0	1,135.76	A	Homewood	11.5	21.5	21.5	2.30	23.80	NM	NM	10.94	1124.82	NM[4]	--	--	NM	NM	NM	NM
	LL9mw-004	2357338.76	556002.00	NA	33.0	1,131.83	A	Homewood	22.0	32.0	32.0	2.91	34.91	NM	NM	19.22	1112.61	NM[4]	--	--	NM	NM	NM	NM
	LL9mw-005	2356505.95	557063.36	NA	20.6	1,130.93	A	Homewood	10.0	20.0	20.0	3.30	23.30	NM	NM	13.99	1116.94	NM[4]	--	--	NM	NM	NM	NM
	LL9mw-006	2357446.67	556434.79	NA	26.8	1,129.88	A	Homewood	16.0	26.0	26.0	2.90	28.90	NM	NM	17.38	1112.50	28.81	0.09	Soft	NM	NM	NM	NM
	LL9mw-007	2357024.34	557000.56	NA	19.0	1,119.99	F	Homewood	8.5	18.5	18.5	0.00	18.50	NM	NM	8.12	1111.87	NM[4]	--	--	NM	NM	NM	NM
Load Line 10	LL10mw-001	2355272.22	555816.25	1,130.00	28.0	1,132.77	A	Homewood	17.0	27.0	27.0	2.77	29.77	NM	NM	23.84	1108.93	NM[4]	--	--	NM	NM	NM	NM
	LL10mw-002	2355710.51	555523.36	1,124.40	28.0	1,127.13	A	Homewood	17.0	27.0	27.0	2.73	29.73	NM	NM	15.34	1111.79	29.88	0.00	Hard	NM	NM	NM	NM
	LL10mw-003	2355389.92	555494.71	1,127.40	26.4	1,130.28	A	Homewood	16.0	26.0	26.0	2.88	28.88	NM	NM	17.96	1112.32	NM[4]	--	--	NM	NM	22.17	1108.11
	LL10mw-004	2355438.20	555236.59	1,119.60	31.2	1,122.39	A	Homewood	21.0	31.0	31.0	2.79	33.79	NM	NM	11.41	1110.98	33.58	0.21	Hard	NM	NM	NM	NM
	LL10mw-005	2355943.55	555380.53	1,122.90	27.0	1,125.67	A	Homewood	16.5	26.5	26.5	2.77	29.27	NM	NM	14.61	1111.06	29.3	0.00	Hard	NM	NM	19.25	1106.42
	LL10mw-006	2355654.80	554995.25	1,121.20	24.0	1,123.83	A	Unconsolidated	13.5	23.5	23.5	2.63	26.13	NM	NM	9.98	1113.85	NM[4]	--	--	NM	NM	NM	NM
Load Line 11	LL11mw-001	2352778.89	557505.03	1,097.46	23.0	1,100.16	A	Unconsolidated	11.4	21.4	21.4	2.70	24.10	NM	NM	9.00	1091.16	NM[4]	--	--	NM	NM	NM	NM
	LL11mw-002	2353354.28	558310.52	1,080.29	20.0	1,080.00	F	Unconsolidated	6.3	16.3	16.3	-0.29	16.01	NM	NM	1.16	1078.84	NM[4]	--	--	NM	NM	NM	NM
	LL11mw-003	2352737.87	557999.62	1,088.45	17.0	1,088.48	F	Unconsolidated	5.9	15.9	15.9	0.03	15.93	NM	NM	0.75	1087.73	NM[4]	--	--	NM	NM	NM	NM
	LL11mw-004	2352737.24	558164.36	1,084.60	17.0	1,084.72	F	Unconsolidated	6.1	16.1	16.1	0.12	16.22	NM	NM	1.24	1083.48	16.24	0.00	Soft	NM	NM	NM	NM
	LL11mw-005	2352847.56	558501.02	1,079.60	17.0	1,079.40	F	Unconsolidated	6.2	16.2	16.2	-0.20	16.00	NM	NM	5.29	1074.11	NM[4]	--	--	NM	NM	12.60	1066.8
	LL11mw-006	2352521.36	558263.28	1,086.61	17.0	1,086.50	F	Unconsolidated	5.6	15.6	15.6	-0.11	15.49	NM	NM	2.16	1084.34	NM[4]	--	--	NM	NM	NM	NM
	LL11mw-007	2352094.81	558189.71	1,079.22	23.0	1,082.00	A	Unconsolidated	12.4	22.4	22.4	2.78	25.18	NM	NM	13.79	1068.21	25.37	0.00	Soft	NM	NM	NM	NM
	LL11mw-008	2352388.60	557981.17	1,087.90	17.0	1,087.74	F	Unconsolidated	5.6	15.6	15.6	-0.16	15.44	NM	NM	0.39	1087.35	15.79	0.00	Soft	NM	NM	NM	NM
	LL11mw-009	2352577.18	557901.18	1,088.38	17.0	1,091.54	F	Unconsolidated	6.7	16.7	16.7	-0.10	16.60	NM	NM	1.61	1089.93	19.58	0.00	Soft	NM	NM	NM	NM
	LL11mw-010	2352039.00	557675.43	1,080.22	22.0	1,082.68	A	Unconsolidated	10.9	20.9	20.9	2.46	23.36	NM	NM	3.69	1078.99	NM[4]	--	--	NM	NM	NM	NM
	LL11mw-011	2351119.00	558680.00	1,077.40	18.5	1,080.20	A	Unconsolidated	7.8	17.8	18.1	2.80	20.90	NM	NM	7.96	1072.24	20.45	0.45	Soft	NM	NM	NM	NM
	LL11mw-012	2351125.00	558691.00	1,077.90	115.0	1,080.36	A	Sharon Shale	104.5	114.5	114.8	2.46	117.26	NM	NM	19.27	1061.09	118.60	0.00	Soft	NM	NM	NM	NM
Load Line 12	LL12mw-088	2368667.75	556393.79	978.94	29.0	981.06	A	Unconsolidated	14.8	24.8	25.0	2.12	27.12	NM	NM	7.30	973.76	27.54	0.00	Soft	NM	NM	NM	NM
	LL12mw-107	2368595.67	556759.02	978.03	33.0	980.15	A	Unconsolidated	20.7	30.7	31.0	2.12	33.12	NM	NM	10.56	969.59	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-113	2368223.73	558345.37	977.67	23.0	980.18	A	Sharon Shale	12.3	22.3	22.5	2.51	25.01	NM	NM	5.79	974.39	20.80	4.21	Soft	NM	NM	NM	NM
	LL12mw-128	2368293.20	557371.54	976.21	34.0	978.24	A	Unconsolidated	21.1	31.1	31.3	2.03	33.33	NM	NM	10.07	968.17	34.01	0.00	Soft	NM	NM	NM	NM
	LL12mw-153	2368138.87	557823.23	975.34	26.0	977.85	A	Unconsolidated	12.3	22.3	22.5	2.51	25.01	NM	NM	6.92	970.93	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-154	2368183.88	557754.56	977.00	29.0	979.06	A	Unconsolidated	16.4	26.4	26.6	2.06	28.66	NM	NM	9.70	969.36	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-182	2368853.20	555890.35	982.20	36.1	984.42	A	Unconsolidated	25.2	35.2	35.5	2.22	37.72	NM	NM	10.96	973.46	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-182ss	2368867.00	555897.00	982.30	36	985.02	A	Unconsolidated	25.25	35.25	35.55	2.72	38.27	NM	NM	10.88	974.14	38.52	0.00	Soft	NM	NM	NM	NM
	LL12mw-183	2369224.36	556068.15	980.59	36.0	982.98	A	Sharon Shale	23.3	33.3	33.6	2.39	35.99	NM	NM	13.16	969.82	NM[4]	--	--	NM	NM	17.75	965.23
	LL12mw-184	2368997.48	556399.46	980.96	29.5	983.16	A	Unconsolidated	18.8	28.8	29.0	2.20	31.20	NM	NM	13.45	969.71	31.43	0.00	Soft	NM	NM	NM	NM
	LL12mw-185	2368829.86	556946.75	979.09	24.0	981.31	A	Unconsolidated	10.8	20.8	21.0	2.22	23.22	NM	NM	8.27	973.04	NM[4]	--	--	NM	NM	13.95	967.36
	LL12mw-186	2367912.39	559065.95	976.34	23.0	978.31	A	Sharon Shale	8.8	18.8	19.0	1.97	20.97	NM	NM	6.02	972.29	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-187	2368524.14	557633.10	977.90	29.0	979.94	A	Unconsolidated	17.2	27.2	27.4	2.04	29.44	NM	NM	10.19	969.75	NM[4]	--	--	NM	NM	16.90	963.04
	LL12mw-188	2367908.82	558132.59	978.46	20.5	980.63	A	Unconsolidated	9.8	19.8	20.0	2.17	22.17	NM	NM	4.93	975.70	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-189	2367945.92	558569.27	976.17	18.5	978.04	A	Sharon Shale	7.5	17.5	17.7	1.87	19.57	NM	NM	3.89	974.15	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-242	2368545.29	558020.51	978.40	26.3	981.20	A	Unconsolidated	15.5	25.5	25.5	2.80	28.30	NM	NM	9.45	971.75	NM[4]	--	--	NM	NM	17.35	963.85
	LL12mw-243	2368190.04	557376.32	978.10	24.0	980.79	A	Unconsolidated	13.0	23.0	23.0	2.69	25.69	NM	NM	10.37	970.42	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-244	2368751.42	557377.17	978.10	30.0	980.65	A	Unconsolidated	19.5	29.5	29.5	2.55	32.05	NM	NM	10.61	970.04	NM[4]	--	--	NM	NM	NM	NM
	LL12mw-245	2368370.74	557044.55	977.50	29.0	980.04	A	Unconsolidated	18.0	28.0	28.0	2.54	30.54	NM	NM	9.42	970.62	NM[4]	--	--	NM	NM	14.10	965.94
	LL12mw-246	2369432.17	556658.89	982.00	32.0	984.83	A	Unconsolidated	21.5	31.5	31.5	2.83	34.33	NM	NM	18.16	966.67	35.23	0.00	Hard	NM	NM	NM	NM
	LL12mw-247	2368932.00	555141.00	981.30	20.5	984.25	A	Unconsolidated	10	20	20.3	2.95	23.25	NM	NM	5.35	978.90	NM[4]	--	--	NM	NM	8.99	975.26
Landfill North of	LNWmw-024	2358403.21	564825.89	1,035.30	24.0	1,038.00	A	Unconsolidated	10.0	20.0	20.0	2.70	22.70	NM	NM	11.37	1026.63	22.61	0.09	Hard	NM	NM	NM	NM
Winklepeck Burning	LNWmw-025	2358417.06	565071.92	1,027.20	19.0	1,029.13	A	Unconsolidated	8.0	18.0	18.0	1.93	19.93	NM	NM	4.55	1024.58	NM[4]	--	--	NM	NM	NM	NM
Grounds	LNWmw-026	2358952.24	564658.16	1,025.00	24.0	1,027.80	A	Unconsolidated	13.0	23.0	23.0	2.80	25.80	NM	NM	3.54	1024.26	NM[4]	--	--	NM	NM	NM	NM
	LNWmw-027	2358628.75	564517.41	1,024.40	25.0	1,027.13	A	Unconsolidated	14.0	24.0	24.0	2.73	26.73	NM	NM	6.36	1020.77	26.97	0.00	Soft	NM	NM	NM	NM

Table 2-1
Well Construction Details, Groundwater Elevations, and Depth to Bottom Measurements

RVAAP Area	Well ID	Ohio State Plane Easting	Ohio State Plane Northing	Ground Elevation (ft, AMSL)	Total Drilled Depth (ft, BGS)	TOC Elevation (ft, AMSL)	Well Head Type[1]	Monitored Zone	Top of Screen (ft, BGS)	Bottom of Screen (ft, BGS)	Bottom of Inner Casing Plug or End Cap (ft, BGS)	Stickup height (ft, AGS)	Reported Bottom of Inner Casing (ft, BTOC)	Depth to Water - January 2017 (ft, BTOC)	Groundwater Elevation - January 2017 (ft, AMSL)	Depth to Water - April 2017 (ft, BTOC)	Groundwater Elevation - April 2017 (ft, AMSL)	Measured Bottom of Inner Casing - April 2017 (ft, BTOC)	Sediment Accumulation - April 2017 (ft)	Description of Bottom	Depth to Water - July 2017 (ft, BTOC)	Groundwater Elevation - July 2017 (ft, AMSL)	Depth to Water - December 2017 (ft, BTOC)	Groundwater Elevation - December 2017 (ft, AMSL)
Suspected Mustard Agent Burial Site	MBS-001	2345323.00	550759.50	1,079.68	30.0	1,082.20	A	Unconsolidated	19	28.7	29	2.52	31.52	NM	NM	17.36	1064.84	30.97	0.55	Hard	NM	NM	NM	NM
	MBS-002	2345322.30	550886.20	1,080.50	30.0	1,083.22	A	Unconsolidated	18	27.3	28	2.72	30.72	NM	NM	18.05	1065.17	31.24	0.00	Hard	NM	NM	NM	NM
	MBS-003	2345172.40	550922.80	1,082.45	30.0	1,084.45	A	Unconsolidated	18.5	28.2	28.5	2.00	30.50	NM	NM	19.04	1065.41	30.80	0.00	Hard	NM	NM	NM	NM
	MBS-004	2345134.20	550767.90	1,079.55	26.0	1,081.80	A	Unconsolidated	14.7	24.4	24.7	2.25	26.95	NM	NM	17.08	1064.72	NM[4]	--	--	NM	NM	NM	NM
	MBS-005	2345354.10	550800.70	1,080.50	30.0	1,082.42	A	Unconsolidated	18	28	28.08	1.92	30.00	NM	NM	17.61	1064.81	30.09	0.00	Soft	NM	NM	NM	NM
	MBS-006	2345282.30	550726.10	1,080.29	28.0	1,081.83	A	Unconsolidated	16.5	26.5	26.56	1.54	28.10	NM	NM	17.08	1064.75	NM[4]	--	--	NM	NM	NM	NM
NACA Test Area	NTAmw-107	2345433.40	551697.29	1,077.65	23.0	1,080.30	A	Unconsolidated	12.0	22.0	22.0	2.65	24.65	NM	NM	12.49	1067.81	24.23	0.42	Soft	NM	NM	NM	NM
	NTAmw-108	2345781.60	551916.22	1,083.22	23.0	1,085.62	A	Unconsolidated	12.0	22.0	22.0	2.40	24.40	NM	NM	17.63	1067.99	24.63	0.00	Soft	NM	NM	NM	NM
	NTAmw-109	2345997.72	551293.25	1,076.89	19.0	1,079.84	A	Unconsolidated	8.0	18.0	18.0	2.95	20.95	NM	NM	11.30	1068.54	NM[4]	--	--	NM	NM	NM	NM
	NTAmw-110	2346438.94	551351.46	1,080.03	28.0	1,082.62	A	Unconsolidated	17.0	27.0	27.0	2.59	29.59	NM	NM	13.68	1068.94	29.84	0.00	Soft	NM	NM	NM	NM
	NTAmw-111	2346638.01	551538.60	1,078.07	20.0	1,080.94	A	Unconsolidated	9.5	19.5	19.5	2.87	22.37	NM	NM	3.46	1077.48	22.18	0.19	Hard	NM	NM	NM	NM
	NTAmw-112	2346889.48	551712.14	1,075.36	23.9	1,078.33	A	Unconsolidated	13.9	23.9	23.9	2.97	26.87	NM	NM	8.70	1069.63	26.72	0.15	Soft	NM	NM	NM	NM
	NTAmw-113	2347082.83	551488.52	1,072.61	27.5	1,075.68	A	Unconsolidated	17.0	27.0	27.5	3.07	30.57	NM	NM	6.67	1069.01	NM[4]	--	--	NM	NM	NM	NM
	NTAmw-114	2347301.57	551592.94	1,075.61	20.0	1,078.71	A	Unconsolidated	9.5	19.5	19.5	3.10	22.60	NM	NM	5.93	1072.78	NM[4]	--	--	NM	NM	NM	NM
	NTAmw-115	2347581.16	551791.78	1,086.91	24.0	1,089.65	A	Unconsolidated	12.5	22.5	22.5	2.74	25.24	NM	NM	12.20	1077.45	NM[4]	--	--	NM	NM	NM	NM
	NTAmw-116	2348196.39	551748.00	1,091.68	22.0	1,094.33	A	Unconsolidated	10.0	20.0	20.0	2.65	22.65	NM	NM	4.62	1089.71	NM[4]	--	--	NM	NM	NM	NM
	NTAmw-117	2347994.83	551584.57	1,091.67	25.0	1,094.54	A	Unconsolidated	14.5	24.5	24.5	2.87	27.37	NM	NM	13.05	1081.49	NM[4]	--	--	NM	NM	17.04	1077.5
	NTAmw-118	2347609.41	551335.04	1,078.86	22.5	1,081.44	A	Unconsolidated	12.0	22.0	22.0	2.58	24.58	NM	NM	8.51	1072.93	NM[4]	--	--	NM	NM	10.40	1071.04
	NTAmw-119	2346013.00	551286.00	1,077.40	130	1,080.07	A	Unconsolidated	90.0	100.0	100.3	2.67	102.97	NM	NM	12.55	1067.52	NM[4]	--	--	NM	NM	14.45	1065.62
	NTAmw-120	2347141.08	551376.89	1,072.67	120	1,075.20	A	Sharon	109.5	119.5	119.5	2.53	122.03	34.41	1040.789	33.35	1041.85	NM[4]	--	--	33.85	1041.35	34.80	1040.399
Ramsdell Quarry Landfill	RQLmw-006	2375927.71	566091.26	993.52	42.1	995.39	A	Sharon	19.4	39.4	39.6	1.87	41.47	NM	NM	36.72	958.67	42.09	0.00	Hard	NM	NM	NM	NM
	RQLmw-007	2375872.56	566544.36	963.86	18.7	965.91	A	Sharon	6.0	16.0	16.2	2.05	18.25	NM	NM	6.40	959.51	NM[4]	--	--	NM	NM	10.80	955.11
	RQLmw-008	2376011.08	566327.94	963.82	18.7	966.08	A	Sharon	6.0	16.0	16.2	2.26	18.46	NM	NM	6.98	959.10	NM[4]	--	--	NM	NM	NM[3]	NM
	RQLmw-009	2376253.65	566351.20	962.60	18.8	964.58	A	Sharon	5.9	15.9	16.4	1.98	18.38	5.63	958.95	5.25	959.33	NM[4]	--	--	NM	NM	8.48	956.1
	RQLmw-010	2376048.58	566857.39	980.04	35.4	982.14	A	Sharon	12.5	32.5	33.0	2.10	35.10	NM	NM	26.12	956.02	35.39	0.00	Hard	NM	NM	NM	NM
	RQLmw-011	2376398.19	566819.66	974.60	35.4	976.57	A	Sharon	12.4	32.4	32.6	1.97	34.57	NM	NM	22.37	954.20	NM[4]	--	--	NM	NM	25.90	950.67
	RQLmw-012	2376558.19	566551.95	975.12	30.5	977.65	A	Sharon	19.8	29.8	30.0	2.53	32.53	NM	NM	22.49	955.16	NM[4]	--	--	NM	NM	27.50	950.15
	RQLmw-013	2376204.93	566928.09	978.04	34.4	980.71	A	Sharon	23.7	33.7	33.9	2.67	36.57	NM	NM	26.89	953.82	NM[4]	--	--	NM	NM	29.50	951.21
	RQLmw-014	2376519.38	566941.29	970.83	29.4	973.49	A	Sharon	18.6	28.6	28.9	2.66	31.56	NM	NM	20.29	953.20	NM[4]	--	--	NM	NM	23.75	949.74
	RQLmw-015	2375490.96	566560.90	989.19	40.1	991.26	A	Sharon	29.2	39.2	39.5	2.07	41.57	35.38	955.88	33.42	957.84	NM[4]	--	--	NM	NM	NM	NM
	RQLmw-016	2375649.55	566177.68	994.02	39.5	996.60	A	Sharon	28.5	38.5	39.0	2.58	41.58	NM	NM	37.84	958.76	NM[4]	--	--	NM	NM	38.80	957.8
	RQLmw-017	2376124.18	565931.38	988.69	30.5	991.23	A	Sharon	19.8	29.8	30.0	2.54	32.54	NM	NM	NM[3]	NM[3]	NM[4]	--	--	NM	NM	NM	NM
Basal Sharon Conglomerate	SCFmw-001	2353178.98	554768.62	1,118.53	230	1,120.71	A	Sharon Cong.	201	211	NA	2.18	213.18	90.41	1030.3	89.02	1031.69	NM[4]	--	--	NM	NM	NM	NM
	SCFmw-002	2368927.36	555152.38	982.28	153	984.56	A	Sharon Cong.	137	147	NA	2.28	149.28	NM	NM	20.09	964.47	NM[4]	--	--	NM	NM	NM	NM
	SCFmw-003	2375843.20	557957.67	956.14	140	958.47	A	Sharon Cong.	125.5	135.5	NA	2.33	137.83	NM	NM	8.68	949.79	NM[4]	--	--	NM	NM	NM	NM
	SCFmw-004	2378730.23	560361.03	941.87	120	944.17	A	Sharon Cong.	100	110	NA	2.30	112.30	NM	NM	0.00	944.17	NM[4]	--	--	NM	NM	0.00	944.17
	SCFmw-005	2377014.05	567302.35	958.43	160	960.80	A	Sharon Cong.	139	154	NA	2.37	156.37	NM	NM	10.31	950.49	156.40	0.00	Soft	NM	NM	NM	NM
	SCFmw-006	2369394.54	569583.41	963.69	90	965.92	A	Sharon Cong.	76	86	NA	2.23	88.23	NM	NM	17.62	948.30	NM[4]	--	--	NM	NM	19.07	946.85
Winklepeck Burning Grounds	WBGmw-005	2357163.55	563037.18	1,052.20	19.0	1,054.70	A	Unconsolidated	8.3	18.3	18.6	2.50	21.10	NM	NM	4.46	1050.24	NM[4]	--	Hard	NM	NM	NM	NM
	WBGmw-006	2359087.79	563008.87	1,012.16	19.0	1,014.66	A	Unconsolidated	7.6	17.6	17.9	2.50	20.40	8.62	1006.04	6.25	1008.41	NM[4]	--	--	NM	NM	10.47	1004.19
	WBGmw-007	2360420.44	562479.87	998.09	24.0	1,000.59	A	Unconsolidated	13.5	23.5	23.8	2.50	26.30	NM	NM	16.24	984.35	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-008	2359700.57	562010.35	1,005.71	18.5	1,008.21	A	Unconsolidated	8.1	18.2	18.5	2.50	21.00	NM	NM	14.33	993.88	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-009	2357159.20	561603.54	1,045.03	24.0	1,047.53	A	Unconsolidated	11.4	21.4	21.5	2.50	24.00	NM	NM	13.53	1034.00	NM[4]	--	--	NM	NM	NM[3]	NM
	WBGmw-010	2356051.96	562893.20	1,067.10	21.0	1,069.85	A	Unconsolidated	10.5	20.5	20.8	2.75	23.55	NM	NM	6.52	1063.33	23.40	0.15	Soft	NM	NM	NM	NM
	WBGmw-011	2356187.29	562609.18	1,069.70	22.0	1,072.38	A	Unconsolidated	11.0	21.0	21.3	2.68	23.98	NM	NM	9.40	1062.98	23.94	0.04	Soft	NM	NM	NM	NM
	WBGmw-012	2354810.65	562240.90	1,076.50	30.0	1,079.11	A	Unconsolidated	19.0	29.0	29.4	2.61	32.01	NM	NM	21.32	1057.79	31.78	0.23	Soft	NM	NM	NM	NM
	WBGmw-013	2355223.25	561518.27	1,069.10	22.0	1,071.70	A	Unconsolidated	11.0	21.0	21.3	2.60	23.90	NM	NM	11.57	1060.13	24.26	0.00	Soft	NM	NM	NM	NM
	WBGmw-014	2360439.22	562061.26	994.10	23.0	996.78	A	Unconsolidated	12.0	22.0	22.3	2.68	24.98	NM	NM	15.18	981.60	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-015	2359182.41	562340.12	1,009.10	22.0	1,011.60	A	Unconsolidated	11.0	21.0	21.3	2.50	23.80	14.34	997.26	12.09	999.51	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-016	2360645.88	562709.13	994.90	24.0	997.03	A	Unconsolidated	13.0	23.0	23.3	2.13	25.43	NM	NM	15.72	981.31	25.22	0.21	Soft	NM	NM	NM	NM
	WBGmw-017	2359603.84	562913.24	1,004.00	22.0	1,006.62	A	Unconsolidated	11.0	21.0	21.3	2.62	23.92	NM	NM	7.90	998.72	23.45	0.47	Soft	NM	NM	NM	NM
	WBGmw-018	2361302.00	562659.00	990.50	24.0	991.45	A	Unconsolidated	13.5	23.5	23.8	0.95	24.75	NM	NM	12.76	978.69	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-019	2361304.00	562645.00	989.30	50.0	990.25	A	Sharon	39.55	49.55	49.85	0.95	50.80	NM	NM	16.10	974.15	NM[4]	--	--	NM	NM	NM	NM
	WBGmw-020	2357161.00	561623.00	1,043.40	43.3	1,044.31	A	Sharon	32.9	42.9	43.2	0.91	44.11	15.58	1028.73	12.96	1031.35	NM[4]	--	--	NM	NM	16.50	1027.81
	WBGmw-021	2359106.00	563009.00	1,010.00	42.5	1,010.92	A	Sharon	32	42	42.3	0.92	43.22	10.69	1000.23	8.63	1002.29	NM[4]	--	--	NM	NM	12.11	998.81

Notes and Abbreviations:

[1] A = above grade completion; F = flush-mount completion

[2] Sediment accumulation is based on historical construction depths that may not be accurate; only positive sediment accumulation is presented.

[3] Groundwater surface below the top of dedicated sampling pump.

[4] Total depth could not be measured because a sampling pump is installed in the well.

Sediment accumulation values with gray-shading and bold font identify a calculated sediment thickness greater than 0.20 feet, with a "soft" or "medium" bottom description.

AGS = above ground surface
AMSL - above mean sea level
BGS = below ground surface
BTOC - below top of casing
ft - feet
NA - not applicable
NM - not measured
TOC - top of casing

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Building 1200	B12mw-011	Upper Sharon	04/26/17	6.83
Background	BKGmw-005	Unconsolidated	04/19/17	5.96
Background	BKGmw-005	Unconsolidated	05/03/17	3.83
Background	BKGmw-005	Unconsolidated	12/01/17	0.00
Background	BKGmw-006	Upper Sharon	04/24/17	6.59
Background	BKGmw-006	Upper Sharon	12/05/17	0.00
Background	BKGmw-008	Upper Sharon	04/18/17	0.20
Background	BKGmw-008	Upper Sharon	05/04/17	1.03
Background	BKGmw-008	Upper Sharon	12/06/17	8.40
Background	BKGmw-015	Upper Sharon	04/19/17	0.45
Background	BKGmw-015	Upper Sharon	05/03/17	4.10
Background	BKGmw-015	Upper Sharon	12/05/17	0.00
Background	BKGmw-016	Unconsolidated	04/19/17	0.52
Background	BKGmw-016	Unconsolidated	05/01/17	0.75
Background	BKGmw-016	Unconsolidated	12/04/17	10.00
Background	BKGmw-017	Unconsolidated	04/20/17	158.00
Background	BKGmw-017	Unconsolidated	12/04/17	57.40
Background	BKGmw-018	Upper Sharon	04/20/17	0.04
Background	BKGmw-018	Upper Sharon	12/05/17	0.00
Background	BKGmw-021	Unconsolidated	04/20/17	1.72
Background	BKGmw-021	Unconsolidated	04/21/17	0.52
Background	BKGmw-021	Unconsolidated	12/05/17	6.30
Background	BKGmw-022	Homewood	04/21/17	5.62
Background	BKGmw-022	Homewood	08/02/17	9.60
Background	BKGmw-022	Homewood	12/01/17	0.00
Background	BKGmw-023	Homewood	08/02/17	0.00
Background	BKGmw-023	Homewood	12/01/17	0.00
Background	BKGmw-024	Basal Sharon	04/20/17	1.20
Background	BKGmw-024	Basal Sharon	05/03/17	0.53
Background	BKGmw-024	Basal Sharon	08/07/17	0.00
Background	BKGmw-024	Basal Sharon	12/05/17	0.00
Background	BKGmw-025	Basal Sharon	04/26/17	0.28
Background	BKGmw-025	Basal Sharon	08/02/17	0.00
Background	BKGmw-025	Basal Sharon	12/01/17	0.00
Central Burn Pits	CBPmw-008	Unconsolidated	04/28/17	1.01
Central Burn Pits	CBPmw-008	Unconsolidated	12/06/17	9.70
Central Burn Pits	CBPmw-009	Upper Sharon	04/28/17	0.23
Central Burn Pits	CBPmw-009	Upper Sharon	12/05/17	0.00
Open Demolition Area #2	DA2mw-115	Upper Sharon	05/10/16	0.00
Open Demolition Area #2	DA2mw-115	Upper Sharon	11/10/2016	0.85
Open Demolition Area #2	DA2mw-115	Upper Sharon	4/24/2017	0.62
Demolition Area 2	DA2mw-115	Upper Sharon	12/05/17	0.00
Open Demolition Area #2	DET-003	Unconsolidated	05/10/16	0.00
Open Demolition Area #2	DET-003	Unconsolidated	11/9/2016	1.68

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Open Demolition Area #2	DET-003	Unconsolidated	04/24/17	0.41
Open Demolition Area #2	DET-004	Unconsolidated	04/27/17	21.10
Open Demolition Area #2	DET-004	Unconsolidated	05/10/16	0.00
Open Demolition Area #2	DETmw-003	Unconsolidated	12/05/17	0.00
Erie Burning Grounds	EBGmw-125	Unconsolidated	04/17/17	2.80
Erie Burning Grounds	EBGmw-125	Unconsolidated	12/06/17	0.00
Erie Burning Grounds	EBGmw-131	Upper Sharon	04/17/17	0.50
Erie Burning Grounds	EBGmw-131	Upper Sharon	12/06/17	0.00
Fuze and Booster Quarry	FBQmw-166	Unconsolidated	04/27/17	0.43
Fuze and Booster Quarry	FBQmw-171	Homewood	05/02/17	0.48
Fuze and Booster Quarry	FBQmw-171	Homewood	12/04/17	9.80
Fuze and Booster Quarry	FBQmw-172	Homewood	05/02/17	3.86
Fuze and Booster Quarry	FBQmw-172	Homewood	12/04/17	2.00
Fuze and Booster Quarry	FBQmw-174	Homewood	05/02/17	2.63
Fuze and Booster Quarry	FBQmw-175	Homewood	05/02/17	LLOERR
Fuze and Booster Quarry	FBQmw-175	Homewood	12/04/17	89.70
Fuze and Booster Quarry	FBQmw-176	Unconsolidated	04/27/17	6.83
Fuze and Booster Quarry	FBQmw-176	Unconsolidated	12/04/17	6.70
Building 1200	FWGmw-002	Unconsolidated	12/05/17	23.10
Motor Pool Area	FWGmw-004	Unconsolidated	05/09/16	25.90
Motor Pool Area	FWGmw-004	Unconsolidated	04/17/17	8.88
Motor Pool Area	FWGmw-004	Unconsolidated	12/05/17	8.30
Facility-Wide	FWGmw-005	Homewood	04/19/17	6.22
Facility-Wide	FWGmw-005	Homewood	05/03/17	8.84
Facility-Wide	FWGmw-005	Homewood	12/01/17	8.90
NACA Test Area	FWGmw-007	Unconsolidated	05/11/16	8.00
NACA Test Area	FWGmw-007	Unconsolidated	11/10/2016	22.50
NACA Test Area	FWGmw-007	Unconsolidated	4/26/2017	7.00
NACA Test Area	FWGmw-007	Unconsolidated	12/04/17	1.60
Load Line 1	FWGmw-010	Unconsolidated	05/02/17	4.42
Load Line 1	FWGmw-010	Unconsolidated	12/07/17	7.00
Load Line 1	FWGmw-011	Unconsolidated	05/12/16	60.70
Load Line 1	FWGmw-011	Unconsolidated	11/10/2016	98.70
Load Line 1	FWGmw-011	Unconsolidated	5/2/2017	133.00
Load Line 1	FWGmw-011	Unconsolidated	12/06/17	27.70
Ramsdell Quarry Landfill	FWGmw-012	Upper Sharon*	05/12/16	0.00
Ramsdell Quarry Landfill	FWGmw-012	Upper Sharon*	11/10/2016	9.26
Ramsdell Quarry Landfill	FWGmw-012	Upper Sharon*	5/2/2017	8.87
Ramsdell Quarry Landfill	FWGmw-012	Upper Sharon*	12/06/17	10.00
Demolition Area 2	FWGmw-013	Upper Sharon	04/19/17	2.61
Demolition Area 2	FWGmw-013	Upper Sharon	12/05/17	2.00
Motor Pool Area	FWGmw-015	Unconsolidated	05/09/16	0.00
Motor Pool Area	FWGmw-015	Unconsolidated	11/9/2016	6.69
Motor Pool Area	FWGmw-015	Unconsolidated	4/17/2017	2.17

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Motor Pool Area	FWGmw-015	Unconsolidated	12/04/17	4.60
Motor Pool Area	FWGmw-016	Upper Sharon	05/09/16	0.00
Motor Pool Area	FWGmw-016	Upper Sharon	11/9/2016	1.30
Motor Pool Area	FWGmw-016	Upper Sharon	4/17/2017	0.15
Motor Pool Area	FWGmw-016	Upper Sharon	12/04/17	0.00
Load Line 2	FWGmw-017	Basal Sharon	04/28/17	0.10
Load Line 2	FWGmw-017	Basal Sharon	08/09/17	0.00
Load Line 2	FWGmw-017	Basal Sharon	12/02/17	0.10
Load Line 12	FWGmw-018	Basal Sharon	04/26/17	0.34
Load Line 12	FWGmw-018	Basal Sharon	08/08/17	0.00
Load Line 12	FWGmw-018	Basal Sharon	12/02/17	0.00
Load Line 10	FWGmw-019	Basal Sharon	01/11/17	8.17
Load Line 10	FWGmw-019	Basal Sharon	04/25/17	0.96
Load Line 10	FWGmw-019	Basal Sharon	12/05/17	0.00
Load Line 12	FWGmw-020	Upper Sharon	04/26/17	0.40
Load Line 12	FWGmw-020	Upper Sharon	08/08/17	8.30
Load Line 12	FWGmw-020	Upper Sharon	12/02/17	2.20
Load Line 3	FWGmw-021	Upper Sharon	04/28/17	4.70
Load Line 3	FWGmw-021	Upper Sharon	05/03/17	2.80
Load Line 3	FWGmw-021	Upper Sharon	08/08/17	0.00
Load Line 3	FWGmw-021	Upper Sharon	12/02/17	6.20
Load Line 10	FWGmw-022	Upper Sharon	01/11/17	6.52
Load Line 10	FWGmw-022	Upper Sharon	04/25/17	8.40
Load Line 10	FWGmw-022	Upper Sharon	08/01/17	1.20
Load Line 10	FWGmw-022	Upper Sharon	12/05/17	1.00
Fuze and Booster Quarry	FWGmw-023	Upper Sharon	01/12/17	4.89
Fuze and Booster Quarry	FWGmw-023	Upper Sharon	04/19/17	0.47
Fuze and Booster Quarry	FWGmw-023	Upper Sharon	07/31/17	0.00
Fuze and Booster Quarry	FWGmw-023	Upper Sharon	12/04/17	1.10
Load Line 2	FWGmw-024	Upper Sharon	04/28/17	7.09
Load Line 2	FWGmw-024	Upper Sharon	08/09/17	2.00
Load Line 2	FWGmw-024	Upper Sharon	12/02/17	9.90
Load Line 10	LL10mw-003	Homewood	05/11/16	0.00
Load Line 10	LL10mw-003	Homewood	11/3/2016	0.58
Load Line 10	LL10mw-003	Homewood	04/19/17	1.11
Load Line 10	LL10mw-003	Homewood	12/05/17	0.00
Load Line 10	LL10mw-005	Homewood	04/28/17	1.59
Load Line 10	LL10mw-005	Homewood	12/04/17	9.80
Load Line 10	LL10mw-006	Homewood	04/19/17	0.38
Load Line 11	LL11mw-005	Unconsolidated	04/26/17	1.36
Load Line 11	LL11mw-005	Unconsolidated	12/04/17	1.80
Load Line 12	LL12mw-183	Upper Sharon	04/19/17	2.10
Load Line 12	LL12mw-183	Upper Sharon	12/06/17	9.90
Load Line 12	LL12mw-185	Unconsolidated	05/11/16	0.00

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Load Line 12	LL12mw-185	Unconsolidated	11/7/2016	1.17
Load Line 12	LL12mw-185	Unconsolidated	04/25/17	2.70
Load Line 12	LL12mw-185	Unconsolidated	12/06/17	4.50
Load Line 12	LL12mw-187	Unconsolidated	05/11/16	0.00
Load Line 12	LL12mw-187	Unconsolidated	11/7/2016	1.12
Load Line 12	LL12mw-187	Unconsolidated	4/25/2017	0.89
Load Line 12	LL12mw-187	Unconsolidated	12/06/17	2.30
Load Line 12	LL12mw-189	Upper Sharon*	04/28/17	8.33
Load Line 12	LL12mw-242	Unconsolidated	05/11/16	27.00
Load Line 12	LL12mw-242	Unconsolidated	11/4/2016	9.31
Load Line 12	LL12mw-242	Unconsolidated	4/25/2017	1000.00
Load Line 12	LL12mw-242	Unconsolidated	12/06/17	225.00
Load Line 12	LL12mw-245	Unconsolidated	05/11/16	0.00
Load Line 12	LL12mw-245	Unconsolidated	11/4/2016	1.95
Load Line 12	LL12mw-245	Unconsolidated	04/25/17	2.37
Load Line 12	LL12mw-245	Unconsolidated	12/06/17	3.10
Load Line 12	LL12mw-247	Unconsolidated	05/11/16	9.70
Load Line 12	LL12mw-247	Unconsolidated	11/8/2016	1.59
Load Line 12	LL12mw-247	Unconsolidated	04/25/17	7.38
Load Line 12	LL12mw-247	Unconsolidated	12/06/17	337.00
Load Line 1	LL1mw-063	Upper Sharon	04/21/17	0.00
Load Line 1	LL1mw-063	Upper Sharon	12/07/17	183.00
Load Line 1	LL1mw-064	Unconsolidated	05/12/16	0.00
Load Line 1	LL1mw-064	Unconsolidated	10/31/2016	7.95
Load Line 1	LL1mw-064	Unconsolidated	4/18/2017	2.32
Load Line 1	LL1mw-064	Unconsolidated	12/07/17	0.00
Load Line 1	LL1mw-065	Unconsolidated	05/12/16	0.00
Load Line 1	LL1mw-065	Unconsolidated	04/21/17	0.23
Load Line 1	LL1mw-065	Unconsolidated	12/07/17	9.40
Load Line 1	LL1mw-080	Upper Sharon	04/21/17	3.12
Load Line 1	LL1mw-080	Upper Sharon	12/07/17	0.00
Load Line 1	LL1mw-081	Upper Sharon	04/21/17	6.03
Load Line 1	LL1mw-081	Upper Sharon	12/07/17	7.50
Load Line 1	LL1mw-083	Upper Sharon	05/13/16	4.00
Load Line 1	LL1mw-083	Upper Sharon	10/31/2016	8.80
Load Line 1	LL1mw-083	Upper Sharon	5/1/2017	1.70
Load Line 1	LL1mw-084	Upper Sharon	05/13/16	8.70
Load Line 1	LL1mw-084	Upper Sharon	11/7/2016	0.30
Load Line 1	LL1mw-084	Upper Sharon	4/21/2017	0.47
Load Line 1	LL1mw-084	Upper Sharon	5/3/2017	0.79
Load Line 1	LL1mw-086	Unconsolidated	05/12/16	0.00
Load Line 1	LL1mw-086	Unconsolidated	10/31/2016	486.00
Load Line 1	LL1mw-086	Unconsolidated	4/21/2017	94.60
Load Line 1	LL1mw-086	Unconsolidated	12/07/17	2.20

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Load Line 1	LL1mw-087	Unconsolidated	05/12/16	0.00
Load Line 1	LL1mw-087	Unconsolidated	10/31/2016	25.10
Load Line 1	LL1mw-087	Unconsolidated	4/18/2017	7.63
Load Line 1	LL1mw-087	Unconsolidated	12/06/17	9.30
Load Line 1	LL1mw-088	Unconsolidated	05/11/16	0.00
Load Line 1	LL1mw-088	Unconsolidated	11/1/2016	9.95
Load Line 1	LL1mw-088	Unconsolidated	4/28/2017	77.70
Load Line 1	LL1mw-088	Unconsolidated	12/02/17	5.70
Load Line 1	LL1mw-089	Upper Sharon	01/12/17	3.02
Load Line 1	LL1mw-089	Upper Sharon	04/25/17	0.25
Load Line 1	LL1mw-089	Upper Sharon	08/03/17	0.00
Load Line 1	LL1mw-089	Upper Sharon	12/07/17	0.00
Load Line 2	LL2mw-059	Upper Sharon	05/13/16	9.80
Load Line 2	LL2mw-059	Upper Sharon	10/31/2016	3.28
Load Line 2	LL2mw-059	Upper Sharon	4/28/2017	0.90
Load Line 2	LL2mw-059	Upper Sharon	12/06/17	8.30
Load Line 2	LL2mw-060	Upper Sharon	05/13/16	9.70
Load Line 2	LL2mw-060	Upper Sharon	10/31/2016	5.57
Load Line 2	LL2mw-264	Upper Sharon	04/27/17	1.66
Load Line 2	LL2mw-264	Upper Sharon	12/07/17	9.70
Load Line 2	LL2mw-267	Upper Sharon	05/13/16	0.00
Load Line 2	LL2mw-267	Upper Sharon	10/31/2016	7.98
Load Line 2	LL2mw-267	Upper Sharon	4/25/2017	12.30
Load Line 2	LL2mw-267	Upper Sharon	12/07/17	9.70
Load Line 2	LL2mw-270	Upper Sharon	04/25/17	1.86
Load Line 2	LL2mw-271	Upper Sharon	05/12/16	0.00
Load Line 2	LL2mw-271	Upper Sharon	11/1/2016	1.09
Load Line 2	LL2mw-272	Upper Sharon	1/12/2017	6.16
Load Line 2	LL2mw-272	Upper Sharon	04/27/17	1.27
Load Line 2	LL2mw-272	Upper Sharon	08/03/17	0.00
Load Line 2	LL2mw-272	Upper Sharon	12/07/17	9.50
Load Line 3	LL3mw-234	Upper Sharon	04/14/17	36.50
Load Line 3	LL3mw-234	Upper Sharon	12/06/17	9.70
Load Line 3	LL3mw-236	Upper Sharon	04/24/17	8.59
Load Line 3	LL3mw-236	Upper Sharon	05/02/17	4.48
Load Line 3	LL3mw-237	Upper Sharon	04/24/17	2.87
Load Line 3	LL3mw-237	Upper Sharon	12/06/17	2.60
Load Line 3	LL3mw-238	Upper Sharon	05/12/16	7.80
Load Line 3	LL3mw-238	Upper Sharon	11/15/2016	236.00
Load Line 3	LL3mw-241	Upper Sharon	05/12/16	0.00
Load Line 3	LL3mw-241	Upper Sharon	10/26/2016	2.03
Load Line 3	LL3mw-244	Upper Sharon	05/13/16	0.00
Load Line 3	LL3mw-244	Upper Sharon	10/27/2016	0.84
Load Line 3	LL3mw-244	Upper Sharon	1/11/2017	1.87

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Load Line 3	LL3mw-244	Upper Sharon	4/24/2017	0.75
Load Line 3	LL3mw-244	Upper Sharon	12/06/17	2.40
Load Line 3	LL3mw-246	Upper Sharon	05/12/16	0.00
Load Line 3	LL3mw-246	Upper Sharon	10/28/2016	0.30
Load Line 3	LL3mw-246	Upper Sharon	01/11/17	0.51
Load Line 3	LL3mw-246	Upper Sharon	4/28/2017	0.17
Load Line 3	LL3mw-246	Upper Sharon	5/3/2017	0.71
Load Line 3	LL3mw-246	Upper Sharon	12/02/17	0.00
Load Line 4	LL4mw-193	Unconsolidated	04/24/17	9.44
Load Line 4	LL4mw-193	Unconsolidated	12/06/17	9.80
Load Line 4	LL4mw-200	Unconsolidated	04/24/17	1.16
Load Line 5	LL5mw-001	Homewood	04/21/17	5.04
Load Line 6	LL6mw-001	Unconsolidated	04/26/17	0.43
Load Line 6	LL6mw-002	Unconsolidated	04/26/17	9.15
Load Line 6	LL6mw-006	Unconsolidated	04/26/17	5.86
Load Line 7 Pink Waste Water Treatment	LL7mw-001	Homewood	05/10/16	31.30
Load Line 7 Pink Waste Water Treatment	LL7mw-001	Homewood	11/7/2016	8.46
Load Line 7 Pink Waste Water Treatment	LL7mw-001	Homewood	4/19/2017	7.78
Load Line 7 Pink Waste Water Treatment	LL7mw-006	Homewood	04/19/17	4.62
Load Line 7	LL7mw-006	Homewood	12/04/17	8.90
Landfill North of Winklepeck	LNWmw-026	Unconsolidated	04/20/17	4.20
Mustard Burial Site	MBSmw-004	Unconsolidated	04/26/17	0.57
Mustard Burial Site	MBSmw-006	Unconsolidated	04/26/17	0.90
NACA Test Area	NTAmw-116	Unconsolidated	04/27/17	146.00
NACA Test Area	NTAmw-117	Unconsolidated	04/27/17	0.75
NACA Test Area	NTAmw-117	Unconsolidated	12/04/17	2.90
NACA Test Area	NTAmw-118	Unconsolidated	04/27/17	30.60
NACA Test Area	NTAmw-118	Unconsolidated	12/04/17	7.80
NACA Test Area	NTAmw-119	Unconsolidated	05/11/16	9.50
NACA Test Area	NTAmw-119	Unconsolidated	11/1/2016	8.04
NACA Test Area	NTAmw-119	Unconsolidated	4/27/2017	5.92
NACA Test Area	NTAmw-119	Unconsolidated	12/04/17	9.10
NACA Test Area	NTAmw-120	Upper Sharon	01/12/17	9.49
NACA Test Area	NTAmw-120	Upper Sharon	04/27/17	0.38
NACA Test Area	NTAmw-120	Upper Sharon	08/01/17	0.00
NACA Test Area	NTAmw-120	Upper Sharon	12/04/17	2.60
Ramsdell Quarry Landfill	RGLmw-016	Upper Sharon	05/01/17	0.00
Ramsdell Quarry Landfill	RGLmw-017	Upper Sharon	05/01/17	1.20
Ramsdell Quarry Landfill	RQLmw-007	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-007	Upper Sharon	11/2/2016	1.12
Ramsdell Quarry Landfill	RQLmw-007	Upper Sharon	5/1/2017	3.20
Ramsdell Quarry Landfill	RQLmw-007	Upper Sharon	12/07/17	0.00

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Ramsdell Quarry Landfill	RQLmw-008	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-008	Upper Sharon	11/10/2016	29.10
Ramsdell Quarry Landfill	RQLmw-008	Upper Sharon	5/1/2017	6.22
Ramsdell Quarry Landfill	RQLmw-008	Upper Sharon	12/07/17	0.00
Ramsdell Quarry Landfill	RQLmw-009	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-009	Upper Sharon	11/2/2016	9.05
Ramsdell Quarry Landfill	RQLmw-009	Upper Sharon	01/13/17	9.11
Ramsdell Quarry Landfill	RQLmw-009	Upper Sharon	5/1/2017	4.05
Ramsdell Quarry Landfill	RQLmw-009	Upper Sharon	12/07/17	2.60
Ramsdell Quarry Landfill	RQLmw-011	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-011	Upper Sharon	11/15/2016	5.13
Ramsdell Quarry Landfill	RQLmw-011	Upper Sharon	5/1/2017	0.00
Ramsdell Quarry Landfill	RQLmw-011	Upper Sharon	12/07/17	0.00
Ramsdell Quarry Landfill	RQLmw-012	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-012	Upper Sharon	11/3/2016	1.13
Ramsdell Quarry Landfill	RQLmw-012	Upper Sharon	5/3/2017	0.59
Ramsdell Quarry Landfill	RQLmw-012	Upper Sharon	12/07/17	0.00
Ramsdell Quarry Landfill	RQLmw-013	Upper Sharon	05/12/16	0.00
Ramsdell Quarry Landfill	RQLmw-013	Upper Sharon	11/7/2016	1.42
Ramsdell Quarry Landfill	RQLmw-013	Upper Sharon	5/1/2017	0.58
Ramsdell Quarry Landfill	RQLmw-013	Upper Sharon	12/07/17	0.00
Ramsdell Quarry Landfill	RQLmw-014	Upper Sharon	4/18/2017	0.80
Ramsdell Quarry Landfill	RQLmw-014	Upper Sharon	12/07/17	0.00
Ramsdell Quarry Landfill	RQLmw-015	Upper Sharon	01/13/17	8.19
Ramsdell Quarry Landfill	RQLmw-016	Upper Sharon	12/07/17	7.10
Basal Sharon Conglomerate Wells	SCFmw-001	Basal Sharon	01/17/17	0.99
Basal Sharon Conglomerate Wells	SCFmw-002	Basal Sharon	05/11/16	0.00
Basal Sharon Conglomerate Wells	SCFmw-002	Basal Sharon	11/10/2016	0.70
Basal Sharon Conglomerate Wells	SCFmw-004	Basal Sharon	05/13/16	0.00
Basal Sharon Conglomerate Wells	SCFmw-004	Basal Sharon	11/9/2016	1.78
Basal Sharon Conglomerate Wells	SCFmw-004	Basal Sharon	4/18/2017	0.35
Basal Sharon Conglomerate Wells	SCFmw-006	Basal Sharon	04/18/17	1.10
Basal Sharon Conglomerate Wells	SCFmw-006	Basal Sharon	04/28/17	0.50
Basal Sharon Conglomerate Wells	SCFmw-006	Basal Sharon	12/05/17	0.40
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	05/10/16	0.00
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	10/28/2016	0.41
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	1/10/2017	2.30
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	4/20/2017	1.47

Table 2-2
2017 Turbidity Results

Area or AOC	Well ID	Monitored_Zone	Date Collected	Results
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	12/05/17	9.40
Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	05/10/16	0.00
Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	10/28/2016	0.76
Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	4/20/2017	0.89
Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	12/05/17	0.10
Winklepeck Burning Grounds	WBGmw-015	Unconsolidated	01/10/17	15.90
Winklepeck Burning Grounds	WBGmw-015	Unconsolidated	04/20/17	5.04
Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	05/10/16	0.00
Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	10/28/2016	4.24
Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	01/10/17	5.98
Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	4/20/2017	1.07
Winklepeck Burning Grounds	WBGmw-020	Upper Sharon	12/05/17	5.60
Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	05/10/16	2.90
Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	10/28/2016	2.15
Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	01/10/17	1.03
Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	4/20/2017	4.82
Winklepeck Burning Grounds	WBGmw-021	Upper Sharon	12/05/17	10.00

Notes:
AOC - Area of Concern
All results reported in Nephelometric Turbidity Units (NTU)
* Identified during well installation to be installed in the Sharon Shale Member
LLOERR - over the reading limit of the field monitoring instrument

Table 3-1
Hydraulic Gradient and Velocity Calculations

Formation	Hydraulic Gradient [1]		Predominant Vector Flow Direction [2]	Porosity [3]	Hydraulic Conductivity [4]		Groundwater Velocity [5]	Groundwater Velocity [5]
				(%)	(cm/sec)	(ft/day)	(ft/day)	(ft/year)
Unconsolidated	i1	0.011	East	27.4	4.27E-04	1.21	4.9E-02	18
Unconsolidated	i2	0.025	South-southeast	27.4	4.27E-04	1.21	1.1E-01	40
Unconsolidated	i3	0.015	East	27.4	4.27E-04	1.21	6.6E-02	24
Homewood	i1	0.005	South-southwest	13.9	2.81E-03	7.97	2.9E-01	105
Homewood	i2	0.008	East	13.9	2.81E-03	7.97	4.6E-01	167
Homewood	i3	0.021	South-southeast	13.9	2.81E-03	7.97	1.2E+00	439
Upper Sharon	i1	0.013	East	10.5	4.46E-03	12.64	1.6E+00	571
Upper Sharon	i2	0.028	Northeast	10.5	4.46E-03	12.64	3.4E+00	1231
Upper Sharon	i3	0.014	Northeast	10.5	4.46E-03	12.64	1.7E+00	615
Basal Sharon Conglomerate [6]	i1	0.0058	Northeast	10.5	1.00E-04	0.28	1.6E-02	6

Notes:

[1] Hydraulic gradient is the change in head at two points, divided by the distance between the two points (ft/ft; unitless).

[2] The vector flow direction is the predominant flow path between points h1 and h2.

[3] Percent porosity is the average of the values derived from geotechnical testing of Shelby tubes and rock cores during the remedial investigation of facility-wide groundwater. Refer to Table 2-3 of the Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Monitoring Well Installation Report (EQM, December 2012).

[4] Hydraulic conductivity is the average of the values derived from falling head/rising head tests performed on several RI wells in November 2012.

[5] Groundwater velocity is determined from the following equation: v = Ki/n, where “K” is the hydraulic conductivity, “i” is the hydraulic gradient, and “n” is the porosity.

[6] Hydraulic conductivity for Sharon Conglomerate is modified from Bear, J. (1972). *Dynamics of Fluids in Porous Media* . Dover Publications. ISBN 0-486-65675-6.

Table 3-2
Vertical Gradient Calculations

RVAAP Area	Well ID	Monitored Zone / Aquifer	TOC Elevation (ft, AMSL)	Groundwater Elevation - April 2017 (ft, AMSL)	Elevation of Screen Midpoint (ft, AMSL)	Vertical Hydraulic Gradient (ft/ft)	Vertical Flow Direction	Comments
Unconsolidated and Homewood Aquifers								
Load Line 6	LL6mw-008	Unconsolidated	1,124.15	1,110.44	1,108.80	0.007	Down	Negligible vertical gradient
Load Line 6	LL6mw-009	Homewood	1,123.75	1,110.29	1,087.10			
Unconsolidated and Sharon Sandstone Aquifers								
Erie Burning Grounds	EBGmw-125	Unconsolidated	949.89	937.17	928.05	-0.083	Up	Flow is from Sharon to Unconsolidated
Erie Burning Grounds	EBGmw-131	Sharon	950.08	941.04	881.70			
Facility-Wide Groundwater	FWGmw-015	Unconsolidated	1,014.51	1,009.83	993.30	0.280	Down	Flow is from Unconsolidated to Sharon
Facility-Wide Groundwater	FWGmw-016	Sharon	1,014.39	998.31	952.10			
Load Line 4	LL4mw-199	Unconsolidated	977.28	969.81	959.70	0.054	Down	Flow is from Unconsolidated to Sharon
Load Line 4	LL4mw-201	Sharon	978.02	967.45	916.22			
NACA Test Area	NTAmw-113	Unconsolidated	1,075.68	1,069.01	1,050.11	0.295	Down	Flow is from Unconsolidated to Sharon
NACA Test Area	NTAmw-120	Sharon	1,075.20	1,041.85	958.17			
Winklepeck Burning Grounds	WBGmw-009	Unconsolidated	1,047.53	1,034.00	1,028.53	0.114	Down	Flow is from Sharon to Unconsolidated
Winklepeck Burning Grounds	WBGmw-020	Sharon	1,044.31	1,031.35	1,005.20			
Winklepeck Burning Grounds	WBGmw-018	Unconsolidated	991.45	978.69	971.70	0.167	Down	Flow is from Sharon to Unconsolidated
Winklepeck Burning Grounds	WBGmw-019	Sharon	990.25	974.15	944.45			
Winklepeck Burning Grounds	WBGmw-006	Unconsolidated	1,014.66	1,008.41	999.26	0.230	Down	Flow is from Unconsolidated to Sharon
Winklepeck Burning Grounds	WBGmw-021	Sharon	1,010.92	1,002.29	972.70			

Table 3-2
Vertical Gradient Calculations

RVAAP Area	Well ID	Monitored Zone / Aquifer	TOC Elevation (ft, AMSL)	Groundwater Elevation - April 2017 (ft, AMSL)	Elevation of Screen Midpoint (ft, AMSL)	Vertical Hydraulic Gradient (ft/ft)	Vertical Flow Direction	Comments
Unconsolidated Aquifer Compared to Basal Sharon Conglomerate Aquifer								
Load Line 1	LL1mw-087	Unconsolidated	944.32	939.67	929.50	-0.049	Up	Artesian conditions indicated by historical gauging measurements and recent field observations for SCFmw-004 are under review.
Basal Sharon Conglomerate	SCFmw-004	Basal Sharon Conglomerate	944.17	944.17	836.87			
Load Line 12	LL12mw-247	Unconsolidated	984.25	978.90	966.00	0.115	Down	Flow is from Unconsolidated to Basal Sharon Conglomerate
Basal Sharon Conglomerate	SCFmw-002	Basal Sharon Conglomerate	984.56	964.47	840.28			
Sharon Sandstone Aquifer Compared to Basal Sharon Conglomerate Aquifer								
Load Line 2 (post boundary)	FWGmw-024	Sharon	963.16	948.84	931.60	0.002	Down	Negligible vertical gradient
Load Line 2 (post boundary)	FWGmw-017	Basal Sharon Conglomerate	961.26	948.65	820.03			
Load Line 10	FWGmw-022	Sharon	1,132.31	1,018.12	970.81	0.013	Down	Flow is from Sharon to Basal Sharon Conglomerate
Load Line 10	FWGmw-019	Basal Sharon Conglomerate	1,132.23	1,017.17	900.08			
Load Line 12 (post boundary)	FWGmw-020	Sharon	984.58	961.68	942.03	-0.003	Up	Negligible vertical gradient
Load Line 12 (post boundary)	FWGmw-018	Basal Sharon Conglomerate	984.03	962.02	839.92			

Notes and Abbreviations:
AMSL - above mean sea level
ft - feet
TOC - top of casing

Table 3-3
Data Completeness Summary

Analytical Method	Total Number of Analytes	Number of Rejects	Percent Completeness
January 2017 Event			
VOCs SW8260B	315	1	99.7%
SVOCs SW8270D	329	10	97.0%
PAHs SW8270D SIM	112	0	100%
Pesticides SW8081B	147	0	100%
PCBs SW8082A	112	0	100%
Explosives SW8330B	128	0	100.0%
Metals (ICP) SW6010C/SW6020A	154	0	100%
Mercury SW7470A	7	0	100%
Common Anions EPA 9056A	0	0	100%
Alkalinity	0	0	100%
Total Cyanide SW9012B	8	0	100%
Free cyanide	0	0	100%
Phosphorous	0	0	100%
Perchlorate SW6860	0	0	100%
TOTAL	1312	11	99.2%
April/May 2017 Event			
VOCs SW8260B	910	0	100%
SVOCs SW8270D	1,402	6	99.6%
PAHs SW8270D SIM	448	0	100%
Pesticides SW8081B	567	0	100%
PCBs SW8082A	173	0	100%
Explosives SW8330B	968	32	96.7%
Metals (ICP) SW6010C/SW6020A	1468	0	100%
Mercury SW7470A	67	0	100%
Common Anions EPA 9056A	117	0	100%
Alkalinity	33	0	100%
Hexavalent Chromium SW7196A	49	0	100%
Total Cyanide SW9012B	54	0	100%
Free cyanide	8	0	100%
Phosphorous	2	0	100%
Perchlorate SW6860	12	0	100%
TOTAL	6278	38	99.4%

Table 3-3
Data Completeness Summary

Analytical Method	Total Number of Analytes	Number of Rejects	Percent Completeness
July/August 2017 Event			
VOCs SW8260C	612	0	100%
SVOCs SW8270D	1139	0	100%
PAHs SW8270D SIM	0	0	100%
Pesticides SW8081B	357	0	100%
PCBs SW8082A	119	0	100%
Explosives SW8330B	290	0	100%
Metals (ICP) SW6010C/SW6020A	389	0	100%
Mercury SW7470A	17	0	100%
Hexavalent Chromium SW7196A	17	0	100%
Total Cyanide SW9012B	17	0	100%
Perchlorate SW6860	17	0	100%
TOTAL	2974	0	100%
December 2017 Event			
VOCs SW8260B	875	0	100%
SVOCs SW8270D	1,368	3	99.8%
PAHs SW8270D SIM	432	0	100%
Pesticides SW8081B	525	0	100%
PCBs SW8082A	161	0	100%
Explosives SW8330B	898	16	98.2%
Metals (ICP) SW6010C/SW6020A	1,455	0	100%
Mercury SW7470A	66	0	100%
Common Anions EPA 9056A	67	0	100%
Alkalinity	28	0	100%
Hexavalent Chromium SW7196A	20	0	100%
Total Cyanide SW9012B	47	0	100%
Free cyanide	7	0	100%
Phosphorous	2	0	100%
Perchlorate SW6860	19	0	100%
TOTAL	5970	19	99.7%

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
Common Anions	16887-00-6	Chloride	---	---	---	---
Common Anions	14797-55-8	Nitrate	10000	**10000**	3200	10000
Common Anions	N599	Nitrate/Nitrite (NO3/NO2-N)	---	---	---	---
Common Anions	14808-79-8	Sulfate	---	---	---	---
Common Anions	18496-25-8	Sulfide	---	---	---	---
Common Anions	14265-45-3	Sulfite	---	---	---	---
Explosives	99-35-4	1,3,5-Trinitrobenzene (Explosive)	---	---	**59**	59
Explosives	99-65-0	1,3-Dinitrobenzene (Explosive)	**0.104**	---	0.2	0.104
Explosives	118-96-7	2,4,6-Trinitrotoluene (Explosive)	**0.521**	---	0.98	0.521
Explosives	121-14-2	2,4-Dinitrotoluene (Explosive)	**0.12**	---	0.24	0.12
Explosives	606-20-2	2,6-Dinitrotoluene (Explosive)	**0.122**	---	0.049	0.122
Explosives	35572-78-2	2-Amino-4,6-Dinitrotoluene (Explosive)	**0.209**	---	3.9	0.209
Explosives	88-72-2	2-Nitrotoluene (Explosive)	**0.37**	---	0.31	0.37
Explosives	99-08-1	3-Nitrotoluene (Explosive)	---	---	**0.17**	0.17
Explosives	19406-51-0	4-Amino-2,6-Dinitrotoluene (Explosive)	**0.209**	---	3.9	0.209
Explosives	99-99-0	4-Nitrotoluene (Explosive)	**5.01**	---	4.3	5.01
Explosives	80251-29-2	DNX (Explosive)	---	---	---	---
Explosives	2691-41-0	HMX (Explosive)	---	---	100	100
Explosives	5755-27-1	MNX (Explosive)	---	---	---	---
Explosives	98-95-3	Nitrobenzene (Explosive)	**0.521**	---	0.14	0.521
Explosives	9004-70-0	Nitrocellulose (Explosive)	---	---	6000000	6000000
Explosives	55-63-0	Nitroglycerin (Explosive)	**5.01**	---	0.2	5.01
Explosives	556-88-7	Nitroguanidine (Explosive)	---	---	**200**	200
Explosives	78-11-5	PETN (Explosive)	---	---	**3.9**	3.9
Explosives	121-82-4	RDX (Explosive)	**0.774**	---	0.7	0.774
Explosives	479-45-8	Tetryl (Explosive)	---	---	**3.9**	3.9
Explosives	13980-04-6	TNX (Explosive)	---	---	---	---
Herbicides	93-76-5	2,4,5-T	---	---	**16**	16
Herbicides	94-75-7	2,4-D	---	70	**17**	17
Herbicides	88-85-7	Dinoseb	---	7	**1.5**	1.5
Herbicides	93-72-1	Silvex	---	50	**11**	11
Metals	7429-90-5	Aluminum	*	---	**2000**	2000
Metals	7440-36-0	Antimony	*	6	**0.78**	0.78
Metals	7440-38-2	Arsenic	*	10	**0.052**	0.052
Metals	7440-39-3	Barium	*	2000	**380**	380
Metals	7440-41-7	Beryllium	*	4	**2.5**	2.5
Metals	7440-43-9	Cadmium	*	5	**0.92**	0.92
Metals	7440-70-2	Calcium	*	---	---	---
Metals	7440-47-3	Chromium	*	100	---	---
Metals	7440-48-4	Cobalt	*	---	**0.6**	0.6
Metals	7440-50-8	Copper	*	1300	**80**	80
Metals	7439-89-6	Iron	*	---	**1400**	1400
Metals	7439-92-1	Lead	*	15	**15**	15
Metals	7439-95-4	Magnesium	*	---	---	---
Metals	7439-96-5	Manganese	*	---	**43**	43
Metals	7439-97-6	Mercury	*	2	**0.063**	0.063
Metals	7440-02-0	Nickel	*	---	**39**	39
Metals	7440-09-7	Potassium	*	---	---	---
Metals	7782-49-2	Selenium	*	50	**10**	10
Metals	7440-22-4	Silver	*	---	**9.4**	9.4
Metals	7440-23-5	Sodium	*	---	---	---
Metals	7440-28-0	Thallium	*	2	**0.02**	0.02

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
Metals	7440-29-1	Thorium	*	---	---	---
Metals	7440-31-5	Tin	*	---	**1200**	1200
Metals	7440-61-1	Uranium (inorg)	*	---	---	---
Metals	7440-62-2	Vanadium	*	---	**8.6**	8.6
Metals	7440-66-6	Zinc	*	---	**600**	600
Miscellaneous	57-14-7	1,1-Dimethylhydrazine (UDMH)	---	---	**0.00042**	0.00042
Miscellaneous	505-29-3	1,4-Dithiane	---	---	**20**	20
Miscellaneous	15980-15-1	1,4-Oxathiane	---	---	---	---
Miscellaneous	N33	Alkalinity	---	---	---	---
Miscellaneous	7664-41-7	Ammonia	---	---	---	---
Miscellaneous	N179	Chemical Oxygen Demand	---	---	---	---
Miscellaneous	18540-29-9	Chromium, hexavalent	---	---	**0.035**	0.035
Miscellaneous	124-38-9	CO2	---	---	---	---
Miscellaneous	N237	Conductivity	---	---	---	---
Miscellaneous	57-12-5	Cyanide	---	200	**0.15**	0.15
Miscellaneous	302-01-2	Hydrazine	---	---	**0.0011**	0.0011
Miscellaneous	N522	Kjeldahl Nitrogen	---	---	---	---
Miscellaneous	74-82-8	Methane	---	---	---	---
Miscellaneous	67-56-1	Methanol	---	---	**2000**	2000
Miscellaneous	14797-73-0	Perchlorate	---	---	**1.4**	1.4
Miscellaneous	N704	pH	---	---	---	---
Miscellaneous	64743-03-9	Phenols (misc)	---	---	---	---
Miscellaneous	111-48-8	Thiodiglycol	---	---	**140**	140
Miscellaneous	N340	Total Dissolved Solids	---	---	---	---
Miscellaneous	N997	Total Organic Carbon	---	---	---	---
Miscellaneous	7723-14-0	Total Phosphorus as P	---	---	**0.04**	0.04
Miscellaneous	NS791	TPH - Diesel Range Organics (misc)	---	---	---	---
Miscellaneous	NS834	TPH - Gasoline Range Organics (misc)	---	---	---	---
PCBs	12674-11-2	PCB-1016	---	---	**0.14**	0.14
PCBs	11104-28-2	PCB-1221	---	---	**0.0047**	0.0047
PCBs	11141-16-5	PCB-1232	---	---	**0.0047**	0.0047
PCBs	53469-21-9	PCB-1242	**0.213**	---	0.0078	0.213
PCBs	12672-29-6	PCB-1248	---	---	**0.0078**	0.0078
PCBs	11097-69-1	PCB-1254	**0.021**	---	0.0078	0.021
PCBs	11096-82-5	PCB-1260	**0.213**	---	0.0078	0.213
Pesticides	72-54-8	4,4'-DDD	**0.059**	---	0.032	0.059
Pesticides	72-55-9	4,4'-DDE	**0.047**	---	0.046	0.047
Pesticides	50-29-3	4,4'-DDT	**0.027**	---	0.23	0.027
Pesticides	309-00-2	Aldrin	**0.005**	---	0.00092	0.005
Pesticides	319-84-6	alpha-BHC	**0.014**	---	0.0072	0.014
Pesticides	5103-71-9	alpha-Chlordane	---	---	---	---
Pesticides	319-85-7	beta-BHC	**0.047**	---	0.025	0.047
Pesticides	57-74-9	Chlordane	---	2	**0.02**	0.02
Pesticides	319-86-8	delta-BHC	---	---	---	---
Pesticides	60-57-1	Dieldrin	**0.004**	---	0.0018	0.004
Pesticides	959-98-8	Endosulfan I	---	---	---	---
Pesticides	33213-65-9	Endosulfan II	---	---	---	---
Pesticides	1031-07-8	Endosulfan sulfate	---	---	---	---
Pesticides	72-20-8	Endrin	---	2	**0.23**	0.23
Pesticides	7421-93-4	Endrin aldehyde	---	---	---	---
Pesticides	53494-70-5	Endrin ketone	---	---	---	---
Pesticides	5103-74-2	gamma-Chlordane	---	---	---	---
Pesticides	76-44-8	Heptachlor	**0.4**	0.4	0.0014	0.4
Pesticides	1024-57-3	Heptachlor epoxide	**0.2**	0.2	0.0014	0.2

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
Pesticides	465-73-6	Isodrin	---	---	---	---
Pesticides	143-50-0	Kepone	---	---	**0.0035**	0.0035
Pesticides	58-89-9	Lindane	**0.2**	0.2	0.042	0.2
Pesticides	72-43-5	Methoxychlor	---	40	**3.7**	3.7
Pesticides	298-00-0	Methyl parathion	---	---	**0.45**	0.45
Pesticides	56-38-2	Parathion	---	---	**8.6**	8.6
Pesticides	8001-35-2	Toxaphene	**3**	3	0.071	3
Radiological	14952-40-0	Actinium-227	---	---	---	---
Radiological	14331-83-0	Actinium-228	---	---	---	---
Radiological	12587-46-1	Alpha activity	---	---	---	---
Radiological	12587-47-2	Beta activity	---	---	---	---
Radiological	14913-49-6	Bismuth-212	---	---	---	---
Radiological	14733-03-0	Bismuth-214	---	---	---	---
Radiological	10045-97-3	Cesium-137	---	---	---	---
Radiological	14255-04-0	Lead-210	---	---	---	---
Radiological	15092-94-1	Lead-212	---	---	---	---
Radiological	15067-28-4	Lead-214	---	---	---	---
Radiological	13966-00-2	Potassium-40	---	---	---	---
Radiological	14331-85-2	Protactinium-231	---	---	---	---
Radiological	7440-14-4	Radium	---	---	---	---
Radiological	13982-63-3	Radium-226	---	---	---	---
Radiological	15262-20-1	Radium-228	---	---	---	---
Radiological	14913-50-9	Thallium-208	---	---	---	---
Radiological	15065-10-8	Thorium-234	---	---	---	---
Radiological	7440-61-1	Uranium	---	---	---	---
Radiological	15117-96-1	Uranium-235	---	---	---	---
Radiological	24678-82-8	Uranium-238	---	---	---	---
SVOCs	92-52-4	1,1-Biphenyl	---	---	**0.083**	0.083
SVOCs	95-94-3	1,2,4,5-Tetrachlorobenzene	---	---	**0.17**	0.17
SVOCs	120-82-1	1,2,4-Trichlorobenzene (SVOC)	---	70	**0.4**	0.4
SVOCs	95-50-1	1,2-Dichlorobenzene (SVOC)	---	600	**30**	30
SVOCs	99-35-4	1,3,5-Trinitrobenzene (SVOC)	---	---	**59**	59
SVOCs	541-73-1	1,3-Dichlorobenzene (SVOC)	---	---	---	---
SVOCs	99-65-0	1,3-Dinitrobenzene	**0.104**	---	0.2	0.104
SVOCs	106-46-7	1,4-Dichlorobenzene (SVOC)	---	75	**0.48**	0.48
SVOCs	130-15-4	1,4-Naphthoquinone	---	---	---	---
SVOCs	134-32-7	1-Naphthalenamine	---	---	---	---
SVOCs	58-90-2	2,3,4,6-Tetrachlorophenol	---	---	**24**	24
SVOCs	95-95-4	2,4,5-Trichlorophenol	---	---	**120**	120
SVOCs	88-06-2	2,4,6-Trichlorophenol	---	---	**1.2**	1.2
SVOCs	120-83-2	2,4-Dichlorophenol	---	---	**4.6**	4.6
SVOCs	105-67-9	2,4-Dimethylphenol	---	---	**36**	36
SVOCs	51-28-5	2,4-Dinitrophenol	---	---	**3.9**	3.9
SVOCs	121-14-2	2,4-Dinitrotoluene	**0.12**	---	0.24	0.12
SVOCs	87-65-0	2,6-Dichlorophenol	---	---	---	---
SVOCs	606-20-2	2,6-Dinitrotoluene	**0.122**	---	0.049	0.122
SVOCs	53-96-3	2-Acetylaminofluorene	---	---	**0.016**	0.016
SVOCs	91-58-7	2-Chloronaphthalene	---	---	**75**	75
SVOCs	95-57-8	2-Chlorophenol	---	---	**9.1**	9.1
SVOCs	534-52-1	2-Methyl-4,6-dinitrophenol	---	---	**0.15**	0.15
SVOCs	91-57-6	2-Methylnaphthalene	---	---	**3.6**	3.6
SVOCs	95-48-7	2-Methylphenol	---	---	**93**	93
SVOCs	91-59-8	2-Naphthalenamine	---	---	**0.039**	0.039
SVOCs	88-74-4	2-Nitrobenzenamine	---	---	**19**	19

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
SVOCs	88-75-5	2-Nitrophenol	---	---	---	---
SVOCs	91-94-1	3,3'-Dichlorobenzidine	---	---	**0.13**	0.13
SVOCs	119-93-7	3,3'-Dimethylbenzidine	---	---	**0.0065**	0.0065
SVOCs	15831-10-4	3+4-Methylphenol	---	---	---	---
SVOCs	56-49-5	3-Methylcholanthrene	---	---	**0.0011**	0.0011
SVOCs	108-39-4	3-Methylphenol	---	---	**93**	93
SVOCs	99-09-2	3-Nitrobenzenamine	---	---	---	---
SVOCs	92-67-1	4-Aminobiphenyl	---	---	**0.003**	0.003
SVOCs	101-55-3	4-Bromophenyl phenyl ether	---	---	---	---
SVOCs	59-50-7	4-Chloro-3-methylphenol	---	---	**140**	140
SVOCs	106-47-8	4-Chlorobenzenamine	---	---	**0.37**	0.37
SVOCs	7005-72-3	4-Chlorophenyl phenyl ether	---	---	---	---
SVOCs	106-44-5	4-Methylphenol	---	---	**190**	190
SVOCs	100-01-6	4-Nitrobenzenamine	**3.13**	---	3.8	3.13
SVOCs	100-02-7	4-Nitrophenol	---	---	---	---
SVOCs	94-59-7	5-(2-Propenyl)-1,3-benzodioxole	---	---	**0.096**	0.096
SVOCs	99-55-8	5-Nitro-o-toluidine	---	---	**8.2**	8.2
SVOCs	57-97-6	7,12-Dimethylbenz(a)anthracene	---	---	**0.0001**	0.0001
SVOCs	83-32-9	Acenaphthene	---	---	**53**	53
SVOCs	208-96-8	Acenaphthylene	---	---	---	---
SVOCs	98-86-2	Acetophenone	---	---	**190**	190
SVOCs	120-12-7	Anthracene	---	---	**180**	180
SVOCs	1912-24-9	Atrazine	---	3	**0.3**	0.3
SVOCs	56-55-3	Benz(a)anthracene	**0.004**	---	0.03	0.004
SVOCs	100-52-7	Benzaldehyde	---	---	**19**	19
SVOCs	100-51-6	Benzenemethanol	---	---	**200**	200
SVOCs	50-32-8	Benzo(a)pyrene	**0.2**	0.2	0.25	0.2
SVOCs	205-99-2	Benzo(b)fluoranthene	**0.002**		0.25	0.002
SVOCs	191-24-2	Benzo(ghi)perylene	---	---	---	---
SVOCs	207-08-9	Benzo(k)fluoranthene	---	---	**0.34**	0.34
SVOCs	65-85-0	Benzoic acid	---	---	**7500**	7500
SVOCs	111-91-1	bis(2-Chloroethoxy)methane	---	---	**5.9**	5.9
SVOCs	111-44-4	bis(2-Chloroethyl) ether	---	---	**0.014**	0.014
SVOCs	108-60-1	Bis(2-chloroisopropyl) ether	---	---	**71**	71
SVOCs	117-81-7	Bis(2-ethylhexyl)phthalate	**6**	6	5.6	6
SVOCs	85-68-7	Butyl benzyl phthalate	---	---	**16**	16
SVOCs	105-60-2	Caprolactam	---	---	**990**	990
SVOCs	86-74-8	Carbazole	---	---	---	---
SVOCs	510-15-6	Chlorobenzilate	---	---	**0.31**	0.31
SVOCs	218-01-9	Chrysene	---	---	**3.4**	3.4
SVOCs	2303-16-4	Diallate	---	---	**0.54**	0.54
SVOCs	53-70-3	Dibenz(a,h)anthracene	**0.002**	---	0.0034	0.002
SVOCs	132-64-9	Dibenzofuran	---	---	**0.79**	0.79
SVOCs	84-66-2	Diethyl phthalate	---	---	**1500**	1500
SVOCs	60-51-5	Dimethoate	---	---	**0.4**	0.4
SVOCs	131-11-3	Dimethyl phthalate	---	---	---	---
SVOCs	84-74-2	Di-n-butyl phthalate	---	---	**90**	90
SVOCs	117-84-0	Di-n-octylphthalate	---	---	**20**	20
SVOCs	122-39-4	Diphenylamine	---	---	**31**	31
SVOCs	298-04-4	Disulfoton	---	---	**0.05**	0.05
SVOCs	62-50-0	Ethyl methanesulfonate	---	---	---	---
SVOCs	52-85-7	Famphur	---	---	---	---
SVOCs	206-44-0	Fluoranthene	---	---	**80**	80
SVOCs	86-73-7	Fluorene	---	---	**29**	29

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
SVOCs	1888-71-7	Hexachloro-1-propene	---		---	---
SVOCs	118-74-1	Hexachlorobenzene	---	1	**0.0098**	0.0098
SVOCs	87-68-3	Hexachlorobutadiene (SVOC)	---	---	**0.14**	0.14
SVOCs	77-47-4	Hexachlorocyclopentadiene	---	50	**0.041**	0.041
SVOCs	67-72-1	Hexachloroethane	---	---	**0.33**	0.33
SVOCs	193-39-5	Indeno(1,2,3-cd)pyrene	**0.002**	---	0.25	0.002
SVOCs	78-59-1	Isophorone	---	---	**78**	78
SVOCs	120-58-1	Isosafrole	---	---	---	---
SVOCs	91-80-5	Methapyrilene	---	---	---	---
SVOCs	66-27-3	Methyl methanesulfonate	---	---	**0.79**	0.79
SVOCs	91-20-3	Naphthalene (SVOC)	---	---	**0.17**	0.17
SVOCs	98-95-3	Nitrobenzene	**0.521**	---	0.14	0.521
SVOCs	55-18-5	N-Nitrosodiethylamine	---	---	**0.00017**	0.00017
SVOCs	62-75-9	N-Nitrosodimethylamine	---	---	**0.00011**	0.00011
SVOCs	924-16-3	N-Nitroso-di-n-butylamine	---	---	**0.0027**	0.0027
SVOCs	621-64-7	N-Nitroso-di-n-propylamine	---	---	**0.011**	0.011
SVOCs	86-30-6	N-Nitrosodiphenylamine	---	---	**12**	12
SVOCs	10595-95-6	N-Nitrosomethylethylamine	---	---	**0.00071**	0.00071
SVOCs	100-75-4	N-Nitrosopiperidine	---	---	**0.0082**	0.0082
SVOCs	930-55-2	N-Nitrosopyrrolidine	---	---	**0.037**	0.037
SVOCs	126-68-1	O,O,O-Triethylphosphorothioate	---	---	---	---
SVOCs	95-53-4	o-Toluidine	---	---	**4.7**	4.7
SVOCs	60-11-7	p-Dimethylaminoazobenzene	---	---	**0.005**	0.005
SVOCs	608-93-5	Pentachlorobenzene	---	---	**0.32**	0.32
SVOCs	82-68-8	Pentachloronitrobenzene	---	---	**0.12**	0.12
SVOCs	87-86-5	Pentachlorophenol	**1**	1	0.041	1
SVOCs	62-44-2	Phenacetin	---	---	**34**	34
SVOCs	85-01-8	Phenanthrene	---	---	---	---
SVOCs	108-95-2	Phenol	---	---	**580**	580
SVOCs	64743-03-9	Phenols	---	---	---	---
SVOCs	298-02-2	Phorate	---	---	**0.3**	0.3
SVOCs	106-50-3	p-Phenylenediamine	---	---	**380**	380
SVOCs	23950-58-5	Pronamide	---	---	**120**	120
SVOCs	129-00-0	Pyrene	---	---	**12**	12
SVOCs	297-97-2	Thionazin	---	---	---	---
VOCs	630-20-6	1,1,1,2-Tetrachloroethane	---	---	**0.57**	0.57
VOCs	71-55-6	1,1,1-Trichloroethane	---	200	**800**	800
VOCs	79-34-5	1,1,2,2-Tetrachloroethane	**0.069**	---	0.076	0.069
VOCs	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	---	---	**5500**	5500
VOCs	79-00-5	1,1,2-Trichloroethane	---	5	**0.041**	0.041
VOCs	75-34-3	1,1-Dichloroethane	---	---	**2.8**	2.8
VOCs	75-35-4	1,1-Dichloroethene	---	7	**28**	28
VOCs	563-58-6	1,1-Dichloropropene	---	---	---	---
VOCs	96-18-4	1,2,3-Trichloropropane	---	---	**0.00075**	0.00075
VOCs	120-82-1	1,2,4-Trichlorobenzene (VOC)	---	70	**0.4**	0.4
VOCs	96-12-8	1,2-Dibromo-3-chloropropane	---	0.2	**0.00033**	0.00033
VOCs	106-93-4	1,2-Dibromoethane	---	0.05	**0.0075**	0.0075
VOCs	95-50-1	1,2-Dichlorobenzene (VOC)	---	600	**30**	30
VOCs	107-06-2	1,2-Dichloroethane	**5**	5	0.17	5
VOCs	540-59-0	1,2-Dichloroethene	---	---	---	---
VOCs	78-87-5	1,2-Dichloropropane	---	5	**0.44**	0.44
VOCs	541-73-1	1,3-Dichlorobenzene (VOC)	---	---	---	---
VOCs	142-28-9	1,3-Dichloropropane	---	---	**37**	37
VOCs	106-46-7	1,4-Dichlorobenzene (VOC)	---	75	**0.48**	0.48

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria
VOCs	594-20-7	2,2-Dichloropropane	---	---	---	---
VOCs	78-93-3	2-Butanone	---	---	**560**	560
VOCs	126-99-8	2-Chloro-1,3-butadiene	---	---	**0.019**	0.019
VOCs	110-75-8	2-Chloroethyl vinyl ether	---	---	---	---
VOCs	591-78-6	2-Hexanone	---	---	**3.8**	3.8
VOCs	1634-04-4	2-Methoxy-2-methylpropane	---	---	**14**	14
VOCs	108-10-1	4-Methyl-2-pentanone	---	---	**630**	630
VOCs	67-64-1	Acetone	---	---	**1400**	1400
VOCs	75-05-8	Acetonitrile	---	---	**13**	13
VOCs	107-02-8	Acrolein	---	---	**0.0042**	0.0042
VOCs	107-13-1	Acrylonitrile	---	---	**0.052**	0.052
VOCs	107-05-1	Allyl chloride	---	---	**0.21**	0.21
VOCs	71-43-2	Benzene	**5**	5	0.46	5
VOCs	74-97-5	Bromochloromethane	---	---	**8.3**	8.3
VOCs	75-27-4	Bromodichloromethane	---	---	**0.13**	0.13
VOCs	75-25-2	Bromoform	---	---	**3.3**	3.3
VOCs	74-83-9	Bromomethane	---	---	**0.75**	0.75
VOCs	75-15-0	Carbon disulfide	---	---	**81**	81
VOCs	56-23-5	Carbon tetrachloride	**5**	5	0.46	5
VOCs	108-90-7	Chlorobenzene	---	100	**7.8**	7.8
VOCs	75-00-3	Chloroethane	---	---	**2100**	2100
VOCs	67-66-3	Chloroform	**0.207**	---	0.22	0.207
VOCs	74-87-3	Chloromethane	---	---	**19**	19
VOCs	156-59-2	cis-1,2-Dichloroethene	---	70	**3.6**	3.6
VOCs	10061-01-5	cis-1,3-Dichloropropene	---	---	---	---
VOCs	98-82-8	Cumene	---	---	**45**	45
VOCs	110-82-7	Cyclohexane	---	---	**1300**	1300
VOCs	124-48-1	Dibromochloromethane	---	---	**0.87**	0.87
VOCs	74-95-3	Dibromomethane	---	---	**0.83**	0.83
VOCs	75-71-8	Dichlorodifluoromethane	---	---	**20**	20
VOCs	107-12-0	Ethyl cyanide	---	---	---	---
VOCs	97-63-2	Ethyl methacrylate	---	---	**63**	63
VOCs	100-41-4	Ethylbenzene	---	700	**1.5**	1.5
VOCs	74-88-4	Iodomethane	---	---	---	---
VOCs	78-83-1	Isobutanol	---	---	**590**	590
VOCs	126-98-7	Methacrylonitrile	---	---	**0.19**	0.19
VOCs	79-20-9	Methyl acetate	---	---	**2000**	2000
VOCs	80-62-6	Methyl methacrylate	---	---	**140**	140
VOCs	108-87-2	Methylcyclohexane	---	---	---	---
VOCs	75-09-2	Methylene chloride	**5.34**	5	11	5.34
VOCs	100-42-5	Styrene	---	100	**120**	120
VOCs	127-18-4	Tetrachloroethene	**5**	5	4.1	5
VOCs	108-88-3	Toluene	---	1000	**110**	110
VOCs	156-60-5	trans-1,2-Dichloroethene	---	100	**36**	36
VOCs	10061-02-6	trans-1,3-Dichloropropene	---	---	---	---
VOCs	110-57-6	trans-1,4-Dichloro-2-butene	---	---	**0.0013**	0.0013
VOCs	79-01-6	Trichloroethene	**5**	5	0.28	5
VOCs	75-69-4	Trichlorofluoromethane	---	---	**520**	520
VOCs	108-05-4	Vinyl acetate	---	---	**41**	41
VOCs	75-01-4	Vinyl chloride	---	2	**0.019**	0.019
VOCs	179601-23-1	Xylene, m+p	---	---	---	---
VOCs	95-47-6	Xylene, ortho	---	---	**19**	19
VOCs	1330-20-7	Xylenes, total	---	10000	**19**	19

Table 3-4
Screening Criteria

Sum Category	CAS Number	Parameter Name	FWCUG	MCL	RSL	Screening Criteria

Notes and Abbreviations:

'-- indicates value not established

All screening criteria are presented in micrograms per liter (µg/l)

Screening Criteria include the Facility-Wide Cleanup Goals (FWCUG), Maximum Contaminant Levels (MCL), and Regional Screening Levels (RSL).

FWCUGs are from *Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio,* dated March 23, 2010 (S

FWCUGs will be updated during the Remedial Investigation (RI).

RSLs are from November 2017 (using a Target Hazard Quotient=0.1, and Target Cancer Risk=10e-6).

MCL - U.S. EPA Maximum Contaminant Level

PCBs - Polychlorinated biphenyls

SVOCs - Semivolatile Organic Compounds

VOCs - Volatile Organic Compounds

Highlighted and Bold values identify the screening value.

* The FWCUG for metals are not included in this table; these will be revised during the pending Remedial Investigation.

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					DET-003	DET-500	DETmw-003	BKGmw-005	BKGmw-005	BKGmw-005	BKGmw-005-D	BKGmw-006	BKGmw-006	BKGmw-008	BKGmw-008	BKGmw-008	BKGmw-008
Sample Date					4/24/2017	4/24/2017	12/5/2017	4/19/2017	5/3/2017	12/1/2017	12/1/2017	4/24/2017	12/5/2017	4/18/2017	4/19/2017	5/4/2017	12/6/2017
RVAAP Area	Screening Criteria				Open Demolition Area #2	Open Demolition Area #2	Open Demolition Area #2	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value		DUP DET-003		Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		7.01	7.01	7.60	6.56	7.24	6.81	6.81	6.32	6.66	6.34	NA	6.56	6.41
Turbidity (NTU)	--	--	--		0.41	0.41	0	5.96	3.83	0	0	6.59	0	0.2	NA	1.03	8.4
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	4 U	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	**10**	**22**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	--	--	53	53	0.041 U	0.045 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	--	--	--	0.041 U	0.045 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	0.012 U	0.013 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	0.012 U	0.013 U	**0.0053 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	--	--	200	200	0.5 U	0.51 U	0.95 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	2 U	2.1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	--	--	25	25	0.012 U	0.013 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	80	80	0.012 U	0.013 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	--	--	29	29	0.041 U	0.045 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	0.041 U	0.045 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	--	--	0.17	0.17	0.012 U	0.013 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	2 U	2.1 U	0.95 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	--	--	--	--	0.021 U	0.022 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	--	--	12	12	0.021 U	0.022 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.41 U	0.41 U	0.42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 U	0.12 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 U	0.12 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	0.41 U	0.41 U	0.42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	--	--	100	100	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	**0.34 J**	**0.78**	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	0.12 U	0.12 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	**590 J**	NA	**2300 J**	**2300 J**	**114000**	**94000**	**3800**	NA	NA	**3200 J**
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	**110 J**	NA	NA	NA	**123 J**	NA	**170 J**	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	**37000**	NA	**50000**	**50300**	**55400**	**53000**	**32000**	NA	NA	**28000**
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	0.041 U	0.041 U	0.044 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	0.023 U	0.023 U	0.024 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					DET-003	DET-500	DETmw-003	BKGmw-005	BKGmw-005	BKGmw-005	BKGmw-005-D	BKGmw-006	BKGmw-006	BKGmw-008	BKGmw-008	BKGmw-008	BKGmw-008
Sample Date					4/24/2017	4/24/2017	12/5/2017	4/19/2017	5/3/2017	12/1/2017	12/1/2017	4/24/2017	12/5/2017	4/18/2017	4/19/2017	5/4/2017	12/6/2017
RVAAP Area	Screening Criteria				Open Demolition Area #2	Open Demolition Area #2	Open Demolition Area #2	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value		DUP DET-003		Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	70 U	70 U	**110 J**	NA	**750**	**580**	70 U	**32 J**	**22 J**	NA	NA	300 U
Antimony	--	6	0.78	0.78	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
Arsenic	--	10	0.052	0.052	**9.3**	**9.4**	**10 J**	1 U	NA	**0.49 J**	**0.64 J**	**0.93 J**	**3.3 J**	1 U	NA	NA	1 U
Barium	--	2000	380	380	**47**	**48**	**42**	**14**	NA	**18**	**19**	**9.8**	**11**	**4**	NA	NA	**7.3 J**
Beryllium	--	4	2.5	2.5	0.3 U	0.3 U	0.3 U	0.3 U	NA	1 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	0.3 U
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U
Calcium	--	--	--	--	**85000**	**86000**	**78000**	**77000**	NA	**63000**	**62000**	**68000**	**61000**	**24000**	NA	NA	**19000**
Chromium	--	100		--	1.8 U	1.8 U	1.8 UJ	1.8 U	NA	**0.98 J**	**1.2 J**	1.8 U	1.8 UJ	1.8 U	NA	NA	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	4 U	4 U	20 U	20 U	4 U	20 U	NA	4 U	4 U	20 U
Cobalt	--	--	0.6	0.6	**0.28 J**	**0.31 J**	**0.055 J**	**0.11 J**	NA	**0.39 J**	**0.38 J**	**0.38 J**	**0.54 J**	**0.059 J**	NA	NA	**15**
Copper	--	1300	80	80	1.8 U	1.8 U	1.8 U	1.8 U	NA	**1.1 J**	**1.2 J**	1.8 U	1.8 U	1.8 U	NA	NA	1.8 U
Iron	--	--	1400	1400	**1800**	**1800**	**1700**	**230**	NA	**1000**	**820**	**850**	**4000**	**27 J**	NA	NA	**200**
Lead	--	15	15	15	0.7 U	0.7 U	0.7 U	0.7 U	NA	**0.68 J**	**0.7 J**	0.7 U	3 U	0.7 U	NA	NA	**1.5 J**
Magnesium	--	--	--	--	**30000**	**31000**	**30000**	**17000**	NA	**17000**	**16000**	**20000**	**20000**	**9200**	NA	NA	**7400**
Manganese	--	--	43	43	**250**	**260**	**240**	**6.7**	NA	**50**	**52**	**71**	**140**	**0.77 J**	NA	NA	**130 J**
Nickel	--	--	39	39	1 U	1 U	1 U	1 U	NA	**0.92 J**	**1.1 J**	**0.69 J**	**0.99 J**	1 U	NA	NA	**1.6 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**1700 J**	**1600 J**	**1900 J**	940 U	NA	**1800 J**	**1700 J**	**1400 J**	**1400 J**	940 U	NA	NA	**580 J**
Selenium	--	50	10	10	2 U	2 U	2 U	2 U	NA	2 U	2 U	**0.73 J**	2 U	2 U	NA	NA	2 U
Sodium	--	--	--	--	**12000**	**12000**	**13000**	**2300 J**	NA	**8200**	**7700**	**57000**	**54000**	**7100**	NA	NA	**6200**
Thallium	--	2	0.02	0.02	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U
Total Cyanide	--	200	0.15	0.15	5 U	**2 J**	**6.1 J**	NA	NA	NA	NA	NA	NA	**2 J**	NA	NA	10 U
Vanadium	--	--	8.6	8.6	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U	2 U	NA	NA	2 UJ
Zinc	--	--	600	600	8 U	8 U	8 U	8 U	NA	**3.2 J**	**4.4 J**	8 U	8 U	8 U	NA	NA	**9.3 J**
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	**230000**	NA	**200000 B**	**200000**	**190000**	**190000**	**78000**	NA	NA	**62000**
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-008-D	BKGmw-015	BKGmw-015	BKGmw-015	BKGmw-016	BKGmw-016	BKGmw-016	BKGmw-016-D	BKGmw-017	BKGmw-017	BKGmw-018	BKGmw-509	BKGmw-018
Sample Date					12/6/2017	4/19/2017	5/4/2017	12/5/2017	4/19/2017	5/1/2017	12/4/2017	12/4/2017	4/20/2017	12/4/2017	4/20/2017	4/20/2017	12/5/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	DUP BKGmw-018	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		6.41	6.75	6.68	6.56	4.93	5.71	7.22	7.22	6.91	7.10	6.22	6.22	6.53
Turbidity (NTU)	--	--	--		8.4	0.45	4.1	0	0.52	0.75	10	10	158	57.4	0.04	0.04	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	--	--	53	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	--	--	200	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	--	--	25	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	--	--	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	--	--	29	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	--	--	0.17	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	--	--	12	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	--	--	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	**3260**	**790 J**	NA	**920 J**	**1600 J**	NA	**5000 J**	**4980**	3000 U	**1700 J**	**3300**	NA	**4700**
Nitrate as N	10000	10000	3200	10000	NA	**1900**	NA	NA	**56 J**	NA	NA	NA	100 UJ	NA	**290 J**	NA	NA
Sulfate	--	--	--	--	**27600**	**6960**	NA	**4400 J**	**36000**	NA	**39000**	**39100**	**140000**	**130000**	**14000**	NA	**32000**
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-008-D	BKGmw-015	BKGmw-015	BKGmw-015	BKGmw-016	BKGmw-016	BKGmw-016	BKGmw-016-D	BKGmw-017	BKGmw-017	BKGmw-018	BKGmw-509	BKGmw-018
Sample Date					12/6/2017	4/19/2017	5/4/2017	12/5/2017	4/19/2017	5/1/2017	12/4/2017	12/4/2017	4/20/2017	12/4/2017	4/20/2017	4/20/2017	12/5/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	DUP BKGmw-018	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	**38 J**	NA	70 U	**26 J**	NA	**190 J**	NA	**1300**	**600**	70 U	70 U	70 U
Antimony	--	6	0.78	0.78	NA	1 U	NA	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
Arsenic	--	10	0.052	0.052	NA	1 U	NA	1 UJ	1 U	NA	**1.5 J**	NA	**21**	**19**	1 U	1 U	1 UJ
Barium	--	2000	380	380	NA	**250**	NA	**260**	**12**	NA	**20 J**	NA	**50**	**33**	**7.6**	**6.7**	**18**
Beryllium	--	4	2.5	2.5	NA	0.3 U	NA	0.3 U	0.3 U	NA	0.3 U	NA	1 U	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium	--	5	0.92	0.92	NA	1 U	NA	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U
Calcium	--	--	--	--	NA	**32000**	NA	**28000**	**12000**	NA	**69000**	NA	**100000**	**94000**	**23000**	**23000**	**55000**
Chromium	--	100		--	NA	1.8 U	NA	1.8 UJ	1.8 U	NA	1.8 U	NA	**2.5 J**	**1 J**	1.8 U	1.8 U	1.8 UJ
Chromium, hexavalent	--	--	0.035	0.035	NA	4 U	4 U	20 U	4 U	4 U	20 U	NA	4 U	20 U	4 U	**4U**	20 U
Cobalt	--	--	0.6	0.6	NA	0.2 U	NA	0.2 UJ	0.2 U	NA	**0.081 J**	NA	**2.7**	**1.3**	0.2 U	0.2 U	0.2 UJ
Copper	--	1300	80	80	NA	1.8 U	NA	1.8 U	1.8 U	NA	1.8 U	NA	**2.7**	**1.2 J**	**0.99 J**	1.8 U	1.8 U
Iron	--	--	1400	1400	NA	**42 J**	NA	85 U	85 U	NA	**900**	NA	**4300**	**3000**	85 U	85 U	100 U
Lead	--	15	15	15	NA	0.7 U	NA	0.7 U	0.7 U	NA	**0.63 J**	NA	**2.7 J**	**2.1 J**	**0.53 J**	0.7 U	3 U
Magnesium	--	--	--	--	NA	**13000**	NA	**12000**	**5200**	NA	**22000**	NA	**39000**	**40000**	**3000**	**2800**	**8700**
Manganese	--	--	43	43	NA	**1.1 J**	NA	3.5 U	**2.2 J**	NA	**7.2 J**	NA	**230**	**250**	**1.6 J**	**0.7 J**	**10**
Nickel	--	--	39	39	NA	**0.35 J**	NA	**0.97 J**	**2 J**	NA	**0.42 J**	NA	**4**	**2.4 J**	**0.33 J**	**0.4 J**	**0.37 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	**4700**	NA	**5000**	940 U	NA	3000 U	NA	**2600 J**	**2400 J**	940 U	940 U	**1100 J**
Selenium	--	50	10	10	NA	2 U	NA	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	2 U	**1.1 J**
Sodium	--	--	--	--	NA	**13000**	NA	**13000**	**3600 J**	NA	**7800**	NA	**23000**	**23000**	**3400 J**	**3200 J**	**4100 J**
Thallium	--	2	0.02	0.02	NA	0.2 U	NA	0.2 U	0.2 U	NA	0.2 U	NA	**0.29 J**	**0.15 J**	0.2 U	0.2 U	0.2 U
Total Cyanide	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	NA	2 U	NA	2 U	2 U	NA	2 U	NA	**3.2 J**	**0.77 J**	2 U	2 U	2 U
Zinc	--	--	600	600	NA	**3.3 J**	NA	**5 J**	**5.4 J**	NA	8 U	NA	**13 J**	**9.9 J**	**4.2 J**	8 U	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	**140000**	NA	**150000**	**17000**	NA	**210000**	NA	**350000**	**340000 B**	**94000 J**	**57000 J**	**160000**
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	**470**	70 U	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	**17**	**18**	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	**43**	**33 J**	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	0.3 U	0.3 U	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	**97000**	**84000**	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	**1.1 J**	1.8 U	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	**1.1**	**0.3 J**	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	**1 J**	1.8 U	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	**2400**	**1300**	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	**0.95 J**	0.7 U	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	**37000**	**37000**	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	**200**	**200**	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	**1.8 J**	1 U	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	**2700 J**	**2000 J**	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	**24000**	**21000**	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	**0.1 J**	0.2 U	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	6 U	2 U	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	**5.4 J**	8 U	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-021	BKGmw-021	BKGmw-022	BKGmw-510	BKGMW-022	BKGmw-022	BKGmw-023	BKGMW-023	BKGmw-023	BKGmw-023-D	BKGmw-024	BKGmw-024	BKGMW-024
Sample Date					4/21/2017	12/5/2017	4/21/2017	4/21/2017	8/2/2017	12/1/2017	4/20/2017	8/2/2017	12/1/2017	12/1/2017	4/20/2017	5/3/2017	8/7/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Homewood	DUP BKGmw-022	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Basal Sharon	Basal Sharon	Basal Sharon
Field Measurements																	
pH (s.u.)	--	--	--		6.76	6.83	6.73	6.73	6.50	6.90	NA	6.85	6.99	6.99	6.99	7.23	7.16
Turbidity (NTU)	--	--	--		0.52	6.3	5.62	5.62	9.6	0	NA	0	0	0	1.2	0.53	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.4 U	NA	0.25 U
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	0.8 U	NA	0.25 U
1,1-Dichloroethene	--	7	28	7	NA	NA	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	0.8 U	NA	0.25 U
2-Hexanone	--	--	3.8	3.8	NA	NA	4 U	4 U	0.5 U	4 U	4 U	0.5 U	4 U	4 U	4 U	NA	0.5 U
Acetone	--	--	1400	1400	NA	NA	10 U	10 U	**2.1**	6.4 U	10 U	**2.1**	6.4 U	6.4 U	10 U	NA	**2.1**
Benzene	5	5	0.46	5	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.4 U	NA	0.25 U
Carbon tetrachloride	5	5	0.46	5	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.4 U	NA	0.25 U
Chloroform	0.207	--	0.22	0.207	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	**0.13 J**	0.4 U	0.4 U	0.4 U	NA	0.25 U
Ethylbenzene	--	700	1.5	1.5	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.4 U	NA	0.25 U
Methylene Chloride	5.34	5	11	5.34	NA	NA	0.8 U	0.8 U	NA	0.8 U	0.8 U	NA	0.8 U	NA	0.8 U	NA	0.5 U
Toluene	--	1000	110	110	NA	NA	**0.38 J**	**0.37 J**	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	0.4 U	NA	0.25 U
Xylene (Total)	--	10000	19	19	NA	NA	0.8 U	0.8 U	0.5 U	0.8 U	0.8 U	0.5 U	0.8 U	0.8 U	0.8 U	NA	0.5 U
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	4.2 U	4.2 U	3 U	1.9 UJ	4.5 U	2.9 U	2 U	2.3 U	4.2 U	NA	3 U Q
Acenaphthene	--	--	53	53	NA	NA	0.04 U	0.04 U	3 U	0.042 U	0.041 U	2.9 U	0.042 U	0.04 U	0.04 U	NA	3 U
Acenaphthylene	--	--	--	--	NA	NA	0.04 U	0.04 U	3 U	0.042 U	0.041 U	2.9 U	0.042 U	0.04 U	0.04 U	NA	3 U
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NA	0.012 U	0.012 U	3 U	**0.0076 J**	0.012 U	2.9 U	**0.007 J**	0.012 U	0.012 U	NA	3 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NA	0.012 U	0.012 U	3 U	**0.0041**	0.012 U	2.9 U	0.012 U	0.012 U	0.012 U	NA	3 U
Benzyl alcohol	--	--	200	200	NA	NA	0.47 U	0.48 U	3 U Q	0.96 U	0.51 U	2.9 U Q	0.98 U	1.1 U	0.48 U	NA	3 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	NA	1.9 U	1.9 U	3 U	4.2 U	2.1 U	2.9 U	4.3 U	5 U	1.9 U	NA	3 U
Chrysene	--	--	25	25	NA	NA	0.012 U	0.012 U	3 U	0.013 U	0.012 U	2.9 U	0.012 U	0.012 U	0.012 U	NA	3 U
Fluoranthene	--	--	80	80	NA	NA	0.012 U	0.012 U	3 U	0.013 U	0.012 U	2.9 U	0.012 U	0.012 U	0.012 U	NA	3 U
Fluorene	--	--	29	29	NA	NA	0.04 U	0.04 U	3 U	0.042 U	0.041 U	2.9 U	0.042 U	0.04 U	0.04 U	NA	3 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NA	0.04 U	0.04 U	3 U Q	0.042 U	0.041 U	2.9 U Q	0.042 U	0.04 U	0.04 U	NA	3 U
Naphthalene	--	--	0.17	0.17	NA	NA	0.012 U	0.012 U	3 U	**0.0086 J**	0.012 U	2.9 U	0.012 U	**0.012 J**	0.012 U	NA	3 U J
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	1.9 U	1.9 U	3 U	0.96 UJ	2.1 U	2.9 U	0.98 U	1.1 U	1.9 U	NA	3 U J
Phenanthrene	--	--	--	--	NA	NA	0.02 U	0.02 U	3 U	**0.011 J**	0.021 U	2.9 U	0.021 U	0.02 U	0.02 U	NA	3 U
Pyrene	--	--	12	12	NA	NA	0.02 U	0.02 U	3 U	0.021 U	0.021 U	2.9 U	0.021 U	0.02 U	0.02 U	NA	3 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	NA	0.42 U	0.41 U	0.2 U	0.42 UJ	0.42 U	0.2 U	0.42 U	0.43 UJ	0.41 U	NA	0.2 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	0.13 U	0.12 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 U	0.13 UJ	0.12 U	NA	0.2 U
3-Nitrotoluene	--	--	0.17	0.17	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	0.13 U	0.12 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 U	0.13 UJ	0.12 U	NA	0.2 U
4-Nitrotoluene	5.01	--	4.3	5.01	NA	NA	0.42 U	0.41 U	0.2 U	0.42 UJ	0.42 U	0.2 U	0.42 UJ	0.43 UJ	0.41 U	NA	0.2 U
HMX	--	--	100	100	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
RDX	0.774	--	0.7	0.774	NA	NA	0.13 U	0.12 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 U	0.13 UJ	0.12 U	NA	0.2 U
Tetryl	--	--	3.9	3.9	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 U	0.21 UJ	0.21 U	NA	0.2 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	**3600**	**2100 J**	3000 U	3000 U	NA	**2500 J**	**11000**	NA	**12000**	**12000**	**6800**	NA	NA
Nitrate as N	10000	10000	3200	10000	**440 J**	NA	**190 J**	**43 J**	NA	NA	**1000 J**	NA	NA	NA	100 U	NA	NA
Sulfate	--	--	--	--	**50000**	**32000**	**25000**	**25000**	NA	**27000**	**63000**	NA	**61000**	**60000**	**34400**	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	0.095 U	0.095 U	0.31 U	0.099 U	0.1 U	0.29 U	0.097 U	**0.097 J**	0.096 U	NA	0.3 U
Delta-BHC	--	--	--	--	NA	NA	0.04 U	0.04 U	0.02 U	0.041 U	0.041 U	0.019 U	0.04 U	0.04 U	0.04 U	NA	0.02 U
Endosulfan I	--	--	--	--	NA	NA	0.022 U	0.022 U	0.02 U	0.023 U	0.023 U	0.019 U	0.022 U	0.022 U	0.022 U	NA	0.02 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-021	BKGmw-021	BKGmw-022	BKGmw-510	BKGMW-022	BKGmw-022	BKGmw-023	BKGMW-023	BKGmw-023	BKGmw-023-D	BKGmw-024	BKGmw-024	BKGMW-024
Sample Date					4/21/2017	12/5/2017	4/21/2017	4/21/2017	8/2/2017	12/1/2017	4/20/2017	8/2/2017	12/1/2017	12/1/2017	4/20/2017	5/3/2017	8/7/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Homewood	DUP BKGmw-022	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Basal Sharon	Basal Sharon	Basal Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	70 U	70 U	70 U	150 U	70 U	**22 J**	150 U	70 U	70 U	70 U	NA	150 U
Antimony	--	6	0.78	0.78	1 U	**3.6 J**	1 U	1 U	9 U	1 U	1 U	9 U	1 U	1 U	**0.41 J**	NA	9 U J
Arsenic	--	10	0.052	0.052	1 U	**0.45 J**	**3.1 J**	**3 J**	**4.9 J D**	**4.5 J**	1 U	8 U	1 U	1 U	**7.5**	NA	**7.9 J D**
Barium	--	2000	380	380	**25**	**36**	**82**	**84**	**89 D**	**85 J**	**23**	**24 D**	**20 J**	**22**	**87**	NA	**96 D**
Beryllium	--	4	2.5	2.5	0.3 U	**0.21 J**	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U	**0.23 J**	NA	4.5 U
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	1 U	4.5 U	1 U	1 U	4.5 U	1 U	1 U	1 U	NA	4.5 U
Calcium	--	--	--	--	**85000**	**69000**	**23000**	**22000**	**23000 D B J**	**21000**	**71000**	**72000 D B**	**64000**	**68000**	**75000**	NA	**75000 J D B**
Chromium	--	100		--	1.8 U	1.8 UJ	**0.75 J**	1.8 U	8 U	1.8 U	1.8 U	8 U	1.8 U	1.8 U	1.8 U	NA	8 U
Chromium, hexavalent	--	--	0.035	0.035	4 UJ	20 U	4 UJ	4 UJ	20 U	20 U	4 U	20 U	20 U	20 U	4 U	NA	20 U
Cobalt	--	--	0.6	0.6	0.2 U	0.2 UJ	**2.2**	**2.3**	**2.3 D**	**2.2**	**1.1**	**2.1 D**	**1.7**	**1.6**	**0.46 J**	NA	1.8 U
Copper	--	1300	80	80	1.8 U	1.8 U	1.8 U	1.8 U	**0.96 J D**	1.8 U	1.8 U	**1.6 J D**	1.8 U	1.8 U	1.8 U	NA	0.8 U
Iron	--	--	1400	1400	85 U	85 U	**9700**	**9100**	**11000**	**9300**	**300**	**210**	**130**	**150**	**1400**	NA	**1300 J**
Lead	--	15	15	15	0.7 U	**100**	0.7 U	0.7 U	2 U	0.7 U	0.7 U	2 U	0.7 U	0.7 U	0.7 U	NA	2 U
Magnesium	--	--	--	--	**42000**	**33000**	**6600**	**6300**	**6700 D**	**6700**	**18000**	**19000 D**	**19000**	**19000**	**21000**	NA	**22000 J D B**
Manganese	--	--	43	43	**0.39 J**	3.5 U	**370**	**380**	**380 D**	**390**	**210**	**360 D**	**310**	**270**	**450**	NA	**470 J D**
Nickel	--	--	39	39	1 U	**0.35 J**	**2.5 J**	**2.4 J**	**3 J D**	**2.9 J**	**1.7 J**	**2.7 J D**	**2.1 J**	**1.4 J**	**0.86 J**	NA	4 U
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	940 U	**1200 J**	**280 J**	**250 J**	**850 D**	**660 J**	**430 J**	**1100 D**	**730 J**	**730 J**	**1400 J**	NA	**2000 D**
Selenium	--	50	10	10	**0.99 J**	2 U	2 U	2 U	4 U	2 U	2 U	4 U	2 U	2 U	2 U	NA	4 U
Sodium	--	--	--	--	**12000**	**9300**	**3300 J**	5000 U	**2700 D**	**2700 J**	**10000**	**11000 D**	**9900**	**9100**	**11000**	NA	**11000 Q J D**
Thallium	--	2	0.02	0.02	0.2 U	**0.075 J**	0.2 U	0.2 U	15 U	0.2 U	0.2 U	15 U	0.2 U	0.2 U	**0.097 J**	NA	15 U
Total Cyanide	--	200	0.15	0.15	NA	NA	**5.5 J**	5 U	5 U	5 U	5 U	5 U	10 U	10 U	5 U	NA	**4.6 J**
Vanadium	--	--	8.6	8.6	2 U	2 U	2 U	2 U	8 U	2 U	2 U	8 U	2 U	2 U	2 U	NA	8 U
Zinc	--	--	600	600	8 U	8 U	**3.2 J**	**3.3 J**	**6.4 J**	**4.2 J**	8 U	18 U	8 U	**2.4 J**	8 U	NA	18 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	**350000**	**300000**	**67000**	**63000**	NA	**69000**	**210000**	NA	**200000**	**190000 B**	**260000**	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	**0.026 J**	0.01 U	**0.031**	**0.038**	NA	0.01 U	0.01 U
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-024	BKGmw-025	BKGMW-025	BKGmw-025	BKGmw-025-D	B12mw-011	FWGmw-002	FWGmw-002	CBPmw-008	CBPmw-008	CBPmw-009	CBPmw-009	DA2mw-115
Sample Date					12/5/2017	4/26/2017	8/2/2017	12/1/2017	12/1/2017	4/26/2017	5/2/2017	12/5/2017	4/28/2017	12/6/2017	4/28/2017	12/5/2017	4/24/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Building 1200	Building 1200	Building 1200	Central Burn Pits	Central Burn Pits	Central Burn Pits	Central Burn Pits	Demolition Area 2
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		7.24	7.35	7.28	7.37	7.37	5.90	7.71	7.67	6.90	7.34	7.34	7.40	7.01
Turbidity (NTU)	--	--	--		0	0.28	0	0	0	6.83	305	23.1	1.01	9.7	0.23	0	0.62
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.4 UJ	0.4 U	0.25 U	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.8 UJ	0.8 U	0.25 U	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.8 UJ	0.8 U	0.25 U	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	4 UJ	4 U	**0.29 J**	4 U	4 U	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	6.4 UJ	6.4 U	**3**	6.4 U	6.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.4 UJ	0.4 U	0.25 U	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.4 UJ	0.4 U	0.25 U	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.4 UJ	0.4 U	**0.2 J**	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.4 UJ	0.4 U	**0.29 J**	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.8 UJ	0.8 U	NA	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.4 UJ	0.4 U	0.25 U	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.8 UJ	0.8 U	**0.9 J**	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	1.9 U	4.3 U	2.9 U	2 U	1.9 U	NA	NA	NA	NA	NA	NR	NA	NR
Acenaphthene	--	--	53	53	0.042 U	0.04 UJ	2.9 U	0.042 U	0.041 U	0.04 U	NA	NA	NA	NA	NR	NA	NR
Acenaphthylene	--	--	--	--	0.042 U	0.04 U	2.9 U	0.042 U	0.041 U	0.04 U	NA	NA	NA	NA	NR	NA	NR
Benz(a)anthracene	0.004	--	0.03	0.004	0.11 U	0.012 UJ	2.9 U	**0.0066 J**	**0.006 J**	0.012 U	NA	NA	NA	NA	NR	NA	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	**0.0038 J**	0.012 UJ	2.9 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NR	NA	NR
Benzyl alcohol	--	--	200	200	0.95 U	0.49 U	2.9 U Q	0.98 U	0.96 U	NA	NA	NA	NA	NA	NR	NA	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.2 U	2 U	2.9 U	4.3 U	4.2 U	2 U	NA	NA	NA	NA	1.9 U	NA	1.9 U
Chrysene	--	--	25	25	0.11 U	0.012 UJ	2.9 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NR	NA	NR
Fluoranthene	--	--	80	80	0.11 U	0.012 UJ	2.9 U	0.013 U	**0.0049 J**	0.012 U	NA	NA	NA	NA	NR	NA	NR
Fluorene	--	--	29	29	0.042 U	0.04 UJ	2.9 U	0.042 U	0.041 U	0.04 U	NA	NA	NA	NA	NR	NA	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	0.042 U	0.04 UJ	2.9 U Q	0.042 U	0.041 U	0.04 U	NA	NA	NA	NA	NR	NA	NR
Naphthalene	--	--	0.17	0.17	**0.015 J**	**0.046 J**	2.9 U	**0.056 J**	**0.051 J**	0.012 U	NA	NA	NA	NA	NR	NA	NR
Nitrobenzene	0.521	--	0.14	0.521	0.95 U	2 U	2.9 U	0.98 U	0.96 U	NA	NA	NA	NA	NA	NR	NA	NR
Phenanthrene	--	--	--	--	0.11 U	0.02 UJ	2.9 U	0.021 U	**0.01 J**	0.02 U	NA	NA	NA	NA	NR	NA	NR
Pyrene	--	--	12	12	0.11 U	0.02 U	2.9 U	0.021 U	0.02 U	0.02 U	NA	NA	NA	NA	NR	NA	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.44 UJ	0.42 U	0.2 U	0.41 U	0.41 U	NA	NA	NA	NA	NA	NA	NA	0.42 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.22 UJ	0.21 UJ	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.22 UJ	0.21 U	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.22 UJ	0.21 U	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	0.13 U	0.2 U	0.12 U	0.12 U	NA	NA	NA	NA	NA	NA	NA	0.12 U
3-Nitrotoluene	--	--	0.17	0.17	0.22 UJ	0.21 U	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	0.13 U	0.2 U	0.12 U	0.12 U	NA	NA	NA	NA	NA	NA	NA	0.12 U
4-Nitrotoluene	5.01	--	4.3	5.01	0.44 UJ	0.42 U	0.2 U	0.41 UJ	0.41 UJ	NA	NA	NA	NA	NA	NA	NA	0.42 U
HMX	--	--	100	100	0.22 UJ	0.21 UJ	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	0.22 UJ	0.21 U	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	**0.3 J**
RDX	0.774	--	0.7	0.774	0.13 UJ	0.13 UJ	0.2 U	0.12 U	0.12 U	NA	NA	NA	NA	NA	NA	NA	0.12 U
Tetryl	--	--	3.9	3.9	0.22 UJ	0.21 U	0.2 U	0.21 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	**6200**	**3050**	NA	**3300**	**3500**	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	**32000**	**23000**	NA	**22000**	**22000**	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.099 U	0.095 U	0.3 U	**0.08 J**	**0.13 J**	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	0.044 U	0.04 U	0.02 U	0.041 U	0.042 U	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	0.024 U	0.022 U	0.02 U	0.022 U	0.023 U	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					BKGmw-024	BKGmw-025	BKGMW-025	BKGmw-025	BKGmw-025-D	B12mw-011	FWGmw-002	FWGmw-002	CBPmw-008	CBPmw-008	CBPmw-009	CBPmw-009	DA2mw-115
Sample Date					12/5/2017	4/26/2017	8/2/2017	12/1/2017	12/1/2017	4/26/2017	5/2/2017	12/5/2017	4/28/2017	12/6/2017	4/28/2017	12/5/2017	4/24/2017
RVAAP Area	Screening Criteria				Background	Background	Background	Background	Background	Building 1200	Building 1200	Building 1200	Central Burn Pits	Central Burn Pits	Central Burn Pits	Central Burn Pits	Demolition Area 2
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	70 U	150 U	70 U	70 U	NA	NA	NA	NA	NA	NA	NA	70 U
Antimony	--	6	0.78	0.78	1 U	**0.6 J**	9 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	1 U
Arsenic	--	10	0.052	0.052	**7.2**	**48**	**24 D**	**22**	**22**	NA	NA	NA	NA	NA	NA	NA	**1.8 J**
Barium	--	2000	380	380	**94**	**89 J**	**83 D**	**81**	**84**	NA	NA	NA	NA	NA	NA	NA	**22**
Beryllium	--	4	2.5	2.5	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U	NA	NA	NA	NA	NA	NA	NA	0.3 U
Cadmium	--	5	0.92	0.92	1 U	1 U	4.5 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	1 U
Calcium	--	--	--	--	**69000**	**75000**	**69000 D B**	**64000**	**64000**	NA	NA	NA	NA	NA	NA	NA	**100000**
Chromium	--	100		--	1.8 U	1.8 U	8 U	1.8 U	1.8 U	NA	NA	NA	NA	NA	NA	NA	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	20 U	4 UJ	20 U	20 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	0.2 U	**3.4**	**2 D**	**2.3**	**2.2**	NA	NA	NA	NA	NA	NA	NA	**0.056 J**
Copper	--	1300	80	80	1.8 U	1.8 U	**0.69 J D**	1.8 U	1.8 U	NA	NA	NA	NA	NA	NA	NA	1.8 U
Iron	--	--	1400	1400	**1300**	**890 J**	**220**	**540**	**460**	NA	NA	NA	NA	NA	NA	NA	**980**
Lead	--	15	15	15	3 U	0.7 U	2 U	0.7 U	0.7 U	NA	NA	NA	NA	NA	NA	NA	0.7 U
Magnesium	--	--	--	--	**21000**	**18000**	**17000 D**	**17000**	**17000**	NA	NA	NA	NA	NA	NA	NA	**27000**
Manganese	--	--	43	43	**530**	**330**	**220 D**	**300**	**310**	NA	NA	NA	NA	NA	NA	NA	**110**
Nickel	--	--	39	39	**0.41 J**	**7.4**	**5.7 D**	**3.7 J**	**3.6 J**	NA	NA	NA	NA	NA	NA	NA	1 U
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**1900 J**	3000 U	**1400 D**	**950 J**	**920 J**	NA	NA	NA	NA	NA	NA	NA	**3300**
Selenium	--	50	10	10	2 U	2 U	4 U	2 U	2 U	NA	NA	NA	NA	NA	NA	NA	2 U
Sodium	--	--	--	--	**12000**	**9800 J**	**11000 D**	**8800**	**9100**	NA	NA	NA	NA	NA	NA	NA	**11000**
Thallium	--	2	0.02	0.02	0.2 U	0.2 U	15 U	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.2 U
Total Cyanide	--	200	0.15	0.15	5 U	**2.4 J**	5 U	**2.6 J**	5 U	NA	NA	NA	5 U	10 U	5 U	**5 J**	**4.2 J**
Vanadium	--	--	8.6	8.6	2 U	2 U	8 U	2 U	2 U	NA	NA	NA	NA	NA	NA	NA	2 U
Zinc	--	--	600	600	8 U	8 U	18 U	8 U	8 U	NA	NA	NA	NA	NA	NA	NA	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	**270000**	**240000**	NA	**230000**	**240000**	NA	**210000**	**220000**	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	0.01 U	0.01 U	0.01 U	**0.027**	0.01 U	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					DA2mw-115	FWGmw-013	FWGmw-013	EBGmw-125	EBGmw-125	EBGmw-131	EBGmw-131	FWGmw-005	FWGmw-005	FWGmw-005	FBQmw-166	FBQmw-501	FBQmw-171
Sample Date					**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/17/2017**	**12/6/2017**	**4/17/2017**	**12/6/2017**	**4/19/2017**	**5/3/2017**	**12/1/2017**	**4/27/2017**	**4/27/2017**	**5/2/2017**
RVAAP Area	**Screening Criteria**				**Demolition Area 2**	**Demolition Area 2**	**Demolition Area 2**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Facility-Wide**	**Facility-Wide**	**Facility-Wide**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**
Monitored Zone	**FWCUG**	**MCL**	**RSL**	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Unconsolidated**	**Unconsolidated**	**Upper Sharon**	**Upper Sharon**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**DUP FBQmw-166**	**Homewood**
Field Measurements																	
pH (s.u.)	--	--	--		7.63	6.72	6.98	6.63	7.16	6.93	7.36	6.28	7.05	6.74	7.30	7.30	5.84
Turbidity (NTU)	--	--	--		0	2.61	2	2.8	0	0.5	0	6.22	8.84	8.9	0.43	0.43	0.48
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Acenaphthene	--	--	53	53	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Acenaphthylene	--	--	--	--	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Benz(a)anthracene	0.004	--	0.03	0.004	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Benzyl alcohol	--	--	200	200	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	590 U	NA
Chrysene	--	--	25	25	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Fluoranthene	--	--	80	80	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Fluorene	--	--	29	29	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Naphthalene	--	--	0.17	0.17	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Nitrobenzene	0.521	--	0.14	0.521	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Phenanthrene	--	--	--	--	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Pyrene	--	--	12	12	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	0.42 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HMX	--	--	100	100	0.21 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**3200**	NA	**3000**	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	**130 J**	NA	NA	NA	NA	**306 J**
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**49000**	NA	**52000**	NA	NA	**22100**
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					DA2mw-115	FWGmw-013	FWGmw-013	EBGmw-125	EBGmw-125	EBGmw-131	EBGmw-131	FWGmw-005	FWGmw-005	FWGmw-005	FBQmw-166	FBQmw-501	FBQmw-171
Sample Date					12/5/2017	4/19/2017	12/5/2017	4/17/2017	12/6/2017	4/17/2017	12/6/2017	4/19/2017	5/3/2017	12/1/2017	4/27/2017	4/27/2017	5/2/2017
RVAAP Area	Screening Criteria				Demolition Area 2	Demolition Area 2	Demolition Area 2	Erie Burning Grounds	Erie Burning Grounds	Erie Burning Grounds	Erie Burning Grounds	Facility-Wide	Facility-Wide	Facility-Wide	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Homewood	Homewood	Homewood	Unconsolidated	DUP FBQmw-166	Homewood
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	NA	NA	NA	NA	NA	NA	**47 J**	NA	**430**	NA	NA	NA
Antimony	--	6	0.78	0.78	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA	NA
Arsenic	--	10	0.052	0.052	**1.5 J**	NA	NA	NA	NA	NA	NA	**1.2 J**	NA	**2.1 J**	NA	NA	NA
Barium	--	2000	380	380	**22**	NA	NA	NA	NA	NA	NA	**57**	NA	**62 J**	NA	NA	NA
Beryllium	--	4	2.5	2.5	0.3 U	NA	NA	NA	NA	NA	NA	0.3 U	NA	1 U	NA	NA	NA
Cadmium	--	5	0.92	0.92	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA	NA
Calcium	--	--	--	--	**99000**	NA	NA	NA	NA	NA	NA	**47000**	NA	**40000**	NA	NA	NA
Chromium	--	100		--	1.8 UJ	NA	NA	NA	NA	NA	NA	1.8 U	NA	**0.88 J**	NA	NA	NA
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	NA	4 UJ	4 U	20 U	NA	NA	4 U
Cobalt	--	--	0.6	0.6	0.2 UJ	NA	NA	NA	NA	NA	NA	**1.6**	NA	**2**	NA	NA	NA
Copper	--	1300	80	80	1.8 U	NA	NA	NA	NA	NA	NA	1.8 U	NA	1.8 U	NA	NA	NA
Iron	--	--	1400	1400	**930**	NA	NA	NA	NA	NA	NA	**3600**	NA	**5000**	NA	NA	NA
Lead	--	15	15	15	0.7 U	NA	NA	NA	NA	NA	NA	0.7 U	NA	**0.32 J**	NA	NA	NA
Magnesium	--	--	--	--	**29000**	NA	NA	NA	NA	NA	NA	**15000**	NA	**14000**	NA	NA	NA
Manganese	--	--	43	43	**120**	NA	NA	NA	NA	NA	NA	**240**	NA	**260**	NA	NA	NA
Nickel	--	--	39	39	1 U	NA	NA	NA	NA	NA	NA	**1.5 J**	NA	**2.3 J**	NA	NA	NA
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**3400**	NA	NA	NA	NA	NA	NA	**870 J**	NA	**1200 J**	NA	NA	NA
Selenium	--	50	10	10	2 U	NA	NA	NA	NA	NA	NA	2 U	NA	2 U	NA	NA	NA
Sodium	--	--	--	--	**12000**	NA	NA	NA	NA	NA	NA	**7100**	NA	**6100**	NA	NA	NA
Thallium	--	2	0.02	0.02	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	1 U	NA	NA	NA
Total Cyanide	--	200	0.15	0.15	5 U	**7.9 J**	**2.6 J**	**19**	10 U	5 U	10 U	NA	NA	NA	5 U	5 U	5 U
Vanadium	--	--	8.6	8.6	2 U	NA	NA	NA	NA	NA	NA	2 U	NA	2 U	NA	NA	NA
Zinc	--	--	600	600	8 U	NA	NA	NA	NA	NA	NA	**4.7 J**	NA	**9 J**	NA	NA	NA
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	**29**	**5.4 J**	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**140000**	NA	**130000**	NA	NA	**39000**
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FBQmw-502	FBQmw-171	FBQmw-171-D	FBQmw-172	FBQmw-172	FBQmw-174	FBQmw-175	FBQmw-175	FBQmw-176	FBQmw-176	FWGmw-023	FWGmw-500	FWGmw-023
Sample Date					5/2/2017	12/4/2017	12/4/2017	5/2/2017	12/4/2017	5/2/2017	5/2/2017	12/4/2017	4/27/2017	12/4/2017	1/12/2017	1/12/2017	4/19/2017
RVAAP Area	Screening Criteria				Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	DUP FBQmw-171	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Unconsolidated	Unconsolidated	Upper Sharon	DUP FWGmw-023	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		5.84	-	-	6.38	-	6.15	5.45	-	6.05	-	7.37	7.37	7.18
Turbidity (NTU)	--	--	--		0.48	9.8	9.8	3.86	2	2.63	LLOERR	89.7	6.83	6.7	4.89	4.89	0.47
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.8 U
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.8 U
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	4 U
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.4 U	10 U	6.4 U
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.94 J**	**1.3**	0.4 U
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.3 J**	**1.4**	0.4 U
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	5 U	0.8 U
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15 R**	**7.3**	0.8 U
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	NR	NR	4.3 U
Acenaphthene	--	--	53	53	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.039 U	0.037 U	0.041 U
Acenaphthylene	--	--	--	--	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.039 U	0.037 U	0.041 U
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.012 U	0.011 U	0.012 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.012 U	0.011 U	0.012 U
Benzyl alcohol	--	--	200	200	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	**0.49 U J**	0.49 U	0.49 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	NA	NA	NA	NA	**2.6 J**	NA	NA	NA	NA	2 U	2 U	2 U
Chrysene	--	--	25	25	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.012 UJ	0.011 U	0.012 U
Fluoranthene	--	--	80	80	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	**0.012 U J**	0.011 U	0.012 U
Fluorene	--	--	29	29	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.039 U	0.037 U	0.041 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.039 U	0.037 U	0.041 U
Naphthalene	--	--	0.17	0.17	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	**0.061 J**	**0.055 J**	**0.045 J**
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	NR	NR	2 U
Phenanthrene	--	--	--	--	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	**0.019 U J**	0.019 U	0.02 U
Pyrene	--	--	12	12	NA	NA	NA	NA	NA	NR	NA	NA	NA	NA	0.019 U	0.019 U	0.02 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	NA	NA	NA	NA	4.4 U	NA	NA	NA	0.45 UJ	0.42 U	0.42 U	0.42 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.21 U	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	NA	NA	NA	NA	**49 J**	NA	NA	NA	0.22 UJ	0.21 U	0.21 U	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.21 U	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	NA	NA	NA	**18 J**	NA	NA	NA	0.13 UJ	0.13 U	0.13 U	0.12 U
3-Nitrotoluene	--	--	0.17	0.17	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 UJ	0.21 UJ	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	NA	NA	NA	NA	**28 J**	NA	NA	NA	0.13 UJ	**0.13 U J**	0.13 U	0.12 U
4-Nitrotoluene	5.01	--	4.3	5.01	NA	NA	NA	NA	NA	4.4 U	NA	NA	NA	0.45 UJ	0.42 UJ	0.42 UJ	0.42 U
HMX	--	--	100	100	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.21 U	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.21 U	0.21 U
RDX	0.774	--	0.7	0.774	NA	NA	NA	NA	NA	1.3 U	NA	NA	NA	**0.089 J**	0.21 U	**0.27 J**	0.12 U
Tetryl	--	--	3.9	3.9	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 UJ	0.21 UJ	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	**1400 J**	**1300 J**	NA	NA	NA	NA	**1400 J**	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	**810**	**3000**	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	**24000**	**23900**	NA	NA	**14000**	**20000**	**26000**	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.098 U	0.096 U	0.095 U
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	0.041 U	NA	NA	0.04 U	NA	0.024 U	0.023 U	0.043 U
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	0.022 U	NA	NA	0.022 U	NA	0.022 U	0.021 U	0.023 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FBQmw-502	FBQmw-171	FBQmw-171-D	FBQmw-172	FBQmw-172	FBQmw-174	FBQmw-175	FBQmw-175	FBQmw-176	FBQmw-176	FWGmw-023	FWGmw-500	FWGmw-023
Sample Date					5/2/2017	12/4/2017	12/4/2017	5/2/2017	12/4/2017	5/2/2017	5/2/2017	12/4/2017	4/27/2017	12/4/2017	1/12/2017	1/12/2017	4/19/2017
RVAAP Area	Screening Criteria				Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	DUP FBQmw-171	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Unconsolidated	Unconsolidated	Upper Sharon	DUP FWGmw-023	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**25 J**	**23 J**	70 U
Antimony	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6 U	6 U	**1.2 J**
Arsenic	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**150**	**150**	**98**
Barium	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**52 J**	**53 J**	**70**
Beryllium	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3 U	0.3 U	0.3 U
Cadmium	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	1 U
Calcium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**85000 J**	**84000**	**85000**
Chromium	--	100		--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8 U	1.8 U	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	**4U**	20 U	NA	NA	NA	4 U	4 U	20 U	NA	NA	NA	NA	4 U
Cobalt	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**24**	**24**	**13**
Copper	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.8 U	1.8 U	1.8 U
Iron	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3000 J**	**2700**	**1100**
Lead	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.7 U	0.7 U	0.7 U
Magnesium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**23000**	**23000**	**21000**
Manganese	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**440 J**	**410**	**320 J**
Nickel	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**33**	**36**	**14**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2400 J**	**2400 J**	**1500 J**
Selenium	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	2 U
Sodium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**11000**	**11000**	**9700**
Thallium	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	0.2 U
Total Cyanide	--	200	0.15	0.15	NA	10 U	NA	5 U	5 U	NA	NA	NA	**3.3 J**	5 U	5 U	**3.7 J**	**3 J**
Vanadium	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	2 U
Zinc	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.2 J**	**2.2 J**	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	10 U	**4.5 J**	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	**41000**	**39000**	NA	NA	NA	5000 U	**7200**	**7800**	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.057**
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGMW-023	FWGmw-023	LNWmw-026	FWGmw-010	FWGmw-010	FWGmw-011	FWGmw-011	LL1mw-064	LL1mw-064	LL1mw-065	LL1mw-065	LL1mw-080	LL1mw-080
Sample Date					7/31/2017	12/4/2017	4/20/2017	5/2/2017	12/7/2017	5/2/2017	12/6/2017	4/18/2017	12/7/2017	4/21/2017	12/7/2017	4/21/2017	12/7/2017
RVAAP Area	Screening Criteria				Fuze and Booster Quarry	Fuze and Booster Quarry	Landfill North of Winklepeck	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		6.90	6.96	7.41	4.42	5.17	7.45	7.33	7.29	7.12	7.15	6.85	6.57	6.15
Turbidity (NTU)	--	--	--		0	1.1	4.2	4.42	7	133	27.7	2.32	0	0.23	9.4	3.12	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.25 U	0.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.25 U	0.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	0.5 U	4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	**2.2 J**	6.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.5 U	0.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.25 U	0.4 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.5 U	0.8 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	2.9 U	1.9 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Acenaphthene	--	--	53	53	2.9 U	0.04 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Acenaphthylene	--	--	--	--	2.9 U	0.04 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	2.9 U	0.1 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	2.9 U	0.012 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Benzyl alcohol	--	--	200	200	2.9 U Q	0.95 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	2.9 U	4.2 U	NA	NA	NA	**1.9 J**	4.2 U	1.9 U	4.3 U	1.9 U	4.2 U	NA	NA
Chrysene	--	--	25	25	2.9 U	0.1 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Fluoranthene	--	--	80	80	2.9 U	0.1 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Fluorene	--	--	29	29	2.9 U	0.04 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	2.9 U Q	0.04 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Naphthalene	--	--	0.17	0.17	2.9 U	**0.011 J**	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	2.9 U	0.95 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Phenanthrene	--	--	--	--	2.9 U	0.1 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Pyrene	--	--	12	12	2.9 U	0.1 U	NA	NA	NA	NR	NR	NR	NR	NR	NR	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.2 U	0.43 UJ	0.41 U	NA	NA	0.45 U	0.43 UJ	0.41 U	0.43 UJ	0.42 U	0.44 UJ	0.44 UJ	0.43 UJ
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.2 U	0.21 UJ	0.21 U	NA	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.2 U	0.21 UJ	0.21 U	NA	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.2 U	0.21 UJ	0.21 U	NA	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.2 U	0.13 UJ	0.12 U	NA	NA	0.13 U	0.13 UJ	0.12 U	0.13 UJ	0.13 U	0.13 UJ	**0.66 J**	**0.23 J**
3-Nitrotoluene	--	--	0.17	0.17	0.2 U	0.21 UJ	0.21 U	NA	NA	**0.33 J**	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.2 U	0.13 UJ	0.12 U	NA	NA	0.13 UJ	0.13 UJ	0.12 U	0.13 UJ	0.13 U	0.13 UJ	**1.4 J**	**0.34 J**
4-Nitrotoluene	5.01	--	4.3	5.01	0.2 U	0.43 UJ	0.41 U	NA	NA	0.45 U	0.43 UJ	0.41 U	0.43 UJ	0.42 U	0.44 UJ	0.44 UJ	0.43 UJ
HMX	--	--	100	100	0.2 U	0.21 UJ	0.21 U	NA	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	**1.5 J**	**0.33 J**
Nitrobenzene	0.521	--	0.14	0.521	0.2 U	0.21 UJ	0.21 U	NA	NA	0.45 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
RDX	0.774	--	0.7	0.774	0.2 U	0.13 UJ	0.12 U	NA	NA	0.13 U	0.13 UJ	0.12 U	0.13 UJ	0.13 U	0.13 UJ	**7.8 J**	**1.4 J**
Tetryl	--	--	3.9	3.9	0.2 U	0.21 UJ	0.21 U	NA	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.29 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	0.019 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	0.019 U	0.022 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGMW-023	FWGmw-023	LNWmw-026	FWGmw-010	FWGmw-010	FWGmw-011	FWGmw-011	LL1mw-064	LL1mw-064	LL1mw-065	LL1mw-065	LL1mw-080	LL1mw-080
Sample Date					7/31/2017	12/4/2017	4/20/2017	5/2/2017	12/7/2017	5/2/2017	12/6/2017	4/18/2017	12/7/2017	4/21/2017	12/7/2017	4/21/2017	12/7/2017
RVAAP Area	Screening Criteria				Fuze and Booster Quarry	Fuze and Booster Quarry	Landfill North of Winklepeck	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	150 U	70 U	NA	NA	NA	**7800**	**710**	**37 J**	300 U	70 U	300 U	NA	NA
Antimony	--	6	0.78	0.78	9 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Arsenic	--	10	0.052	0.052	**65 D**	**47**	NA	NA	NA	**5.1**	**3.7 J**	**4.3 J**	**4.9 J**	**1 J**	**0.5 J**	NA	NA
Barium	--	2000	380	380	**78 D**	**73**	NA	NA	NA	**45**	**33 J**	**46**	**55**	**50**	**60 J**	NA	NA
Beryllium	--	4	2.5	2.5	4.5 U	0.3 U	NA	NA	NA	**0.26 J**	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA
Cadmium	--	5	0.92	0.92	4.5 U	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA
Calcium	--	--	--	--	**84000 D B**	**81000**	NA	NA	NA	**52000**	**49000**	**64000**	**51000**	**80000**	**76000**	NA	NA
Chromium	--	100		--	8 U	1.8 U	NA	NA	NA	**5.2 J**	**1 J**	1.8 U	1.8 U	1.8 U	1.8 U	NA	NA
Chromium, hexavalent	--	--	0.035	0.035	20 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	**9.2 D**	**5.5**	NA	NA	NA	**3.3**	**1.4**	**0.069 J**	**0.21 J**	**0.36 J**	**0.32 J**	NA	NA
Copper	--	1300	80	80	0.8 U	1.8 U	NA	NA	NA	**3.1**	2 U	1.8 U	1.8 U	1.8 U	1.8 U	NA	NA
Iron	--	--	1400	1400	**850**	**850**	NA	NA	NA	**13000**	**6400**	**1200**	**930**	**120**	**100**	NA	NA
Lead	--	15	15	15	2 U	0.7 U	NA	NA	NA	**2.3 J**	**0.5 J**	0.7 U	0.7 U	0.7 U	**0.2 J**	NA	NA
Magnesium	--	--	--	--	**22000 D**	**23000**	NA	NA	NA	**12000**	**9900**	**10000**	**9300**	**19000**	**18000**	NA	NA
Manganese	--	--	43	43	**350 D**	**380**	NA	NA	NA	**320**	**330 J**	**120**	**160 J**	**240**	**150 J**	NA	NA
Nickel	--	--	39	39	**8.4 D**	**5.1**	NA	NA	NA	**5.6**	**1.7 J**	1 U	1 U	1 U	1 U	NA	NA
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**2000 D**	**2200 J**	NA	NA	NA	**3500**	**1500 J**	**550 J**	**830 J**	**480 J**	**1200 J**	NA	NA
Selenium	--	50	10	10	4 U	2 U	NA	NA	NA	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA
Sodium	--	--	--	--	**9700 D**	**11000**	NA	NA	NA	**5700**	**5600**	**5600**	**5300**	**11000**	**11000**	NA	NA
Thallium	--	2	0.02	0.02	15 U	0.2 U	NA	NA	NA	**0.058 J**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA
Total Cyanide	--	200	0.15	0.15	5 U	**4.1 J**	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	8 U	2 U	NA	NA	NA	6 U	2 UJ	2 U	2 UJ	2 U	2 UJ	NA	NA
Zinc	--	--	600	600	18 U	8 U	NA	NA	NA	**13 J**	**2.6 J**	8 U	8 U	**2.1 J**	8 U	NA	NA
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	0.01 U	**0.014 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	70 U	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	**3.2 J**	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	**31**	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**48000**	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	**1.1**	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	**5700**	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	0.7 U	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**11000**	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	**270**	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	**0.56 J**	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**930 J**	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**5400**	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	8 U	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL1mw-081	LL1mw-081	LL1mw-083	LL1mw-084	LL1mw-084	LL1mw-086	LL1mw-086	LL1mw-086-D	LL1mw-087	LL1mw-087	LL1mw-087D	LL1mw-088	LL1mw-503
Sample Date					4/21/2017	12/7/2017	5/1/2017	4/21/2017	5/3/2017	4/21/2017	12/7/2017	12/7/2017	4/18/2017	12/6/2017	12/6/2017	4/28/2017	4/28/2017
RVAAP Area	Screening Criteria				Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	DUP LL1mw-088
Field Measurements																	
pH (s.u.)	--	--	--		6.67	6.62	4.67	5.27	5.61	9.34	10.51	10.51	6.96	7.24	7.24	7.65	7.65
Turbidity (NTU)	--	--	--		6.03	7.5	1.7	CAP ERROR	0.79	94.6	2.2	2.2	7.63	9.3	9.3	77.7	77.7
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Acenaphthene	--	--	53	53	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Acenaphthylene	--	--	--	--	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Benzyl alcohol	--	--	200	200	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	NA	1.9 U	2.2 U	NA	1.9 U	4.3 U	NA	1.9 U	4.2 U	4.4 U	2 U	1.9 U
Chrysene	--	--	25	25	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Fluoranthene	--	--	80	80	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Fluorene	--	--	29	29	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Naphthalene	--	--	0.17	0.17	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Phenanthrene	--	--	--	--	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Pyrene	--	--	12	12	NA	NA	NR	NR	NA	NR	NR	NA	NR	NR	NR	NR	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.43 U	0.42 UJ	**5.6**	**1.3 J**	NA	0.42 U	0.44 U	NA	0.41 U	0.44 UJ	0.43 U	0.43 U	0.43 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 U	0.21 UJ	0.21 U	**0.28 J**	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U	0.21 UJ	**3.2 J**	**5.4**	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 U	0.21 UJ	**3.3**	**0.95**	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	**0.65 J**	0.13 UJ	0.13 U	**8.2**	NA	0.13 U	0.13 UJ	NA	0.12 U	0.13 UJ	0.13 UJ	0.13 U	0.13 U
3-Nitrotoluene	--	--	0.17	0.17	**0.58 J**	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.43 U	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	**0.49 J**	0.13 UJ	0.13 U	**19**	NA	0.13 U	0.13 U	NA	0.12 U	0.13 UJ	0.13 U	0.13 U	0.13 U
4-Nitrotoluene	5.01	--	4.3	5.01	0.43 U	0.42 UJ	0.43 U	0.42 U	NA	0.42 U	0.44 U	NA	0.41 U	0.44 UJ	0.43 U	0.43 U	0.43 U
HMX	--	--	100	100	0.21 U	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	0.21 U	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
RDX	0.774	--	0.7	0.774	**0.29 J**	0.13 UJ	0.13 U	**1.7 J**	NA	0.13 U	0.13 U	NA	0.12 U	0.13 UJ	0.13 U	0.13 U	0.13 U
Tetryl	--	--	3.9	3.9	0.21 U	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	**1330 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	**370 J**	**451 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	**130000**	**140000**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	0.11 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	NA	NA	0.041 U	0.041 U	NA	NA	NA	NA	NA	NA	NA	0.041 U	0.04 U
Endosulfan I	--	--	--	--	NA	NA	0.023 U	**0.013 J**	NA	NA	NA	NA	NA	NA	NA	0.022 U	0.022 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL1mw-081	LL1mw-081	LL1mw-083	LL1mw-084	LL1mw-084	LL1mw-086	LL1mw-086	LL1mw-086-D	LL1mw-087	LL1mw-087	LL1mw-087D	LL1mw-088	LL1mw-503
Sample Date					4/21/2017	12/7/2017	5/1/2017	4/21/2017	5/3/2017	4/21/2017	12/7/2017	12/7/2017	4/18/2017	12/6/2017	12/6/2017	4/28/2017	4/28/2017
RVAAP Area	Screening Criteria				Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	DUP LL1mw-088
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	NA	NA	**420**	NA	**470**	**1200**	NA	**130 J**	**1700**	**2400**	**340**	**300**
Antimony	--	6	0.78	0.78	NA	NA	NA	1 U	NA	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Arsenic	--	10	0.052	0.052	NA	NA	NA	1 U	NA	**4 J**	**3.9 J**	NA	**0.37 J**	**2.9 J**	**3.1 J**	**29**	**27**
Barium	--	2000	380	380	NA	NA	NA	**14**	NA	**69**	**100 J**	NA	**24**	**37 J**	**36 J**	**44 J**	**41 J**
Beryllium	--	4	2.5	2.5	NA	NA	NA	1 U	NA	0.3 U	0.3 U	NA	0.3 U	**0.14 J**	**0.089 J**	1 U	0.3 U
Cadmium	--	5	0.92	0.92	NA	NA	NA	**1.4**	NA	1 U	1 U	NA	1 U	1 U	1 U	1 U	1 U
Calcium	--	--	--	--	NA	NA	NA	**58000**	NA	**48000**	**49000**	NA	**100000**	**110000**	**120000**	**86000**	**83000**
Chromium	--	100		--	NA	NA	NA	1.8 U	NA	**0.57 J**	**1.7 J**	NA	1.8 U	**2.9 J**	**3.2 J**	**0.83 J**	**0.74 J**
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	4 UJ	4 UJ	4 U	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	NA	NA	NA	**9.7**	NA	**0.79 J**	**1.2**	NA	**0.4 J**	**2.6**	**2.8**	**0.42 J**	**0.38 J**
Copper	--	1300	80	80	NA	NA	NA	**5.2**	NA	**1.1 J**	**2.7**	NA	**0.56 J**	**3.4**	**3.4**	**0.6 J**	**0.92 J**
Iron	--	--	1400	1400	NA	NA	NA	**48 J**	NA	**2100**	**2400**	NA	**300**	**4000**	**5500**	**2100 J**	**2000 J**
Lead	--	15	15	15	NA	NA	NA	**0.48 J**	NA	**0.62 J**	**1.2 J**	NA	**0.21 J**	**2.5 J**	**2.9 J**	**0.39 J**	**0.48 J**
Magnesium	--	--	--	--	NA	NA	NA	**2800**	NA	**24000**	**30000**	NA	**29000**	**35000**	**37000**	**36000**	**35000**
Manganese	--	--	43	43	NA	NA	NA	**77**	NA	**230**	**240 J**	NA	**83**	**280 J**	**280 J**	**55**	**52**
Nickel	--	--	39	39	NA	NA	NA	**19**	NA	**2.5 J**	**3.1**	NA	**0.95 J**	**6.3**	**7.2**	**0.85 J**	**0.74 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	NA	NA	**2500 J**	NA	**13000**	**9500**	NA	**790 J**	**1500 J**	**1700 J**	**4800**	**4600**
Selenium	--	50	10	10	NA	NA	NA	**2.3 J**	NA	2 U	2 U	NA	2 U	2 U	2 U	2 U	2 U
Sodium	--	--	--	--	NA	NA	NA	**4400 J**	NA	**9400**	**7300**	NA	**11000**	**14000**	**14000**	**31000 J**	**28000 J**
Thallium	--	2	0.02	0.02	NA	NA	NA	**0.29 J**	NA	0.2 U	0.2 U	NA	0.2 U	**0.087 J**	**0.066 J**	0.2 U	0.2 U
Total Cyanide	--	200	0.15	0.15	5 U	10 U	NA	5 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	NA	NA	NA	2 U	NA	2 U	2 UJ	NA	2 U	6 UJ	6 UJ	**0.7 J**	**0.57 J**
Zinc	--	--	600	600	NA	NA	NA	**43**	NA	**3.7 J**	**5.4 J**	NA	**2.2 J**	**14 J**	**13 J**	**2.8 J**	**2.3 J**
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	**3.5 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	3200 U	**29000**	NA	**110000**	**120000**	**117000**	NA	NA	NA	**280000**	**300000**
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	**46 J**	NA	NA	NA	NA	NA	70 U	70 U
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	**3 J**	NA	NA	NA	NA	NA	**28**	**28**
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	**50**	NA	NA	NA	NA	NA	**38 J**	**41 J**
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	0.3 U	NA	NA	NA	NA	NA	0.3 U	0.3 U
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	1 U	1 U
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**44000**	NA	NA	NA	NA	NA	**83000**	**85000**
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	1.8 U	1.8 U
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	**0.26 J**	NA	NA	NA	NA	NA	**0.081 J**	**0.062 J**
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	1.8 U	1.8 U
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	**280**	NA	NA	NA	NA	NA	**1500 J**	**1500 J**
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	0.7 U	NA	NA	NA	NA	NA	0.7 U	0.7 U
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**22000**	NA	NA	NA	NA	NA	**35000**	**36000**
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	**170**	NA	NA	NA	NA	NA	**47**	**49**
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	**1.4 J**	NA	NA	NA	NA	NA	1 U	1 U
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**14000**	NA	NA	NA	NA	NA	3000 U	**3500**
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	2 U	2 U
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	**9500**	NA	NA	NA	NA	NA	**27000 J**	**28000 J**
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	0.2 U	0.2 U
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	2 U	2 U
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	8 U	NA	NA	NA	NA	NA	8 U	8 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL1mw-088	LL1mw-089	LL1mw-089	LL1MW-089	LL1MW-089-DUP	LL1mw-089	FWGmw-019	FWGmw-019	FWGMW-019	FWGmw-019	FWGmw-019-D	FWGmw-022	FWGmw-022
Sample Date					12/2/2017	1/12/2017	4/25/2017	8/3/2017	8/3/2017	12/7/2017	1/11/2017	4/25/2017	8/1/2017	12/5/2017	12/5/2017	1/11/2017	4/25/2017
RVAAP Area	Screening Criteria				Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Dup LL1mw-089	Upper Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		7.23	4.43	4.51	5.02	5.02	6.06	7.32	7.36	6.97	7.22	7.22	6.87	7.37
Turbidity (NTU)	--	--	--		5.7	3.02	0.25	0	0	0	8.17	0.96	0	0	0	6.52	8.4
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	0.4 U	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 UJ	0.4 U	0.4 U
1,1-Dichloroethane	--	--	2.8	2.8	NA	0.8 U	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 UJ	0.8 UJ	0.8 U	0.8 U
1,1-Dichloroethene	--	7	28	7	NA	0.8 U	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 UJ	0.8 UJ	0.8 U	0.8 U
2-Hexanone	--	--	3.8	3.8	NA	4 U	4 U	0.5 U	0.5 U Q	4 U	4 U	4 U	0.5 U	4 UJ	4 UJ	4 U	4 U
Acetone	--	--	1400	1400	NA	6.4 U	6.4 U	**2.1**	**2.1**	6.4 U	6.4 U	6.4 U	**1.7 J**	6.4 UJ	6.4 UJ	**3.1 J**	**2.6 J**
Benzene	5	5	0.46	5	NA	0.4 U	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 UJ	0.4 U	0.4 U
Carbon tetrachloride	5	5	0.46	5	NA	0.4 U	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 UJ	0.4 U	0.4 U
Chloroform	0.207	--	0.22	0.207	NA	0.4 U	0.4 U	0.25 U	0.25 U	0.4 U	**0.99 J**	0.4 U	0.25 U	0.4 UJ	0.4 UJ	**1.7**	**0.17 J**
Ethylbenzene	--	700	1.5	1.5	NA	0.4 U	0.4 U	0.25 U	0.25 U Q	0.4 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 UJ	0.4 U	0.4 U
Methylene Chloride	5.34	5	11	5.34	NA	0.8 U	0.8 U	0.5 U	0.5 U	5 U	0.8 U	0.8 U	0.5 U	0.8 UJ	0.8 UJ	0.8 U	0.8 U
Toluene	--	1000	110	110	NA	0.4 U	0.4 U	0.25 U	0.25 U Q	0.4 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 UJ	0.4 U	0.4 U
Xylene (Total)	--	10000	19	19	NA	0.8 U	0.8 U	0.5 U	0.5 U Q	0.8 U	**0.69 J**	0.8 U	0.5 U	0.8 UJ	0.8 UJ	0.8 U	0.8 U
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NR	4.3 U	3.2 U	3 U	2 U	NR	4.4 U	2.9 U	1.9 U	1.9 U	NR	4.4 U
Acenaphthene	--	--	53	53	NR	0.042 U	0.041 U	3.2 U	3 U	0.042 UJ	0.038 U	0.04 U	2.9 U	0.043 UJ	0.043 U	0.044 U	0.04 U
Acenaphthylene	--	--	--	--	NR	0.042 U	0.041 U	3.2 U	3 U	0.042 UJ	0.038 U	0.04 U	2.9 U	0.043 UJ	0.043 U	0.044 U	0.04 U
Benz(a)anthracene	0.004	--	0.03	0.004	NR	0.013 U	0.012 U	3.2 U	3 U	0.11 U	0.011 U	0.012 U	2.9 U	0.11 U	0.11 U	0.013 U	0.012 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	0.013 U	0.012 U	3.2 U	3 U	0.11 U	0.011 U	0.012 U	2.9 U	0.013 U	0.013 U	0.013 U	0.012 U
Benzyl alcohol	--	--	200	200	NR	0.53 U	0.49 U	3.2 U Q	3 U Q	1 U	0.51 U	0.5 U	2.9 U Q	0.96 U	0.95 U	0.51 U	0.5 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.4 U	2.1 U	2 U	3.2 U	3 U	4.5 U	**0.7 J**	2 U	2.9 U	4.2 U	4.2 U	2 U	2 U
Chrysene	--	--	25	25	NR	0.013 U	0.012 U	3.2 U	3 U	0.11 U	0.011 U	0.012 U	2.9 U	0.11 U	0.11 U	0.013 U	0.012 U
Fluoranthene	--	--	80	80	NR	0.013 U	0.012 U	3.2 U	3 U	0.11 UJ	0.011 U	0.012 U	2.9 U	0.11 U	0.11 U	0.013 U	0.012 U
Fluorene	--	--	29	29	NR	0.042 U	0.041 U	3.2 U	3 U	0.042 UJ	0.038 U	0.04 U	2.9 U	0.043 UJ	0.043 U	0.044 U	0.04 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	0.042 U	0.041 U	3.2 U Q	3 U Q	**0.0062 J**	0.038 U	0.04 U	2.9 U Q	0.043 U	0.043 U	0.044 U	0.04 U
Naphthalene	--	--	0.17	0.17	NR	**0.09 J**	0.012 U	3.2 U	3 U	**0.013 J**	**0.057 J**	**0.027 J**	2.9 U	**0.023 J**	**0.016 J**	0.013 U	0.012 U
Nitrobenzene	0.521	--	0.14	0.521	NR	NR	2 U	3.2 U	3 U	1 U	NR	2 U	2.9 U	0.96 U	0.95 U	NR	2 U
Phenanthrene	--	--	--	--	NR	0.021 U	0.02 U	3.2 U	3 U	0.11 UJ	0.019 U	0.02 U	2.9 U	0.11 U	0.11 U	0.022 U	0.02 U
Pyrene	--	--	12	12	NR	0.021 U	0.02 U	3.2 U	3 U	0.11 UJ	0.019 U	0.02 U	2.9 U	0.11 U	0.11 U	0.022 U	0.02 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.41 UJ	0.43 U	0.41 U	0.2 U	0.2 U	0.44 UJ	0.43 U	0.41 U	0.2 U	0.42 UJ	0.41 UJ	0.42 U	0.42 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 UJ	0.21 U	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.21 U	0.2 U	0.21 UJ	0.2 UJ	0.21 U	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 UJ	0.21 U	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.21 U	0.2 U	0.21 UJ	0.2 U	0.21 U	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 UJ	0.21 U	0.21 U	0.2 U	3 U	0.22 UJ	0.21 U	0.21 U	0.2 U	0.21 UJ	0.2 UJ	0.21 U	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 UJ	0.13 U	0.12 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.12 U	0.2 U	0.13 UJ	0.12 UJ	0.13 U	0.12 U
3-Nitrotoluene	--	--	0.17	0.17	0.21 UJ	0.21 UJ	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 UJ	0.21 U	0.2 U	0.21 UJ	0.2 UJ	0.21 UJ	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 UJ	0.13 U	0.12 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.12 U	0.2 U	0.13 UJ	0.12 UJ	0.13 U	0.12 U
4-Nitrotoluene	5.01	--	4.3	5.01	0.41 UJ	0.43 UJ	0.41 U	0.2 U	0.2 U	0.44 UJ	0.43 UJ	0.41 U	0.2 U	0.42 UJ	0.41 UJ	0.42 UJ	0.42 U
HMX	--	--	100	100	0.21 UJ	0.21 U	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.21 U	0.2 U	0.21 UJ	0.2 U	0.21 U	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	0.21 UJ	0.21 U	**0.46**	0.2 U	3 U	0.22 UJ	0.21 U	**0.27 J**	0.2 U	0.21 UJ	0.2 UJ	0.21 U	**0.24 J**
RDX	0.774	--	0.7	0.774	0.12 UJ	0.13 U	0.12 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.12 U	0.2 U	0.13 UJ	0.12 UJ	0.13 U	0.12 U
Tetryl	--	--	3.9	3.9	0.21 UJ	0.21 UJ	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 UJ	0.21 U	0.2 U	0.21 UJ	0.2 UJ	0.21 UJ	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	0.1 U	0.094 U	0.3 U	0.3 U	0.1 U	0.095 U	0.095 U	0.29 U	**0.074 J**	0.095 U	0.1 UJ	0.095 UJ
Delta-BHC	--	--	--	--	0.04 U	0.027 U	0.04 U	0.02 U	0.02 U	0.042 U	0.023 U	0.04 U	0.019 U	0.041 U	0.04 U	0.025 U	0.04 U
Endosulfan I	--	--	--	--	0.022 U	0.025 U	0.022 U	0.02 U	0.02 U	0.023 U	0.021 U	0.022 U	0.019 U	0.023 U	0.022 U	0.023 U	0.022 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL1mw-088	LL1mw-089	LL1mw-089	LL1MW-089	LL1MW-089-DUP	LL1mw-089	FWGmw-019	FWGmw-019	FWGMW-019	FWGmw-019	FWGmw-019-D	FWGmw-022	FWGmw-022
Sample Date					12/2/2017	1/12/2017	4/25/2017	8/3/2017	8/3/2017	12/7/2017	1/11/2017	4/25/2017	8/1/2017	12/5/2017	12/5/2017	1/11/2017	4/25/2017
RVAAP Area	Screening Criteria				Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Dup LL1mw-089	Upper Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	**140 J**	**71 J**	**63 J**	150 U	150 U	300 U	**24 J**	70 U	150 U	70 U	70 U	**510 J**	**100 J**
Antimony	--	6	0.78	0.78	1 U	6 U	1 U	9 U	9 U	1 U	6 U	6 U	9 U	**0.97 J**	**0.67 J**	**7.5**	6 U
Arsenic	--	10	0.052	0.052	**31**	1 U	**0.73 J**	8 U	8 U	**0.78 J**	**13**	**16**	**15 D**	**12**	**13**	**17**	**44**
Barium	--	2000	380	380	**39 J**	**6.6 J**	**1 J**	1.8 U	**5.3 D**	**0.47 J**	**41 J**	**41**	**41 D**	**37**	**37**	**72 J**	**58**
Beryllium	--	4	2.5	2.5	0.3 U	0.3 U	0.3 U	4.5 U	4.5 U	0.3 U	0.3 UJ	0.3 U	4.5 U	0.3 U	0.3 U	0.3 UJ	0.3 U
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	4.5 U	4.5 U	1 U	1 UJ	1 U	4.5 U	1 U	1 U	1 UJ	1 U
Calcium	--	--	--	--	**83000**	**4000**	**3800**	**3800 D B**	**3800 D B**	**3500**	**98000**	**100000 J**	**97000 D B J**	**89000**	**93000**	**110000 J**	**85000**
Chromium	--	100		--	1.8 U	1.8 U	1.8 U	**7.4 J D**	8 U	1.8 U	1.8 U	1.8 U	8 U	1.8 U	1.8 U	**1.8 J**	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	4 U	20 U	20 U	20 U	20 U	4 U	NA	20 U	20 U	NA	4 U
Cobalt	--	--	0.6	0.6	**0.16 J**	**1.3**	**1.1**	1.8 U	1.8 U	**0.69 J**	**7.5**	**4.8**	**3 D**	**1.8**	**1.8**	**21**	**1.3**
Copper	--	1300	80	80	1.8 U	**1.5 J**	1.8 U	**0.5 J D**	**0.41 J D**	1.8 U	1.8 U	1.8 U	**0.44 J D**	1.8 U	1.8 U	**0.73 J**	1.8 U
Iron	--	--	1400	1400	**1700**	85 U	85 U	90 U	90 U	85 U	**500**	**520**	**510**	**560**	**570**	**3400 J**	**1200**
Lead	--	15	15	15	0.7 U	0.7 U	0.7 U	2 U	2 U	0.7 U	0.7 U	0.7 U	2 U	0.7 U	0.7 U	**0.9 J**	0.7 U
Magnesium	--	--	--	--	**38000**	**5000**	**4600**	**4800 D**	**4900 D**	**4700**	**31000**	**28000**	**30000 D J**	**29000**	**30000**	**33000**	**25000**
Manganese	--	--	43	43	**49 J**	**56**	**48**	**46 D**	**43 D**	**43 J**	**220 J**	**140**	**100 D**	**100**	**100**	**890 J**	**430**
Nickel	--	--	39	39	1 U	**6.6**	**7**	**11 D**	**6.5 D**	**6**	**33**	**17**	**10 D**	**6.1**	**6.8**	**150**	**11**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**3700**	**950 J**	**680 J**	**1100 D**	NA	**760 J**	**2900 J**	**2400 J**	**2200 D**	**2200 J**	**2200 J**	**3700**	**2400 J**
Selenium	--	50	10	10	2 U	2 U	2 U	4 U	4 U	2 U	2 U	2 U	4 U	2 U	2 U	**0.89 J**	2 U
Sodium	--	--	--	--	**27000**	**2000 J**	5000 U	**2000 D**	**2100 D**	5000 U	**19000**	**16000**	**15000 D**	**15000**	**16000**	**14000**	**12000**
Thallium	--	2	0.02	0.02	0.2 U	1 U	**0.16 J**	15 U	15 U	**0.15 J**	0.2 U	**0.059 J**	15 U	0.2 U	0.2 U	1 U	0.2 U
Total Cyanide	--	200	0.15	0.15	NA	**2.1 J**	5 U	5 U	5 U	10 U	**5.1 J**	10 U	**3.5 J**	5 U	5 U	**2.5 J**	5 U
Vanadium	--	--	8.6	8.6	2 U	2 U	2 U	8 U	8 U	2 UJ	2 U	2 U	8 U	2 U	2 U	**0.5 J**	2 U
Zinc	--	--	600	600	8 U	**8.9 J**	**8.9 J**	**11 J**	**11 J**	**8.7 J**	**3.4 J**	**2.6 J**	18 U	8 U	8 U	**2.6 J**	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	**290000**	NA	NA	NA	NA	**7300**	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	**0.01 J**	0.01 U	0.01 U	**0.016 J**	NA	0.01 U	0.01 U	0.01 U	0.01 U	NA	0.1 U
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGMW-022	FWGmw-022	LL10mw-003	LL10mw-003	LL10mw-005	LL10mw-005	LL11mw-005	LL11mw-005	FWGmw-018	FWGMW-018	FWGmw-018	FWGmw-020	FWGMW-020
Sample Date					**8/1/2017**	**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/28/2017**	**12/4/2017**	**4/26/2017**	**12/4/2017**	**4/26/2017**	**8/8/2017**	**12/2/2017**	**4/26/2017**	**8/8/2017**
RVAAP Area	**Screening Criteria**				**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 11**	**Load Line 11**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**
Monitored Zone	**FWCUG**	**MCL**	**RSL**	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**
Field Measurements																	
pH (s.u.)	--	--	--		7.05	7.74	6.56	6.70	6.64	6.98	6.01	4.60	7.07	7.24	7.49	7.30	7.08
Turbidity (NTU)	--	--	--		1.2	1	1.11	0	1.59	9.8	1.36	1.8	0.34	0	0	0.4	8.3
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.25 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U
1,1-Dichloroethane	--	--	2.8	2.8	0.25 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	0.8 U	0.25 U	0.8 UJ	0.8 U	0.25 U
1,1-Dichloroethene	--	7	28	7	0.25 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	0.8 U	0.25 U	0.8 UJ	0.8 U	0.25 U
2-Hexanone	--	--	3.8	3.8	0.5 U	4 UJ	4 U	4 U	4 U	4 U	NA	NA	4 U	0.5 U Q	4 UJ	4 U	0.5 U
Acetone	--	--	1400	1400	1 U	6.4 UJ	10 U	6.4 U	**10 J**	6.4 U	NA	NA	6.4 U	1 U	6.4 UJ	6.4 U	**2**
Benzene	5	5	0.46	5	0.25 U	0.4 UJ	0.4 U	0.4 U	**0.17 J**	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U
Carbon tetrachloride	5	5	0.46	5	0.25 U	0.4 UJ	**4.1**	**8.1**	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U
Chloroform	0.207	--	0.22	0.207	0.25 U	0.4 UJ	**0.49 J**	**0.67 J**	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U
Ethylbenzene	--	700	1.5	1.5	0.25 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	**0.4 J**	**0.28 J Q**	0.4 UJ	0.4 U	0.25 U
Methylene Chloride	5.34	5	11	5.34	0.5 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	0.8 U	0.5 U	0.8 UJ	0.8 U	0.5 U
Toluene	--	1000	110	110	0.25 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U Q	0.4 UJ	0.4 U	0.25 U
Xylene (Total)	--	10000	19	19	0.5 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	**0.77 J**	0.5 U Q	0.8 UJ	0.8 U	0.5 U
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	3.1 U Q	1.9 U	4.2 U	2 U	4.3 U	2 U	NA	NA	4.4 U	3 U Q	1.9 U	4.3 U	2.9 U Q
Acenaphthene	--	--	53	53	3.1 U	0.04 U	NR	NR	0.04 U	0.04 U	NA	NA	0.041 U	3 U	0.04 U	0.042 UJ	2.9 U
Acenaphthylene	--	--	--	--	3.1 U	0.04 U	NR	NR	0.04 U	0.04 U	NA	NA	0.041 U	3 U	0.04 U	0.042 UJ	2.9 U
Benz(a)anthracene	0.004	--	0.03	0.004	3.1 U	0.1 U	NR	NR	0.012 U	0.0095 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	3.1 U	0.012 U	NR	NR	0.012 U	0.012 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U
Benzyl alcohol	--	--	200	200	3.1 U Q	**0.95 U J**	NR	NR	0.48 U	1 U	NA	NA	**2.3 J**	3 U	0.95 U	0.49 U	2.9 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	3.1 U	4.2 U	1.9 U	4.4 U	1.9 U	4.4 U	NA	NA	2 U	3 U	4.2 U	2 U	2.9 U
Chrysene	--	--	25	25	3.1 U	0.1 U	NR	NR	0.012 U	**0.0047 Y**	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U
Fluoranthene	--	--	80	80	3.1 U	0.1 U	NR	NR	0.012 U	0.013 U	NA	NA	0.012 U	3 U	0.012 U	0.013 UJ	2.9 U
Fluorene	--	--	29	29	3.1 U	0.04 U	NR	NR	0.04 U	0.04 U	NA	NA	0.041 U	3 U	0.04 U	0.042 UJ	2.9 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	3.1 U	0.04 U	NR	NR	0.04 U	0.04 U	NA	NA	0.041 U	3 U	0.04 U	0.042 U	2.9 U
Naphthalene	--	--	0.17	0.17	3.1 U	**0.016 J**	NR	NR	0.012 U	**0.021 J**	NA	NA	**0.064 J**	3 U	**0.025 J**	0.013 U	2.9 U
Nitrobenzene	0.521	--	0.14	0.521	3.1 U	0.95 U	**2.2 J**	0.99 U	1.9 U	1 U	NA	NA	2 U	3 U	0.95 U	2 U	2.9 U
Phenanthrene	--	--	--	--	3.1 U	0.1 U	NR	NR	0.02 U	0.011 U	NA	NA	0.02 U	3 U	0.02 U	0.021 UJ	2.9 U
Pyrene	--	--	12	12	3.1 U	0.1 U	NR	NR	0.02 U	0.0098 U	NA	NA	0.02 U	3 U	0.02 U	0.021 UJ	2.9 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.2 U	0.44 UJ	NA	NA	NA	NA	NA	NA	0.42 U	0.2 U	0.41 UJ	0.43 U	0.2 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.2 U	0.13 UJ	NA	NA	NA	NA	NA	NA	0.13 U	0.2 U	0.12 UJ	0.13 U	0.2 U
3-Nitrotoluene	--	--	0.17	0.17	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.2 U	0.13 UJ	NA	NA	NA	NA	NA	NA	0.13 U	0.2 U	0.12 UJ	0.13 U	0.2 U
4-Nitrotoluene	5.01	--	4.3	5.01	0.2 U	0.44 UJ	NA	NA	NA	NA	NA	NA	0.42 U	0.2 U	0.41 UJ	0.43 U	0.2 U
HMX	--	--	100	100	0.2 U	0.22 U	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
Nitrobenzene	0.521	--	0.14	0.521	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
RDX	0.774	--	0.7	0.774	0.2 U	0.13 UJ	NA	NA	NA	NA	NA	NA	0.13 U	0.2 U	0.12 UJ	0.13 U	0.2 U
Tetryl	--	--	3.9	3.9	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.29 U	**0.044 J**	NA	NA	NA	NA	NA	NA	0.097 U	0.29 U	**0.18**	0.096 U	0.29 U
Delta-BHC	--	--	--	--	0.019 U	0.042 UJ	NA	NA	NA	NA	NA	NA	0.041 U	0.02 U	0.043 U	0.04 U	0.02 U
Endosulfan I	--	--	--	--	0.019 U	0.023 UJ	NA	NA	NA	NA	NA	NA	0.022 U	0.02 U	0.024 U	0.022 U	0.02 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGMW-022	FWGmw-022	LL10mw-003	LL10mw-003	LL10mw-005	LL10mw-005	LL11mw-005	LL11mw-005	FWGmw-018	FWGMW-018	FWGmw-018	FWGmw-020	FWGMW-020
Sample Date					8/1/2017	12/5/2017	4/19/2017	12/5/2017	4/28/2017	12/4/2017	4/26/2017	12/4/2017	4/26/2017	8/8/2017	12/2/2017	4/26/2017	8/8/2017
RVAAP Area	Screening Criteria				Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 10	Load Line 11	Load Line 11	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Homewood	Homewood	Homewood	Homewood	Unconsolidated	Unconsolidated	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	**390**	**27 J**	70 U	**24 J**	**69 J**	**20 J**	NA	NA	70 U	150 U	70 U	70 U	**51 J**
Antimony	--	6	0.78	0.78	9 U	**1.8 J**	1 U	1 U	1 U	1 U	NA	NA	**0.67 J**	9 U	1 U	**0.57 J**	9 U
Arsenic	--	10	0.052	0.052	**59 D**	**46 J**	1 U	1 UJ	1 U	1 U	NA	NA	**32**	**30 D**	**28**	**26**	**130 D**
Barium	--	2000	380	380	**58 D**	**55**	**3**	**2.2 J**	**29 J**	**5.5**	NA	NA	**61 J**	**70 D**	**69 J**	**84 J**	**88 D**
Beryllium	--	4	2.5	2.5	4.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	0.3 U	4.5 U	0.3 U	1 U	4.5 U
Cadmium	--	5	0.92	0.92	4.5 U	1 U	1 U	1 U	**0.79 J**	1 U	NA	NA	1 U	4.5 U	1 U	1 U	4.5 U
Calcium	--	--	--	--	**91000 D B**	**84000 J**	**63000**	**51000**	**64000**	**57000**	NA	NA	**86000**	**95000 D**	**90000**	**98000**	**100000 D**
Chromium	--	100		--	8 U	1.8 UJ	1.8 U	1.8 UJ	1.8 U	1.8 U	NA	NA	1.8 U	**5.2 J D**	1.8 U	1.8 U	8 U
Chromium, hexavalent	--	--	0.035	0.035	20 U	20 U	NA	NA	NA	NA	NA	NA	4 U	20 U	20 U	4 U	20 U
Cobalt	--	--	0.6	0.6	**2.4 D**	1.7 UJ	0.2 U	0.2 UJ	**0.39 J**	0.2 U	NA	NA	**2.1**	**1.6 J D**	**1.9**	**4.7**	**3.3 D**
Copper	--	1300	80	80	**0.41 J D**	1.8 U	1.8 U	1.8 U	**0.57 J**	1.8 U	NA	NA	1.8 U	0.8 U	1.8 U	1.8 U	**0.74 J D**
Iron	--	--	1400	1400	**1000**	**610**	**25 J**	100 U	**140 J**	33 U	NA	NA	**540 J**	**340**	**490**	**720 J**	**2800**
Lead	--	15	15	15	2 U	3 U	0.7 U	0.7 U	0.7 U	0.7 U	NA	NA	0.7 U	**3.2 J**	0.7 U	0.7 U	2 U
Magnesium	--	--	--	--	**28000 D**	**27000**	**18000**	**15000**	**14000**	**14000**	NA	NA	**23000**	**30000 D**	**26000**	**31000**	**35000 D**
Manganese	--	--	43	43	**320 D**	**280 J**	**3.5**	3.5 U	**11000**	**1900**	NA	NA	**360**	**280 D**	**270 J**	**130**	**110 D**
Nickel	--	--	39	39	**18 D**	**12**	1 U	1 U	**15**	**2.5 J**	NA	NA	**1.8 J**	**5.4 D**	**2.6 J**	**6.7**	**5.2 D**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**2300 D**	**2100 J**	940 U	**720 J**	3000 U	**770 J**	NA	NA	3000 U	**2500 D**	3000 U	**4100**	**4300 D**
Selenium	--	50	10	10	4 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	4 U	2 U	2 U	4 U
Sodium	--	--	--	--	**11000 D**	**11000**	**7000**	**7700**	5000 U	**3500 J**	NA	NA	**20000 J**	**22000 Q D**	**17000**	**16000 J**	**16000 Q D**
Thallium	--	2	0.02	0.02	15 U	0.2 U	0.2 U	0.2 U	**0.084 J**	**0.052 J**	NA	NA	0.2 U	15 U	0.2 U	0.2 U	15 U
Total Cyanide	--	200	0.15	0.15	5 U	**2 J**	NA	NA	NA	NA	5 U	5 U	5 U	5 U	10 U	5 U	**3.6 J**
Vanadium	--	--	8.6	8.6	8 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	8 U	2 U	2 U	8 U
Zinc	--	--	600	600	18 U	8 U	**6.1 J**	8 U	**6.2 J**	8 U	NA	NA	**2.2 J**	18 U	8 U	8 U	18 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	10 U	**4 J**	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	0.01 U	0.01 U	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-020	LL12mw-183	LL12mw-183	LL12mw-185	LL12mw-505	LL12mw-185	LL12mw-187	LL12mw-187	LL12mw-189	LL12mw-242	LL12mw-242	LL12mw-242-D	LL12mw-245
Sample Date					12/2/2017	4/19/2017	12/6/2017	4/25/2017	4/25/2017	12/6/2017	4/25/2017	12/6/2017	4/28/2017	4/25/2017	12/6/2017	12/6/2017	4/25/2017
RVAAP Area	Screening Criteria				Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	DUP LL12mw-185	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon*	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Field Measurements																	
pH (s.u.)	--	--	--		7.76	7.12	7.37	6.44	6.44	6.35	6.28	6.11	6.47	7.61	7.53	7.53	6.90
Turbidity (NTU)	--	--	--		2.2	2.1	9.9	2.7	2.7	4.5	0.89	2.3	8.33	'1000'	225	225	2.37
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	6.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	2 U	NR	NR	NA	NA	NA	NR	NR	NR	NR	NR	NA	NR
Acenaphthene	--	--	53	53	0.042 U	0.041 U	0.042 U	NA	NA	NA	NR	NR	0.046 UJ	NR	NR	NA	NR
Acenaphthylene	--	--	--	--	0.042 U	0.041 U	0.042 U	NA	NA	NA	NR	NR	0.046 UJ	NR	NR	NA	NR
Benz(a)anthracene	0.004	--	0.03	0.004	0.013 U	0.012 U	**0.0099 J**	NA	NA	NA	NR	NR	0.014 UJ	NR	NR	NA	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	0.013 U	0.012 U	0.012 U	NA	NA	NA	NR	NR	0.014 UJ	NR	NR	NA	NR
Benzyl alcohol	--	--	200	200	1 U	NR	NR	NA	NA	NA	NR	NR	NR	NR	NR	NA	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.4 U	NR	NR	NA	NA	NA	2 U	4.3 U	NR	2 U	**4.2 U J1**	NA	2 U
Chrysene	--	--	25	25	0.013 U	0.012 U	**0.0054 J**	NA	NA	NA	NR	NR	0.014 UJ	NR	NR	NA	NR
Fluoranthene	--	--	80	80	0.1 U	0.012 U	**0.013 J**	NA	NA	NA	NR	NR	0.014 UJ	NR	NR	NA	NR
Fluorene	--	--	29	29	0.042 U	0.041 U	0.042 U	NA	NA	NA	NR	NR	0.046 UJ	NR	NR	NA	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	0.042 U	0.041 U	0.042 U	NA	NA	NA	NR	NR	0.046 UJ	NR	NR	NA	NR
Naphthalene	--	--	0.17	0.17	**0.018 J**	**0.085 J**	**0.032 J**	NA	NA	NA	NR	NR	**0.018 J**	NR	NR	NA	NR
Nitrobenzene	0.521	--	0.14	0.521	1 U	NR	NR	NA	NA	NA	NR	NR	NR	NR	NR	NA	NR
Phenanthrene	--	--	--	--	0.021 U	0.021 U	**0.013 J**	NA	NA	NA	NR	NR	0.023 UJ	NR	NR	NA	NR
Pyrene	--	--	12	12	0.021 U	0.021 U	**0.01 J**	NA	NA	NA	NR	NR	0.023 UJ	NR	NR	NA	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.41 UJ	NA	NA	NA	NA	NA	NA	NA	0.48 U	0.42 U	0.44 U Q J1	NA	0.41 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 UJ	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.13 U	0.13 U Q J1	NA	0.12 U
3-Nitrotoluene	--	--	0.17	0.17	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 UJ	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.13 U	0.13 U Q J1	NA	0.12 U
4-Nitrotoluene	5.01	--	4.3	5.01	0.41 UJ	NA	NA	NA	NA	NA	NA	NA	0.48 U	0.42 U	0.44 U Q J1	NA	0.41 U
HMX	--	--	100	100	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
Nitrobenzene	0.521	--	0.14	0.521	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	**0.12 J**	**0.19 J**	0.22 U Q J1	NA	0.2 U
RDX	0.774	--	0.7	0.774	0.12 UJ	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.13 U	0.13 U Q J1	NA	0.12 U
Tetryl	--	--	3.9	3.9	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	**130000**	NA	**120000 D**	**1600000**	**1700000 D**	NA	**97 J**	100 U	100 U	**140 J**
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	0.022 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-020	LL12mw-183	LL12mw-183	LL12mw-185	LL12mw-505	LL12mw-185	LL12mw-187	LL12mw-187	LL12mw-189	LL12mw-242	LL12mw-242	LL12mw-242-D	LL12mw-245
Sample Date					12/2/2017	4/19/2017	12/6/2017	4/25/2017	4/25/2017	12/6/2017	4/25/2017	12/6/2017	4/28/2017	4/25/2017	12/6/2017	12/6/2017	4/25/2017
RVAAP Area	Screening Criteria				Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	DUP LL12mw-185	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon*	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	NA	NA	NA	**190 J**	NA	70 U	**30 J**	NA	**15000**	**2400 J1**	NA	70 U
Antimony	--	6	0.78	0.78	1 U	NA	NA	NA	6 U	NA	1 U	1 U	NA	1 U	1 U J1	NA	6 U
Arsenic	--	10	0.052	0.052	**30**	NA	NA	**0.53 J**	**0.54 J**	**0.49 J**	**0.49 J**	**0.5 J**	NA	**39**	**21**	NA	**2.1 J**
Barium	--	2000	380	380	**84 J**	NA	NA	NA	**47**	NA	**260**	**290**	NA	**110**	**31**	NA	**26**
Beryllium	--	4	2.5	2.5	0.3 U	NA	NA	NA	1 U	NA	0.3 U	0.3 U	NA	**0.9 J**	**0.083 J**	NA	0.3 U
Cadmium	--	5	0.92	0.92	1 U	NA	NA	NA	**0.38 J**	NA	1 U	1 U	NA	1 U	1 U	NA	1 U
Calcium	--	--	--	--	**100000**	NA	NA	NA	**580000**	NA	**1000000**	**1100000**	NA	**80000**	**64000**	NA	**140000**
Chromium	--	100		--	1.8 U	NA	NA	NA	1.8 U	NA	1.8 U	1.8 U	NA	**26**	**2.5 J**	NA	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	**3**	NA	NA	NA	**2.2**	NA	**11**	**11**	NA	**14**	**1.6**	NA	**0.56 J**
Copper	--	1300	80	80	1.8 U	NA	NA	NA	**1.7 J**	NA	**0.77 J**	**0.63 J**	NA	**24**	**2.2**	NA	**0.77 J**
Iron	--	--	1400	1400	**880**	NA	NA	NA	**100**	NA	**23 J**	**72 J**	NA	**35000**	**4000 J1**	NA	**260**
Lead	--	15	15	15	0.7 U	NA	NA	NA	3 U	NA	0.7 U	**0.18 J**	NA	**12**	**1.2 J**	NA	0.7 U
Magnesium	--	--	--	--	**34000**	NA	NA	NA	**230000**	NA	**290000**	**340000**	NA	**50000**	**38000**	NA	**65000**
Manganese	--	--	43	43	**90 J**	NA	NA	NA	**1200**	NA	**2700**	**2900**	NA	**490**	**140**	NA	**39**
Nickel	--	--	39	39	**3.4**	NA	NA	NA	**5.8**	NA	**15**	**16**	NA	**34**	**3.1**	NA	**1.5 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**4600**	NA	NA	NA	**7800**	NA	**57000**	**61000**	NA	**5200**	**2800 J**	NA	**3300**
Selenium	--	50	10	10	2 U	NA	NA	NA	2 U	NA	2 U	2 U	NA	2 U	2 U	NA	2 U
Sodium	--	--	--	--	**15000**	NA	NA	NA	**66000**	NA	**47000**	**40000**	NA	**26000**	**20000**	NA	**26000**
Thallium	--	2	0.02	0.02	0.2 U	NA	NA	NA	1 U	NA	**0.71 J**	**0.74 J**	NA	**0.27 J**	**0.058 J**	NA	0.2 U
Total Cyanide	--	200	0.15	0.15	5 U	**3.4 J**	**2.2 J**	5 UJ	5 U	**7.7 J**	NA	NA	5 U	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	2 U	NA	NA	NA	2 U	NA	2 U	2 U	NA	**30**	**3.3 J**	NA	2 U
Zinc	--	--	600	600	8 U	NA	NA	NA	**6.7 J**	NA	**6 J**	**5.2 J**	NA	**80**	**7.5 J**	NA	**3.2 J**
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	0.01 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2700**	**70 U J1**	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	**20**	**19**	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	**51**	**22 J1**	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	0.3 U	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	**70000**	**61000 J1**	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	**6 J**	1.8 U	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2.5**	**0.42 J**	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4**	1.8 U	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5500**	**540 J1**	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	3 U	0.7 U	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	**42000**	**40000**	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	**130**	**88**	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.7**	1 U	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	**2700 J**	**1700 J**	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	**25000**	**20000**	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	0.2 U	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	**7.3**	2 U	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	**15 J**	**6 J**	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL12mw-245	LL12mw-245-D	LL12mw-247	LL12mw-506	LL12mw-247	FWGmw-017	FWGMW-017	FWGMW-017-DUP	FWGmw-017	FWGmw-024	FWGMW-024	FWGmw-024	LL2mw-059
Sample Date					**12/6/2017**	**12/6/2017**	**4/25/2017**	**4/25/2017**	**12/6/2017**	**4/28/2017**	**8/9/2017**	**8/9/2017**	**12/2/2017**	**4/28/2017**	**8/9/2017**	**12/2/2017**	**4/28/2017**
RVAAP Area	**Screening Criteria**				**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**
Monitored Zone	**FWCUG**	**MCL**	**RSL**	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP LL12mw-247**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**	**Dup FWGmw-017**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**
Field Measurements																	
pH (s.u.)	--	--	--		6.83	6.83	6.98	6.98	7.34	7.16	7.27	7.27	8.27	7.05	7.08	7.24	6.40
Turbidity (NTU)	--	--	--		3.1	3.1	7.38	7.38	337	0.1	0	0	0.1	7.09	2	9.9	0.9
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	4 U	0.5 U	0.5 U	4 U	4 U	0.5 U	4 U	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	6.4 U	**2**	1 U	**2 J**	6.4 U	1 U	6.4 U	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	0.8 U	0.5 U	0.5 U	0.8 U	0.8 U	0.5 U	0.8 U	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	0.8 U	0.5 U	0.5 U	0.8 U	0.8 U	0.5 U	0.8 U	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NR	NR	NA	NR	4.3 U	2.9 U Q	2.9 U Q	2 U	4.3 U	2.9 U Q	NR	NR
Acenaphthene	--	--	53	53	NR	NR	NR	NA	NR	0.04 UJ	2.9 U	2.9 U	0.04 U	0.04 U	2.9 U	0.041 U	NR
Acenaphthylene	--	--	--	--	NR	NR	NR	NA	NR	0.04 UJ	2.9 U	2.9 U	0.04 U	0.04 U	2.9 U	0.041 U	NR
Benz(a)anthracene	0.004	--	0.03	0.004	NR	NR	NR	NA	NR	0.012 U	2.9 U	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	NR	NR	NA	NR	0.012 U	2.9 U	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NR
Benzyl alcohol	--	--	200	200	NR	NR	NR	NA	NR	0.49 U	2.9 U	2.9 U	1 U	0.49 U	2.9 U	NR	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.5 U	4.3 U	2 U	NA	4.4 U	1.9 U	2.9 U	2.9 U	4.4 U	2 U	2.9 U	4.3 U	2 U
Chrysene	--	--	25	25	NR	NR	NR	NA	NR	0.012 U	2.9 U	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NR
Fluoranthene	--	--	80	80	NR	NR	NR	NA	NR	0.012 UJ	2.9 U	2.9 U	0.012 U	0.012 U	2.9 U	0.1 U	NR
Fluorene	--	--	29	29	NR	NR	NR	NA	NR	0.04 UJ	2.9 U	2.9 U	0.04 U	0.04 U	2.9 U	0.041 U	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	NR	NR	NA	NR	0.04 U	2.9 U	2.9 U	0.04 U	0.04 U	2.9 U	0.041 U	NR
Naphthalene	--	--	0.17	0.17	NR	NR	NR	NA	NR	**0.024 J**	2.9 U	2.9 U	**0.023 J**	**0.035 J**	2.9 U	**0.026 J**	NR
Nitrobenzene	0.521	--	0.14	0.521	NR	NR	NR	NA	NR	1.9 U	2.9 U	2.9 U	1 U	2 U	2.9 U	NR	NR
Phenanthrene	--	--	--	--	NR	NR	NR	NA	NR	0.02 UJ	2.9 U	2.9 U	0.02 U	0.02 U	2.9 U	0.021 U	NR
Pyrene	--	--	12	12	NR	NR	NR	NA	NR	0.02 UJ	2.9 U	2.9 U	0.02 U	0.02 U	2.9 U	0.021 U	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.42 U Q	0.43 U Q	0.41 U	0.41 U	0.44 U Q	0.43 U	0.2 U	0.2 U	0.44 UJ	0.43 U	0.2 U	0.43 UJ	**1.7**
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	**0.2 J**
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.22 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	2.9 U Q	0.22 UJ	0.21 U	0.2 U	0.22 UJ	**0.47**
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 U Q	0.13 U Q	0.12 U	0.12 U	0.13 U Q	0.13 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 UJ	**0.56**
3-Nitrotoluene	--	--	0.17	0.17	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.22 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 U Q	0.13 U Q	0.12 U	0.12 U	0.13 U Q	0.13 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 UJ	**0.45**
4-Nitrotoluene	5.01	--	4.3	5.01	0.42 U Q	0.43 U Q	0.41 U	0.41 U	0.44 U Q	0.43 U	0.2 U	0.2 U	0.44 UJ	0.43 U	0.2 U	0.43 UJ	0.43 U
HMX	--	--	100	100	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.22 U
Nitrobenzene	0.521	--	0.14	0.521	0.21 U Q	0.21 U Q	**0.13 J**	**0.14 J**	0.22 U Q	0.21 U	0.2 U	2.9 U	0.22 UJ	**0.17 J**	0.2 U	0.22 UJ	0.22 U
RDX	0.774	--	0.7	0.774	0.13 U Q	0.13 U Q	0.12 U	0.12 U	0.13 U Q	0.13 U	0.2 U	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 UJ	0.13 U
Tetryl	--	--	3.9	3.9	0.21 U Q	0.21 U Q	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	**3.1**
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	100 U	100 U	**99 J**	NA	100 U	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	0.099 U	0.29 U	0.29 U	0.095 U	0.096 U	0.31 U	0.096 U	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	0.041 U	0.02 U	0.019 U	0.04 U	0.04 U	0.02 U	0.041 U	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	0.022 U	0.02 U	0.019 U	0.022 U	0.022 U	0.02 U	0.023 U	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL12mw-245	LL12mw-245-D	LL12mw-247	LL12mw-506	LL12mw-247	FWGmw-017	FWGMW-017	FWGMW-017-DUP	FWGmw-017	FWGmw-024	FWGMW-024	FWGmw-024	LL2mw-059
Sample Date					12/6/2017	12/6/2017	4/25/2017	4/25/2017	12/6/2017	4/28/2017	8/9/2017	8/9/2017	12/2/2017	4/28/2017	8/9/2017	12/2/2017	4/28/2017
RVAAP Area	Screening Criteria				Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 12	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	DUP LL12mw-247	Unconsolidated	Basal Sharon	Basal Sharon	Dup FWGmw-017	Basal Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	**680**	**490**	**300**	NA	**9000**	70 U	**62 J**	150 U	70 U	**18 J**	**97 J**	70 U	**18 J**
Antimony	--	6	0.78	0.78	1 U	1 U	1 U	NA	1 U	1 U	9 U	9 U	1 U	1 U	9 U	1 U	1 U
Arsenic	--	10	0.052	0.052	**2.4 J**	**3 J**	**7.3**	NA	**17**	**10**	**7.6 J D**	**8 J D**	**5.6**	**4.2 J**	**6.2 J D**	**3.9 J**	**0.39 J**
Barium	--	2000	380	380	**26**	**25**	**24**	NA	**74**	**130 J**	**130 D**	**130 D**	**130 J**	**8.7 J**	**8.2 D**	**6.5 J**	**4.3 J**
Beryllium	--	4	2.5	2.5	0.3 U	0.3 U	0.3 U	NA	**0.76 J**	0.3 U	4.5 U	4.5 U	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	NA	1 U	1 U	4.5 U	4.5 U	1 U	1 U	4.5 U	1 U	1 U
Calcium	--	--	--	--	**150000**	**150000**	**91000**	NA	**110000**	**69000**	**65000 D**	**66000 D**	**63000**	**71000**	**72000 D**	**70000**	**24000**
Chromium	--	100		--	**1.1 J**	**1.1 J**	1.8 U	NA	**14**	1.8 U	8 U	8 U	1.8 U	1.8 U	8 U	1.8 U	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	4 U	NA	100 U	4 UJ	20 U	20 U	20 U	**4.6 J**	20 U	20 U	NA
Cobalt	--	--	0.6	0.6	**2.2**	**1.9**	**0.61 J**	NA	**13**	**0.62 J**	1.8 U	1.8 U	**0.39 J**	**0.85 J**	1.8 U	**0.91 J**	**1.1**
Copper	--	1300	80	80	**0.95 J**	**1.2 J**	1.8 U	NA	**16**	1.8 U	0.8 U	0.8 U	1.8 U	**1.1 J**	**1.1 J D**	1.8 U	1.8 U
Iron	--	--	1400	1400	**1900**	**1600**	**1300**	NA	**27000**	**740 J**	**480**	**520**	**470**	**1700 J**	**2300**	**960**	**130 J**
Lead	--	15	15	15	**0.68 J**	**0.81 J**	3 U	NA	**13**	0.7 U	2 U	2 U	0.7 U	0.7 U	2 U	0.7 U	**0.21 J**
Magnesium	--	--	--	--	**66000**	**66000**	**48000**	NA	**55000**	**26000**	**27000 D**	**26000 D**	**25000**	**20000**	**22000 D**	**21000**	**10000**
Manganese	--	--	43	43	**270**	**280**	**220**	NA	**780**	**340**	**320 D**	**320 D**	**310 J**	**330**	**290 D**	**260 J**	**85**
Nickel	--	--	39	39	**2.8 J**	**3**	**0.69 J**	NA	**23**	**2.9 J**	4 U	**2.1 J D**	**1.7 J**	**2.6 J**	**2.6 J D**	**2.4 J**	**4.1**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**3900**	**3800**	**2200 J**	NA	**4200**	3000 U	**1800 D**	NA	3000 U	3000 U	**1000 D**	3000 U	3000 U
Selenium	--	50	10	10	2 U	2 U	2 U	NA	2 U	2 U	4 U	4 U	2 U	2 U	4 U	2 U	2 U
Sodium	--	--	--	--	**26000**	**27000**	**23000**	NA	**24000**	**13000 J**	**14000 D**	**14000 D**	**13000**	**5500 J**	**5700 Q D**	**5000**	5000 U
Thallium	--	2	0.02	0.02	0.2 U	0.2 U	0.2 U	NA	**0.22 J**	0.2 U	15 U	15 U	0.2 U	0.2 U	15 U	0.2 U	**0.054 J**
Total Cyanide	--	200	0.15	0.15	NA	NA	5 U	**3.4 J**	**2.6 J J1**	5 U	5 U	5 U	5 U	5 U	5 U	5 U	NA
Vanadium	--	--	8.6	8.6	**1.1 J**	**0.85 J**	2 U	NA	**17**	2 U	8 U	8 U	2 U	2 U	8 U	2 U	2 U
Zinc	--	--	600	600	**4.6 J**	**4.4 J**	**3.3 J**	NA	**53**	8 U	18 U	18 U	8 U	8 U	18 U	8 U	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	10 U	10 U	**5 J**	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	70 U	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	**0.42 J**	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	**6.5**	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	**24**	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	**78000**	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	**0.33 J**	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	**0.92 J**	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	**280**	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	**0.23 J**	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	**41000**	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	**150**	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	1 U	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	**2100 J**	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	**20000**	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	8 U	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL2mw-059	LL2mw-264	LL2mw-264	LL2mw-264-D	LL2mw-267	LL2mw-267	LL2mw-272	LL2mw-272	LL2MW-272	LL2mw-272	FWGmw-021	FWGmw-021	FWGMW-021
Sample Date					12/6/2017	4/27/2017	12/7/2017	12/7/2017	4/25/2017	12/7/2017	1/12/2017	4/27/2017	8/3/2017	12/7/2017	4/28/2017	5/3/2017	8/8/2017
RVAAP Area	Screening Criteria				Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 3	Load Line 3	Load Line 3
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		6.39	6.76	7.24	7.24	6.05	6.59	6.61	6.27	6.47	6.52	6.10	6.12	6.03
Turbidity (NTU)	--	--	--		8.3	1.66	9.7	9.7	12.3	9.7	6.16	1.27	0	9.5	4.7	2.8	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	NA	0.25 U
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	NA	0.25 U
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.25 U	0.8 U	0.8 U	NA	0.25 U
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	4 U	4 U	0.5 U	4 U	4 U	NA	0.5 U
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	6.4 U	6.4 U	**2.2**	6.4 U	6.4 U	NA	**1.9 J**
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	NA	0.25 U
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	NA	0.25 U
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	NA	0.25 U
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.25 U	0.4 U	0.4 U	NA	0.25 U
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	**2.2 J**	0.8 U	0.5 U	5 U	0.8 U	NA	0.5 U
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	0.4 U	**0.2 J**	0.25 U	0.4 U	0.4 U	NA	0.25 U
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.5 U	0.8 U	0.8 U	NA	0.5 U
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NA	NA	NA	NR	NR	NR	4.3 U	2.9 U	2 U	4.3 U	NA	3 U Q
Acenaphthene	--	--	53	53	NR	NA	NA	NA	NR	NR	0.041 U	0.041 U	2.9 U	**0.018 J**	0.04 U	NA	3 U
Acenaphthylene	--	--	--	--	NR	NA	NA	NA	NR	NR	0.041 U	0.041 U	2.9 U	**0.0056 J**	0.04 U	NA	3 U
Benz(a)anthracene	0.004	--	0.03	0.004	NR	NA	NA	NA	NR	NR	0.012 U	0.012 U	2.9 U	0.1 U	0.012 U	NA	3 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	NA	NA	NA	NR	NR	0.012 U	0.012 U	2.9 U	0.1 U	0.012 U	NA	3 U
Benzyl alcohol	--	--	200	200	NR	NA	NA	NA	NR	NR	0.53 U	0.49 U	2.9 U Q	1 U	0.49 U	NA	3 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.6 U	NA	NA	NA	1.9 U	4.6 U	2.1 U	2 U	2.9 U	4.4 U	2 U	NA	3 U
Chrysene	--	--	25	25	NR	NA	NA	NA	NR	NR	0.012 U	0.012 U	2.9 U	0.1 U	0.012 U	NA	3 U
Fluoranthene	--	--	80	80	NR	NA	NA	NA	NR	NR	0.012 U	0.012 U	2.9 U	0.1 U	0.012 U	NA	3 U
Fluorene	--	--	29	29	NR	NA	NA	NA	NR	NR	0.041 U	0.041 U	2.9 U	**0.017 J**	0.04 U	NA	3 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	NA	NA	NA	NR	NR	0.041 U	0.041 U	2.9 U Q	0.041 U	0.04 U	NA	3 U
Naphthalene	--	--	0.17	0.17	NR	NA	NA	NA	NR	NR	0.012 U	**0.026 J**	2.9 U	**0.013 J**	0.012 U	NA	3 U
Nitrobenzene	0.521	--	0.14	0.521	NR	NA	NA	NA	NR	NR	NR	2 U	2.9 U	1 U	2 U	NA	3 U
Phenanthrene	--	--	--	--	NR	NA	NA	NA	NR	NR	0.02 U	0.02 U	2.9 U	0.1 U	0.02 U	NA	3 U
Pyrene	--	--	12	12	NR	NA	NA	NA	NR	NR	0.02 U	0.02 U	2.9 U	0.1 U	0.02 U	NA	3 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	**1.8 J**	NA	NA	NA	0.42 U	0.46 UJ	0.44 U	0.43 U	0.2 U	**0.43 R**	0.42 U	NA	0.2 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.22 U	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.22 UJ	NA	NA	NA	0.21 U	**0.11 J**	0.22 U	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	**0.38 J**	NA	NA	NA	0.21 U	**0.11 J**	0.22 U	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	**0.4 J**	NA	NA	NA	**0.38**	**0.46 J**	0.13 U	0.13 UJ	0.2 U	**0.13 R**	**0.32**	NA	**0.25 J**
3-Nitrotoluene	--	--	0.17	0.17	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.22 UJ	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	**0.37 J**	NA	NA	NA	**0.28**	**0.45 J**	0.13 U	0.13 UJ	0.2 U	**0.13 R**	**0.24**	NA	**0.25 J**
4-Nitrotoluene	5.01	--	4.3	5.01	0.44 UJ	NA	NA	NA	0.42 U	0.46 UJ	0.44 UJ	0.43 U	0.2 U	**0.43 R**	0.42 U	NA	0.2 U
HMX	--	--	100	100	0.22 UJ	NA	NA	NA	**0.2 J**	**0.39 J**	0.22 U	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
Nitrobenzene	0.521	--	0.14	0.521	0.22 UJ	NA	NA	NA	**0.28 J**	0.23 UJ	0.22 U	0.21 U	0.2 U	**0.21 R**	**0.12 J**	NA	0.2 U
RDX	0.774	--	0.7	0.774	0.13 UJ	NA	NA	NA	**0.36**	**0.79 J**	0.13 U	0.13 U	0.2 U	**0.13 R**	**0.22**	NA	0.2 U
Tetryl	--	--	3.9	3.9	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.22 UJ	0.21 U	0.2 U	**0.21 R**	0.21 U	NA	0.2 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	0.11 U	0.095 U	0.29 U	0.098 U	0.096 U	NA	0.29 U
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	0.025 U	0.04 U	0.02 U	0.041 U	0.04 U	NA	0.019 U
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	0.023 U	0.022 U	0.02 U	0.023 U	0.022 U	NA	0.019 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL2mw-059	LL2mw-264	LL2mw-264	LL2mw-264-D	LL2mw-267	LL2mw-267	LL2mw-272	LL2mw-272	LL2MW-272	LL2mw-272	FWGmw-021	FWGmw-021	FWGMW-021
Sample Date					12/6/2017	4/27/2017	12/7/2017	12/7/2017	4/25/2017	12/7/2017	1/12/2017	4/27/2017	8/3/2017	12/7/2017	4/28/2017	5/3/2017	8/8/2017
RVAAP Area	Screening Criteria				Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 2	Load Line 3	Load Line 3	Load Line 3
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	300 U	NA	NA	NA	**57 J**	300 U	**47 J**	70 U	150 U	300 UJ	**20 J**	NA	**55 J**
Antimony	--	6	0.78	0.78	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	9 U	1 U	**0.54 J**	NA	9 U
Arsenic	--	10	0.052	0.052	**0.44 J**	NA	NA	NA	**1.8 J**	**1.4 J**	**7**	**8.2**	**9.5 J D**	**9.1**	**1.2 J**	NA	8 U
Barium	--	2000	380	380	**2.8 J**	NA	NA	NA	**13**	**21 J**	**34 J**	**30 J**	**33 D**	**38**	**15 J**	NA	**14 D**
Beryllium	--	4	2.5	2.5	0.3 U	NA	NA	NA	0.3 U	0.3 U	0.3 UJ	0.3 U	4.5 U	0.3 U	0.3 U	NA	4.5 U
Cadmium	--	5	0.92	0.92	1 U	NA	NA	NA	1 U	1 U	1 U	1 U	4.5 U	1 U	1 U	NA	4.5 U
Calcium	--	--	--	--	**24000**	NA	NA	NA	**31000**	**29000**	**39000**	**38000**	**36000 D B**	**33000**	**21000**	NA	**20000 J D**
Chromium	--	100		--	1.8 U	NA	NA	NA	1.8 U	**0.58 J**	1.8 U	1.8 U	8 U	**0.63 J**	1.8 U	NA	8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	NA	4 U	20 U	20 U	NA	4 U	20 U
Cobalt	--	--	0.6	0.6	**0.75 J**	NA	NA	NA	**4**	**3.8**	**4.4**	**5**	**4.6 D**	**4.8**	**0.15 J**	NA	1.8 U
Copper	--	1300	80	80	1.8 U	NA	NA	NA	1.8 U	2 U	1.8 U	1.8 U	0.8 U	1.8 U	**0.62 J**	NA	**0.58 J D**
Iron	--	--	1400	1400	**320**	NA	NA	NA	**2100**	**2100**	**5400**	**6700 J**	**6600 J**	**5500 J**	**940 J**	NA	**500**
Lead	--	15	15	15	0.7 U	NA	NA	NA	0.7 U	**0.22 J**	0.7 U	0.7 U	2 U	**0.27 J**	**0.39 J**	NA	2 U
Magnesium	--	--	--	--	**10000**	NA	NA	NA	**14000**	**13000**	**19000**	**17000**	**17000 D**	**15000**	**6500**	NA	**7100 J D**
Manganese	--	--	43	43	**130 J**	NA	NA	NA	**600**	**630 J**	**450**	**500**	**480 D**	**510 J**	**5.5**	NA	**9.4 D**
Nickel	--	--	39	39	**4.1**	NA	NA	NA	**3.6**	**2.7 J**	**7.8**	**9.3**	**8.9 D**	**8.8**	**1.9 J**	NA	**2.1 J D**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**760 J**	NA	NA	NA	**540 J**	**760 J**	**1500 J**	3000 U	**1200 D**	**1400 J**	3000 U	NA	**1200 D**
Selenium	--	50	10	10	2 U	NA	NA	NA	2 U	2 U	2 U	2 U	4 U	2 U	2 U	NA	4 U
Sodium	--	--	--	--	5000 U	NA	NA	NA	**8500**	**8400**	**5600**	**5700 J**	**6600 D**	**5000**	5000 U	NA	**3300 Q D**
Thallium	--	2	0.02	0.02	0.2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	15 U	0.2 U	0.2 U	NA	15 U
Total Cyanide	--	200	0.15	0.15	NA	**2 J**	10 U	10 U	NA	NA	5 U	**2 J**	**3.3 J**	10 U	5 U	NA	**4.3 J**
Vanadium	--	--	8.6	8.6	2 UJ	NA	NA	NA	2 U	2 UJ	2 U	2 U	8 U	2 UJ	2 U	NA	8 U
Zinc	--	--	600	600	8 U	NA	NA	NA	**4.8 J**	**3.1 J**	8 U	8 U	18 U	8 U	**6.4 J**	NA	**8.8 J**
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	**0.067**	NA	**0.07 M**
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-021	LL3mw-234	LL3mw-234	LL3mw-236	LL3mw-237	LL3mw-237	LL3mw-244	LL3mw-500	LL3mw-244	LL3mw-244	LL3mw-246	LL3mw-246	LL3mw-504
Sample Date					12/2/2017	4/24/2017	12/6/2017	5/2/2017	4/24/2017	12/6/2017	1/11/2017	1/11/2017	4/24/2017	12/6/2017	1/11/2017	4/28/2017	4/28/2017
RVAAP Area	Screening Criteria				Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP LL3mw-244	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP LL3mw-246
Field Measurements																	
pH (s.u.)	--	--	--		6.72	6.82	6.96	5.68	6.30	6.54	6.07	6.07	5.77	6.32	6.03	5.84	5.84
Turbidity (NTU)	--	--	--		6.2	36.5	9.7	4.48	2.87	2.6	1.87	1.87	0.75	2.4	0.51	0.17	0.17
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	6.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	2 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Acenaphthene	--	--	53	53	0.041 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Acenaphthylene	--	--	--	--	0.041 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Benz(a)anthracene	0.004	--	0.03	0.004	0.012 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	0.012 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Benzyl alcohol	--	--	200	200	0.98 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.3 U	NA	NA	NA	NA	NA	NA	NA	2 U	4.4 U	NA	2 U	2 U
Chrysene	--	--	25	25	0.012 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Fluoranthene	--	--	80	80	0.1 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Fluorene	--	--	29	29	0.041 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	0.041 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Naphthalene	--	--	0.17	0.17	**0.012 J**	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Nitrobenzene	0.521	--	0.14	0.521	0.98 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Phenanthrene	--	--	--	--	0.02 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Pyrene	--	--	12	12	0.02 U	NA	NA	NA	NA	NA	NA	NA	NR	NR	NA	NR	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.43 UJ	NA	NA	0.45 U	0.41 U	0.44 U	NA	NA	0.42 U	0.44 U Q	NA	0.43 U	0.43 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.22 UJ	NA	NA	0.22 U	**1**	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	**0.14 J**	NA	NA	0.13 U	**3.6**	0.13 UJ	NA	NA	**0.44**	**0.34 Q**	NA	0.13 U	**0.3**
3-Nitrotoluene	--	--	0.17	0.17	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	NA	NA	0.13 UJ	**6.5**	0.13 U	NA	NA	**0.36**	**0.32 Q J**	NA	0.13 U	**0.22**
4-Nitrotoluene	5.01	--	4.3	5.01	0.43 UJ	NA	NA	0.45 U	0.41 U	0.44 U	NA	NA	0.42 U	0.44 U Q	NA	0.43 UJ	0.43 U
HMX	--	--	100	100	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	**0.12 J**	0.22 U Q	NA	0.22 U	**0.11 J**
RDX	0.774	--	0.7	0.774	**0.11 J**	NA	NA	0.13 U	0.12 U	0.13 U	NA	NA	**0.16 J**	**0.13 Q J**	NA	**0.18 J**	**0.18 J**
Tetryl	--	--	3.9	3.9	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	NA	NA	0.21 U	0.22 U Q	NA	0.22 U	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	**0.081 J**	NA	NA	NA	NA	NA	0.1 U	0.1 U	NA	NA	0.099 U	NA	NA
Delta-BHC	--	--	--	--	0.041 U	NA	NA	NA	NA	NA	NA	NA	0.041 U	0.041 U	NA	NA	NA
Endosulfan I	--	--	--	--	0.023 U	NA	NA	NA	NA	NA	NA	NA	0.023 U	0.023 U	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-021	LL3mw-234	LL3mw-234	LL3mw-236	LL3mw-237	LL3mw-237	LL3mw-244	LL3mw-500	LL3mw-244	LL3mw-244	LL3mw-246	LL3mw-246	LL3mw-504
Sample Date					12/2/2017	4/24/2017	12/6/2017	5/2/2017	4/24/2017	12/6/2017	1/11/2017	1/11/2017	4/24/2017	12/6/2017	1/11/2017	4/28/2017	4/28/2017
RVAAP Area	Screening Criteria				Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3	Load Line 3
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP LL3mw-244	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP LL3mw-246
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	70 U	NA	NA	NA	NA	NA	NA	NA	**28 J**	**39 J**	NA	**19 J**	**18 J**
Antimony	--	6	0.78	0.78	6 U	NA	NA	NA	NA	NA	NA	NA	6 U	**0.5 J**	NA	**0.51 J**	**0.9 J**
Arsenic	--	10	0.052	0.052	**1.7 J**	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U	1 U
Barium	--	2000	380	380	**16 J**	NA	NA	NA	NA	NA	NA	NA	**16**	**17**	NA	**15 J**	**15 J**
Beryllium	--	4	2.5	2.5	0.3 U	NA	NA	NA	NA	NA	NA	NA	0.3 U	**0.11 J**	NA	0.3 U	1 U
Cadmium	--	5	0.92	0.92	1 U	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	1 U	1 U
Calcium	--	--	--	--	**21000**	NA	NA	NA	NA	NA	NA	NA	**20000**	**23000**	NA	**21000**	**22000**
Chromium	--	100		--	1.8 U	NA	NA	NA	NA	NA	NA	NA	1.8 U	1.8 U	NA	1.8 U	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	20 U	NA	NA	NA	NA	NA	NA	NA	4 U	20 U	NA	NA	NA
Cobalt	--	--	0.6	0.6	**2.6**	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	0.2 U	0.2 U
Copper	--	1300	80	80	**0.63 J**	NA	NA	NA	NA	NA	NA	NA	1.8 U	1.8 U	NA	1.8 U	1.8 U
Iron	--	--	1400	1400	**4100**	NA	NA	NA	NA	NA	NA	NA	**42 J**	**82 J**	NA	**85 J**	**85 J**
Lead	--	15	15	15	0.7 U	NA	NA	NA	NA	NA	NA	NA	0.7 U	0.7 U	NA	**0.24 J**	0.7 U
Magnesium	--	--	--	--	**7800**	NA	NA	NA	NA	NA	NA	NA	**6200**	**6900**	NA	**6700**	**6900**
Manganese	--	--	43	43	**360 J**	NA	NA	NA	NA	NA	NA	NA	3.5 U	**1.3 J**	NA	3.5 U	3.5 U
Nickel	--	--	39	39	**9.5**	NA	NA	NA	NA	NA	NA	NA	**1.3 J**	**1.4 J**	NA	**1.6 J**	**1.5 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	3000 U	NA	NA	NA	NA	NA	NA	NA	**1100 J**	**1400 J**	NA	3000 U	3000 U
Selenium	--	50	10	10	2 U	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	2 U	2 U
Sodium	--	--	--	--	**4000 J**	NA	NA	NA	NA	NA	NA	NA	5000 U	**3400 J**	NA	5000 U	5000 U
Thallium	--	2	0.02	0.02	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	0.2 U	**0.051 J**
Total Cyanide	--	200	0.15	0.15	10 U	5 U	5 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	2 U	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	2 U	2 U
Zinc	--	--	600	600	**36**	NA	NA	NA	NA	NA	NA	NA	**2.6 J**	**4 J**	NA	**3.5 J**	8 U
Cyanide, Free	--	200	0.15	0.15	NA	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	**0.046 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL3mw-246	LL3mw-246	LL4mw-193	LL4mw-193	LL4mw-200	LL5mw-001	LL6mw-001	LL6mw-002	LL6mw-006	LL7mw-001	LL7mw-006	LL7mw-006	FWGmw-004
Sample Date					5/3/2017	12/2/2017	4/24/2017	12/6/2017	4/24/2017	4/21/2017	4/26/2017	4/26/2017	4/26/2017	4/19/2017	4/19/2017	12/4/2017	4/17/2017
RVAAP Area	Screening Criteria				Load Line 3	Load Line 3	Load Line 4	Load Line 4	Load Line 4	Load Line 5	Load Line 6	Load Line 6	Load Line 6	Load Line 7	Load Line 7	Load Line 7	Motor Pool Area
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Homewood	Unconsolidated	Unconsolidated	Unconsolidated	Homewood	Homewood	Homewood	Unconsolidated
Field Measurements																	
pH (s.u.)	--	--	--		5.92	6.45	6.93	7.49	6.58	7.19	7.33	7.11	7.30	6.15	6.36	5.46	6.93
Turbidity (NTU)	--	--	--		0.71	0	9.44	9.8	1.16	5.04	0.43	9.15	5.86	7.78	4.62	8.9	8.88
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	**4.1**	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	**1.8**	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	**3.5**	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	4 U	NA	NA	NA	4 U	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	6.4 U	NA	NA	NA	10 U	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	0.8 U	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	0.8 U	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NR	NA	NA	NR	NA	NR	4.3 U	NR	NR	NR	NR	NR
Acenaphthene	--	--	53	53	NA	NR	NA	NA	0.04 U	NA	NR	0.04 U	NR	NR	NR	NR	NR
Acenaphthylene	--	--	--	--	NA	NR	NA	NA	0.04 U	NA	NR	0.04 U	NR	NR	NR	NR	NR
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NR	NA	NA	0.012 U	NA	NR	0.012 U	NR	NR	NR	NR	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NR	NA	NA	0.012 U	NA	NR	0.012 U	NR	NR	NR	NR	NR
Benzyl alcohol	--	--	200	200	NA	NR	NA	NA	NR	NA	NR	0.49 U	NR	NR	NR	NR	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	4.6 U	NA	NA	NR	NA	2 U	2 U	2 U	1.9 U	NA	NA	1.9 U
Chrysene	--	--	25	25	NA	NR	NA	NA	0.012 U	NA	NR	0.012 U	NR	NR	NR	NR	NR
Fluoranthene	--	--	80	80	NA	NR	NA	NA	0.012 U	NA	NR	0.012 U	NR	NR	NR	NR	NR
Fluorene	--	--	29	29	NA	NR	NA	NA	0.04 U	NA	NR	0.04 U	NR	NR	NR	NR	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NR	NA	NA	0.04 U	NA	NR	0.04 U	NR	NR	NR	NR	NR
Naphthalene	--	--	0.17	0.17	NA	NR	NA	NA	0.012 U	NA	NR	0.012 U	NR	NR	NR	NR	NR
Nitrobenzene	0.521	--	0.14	0.521	NA	NR	NA	NA	NR	NA	NR	2 U	NR	NR	NR	NR	NR
Phenanthrene	--	--	--	--	NA	NR	NA	NA	0.02 U	NA	NR	0.02 U	NR	NR	NR	NR	NR
Pyrene	--	--	12	12	NA	NR	NA	NA	0.02 U	NA	NR	0.02 U	NR	NR	NR	NR	NR
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	0.43 UJ	0.42 U	NA	NA	NA	NA	0.42 U	0.42 UJ	0.42 U	0.46 U	0.41 UJ	0.43 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	0.13 UJ	0.13 U	NA	NA	NA	NA	0.13 U	0.13 UJ	0.12 U	0.14 U	0.12 UJ	0.13 U
3-Nitrotoluene	--	--	0.17	0.17	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	**0.2 J**	0.13 U	NA	NA	NA	NA	0.13 U	0.13 UJ	0.12 U	0.14 U	0.12 UJ	0.13 U
4-Nitrotoluene	5.01	--	4.3	5.01	NA	0.43 UJ	0.42 U	NA	NA	NA	NA	0.42 U	0.42 UJ	0.42 U	0.46 U	0.41 UJ	0.43 U
HMX	--	--	100	100	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	**0.24 J**	0.21 UJ	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	NA	0.22 UJ	0.21 U	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
RDX	0.774	--	0.7	0.774	NA	**0.097 J**	0.13 U	NA	NA	NA	NA	0.13 U	0.13 UJ	0.12 U	**0.62**	**0.78 J**	**0.13 J**
Tetryl	--	--	3.9	3.9	NA	0.22 UJ	**0.1 J**	NA	NA	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					LL3mw-246	LL3mw-246	LL4mw-193	LL4mw-193	LL4mw-200	LL5mw-001	LL6mw-001	LL6mw-002	LL6mw-006	LL7mw-001	LL7mw-006	LL7mw-006	FWGmw-004
Sample Date					5/3/2017	12/2/2017	4/24/2017	12/6/2017	4/24/2017	4/21/2017	4/26/2017	4/26/2017	4/26/2017	4/19/2017	4/19/2017	12/4/2017	4/17/2017
RVAAP Area	Screening Criteria				Load Line 3	Load Line 3	Load Line 4	Load Line 4	Load Line 4	Load Line 5	Load Line 6	Load Line 6	Load Line 6	Load Line 7	Load Line 7	Load Line 7	Motor Pool Area
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Homewood	Unconsolidated	Unconsolidated	Unconsolidated	Homewood	Homewood	Homewood	Unconsolidated
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	**29 J**	NA	NA	NA	NA	NA	NA	NA	70 U	NA	NA	**250 J**
Antimony	--	6	0.78	0.78	NA	6 U	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	1 U
Arsenic	--	10	0.052	0.052	NA	1 U	NA	NA	NA	NA	NA	NA	NA	**1.8 J**	NA	NA	**0.42 J**
Barium	--	2000	380	380	NA	**18 J**	NA	NA	NA	NA	NA	NA	NA	**22**	NA	NA	**22**
Beryllium	--	4	2.5	2.5	NA	0.3 U	NA	NA	NA	NA	NA	NA	NA	**0.19 J**	NA	NA	0.3 U
Cadmium	--	5	0.92	0.92	NA	1 U	NA	NA	NA	NA	NA	NA	NA	1 U	NA	NA	1 U
Calcium	--	--	--	--	NA	**24000**	NA	NA	NA	NA	NA	NA	NA	**39000**	NA	NA	**96000**
Chromium	--	100		--	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	**6.1**	NA	NA	**0.16 J**
Copper	--	1300	80	80	NA	1.8 U	NA	NA	NA	NA	NA	NA	NA	1.8 U	NA	NA	1.8 U
Iron	--	--	1400	1400	NA	100 U	NA	NA	NA	NA	NA	NA	NA	**9100**	NA	NA	**470**
Lead	--	15	15	15	NA	0.7 U	NA	NA	NA	NA	NA	NA	NA	0.7 U	NA	NA	**0.3 J**
Magnesium	--	--	--	--	NA	**8200**	NA	NA	NA	NA	NA	NA	NA	**13000**	NA	NA	**44000**
Manganese	--	--	43	43	NA	**0.77 J**	NA	NA	NA	NA	NA	NA	NA	**430**	NA	NA	**9.4**
Nickel	--	--	39	39	NA	**1.5 J**	NA	NA	NA	NA	NA	NA	NA	**7.9**	NA	NA	**0.35 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	3000 U	NA	NA	NA	NA	NA	NA	NA	**610 J**	NA	NA	**510 J**
Selenium	--	50	10	10	NA	2 U	NA	NA	NA	NA	NA	NA	NA	2 U	NA	NA	**1.4 J**
Sodium	--	--	--	--	NA	**3300 J**	NA	NA	NA	NA	NA	NA	NA	**6900**	NA	NA	**4100 J**
Thallium	--	2	0.02	0.02	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	**0.13 J**	NA	NA	0.2 U
Total Cyanide	--	200	0.15	0.15	NA	NA	5 U	**2.2 J**	**4.1 J**	NA	**3.2 J**	5 U	5 U	**2 J**	NA	NA	NA
Vanadium	--	--	8.6	8.6	NA	2 U	NA	NA	NA	NA	NA	NA	NA	2 U	NA	NA	2 U
Zinc	--	--	600	600	NA	8 U	NA	NA	NA	NA	NA	NA	NA	**48**	NA	NA	**4.8 J**
Cyanide, Free	--	200	0.15	0.15	NA	NA	10 U	**4.3 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	**0.073**	**0.077**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-004	FWGmw-015	FWGmw-015	FWGmw-016	FWGmw-016	MBSmw-004	MBSmw-006	FWGmw-007	FWGmw-007	NTAmw-116	NTAmw-117	NTAmw-117	NTAmw-118
Sample Date					12/5/2017	4/17/2017	12/4/2017	4/17/2017	12/4/2017	4/26/2017	4/26/2017	4/26/2017	12/4/2017	4/27/2017	4/27/2017	12/4/2017	4/27/2017
RVAAP Area	Screening Criteria				Motor Pool Area	Motor Pool Area	Motor Pool Area	Motor Pool Area	Motor Pool Area	Mustard Burial Site	Mustard Burial Site	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Field Measurements																	
pH (s.u.)	--	--	--		6.87	6.93	7.00	6.95	6.86	7.30	7.29	7.11	7.44	6.36	7.38	7.33	7.51
Turbidity (NTU)	--	--	--		8.3	2.17	4.6	0.15	0	0.57	0.9	7	1.6	146	0.75	2.9	30.6
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NR	NR	NR	NR	NA	NA	NR	NR	NR	NA	NA	NA
Acenaphthene	--	--	53	53	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.042 U	NA	NA	NA
Acenaphthylene	--	--	--	--	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.042 U	NA	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.013 U	NA	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.013 U	NA	NA	NA
Benzyl alcohol	--	--	200	200	NR	NR	NR	NR	NR	NA	NA	NR	NR	NR	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	**4.9 J**	1.9 U	4.2 U	1.9 U	4.2 U	NA	NA	2 U	4.4 U	NR	NA	NA	NA
Chrysene	--	--	25	25	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.013 U	NA	NA	NA
Fluoranthene	--	--	80	80	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.013 U	NA	NA	NA
Fluorene	--	--	29	29	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.042 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.042 U	NA	NA	NA
Naphthalene	--	--	0.17	0.17	NR	NR	NR	NR	NR	NA	NA	NR	NR	**0.046 J**	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NR	NR	NR	NR	NR	NA	NA	NR	NR	NR	NA	NA	NA
Phenanthrene	--	--	--	--	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.021 U	NA	NA	NA
Pyrene	--	--	12	12	NR	NR	NR	NR	NR	NA	NA	NR	NR	0.021 U	NA	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.43 UJ	0.41 U	0.43 UJ	0.41 U	0.43 U	0.42 UJ	0.42 U	0.42 U	0.44 UJ	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	0.12 U	0.13 UJ	0.12 U	0.13 UJ	0.13 UJ	0.13 U	0.13 U	0.13 UJ	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 UJ	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 UJ	0.12 U	0.13 UJ	0.12 U	0.13 UJ	0.13 UJ	0.13 U	0.13 U	0.13 UJ	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	0.43 UJ	0.41 U	0.43 UJ	0.41 U	0.43 U	0.42 UJ	0.42 U	0.42 U	0.44 UJ	NA	NA	NA	NA
HMX	--	--	100	100	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	0.13 UJ	0.12 U	0.13 UJ	**0.11 J**	0.13 U	0.13 UJ	0.13 U	0.13 U	0.13 UJ	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					FWGmw-004	FWGmw-015	FWGmw-015	FWGmw-016	FWGmw-016	MBSmw-004	MBSmw-006	FWGmw-007	FWGmw-007	NTAmw-116	NTAmw-117	NTAmw-117	NTAmw-118
Sample Date					12/5/2017	4/17/2017	12/4/2017	4/17/2017	12/4/2017	4/26/2017	4/26/2017	4/26/2017	12/4/2017	4/27/2017	4/27/2017	12/4/2017	4/27/2017
RVAAP Area	Screening Criteria				Motor Pool Area	Motor Pool Area	Motor Pool Area	Motor Pool Area	Motor Pool Area	Mustard Burial Site	Mustard Burial Site	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	**2400**	**39 J**	**300**	70 U	70 U	NA	NA	**49 J**	**270 J**	NA	NA	NA	NA
Antimony	--	6	0.78	0.78	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA
Arsenic	--	10	0.052	0.052	**1.6 J**	**0.71 J**	**1.1 J**	**4.5 J**	**4.6 J**	NA	NA	1 U	**0.88 J**	NA	NA	NA	NA
Barium	--	2000	380	380	**38**	**13**	**11 J**	**53**	**56 J**	NA	NA	**20 J**	**33 J**	NA	NA	NA	NA
Beryllium	--	4	2.5	2.5	**0.097 J**	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	0.3 U	0.3 U	NA	NA	NA	NA
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	1 U	1 U	NA	NA	1 U	1 U	NA	NA	NA	NA
Calcium	--	--	--	--	**71000**	**280000**	**240000**	**100000**	**100000**	NA	NA	**130000**	**200000**	NA	NA	NA	NA
Chromium	--	100		--	**3.9 J**	1.8 U	1.8 U	1.8 U	1.8 U	NA	NA	1.8 U	**0.99 J**	NA	NA	NA	NA
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	**1.8 J**	**0.55 J**	**1.3**	0.2 U	0.2 U	NA	NA	**0.42 J**	**1.6**	NA	NA	NA	NA
Copper	--	1300	80	80	**3.6**	1.8 U	**0.56 J**	1.8 U	1.8 U	NA	NA	1.8 U	**0.69 J**	NA	NA	NA	NA
Iron	--	--	1400	1400	**4900**	**150**	**920**	**650**	**660**	NA	NA	**210 J**	**960**	NA	NA	NA	NA
Lead	--	15	15	15	3 U	0.7 U	**0.43 J**	0.7 U	0.7 U	NA	NA	0.7 U	**0.42 J**	NA	NA	NA	NA
Magnesium	--	--	--	--	**34000**	**260000**	**190000**	**27000**	**29000**	NA	NA	**61000**	**110000**	NA	NA	NA	NA
Manganese	--	--	43	43	**140**	**240**	**500 J**	**210**	**200 J**	NA	NA	**120**	**360 J**	NA	NA	NA	NA
Nickel	--	--	39	39	**5.3**	**0.77 J**	**1.1 J**	1 U	1 U	NA	NA	**1.3 J**	**3.3**	NA	NA	NA	NA
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	**1700 J**	**3400**	**3400**	**2100 J**	3000 U	NA	NA	3000 U	**3100**	NA	NA	NA	NA
Selenium	--	50	10	10	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	2 U	NA	NA	NA	NA
Sodium	--	--	--	--	**4100 J**	**42000**	**36000**	**11000**	**11000**	NA	NA	**10000 J**	**14000**	NA	NA	NA	NA
Thallium	--	2	0.02	0.02	**0.06 J**	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA
Total Cyanide	--	200	0.15	0.15	NA	NA	NA	NA	NA	**2.2 J**	5 U	NA	NA	NA	5 U	5 U	**2.5 J**
Vanadium	--	--	8.6	8.6	**3.2 J**	2 U	2 U	2 U	2 U	NA	NA	2 U	2 U	NA	NA	NA	NA
Zinc	--	--	600	600	**11 J**	**2.1 J**	20 U	8 U	8 U	NA	NA	**4.3 J**	20 U	NA	NA	NA	NA
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					NTAmw-118	NTAmw-119	NTAmw-507	NTAmw-119	NTAmw-120	NTAmw-120	NTAMW-120	NTAmw-120	FWGmw-012	FWGmw-012	RQLmw-007	RQLmw-508	RQLmw-007
Sample Date					12/4/2017	4/27/2017	4/27/2017	12/4/2017	1/12/2017	4/27/2017	8/1/2017 12:30	12/4/2017	5/2/2017	12/6/2017	5/1/2017	5/1/2017	12/7/2017
RVAAP Area	Screening Criteria				NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	DUP NTAmw-119	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon*	Upper Sharon*	Upper Sharon	DUP RQLmw-007	
Field Measurements																	
pH (s.u.)	--	--	--		7.37	7.21	7.21	7.41	7.20	7.70	7.31	7.32	6.90	6.01	6.50	6.50	6.75
Turbidity (NTU)	--	--	--		7.8	5.92	5.92	9.1	9.49	0.38	0	2.6	8.87	10	3.2	3.2	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
1,1-Dichloroethane	--	--	2.8	2.8	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA	0.8 U	NA	0.8 UJ
1,1-Dichloroethene	--	7	28	7	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA	0.8 U	NA	0.8 UJ
2-Hexanone	--	--	3.8	3.8	NA	4 U	4 U	4 U	4 U	4 U	0.5 U	4 U	NA	NA	4 U	NA	4 UJ
Acetone	--	--	1400	1400	NA	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	1 U	6.4 U	NA	NA	6.4 U	NA	6.4 UJ
Benzene	5	5	0.46	5	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
Carbon tetrachloride	5	5	0.46	5	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
Chloroform	0.207	--	0.22	0.207	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
Ethylbenzene	--	700	1.5	1.5	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
Methylene Chloride	5.34	5	11	5.34	NA	0.8 U	0.8 U	0.8 U	5 U	0.8 U	0.5 U	0.8 U	NA	NA	0.8 U	NA	0.8 UJ
Toluene	--	1000	110	110	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	0.4 U	NA	0.4 UJ
Xylene (Total)	--	10000	19	19	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.5 U	0.8 U	NA	NA	0.8 U	NA	0.8 UJ
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	4.3 U	4.3 U	2 U	NR	4.3 U	2.9 U	2 U	NR	NR	NR	NR	NA
Acenaphthene	--	--	53	53	NA	0.04 UJ	NR	0.04 U	0.045 U	0.041 U	2.9 U	0.044 U	NR	NR	0.049 U	NR	0.044 U
Acenaphthylene	--	--	--	--	NA	0.04 UJ	NR	0.04 U	0.045 U	0.041 U	2.9 U	0.044 U	NR	NR	0.049 U	NR	0.044 U
Benz(a)anthracene	0.004	--	0.03	0.004	NA	0.012 UJ	NR	0.1 U	0.014 U	0.012 U	2.9 U	0.11 U	NR	NR	0.015 U	NR	0.11 U
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	0.012 UJ	NR	**0.0032 J**	0.014 U	0.012 U	2.9 U	0.013 U	NR	NR	0.015 U	NR	0.013 U
Benzyl alcohol	--	--	200	200	NA	NR	NR	NR	0.52 U	0.49 U	2.9 U Q	1 U	NR	NR	24 U	24 U	0.99 U
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	2 U	2 U	4.4 U	2.1 U	2 U	2.9 U	4.5 U	**1.9 J**	4.2 U	**0.97 J**	NR	4.4 U
Chrysene	--	--	25	25	NA	0.012 UJ	NR	0.1 U	0.014 U	0.012 U	2.9 U	0.11 U	NR	NR	0.015 U	NR	0.11 U
Fluoranthene	--	--	80	80	NA	0.012 UJ	NR	0.1 U	0.014 U	0.012 U	2.9 U	0.11 U	NR	NR	0.015 U	NR	0.11 U
Fluorene	--	--	29	29	NA	0.04 UJ	NR	0.04 U	0.045 U	0.041 U	2.9 U	0.044 U	NR	NR	0.049 U	NR	0.044 U
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	0.04 UJ	NR	0.04 U	0.045 U	0.041 U	2.9 U Q	0.044 U	NR	NR	0.049 U	NR	0.044 U
Naphthalene	--	--	0.17	0.17	NA	0.012 UJ	NR	**0.0094 J**	0.014 U	0.012 U	2.9 U	**0.018 J**	NR	NR	0.015 U	NR	**0.014 J**
Nitrobenzene	0.521	--	0.14	0.521	NA	2 U	2 U	1 U	NR	2 U	2.9 U	1 U	NR	NR	NR	NR	NA
Phenanthrene	--	--	--	--	NA	0.02 UJ	NR	0.1 U	0.023 U	0.02 U	2.9 U	0.11 U	NR	NR	0.025 U	NR	0.11 U
Pyrene	--	--	12	12	NA	0.02 UJ	NR	0.1 U	0.023 U	0.02 U	2.9 U	0.11 U	NR	NR	0.025 U	NR	0.11 U
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	**0.42 R**	**0.43 R**	0.42 UJ	0.43 U	0.43 U	0.2 U	0.43 UJ	0.43 U	0.44 UJ	0.44 U	0.43 U	0.43 U
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 U	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 UJ
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 U	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 UJ
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 U	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 UJ
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	**0.13 R**	**0.13 R**	0.13 UJ	0.13 U	0.13 UJ	0.2 U	0.13 UJ	0.13 U	0.13 UJ	0.13 U	0.13 U	0.13 UJ
3-Nitrotoluene	--	--	0.17	0.17	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 UJ	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.21 U	0.21 UJ
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	**0.13 R**	**0.13 R**	0.13 UJ	0.13 U	0.13 UJ	0.2 U	0.13 UJ	0.13 UJ	0.13 UJ	0.13 U	0.13 U	0.13 UJ
4-Nitrotoluene	5.01	--	4.3	5.01	NA	**0.42 R**	**0.43 R**	0.42 UJ	0.43 UJ	0.43 U	0.2 U	0.43 UJ	0.43 U	0.44 UJ	0.44 UJ	0.43 U	0.43 U
HMX	--	--	100	100	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 U	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 U	0.22 U	0.21 U	0.21 U
Nitrobenzene	0.521	--	0.14	0.521	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 U	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 U	0.21 U	0.21 UJ
RDX	0.774	--	0.7	0.774	NA	**0.13 R**	**0.13 R**	0.13 UJ	0.13 U	0.13 U	0.2 U	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Tetryl	--	--	3.9	3.9	NA	**0.21 R**	**0.22 R**	0.21 UJ	0.21 UJ	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 U	0.22 U	0.21 U	0.21 U
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	NA	0.1 U	0.095 U	0.29 U	0.1 U	NA	NA	0.098 U	0.11 U	0.1 U
Delta-BHC	--	--	--	--	NA	NA	NA	NA	0.026 U	0.04 U	0.02 U	0.042 U	NA	NA	0.04 U	NA	0.043 U
Endosulfan I	--	--	--	--	NA	NA	NA	NA	0.023 U	0.022 U	0.02 U	0.023 U	NA	NA	0.022 U	NA	0.024 U

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					NTAmw-118	NTAmw-119	NTAmw-507	NTAmw-119	NTAmw-120	NTAmw-120	NTAMW-120	NTAmw-120	FWGmw-012	FWGmw-012	RQLmw-007	RQLmw-508	RQLmw-007
Sample Date					12/4/2017	4/27/2017	4/27/2017	12/4/2017	1/12/2017	4/27/2017	8/1/2017 12:30	12/4/2017	5/2/2017	12/6/2017	5/1/2017	5/1/2017	12/7/2017
RVAAP Area	Screening Criteria				NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	NACA Test Area	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	DUP NTAmw-119	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon*	Upper Sharon*	Upper Sharon	DUP RQLmw-007	
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	**130 J**	NA	**97 J**	**550**	70 U	150 U	**1000**	70 U	300 U	**65 J**	**52 J**	70 U
Antimony	--	6	0.78	0.78	NA	1 U	NA	1 U	1 U	1 U	9 U	1 U	1 U	1 U	6 U	6 U	6 U
Arsenic	--	10	0.052	0.052	NA	**6.2**	NA	**6.8**	**8.3**	**8.2**	**8.1 J D**	**9.3**	**1.3 J**	**1.5 J**	**5.9**	**5.3**	**30**
Barium	--	2000	380	380	NA	**88 J**	NA	**88 J**	29 U	**26 J**	**26 D**	**31 J**	**36**	**23 J**	**37**	**37**	**53**
Beryllium	--	4	2.5	2.5	NA	0.3 U	NA	0.3 U	0.3 UJ	0.3 U	4.5 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium	--	5	0.92	0.92	NA	1 U	NA	1 U	1 U	1 U	4.5 U	1 U	1 U	1 U	**0.37 J**	1 U	1 U
Calcium	--	--	--	--	NA	**85000**	NA	**81000**	**99000**	**98000**	**100000 D B**	**100000**	**30000**	**20000**	**120000**	**120000**	**140000**
Chromium	--	100		--	NA	1.8 U	NA	1.8 U	**0.8 J**	1.8 U	8 U	**2.1 J**	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	4 U	20 U	20 U	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	NA	**0.19 J**	NA	**0.14 J**	**0.6 J**	**0.3 J**	1.8 U	**2**	**1.9**	**1.5**	**6.7**	**7.1**	**5**
Copper	--	1300	80	80	NA	1.8 U	NA	1.8 U	**0.81 J**	1.8 U	0.8 U	**1.6 J**	1.8 U	1.8 U	**2.5**	**2.6**	1.8 U
Iron	--	--	1400	1400	NA	**1400 J**	NA	**1200**	**1800**	**870 J**	**1000 D**	**2600**	**2800**	**2600**	**790**	**810**	**11000 J**
Lead	--	15	15	15	NA	**0.25 J**	NA	**0.2 J**	**0.38 J**	0.7 U	2 U	**1.8 J**	0.7 U	**0.5 J**	**0.67 J**	**0.66 J**	**0.43 J**
Magnesium	--	--	--	--	NA	**21000**	NA	**22000**	**36000**	**35000**	**36000 D**	**41000**	**5300**	**4800**	**32000**	**35000**	**76000**
Manganese	--	--	43	43	NA	**340**	NA	**330 J**	**110**	**97**	**97 D**	**130 J**	**140**	**91 J**	**380 J**	**390**	**1200 J**
Nickel	--	--	39	39	NA	1 U	NA	1 U	**1.3 J**	1 U	4 U	**3.3**	**1.4 J**	**1.1 J**	**13**	**13**	**15**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**19 J**	**21 J**	**43 J**
Potassium	--	--	--	--	NA	3000 U	NA	3000 U	**3200**	3000 U	**2700 D**	**3500**	**3300**	**1100 J**	**3500**	**3500**	**6100**
Selenium	--	50	10	10	NA	2 U	NA	2 U	2 U	2 U	4 U	2 U	2 U	2 U	2 U	2 U	2 U
Sodium	--	--	--	--	NA	**7000 J**	NA	**6500**	**15000**	**14000 J**	**15000 D**	**16000**	**6300**	**6200**	5000 U	**5500**	**4700 J**
Thallium	--	2	0.02	0.02	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	15 U	1 U	0.2 U	0.2 U	**0.14 J**	**0.13 J**	**0.22 J**
Total Cyanide	--	200	0.15	0.15	5 U	NA	NA	NA	5 U	5 U	5 U	5 U	NA	NA	10 U	NA	10 U
Vanadium	--	--	8.6	8.6	NA	2 U	NA	2 U	**0.54 J**	2 U	8 U	2 U	2 U	2 UJ	2 U	2 U	2 UJ
Zinc	--	--	600	600	NA	8 U	NA	8 U	8 U	8 U	18 U	20 U	8 U	**2.4 J**	**45**	**47**	**75**
Cyanide, Free	--	200	0.15	0.15	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					RQLmw-007-D	RQLmw-008	RQLmw-008	RQLmw-009	RQLmw-009	RQLmw-009	RQLmw-011	RQLmw-011	RQLmw-012	RQLmw-012	RQLmw-012-D	RQLmw-013	RQLmw-013
Sample Date					12/7/2017	5/1/2017	12/7/2017	1/13/2017	5/1/2017	12/7/2017	5/1/2017	12/7/2017	5/3/2017	12/7/2017	12/7/2017	5/1/2017	12/7/2017
RVAAP Area	Screening Criteria				Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value		Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP	Upper Sharon	Upper Sharon
Field Measurements																	
pH (s.u.)	--	--	--		6.75	6.24	6.43	6.36	6.82	5.61	4.28	6.02	5.50	5.10	5.10	5.16	3.87
Turbidity (NTU)	--	--	--		0	6.22	0	9.11	4.05	2.6	0	0	0.59	0	0	0.58	0
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	0.8 UJ	0.8 U	0.8 UJ	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	0.8 UJ	0.8 U	0.8 UJ	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	4 UJ	4 U	4 UJ	NA	4 U	4 U	NA	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	6.4 UJ	6.4 U	6.4 UJ	NA	6.4 U	6.4 U	NA	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	0.8 UJ	0.8 U	0.8 UJ	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	0.4 UJ	0.4 U	0.4 UJ	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	0.8 UJ	0.8 U	0.8 UJ	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NR	NR	NA	NR	NR	4.3 U	2 U	NA	NA	NA	NA	NA
Acenaphthene	--	--	53	53	0.043 U	0.04 U	**0.028 J**	NA	0.04 U	0.042 U	0.04 U	0.041 U	NA	NA	NA	NA	NA
Acenaphthylene	--	--	--	--	0.043 U	0.04 U	0.04 U	NA	0.04 U	0.042 U	0.04 U	0.041 U	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	0.11 U	0.012 U	0.1 U	NA	0.012 U	0.1 U	0.012 U	0.1 U	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	**0.0061 J**	0.012 U	0.012 U	NA	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA
Benzyl alcohol	--	--	200	200	0.99 U	**0.33 J**	1.1 U	NA	0.48 U	0.99 U	0.49 U	0.99 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	4.4 U	**1.5 J**	4.7 U	NA	**1.7 J**	4.3 U	**2 J**	4.3 U	NA	NA	NA	NA	NA
Chrysene	--	--	25	25	0.11 U	0.012 U	0.012 U	NA	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA
Fluoranthene	--	--	80	80	0.11 U	0.012 U	0.1 U	NA	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA
Fluorene	--	--	29	29	0.043 U	**0.073 J**	**0.05 J**	NA	0.04 U	0.042 U	0.04 U	0.041 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	0.043 U	0.04 U	0.04 U	NA	0.04 U	0.042 U	0.04 U	0.041 U	NA	NA	NA	NA	NA
Naphthalene	--	--	0.17	0.17	**0.0087 J**	0.012 U	**0.011 J**	NA	0.012 U	**0.012 J**	0.012 U	**0.011 J**	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NA	NR	NR	NA	NR	NR	2 U	0.99 U	NA	NA	NA	NA	NA
Phenanthrene	--	--	--	--	0.11 U	0.02 U	0.02 U	NA	0.02 U	0.1 U	0.02 U	0.02 U	NA	NA	NA	NA	NA
Pyrene	--	--	12	12	0.11 U	0.02 U	0.02 U	NA	0.02 U	0.021 U	0.02 U	0.02 U	NA	NA	NA	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	0.43 U	0.43 U	0.43 U	NA	0.42 U	0.42 UJ	NA	NA	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 U	0.22 U	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U	0.22 U	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 U	0.22 U	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 U	0.13 U	0.13 U	NA	0.13 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	0.21 U	**1.5**	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.13 U	0.13 U	0.13 U	NA	0.13 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	0.43 U	**0.98 J**	0.43 U	NA	0.42 U	0.42 UJ	NA	NA	NA	NA	NA	NA	NA
HMX	--	--	100	100	0.21 U	0.22 U	**0.46**	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	0.21 U	0.22 U	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	0.13 U	**0.25**	0.13 U	NA	0.13 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	0.21 U	0.22 U	0.21 U	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**1100 J**	NA	**1100 J J1**	**1170 J**	NA	**4600 J1**
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	100 U	NA	**640**	NA	NA	100 U	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	**110000 J**	**69000**	**190000 J**	**86000**	**84100**	**150000**	**170000 D**
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	0.099 U	0.096 U	0.097 U	0.098 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	--	--	--	--	0.043 U	0.04 U	0.041 U	NA	0.041 U	0.042 U	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	0.024 U	0.022 U	0.023 U	NA	0.022 U	0.023 U	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					RQLmw-007-D	RQLmw-008	RQLmw-008	RQLmw-009	RQLmw-009	RQLmw-009	RQLmw-011	RQLmw-011	RQLmw-012	RQLmw-012	RQLmw-012-D	RQLmw-013	RQLmw-013
Sample Date					12/7/2017	5/1/2017	12/7/2017	1/13/2017	5/1/2017	12/7/2017	5/1/2017	12/7/2017	5/3/2017	12/7/2017	12/7/2017	5/1/2017	12/7/2017
RVAAP Area	Screening Criteria				Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value		Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	DUP	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	**27 J**	**150 J**	70 U	NA	**40 J**	**38 J**	NA	NA	NA	NA	NA	NA	NA
Antimony	--	6	0.78	0.78	6 U	6 U	1 U	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
Arsenic	--	10	0.052	0.052	**30**	**35**	**44**	NA	**1.1 J**	**2.3 J**	NA	NA	NA	NA	NA	NA	NA
Barium	--	2000	380	380	**53**	**84**	**87**	NA	**23**	**34**	NA	NA	NA	NA	NA	NA	NA
Beryllium	--	4	2.5	2.5	0.3 U	**0.27 J**	0.3 U	NA	0.3 U	0.3 U	NA	NA	NA	NA	NA	NA	NA
Cadmium	--	5	0.92	0.92	**0.34 J**	1 U	1 U	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	NA
Calcium	--	--	--	--	**140000**	**48000**	**57000**	NA	**21000**	**22000**	NA	NA	NA	NA	NA	NA	NA
Chromium	--	100		--	1.8 U	**0.57 J**	1.8 U	NA	1.8 U	1.8 U	NA	NA	NA	NA	NA	NA	NA
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	4 UJ	20 U	4 UJ	20 U	NA	4 U	20 U
Cobalt	--	--	0.6	0.6	**5**	**3**	**12**	NA	**0.77 J**	**1.4**	NA	NA	NA	NA	NA	NA	NA
Copper	--	1300	80	80	1.8 U	**1.4 J**	1.8 U	NA	**3.5**	**3.5**	NA	NA	NA	NA	NA	NA	NA
Iron	--	--	1400	1400	**11000**	**49000**	**65000**	NA	**930**	**1100**	NA	NA	NA	NA	NA	NA	NA
Lead	--	15	15	15	**0.42 J**	**0.77 J**	0.7 U	NA	**0.57 J**	**1.4 J**	NA	NA	NA	NA	NA	NA	NA
Magnesium	--	--	--	--	**76000**	**49000**	**54000**	NA	**10000**	**32000**	NA	NA	NA	NA	NA	NA	NA
Manganese	--	--	43	43	**1200 J**	**520**	540 UJ	NA	**330**	**480 J**	NA	NA	NA	NA	NA	NA	NA
Nickel	--	--	39	39	**15**	**4.8**	**36**	NA	**3.6**	**2.2 J**	NA	NA	NA	NA	NA	NA	NA
Phosphorus	--	--	0.04	0.04	**39 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	3000 U	**3100**	NA	3000 U	**2900 J**	NA	NA	NA	NA	NA	NA	NA
Selenium	--	50	10	10	2 U	2 U	2 U	NA	2 U	2 U	NA	NA	NA	NA	NA	NA	NA
Sodium	--	--	--	--	**4700 J**	5000 U	**5700 J**	NA	5000 U	**1700 J**	NA	NA	NA	NA	NA	NA	NA
Thallium	--	2	0.02	0.02	**0.22 J**	**0.11 J**	**0.11 J**	NA	**0.098 J**	**0.14 J**	NA	NA	NA	NA	NA	NA	NA
Total Cyanide	--	200	0.15	0.15	10 U	10 U	10 U	NA	5 U	10 U	NA	NA	5 U	10 U	NA	NA	NA
Vanadium	--	--	8.6	8.6	2 UJ	2 U	**2 J**	NA	2 U	2 UJ	NA	NA	NA	NA	NA	NA	NA
Zinc	--	--	600	600	**75**	**22**	**440**	NA	**3.7 J**	**4.4 J**	NA	NA	NA	NA	NA	NA	NA
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	10 U	**9.4 J**	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	**15000**	**140000**	**28000**	**18000**	NA	3200 U	3200 U
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					RQLmw-013-D	RQLmw-014	RQLmw-014	RQLmw-015	RQLmw-016	RQLmw-016	SCFmw-001	SCFmw-004	SCFmw-006	SCFmw-006	SCFmw-006	SCFmw-006	WBGmw-006
Sample Date					**12/7/2017**	**4/18/2017**	**12/7/2017**	**1/13/2017**	**5/1/2017**	**12/7/2017**	**1/17/2017**	**4/18/2017**	**4/18/2017**	**4/19/2017**	**4/28/2017**	**12/5/2017**	**1/10/2017**
RVAAP Area	**Screening Criteria**				**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Winklepeck Burning Grounds**
Monitored Zone	**FWCUG**	**MCL**	**RSL**	**Selected Comparison Value**	**DUP**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Unconsolidated**
Field Measurements																	
pH (s.u.)	--	--	--		3.87	5.59	5.91	6.53	5.95	6.44	7.18	7.05	7.46	NA	7.22	7.53	7.03
Turbidity (NTU)	--	--	--		0	0.8	0	8.19	0	7.1	0.99	0.35	1.1	NA	0.5	0.4	2.3
VOCs (µg/L)																	
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	NA	NA	6.4 U	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																	
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	NA	NA	NA	NA	NA	4.3 U	NR	NA	NA	NA	NA	NA
Acenaphthene	--	--	53	53	NA	NA	NA	NA	NA	NA	0.044 U	NR	NA	NA	NA	NA	NA
Acenaphthylene	--	--	--	--	NA	NA	NA	NA	NA	NA	0.044 U	NR	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	--	0.03	0.004	NA	NA	NA	NA	NA	NA	0.013 U	NR	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NA	NA	NA	NA	NA	NA	0.013 U	NR	NA	NA	NA	NA	NA
Benzyl alcohol	--	--	200	200	NA	NA	NA	NA	NA	NA	0.49 U	NR	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	NA	NA	NA	NA	NA	NA	2 U	1.9 U	NA	NA	NA	NA	NA
Chrysene	--	--	25	25	NA	NA	NA	NA	NA	NA	0.013 U	NR	NA	NA	NA	NA	NA
Fluoranthene	--	--	80	80	NA	NA	NA	NA	NA	NA	0.013 U	NR	NA	NA	NA	NA	NA
Fluorene	--	--	29	29	NA	NA	NA	NA	NA	NA	0.044 U	NR	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NA	NA	NA	NA	NA	NA	0.044 U	NR	NA	NA	NA	NA	NA
Naphthalene	--	--	0.17	0.17	NA	NA	NA	NA	NA	NA	**0.15**	NR	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NA	NA	NA	NA	NA	NA	2 U	NR	NA	NA	NA	NA	NA
Phenanthrene	--	--	--	--	NA	NA	NA	NA	NA	NA	0.022 U	NR	NA	NA	NA	NA	NA
Pyrene	--	--	12	12	NA	NA	NA	NA	NA	NA	0.022 U	NR	NA	NA	NA	NA	NA
Explosives (µg/L)																	
1,3,5-Trinitrobenzene	--	--	59	59	NA	0.43 U	0.4 U	NA	NA	NA	0.44 U	0.41 UJ	NA	NA	NA	NA	NA
1,3-Dinitrobenzene	0.104	--	0.2	0.104	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	NA	0.13 U	0.12 U	NA	NA	NA	0.13 U	0.12 UJ	NA	NA	NA	NA	NA
3-Nitrotoluene	--	--	0.17	0.17	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	NA	0.13 U	0.12 U	NA	NA	NA	0.13 U	0.12 UJ	NA	NA	NA	NA	NA
4-Nitrotoluene	5.01	--	4.3	5.01	NA	0.43 U	0.4 U	NA	NA	NA	0.44 U	0.41 UJ	NA	NA	NA	NA	NA
HMX	--	--	100	100	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
Nitrobenzene	0.521	--	0.14	0.521	NA	0.21 U	0.2 U	NA	NA	NA	0.22 UJ	0.21 UJ	NA	NA	NA	NA	NA
RDX	0.774	--	0.7	0.774	NA	**0.28 J**	0.12 U	NA	NA	NA	0.13 U	0.12 UJ	NA	NA	NA	NA	NA
Tetryl	--	--	3.9	3.9	NA	0.21 U	0.2 U	NA	NA	NA	0.22 U	0.21 UJ	NA	NA	NA	NA	NA
Common Anions (µg/L)																	
Chloride	--	--	--	--	**4720**	**4950**	**3300**	NA	NA	NA	NA	NA	**3900**	NA	NA	**2700 J**	NA
Nitrate as N	10000	10000	3200	10000	NA	100 U	NA	NA	NA	NA	NA	NA	100 UJ	NA	NA	NA	NA
Sulfate	--	--	--	--	**171000 D**	**49000**	**120000**	NA	NA	NA	NA	NA	**28000**	NA	NA	**21000**	NA
Pesticides and PCBs (µg/L)																	
Aroclor-1254	0.021	--	0.0078	0.021	NA	NA	NA	0.098 U	NA	NA	0.098 U	NA	NA	NA	NA	NA	0.1 U
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	0.041 U	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	0.022 U	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					RQLmw-013-D	RQLmw-014	RQLmw-014	RQLmw-015	RQLmw-016	RQLmw-016	SCFmw-001	SCFmw-004	SCFmw-006	SCFmw-006	SCFmw-006	SCFmw-006	WBGmw-006
Sample Date					12/7/2017	4/18/2017	12/7/2017	1/13/2017	5/1/2017	12/7/2017	1/17/2017	4/18/2017	4/18/2017	4/19/2017	4/28/2017	12/5/2017	1/10/2017
RVAAP Area	Screening Criteria				Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Ramsdell Quarry Landfill	Sharon Conglomerate	Sharon Conglomerate	Sharon Conglomerate	Sharon Conglomerate	Sharon Conglomerate	Sharon Conglomerate	Winklepeck Burning Grounds
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	DUP	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Unconsolidated
Total Inorganics (µg/L)																	
Aluminum	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	70 U	70 U	NA	NA	**37 J**	NA
Antimony	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	1 U	NA
Arsenic	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	1 U	**10**	NA	NA	**12 J**	NA
Barium	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	**66**	**110**	NA	NA	**110**	NA
Beryllium	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	0.3 U	0.3 U	NA	NA	0.3 U	NA
Cadmium	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	1 U	NA
Calcium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**160000**	**63000**	NA	NA	**57000**	NA
Chromium	--	100		--	NA	NA	NA	NA	NA	NA	NA	1.8 U	**0.74 J**	NA	NA	1.8 UJ	NA
Chromium, hexavalent	--	--	0.035	0.035	NA	4 UJ	20 U	NA	NA	NA	NA	NA	NA	4 U	4 U	20 U	NA
Cobalt	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	0.2 U	**0.12 J**	NA	NA	0.2 UJ	NA
Copper	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	**1.1 J**	1.8 U	NA	NA	1.8 U	NA
Iron	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	**45 J**	**610**	NA	NA	**770**	NA
Lead	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	0.7 U	0.7 U	NA	NA	3 U	NA
Magnesium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**61000**	**15000**	NA	NA	**15000**	NA
Manganese	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	**800**	**150**	NA	NA	**180**	NA
Nickel	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	1 U	1 U	NA	NA	1 U	NA
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**2600 J**	**2000 J**	NA	NA	**1700 J**	NA
Selenium	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	NA	2 U	NA
Sodium	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	**11000**	**10000**	NA	NA	**10000**	NA
Thallium	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.2 U	NA
Total Cyanide	--	200	0.15	0.15	NA	NA	NA	NA	10 U	10 U	5 U	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	NA	NA	2 U	NA
Zinc	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	**2.2 J**	8 U	NA	NA	8 U	NA
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	**48000**	**90000 B**	NA	NA	NA	NA	NA	**210000**	NA	NA	**210000**	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																	
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					WBGmw-006	WBGmw-006	WBGmw-009	WBGmw-009	WBGmw-015	WBGmw-015	WBGmw-020	WBGmw-020	WBGmw-020	WBGmw-021	WBGmw-021	WBGmw-021
Sample Date					4/20/2017	12/5/2017	4/20/2017	12/5/2017	1/10/2017	4/20/2017	1/10/2017	4/20/2017	12/5/2017	1/10/2017	4/20/2017	12/5/2017
RVAAP Area	Screening Criteria				Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Field Measurements																
pH (s.u.)	--	--	--		7.38	7.43	6.16	7.02	7.03	7.03	6.76	6.73	7.03	6.98	7.27	7.28
Turbidity (NTU)	--	--	--		1.47	9.4	0.89	0.1	15.9	5.04	5.98	1.07	5.6	1.03	4.82	10
VOCs (µg/L)																
1,1,1-Trichloroethane	--	200	800	200	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	--	--	2.8	2.8	NA	NA	NA	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	--	7	28	7	NA	NA	NA	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA
2-Hexanone	--	--	3.8	3.8	NA	NA	NA	NA	4 U	4 U	NA	NA	NA	NA	NA	NA
Acetone	--	--	1400	1400	NA	NA	NA	NA	6.4 U	6.4 U	NA	NA	NA	NA	NA	NA
Benzene	5	5	0.46	5	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	5	5	0.46	5	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
Chloroform	0.207	--	0.22	0.207	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
Ethylbenzene	--	700	1.5	1.5	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
Methylene Chloride	5.34	5	11	5.34	NA	NA	NA	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA
Toluene	--	1000	110	110	NA	NA	NA	NA	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA
Xylene (Total)	--	10000	19	19	NA	NA	NA	NA	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA
SVOCs (µg/L)																
2,4-Dinitrotoluene	0.12	--	0.24	0.12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Acenaphthene	--	--	53	53	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Acenaphthylene	--	--	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benz(a)anthracene	0.004	--	0.03	0.004	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzo(b)fluoranthene	0.002	--	0.25	0.002	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzyl alcohol	--	--	200	200	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
bis(2-Ethylhexyl)phthalate	6	6	5.6	6	1.9 U	4.2 U	1.9 U	4.2 U	NA	NA	NA	2 U	4.6 U	NA	2 U	4.2 UJ
Chrysene	--	--	25	25	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluoranthene	--	--	80	80	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fluorene	--	--	29	29	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Indeno(1,2,3-cd)pyrene	0.002		0.25	0.002	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Naphthalene	--	--	0.17	0.17	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nitrobenzene	0.521	--	0.14	0.521	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Phenanthrene	--	--	--	--	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Pyrene	--	--	12	12	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Explosives (µg/L)																
1,3,5-Trinitrobenzene	--	--	59	59	0.41 U	0.41 UJ	0.41 U	0.44 UJ	0.43 U	0.42 U	NA	0.43 U	0.44 UJ	NA	0.41 U	0.44 UJ
1,3-Dinitrobenzene	0.104	--	0.2	0.104	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 UJ	NA	0.21 U	0.22 UJ
2,4,6-Trinitrotoluene	0.521	--	0.98	0.521	0.21 U	0.2 U	0.21 U	0.22 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 U
2,4-Dinitrotoluene	0.12	--	0.24	0.12	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 UJ	NA	0.21 U	0.22 UJ
2-Amino-4,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 U	0.12 UJ	0.12 U	0.13 UJ	0.13 U	0.13 U	NA	0.13 U	0.13 UJ	NA	0.12 U	0.13 UJ
3-Nitrotoluene	--	--	0.17	0.17	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 UJ	0.21 U	NA	0.21 U	0.22 UJ	NA	0.21 U	0.22 UJ
4-Amino-2,6-dinitrotoluene	0.209	--	3.9	0.209	0.12 U	0.12 UJ	0.12 U	0.13 UJ	0.13 U	0.13 U	NA	0.13 U	0.13 UJ	NA	0.12 U	0.13 UJ
4-Nitrotoluene	5.01	--	4.3	5.01	0.41 U	**0.41 J**	0.41 U	0.44 UJ	0.43 UJ	0.42 U	NA	0.43 U	0.44 UJ	NA	0.41 U	0.44 UJ
HMX	--	--	100	100	**3.5**	**0.38 J**	**0.73**	**3.5 J**	0.21 U	0.21 U	NA	0.21 U	0.22 U	NA	0.21 U	0.22 U
Nitrobenzene	0.521	--	0.14	0.521	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 UJ	NA	0.21 U	0.22 UJ
RDX	0.774	--	0.7	0.774	**11**	1.2 UJ	**2.1**	**11 J**	0.13 U	0.13 U	NA	0.13 U	**0.068 J**	NA	0.12 U	0.13 UJ
Tetryl	--	--	3.9	3.9	0.21 U	0.2 U	0.21 U	0.22 UJ	0.21 UJ	0.21 U	NA	0.21 U	0.22 UJ	NA	0.21 U	0.22 UJ
Common Anions (µg/L)																
Chloride	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10000	10000	3200	10000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs (µg/L)																
Aroclor-1254	0.021	--	0.0078	0.021	0.11 U	NA	NA	NA	NA	NA	0.097 U	0.1 U	NA	0.097 U	0.096 U	NA
Delta-BHC	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Well Number					WBGmw-006	WBGmw-006	WBGmw-009	WBGmw-009	WBGmw-015	WBGmw-015	WBGmw-020	WBGmw-020	WBGmw-020	WBGmw-021	WBGmw-021	WBGmw-021
Sample Date					4/20/2017	12/5/2017	4/20/2017	12/5/2017	1/10/2017	4/20/2017	1/10/2017	4/20/2017	12/5/2017	1/10/2017	4/20/2017	12/5/2017
RVAAP Area	Screening Criteria				Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds	Winklepeck Burning Grounds
Monitored Zone	FWCUG	MCL	RSL	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon	Upper Sharon
Total Inorganics (µg/L)																
Aluminum	--	--	2000	2000	**23 J**	**160 J**	**67 J**	**21 J**	NA	NA	NA	70 U	70 U	NA	70 U	70 U
Antimony	--	6	0.78	0.78	**0.71 J**	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	NA	1 U	1 U
Arsenic	--	10	0.052	0.052	1 U	**0.33 J**	1 U	1 UJ	NA	NA	NA	**1.2 J**	**1.4 J**	NA	**6**	**15 J**
Barium	--	2000	380	380	**19**	**25**	**16**	**16**	NA	NA	NA	**16**	**15**	NA	**55**	**56**
Beryllium	--	4	2.5	2.5	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	NA	0.3 U	0.3 U	NA	0.3 U	0.3 U
Cadmium	--	5	0.92	0.92	1 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	NA	1 U	1 U
Calcium	--	--	--	--	**65000**	**56000**	**43000**	**85000**	NA	NA	NA	**31000**	**29000**	NA	**74000**	**63000**
Chromium	--	100		--	1.8 U	1.8 UJ	1.8 U	1.8 UJ	NA	NA	NA	1.8 U	1.8 UJ	NA	1.8 U	1.8 UJ
Chromium, hexavalent	--	--	0.035	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	--	--	0.6	0.6	**0.28 J**	**2.6 J**	**0.13 J**	0.2 UJ	NA	NA	NA	**0.36 J**	0.23 UJ	NA	**0.24 J**	0.2 UJ
Copper	--	1300	80	80	1.8 U	**1 J**	**0.97 J**	1.8 U	NA	NA	NA	1.8 U	1.8 U	NA	1.8 U	1.8 U
Iron	--	--	1400	1400	**51 J**	**350**	**94 J**	100 U	NA	NA	NA	**3300**	**4100**	NA	**540**	**2500**
Lead	--	15	15	15	0.7 U	3 U	**0.29 J**	0.7 U	NA	NA	NA	**0.18 J**	3 U	NA	0.7 U	3 U
Magnesium	--	--	--	--	**21000**	**20000**	**11000**	**28000**	NA	NA	NA	**9800**	**10000**	NA	**18000**	**17000**
Manganese	--	--	43	43	**94 J**	**1000**	**23 J**	**220**	NA	NA	NA	**240 J**	**310**	NA	**300 J**	**520**
Nickel	--	--	39	39	1 U	**1.3 J**	**0.84 J**	**0.65 J**	NA	NA	NA	**2.4 J**	**2.5 J**	NA	1 U	**0.31 J**
Phosphorus	--	--	0.04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	--	--	--	--	940 U	**840 J**	940 U	**1300 J**	NA	NA	NA	940 U	**660 J**	NA	**660 J**	**1400 J**
Selenium	--	50	10	10	2 U	2 U	2 U	2 U	NA	NA	NA	2 U	2 U	NA	2 U	2 U
Sodium	--	--	--	--	**5700**	**5000**	5000 U	**4900 J**	NA	NA	NA	5000 U	**4100 J**	NA	**5100**	**4900 J**
Thallium	--	2	0.02	0.02	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	0.2 U	0.2 U	NA	0.2 U	0.2 U
Total Cyanide	--	200	0.15	0.15	NA	NA	NA	NA	5 U	5 U	NA	NA	NA	NA	NA	NA
Vanadium	--	--	8.6	8.6	2 U	2 U	2 U	2 U	NA	NA	NA	2 U	2 U	NA	2 U	2 U
Zinc	--	--	600	600	8 U	**2.3 J**	8 U	8 U	NA	NA	NA	8 U	8 U	NA	8 U	8 U
Cyanide, Free	--	200	0.15	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity (as CaCO3)	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate	--	--	1.4	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Inorganics (µg/L)																
Aluminum, Dissolved	--	--	2000	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	--	6	0.78	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic, Dissolved	--	10	0.052	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium, Dissolved	--	2000	380	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium, Dissolved	--	4	2.5	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	--	5	0.92	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, Dissolved	--	100	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt, Dissolved	--	--	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper, Dissolved	--	1300	80	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron, Dissolved	--	--	1400	1400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead, Dissolved	--	15	15	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese, Dissolved	--	--	43	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel, Dissolved	--	--	39	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium, Dissolved	--	50	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium, Dissolved	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	--	2	0.02	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium, Dissolved	--	--	8.6	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc, Dissolved	--	--	600	600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table 3-5
Summary of 2017 Detected Constituents - FWGWMP Monitoring Wells

Notes and Abbreviations:

-- indicates value not established
µg/L - micrograms per liter
B - Constituent detected in sample and laboratory blank sample
D - The reported value is from a dilution
HF - Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J - Estimated value
M - Manual integrated compound
NA - Constituent not analyzed
NR - Constituent not reported
NTU - Nephelometric turbidity units
PCBs - Polychlorinated Biphenyls
Q - One or more laboratory quality control criteria failed
R - Rejected during data validation
s.u. - Standard pH units
SVOCs - Semi-Volatile Organic Compounds
U - Constituent not detected; Reporting limit presented
VOCs - Volatile Organic Compounds
Only detected constituents are included in this table
Screening Criteria include the Facility-Wide Cleanup Goals (FWCUG), Maximum Contaminant Levels (MCL), and Regional Screening Levels (RSL).
Selected criteria identified as Comparison Value.
FWCUGs are from *Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio, dated March 23, 2010* (SAIC, 2010)
FWCUGs will be updated during the Remedial Investigation (RI).
RSLs are from November 2017 (using a Target Hazard Quotient=0.1, and Target Cancer Risk=10e-6).
Highlighted pH values identify pH levels less than 5.0 or greater than 9.0 s.u.
Highlighted concentrations indicate the constituent concentration is greater than the screening criteria
The sample ID only includes the unfiltered sample. All filtered sample results, for metals, are incorporated under the unfiltered sample column

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APPENDIX A

REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA

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APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**DET-003**	**DET-500**	**DETmw-003**	**BKGmw-005**	**BKGmw-005**	**BKGmw-005**	**BKGmw-005-D**	**BKGmw-006**	**BKGmw-006**	**BKGmw-008**	**BKGmw-008**	**BKGmw-008**	**BKGmw-008**	**BKGmw-008-D**	**BKGmw-015**	**BKGmw-015**
Sample Date		**4/24/2017**	**4/24/2017**	**12/5/2017**	**4/19/2017**	**5/3/2017**	**12/1/2017**	**12/1/2017**	**4/24/2017**	**12/5/2017**	**4/18/2017**	**4/19/2017**	**5/4/2017**	**12/6/2017**	**12/6/2017**	**4/19/2017**	**5/4/2017**
RVAAP Area		**Open Demolition Area #2**	**Open Demolition Area #2**	**Open Demolition Area #2**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**
Monitored Zone	**Selected Comparison Value**		**DUP DET-003**		**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	4 U	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	1 U	1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	1 U	1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	1 U	1 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	30 U	31 U	15 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	8.8 U	9 U	15 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	0.012 U	0.013 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	0.012 U	0.013 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	0.012 U	0.013 U	0.0053 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	0.012 U	0.013 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	1 U	1 U	0.95 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	2 U	2.1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	16	2 U	2.1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.002	0.012 U	0.013 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	1 U	1 U	0.95 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Octyl phthalate	20	1 U	1 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	0.0098	2 U	2.1 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	10 U	10 U	28 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	30 UJ	31 UJ	24 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	4.4 U	4.5 U	28 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	0.041 U	0.045 U	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	0.012 U	0.013 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	1 U	1 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	60 U	62 U	15 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		DET-003	DET-500	DETmw-003	BKGmw-005	BKGmw-005	BKGmw-005	BKGmw-005-D	BKGmw-006	BKGmw-006	BKGmw-008	BKGmw-008	BKGmw-008	BKGmw-008	BKGmw-008-D	BKGmw-015	BKGmw-015
Sample Date		4/24/2017	4/24/2017	12/5/2017	4/19/2017	5/3/2017	12/1/2017	12/1/2017	4/24/2017	12/5/2017	4/18/2017	4/19/2017	5/4/2017	12/6/2017	12/6/2017	4/19/2017	5/4/2017
RVAAP Area		Open Demolition Area #2	Open Demolition Area #2	Open Demolition Area #2	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	Selected Comparison Value		DUP DET-003		Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Sharon	Sharon	Sharon	Sharon	Sharon	Sharon	Sharon	Sharon	Sharon
Explosives																	
1,3-Dinitrobenzene	0.104	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	4.4 U	4.5 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	0.37	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	0.17	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	2 U	2.1 U	0.95 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	2.1 U	2.1 U	2.1 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PETN	3.9	1.2 U	1.2 U	1.3 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	0.12 U	0.12 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs																	
Aldrin	0.005	0.022 UJ	0.022 UJ	0.023 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	0.019 U	0.02 U	0.021 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.213	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.021	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.213	0.098 U	0.095 U	0.095 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.004	0.016 U	0.017 U	0.018 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																	
Antimony	0.78	1 U	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	NA
Antimony, Dissolved	0.78	1 U	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	NA
Arsenic	0.052	9.3	9.4	10 J	1 U	NA	0.64 J	NA	0.93 J	3.3 J	1 U	NA	NA	1 U	NA	1 U	NA
Beryllium	2.5	0.3 U	0.3 U	0.3 U	0.3 U	NA	1 U	NA	0.3 U	0.3 U	0.3 U	NA	NA	0.3 U	NA	0.3 U	NA
Cadmium	0.92	1 U	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	NA
Cadmium, Dissolved	0.92	1 U	1 U	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	NA	NA	1 U	NA	1 U	NA
Chromium, hexavalent	0.035	NA	NA	NA	4 U	4 U	20 U	NA	4 U	20 U	NA	4 U	4 U	20 U	NA	4 U	4 U
Cobalt	0.6	0.28 J	0.31 J	0.055 J	0.11 J	NA	0.39 J	NA	0.38 J	0.54 J	0.059 J	NA	NA	15	NA	0.2 U	NA
Cr (VI)	0.035	NA	NA	NA	4 U	4 U	20 U	NA	4 U	20 U	NA	4 U	4 U	20 U	NA	4 U	4 U
Hexavalent chromium	0.035	NA	NA	NA	4 U	4 U	20 U	NA	4 U	20 U	NA	4 U	4 U	20 U	NA	4 U	4 U
Manganese	43	250	260	240	6.7	NA	52	NA	71	140	0.77 J	NA	NA	130 J	NA	1.1 J	NA
Mercury	0.063	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.08 U	NA	NA	0.08 U	NA	0.08 U	NA
Mercury, Dissolved	0.063	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.08 U	NA	NA	0.08 U	NA	0.08 U	NA
Selenium	10	2 U	2 U	2 U	2 U	NA	2 U	NA	0.73 J	2 U	2 U	NA	NA	2 U	NA	2 U	NA
Thallium	0.02	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA
Thallium, Dissolved	0.02	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	NA	0.2 U	NA
Total Cyanide	0.15	5 U	2 J	6.1 J	NA	NA	NA	NA	NA	NA	2 J	NA	NA	10 U	NA	NA	NA
Vanadium	8.6	2 U	2 U	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	NA	NA	2 UJ	NA	2 U	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		BKGmw-015	BKGmw-016	BKGmw-016	BKGmw-016	BKGmw-016-D	BKGmw-017	BKGmw-017	BKGmw-018	BKGmw-509	BKGmw-018	BKGmw-021	BKGmw-021	BKGmw-022	BKGmw-510	BKGMW-022	BKGmw-022
Sample Date		12/5/2017	4/19/2017	5/1/2017	12/4/2017	12/4/2017	4/20/2017	12/4/2017	4/20/2017	4/20/2017	12/5/2017	4/21/2017	12/5/2017	4/21/2017	4/21/2017	8/2/2017	12/1/2017
RVAAP Area		Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	Selected Comparison Value	Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Sharon	DUP BKGmw-018	Sharon	Unconsolidated	Unconsolidated	Homewood	DUP BKGmw-022	Homewood	Homewood
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	NA	0.8 U
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	NA	0.8 U
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	NA	0.4 U
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	NA	4 U
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	NA	0.4 U
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	NA	0.8 U
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	NA	0.4 U
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	NA	0.2 U
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	4.2 U
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	4.2 U
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	1.9 U
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28 U	29 U	10 U Q	15 U
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U	1.9 U
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.4 U	8.4 U	3 U Q	15 U
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U	1.9 U
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U Q	1.9 U
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.0076 J
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.013 U
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.0041
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.013 U
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	0.96 U
bis(2-Ethylhexyl)phthalate	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	3 U	4.2 U
Butyl benzyl phthalate	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	3 U	4.2 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.013 U
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	0.96 U
Di-N-Butyl phthalate	90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U	1.9 U
Di-N-Octyl phthalate	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	10 U	4.2 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	3 U	1.9 U
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.5 U	9.6 U	3 U Q	29 U
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	28 R	29 R	3 U Q	24 U
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U Q	29 U
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U	0.04 U	3 U Q	0.042 U
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	0.012 U	3 U	0.0086 J
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.95 U	0.96 U	3 U	1.9 U
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	57 U	58 U	3 U	15 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		BKGmw-015	BKGmw-016	BKGmw-016	BKGmw-016	BKGmw-016-D	BKGmw-017	BKGmw-017	BKGmw-018	BKGmw-509	BKGmw-018	BKGmw-021	BKGmw-021	BKGmw-022	BKGmw-510	BKGMW-022	BKGmw-022
Sample Date		12/5/2017	4/19/2017	5/1/2017	12/4/2017	12/4/2017	4/20/2017	12/4/2017	4/20/2017	4/20/2017	12/5/2017	4/21/2017	12/5/2017	4/21/2017	4/21/2017	8/2/2017	12/1/2017
RVAAP Area		Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background	Background
Monitored Zone	Selected Comparison Value	Sharon	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Sharon	DUP BKGmw-018	Sharon	Unconsolidated	Unconsolidated	Homewood	DUP BKGmw-022	Homewood	Homewood
Explosives																	
1,3-Dinitrobenzene	0.104	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.2 U	4.2 U	3 U	1.9 UJ
2,6-Dinitrotoluene	0.122	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ
2-Nitrotoluene	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.21 U	0.5 U	0.21 UJ
3-Nitrotoluene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U	0.21 U	0.2 U	0.21 UJ
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	3 U	0.96 UJ
Nitroglycerin	5.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1 U	2.1 U	0.99 U	2.1 UJ
PETN	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.3 U	1.2 U	0.99 U	1.3 UJ
RDX	0.774	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.13 U	0.12 U	0.2 U	0.13 UJ
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.021 UJ	0.021 UJ	0.02 U	0.022 U
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.019 U	0.019 U	0.02 U	0.02 U
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.81 U	0.099 U
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.81 U	0.099 U
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.81 U	0.099 U
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.81 U	0.099 U
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.81 U	0.099 U
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.31 U	0.099 U
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.095 U	0.31 U	0.099 U
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.016 U	0.016 U	0.02 U	0.016 U
Inorganics																	
Antimony	0.78	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	3.6 J	1 U	1 U	NA	1 U
Antimony, Dissolved	0.78	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	3.6 J	1 U	1 U	NA	1 U
Arsenic	0.052	1 UJ	1 U	NA	1.5 J	NA	21	19	1 U	1 U	1 UJ	1 U	0.45 J	3.1 J	3 J	NA	4.5 J
Beryllium	2.5	0.3 U	0.3 U	NA	0.3 U	NA	1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.21 J	0.3 U	0.3 U	NA	0.3 U
Cadmium	0.92	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U
Cadmium, Dissolved	0.92	1 U	1 U	NA	1 U	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	NA	1 U
Chromium, hexavalent	0.035	20 U	4 U	4 U	20 U	NA	4 U	20 U	4 U	4 U	20 U	4 U	20 U	4 UJ	4 UJ	20 U	20 U
Cobalt	0.6	0.2 UJ	0.2 U	NA	0.081 J	NA	2.7	1.3	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	2.2	2.3	NA	2.2
Cr (VI)	0.035	20 U	4 U	4 U	20 U	NA	4 U	20 U	4 U	4 U	20 U	4 U	20 U	4 UJ	4 UJ	20 U	20 U
Hexavalent chromium	0.035	20 U	4 U	4 U	20 U	NA	4 U	20 U	4 U	4 U	20 U	4 U	20 U	4 UJ	4 UJ	20 U	20 U
Manganese	43	3.5 U	2.2 J	NA	7.2 J	NA	230	250	1.6 J	0.7 J	10	0.39 J	3.5 U	370	380	NA	390
Mercury	0.063	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U
Mercury, Dissolved	0.063	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U
Selenium	10	2 U	2 U	NA	2 U	NA	2 U	2 U	2 U	2 U	1.1 J	0.99 J	2 U	2 U	2 U	NA	2 U
Thallium	0.02	0.2 U	0.2 U	NA	0.2 U	NA	0.29 J	0.15 J	0.2 U	0.2 U	0.2 U	0.2 U	0.075 J	0.2 U	0.2 U	NA	0.2 U
Thallium, Dissolved	0.02	0.2 U	0.2 U	NA	0.2 U	NA	0.29 J	0.15 J	0.2 U	0.2 U	0.2 U	0.2 U	0.075 J	0.2 U	0.2 U	NA	0.2 U
Total Cyanide	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.5 J	5 U	NA	5 U
Vanadium	8.6	2 U	2 U	NA	2 U	NA	6 U	0.77 J	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	2 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**BKGmw-023**	**BKGMW-023**	**BKGmw-023**	**BKGmw-023-D**	**BKGmw-024**	**BKGmw-024**	**BKGMW-024**	**BKGmw-024**	**BKGmw-025**	**BKGMW-025**	**BKGmw-025**	**BKGmw-025-D**	**B12mw-011**	**FWGmw-002**	**FWGmw-002**	**CBPmw-008**
Sample Date		**4/20/2017**	**8/2/2017**	**12/1/2017**	**12/1/2017**	**4/20/2017**	**5/3/2017**	**8/7/2017**	**12/5/2017**	**4/26/2017**	**8/2/2017**	**12/1/2017**	**12/1/2017**	**4/26/2017**	**5/2/2017**	**12/5/2017**	**4/28/2017**
RVAAP Area		**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Building 1200**	**Building 1200**	**Building 1200**	**Central Burn Pits**
Monitored Zone	**Selected Comparison Value**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	0.8 U	NA	0.8 U	NA	0.8 U	NA	0.25 U	0.8 UJ	0.8 U	NA	0.8 U	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	0.8 U	NA	0.8 U	NA	0.8 U	NA	0.25 U	0.8 UJ	0.8 U	NA	0.8 U	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	0.4 U	NA	0.4 U	NA	0.4 U	NA	0.5 U	0.4 UJ	0.4 U	NA	0.4 U	NA	NA	NA	NA	NA
2-Hexanone	3.8	4 U	NA	4 U	NA	4 U	NA	0.5 U	4 UJ	4 U	NA	4 U	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	0.4 U	NA	0.4 U	NA	0.4 U	NA	0.25 U	0.4 UJ	0.4 U	NA	0.4 U	NA	NA	NA	NA	NA
Bromomethane	0.75	0.8 U	NA	0.8 U	NA	0.8 U	NA	0.5 U	0.8 UJ	0.8 U	NA	0.8 U	NA	NA	NA	NA	NA
Chloroform	0.207	0.4 U	NA	0.4 U	NA	0.4 U	NA	0.25 U	0.4 UJ	0.4 U	NA	0.4 U	NA	NA	NA	NA	NA
Vinylchloride	0.019	0.2 U	NA	0.2 U	NA	0.2 U	NA	0.25 U	0.2 UJ	0.2 U	NA	0.2 U	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	1 U	2.9 U	5 U	NA	0.96 U	NA	3 U J	4.2 U	0.99 U	2.9 U	4.3 U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	1 U	2.9 U	5 U	NA	0.96 U	NA	3 U J	4.2 U	0.99 U	2.9 U	4.3 U	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	1 U	2.9 U	2.3 U	NA	0.96 U	NA	3 U	1.9 U	0.99 U	2.9 U	2 U	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	31 U	9.7 U Q	18 U	NA	29 U	NA	9.9 U Q	15 U	30 U	9.8 U Q	16 U	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	4.5 U	2.9 U	2.3 U	NA	4.2 U	NA	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	9 U	2.9 U Q	18 U	NA	8.5 U	NA	3 U Q	15 U	8.7 U	2.9 U Q	16 U	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	4.5 U	2.9 U	2.3 U	NA	4.2 U	NA	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	4.5 U	2.9 U Q	2.3 U	NA	4.2 U	NA	3 U	1.9 U	4.3 U	2.9 U Q	2 U	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U	0.11 U	0.012 UJ	2.9 U	0.0066 J	NA	0.012 U	NA	NA	NA
Benzo(a)pyrene	0.2	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U	0.013 U	0.012 UJ	2.9 U	0.013 U	NA	0.012 U	NA	NA	NA
Benzo(b)fluoranthene	0.002	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U	0.0038 J	0.012 UJ	2.9 U	0.013 U	NA	0.012 U	NA	NA	NA
Benzo(k)fluoranthene	2.5	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U	0.013 U	0.012 UJ	2.9 U	0.013 U	NA	0.012 U	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	1 U	2.9 U	1.1 U	NA	0.96 U	NA	3 U J	0.95 U	0.99 U	2.9 U	0.98 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	2.1 U	2.9 U	5 U	NA	1.9 U	NA	3 U	4.2 U	2 U	2.9 U	4.3 U	NA	2 U	NA	NA	NA
Butyl benzyl phthalate	16	2.1 U	2.9 U	5 U	NA	1.9 U	NA	3 U	4.2 U	2 U	2.9 U	4.3 U	NA	2 U	NA	NA	NA
Dibenz(a,h)anthracene	0.002	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U Q	0.013 U	0.012 UJ	2.9 U	0.013 U	NA	0.012 U	NA	NA	NA
Dibenzofuran	0.79	1 U	2.9 U	1.1 U	NA	0.96 U	NA	3 U	0.95 U	0.99 U	2.9 U	0.98 U	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	4.5 U	2.9 U	2.3 U	NA	4.2 U	NA	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	4.4 U	NA	NA	NA
Di-N-Octyl phthalate	20	1 U	9.7 U	5 U	NA	0.96 U	NA	9.9 U	4.2 U	0.99 U	9.8 U	4.3 U	NA	0.99 U	NA	NA	NA
Hexachlorobenzene	0.0098	2.1 U	2.9 U	2.3 U	NA	1.9 U	NA	3 U	1.9 U	2 U	2.9 U	2 U	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	10 U	2.9 U Q	34 U	NA	9.6 U	NA	3 U J	29 U	9.9 U	2.9 U Q	29 U	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	31 R	2.9 U Q	28 U	NA	29 R	NA	3 U J	24 UJ	30 UJ	2.9 U Q	25 U	NA	NA	NA	NA	NA
Hexachloroethane	0.33	4.5 U	2.9 U Q	34 U	NA	4.2 U	NA	3 U J	29 U	4.3 U	2.9 U Q	29 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	0.041 U	2.9 U Q	0.042 U	NA	0.04 U	NA	3 U	0.042 U	0.04 UJ	2.9 U Q	0.042 U	NA	0.04 U	NA	NA	NA
Naphthalene	0.17	0.012 U	2.9 U	0.012 U	NA	0.012 U	NA	3 U J	0.015 J	0.046 J	2.9 U	0.056 J	NA	0.012 U	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	1 U	2.9 U	2.3 U	NA	0.96 U	NA	3 U J	1.9 U	0.99 U	2.9 U	2 U	NA	NA	NA	NA	NA
Pentachlorophenol	1	62 U	2.9 U	18 U	NA	58 U	NA	3 U	15 U	59 U	2.9 U	16 U	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**BKGmw-023**	**BKGMW-023**	**BKGmw-023**	**BKGmw-023-D**	**BKGmw-024**	**BKGmw-024**	**BKGMW-024**	**BKGmw-024**	**BKGmw-025**	**BKGMW-025**	**BKGmw-025**	**BKGmw-025-D**	**B12mw-011**	**FWGmw-002**	**FWGmw-002**	**CBPmw-008**
Sample Date		**4/20/2017**	**8/2/2017**	**12/1/2017**	**12/1/2017**	**4/20/2017**	**5/3/2017**	**8/7/2017**	**12/5/2017**	**4/26/2017**	**8/2/2017**	**12/1/2017**	**12/1/2017**	**4/26/2017**	**5/2/2017**	**12/5/2017**	**4/28/2017**
RVAAP Area		**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Background**	**Building 1200**	**Building 1200**	**Building 1200**	**Central Burn Pits**
Monitored Zone	**Selected Comparison Value**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**
Explosives																	
1,3-Dinitrobenzene	0.104	0.21 U	0.2 U	0.21 U	NA	0.21 U	NA	0.2 U	0.22 UJ	0.21 UJ	0.2 U	0.21 U	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	4.5 U	2.9 U	2.3 U	NA	4.2 U	NA	3 U Q	1.9 U	4.3 U	2.9 U	2 U	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	0.21 U	0.2 U	0.21 U	NA	0.21 U	NA	0.2 U	0.22 UJ	0.21 U	0.2 U	0.21 U	NA	NA	NA	NA	NA
2-Nitrotoluene	0.37	0.21 U	0.5 U	0.21 U	NA	0.21 U	NA	0.5 U	0.22 UJ	0.21 U	0.5 U	0.21 U	NA	NA	NA	NA	NA
3-Nitrotoluene	0.17	0.21 U	0.2 U	0.21 U	NA	0.21 U	NA	0.2 U	0.22 UJ	0.21 U	0.2 U	0.21 U	NA	NA	NA	NA	NA
Nitrobenzene	0.521	2.1 U	2.9 U	1.1 U	NA	1.9 U	NA	3 U J	0.95 U	2 U	2.9 U	0.98 U	NA	NA	NA	NA	NA
Nitroglycerin	5.01	2.1 U	1 U	2.1 U	NA	2.1 U	NA	1 U	2.2 UJ	2.1 U	1 U	2.1 U	NA	NA	NA	NA	NA
PETN	3.9	1.3 U	1 U	1.3 U	NA	1.2 U	NA	1 U	1.3 UJ	1.3 U	1 U	1.2 U	NA	NA	NA	NA	NA
RDX	0.774	0.13 U	0.2 U	0.13 U	NA	0.12 U	NA	0.2 U	0.13 UJ	0.13 UJ	0.2 U	0.12 U	NA	NA	NA	NA	NA
Pesticides and PCBs																	
Aldrin	0.005	0.022 UJ	0.019 U	0.021 U	NA	0.021 UJ	NA	0.02 U	0.023 U	0.021 U	0.02 U	0.022 U	NA	NA	NA	NA	NA
Alpha-BHC	0.014	0.02 U	0.019 U	0.019 U	NA	0.019 U	NA	0.02 U	0.021 U	0.019 U	0.02 U	0.02 U	NA	NA	NA	NA	NA
Aroclor-1016	0.14	0.1 U	0.78 U	0.097 U	NA	0.096 U	NA	0.8 U	0.099 U	0.095 U	0.79 U	0.099 U	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	0.1 U	0.78 U	0.097 U	NA	0.096 U	NA	0.8 U	0.099 U	0.095 U	0.79 U	0.099 U	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	0.1 U	0.78 U	0.097 U	NA	0.096 U	NA	0.8 U	0.099 U	0.095 U	0.79 U	0.099 U	NA	NA	NA	NA	NA
Aroclor-1242	0.213	0.1 U	0.78 U	0.097 U	NA	0.096 U	NA	0.8 U	0.099 U	0.095 U	0.79 U	0.099 U	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	0.1 U	0.78 U	0.097 U	NA	0.096 U	NA	0.8 U	0.099 U	0.095 U	0.79 U	0.099 U	NA	NA	NA	NA	NA
Aroclor-1254	0.021	0.1 U	0.29 U	0.097 U	NA	0.096 U	NA	0.3 U	0.099 U	0.095 U	0.3 U	0.13 J	NA	NA	NA	NA	NA
Aroclor-1260	0.213	0.1 U	0.29 U	0.097 U	NA	0.096 U	NA	0.3 U	0.099 U	0.095 U	0.3 U	0.099 U	NA	NA	NA	NA	NA
Dieldrin	0.004	0.016 U	0.019 U	0.016 U	NA	0.016 U	NA	0.02 U	0.018 U	0.016 U	0.02 U	0.017 U	NA	NA	NA	NA	NA
Inorganics																	
Antimony	0.78	1 U	9 U	1 U	NA	0.41 J	NA	9 U J	1 U	0.6 J	9 U	1 U	NA	NA	NA	NA	NA
Antimony, Dissolved	0.78	1 U	9 U	1 U	NA	0.41 J	NA	9 U J	1 U	0.6 J	9 U	1 U	NA	NA	NA	NA	NA
Arsenic	0.052	1 U	8 U	1 U	NA	7.5	NA	7.9 J D	7.2	48	24 D	22	NA	NA	NA	NA	NA
Beryllium	2.5	0.3 U	4.5 U	0.3 U	NA	0.23 J	NA	4.5 U	0.3 U	0.3 U	4.5 U	0.3 U	NA	NA	NA	NA	NA
Cadmium	0.92	1 U	4.5 U	1 U	NA	1 U	NA	4.5 U	1 U	1 U	4.5 U	1 U	NA	NA	NA	NA	NA
Cadmium, Dissolved	0.92	1 U	4.5 U	1 U	NA	1 U	NA	4.5 U	1 U	1 U	4.5 U	1 U	NA	NA	NA	NA	NA
Chromium, hexavalent	0.035	4 U	20 U	20 U	NA	4 U	NA	NA	20 U	4 UJ	20 U	20 U	NA	NA	NA	NA	NA
Cobalt	0.6	1.1	2.1 D	1.7	NA	0.46 J	NA	1.8 U	0.2 U	3.4	2 D	2.3	NA	NA	NA	NA	NA
Cr (VI)	0.035	4 U	20 U	20 U	NA	4 U	NA	NA	20 U	4 UJ	20 U	20 U	NA	NA	NA	NA	NA
Hexavalent chromium	0.035	4 U	20 U	20 U	NA	4 U	NA	NA	20 U	4 UJ	20 U	20 U	NA	NA	NA	NA	NA
Manganese	43	210	360 D	310	NA	450	NA	470 J D	530	330	220 D	310	NA	NA	NA	NA	NA
Mercury	0.063	0.08 U	0.15 U	0.08 U	NA	0.08 U	NA	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	NA	NA	NA	NA	NA
Mercury, Dissolved	0.063	0.08 U	0.15 U	0.08 U	NA	0.08 U	NA	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	NA	NA	NA	NA	NA
Selenium	10	2 U	4 U	2 U	NA	2 U	NA	4 U	2 U	2 U	4 U	2 U	NA	NA	NA	NA	NA
Thallium	0.02	0.2 U	15 U	0.2 U	NA	0.097 J	NA	15 U	0.2 U	0.2 U	15 U	0.2 U	NA	NA	NA	NA	NA
Thallium, Dissolved	0.02	0.2 U	15 U	0.2 U	NA	0.097 J	NA	15 U	0.2 U	0.2 U	15 U	0.2 U	NA	NA	NA	NA	NA
Total Cyanide	0.15	5 U	5 U	10 U	NA	5 U	NA	4.6 J	5 U	2.4 J	5 U	5 U	NA	NA	NA	NA	5 U
Vanadium	8.6	2 U	8 U	2 U	NA	2 U	NA	8 U	2 U	2 U	8 U	2 U	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**CBPmw-008**	**CBPmw-009**	**CBPmw-009**	**DA2mw-115**	**DA2mw-115**	**FWGmw-013**	**FWGmw-013**	**EBGmw-125**	**EBGmw-125**	**EBGmw-131**	**EBGmw-131**	**FWGmw-005**	**FWGmw-005**	**FWGmw-005**	**FBQmw-166**	**FBQmw-501**
Sample Date		**12/6/2017**	**4/28/2017**	**12/5/2017**	**4/24/2017**	**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/17/2017**	**12/6/2017**	**4/17/2017**	**12/6/2017**	**4/19/2017**	**5/3/2017**	**12/1/2017**	**4/27/2017**	**4/27/2017**
RVAAP Area		**Central Burn Pits**	**Central Burn Pits**	**Central Burn Pits**	**Demolition Area 2**	**Demolition Area 2**	**Demolition Area 2**	**Demolition Area 2**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Facility-Wide**	**Facility-Wide**	**Facility-Wide**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**DUP FBQmw-166**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	1.9 U	NA	1.9 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	590 U
Butyl benzyl phthalate	16	NA	1.9 U	NA	1.9 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	590 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	NA	4.3 U	NA	4.3 U	1.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.4 U	1300 U
Di-N-Octyl phthalate	20	NA	0.97 U	NA	0.97 U	4.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	290 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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CAMP RAVENNA, OH

Well Number		CBPmw-008	CBPmw-009	CBPmw-009	DA2mw-115	DA2mw-115	FWGmw-013	FWGmw-013	EBGmw-125	EBGmw-125	EBGmw-131	EBGmw-131	FWGmw-005	FWGmw-005	FWGmw-005	FBQmw-166	FBQmw-501
Sample Date		**12/6/2017**	**4/28/2017**	**12/5/2017**	**4/24/2017**	**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/17/2017**	**12/6/2017**	**4/17/2017**	**12/6/2017**	**4/19/2017**	**5/3/2017**	**12/1/2017**	**4/27/2017**	**4/27/2017**
RVAAP Area		**Central Burn Pits**	**Central Burn Pits**	**Central Burn Pits**	**Demolition Area 2**	**Demolition Area 2**	**Demolition Area 2**	**Demolition Area 2**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Erie Burning Grounds**	**Facility-Wide**	**Facility-Wide**	**Facility-Wide**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**DUP FBQmw-166**
Explosives																	
1,3-Dinitrobenzene	0.104	NA	NA	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	NA	NA	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	0.37	NA	NA	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitrotoluene	0.17	NA	NA	NA	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	NA	NA	NA	2.1 U	2.1 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PETN	3.9	NA	NA	NA	1.2 U	1.3 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RDX	0.774	NA	NA	NA	0.12 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																	
Antimony	0.78	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA
Antimony, Dissolved	0.78	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA
Arsenic	0.052	NA	NA	NA	1.8 J	1.5 J	NA	NA	NA	NA	NA	NA	1.2 J	NA	2.1 J	NA	NA
Beryllium	2.5	NA	NA	NA	0.3 U	0.3 U	NA	NA	NA	NA	NA	NA	0.3 U	NA	1 U	NA	NA
Cadmium	0.92	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA
Cadmium, Dissolved	0.92	NA	NA	NA	1 U	1 U	NA	NA	NA	NA	NA	NA	1 U	NA	1 U	NA	NA
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA
Cobalt	0.6	NA	NA	NA	0.056 J	0.2 UJ	NA	NA	NA	NA	NA	NA	1.6	NA	2	NA	NA
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA
Manganese	43	NA	NA	NA	110	120	NA	NA	NA	NA	NA	NA	240	NA	260	NA	NA
Mercury	0.063	NA	NA	NA	0.08 U	0.08 U	NA	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	NA	NA
Mercury, Dissolved	0.063	NA	NA	NA	0.08 U	0.08 U	NA	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	NA	NA
Selenium	10	NA	NA	NA	2 U	2 U	NA	NA	NA	NA	NA	NA	2 U	NA	2 U	NA	NA
Thallium	0.02	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	1 U	NA	NA
Thallium, Dissolved	0.02	NA	NA	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	0.2 U	NA	1 U	NA	NA
Total Cyanide	0.15	10 U	5 U	NA	4.2 J	5 U	7.9 J	2.6 J	19	10 U	5 U	10 U	NA	NA	NA	5 U	5 U
Vanadium	8.6	NA	NA	NA	2 U	2 U	NA	NA	NA	NA	NA	NA	2 U	NA	2 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FBQmw-171**	**FBQmw-502**	**FBQmw-171**	**FBQmw-171-D**	**FBQmw-172**	**FBQmw-172**	**FBQmw-174**	**FBQmw-175**	**FBQmw-175**	**FBQmw-176**	**FBQmw-176**	**FWGmw-023**	**FWGMW-023**	**FWGmw-023**	**LNWmw-026**	**FWGmw-010**
Sample Date		**5/2/2017**	**5/2/2017**	**12/4/2017**	**12/4/2017**	**5/2/2017**	**12/4/2017**	**5/2/2017**	**5/2/2017**	**12/4/2017**	**4/27/2017**	**12/4/2017**	**4/19/2017**	**7/31/2017**	**12/4/2017**	**4/20/2017**	**5/2/2017**
RVAAP Area		**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Fuze and Booster Quarry**	**Landfill North of Winklepeck**	**Load Line 1**
Monitored Zone	**Selected Comparison Value**	**Homewood**	**DUP FBQmw-171**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Unconsolidated**	**Unconsolidated**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.8 UJ	NA	NA
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.8 UJ	NA	NA
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.5 U	0.4 UJ	NA	NA
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	0.5 U	4 UJ	NA	NA
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.4 UJ	NA	NA
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.5 U	0.8 UJ	NA	NA
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.4 UJ	NA	NA
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	0.2 UJ	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.2 U	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.2 U	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1.9 U	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 U	9.7 U Q	15 U	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	1.9 U	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.6 U	2.9 U Q	15 U	NA	NA
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	1.9 U	NA	NA
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	1.9 U	NA	NA
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.1 U	NA	NA
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	0.95 U	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	NA	NA	NA	NA	NA	2.6 J	NA	NA	NA	NA	2 U	2.9 U	4.2 U	NA	NA
Butyl benzyl phthalate	16	NA	NA	NA	NA	NA	NA	1.9 U	NA	NA	NA	NA	2 U	2.9 U	4.2 U	NA	NA
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	NA	NA
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	0.95 U	NA	NA
Di-N-Butyl phthalate	90	NA	NA	NA	NA	NA	NA	4.3 U	NA	NA	NA	NA	4.3 U	2.9 U	1.9 U	NA	NA
Di-N-Octyl phthalate	20	NA	NA	NA	NA	NA	NA	0.97 U	NA	NA	NA	NA	0.98 U	9.7 U	4.2 U	NA	NA
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2.9 U	1.9 U	NA	NA
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	2.9 U Q	28 U	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 R	2.9 U Q	24 UJ	NA	NA
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	28 U	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.041 U	2.9 U Q	0.04 U	NA	NA
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.045 J	2.9 U	0.011 J	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1.9 U	NA	NA
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	59 U	2.9 U	15 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		FBQmw-171	FBQmw-502	FBQmw-171	FBQmw-171-D	FBQmw-172	FBQmw-172	FBQmw-174	FBQmw-175	FBQmw-175	FBQmw-176	FBQmw-176	FWGmw-023	FWGMW-023	FWGmw-023	LNWmw-026	FWGmw-010
Sample Date		5/2/2017	5/2/2017	12/4/2017	12/4/2017	5/2/2017	12/4/2017	5/2/2017	5/2/2017	12/4/2017	4/27/2017	12/4/2017	4/19/2017	7/31/2017	12/4/2017	4/20/2017	5/2/2017
RVAAP Area		Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Fuze and Booster Quarry	Landfill North of Winklepeck	Load Line 1
Monitored Zone	Selected Comparison Value	Homewood	DUP FBQmw-171	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Homewood	Unconsolidated	Unconsolidated	Upper Sharon	Upper Sharon	Upper Sharon	Unconsolidated	Unconsolidated
Explosives																	
1,3-Dinitrobenzene	0.104	NA	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U	NA
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	1.9 U	NA	NA
2,6-Dinitrotoluene	0.122	NA	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U	NA
2-Nitrotoluene	0.37	NA	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.5 U	0.21 UJ	0.21 U	NA
3-Nitrotoluene	0.17	NA	NA	NA	NA	NA	NA	2.2 U	NA	NA	NA	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U	NA
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2.9 U	0.95 U	NA	NA
Nitroglycerin	5.01	NA	NA	NA	NA	NA	NA	22 U	NA	NA	NA	2.2 UJ	2.1 U	0.99 U	2.1 UJ	2.1 U	NA
PETN	3.9	NA	NA	NA	NA	NA	NA	13 U	NA	NA	NA	1.3 UJ	1.2 U	0.99 U	1.3 UJ	1.2 U	NA
RDX	0.774	NA	NA	NA	NA	NA	NA	1.3 U	NA	NA	NA	0.089 J	0.12 U	0.2 U	0.13 UJ	0.12 U	NA
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	NA	0.021 U	NA	NA	0.021 U	NA	0.022 U	0.019 U	0.021 U	NA	NA
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	0.019 U	NA	NA	0.019 U	NA	0.02 U	0.019 U	0.019 U	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.77 U	0.095 U	NA	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.77 U	0.095 U	NA	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.77 U	0.095 U	NA	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.77 U	0.095 U	NA	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.77 U	0.095 U	NA	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.095 U	NA	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.095 U	NA	NA
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	0.016 U	NA	NA	0.016 U	NA	0.017 U	0.019 U	0.016 U	NA	NA
Inorganics																	
Antimony	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2 J	9 U	1 U	NA	NA
Antimony, Dissolved	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.2 J	9 U	1 U	NA	NA
Arsenic	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	98	65 D	47	NA	NA
Beryllium	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3 U	4.5 U	0.3 U	NA	NA
Cadmium	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	4.5 U	1 U	NA	NA
Cadmium, Dissolved	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1 U	4.5 U	1 U	NA	NA
Chromium, hexavalent	0.035	4 U	4 U	20 U	NA	NA	NA	4 U	4 U	20 U	NA	NA	4 U	NA	20 U	NA	NA
Cobalt	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13	9.2 D	5.5	NA	NA
Cr (VI)	0.035	4 U	4 U	20 U	NA	NA	NA	4 U	4 U	20 U	NA	NA	4 U	NA	20 U	NA	NA
Hexavalent chromium	0.035	4 U	4 U	20 U	NA	NA	NA	4 U	4 U	20 U	NA	NA	4 U	NA	20 U	NA	NA
Manganese	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	320 J	350 D	380	NA	NA
Mercury	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.08 U	0.15 U	0.08 U	NA	NA
Mercury, Dissolved	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.08 U	0.15 U	0.08 U	NA	NA
Selenium	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	4 U	2 U	NA	NA
Thallium	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	15 U	0.2 U	NA	NA
Thallium, Dissolved	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	15 U	0.2 U	NA	NA
Total Cyanide	0.15	5 U	10 U	10 U	NA	5 U	5 U	NA	NA	NA	3.3 J	5 U	3 J	5 U	4.1 J	NA	10 U
Vanadium	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	8 U	2 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGmw-010**	**FWGmw-011**	**FWGmw-011**	**LL1mw-064**	**LL1mw-064**	**LL1mw-065**	**LL1mw-065**	**LL1mw-080**	**LL1mw-080**	**LL1mw-081**	**LL1mw-081**	**LL1mw-083**	**LL1mw-084**	**LL1mw-084**	**LL1mw-086**	**LL1mw-086**
Sample Date		**12/7/2017**	**5/2/2017**	**12/6/2017**	**4/18/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**5/1/2017**	**4/21/2017**	**5/3/2017**	**4/21/2017**	**12/7/2017**
RVAAP Area		**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	1.9 J	4.2 U	1.9 U	4.3 U	1.9 U	4.2 U	NA	NA	NA	NA	1.9 U	2.2 U	NA	1.9 U	4.3 U
Butyl benzyl phthalate	16	NA	1.9 U	4.2 U	1.9 U	4.3 U	1.9 U	4.2 U	NA	NA	NA	NA	1.9 U	2.2 U	NA	1.9 U	4.3 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	NA	4.3 U	1.9 U	4.2 U	1.9 U	4.2 U	1.9 U	NA	NA	NA	NA	4.3 U	4.7 U	NA	4.3 U	1.9 U
Di-N-Octyl phthalate	20	NA	0.97 U	4.2 U	0.96 U	4.3 U	0.95 U	4.2 U	NA	NA	NA	NA	0.97 U	1.1 U	NA	0.97 U	4.3 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGmw-010**	**FWGmw-011**	**FWGmw-011**	**LL1mw-064**	**LL1mw-064**	**LL1mw-065**	**LL1mw-065**	**LL1mw-080**	**LL1mw-080**	**LL1mw-081**	**LL1mw-081**	**LL1mw-083**	**LL1mw-084**	**LL1mw-084**	**LL1mw-086**	**LL1mw-086**
Sample Date		**12/7/2017**	**5/2/2017**	**12/6/2017**	**4/18/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**4/21/2017**	**12/7/2017**	**5/1/2017**	**4/21/2017**	**5/3/2017**	**4/21/2017**	**12/7/2017**
RVAAP Area		**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**
Explosives																	
1,3-Dinitrobenzene	0.104	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ	0.21 U	0.21 UJ	0.21 U	0.28 J	NA	0.21 U	0.22 U
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ	0.21 U	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U
2-Nitrotoluene	0.37	NA	0.22 U	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ	0.21 U	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U
3-Nitrotoluene	0.17	NA	0.33 J	0.22 UJ	0.2 U	0.22 UJ	0.21 U	0.22 UJ	0.22 UJ	0.22 UJ	0.58 J	0.21 UJ	0.21 U	0.21 U	NA	0.21 U	0.22 U
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	NA	2.2 U	2.2 UJ	2 U	2.2 UJ	2.1 U	2.2 UJ	2.2 UJ	2.2 UJ	2.1 U	2.1 UJ	2.1 U	2.1 U	NA	2.1 U	2.2 U
PETN	3.9	NA	1.3 U	1.3 UJ	1.2 U	1.3 UJ	1.3 U	1.3 UJ	1.3 UJ	1.3 UJ	1.3 U	1.3 UJ	1.3 U	1.3 U	NA	1.3 U	1.3 U
RDX	0.774	NA	0.13 U	0.13 UJ	0.12 U	0.13 UJ	0.13 U	0.13 UJ	7.8 J	1.4 J	0.29 J	0.13 UJ	0.13 U	1.7 J	NA	0.13 U	0.13 U
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022 U	0.022 UJ	NA	NA	NA
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U	0.02 U	NA	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.017 U	0.016 U	NA	NA	NA
Inorganics																	
Antimony	0.78	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U
Antimony, Dissolved	0.78	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U
Arsenic	0.052	NA	5.1	3.7 J	4.3 J	4.9 J	1 J	0.5 J	NA	NA	NA	NA	NA	1 U	NA	4 J	3.9 J
Beryllium	2.5	NA	0.26 J	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	NA	NA	NA	1 U	NA	0.3 U	0.3 U
Cadmium	0.92	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1.4	NA	1 U	1 U
Cadmium, Dissolved	0.92	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	1.4	NA	1 U	1 U
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 UJ	4 UJ	4 U	NA	NA
Cobalt	0.6	NA	3.3	1.4	0.069 J	0.21 J	0.36 J	0.32 J	NA	NA	NA	NA	NA	9.7	NA	0.79 J	1.2
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 UJ	4 UJ	4 U	NA	NA
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 UJ	4 UJ	4 U	NA	NA
Manganese	43	NA	320	330 J	120	160 J	240	150 J	NA	NA	NA	NA	NA	77	NA	230	240 J
Mercury	0.063	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	0.08 U
Mercury, Dissolved	0.063	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	0.08 U
Selenium	10	NA	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA	NA	NA	2.3 J	NA	2 U	2 U
Thallium	0.02	NA	0.058 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA	0.29 J	NA	0.2 U	0.2 U
Thallium, Dissolved	0.02	NA	0.058 J	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	NA	NA	NA	0.29 J	NA	0.2 U	0.2 U
Total Cyanide	0.15	10 U	NA	NA	NA	NA	NA	NA	NA	NA	5 U	10 U	NA	5 U	NA	NA	NA
Vanadium	8.6	NA	6 U	2 UJ	2 U	2 UJ	2 U	2 UJ	NA	NA	NA	NA	NA	2 U	NA	2 U	2 UJ

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		LL1mw-086-D	LL1mw-087	LL1mw-087	LL1mw-087D	LL1mw-087D	LL1mw-088	LL1mw-503	LL1mw-088	LL1mw-089	LL1MW-089	LL1MW-089	LL1mw-089	FWGmw-019	FWGMW-019	FWGmw-019	FWGmw-022
Sample Date		12/7/2017	4/18/2017	12/6/2017	12/6/2017	12/6/2017	4/28/2017	4/28/2017	12/2/2017	4/25/2017	8/3/2017	8/3/2017	12/7/2017	4/25/2017	8/1/2017	12/5/2017	4/25/2017
RVAAP Area		Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 1	Load Line 10	Load Line 10	Load Line 10	Load Line 10
Monitored Zone	Selected Comparison Value	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	Unconsolidated	DUP LL1mw-088	Unconsolidated	Upper Sharon	Upper Sharon	Dup LL1mw-089	Upper Sharon	Basal Sharon	Basal Sharon	Basal Sharon	Upper Sharon
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 UJ	0.8 U
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.25 U	0.8 U	0.8 U	0.25 U	0.8 UJ	0.8 U
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.5 U	0.5 U	0.4 U	0.4 U	0.5 U	0.4 UJ	0.4 U
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	4 U	0.5 U	0.5 U	4 U	4 U	0.5 U	4 UJ	4 U
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.4 U
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.5 U	0.5 U	0.8 U	0.8 U	0.5 U	0.8 UJ	0.8 U
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.25 U	0.4 U	0.4 U	0.25 U	0.4 UJ	0.17 J
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	0.25 U	0.2 U	0.2 U	0.25 U	0.2 UJ	0.2 U
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	4.5 U	0.99 U	2.9 U	4.2 U	1 U
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	4.5 U	0.99 U	2.9 U	4.2 U	1 U
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	2 U	0.99 U	2.9 U	1.9 U	1 U
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	29 U	11 U Q	11 U Q	16 U	30 U	9.8 U Q	15 U	30 U
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	3.2 U	3.2 U	2 U	4.4 U	2.9 U	1.9 U	4.4 U
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	8.6 U	3.2 U Q	3.2 U Q	16 U	8.8 U	2.9 U Q	15 U	8.8 U
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	3.2 U	3.2 U	2 U	4.4 U	2.9 U	1.9 U	4.4 U
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	3.2 U Q	3.2 U Q	2 U	4.4 U	2.9 U Q	1.9 U	4.4 U
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.11 U	0.012 U	2.9 U	0.11 U	0.012 U
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.013 U	0.012 U	2.9 U	0.013 U	0.012 U
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.11 U	0.012 U	2.9 U	0.013 U	0.012 U
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.013 U	0.012 U	2.9 U	0.013 U	0.012 U
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	1 U	0.99 U	2.9 U	0.96 U	1 U
bis(2-Ethylhexyl)phthalate	6	NA	1.9 U	4.2 U	4.4 U	4.4 U	2 U	1.9 U	4.4 U	2 U	3.2 U	3.2 U	4.5 U	2 U	2.9 U	4.2 U	2 U
Butyl benzyl phthalate	16	NA	1.9 U	4.2 U	4.4 U	4.4 U	2 U	1.9 U	4.4 U	2 U	3.2 U	3.2 U	4.5 U	2 U	2.9 U	4.2 U	2 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.013 U	0.012 U	2.9 U	0.013 U	0.012 U
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	1 U	0.99 U	2.9 U	0.96 U	1 U
Di-N-Butyl phthalate	90	NA	4.2 U	1.9 U	2 U	2 U	4.3 U	4.3 U	2 U	4.3 U	3.2 U	3.2 U	2 U	4.4 U	2.9 U	1.9 U	4.4 U
Di-N-Octyl phthalate	20	NA	0.95 U	4.2 U	4.4 U	4.4 U	0.98 U	0.97 U	4.4 U	0.98 U	11 U	11 U	4.5 U	0.99 U	9.8 U	4.2 U	1 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	2 U	3.2 U	3.2 U	2 U	2 U	2.9 U	1.9 U	2 U
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	3.2 U Q	3.2 U Q	31 U	9.9 U	2.9 U Q	29 U	10 U
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	29 U	3.2 U Q	3.2 U Q	26 U	30 U	2.9 U Q	24 UJ	30 U
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	3.2 U Q	3.2 U Q	31 U	4.4 U	2.9 U Q	29 U	4.4 U
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	0.041 U	3.2 U Q	3.2 U Q	0.0062 J	0.04 U	2.9 U Q	0.043 U	0.04 U
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	3.2 U	3.2 U	0.013 J	0.027 J	2.9 U	0.023 J	0.012 U
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	3.2 U	3.2 U	2 U	0.99 U	2.9 U	1.9 U	1 U
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	59 U	3.2 U	3.2 U	16 U	60 U	2.9 U	15 U	60 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**LL1mw-086-D**	**LL1mw-087**	**LL1mw-087**	**LL1mw-087D**	**LL1mw-087D**	**LL1mw-088**	**LL1mw-503**	**LL1mw-088**	**LL1mw-089**	**LL1MW-089**	**LL1MW-089**	**LL1mw-089**	**FWGmw-019**	**FWGMW-019**	**FWGmw-019**	**FWGmw-022**
Sample Date		**12/7/2017**	**4/18/2017**	**12/6/2017**	**12/6/2017**	**12/6/2017**	**4/28/2017**	**4/28/2017**	**12/2/2017**	**4/25/2017**	**8/3/2017**	**8/3/2017**	**12/7/2017**	**4/25/2017**	**8/1/2017**	**12/5/2017**	**4/25/2017**
RVAAP Area		**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 1**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP LL1mw-088**	**Unconsolidated**	**Upper Sharon**	**Upper Sharon**	**Dup LL1mw-089**	**Upper Sharon**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Upper Sharon**
Explosives																	
1,3-Dinitrobenzene	0.104	NA	0.21 U	0.22 UJ	0.22 U	0.22 U	0.21 U	0.21 U	0.21 UJ	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	3.2 U	3.2 U	2 U	4.4 U	2.9 U	1.9 U	4.4 U
2,6-Dinitrotoluene	0.122	NA	0.21 U	0.22 UJ	0.22 U	0.22 U	0.21 U	0.21 U	0.21 UJ	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U
2-Nitrotoluene	0.37	NA	0.21 U	0.22 UJ	0.22 U	0.22 U	0.21 U	0.21 U	0.21 UJ	0.21 U	0.5 U	0.5 U	0.22 UJ	0.21 U	0.5 U	0.21 UJ	0.21 U
3-Nitrotoluene	0.17	NA	0.21 U	0.22 UJ	0.22 U	0.22 U	0.43 U	0.21 U	0.21 UJ	0.21 U	0.2 U	0.2 U	0.22 UJ	0.21 U	0.2 U	0.21 UJ	0.21 U
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	2 U	3.2 U	3.2 U	1 U	2 U	2.9 U	0.96 U	2 U
Nitroglycerin	5.01	NA	2.1 U	2.2 UJ	2.2 U	2.2 U	2.1 U	2.1 U	2.1 UJ	2.1 U	1 U	1 U	2.2 UJ	2.1 U	1 U	2.1 UJ	2.1 U
PETN	3.9	NA	1.2 U	1.3 UJ	1.3 U	1.3 U	1.3 U	1.3 U	1.2 UJ	1.2 U	1 U	1 U	1.3 UJ	1.2 U	1 U	1.3 UJ	1.2 U
RDX	0.774	NA	0.12 U	0.13 UJ	0.13 U	0.13 U	0.13 U	0.13 U	0.12 UJ	0.12 U	0.2 U	0.2 U	0.13 UJ	0.12 U	0.2 U	0.13 UJ	0.12 U
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	0.021 U	0.021 U	0.021 U	0.021 UJ	0.02 U	0.02 U	0.022 U	0.021 UJ	0.019 U	0.022 U	0.021 UJ
Alpha-BHC	0.014	NA	NA	NA	NA	NA	0.019 U	0.019 U	0.019 U	0.019 U	0.02 U	0.02 U	0.02 U	0.019 U	0.019 U	0.019 U	0.019 U
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.78 U	0.78 U	0.1 U	0.095 U	0.77 U	0.095 U	0.095 UJ
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.78 U	0.78 U	0.1 U	0.095 U	0.77 U	0.095 U	0.095 UJ
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.78 U	0.78 U	0.1 U	0.095 U	0.77 U	0.095 U	0.095 UJ
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.78 U	0.78 U	0.1 U	0.095 U	0.77 U	0.095 U	0.095 UJ
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.78 U	0.78 U	0.1 U	0.095 U	0.77 U	0.095 U	0.095 UJ
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.29 U	0.29 U	0.1 U	0.095 U	0.29 U	0.095 U	0.095 UJ
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	0.094 U	0.29 U	0.29 U	0.1 U	0.095 U	0.29 U	0.095 U	0.095 UJ
Dieldrin	0.004	NA	NA	NA	NA	NA	0.016 U	0.016 U	0.016 U	0.016 U	0.02 U	0.02 U	0.017 U	0.016 U	0.019 U	0.016 U	0.016 U
Inorganics																	
Antimony	0.78	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	9 U	9 U	1 U	6 U	9 U	0.97 J	6 U
Antimony, Dissolved	0.78	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	9 U	9 U	1 U	6 U	9 U	0.97 J	6 U
Arsenic	0.052	NA	0.37 J	2.9 J	3.1 J	3.1 J	29	28	31	0.73 J	8 U	8 U	0.78 J	16	15 D	13	44
Beryllium	2.5	NA	0.3 U	0.14 J	0.089 J	0.089 J	1 U	0.3 U	0.3 U	0.3 U	4.5 U	4.5 U	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U
Cadmium	0.92	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.5 U	4.5 U	1 U	1 U	4.5 U	1 U	1 U
Cadmium, Dissolved	0.92	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.5 U	4.5 U	1 U	1 U	4.5 U	1 U	1 U
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	NA	20 U	4 U	NA	20 U	4 U
Cobalt	0.6	NA	0.4 J	2.6	2.8	2.8	0.42 J	0.38 J	0.16 J	1.1	1.8 U	1.8 U	0.69 J	4.8	3 D	1.8	1.3
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	NA	20 U	4 U	NA	20 U	4 U
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	NA	20 U	4 U	NA	20 U	4 U
Manganese	43	NA	83	280 J	280 J	280 J	55	52	49 J	48	46 D	46 D	43 J	140	100 D	100	430
Mercury	0.063	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.15 U	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	0.08 U
Mercury, Dissolved	0.063	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.15 U	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	0.08 U
Selenium	10	NA	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U	4 U	2 U	2 U	4 U	2 U	2 U
Thallium	0.02	NA	0.2 U	0.087 J	0.066 J	0.066 J	0.2 U	0.2 U	0.2 U	0.16 J	15 U	15 U	0.15 J	0.059 J	15 U	0.2 U	0.2 U
Thallium, Dissolved	0.02	NA	0.2 U	0.087 J	0.066 J	0.066 J	0.2 U	0.2 U	0.2 U	0.16 J	15 U	15 U	0.15 J	0.059 J	15 U	0.2 U	0.2 U
Total Cyanide	0.15	NA	NA	NA	NA	NA	NA	NA	NA	5 U	5 U	5 U	10 U	10 U	3.5 J	5 U	5 U
Vanadium	8.6	NA	2 U	6 UJ	6 UJ	6 UJ	2 U	2 U	2 U	2 U	8 U	8 U	2 UJ	2 U	8 U	2 U	2 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGMW-022**	**FWGmw-022**	**LL10mw-003**	**LL10mw-003**	**LL10mw-005**	**LL10mw-005**	**LL11mw-005**	**LL11mw-005**	**FWGmw-018**	**FWGMW-018**	**FWGmw-018**	**FWGmw-020**	**FWGMW-020**	**FWGmw-020**	**LL12mw-183**	**LL12mw-183**
Sample Date		**8/1/2017**	**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/28/2017**	**12/4/2017**	**4/26/2017**	**12/4/2017**	**4/26/2017**	**8/8/2017**	**12/2/2017**	**4/26/2017**	**8/8/2017**	**12/2/2017**	**4/19/2017**	**12/6/2017**
RVAAP Area		**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 11**	**Load Line 11**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**
Monitored Zone	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Unconsolidated**	**Unconsolidated**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	0.25 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	0.8 U	0.25 U	0.8 UJ	0.8 U	0.25 U	0.8 U	NA	NA
1,1,2-Trichloroethane	0.041	0.25 U	0.8 UJ	0.8 U	0.8 U	0.8 U	0.8 U	NA	NA	0.8 U	0.25 U Q	0.8 UJ	0.8 U	0.25 U	0.8 U	NA	NA
1,2-Dibromoethane	0.0075	0.5 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	0.4 U	0.5 U Q	0.4 UJ	0.4 U	0.5 U	0.4 U	NA	NA
2-Hexanone	3.8	0.5 U	4 UJ	4 U	4 U	4 U	4 U	NA	NA	4 U	0.5 U Q	4 UJ	4 U	0.5 U	4 U	NA	NA
Bromodichloromethane	0.13	0.25 U	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U	0.4 U	NA	NA
Bromomethane	0.75	0.5 U	0.8 UJ	0.8 U	0.8 U	0.8 UJ	0.8 U	NA	NA	0.8 U	0.5 U	0.8 UJ	0.8 U	0.5 U	0.8 U	NA	NA
Chloroform	0.207	0.25 U	0.4 UJ	0.49 J	0.67 J	0.4 U	0.4 U	NA	NA	0.4 U	0.25 U	0.4 UJ	0.4 U	0.25 U	0.4 U	NA	NA
Vinylchloride	0.019	0.25 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	NA	NA	0.2 U	0.25 U	0.2 UJ	0.2 U	0.25 U	0.2 U	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	3.1 U	4.2 U	NA	NA	0.97 U	4.4 U	NA	NA	0.99 U	3 U	4.2 U	0.98 U	2.9 U	4.4 U	NA	NA
1,4-Dichlorobenzene	0.48	3.1 U	4.2 U	NA	NA	0.97 U	4.4 U	NA	NA	0.99 U	3 U	4.2 U	0.98 U	2.9 U	4.4 U	NA	NA
2,4,6-Trichlorophenol	1.2	3.1 U	1.9 U	NA	NA	0.97 UJ	2 U	NA	NA	0.99 U	3 U	1.9 U	0.98 U	2.9 U	2 U	NA	NA
2,4-Dinitrophenol	3.9	10 U Q	15 U	NA	NA	29 UJ	16 U	NA	NA	30 U	10 U Q	15 U	29 U	9.8 U Q	16 U	NA	NA
3,3'-Dichlorobenzidine	0.13	3.1 U	1.9 U	NA	NA	4.3 U	2 U	NA	NA	4.4 U	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA
4,6-Dinitro-2-methylphenol	0.15	3.1 U Q	15 U	NA	NA	8.5 UJ	16 U	NA	NA	8.8 U	3 U Q	15 U	8.6 U	2.9 U Q	16 U	NA	NA
4-Chloroaniline	0.37	3.1 U	1.9 U	NA	NA	4.3 U	2 U	NA	NA	4.4 U	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA
4-Nitroaniline	3.13	3.1 U Q	1.9 U	NA	NA	4.3 U	2 U	NA	NA	4.4 U	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA
Benz(a)anthracene	0.004	3.1 U	0.1 U	NA	NA	0.012 U	0.0095 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U	0.013 U	0.012 U	0.0099 J
Benzo(a)pyrene	0.2	3.1 U	0.012 U	NA	NA	0.012 U	0.012 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U	0.013 U	0.012 U	0.012 U
Benzo(b)fluoranthene	0.002	3.1 U	0.012 U	NA	NA	0.012 U	0.012 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U	0.013 U	0.012 U	0.012 U
Benzo(k)fluoranthene	2.5	3.1 U	0.012 U	NA	NA	0.012 U	0.012 U	NA	NA	0.012 U	3 U	0.012 U	0.013 U	2.9 U	0.013 U	0.012 U	0.012 U
bis(2-Chloroethyl)ether	0.014	3.1 U	0.95 U	NA	NA	0.97 U	1 U	NA	NA	0.99 U	3 U	0.95 U	0.98 U	2.9 U	1 U	NA	NA
bis(2-Ethylhexyl)phthalate	6	3.1 U	4.2 U	1.9 U	4.4 U	1.9 U	4.4 U	NA	NA	2 U	3 U	4.2 U	2 U	2.9 U	4.4 U	NA	NA
Butyl benzyl phthalate	16	3.1 U	4.2 U	1.9 U	4.4 U	1.9 U	4.4 U	NA	NA	2 U	3 U	4.2 U	2 U	2.9 U	4.4 U	NA	NA
Dibenz(a,h)anthracene	0.002	3.1 U	0.012 U	NA	NA	0.012 U	0.012 U	NA	NA	0.012 U	3 U Q	0.012 U	0.013 U	2.9 U Q	0.013 U	0.012 U	0.012 U
Dibenzofuran	0.79	3.1 U	0.95 U	NA	NA	0.97 U	1 U	NA	NA	0.99 U	3 U	0.95 U	0.98 U	2.9 U	1 U	NA	NA
Di-N-Butyl phthalate	90	3.1 U	1.9 U	4.2 U	2 U	4.3 U	2 U	NA	NA	4.4 U	3 U	1.9 U	4.3 U	2.9 U	2 U	NA	NA
Di-N-Octyl phthalate	20	10 U	4.2 U	0.96 U	4.4 U	0.97 U	4.4 U	NA	NA	0.99 U	10 U	4.2 U	0.98 U	9.8 U	4.4 U	NA	NA
Hexachlorobenzene	0.0098	3.1 U	1.9 U	NA	NA	1.9 U	2 U	NA	NA	2 U	3 U	1.9 U	2 U	2.9 U	2 U	NA	NA
Hexachlorobutadiene	0.14	3.1 U Q	28 U	NA	NA	9.7 U	30 U	NA	NA	9.9 U	3 U	28 U	9.8 U	2.9 U	30 U	NA	NA
Hexachlorocyclopentadiene	0.041	3.1 U Q	24 UJ	NA	NA	29 U	25 UJ	NA	NA	30 U	3 U	24 U	29 U	2.9 U	25 U	NA	NA
Hexachloroethane	0.33	3.1 U Q	28 U	NA	NA	4.3 U	30 U	NA	NA	4.4 U	3 U	28 U	4.3 U	2.9 U	30 U	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	3.1 U	0.04 U	NA	NA	0.04 U	0.04 U	NA	NA	0.041 U	3 U	0.04 U	0.042 U	2.9 U	0.042 U	0.041 U	0.042 U
Naphthalene	0.17	3.1 U	0.016 J	NA	NA	0.012 U	0.021 J	NA	NA	0.064 J	3 U	0.025 J	0.013 U	2.9 U	0.018 J	0.085 J	0.032 J
N-Nitroso-di-N-propylamine	0.011	3.1 U	1.9 U J	NA	NA	0.97 U	2 U	NA	NA	0.99 U	3 U	1.9 U	0.98 U	2.9 U	2 U	NA	NA
Pentachlorophenol	1	3.1 U	15 U	NA	NA	58 UJ	16 U	NA	NA	60 U	3 U	15 U	59 U	2.9 U	16 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGMW-022**	**FWGmw-022**	**LL10mw-003**	**LL10mw-003**	**LL10mw-005**	**LL10mw-005**	**LL11mw-005**	**LL11mw-005**	**FWGmw-018**	**FWGMW-018**	**FWGmw-018**	**FWGmw-020**	**FWGMW-020**	**FWGmw-020**	**LL12mw-183**	**LL12mw-183**
Sample Date		**8/1/2017**	**12/5/2017**	**4/19/2017**	**12/5/2017**	**4/28/2017**	**12/4/2017**	**4/26/2017**	**12/4/2017**	**4/26/2017**	**8/8/2017**	**12/2/2017**	**4/26/2017**	**8/8/2017**	**12/2/2017**	**4/19/2017**	**12/6/2017**
RVAAP Area		**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 10**	**Load Line 11**	**Load Line 11**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**
Monitored Zone	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Homewood**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Unconsolidated**	**Unconsolidated**
Explosives																	
1,3-Dinitrobenzene	0.104	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 UJ	NA	NA
2,4-Dinitrotoluene	0.12	3.1 U Q	1.9 U	4.2 U	2 U	4.3 U	2 U	NA	NA	4.4 U	3 U Q	1.9 U	4.3 U	2.9 U Q	2 U	NA	NA
2,6-Dinitrotoluene	0.122	0.2 U	0.22 UJ	4.2 U	2 U	4.3 U	2 U	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 UJ	NA	NA
2-Nitrotoluene	0.37	0.5 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.5 U	0.21 UJ	0.21 U	0.5 U	0.21 UJ	NA	NA
3-Nitrotoluene	0.17	0.2 U	0.22 UJ	NA	NA	NA	NA	NA	NA	0.21 U	0.2 U	0.21 UJ	0.21 U	0.2 U	0.21 UJ	NA	NA
Nitrobenzene	0.521	3.1 U	0.95 U	2.2 J	0.99 U	1.9 U	1 U	NA	NA	2 U	3 U	0.95 U	2 U	2.9 U	1 U	NA	NA
Nitroglycerin	5.01	1 U	2.2 UJ	NA	NA	NA	NA	NA	NA	2.1 U	1 U	2.1 UJ	2.1 U	1 U	2.1 UJ	NA	NA
PETN	3.9	1 U	1.3 UJ	NA	NA	NA	NA	NA	NA	1.3 U	1 U	1.2 UJ	1.3 U	1 U	1.2 UJ	NA	NA
RDX	0.774	0.2 U	0.13 UJ	NA	NA	NA	NA	NA	NA	0.13 U	0.2 U	0.12 UJ	0.13 U	0.2 U	0.12 UJ	NA	NA
Pesticides and PCBs																	
Aldrin	0.005	0.019 U	0.022 UJ	NA	NA	NA	NA	NA	NA	0.021 U	0.02 U	0.022 U	0.021 U	0.02 U	0.021 U	NA	NA
Alpha-BHC	0.014	0.019 U	0.02 UJ	NA	NA	NA	NA	NA	NA	0.019 U	0.02 U	0.02 U	0.019 U	0.02 U	0.019 U	NA	NA
Aroclor-1016	0.14	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.78 U	0.095 U	0.096 U	0.78 U	0.095 U	NA	NA
Aroclor-1221	0.0047	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.78 U	0.095 U	0.096 U	0.78 U	0.095 U	NA	NA
Aroclor-1232	0.0047	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.78 U	0.095 U	0.096 U	0.78 U	0.095 U	NA	NA
Aroclor-1242	0.213	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.78 U	0.095 U	0.096 U	0.78 U	0.095 U	NA	NA
Aroclor-1248	0.0078	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.78 U	0.095 U	0.096 U	0.78 U	0.095 U	NA	NA
Aroclor-1254	0.021	0.29 U	0.044 J	NA	NA	NA	NA	NA	NA	0.097 U	0.29 U	0.18	0.096 U	0.29 U	0.095 U	NA	NA
Aroclor-1260	0.213	0.29 U	0.1 U	NA	NA	NA	NA	NA	NA	0.097 U	0.29 U	0.095 U	0.096 U	0.29 U	0.095 U	NA	NA
Dieldrin	0.004	0.019 U	0.017 UJ	NA	NA	NA	NA	NA	NA	0.016 U	0.02 U	0.017 U	0.016 U	0.02 U	0.016 U	NA	NA
Inorganics																	
Antimony	0.78	9 U	1.8 J	1 U	1 U	1 U	1 U	NA	NA	0.67 J	9 U	1 U	0.57 J	9 U	1 U	NA	NA
Antimony, Dissolved	0.78	9 U	1.8 J	1 U	1 U	1 U	1 U	NA	NA	0.67 J	9 U	1 U	0.57 J	9 U	1 U	NA	NA
Arsenic	0.052	59 D	46 J	1 U	1 UJ	1 U	1 U	NA	NA	32	30 D	28	26	130 D	30	NA	NA
Beryllium	2.5	4.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	0.3 U	4.5 U	0.3 U	1 U	4.5 U	0.3 U	NA	NA
Cadmium	0.92	4.5 U	1 U	1 U	1 U	0.79 J	1 U	NA	NA	1 U	4.5 U	1 U	1 U	4.5 U	1 U	NA	NA
Cadmium, Dissolved	0.92	4.5 U	1 U	1 U	1 U	0.79 J	1 U	NA	NA	1 U	4.5 U	1 U	1 U	4.5 U	1 U	NA	NA
Chromium, hexavalent	0.035	NA	20 U	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	4 U	NA	20 U	NA	NA
Cobalt	0.6	2.4 D	1.7 UJ	0.2 U	0.2 UJ	0.39 J	0.2 U	NA	NA	2.1	45 U	1.9	4.7	3.3 D	3	NA	NA
Cr (VI)	0.035	NA	20 U	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	4 U	NA	20 U	NA	NA
Hexavalent chromium	0.035	NA	20 U	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	4 U	NA	20 U	NA	NA
Manganese	43	320 D	280 J	3.5	3.5 U	11000	1900	NA	NA	360	280 D	270 J	130	110 D	90 J	NA	NA
Mercury	0.063	0.15 U	0.08 U	0.08 U	0.08 U	0.2 U	0.08 U	NA	NA	0.08 U	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	NA	NA
Mercury, Dissolved	0.063	0.15 U	0.08 U	0.08 U	0.08 U	0.2 U	0.08 U	NA	NA	0.08 U	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	NA	NA
Selenium	10	4 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	14 U	2 U	2 U	4 U	2 U	NA	NA
Thallium	0.02	15 U	0.2 U	0.2 U	0.2 U	0.084 J	0.052 J	NA	NA	0.2 U	15 U	0.2 U	0.2 U	15 U	0.2 U	NA	NA
Thallium, Dissolved	0.02	15 U	0.2 U	0.2 U	0.2 U	0.084 J	0.052 J	NA	NA	0.2 U	15 U	0.2 U	0.2 U	15 U	0.2 U	NA	NA
Total Cyanide	0.15	5 U	2 J	NA	NA	NA	NA	5 U	5 U	5 U	5 U	10 U	5 U	3.6 J	5 U	3.4 J	2.2 J
Vanadium	8.6	8 U	2 U	2 U	2 U	2 U	2 U	NA	NA	2 U	45 U	2 U	2 U	8 U	2 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**LL12mw-185**	**LL12mw-505**	**LL12mw-185**	**LL12mw-187**	**LL12mw-187**	**LL12mw-189**	**LL12mw-242**	**LL12mw-242**	**LL12mw-242-D**	**LL12mw-245**	**LL12mw-245**	**LL12mw-245-D**	**LL12mw-247**	**LL12mw-506**	**LL12mw-247**	**FWGmw-017**	**FWGMW-017**
Sample Date		**4/25/2017**	**4/25/2017**	**12/6/2017**	**4/25/2017**	**12/6/2017**	**4/28/2017**	**4/25/2017**	**12/6/2017**	**12/6/2017**	**4/25/2017**	**12/6/2017**	**12/6/2017**	**4/25/2017**	**4/25/2017**	**12/6/2017**	**4/28/2017**	**8/9/2017**
RVAAP Area		**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 2**	**Load Line 2**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**DUP LL12mw-185**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon Shale**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP LL12mw-247**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**
Volatile Organic Compounds																		
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.5 U
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	0.5 U
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 UJ	0.5 U
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U
Semi-Volatile Organic Compounds																		
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 U	9.7 U Q
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.6 U	2.9 U Q
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	0.014 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	0.014 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	0.014 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	0.014 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
bis(2-Ethylhexyl)phthalate	6	NA	NA	NA	2 U	4.3 U	NA	2 U	4.2 U J1	NA	2 U	4.5 U	NA	2 U	NA	4.4 U	1.9 U	2.9 U
Butyl benzyl phthalate	16	NA	NA	NA	2 U	4.3 U	NA	2 U	4.2 U J1	NA	2 U	4.5 U	NA	2 U	NA	4.4 U	1.9 U	2.9 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	0.014 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U Q
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
Di-N-Butyl phthalate	90	NA	NA	NA	4.3 U	1.9 U	NA	4.3 U	1.9 U J1	NA	4.3 U	2 U	NA	4.3 U	NA	2 U	4.3 U	2.9 U
Di-N-Octyl phthalate	20	NA	NA	NA	0.98 U	4.3 U	NA	0.98 U	4.2 U J1	NA	0.98 U	4.5 U	NA	0.99 U	NA	4.4 U	0.97 U	9.7 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	2.9 U
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.7 U	2.9 U
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 U	2.9 U
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	0.046 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U	2.9 U
Naphthalene	0.17	NA	NA	NA	NA	NA	0.018 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.024 J	2.9 U
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.97 U	2.9 U
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	58 U	2.9 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**LL12mw-185**	**LL12mw-505**	**LL12mw-185**	**LL12mw-187**	**LL12mw-187**	**LL12mw-189**	**LL12mw-242**	**LL12mw-242**	**LL12mw-242-D**	**LL12mw-245**	**LL12mw-245**	**LL12mw-245-D**	**LL12mw-247**	**LL12mw-506**	**LL12mw-247**	**FWGmw-017**	**FWGMW-017**
Sample Date		**4/25/2017**	**4/25/2017**	**12/6/2017**	**4/25/2017**	**12/6/2017**	**4/28/2017**	**4/25/2017**	**12/6/2017**	**12/6/2017**	**4/25/2017**	**12/6/2017**	**12/6/2017**	**4/25/2017**	**4/25/2017**	**12/6/2017**	**4/28/2017**	**8/9/2017**
RVAAP Area		**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 12**	**Load Line 2**	**Load Line 2**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**DUP LL12mw-185**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon Shale**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP LL12mw-247**	**Unconsolidated**	**Basal Sharon**	**Basal Sharon**
Explosives																		
1,3-Dinitrobenzene	0.104	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U	0.21 U Q	NA	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q
2,6-Dinitrotoluene	0.122	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U	0.21 U Q	NA	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U
2-Nitrotoluene	0.37	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U	0.21 U Q	NA	0.21 U	0.2 U	0.22 U Q	0.21 U	0.5 U
3-Nitrotoluene	0.17	NA	NA	NA	NA	NA	0.24 U	0.21 U	0.22 U Q J1	NA	0.2 U	0.21 U Q	NA	0.21 U	0.2 U	0.22 U Q	0.21 U	0.2 U
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	2.9 U
Nitroglycerin	5.01	NA	NA	NA	NA	NA	2.4 U	2.1 U	2.2 U Q J1	NA	2 U	2.1 U Q	NA	2.1 U	2 U	2.2 U Q	2.1 U	1 U
PETN	3.9	NA	NA	NA	NA	NA	1.5 U	1.3 U	1.3 U Q J1	NA	1.2 U	1.3 U Q	NA	1.2 U	1.2 U	1.3 U Q	1.3 U	1 U
RDX	0.774	NA	NA	NA	NA	NA	0.15 U	0.13 U	0.13 U Q J1	NA	0.12 U	0.13 U Q	NA	0.12 U	0.12 U	0.13 U Q	0.13 U	0.2 U
Pesticides and PCBs																		
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.021 U	0.02 U
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.019 U	0.02 U
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.78 U
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.78 U
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.78 U
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.78 U
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.78 U
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.29 U
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.099 U	0.29 U
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.016 U	0.02 U
Inorganics																		
Antimony	0.78	NA	6 U	NA	1 U	1 U	NA	1 U	1 U J1	NA	6 U	1 U	NA	1 U	NA	1 U	1 U	9 U
Antimony, Dissolved	0.78	NA	6 U	NA	1 U	1 U	NA	1 U	1 U J1	NA	6 U	1 U	NA	1 U	NA	1 U	1 U	9 U
Arsenic	0.052	0.53 J	0.54 J	0.49 J	0.49 J	0.5 J	NA	39	21	NA	2.1 J	3 J	NA	7.3	NA	17	10	7.6 J D
Beryllium	2.5	NA	1 U	NA	0.3 U	0.3 U	NA	1 U	0.083 J	NA	0.3 U	0.3 U	NA	0.3 U	NA	0.76 J	0.3 U	4.5 U
Cadmium	0.92	NA	0.38 J	NA	1 U	1 U	NA	1 U	1 U	NA	1 U	1 U	NA	1 U	NA	1 U	1 U	4.5 U
Cadmium, Dissolved	0.92	NA	0.38 J	NA	1 U	1 U	NA	1 U	1 U	NA	1 U	1 U	NA	1 U	NA	1 U	1 U	4.5 U
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	100 U	4 UJ	NA
Cobalt	0.6	NA	2.2	NA	11	11	NA	14	1.6	NA	0.56 J	2.2	NA	0.61 J	NA	13	0.62 J	1.8 U
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	100 U	4 UJ	NA
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	100 U	4 UJ	NA
Manganese	43	NA	1200	NA	2700	2900	NA	490	140	NA	39	280	NA	220	NA	780	340	320 D
Mercury	0.063	NA	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.15 U
Mercury, Dissolved	0.063	NA	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	0.08 U	NA	0.08 U	NA	0.08 U	0.08 U	0.15 U
Selenium	10	NA	2 U	NA	2 U	2 U	NA	2 U	2 U	NA	2 U	2 U	NA	2 U	NA	2 U	2 U	4 U
Thallium	0.02	NA	1 U	NA	0.71 J	0.74 J	NA	1 U	0.058 J	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.22 J	0.2 U	15 U
Thallium, Dissolved	0.02	NA	1 U	NA	0.71 J	0.74 J	NA	1 U	0.058 J	NA	0.2 U	0.2 U	NA	0.2 U	NA	0.22 J	0.2 U	15 U
Total Cyanide	0.15	5 UJ	5 U	7.7 J	NA	NA	5 U	NA	NA	NA	NA	NA	NA	5 U	3.4 J	2.6 J J1	5 U	5 U
Vanadium	8.6	NA	2 U	NA	2 U	2 U	NA	30	3.3 J	NA	2 U	1.1 J	NA	2 U	NA	17	2 U	8 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGMW-017**	**FWGmw-017**	**FWGmw-024**	**FWGMW-024**	**FWGmw-024**	**LL2mw-059**	**LL2mw-059**	**LL2mw-264**	**LL2mw-264**	**LL2mw-264-D**	**LL2mw-267**	**LL2mw-267**	**LL2mw-272**	**LL2MW-272**	**LL2mw-272**	**FWGmw-021**
Sample Date		**8/9/2017**	**12/2/2017**	**4/28/2017**	**8/9/2017**	**12/2/2017**	**4/28/2017**	**12/6/2017**	**4/27/2017**	**12/7/2017**	**12/7/2017**	**4/25/2017**	**12/7/2017**	**4/27/2017**	**8/3/2017**	**12/7/2017**	**4/28/2017**
RVAAP Area		**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 3**
Monitored Zone	**Selected Comparison Value**	**Dup FWGmw-017**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.8 U	0.8 U
1,1,2-Trichloroethane	0.041	0.25 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.25 U	0.8 U	0.8 U
1,2-Dibromoethane	0.0075	0.5 U	0.4 U	0.4 U	0.5 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.5 U	0.4 U	0.4 U
2-Hexanone	3.8	0.5 U	4 U	4 U	0.5 U	4 U	NA	NA	NA	NA	NA	NA	NA	4 U	0.5 U	4 U	4 U
Bromodichloromethane	0.13	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.4 U	0.4 U
Bromomethane	0.75	0.5 U	0.8 U	0.8 UJ	0.5 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.5 U	0.8 U	0.8 UJ
Chloroform	0.207	0.25 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.25 U	0.4 U	0.4 U
Vinylchloride	0.019	0.25 U	0.2 U	0.2 U	0.25 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.25 U	0.2 U	0.2 U
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	2.9 U	4.4 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.4 U	0.98 U
1,4-Dichlorobenzene	0.48	2.9 U	4.4 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.4 U	0.98 U
2,4,6-Trichlorophenol	1.2	2.9 U	2 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	2 U	0.98 U
2,4-Dinitrophenol	3.9	9.7 U Q	16 U	29 U	9.6 U Q	NA	NA	NA	NA	NA	NA	NA	NA	29 U	9.8 U Q	16 U	29 U
3,3'-Dichlorobenzidine	0.13	2.9 U	2 U	4.3 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	2 U	4.3 U
4,6-Dinitro-2-methylphenol	0.15	2.9 U Q	16 U	8.6 U	2.9 U Q	NA	NA	NA	NA	NA	NA	NA	NA	8.6 U	2.9 U Q	16 U	8.6 U
4-Chloroaniline	0.37	2.9 U	2 U	4.3 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	2 U	4.3 U
4-Nitroaniline	3.13	2.9 U	2 U	4.3 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	2 U	4.3 U
Benz(a)anthracene	0.004	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.1 U	0.012 U
Benzo(a)pyrene	0.2	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	0.012 U
Benzo(b)fluoranthene	0.002	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.1 U	0.012 U
Benzo(k)fluoranthene	2.5	2.9 U	0.012 U	0.012 U	2.9 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	0.012 U
bis(2-Chloroethyl)ether	0.014	2.9 U	1 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1 U	0.98 U
bis(2-Ethylhexyl)phthalate	6	2.9 U	4.4 U	2 U	2.9 U	4.3 U	2 U	4.6 U	NA	NA	NA	1.9 U	4.6 U	2 U	2.9 U	4.4 U	2 U
Butyl benzyl phthalate	16	2.9 U	4.4 U	2 U	2.9 U	4.3 U	2 U	4.6 U	NA	NA	NA	1.9 U	4.6 U	2 U	2.9 U	4.4 U	2 U
Dibenz(a,h)anthracene	0.002	2.9 U Q	0.012 U	0.012 U	2.9 U Q	0.012 U	NA	NA	NA	NA	NA	NA	NA	0.012 U	2.9 U	0.012 U	0.012 U
Dibenzofuran	0.79	2.9 U	1 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1 U	0.98 U
Di-N-Butyl phthalate	90	2.9 U	2 U	4.3 U	2.9 U	1.9 U	4.5 U	2.1 U	NA	NA	NA	4.2 U	2.1 U	4.3 U	2.9 U	2 U	4.3 U
Di-N-Octyl phthalate	20	9.7 U	4.4 U	0.98 U	9.6 U	4.3 U	1 U	4.6 U	NA	NA	NA	0.96 U	4.6 U	0.98 U	9.8 U	4.4 U	0.98 U
Hexachlorobenzene	0.0098	2.9 U	2 U	2 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2.9 U	2 U	2 U
Hexachlorobutadiene	0.14	2.9 U	30 U	9.8 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	2.9 U Q	30 U	9.8 U
Hexachlorocyclopentadiene	0.041	2.9 U	25 U	29 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	29 R	2.9 U Q	25 U	29 U
Hexachloroethane	0.33	2.9 U	30 U	4.3 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	30 U	4.3 U
Indeno(1,2,3-cd)pyrene	0.002	2.9 U	0.04 U	0.04 U	2.9 U	0.041 U	NA	NA	NA	NA	NA	NA	NA	0.041 U	2.9 U Q	0.041 U	0.04 U
Naphthalene	0.17	2.9 U	0.023 J	0.035 J	2.9 U	0.026 J	NA	NA	NA	NA	NA	NA	NA	0.026 J	2.9 U	0.013 J	0.012 U
N-Nitroso-di-N-propylamine	0.011	2.9 U	2 U	0.98 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	2 U	0.98 U
Pentachlorophenol	1	2.9 U	16 U	59 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	59 U	2.9 U	16 U	59 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGMW-017**	**FWGmw-017**	**FWGmw-024**	**FWGMW-024**	**FWGmw-024**	**LL2mw-059**	**LL2mw-059**	**LL2mw-264**	**LL2mw-264**	**LL2mw-264-D**	**LL2mw-267**	**LL2mw-267**	**LL2mw-272**	**LL2MW-272**	**LL2mw-272**	**FWGmw-021**
Sample Date		**8/9/2017**	**12/2/2017**	**4/28/2017**	**8/9/2017**	**12/2/2017**	**4/28/2017**	**12/6/2017**	**4/27/2017**	**12/7/2017**	**12/7/2017**	**4/25/2017**	**12/7/2017**	**4/27/2017**	**8/3/2017**	**12/7/2017**	**4/28/2017**
RVAAP Area		**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 2**	**Load Line 3**
Monitored Zone	**Selected Comparison Value**	**Dup FWGmw-017**	**Basal Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**
Explosives																	
1,3-Dinitrobenzene	0.104	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.2 J	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.21 U	0.2 U	0.21 R	0.21 U
2,4-Dinitrotoluene	0.12	2.9 U Q	2 U	4.3 U	2.9 U Q	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	2 U	4.3 U
2,6-Dinitrotoluene	0.122	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.22 U	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.21 U	0.2 U	0.21 R	0.21 U
2-Nitrotoluene	0.37	0.5 U	0.22 UJ	0.21 U	0.5 U	0.22 UJ	0.22 U	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.21 U	0.5 U	0.21 R	0.21 U
3-Nitrotoluene	0.17	0.2 U	0.22 UJ	0.21 U	0.2 U	0.22 UJ	0.22 U	0.22 UJ	NA	NA	NA	0.21 U	0.23 UJ	0.21 U	0.2 U	0.21 R	0.21 U
Nitrobenzene	0.521	2.9 U	1 U	2 U	2.9 U	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2.9 U	1 U	2 U
Nitroglycerin	5.01	1 U	2.2 UJ	2.1 U	1 U	2.2 UJ	2.2 U	2.2 UJ	NA	NA	NA	2.1 U	2.3 UJ	2.1 U	0.99 U	2.1 R	2.1 U
PETN	3.9	1 U	1.3 UJ	1.3 U	1 U	1.3 UJ	1.3 U	1.3 UJ	NA	NA	NA	1.3 U	1.4 UJ	1.3 U	0.99 U	1.3 R	1.3 U
RDX	0.774	0.2 U	0.13 UJ	0.13 U	0.2 U	0.13 UJ	0.13 U	0.13 UJ	NA	NA	NA	0.36	0.79 J	0.13 U	0.2 U	0.13 R	0.22
Pesticides and PCBs																	
Aldrin	0.005	0.02 U	0.021 U	0.021 U	0.02 U	0.022 U	NA	NA	NA	NA	NA	NA	NA	0.021 U	0.02 U	0.022 U	0.021 U
Alpha-BHC	0.014	0.02 U	0.019 U	0.019 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	0.019 U	0.02 U	0.019 U	0.019 U
Aroclor-1016	0.14	0.78 U	0.095 U	0.096 U	0.82 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.78 U	0.098 U	0.096 U
Aroclor-1221	0.0047	0.78 U	0.095 U	0.096 U	0.82 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.78 U	0.098 U	0.096 U
Aroclor-1232	0.0047	0.78 U	0.095 U	0.096 U	0.82 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.78 U	0.098 U	0.096 U
Aroclor-1242	0.213	0.78 U	0.095 U	0.096 U	0.82 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.78 U	0.098 U	0.096 U
Aroclor-1248	0.0078	0.78 U	0.095 U	0.096 U	0.82 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.78 U	0.098 U	0.096 U
Aroclor-1254	0.021	0.29 U	0.095 U	0.096 U	0.31 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.098 U	0.096 U
Aroclor-1260	0.213	0.29 U	0.095 U	0.096 U	0.31 U	0.096 U	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.098 U	0.096 U
Dieldrin	0.004	0.02 U	0.016 U	0.016 U	0.02 U	0.017 U	NA	NA	NA	NA	NA	NA	NA	0.016 U	0.02 U	0.016 U	0.016 U
Inorganics																	
Antimony	0.78	9 U	1 U	1 U	9 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	9 U	1 U	0.54 J
Antimony, Dissolved	0.78	9 U	1 U	1 U	9 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	9 U	1 U	0.54 J
Arsenic	0.052	7.6 J D	5.6	4.2 J	6.2 J D	3.9 J	0.39 J	0.44 J	NA	NA	NA	1.8 J	1.4 J	8.2	9.5 J D	9.1	1.2 J
Beryllium	2.5	4.5 U	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U	0.3 U	NA	NA	NA	0.3 U	0.3 U	0.3 U	4.5 U	0.3 U	0.3 U
Cadmium	0.92	4.5 U	1 U	1 U	4.5 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	4.5 U	1 U	1 U
Cadmium, Dissolved	0.92	4.5 U	1 U	1 U	4.5 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	1 U	4.5 U	1 U	1 U
Chromium, hexavalent	0.035	NA	20 U	4.6 J	NA	20 U	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA
Cobalt	0.6	1.8 U	0.39 J	0.85 J	1.8 U	0.91 J	1.1	0.75 J	NA	NA	NA	4	3.8	5	4.6 D	4.8	0.15 J
Cr (VI)	0.035	NA	20 U	4.6 J	NA	20 U	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA
Hexavalent chromium	0.035	NA	20 U	4.6 J	NA	20 U	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA
Manganese	43	320 D	310 J	330	290 D	260 J	85	130 J	NA	NA	NA	600	630 J	500	480 D	510 J	5.5
Mercury	0.063	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	0.2 U	0.08 U	NA	NA	NA	0.08 U	0.08 U	0.08 U	0.15 U	0.08 U	0.2 U
Mercury, Dissolved	0.063	0.15 U	0.08 U	0.08 U	0.15 U	0.08 U	0.2 U	0.08 U	NA	NA	NA	0.08 U	0.08 U	0.08 U	0.15 U	0.08 U	0.2 U
Selenium	10	4 U	2 U	2 U	4 U	2 U	2 U	2 U	NA	NA	NA	2 U	2 U	2 U	4 U	2 U	2 U
Thallium	0.02	15 U	0.2 U	0.2 U	15 U	0.2 U	0.054 J	0.2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U	15 U	0.2 U	0.2 U
Thallium, Dissolved	0.02	15 U	0.2 U	0.2 U	15 U	0.2 U	0.054 J	0.2 U	NA	NA	NA	0.2 U	0.2 U	0.2 U	15 U	0.2 U	0.2 U
Total Cyanide	0.15	5 U	5 U	5 U	5 U	5 U	NA	NA	2 J	10 U	NA	NA	NA	2 J	3.3 J	10 U	5 U
Vanadium	8.6	8 U	2 U	2 U	8 U	2 U	2 U	2 UJ	NA	NA	NA	2 U	2 UJ	2 U	8 U	2 UJ	2 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**FWGmw-021**	**FWGMW-021**	**FWGmw-021**	**LL3mw-234**	**LL3mw-234**	**LL3mw-236**	**LL3mw-237**	**LL3mw-237**	**LL3mw-244**	**LL3mw-244**	**LL3mw-246**	**LL3mw-504**	**LL3mw-246**	**LL3mw-246**	**LL4mw-193**	**LL4mw-193**	**LL4mw-200**
Sample Date		**5/3/2017**	**8/8/2017**	**12/2/2017**	**4/24/2017**	**12/6/2017**	**5/2/2017**	**4/24/2017**	**12/6/2017**	**4/24/2017**	**12/6/2017**	**4/28/2017**	**4/28/2017**	**5/3/2017**	**12/2/2017**	**4/24/2017**	**12/6/2017**	**4/24/2017**
RVAAP Area		**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 4**	**Load Line 4**	**Load Line 4**
Monitored Zone	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**DUP LL3mw-246**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**
Volatile Organic Compounds																		
1,1,2,2-Tetrachloroethane	0.069	NA	0.25 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	NA	0.25 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	NA	0.5 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	NA	0.5 U	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	NA	0.25 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	NA	0.5 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	NA	0.25 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	NA	0.25 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																		
1,2,4-Trichlorobenzene	0.4	NA	3 U	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	NA	3 U	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	NA	10 U Q	16 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	3 U Q	16 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	NA	3 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
Benzo(a)pyrene	0.2	NA	3 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
Benzo(b)fluoranthene	0.002	NA	3 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
Benzo(k)fluoranthene	2.5	NA	3 U	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
bis(2-Chloroethyl)ether	0.014	NA	3 U	0.98 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	3 U	4.3 U	NA	NA	NA	NA	NA	2 U	4.4 U	2 U	2 U	NA	4.6 U	NA	NA	NA
Butyl benzyl phthalate	16	NA	3 U	4.3 U	NA	NA	NA	NA	NA	2 U	4.4 U	2 U	2 U	NA	4.6 U	NA	NA	NA
Dibenz(a,h)anthracene	0.002	NA	3 U Q	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
Dibenzofuran	0.79	NA	3 U	0.98 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	NA	3 U	2 U	NA	NA	NA	NA	NA	4.3 U	2 U	4.3 U	4.3 U	NA	2.1 U	NA	NA	NA
Di-N-Octyl phthalate	20	NA	10 U	4.3 U	NA	NA	NA	NA	NA	0.99 U	4.4 U	0.98 U	0.98 U	NA	4.6 U	NA	NA	NA
Hexachlorobenzene	0.0098	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	NA	3 U	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	NA	3 U	25 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	NA	3 U	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	3 U	0.041 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U
Naphthalene	0.17	NA	3 U	0.012 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.012 U
N-Nitroso-di-N-propylamine	0.011	NA	3 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	NA	3 U	16 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
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CAMP RAVENNA, OH

Well Number		**FWGmw-021**	**FWGMW-021**	**FWGmw-021**	**LL3mw-234**	**LL3mw-234**	**LL3mw-236**	**LL3mw-237**	**LL3mw-237**	**LL3mw-244**	**LL3mw-244**	**LL3mw-246**	**LL3mw-504**	**LL3mw-246**	**LL3mw-246**	**LL4mw-193**	**LL4mw-193**	**LL4mw-200**
Sample Date		**5/3/2017**	**8/8/2017**	**12/2/2017**	**4/24/2017**	**12/6/2017**	**5/2/2017**	**4/24/2017**	**12/6/2017**	**4/24/2017**	**12/6/2017**	**4/28/2017**	**4/28/2017**	**5/3/2017**	**12/2/2017**	**4/24/2017**	**12/6/2017**	**4/24/2017**
RVAAP Area		**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 3**	**Load Line 4**	**Load Line 4**	**Load Line 4**
Monitored Zone	**Selected Comparison Value**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**DUP LL3mw-246**	**Sharon**	**Sharon**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**
Explosives																		
1,3-Dinitrobenzene	0.104	NA	0.2 U	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	0.21 U	0.22 U Q	0.22 U	0.21 U	NA	0.22 UJ	0.21 U	NA	NA
2,4-Dinitrotoluene	0.12	NA	3 U Q	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	NA	0.2 U	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	0.21 U	0.22 U Q	0.22 U	0.21 U	NA	0.22 UJ	0.21 U	NA	NA
2-Nitrotoluene	0.37	NA	0.5 U	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	0.21 U	0.22 U Q	0.22 U	0.21 U	NA	0.22 UJ	0.21 U	NA	NA
3-Nitrotoluene	0.17	NA	0.2 U	0.22 UJ	NA	NA	0.22 U	0.21 U	0.22 U	0.21 U	0.22 U Q	0.22 U	0.21 U	NA	0.22 UJ	0.21 U	NA	NA
Nitrobenzene	0.521	NA	3 U	0.98 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	NA	1 U	2.2 UJ	NA	NA	2.2 U	2.1 U	2.2 U	2.1 U	2.2 U Q	2.2 U	2.1 U	NA	2.2 UJ	2.1 U	NA	NA
PETN	3.9	NA	1 U	1.3 UJ	NA	NA	1.3 U	1.2 U	1.3 U	1.2 U	1.3 U	1.3 U	1.3 U	NA	1.3 UJ	1.3 U	NA	NA
RDX	0.774	NA	0.2 U	0.11 J	NA	NA	0.13 U	0.12 U	0.13 U	0.16 J	0.13 Q J	0.18 J	0.18 J	NA	0.097 J	0.13 U	NA	NA
Pesticides and PCBs																		
Aldrin	0.005	NA	0.019 U	0.022 U	NA	NA	NA	NA	NA	0.022 UJ	0.022 U	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	NA	0.019 U	0.019 U	NA	NA	NA	NA	NA	0.019 U	0.02 U	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	NA	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	NA	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	NA	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.213	NA	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	NA	0.78 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.021	NA	0.29 U	0.081 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.213	NA	0.29 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.004	NA	0.019 U	0.016 U	NA	NA	NA	NA	NA	0.016 U	0.017 U	NA	NA	NA	NA	NA	NA	NA
Inorganics																		
Antimony	0.78	NA	9 U	6 U	NA	NA	NA	NA	NA	6 U	0.5 J	0.51 J	0.9 J	NA	6 U	NA	NA	NA
Antimony, Dissolved	0.78	NA	9 U	6 U	NA	NA	NA	NA	NA	6 U	0.5 J	0.51 J	0.9 J	NA	6 U	NA	NA	NA
Arsenic	0.052	NA	8 U	1.7 J	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	NA	1 U	NA	NA	NA
Beryllium	2.5	NA	4.5 U	0.3 U	NA	NA	NA	NA	NA	0.3 U	0.11 J	0.3 U	1 U	NA	0.3 U	NA	NA	NA
Cadmium	0.92	NA	4.5 U	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	NA	1 U	NA	NA	NA
Cadmium, Dissolved	0.92	NA	4.5 U	1 U	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	NA	1 U	NA	NA	NA
Chromium, hexavalent	0.035	4 U	NA	20 U	NA	NA	NA	NA	NA	4 U	20 U	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.6	NA	1.8 U	2.6	NA	NA	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	NA	NA	NA
Cr (VI)	0.035	4 U	NA	20 U	NA	NA	NA	NA	NA	4 U	20 U	NA	NA	NA	NA	NA	NA	NA
Hexavalent chromium	0.035	4 U	NA	20 U	NA	NA	NA	NA	NA	4 U	20 U	NA	NA	NA	NA	NA	NA	NA
Manganese	43	NA	9.4 D	360 J	NA	NA	NA	NA	NA	3.5 U	1.3 J	3.5 U	3.5 U	NA	0.77 J	NA	NA	NA
Mercury	0.063	NA	0.15 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	0.08 U	0.08 U	0.2 U	NA	0.08 U	NA	NA	NA
Mercury, Dissolved	0.063	NA	0.15 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	0.08 U	0.08 U	0.2 U	NA	0.08 U	NA	NA	NA
Selenium	10	NA	4 U	2 U	NA	NA	NA	NA	NA	2 U	2 U	2 U	2 U	NA	2 U	NA	NA	NA
Thallium	0.02	NA	15 U	0.2 U	NA	NA	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.051 J	NA	0.2 U	NA	NA	NA
Thallium, Dissolved	0.02	NA	15 U	0.2 U	NA	NA	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.051 J	NA	0.2 U	NA	NA	NA
Total Cyanide	0.15	NA	4.3 J	10 U	5 U	5 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	5 U	2.2 J	4.1 J
Vanadium	8.6	NA	8 U	2 U	NA	NA	NA	NA	NA	2 U	2 U	2 U	2 U	NA	2 U	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**LL5mw-001**	**LL6mw-001**	**LL6mw-002**	**LL6mw-006**	**LL7mw-001**	**LL7mw-006**	**LL7mw-006**	**FWGmw-004**	**FWGmw-004**	**FWGmw-015**	**FWGmw-015**	**FWGmw-016**	**FWGmw-016**	**MBSmw-004**
Sample Date		**4/21/2017**	**4/26/2017**	**4/26/2017**	**4/26/2017**	**4/19/2017**	**4/19/2017**	**12/4/2017**	**4/17/2017**	**12/5/2017**	**4/17/2017**	**12/4/2017**	**4/17/2017**	**12/4/2017**	**4/26/2017**
RVAAP Area		**Load Line 5**	**Load Line 6**	**Load Line 6**	**Load Line 6**	**Load Line 7**	**Load Line 7**	**Load Line 7**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Mustard Burial Site**
Monitored Zone	**Selected Comparison Value**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Unconsolidated**
Volatile Organic Compounds															
1,1,2,2-Tetrachloroethane	0.069	0.8 U	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	0.8 U	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	4 U	NA	NA	NA	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	0.8 U	NA	NA	NA	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	0.4 U	NA	NA	NA	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	0.2 U	NA	NA	NA	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds															
1,2,4-Trichlorobenzene	0.4	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	8.7 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	NA	NA	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	NA	NA	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	2 U	2 U	2 U	1.9 U	NA	NA	1.9 U	4.9 J	1.9 U	4.2 U	1.9 U	4.2 U	NA
Butyl benzyl phthalate	16	NA	2 U	2 U	2 U	1.9 U	NA	NA	1.9 U	4.2 U	1.9 U	4.2 U	1.9 U	4.2 U	NA
Dibenz(a,h)anthracene	0.002	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	NA	4.3 U	4.3 U	4.3 U	4.2 U	NA	NA	4.2 U	1.9 U	4.2 U	1.9 U	4.2 U	1.9 U	NA
Di-N-Octyl phthalate	20	NA	0.98 U	0.99 U	0.98 U	0.95 U	NA	NA	0.95 U	4.2 U	0.95 U	4.2 U	0.95 U	4.2 U	NA
Hexachlorobenzene	0.0098	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	NA	NA	9.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	30 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	NA	NA	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	0.04 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	NA	NA	0.012 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	0.99 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	NA	NA	59 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**LL5mw-001**	**LL6mw-001**	**LL6mw-002**	**LL6mw-006**	**LL7mw-001**	**LL7mw-006**	**LL7mw-006**	**FWGmw-004**	**FWGmw-004**	**FWGmw-015**	**FWGmw-015**	**FWGmw-016**	**FWGmw-016**	**MBSmw-004**
Sample Date		**4/21/2017**	**4/26/2017**	**4/26/2017**	**4/26/2017**	**4/19/2017**	**4/19/2017**	**12/4/2017**	**4/17/2017**	**12/5/2017**	**4/17/2017**	**12/4/2017**	**4/17/2017**	**12/4/2017**	**4/26/2017**
RVAAP Area		**Load Line 5**	**Load Line 6**	**Load Line 6**	**Load Line 6**	**Load Line 7**	**Load Line 7**	**Load Line 7**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Motor Pool Area**	**Mustard Burial Site**
Monitored Zone	**Selected Comparison Value**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Homewood**	**Homewood**	**Homewood**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Unconsolidated**
Explosives															
1,3-Dinitrobenzene	0.104	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ
2,4-Dinitrotoluene	0.12	NA	NA	4.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ
2-Nitrotoluene	0.37	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 U	0.21 UJ
3-Nitrotoluene	0.17	NA	NA	0.21 U	0.21 UJ	0.21 U	0.23 U	0.21 UJ	0.21 U	0.22 UJ	0.21 U	0.22 UJ	0.2 U	0.22 UJ	0.21 UJ
Nitrobenzene	0.521	NA	NA	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	NA	NA	2.1 U	2.1 UJ	2.1 U	2.3 U	2.1 UJ	2.1 U	2.2 UJ	2.1 U	2.2 UJ	2 U	2.2 U	2.1 UJ
PETN	3.9	NA	NA	1.3 U	1.3 UJ	1.2 U	1.4 U	1.2 UJ	1.3 U	1.3 UJ	1.2 U	1.3 UJ	1.2 U	1.3 U	1.3 UJ
RDX	0.774	NA	NA	0.13 U	0.13 UJ	0.12 U	0.62	0.78 J	0.13 J	0.13 UJ	0.12 U	0.13 UJ	0.11 J	0.13 U	0.13 UJ
Pesticides and PCBs															
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics															
Antimony	0.78	NA	NA	NA	NA	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA
Antimony, Dissolved	0.78	NA	NA	NA	NA	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA
Arsenic	0.052	NA	NA	NA	NA	1.8 J	NA	NA	0.42 J	1.6 J	0.71 J	1.1 J	4.5 J	4.6 J	NA
Beryllium	2.5	NA	NA	NA	NA	0.19 J	NA	NA	0.3 U	0.097 J	0.3 U	0.3 U	0.3 U	0.3 U	NA
Cadmium	0.92	NA	NA	NA	NA	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA
Cadmium, Dissolved	0.92	NA	NA	NA	NA	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	NA
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.6	NA	NA	NA	NA	6.1	NA	NA	0.16 J	1.8 J	0.55 J	1.3	0.2 U	0.2 U	NA
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	43	NA	NA	NA	NA	430	NA	NA	9.4	140	240	500 J	210	200 J	NA
Mercury	0.063	NA	NA	NA	NA	0.08 U	NA	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA
Mercury, Dissolved	0.063	NA	NA	NA	NA	0.08 U	NA	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA
Selenium	10	NA	NA	NA	NA	2 U	NA	NA	1.4 J	2 U	2 U	2 U	2 U	2 U	NA
Thallium	0.02	NA	NA	NA	NA	0.13 J	NA	NA	0.2 U	0.06 J	0.2 U	0.2 U	0.2 U	0.2 U	NA
Thallium, Dissolved	0.02	NA	NA	NA	NA	0.13 J	NA	NA	0.2 U	0.06 J	0.2 U	0.2 U	0.2 U	0.2 U	NA
Total Cyanide	0.15	NA	3.2 J	5 U	5 U	2 J	NA	NA	NA	NA	NA	NA	NA	NA	2.2 J
Vanadium	8.6	NA	NA	NA	NA	2 U	NA	NA	2 U	3.2 J	2 U	2 U	2 U	2 U	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		MBSmw-006	FWGmw-007	FWGmw-007	NTAmw-116	NTAmw-117	NTAmw-117	NTAmw-118	NTAmw-118	NTAmw-119	NTAmw-507	NTAmw-119	NTAmw-120	NTAMW-120	NTAmw-120	FWGmw-012	FWGmw-012
Sample Date		**4/26/2017**	**4/26/2017**	**12/4/2017**	**4/27/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**8/1/2017 12:30**	**12/4/2017**	**5/2/2017**	**12/6/2017**
RVAAP Area		**Mustard Burial Site**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP NTAmw-119**	**Unconsolidated**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon Shale**	**Sharon Shale**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.25 U	0.8 U	NA	NA
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.5 U	0.4 U	NA	NA
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	4 U	4 U	4 U	4 U	0.5 U	4 U	NA	NA
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	0.8 U	0.8 U	0.8 U	0.5 U	0.8 U	NA	NA
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	0.25 U	0.4 U	NA	NA
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.25 U	0.2 U	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.5 U	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	4.5 U	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	2 U	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 U	9.7 U Q	16 U	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	2 U	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.6 U	2.9 U Q	16 U	NA	NA
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U	2 U	NA	NA
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	2 U	NA	NA
Benz(a)anthracene	0.004	NA	NA	NA	0.013 U	NA	NA	NA	NA	0.012 UJ	NA	0.1 U	0.012 U	2.9 U	0.11 U	NA	NA
Benzo(a)pyrene	0.2	NA	NA	NA	0.013 U	NA	NA	NA	NA	0.012 UJ	NA	0.012 U	0.012 U	2.9 U	0.013 U	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	NA	0.013 U	NA	NA	NA	NA	0.012 UJ	NA	0.0032 J	0.012 U	2.9 U	0.013 U	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	NA	0.013 U	NA	NA	NA	NA	0.012 UJ	NA	0.012 U	0.012 U	2.9 U	0.013 U	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1 U	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	2 U	4.4 U	NA	NA	NA	NA	NA	2 U	2 U	4.4 U	2 U	2.9 U	4.5 U	1.9 J	4.2 U
Butyl benzyl phthalate	16	NA	2 U	4.4 U	NA	NA	NA	NA	NA	2 U	2 U	4.4 U	2 U	2.9 U	4.5 U	2 U	4.2 U
Dibenz(a,h)anthracene	0.002	NA	NA	NA	0.013 U	NA	NA	NA	NA	0.012 UJ	NA	0.012 U	0.012 U	2.9 U	0.013 U	NA	NA
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	1 U	NA	NA
Di-N-Butyl phthalate	90	NA	4.3 U	2 U	NA	NA	NA	NA	NA	4.3 U	4.3 U	2 U	4.3 U	2.9 U	2 U	4.3 U	1.9 U
Di-N-Octyl phthalate	20	NA	0.99 U	4.4 U	NA	NA	NA	NA	NA	0.98 U	0.99 U	4.4 U	0.98 U	9.7 U	4.5 U	0.98 U	4.2 U
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2.9 U	2 U	NA	NA
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.8 U	2.9 U Q	30 U	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29 R	2.9 U Q	25 U	NA	NA
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	2.9 U Q	30 U	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	0.042 U	NA	NA	NA	NA	0.04 UJ	NA	0.04 U	0.041 U	2.9 U Q	0.044 U	NA	NA
Naphthalene	0.17	NA	NA	NA	0.046 J	NA	NA	NA	NA	0.012 UJ	NA	0.0094 J	0.012 U	2.9 U	0.018 J	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.98 U	2.9 U	2 U	NA	NA
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	59 U	2.9 U	16 U	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**MBSmw-006**	**FWGmw-007**	**FWGmw-007**	**NTAmw-116**	**NTAmw-117**	**NTAmw-117**	**NTAmw-118**	**NTAmw-118**	**NTAmw-119**	**NTAmw-507**	**NTAmw-119**	**NTAmw-120**	**NTAMW-120**	**NTAmw-120**	**FWGmw-012**	**FWGmw-012**
Sample Date		**4/26/2017**	**4/26/2017**	**12/4/2017**	**4/27/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**4/27/2017**	**12/4/2017**	**4/27/2017**	**8/1/2017 12:30**	**12/4/2017**	**5/2/2017**	**12/6/2017**
RVAAP Area		**Mustard Burial Site**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**NACA Test Area**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**
Monitored Zone	**Selected Comparison Value**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**DUP NTAmw-119**	**Unconsolidated**	**Upper Sharon**	**Upper Sharon**	**Upper Sharon**	**Sharon Shale**	**Sharon Shale**
Explosives																	
1,3-Dinitrobenzene	0.104	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA	NA	0.21 R	0.22 R	0.21 UJ	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	4.3 U	4.3 U	2 U	4.3 U	2.9 U	2 U	NA	NA
2,6-Dinitrotoluene	0.122	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA	NA	0.21 R	0.22 R	0.21 UJ	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ
2-Nitrotoluene	0.37	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA	NA	0.21 R	0.22 R	0.21 UJ	0.21 U	0.5 U	0.22 UJ	0.21 U	0.22 UJ
3-Nitrotoluene	0.17	0.21 U	0.21 U	0.22 UJ	NA	NA	NA	NA	NA	0.21 R	0.22 R	0.21 UJ	0.21 U	0.2 U	0.22 UJ	0.21 U	0.22 UJ
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	2 U	2 U	1 U	2 U	2.9 U	1 U	NA	NA
Nitroglycerin	5.01	2.1 U	2.1 U	2.2 UJ	NA	NA	NA	NA	NA	2.1 R	2.2 R	2.1 UJ	2.1 U	1 U	2.2 UJ	2.1 U	2.2 UJ
PETN	3.9	1.3 U	1.3 U	1.3 UJ	NA	NA	NA	NA	NA	1.3 R	1.3 R	1.3 UJ	1.3 U	1 U	1.3 UJ	1.3 U	1.3 U
RDX	0.774	0.13 U	0.13 U	0.13 UJ	NA	NA	NA	NA	NA	0.13 R	0.13 R	0.13 UJ	0.13 U	0.2 U	0.13 UJ	0.13 U	0.13 U
Pesticides and PCBs																	
Aldrin	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.021 U	0.02 U	0.022 U	NA	NA
Alpha-BHC	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.019 U	0.02 U	0.02 U	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.79 U	0.1 U	NA	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.79 U	0.1 U	NA	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.79 U	0.1 U	NA	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.79 U	0.1 U	NA	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.79 U	0.1 U	NA	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.1 U	NA	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.095 U	0.29 U	0.1 U	NA	NA
Dieldrin	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.016 U	0.02 U	0.017 U	NA	NA
Inorganics																	
Antimony	0.78	NA	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U	9 U	1 U	1 U	1 U
Antimony, Dissolved	0.78	NA	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U	9 U	1 U	1 U	1 U
Arsenic	0.052	NA	1 U	0.88 J	NA	NA	NA	NA	NA	6.2	NA	6.8	8.2	8.1 J D	9.3	1.3 J	1.5 J
Beryllium	2.5	NA	0.3 U	0.3 U	NA	NA	NA	NA	NA	0.3 U	NA	0.3 U	0.3 U	4.5 U	1 U	0.3 U	0.3 U
Cadmium	0.92	NA	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U	4.5 U	1 U	1 U	1 U
Cadmium, Dissolved	0.92	NA	1 U	1 U	NA	NA	NA	NA	NA	1 U	NA	1 U	1 U	4.5 U	1 U	1 U	1 U
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA	NA
Cobalt	0.6	NA	0.42 J	1.6	NA	NA	NA	NA	NA	0.19 J	NA	0.14 J	0.3 J	1.8 U	2	1.9	1.5
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA	NA
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	20 U	NA	NA
Manganese	43	NA	120	360 J	NA	NA	NA	NA	NA	340	NA	330 J	97	97 D	130 J	140	91 J
Mercury	0.063	NA	0.08 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	0.08 U	0.15 U	0.08 U	0.08 U	0.08 U
Mercury, Dissolved	0.063	NA	0.08 U	0.08 U	NA	NA	NA	NA	NA	0.08 U	NA	0.08 U	0.08 U	0.15 U	0.08 U	0.08 U	0.08 U
Selenium	10	NA	2 U	2 U	NA	NA	NA	NA	NA	2 U	NA	2 U	2 U	4 U	2 U	2 U	2 U
Thallium	0.02	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	0.2 U	NA	0.2 U	0.2 U	15 U	1 U	0.2 U	0.2 U
Thallium, Dissolved	0.02	NA	0.2 U	0.2 U	NA	NA	NA	NA	NA	0.2 U	NA	0.2 U	0.2 U	15 U	1 U	0.2 U	0.2 U
Total Cyanide	0.15	5 U	NA	NA	NA	5 U	5 U	2.5 J	5 U	NA	NA	NA	5 U	5 U	5 U	NA	NA
Vanadium	8.6	NA	2 U	2 U	NA	NA	NA	NA	NA	2 U	NA	2 U	2 U	8 U	2 U	2 U	2 UJ

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**RQLmw-007**	**RQLmw-007**	**RQLmw-508**	**RQLmw-008**	**RQLmw-008**	**RQLmw-009**	**RQLmw-009**	**RQLmw-011**	**RQLmw-011**	**RQLmw-012**	**RQLmw-012**	**RQLmw-012-D**	**RQLmw-013**	**RQLmw-013**	**RQLmw-013-D**	**RQLmw-014**
Sample Date		**5/1/2017**	**12/7/2017**	**5/1/2017**	**5/1/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**5/3/2017**	**12/7/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**12/7/2017**	**4/18/2017**
RVAAP Area		**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**
Monitored Zone	**Selected Comparison Value**	**Sharon**	**Sharon**	**DUP RQLmw-007**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**DUP**	**Sharon**	**Sharon**	**DUP**	**Sharon**
Volatile Organic Compounds																	
1,1,2,2-Tetrachloroethane	0.069	0.8 U	0.8 UJ	NA	0.8 U	0.8 UJ	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	0.8 U	0.8 UJ	NA	0.8 U	0.8 UJ	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	0.4 U	0.4 UJ	NA	0.4 U	0.4 UJ	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	3.8	4 U	4 UJ	NA	4 U	4 UJ	4 U	4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	0.13	0.4 U	0.4 UJ	NA	0.4 U	0.4 UJ	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	0.75	0.8 U	0.8 UJ	NA	0.8 U	0.8 UJ	0.8 U	0.8 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.207	0.4 U	0.4 UJ	NA	0.4 U	0.4 UJ	0.4 U	0.4 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylchloride	0.019	0.2 U	0.2 UJ	NA	0.2 U	0.2 UJ	0.2 U	0.2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semi-Volatile Organic Compounds																	
1,2,4-Trichlorobenzene	0.4	0.96 U	4.4 U	1 U	0.97 U	4.7 U	0.97 U	4.3 U	0.98 U	4.3 U	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	0.96 U	4.4 U	1 U	0.97 U	4.7 U	0.97 U	4.3 U	0.98 U	4.3 U	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	0.96 U	2 U	1 U	0.97 U	2.1 U	0.97 U	2 U	0.98 U	2 U	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	29 U	16 R	30 U	29 U	17 R	29 U	16 U	29 U	16 R	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	4.2 UJ	2 U	4.5 U	4.3 U	2.1 U	4.3 U	2 U	4.3 UJ	2 U	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	8.5 U	16 UJ	8.9 U	8.6 U	17 U	8.5 U	16 UJ	8.6 U	16 UJ	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	4.2 U	2 U	4.5 U	4.3 U	2.1 U	4.3 U	2 U	4.3 U	2 U	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	4.2 U	2 U	4.5 U	4.3 U	2.1 U	4.3 U	2 U	4.3 U	2 U	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	0.015 U	0.11 U	NA	0.012 U	0.1 U	0.012 U	0.1 U	0.012 U	0.1 U	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	0.015 U	0.013 U	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	0.015 U	0.013 U	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	0.015 U	0.013 U	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	0.96 U	0.99 U	1 U	0.97 U	1.1 U	0.97 U	0.99 U	0.98 U	0.99 U	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	0.97 J	4.4 U	NA	1.5 J	4.7 U	1.7 J	4.3 U	2 J	4.3 U	NA	NA	NA	NA	NA	NA	NA
Butyl benzyl phthalate	16	1.9 UJ	4.4 U	NA	1.9 U	4.7 U	1.9 U	4.3 U	2 U	4.3 U	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.002	0.015 U	0.013 UJ	NA	0.012 U	0.012 U	0.012 U	0.013 U	0.012 U	0.012 U	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	0.96 U	0.99 U	1 U	0.97 U	1.1 U	0.97 U	0.99 U	0.98 U	0.99 U	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	4.2 U	2 U	NA	4.3 U	2.1 U	4.3 U	2 U	4.3 U	2 U	NA	NA	NA	NA	NA	NA	NA
Di-N-Octyl phthalate	20	0.96 UJ	4.4 U	NA	0.97 U	4.7 U	0.97 U	4.3 U	0.98 U	4.3 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	0.0098	1.9 U	2 U	2 U	1.9 U	2.1 U	1.9 U	2 U	2 U	2 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	9.6 U	30 U	10 U	9.7 U	32 U	9.7 U	30 U	9.8 U	30 U	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	29 U	25 U	30 U	29 U	27 U	29 U	25 U	29 U	25 U	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	4.2 U	30 U	4.5 U	4.3 U	32 U	4.3 U	30 U	4.3 U	30 U	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	0.049 U	0.044 U	NA	0.04 U	0.04 U	0.04 U	0.042 U	0.04 U	0.041 U	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	0.015 U	0.014 J	NA	0.012 U	0.011 J	0.012 U	0.012 J	0.012 U	0.011 J	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	0.96 U	2 U	1 U	0.97 U	2.1 U	0.97 U	2 U	0.98 U	2 U	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	58 U	16 U	61 U	58 U	17 U	58 U	16 U	59 U	16 U	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**RQLmw-007**	**RQLmw-007**	**RQLmw-508**	**RQLmw-008**	**RQLmw-008**	**RQLmw-009**	**RQLmw-009**	**RQLmw-011**	**RQLmw-011**	**RQLmw-012**	**RQLmw-012**	**RQLmw-012-D**	**RQLmw-013**	**RQLmw-013**	**RQLmw-013-D**	**RQLmw-014**
Sample Date		**5/1/2017**	**12/7/2017**	**5/1/2017**	**5/1/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**5/3/2017**	**12/7/2017**	**12/7/2017**	**5/1/2017**	**12/7/2017**	**12/7/2017**	**4/18/2017**
RVAAP Area		**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**
Monitored Zone	**Selected Comparison Value**	**Sharon**	**Sharon**	**DUP RQLmw-007**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**Sharon**	**DUP**	**Sharon**	**Sharon**	**DUP**	**Sharon**
Explosives																	
1,3-Dinitrobenzene	0.104	0.22 U	0.21 UJ	0.21 U	0.22 U	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	4.3 U	2 U	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	0.22 U	0.21 UJ	0.21 U	0.22 U	0.21 U	0.21 U	0.21 UJ	4.3 U	2 U	NA	NA	NA	NA	NA	NA	0.21 U
2-Nitrotoluene	0.37	0.22 U	0.21 UJ	0.21 U	0.22 U	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U
3-Nitrotoluene	0.17	0.22 UJ	0.21 UJ	0.21 U	1.5	0.21 U	0.21 U	0.21 UJ	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	2 U	0.99 U	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	2.2 U	2.1 U	2.1 U	2.2 U	2.1 U	2.1 U	2.1 UJ	NA	NA	NA	NA	NA	NA	NA	NA	2.1 U
PETN	3.9	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 UJ	NA	NA	NA	NA	NA	NA	NA	NA	1.3 U
RDX	0.774	0.13 U	0.13 U	0.13 U	0.25	0.13 U	0.13 U	0.13 UJ	NA	NA	NA	NA	NA	NA	NA	NA	0.28 J
Pesticides and PCBs																	
Aldrin	0.005	0.021 U	0.022 U	NA	0.021 U	0.022 U	0.021 U	0.022 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	0.019 U	0.02 U	NA	0.019 U	0.02 U	0.019 U	0.02 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1221	0.0047	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1232	0.0047	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1242	0.213	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1248	0.0078	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1254	0.021	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1260	0.213	0.098 U	0.1 U	0.11 U	0.096 U	0.097 U	0.095 U	0.1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	0.004	0.016 U	0.017 U	NA	0.016 U	0.016 U	0.016 U	0.017 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																	
Antimony	0.78	6 U	6 U	6 U	6 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Antimony, Dissolved	0.78	6 U	6 U	6 U	6 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	0.052	5.9	30	5.3	35	44	1.1 J	2.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	2.5	0.3 U	0.3 U	0.3 U	0.27 J	0.3 U	0.3 U	0.3 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	0.92	0.37 J	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium, Dissolved	0.92	0.37 J	1 U	1 U	1 U	1 U	1 U	1 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, hexavalent	0.035	NA	NA	NA	NA	NA	NA	NA	4 U	20 U	4 UJ	20 U	NA	4 U	20 U	NA	4 UJ
Cobalt	0.6	6.7	5	7.1	3	12	0.77 J	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cr (VI)	0.035	NA	NA	NA	NA	NA	NA	NA	4 U	20 U	4 UJ	20 U	NA	4 U	20 U	NA	4 UJ
Hexavalent chromium	0.035	NA	NA	NA	NA	NA	NA	NA	4 U	20 U	4 UJ	20 U	NA	4 U	20 U	NA	4 UJ
Manganese	43	380 J	1200 J	390	520	540 UJ	330	480 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.063	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury, Dissolved	0.063	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	10	2 U	2 U	2 U	2 U	2 U	2 U	2 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.02	0.14 J	0.22 J	0.13 J	0.11 J	0.11 J	0.098 J	0.14 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium, Dissolved	0.02	0.14 J	0.22 J	0.13 J	0.11 J	0.11 J	0.098 J	0.14 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide	0.15	10 U	10 U	NA	10 U	10 U	5 U	10 U	NA	NA	5 U	10 U	NA	NA	NA	NA	NA
Vanadium	8.6	2 U	2 UJ	2 U	2 U	2 J	2 U	2 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		**RQLmw-014**	**RQLmw-016**	**RQLmw-016**	**SCFmw-004**	**SCFmw-006**	**SCFmw-006**	**SCFmw-006**	**SCFmw-006**	**WBGmw-006**	**WBGmw-006**	**WBGmw-009**	**WBGmw-009**	**WBGmw-015**	**WBGmw-020**	**WBGmw-020**	**WBGmw-021**	**WBGmw-021**
Sample Date		**12/7/2017**	**5/1/2017**	**12/7/2017**	**4/18/2017**	**4/18/2017**	**4/19/2017**	**4/28/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**
RVAAP Area		**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**
Monitored Zone	**Selected Comparison Value**	**Sharon**	**Sharon**	**Sharon**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**
Volatile Organic Compounds																		
1,1,2,2-Tetrachloroethane	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA
1,1,2-Trichloroethane	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA
1,2-Dibromoethane	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA
2-Hexanone	3.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4 U	NA	NA	NA	NA
Bromodichloromethane	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA
Bromomethane	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8 U	NA	NA	NA	NA
Chloroform	0.207	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.4 U	NA	NA	NA	NA
Vinylchloride	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA	NA	NA
Semi-Volatile Organic Compounds																		
1,2,4-Trichlorobenzene	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,6-Dinitro-2-methylphenol	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	3.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benz(a)anthracene	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Chloroethyl)ether	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	6	NA	NA	NA	1.9 U	NA	NA	NA	NA	1.9 U	4.2 U	1.9 U	4.2 U	NA	2 U	4.6 U	2 U	4.2 UJ
Butyl benzyl phthalate	16	NA	NA	NA	1.9 U	NA	NA	NA	NA	1.9 U	4.2 U	1.9 U	4.2 U	NA	2 U	4.6 U	2 U	4.2 UJ
Dibenz(a,h)anthracene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	0.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-N-Butyl phthalate	90	NA	NA	NA	4.2 U	NA	NA	NA	NA	4.3 U	1.9 U	4.2 U	1.9 U	NA	4.5 U	2.1 U	4.3 U	1.9 UJ
Di-N-Octyl phthalate	20	NA	NA	NA	0.96 U	NA	NA	NA	NA	0.97 U	4.2 U	0.96 U	4.2 U	NA	1 U	4.6 U	0.98 U	4.2 UJ
Hexachlorobenzene	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
N-Nitroso-di-N-propylamine	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Well Number		RQLmw-014	RQLmw-016	RQLmw-016	SCFmw-004	SCFmw-006	SCFmw-006	SCFmw-006	SCFmw-006	WBGmw-006	WBGmw-006	WBGmw-009	WBGmw-009	WBGmw-015	WBGmw-020	WBGmw-020	WBGmw-021	WBGmw-021
Sample Date		**12/7/2017**	**5/1/2017**	**12/7/2017**	**4/18/2017**	**4/18/2017**	**4/19/2017**	**4/28/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**4/20/2017**	**12/5/2017**	**4/20/2017**	**12/5/2017**
RVAAP Area		**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Ramsdell Quarry Landfill**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Sharon Conglomerate**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**	**Winklepeck Burning Grounds**
Monitored Zone	**Selected Comparison Value**	**Sharon**	**Sharon**	**Sharon**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Sharon Cong.**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Unconsolidated**	**Sharon**	**Sharon**	**Sharon**	**Sharon**
Explosives																		
1,3-Dinitrobenzene	0.104	0.2 U	NA	NA	0.21 UJ	NA	NA	NA	NA	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	0.22 UJ	0.21 U	0.22 UJ
2,4-Dinitrotoluene	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	0.122	0.2 U	NA	NA	0.21 UJ	NA	NA	NA	NA	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	0.22 UJ	0.21 U	0.22 UJ
2-Nitrotoluene	0.37	0.2 U	NA	NA	0.21 UJ	NA	NA	NA	NA	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	0.22 UJ	0.21 U	0.22 UJ
3-Nitrotoluene	0.17	0.2 U	NA	NA	0.21 UJ	NA	NA	NA	NA	0.21 U	0.2 UJ	0.21 U	0.22 UJ	0.21 U	0.21 U	0.22 UJ	0.21 U	0.22 UJ
Nitrobenzene	0.521	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitroglycerin	5.01	2 U	NA	NA	2.1 UJ	NA	NA	NA	NA	2.1 U	2 UJ	2.1 U	2.2 UJ	2.1 U	2.1 U	2.2 UJ	2.1 U	2.2 UJ
PETN	3.9	1.2 U	NA	NA	1.2 UJ	NA	NA	NA	NA	1.2 U	1.2 J	1.2 U	1.3 UJ	1.3 U	1.3 U	1.3 UJ	1.2 U	1.3 UJ
RDX	0.774	0.12 U	NA	NA	0.12 UJ	NA	NA	NA	NA	11	1.2 UJ	2.1	11 J	0.13 U	0.13 U	0.068 J	0.12 U	0.13 UJ
Pesticides and PCBs																		
Aldrin	0.005	NA	NA	NA	0.021 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alpha-BHC	0.014	NA	NA	NA	0.019 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor-1016	0.14	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1221	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1232	0.0047	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1242	0.213	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1248	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1254	0.021	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Aroclor-1260	0.213	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	NA	NA	NA	NA	0.1 U	NA	0.096 U	NA
Dieldrin	0.004	NA	NA	NA	0.016 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																		
Antimony	0.78	NA	NA	NA	1 U	1 U	NA	NA	1 U	0.71 J	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Antimony, Dissolved	0.78	NA	NA	NA	1 U	1 U	NA	NA	1 U	0.71 J	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Arsenic	0.052	NA	NA	NA	1 U	10	NA	NA	12 J	1 U	0.33 J	1 U	1 UJ	NA	1.2 J	1.4 J	6	15 J
Beryllium	2.5	NA	NA	NA	0.3 U	0.3 U	NA	NA	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	NA	0.3 U	0.3 U	0.3 U	0.3 U
Cadmium	0.92	NA	NA	NA	1 U	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Cadmium, Dissolved	0.92	NA	NA	NA	1 U	1 U	NA	NA	1 U	1 U	1 U	1 U	1 U	NA	1 U	1 U	1 U	1 U
Chromium, hexavalent	0.035	20 U	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	0.6	NA	NA	NA	0.2 U	0.12 J	NA	NA	0.2 UJ	0.28 J	2.6 J	0.13 J	0.2 UJ	NA	0.36 J	0.23 UJ	0.24 J	0.2 UJ
Cr (VI)	0.035	20 U	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexavalent chromium	0.035	20 U	NA	NA	NA	NA	4 U	4 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	43	NA	NA	NA	800	150	NA	NA	180	94 J	1000	23 J	220	NA	240 J	310	300 J	520
Mercury	0.063	NA	NA	NA	0.08 U	0.08 U	NA	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U	0.08 U	0.08 U	0.08 U
Mercury, Dissolved	0.063	NA	NA	NA	0.08 U	0.08 U	NA	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	0.08 U	0.08 U	0.08 U	0.08 U
Selenium	10	NA	NA	NA	2 U	2 U	NA	NA	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U
Thallium	0.02	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U
Thallium, Dissolved	0.02	NA	NA	NA	0.2 U	0.2 U	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.2 U	0.2 U	0.2 U	0.2 U
Total Cyanide	0.15	NA	10 U	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5 U	NA	NA	NA	NA
Vanadium	8.6	NA	NA	NA	2 U	2 U	NA	NA	2 U	2 U	2 U	2 U	2 U	NA	2 U	2 U	2 U	2 U

APPENDIX A
REPORTING LIMITS IN EXCESS OF SCREENING CRITERIA
CAMP RAVENNA, OH

Notes and Abbreviations:
µg/L - Micrograms per liter
J - Estimated value.
Q - One or more quality control criteria failed.
R - Rejected during data validation.
U - Constituent not detected. Reporting limit presented.
NA - Constituent not analyzed.
Highlighted concentrations indicate the constituent detection limit is equal to or greater than the screening criteria.

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APPENDIX B

LABORATORY DATA AND VALIDATION REPORTS

(Provided as separate files on Compact Disc)

THIS APPENDIX CONTAINS 39,796 PAGES OF DATA VALIDATION AND ANALYTICAL REPORTS, AND IS NOT 508 COMPLIANT

January 2017

DVR_280-92979-1
DVR_280-93104-1
J92979-1 Std_Tal_L4 Fnl Rpt_Pt 1
J92979-1 Std_Tal_L4 Fnl Rpt_Pt 2
J92979-1 UDS Level 2 Fnl Rpt
J93104-1 Std_Tal_L4 Fnl Rpt
J93104-1 UDS Level 2 Fnl Rpt
J93104-2 UDS Level 2 Fnl Rpt

December 2017

DVR_240-88739-1
DVR_240-88785-1
DVR_240-88812-1
DVR_240-88815-1
DVR_240-88885-1
DVR_240-88967-1
DVR_240-89062-1
DVR_240-89104-1
DVR_280-104206-1
DVR_280-104281-1
DVR_280-104281-2
DVR_280-104320-1
J88739-1 Std_Tal_L4 Fnl Rpt
J88739-1 UDS Level 2 Fnl Rpt
J88785-1 Std_Tal_L4 Fnl Rpt
J88785-1 UDS Level 2 Fnl Rpt
J88812-1 Std_Tal_L4 Fnl Rpt
J88812-1 UDS Level 2 Fnl Rpt
J88815-1 Std_Tal_L4 Fnl Rpt
J88815-1 UDS Level 2 Fnl Rpt
J88885-1 Std_Tal_L4 Fnl Rpt
J88885-1 UDS Level 2 Fnl Rpt
J88967-1 Std_Tal_L4 Fnl Rpt
J88967-1 UDS Level 2 Fnl Rpt
J89062-1 Std_Tal_L4 Fnl Rpt
J89062-1 UDS Level 2 Fnl Rpt
J89104-1 Std_Tal_L4 Fnl Rpt
J89104-1 UDS Level 2 Fnl Rpt
J89105-1 UDS Level 2 Fnl Rpt
J104206-1 Std_Tal_L4 Fnl Rpt
J104206-1 UDS Level 2 Fnl Rpt
J104281-1 Std_Tal_L4 Fnl Rpt_Pt 1
J104281-1 Std_Tal_L4 Fnl Rpt_Pt 2
J104281-1 UDS Level 2 Fnl Rpt
J104281-2 Std_Tal_L4 Fnl Rpt
J104281-2 UDS Level 2 Fnl Rpt
J104320-1 Std_Tal_L4 Fnl Rpt_Pt 1
J104320-1 Std_Tal_L4 Fnl Rpt_Pt 2
J104320-1 Std_Tal_L4 Fnl Rpt_Pt 3
J104320-1 UDS Level 2 Fnl Rpt
J104384-1 Std_Tal_L4 Rev(l) Fnl Rpt_Pt 1
J104384-1 Std_Tal_L4 Rev(l) Fnl Rpt_Pt 2
J104384-1 Std_Tal_L4 Rev(l) Fnl Rpt_Pt 3
J104384-1 Std_Tal_L4 Rev(l) Fnl Rpt_Pt 4
J104384-1 UDS Level 2 Fnl Rpt
J104384-2 Std_Tal_L4 Fnl Rpt
J104384-2 UDS Level 2 Fnl Rpt
J104483-1 Std_Tal_L4 Fnl Rpt_Pt 1
J104483-1 Std_Tal_L4 Fnl Rpt_Pt 2
J104483-1 Std_Tal_L4 Fnl Rpt_Pt 3
J104483-1 Std_Tal_L4 Fnl Rpt_Pt 4
J104483-1 UDS Level 2 Fnl Rpt
J104483-2 Std_Tal_L4 Fnl Rpt
J104483-2 UDS Level 2 Fnl Rpt
J104552-1 Std_Tal_L4 Fnl Rpt_Pt 1
J104552-1 Std_Tal_L4 Fnl Rpt_Pt 2
J104552-1 Std_Tal_L4 Fnl Rpt_Pt 3
J104552-1 UDS Level 2 Fnl Rpt
J104552-2 Std_Tal_L4 Fnl Rpt
J104552-2 UDS Level 2 Fnl Rpt

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APPENDIX C

TIME-TREND GRAPHS

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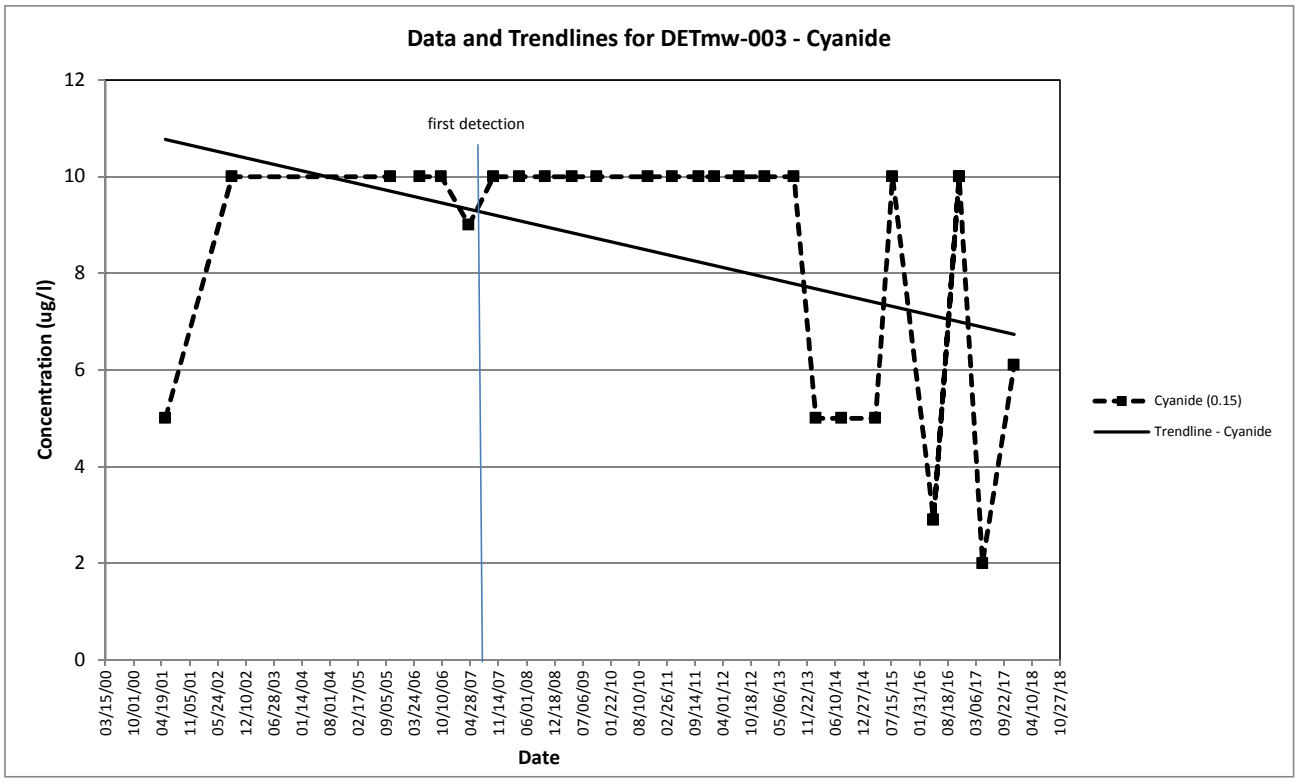
Appendix C
Trend Graphs



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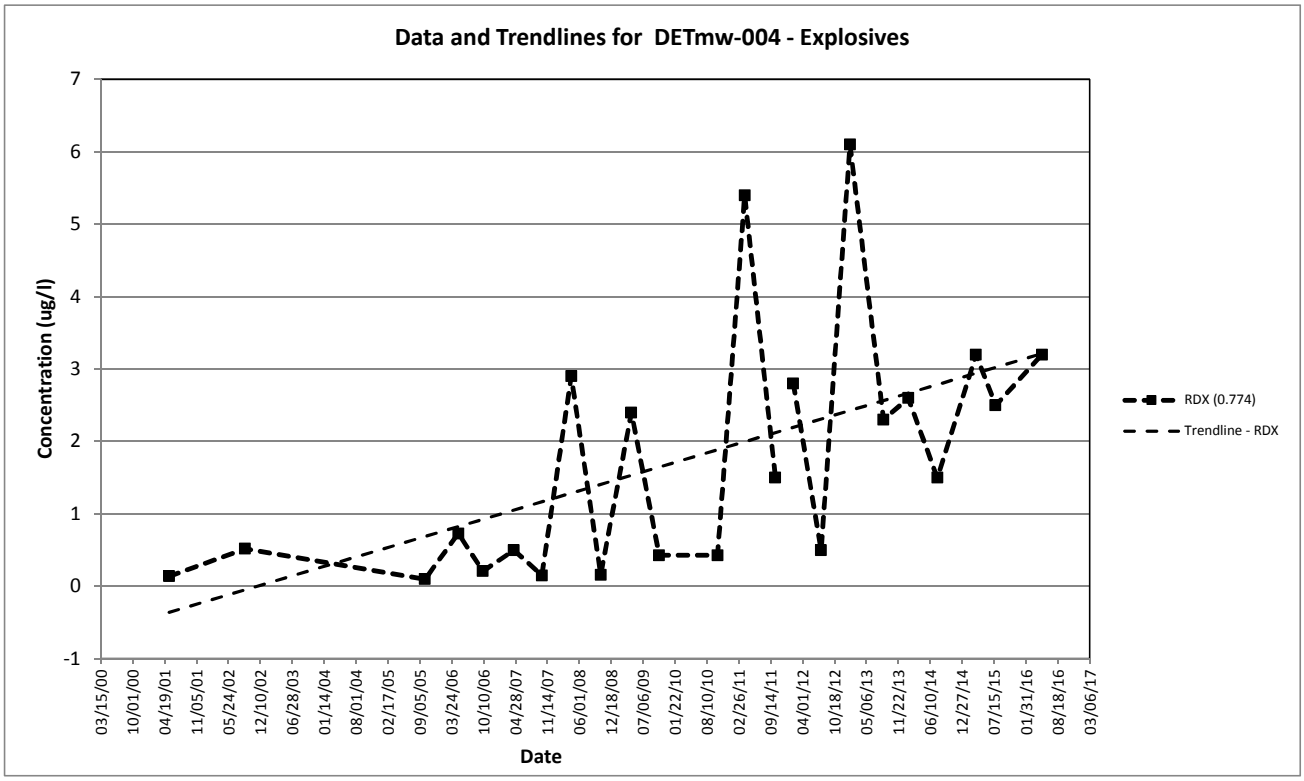

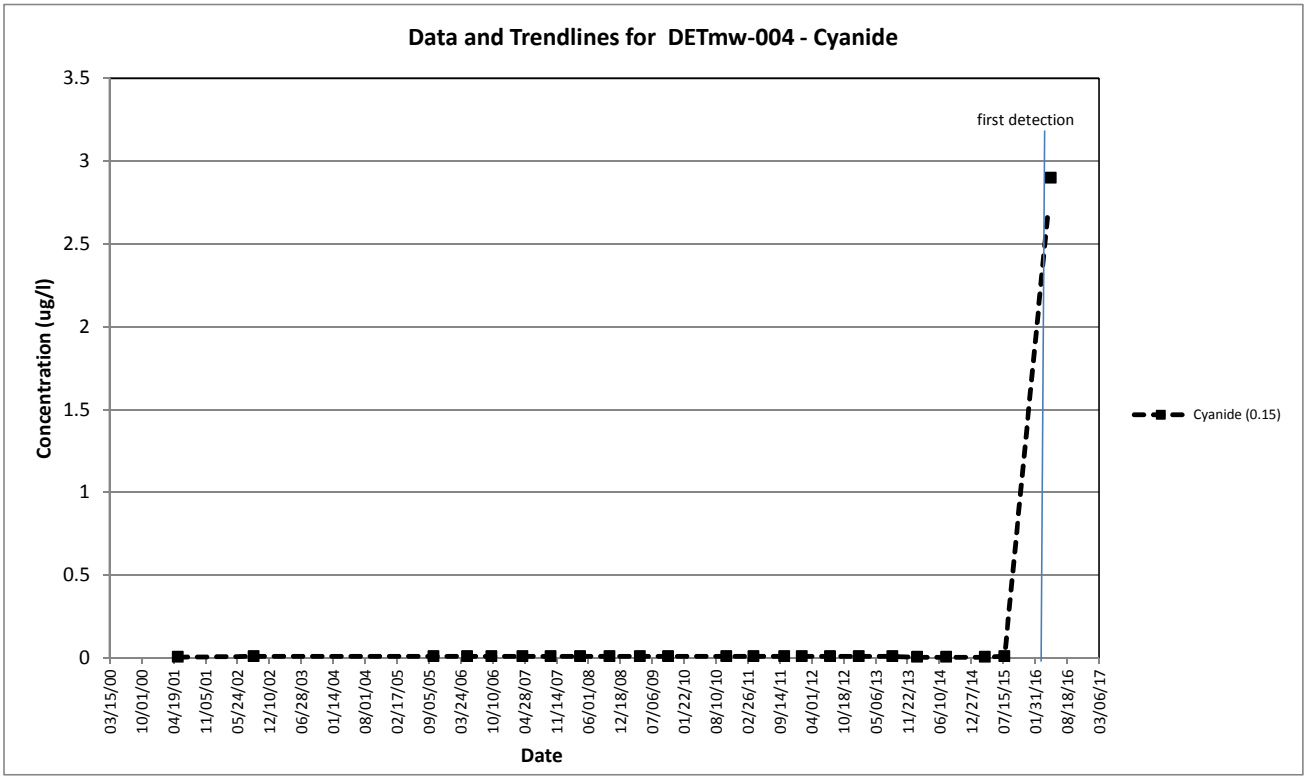

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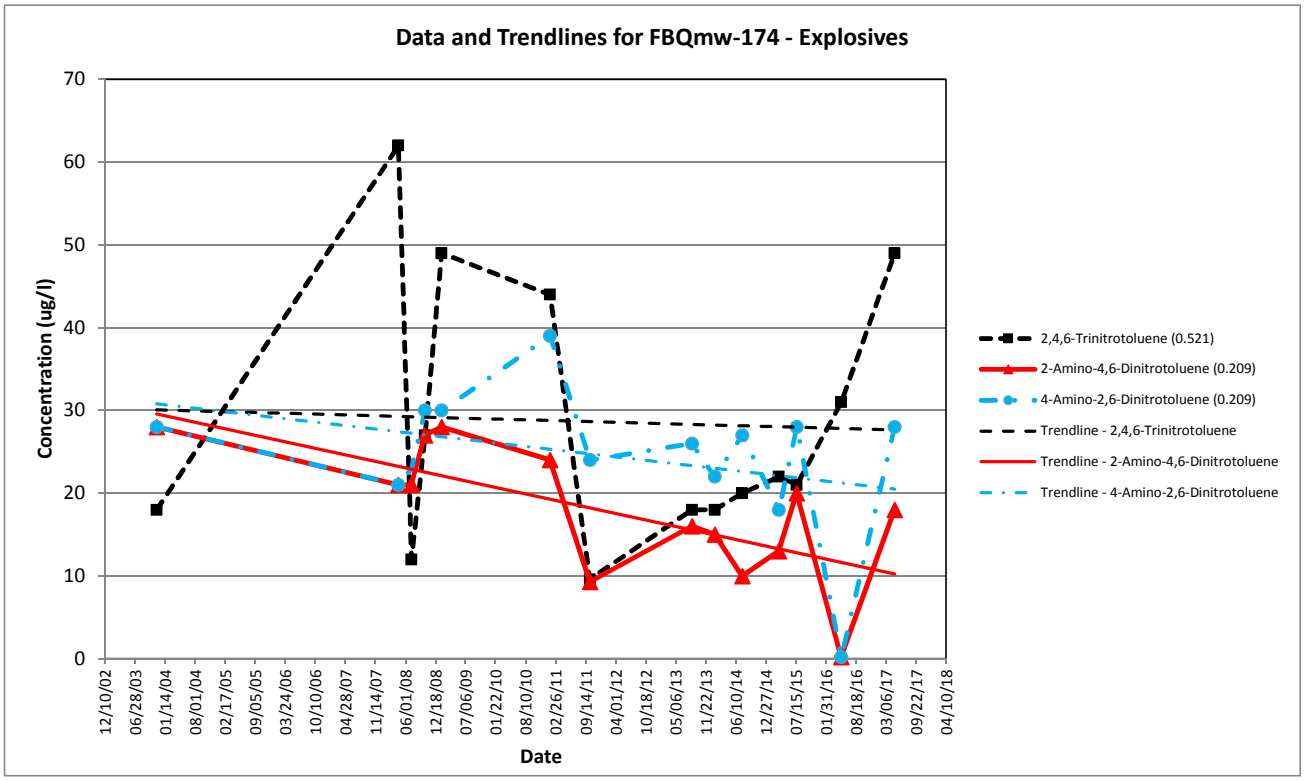
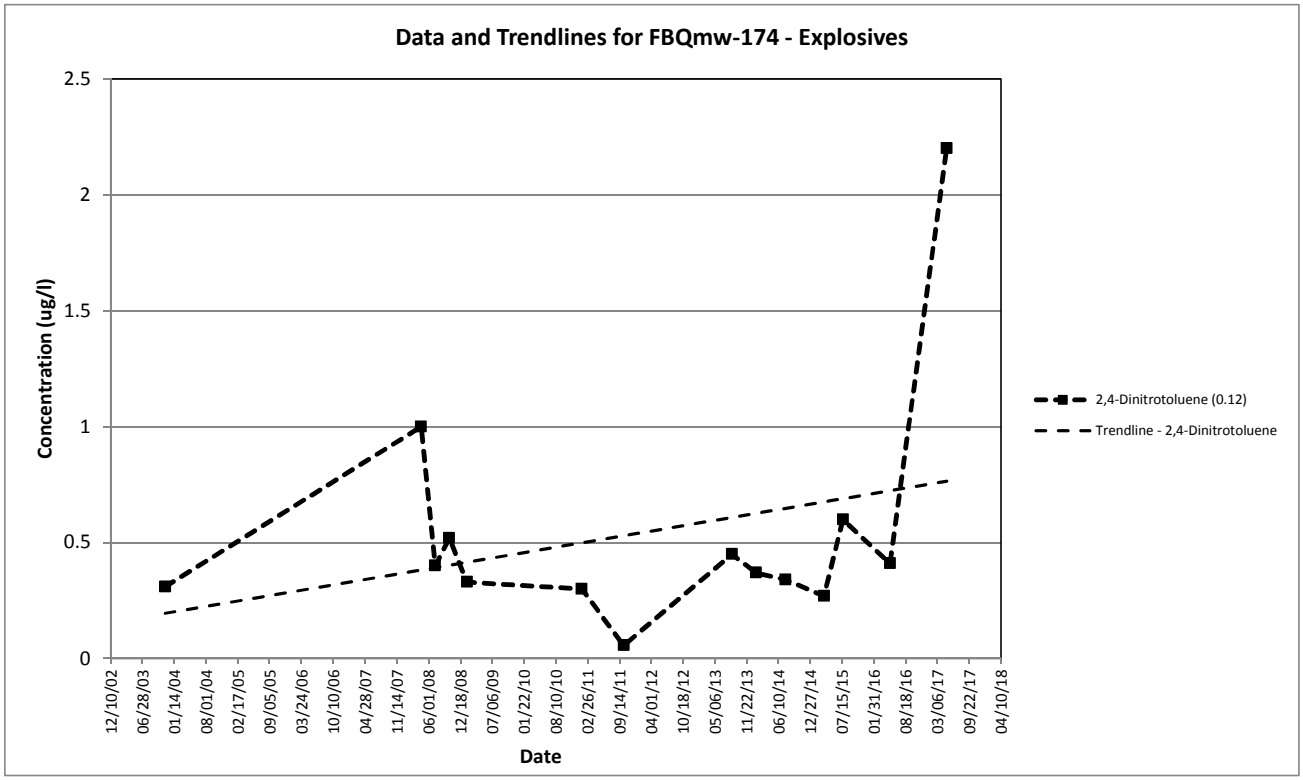
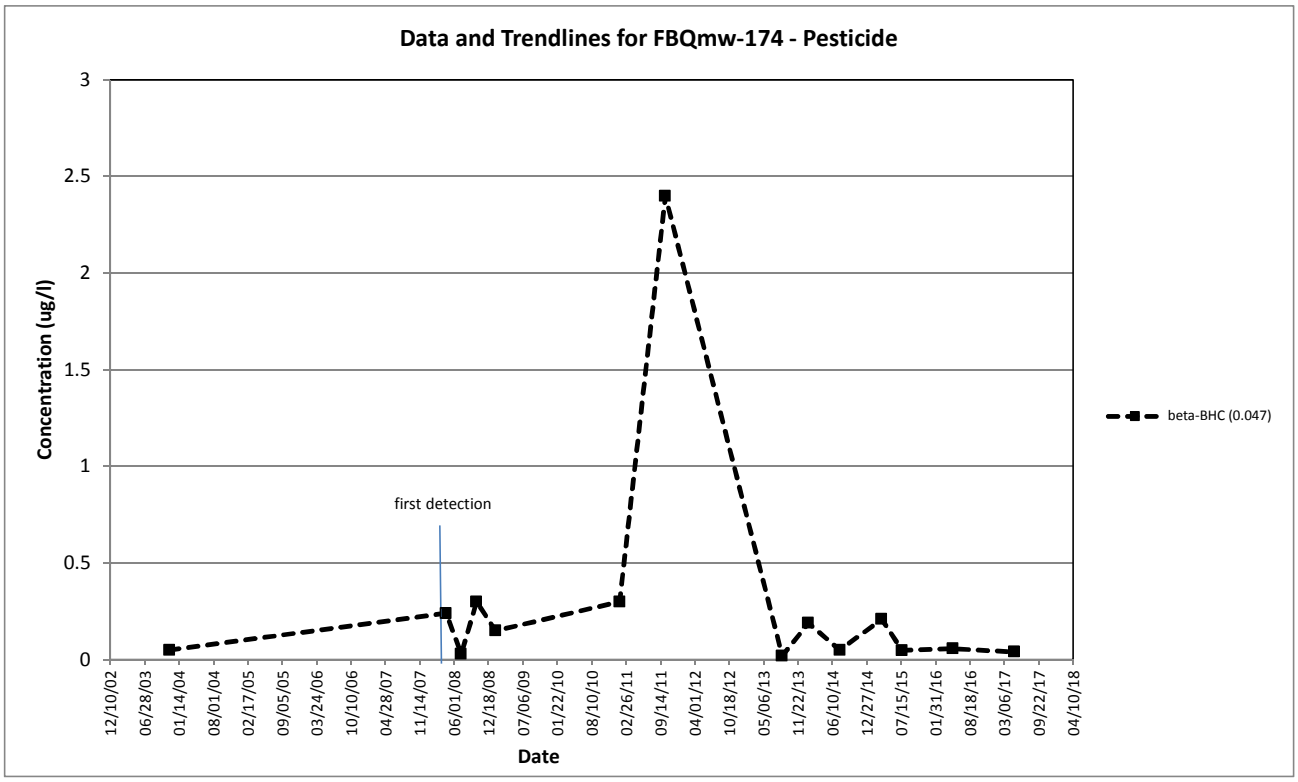




Appendix C
Trend Graphs



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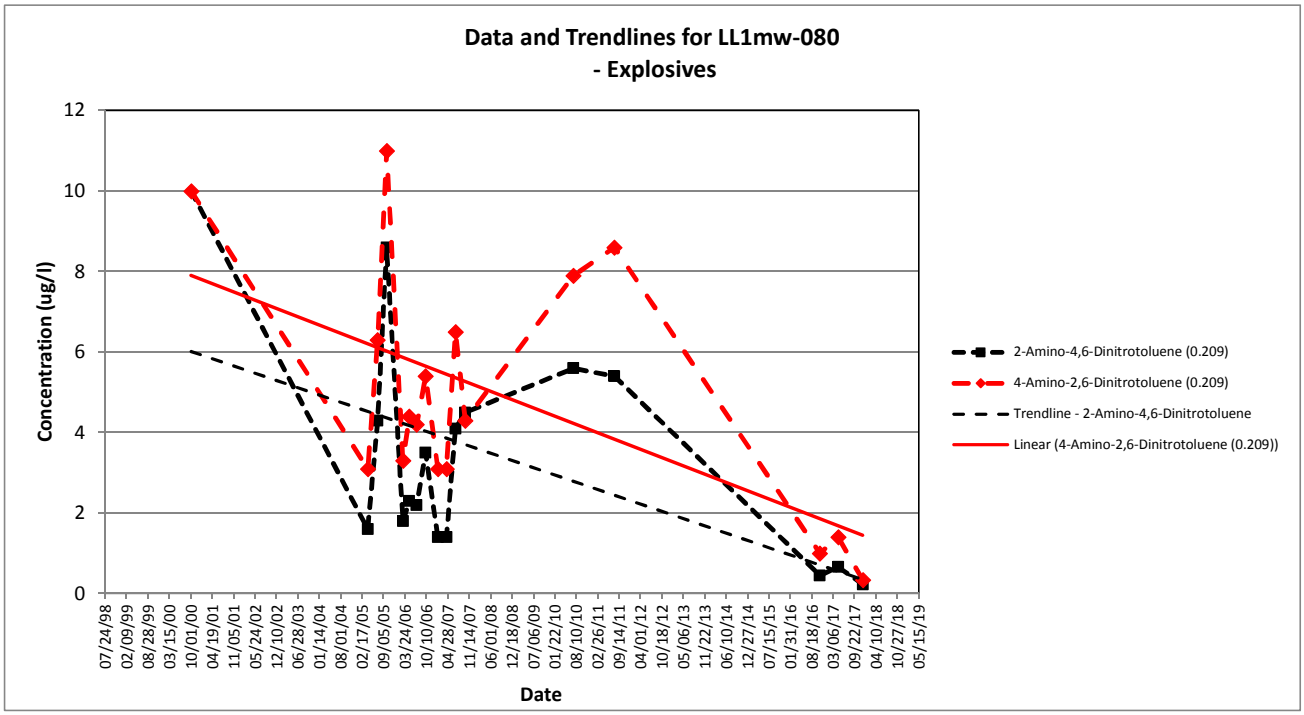

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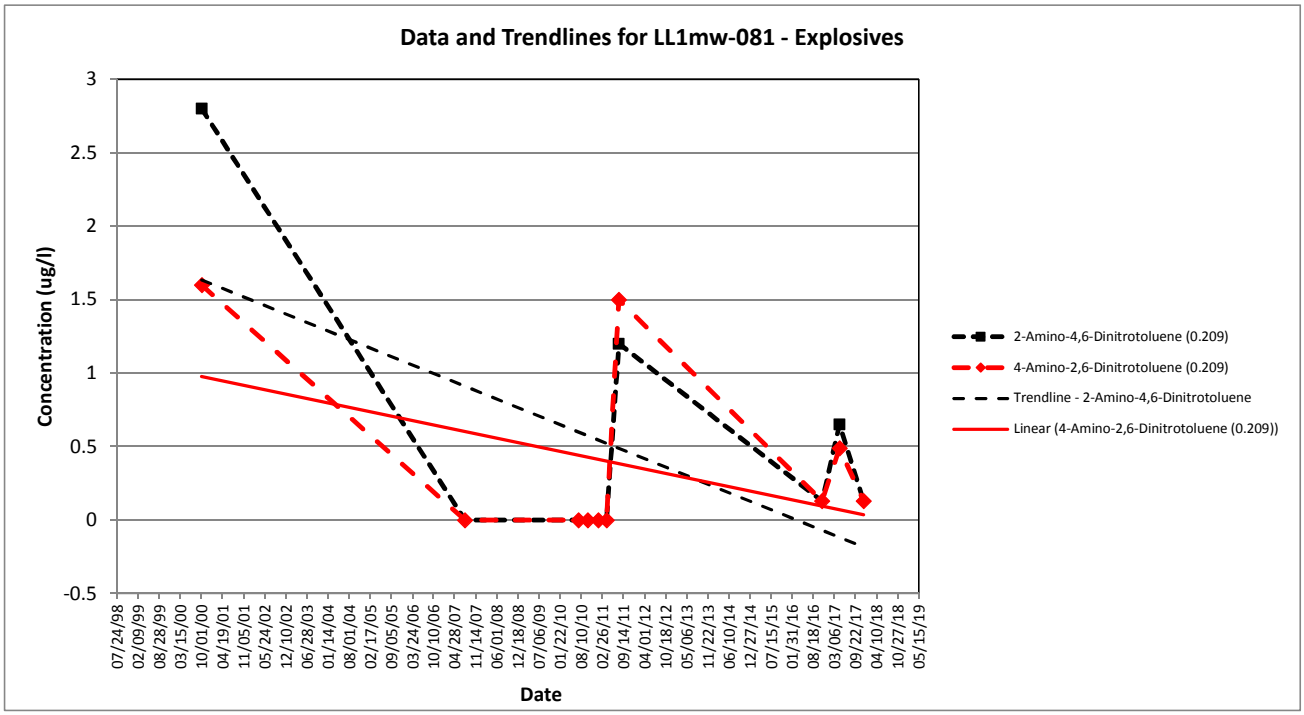

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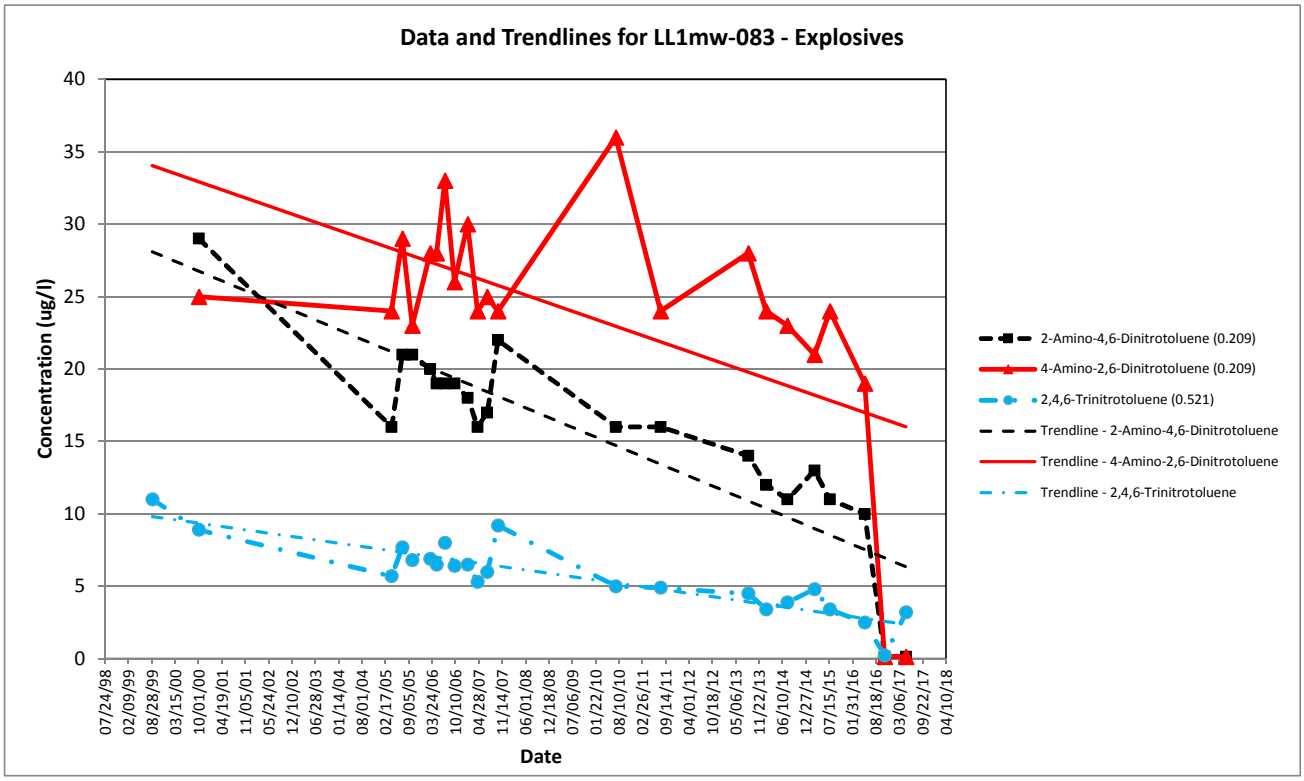

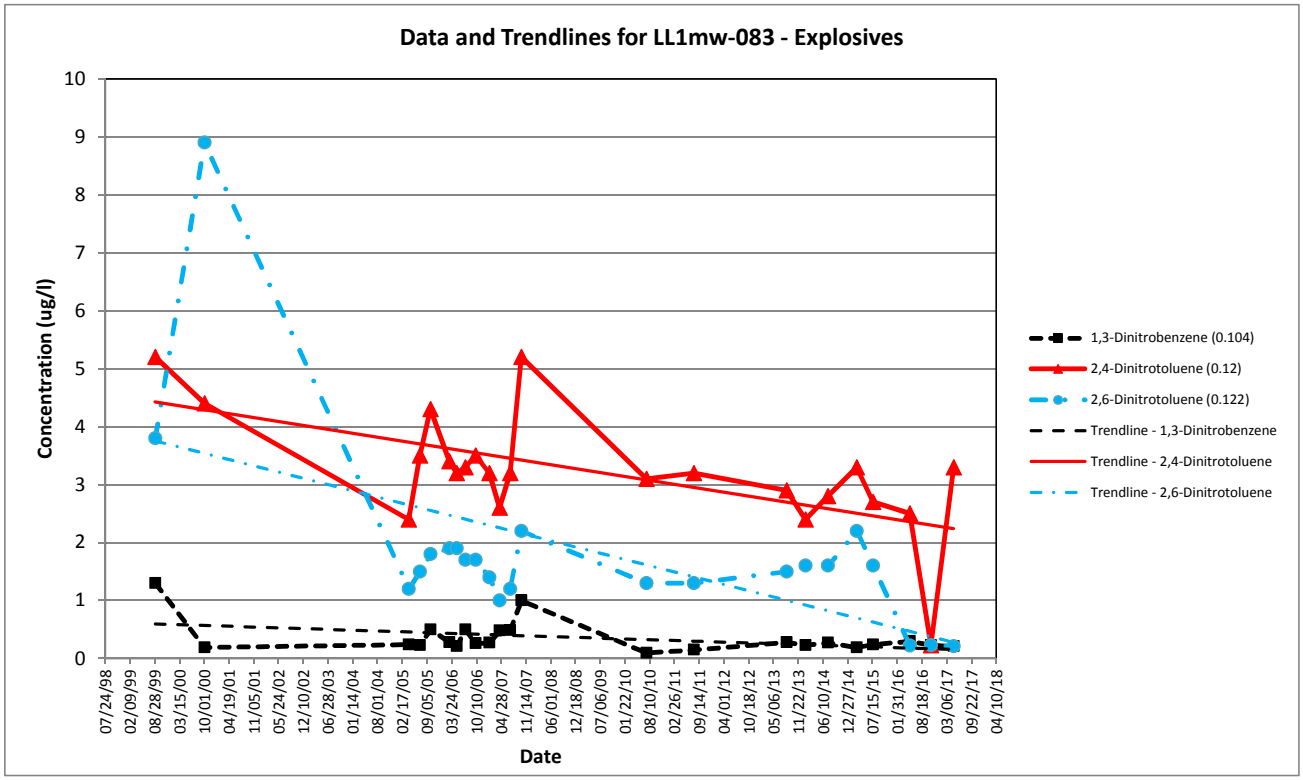

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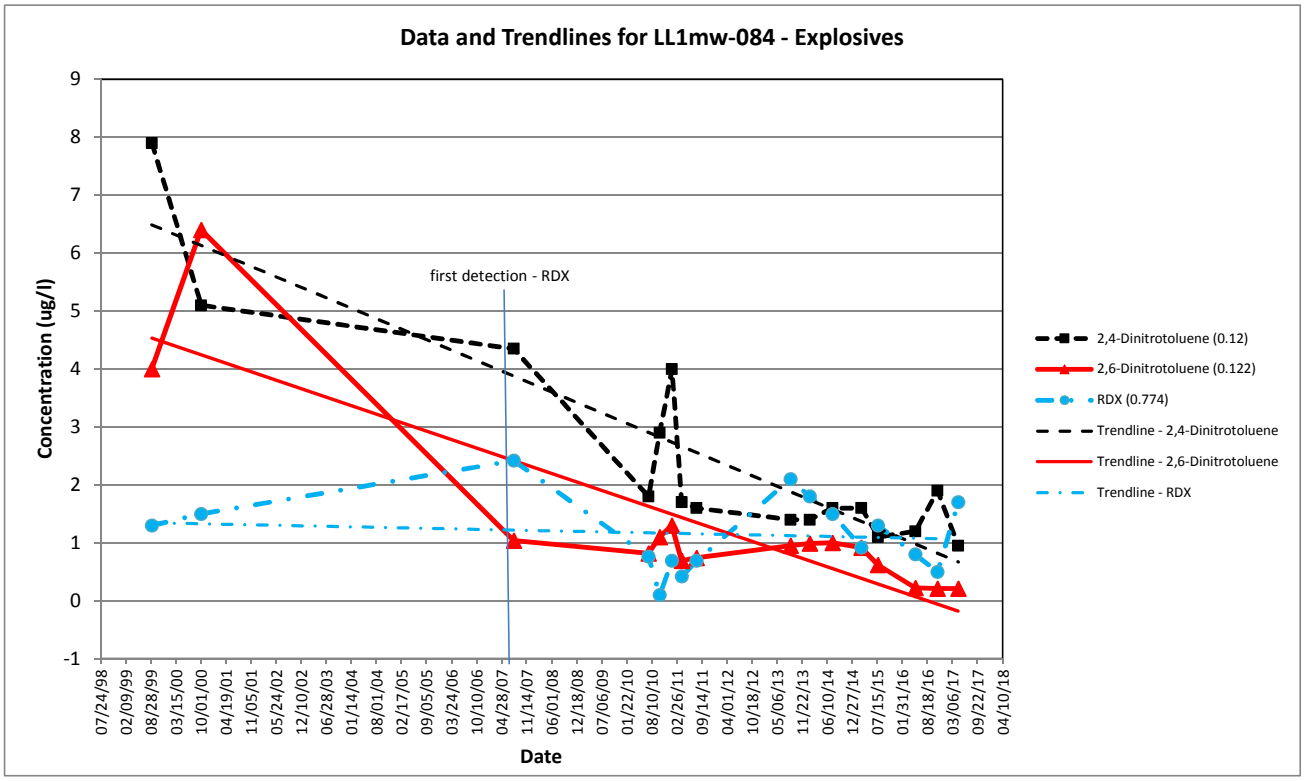

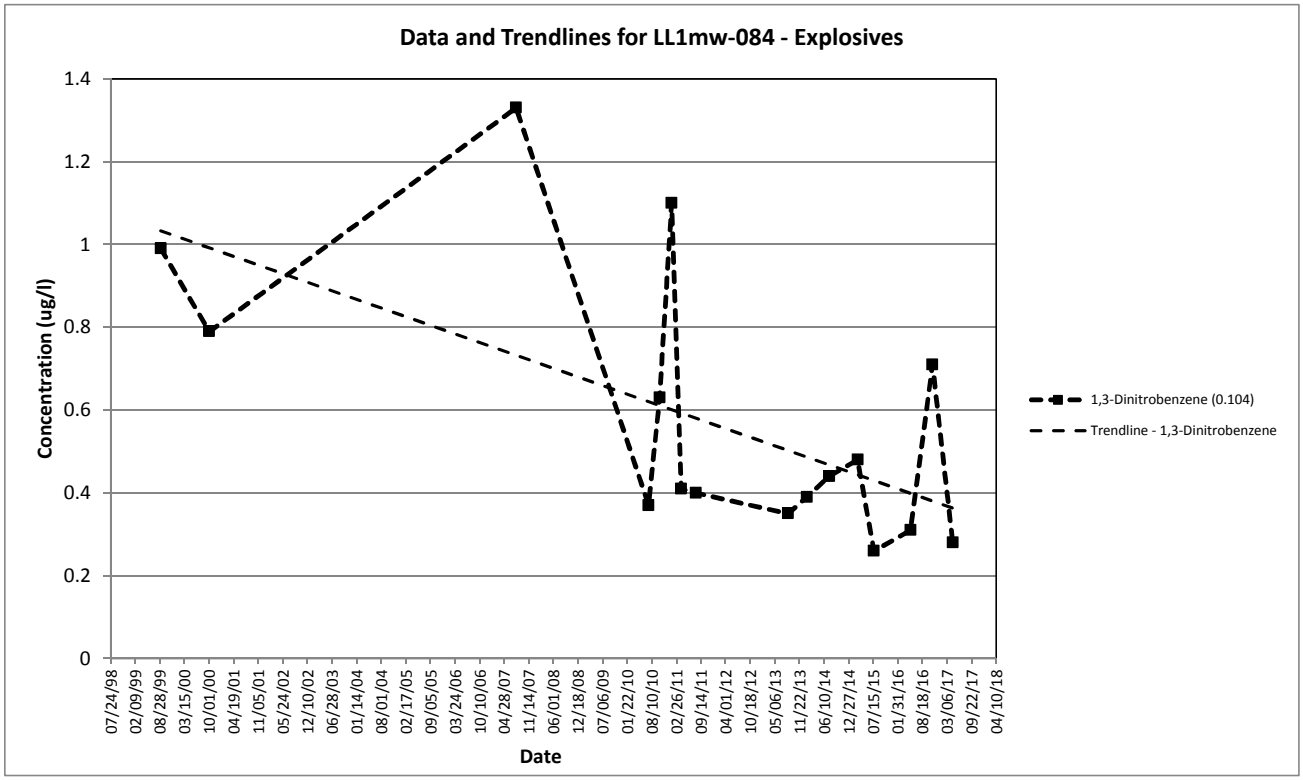

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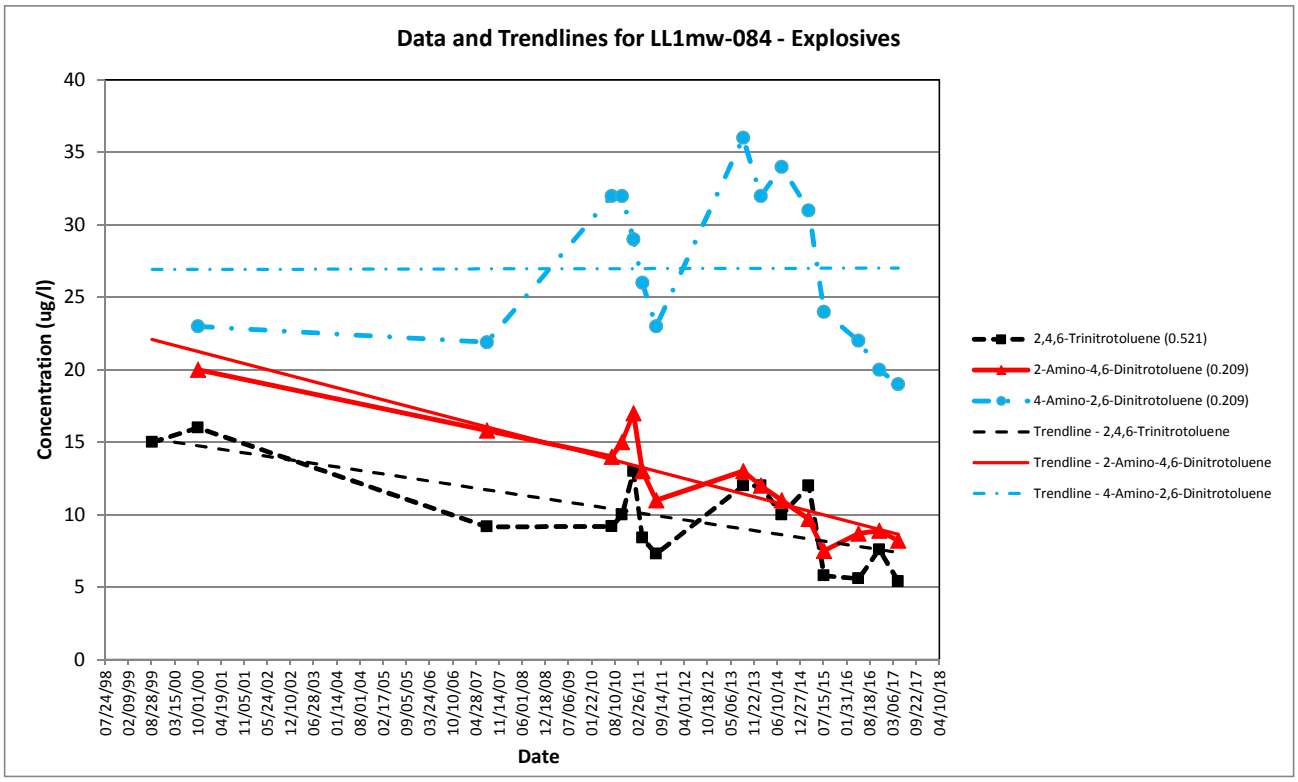

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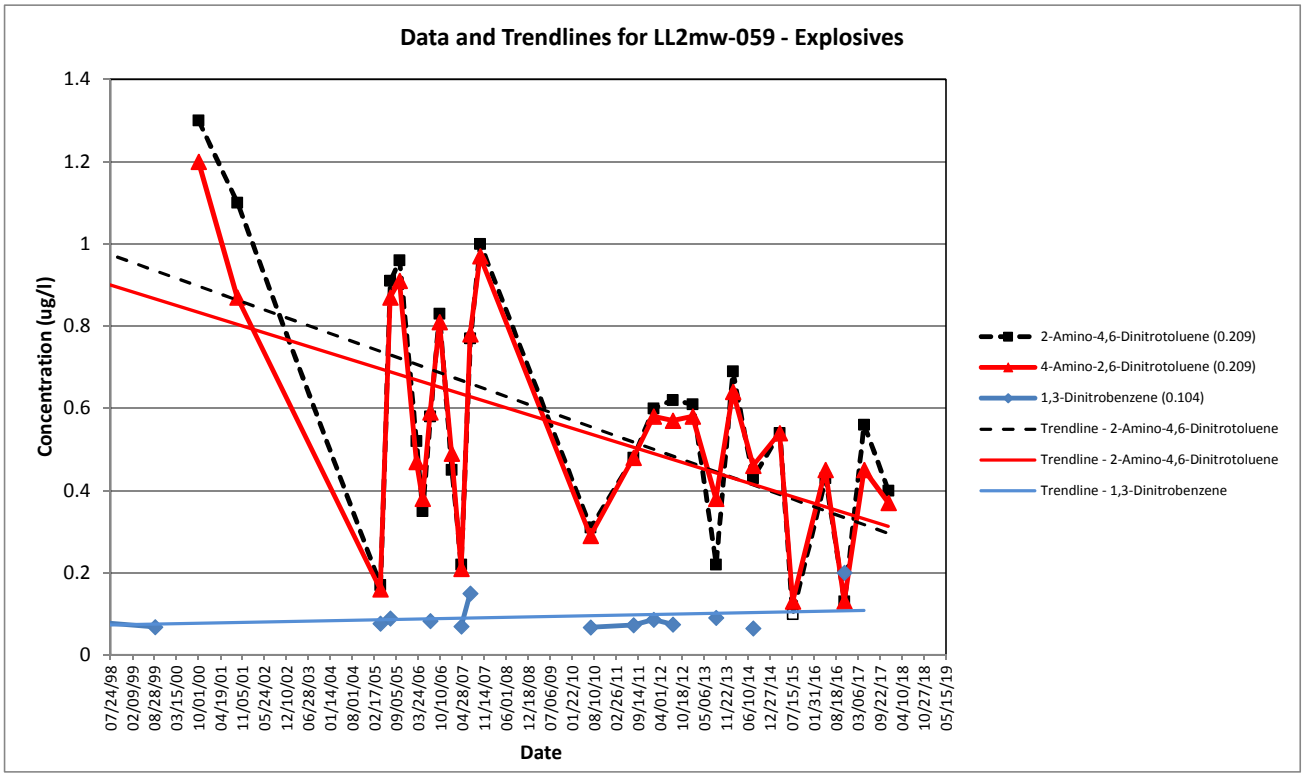

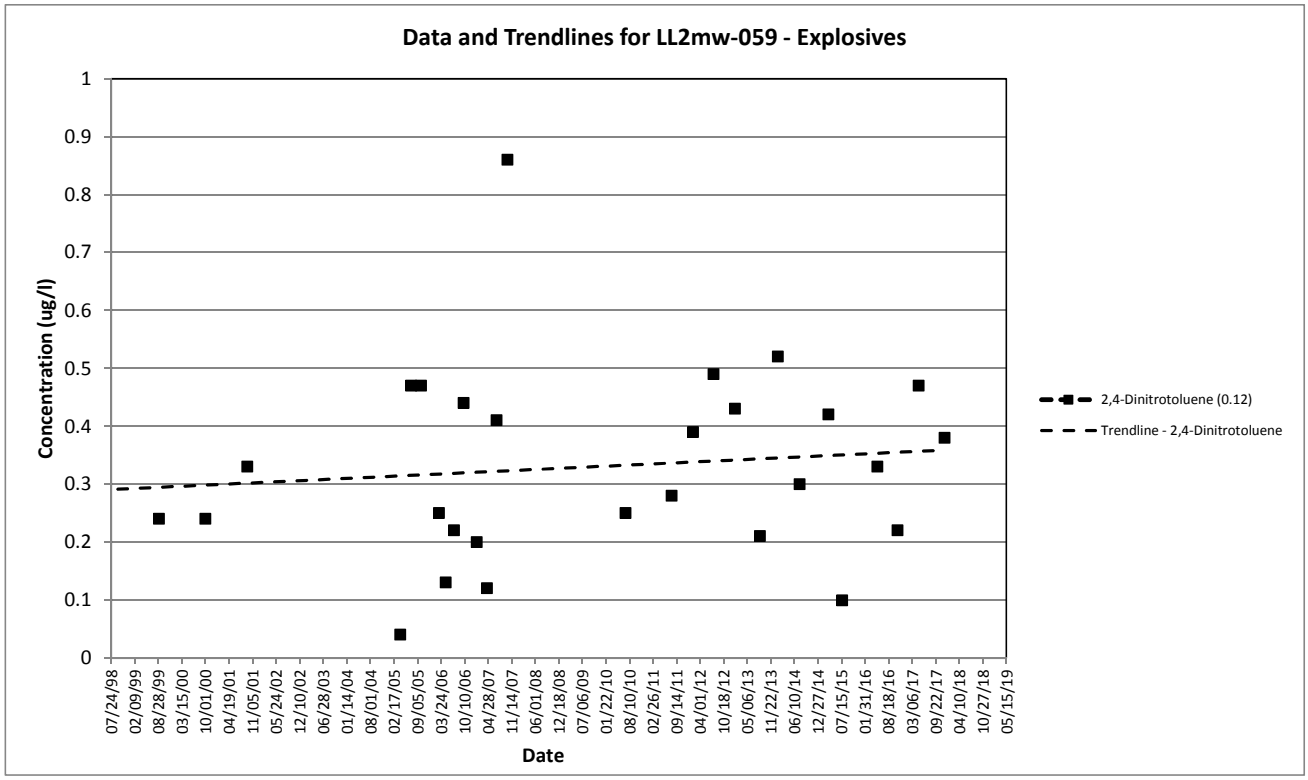

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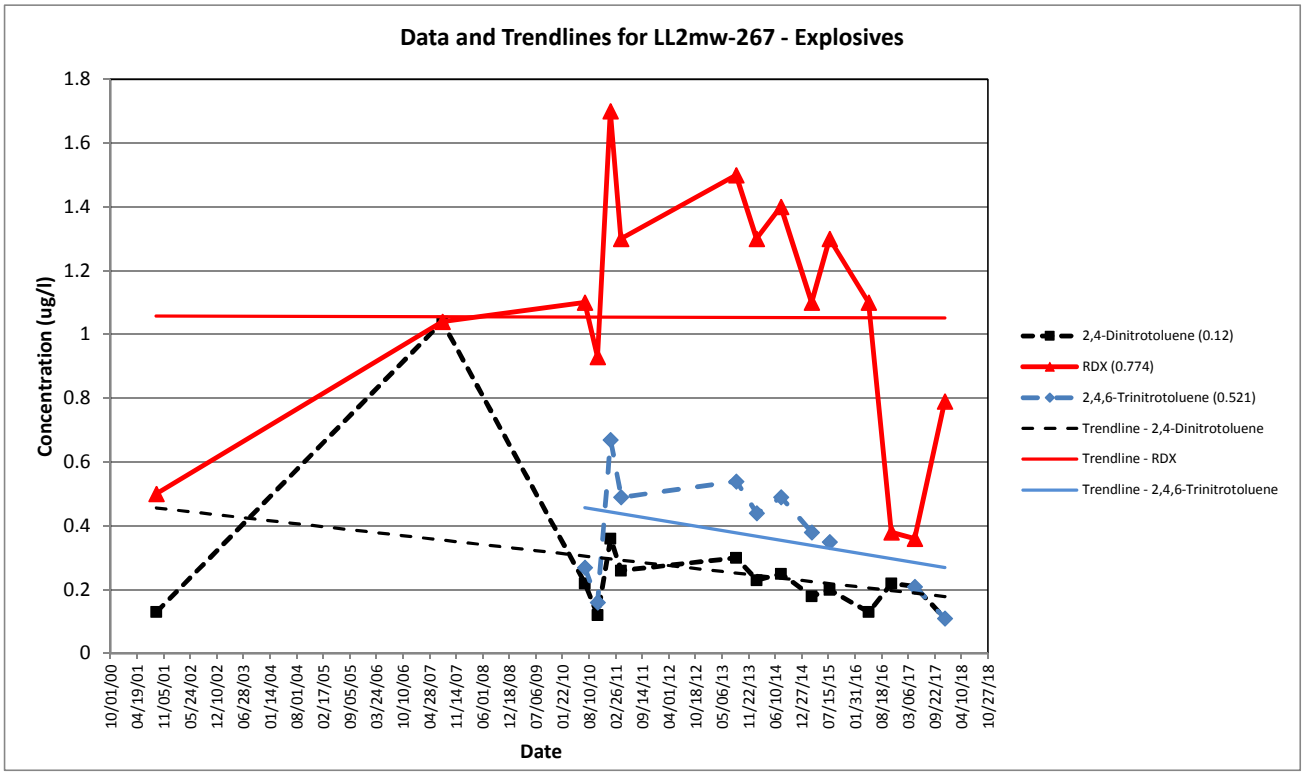

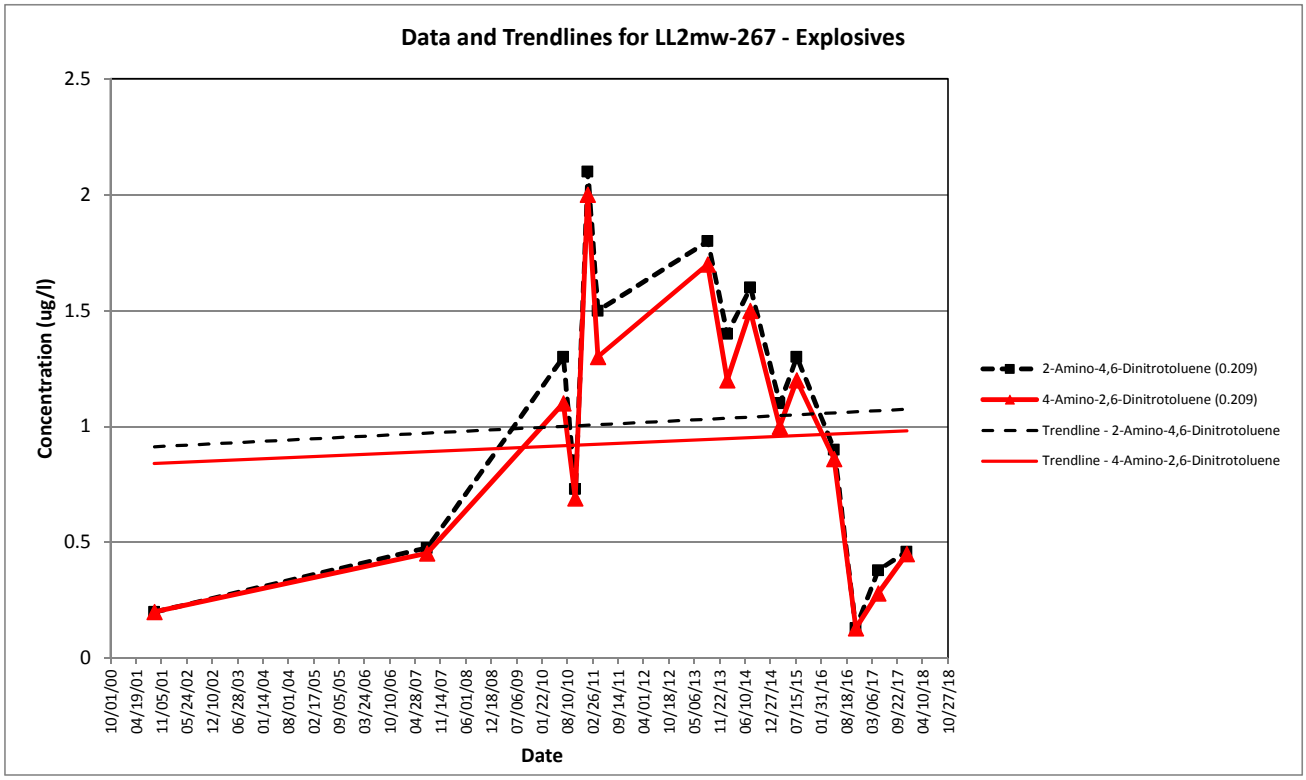

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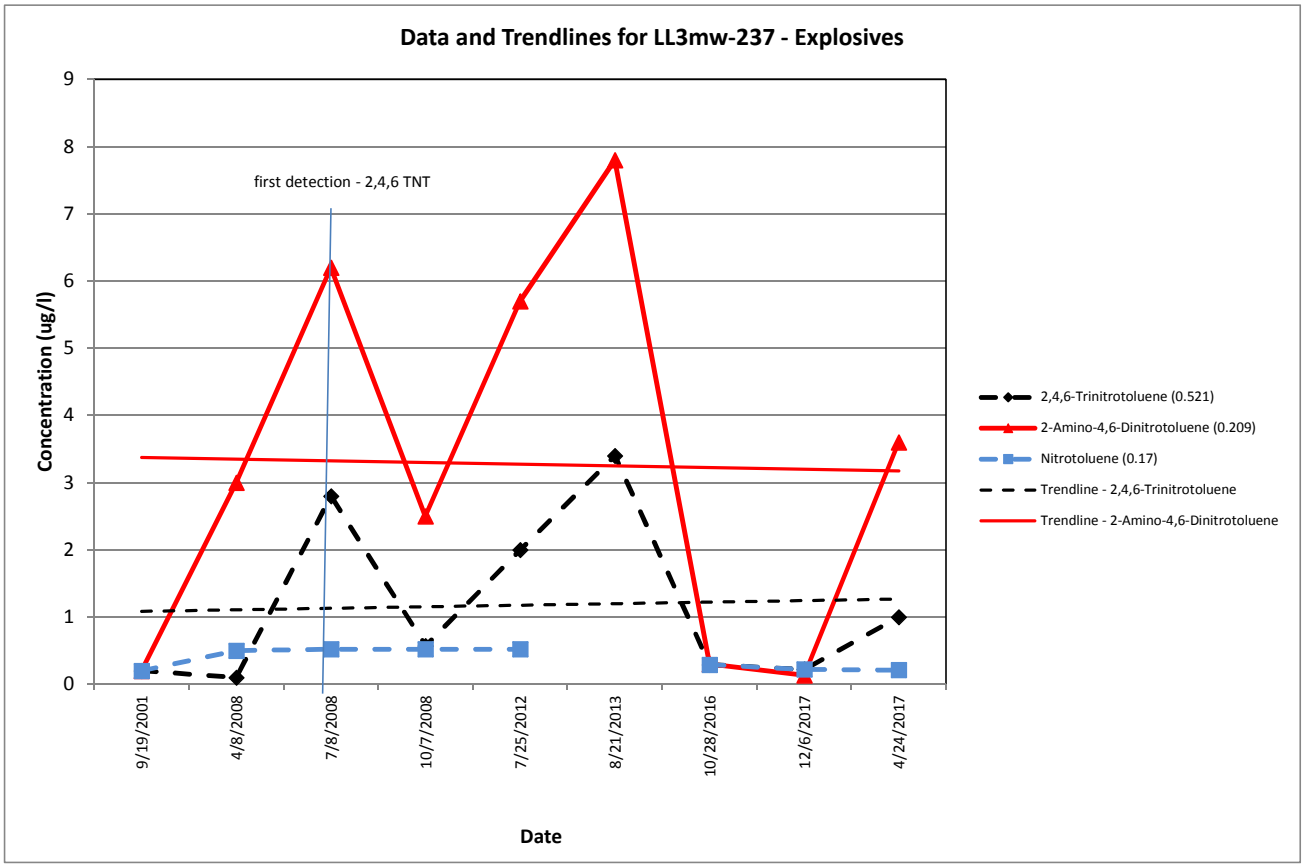

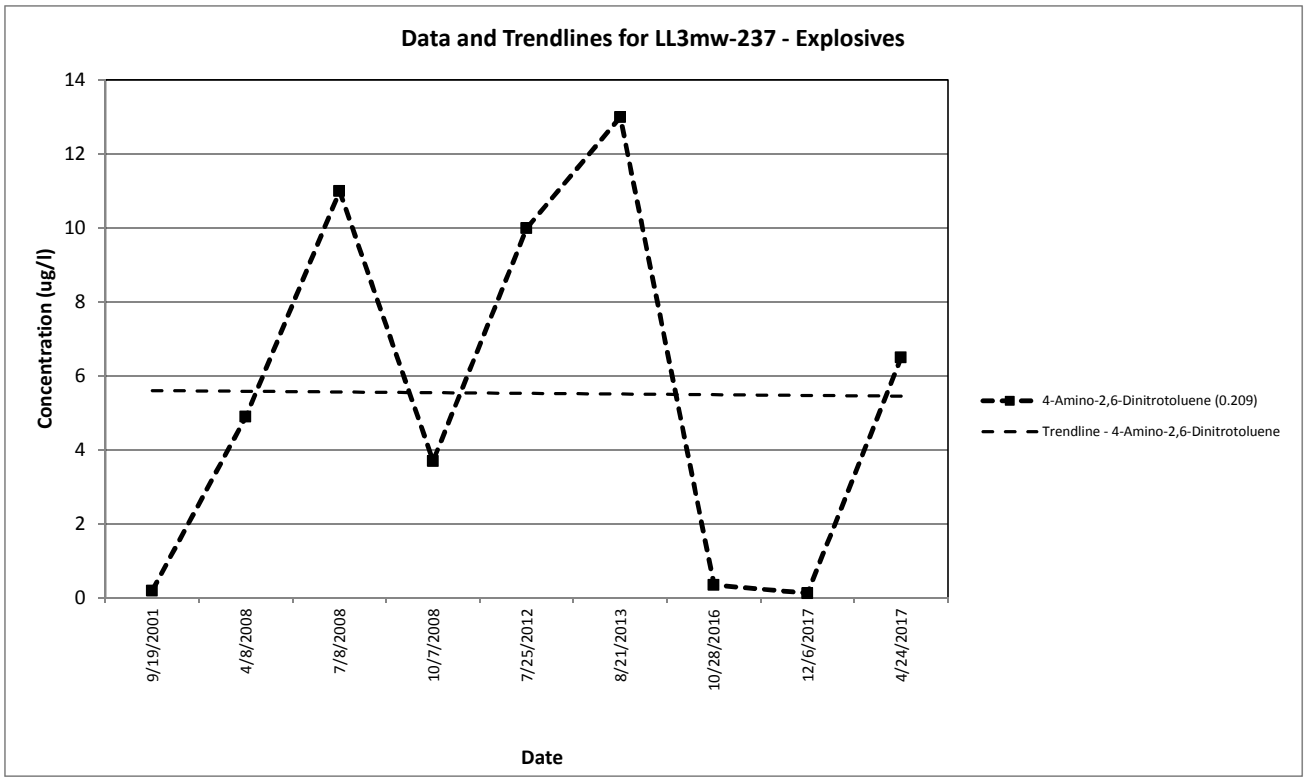

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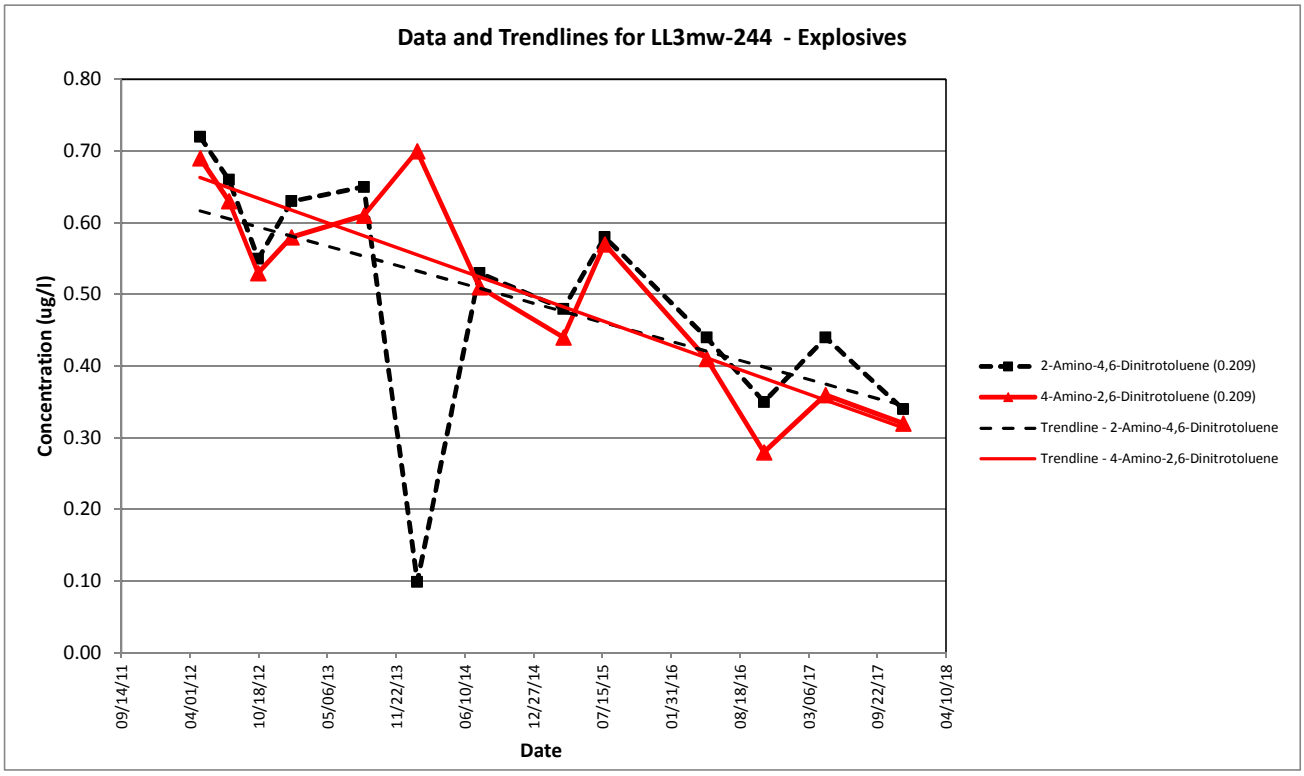

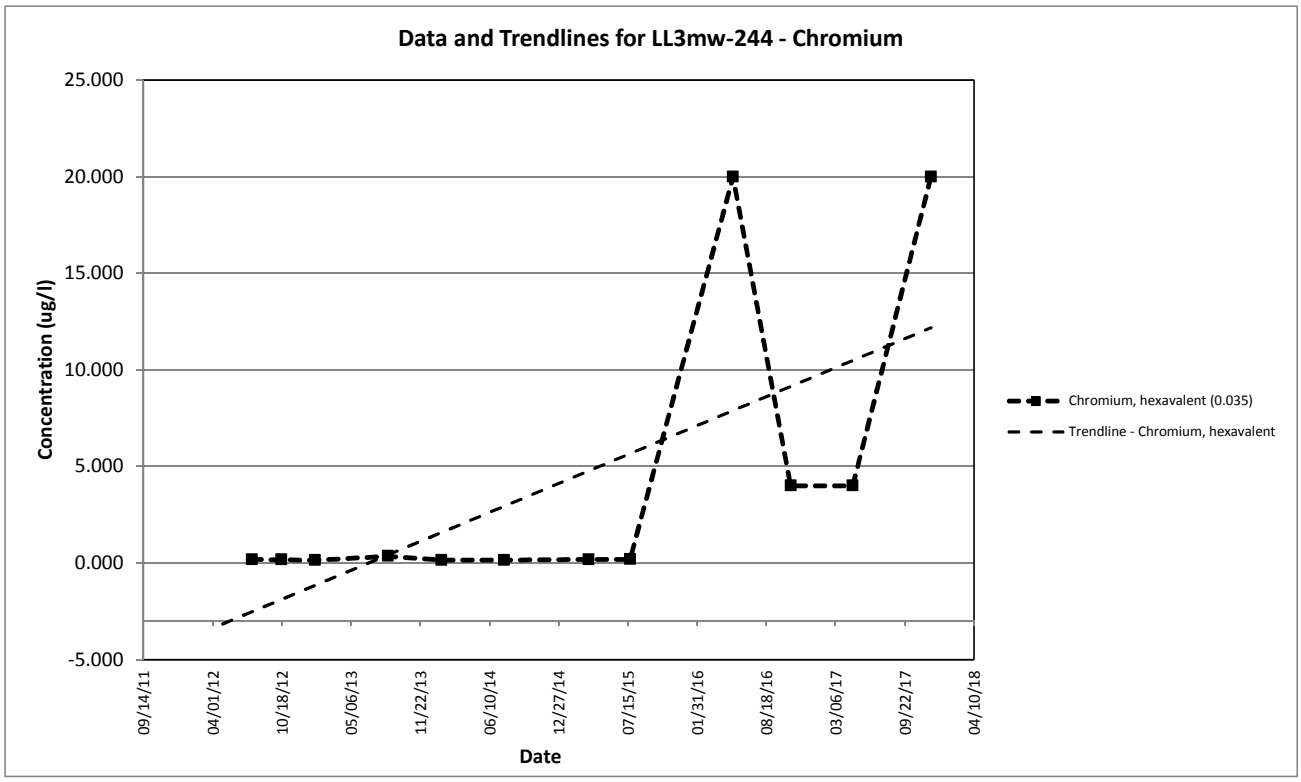

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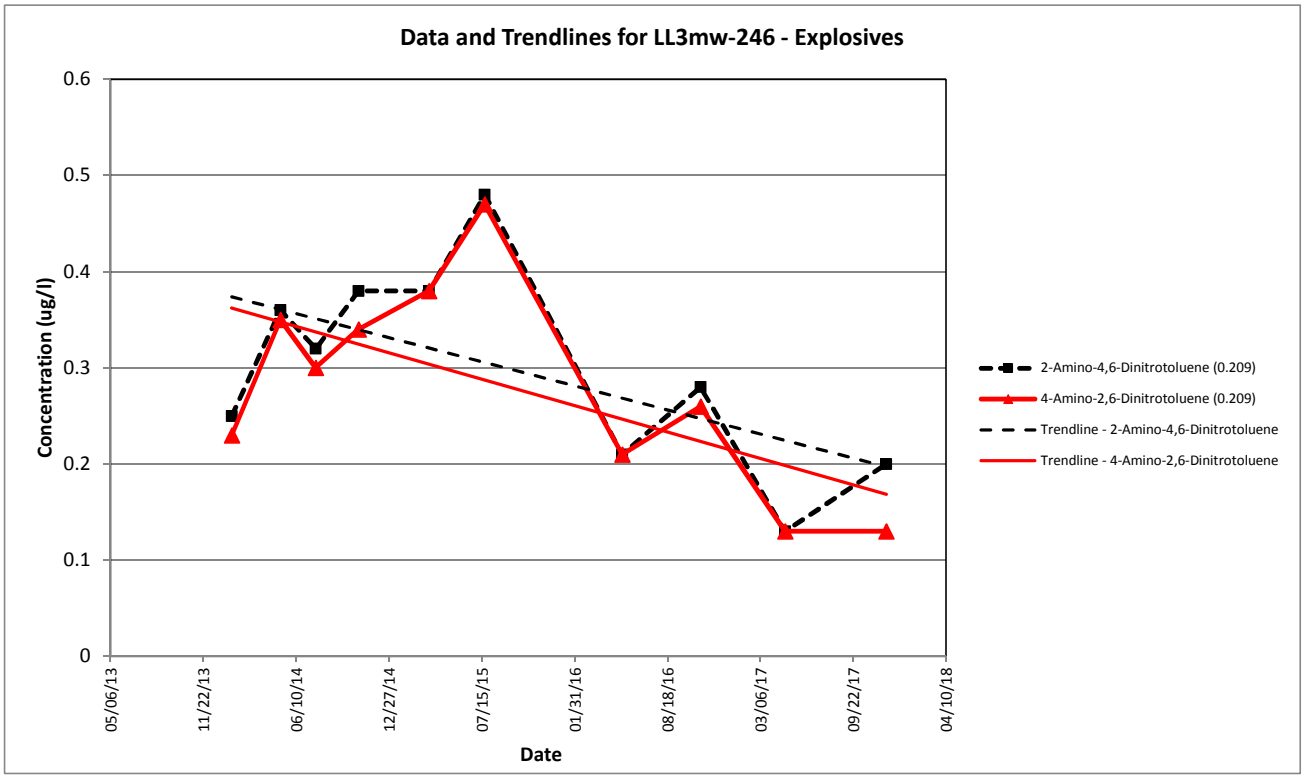

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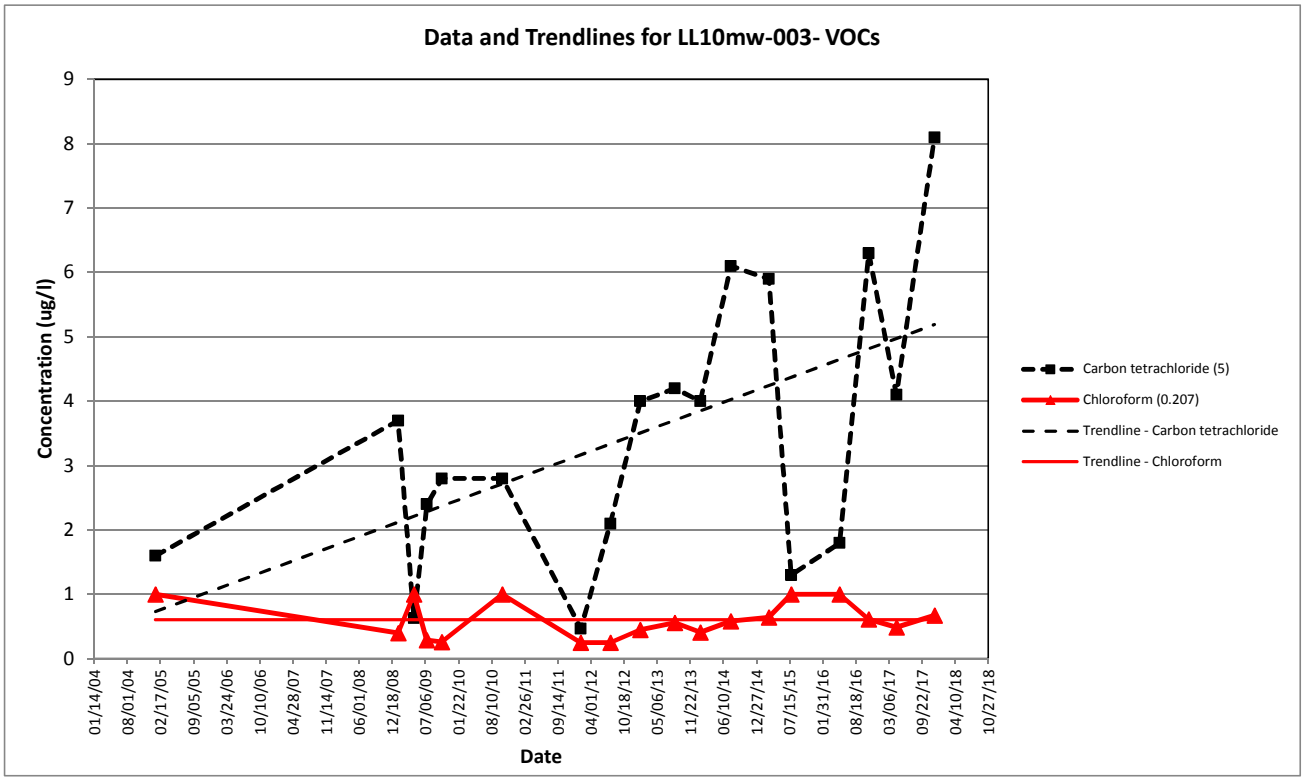

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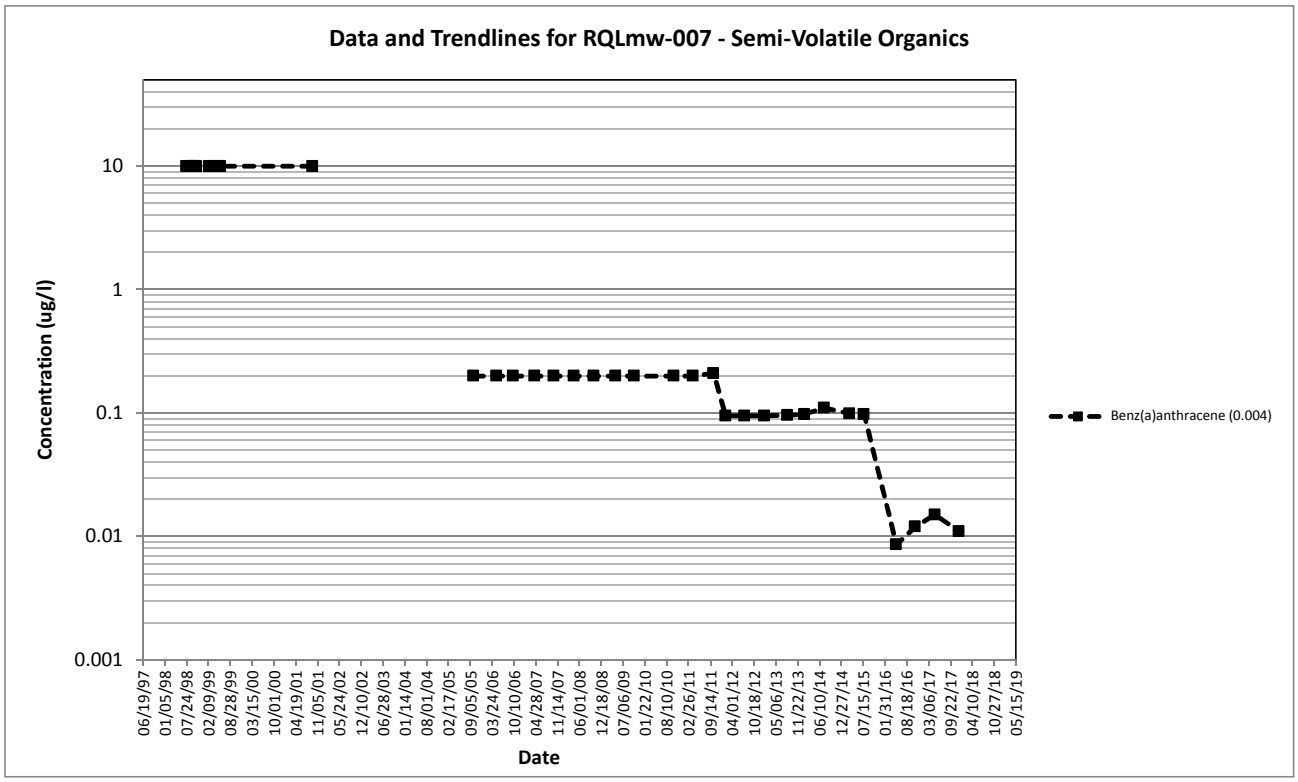

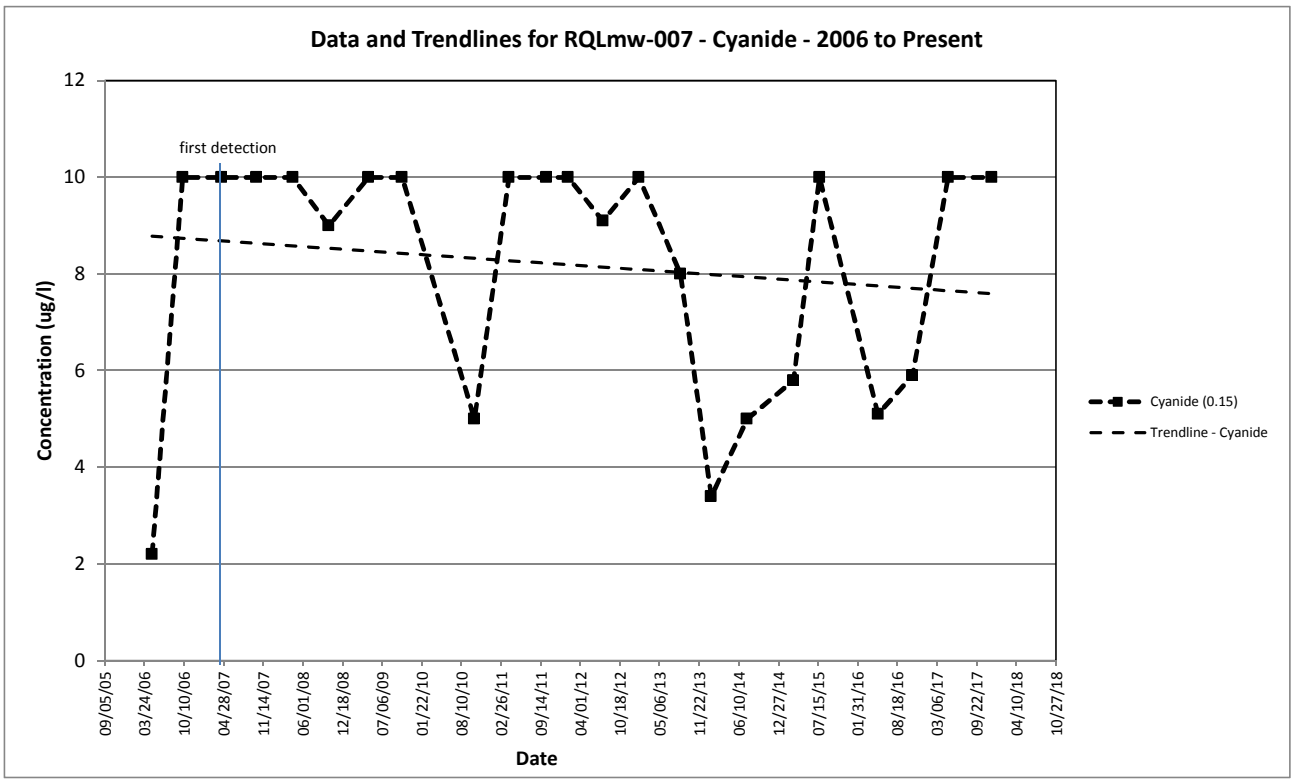

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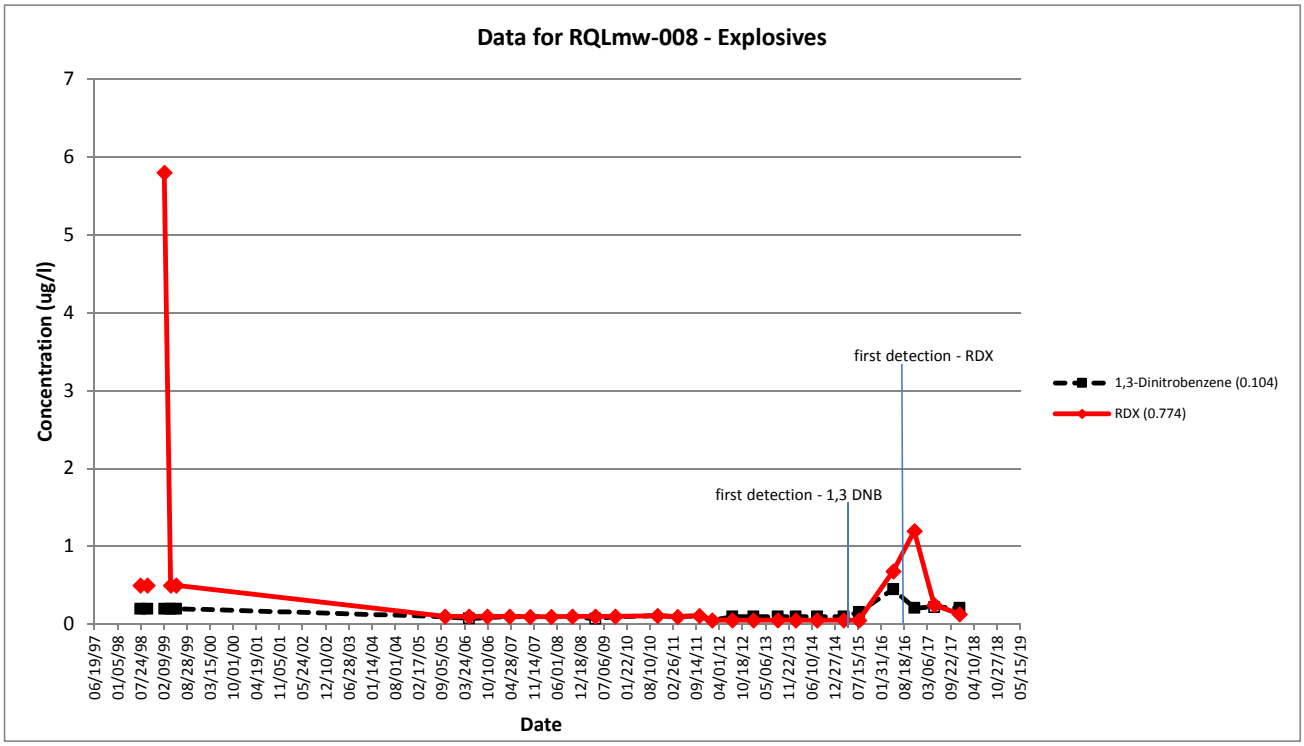
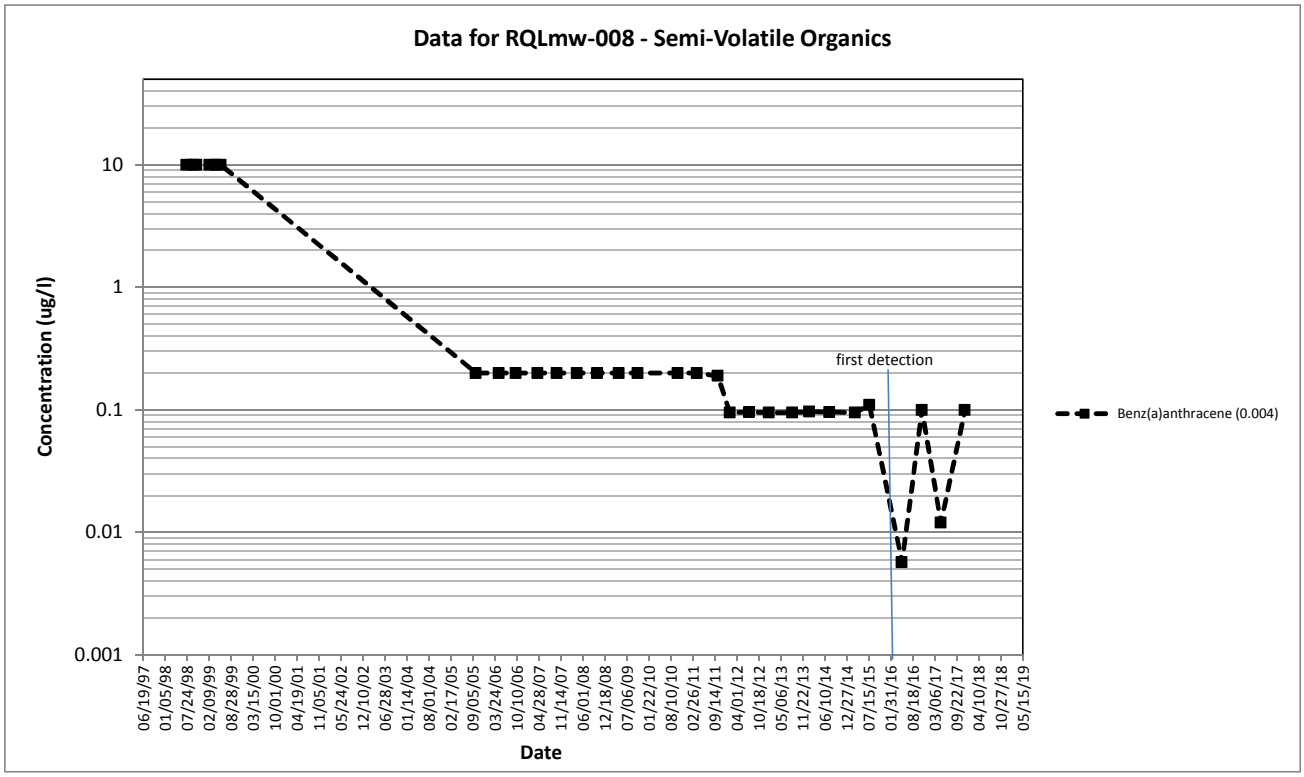
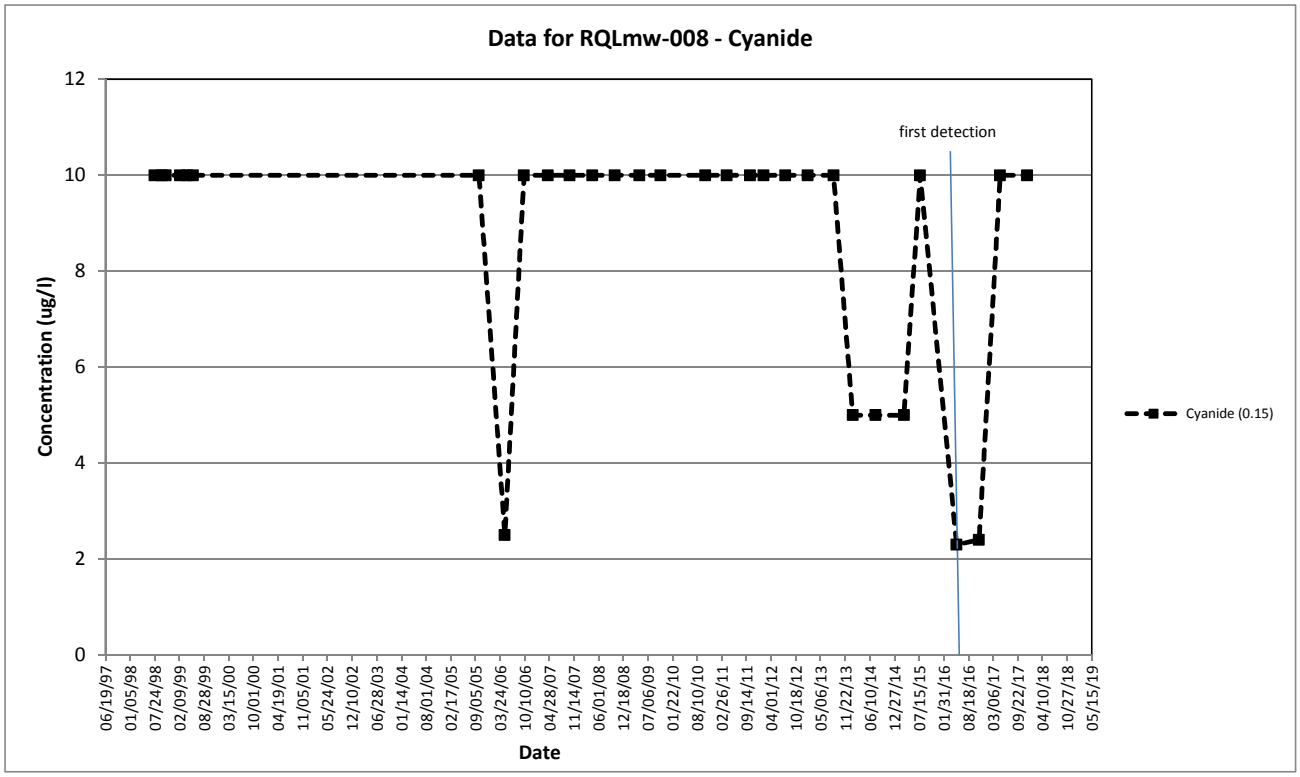
Trend Graphs

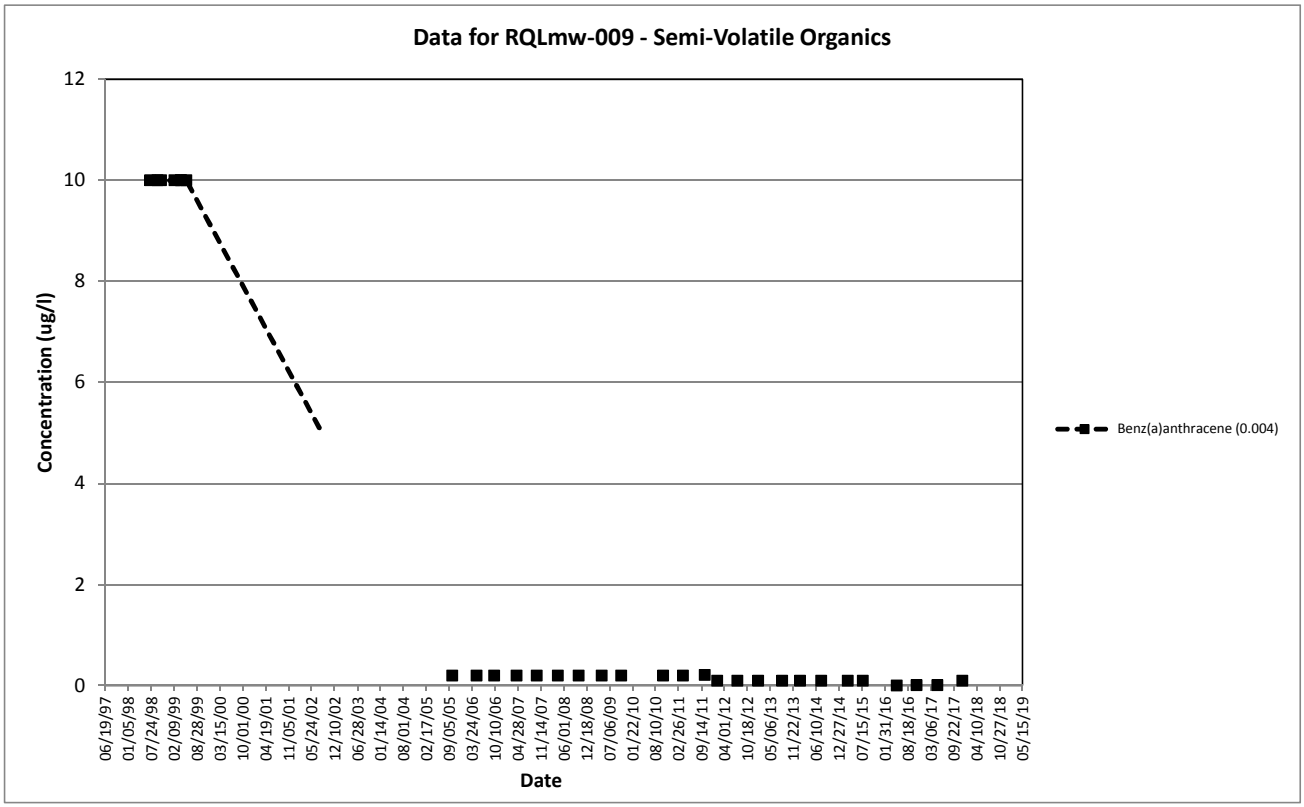


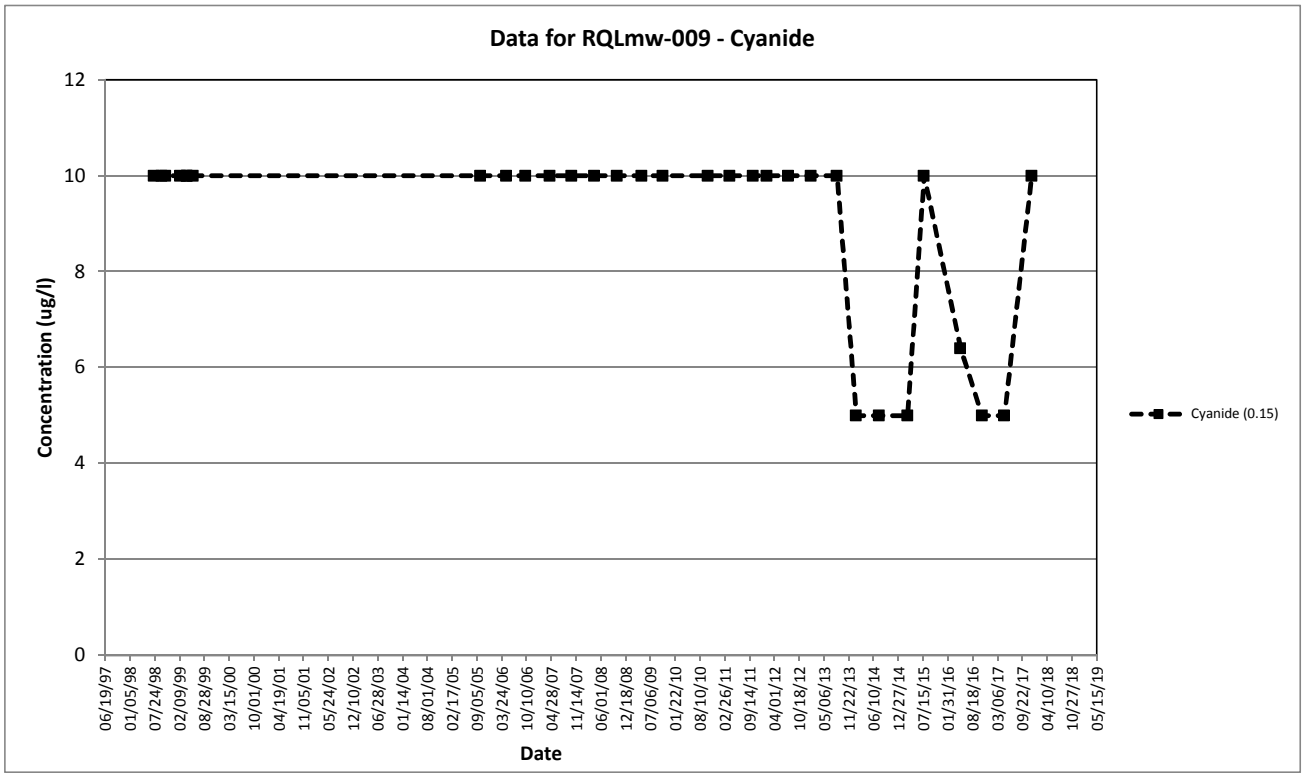


Appendix C
Trend Graphs

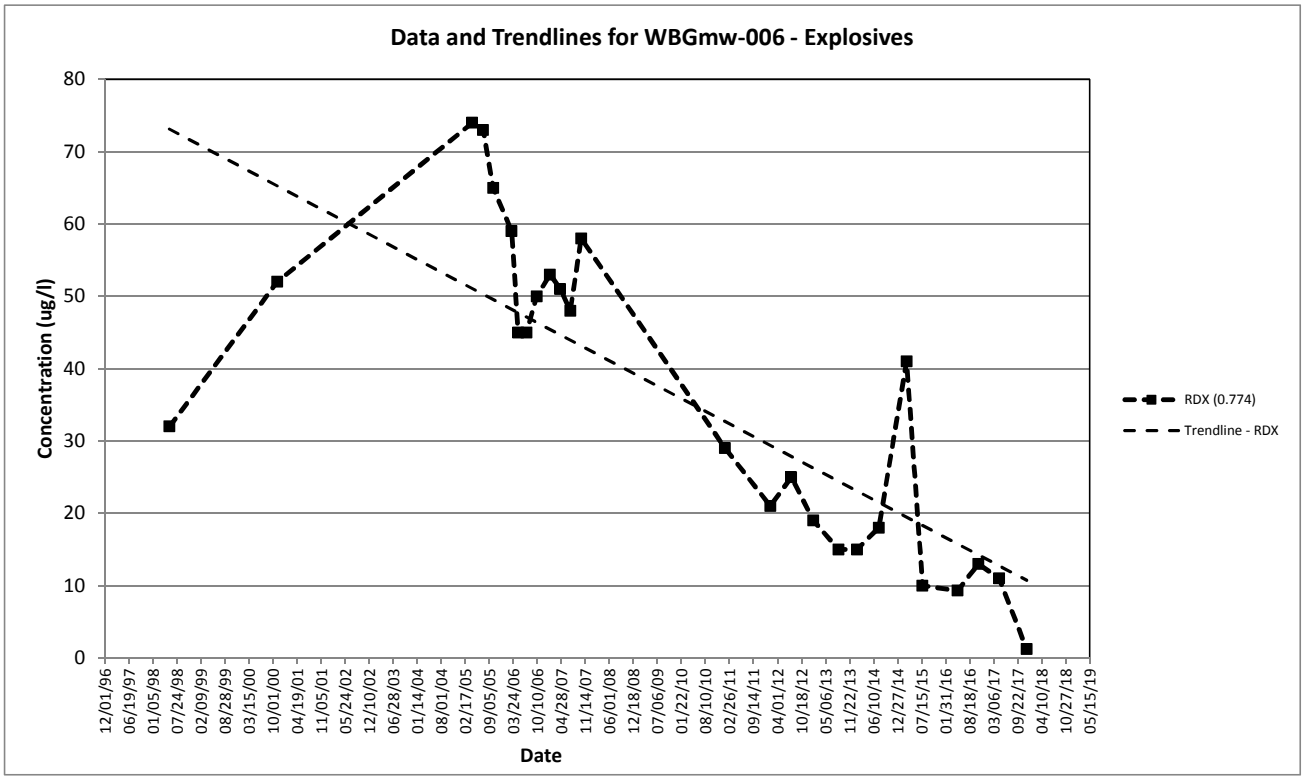


Appendix C
Trend Graphs

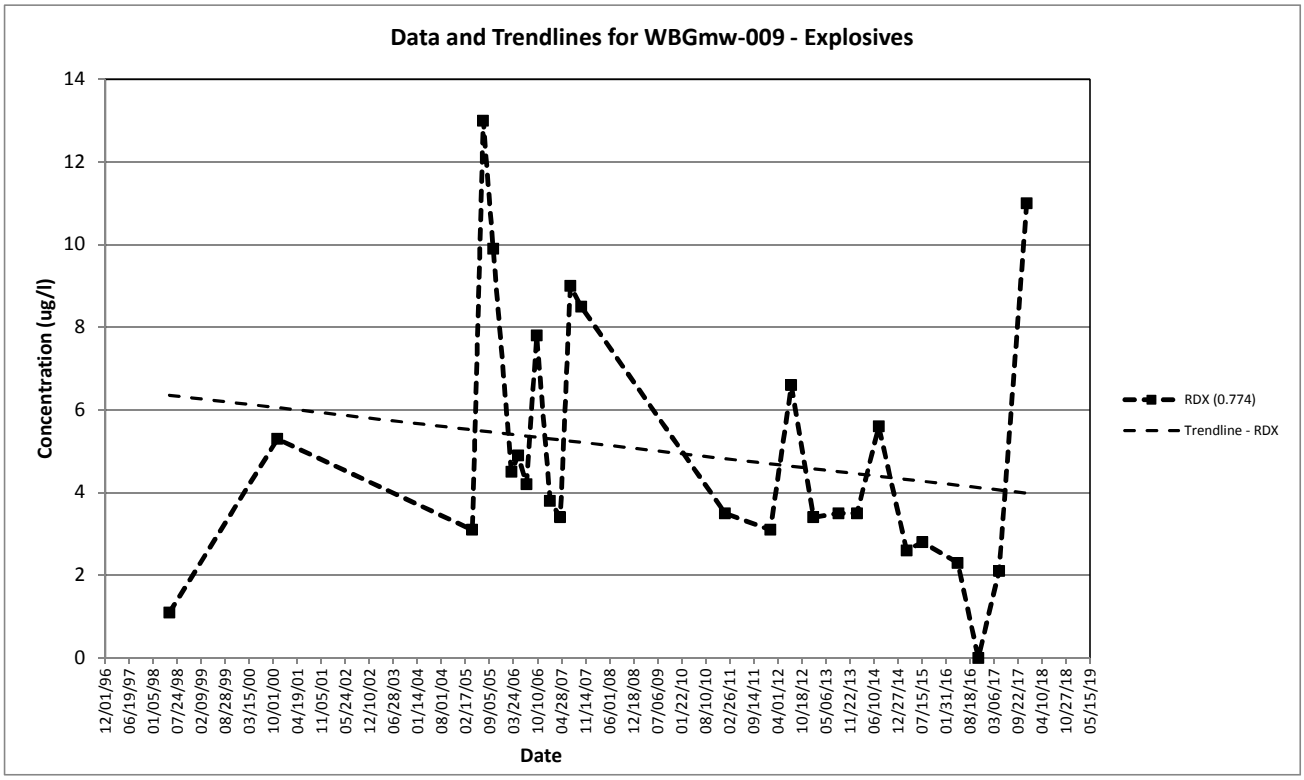




Appendix C
Trend Graphs



Appendix C
Trend Graphs



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APPENDIX D

FIELD FORMS AND NOTES

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APPENDIX D.1

DAILY REPORTS

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Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base Contract Number W9133L-14-D-0008; Task Order 0008
Project Contract:	
Prepared By:	Kimberly Kroenke
Prepared For:	Katie Hendrickson
Work Tasks Conducted:	Sampling Groundwater Wells
Conducted By:	ATC Kim Kroenke, Jason Seik and Matt Hummel
Weather:	32 degrees, snow, sleet, rain
Date of Activity:	Tuesday, January 10, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Equipment, review of FSP, Cooler preparation for upcoming field work Organized and calibrated field equipment. Collected 4 groundwater samples in the Winklepeck Burning Ground AOC, three of which were PCB resamples

Deviation From Plan:	None
Other Comments:	
Completed By:	Kim Kroenke
Checked By:	Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base Contract Number W9133L-14-D-0008; Task Order 0008
Project Contract:	
Prepared By:	Kimberly Kroenke
Prepared For:	Katie Hendrickson
Work Tasks Conducted:	Sampling Groundwater Wells
Conducted By:	ATC Kim Kroenke, Jason Seik and Matt Hummel
Weather:	32 degrees, snow, sleet, rain
Date of Activity:	Wednesday, January 11, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Equipment, review of FSP, Cooler preparation for upcoming field work Organized and calibrated field equipment. Collected 4 groundwater samples, two of which were PCB resamples in Loadline 3. The two remaining were from FWGmw-019 and FWGmw-022. The pump was removed from SCFmw-001. New tubling was attached so that the top of pump was located at 120 feet BGS and the intake was at 208 feet BGS. Pump was reinstalled in SCFmw-001

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base Contract Number W9133L-14-D-0008; Task Order 0008
Project Contract:	
Prepared By:	Kimberly Kroenke
Prepared For:	Katie Hendrickson
Work Tasks Conducted:	Sampling Groundwater Wells
Conducted By:	ATC Kim Kroenke, Jason Seik and Matt Hummel
Weather:	58 dropping through the day, heavy rain
Date of Activity:	Thursday, January 12, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Equipment, review of FSP, Cooler preparation for upcoming field work Organized and calibrated field equipment. Collected 4 groundwater samples, FWGmw-023 (Dup, MS/MSD), NTAmw-120, LL1mw-089 and LL2mw-272. Samples collected will be shipped on Friday, 1/13/17.

Deviation From Plan:	None
Other Comments:	
Completed By:	Kim Kroenke
Checked By:	Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base Contract Number W9133L-14-D-0008; Task Order 0008
Project Contract:	
Prepared By:	Kimberly Kroenke
Prepared For:	Katie Hendrickson
Work Tasks Conducted:	Sampling Groundwater Wells
Conducted By:	ATC Kim Kroenke and Bethany Weeder
Weather:	28 degrees, light wind, partly cloudy
Date of Activity:	Friday, January 13, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Equipment, review of FSP, Cooler preparation for upcoming field work Organized and calibrated field equipment. Changed batteries in one of the YSIs and then the pH probe would not calibrate. One of the Hanna turbitiy meters would not calibrate or read due to a "cap" error. Measures were taken to fix/work around but still would not calibrate/read. Collected 2 groundwater samples RQLmw-009 and RQLmw-015. Were informed at 1500 that ATC must be off base at 1600 due to the holiday weekend. Last well could not be started. Samples collected on Thursday adn Friday, 1/13/17.
Deviation From Plan:	None
Other Comments:	
Completed By:	Kim Kroenke
Checked By:	Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base Contract Number W9133L-14-D-0008; Task Order 0008
Project Contract:	
Prepared By:	Kimberly Kroenke
Prepared For:	Katie Hendrickson
Work Tasks Conducted:	Sampling Groundwater Wells
Conducted By:	
	ATC Kim Kroenke
Weather:	58 degrees, light wind, partly cloudy, rain
Date of Activity:	Tuesday, January 17, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Equipment, review of FSP, Organized and calibrated field equipment. Collected 1 groundwater samples SCFmw-001. Collected IDW samples Shipped GW sample and IDW sample

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

SITE SPECIFIC SAFETY AND HEALTH PLAN COMPLIANCE AGREEMENT

Project Name: ATC Task Order 8 - GWS - 15 wells total

Project Number: _____

I have read and understand the health and safety plan indicated above and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in the plan.

Name	Signature	Employer	Date
Kim Kranke	Kim Kranke	ATC	1/10/17
Matt Hummel	Matt Hummel	ATC	1/10/17
Jason Sick	Jason Sick	ATC	1/10/17
Bethany Wieder	Bethany Wieder	ATC	1/13/17

TAILGATE SAFETY MEETING LOG

PROJECT NAME: **PROJECT NO:**

DATE 01-01-17 M Tu W Th F Sa Su TIME: 815

WEATHER: 30° Snow, Sleet, freezing rain, rain

WORKING CONDITIONS:

PPE: gloves, cold weather gear, safety glasses

ITEMS DISCUSSED:

- Slip trip falls
- Slippery conditions
- Cold exposure
- Chemical exposure
- unexploded ordnance
- base procedures
- team communication
- hoop awareness

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

[illegible]		
[illegible]		
[illegible]		

[illegible]

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG
PROJECT NAME: RVMAP **PROJECT NO:**

DATE: 1-11-17 M Tu W Th F Sa Su TIME: 815

WEATHER: 32° Sunny

WORKING CONDITIONS: Dry

PPE: gloves, & cold weather gear, safety glasses hard hats

ITEMS DISCUSSED:

- Slip, trip, falls
- Slipping, driving conditions
- chemical exposure
- PPE
- Cold exposure
- base procedures
- Communication

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG

PROJECT NAME: **PROJECT NO:**

DATE: 1-12-17 M Tu W (Th) F Sa Su TIME: 0800

WEATHER: 50s rain

WORKING CONDITIONS: out doors, rain wind

PPE: standard

ITEMS DISCUSSED: weather

mud (slips trips falls)

Thunder / lightning

Hypothermia

Widdowmakers

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

[illegible]		
[illegible]		

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG

PROJECT NAME: **PROJECT NO:**

DATE: 1/13/17 M Tu W Th F Sa Su TIME: 845

WEATHER: 30° mostly cloudy

WORKING CONDITIONS: cold, dry

PPE: gloves, vests, eye protection, hardhat when needed

ITEMS DISCUSSED:

- freezing temp. - exposure
- slipper conditions
- chemical exposure
- Ramsdell, asbestos exposure

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

[signature]		
Benjamin Weeder	[signature]	1.13.17

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG

PROJECT NAME: **PROJECT NO:**

DATE: 1-17-17 M Tu W Th F Sa Su TIME: 815

WEATHER: 55°

WORKING CONDITIONS: Rain + Sun

PPE: Gloves, hard hat, Safety glasses

ITEMS DISCUSSED:

- Slip, trips, falls
- Working alone
- communication w/ office + range control
- Changing weather
- exposure

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

K Hueke		

K. Hueke

SITE SAFETY AND HEALTH OFFICER

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Receive and organize sample equiptment. Prepare for groundwater sampling activities
Conducted By:	Elizabeth Busby & Jessica Cain (Cardno)
Weather:	Clear 30-50deg. F
Date of Activity:	Thursday, November 30, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600 Organized and cleaned contrator building. Received rental equiptment, sample bottles, and IDW drums at contractor building. Drive by SR5 wells with Kevin Sedlack. Discussed safe approach for sampling wells. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day.

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby & Jessica Cain (Cardno)
Weather:	Clear and cold. 46F
Date of Activity:	Friday, December 01, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. Calibrated water quality meters. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Conducted weekly IDW inspection Sampled monitoring wells - see COC for specific wells

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby & Jessica Cain (Cardno)
Weather:	Cold. 30-50F
Date of Activity:	Saturday, December 02, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. Calibrated water quality meters. Sampled offsite monitoring wells - see COC for specific wells Drive samples to TestAmerica Labs in Canton, OH

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Organize sample kits for each well
Conducted By:	Elizabeth Busby & Jessica Cain (Cardno)
Weather:	Cold. 30-50F. No wind.
Date of Activity:	Sunday, December 03, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. Organized coolers and sample kits in contractor building.

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby, Jessica Cain, Dean Bender, Danyelle Phillips, Caitlin Jafolla, Leslie Meyers, and Devin Rowell (Cardno)
Weather:	Cold. 30-50F. No wind.
Date of Activity:	Monday, December 04, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Calibrated water quality meters. Sampled monitoring wells - see COC for specific wells Drive samples to TestAmerica Labs in Canton, OH (Elizabeth Busby only)

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby, Jessica Cain, Dean Bender, Danyelle Phillips, Caitlin Jafolla, Leslie Meyers, and Devin Rowell (Cardno)
Weather:	Cold. 30-50F. Calm
Date of Activity:	Tuesday, December 05, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Calibrated water quality meters. Sampled monitoring wells - see COC for specific wells Drive samples to TestAmerica Labs in Canton, OH (Elizabeth Busby and Danyelle Phillips)

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby, Jessica Cain, Dean Bender, Danyelle Phillips, Caitlin Jafolla, Leslie Meyers, and Devin Rowell (Cardno)
Weather:	Cold. 26-50F. Calm
Date of Activity:	Wednesday, December 06, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Calibrated water quality meters. Sampled monitoring wells - see COC for specific wells

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby, Jessica Cain, Dean Bender, Danyelle Phillips, Caitlin Jafolla, Leslie Meyers, and Devin Rowell (Cardno)
Weather:	Cold. 19-34F. Snowing in the afternoon
Date of Activity:	Thursday, December 07, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Calibrated water quality meters. Sampled monitoring wells - see COC for specific wells

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

Daily Report

Project Name:	Remedial Investigation Work Plan for RVAAP-66 Facility-Wide Groundwater Sampling
Project Location:	Ravenna Army National Guard Base
Project Contract:	Contract Number W9133L-14-D-0008
Prepared By:	Elizabeth Busby (Cardno)
Prepared For:	TEC Weston JV
Work Tasks Conducted:	Groundwater sampling
Conducted By:	Elizabeth Busby, Jessica Cain, and Caitlin Jafolla (Cardno)
Weather:	Cold. 37F.
Date of Activity:	Friday, December 08, 2017
Field Activity Summary:	Conducted Tailgate Health and Safety Meeting,review of FSP, Discussion of FSP and notetaking, reporting in, returning to the building by 1600, and IDW management. Conducted IDW weekly inspection and sampled IDW drums. Organized and cleaned contrator building. Drive samples to TestAmerica Labs in Canton, OH (Elizabeth Busby, Jessica Cain and Caitlin Jafolla) Return rental equiptment to FedEx, ship back. All onsite work observed by Kevin Sedlack. Liz Busby texted Kevin once everyone was offsite at the end of the day. Kevin Seclack and Kait Tait onsite at Contractor Building for final walk through together.

Deviation From Plan: None

Other Comments:

Completed By: Kim Kroenke
Checked By: Katie Hendrickson

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter. (1)

Site Name: Camp Ravenna **Date:** ~~11/29/17~~ 11/30/17

Contract No.: W9133L-14-D-0008 **Delivery Order No.:** 0003

HEALTH & SAFETY PLAN REVIEW

☐ H & S objectives	☑ Site emergency procedures	☑ Chem. hazards. contaminants	☑ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☐ Gen. site hazard assess.	☑ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☐ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☐ Decontamination procedures	

FIELD ACTIVITY

Safety Topics and Suggestions

Safe lifting, careful handing of bottles, watch for glass + acid

Personal Protective Equipment (PPE)

modified level D

Emergency Information and Procedures

See HASP

Injuries and Accidents Since Previous Meeting

none - 1st day

Additional comments

TAILGATE SAFETY MEETING ATTENDEES.		DATE	11-20-2017
NAME	COMPANY		SIGNATURE
Liz Busby	Cardno		[illegible]
Jess Cain	↓		[illegible]

Meeting conducted by LIZ BUSBY Title Engineer

Signature [illegible] Date/Time 11/20/17

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

(ab)

Site Name: Camp Ravenna **Date:** ~~11-30-2017~~ 12/1/17

Contract No.: W9133L-14-D-0008 **Delivery Order No.:** 0003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☑ Chem. hazards. contaminants	☑ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☑ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☐ Decontamination procedures	

FIELD ACTIVITY

Safety Topics and Suggestions

Cold stress. Safe driving

Personal Protective Equipment (PPE)

Modified Level D

Emergency Information and Procedures

See pg. #1 of HASP

Injuries and Accidents Since Previous Meeting

none

Additional comments

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/1/17
NAME	COMPANY		SIGNATURE
[illegible]	Cardno		[illegible]
Jess Cain	↓		

Meeting conducted by [illegible] Title Engineer

Signature [illegible] Date/Time 12/1/17

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/2/2017

Contract No.: W91332-14-D-0008 **Delivery Order No.:** 0003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☐ Chem. hazards. contaminants	☑ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☐ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☐ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☐ Decontamination procedures	

FIELD ACTIVITY

Safety Topics and Suggestions

Cold. Safe driving to St. Route 5 wells & opposite & to Canton Ohio

Personal Protective Equipment (PPE)

Modified Level D

Emergency Information and Procedures

See HASP

Injuries and Accidents Since Previous Meeting

none

Additional comments

Stay warm!

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/2/2017
NAME	COMPANY		SIGNATURE
LIZ BUSBY	Cardno		Liz Busby
Jess Cain	Cardno		

Meeting conducted by Liz Busby Title Engineer

Signature Date/Time 12-2-17

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/3/17

Contract No.: W9133L-14-D-0008 **Delivery Order No.:** 0003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☐ Chem. hazards. contaminants	☑ Physical hazards
☑ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☑ Hospital location	☑ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☐ Decontamination procedures	

FIELD ACTIVITY sample monitoring wells

Safety Topics and Suggestions

- safe driving along state route 5 & to Canton, OH.
- cold stress
- safe lifting

Personal Protective Equipment (PPE)

Modified Level D

Emergency Information and Procedures

in HASP, reviewed.

Injuries and Accidents Since Previous Meeting

none

Additional comments

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/3/2017
NAME	COMPANY		SIGNATURE
WZ BUSBY	CARDNO		WZ Busby
JESS CAIN	CARDNO		[illegible]

Meeting conducted by WZ Busby Title Engineer

Signature Date/Time 12/3/17

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/4/17 mon.

Contract No.: **Delivery Order No.:** 0003

HEALTH & SAFETY PLAN REVIEW

☒ H & S objectives	☒ Site emergency procedures	☒ Chem. hazards. contaminants	☒ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☐ Gen. site hazard assess.	☒ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☒ Chain of command	☒ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☒ Visitor policy	☐ Response to media inquiries	☒ Decontamination procedures	

FIELD ACTIVITY Sample groundwater wells

Safety Topics and Suggestions

- Safe driving onsite & on dirt roads
- cold stress, frost bite
- acid in (some) sample bottles

Personal Protective Equipment (PPE)

modified level D

Emergency Information and Procedures

in HASP page #1.
Range control is 1st call

Injuries and Accidents Since Previous Meeting

none

Additional comments

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/4/17
NAME	COMPANY		SIGNATURE
Liz Busby	Cardno		
Jessica Cen	Cardno		
CAITLIN JAFFOLLA	CARDNO		
Lesley Myers	Cardno		Lesley Myers
Dean Bender	Cardno		
Danyelle Phillips	Cardno		
Devin Rowell	Cardno		

Meeting conducted by LIZ BUSBY Title Engineer

Signature Date/Time 12/4/17

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/5/2017

Contract No.: **Delivery Order No.:**

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☑ Chem. hazards. contaminants	☒ Physical hazards
☑ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☒ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☐ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☒ Decontamination procedures	☒ cold stress

FIELD ACTIVITY

Safety Topics and Suggestions

Rain this morning. Safe driving in mud

Personal Protective Equipment (PPE)

modified level D

Emergency Information and Procedures

see HASP

Injuries and Accidents Since Previous Meeting

none

Additional comments

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/5/2017
NAME	COMPANY		SIGNATURE
Liz Busby	Cardno		Liz Busby
Lesley Myers	Cardno		Lesley Myers
Danyelle Phillips	Cardno		[illegible]
Devin Rowell	Cardno		[illegible]
Dean Bender	Cardno		[illegible]
CAITLIN JAFOLLA	CARDNO		[illegible]
Jessica Cain	Cardno		[illegible]

Meeting conducted by Liz Busby Title Engineer

Signature Liz Busby Date/Time 0640 12/5/2015

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/6/2017

Contract No.: **Delivery Order No.:** 003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☐ Chem. hazards. contaminants	☑ Physical hazards
☑ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☑ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☑ Decontamination procedures	☑ Cold stress

FIELD ACTIVITY Groundwater Sampling

Safety Topics and Suggestions

biological hazards ~ ticks, spotted 2 on clothing yesterday, keep a watch ful eye, risk should be mitigated by long sleeves, PPE, etc in winter.

Personal Protective Equipment (PPE)

modified level D

Emergency Information and Procedures

page 1 of HASP, call Range Control

Injuries and Accidents Since Previous Meeting

none

Additional comments

Ohio EPA scheduled to be on site today

TAILGATE SAFETY MEETING ATTENDEES		DATE	12-6-2017
NAME	COMPANY		SIGNATURE
Liz Busby	Cardno		Liz Busby
Lesley Myers	Cardno		Lesley Myers
Danyelle Phillips	Cardno		
Devin Rowell	Cardno		Devin Rowell
Jessica Cain	Cardno		
Dean Bender	Cardno		
CAITLIN JAFOLLA	CARDNO		

Meeting conducted by LIZ Busby Title engineer

Signature Liz Busby Date/Time 12/6/17 0640

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

Thurs

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/7/2017

Contract No.: **Delivery Order No.:** 003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☐ Chem. hazards. contaminants	☑ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☑ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☑ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☑ Visitor policy	☐ Response to media inquiries	☑ Decontamination procedures	Cold ☑

FIELD ACTIVITY

Safety Topics and Suggestions

- Safe driving, 20 MPH in troop areas. Slow off road.
- Cold & wind chill ~ this is the biggest H&S issue onsite

Personal Protective Equipment (PPE)

Modified Level D

Emergency Information and Procedures

See HASP, 1st page

Injuries and Accidents Since Previous Meeting

none

Additional comments

TAILGATE SAFETY MEETING ATTENDEES		DATE	12/7/2016
NAME	COMPANY		SIGNATURE
LIZ BUSBY	Cardno		Liz Busby
Lesley Myers	Cardno		Lesley Myers
Danyelle Phillips	Cardno		[illegible]
Devin Rowell	Cardno		[illegible]
Jessica Cain	Cardno		[illegible]
CAITLIN JAFOLLA	CARDNO		[illegible]
Dean Bender	cardno		[illegible]

Meeting conducted by Liz Busby Title Engineer

Signature [illegible] Date/Time 0640 12/7/2017

Cardno TEC WESTON

TEC-Weston Joint Venture

TEC-Weston Joint Venture

TAILGATE SAFETY MEETING REPORT

A tailgate safety meeting should be held before each unique activity, for each new crew and daily thereafter.

Site Name: Camp Ravenna **Date:** 12/8/17

Contract No.: **Delivery Order No.:** 003

HEALTH & SAFETY PLAN REVIEW

☑ H & S objectives	☑ Site emergency procedures	☐ Chem. hazards. contaminants	☑ Physical hazards
☐ Site history	☐ Air-horn signals, if any	☐ Exposure pathways	☐ Well drilling oper.
☑ Gen. site hazard assess.	☐ Hospital location	☐ Exposure monitoring program	☐ Noise monitoring
☐ Chain of command	☑ Telephone location	☐ Acute symptoms, if distinct	☐ Heat stress
☐ Visitor policy	☐ Response to media inquiries	☐ Decontamination procedures	☑ Cold

FIELD ACTIVITY Demobilize, drive samples to canton clean up

Safety Topics and Suggestions

Safe lifting / driving today.
Slips, trips, falls to watch for ice, it's cold

Personal Protective Equipment (PPE)

modified level D

Emergency Information and Procedures

see HASP

Injuries and Accidents Since Previous Meeting

protective plastic bumper of 1 rental car cracked. No mechanical issues only cosmetic. Insurance & rental car notified.

Additional comments

4 Team members from C-ville are driving home

TAILGATE SAFETY MEETING ATTENDEES		DATE	12-8-2018
NAME	COMPANY		SIGNATURE
LIZ BUSBY	Cardno		Liz Busby
CAITLIN JAFFUA	CARDNO		Caitlin Jaffua
Lesley Myers	Cardno		Lesley Myers
Devin Rowell	Cardno		Devin Rowell
Jessica Cain	Cardno		Jessica Cain
Dean Bender	Cardno		Dean Bender
Danyelle Phillips	Cardno		Danyelle Phillips

Meeting conducted by Liz Busby Title Engineer

Signature Liz Busby Date/Time 0700 12/8/17

Cardno TEC WESTON

TEC-Weston Joint Venture

APPENDIX D.2

LOG BOOKS

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Location RVAAP Date 1/6/17 cont.

Project / Client Cardno - Pump Instal

1045 leave 1036
1050 arrive at FWGMW-019 +
FWG MW-022
1105 drop pump in FWGMW019
1125 drop pump in FWGMW022
1140 leave location
1150 arrive @ FWGMW-023
1200 install pump
1220 leave NACA
1250 arrive @ 1036
clean-up
prepare for GWS event
1430 leave facility
return keys to Vista.

Rudy Shoelle

Location RVAAP Date 1/11/17

Project / Client CORDNO - JANUARY GW SAMPLING

9:45 LEAVE 1036
9:50 ARRIVE AT
9:55 SET UP EQUIPMENT FOR SAMPLING
10:00 GATHERED DTW MEASUREMENT, FLOW RATE
10:10 BEGAN PURGING WELL
10:40 SAMPLED WELL
11:08 SAMPLE CONCLUDED
11:15 RETURN TO 1036
11:35 ARRIVE AT FWGMW-019
11:40 SET UP, INITIAL DEPTH TO WATER/FLOW RATE
12:10 BEGAN PURGING WELL
12:40 BEGAN SAMPLING
2:35 CONCLUDED SAMPLING
3:00 Return to BLDG 1036
4:15 LEAVE FACILITY

[signature]

Location RVAAP Date 1/12/17

Project / Client CARONO JANUARY GW SAMPLING

50° Rain

9:00 LEAVE BLDG 1036
9:15 ARRIVE AT FWG 023
9:20 STAG EQUIPMENT
9:35 INITIAL DEPTH TO WATER 118.25
9:45 STABALIZE PARAMETERS, TURBITY HIGH
10:35 BEGAN SAMPLING
1:10 ARRIVED AT BLDG 1036, UNLOAD LOAD UP
1:35 ARRIVE AT LL2-272
1:45 SET UP EQUIPMENT, DEPTH TO WATER @ 9.52
2:20 BEGAN SAMPLING LL2-272
3:50 COMPLETED SAMPLING
4:05 RETURN TO BLDG 1036
4:30 LEAVE FACILITY

Location RVAAP Date 1/13/17

Project / Client Carono - January Sampling

Clear 30° w/ Bethany Weeder

0815 on site
- Calibrate equipment
  - one YSI would not calibrate for pH
  - one turbidity meter would not calibrate - 'CAP' error
- pack vehicle for sampling

~~1030~~ 1130 leave building for Ramsdell Quarry

1045 arrive at Ramsdell + set up on RQLmw-015 (outside fence)

1250 Start sampling RQLmw-015
1255 K. Kroeckel moves to RQLmw-009
1515 Sampling RQLmw-009 called Range Control med to be done by 1630.
1520 Return to 1036 fac

Location RVAAP Date 1-13-13

Project / Client GWS Cont

1520 con't: to building 1036
to pack samples
1625 off site to complete
cont. packing samples
@ GetGo for ice and
packing tape

KSKroenke

Location RVAAP Date 1-17-17

Project / Client GWS

55° Rain then Sun

815 KSK on site
- Calibrate meters
- pack vehicle
- Clean building to wait out rain

1015 leave building 1036
1020 arrive at SCFMW-001
~~Sam~~ ~~Pl~~ purge then sample

1215 leave SCFMW-001 for building 1036
1220 arrive at 1036
- pack samples
- clean
- IDW samples @ 1300 sweep

~~1330~~
1415 leave 1036 for Env. Building + Vista
1445 leave Env. Bldg + Vista

KSK

Ravenna GWS 1-10-17 1 of 1

0800 - arrive at Bldg. 1036
~~met~~ K. Kroenke & J. Seitz
- Tailgate & H&S
0910 - left Bldg for WBG
0920 - checked in with Tetratech
~~At~~ front Gate
0930 - Begin at WBGmw-015
1208 - Sample WBGmw-015-011017-GW
1215 - leave Jason to move to 021/06
1319 - sampled WBGmw-006, let Jason fill
1321 - start at WBGmw-021
1325 - Begin Purge of 21
~~1349~~ - 1349 - finish Sampling WBGmw-006
1400 - sample WBGMW-21
1406 - MH moves to 020
1427 - Begin Purge WBGmw-020
1457 - sampled WBGmw-020-011017-GW
1508 - finish sampling head to 1036
to clean up, ship samples tomorrow
1538 - called range control
1540 - depart site

MH 1-11-17

Ravenna GWS 1-11-17 MH
1 of 1

tos clear
0800 - arrive onsite Begin calibration
0820 - Jason & Kim onsite tailgate
0900 - Begin work
0909 - arrive at 244
0930 Begin Purge
1002 - Begin sampling LL3mw-244-011117-GW
MS/MSD
1020 - LL3mw-500-011117-GW (Dup of 244)
rebuild pump to SCFmw-001.
1135 - arrive at 001 to drop pump
1140 - set up on ~~[illegible]~~ FWGmw-022
1200 - Begin Purge
1345 - ~~[illegible]~~ sample FWGmw-022-011117-GW
1440 - finish sampling head to 1036
Pack coolers & Prep
1530 - depart site to office
~~[illegible]~~ 1730 - drop samples off at
fedex

MH 1-11-17

Ravenna GWS

MH
1-12-17

Sos rain

0800 - arrive onsite, tailgate & calibrate meters

0910 - Jason departs to begin

0920 - Range control called
- stopped by Jason to Drop off Coolers

0945 - arrive at
NTAmw-120

0955 - Begin Purge

1025 - Sample NTAmw-120

1050 - finish filling bottles, clean up

1055 - check on Jason, head to 1036 to swap bottles

1150 - arrive at LL1mw-089

1200 - Begin Purge

1230 - sampled LL1mw-089-01121T-GW

1315 - finish pumping, meet Jason at LL2-222

1450 Sample LL2mw-277

1530 - finish sampling head to Contractor bldg to pack & clean up

MH 1-12-17

076003 RAVENNA

Nov 30, 2018

Staff: Liz + Jess (cardno)

PPE: Mod Level D

Weather: 30-50°F

Objective: Receive + org eq pt.

0730 Onsite @ Base Em. Office

Meet w/ Kevin & Kate to discuss week

0800 Meet Enviroserve at Bldg 1036

Receive 12 drums. Kevin w/ us

0900 Test America onsite & drop off bottles

0930 Test America offsite.

Table empty drums. ~~Give map + schedule to range control~~ & eb

0951 leave building 1036 to go visit range control

1006 Leave Range Control, do St. Rt #5 driveby with Kevin, Jess, Liz

1030 Back @ Bldg 1036. Kevin leaves to go back to Env. Office

Jess + Liz begin organizing bottle kits

eb

076003 RAVENNA 11/30/2017

1600 Leave Building 1036 Offsite

Elizabeth Busby November 30, 2017

eb

Rite in the Rain

076003 RAVENNA

~~Thurs~~ Dec. 1, 2017 Friday
Staff: Elizabeth Busby + Jessica Cain from Cardno
Weather: cold ~46°F
Objective: Sample MWs onsite
PPE: Modified level D, see HASP
0630: at hotel conduct H+S meeting, calibrate horiba buy ice & drive to site
~~0700~~ eb
0715 onsite. Load eqpt at building 1036
0730 Dispose of trash & move to MWs to sample groundwater
0802 Kevin Sedlack onsite with us at FWGMW-005, observing sampling
1527 Finished sampling, in route to contractor Building.
1530 ~~Relinquish~~ (eb) Sign COC's
1540 & give coolers to Test America, dispose of IDW
1625 leave building 1036
1630 offsite

Elizabeth Busby
Dec. 1, 2017

076003 RAVENNA

Saturday December 2, 2017
Staff: Elizabeth Busby & Jessica Cain (Cardno JS)
Weather: Cold 30-50's
PPE: Modified level D
Objective: Sample MW's offsite
0645: conduct H+S meeting at hotel, calibrate horiba, buy ice & drive to contractor building to pick up eqpt.
0750 Onsite. Load eqpt in truck @ building 1036.
0806 Offsite to sample MWs.
1450 Finish GW sampling ~~to~~ (eb) drive back to building 1036 to dispose of IDW & drop off equipment
1456 onsite. At building 1036
1513 offsite drive samples to Test America, Canton, OH
1635 Sign COC & relinquish samples to Test America

Elizabeth Busby
Dec. 2 2017

Rite in the Rain

076003 RAVENNA

Sunday December 3, 2017

Staff: Liz Busby + Jess Cain - Cardno

Weather: 30-50°F cold no wind

PPE: Modified Level D

Objective: Sample monitoring wells offsite & organize bottle kits

0645: at hotel conduct H&S meeting, calibrate equipment & buy ice

0742 Onsite. organize + load up equipment & move offsite to sample MWs

0800 Offsite. Begin GW sampling activities - see field forms

0823 - Confirmed that 3 MWs that were presumed to be offsite are actually onsite.

Drive to Walmart to return battery & supplies.

1020 Onsite to organize bottles

1545 Offsite to hotel

Elizabeth Busby 12/3/17

eb

076003 RAVENNA

Monday Dec 4, 2017

Staff: Liz Busby, Caitlin Jafolla, Dean Bender, Jess Cain, Danyelle Phillips, Jesse Meyers, & Dean Rowell

PPE: Modified Level D

Objective: Sample MWs

0640 at hotel - conduct H&S meeting, calibrate eqpt. & buy ice. then drive to site

Onsite. organize eqpt & load up. Begin GW sampling - see field forms

0708: Arrive at Contractor Building.

0723: Left contractor Bldg

~~0815 Arrive on site~~

0815 OFFSITE TO SAMPLE MW

1630 ARRIVE AT CONTRACTOR BLDG

1640 OFFSITE

eb

076003 RAVENNA

TUESDAY DECEMBER 5, 2017

STAFF: Liz Kirby, JESSICA CAIN, DEVIN ROWELL, DEAN BENDER, DANYELLE PHILLIPS, LESLIE MEYERS, CAITLEN JOFALLA

WEATHER: RAIN 46°F

PPE: MODIFIED LEVEL D

OBJECTIVE: SAMPLE MW's.

0645: CALIBRATE FORIBIA, SAFETY MEETING

~~0700 : ARRIVE ONSITE~~ J. C.

0715 : ARRIVE ONSITE

~~0720 : OFFSIT~~ J. C.

0720 : LEAVE CONTRACTOR BLDG FOR SAMPLING.

1620 Arrive at Contractor Building

16:27 OFFSITE

076003 RAVENNA

Wednesday, December 6, 2017

STAFF: Liz Busby, Dean Bender, Caitlin Jofalla, Devin Rowell, Danyelle Phillips, Leslie Meyers, & Jessica Cain

PPE: Modified level D

Objective: Sample MW

6:45 Calibrate equipment & H&S Meeting

7:16 Arrive at Contractor Building

16:25 Arrive at Contractor Building Drop off Samples.

16:34 Offsite

J. C.

Rite in the Rain

076 003 RAVENNA

Thursday, December 7, 2017

Staff: Liz Busby, Dean Bender, Devin Rowell, Jessica Cain, Leslie Meyers, Danyelle Phillips, Caitlin Jafolla,

PPE: Modified Level D

Weather: Overcast, 30°F

6:45: At hotel, H&S meeting, Calibrate equipment

7:00: Leave hotel, drive to site

Obejective: Sample MWs.

7:20: Arrive at Contractor Building & load Equipment

7:26: Leave Bldg to sample MW.

16:26: Arrive at Contractor's Bldg to unload samples & IDW.

16:40 OFFSITE

076003 RAVENNA

Thursday Dec 21, 2017

Staff: Liz Busby (Cardno) & Enviro Serve

Objective: Onsite for IDW pickup for offsite disposal & IDW Inspection

PPE: Modified Level D

Weather: 27°F Calm & Cold Cloudy & no wind

0745 Onsite at Building #1036 Wait for Katie Tait & EnviroServe

0750 EnviroServe Onsite

0755 Kevin Sedlack & Katie Tait at Building 1036.

0800 IDW Inspection & IDW disposal

10 boxes of gloves

6 filters for gw

5 boxes - ziploc ~~50gal~~ 1gal (50 count)

0830 Done with loading up IDW drums. Offsite to airport

Rite in the Rain

Ravenna 076003 Mon. Dec. 4

0650 = Health & safety meeting.
Staff = Danyelle Phillips (DP), Lesley Myers (LM), Dean Bender (DB), Liz Busby (LB), Jess Cain (JC), Caitlin Jafolla (CJ). calibrated equipment.
Weather = High of 50. currently 27°F.
0715 = On site. Put equipment in car.
0744 = Arrived at sampling site - MW171.
0756 = started purging MW171.
0827 = sampled FBQMW-171.
0920 = Water level meter did not read, hit top off pump around 15' and could not find water. Started pumping but did not fill over 100ml in Horiba. Kevin (OHARNG) deemed well is dry and doesnot want pump removed. No sample collected. LM started purging FBQMW-175.
0952 = Started purging FBQMW-172.
1023 = sampled FBQMW-172.
1111 = LM sampled FBQMW-175.
1147 = started purging FBQMW-176.
1258 = sampled FBQMW-176.
1319 = Getting set upon BKGMW-017.

Rite in the Rain

Ravenna 076003 Mon. Dec. 4

1320 = Realized FBQMW-171 and FBQMW-175 were sampled through Horiba tubing. Each Horiba had been calibrated and that was its first use of the day.

1548 = Leaving ~~GA~~ BKGMW-017.

1628 = Calibrated Horibas.

1639 = Leaving Base.

12/4/17

Ravenna 076003 Tues Dec. 5

0713 = Arrived onsite.

0724 = Leaving contractor Bldg headed to BKGmw-024.

0758 = Located BKGmw-024 and 018.

0915 = Finished BKGmw-024. Starting BKGMW-018. Staff = DR, LM. Did safety tailgate at hotel this morning. Weather = 50° and rain drizzles.

1003 = On our way to BKGMW006

1020 = Arrived at BKGMW-006.

1123 = Headed to BKGMW-015.

1130 = Arrived at BKGMW-015.

1140 = Took water level reading at BKGmw-015 but did not detect water before hitting pump at 50'. Total well depth is recorded as 53'.

1143 = Started purging well to see if there is water below pump.

1150 = Turned PSI up to 75 on compressor and pulled some water.

1153 = Water starting to discharge from Horiba drip by drip.

12/5/17

Ravenna 076003 Tues Dec. 5, 2017

1158 = Water reached pumping rate of 100 mL/min.
1400 = Leaving BKGMW-015 headed to LL10mw-003.
1416 = Arrived at LL10mw-003.
1509 = Leaving LL10MW-003. Headed to CBPmw-009.
1523 = Arrived at CBPmw-009.
1604 = On our way back to contractor Bldg.
1630 = Leaving base.
1700 = Calibrated Horiba.

12/5/17

Ravenna 076003 Wed. Dec. 6.

0650 = Safety tailgate at hotel. Weather = partly cloudy, High of 40°F and currently 27°F.
Staff = LB, LM, DR, DP, DB, CJ, JC.
0721 = Arrived on Base at contractor Bldg. Loaded up gear.
0740 = Arrived at LL12mw-247. Turbidity keeps rising and dropping ~~Took~~ OK
1005 = Headed to LL3mw-244.
1026 = Arrived at LL3MW-244.
1130 = Headed to LL3MW-059.
1136 = Arrived at LL3MW-059.
1233 = Headed to LL3MW-237.
1244 = Arrived at LL3mw-237
1334 = Headed to LL2MW-234
1404 = Arrived at LL2MW-234.
1416 = Headed to contractor Bldg.
1636 = Leaving Base.

12/6/17

Ravenna 076003 Thurs. Dec. 7

0650=safety tailgate at hotel. Staff= DR, LM, DP, JC, GJ, LB, DB. Weather= currently 29°F and cloudy, High of 33°F.

0723=Arrived at Ravenna.

0730=Headed to LLMW-084.

0802=Arrived at LLMW-084.

0821=no water detected with water level. Well pump would not pull any water either. Well deemed dry by Kevin (OHARNG). Will move MS/MSD to another well.

0822=Arrived at LLMW-083.

0836=Deemed dry by Kevin, no water detected or pumped.

0840=Arrived at LLMW-063.

0845=No water detected w/ water level. Started pumping. Water drawn out with pump but became dry after 7 minutes.

0856=Well deemed dry.

0903=Arrived at LLMW-081.

0905=Lines frozen. Had to defrost.

0932=Lines defrosted.

D. Prell 12/7/17

Ravenna 076003 Thurs. Dec. 7

1106=Headed to LLMW-080.

1114=Arrived at LLMW-080.

1118=Water tube frozen.

1130=Water tube defrosted.

1230=Headed to meet LB to get Friday sample bottles/coolers.

1248=Headed to RQ area.

1258=Arrived at RQLMW-011

LLM 1310=Headed to RQLMW-009.

LLM 1312=Arrived at RQLMW-009.

~~1400 Headed over to RQ~~ LLM

1448 Begin collecting sample at RQLMW-009. See COC for details.

1500 Devin Rowell leaves RQLMW-009 site to assist D. Phillips at RQLMW-007.

1535 L. Myers leaves RQLMW-009 site, drive to RQLMW-007.

1545 L. Myers & C. Jafolla leave RQ area for Contractor House.

1600 Arrive Contractor House.

1635 L. Myers & C. Jafolla leave Ravenna.

12/7/17 Lesley Myers

Ravenna 076003 12/4/17

Staff: Liz Busby, Dean Bender, Jessica Cain, Devin Rowell, Jeslie Meyers, Danyelle Phillips, Caitlin Jafolla - with cardno.

Weather 30-50°F

PPE: Modified Level D

Objective: Sample MWs

0640 at hotel conduct H&S meeting, buy ice and move to site

0715 onsite load eqpt. call range control

0730 leave contractor building EB with DR&LM to sample wells see field forms. Kevin Sedlack observs.

- FBQmw-F4 is dry. no sample
- LL1mw-005 is flush mount

1006 leave Devin + Jeslie @ FBQ to delivery ice to other sample teams

1020 with Dean + Jessica. LL7mw-001 is dry. Kevin is with team

1040 leaving Jess + Dean. Drive over with Kevin to see Caitlin & Danyelle @ NTA wells

Ravenna 076003 12/4/17

1052 Arrive at NTA wells. Check on Danyelle + Caitlin. Kevin with us

1118 Kevin leaves wells. He did not say where he's going to. Liz stays with Caitlin + Danyelle

1300 leave NTA wells. Meet Kevin on road at 1306. drive together to FNGmw-025. There are 2 air lines. Jess + Dean sampling. Must be done with gasoline controller to have enough power

1320 Kevin leaves for NTA

1325 Jeave w/ Jess + Dean to Contractor building

1344 Jess & Dean setup on FNGmw-015 and FNGmw-016. Liz goes to contractor building to dispose of IDW & eb

1356 leave contractor building to meet Devin + Jeslie at BKGmw-017

1424 at BKGmw-017

Ravenna 076003 12/4/17

1435 FBQ mw-175 ~~stabalizes~~ eb
final turbidity = 89.7 NTU
after 2 hours of purging all
others parameters have
stabalize. Leave Devin & Leslie
drive back to contractor building
1450 Arrive at contractor building
Dispose of IDW & QC the chains
1530 Sign COC & hand off coolers
to Test America courier.
Kevin Sedlack at contractor
building. We discussed protocol
for accessing Winkelpeck Drive
grounds and ODEA tomorrow.
Dispose of IDW & organize
equiptment & clean up contractor
building. Wait for sample
teams to return & prep
for tomorrow
1428 Called Range Control. We're
done sampling for the day.
everyone at contractor Building
1640 Offsite. Drive 2 Cr(VI) to TA
Canton.

Jo Bailey

Ravenna 076003 12/4/17

~~15~~ eb 1730 drop off Cr(VI)
samples at Test America
Canton. Drive back to hotel

Jo Bailey
December 4
2017

eb

Rite in the Rain

Ravenna 076003
Dec 5 2017. Tuesday
Staff: Cardno, Liz Busby, Jessica Cain, Dean Bendel, Derek Rowell, Danyelle Phillips & Caitlin Jaballez
PPE: Modified Level D
Weather: 30-50°F calm, cold
Objective: Groundwater sampling
0640 At hotel, conduct health & safety meeting, buy ice, drive to site
0715 onsite. Call Range Control
0730 Kevin Sedack at contractor building. He is going to meet Danyelle & Caitlin @ WBG
Liz drive to DEA malls to meet Jessica & dean
- DETmw-004 is dry
1023 Leave Jess + Dean at FWGmw-022 & FWGmw-019 to sample. Visit other field teams to collect bottles & IDW from them
FWGmw-019 } need to be
FWGmw-022 } sampled with
17 FWGmw-023 } generator

Ravenna 076003 12/5/17
1140 Dispose of IDW at contractor building
1147 make offsite to buy extra gas for generator
1220 onsite. Drive to Jessica & dean at FWGmw-022 to deliver extra fuel. Then back to contractor building to QC coolers & COCs
1423 Offsite to buy more ice
1453 Onsite make ice baggies for coolers
FWGmw-002 was sampled after 2 hours of purging. All paramaters all stable except turbidity.
final turbidity = 23.1 NTU
1600 Katie Tait visits contractor building.
1608 Katie Tait gone.
1614 Teams at contractor building. called range control to let them know were out of the field
1426 Offsite. Danyelle & Liz

Ravenna 076003 12/5/17
Drive Samples to Test America Canton.
1714 Arrive at Test America Canton QC Chains
1730 Sign COCs & relinquish custody to Test America

Elizabeth Busby
December 6
2017

Ravenna 076003
December 6, 2017. Wednesday
Staff: Liz Busby, Leslie Meyers, Caitlin Spagella, Devin Rowell, Danyelle Phillips, Deem Bender, Jessica Cain
PPE: Modified Level D
Weather: 26-50°F
Objective: Sample groundwater wells onsite
0640 Conduct health & safety meeting at hotel. Buy ice & drive to site
0715 Onsite. Pick up supplies at contractor building
0730 Kevin Sedlack at contractor building
0738 Drive out to MWs (teams).
Liz Busby call Range Control.
Liz goes with Deem + Jessica to Lead Line 12
1000 OEPA onsite at LL12 with Kevin.
B12mw-12 is dry
LL12mw. high turbidity 225NTU
242

Ravenna 076003 12/6/17

1135 leave LL12 head to LL2 mw-08 to meet devin + leslie. Then deliver ice / extra supplies to danyelle & caitlin

1300 liz's truck is stuck in mud. Use winch to get it out.

1330 call dean to come tow me out

1400 leave truck in danyelle + caitlins vehicle to contractor building to QC samples & dispose of IDW

1500 At contractor building Dean has pulled truck out. Make ice packs. Dean & Jessica drop off IDW

1530 Sign COCs & relinquish custody to test america labs

1710 call Range Control to sign out of the field for the day

1635 Offsite. I forgot to note LL12mw 244 stabilized with high turbidity at 337 NTU

~~Liz Busby~~ 12/6/17

RAVENNA 076003

December 7 2017 Thursday

PPE: Modified Level D

Staff: Liz Busby, Jessica Cain, Danyelle Phillips Deem Bender, Caitlin Jafalla, Leslie Meyers, and Devin Ravell

Objective: sample monitoring wells onsite

Weather 19-34°F cold

0610 H+S meeting at hotel

0708 drive to Camp Ravenna

0730 onsite at building 1036. Pick up supplies for sampling. Call Range Control to check in onsite. Drive to LL1 with Leslie & Devin

0800 Kevin Sedlack at LL1mw-084 with Liz, Devin & Leslie

LL1mw-084 is dry

LL1mw-083 is dry

0844 leave LL1 to go to see Danyelle and Caitlin at LL2

LL1mw-063 is dry

1245 leave LL2 to contractor building

Ravenna 076003 12/7/17

1305 At Contractor Building. QC COCs offsite to buy ice. Done checking chains

~~1530 Relinquish~~ eb

~~Onsite~~ eb

1530 Relinquish Samples to Test America CANTON

1700 Offsite. Last well was sampled at ≈1615 so we are a bit delayed. Everyone was back at building 1036 by 1640, I called range control to sign us out.

Liz Busby
12/7/17

eb

Ravenna 076003

December 8 2017

Staff: Liz Busby, Jessica Cain, Caitlin Jafalla, Dean Bender, Leslie Meyers, Devin Russell & Danyelle Phillips - Cardno

PPE: Modified Level D

Weather: 37°F

Objective: Sample IDW, drive samples to Canton lab, clean contractor building. C-Ville staff is driving home

0700 Conduct H+S meeting at hotel.

0730 Mobilize to the site (Liz, Jessica & Caitlin). Demobilize (Dean, Leslie, Devin, Danyelle).

0750 Onsite clean contractor building, sample IDW, return rental equipment to FedEx.

1000 Sign COCs. Load up cars. Take out trash

1010 Walk through with Katie Tait + Kevin Sedlack at Building 1036.

eb

Rite in the Rain

Ravenna 076003 12/8/17

1017 Offsite drive samples to TestAmerica Canton & return supplies to FedEx. Call Range Control & Report as offsite

1109 Drop of samples at Test America Canton

Elizabeth Busby 12/8/17

25

Ravenna 076003

December 12, 2017 Tuesday

Staff: Liz Busby, Cardno

PPE: Modified Level D

Weather: 30-50F cold

Objective: conduct IDW inspection

1420 Onsite at Env. Management Office to pick up keys from Katie Tait

1440 At Building 1036, conduct weekly inspection. document on field form + photos

1505 ~~Offsite~~ ob Return keys

1506 Offsite

Elizabeth Busby 12/12/17

26

Rite in the Rain

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APPENDIX D.3

CALIBRATION LOGS

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INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

5170 Hudson Drive, Suite E
Hudson, OH 44236
Toll-free: (877) 326-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 19398
Description Hanna HI 98703
Calibrated 1/10/2017 12:33:04PM

First field use 1/11/17

Manufacturer Hanna
Model Number 98703
Serial Number/ Lot Number 08527149
Location Ohio
Department

State Certified
Status Pass
Temp °C
Humidity %

Calibration Specifications

Group # 1
Group Name Turbidimeter
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.10 / 0.10	NTU	0.10	NTU	0.10	0.10	0.00%	Pass
15.00 / 15.00	NTU	15.00	NTU	15.00	15.00	0.00%	Pass
100.00 / 100.00	NTU	100.00	NTU	100.00	100.00	0.00%	Pass
750.00 / 750.00	NTU	750.00	NTU	750.00	750.00	0.00%	Pass

Test Instruments Used During the Calibration (As Of Cal Entry Date)

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date
OH .1 NTU	OH 0.10 NTU Hanna	Hanna	0.10 NTU		
OH 100 NTU	OH 100 NTU	Hanna	100 NTU	9704	
OH 15 NTU	OH 15 NTU Hanna	Hanna	15 NTU		
OH 750 NTU	OH 750 NTU	Hanna	750 NTU		

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated James Farrell

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

5170 Hudson Drive, Suite E
Hudson, OH 44236
Toll-free: (877) 326-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 9016
Description Hanna 98703
Calibrated 1/5/2017 3:27:26PM

Manufacturer Hanna
Model Number 98703
Serial Number/ Lot Number 08179372
Location Ohio
Department

State Certified
Status Pass
Temp °C
Humidity %

Calibration Specifications

Group # 1
Group Name Turbidimeter
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 5.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.10 / 0.10	NTU	0.10	NTU	0.10	0.10	0.00%	Pass
15.0 / 15.0	NTU	15.0	NTU	15.0	15.0	0.00%	Pass
100.0 / 100.0	NTU	100.0	NTU	100.0	100.0	0.00%	Pass
750 / 750	NTU	750	NTU	750	750	0.00%	Pass

Test Instruments Used During the Calibration (As Of Cal Entry Date)

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Next Cal Date / Last Cal Date/ Expiration Date Opened Date
OH .1 NTU	OH 0.10 NTU Hanna	Hanna	0.10 NTU		
OH 100 NTU	OH 100 NTU	Hanna	100 NTU	9704	
OH 15 NTU	OH 15 NTU Hanna	Hanna	15 NTU		
OH 750 NTU	OH 750 NTU	Hanna	750 NTU		

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated James Farrell

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

5170 Hudson Drive, Suite E
Hudson, OH 44236
Toll-free: (877) 326-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 16512
Description YSI 556
Calibrated 1/5/2017 3:50:33PM

Manufacturer YSI
Model Number 556
Serial Number/ Lot Number 11A101273
Location Ohio
Department

State Certified
Status Pass
Temp °C
Humidity %

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.00	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	4.00	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.00	10.00	0.00%	Pass

Group # 2
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.413	1.413	0.00%	Pass

Group # 3
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	240.00	240.00	0.00%	Pass

Group # 4
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	100.00	100.00	0.00%	Pass

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

5170 Hudson Drive, Suite E
Hudson, OH 44236
Toll-free: (877) 326-PINE (7463)

Pine Environmental Services, Inc.

Instrument ID 22155
Description YSI 556
Calibrated 1/5/2017 3:41:25PM

Manufacturer YSI
Model Number 556
Serial Number/ Lot Number 13F100510
Location Ohio
Department

State Certified
Status Pass
Temp °C
Humidity %

Calibration Specifications

Group # 1
Group Name PH
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
7.00 / 7.00	PH	7.00	PH	7.00	7.00	0.00%	Pass
4.00 / 4.00	PH	4.00	PH	4.00	4.00	0.00%	Pass
10.00 / 10.00	PH	10.00	PH	10.00	10.00	0.00%	Pass

Group # 2
Group Name Conductivity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1.413 / 1.413	ms/cm	1.413	ms/cm	1.413	1.413	0.00%	Pass

Group # 3
Group Name Redox (ORP)
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
240.00 / 240.00	mv	240.00	mv	240.00	240.00	0.00%	Pass

Group # 4
Group Name Disolved Oxygen Span
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.00 / 100.00	%	100.00	%	100.00	100.00	0.00%	Pass

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
YSI-155	Cond		1.061		1.41	Matt Hamel	1/11/17
	pH 7		6.8		7.2		
	4		4.23		3.98		
	10		9.52		9.94		
Hanna - 09016	Would not Calibrate						
	at 8:00						
	1330 Retried Calibration	N/A	N/A	N/A	N/A	Kim Keller	1/11/17

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
398	~~Dep~~ TURB	0.10	Pass			MH	1-22-17
~~016~~		15					
		100					
		750					
016	TURB	0.10	Pass			MH	
		15					
		100					
		750					
512	YSI cond	1.070			1.413		
	PH 7	7.16			7.00		
	4	4.06			4.00		
	10	9.71			10.01		
YSI 155	cond	1.408			1.413		
	PH 10	~~9.75~~ 10.03			10.01		
	4	4.~~00~~19			3.99		
	7	6.91			7.0		

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
16512	pH-7 7.02			-.02		[illegible]	1/13/17
YSI	pH-4 3.89			+.11		[illegible]	1/13/17
	pH-10 10.04			-.04		[illegible]	1/13/17
	Cond 1.403			+.010		[illegible]	1/13/17
T	DCP 263.4			-23.4		[illegible]	1/13/17
Hanna	4 point cal 40.15, 15, 100, 750					[illegible]	1/13/17
19398							
Hanna							

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
YSI	pH-7	6.97		+0.03		Kroeker	1-19-16
	pH-4	4.09		-0.09		Kroeker	1-17-16
	pH-10	10.15		-0.15		Kroeker	1-17-16
	Cond.	1.523		-0.11		Kroeker	1-17-16
	ORP	236		4		Kroeker	1-17-16
Hanna							
Turb	0.15,15,100,750	N/A		N/A		Kroeker	1-17-16
19398							

CATEGORY 1 CALIBRATION STANDARDS LOG

PROJECT NAME: Camp Ravenna **DELIVERY ORDER NO:** 0003

12/4/17

INCLUSIVE DATES FOR CALIBRATION MATERIAL USAGE	INSTRUMENT DESCRIPTION	CALIBRATION MATERIAL *	Psi/BOTTLE	NIST # LOT # AND MANUFACTURER	PERSON (INITIALS)
Start: 6.99 Finish 7.00	YSI 6920 #15970	pH	7GH1000	Aquaphoenix	eD
Start: 3.92 Finish 4.00		pH	7GI006		
Start: 9.89 Finish 10.00		pH	7GH579		
Start: 1.413 Finish 1.413		conductivity	7GB626		
Start: 100% Finish 100%		DO%	NA	NA	
Start: 0.0 Finish 0.0		Turbidity	—	YSI	
Start: 3.99 Finish 4.00	YSI 6920 #5307	pH	7GI006	Aquaphoenix	eD
Start: 7.00 Finish 7.00			7GH1000		
Start: 9.98 Finish 10.00			7GH579		
Start: 1.413 Finish 1.413		conductivity	7GB626		
Start: 0.0 Finish 0.0		Turbidity 0	—	YSI	
Start: 100% Finish 100%		DO%	NA	NA	
Start: 238 Finish 240		ORP	0953	Hanna	
Start: 240 Finish 240	YSI 692 #15970	ORP			
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
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Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					

Figure 6-2. Calibration Standards Logs

CATEGORY 1 CALIBRATION STANDARDS LOG

PROJECT NAME:				DELIVERY ORDER NO:	
INCLUSIVE DATES FOR CALIBRATION MATERIAL USAGE	INSTRUMENT DESCRIPTION	CALIBRATION MATERIAL *	Initial ~~Psi/BOTTLE~~	Post ~~NIST # LOT # AND MANUFACTURER~~	PERSON (INITIALS)
Start: Finish	YSI 6670	0.0 NTU	0.3	0.0	
Start: Finish		126 NTU	125	127.6	
Start: Finish		1.413 mS/cm	1.540	1.417	
Start: Finish		240 ORP	240.1	242.6	
Start: Finish		7 pH	7.01	7.00	
Start: Finish		4 pH	3.95	3.85	
Start: Finish		10 pH	10.02	10.17	
Start: Finish	YSI 5307	0.0 NTU	-3.2	0.0	
Start: Finish		126 NTU	120.4	DEPL ~~27.6~~ 126.0	
Start: Finish		1.413 mS/cm	1.389	1.414	
Start: Finish		240 ORP	239.4	240	
Start: Finish		7 pH	7.04	7	
Start: Finish		4 pH	4.11	3.99	
Start: Finish		10 pH	10.04	10.04	
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
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Start: Finish					
Start: Finish					
Start: Finish					

Figure 6-2. Calibration Standards Logs

CATEGORY 1 CALIBRATION STANDARDS LOG

PROJECT NAME:				DELIVERY ORDER NO:	
INCLUSIVE DATES FOR CALIBRATION MATERIAL USAGE	INSTRUMENT DESCRIPTION	CALIBRATION MATERIAL *	Psi/BOTTLE	NIST # LOT # AND MANUFACTURER	PERSON (INITIALS)
Start: Finish	U-5000 XKF0GN55			12/7/17	JC
Start: Finish	~~U-5000, U595~~ 4.33 mS/cm	Conductivity	0.0 24 mS/cm		
Start: Finish	10.69 mg/L	DO	11.0 mg/L		
Start: Finish	0 NTU	Turb	0 NTU		
Start: Finish	3.75	pH	4.63 pH		
Start: Finish	9.89	pH	10 pH		
Start: Finish	7.90	pH			
Start: Finish	U59M9X, U-5000				
Start: Finish	5.21 mS/cm.	Cond	4.45	Cond	
Start: Finish	12.05 mg/L	DO	11.96 mg/L	DO	
Start: Finish	0	NTU	0 NTU	Turb	
Start: Finish	4.15	pH	4.09 pH	pH	
Start: Finish	9.86	pH	~~4.04 pH~~	10 pH	
Start: Finish	7.37	pH	7.05		
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
Start: Finish					
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Start: Finish					
Start: Finish					
Start: Finish					

Figure 6-2. Calibration Standards Logs

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
XKFØGNS5	HORIBA U-5000	N/A	7.14	pH	7.00	JB Bailey	~~11/30/17~~ 12/1/17 FRI
			3.67	↓	4.00		
			9.88	↓	10.00		
			1.55	COND.	1409	~~µmho/cm~~ mS/cm	
			0.0	Turb	0.0		
U599X	HORIBA U-5000	n/a	3.89	pH	4.00		12/2/17 SAT
			7.11	↓	7.00		
			10.03	↓	10.00		
			0.1	Turb	0.0		
			4.50	cond	4.45	mS/cm	
			11.42	DO	~~11.42~~	eb 11.00 mg/L	
XKFØGNS5	HORIBA U5000	n/a	3.94	pH	4.00		12/2/17
			6.81	↓	7.00		
			9.88	↓	10.00		
			0.0	Turb	0.0		
			4.40	cond	4.45	mS/cm	
			11.44	DO	11.00	mg/L	12/4/17 MONDAY
XKFØGNS5	HORIBA U5000	n/a	3.88	pH	4.00		~~12/3/17 SUN~~ eb
			7.17	↓	7.00		
			9.79	↓	10.00		
			4.52	cond	4.45	mS/cm	
			11.10	DO	11.06	mg/L	
U599X	HORIBA U5000	n/a	3.95	pH	4.00		12/4/17 MONDAY
			7.12	↓	7.00		
			9.73	↓	10.00		
			4.51	cond	4.45	mS/cm	
			11.11	DO	11.02	mg/L	

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
5307	YSI 0.0	~~2.5~~ NTU	5.4		0.0	Danyelle Phillips	~~12/4/17~~ 12/5/17
	126	~~nS/cm~~ NTU	119.3		126.0		
	1.413	mS/cm	1.241		1.413		
	7	pH	6.98		7.06		
	4	pH	3.92		4.00		
240 ORP ←	251 ORP → 240.1/10	pH	9.99		10.00		
6670	YSI	0.0 NTU	2.2		0.0	CAITLIN JATOWA	~~12/4/17~~ 12/5/17
		126 NTU	120.0		126.0		
		mS/cm	0.203		1.413		
		7 pH	~~6.98~~ 6.97		7.00		
		4 pH	~~3.92~~ 4.20		3.99		
		10 pH	10.10		10.09		
		240 ORP	242.4		240.1		
5307	YSI	0 NTU	0.3		-0.2	CAITLIN JATOWA	12/6/17
		126 NTU	124.4		125.9		
	1.413	mS/cm	1.299		1.450		
		7 pH	3.8		7.1		
		4 pH	4.48		3.98		
		10 pH	10.46		10.09		
		240 ORP	247.3		240.4		
6670	YSI	0 NTU	~~3.5~~ or 1.0		0.0		
		126 NTU	~~124.5~~ 121.9		~~125.7~~ 125.9		
		1.413 mS/cm	~~0.567~~ 1.293		1.405		
		7 pH	6.81		7.08		
		4 pH	4.36		4.00		
		10 pH	9.89		10.44		
		240 ORP	240.4		240.2		

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
58711 ~~59681~~ ~~58965~~	Horiba	pH	~~6.67~~	4.32	3.90	Devin Rowell	12/4/17
		ms/cm	0.003	5.46	4.51		
		mg/L DO	~~11.73~~	9.82	9.94		
		NTU	~~140~~	4.4	0.0		
58711	Horiba	pH	9.10		10.0		
58711	Horiba	~~ms/cm~~	pH ~~4.53~~	9.38	7.0		
		~~NTU~~	~~1.9~~				
		~~mg/L DO~~					
59819 ~~58711~~	Horiba	pH	4.53		4.04	DR	12/4/17
		ms/cm	1.93		5.04		
		NTU	0.0		0.4		
		mg/L DO	10.38		11.44		
59819	Horiba	pH	6.15		10.00	DR	12/4/17
		~~ms/cm~~	pH 9.92				
		~~mg/L DO~~					
		~~NTU~~					
58711 ~~59819~~	Horiba	pH	3.97		3.98	DR	12/5/17
		ms/cm	4.51		4.86		
		mg/L DO	12.78		12.65		
		NTU	0.0		0.0		
58711 ~~59819~~	Horiba	pH	4.70		7.0		
58711	Horiba	~~ms/cm~~	pH 9.71		10.0		
		~~mg/L DO~~					
		~~NTU~~					
~~58711~~	~~Horiba~~	~~pH~~				~~DR~~	~~12/6/17~~
		~~ms/cm~~				DR	12/6/17
		~~NTU~~	0.0		0.0		
		~~mg/L DO~~					
58711	Horiba	pH	6.51		7.0		
58711	Horiba	pH	8.19		10.0		
58711	Horiba						

EQUIPMENT CALIBRATION

IDENTIFIER	DESCRIPTION	BACKGROUND READING	PRE	ADJUSTMENT (IF NEEDED)	POST	NAME	DATE
Davis	Auto Calibration	4.0 pH	4.50 mS/cm	0.0 NTU	8.93 mg/L DO		12/4/17
	2-point	pH = 3.97		pH = 9.81	pH = 10.00		
XKFQGNS5	Horiba U-5000	N/A	3.91	pH	4.00	pH	12.06.2017
			6.99	pH	7.00	pH	
			9.99	pH			
			4.57 mS/cm	cond.	4.45 mS/cm	Cond	
			0.0 NTU	Turb	0.0	Turb	
			11.71 mg/L	DO	11 mg/L	DO	
RXPAXCBLW	Horiba U-52	3.79 pH	pH	~~4.0 pH~~	4.0	pH	12.06.17
		7.60 pH			7.0	pH	
		9.95 pH			10.00	pH	
		0.0 NTU	Turb		0.0 NTU	Turb	
		11.41 mg/L	DO		11.30 mg/L	DO	
		4.58 mS/cm	Cond		4.45 mS/cm	Cond	
YKFQGNSS	Horiba U-5000	6.94	pH		7.0	pH	
		10.04	pH		10.0	pH	
		4.59	pH		4.0	pH	
		4.43 mS/cm	Cond		4.45 mS/cm	Cond	
		0.0 NTU	Turb		0.0 NTU	Turb	
		12.12 mg/L	DO		11 mg/L	DO	

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APPENDIX D.4

PURGE FORMS

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-10-17

Project Name: Camp Ravenna

Site Name: WBL

Location ID: WBLMW-606

Sample ID: WBLMW-CCR-010117-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N __ DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1240			8.62							
1249	90	.9	8.90	9.93	7.18	0.284	26	1.94	69.0	
1254	90	1.8	8.78	9.28	7.11	0.279	16.2	0.72	64.1	
1259	90	2.7	8.79	9.25	7.07	0.277	6.32	0.33	61.8	
1304	90	3.6	8.79	9.36	7.05	0.277	3.68	0.19	60.8	
1309	90	4.5	8.79	9.48	7.04	0.273	3.45	0.19	59.8	
1314	90	5.4	8.79	9.53	7.04	0.275	2.44	0.20	59.4	
1319	90	6								
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1319		6	[1]8.79	9.66	7.03	0.279	2.36	0.19	59.1	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-10-17

Project Name: Camp Ravenna

Site Name: WB6

Location ID: WB6mw-020

Sample ID: WB6mw-020-011017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —

LNAPL: Y X N __ DNAPL: Y X N__ Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MJ

QC Sample: Y / N Type: N

Parameter(s) Types Collected: PLB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1425			15.58							
1427	200		15.58	10.63	7.03	0.141	44.4	2.32	-30.2	
1432	200		15.58	10.91	6.91	0.144	24.0	1.04	-44.7	
1437	200		15.58	10.82	6.86	0.144	15.4	0.42	-57.3	
1442	200		15.58	10.79	6.81	0.144	13.5	0.23	-55.0	
1447	200		15.58	10.82	6.77	0.145	7.67	0.19	-57.8	
1452	200		15.58	10.87	6.76	0.146	6.2	0.17	-59.1	
1457	200	7.5	15.58	10.86	6.76	0.146	5.98	0.16	-59.1	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1457		7.5	[1]15.58	10.86	6.76	0.146	5.98	0.16	-59.1	
(DUP)										

Additional Comments:

1 of 3

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-10-17

Project Name: Camp Ravenna

Site Name: WBG

Location ID: WBGMW-015

Sample ID: WBGMW-015-011017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y (N) Type:

Parameter(s) Types Collected: ~~PCBs~~ ext, VOC, cyanide

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0935			14.34							
1008	60	68	14.41	8.19	7.06	0.279	714	5.68	124.1	adjusting flow
1013	60	+.3	14.43	8.83	6.96	0.283	732	1.41	85.2	
1018	60	+.3	14.43	8.69	6.96	0.155	8712	1.27	78.3	
1023	60	+.3	14.43	9.29	6.96	0.286	899	0.93	71.1	
1028	60	+.3	14.43	9.40	6.95	0.287	927	0.77	68.9	
1033	60	+.3	14.42	9.41	6.96	0.288	934	0.68	68.1	
1038	60	+.3	14.43	9.42	6.95	0.288	889	0.65	68.0	
1043	60	+.3	14.42	9.46	6.96	0.289	906	0.62	67.8	
1048	60	+.3	14.41	9.40	6.97	0.290	807	0.61	68.1	
1053	60	+.3	14.41	9.37	6.97	0.292	623	0.60	68.5	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
		See R3	[1]Water Level Measurements in these boxes must match!							
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-10-17

Project Name: Camp Ravenna

Site Name: WBG

Location ID: WBGmw-015

Sample ID: WBGmw-015-011017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / N Type:

Parameter(s) Types Collected: VOC, EXP, cyanide

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1058	60	+.3	14.40	9.36	6.96	0.297	352	0.61	68.5	
1103	60	+.3	14.40	9.35	6.98	0.303	211	0.66	68.2	
1108	60	+.3					134			
1113	60	+.3	14.40	9.45	6.99	0.309	88.4	0.64	66.3	
1118	60	+.3	14.41	9.45	6.99	0.311	65.3	0.65	65.0	
1123	60	+.3	14.40	9.45	7.00	0.312	51.8	0.68	63.9	
1128	60	+.3	14.40	9.50	7.00	0.315	38.3	0.68	62.6	
1133	60	+.3	14.39	9.54	7.00	0.315	33.1	0.68	60.8	
1138	60	+.3	14.39	9.54	7.01	0.317	24.7	0.68	59.3	
1143		+.3	14.39	9.59	7.01	0.319	23.8	0.67	57.7	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
		See P.3	[1]Water Level Measurements in these boxes must match!							
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-10-17

Project Name: Camp Ravenna

Site Name: CWB6MW-15

Location ID: WB6

Sample ID: WB6MW-15-011017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y__ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / N Type:

Parameter(s) Types Collected: EXP, VOC, cyanide

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1148	60	~~1.3~~	14.39	9.63	7.01	0.320	23.3	0.68	56.0	
1153	60	~~1.3~~ 1.4	14.40	9.66	7.02	0.322	21.4	0.69	54.4	
1158		~~1.3~~ 1.5	14.40	9.63	7.02	0.323	17.2	0.70	53.2	
1203		~~1.3~~ 1.6	14.39	9.62	7.02	0.323	15.7	0.73	51.9	
1208		13	14.39	9.63	7.03	0.324	15.9	0.75	51.4	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1208		13	[1] 14.39	9.63	7.03	0.324	15.9	0.75	51.4	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 110-17

Project Name: Camp Ravenna

Site Name: WB6

Location ID: WB6mw-021

Sample ID: WB6mw-021-91017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N __ DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / (Bladder) / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / (N) Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1325			10.69							
1330	200	1.00	10.69	10.59	7.07	0.267	11.2	2.24	41.6	
1335	200	2.00	10.69	10.24	7.02	0.264	3.89	0.46	13.2	
1340	200	3.00	10.69	10.31	7.00	0.265	2.17	0.19	-3.6	
1345	200	4.00	10.69	10.29	6.99	0.266	2.50	0.15	-13.7	
1350	200	5.00	10.69	10.36	6.98	0.267	1.83	0.13	-21.7	
1355	200	6.00	10.69	10.33	6.98	0.269	1.07	0.16	-27.9	
1400	200	7	10.69	10.23	6.98	0.269	1.03	0.16	-30.8	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
1400		7	10.69	10.23	6.98	0.269	1.03	0.16	-30.8	
(DUP)										

Additional Comments:

J.S.

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/11/17

Project Name: Camp Ravenna

Site Name: LOOO Line 3

Location ID: LL3 MW 246

Sample ID: LL3MW-246-011117-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: NM

LNAPL: Y __ N✗ DNAPL: Y __ N✗ Product Depth N/A

Purge Style: Peristaltic / (Bladder) / Submersible / Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) JS

QC Sample: Y / (N) Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
9:52			23.4							
10:10	275 mL/min	2.4	23.55	9.79	6.33	0.153	1.05	6.06	-85.8	
10:15	275 mL/min	2.8	23.56	9.81	6.28	0.152	0.96	5.33	-86.9	
10:20	275	4.2	23.55	9.85	6.23	0.152	0.77	4.81	-93.8	
10:25	275	5.6	23.56	9.88	6.22	0.151	1.05	4.60	-101.5	
10:30	275	7	23.58	9.94	6.22	0.152	0.41	4.44	-98.3	
10:35	275	8.4	23.58	9.99	6.04	0.37	0.35	4.22	-98.9	
10:40	275	9.8	23.58	9.99	6.03	0.37	0.51	4.20	-101.4	
10:40			23.58	9.99	6.03	0.37	0.51	4.20	-101.4	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
10:40		11.	[1] 23.58	9.99	6.03	0.37	0.51	4.20	-101.4	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-11-17

Project Name: Camp Ravenna

Site Name: LL3

Location ID: LL3 mw-244 ~~011117-GW~~

Sample ID: LL3mw-244-011117-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: — NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / (Bladder) / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: (Y) N Type: Dup, QA/QC

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0912			15.08							
0932	120	2.5	15.22	9.18	9.44	0.230	6.74	5.38	144.2	
0937	150	3.25	15.22	10.13	8.03	0.219	3.64	3.40	152.3	
0942	150	4	15.22	10.20	7.25	0.218	2.95	2.59	153.4	
0947	150	4.75	15.22	10.30	6.34	0.215	1.87	2.14	157.1	
0952	150	5.5	15.21	10.29	6.26	0.215	1.23	2.16	157.3	
0957	150	7.25	15.21	10.31	6.15	0.214	1.27	2.20	158.7	
1002	150	8	15.21	10.30	6.07	0.213	1.87	2.22	159.9	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1002		8	[1]15.21	10.3	6.07	0.213	1.87	2.22	159.9	
(DUP)										

Additional Comments: Dup @ 1020

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-11-17

Project Name: Camp Ravenna

Site Name: ~~LL3~~ FWG

Location ID: ~~LL3mw-022~~ FWGmw-022

Sample ID: FWGmw-022-011117-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N ~~0~~ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: — NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y (N) Type: —

Parameter(s) Types Collected: SVOCs, DAHs, VOCs, PCBs, Exps, Pest., Cy, Metals

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1205			116.19							
1220	~~80~~ 120	.5	116.21	9.04	6.96	0.708	12.6	~~126.2~~ 6.42	125.4	
1225	~~120~~ 80	.9	116.20	9.27	6.92	0.716	24.3	5.71	106.5	
1230	~~120~~ 80	1.3	116.19	9.49	6.91	0.739	70.4	3.81	37.1	
1235	~~120~~ 80	1.7	116.20	9.57	6.90	0.741	84	3.29	17.1	
1240	~~120~~ 80	2.1	116.18	9.54	6.90	0.742	82	3.08	11.0	
1245	80	2.5	116.20	9.68	6.90	0.750	57.8	3.09	-5.6	
1250	80	2.9	116.20	9.68	6.90	0.749	47.6	2.69	-8.8	
1255	80	3.3	116.20	9.72	6.89	0.749	37.9	2.44	-11.7	
1300	80	3.7	116.20	9.73	6.88	0.750	28.9	2.07	-14.5	
1305	80	4.1	116.21	9.74	6.88	0.750	26.5	1.98	-16.2	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
			1							
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-11-17

Project Name: Camp Ravenna

Site Name: FW6

Location ID: FW6mw-022

Sample ID: FW6mw-022-011017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / N Type: —

Parameter(s) Types Collected: See P. 1

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1310	80	4.5	16.22	9.77	6.88	0.749	19	1.77	-17.3	
1315	80	4.9	16.19	9.78	6.88	0.750	16.5	1.76	-18.5	
1320	80	5.3	16.21	9.84	6.85	0.751	14.5	1.69	-18.9	
1325	80	~~4~~ 5.7	16.20	9.87	6.87	0.751	11.4	1.72	-19.7	
1330	8	6.1	16.21	10.02	6.85	0.752	9.26	1.77	-19.9	
1335	8	6.5	16.20	10.49	6.87	0.754	7.83	1.06	-22.2	
1340	8	6.9	16.21	10.42	6.87	0.754	7.22	1.03	-22.3	
1345	8	~~6.25~~ MH 7.5	16.20	10.42	6.87	0.753	6.52	1.00	-22.0	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1345		~~6.25~~ MH	[1]16.2	10.42	6.87	0.753	6.52	1.00	-22.0	
(DUP)		7.5								

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/11/17

Project Name: Camp Ravenna

Site Name:

Location ID: FW6 MW-019

Sample ID: FW6 MW-019-011117-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): —

Pump Intake (ft btoc) NM

Sampler(s) JS

QC Sample: Y / N Type:

Parameter(s) Types Collected: SVOCs, VOCs, PAHs, PCBs, TVP, Pest, Cyanide, Metals

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
11:40			117.0							
12:10	150 mL/min	1.5	116.9	9.16	7.40	0.545	6.18	9.36	-82.3	
12:15	150 ml/min	2.25	117.0	9.34	7.39	0.548	5.46	7.63	-84.0	
12:20	150	3	117.0	9.36	7.37	0.552	6.70	6.43	-87.0	
12:25	150	3.75	116.9	9.26	7.36	0.551	6.23	5.96	-90.6	
12:30	150	4.5	117.0	9.22	7.35	0.549	6.87	5.60	-92.7	
12:35	150	5.25	117.0	9.70	7.33	0.544	8.39	4.63	-96.5	
12:40	150	6	117.0	9.93	7.32	0.544	8.17	4.14	-97.5	
12:40				9.93	7.32	0.544	8.17	4.14	-97.5	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
12:40		7	1	9.93	7.32	0.544	8.17	4.14	-97.5	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-12-17

Project Name: Camp Ravenna

Site Name: NACA

Location ID: NTAmw-120

Sample ID: NTAmw-120-011217-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MJ

QC Sample: Y / N Type: —

Parameter(s) Types Collected: VOCs, SVOCs, PAHs, PCBs, Exp. Pest, Cyanide, Metals

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0950			34.41							
0955	300	2	34.45	10.71	7.23	0.910	15.9	4.81	14.0	
~~1000~~ 1000	300	3.5	34.45	10.77	7.25	0.877	9.49	5.38	128.4	
1005	300	5	34.44	10.81	7.19	0.837	11.9	1.85	60.1	
1010	300	6.5	34.41	10.80	7.15	0.815	10.9	0.77	-30.4	
1015	300	7.5	34.4	10.81	7.17	0.809	9.57	0.73	-43.9	
1020	300	8.5	34.42	10.82	7.19	0.803	9.55	0.73	-55.8	
1025	300	9	34.43	10.82	7.20	0.797	9.49	0.70	-61.7	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1025		9	[1]34.42	10.52	7.20	0.797	9.49	0.70	-61.7	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-12-17

Project Name: Camp Ravenna

Site Name:

Location ID: LL1mw-089

Sample ID: LL1mw-089-011217-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth —

Purge Style: Peristaltic / Bladder / Submersible /Other —

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) MH

QC Sample: Y / N Type:

Parameter(s) Types Collected: VOCs, SVOCs, PAHs, PCBs, Exp. Pest, Cyanide, Metals

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.[x] °C	pH[x]	Sp. Cond. (mS/cm)[x]	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1158			28.14			0.127				
1200	110	0.5	28.20	11.21	7.13	0.[illegible]	13.1	6.06	71.0	
1205	~~[illegible]~~ 120	1	28.20	11.18	5.19	0.[illegible]6.7	6.87	1.09	133.4	
1210	120	1.6	28.2	11.16	4.14	283.3	8.3	0.69	151.1	
1215	120	2.2	28.19	11.10	4.26	316.4	4.79	0.02	135.0	
1220	120	2.8	28.20	11.08	4.41	384.1	3.53	0.02	129.8	
1225	120	3.40	28.20	11.10	4.38	379.1	3.29	0.03	130.0	
1230	~~[illegible]~~ 120	4.0	28.19	11.10	4.43	384.0	3.02	0.02	128.8	

Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)

[1]Water Level Measurements in these boxes must match!

1230		4.0	[1]28.20	11.10	4.43	384.0	3.02	0.02	128.8	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: [illegible]/17

Project Name: Camp Ravenna

Site Name: LL 2

Location ID: LL2-MW-272

Sample ID: LL2-MW-272-01[illegible]17-GW

Well Head Condition: Locked: Y__ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: NM

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): Unknown

Pump Intake (ft btoc) Unknown

Sampler(s) J.S. / M.H.

QC Sample: Y (N) Type:

Parameter(s) Types Collected: VOCs, SVOCs, PAHs, PCBs, Explosives, Cyanide, Metals, PFAS

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1:35			9.72							
1:00	125 mL/min	1	9.78	10.87	6.67	0.362	49.7	2.34	118.9	
2:05	125	1.6	9.78	10.07	6.66	0.362	36.[illegible]	1.71	-120.4	
2:10	125	1.9	9.80	10.79	6.65	0.353	32.8	1.34	-121.2	
2:15	125	2.5	9.78	10.80	6.63	0.353	30.9	1.13	-114.7	
2:20	125	3.1	9.75	10.81	6.63	0.352	21.6	1.09	-119.5	
2:25	125	3.7	9.78	[illegible]	6.62	[illegible]	32.5	1.01	-117.1	
2:30	125	4.3	9.81	[illegible]	6.62	0.352	[illegible]	0.92	-114.0	
2:35	125	4.9	9.78	10.88	6.62	0.352	10.5	0.86	-152.7	
2:40	125	5.5	9.80	10.88	6.62	0.352	1.28	0.82	-125.1	
2:45	125	6	9.80	10.89	6.61	0.351	7.19	0.81	-116.6	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
2:50		6.5	[1] 9.80	[illegible]	6.61	0.351	6.16	0.78	[illegible]	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/12/17

Project Name: Camp Ravenna

Site Name: FWG

Location ID: FWG-MW-023

Sample ID: FWG-MW-023-011217

Well Head Condition: Locked: Y__ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: NM

LNAPL: Y__ N X DNAPL: Y__ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): —

Pump Intake (ft btoc) —

Sampler(s) JS

QC Sample: Y / N Type:

Parameter(s) Types Collected: VOCs, SVOCs, Exp., Metals, Pest, Cyanide, PAHs, PCBs

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
9:35			118.25							
9:45	125	1.	118.26	10.70	7.36	0.648	12.5	2.25	-123.2	
9:[illegible]	125	1.6	18.26	10.71	7.38	0.642	[illegible].4	1.72	-129.5	
9:55	125	1.8	118.27	10.72	7.38	0.641	11.4	1.72	-129.3	
10:00	125	2.4	118.26	10.78	7.38	0.638	11.3	1.65	-128.[illegible]	
10:05	125	3	118.26	10.80	7.38	0.63[illegible]	9.66	1.67	-119.5	
10:10	125	3.6	118.29	10.8[illegible]	[illegible]	0.634	[illegible]	1.74	-121.[illegible]	
10:15	125	4.2	118.28	10.88	[illegible]	0.633	[illegible]	[illegible]	-120.7	
10:20	125	4.8	118.29	[illegible]	7.37	0.63[illegible]	6.15	[illegible]	[illegible]	
10:25	125	5.4	118.29	10.96	7.37	0.6[illegible]	5.32	[illegible]	[illegible]	
10:30	125	6	118.29	10.91	7.37	0.631	[illegible]	1.69	-120.[illegible]	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
			1							
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/12/17

Project Name: Camp Ravenna

Site Name: EWG

Location ID: EWG-MW-033

Sample ID: EWG-MW-033-011217

Well Head Condition: Locked: Y__ N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) JS

QC Sample: Y / N Type:

Parameter(s) Types Collected: See D. 1

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
10:35	1.25	7	118.30	10.91	7.37	0.630	4.89	1.57	-125.9	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
10:35		7	[1] 118.30	10.91	7.37	0.630	4.89	1.57	-125.9	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-13-17
Project Name: Camp Ravenna
Site Name: Ravenna Arsenal
Location ID: RQL MW015
Sample ID: RQLMW-015-011317-gw
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth NA
Purge Style: Peristaltic / Bladder / Submersible /Other
Mid Screen Depth (ft btoc):
Pump Intake (ft btoc)
Sampler(s) B Wagner, K Kronke
QC Sample: Y / N Type:
Parameter(s) Types Collected: RCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L) %	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1048			35.38							
1050	250	1.0	36.25	9.67	6.31	0.272	26.0	5.76%	5.8	
1055	250	2.25	36.46	10.43	6.34	0.272	14.9	3.31%	-123.7	
1100	250	3.5	36.63	10.48	6.38	0.280	7.85	18.7%	-139.3	
1105	250	4.75	36.83	10.54	6.41	0.284	7.39	12.3%	-157.3	
1110	250	6.0	37.04	10.62	6.45	0.290	10.7	1.20 mg/L	-166.3	
1115	250	6.5	37.08	10.52	6.47	0.293	20.1	~~10.0~~ 6.10	-168	
1120	250	7L	36.94	10.45	6.5	.294	27.6	9.1	-165.4	
1123	225	7.9	36.95	10.21	6.49	0.295	41.3	8.5	-177.4	
1126	225	8.9	36.92	10.45	6.5	0.296	77.9	7.6	-186.4	
1129	225	10	36.94	10.46	6.5	0.295	69.5	8.1	-184.1	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
1255		22L	36.98	10.41	6.53	0.305	8.19	0.61	-183.3	
(DUP)										

Additional Comments:

2 of 3

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/13/17

Project Name: Camp Ravenna

Site Name: Ravenna Cleaners - Ramsdale R

Location ID: RQLMW-015

Sample ID: RQLMW-015-011317-JW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N X

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: — NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth NA

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) B. Weeder

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCBs

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1135	225	11	36.96	10.52	6.50	0.298	53.1	2.82	-180.9	
1140	225	12	36.96	10.59	6.55	0.298	34.0	2.08	-172.6	
1143	225	13	36.98	10.57	6.51	0.299	19.5	1.36	-176.8	
1146	225	14	36.94	10.6	6.51	0.299	13.9	1.27	-175.6	
1149	225	15	36.94	10.58	6.51	.300	7.43	1.11	-177.9	
1152	225	16	36.95	10.54	6.52	.301	6.47	0.86	-175.6	
1155	225	17	36.96	10.53	6.52	.301	34.7	0.94	-175.8	
1204	225	18	36.94	10.54	6.53	.302	31.0	0.31	-169.6	
1207	225	19	36.94	10.50	6.52	.302	33.7	0.94	-172.6	
1210	225	20	36.96	10.50	6.50	0.302	30.6	0.85	-174.6	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]**Water Level Measurements in these boxes must match!**										
			1							
(DUP)										

Additional Comments:

1250

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1/13/17

Project Name: Camp Ravenna

Site Name: Ravenna Arsenal - Ramsdell Q

Location ID: RQL mw-015

Sample ID: RQL mw-015-011317-gw

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc):

Pump Intake (ft btoc)

Sampler(s) B Weiss K Kronke

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1215	225	21	36.96	10.40	6.59	0.303	30.5	0.73	-171.8	
1220	225	22	36.98	10.58	6.52	0.302	16.4	0.71	-177.8	
1225	225	23	36.97	10.57	6.51	0.303	10.7	0.71	-179.0	
1230	225	24	36.98	10.61	6.52	0.303	41.4	0.63	-182.0	
1235	225	25	36.99	10.45	6.53	0.305	21.9	0.63	-183.0	
1240	225	26	36.97	10.44	6.52	0.305	13.9	0.62	-185.0	
1245	225	27	36.98	10.44	6.53	0.302	10.7	0.62	-182.8	
1250	225	28	36.98	10.41	6.53	0.305	8.19	0.61	-183.3	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1250		30	[1]36.98	10.41	6.53	0.305	8.19	0.61	-183.3	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-13-17

Project Name: Camp Ravenna

Site Name: Ramsdell Quarry

Location ID: RQL mw-009

Sample ID: RQLmw-009-011317-gw

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) ~~[illegible]~~ KSK K Kronke

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1258			5.63							
1310	110 ml/min	2.0	6.10	5.92	6.25	0.099	48.7	7.70	-143.6	
1320	110	2.5	6.18	5.77	6.39	0.100	35.6	8.77	-148.2	water level quit operating correctly
1325	110	3	NM	5.69	6.38	0.099	25.3	8.97	-152.6	
1330	110	3.5	NM	5.76	6.37	0.099	16.7	5.63	-153.2	
1335	110	4	NM	5.82	6.37	0.100	88.6	8.52	-155.2	
1340	110	4.5	NM	5.76	6.39	0.099	56.1	8.66	-158.0	
1345	110	5	NM	5.76	6.38	0.099	58.1	8.16	-159.2	
1350	110	5.5	NM	6.00	6.37	0.098	41.4	8.04	-160.8	
1355	110	6.5	NM	6.43	6.41	0.098	45.2	10.46	-160.7	
1400	110	7	NM	6.25	6.38	0.098	30.8	8.28	-160.4	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1313		17L	[1]6.3	5.61	6.36	0.098	9.11	7.46	-167.9	
(DUP)										

Additional Comments:

mountain time...

2 of 3

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-13-17

Project Name: Camp Ravenna

Site Name: Rainskill Quarry

Location ID: RQLmw-009

Sample ID: RQLmw-009-01317-gw

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: —

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth NA

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): —

Pump Intake (ft btoc) —

Sampler(s) B Weeder K Kroeke

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCBs

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1405	110	7.5	NM	6.23	6.37	0.098	28.2	8.03	-160.4	
1410	110	8	NM	6.17	6.37	0.098	21.4	7.87	-160.8	
1415	110	8.5	NM	5.92	6.30	0.098	18.4	7.74	-160.4	
1420	110	9	NM	5.98	6.37	0.098	16.5	7.67	-160.0	
1425	110	9.5	NM	5.91	6.37	0.098	16.1	7.67	-161.3	
1430	110	10	NM	5.88	6.37	0.098	13.6	7.68	-161.4	
1435	110	10.5	NM	5.82	6.37	0.098	12.5	7.60	-162.9	
1440	110	11	NM	5.97	6.37	0.098	19.1	7.64	-163.6	
1445	110	11.5	~~7.6~~ NM	5.75	6.38	0.099	13.6	7.58	-163.1	
1450	110	12	NM	5.66	6.37	0.098	11.0	7.64	-163.6	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
		12.3	1							
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-13-17

Project Name: Camp Ravenna

Site Name: Ramsdell

Location ID: RQLmw-009

Sample ID: RQLmw-009-011317-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth NM

Purge Style: Peristaltic / Bladder / Submersible /Other

Mid Screen Depth (ft btoc): NM

Pump Intake (ft btoc) NM

Sampler(s) Kreuke

QC Sample: Y / N Type:

Parameter(s) Types Collected: PCB

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1455	110	12.5	NM	5.63	6.36	0.097	11.6	7.52	-164.2	
1500	110	13	NM	5.62	6.36	0.098	10.8	7.52	-164.5	
1503	110	13.5	N	5.62	6.36	0.099	10.4	7.48	-166.3	
1510	110	~~3.14~~ 17.2	M	5.61	6.36	0.098	9.11	7.46	-167.9	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line)										
[1]Water Level Measurements in these boxes must match!										
1510		17.2	[1] NM	5.61	6.36	0.098	9.11	7.46	-167.9	
(DUP)										

Additional Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 1-17-17

Project Name: Camp Ravenna

Site Name: Facility Wide / Sharon

Location ID: SCFMW-001

Sample ID: SCFMW-001-011717-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: NM

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A

Purge Style: Peristaltic / Bladder / Submersible /Other Bladder

Mid Screen Depth (ft btoc): 206

Pump Intake (ft btoc) ~~240~~ KSK 203

Sampler(s) KSK

QC Sample: Y / N Type:

Parameter(s) Types Collected: SVOCs, PAH, PCBs Exp. Cyanid

Time	Purge Rate (100 – 500 mL/min)	Total Purge (L)	Depth to Water	Temp.× °C	pH×	Sp. Cond. (mS/cm)×	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
Stabilization Requirements				±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1025			90.41							
1050	100 mL/min	4	90.8	10.77	7.16	0.695	0.86	1.97	-154.3	
1055	100	5	90.8	10.77	7.17	0.694	0.64	1.79	-157.9	
1100	100	6	90.79	10.77	7.18	0.692	0.40	1.74	-162.0	
1105	100	7L	90.79	10.77	7.18	0.691	0.34	1.72	-161.7	
1110	100	8	90.8	10.77	7.19	0.690	0.34	1.73	-156.8	
1115	100	9	90.79	10.73	7.18	0.690	0.29	1.70	-159.9	
1120	100	10L	90.81	10.73	7.18	0.690	0.99	1.70	-159.9	
Final Parameter Readings Listed Below to be recorded for reporting purposes. (Dup. Info on bottom line) [1]Water Level Measurements in these boxes must match!										
KSK ~~1150~~ 1120		10L	[1]90.81	10.73	7.18	0.690	0.99	1.70	-159.9	
(DUP)										

Additional Comments:

[illegible]

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-6-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: ~~B12 Deep~~ B12mw-012

Sample ID: dry well; could not collect

Well Head Condition: Locked: Y ✓ N__

Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__

Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) —

QC Sample: Y / N Type: —

Parameter(s) Collected: —

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1100			21.80							
1105	not enough water to pump / dry									Horiba not full; not a lot of water
Final Parameter Readings for Sample.										
			dry well							

Comments: DTW at 21.80 = top of pump (top)

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/01/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKG mw-005
Sample ID: BKGmw-005-12012017-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Elizabeth Busby & Jessica Cole
QC Sample: (Y) / N Type: F. Dup
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
14:40			15.35							
1445	100	0.5	15.45	11.26	6.82	0.495	39.1	2.47	61	
14:50	100	1.0	15.50	11.18	6.82	0.494	12.5	1.89	61	
14:55	100	1.5	15.53	11.18	6.79	0.493	5.1	1.43	62	
15:00	100	2.0	15.50	11.21	6.80	0.495	4.0	1.07	63	
5 05 ~~15:10~~	100	2.5	15.50	11.19	6.80	0.498	1.0	~~0.075~~	64	
15:10	100	3.0	15.51	11.18	6.81	0.499	0.0	0.78	65	
Final Parameter Readings for Sample.										
1510		See	[1] above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: BKGMW-006

Sample ID: BKGMW-006-120517-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DR/LLM

QC Sample: Y / (N) Type: none

Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1025			25.33							
1026	100		25.33	10.80	6.32	0.004	140	13.31	149	no water in HoriBa yet
1031	100		25.33	10.81	6.38	0.004	138	12.07	149	"
1036	100		25.57	10.83	7.01	0.758	2.2	9.08	124	clear water
1041	100		25.47	10.81	6.95	0.763	0.7	5.34	133	"
1046	100		25.47	10.88	6.73	0.749	6.0	1.95	140	"
1051	100		25.49	10.90	6.68	0.765	0.0	1.11	136	"
1056	100		25.48	10.92	6.66	0.770	0.0	0.61	110	"
1101	100		25.49	10.91	6.65	0.776	0.8	0.24	80	"
1104	100		25.49	10.88	6.66	0.780	0.0	0.55	68	"
1107	100		25.49	10.88	6.66	0.781	0.0	0.47	61	"
1110	100	1 gal	25.49	10.87	6.66	0.783	0.0	0.42	54	"
Final Parameter Readings for Sample.										
1111		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12·6·17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGmw-008
Sample ID: BKGmw-008-120617-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP & CJ
QC Sample: Y (N) Type: —
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0950			21.00							
0955	100	.5	21.14	6.14	7.91	0.066	9.6	12.69	198.4	Horiba ½ full
1000		1.0	21.16	7.82	6.63	0.327	35.1	12.07	207.9	full
1005		1.5	21.17	8.54	6.46	0.245	36.8	11.66	209.9	
1010		2.0	21.20	8.80	6.41	0.220	24.8	11.52	211.3	
1015		2.5	21.20	8.94	6.40	0.222	15.2	11.30	209.7	
1020		3.0	21.20	9.00	6.41	0.226	11.5	11.34	205.6	
1025		3.5	21.20	8.77	6.41	0.228	8.4	11.58	203.0	
Final Parameter Readings for Sample.										
1025		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGMW-015
Sample ID: BKGMW-015-120517-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LLM
QC Sample: Y (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1140			no water							
1143	unknown		detected.							no water pulled yet.
1148	"		Hit top of	11.04	6.48	0.004	142	12.98	127	turned PSI to 75
1153	"		pump @ 50 ft.	11.05	7.20	0.317	0.0	6.02	108	water in Horiba but not bucket.
1158	100			10.86	6.86	0.326	0.0	~~0~~ 3.56	118	water reached
1203	100			10.85	6.81	0.325	0.0	2.40	124	rate of 100ml/min
1208	100			10.86	6.79	0.325	0.0	1.56	128	clear water
1213	100			10.87	6.65	0.321	0.0	1.02	133	"
1216	100			10.85	6.47	0.326	0.0	2.23	153	"
1219	~~100~~ 30			10.89	6.49	0.326	0.0	2.04	152	Water rate slowed drastically
1222	30	0.5 gal		10.89	6.56	0.325	0.0	2.30	149	"
Final Parameter Readings for Sample.										
1223		see above								

Comments:

Date: 12-4-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: BKGmw-016

Sample ID: BKGmw-016-120417-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth ——

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) CJ & DP

QC Sample: Y / (N) Type: ——

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0812			8.22							
0820	100	0.8	8.30	12.90	7.21	0.448	22.8	3.73	103.2	
0825		1.3	8.32	12.11	7.23	0.450	17.7	4.69	106.5	
0830		1.8	8.32	11.46	7.23	0.447	16.8	4.15	113.0	
0835		2.3	8.32	11.49	7.22	0.448	20.0	4.53	115.2	
0840		2.8	8.27	11.00	7.22	0.448	20.0	4.42	119.1	
0845		3.3	8.29	9.00	7.22	0.445	16.4	4.13	127.0	
0850		3.8	8.25	7.75	7.23	0.456	14.8	4.14	132.8	
0855		4.3	8.32	9.23	7.20	0.439	14.4	4.48	130.5	
0900		4.8	8.32	10.98	7.22	0.444	13.3	3.46	124.2	
0905		5.3	8.30	11.16	7.22	0.445	12.3	3.66	122.9	
0910		5.8	8.3	11.40	7.22	0.445	11.1	4.11	121.8	
0915		6.3	8.3	11.61	7.22	0.445	10.0	3.98	121.2	
Final Parameter Readings for Sample.										
0915		see	above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGMW-017 Page 1 of 2
Sample ID: BKGMW-017-120417-GW, BKGMW017-120417-GF
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR + LM
QC Sample: Y / N Type: N/A
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1323			21.63							
1330	100		22.11	12.31	7.12	0.610	108	7.73	-31	Clear water
1335	100		22.19	11.53	7.17	0.828	43.6	3.76	-40	" "
1340	100		22.25	11.51	7.12	0.899	39.2	0.14	-88	" "
1345	100		22.25	11.48	7.11	0.926	44.0	0.0	-89	" "
1350	100		22.15	11.44	7.11	0.936	85.0	0.0	-92	Slightly turbid
1355	100		21.85	11.58	6.28	0.005	140	9.61	-7	* cleared out
1400	100		22.14	11.37	7.10	0.926	133	0.46	-85	Horiba at 1354
1405	100		21.92	11.43	7.11	0.935	113	0.0	-92	clear
1410	100		21.90	11.40	7.11	0.940	115	0.0	-93	"
1415	100		21.86	11.45	7.11	0.941	107	0.0	-93	"
1420	100		21.86	11.51	7.10	0.943	99.8	0.0	-94	"
1425	100		21.83	11.52	7.10	0.944	94.8	0.0	-94	"
1430	100		21.82	11.52	7.10	0.944	88.3	0.00	-95	"
1435	100		21.82	11.53	7.11	0.944	83.6	0.00	-95	"
1440	100		21.82	11.53	7.11	0.945	79.0	0.00	-95	"
1445	100		21.81	11.50	7.11	0.945	74.2	0.00	-95	"
1450	100	↓	21.81	11.50	7.11	0.945	72.0	0.00	-96	"
Final Parameter Readings for Sample.										
		~~See above~~ DR	See next page							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKG MW-017 Page 2 of 2
Sample ID: BKGMW-017-120417-GW, BKGMW-017-120417-GF
Well Head Condition: Locked: Y__ N__ see page 1
Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__
Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A
LNAPL: Y __(N)__ DNAPL: Y __(N)__ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LLM
QC Sample: Y /(N) Type: N/A
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1455	100		21.81	11.51	7.11	0.945	68.4	0.00	-96	Clear
1500	100		21.81	11.52	7.11	0.944	66.0	0.00	-96	"
1505	100		21.79	11.56	7.10	0.944	61.1	0.00	-96	"
1510	100		21.80	11.55	7.10	0.944	60.5	0.00	-96	"
1515	100		21.81	11.55	7.11	0.944	60.6	0.00	-96	"
1520	100		21.81	11.50	7.11	0.944	60.1	0.00	-96	"
1525	100	4gal	21.81	11.53	7.10	0.942	57.4	0.00	-97	"
Final Parameter Readings for Sample.										
1526		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGMW-018
Sample ID: BKGMW-018-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LLM
QC Sample: Y / N Type: none
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0917			16.86							
0918	100		16.93	10.44	6.31	0.004	136	11.72	88	clear water
0923	100		16.93	10.43	6.57	0.005	0.0	11.39	88	"
0928	100		17.00	10.94	6.78	0.333	0.0	5.48	79	"
0933	100		17.01	11.31	6.54	0.379	0.0	3.99	99	"
0938	100		17.02	11.42	6.53	0.400	0.0	3.34	111	"
0943	100		17.02	11.47	6.52	0.403	0.0	3.12	119	"
0948	100	0.5gal	17.02	11.49	6.53	0.404	0.0	2.97	126	"
Final Parameter Readings for Sample.										
0949		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGmw-021
Sample ID: BKGmw-021-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CJ
QC Sample: Y /(N) Type:
Parameter(s) Collected: SEE COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1150			t.o.p							
1155	100	0.5		12.56	7.18	0.638	102.1	7.23	232.2	
1200		1.0		12.64	6.94	0.622	62.3	6.97	233.9	
1205		1.5		12.53	6.88	0.623	42.3	7.13	233.2	
1210		2.0		12.41	6.86	0.625	26.5	7.37	231.9	
1215		2.5		12.31	6.84	0.628	16.0	7.47	230.3	
1220		3.0		12.25	6.83	0.629	9.0	7.56	228.3	
Final Parameter Readings for Sample										
1225		3.5	t.o.p	12.22	6.83	0.630	6.3	7.61	226.8	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-1-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna (ele)

Location ID: BKGmw ~~-023~~ -022

Sample ID: BKGmw-022-12012017-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) Jessica Cain & Liz Bushy

QC Sample: Y (N) Type:

Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
11:~~20~~ ~~11:20~~			15.80							
11:25	100	0.50	15.81	11.14	7.33	0.222	25.6	9.91	-120	
11:30	100	1.0	15.80	10.87	7.00	0.218	54.6	9.64	-88	
11:35	100	1.5	15.80	10.65	6.82	0.218	29.5	9.50	-63	
11:40	100	2.0	15.81	10.56	6.82	0.221	16.6	9.25	-56	
11:45	100	2.5	15.80	10.44	6.77	0.222	7.20	2.15	-63	
11:50	100	3.0	15.80	10.45	6.81	0.222	1.50	2.11	-50	
11:55	100	3.5	15.81	10.50	6.90	0.223	0.0	2.43	-58	
Final Parameter Readings for Sample.										
1155			[1] see	above						

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/01/2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKG mw-023
Sample ID: BKG mw-023-12012017
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Elizabeth Busby & Jessica Cain
QC Sample: Y / N Type: F. Dup
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
12:50			8.70							
12:55	100	0.50	8.70	9.36	6.50	0.00	135	8.32	70	
13:00	100	1.0	8.70	9.38	6.55	0.00	130	8.35	43	
13:05	100	1.5	8.70	9.94	6.95	0.549	0.00	0.45	32	
13:10	100	2.0	8.70	9.97	7.00	0.549	0.00	0.00	28	
13:15	100	2.5	8.70	10.07	6.99	0.550	0.00	0.00	33	
13:20	100	3.0	8.70	9.99	6.99	0.551	0.00	0.00	37	
Final Parameter Readings for Sample.										
1320		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: BKGmw-024

Sample ID: BKGmw-024-120517-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth N/A

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DR/LLM

QC Sample: Y (N) Type: none

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0807			11.82							
0808	150		11.99	11.51	7.14	0.594	0.0	3.53	151	clear
0813	100		11.99	11.09	7.20	0.601	0.0	1.25	-85	"
0818	100		11.88	11.05	7.22	0.594	0.0	0.46	-123	"
0823	100		11.93	11.10	7.24	0.590	0.0	0.00	-138	"
0828	100		11.92	11.09	7.24	0.588	0.0	0.00	-136	"
0833	100	↓	11.93	11.05	7.25	0.589	0.0	0.00	-134	"
0838	100	2 gal	11.90	11.02	7.24	0.589	0.0	0.00	-132	"
Final Parameter Readings for Sample.										
0839		See above								

Comments:

LOW FLOW/WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/1/2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: BKGmw-025
Sample ID: BKGmw-025-120117-GW
Well Head Condition: Locked: Y N
Pooled water at head: Y N Inner Casing Clean: Y N
Exterior Seal Good: Y N Inner Casing Straight and Clear: Y N

PID Borehole Reading: N/A
LNAPL: Y N DNAPL: Y N Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Liz Busby + Jessica Cain
QC Sample: Y N Type: FDup
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
9:40			43.1							
9:45	100	0.5	43.4	8.60	6.88	0.570	3.30	9.61	2	
9:50	100	1	43.4	8.82	6.94	0.515	0.00	2.42	-45	
9:55	100	1.5	43.4	8.81	7.27	0.514	0.00	9.84	-79	
10:00	100	2.0	43.4	8.89	7.38	0.509	0.00	9.71	-84	
10:05	100	2.5	43.4	8.88	7.38	0.518	0.00	9.70	-76	
10:10	100	3.0	43.43	9.15	7.35	0.516	0.00	9.65	-72	
10:15	100	3.5	43.	9.22	7.37	0.512	0.00	9.69	-71	
Final Parameter Readings for Sample.										
1015		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: OBPMW-008

Sample ID: OBPMW-008-120617-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DP & CJ

QC Sample: Y / N Type:

Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0850			19.50							YSI NOT FULL cg
0855	100	0.5	19.74	6.14	7.85	1.051	52.5	7.03	237.4	~~LINE FROZEN/THAWING~~
~~0825~~ 0900		1.0	19.81	6.82	7.42	1.836	52.8	3.90	234.7	
~~0830~~ 0905		1.5	19.95	7.26	7.33	1.665	40.1	3.19	232.1	
~~0835~~ 0910		2.0	20.10	7.52	7.32	1.608	30.0	3.29	231.3	
~~0840~~ 0915		2.5	20.20	7.68	7.31	1.584	15.9	3.31	230.5	
~~0845~~ 0920		3.0	20.40	7.80	7.34	1.572	9.7	3.17	229.5	
Final Parameter Readings for Sample.										
920		SEE ABOVE								

Comments:

Q

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: CBPMW-009
Sample ID: CBPMW-009-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB/LLM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1526			13.49							
1527	100		13.49	11.21	6.43	0.003	136	11.83	189	no water in Horiba yet
1532	100		13.49	11.21	6.44	0.004	136	11.61	189	water entering Horiba
1537	100		13.85	11.16	6.54	0.542	0.0	11.02	156	clear
1542	100		13.54	10.92	7.47	0.588	0.0	0.48	-78	"
1547	100		13.59	10.99	7.43	0.590	0.0	0.00	-102	"
1552	100		13.55	11.00	7.40	0.591	0.0	0.00	-112	"
1557	100	0.5 gal	13.58	10.95	7.40	0.591	0.0	0.00	-117	"
Final Parameter Readings for Sample.										
1558		See above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: DA2 MW-115
Sample ID: DA2 MW-115-(GW)
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Dean Beach
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
9:15			7.8							
9:20	200	1.00	8.3	11.41	8.65	0.850	12.4	7.18	60	
9:25	150	1.75	8.2	11.38	8.11	0.848	1.9	10.08	3	
9:30	100	2.25	8.1	11.35	7.83	0.845	∅	8.95	-26	
9:35	100	2.75	8.2	11.33	7.71	0.842	∅	7.00	-44	
9:40	100	3.25	8.2	11.30	7.63	0.843	∅	4.80	-43	
9:45	100	3.75	8.2	11.27	7.62	0.842	∅	2.99	-45	
9:50	100	4.25	8.2	11.25	7.61	0.841	∅	3.15	-47	
9:55	100	4.75	8.2	11.23	7.63	0.842	∅	2.98	-48	
Final Parameter Readings for Sample.										
9:55		4.75	8.2	11.23	7.63	0.842	∅	2.98	-48	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: DETMW-003
Sample ID: DETMW-003-(GW)
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
9:15			09.57							
9:20	100	0.5	09.65	12.14	7.70	0.774	ϕ	0.10	-60	
9:25		1.0	9.60	12.17	7.65	0.773	ϕ	ϕ	-41	
9:30		1.5	9.60	12.20	7.63	0.773	ϕ	ϕ	-40	
9:35		2.0	9.60	12.21	7.62	0.774	ϕ	ϕ	-40	
9:40		2.5	9.60	12.21	7.60	0.774	ϕ	ϕ	-39	
9:45		3.0	9.60	12.20	7.60	0.774	ϕ	ϕ	-40	
Final Parameter Readings for Sample.										
9:45		3.0	9.60	12.20	7.60	0.774	ϕ	ϕ	-40	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.05.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: DETmw-004
Sample ID:
Well Head Condition: Locked: Y__ N__
Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__
Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected:

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0820										
										Water level Below top of pump
						WELL DRY				
Final Parameter Readings for Sample.										

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12·06·17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: EBG MW - 125
Sample ID: EBG MW - 125 - 120617 - GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CJ
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC.

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1205			13.48							
1210	100	0.5	13.50	11.37	7.04	0.532	0.3	5.20	-118.1	
1215		1.5	13.46	11.00	7.13	0.532	1.6	5.28	-119.7	
1220		2.0	13.45	10.97	7.15	0.526	0.0	5.08	-120.2	
1225		2.5	13.45	10.83	7.17	0.526	0.0	5.22	-119.9	
1230		3.0	13.44	10.99	7.16	0.518	0.0	4.95	-119.5	
1235		3.5	13.45	11.01	7.16	0.519	0.0	4.75	-121.9	
Final Parameter Readings for Sample.										
1235		SEE ABOVE								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-6-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: EBGmw-131
Sample ID: EBGmw-131-120617-gw
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y__ N✓ DNAPL: Y__ N✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP
QC Sample: Y/(N) Type: —
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1205			12.3					11.95		
1210	200	1.0	12.30	8.08	7.89	0.013	0.1	~~16.9~~	218.9	Horiba not full
1215	200	2.0	12.30	8.60	7.88	0.013	0.0	11.25	218.0	Horiba not full
1220	200	3.0	12.30	8.40	7.74	0.778	3.6	7.45	199.0	full
1225	100	3.5	12.30	9.76	7.71	0.698	0.8	3.04	101.5	
1230	↓	4.5	12.30	9.92	7.49	0.689	0.0	1.87	31.0	
1235	↓	5.0	12.30	10.06	7.40	0.689	0.0	1.55	9.9	
1240	↓	5.5	12.30	10.13	7.37	0.688	0.0	1.31	-2.9	
1245	↓	6.0	12.30	10.15	7.36	0.686	0.0	1.25	-8.7	
Final Parameter Readings for Sample.										
1245		see	above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 4 Dec 2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQ MW 171
Sample ID: FBQMW171-120417-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Devin Rowell, Lesley Myers
QC Sample: Y / (N) Type: ~~See COC~~ N/A
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
~~0750~~			23.77							
0756	100 mL/min		23.93	18.61	7.32	0.005	0.0	9.3	14	
0801	100		24.05	12.23	5.85	0.180	38.0	4.20	209	clear water
0806	100		24.05	12.04	5.82	0.179	32.7	5.84	216	"
0811	100		24.05	11.65	5.80	0.177	22.6	3.16	233	"
0816	100		24.05	11.55	5.76	0.172	14.5	2.68	241	"
0821	100	↓	24.05	11.50	5.76	0.172	12.5	2.52	247	"
0826	100	4	24.05	11.47	5.75	0.171	9.8	2.49	251	sampled
Final Parameter Readings for Sample.										
0827		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQ MW-172
Sample ID: FBQMW-172-120417-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Devin Rowell
QC Sample: Y (N) Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0947			30.87							
0952	100		31.60	8.93	6.75	0.802	13.3	4.22	194	clear water
0957	100		31.50	9.80	6.60	0.751	18.0	2.52	205	"
1002	100		31.60	9.89	6.56	0.741	11.3	1.95	207	"
1007	100		31.50	9.98	6.53	0.737	6.1	1.18	212	"
1012	100		31.60	10.02	6.53	0.735	5.1	1.35	214	"
1017	100		31.60	10.12	6.51	0.733	3.1	1.42	214	"
1022	100	4	31.60	10.20	6.50	0.730	2.0	0.72	224	"
Final Parameter Readings for Sample.										
1023		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQMW-174
Sample ID: FBQMW-174-120417-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Devin Rowell
QC Sample: Y (N) Type:
Parameter(s) Collected: None - dry

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0920			see notes							
										water level below top of pump
Final Parameter Readings for Sample.										
0921						Kevin said OHARNG observed dry well. No sample.				

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQMW-175 Page 1 of 2
Sample ID: FBQmw-175-120417
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) KGM
QC Sample: Y / (N) Type: None
Parameter(s) Collected:

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0908			21.84							
0913	100	0.1	NA	9.37	7.24	0.127	over range	8.41	136	highly turbid, low flow
0918	100	0.1	NA	10.30	6.15	0.124	over range	8.02	170	No water, at top
0923	100	0.1	NA	10.29	5.59	0.125	over range	7.85	193	of pump ?
0928	100	0.1	NA	10.64	5.37	0.125	" "	7.56	209	
0933	100	0.1	NA	10.55	5.31	0.123	over range	7.34	217	
0938	100	0.1	NA	10.54	5.27	0.124	over range	5.60	225	
0943	100	0.1	NA	10.52	5.24	0.122	over range	7.08	231	
0948	100	0.1	NA	10.45	5.21	0.122	over range	7.01	236	
0953	100	0.1	NA	10.37	5.08	0.126	over range	7.02	246	At 0955,
1001	100	0.1	NA	9.68	4.92	0.123	1,000	7.22	219	Stopped purging &
1006	100	0.1	NA	10.11	5.20	0.122	765	6.59	247	rinsed Horiba cell
1011	100	0.1	NA	10.28	5.07	0.122	413	6.15	276	
1016	100	0.1	NA	10.36	5.06	0.121	375	6.36	289	
1021	100	0.1	NA	10.38	5.06	0.121	358	6.29	296	At 1025, Horiba
1030	100	0.1	NA	10.52	5.12	0.124	421	7.03	301	timed out had to
1035	100	0.1	NA	10.49	5.09	0.123	237	6.37	306	restart
1040	100	0.1	NA	10.55	5.08	0.122	172	6.44	308	
Final Parameter Readings for Sample.										
			1							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQ MW-175 Page 2 of 2
Sample ID:
Well Head Condition: Locked: Y__ N__ see page 1
Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__
Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected:

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
see Page 1			—							
1045	100	0.1	NA	10.61	5.07	0.122	135	6.39	312	See page 1 -- at top
1050	100	0.1	NA	10.71	5.08	0.122	128	6.44	313	of pumping well,
1055	100	0.1	NA	10.85	5.09	0.122	104	6.53	314	so no water level
1100	100	0.1	NA	10.94	5.10	0.121	104	6.45	312	readings
1105	100	0.1	NA	11.04	5.08	0.121	90.0	6.39	315	
1110	100	0.1	NA	11.14	5.09	0.121	89.7	6.39	316	
Final Parameter Readings for Sample.										
1111			see above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FBQMW-176
Sample ID: FBQMW-176-~~GW~~120417-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR + LM
QC Sample: Y / (N) Type:
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1144			12.42					1.02		
1147	100		12.55	11.24	6.85	0.005	62.7	~~0.005~~ DR	189	clear water
1152	100		12.55	12.08	6.10	0.135	296	~~0.13~~ DR 24	30	murky water
1157	100		12.55	11.06	5.19	0.005	176	10.17	79	clear water
1202	100		12.55	12.07	6.08	0.125	116	1.10	30	"
1207	100		12.55	12.13	6.08	0.129	64.6	0.30	21	"
1212	100		12.55	12.16	6.11	0.132	51.6	0.0	15	"
1217	100		12.50	12.23	6.13	0.136	39.1	0.0	9	"
1222	100		12.52	12.22	6.14	0.138	28.2	0.0	7	"
1227	100		12.52	12.21	6.15	0.139	22.6	0.0	5	"
1232	100		12.52	12.23	6.15	0.139	19.3	0.0	5	"
1237	100		12.54	12.27	6.14	0.140	15.7	0.0	4	"
1242	100		12.54	12.41	6.14	0.141	13.3	0.0	Ø	"
1247	100		12.50	12.42	6.14	0.142	10.4	0.0	-3	"
1252	100		12.50	12.42	6.15	0.143	8.7	0.0	-5	"
1257	100	4 gal	12.50	12.41	6.17	0.144	6.7	0.0	-6	"
Final Parameter Readings for Sample.										
1258		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-5-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: FWGmw-002

Sample ID: FWGmw-002-120517-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DP

QC Sample: Y / (N) Type: —

Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min) DEP	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1155			24.22							
1200	150	0.75	24.35	11.87	7.61	0.004	1079.1	11.83	106.5	pump wasn't
1205	150	1.25	24.50	10.92	7.89	0.410	124.4	11.56	117.6	discharging; horiba
1210	150	2.0	24.70	11.21	7.84	0.435	172.1	4.41	65.1	not full
1215	100	2.5	24.70	11.12	7.63	0.446	170.3	2.60	-61.3	cloudy & sandy
1220	↓	3.0	24.70	11.11	7.61	0.447	156.2	2.45	-85.7	
1225	↓	3.5	24.70	11.10	7.60	0.447	152.8	2.34	-102.5	
1235	↓	4.0	24.70	11.07	7.62	0.446	116.7	2.33	-114.6	
1240	↓	4.5	24.70	11.07	7.63	0.445	104.1	2.26	-123.8	
1245	↓	5.0	24.70	11.10	7.63	0.444	81.0	2.24	-129.2	cleared YSI,
1250	↓	5.5	24.70	11.11	7.67	0.442	74.1	4.23	-112.6	cleaned optics
1255	↓	6.0	24.70	11.08	7.65	0.442	60.9	3.52	-119.7	
1300	↓	6.5	24.70	11.09	7.65	0.442	54.0	2.94	-120.4	
1305	↓	7.0	24.70	11.13	7.65	0.442	56.7	3.38	-121.3	
1310	↓	7.5	24.70	11.08	7.65	0.442	53.9	3.12	-121.3	
1315	↓	8.0	24.70	11.05	7.66	0.442	48.1	3.21	-122.3	
1320	↓	8.5	24.70	11.08	7.66	0.441	37.1	3.07	-123.3	
1325	↓	9.0	24.70	10.98	7.66	0.441	35.9	3.05	-124.4	
Final Parameter Readings for Sample.										
1355		See	page	2						

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-5-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-002
Sample ID: FWGmw-002-120517-gw
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP
QC Sample: Y (N) Type: —
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1155			24.22							
1330	100	9.5	24.70	10.97	7.66	0.441	39.3	2.84	-126.7	
1335		10	24.70	10.91	7.67	0.441	33.8	2.43	-127.5	
1340		10.5	24.70	10.88	7.67	0.440	31.4	2.24	-130.2	
1345		11	24.70	10.84	7.67	0.440	31.6	2.21	-131.8	
1350		11.5	24.70	10.86	7.67	0.440	28.1	2.21	-131.9	
1355		12	24.70	10.85	7.67	0.440	23.1	2.35	-131.5	
Final Parameter Readings for Sample.										
1355		see	above							

Comments: 2 of 2 ; turbidity above 10 NTU

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.05.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-004
Sample ID: FWGmw-004-120517-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Y & DB
QC Sample: Y / N Type:
Parameter(s) Collected: See C.O.C.

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
~~13~~ 1523			16.15							
1528	100	0.5	16.50	12.19	7.09	0.767	202	11.09	112	
15:33	↓	1.0	16.75	12.11	6.97	0.765	91.6	9.80	114	
15:38		1.5	16.70	12.08	6.95	0.763	85.9	9.17	114	
15:43		2.0	16.30	11.73	6.94	0.758	66.1	8.08	116	
15:48		2.5	16.30	11.45	6.93	0.755	65.1	8.10	117	
15:53		3.0	16.30	11.29	6.91	0.753	34.2	7.53	118	
15:58	100	3.5	16.50	11.25	6.89	0.753	18.5	7.10	119	
16:03	100	4.0	16.50	11.21	6.87	0.753	15.9	6.91	119	
16:08	100	4.5	16.45	11.14	6.87	0.753	8.3	6.85	120	
Final Parameter Readings for Sample.										
1608		4.5	16.45	11.14	6.87	0.753	8.3	6.85	120	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/1/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-005
Sample ID: FWGmw-005-120117-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Liz Kirby & Jessica Cain
QC Sample: Y / N Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
7:50			23.4							
7:57	100	Ø	23.35	12.09	8.71	0.399	0.0	3.66	60	
8:02	100	200mL	23.35	10.78	6.87	0.379	0.0	1.10	-3	
8:07	100	300mL	23.35	10.14	6.63	0.380	473	1.77	-15	
8:15	100	400mL	23.35	10.01	6.71	0.378	214	~~0.40~~ 0.0	-11	
8:20	100	500mL	23.35	9.73	6.52	0.376	142	9.63	-1	
8:25	100	600mL	23.35	9.73	6.42	0.378	105	0.64	-1	
8:30	100	700mL	23.35	9.62	6.31	0.381	~~30~~ 77.1	0.22	2	
8:35	100	800mL	23.35	9.17	6.61	0.378	79.0	0.80	-7	
8:48	100	900mL	23.35	8.95	6.51	0.382	74.0	9.69	-2	Funky Battery
8:53	100	1000mL	23.35	9.09	6.60	0.380	41.1	3.47	-13	
8:58	100	1100mL	23.35	9.12	6.72	0.384	31.1	9.42	-21	
~~8:58~~ 9:03	100	1200mL	23.35	9.19	6.49	0.382	9.1	9.57	-15	
9:08	100	1300mL	23.35	9.18	6.74	0.384	8.9	9.64	-19	
Final Parameter Readings for Sample.										
0908			[1] see	above						

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-4-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-007
Sample ID: FWGmw-007-120417-gw
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CJ & DP
QC Sample: Y / N Type:
Parameter(s) Collected:

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1340			25.35							
1345	150		25.38	12.21	7.98	0.004	1.5	10.37	67.7	Horiba not full
1350	↓		25.51	12.42	7.97	0.004	1.1	10.53	72.6	Horiba full
1355	↓		25.59	12.61	7.85	0.004	1.1	10.64	79.3	
1400	150		25.68	12.79	7.66	0.004	1.7	10.44	85.1	
1405	↓		25.75	12.94	7.50	0.004	1.6	10.25	91.6	
1410	↓		25.77	13.24	7.44	0.004	1.6	10.08	95.2	
Final Parameter Readings for Sample:										
1410		see	[1] above							

Comments:
Kevin observing

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.7.17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGMW-010
Sample ID: FWGMW-010-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DPI CJ
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ±0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0750			15.73							
0755	100	0.5	(t.o.p-	15.60) 6.78	6.42	0.151	57.7	0.25	165.1	
0800	↓	1.0	t.o.p	7.14	5.50	0.129	52.6	8.73	188.7	
0805		1.5	↓	8.27	5.20	0.110	37.7	8.11	208.6	
0810		2.0		8.55	5.16	0.108	19.1	7.92	216.1	
0815		2.5		9.03	5.16	0.106	8.7	7.67	223.4	
0820		3.0		9.35	5.17	0.105	7.0	7.58	227.7	
Final Parameter Readings for Sample.										
0820		see above								

Comments:

Date: 12·6·17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: FWGMW-011

Sample ID: FWGMW-011-120617-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft.btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) CO

QC Sample: Y / N Type:

Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	±.3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1325			3.73							
1330	100	0.5	3.43	9.70	7.27	0.417	1010.2	3.83	-106.9	
1335		1.0	3.48	9.75	7.28	0.416	540.0	3.57	-108.8	
1340		1.5	3.48	9.81	7.28	0.422	537.7	4.76	-104.6	
1345		2.0	3.46	9.64	7.31	0.423	201.2	4.98	-102.3	
1350		2.5	3.46	9.65	7.31	0.423	171.4	4.94	-103.9	
1355		3.0	3.45	9.70	7.31	0.422	127.9	4.39	-105.7	
1400		3.5	3.45	9.71	7.30	0.422	111.6	4.24	-107.7	
1405		4.0	3.47	9.69	7.30	0.422	95.6	4.14	-109.2	
1410		4.5	3.47	9.72	7.29	0.421	92.6	4.20	-109.4	
1415		5.0	3.47	9.62	7.30	0.423	85.0	3.95	-110.9	
1420		5.5	3.45	9.81	7.30	0.424	57.3	3.55	-113.5	
1425		6.0	3.47	9.83	7.30	0.425	50.4	3.49	-116.6	
1430		6.5	3.48	9.83	7.31	0.424	46.1	3.38	-116.7	
1435		7.0	3.47	9.81	7.30	0.420	57.8	3.04	-117.6	
1440		7.5	3.45	9.81	7.30	0.420	52.6	2.99	-120.5	
1445		8.0	3.47	9.86	7.30	0.420	47.4	2.41	-121.7	
1450		8.5	3.47	9.92	7.30	0.419	47.6	2.28	-123.1	
Final Parameter Readings for Sample.										
			1							

Comments:

see page 2

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LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12·6·17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: FWG MW 011

Sample ID: FWG MW-011-120617-GW (LOW.)

Well Head Condition: Locked: Y__ N__

Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__

Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A

LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s)

QC Sample: Y / N Type:

Parameter(s) Collected:

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
SEE PG 1			SEE PG 1							
1455	100	9.0	3.67	9.93	7.30	0.420	43.6	2.55	-123.6	
1500		9.5	3.50	9.77	7.30	0.420	34.2	2.34	-124.1	
1505		10.0	3.43	9.83	7.30	0.418	37.6	2.29	-125.1	
1510		10.5	3.45	9.80	7.29	0.417	35.5	2.13	-125.0	
1515		11.0	3.50	10.09	7.28	0.418	35.5	2.15	-125.2	
1520		11.5	3.72	10.30	7.32	0.427	27.8	1.98	-134.0	
1525		12.0	3.83	10.35	7.33	0.427	27.7	1.84	-137.7	
Final Parameter Readings for Sample.										
1525		S								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-06-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-012
Sample ID: FWGmw-012-120617-mw
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y__ N ✓ DNAPL: Y__ N ✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP
QC Sample: Y / (N) Type: —
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1320			3.42							
1325	100	.5	4.00	9.06	8.09	0.286	1147.6	3.79	29.0	orange
1330		1	3.35	9.81	6.94	0.286	1109.4	2.91	21.4	
1335		1.5	3.50	8.87	6.42	0.275	898.6	2.00	37.4	
1340		2	3.55	9.38	6.23	0.269	235.7	1.08	43.1	
1345		2.5	3.60	9.49	6.11	0.269	156.4	0.94	52.5	
1350		3	3.60	9.51	6.07	0.268	85.2	0.86	59.8	
1355		3.5	3.60	9.58	6.05	0.268	63.0	0.81	64.6	
1400		4	3.55	9.37	6.03	0.268	65.3	0.74	67.2	
1405		4.5	3.60	9.45	6.03	0.268	47.5	0.67	68.6	
1410		5	3.60	9.52	6.02	0.268	35.8	0.63	70.5	
1415		5.5	3.33	9.50	6.02	0.269	27.6	0.67	72.4	
1420		6.0	3.60	9.00	6.01	0.269	23.3	0.66	73.8	
1425		6.5	3.60	9.28	6.01	0.269	21.7	0.57	74.0	
1430		7.0	3.60	9.17	6.01	0.271	20.2	0.55	74.8	
1435		7.5	3.49	9.19	6.01	0.269	17.5	0.55	75.5	
1440		8.0	3.52	9.29	6.00	0.270	14.0	0.52	75.7	
1445		8.5	3.55	9.28	6.01	0.270	10.0	0.53	76.4	
Final Parameter Readings for Sample.										
1445		see lab								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGMW-013
Sample ID: FWGMW-013-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP, CS
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1045			23.79				-1.2			not
1050	100	.5	23.92	10.48	7.73	0.004	~~40.7~~ dep	12.34	90.2	Horiba full
1055		1.0	24.50	11.49	7.32	0.440	47.1	8.01	72.3	
1100		1.5	25.13	12.05	7.09	0.450	10.9	5.37	64.7	
1105		2.0	25.25	11.88	7.02	0.455	12.0	3.14	62.5	
1110		2.5	25.50	11.93	7.00	0.456	4.4	2.67	58.1	
1115		3.0	25.25	11.94	6.98	0.456	2.0	2.85	55.1	
Final Parameter Readings for Sample										
1115		SEE ABOVE								

Comments: well pad is cracked; took picture

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGMW - 015
Sample ID: FWGMW - 015 - 120417 - GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Dean Rowe
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	±3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
13:40			10.45							
13:45	100	0.50	10.60	13.25	7.08	1.755	50.9	7.68	53.7	
13:50	100	1.0	10.80	13.10	7.11	1.710	30.3	8.64	61.7	
13:55	100	1.5	10.85	13.23	7.11	1.701	19.5	8.12	66.2	
14:00	100	2.0	10.87	13.23	7.10	1.724	18.0	8.87	69.0	
14:05	100	2.5	10.89	13.09	7.07	1.753	6.5	7.50	71.2	
14:10	100	3.0	10.89	13.07	7.06	1.769	6.1	7.04	67.1	
14:15	100	3.5	10.90	13.11	7.01	1.775	7.1	7.06	65.3	
14:20	100	4.0	10.90	13.43	7.00	1.781	4.6	7.11	63.9	
Final Parameter Readings for Sample.										
1420		4.0	10.90	13.43	7.00	1.781	4.6	7.11	63.9	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.04.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWG mw - 016
Sample ID: FWGmw - 016 - 120417 - GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) TC
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
13:40			18.75							
13:45	100	0.5	18.80	11.64	6.68	~~0.2~~ 0.727	2.2	0.06	88	
13:50		1.0	18.80	11.65	6.85	0.728	0.0	0.00	52	
13:55		1.5	18.81	11.60	6.80	0.728	0.0	0.00	30	
14:00		2.0	18.80	11.59	6.83	0.729	0.0	0.00	17	
14:05		2.5	18.84	11.58	6.84	0.729	0.0	0.00	10	
1410		3.0	18.84	11.58	6.86	0.727	0.00	0.00	07	
TC 1415		3.5								
Final Parameter Readings for Sample.										
1410		3.0	18.84	11.58	6.86	0.727	0.00	0.00	07	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/2/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: FWGmw-017

Sample ID: FWGmw-017-120217-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) eb

QC Sample: Y / N Type:

Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0930			14.40							
0935	100	0.0	14.45	8.07	8.74	0.001	282	11.52	135	offsite MW
0940	100	0.5	14.43	10.88	8.50	0.601	17.4	0.00	-80	
0945	100	1.0	14.59	11.05	8.59	0.568	18.0	0.00	-66	
0950	100	1.5	14.50	10.31	8.27	0.578	0.1	0.00	-70	
0955	100	2.0	14.50	9.36	8.27	0.577	0.1	0.00	-70	
eb ~~0955~~ 1000	100	2.5	14.50	9.40	8.24	0.572	0.1	0.00	-69	
Final Parameter Readings for Sample.										
1005		3.0	14.50	9.40	8.27	0.570	0.1	0.00	-70	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.02.17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGMW-018
Sample ID: FWGMW-018-120217-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Jessica Cain
QC Sample: Y / N Type: N/A
Parameter(s) Collected: See COC.

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1345			24.57							
1350	100	0.5	25.15	9.99	7.58	0.675	0.00	1.27	-31	
1355		1.0	25.15	10.10	7.56	0.689	0.00	0.00	-71	
1400		1.5	25.16	10.15	7.52	0.693	0.00	0.00	-70	
1405		2.0	25.05	10.19	7.50	0.694	0.00	0.00	-73	
1410		2.5	25.05	10.12	7.50	0.694	0.00	0.00	-75	
1415		3.0	25.05	10.07	7.49	0.694	0.00	0.00	-78	
Final Parameter Readings for Sample.										
1415		3.0	25.05	10.07	7.49	0.694	0.00	0.00	-78	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.05.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-019
Sample ID: FWGmw-019-120517-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC & BD
QC Sample: (Y) N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
040 ~~10:35~~			117.41							
10:45	100	0.5	117.6	10.83	8.19	0.810	Ø	5.31	198	
10:50	↓	1.0	117.5	10.58	7.55	0.825	Ø	3.31	124	
10:55	↓	1.5	117.5	10.49	7.42	0.831	Ø	2.04	96	
11:00	↓	2.0	117.65	10.42	7.32	0.836	Ø	1.26	75	
11:05	↓	2.5	117.65	10.40	7.27	0.840	Ø	0.72	63	
11:10	↓	3.0	117.65	10.36	7.24	0.843	Ø	0.09	50	
11:15	↓	3.5	117.65	10.31	7.24	0.846	Ø	0.26	46	
11:20	↓	4.0	117.65	10.31	7.22	0.847	Ø	0.11	51	
Final Parameter Readings for Sample.										

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/2/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-020
Sample ID: FWGmw-020-120217-gw
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth none
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) eb
QC Sample: Y / (N) Type:
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1339			25.40							
1340	100	0.1	25.71	10.81	7.21	0.751	15.5	3.38	69	clear. offsite MW
1345		0.5	25.78	10.88	7.53	0.772	13.7	2.10	45	
1350		1.0	25.50	10.90	7.60	0.777	6.9	2.00	40	
1355		1.5	↓	11.20	7.72	0.803	5.0	0.00	4	
1400		2.0	↓	11.27	7.72	0.811	4.8	0.00	4	
1405		2.5	↓	11.28	7.73	0.812	6.9	0.00	-6	
1410	↓	3.0	↓	11.29	7.75	0.813	2.2	0.00	-16	
Final Parameter Readings for Sample.										
1411		3.1	25.50	11.30	7.76	0.814	2.0	0.00	-20	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-2-2017

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: FWGmw-~~023~~ 021

Sample ID: FWGmw-021-120217-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) eb

QC Sample: Y / N Type:

Parameter(s) Collected: All COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1145			25.46							
1147	100	0.1	25.62	8.98	8.76	0.205	13.5	9.80	63	Offsite MW
eb ~~1153~~ 1152	100	0.5	25.62	10.43	7.85	0.213	1000.0	2.63	43	First water is
1157	100	1.0	25.58	10.26	7.16	0.216	608	1.67	58	rusty-orange in
eb ~~1155~~ 1202	100	1.5	25.60	10.03	7.12	0.216	725	1.75	59	color, no odor
1207	100	2.0	25.61	10.52	7.02	0.216	435	1.71	60	
1212	100	2.5	25.61	10.32	6.87	0.222	233	0.52	45	
1217	100	3.0	25.61	10.46	6.78	0.222	67.1	0.89	49	clearingup
1220	100	3.3	25.61	10.48	6.76	0.222	32.0	0.30	47	
1225	100	3.8	25.61	10.45	6.74	0.222	28.9	0.27	47	
1230	100	4.2	25.61	10.45	6.72	0.222	26.2	0.19	48	
1235	100	4.8	25.61	10.45	6.72	0.222	6.0	0.20	48	
1240	100	5.2	25.61	10.47	6.71	0.222	6.6	0.19	48	
1245	100	5.8	25.61	10.45	6.72	0.222	6.2	0.21	48	
1246				Final Parameter Readings for Sample.						
~~1220~~ (eb)		5.9	25.61	10.45	6.72	0.222	6.2	0.21	48	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWG MW-022
Sample ID: FWG MW-022-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
30 ~~10:35~~			116.65							
12:35	100ml	0.5	116.70	11.29	7.40	0.830	∅	7.00	77	
12:40	100ml	1.0	117.00	11.24	7.41	0.833	~~∅~~ 249	1.00	22	
12:45	100	1.5	116.90	11.23	7.57	0.912	24.1	0.00	-3	
12:50		2.0	116.95	11.21	7.71	0.787	27.7	∅	-46	
12:55		2.5	116.90	11.22	7.91	0.742	18.7	∅	-41	
13:00		3.0	117.00	11.20	7.80	0.740	9.8	∅	-46	
13:05		3.5	117.00	11.19	7.75	0.744	4.7	∅	-45	
13:10		4.0	~~117.00~~ 116.80	11.19	7.74	0.742	1.0	∅	-44	

Final Parameter Readings for Sample.

13:10		4.0	116.80	11.19	7.74	0.742	1.0	∅	-44	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/14
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWG MW-023
Sample ID: FWG MW-023-120417-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected:

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
15:30 ~~12:25~~			118.75							
15:35	100	0.5	118.70	12.23	7.26	0.597	2.9	7.66	142	
15:40	100	1.0 ~~0.5~~	118.79	12.23	7.13	0.597	1.7	6.87	100	
15:45	100	01.5	118.77	12.15	7.03	0.599	1.3	6.02	37	
15:50	100	2.0	118.77	12.10	7.01	0.602	0.9	5.98	35	
15:50	100	2.5	118.77	12.03	6.98	0.605	0.9	5.92	31	
16:00	100	3.0	118.77	11.98	6.96	0.610	1.1	5.81	31	
Final Parameter Readings for Sample.										
16:00		3.0	118.77	11.98	6.96	0.610	1.1	5.81	31	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.02.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: FWGmw-024
Sample ID: ~~FWGmw-024-GW~~ FWGmw-024-120217-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y ✓ N X DNAPL: Y__ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Jessica Cain
QC Sample: Y / (N) Type: N/A
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0958			16.15							
1002	100	0.1	16.22	10.16	7.65	0.528	374	0.62	-112	
1008		0.5	16.23	10.85	7.34	0.532	320	0.00	-57	
1012		1.0	16.17	10.82	7.10	0.536	202	0.00	-69	
1018		1.5	16.17	10.89	7.11	0.537	90.5	0.00	-70	
1022		2.0	16.18	10.89	7.11	0.537	60.8	0.00	-71	
1028		2.5	16.20	10.87	7.14	0.536	37.9	0.00	-71	
1032		3.0	16.20	10.91	7.15	0.537	26.9	0.00	-71	
1036		3.5	16.21	10.98	7.17	0.536	23.0	0.00	-72	
1041		4.0	16.20	10.98	7.20	0.536	18.4	0.00	-72	
1046		4.5	16.21	11.01	7.21	0.536	16.7	0.00	-73	
1051		5.0	16.20	11.03	7.22	0.536	15.6	0.00	-73	
1056		5.5	16.20	11.01	7.24	0.536	9.90	0.00	-73	
Final Parameter Readings for Sample.										
1056 ~~1030~~		~~2.7~~ 5.5	16.20	11.01	7.24	0.536	9.90	0.00	-73	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL1mw-063
Sample ID: none
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y__ N ✓ DNAPL: Y__ N ✓ Product Depth none
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: ~~see COC~~ none

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0845			27.18							
0846	started pumping to see if we can pull water.		water level did not detect water- sitting on top of pump.							
0849	?			-0.31	9.63	0.008	221	15.80	94	water entering Horiba!
0854	?			-0.29	9.47	0.008	183	13.88	1.03	flow rate slowed drastically & no water coming out of horiba yet. DR

Final Parameter Readings for Sample.

0856		no water pumping out of well. Deemed dry.

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL1mw-064
Sample ID: LL1mw-064-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC & DB
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
7:56			4.15							
7:55	100	0.5	4.22	9.49	7.50	0.456	582	1.35	233	
8:00		1.0	4.30	10.04	7.14	0.449	239	ϕ	152	
8:05		1.5	4.35	10.15	7.13	0.446	94.3	ϕ	100	
8:10		2.0	4.35	10.11	7.13	0.445	29.5	0.00	29	
8:15		2.5	4.35	10.34	7.13	0.442	10.6	0.00	-50	
8:20		3.0	4.35	10.40	7.12	0.441	3.6	ϕ	-82	
8:25		3.5	4.35	10.43	7.12	0.441	2.1	ϕ	-92	
8:30		4.0	4.35	10.48	7.13	0.440	1.5	0.00	-97	
8:35		4.5	4.35	10.53	7.12	0.439	0.0	ϕ	-100	
Final Parameter Readings for Sample.										
8:35		4.5	4.35	10.53	7.12	0.439	ϕ	ϕ	-100	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: ~~[illegible]~~ LLmw-065
Sample ID:
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y__ N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB & JC
QC Sample: Y N Type:
Parameter(s) Collected: See C.O.C.

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
09:05			15.20							
09:10	100	0.5	15.20	7.62	6.86	0.745	23.0	1.50	92	
09:15		1.0	15.20	6.56	6.86	0.751	20.9	0.79	101	
09:20		1.5	15.40	6.10	6.85	0.748	20.7	0.56	108	
09:25		2.0	15.30	5.78	6.84	0.746	19.2	0.12	113	
09:30		2.5	15.20	5.43	6.83	0.745	18.7	0.16	119	
09:35		3.0	15.20	8.97	6.82	0.690	13.8	8.46	116	
09:40		3.5	15.21	9.70	6.84	0.680	11.5	8.43	112	
09:43	100	3.8	15.21	9.68	6.85	0.675	9.4	8.29	111	
Final Parameter Readings for Sample.										
09:45		3.8	15.21	9.68	6.85	0.675	9.4	8.29	111	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LLIMW-080
Sample ID: LLIMW-080-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LLM
QC Sample: Y (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1118	Water tube frozen.									
1135	100		17.67	7.38	6.86	0.576	4.6	7.90	106	clear water
1140	100		18.41	10.03	6.39	1.38	15.0	3.70	124	"
1145	100		18.51	10.97	6.18	1.50	1.6	1.64	130	", at top of pump
1150	100		at top of	11.37	6.11	1.48	0.0	0.44	131	"
1155	100		pump	11.44	6.14	1.46	0.0	0.26	130	"
1200	100		w/no	11.58	6.15	1.49	0.0	0.34	131	"
1205	100	1 gal	water	11.79	6.15	1.49	0.0	0.13	132	"
Final Parameter Readings for Sample.										
1206		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LLMW-081
Sample ID: LLMW-081-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0905			36.70							
~~0910~~	lines frozen, had to defrost.									
0934	100		34.40							no water in Horiba
0939	150		34.68							"
0944	150		34.70							"
0949	150		34.87							Horiba leaking.
0954	150		34.99							"
0959	150		35.10	2.89	8.82	0.608	Off chart	5.44	128	orange water
1004	150		35.56	9.55	8.41	0.603	384	0.88	112	"
1009	100		35.48	6.39	7.42	0.000	265	12.47	134	"
1014	100		35.57	8.35	7.81	0.592	68.7	1.19	74	clear
1019	100		35.69	9.01	7.35	0.589	41.9	0.34	49	"
1024	100		35.79	9.39	7.08	0.586	21.1	0.09	37	"
1029	100		35.86	9.58	6.85	0.583	24.6	0.00	29	"
1034	100		35.91							Horiba leaking
1039	100		35.88	8.31	6.86	0.566	9.3	0.77	71	clear
1044	100		35.90	8.70	6.72	0.567	7.3	0.00	46	"
1049	100		35.94	8.95	6.64	0.567	8.3	0.00	37	"
Final Parameter Readings for Sample.										
1050		2 gal	35.95	8.97	6.62	0.567	7.5	0.00	35	"

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LLIMW-083
Sample ID: none
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y (N) Type: none
Parameter(s) Collected: none

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0824			36.70							
0826	started pump to see if we can draw water.		water level did not detect water - hit top of pump.							DR
Final Parameter Readings for Sample.										
0836		Kevin (OHARNG) deemed well dry.								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL1MW-084
Sample ID: none
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: none

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0810			no water above pump-level							
0811	started pumping to see if we could get water below pump.		resting on top of pump at 33.35.							
Final Parameter Readings for Sample.										
0821		Kevin (OHARNG) deemed pump dry. Will move MS/MSD sample to another well.								

DR

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL1mw-086
Sample ID: LL1mw-086-120717-GW
Well Head Condition: Locked: Y X N
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB & JC
QC Sample: Y / (N) Type: N/A
Parameter(s) Collected: See C.O.C.

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
10:10			11.12							
10:15	100	0.5	11.25	7.00	9.48	0.477	40.5	0.72	89	
10:20	1.0	~~1.5~~	11.20	6.51	10.78	0.707	17.4	0.00	83	
10:25	2.5	~~2.0~~	11.20	6.35	11.06	0.784	12.1	0.00	80	
10:30	2.0	~~2.5~~	11.20	6.30	11.06	0.695	6.8	0.00	78	
10:35	2.5	~~3.0~~	11.20	6.30	10.91	0.570	2.9	0.00	77	
10:40	3.0	3.0	11.20	6.52	10.59	0.491	2.4	0.00	79	
10:45		3.5	11.20	6.32	10.54	0.484	2.2	0.00	79	
10:50		4.0	11.20	6.34	10.51	0.479	2.2	0.00	81	
Final Parameter Readings for Sample.										
10:50		4.0	11.20	6.34	10.51	0.479	2.2	0.00		

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL1 MW-087
Sample ID: LL1 MW-087-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB + JC
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
15:30			9.6							
15:35	100mL	0.5	10.0	11.08	7.38	0.922	41.2	2.08	109	
15:40		1.0	10.1	11.16	7.33	0.924	20.4	1.05	106	
15:45		1.5	10.2	11.27	7.30	0.930	14.2	Ø	103	
15:50		2.0	10.2	11.25	7.27	0.938	8.5	Ø	99	
15:55		2.5	10.2	11.33	7.24	0.947	8.6	Ø	95	
16:00		3.0	10.2	11.36	7.24	0.948	9.3	Ø	94	
Final Parameter Readings for Sample.										
16:00		3.0	10.2	11.36	7.24	0.948	9.3	Ø	94	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: Dec 2 2017

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LLI mw-088

Sample ID: LLI mw-088-120217-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) [illegible]

QC Sample: Y / N Type:

Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0825			9.15							
0830	100	0	11.38	10.34	7.89	0.809	328	2.20	-60	Offsite well
0835	100	0.5	11.27	9.97	7.29	0.808	67.9	2.20	-68	
0840	100	1.0	11.30	10.04	7.16	0.804	10.9	1.42	-95	
0845	100	1.5	11.38	10.10	7.14	0.802	11.3	0.82	-98	
0850	100	2.0	11.40	10.18	7.15	0.804	4.8	0.54	-99	
0855	100	2.5	11.30	10.12	7.20	0.803	3.5	0.58	-90	
0900	100	3.0	11.35	10.09	7.23	0.802	5.7	0.52	-91	
Final Parameter Readings for Sample.										
0900										see above

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LLmw-089
Sample ID: LLmw-089-120717-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB & JC
QC Sample: Y / N Type:
Parameter(s) Collected: See C.O.C.

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
11:40			28.20							
11:45	100	0.5	28.25	5.54	8.65	0.122	ϕ	2.41	102	
11:50		1.0	28.50	5.72	7.42	0.117	ϕ	ϕ	137	
11:55		1.5	28.25	5.99	6.62	0.121	ϕ	ϕ	145	
12:00		2.0	28.25	6.29	6.15	0.117	ϕ	ϕ	149	
12:10		2.5	28.25	6.67	6.09	0.115	ϕ	ϕ	152	
12:15		3.0	28.25	6.71	6.06	0.114	ϕ	ϕ	154	
Final Parameter Readings for Sample.										
12:15		3.0	28.25	6.71	6.06	0.114	ϕ	ϕ	154	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL2MW-059
Sample ID: LL2MW-059-120617-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1140			16.39							
1145	100		16.90	8.41	6.72	0.246	66.6	5.25	180	clear
1150	100		16.83	10.55	6.42	0.248	28.3	0.23	179	"
1155	100		16.84	10.53	6.41	0.250	21.4	0.00	175	"
1200	100		16.88	10.47	6.40	0.251	15.2	0.00	169	"
1205	100		16.89	10.49	6.39	0.250	12.5	0.00	164	"
1210	100		16.90	10.56	6.38	0.250	10.8	0.00	165	"
1213	100		16.90	10.60	6.39	0.250	9.7	0.00	164	"
1216	100		16.90	10.63	6.38	0.250	8.6	0.00	165	"
Final Parameter Readings for Sample.										
1217		~~See above~~ 1 gal	16.90	10.64	6.39	0.249	8.3	0.00	165	"

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-7-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna (eb)

Location ID: ~~FWGmw-264~~ LL2mw-264

Sample ID: ~~FWGmw-264-120717-gw~~

Well Head Condition: Locked: Y✓ N__ LL2mw-264-120717-gw

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y__ N✓ DNAPL: Y__ N✓ Product Depth ——

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs (eb)

Sampler(s) CJ LL2mw ~~FWGmw~~-264D-120717-GW

QC Sample: (Y) N Type: dup, ~~FWGmw-264-120717-gw-d~~ cj

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ±3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0935			10.98							
0940	100	.5	11.00	10.52	7.02	0.454	225.1	2.88	171.7	orange & cloudy
0945	↓	1	11.00	10.26	7.12	0.458	143.4	1.40	141.3	
0950		1.5	11.00	10.10	7.19	0.461	94.2	1.24	116.1	
~~0955~~ 1000		2	11.00	9.15	7.19	0.459	49.4	1.68	99.7	CLEARING UP
1000		2.5	10.98	9.40	7.21	0.459	39.7	1.60	85.0	
1005	↓	3	10.98	9.51	7.22	0.460	29.7	1.62	75.7	
1010		3.5	10.98	9.48	7.24	0.459	23.1	1.55	68.6	
1015		4.0	10.97	9.28	7.22	0.463	19.8	1.51	61.8	
1020		4.5	10.88	9.33	7.24	0.460	18.3	1.47	58.6	
1025		5.0	10.88	9.16	7.25	0.461	16.0	1.50	54.7	
1030		5.5	11.00	9.17	7.24	0.460	13.9	1.37	51.0	
1035	↓									
Final Parameter Readings for Sample.										
1035		6.0	11.00	9.02	7.24	0.460	9.7	1.33	49.2	

Comments:

1/2

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-7-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL2MW-267

Sample ID: LL2MW-267-120717-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s)

QC Sample: Y / N Type:

Parameter(s) Collected:

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1120			12.89							
1125	100	0.5	12.89	9.76	7.42	0.377	73.2	0.25	68.4	
1130		1.0	12.64	11.26	6.63	0.388	188.6	0.85	30.7	Water is orange
1135		1.5	12.64	10.81	6.64	0.388	171.1	0.78	30.5	
1140		2.0	12.62	9.35	6.59	0.388	121.3	0.77	31.8	
1145		2.5	12.61	9.50	6.59	0.385	117.7	0.73	30.8	CLEARING UP
1150		3.0	12.61	9.60	6.56	0.382	125.4	0.68	30.4	
1155		3.5	12.60	9.73	6.56	0.379	123.3	0.68	31.3	
1200		4.0	12.60	9.81	6.56	0.377	114.8	0.66	31.6	
1205		4.5	12.61	9.96	6.56	0.377	106.4	0.65	31.6	
1210		5.0	12.60	10.01	6.55	0.376	96.3	0.62	31.3	
1215		5.5	12.60	9.96	6.55	0.376	84.9	0.63	31.1	
1220		6.0	12.60	9.83	6.55	0.374	73.4	0.61	30.7	
1225		6.5	12.60	9.77	6.55	0.372	63.7	0.61	30.7	
1230		7.0	12.60	9.60	6.56	0.370	55.3	0.61	30.3	
1235		7.5	12.60	9.72	6.57	0.368	47.3	0.61	29.8	
1240		8.0	12.59	9.87	6.56	0.366	41.7	0.61	29.8	
1245		8.5	12.60	9.90	6.56	0.365	37.2	0.60	29.8	
~~1250~~ or			Final Parameter Readings for Sample.							
			1							

Comments:

2/2

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-7-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL2mw-267
Sample ID: LL2MW-267-120717-GW (Cont.)
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth ——
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CS
QC Sample: Y / (N) Type:
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
SEE PG 1			SEE PG 1							
1250	100	9.0	12.65	9.71	6.54	0.362	31.0	0.58	30.3	
1255		9.5	12.64	10.08	6.55	0.360	24.7 ~~30.0~~ cg	0.52	30.0	
1300		10.0	12.66	10.33	6.57	0.364	16.6	0.47	27.7	
1305		10.5	12.65	10.58	6.57	0.367	13.5	0.46	26.0	
1310		11.0	12.65	10.51	6.59	0.371	9.7	0.45	23.9	
~~1315~~		~~11.5~~	cg							
~~1320~~		~~12.0~~	cg							
Final Parameter Readings for Sample										
			1							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-7-2017

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL2mw-272

Sample ID: LL2mw-272-120717-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) dp + eb

QC Sample: (Y) N Type: ms/msd

Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1000			13.8							
1005	100	0.1	13.96	11.23	8.50	0.422	23.1	7.32	117.8	clear
1010	100	0.5	13.98	10.30	7.51	0.409	13.9	7.29	117.2	
1015	100	1.0	13.98	9.76	7.44	0.401	13.1	7.16	118.1	
1020	100	1.5	13.84	9.24	7.06	0.393	85.6	6.23	116.9	
1025	100	2.0	13.94	9.95	6.69	0.398	76.6	3.24	-3.3	
1030	100	2.5	13.94	9.06	6.60	0.404	72.1	2.85	-23.7	
1035		3.0	13.92	8.46	6.57	0.398	46.3	2.16	-26.0	
1040		3.5	13.91	8.45	6.56	0.397	40.0	2.11	-26.3	
1045		4.0	13.92	8.30	6.56	0.395	25.8	1.90	-26.1	
1050		4.5	13.91	8.37	6.54	0.394	29.8	1.83	-26.1	
1055		5.0	13.91	8.52	6.55	0.395	22.2	1.71	-25.8	cleaned optics
1100		5.5	13.91	8.75	6.53	0.394	18.9	1.60	-25.9	
1105		6.0	13.91	8.78	6.54	0.394	14.3	1.47	-25.6	
1110		6.5	13.91	8.60	6.53	0.393	13.1	1.38	-25.0	
1115		7.0	13.91	8.60	6.52	0.392	12.4	1.30	-24.9	
1120		7.5	13.91	9.05	6.53	0.393	9.6	1.23	-24.7	
1125		8.0	13.91	9.50	6.52	0.394	9.5	1.23	-26.5	
Final Parameter Readings for Sample.										
DEP 1025		see	[1] above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL3MW-234 pg 1 of 2

Sample ID: LL3mw-234-120617-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DR/LM

QC Sample: Y (N) Type: none

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1408			11.14							
1413	100		11.80	10.76	7.07	0.398	119	4.06	12	some sediment in water
1418	100		11.85	10.71	7.06	0.412	84.2	0.96	7	clear water
1423	100		11.88	10.54	7.00	0.414	78.4	0.00	9	"
1428	100		11.90	10.47	6.98	0.416	78.2	0.00	2	"
1433	100		11.90	10.53	6.97	0.416	81.7	0.00	-6	"
1438	100		11.90	10.56	6.97	0.415	83.9	0.00	-11	"
1443	100		11.83	9.31	6.37	0.004	154	10.88	52	cleaned out Horiba
1448	100		11.85	8.83	6.72	0.350	38.1	0.55	69	clear
1453	100		11.95	10.08	7.00	0.410	40.6	0.00	-12	"
1458	100		12.20	10.90	6.97	0.412	39.9	0.00	-19	"
1503	100		12.25	10.98	6.97	0.413	34.7	0.00	-18	"
1508	100		12.30	11.01	6.97	0.413	29.6	0.00	-20	"
1513	100		12.35	11.18	6.97	0.414	26.2	0.00	-22	"
1516	100		12.35	11.15	6.97	0.414	24.5	0.00	-22	"
1519	100		12.40	11.17	6.97	0.413	22.2	0.00	-22	"
1522	100		12.40	11.19	6.97	0.414	22.6	0.00	-22	"
1525	100		12.26	8.79	6.87	0.315	18.9	0.09	79	cleaned out Horiba
Final Parameter Readings for Sample.										

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL3MW-234 pg 2 of 2

Sample ID: see pg 1 LL3mw-234-120617-gw

Well Head Condition: Locked: Y__ N__ see pg 1

Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__

Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DR/LM

QC Sample: Y/N Type: none

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1528	100	↓	12.31	10.11	6.99	0.403	18.5	0.00	-17	clear water
1531	100		12.35	11.02	6.97	0.408	23.5	0.00	-21	"
1533	100		12.40	11.05	6.97	0.408	24.3	0.00	-21	"
1538	100		12.40	11.18	6.97	0.408	20.6	0.00	-19	"
1543	100		12.46	11.26	6.96	0.413	16.7	0.00	-21	"
1548	100		12.51	11.31	6.96	0.413	14.7	0.00	-22	"
1553	100		12.52	11.26	6.95	0.413	13.5	0.00	-21	"
1558	100		12.53	11.22	6.96	0.413	12.2	0.00	-22	"
1603	100		12.56	11.15	6.96	0.414	10.3	0.00	-21	"
1608	100	4 gal	12.58	11.17	6.96	0.414	9.7	0.00	-22	"
Final Parameter Readings for Sample.										
1609		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: ~~LL2MW-237~~ LL3mw-237 (eb)
Sample ID: LL3MW-237-120617-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR / LM
QC Sample: Y (N) Type: ~~water~~
Parameter(s) Collected:

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1250			21.76							
1255	100		22.10	9.98	6.71	0.298	23.7	3.60	185	No water in ~~bucket~~ ~~Horiba~~ yet,
1300	100		on top of	10.52	6.63	0.300	21.1	2.36	190	Horiba filling. clear water
1305	100		pump	10.78	6.58	0.320	23.7	0.00	193	"
1310	100		w/no water	10.89	6.55	0.325	16.5	0.00	193	"
1315	100			10.98	6.54	0.327	8.9	0.00	195	"
1320	100			10.92	6.53	0.329	4.1	0.00	196	"
Final Parameter Readings for Sample.										
1321		1 gal	top of pump w/no water	10.93	6.54	0.330	2.6	0.00	194	clear water

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL3MW-244
Sample ID: LL3MW-244-120617-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1030			19.13							
1035	100		19.19	6.45	7.98	0.231	132	9.37	77	water entering Horiba
1040	100		19.19	8.56	6.81	0.220	33.1	5.32	127	clear
1045	100		19.19	8.82	6.48	0.224	12.3	2.55	151	"
1050	100		19.19	9.02	6.39	0.225	6.6	1.51	164	"
1055	100		19.19	9.19	6.36	0.225	4.3	0.60	171	"
1100	100		19.19	9.18	6.34	0.226	2.7	0.25	177	"
1103	100		19.19	9.24	6.33	0.226	3.4	0.77	181	"
1106	100		19.19	9.24	6.33	0.227	3.0	0.49	182	"
1109	100	1 gal	19.19	9.24	6.32	0.228	2.4	0.19	185	"
Final Parameter Readings for Sample.										
1110		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: _____

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL3mw-246

Sample ID: LL3mw-246-120217-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth _____

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) Jessica Cain

QC Sample: Y / N Type: N/A

Parameter(s) Collected: ~~[illegible]~~ See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1045			25.1							
JC ~~1100~~ 1050	100	0.5	25.25	9.52	7.22	0.215	1.50	3.55	33	
JC ~~1105~~ 1055	100	1.0	25.25	9.40	6.78	0.224	0.20	1.19	47	
1100		1.5	25.30	9.44	6.64	0.224	0.00	0.90	52	
1105		2.0	25.30	9.52	6.58	0.223	0.00	1.10	55	
1110		2.5	25.34	9.53	6.51	0.223	0.00	1.11	58	
1115		3.0	25.35	9.60	6.45	0.222	0.00	1.16	62	
Final Parameter Readings for Sample.										
12:15		3.0	25.35	9.60	6.45	0.222	0.00	1.16	62	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL4mw-193
Sample ID: LL4mw-193-120617-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC
QC Sample: Y / N Type:
Parameter(s) Collected: See C.O.C.

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
14:00			8.20							
14:05	100	0.5	9.75	10.00	7.75	0.898	46.8	1.45	67	Pumping at lowest possible rate.
14:10		1.0	9.80	9.80	7.65	0.909	29.4	0.04	62	
14:15		1.5	9.80	9.73	7.60	0.907	24.4	0.00	53	
14:20		2.0	9.80	9.58	7.56	0.905	20.3	0.00	56	
14:25		2.5	9.80	9.52	7.54	0.903	18.6	0.00	55	
14:30		3.0	9.80	9.49	7.52	0.901	16.0	0.00	53	
14:35	100	3.5	9.80	9.48	7.51	0.902	14.3	0.00	53	
14:40	100	4.0	9.80	9.45	7.50	0.902	11.9	0.00	53	
14:45	100	4.5	9.80	9.34	7.49	0.903	9.8	0.00	52	
Final Parameter Readings for Sample.										
14:45		4.5	[1] 9.80	9.34	7.49	0.903	9.8	0.00	52	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: ~~MW~~ LL7 MW 001

Sample ID:

Well Head Condition: Locked: Y__ N__

Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__

Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A

LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s)

QC Sample: Y / N Type:

Parameter(s) Collected:

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
10:20			Dry							
Final Parameter Readings for Sample.										

Comments: water below top of pump. Tried to pump water but it's dry.

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL7 MW-006
Sample ID: LL7 MW - 006 - 120417 - GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC & BI
QC Sample: Y (N) Type: N/A
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
10:40			15.60							
10:45	100	0.5	15.85	10.53	5.22	0.170	603	4.42	214	
10:50	100	1.0	15.85	11.13	5.37	0.165	555	0	184	
10:55	100	1.5	~~15.85~~ 15.85	11.29	5.40	0.167	352	0	172	
11:00	100	2.0	15.85	11.35	5.40	0.167	179	0	166	
11:05	100	2.5	15.85	11.38	5.44	0.163	94.3	0	163	
11:10	100	3.0	15.85	11.35	5.46	0.160	40.7	0	159	
11:15	100	3.5	15.85	11.36	5.46	0.171	20.0	0	158	
11:20	100	4.0	15.85	11.37	5.46	0.171	8.9	0	156	
Final Parameter Readings for Sample.										
11:20		4.0	15.85	11.37	5.46	0.171	8.9	0	156	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL10MW-003
Sample ID: LL10MW-003-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LLM
QC Sample: Y (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1420			22.17							
1423	100		22.17	12.42	6.67	0.003	134	11.17	152	water entering Horiba
1428	100		22.38	12.31	7.11	0.465	0.0	7.85	137	clear
1433	100		22.53	12.06	6.77	0.463	0.0	4.69	151	"
1438	100		22.63	11.95	6.72	0.460	0.0	3.83	157	"
1443	100		22.65	11.89	6.72	0.461	0.0	3.64	159	"
1448	100	↓	22.70	11.85	6.70	0.460	0.0	3.35	160	"
1453	100	0.5gal	22.73	11.80	6.70	0.460	0.0	3.06	163	"
Final Parameter Readings for Sample.										
1454		See above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL10 MW-005-120417-gw cmg
Sample ID: LL10 MW-005-120417-GW
Well Head Condition: Locked: Y ✓ N__
Pooled water at head: Y__ N ✓ Inner Casing Clean: Y ✓ N__
Exterior Seal Good; Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DJ, DP
QC Sample: Y (N) Type: —
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1545			19.25							
1550	100	0.5	19.27	14.76	7.57	0.004	1.3	9.72	119.8	Horiba not full
1555		1.0	19.27	11.22	7.54	0.415	50.1	5.82	95.3	full
1600		1.5	19.28	10.93	7.11	0.373	71.2	3.03	103.1	sandy
1605		2.0	19.28	10.90	7.01	0.366	55.1	2.01	106.6	clearing up
1610		2.5	19.28	10.89	7.00	0.365	27.7	1.62	108.6	
1615		3.0	19.28	10.89	6.98	0.364	9.8	1.44	110.4	
Final Parameter Readings for Sample										
1615		see	above							

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Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/04/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL11mw-005
Sample ID: LL11mw-005-120417-GW
Well Head Condition: Locked: ~~Y~~ N X
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Dean Bender & Jessica Crim
QC Sample: Y (N) Type: N/A
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0905			~~11.60~~ 12.60							
0910	~~100.5~~	0.5	12.60	10.41	4.94	0.121	24.5	4.15	276	
0915	100	1.0	12.75	10.77	4.75	0.118	14.6	2.59	288	
0920		1.5	12.80	10.79	4.70	0.118	9.6	2.31	295	
0925		2.0	13.00	10.83	4.64	0.118	5.9	2.03	303	
0930		2.5	13.00	10.76	4.63	0.117	2.0	1.95	310	
0935		3.0	13.00	10.75	4.60	0.118	1.8	1.87	314	
Final Parameter Readings for Sample.										
0935		3.0	13.00	10.75	4.60	0.118	1.8	1.87	314	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.2017

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL2mw-183

Sample ID: LL2mw-183-120617-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N✓ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) SC & BD

QC Sample: Y / N Type:

Parameter(s) Collected: See COC.

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
12:15			18.75							
12:20	100	0.5	18.10	9.81	7.64	0.902	149	6.42	8	
12:25	100	1.0	18.70	9.93	7.48	0.957	35.5	3.00	-19	
12:30		1.5	18.70	9.94	7.45	0.957	30.0	1.65	-19	
12:35		2.0	18.70	9.13	7.44	0.981	23.6	1.24	-17	
12:40		2.5	18.70	9.07	7.43	0.972	21.9	0.70	-21	
12:45		3.0	19.0	9.50	7.40	0.975	19.5	0.09	-35	
12:50	100	3.5	19.1	9.61	7.39	0.979	15.6	0.00	-39	
12:55	100	4.0	19.20	9.71	7.38	0.985	12.5	0.00	-42	
13:00	100	4.5	19.25	9.75	7.38	0.989	11.3	0.00	-45	
13:05 ~~13:00~~	100	5.0	19.30	9.77	7.37	0.994	11.5	0.00	-49	
13:10	100	5.5	19.30	9.79	7.37	0.996	10.0	0.00	-50	
13:13	100	5.8	19.31	9.80	7.37	0.997	9.90	0.00	-51	
Final Parameter Readings for Sample.										
13:13		5.8	19.31	9.80	7.37	0.997	9.90	0.00	-51	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: [redacted] ~~LL12mw-185~~
2mw-185
Sample ID: LL 12 - 185 - 120617 - GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC
QC Sample: Y (N) Type:
Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0940			13.95							
0945	100	0.5	14.00	9.63	6.58	5.66	23.3	0.00	212	Pumping at lowest
0950		1.0	14.00 ~~14.05~~ JC	10.48	6.36	5.64	19.8	0.00	209	Possible rate.
9.55	1.5	~~2.0~~ JC	14.60	10.20	6.35	5.66	13.6	0.00	209	
10:00	2.0	~~2.5~~ JC	Top of pump	9.50	6.34	5.72	5.1	0.00	208	
10:05	2.5	~~3.0~~ JC	Top of pump	9.03	6.35	5.74	5.1	0.00	207	
10:10	3.0	~~3~~ JC	Top of pump	8.43	6.35	5.71	4.5	0.00	206	
Final Parameter Readings for Sample.										
10:10		3.0	Top of pump	8.43	6.35	5.71	4.5	0.00	206	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL12mw-187
Sample ID: LL12mw-187-120617-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) JC
QC Sample: Y / N Type: NA
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0840			16.90							
0845	100	0.5	16.90	8.44	6.07	14.5	4.5	3.64	224	
0850	100	1.0	16.91	8.70	6.10	15.2	3.1	2.58	224	
08:55	100	1.5	16.90	8.90	6.11	15.4	2.5	1.52	224	
09:00	100	2.0	17.00	9.36	6.14	15.4	2.9	0.40	224	
09:05	100	2.5	17.10	9.40	6.12	15.5	2.7	0.69	224	
09:10	100	3.0	17.10	9.39	6.11	15.6	2.3	0.57	224	
Final Parameter Readings for Sample.										
09:10		3.0	17.10	9.39	6.11	15.6	2.3	0.57	224	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: LL12 MW 242

Sample ID: LL12 MW 242 GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s)

QC Sample: Y / N Type:

Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
8:15			17.35							
8:20	300ml	1.5	16.70	10.98	8.64	0.812	594	0.60	-67	
8:25	100ml	2.0	16.40	10.51	8.16	0.819	548	Ø	-98	
8:30		2.5	16.20	10.03	8.09	0.816	498	Ø	-89	
8:35		3.0	16.05	9.44	7.99	0.814	465	Ø	-85	
8:40		3.5	16.00	8.98	7.86	0.811	405	Ø	-74	
8:45		4.0	15.90	8.90	7.78	0.809	379	Ø	-68	
8:50		4.5	15.90	8.86	7.71	0.809	344	Ø	-59	
8:55		5.0	15.80	8.75	7.67	0.810	320	Ø	-51	
9:00		5.5	15.75	8.64	7.64	0.807	301	Ø	-46	
9:05		6.0	15.75	8.46	7.63	0.799	286	Ø	-39	
9:10		6.5	15.75	7.85	7.60	0.793	266	Ø	-29	
9:15		7.0	15.50	7.19	7.57	0.791	250	Ø	-19	
9:20		7.5	15.50	6.96	7.56	0.791	245	Ø	-16	
9:25		8.0	15.45	6.77	7.55	0.793	248	Ø	-15	
9:30		8.5	15.45	6.51	7.56	0.795	243	Ø	-14	
9:35		9.0	15.45	6.42	7.55	0.796	244	Ø	-13	
9:40		9.5	15.45	6.24	7.55	0.797	246	Ø	-11	
Final Parameter Readings for Sample.										

Comments: Page 1 of 2

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL12mw-242
Sample ID: LL12mw-242-120617-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DW
QC Sample: Y / N Type:
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
8:15			7.35							
9:45	100	10.0	15.40	5.99	7.54	0.799	245	0	-9	
9:50		10.5	15.40	5.89	7.54	0.800	247	0	-8	
9:55		11.0	15.40	5.80	7.53	0.801	242	0	-7	
10:00		11.5	15.40	5.65	7.52	0.803	242	0	-6	
10:05		12.0	15.40	10.19	7.34	0.812	455	0	-25	
10:10		12.5	15.50	9.92	7.54	0.821	398	0	-44	
10:15		13.0	15.50	9.06	7.53	0.826	225	0	-53	
Final Parameter Readings for Sample.										
10:15		13.0	15.50	9.06	7.53	0.826	225	0	-53	

Comments:

Page 2 of 2

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.06.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL12mw-245
Sample ID: LL12mw-245-120617-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Jessica Cain
QC Sample: Y X N Type: Dup
Parameter(s) Collected: See C.O.C

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
10:45			14.10							
10:50	100	0.5	16.00	8.81	6.91	1.44	30.2	1.05	123	Pumping at lowest possible rate.
10:55		1.0	16.90	9.27	6.84	1.43	14.0	0.00	116	
11:00		1.5	17.15	9.06	6.84	1.43	10.0	0.00	116	
11:05		2.0	17.85	8.95	6.83	1.43	5.9	0.00	114	
11:10		2.5	18.40	8.97	6.83	1.42	4.5	0.00	111	
11:15		3.0	19.0	9.03	6.83	1.43	3.1	0.00	108	
Final Parameter Readings for Sample.										
11:15		3.0	19.0	9.03	6.83	1.43	3.1	0.00	10.	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL2 MW-247 pg 1 of 2
Sample ID: LL2 MW-247-120617-GW, LL2MW-247-120617
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR / LM
QC Sample: Y / N Type: none
Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0746			8.99							
0747	100		8.99	-0.19	9.50	0.010	164	17.59	87	no water in flowcell
0752	100		9.46	6.63	8.11	0.874	67.3	6.27	76	clear
0757	100		9.50	7.22	7.61	0.897	74.1	4.34	60	"
0802	100		9.46	6.85	7.53	0.903	58.4	3.26	48	"
0807	100		9.42	6.39	7.50	0.893	72.7	2.22	49	"
0812	100		9.68	5.39	7.46	0.892	42.8	2.26	56	"
0817	100		10.76	10.56	7.36	0.887	134	1.36	-26	"
0822	100		10.83	10.61	7.41	0.888	190	0.67	-26	"
0827	100		10.95	10.03	7.38	0.892	571	0.00	-32	murky
0832	100		10.52	9.77	7.37	0.899	440	0.00	-33	murky
0837	100		10.20	8.77	7.37	0.902	407	0.00	-34	"
0842	100		9.99	8.15	7.37	0.898	306	0.00	-34	"
0847	100		9.84	7.78	7.36	0.897	264	0.00	-35	"
0852	100		9.78	7.51	7.37	0.897	231	0.00	-33	"
0857	100		9.70	7.17	7.37	0.896	211	0.00	-32	"
0902	100		9.64	6.99	7.37	0.895	192	0.00	-30	"
0907	100		9.64	6.73	7.38	0.894	191	0.00	-30	"
Final Parameter Readings for Sample.										
—		~~See above~~ See next page								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/6/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: LL12 MW-247 pg 2 of 2
Sample ID: See pg 1
Well Head Condition: Locked: Y__ N__ see pg 1
Pooled water at head: Y__ N__ Inner Casing Clean: Y__ N__
Exterior Seal Good: Y__ N__ Inner Casing Straight and Clear: Y__ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0912	100		9.62	6.45	7.38	0.894	183	0.00	-27	murky
0917	100		9.58	6.18	7.38	0.894	183	0.00	-25	"
0922	100		9.51	5.88	7.35	0.897	148	0.00	-22	"
0927	100		9.99	5.45	7.39	0.896	344	0.00	-21	"
0932	100		10.32	9.12	7.34	0.873	169	0.00	-16	"
0937	100		10.56	9.64	7.35	0.888	222	0.00	-19	"
0942	100		10.71	9.85	7.35	0.892	278	0.00	-26	"
0947	100	2 gal	10.76	9.90	7.34	0.893	337	0.00	-30	"
Final Parameter Readings for Sample.										
0948		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12·04·17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: NTA MW-117
Sample ID: NTA MW-117-120417-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y__ N__ DNAPL: Y__ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CJ, DP
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1042			17.04							
1047	100	0.8	17.07	10.76	7.70	0.004	18.8	11.86	177.1	YSI NOT FULL YET
1052		1.3	17.07	10.63	7.68	0.004	0.1	11.90	177.4	
1057		1.8	17.08	10.65	7.68	0.004	18.7	11.88	177.7	
1102		2.3	17.91	10.97	7.61	0.527	22.9	3.87	117.8	
1107		2.8	18.15	11.16	7.36	0.522	13.0	1.36	106.8	
1112		3.3	18.30	11.23	7.33	0.512	4.7	2.99	100.9	
1117		3.8	18.60	11.27	7.32	0.511	2.9	3.26	95.1	
~~1122~~	eb									
~~1127~~	eb									
Final Parameter Readings for Sample.										
1122		4.3	18.60	11.30	7.33	0.499	2.9	2.87	98.2	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-4-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: NTAmw-118-~~9~~
Sample ID: NTAmw-118-120417-gw
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N✓ DNAPL: Y __ N✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP
QC Sample: Y / (N) Type: —
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1109			10.40							
1113	100	0.4	12.47	11.70	7.49	0.475	152.8	4.11	125.9	sandy
1118	100	0.9	12.56	11.87	7.43	0.475	166.5	2.08	145.6	↓
1123	250	2.15	12.66	11.65	7.39	0.476	~~105.7~~	1.63	166.2	↓
1128	100	2.65	13.05	11.63	7.37	0.474	46.5	0.87	168.2	↓
1132	100	3.15	13.20	11.63	7.37	0.474	25.5	0.71	164.6	clearing up
1138	↓	3.65	13.31	11.64	7.37	0.474	14.8	0.62	162.0	
1142	↓	4.15	13.43	11.64	7.37	0.473	12.1	0.69	161.5	
1148	↓	4.65	13.57	11.61	7.37	0.472	9.5	0.78	159.2	
1152	↓	5.15	13.63	11.61	7.37	0.472	7.8	0.88	158.2	
Final Parameter Readings for Sample.										
1152		see	above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-4-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: NTAmw-119

Sample ID: NTAmw-119-120417-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth ____

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DP

QC Sample: Y / N Type:

Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1225			14.45							
1230	100	0.5	14.54	15.13	7.96	0.004	1.4	9.69	170.8	Horiba not full
1235	↓	1.0	14.54	10.63	7.60	0.463	3.3	5.23	139.6	Ysi was leaking; put in bucket
1240		1.5	14.50	10.84	7.42	0.490	12.1	3.90	0.3	
1245		2.0	14.54	10.54	7.41	0.496	21.8	2.78	-7.8	
1250		2.5	14.54	10.47	7.53	0.495	23.5	2.27	-14.1	
1255		3.0	14.54	10.40	7.42	0.493	19.1	1.75	-22.7	
1300	100	3.5	14.48	10.39	7.40	0.491	15.5	1.36	-33.3	
1305	100	4.0	14.52	10.40	7.42	0.490	13.5	1.13	-40.1	
1310	↓	4.5	14.52	10.43	7.43	0.489	10.6	0.91	-44.9	
1315		5.0	14.52	10.44	7.41	0.489	9.1	0.80	-49.1	
Final Parameter Readings for Sample.										
1315		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/4/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna (eb)

Location ID: NTAmw-~~020~~ 120

Sample ID: NTAmw-~~020~~ 120 (eb) 120417-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y__ N✓ DNAPL: Y__ N✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) CJ & eb

QC Sample: Y/N Type:

Parameter(s) Collected: See COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1145 ~~1140~~ (eb)			34.80							
1150 ~~1200~~ (eb)	100	0.5	34.85	9.02	7.83	0.664	2.9	13.44	96.5	clear
1155 ~~1205~~ (eb)	↓	1.5	34.84	10.59	7.34	0.697	2.0	5.60	-21.5	
1200 ~~1210~~ (eb)		2.0	34.85	10.61	7.33	0.710	3.2	4.60	-55.6	
1205 ~~1215~~ (eb)		2.5	34.85	10.62	7.31	0.710	9.9	4.51	-57.6	
1210 ~~1220~~ (eb)	↓	3.0	34.85	10.62	7.32	0.708	9.4	~~4.82~~ 4.18	-63.7	DO=4.18
1215 ~~1225~~ (eb)		3.5	34.85	10.61	7.33	0.706	3.5	~~4.~~ 4.11	-70.2	
Final Parameter Readings for Sample.										
1220		~~3~~ 4.0	34.85	10.61	7.32	0.705	2.6	4.02	-70.0	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-7-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: ROLMW-007

Sample ID: ROLMW-007-120717-gw

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DP

QC Sample: (Y)/ N Type: MS/MSD & dup

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
1420			10.8							
1425	200	1.0	11.37	7.86	7.26	0.830	13.1	8.09	69.5	
1430	200	2.0	11.33	8.94	7.03	0.811	14.3	3.93	75.1	
1435	200	3.0	11.32	9.22	6.78	0.826	6.5	1.32	80.1	
1440	↓	4.0	11.21	8.94	6.73	0.858	3.7	1.06	65.0	
1445	↓	5.0	11.23	8.61	6.73	0.906	0.3	0.98	37.7	
1450	↓	6.0	11.23	8.46	6.75	0.951	0.0	0.93	19.0	
Final Parameter Readings for Sample.										
1450		see	above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12 · 7 · 17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: PQLMW-008

Sample ID: PQLMW-008-120717-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) CJ

QC Sample: Y / N Type:

Parameter(s) Collected: SEE COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
~~1435~~			top.-							
1440	100	0.5		9.99	6.53	0.706	4.7	1.55	-38.5	
1445	↓	1.0		10.06	6.47	0.743	1.5	1.02	-50.3	
1450		1.5		10.04	6.43	0.847	3.4	0.67	-64.4	
1455		2.0		10.16	6.43	0.890	0.7	0.56	-72.4	
1500		2.5		10.11	6.43	0.914	0.2	0.49	-76.5	
1505		3.0		10.09	6.43	0.935	0.0	0.44	-76.0	
Final Parameter Readings for Sample.										
1515		See ABOVE								

Comments: top @ 12.5'

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: RQLMW-009
Sample ID: RQLMW-009-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L.	ORP (mV) ± 10mV or 10%	Comments
1417			8.48							
1422	100		8.80	8.46	5.95	0.293	10.4	3.03	122	clear water
1427	100		8.78	8.26	5.87	0.307	22.6	0.82	127	" "
1432	100		8.83	8.11	5.74	0.353	11.7	0.25	127	" "
1437	100		8.85	8.12	5.69	0.364	5.7	0.13	124	" "
1442	100	↓	8.83	8.07	5.66	0.375	3.4	0.01	121	" "
1447	100	1 gal	8.85	8.12	5.61	0.385	2.6	0.00	119	" "
Final Parameter Readings for Sample.										
1448		See above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: RQLMW-011
Sample ID: RQLMW-011-120717-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth N/A
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DR/LM
QC Sample: Y / (N) Type: none
Parameter(s) Collected: see COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1320			25.90							
1325	100	26.03	~~10.33~~	10.36	6.01	0.425	1.1	3.13	178	clear water
1330	100		26.02	10.38	5.97	0.440	0.0	2.93	179	" "
1335	100		26.01	10.17	5.95	0.467	0.0	1.97	180	" "
1340	100		26.00	9.87	5.95	0.476	0.0	1.15	180	" "
1345	100		25.98	9.67	5.99	0.480	0.0	1.17	174	" "
1350	100	0.5gal	26.00	9.52	6.02	0.483	0.0	0.91	167	" "
Final Parameter Readings for Sample.										
1351		see above								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: RQLmw-012-
Sample ID: RQLmw-012-120717-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) TC & DB
QC Sample: Y / N Type:
Parameter(s) Collected: See C.O.C.

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
14:12			27.50							
14:17	100	0.5	27.55	8.65	5.83	0.363	Ø	4.15	94	
14:22		1.0	27.60	9.73	5.43	0.295	Ø	2.14	114	
14:27		1.5	27.70	10.06	5.21	0.279	0.00	1.30	134	
14:32		2.0	27.70	10.20	5.18	0.272	0.00	1.20	140	
14:37		2.5	27.70	9.93	5.17	0.276	0.00	1.18	149	
14:42		3.0	27.70	9.91	5.13	0.276	0.00	1.16	158	
14:45	100	3.3	27.70	9.80	5.10	0.276	0.00	1.14	159	
Final Parameter Readings for Sample.										
			1							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: RQL MW 013
Sample ID: RQL MW 013-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s)
QC Sample: Y / N Type:
Parameter(s) Collected:

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
15:37			29.50							
15:42	100	0.5	29.50	9.84	4.09	0.389	∅	4.01	225	
15:47		1.0	29.60	9.41	3.94	0.402	∅	1.09	228	
15:52		1.5	29.65	9.09	3.91	0.419	∅	0.18	228	
15:57		2.0	29.60	8.94	3.89	0.430	∅	0.00	230	
16:02		2.5	29.60	8.97	3.88	0.435	∅	0.00	231	
16:07		3.0	29.60	8.91	3.87	0.438	∅	0.00	232	
Final Parameter Readings for Sample.										
16:07		3.0	[1] 29.60	8.91	3.87	0.438	∅	0.00	232	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/7/2017

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: RQL MW 014

Sample ID: RQL MW 014-GW

Well Head Condition: Locked: Y X N__

Pooled water at head: Y__ N X Inner Casing Clean: Y X N__

Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A

LNAPL: Y __ N X DNAPL: Y __ N X Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DB + JC

QC Sample: Y / N Type:

Parameter(s) Collected: See COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
14:58			23.75							
~~14:53~~ DB										
~~14:58~~										
15:03	100	0.5	23.85	8.51	5.52	0.358	Ø	0.81	171	
15:08		1.0	23.95	8.00	5.72	0.431	Ø	Ø	162	
15:13		1.5	24.05	8.18	5.89	0.460	Ø	Ø	153	
15:18		2.0	24.00	8.08	5.87	0.474	Ø	Ø	153	
15:23		2.5	24.05	8.07	5.90	0.479	Ø	Ø	152	
15:28		3.0	24.05	8.04	5.91	0.482	Ø	Ø	151	
Final Parameter Readings for Sample.										
15:28		3.0	24.05	8.04	5.91	0.482	Ø	Ø		

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12.07.2017
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: RQLmw-016
Sample ID: RQLmw-016-120717-GW
Well Head Condition: Locked: Y X N__
Pooled water at head: Y__ N X Inner Casing Clean: Y X N__
Exterior Seal Good: Y X N__ Inner Casing Straight and Clear: Y X N__

PID Borehole Reading: N/A
LNAPL: Y __ N X DNAPL: Y __ N X Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DB & JC
QC Sample: Y / N Type:
Parameter(s) Collected: See C.OC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
13:20			38.80							
13:25	100	0.5	39.10	6.61	6.44	2.05	14.5	ϕ	101	
13:30	↓	1.0	39.40	6.63	6.50	1.91	9.1	ϕ	90	
13:35		1.5	39.70	6.72	6.36	1.42	8.1	ϕ	83	
13:40		2.0	39.90	6.79	6.36	1.42	6.4	ϕ	74	
13:45		2.5	40.00	6.85	6.58	1.98	5.8	ϕ	69	
13:50		3.0	40.00	6.97	6.47	2.00	6.8	ϕ	66	
13:55		3.5	40.00	7.05	6.42	2.02	6.9	ϕ	63	
14:00	↓	4.0	40.00	7.00	6.44	2.03	7.1	ϕ	59	
Final Parameter Readings for Sample.										
14:00		4.0	40.00	7.00	6.44	2.03	7.1	ϕ	59	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/8/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: SCFmw-004

Sample ID: N/A

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth none

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) JC + db

QC Sample: Y (N) Type:

Parameter(s) Collected: none

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
Final Parameter Readings for Sample.										

Comments: artesian well, temperatures during sampling event below freezing. MW not sampled

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: SCFMW-006
Sample ID: SCFMW-006-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y__ N✓ DNAPL: Y__ N✓ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) CJ
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
1320			19.07						187.2	
1325	100	0.5	19.09	11.95	7.59	0.004	0.0	10.35	~~0.344~~	YSI NOT FULL
1330		1.0	19.07	11.85	7.57	0.004	0.0	10.36	~~0.344~~	
1335		1.5	19.10	10.42	8.06	0.356	1.0	5.98	~~0.344~~	
1340		2.0	19.08	10.50	8.02	0.389	6.3	3.12	143.4	
1345		2.5	19.10	10.41	7.99	0.404	12.0	2.97	106.4	
1350		3.0	19.10	10.45	7.74	0.439	37.1	2.39	26.5	
1355		3.5	19.10	10.46	7.66	0.447	16.1	2.00	-0.5	
1400		4.0	19.10	10.45	7.65	0.440	12.3	2.08	-1.2	
1405		4.5	19.10	10.45	7.49	0.459	10.8	2.21	-10.2	
1410		5.0	19.19	10.41	7.52	0.449	9.6	2.21	~~-28.7~~	
1415		5.5	19.12	10.37	7.55	0.449	2.0	1.28	~~-36.2~~ ~~1.28~~	
1420		6.0	19.10	10.35	7.53	0.449	0.4	1.17	-40.9	
Final Parameter Readings for Sample.										
1420		SEE ABOVE								

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: WBGmw-006 / 12-5-17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: WBGmw-006

Sample ID: WBGmw-006-120517-gw

Well Head Condition: Locked: Y ✓ N__

Pooled water at head: Y ✓ N ✗ Inner Casing Clean: Y ✓ N__

Exterior Seal Good: Y ✓ N__ Inner Casing Straight and Clear: Y ✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) DP

QC Sample: Y / (N) Type:

Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0915			10.47							
0920	100	.5	10.67	11.80	7.55	0.494	15.6	4.16	201.7	Horiba not full
0925	↓	1.0	10.69	11.78	7.44	0.498	17.1	1.10	200.2	
0930	↓	1.5	10.58	11.43	7.43	0.499	11.7	0.92	199.2	
0935	↓	2.0	10.86	10.99	7.42	0.498	9.4	1.25	197.7	
0940	↓	2.5	10.57	10.86	7.43	0.498	8.0	1.38	198.6	
0945	↓	3.0	10.56	10.77	7.43	0.498	9.4	1.51	196.6	
Final Parameter Readings for Sample.										
0945		see	above							

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12-5-17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: WBGmw-009
Sample ID: WBGmw-009-120517-gw
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N ✓ DNAPL: Y __ N ✓ Product Depth —
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) DP
QC Sample: Y / N Type:
Parameter(s) Collected: see COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0800			16.92							
0805	100	.5	top	10.21	6.66	0.422	1.0	1.29	233.3	Top of pump
0810	↓	1.0	↓	10.81	6.68	0.529	1.9	5.80	227.1	Horiba not full
0815		1.5		11.25	6.51	0.654	2.9	4.11	223.2	full
0820		2.0		11.22	6.91	0.663	2.3	3.70	222.4	
0825		2.5		11.38	6.99	0.664	0.4	3.43	219.4	
0830		3.0		11.44	7.02	0.662	0.1	3.10	217.6	
Final Parameter Readings for Sample.										
0830		see	above							

Comments: top = top of pump = 16.92 ft

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/05/17

Project Name: Camp Ravenna

Site Name: Camp Ravenna

Location ID: WBGMW-020

Sample ID: WBGMW-020-120517-GW

Well Head Condition: Locked: Y✓ N__

Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__

Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A

LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth

Purge Style: Micro-purge with dedicated bladder pump

Mid Screen Depth (ft btoc): see installation logs

Pump Intake (ft btoc) see installation logs

Sampler(s) CJ

QC Sample: Y / N Type:

Parameter(s) Collected: ~~SEE~~ COC

Time (3-5 min) 30 min.	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water <0.3 ft.	Temp.°C ±5°C	pH ± 0.1	Sp. Cond. (mS/cm) ± 3%	Turbidity (NTUs) <10 NTU	DO (mg/L) ±0.3 mg/L	ORP (mV) ± 10mV or 10%	Comments
0800			16.50							
0805	100	0.5	16.20	10.12	7.17	0.545	10.1	6.70	212.5	
0810	100	1.0	16.2	11.3	6.9	0.275	0.0	2.2	-53.3	
0815		1.5	16.2	11.43	6.95	0.279	0.0	0	-71.4	
0820		2.0	16.25	11.45	6.97	0.271	0.0	2.77	-79.9	
0825		2.5	16.26	11.50	7.00	0.271	8.8	2.68	-84.3	
0830		3.0	16.25	11.51	7.01	0.271	8.3	2.65	-88.0	
				~~11.55~~	~~7.03~~	~~0.271~~	~~5.6~~	~~2.80~~	~~-92.3~~	
Final Parameter Readings for Sample:										
0835		3.5	16.25	11.55	7.03	0.271	5.6	2.80	-92.3	

Comments:

LOW FLOW WELL PURGING AND FIELD WATER QUALITY MEASUREMENT FORM

Date: 12/5/17
Project Name: Camp Ravenna
Site Name: Camp Ravenna
Location ID: WBG-MW-121-~~120517-GW~~ g
Sample ID: WBGMW-121-120517-GW
Well Head Condition: Locked: Y✓ N__
Pooled water at head: Y__ N✓ Inner Casing Clean: Y✓ N__
Exterior Seal Good: Y✓ N__ Inner Casing Straight and Clear: Y✓ N__

PID Borehole Reading: N/A
LNAPL: Y __ N __ DNAPL: Y __ N__ Product Depth
Purge Style: Micro-purge with dedicated bladder pump
Mid Screen Depth (ft btoc): see installation logs
Pump Intake (ft btoc) see installation logs
Sampler(s) Ø
QC Sample: Y / N Type:
Parameter(s) Collected: SEE COC

Time (3-5 min)	Purge Rate (100 – 500 mL/min)	Total Purge Vol. (L)	Depth to Water	Temp.°C	pH	Sp. Cond. (mS/cm)	Turbidity (NTUs)	DO (mg/L)	ORP (mV)	Comments
30 min.			<0.3 ft.	±5°C	± 0.1	± 3%	<10 NTU	±0.3 mg/L	± 10mV or 10%	
0915			12.11 ~~11.92~~ g							
0920	100	0.5	12.10	10.84	7.32	0.482	3.6	6.55	2.6	
0925	↓	1.0	12.09	10.81	7.29	0.485	65.5	5.38	-22.1	
0930	↓	1.5	12.08	11.05c	7.28	0.487	112.9	4.77	-28.3	
0935	↓	2.0	12.09	11.14	7.28	0.487	84.3	4.19	-30.0	
0940	↓	2.5	12.10	11.12	7.28	0.487	51.1	3.97	-32.0	
0945	↓	3.0	12.08	11.11	7.28	0.487	31.5	3.82	-34.2	
0950	↓	3.5	12.08	11.14	7.28	0.486	24.6	3.56	-36.9	
0955	↓	4.0	12.10	11.16	7.28	0.487	17.1	3.61	-38.5	
10,00	↓	4.5	12.10	11.18	7.28	0.487	10.2	3.33	-41.1	
Final Parameter Readings for Sample.										
1000		g ~~SEE ABOVE~~ 5.0	12.10	11.18 ~~11.1~~ g	7.28	0.487	10.0	2.92	-41.7	

Comments:

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APPENDIX E

INVESTIGATION –DERIVED WASTE (IDW) CHARACTERIZATION AND DISPOSAL REPORT

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TEC-Weston Joint Venture

2496 Old Ivy Road, Suite 300
Charlottesville, VA 22903

March 9, 2017

Ms. Katie Tait
OHARNG Environmental Specialist 2
Camp Ravenna Joint Military Training Center
1438 State Route 534 SW
Newton Falls, OH 44444

Reference **Contract Number: W9133L-14-D-0008**
Delivery Order: 0003

Subject: **Investigation Derived Waste (IDW) Letter Report for January 2017 Sampling Event IDW, RVAAP-66 Facility Wide Groundwater, Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Camp Ravenna Joint Military Training Center, Portage and Trumbull Counties, Ohio**

Dear Ms. Tait:

TEC-Weston Joint Venture (TEC-Weston JV) completed the sampling of monitoring wells in January 2017. All work was performed in accordance with the *Draft Final Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater* (TEC-Weston JV, 2016). These activities resulted in the generation of Investigation Derived Waste (IDW) consisting of recovered waters from well purging and decontamination of sampling equipment. The purpose of this letter report is to characterize and classify the IDW and request for approval for off-site disposal at a licensed treatment facility. This letter report follows guidance established by the following:

1. *Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater* (RIWP) (TEC-Weston JV, 2016); and

2. *Facility-Wide Sampling and Analysis Plan for Environmental Investigations* (FWSAP) (SAIC, 2011).

The water recovered from sampling operations was containerized in one 55-gallon drum. On January 17, 2017, one composite sample was collected (IDW-011717) for IDW characterization parameters: Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds (VOCs), TCLP semi-VOCs (SVOCs), TCLP metals, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. The sampling event was conducted in accordance with the requirements outlined in Section 7.0 of the RIWP and Section 8.4 of the FWSAP.

Analytical Screening of Results

Upon receipt of the laboratory results, the analytical data were reviewed to determine if the waste was potentially hazardous or nonhazardous.

The data were compared to disposal screening criteria, which are from three sources:

1. Concentration of Contaminants for Toxicity Characteristic (40 Code of Federal Regulations [CFR] 261.24), as listed in Table 8-1 of the FWSAP;
2. Table 8-2 of the FWSAP; and
3. 40 CFR 261.23 – Characteristic of Reactivity.

If analytical results do not exceed disposal criteria then the IDW is classified as “non-hazardous.” If analytical results exceed disposal criteria then the IDW is classified as “hazardous.” All analytical results were below

disposal screening criteria. Attachment 1, Table 1, shows the sample results compared to the disposal screening criteria. The laboratory analytical report is included in Attachment 2.

Table 8-2 of the FWSAP lists the cyanide criteria as 0.01 mg/L, which is not consistent with CFR 261.23 and 261.24 and could not be confirmed or validated by the Camp Ravenna Environmental Office. The source for the cyanide criteria could not be verified and appears to be an error. Two disposal vendors, Tradebe Environmental Services, LLC and US Ecology, were contacted to get information regarding the cyanide criteria; and both vendors referred us to CFR 261.23. CFR 261.23 indicates a solid waste exhibits the characteristic of reactivity if a cyanide-bearing waste, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment. A cyanide concentration of 2.4 mg/L was detected in sample IDW-011717. The US Environmental Protection Agency requires generators to use their knowledge to make a D003 determination per CFR 261.23(a)(5) for cyanide- and sulfide- bearing wastes. Groundwater sampling, which routinely generates IDW, has been conducted for many years as part of the Facility-wide Groundwater Monitoring Program. IDW collected from these same wells routinely in the past has been disposed of as non-hazardous waste. Based on visual assessment of the current condition of the waste and generator knowledge, the waste does not qualify as reactive waste and therefore does not classify as a hazardous waste.

Conclusions and Recommendation

Based on the observed analytical results, it is recommended the IDW purge and decontamination water contained in the one drum be classified as non-hazardous, contaminated waste and be disposed of off-site at a licensed water treatment facility.

Upon ARNG/OHARNG approval of this IDW Report and proposed off-site disposal, TEC-Weston JV will proceed with the off-site disposal.

We appreciate the opportunity to work with you. If you have any questions or comments regarding this deliverable, please feel free to contact me by telephone at (303)-273-0231 or email at Katie.Hendrickson@cardno-gs.com.

Sincerely,

Katie Hendrickson

Digitally signed by Katie Hendrickson
DN: cn=Katie Hendrickson, o, ou=Cardno GS, email=katie.hendrickson@cardno-gs.com, c=US
Date: 2017.03.09 14:14:14 -07'00'

Katie Hendrickson
Environmental Remediation Project Manager,
TEC-Weston Joint Venture
Office (+1) 303-273-0231 **Fax** (+1) 303-273-0235
Address 1658 Cole Boulevard, Suite 190, Golden, CO 80401
Email katie.hendrickson@cardno-gs.com **Web** www.cardno.com

Attachment 1: Investigation Derived Waste Screening Summary Tables
Attachment 2: Laboratory Report

Attachment 1: Investigation Derived Waste Screening Summary Table

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Table 1. Investigation Derived Waste Screening									
Sample Name	**Matrix**	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-011717	Water	87-86-5	Pentachlorophenol	0.1	ND	100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	98-95-3	Nitrobenzene	0.0041	ND	2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	110-86-1	Pyridine	0.0057	ND	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	88-06-2	2,4,6-Trichlorophenol	0.0014	ND	2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	95-95-4	2,4,5-Trichlorophenol	0.0022	ND	400	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	121-14-2	2,4-Dinitrotoluene	0.0083	ND	0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	106-46-7	1,4-Dichlorobenzene	0.0016	ND	7.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	118-74-1	Hexachlorobenzene	0.0033	ND	0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	67-72-1	Hexachloroethane	0.011	ND	3	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	87-68-3	Hexachlorobutadiene	0.017	ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	18496-25-8	Sulfide	0.79	ND	3	mg/L	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-011717	Water	75-35-4	1,1-Dichloroethene	0.0023	ND	0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	107-06-2	1,2-Dichloroethane	0.0013	ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	127-18-4	Tetrachloroethene	0.002	ND	0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	75-01-4	Vinyl chloride	0.001	ND	0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	79-01-6	Trichloroethene	0.0016	ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	78-93-3	2-Butanone (MEK)	0.018	ND	200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening									
Sample Name	**Matrix**	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-011717	Water	71-43-2	Benzene	0.0016	ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	56-23-5	Carbon tetrachloride	0.0019	ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	67-66-3	Chloroform	0.0016	ND	6	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	108-90-7	Chlorobenzene	0.0017	ND	100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	15831-10-4	3 & 4 Methylphenol	0.013	ND	200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7440-39-3	Barium	0.029	J	100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7440-38-2	Arsenic	0.022	ND	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7440-43-9	Cadmium	0.002	ND	1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7439-92-1	Lead	0.014	ND	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7440-47-3	Chromium	0.002	ND	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	94-75-7	2,4-D	0.0021	ND	10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	57-12-5	Cyanide, Total	2.4		--	mg/L	40 CFR 261.23 – Characteristic of reactivity	Non-Hazardous
IDW-011717	Water	93-72-1	Silvex (2,4,5-TP)	0.0017	F ND	1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7439-97-6	Mercury	0.00003	ND	0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	N/A	Flashpoint	>160		<140	Degrees F	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-011717	Water	7782-49-2	Selenium	0.024	ND	1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	8001-35-2	Toxaphene	0.0037	F1 ND	0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening									
Sample Name	**Matrix**	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-011717	Water	72-43-5	Methoxychlor	0.00013	ND	10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	57-74-9	Chlordane (technical)	0.0014	ND	0.03	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	95-48-7	2-Methylphenol	0.0049	ND	200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	N/A	pH adj. to 25 deg C	7.7	HF	$2 \leq pH \leq 12.5$	SU	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-011717	Water	72-20-8	Endrin	0.000079	ND	0.02	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	7440-22-4	Silver	0.004	ND	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	76-44-8	Heptachlor	0.000077	ND	0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	58-89-9	gamma-BHC (Lindane)	0.000069	ND	0.4	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-011717	Water	1024-57-3	Heptachlor epoxide	0.000075	ND	0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Notes:

-- no disposal criteria specified
°F – degrees Fahrenheit
mg/L – milligrams per liter
mg/kg – milligrams per kilogram
CAS – Chemical Abstract Service Number
CFR – Code of Federal Regulations
Data Qualifier Flags:

F1 – Matrris spike (MS and or matrix spike duplicate (MSD) recovery is outside acceptable limits.
F2 – MS/MSD RPD exceeds lab control limits.
HF– Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J – Estimated: The analyte was positively identified; the quantitation is an estimation.
Q – One or more quality criteria failed.
U – Undetected at the Limit of Detection.

FWSAP – Facility-Wide Sampling and Analysis Plan
N/A – Not applicable or not available
SU – Standard units

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Attachment 2: Laboratory Report

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-93104-2
Client Project/Site: Ravenna, OH - Sharon Conglomerate

For:
Cardno TEC, Inc
1658 Cole Boulevard
Suite 190
Golden, Colorado 80401

Attn: Ms. Heather Miner

Authorized for release by:
2/8/2017 1:14:35 PM

Patrick McEntee, Manager of Project Management
(303)736-0107
patrick.mcentee@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Qualifiers

C Semi VOA

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

eneral Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

lossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 280-93104-2

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Cardno TEC, Inc

Project: Ravenna, OH - Sharon Conglomerate

Report Number: 280-93104-2

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off e ors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 1/18/2017 9:55 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.3º C.

Receipt Exceptions

Sample Trip Blank-011717 (280-93104-3) was submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC). The sample date/time was logged as 1/17/2017 1120, the earliest associated sample date/time. This was logged for VOCs 8260B, per the containers received.

One of four 1L unpreserved amber glass containers submitted for sample IDW-011717 was received at the laboratory with a sample ID of "011717" The laboratory was able to accurately determine the p oper identity of this container as "IDW-011717" based on the s mple time, and all other 1L unpreserved amber glass containers were labeled and accounted for. IDW-011717 (280-93104-2).

Sample IDW-011717 is reported under Job 280-93104-2, with a Level 2 report. All other samples are reported under Job 280-93104-1, with a Level 4 report. SCFmw-001-011717-GW (280-93104-1), IDW-011717 (280-93104-2) and TRIP BLANK-011717 (280-93104-3)

TCLP VOLATILE ORGANIC COMPOUNDS (GC-MS)
Sample IDW-011717 (280-93104-2) was analyzed for TCLP volatile organic compounds (GC-MS) in accordance with 1311. The samples were leached on 01/23/2017 and analyzed on 01/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)
Sample IDW-011717 (280-93104-2) was analyzed for TCLP semivolatile organic compounds (GC-MS) in accordance with 8270D. The samples were leached on 01/19/2017, prepared on 01/24/2017 and nalyzed on 01/27/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP ORGANOCHLORINE PESTICIDES (GC)
Sample IDW-011717 (280-93104-2) was analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 1311/8081B. The samples were leached on 01/19/2017, prepared on 01/22/2017 and analyzed on 01/25/2017.

Job ID: 280-93104-2 (Continued)

Laboratory: TestAmerica Denver (Continued)

Toxaphene failed the recovery criteria low for the MSD of sample IDW-011717MSD (280-93104-2) in batch 280-359985. Refer to the QC report for details. The associated result in the parent sample is qualified J.

No additional analytical or quality issues were noted, other th n those described above or in the Definitions/Glossary page.

TCLP HERBICIDES (GC)
Sample IDW-011717 (280-93104-2) was analyzed for Herbicides (GC) in accordance with EPA SW-846 Method 1311/8151A. The samples were leached on 01/19/2017, prepared on 01/23/2017 and analyzed on 01/25/2017.

Silvex (2,4,5-TP) exceeded the RPD limit for the MSD of sample IDW-011717MSD (280-93104-2) in batch 280-359955. Refer to the QC report for details. The associated result in the parent sample is qualified J.

The continuing calibration verification (CCV) associated with batch 280-359955 recovered above the upper control limit (+20%) for 2,4-D, 2,4-Dichlorophenylacetic acid, and Silvex (2,4,5-TP) on both columns. The samples associated with this CCV were non-detects fo the affected analytes; therefore, the data have been reported. Affected samples: IDW-011717 (280-93104-2), (CCV 280-359955/24), (CCV 280-359955/30), (LB3 280-359356/1-G), (LCS 280-359356/2-H), (280-93104-A-2-Q MS) and (280-93104-A-2-R MSD)
Method: 1311_T/8151A_AP/8151A

Sequence follows:
CCV2: 2,4-D +24% on front and +24% on back
2,4-Dichlorophenylacetic acid +22% on front, in control on back
Silvex (2,4,5-TP) +24% on front, in control on back
LB3, LCS, 280-93104-2, -2MS, -2MSD
CCV3: 2,4-D +21% on front, in control on back
Silvex (2,4,5-TP) +22% on front, in control on back

No additional analytical or quality issues were noted, other th n those described above or in the Definitions/Glossary page.

TCLP METALS
Sample IDW-011717 (280-93104-2) was analyzed for TCLP metals in accordance with EPA SW846 Methods 1311/6010C. The samples were leached on 01/19/2017, prepared on 01/20/2017 and analyzed on 01/23/2017 and 01/25/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY
Sample IDW-011717 (280-93104-2) was analyzed for TCLP mercury in accordance with SW-846 1311/7470. The samples were leached on 01/19/2017, and prepared and analyzed on 01/20/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

IGNITABILITY
Sample IDW-011717 (280-93104-2) was analyzed for ignitability in accordance with EPA SW-846 Method 1010. The samples were nalyzed on 01/31/2017.

The sample results were analyzed and entered directly into TALS at time of analysis due to a printer malfunction.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CYANIDE, TOTAL
Sample IDW-011717 (280-93104-2) was analyzed for Cyanide, Total in accordance with 9012B. The samples were prepared and nalyzed on 01/25/2017.

Sample IDW-011717 (280-93104-2)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Job ID: 280-93104-2 (Continued)

Laboratory: TestAmerica Denver (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE

Sample IDW-011717 (280-93104-2) was analyzed for sulfide in accordance with EPA SW-846 Method 9034. The samples were prepared nd analyzed on 01/20/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PH

Sample IDW-011717 (280-93104-2) was analyzed for pH in accordance with EPA SW-846 9040C. The samples were analyzed on 01/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Client Sample ID: IDW-011717 — Lab Sample ID: 280-93104-2

Analyte	Result	Qualifier	L	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.029	J	1.0	0.0040	mg/L	1		6010C	TCL
Flashpoint	>160		1.00	1.00	Degrees F	1		1010A	Total/NA
Cyanide, Total	2400		100	20	ug/L	10		9012B	Total/NA
pH adj. to 25 deg C	7.7	HF	0.1	0.1	SU	1		9040C	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL DEN
8081B	Organochlorine Pesticides (GC)	SW846	TAL DEN
8151A DOD	Herbicides (GC)	EPA	TAL DEN
6010C	Metals (ICP)	SW846	TAL DEN
7470A	Mercury (CVAA)	SW846	TAL DEN
1010A	Ignitability, Pensky-Martens Closed-Cup Method	SW846	TAL DEN
9012B	Cyanide, Total and/or Amenable	EPA	TAL DEN
9034	Sulfide, Acid Soluble and Insoluble (Titrimetric)	SW846	TAL DEN
9040C	pH	SW846	TAL DEN

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-93104-2	IDW-011717	Water	01/17/17 13:00	01/18/17 09:55

Client Sample Results

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.010	0.0016	mg/L			01/26/17 09:32	1
2-Butanone (MEK)	ND		0.10	0.018	mg/L			01/26/17 09:32	1
Carbon tetrachloride	ND		0.010	0.0019	mg/L			01/26/17 09:32	1
Chlorobenzene	ND		0.010	0.0017	mg/L			01/26/17 09:32	1
Chloroform	ND		0.010	0.0016	mg/L			01/26/17 09:32	1
1,2-Dichloroethane	ND		0.010	0.0013	mg/L			01/26/17 09:32	1
1,1-Dichloroethene	ND		0.010	0.0023	mg/L			01/26/17 09:32	1
Tetrachloroethene	ND		0.010	0.0020	mg/L			01/26/17 09:32	1
Trichloroethene	ND		0.010	0.0016	mg/L			01/26/17 09:32	1
Vinyl chloride	ND		0.010	0.0010	mg/L			01/26/17 09:32	1

Surrogate	*%Recovery*	*Qualifier*	*L mits*	*Prepared*	*Analyzed*	*I Fac*
Toluene-d8 (Surr)	*109*		*78 - 120*		*01/26/17 09:32*	*1*
1,2-Dichloroethane-d4 (Surr)	*108*		*64 - 129*		*01/26/17 09:32*	*1*
4-Bromofluorobenzene (Surr)	*101*		*78 - 121*		*01/26/17 09:32*	*1*
Dibromofluoromethane (Surr)	*111*		*79 - 119*		*01/26/17 09:32*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylphenol	ND		0.050	0.0049	mg/L		01/24/17 17:05	01/27/17 21:23	1
3 & 4 Methylphenol	ND		0.050	0.0013	mg/L		01/24/17 17:05	01/27/17 21:23	1
1,4-Dichlorobenzene	ND		0.020	0.0016	mg/L		01/24/17 17:05	01/27/17 21:23	1
2,4-Dinitrotoluene	ND		0.050	0.0083	mg/L		01/24/17 17:05	01/27/17 21:23	1
Hexachlorobenzene	ND		0.050	0.0033	mg/L		01/24/17 17:05	01/27/17 21:23	1
Hexachlorobutadiene	ND		0.050	0.017	mg/L		01/24/17 17:05	01/27/17 21:23	1
Hexachloroethane	ND		0.050	0.011	mg/L		01/24/17 17:05	01/27/17 21:23	1
Nitrobenzene	ND		0.050	0.0041	mg/L		01/24/17 17:05	01/27/17 21:23	1
entachlorophenol	ND		0.25	0.10	mg/L		01/24/17 17:05	01/27/17 21:23	1
Pyridine	ND		0.10	0.0057	mg/L		01/24/17 17:05	01/27/17 21:23	1
2,4,5-Trichlorophenol	ND		0.050	0.0022	mg/L		01/24/17 17:05	01/27/17 21:23	1
2,4,6-Trichlorophenol	ND		0.025	0.0014	mg/L		01/24/17 17:05	01/27/17 21:23	1

Surrogate	*%Recovery*	*Qualifier*	*L mits*	*Prepared*	*Analyzed*	*I Fac*
2-Fluorobiphenyl (Surr)	*74*		*49 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*
2-Fluorophenol (Surr)	*69*		*50 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*
2,4,6-Tribromophenol (Surr)	*1*		*51 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*
Nitrobenzene-d5 (Surr)	*67*		*51 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*
Phenol-d5 (Surr)	*59*		*47 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*
Terphenyl-d14 (Surr)	*1*		*56 - 120*	*01/24/17 17:05*	*01/27/17 21:23*	*1*

Client Sample Results

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin	ND		0.00050	0.000079	mg/L		01/22/17 07:20	01/25/17 18:12	1
Heptachlor	ND		0.00050	0.000077	mg/L		01/22/17 07:20	01/25/17 18:12	1
Heptachlor epoxide	ND		0.00050	0.000075	mg/L		01/22/17 07:20	01/25/17 18:12	1
gamma-BHC (Lindane)	ND		0.00050	0.000069	mg/L		01/22/17 07:20	01/25/17 18:12	1
Methoxychlor	ND		0.0010	0.00013	mg/L		01/22/17 07:20	01/25/17 18:12	1
Toxaphene	ND	F1	0.020	0.0037	mg/L		01/22/17 07:20	01/25/17 18:12	1
Chlordane (technical)	ND		0.0050	0.0014	mg/L		01/22/17 07:20	01/25/17 18:12	1

Surrogate	*%Recovery*	*Qualifier*	*L mits*	*Prepared*	*Analyzed*	*I Fac*
Tetrachloro-m-xylene	*6*		*28 - 115*	*01/22/17 07:20*	*01/25/17 18:12*	*1*
DCB Decachlorobiphenyl	*6*		*34 - 122*	*01/22/17 07:20*	*01/25/17 18:12*	*1*

Method: 8151A DOD - Herbicides (GC) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		0.040	0.0021	mg/L		01/23/17 16:20	01/25/17 19:10	1
Silvex (2,4,5-TP)	ND	F2	0.010	0.0017	mg/L		01/23/17 16:20	01/25/17 19:10	1

Surrogate	*%Recovery*	*Qualifier*	*L mits*	*Prepared*	*Analyzed*	*I Fac*
2,4-Dichlorophenylacetic acid	*93*		*10 - 131*	*01/23/17 16:20*	*01/25/17 19:10*	*1*

Method: 6010C - Metals (ICP) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.022	mg/L		01/20/17 07:40	01/25/17 10:24	1
Barium	**0.029**	**J**	1.0	0.0040	mg/L		01/20/17 07:40	01/23/17 14:43	1
Cadmium	ND		0.10	0.0020	mg/L		01/20/17 07:40	01/23/17 14:43	1
Chromium	ND		0.50	0.0030	mg/L		01/20/17 07:40	01/23/17 14:43	1
Lead	ND		0.50	0.014	mg/L		01/20/17 07:40	01/23/17 14:43	1
Selenium	ND		0.10	0.024	mg/L		01/20/17 07:40	01/23/17 14:43	1
Silver	ND		0.50	0.0040	mg/L		01/20/17 07:40	01/23/17 14:43	1

Method: 7470A - Mercury (CVAA) - TCLP

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.000030	mg/L		01/20/17 11:03	01/20/17 16:06	1

Client Sample Results

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

General Chemistry

Client Sample ID: IDW-011717
Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	**>160**		1.00	1.00	Degrees F			01/31/17 06:08	1
Cyanide, Total	**2400**		100	20	ug/L		01/25/17 06:37	01/25/17 12:34	10
Sulfide	ND		4000	790	ug/L		01/20/17 16:37	01/20/17 20:04	1
pH adj. to 25 deg C	**7.7**	**HF**	0.1	0.1	SU			01/19/17 15:31	1

Surrogate Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		TOL	12DCE	BFB	DBFM
Lab Sample ID	Client Sample ID	(78-120)	(64-129)	(78-121)	(79-119)
280-93104-2	IDW-011717	109	108	101	111
280-93104-2 MS	IDW-011717	110	113	103	115
280-93104-2 MSD	IDW-011717	107	111	101	113
LB3 280-359698/1-A	Method Blank	109	105	100	109
LCS 280-359698/2-A	Lab Control Sample	107	105	102	111

Surrogate Legend

TOL = Toluene-d8 (Surr)
12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		FBP	2FP	TBP	NBZ	PHL	TPH
Lab Sample ID	Client Sample ID	(49-120)	(50-120)	(51-120)	(51-120)	(47-120)	(56-120)
280-93104-2	IDW-011717	74	69	81	67	59	81
280-93104-2 MS	IDW-011717	79	72	87	76	63	85
280-93104-2 MSD	IDW-011717	77	74	85	73	64	82
LB3 280-359356/1-H	Method Blank	70	70	83	69	61	78
LCS 280-359356/2-I	Lab Control Sample	79	73	85	75	61	85

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCB1
Lab Sample ID	Client Sample ID	(28-115)	(34-122)
280-93104-2	IDW-011717	86	86
280-93104-2 MS	IDW-011717	87	89
280-93104-2 MS	IDW-011717	91	95
280-93104-2 MSD	IDW-011717	88	88
280-93104-2 MSD	IDW-011717	84	89
LB3 280-359356/1-E	Method Blank	86	82
LCS 280-359356/2-E	Lab Control Sample	88	95
LCS 280-359356/2-F	Lab Control Sample	91	101

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

Surrogate Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Method: 8151A DOD - Herbicides (GC)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)							
Lab Sample ID	**Client Sample ID**	**DCPA2 (10-131)**							
280-93104-2	IDW-011717	93							
280-93104-2 MS	IDW-011717	68							
280-93104-2 MSD	IDW-011717	92							
LB3 280-359356/1-G	Method Blank	91							
LCS 280-359356/2-H	Lab Control Sample	87							

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: LB3 280-359698/1-A
Matrix: Water
Analysis Batch: 360060

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.010	0.0016	mg/L			01/26/17 09:11	1
2-Butanone (MEK)	ND		0.10	0.018	mg/L			01/26/17 09:11	1
Carbon tetrachloride	ND		0.010	0.0019	mg/L			01/26/17 09:11	1
Chlorobenzene	ND		0.010	0.0017	mg/L			01/26/17 09:11	1
Chloroform	ND		0.010	0.0016	mg/L			01/26/17 09:11	1
1,2-Dichloroethane	ND		0.010	0.0013	mg/L			01/26/17 09:11	1
1,1-Dichloroethene	ND		0.010	0.0023	mg/L			01/26/17 09:11	1
Tetrachloroethene	ND		0.010	0.0020	mg/L			01/26/17 09:11	1
Trichloroethene	ND		0.010	0.0016	mg/L			01/26/17 09:11	1
Vinyl chloride	ND		0.010	0.0010	mg/L			01/26/17 09:11	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*109*		*78 - 120*		*01/26/17 09:11*	*1*
1,2-Dichloroethane-d4 (Surr)	*103*		*64 - 129*		*01/26/17 09:11*	*1*
4-Bromofluorobenzene (Surr)	*100*		*78 - 121*		*01/26/17 09:11*	*1*
Dibromofluoromethane (Surr)	*109*		*79 - 119*		*01/26/17 09:11*	*1*

Lab Sample ID: LCS 280-359698/2-A
Matrix: Water
Analysis Batch: 360060

Client Sample ID: Lab Control Sample
Prep Type: TCLP

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0500	0.0473		mg/L		95	74 - 135
2-Butanone (MEK)	0.200	0.225		mg/L		113	44 - 150
Carbon tetrachloride	0.0500	0.0523		mg/L		105	67 - 135
Chlorobenzene	0.0500	0.0441		mg/L		88	76 - 135
Chloroform	0.0500	0.0521		mg/L		104	76 - 120
1,2-Dichloroethane	0.0500	0.0585		mg/L		117	70 - 135
1,1-Dichloroethene	0.0500	0.0432		mg/L		86	71 - 136
Tetrachloroethene	0.0500	0.0422		mg/L		84	70 - 135
Trichloroethene	0.0500	0.0463		mg/L		93	73 - 135
Vinyl chloride	0.0500	0.0453		mg/L		91	40 - 144

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*107*		*78 - 120*
1,2-Dichloroethane-d4 (Surr)	*103*		*64 - 129*
4-Bromofluorobenzene (Surr)	*102*		*78 - 121*
Dibromofluoromethane (Surr)	*111*		*79 - 119*

Lab Sample ID: 280-93104-2 MS
Matrix: Water
Analysis Batch: 360060

Client Sample ID: IDW-011717
Prep Type: TCLP

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	ND		0.0500	0.0498		mg/L		100	74 - 135
2-Butanone (MEK)	ND		0.200	0.254		mg/L		127	44 - 150
Carbon tetrachloride	ND		0.0500	0.0557		mg/L		111	67 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-93104-2 MS
Matrix: Water
Analysis Batch: 360060

Client Sample ID: IDW-011717
Prep Type: TCLP

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorobenzene	ND		0.0500	0.0457		mg/L		91	76 - 135
Chloroform	ND		0.0500	0.0552		mg/L		110	76 - 120
1,2-Dichloroethane	ND		0.0500	0.0636		mg/L		127	70 - 135
1,1-Dichloroethene	ND		0.0500	0.0461		mg/L		92	71 - 136
Tetrachloroethene	ND		0.0500	0.0434		mg/L		87	70 - 135
Trichloroethene	ND		0.0500	0.0481		mg/L		96	73 - 135
Vinyl chloride	ND		0.0500	0.0473		mg/L		95	40 - 144

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*78 - 120*
1,2-Dichloroethane-d4 (Surr)	*11F*		*64 - 129*
4-Bromofluorobenzene (Surr)	*10F*		*78 - 121*
Dibromofluoromethane (Surr)	*113*		*79 - 119*

Lab Sample ID: 280-93104-2 MSD
Matrix: Water
Analysis Batch: 360060

Client Sample ID: IDW-011717
Prep Type: TCLP

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Benzene	ND		0.0500	0.0493		mg/L		99	74 - 135	1	20
2-Butanone (MEK)	ND		0.200	0.251		mg/L		125	44 - 150	1	32
Carbon tetrachloride	ND		0.0500	0.0544		mg/L		109	67 - 135	2	21
Chlorobenzene	ND		0.0500	0.0456		mg/L		91	76 - 135	0	20
Chloroform	ND		0.0500	0.0552		mg/L		110	76 - 120	0	20
1,2-Dichloroethane	ND		0.0500	0.0636		mg/L		127	70 - 135	0	20
1,1-Dichloroethene	ND		0.0500	0.0452		mg/L		90	71 - 136	2	20
Tetrachloroethene	ND		0.0500	0.0422		mg/L		84	70 - 135	3	20
Trichloroethene	ND		0.0500	0.0475		mg/L		95	73 - 135	1	20
Vinyl chloride	ND		0.0500	0.0447		mg/L		89	40 - 144	6	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*107*		*78 - 120*
1,2-Dichloroethane-d4 (Surr)	*111*		*64 - 129*
4-Bromofluorobenzene (Surr)	*101*		*78 - 121*
Dibromofluoromethane (Surr)	*11F*		*79 - 119*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LB3 280-359356/1-H
Matrix: Water
Analysis Batch: 360300

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 359870

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylphenol	ND		0.050	0.0049	mg/L		01/24/17 17:05	01/27/17 17:19	1
3 & 4 Methylphenol	ND		0.050	0.0013	mg/L		01/24/17 17:05	01/27/17 17:19	1
1,4-Dichlorobenzene	ND		0.020	0.0016	mg/L		01/24/17 17:05	01/27/17 17:19	1
2,4-Dinitrotoluene	ND		0.050	0.0083	mg/L		01/24/17 17:05	01/27/17 17:19	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continu d)

Lab Sample ID: LB3 280-359356/1-H
Matrix: Water
Analysis Batch: 360300

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 359870

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobenzene	ND		0.050	0.0033	mg/L		01/24/17 17:05	01/27/17 17:19	1
Hexachlorobutadiene	ND		0.050	0.017	mg/L		01/24/17 17:05	01/27/17 17:19	1
Hexachloroethane	ND		0.050	0.011	mg/L		01/24/17 17:05	01/27/17 17:19	1
Nitrobenzene	ND		0.050	0.0041	mg/L		01/24/17 17:05	01/27/17 17:19	1
entachlorophenol	ND		0.25	0.10	mg/L		01/24/17 17:05	01/27/17 17:19	1
Pyridine	ND		0.10	0.0057	mg/L		01/24/17 17:05	01/27/17 17:19	1
2,4,5-Trichlorophenol	ND		0.050	0.0022	mg/L		01/24/17 17:05	01/27/17 17:19	1
2,4,6-Trichlorophenol	ND		0.025	0.0014	mg/L		01/24/17 17:05	01/27/17 17:19	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-pluorobiyhen5l (Surr)	*70*		*49 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*
2-pluoroyhenol (Surr)	*70*		*30 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*
2,4,6-Tribromoyhenol (Surr)	*F*		*31 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*
Nitrobenzene-d3 (Surr)	*69*		*31 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*
Phenol-d3 (Surr)	*61*		*47 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*
Teryhen5l-d14 (Surr)	*78*		*36 - 120*	*01/24/17 17:03*	*01/27/17 17:19*	*1*

Lab Sample ID: LCS 280-359356/2-I
Matrix: Water
Analysis Batch: 360300

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 359870

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylphenol	0.250	0.204		mg/L		82	45 - 120
3 & 4 Methylphenol	0.500	0.403		mg/L		81	44 - 120
1,4-Dichlorobenzene	0.250	0.183		mg/L		73	36 - 120
2,4-Dinitrotoluene	0.100	0.0779		mg/L		78	36 - 120
Hexachlorobenzene	0.100	0.0888		mg/L		89	52 - 120
Hexachlorobutadiene	0.250	0.171		mg/L		69	35 - 120
Hexachloroethane	0.250	0.164		mg/L		66	35 - 120
Nitrobenzene	0.250	0.206		mg/L		83	50 - 120
Pentachlorophenol	0.500	0.379		mg/L		76	39 - 120
Pyridine	0.250	0.143		mg/L		57	10 - 121
2,4,5-Trichlorophenol	0.250	0.237		mg/L		95	46 - 120
2,4,6-Trichlorophenol	0.250	0.232		mg/L		93	43 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-pluorobiyhen5l (Surr)	*79*		*49 - 120*
2-pluoroyhenol (Surr)	*7F*		*30 - 120*
2,4,6-Tribromoyhenol (Surr)	*3*		*31 - 120*
Nitrobenzene-d3 (Surr)	*73*		*31 - 120*
Phenol-d3 (Surr)	*61*		*47 - 120*
Teryhen5l-d14 (Surr)	*3*		*36 - 120*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continu d)

Lab Sample ID: 280-93104-2 MS
Matrix: Water
Analysis Batch: 360300

Client Sample ID: IDW-011717
Prep Type: TCLP
Prep Batch: 359870

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2-Methylphenol	ND		0.250	0.206		mg/L		82	45 - 120
3 & 4 Methylphenol	ND		0.500	0.402		mg/L		80	44 - 120
1,4-Dichlorobenzene	ND		0.250	0.183		mg/L		73	36 - 120
2,4-Dinitrotoluene	ND		0.100	0.0771		mg/L		77	36 - 120
Hexachlorobenzene	ND		0.100	0.0882		mg/L		88	52 - 120
Hexachlorobutadiene	ND		0.250	0.169		mg/L		68	35 - 120
Hexachloroethane	ND		0.250	0.163		mg/L		65	35 - 120
Nitrobenzene	ND		0.250	0.198		mg/L		79	50 - 120
Pentachlorophenol	ND		0.500	0.391		mg/L		78	39 - 120
Pyridine	ND		0.250	0.164		mg/L		66	10 - 121
2,4,5-Trichlorophenol	ND		0.250	0.234		mg/L		93	46 - 120
2,4,6-Trichlorophenol	ND		0.250	0.234		mg/L		94	43 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-pluorobiyhen5l (Surr)	*79*		*49 - 120*
2-pluoroyhenol (Surr)	*72*		*30 - 120*
2,4,6-Tribromoyhenol (Surr)	*7*		*31 - 120*
Nitrobenzene-d3 (Surr)	*76*		*31 - 120*
Phenol-d3 (Surr)	*6F*		*47 - 120*
Teryhen5l-d14 (Surr)	*3*		*36 - 120*

Lab Sample ID: 280-93104-2 MSD
Matrix: Water
Analysis Batch: 360300

Client Sample ID: IDW-011717
Prep Type: TCLP
Prep Batch: 359870

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
2-Methylphenol	ND		0.250	0.205		mg/L		82	45 - 120	1	30
3 & 4 Methylphenol	ND		0.500	0.408		mg/L		82	44 - 120	1	30
1,4-Dichlorobenzene	ND		0.250	0.186		mg/L		74	36 - 120	2	30
2,4-Dinitrotoluene	ND		0.100	0.0728		mg/L		73	36 - 120	6	30
Hexachlorobenzene	ND		0.100	0.0835		mg/L		84	52 - 120	5	30
Hexachlorobutadiene	ND		0.250	0.179		mg/L		72	35 - 120	6	30
Hexachloroethane	ND		0.250	0.167		mg/L		67	35 - 120	2	30
Nitrobenzene	ND		0.250	0.207		mg/L		83	50 - 120	4	30
Pentachlorophenol	ND		0.500	0.400		mg/L		80	39 - 120	2	30
Pyridine	ND		0.250	0.158		mg/L		63	10 - 121	3	30
2,4,5-Trichlorophenol	ND		0.250	0.233		mg/L		93	46 - 120	0	30
2,4,6-Trichlorophenol	ND		0.250	0.230		mg/L		92	43 - 120	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-pluorobiyhen5l (Surr)	*77*		*49 - 120*
2-pluoroyhenol (Surr)	*74*		*30 - 120*
2,4,6-Tribromoyhenol (Surr)	*3*		*31 - 120*
Nitrobenzene-d3 (Surr)	*7F*		*31 - 120*
Phenol-d3 (Surr)	*64*		*47 - 120*
Teryhen5l-d14 (Surr)	*2*		*36 - 120*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: LB3 280-359356/1-E
Matrix: Water
Analysis Batch: 359985

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 359603

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin	ND		0.00050	0.000079	mg/L		01/22/17 07:20	01/25/17 17:20	1
Heptachlor	ND		0.00050	0.000077	mg/L		01/22/17 07:20	01/25/17 17:20	1
Heptachlor epoxide	ND		0.00050	0.000075	mg/L		01/22/17 07:20	01/25/17 17:20	1
gamma-BHC (Lindane)	ND		0.00050	0.000069	mg/L		01/22/17 07:20	01/25/17 17:20	1
Methoxychlor	ND		0.0010	0.00013	mg/L		01/22/17 07:20	01/25/17 17:20	1
Toxaphene	ND		0.020	0.0037	mg/L		01/22/17 07:20	01/25/17 17:20	1
Chlordane (technical)	ND		0.0050	0.0014	mg/L		01/22/17 07:20	01/25/17 17:20	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-x5lene	*6*		*28 - 113*	*01/22/17 07:20*	*01/23/17 17:20*	*1*
DCB Decachlorobiyhen5l	*2*		*F4 - 122*	*01/22/17 07:20*	*01/23/17 17:20*	*1*

Lab Sample ID: LCS 280-359356/2-E
Matrix: Water
Analysis Batch: 359985

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 359603

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin	0.00500	0.00507		mg/L		101	66 - 143
Heptachlor	0.00500	0.00466		mg/L		93	59 - 143
Heptachlor epoxide	0.00500	0.00469		mg/L		94	37 - 142
gamma-BHC (Lindane)	0.00500	0.00476		mg/L		95	68 - 142
Methoxychlor	0.00500	0.00486		mg/L		97	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-x5lene			*28 - 113*
DCB Decachlorobiyhen5l	*93*		*F4 - 122*

Lab Sample ID: LCS 280-359356/2-F
Matrix: Water
Analysis Batch: 359985

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 359603

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Toxaphene	0.0200	0.0146	J	mg/L		73	63 - 142

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-x5lene	*91*		*28 - 113*
DCB Decachlorobiyhen5l	*101*		*F4 - 122*

Lab Sample ID: 280-93104-2 MS
Matrix: Water
Analysis Batch: 359985

Client Sample ID: IDW-011717
Prep Type: TCLP
Prep Batch: 359603

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin	ND		0.00500	0.00480		mg/L		96	66 - 143
Heptachlor	ND		0.00500	0.00440		mg/L		88	59 - 143
Heptachlor epoxide	ND		0.00500	0.00450		mg/L		90	37 - 142
gamma-BHC (Lindane)	ND		0.00500	0.00463		mg/L		93	68 - 142

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 280-93104-2 MS — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359985 — **Prep Batch: 359603**

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methoxychlor	ND		0.00500	0.00465		mg/L		93	30 - 150		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-x5lene	*7*		*28 - 113*
DCB Decachlorobiyhen5l	*9*		*F4 - 122*

Lab Sample ID: 280-93104-2 MS — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359985 — **Prep Batch: 359603**

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Toxaphene	ND	F1	0.0200	0.0132	J	mg/L		66	63 - 142		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-x5lene	*91*		*28 - 113*
DCB Decachlorobiyhen5l	*93*		*F4 - 122*

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359985 — **Prep Batch: 359603**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Endrin	ND		0.00500	0.00482		mg/L		96	66 - 143	0	30
Heptachlor	ND		0.00500	0.00445		mg/L		89	59 - 143	1	30
Heptachlor epoxide	ND		0.00500	0.00452		mg/L		90	37 - 142	0	30
gamma-BHC (Lindane)	ND		0.00500	0.00461		mg/L		92	68 - 142	0	30
Methoxychlor	ND		0.00500	0.00476		mg/L		95	30 - 150	2	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-x5lene			*28 - 113*
DCB Decachlorobiyhen5l			*F4 - 122*

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359985 — **Prep Batch: 359603**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Toxaphene	ND	F1	0.0200	0.0125	J F1	mg/L		62	63 - 142	11	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-x5lene	*4*		*28 - 113*
DCB Decachlorobiyhen5l	*9*		*F4 - 122*

Method: 8151A DOD - Herbicides (GC)

Lab Sample ID: LB3 280-359356/1-G — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359955 — **Prep Batch: 359729**

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		0.040	0.0021	mg/L		01/23/17 16:20	01/25/17 18:24	1
Silvex (2,4,5-TP)	ND		0.010	0.0017	mg/L		01/23/17 16:20	01/25/17 18:24	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichloroyhen5lacetic acid	*91*		*10 - 1F1*	*01/2F/17 16:20*	*01/23/17 18:24*	*1*

Lab Sample ID: LCS 280-359356/2-H — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359955 — **Prep Batch: 359729**

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-D	0.0500	0.0431		mg/L		86	13 - 115
Silvex (2,4,5-TP)	0.0500	0.0424		mg/L		85	10 - 158

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichloroyhen5lacetic acid	*7*		*10 - 1F1*

Lab Sample ID: 280-93104-2 MS — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359955 — **Prep Batch: 359729**

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-D	ND		0.0500	0.0324	J	mg/L		65	13 - 115
Silvex (2,4,5-TP)	ND	F2	0.0500	0.0307		mg/L		61	10 - 158

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichloroyhen5lacetic acid	*68*		*10 - 1F1*

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359955 — **Prep Batch: 359729**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
2,4-D	ND		0.0500	0.0427		mg/L		85	13 - 115	30	30
Silvex (2,4,5-TP)	ND	F2	0.0500	0.0453	F2	mg/L		91	10 - 158	37	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichloroyhen5lacetic acid	*92*		*10 - 1F1*

Method: 6010C - Metals (ICP)

Lab Sample ID: LB3 280-359356/1-B — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359725 — **Prep Batch: 359435**

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		1.0	0.0040	mg/L		01/20/17 07:40	01/23/17 14:38	1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LB3 280-359356/1-B
Matrix: Water
Analysis Batch: 359725

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 359435

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	ND		0.10	0.0020	mg/L		01/20/17 07:40	01/23/17 14:38	1
Chromium	ND		0.50	0.0030	mg/L		01/20/17 07:40	01/23/17 14:38	1
Lead	ND		0.50	0.014	mg/L		01/20/17 07:40	01/23/17 14:38	1
Selenium	ND		0.10	0.024	mg/L		01/20/17 07:40	01/23/17 14:38	1
Silver	ND		0.50	0.0040	mg/L		01/20/17 07:40	01/23/17 14:38	1

Lab Sample ID: LB3 280-359356/1-B
Matrix: Water
Analysis Batch: 359999

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 359435

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.50	0.022	mg/L		01/20/17 07:40	01/25/17 10:19	1

Lab Sample ID: LCS 280-359356/2-B
Matrix: Water
Analysis Batch: 359725

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 359435

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	12.0	11.3		mg/L		94	80 - 120
Cadmium	1.10	1.01		mg/L		92	80 - 120
Chromium	5.20	4.85		mg/L		93	80 - 120
Lead	5.50	5.22		mg/L		95	80 - 120
Selenium	3.00	2.66		mg/L		89	80 - 120
Silver	1.05	0.964		mg/L		92	80 - 120

Lab Sample ID: LCS 280-359356/2-B
Matrix: Water
Analysis Batch: 359999

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 359435

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	4.00	3.60		mg/L		90	80 - 120

Lab Sample ID: 280-93104-2 MS
Matrix: Water
Analysis Batch: 359725

Client Sample ID: IDW-011717
Prep Type: TCLP
Prep Batch: 359435

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Barium	0.029	J	12.0	12.2		mg/L		102	80 - 120
Cadmium	ND		1.10	1.10		mg/L		100	80 - 120
Chromium	ND		5.20	5.28		mg/L		102	80 - 120
Lead	ND		5.50	5.67		mg/L		103	80 - 120
Selenium	ND		3.00	2.91		mg/L		97	80 - 120
Silver	ND		1.05	1.05		mg/L		100	80 - 120

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 280-93104-2 MS — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359999 — **Prep Batch: 359435**

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic	ND		4.00	3.97		mg/L		99	80 - 120		

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359725 — **Prep Batch: 359435**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Barium	0.029	J	12.0	12.4		mg/L		103	80 - 120	2	20
Cadmium	ND		1.10	1.11		mg/L		101	80 - 120	0	20
Chromium	ND		5.20	5.31		mg/L		102	80 - 120	0	20
Lead	ND		5.50	5.69		mg/L		103	80 - 120	0	20
Selenium	ND		3.00	2.95		mg/L		98	80 - 120	1	20
Silver	ND		1.05	1.06		mg/L		101	80 - 120	0	20

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359999 — **Prep Batch: 359435**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Arsenic	ND		4.00	3.99		mg/L		100	80 - 120	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: LB3 280-359356/1-D — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359633 — **Prep Batch: 359460**

Analyte	LB3 sult	LB3 Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.000030	mg/L		01/20/17 11:03	01/20/17 15:53	1

Lab Sample ID: LCS 280-359356/2-D — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359633 — **Prep Batch: 359460**

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00500	0.00554		mg/L		111	90 - 116

Lab Sample ID: 280-93104-2 MS — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359633 — **Prep Batch: 359460**

Analyte	Sample sult	Sample Qualifier	Spike Added	MS sult	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00500	0.00502		mg/L		100	90 - 116

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 280-93104-2 MSD — **Client Sample ID: IDW-011717**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 359633 — **Prep Batch: 359460**

Analyte	Sample sult	Sample Qualifier	Spike Added	MSD sult	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Mercury	ND		0.00500	0.00460		mg/L		92	90 - 116	9	10

Method: 1010A - Ignitability, Pensky-Martens Closed-Cup Method

Lab Sample ID: MB 280-360502/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 360502

Analyte	MB sult	MB Qualifi r	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	>160		1.00	1.00	Degrees F			01/31/17 06:08	1

Lab Sample ID: LCS 280-360502/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 360502

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Flashpoint	81.0	81.00		Degrees F		100	97.5 - 102

Lab Sample ID: LCSD 280-360502/2 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 360502

Analyte	Spike Added	LCSD sult	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	PD	PD Limit
Flashpoint	81.0	81.00		Degrees F		100	97.5 - 102	0	10

Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 280-359917/4-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359993 — **Prep Batch: 359917**

Analyte	MB sult	MB Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		10	2.0	ug/L		01/25/17 06:37	01/25/17 11:36	1

Lab Sample ID: HLCS 280-359917/1-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359993 — **Prep Batch: 359917**

Analyte	Spike Added	HLCS sult	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	400	383		ug/L		96	90 - 110

Lab Sample ID: LCS 280-359917/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359993 — **Prep Batch: 359917**

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	100	98.9		ug/L		99	83 - 116

Method: 9012B - Cyanide, Total and/or Amenable (Continued)

Lab Sample ID: LLCS 280-359917/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359993 — **Prep Batch: 359917**

Analyte	Spike Added	LLCS sult	LLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	100	101		ug/L		101	44 - 167

Method: 9034 - Sulfide, Acid Soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 280-359555/2-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359576 — **Prep Batch: 359555**

Analyte	MB sult	MB Qualifier	L	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		4000	790	ug/L		01/20/17 16:37	01/20/17 20:04	1

Lab Sample ID: LCS 280-359555/1-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359576 — **Prep Batch: 359555**

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	22300	19600		ug/L		88	50 - 106

Method: 9040C - pH

Lab Sample ID: LCS 280-359411/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 359411

Analyte	Spike Added	LCS sult	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH adj. to 25 deg C	7.00	7.0		SU		100	99 - 101

QC Association Summary

Client: Cardno TEC, Inc
roject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

GC/MS VOA

Leach Batch: 359698

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	1311	
LB3 280-359698/1-A	Method Blank	TCLP	Water	1311	
LCS 280-359698/2-A	Lab Control Sample	TCLP	Water	1311	
280-93104-2 MS	IDW-011717	TCLP	Water	1311	
280-93104-2 MSD	IDW-011717	TCLP	Water	1311	

Analysis Batch: 360060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	8260B	359698
LB3 280-359698/1-A	Method Blank	TCLP	Water	8260B	359698
LCS 280-359698/2-A	Lab Control Sample	TCLP	Water	8260B	359698
280-93104-2 MS	IDW-011717	TCLP	Water	8260B	359698
280-93104-2 MSD	IDW-011717	TCLP	Water	8260B	359698

GC/MS Semi VOA

Leach Batch: 359356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	1311	
LB3 280-359356/1-H	Method Blank	TCLP	Water	1311	
LCS 280-359356/2-I	Lab Control Sample	TCLP	Water	1311	
280-93104-2 MS	IDW-011717	TCLP	Water	1311	
280-93104-2 MSD	IDW-011717	TCLP	Water	1311	

Prep Batch: 359870

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	3510C	359356
LB3 280-359356/1-H	Method Blank	TCLP	Water	3510C	359356
LCS 280-359356/2-I	Lab Control Sample	TCLP	Water	3510C	359356
280-93104-2 MS	IDW-011717	TCLP	Water	3510C	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	3510C	359356

Analysis Batch: 360300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	8270D	359870
LB3 280-359356/1-H	Method Blank	TCLP	Water	8270D	359870
LCS 280-359356/2-I	Lab Control Sample	TCLP	Water	8270D	359870
280-93104-2 MS	IDW-011717	TCLP	Water	8270D	359870
280-93104-2 MSD	IDW-011717	TCLP	Water	8270D	359870

GC Semi VOA

Leach Batch: 359356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	1311	
LB3 280-359356/1-E	Method Blank	TCLP	Water	1311	
LB3 280-359356/1-G	Method Blank	TCLP	Water	1311	
LCS 280-359356/2-E	Lab Control Sample	TCLP	Water	1311	
LCS 280-359356/2-F	Lab Control Sample	TCLP	Water	1311	
LCS 280-359356/2-H	Lab Control Sample	TCLP	Water	1311	

GC Semi VOA (Continued)

Leach Batch: 359356 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2 MS	IDW-011717	TCLP	Water	1311	
280-93104-2 MSD	IDW-011717	TCLP	Water	1311	

Prep Batch: 359603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	3510C	359356
LB3 280-359356/1-E	Method Blank	TCLP	Water	3510C	359356
LCS 280-359356/2-E	Lab Control Sample	TCLP	Water	3510C	359356
LCS 280-359356/2-F	Lab Control Sample	TCLP	Water	3510C	359356
280-93104-2 MS	IDW-011717	TCLP	Water	3510C	359356
280-93104-2 MS	IDW-011717	TCLP	Water	3510C	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	3510C	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	3510C	359356

Prep Batch: 359729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	8151A	359356
LB3 280-359356/1-G	Method Blank	TCLP	Water	8151A	359356
LCS 280-359356/2-H	Lab Control Sample	TCLP	Water	8151A	359356
280-93104-2 MS	IDW-011717	TCLP	Water	8151A	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	8151A	359356

Analysis Batch: 359955

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	8151A DOD	359729
LB3 280-359356/1-G	Method Blank	TCLP	Water	8151A DOD	359729
LCS 280-359356/2-H	Lab Control Sample	TCLP	Water	8151A DOD	359729
280-93104-2 MS	IDW-011717	TCLP	Water	8151A DOD	359729
280-93104-2 MSD	IDW-011717	TCLP	Water	8151A DOD	359729

Analysis Batch: 359985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	8081B	359603
LB3 280-359356/1-E	Method Blank	TCLP	Water	8081B	359603
LCS 280-359356/2-E	Lab Control Sample	TCLP	Water	8081B	359603
LCS 280-359356/2-F	Lab Control Sample	TCLP	Water	8081B	359603
280-93104-2 MS	IDW-011717	TCLP	Water	8081B	359603
280-93104-2 MS	IDW-011717	TCLP	Water	8081B	359603
280-93104-2 MSD	IDW-011717	TCLP	Water	8081B	359603
280-93104-2 MSD	IDW-011717	TCLP	Water	8081B	359603

Metals

Leach Batch: 359356

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	1311	
LB3 280-359356/1-B	Method Blank	TCLP	Water	1311	
LB3 280-359356/1-D	Method Blank	TCLP	Water	1311	
LCS 280-359356/2-B	Lab Control Sample	TCLP	Water	1311	
LCS 280-359356/2-D	Lab Control Sample	TCLP	Water	1311	

Metals (Continued)

Leach Batch: 359356 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2 MS	IDW-011717	TCLP	Water	1311	
280-93104-2 MSD	IDW-011717	TCLP	Water	1311	

Prep Batch: 359435

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	3010A	359356
LB3 280-359356/1-B	Method Blank	TCLP	Water	3010A	359356
LCS 280-359356/2-B	Lab Control Sample	TCLP	Water	3010A	359356
280-93104-2 MS	IDW-011717	TCLP	Water	3010A	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	3010A	359356

Prep Batch: 359460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	7470A	359356
LB3 280-359356/1-D	Method Blank	TCLP	Water	7470A	359356
LCS 280-359356/2-D	Lab Control Sample	TCLP	Water	7470A	359356
280-93104-2 MS	IDW-011717	TCLP	Water	7470A	359356
280-93104-2 MSD	IDW-011717	TCLP	Water	7470A	359356

Analysis Batch: 359633

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	7470A	359460
LB3 280-359356/1-D	Method Blank	TCLP	Water	7470A	359460
LCS 280-359356/2-D	Lab Control Sample	TCLP	Water	7470A	359460
280-93104-2 MS	IDW-011717	TCLP	Water	7470A	359460
280-93104-2 MSD	IDW-011717	TCLP	Water	7470A	359460

Analysis Batch: 359725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	6010C	359435
LB3 280-359356/1-B	Method Blank	TCLP	Water	6010C	359435
LCS 280-359356/2-B	Lab Control Sample	TCLP	Water	6010C	359435
280-93104-2 MS	IDW-011717	TCLP	Water	6010C	359435
280-93104-2 MSD	IDW-011717	TCLP	Water	6010C	359435

Analysis Batch: 359999

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	TCLP	Water	6010C	359435
LB3 280-359356/1-B	Method Blank	TCLP	Water	6010C	359435
LCS 280-359356/2-B	Lab Control Sample	TCLP	Water	6010C	359435
280-93104-2 MS	IDW-011717	TCLP	Water	6010C	359435
280-93104-2 MSD	IDW-011717	TCLP	Water	6010C	359435

General Chemistry

Analysis Batch: 359411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	9040C	
LCS 280-359411/4	Lab Control Sample	Total/NA	Water	9040C	

General Chemistry (Continued)

Prep Batch: 359555

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	9030B	
MB 280-359555/2-A	Method Blank	Total/NA	Water	9030B	
LCS 280-359555/1-A	Lab Control Sample	Total/NA	Water	9030B	

Analysis Batch: 359576

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	9034	359555
MB 280-359555/2-A	Method Blank	Total/NA	Water	9034	359555
LCS 280-359555/1-A	Lab Control Sample	Total/NA	Water	9034	359555

Prep Batch: 359917

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	9012B	
MB 280-359917/4-A	Method Blank	Total/NA	Water	9012B	
HLCS 280-359917/1-A	Lab Control Sample	Total/NA	Water	9012B	
LCS 280-359917/3-A	Lab Control Sample	Total/NA	Water	9012B	
LLCS 280-359917/2-A	Lab Control Sample	Total/NA	Water	9012B	

Analysis Batch: 359993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	9012B	359917
MB 280-359917/4-A	Method Blank	Total/NA	Water	9012B	359917
HLCS 280-359917/1-A	Lab Control Sample	Total/NA	Water	9012B	359917
LCS 280-359917/3-A	Lab Control Sample	Total/NA	Water	9012B	359917
LLCS 280-359917/2-A	Lab Control Sample	Total/NA	Water	9012B	359917

Analysis Batch: 360502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-93104-2	IDW-011717	Total/NA	Water	1010A	
MB 280-360502/3	Method Blank	Total/NA	Water	1010A	
LCS 280-360502/1	Lab Control Sample	Total/NA	Water	1010A	
LCSD 280-360502/2	Lab Control Sample Dup	Total/NA	Water	1010A	

Lab Chronicle

Client: Cardno TEC, Inc
oject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Client Sample ID: IDW-011717

Date Collected: 01/17/17 13:00
Date Received: 01/18/17 09:55

Lab Sample ID: 280-93104-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			1.0 g	1.0 mL	359698	01/23/17 12:03	DLW	TAL DEN
TCLP	Analysis	8260B		1	2 mL	20 mL	360060	01/26/17 09:32	TAW	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	3510C			200 mL	1 mL	359870	01/24/17 17:05	BJA	TAL DEN
TCLP	Analysis	8270D		1			360300	01/27/17 21:23	AFH	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	3510C			100 mL	10 mL	359603	01/22/17 07:20	JDW	TAL DEN
TCLP	Analysis	8081B		1			359985	01/25/17 18:12	DAW	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	8151A			100 mL	10 mL	359729	01/23/17 16:20	RPC	TAL DEN
TCLP	Analysis	8151A DOD		1			359955	01/25/17 19:10	AMB1	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	3010A			10 mL	50 mL	359435	01/20/17 07:40	SUR	TAL DEN
TCLP	Analysis	6010C		1			359725	01/23/17 14:43	CRR	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	3010A			10 mL	50 mL	359435	01/20/17 07:40	SUR	TAL DEN
TCLP	Analysis	6010C		1			359999	01/25/17 10:24	CRR	TAL DEN
TCLP	Leach	1311			1.0 g	1.0 mL	359356	01/19/17 10:54	DLW	TAL DEN
TCLP	ep	7470A			30 mL	50 mL	359460	01/20/17 11:03	TEB	TAL DEN
TCLP	Analysis	7470A		1			359633	01/20/17 16:06	TEB	TAL DEN
Total/NA	Analysis	1010A		1	70 mL	70 mL	360502	01/31/17 06:08	JML	TAL DEN
Total/NA	ep	9012B			50 mL	50 mL	359917	01/25/17 06:37	JML	TAL DEN
Total/NA	Analysis	9012B		10	50 mL	50 mL	359993	01/25/17 12:34	JML	TAL DEN
Total/NA	ep	9030B			50 mL	50 mL	359555	01/20/17 16:37	ALS	TAL DEN
Total/NA	Analysis	9034		1			359576	01/20/17 20:04	ALS	TAL DEN
Total/NA	Analysis	9040C		1			359411	01/19/17 15:31	MMC	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Certification Summary

Client: Cardno TEC, Inc
oject/Site: Ravenna, OH - Sharon Conglomerate

TestAmerica Job ID: 280-93104-2

Laboratory: TestAmerica Denver

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-17

Analysis Method	ep Method	Matrix	Analyte

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Kim Kroenke	Lab PM: McEntee, Patrick J	Carrier Tracking No(s):	COC No:
Client Contact: Ms. Heather Miner	Phone: 330 388 1598	E-Mail: patrick.mcentee@testamericainc.com		Page: Page 1 of 1
Company: Cardno TEC, Inc				Job #:
Address: 1658 Cole Boulevard Suite 190	Due Date Requested:			
City: Golden	TAT Requested (days):			
State, Zip: CO, 80401				
Phone:	PO #: 076003.009.002			
Email: heather.miner@cardno-gs.com	WO #:			
Project Name: Ravenna, OH - Sharon Conglomerate	Project #: 28014271			
Site:	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B_DOD5 - VOCs	8270D_DOD5 - SVOCs (phthalates, nitroaromatics, pheno	8270D_SIM_DOD5 - PAHs	8330B_DOD5 - Explosives	8082A_LL PCBs	9012B Cyanide	TCLP VOC's 8260B	TCLP SVOCs 8270D	TCLP herbicides 8151A	TCLP pesticides 8081B	TCLP metals	Total Sulfide 9034	Cyanide & Corrosivity	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	N	N	N	N	B									
SCFmw-001-~~011317~~ 011717 KSK -GW	01/~~13~~ 17 KSK/17	1120	G	Water	N	N	X	X	X	X	X	X								12	
IDW-011717	01/17/17	1300	C	W	N	N						X	X	X	X	X	X	X	X	10	X + Flashpoint

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

280-93104 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Kimberly Kroenke	Date/Time: 01/~~13~~ 17 KSK/17	Company: ATC	Received by: FEDEX	Date/Time: 01/~~13~~ 17 KSK/17	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: ~~01/13/17~~ KSK	Company
Relinquished by:	Date/Time:	Company	Received by: Se	Date/Time: 1-18-17 0955	Company: TAD

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 0.5 IRS (f-0.2 transfered SPLS 1-18-17

Login Sample Receipt Checklist

Client: Cardno TEC, Inc

Job Number: 280-93104-2

Login Number: 93104
List Number: 1
Creator: Woodworth, Sean P

List Source: TestAmerica Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	SEE CUR ALSO Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
ppropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any equested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
OH5 210 020 736	1	330-677-0785	127116

5. Generator's Name and Mailing Address
Former Ravenna Army Ammunition Plant
C/O Camp Ravenna Attn: Kathryn Tait
1438 State Route 534 SW
Newton Falls, OH 44444
Generator's Phone: 614-336-6136

Generator's Site Address (if different than mailing address)
Former Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, OH 44266 Contact: Kathryn Tait

6. Transporter 1 Company Name: Emerald Environmental Services, Inc
U.S. EPA ID Number: OHR 000 102 053

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Veolia Technology
955 West Smith Road
Medina, Ohio 44256
Facility's Phone: 330-721-9773
U.S. EPA ID Number: OHD 077 772 895

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non DOT Regulated, Non Hazardous Material (IDW - Groundwater)	08	DM	380	G
2.				
3.				
4.				

13. Special Handling Instructions and Additional Information
9 1) Approval # VEX31376
Consultant: CARDNO Government Services Division
Emergency Contact: Emerald Environmental 330-677-0785

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Kathryn S. Tait
Signature: Kathryn S. Tait
Month 01 Day 27 Year 17

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Michael Fisher
Signature: Michael Fisher
Month 01 Day 27 Year 17

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Tim O'Brien
Signature:
Month 01 Day 27 Year 17

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

TEC-Weston Joint Venture

2496 Old Ivy Road, Suite 300
Charlottesville, VA 22903

December 20, 2017

Ms. Katie Tait
OHARNG Environmental Specialist 2
Camp Ravenna Joint Military Training Center
1438 State Route 534 SW
Newton Falls, OH 44444

Reference **Contract Number: W9133L-14-D-0008**
Delivery Order: 0003

Subject: **Investigation Derived Waste (IDW) Letter Report for December 2017 Sampling Event IDW, RVAAP-66 Facility Wide Groundwater, Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Camp Ravenna Joint Military Training Center, Portage and Trumbull Counties, Ohio**

Dear Ms. Tait:

TEC-Weston Joint Venture (TEC-Weston JV) completed the sampling of monitoring wells in December 2017. All work was performed in accordance with the *Final Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater* (TEC-Weston JV, 2016). These activities resulted in the generation of Investigation Derived Waste (IDW) consisting of recovered waters from well purging and decontamination of sampling equipment. The purpose of this letter report is to characterize and classify the IDW and request for approval for off-site disposal at a licensed treatment facility. This letter report follows guidance established by the following:

1. *Final Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater* (RIWP) (TEC-Weston JV, 2016); and

2. *Facility-Wide Sampling and Analysis Plan for Environmental Investigations* (FWSAP) (SAIC, 2011).

The water recovered from sampling operations was containerized in four 55-gallon drums. On December 8, 2017, one composite sample was collected (IDW-120817) for IDW characterization parameters: Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds (VOCs), TCLP semi-VOCs (SVOCs), TCLP metals, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. The sampling event was conducted in accordance with the requirements outlined in Section 7.0 of the RIWP and Section 8.4 of the FWSAP.

Analytical Screening of Results

Upon receipt of the laboratory results, the analytical data were reviewed to determine if the waste was potentially hazardous or nonhazardous.

The data were compared to disposal screening criteria, which are from three sources:

1. Concentration of Contaminants for Toxicity Characteristic (40 Code of Federal Regulations [CFR] 261.24), as listed in Table 8-1 of the FWSAP;
2. Table 8-2 of the FWSAP; and
3. 40 CFR 261.23 – Characteristic of Reactivity.

If analytical results do not exceed disposal criteria then the IDW is classified as "non-hazardous." If analytical results exceed disposal criteria then the IDW is classified as "hazardous." All analytical results were below

disposal screening criteria. Attachment 1, Table 1, shows the sample results compared to the disposal screening criteria. The laboratory analytical report is included in Attachment 2.

Conclusions and Recommendation

Based on the observed analytical results, it is recommended the IDW be classified as non-hazardous waste and be disposed of off-site at a licensed water treatment facility.

Upon ARNG/OHARNG approval of this IDW Report and proposed off-site disposal, TEC-Weston JV will proceed with the off-site disposal.

We appreciate the opportunity to work with you. If you have any questions or comments regarding this deliverable, please feel free to contact me by telephone at (512)-651-7108 or email at Brent.Ferry@WestonSolutions.com.

Sincerely,

for Brent C. Ferry, PG
Environmental Restoration Project Manager, TEC-Weston Joint Venture
Direct 512-651-7108 Mobile 309-236-9235 Fax 512-651-7101
Address 2705 Bee Cave Road, Suite 100, Austin, TX 78746-5685
Email Brent.Ferry@WestonSolutions.com Web www.westonsolutions.com

Attachment 1: Investigation Derived Waste Screening Summary Tables
Attachment 2: Laboratory Report

Attachment 1: Investigation Derived Waste Screening Summary Tables

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Table 1. Investigation Derived Waste Screening Summary Table								
Sample Name	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-120817	N/A	Flashpoint	**>200**		>140	Degrees F	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	7440-38-2	Arsenic	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-39-3	Barium	0.041	J	100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-47-3	Chromium	0.00095	J B	5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7439-92-1	Lead	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7782-49-2	Selenium	ND		1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-22-4	Silver	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7439-97-6	Mercury	ND		0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	57-74-9	Chlordane (technical)	ND		0.03	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	72-20-8	Endrin	ND		0.02	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	76-44-8	Heptachlor	ND		0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	1024-57-3	Heptachlor epoxide	ND		0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	58-89-9	gamma-BHC (Lindane)	ND		0.4	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	72-43-5	Methoxychlor	ND		10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	8001-35-2	Toxaphene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	94-75-7	2,4-D	ND		10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	93-72-1	Silvex (2,4,5-TP)	ND		1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening Summary Table								
Sample Name	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-120817	75-35-4	1,1-Dichloroethene	ND		0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	107-06-2	1,2-Dichloroethane	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	78-93-3	2-Butanone (MEK)	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	71-43-2	Benzene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	56-23-5	Carbon tetrachloride	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	108-90-7	Chlorobenzene	ND		100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	67-66-3	Chloroform	ND		6	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	127-18-4	Tetrachloroethene	ND		0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	79-01-6	Trichloroethene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	75-01-4	Vinyl chloride	ND		0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	106-46-7	1,4-Dichlorobenzene	ND		7.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	95-95-4	2,4,5-Trichlorophenol	ND		400	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	88-06-2	2,4,6-Trichlorophenol	ND		2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	121-14-2	2,4-Dinitrotoluene	ND		0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	95-48-7	2-Methylphenol	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	15831-10-4	3 & 4 Methylphenol	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	118-74-1	Hexachlorobenzene	ND		0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening Summary Table								
Sample Name	**CAS Number**	**Analyte**	**Result**	**Qualifier**	**FWSAP IDW Disposal Standard**	**Units**	**Disposal Standard Source**	**Result Exceeds Hazardous Criteria?**
IDW-120817	87-68-3	Hexachlorobutadiene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	67-72-1	Hexachloroethane	ND		3	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	98-95-3	Nitrobenzene	ND		2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	87-86-5	Pentachlorophenol	ND		100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	110-86-1	Pyridine	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	57-12-5	Cyanide, Total	0.0091	J B	0.01	mg/L	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	18496-25-8	Sulfide	ND		3.0	mg/L	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	N/A	pH	**7.4**	H F	$2 \leq pH \leq 12.5$	SU	FWSAP (2011) Table 8-2	Non-Hazardous

Notes:
µg/L – micrograms per liter
-- no disposal criteria specified
°F – degrees Fahrenheit
mg/L – milligrams per liter
CAS – Chemical Abstract Service Number
CFR – Code of Federal Regulations
Data Qualifier Flags:
B – Compound was found in the blank and sample
HF – Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J – Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
ND – Not detected at the reporting limit
FWSAP – Facility-Wide Sampling and Analysis Plan
N/A – Not applicable or not available
SU – Standard units

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Attachment 2: Laboratory Report

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-89105-1
Client Project/Site: Ravenna, OH

For:
Cardno TEC, Inc
2496 Old Ivy Road
Suite 300
Charlottesville, Virginia 22903

Attn: Mr. Peter Chapman

Authorized for release by:
12/14/2017 2:53:10 PM

Patrick McEntee, Manager of Project Management
(303)736-0107
patrick.mcentee@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
X	Surrogate is outside control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 240-89105-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: Cardno TEC, Inc

Project: Ravenna, OH

Report Number: 240-89105-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The sample was received on 12/8/2017 11:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.3º C.

TCLP VOLATILE ORGANIC COMPOUNDS (GC-MS)
Sample IDW-120817 (240-89105-1) was analyzed for TCLP volatile organic compounds (GC-MS) in accordance with EPA SW-846 Methods 1311/8260B. The samples were leached on 12/10/2017 and analyzed on 12/12/2017.

The continuing calibration verification (CCV) associated with batch 240-307239 recovered above the upper control limit for vinyl chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: IDW-120817 (240-89105-1) and (CCVIS 240-307239/3).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)
Sample IDW-120817 (240-89105-1) was analyzed for TCLP semivolatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 1311/8270D. The samples were leached on 12/10/2017, prepared on 12/11/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP ORGANOCHLORINE PESTICIDES (GC)
Sample IDW-120817 (240-89105-1) was analyzed for TCLP Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 1311/8081B. The samples were leached on 12/10/2017, prepared on 12/12/2017 and analyzed on 12/13/2017.

The continuing calibration verification (CCV) associated with batch 240-307466 recovered above the upper control limit for Endrin and Chlordane (technical) Peak 1. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following sample is impacted: IDW-120817 (240-89105-1).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP CHLORINATED HERBICIDES
Sample IDW-120817 (240-89105-1) was analyzed for TCLP chlorinated herbicides in accordance with EPA SW-846 Methods 1311/

Job ID: 240-89105-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

8151A. The samples were leached on 12/10/2017, prepared on 12/12/2017 and analyzed on 12/14/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP METALS
Sample IDW-120817 (240-89105-1) was analyzed for TCLP Metals in accordance with EPA SW-846 Method 1311/6010C. The samples were leached on 12/10/2017, prepared on 12/11/2017 and analyzed on 12/12/2017.

Arsenic, Chromium and Lead were detected in method blank LB 240-307100/1-B at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY
Sample IDW-120817 (240-89105-1) was analyzed for TCLP mercury in accordance with EPA SW-846 Methods 1311/7470A. The samples were leached on 12/10/2017, prepared on 12/11/2017 and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

IGNITABILITY
Sample IDW-120817 (240-89105-1) was analyzed for ignitability in accordance with EPA SW-846 Method 1010. The samples were analyzed on 12/11/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL CYANIDE
Sample IDW-120817 (240-89105-1) was analyzed for total cyanide in accordance with EPA SW-846 Method 9012B. The samples were prepared and analyzed on 12/13/2017.

Cyanide, Total was detected in method blank MB 240-307521/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE
Sample IDW-120817 (240-89105-1) was analyzed for sulfide in accordance with EPA SW-846 9034. The samples were prepared and analyzed on 12/13/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CORROSIVITY (PH)
Sample IDW-120817 (240-89105-1) was analyzed for Corrosivity (pH) in accordance with EPA SW-846 9040C. The samples were analyzed on 12/08/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Method Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8081B	Organochlorine Pesticides (GC)	SW846	TAL CAN
8151A	Herbicides (GC)	SW846	TAL CAN
6010C	Metals (ICP)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
1010A	Ignitability, Pensky-Martens Closed-Cup Method	SW846	TAL CAN
9012B	Cyanide, Total andor Amenable	SW846	TAL CAN
9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL CAN
9040C	pH	SW846	TAL CAN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-89105-1	IDW-120817	Water	12/08/17 08:00	12/08/17 11:15

Detection Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Client Sample ID: IDW-120817 — Lab Sample ID: 240-89105-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.041	J	0.50	0.0024	mg/L	1		6010C	TCLP
Chromium	0.00095	J B	0.050	0.00055	mg/L	1		6010C	TCLP
Flashpoint	>200		1.00	1.00	Degrees F	1		1010A	Total/NA
Cyanide, Total	9.1	J B	10	2.0	ug/L	1		9012B	Total/NA
pH	7.4	HF	0.1	0.1	SU	1		9040C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Client Sample ID: IDW-120817

Lab Sample ID: 240-89105-1

Date Collected: 12/08/17 08:00
Matrix: Water
Date Received: 12/08/17 11:15

Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.025	0.00027	mg/L			12/12/17 00:03	1
1,2-Dichloroethane	ND		0.025	0.00030	mg/L			12/12/17 00:03	1
2-Butanone (MEK)	ND		0.25	0.0010	mg/L			12/12/17 00:03	1
Benzene	ND		0.025	0.00028	mg/L			12/12/17 00:03	1
Carbon tetrachloride	ND		0.025	0.00035	mg/L			12/12/17 00:03	1
Chlorobenzene	ND		0.025	0.00032	mg/L			12/12/17 00:03	1
Chloroform	ND		0.025	0.00031	mg/L			12/12/17 00:03	1
Tetrachloroethene	ND		0.025	0.00030	mg/L			12/12/17 00:03	1
Trichloroethene	ND		0.025	0.00033	mg/L			12/12/17 00:03	1
Vinyl chloride	ND		0.025	0.00045	mg/L			12/12/17 00:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*73 - 120*		*12/12/17 00:03*	*1*
4-Bromofluorobenzene (Surr)	*104*		*76 - 120*		*12/12/17 00:03*	*1*
Toluene-d8 (Surr)	*117*		*80 - 120*		*12/12/17 00:03*	*1*
Dibromofluoromethane (Surr)	*110*		*73 - 123*		*12/12/17 00:03*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040	0.00034	mg/L		12/11/17 11:46	12/13/17 12:45	1
2,4,5-Trichlorophenol	ND		0.0040	0.00030	mg/L		12/11/17 11:46	12/13/17 12:45	1
2,4,6-Trichlorophenol	ND		0.0040	0.00024	mg/L		12/11/17 11:46	12/13/17 12:45	1
2,4-Dinitrotoluene	ND		0.0040	0.00025	mg/L		12/11/17 11:46	12/13/17 12:45	1
2-Methylphenol	ND		0.0040	0.00017	mg/L		12/11/17 11:46	12/13/17 12:45	1
3 & 4 Methylphenol	ND		0.0040	0.00080	mg/L		12/11/17 11:46	12/13/17 12:45	1
Hexachlorobenzene	ND		0.00080	0.000085	mg/L		12/11/17 11:46	12/13/17 12:45	1
Hexachlorobutadiene	ND		0.0040	0.00027	mg/L		12/11/17 11:46	12/13/17 12:45	1
Hexachloroethane	ND		0.0040	0.00019	mg/L		12/11/17 11:46	12/13/17 12:45	1
Nitrobenzene	ND		0.0040	0.000040	mg/L		12/11/17 11:46	12/13/17 12:45	1
Pentachlorophenol	ND		0.016	0.00027	mg/L		12/11/17 11:46	12/13/17 12:45	1
Pyridine	ND		0.0040	0.00035	mg/L		12/11/17 11:46	12/13/17 12:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*42*		*28 - 120*	*12/11/17 11:46*	*12/13/17 12:45*	*1*
2-Fluorobiphenyl (Surr)	*93*		*38 - 120*	*12/11/17 11:46*	*12/13/17 12:45*	*1*
2-Fluorophenol (Surr)	*32*		*10 - 120*	*12/11/17 11:46*	*12/13/17 12:45*	*1*
Nitrobenzene-d5 (Surr)	*82*		*32 - 120*	*12/11/17 11:46*	*12/13/17 12:45*	*1*
Phenol-d5 (Surr)	*27*		*10 - 120*	*12/11/17 11:46*	*12/13/17 12:45*	*1*
Terphenyl-d14 (Surr)	*109*		*23 - 127*	*12/11/17 11:46*	*12/13/17 12:45*	*1*

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	ND		0.0050	0.00011	mg/L		12/12/17 09:01	12/13/17 10:36	1
Endrin	ND		0.00050	0.000014	mg/L		12/12/17 09:01	12/13/17 10:36	1
Heptachlor	ND		0.00050	0.000031	mg/L		12/12/17 09:01	12/13/17 10:36	1
Heptachlor epoxide	ND		0.00050	0.000012	mg/L		12/12/17 09:01	12/13/17 10:36	1
gamma-BHC (Lindane)	ND		0.00050	0.000011	mg/L		12/12/17 09:01	12/13/17 10:36	1
Methoxychlor	ND		0.0010	0.0000080	mg/L		12/12/17 09:01	12/13/17 10:36	1
Toxaphene	ND		0.020	0.00068	mg/L		12/12/17 09:01	12/13/17 10:36	1

Client Sample Results

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Client Sample ID: IDW-120817

Date Collected: 12/08/17 08:00
Date Received: 12/08/17 11:15

Lab Sample ID: 240-89105-1

Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*83*		*21 - 135*	*12/12/17 09:01*	*12/13/17 10:36*	*1*
DCB Decachlorobiphenyl	*85*		*21 - 135*	*12/12/17 09:01*	*12/13/17 10:36*	*1*
Tetrachloro-m-xylene	*66*		*33 - 123*	*12/12/17 09:01*	*12/13/17 10:36*	*1*
Tetrachloro-m-xylene	*63*		*33 - 123*	*12/12/17 09:01*	*12/13/17 10:36*	*1*

Method: 8151A - Herbicides (GC) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		0.0040	0.0022	mg/L		12/12/17 08:54	12/14/17 00:42	1
Silvex (2,4,5-TP)	ND		0.0010	0.00043	mg/L		12/12/17 08:54	12/14/17 00:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*43*		*41 - 130*	*12/12/17 08:54*	*12/14/17 00:42*	*1*
2,4-Dichlorophenylacetic acid	*43*		*41 - 130*	*12/12/17 08:54*	*12/14/17 00:42*	*1*

Method: 6010C - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	0.0033	mg/L		12/11/17 14:00	12/12/17 11:04	1
Barium	**0.041**	**J**	0.50	0.0024	mg/L		12/11/17 14:00	12/12/17 11:04	1
Cadmium	ND		0.050	0.00029	mg/L		12/11/17 14:00	12/12/17 11:04	1
Chromium	**0.00095**	**J B**	0.050	0.00055	mg/L		12/11/17 14:00	12/12/17 11:04	1
Lead	ND		0.050	0.0019	mg/L		12/11/17 14:00	12/12/17 11:04	1
Selenium	ND		0.050	0.0051	mg/L		12/11/17 14:00	12/12/17 11:04	1
Silver	ND		0.050	0.00092	mg/L		12/11/17 14:00	12/12/17 11:04	1

Method: 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		12/11/17 14:00	12/13/17 15:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	**>200**		1.00	1.00	Degrees F			12/11/17 06:06	1
Cyanide, Total	**9.1**	**J B**	10	2.0	ug/L		12/13/17 10:00	12/13/17 14:11	1
Sulfide	ND		3000	1400	ug/L		12/13/17 08:14	12/13/17 12:06	1
pH	**7.4**	**HF**	0.1	0.1	SU			12/08/17 15:19	1

Surrogate Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(73-120)	(76-120)	(80-120)	(73-123)
LCS 240-307239/9	Lab Control Sample	103	107	117	113

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(73-120)	(76-120)	(80-120)	(73-123)
240-89105-1	IDW-120817	108	104	117	110
LB 240-307118/1-A MB	Method Blank	107	98	114	110

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(28-120)	(38-120)	(10-120)	(32-120)	(10-120)	(23-127)
LCS 240-307168/11-A	Lab Control Sample	100	93	71	85	62	107
MB 240-307168/10-A	Method Blank	92	93	68	87	53	107

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)					
		TBP	FBP	2FP	NBZ	PHL	TPHL
Lab Sample ID	Client Sample ID	(28-120)	(38-120)	(10-120)	(32-120)	(10-120)	(23-127)
240-89105-1	IDW-120817	42	93	32	82	27	109

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)

Surrogate Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(21-135)	(21-135)	(33-123)	(33-123)
LCS 240-307309/6-A	Lab Control Sample	78	83	66	62
MB 240-307309/5-A	Method Blank	82	82	65	63

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1	DCBP2	TCX1	TCX2
Lab Sample ID	Client Sample ID	(21-135)	(21-135)	(33-123)	(33-123)
240-89105-1	IDW-120817	83	85	66	63

Surrogate Legend

DCBP = DCB Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(41-130)	(41-130)
LCS 240-307308/6-A	Lab Control Sample	32 X	43
MB 240-307308/5-A	Method Blank	31 X	42

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151A - Herbicides (GC)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1	DCPAA2
Lab Sample ID	Client Sample ID	(41-130)	(41-130)
240-89105-1	IDW-120817	43	43
240-89105-1 MS	IDW-120817	47	45

Surrogate Legend

DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: LCS 240-307239/9
Matrix: Water
Analysis Batch: 307239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.00	1.10		mg/L		110	76 - 131
1,2-Dichloroethane	1.00	1.03		mg/L		103	72 - 125
2-Butanone (MEK)	2.00	1.79		mg/L		89	55 - 137
Benzene	1.00	1.04		mg/L		104	80 - 122
Carbon tetrachloride	1.00	0.982		mg/L		98	69 - 130
Chlorobenzene	1.00	1.05		mg/L		105	80 - 120
Chloroform	1.00	1.02		mg/L		102	80 - 122
Tetrachloroethene	1.00	1.06		mg/L		106	79 - 120
Trichloroethene	1.00	1.03		mg/L		103	80 - 121
Vinyl chloride	1.00	1.10		mg/L		110	73 - 132

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*73 - 120*
4-Bromofluorobenzene (Surr)	*107*		*76 - 120*
Toluene-d8 (Surr)	*117*		*80 - 120*
Dibromofluoromethane (Surr)	*113*		*73 - 123*

Lab Sample ID: LB 240-307118/1-A MB
Matrix: Water
Analysis Batch: 307239

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.025	0.00027	mg/L			12/11/17 21:44	1
1,2-Dichloroethane	ND		0.025	0.00030	mg/L			12/11/17 21:44	1
2-Butanone (MEK)	ND		0.25	0.0010	mg/L			12/11/17 21:44	1
Benzene	ND		0.025	0.00028	mg/L			12/11/17 21:44	1
Carbon tetrachloride	ND		0.025	0.00035	mg/L			12/11/17 21:44	1
Chlorobenzene	ND		0.025	0.00032	mg/L			12/11/17 21:44	1
Chloroform	ND		0.025	0.00031	mg/L			12/11/17 21:44	1
Tetrachloroethene	ND		0.025	0.00030	mg/L			12/11/17 21:44	1
Trichloroethene	ND		0.025	0.00033	mg/L			12/11/17 21:44	1
Vinyl chloride	ND		0.025	0.00045	mg/L			12/11/17 21:44	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*73 - 120*		*12/11/17 21:44*	*1*
4-Bromofluorobenzene (Surr)	*98*		*76 - 120*		*12/11/17 21:44*	*1*
Toluene-d8 (Surr)	*114*		*80 - 120*		*12/11/17 21:44*	*1*
Dibromofluoromethane (Surr)	*110*		*73 - 123*		*12/11/17 21:44*	*1*

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-307168/10-A
Matrix: Water
Analysis Batch: 307497

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 307168

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040	0.00034	mg/L		12/11/17 11:46	12/13/17 11:09	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-307168/10-A
Matrix: Water
Analysis Batch: 307497

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 307168

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-Trichlorophenol	ND		0.0040	0.00030	mg/L		12/11/17 11:46	12/13/17 11:09	1
2,4,6-Trichlorophenol	ND		0.0040	0.00024	mg/L		12/11/17 11:46	12/13/17 11:09	1
2,4-Dinitrotoluene	ND		0.0040	0.00025	mg/L		12/11/17 11:46	12/13/17 11:09	1
2-Methylphenol	ND		0.0040	0.00017	mg/L		12/11/17 11:46	12/13/17 11:09	1
3 & 4 Methylphenol	ND		0.0040	0.00080	mg/L		12/11/17 11:46	12/13/17 11:09	1
Hexachlorobenzene	ND		0.00080	0.000085	mg/L		12/11/17 11:46	12/13/17 11:09	1
Hexachlorobutadiene	ND		0.0040	0.00027	mg/L		12/11/17 11:46	12/13/17 11:09	1
Hexachloroethane	ND		0.0040	0.00019	mg/L		12/11/17 11:46	12/13/17 11:09	1
Nitrobenzene	ND		0.0040	0.000040	mg/L		12/11/17 11:46	12/13/17 11:09	1
Pentachlorophenol	ND		0.016	0.00027	mg/L		12/11/17 11:46	12/13/17 11:09	1
Pyridine	ND		0.0040	0.00035	mg/L		12/11/17 11:46	12/13/17 11:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4,6-Tribromophenol (Surr)	*92*		*28 - 120*	*12/11/17 11:46*	*12/13/17 11:09*	*1*
2-Fluorobiphenyl (Surr)	*93*		*38 - 120*	*12/11/17 11:46*	*12/13/17 11:09*	*1*
2-Fluorophenol (Surr)	*68*		*10 - 120*	*12/11/17 11:46*	*12/13/17 11:09*	*1*
Nitrobenzene-d5 (Surr)	*87*		*32 - 120*	*12/11/17 11:46*	*12/13/17 11:09*	*1*
Phenol-d5 (Surr)	*53*		*10 - 120*	*12/11/17 11:46*	*12/13/17 11:09*	*1*
Terphenyl-d14 (Surr)	*107*		*23 - 127*	*12/11/17 11:46*	*12/13/17 11:09*	*1*

Lab Sample ID: LCS 240-307168/11-A
Matrix: Water
Analysis Batch: 307497

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 307168

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dichlorobenzene	0.0800	0.0564		mg/L		70	47 - 120
2,4,5-Trichlorophenol	0.0800	0.0787		mg/L		98	54 - 120
2,4,6-Trichlorophenol	0.0800	0.0712		mg/L		89	54 - 120
2,4-Dinitrotoluene	0.0800	0.0862		mg/L		108	60 - 120
2-Methylphenol	0.0800	0.0655		mg/L		82	46 - 120
3 & 4 Methylphenol	0.0800	0.0595		mg/L		74	40 - 120
Hexachlorobenzene	0.0800	0.0663		mg/L		83	51 - 120
Hexachlorobutadiene	0.0800	0.0600		mg/L		75	44 - 120
Hexachloroethane	0.0800	0.0567		mg/L		71	44 - 120
Nitrobenzene	0.0800	0.0644		mg/L		80	55 - 120
Pentachlorophenol	0.160	0.0875		mg/L		55	30 - 120
Pyridine	0.160	0.0978		mg/L		61	23 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4,6-Tribromophenol (Surr)	*100*		*28 - 120*
2-Fluorobiphenyl (Surr)	*93*		*38 - 120*
2-Fluorophenol (Surr)	*71*		*10 - 120*
Nitrobenzene-d5 (Surr)	*85*		*32 - 120*
Phenol-d5 (Surr)	*62*		*10 - 120*
Terphenyl-d14 (Surr)	*107*		*23 - 127*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 240-307309/5-A
Matrix: Water
Analysis Batch: 307466

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 307309

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	ND		0.0050	0.00011	mg/L		12/12/17 09:01	12/13/17 10:11	1
Endrin	ND		0.00050	0.000014	mg/L		12/12/17 09:01	12/13/17 10:11	1
Heptachlor	ND		0.00050	0.000031	mg/L		12/12/17 09:01	12/13/17 10:11	1
Heptachlor epoxide	ND		0.00050	0.000012	mg/L		12/12/17 09:01	12/13/17 10:11	1
gamma-BHC (Lindane)	ND		0.00050	0.000011	mg/L		12/12/17 09:01	12/13/17 10:11	1
Methoxychlor	ND		0.0010	0.0000080	mg/L		12/12/17 09:01	12/13/17 10:11	1
Toxaphene	ND		0.020	0.00068	mg/L		12/12/17 09:01	12/13/17 10:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCB Decachlorobiphenyl	*82*		*21 - 135*	*12/12/17 09:01*	*12/13/17 10:11*	*1*
DCB Decachlorobiphenyl	*82*		*21 - 135*	*12/12/17 09:01*	*12/13/17 10:11*	*1*
Tetrachloro-m-xylene	*65*		*33 - 123*	*12/12/17 09:01*	*12/13/17 10:11*	*1*
Tetrachloro-m-xylene	*63*		*33 - 123*	*12/12/17 09:01*	*12/13/17 10:11*	*1*

Lab Sample ID: LCS 240-307309/6-A
Matrix: Water
Analysis Batch: 307466

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 307309

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin	0.000800	0.000628		mg/L		78	36 - 124
Heptachlor	0.000800	0.000554		mg/L		69	37 - 120
Heptachlor epoxide	0.000800	0.000511		mg/L		64	44 - 120
gamma-BHC (Lindane)	0.000800	0.000517		mg/L		65	23 - 120
Methoxychlor	0.000800	0.000592	J	mg/L		74	36 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCB Decachlorobiphenyl	*78*		*21 - 135*
DCB Decachlorobiphenyl	*83*		*21 - 135*
Tetrachloro-m-xylene	*66*		*33 - 123*
Tetrachloro-m-xylene	*62*		*33 - 123*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 240-307308/5-A
Matrix: Water
Analysis Batch: 307545

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 307308

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND		0.0040	0.0022	mg/L		12/12/17 08:54	12/13/17 23:39	1
Silvex (2,4,5-TP)	ND		0.0010	0.00043	mg/L		12/12/17 08:54	12/13/17 23:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*31*	*X*	*41 - 130*	*12/12/17 08:54*	*12/13/17 23:39*	*1*
2,4-Dichlorophenylacetic acid	*42*		*41 - 130*	*12/12/17 08:54*	*12/13/17 23:39*	*1*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: LCS 240-307308/6-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307545 — **Prep Batch: 307308**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-D	0.0200	0.0119		mg/L		59	42 - 120
Silvex (2,4,5-TP)	0.00500	0.00250		mg/L		50	41 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*32*	*X*	*41 - 130*
2,4-Dichlorophenylacetic acid	*43*		*41 - 130*

Lab Sample ID: 240-89105-1 MS — **Client Sample ID: IDW-120817**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 307545 — **Prep Batch: 307308**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4-D	ND	F1	0.0200	0.00819		mg/L		41	38 - 120
Silvex (2,4,5-TP)	ND	*	0.00500	0.00317		mg/L		63	36 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*47*		*41 - 130*
2,4-Dichlorophenylacetic acid	*45*		*41 - 130*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 240-307201/2-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307354 — **Prep Batch: 307201**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	0.0033	mg/L		12/11/17 14:00	12/12/17 10:34	1
Barium	ND		0.50	0.0024	mg/L		12/11/17 14:00	12/12/17 10:34	1
Cadmium	ND		0.050	0.00029	mg/L		12/11/17 14:00	12/12/17 10:34	1
Chromium	ND		0.050	0.00055	mg/L		12/11/17 14:00	12/12/17 10:34	1
Lead	ND		0.050	0.0019	mg/L		12/11/17 14:00	12/12/17 10:34	1
Selenium	ND		0.050	0.0051	mg/L		12/11/17 14:00	12/12/17 10:34	1
Silver	ND		0.050	0.00092	mg/L		12/11/17 14:00	12/12/17 10:34	1

Lab Sample ID: LCS 240-307201/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307354 — **Prep Batch: 307201**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.00	2.22		mg/L		111	50 - 150
Barium	2.00	2.01		mg/L		100	50 - 150
Cadmium	0.0500	0.0548		mg/L		110	50 - 150
Chromium	0.200	0.205		mg/L		103	50 - 150
Lead	0.500	0.467		mg/L		93	50 - 150
Selenium	2.00	2.22		mg/L		111	50 - 150
Silver	0.0500	0.0575		mg/L		115	50 - 150

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LB 240-307100/1-B — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 307354 — **Prep Batch: 307201**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00372	J	0.050	0.0033	mg/L		12/11/17 14:00	12/12/17 10:25	1
Barium	ND		0.50	0.0024	mg/L		12/11/17 14:00	12/12/17 10:25	1
Cadmium	ND		0.050	0.00029	mg/L		12/11/17 14:00	12/12/17 10:25	1
Chromium	0.000839	J	0.050	0.00055	mg/L		12/11/17 14:00	12/12/17 10:25	1
Lead	0.00224	J	0.050	0.0019	mg/L		12/11/17 14:00	12/12/17 10:25	1
Selenium	ND		0.050	0.0051	mg/L		12/11/17 14:00	12/12/17 10:25	1
Silver	ND		0.050	0.00092	mg/L		12/11/17 14:00	12/12/17 10:25	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-307202/2-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307585 — **Prep Batch: 307202**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		12/11/17 14:00	12/13/17 14:46	1

Lab Sample ID: LCS 240-307202/3-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307585 — **Prep Batch: 307202**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.00500	0.00571		mg/L		114	80 - 120

Lab Sample ID: LB 240-307100/1-C — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: TCLP**
Analysis Batch: 307585 — **Prep Batch: 307202**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		12/11/17 14:00	12/13/17 14:44	1

Method: 1010A - Ignitability, Pensky-Martens Closed-Cup Method

Lab Sample ID: LCS 240-307121/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Flashpoint	81.0	83.00		Degrees F		102	97 - 103

Lab Sample ID: 240-89105-1 DU — **Client Sample ID: IDW-120817**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307121

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Flashpoint	>200		>200		Degrees F		NC	20

Method: 9012B - Cyanide, Total andor Amenable

Lab Sample ID: MB 240-307521/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307573 — **Prep Batch: 307521**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	7.60	J	10	2.0	ug/L		12/13/17 10:00	12/13/17 13:53	1

Lab Sample ID: LCS 240-307521/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307573 — **Prep Batch: 307521**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	598	630		ug/L		105	59 - 129

Lab Sample ID: MRL 240-307573/12 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307573

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	0.0100	0.00980	J	mg/L		98	70 - 130

Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 240-307478/7-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307517 — **Prep Batch: 307478**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3000	1400	ug/L		12/13/17 08:14	12/13/17 11:57	1

Lab Sample ID: LCS 240-307478/8-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307517 — **Prep Batch: 307478**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	8270	8130		ug/L		98	70 - 120

Lab Sample ID: 240-89105-1 MS — **Client Sample ID: IDW-120817**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307517 — **Prep Batch: 307478**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	ND		8270	7730		ug/L		94	32 - 130

Lab Sample ID: 240-89105-1 MSD — **Client Sample ID: IDW-120817**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 307517 — **Prep Batch: 307478**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		8270	6930		ug/L		84	32 - 130	11	30

QC Sample Results

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Method: 9040C - pH

Lab Sample ID: LCS 240-306952/2
Matrix: Water
Analysis Batch: 306952

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH			9.19	9.2		SU		100	97 - 103		

Lab Sample ID: 240-89105-1 DU
Matrix: Water
Analysis Batch: 306952

Client Sample ID: IDW-120817
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.4	HF		7.4		SU				0.3	20

QC Association Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

GC/MS VOA

Leach Batch: 307118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	1311	
LB 240-307118/1-A MB	Method Blank	TCLP	Water	1311	

Analysis Batch: 307239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	8260B	307118
LB 240-307118/1-A MB	Method Blank	TCLP	Water	8260B	307118
LCS 240-307239/9	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Leach Batch: 307100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	1311	

Prep Batch: 307168

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	3510C	307100
MB 240-307168/10-A	Method Blank	Total/NA	Water	3510C	
LCS 240-307168/11-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 307497

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	8270D	307168
MB 240-307168/10-A	Method Blank	Total/NA	Water	8270D	307168
LCS 240-307168/11-A	Lab Control Sample	Total/NA	Water	8270D	307168

GC Semi VOA

Leach Batch: 307100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	1311	
240-89105-1 MS	IDW-120817	TCLP	Water	1311	

Prep Batch: 307308

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	8151A	307100
MB 240-307308/5-A	Method Blank	Total/NA	Water	8151A	
LCS 240-307308/6-A	Lab Control Sample	Total/NA	Water	8151A	
240-89105-1 MS	IDW-120817	TCLP	Water	8151A	307100

Prep Batch: 307309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	3510C	307100
MB 240-307309/5-A	Method Blank	Total/NA	Water	3510C	
LCS 240-307309/6-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 307466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	8081B	307309

GC Semi VOA (Continued)

Analysis Batch: 307466 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-307309/5-A	Method Blank	Total/NA	Water	8081B	307309
LCS 240-307309/6-A	Lab Control Sample	Total/NA	Water	8081B	307309

Analysis Batch: 307545

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	8151A	307308
MB 240-307308/5-A	Method Blank	Total/NA	Water	8151A	307308
LCS 240-307308/6-A	Lab Control Sample	Total/NA	Water	8151A	307308
240-89105-1 MS	IDW-120817	TCLP	Water	8151A	307308

Metals

Leach Batch: 307100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	1311	
LB 240-307100/1-B	Method Blank	TCLP	Water	1311	
LB 240-307100/1-C	Method Blank	TCLP	Water	1311	

Prep Batch: 307201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	3010A	307100
LB 240-307100/1-B	Method Blank	TCLP	Water	3010A	307100
MB 240-307201/2-A	Method Blank	Total/NA	Water	3010A	
LCS 240-307201/3-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 307202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	7470A	307100
LB 240-307100/1-C	Method Blank	TCLP	Water	7470A	307100
MB 240-307202/2-A	Method Blank	Total/NA	Water	7470A	
LCS 240-307202/3-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 307354

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	6010C	307201
LB 240-307100/1-B	Method Blank	TCLP	Water	6010C	307201
MB 240-307201/2-A	Method Blank	Total/NA	Water	6010C	307201
LCS 240-307201/3-A	Lab Control Sample	Total/NA	Water	6010C	307201

Analysis Batch: 307585

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	TCLP	Water	7470A	307202
LB 240-307100/1-C	Method Blank	TCLP	Water	7470A	307202
MB 240-307202/2-A	Method Blank	Total/NA	Water	7470A	307202
LCS 240-307202/3-A	Lab Control Sample	Total/NA	Water	7470A	307202

QC Association Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

General Chemistry

Analysis Batch: 306952

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	9040C	
LCS 240-306952/2	Lab Control Sample	Total/NA	Water	9040C	
240-89105-1 DU	IDW-120817	Total/NA	Water	9040C	

Analysis Batch: 307121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	1010A	
LCS 240-307121/1	Lab Control Sample	Total/NA	Water	1010A	
240-89105-1 DU	IDW-120817	Total/NA	Water	1010A	

Prep Batch: 307478

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	9030B	
MB 240-307478/7-A	Method Blank	Total/NA	Water	9030B	
LCS 240-307478/8-A	Lab Control Sample	Total/NA	Water	9030B	
240-89105-1 MS	IDW-120817	Total/NA	Water	9030B	
240-89105-1 MSD	IDW-120817	Total/NA	Water	9030B	

Analysis Batch: 307517

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	9034	307478
MB 240-307478/7-A	Method Blank	Total/NA	Water	9034	307478
LCS 240-307478/8-A	Lab Control Sample	Total/NA	Water	9034	307478
240-89105-1 MS	IDW-120817	Total/NA	Water	9034	307478
240-89105-1 MSD	IDW-120817	Total/NA	Water	9034	307478

Prep Batch: 307521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	9012B	
MB 240-307521/1-A	Method Blank	Total/NA	Water	9012B	
LCS 240-307521/2-A	Lab Control Sample	Total/NA	Water	9012B	

Analysis Batch: 307573

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-89105-1	IDW-120817	Total/NA	Water	9012B	307521
MB 240-307521/1-A	Method Blank	Total/NA	Water	9012B	307521
LCS 240-307521/2-A	Lab Control Sample	Total/NA	Water	9012B	307521
MRL 240-307573/12	Lab Control Sample	Total/NA	Water	9012B	

Lab Chronicle

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Client Sample ID: IDW-120817

Date Collected: 12/08/17 08:00
Date Received: 12/08/17 11:15

Lab Sample ID: 240-89105-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			307118	12/10/17 14:30	DRJ	TAL CAN
TCLP	Analysis	8260B		1	307239	12/12/17 00:03	TJL1	TAL CAN
TCLP	Leach	1311			307100	12/10/17 14:30	MNH	TAL CAN
TCLP	Prep	3510C			307168	12/11/17 11:46	BMB	TAL CAN
TCLP	Analysis	8270D		1	307497	12/13/17 12:45	JMG	TAL CAN
TCLP	Leach	1311			307100	12/10/17 14:30	MNH	TAL CAN
TCLP	Prep	3510C			307309	12/12/17 09:01	BMB	TAL CAN
TCLP	Analysis	8081B		1	307466	12/13/17 10:36	BPM	TAL CAN
TCLP	Leach	1311			307100	12/10/17 14:30	MNH	TAL CAN
TCLP	Prep	8151A			307308	12/12/17 08:54	BMB	TAL CAN
TCLP	Analysis	8151A		1	307545	12/14/17 00:42	RTR	TAL CAN
TCLP	Leach	1311			307100	12/10/17 14:30	MNH	TAL CAN
TCLP	Prep	3010A			307201	12/11/17 14:00	AJC	TAL CAN
TCLP	Analysis	6010C		1	307354	12/12/17 11:04	AS1	TAL CAN
TCLP	Leach	1311			307100	12/10/17 14:30	MNH	TAL CAN
TCLP	Prep	7470A			307202	12/11/17 14:00	AJC	TAL CAN
TCLP	Analysis	7470A		1	307585	12/13/17 15:04	DSH	TAL CAN
Total/NA	Analysis	1010A		1	307121	12/11/17 06:06	TPH	TAL CAN
Total/NA	Prep	9012B			307521	12/13/17 10:00	JESW	TAL CAN
Total/NA	Analysis	9012B		1	307573	12/13/17 14:11	JESW	TAL CAN
Total/NA	Prep	9030B			307478	12/13/17 08:14	BLW	TAL CAN
Total/NA	Analysis	9034		1	307517	12/13/17 12:06	BLW	TAL CAN
Total/NA	Analysis	9040C		1	306952	12/08/17 15:19	MMM	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: Cardno TEC, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 240-89105-1

Laboratory: TestAmerica Canton

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Ohio VAP	State Program	5	CL0024	09-06-19

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
1010A		Water	Flashpoint
6010C	3010A	Water	Arsenic
6010C	3010A	Water	Barium
6010C	3010A	Water	Cadmium
6010C	3010A	Water	Chromium
6010C	3010A	Water	Lead
6010C	3010A	Water	Selenium
6010C	3010A	Water	Silver
8081B	3510C	Water	Chlordane (technical)
8081B	3510C	Water	Endrin
8081B	3510C	Water	gamma-BHC (Lindane)
8081B	3510C	Water	Heptachlor
8081B	3510C	Water	Heptachlor epoxide
8081B	3510C	Water	Methoxychlor
8081B	3510C	Water	Toxaphene
8270D	3510C	Water	1,4-Dichlorobenzene
8270D	3510C	Water	2,4,5-Trichlorophenol
8270D	3510C	Water	2,4,6-Trichlorophenol
8270D	3510C	Water	2,4-Dinitrotoluene
8270D	3510C	Water	2-Methylphenol
8270D	3510C	Water	3 & 4 Methylphenol
8270D	3510C	Water	Hexachlorobenzene
8270D	3510C	Water	Hexachlorobutadiene
8270D	3510C	Water	Hexachloroethane
8270D	3510C	Water	Nitrobenzene
8270D	3510C	Water	Pentachlorophenol
8270D	3510C	Water	Pyridine
9012B	9012B	Water	Cyanide, Total
9034	9030B	Water	Sulfide
9040C		Water	pH

Laboratory: TestAmerica Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-19 *
A2LA	ISO/IEC 17025		2907.01	10-31-19
Alabama	State Program	4	40730	09-30-12 *
Alaska (UST)	State Program	10	UST-30	04-05-18
Arizona	State Program	9	AZ0713	12-20-17
Arkansas DEQ	State Program	6	88-0687	06-01-18
California	State Program	9	2513	01-08-18
Connecticut	State Program	1	PH-0686	09-30-18
Florida	NELAP	4	E87667	06-30-18
Georgia	State Program	4	N/A	01-08-18
Illinois	NELAP	5	200017	04-30-18
Iowa	State Program	7	370	12-01-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Laboratory: TestAmerica Denver (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Kansas	NELAP	7	E-10166	04-30-18
Louisiana	NELAP	6	02096	06-30-18
Maine	State Program	1	CO0002	03-03-19
Minnesota	NELAP	5	8-999-405	12-31-17
Nevada	State Program	9	CO0026	07-31-18
New Hampshire	NELAP	1	205310	04-28-18
New Jersey	NELAP	2	CO004	06-30-18
New York	NELAP	2	11964	04-01-18
North Carolina (WW/SW)	State Program	4	358	12-31-17
North Dakota	State Program	8	R-034	01-09-18
Oklahoma	State Program	6	8614	08-31-18
Oregon	NELAP	10	4025	01-08-18
Pennsylvania	NELAP	3	68-00664	07-31-18
South Carolina	State Program	4	72002001	01-08-18
Texas	NELAP	6	T104704183-17-14	09-30-18
USDA	Federal		P330-16-00397	12-15-19
Utah	NELAP	8	CO00026	07-31-18
Virginia	NELAP	3	460232	06-14-18
Washington	State Program	10	C583	08-03-18
West Virginia DEP	State Program	3	354	12-31-17 *
Wisconsin	State Program	5	999615430	08-31-18
Wyoming (UST)	A2LA	8	2907.01	10-31-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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Chain of Custody Record IDW

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Liz Busby	Lab PM: McEntee, Patrick J	Carrier Tracking No(s):	COC No:
Client Contact: Elizabeth Busby	Phone: 303 941 6689	E-Mail: patrick.mcentee@testamericainc.com		Page: Page:
Company: Cardno TEC, Inc				Job #:
Address: 1658 Cole Boulevard Suite 190	Due Date Requested:			
City: Golden	TAT Requested (days): 3 BUSINESS DAY RUSH			
State, Zip: CO, 80401				
Phone: 303-273-0231	PO #:			
Email: Elizabeth.Busby@cardno-gs.com	WO #: 076003.009.007			
Project Name: Ravenna, OH - IDW	TestAmerica Project #: 28014271			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	1311/8260B - TCLP VOCs	1311/8270D - TCLP SVOCs	1311/6010C/6020A/7470A - TCLP Metals	1311/8081B - TCLP Pesticides	1311/8151A - TCLP Herbicides	9034 - Sulfide	9012B - Cyanide	9040C - pH	1010A - Flashpoint	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N	N	C/B	B	N	N		
IDW-120817	12/8/17	0800	G	W			X	X	X	X	X	X	X	X	X	11	ALL ANALYSES TO BE PERFORMED BY TA CANTON
																	• Rush 3 day TAT
																	• Report as seperate SDG

240-89105 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Liz Busby	1000 12-8-17	Cardno	[signature]	12/8/17 1115	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login # : 89105

Client Cardno Site Name _____ Cooler unpacked by: [signature]

Cooler Received on 12/8/17 Opened on 12/8/17

FedEx: 1st Grd Exp UPS FAS Clipper (Client Drop Off) TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box (Client Cooler) Box Other _____

Packing material used: (Bubble Wrap) Foam (Plastic Bag) None Other _____

COOLANT: (Wet Ice) Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt ☐ See Multiple Cooler Form
   IR GUN# IR-8 (CF **-0.3** °C) Observed Cooler Temp. 4.6 °C Corrected Cooler Temp. 4.3 °C
   IR GUN #36 (CF **+0.3**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
   ~~IR GUN # 627 (CF **-1.3**°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C~~
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 (Yes) No
   -Were the seals on the outside of the cooler(s) signed & dated? (Yes) No NA
   -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes (No)
   -Were tamper/custody seals intact and uncompromised? (Yes) No NA
3. Shippers' packing slip attached to the cooler(s)? Yes (No)
4. Did custody papers accompany the sample(s)? (Yes) No
5. Were the custody papers relinquished & signed in the appropriate place? (Yes) No
6. Was/were the person(s) who collected the samples clearly identified on the COC? (Yes) No
7. Did all bottles arrive in good condition (Unbroken)? (Yes) No
8. Could all bottle labels be reconciled with the COC? (Yes) No
9. Were correct bottle(s) used for the test(s) indicated? (Yes) No
10. Sufficient quantity received to perform indicated analyses? (Yes) No
11. Are these work share samples? Yes (No)
    If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? (Yes) No NA pH Strip Lot# **HC730269**
13. Were VOAs on the COC? (Yes) No
14. Were air bubbles >6 mm in any VOA vials? ● ⬅ Larger than this. Yes (No) NA
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot #_____ Yes (No)
16. Was a LL Hg or Me Hg trip blank present? _____ Yes (No)

Tests that are not checked for pH by Receiving:

VOAs
Oil and Grease
TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by:

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____.

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
IDW-120817	240-89105-F-1	Plastic 250ml - with Sodium Hydro>	>12	_____	_____
IDW-120817	240-89105-G-1	Plastic 250ml - with Zinc Acetate &	>9	_____	_____
IDW-120817	240-89105-H-1	Plastic 500ml - with Nitric Acid	<2	_____	_____

Login Sample Receipt Checklist

Client: Cardno TEC, Inc

Job Number: 240-89105-1

Login Number: 89105
List Number: 1
Creator: Dolezal, Derren S

List Source: TestAmerica Canton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

CAMP RAVENNA WEEKLY NON-HAZARDOUS & HAZARDOUS WASTE INSPECTION/INVENTORY SHEET

Contractor: Cardno **Month:** December **Year:** 2017 **Waste Description:** purge water from monitoring wells

Container Nos. Cardno #1-#4

	WEEK 1	WEEK 2	WEEK 3	WEEK 4
	Date: 12/1/17 Time: 1456	Date: 12/8/17 Time: 0934	Date: 12/12/17 Time: 1440	Date: 12/21/17 Time: 0800
Point of Contact (Name / Number)	Liz Busby (303) 941 6689 ←			→
Project Name:	Camp Ravenna, Groundwater Monitoring			
Contracting Agency and POC:	NGB, COR	Mark Keper	614-336-6000	
Waste Determination: Pending Analysis, Hazardous, Non-Hazardous, etc.	pending analysis ←			→
*Location on installation:	Bldg #1036	Bldg #1036	Building #1036	Bldg #1036
Date Generated:	12/1/17	12/8/17	12/8/17	12/8/17
Projected date of disposal:	12/20/17	12/20/17	12/20/17	12/20/17
Non-Haz, Satellite, 90 day storage area	Bldg #1036	Bldg #1036	Bldg #1036	Bldg. #1036
Waste generation site:	Camp Ravenna ←			→
Number of Containers (size / type):	1	4	4	4
Condition of Container:	Good	Good	Good	Good
Containers closed, no loose lids, no loose bungs?	yes / no	yes / no	yes / no	yes / no
Waste labeled properly and visible (40 CFR 262.34 (c) (1):	yes / no	yes / no	yes / no	yes / no
Secondary containment	yes / no	yes / no	yes / no	yes / no
Incompatibles stored together?	yes / no	yes / no	yes / no	yes / no
Any spills?	yes / no	yes / no	yes / no	yes / no
Spill kit available?	yes / no	yes / no	yes / no	yes / no
Fire extinguisher present and charged?	yes / no	yes / no	yes / no	yes / no
Containers grounded if ignitables?	yes / no / na	yes / no / na	yes / no / na	yes / no / na
Emergency notification form/info present?	yes / no	yes / no	yes / no	yes / no
Container log binder present?	yes / no	yes / no	yes / no	yes / no
Signs posted if required?	yes / no	yes / no	yes / no	yes / no
Photo's submitted	yes / no	yes / no	yes / no	yes / no
Printed Name:	Liz Busby	Liz Busby	Liz Busby	Liz Busby
Signature:	Liz Busby	Liz Busby	Liz Busby	Liz Busby

This form is required for Non-Hazardous and Hazardous waste including PCB and special waste.

CONTRACTORS ARE REQUIRED TO SUBMIT THIS FORM WEEKLY TO THE CAMP RAVENNA ENV OFFFICE WHEN WASTE IS STORED ON SITE.

CONTRACTORS ARE ENCOURAGED TO INCLUDE PHOTOS WITH EACH WEEKLY INSPECTION SHEET WHEN WASTE IS STORED ON SITE.

NOTES

*Draw detailed map showing location of waste within the site.

① The heat in building 1036 was set to 45°F on 12/8/17. The heat in building 1036 was turned off on 12/19/17 by Kevin Sedlack ~ see email correspondence

② All four IDW drums were picked up for offsite disposal on 12/21/2017. Katie Tait & Liz Busby present with disposal subcontractor & Kevin Sedlack

FOR LEAK, FIRE OR MEDICAL EMERGENCY, CALL INFOTRAC AT 1-800-535-5053 AND REFERENCE CONTRACT #104631

BILL OF LADING MATERIAL MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	Document Number
OH5210020736	1	(800) 535-5053	122628

4. Generator's Name and Mailing Address
FORMER RAVENNA ARMY AMMUNITION PLANT C/O CAMP RAVENNA
1438 SR 534 SW, NEWTON FALLS, OH 44444
Generator's Phone (614) 336-6136

Generator's Site Address (if different than mailing address)
FORMER RAVENNA ARMY AMMUNITION PLANT
8451 STATE RT 5, RAVENNA, OH 44266

5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone
ENVIROSERVE, J.V.	OHD017730540	(216) 642-1311
7. Transporter 2 Company Name	**8. US EPA ID Number**	**B. Transporter's Phone**
VALICOR ENVIRONMENTAL SERVICES	OHR000200386	(513) 733-4666
9. Designated Facility Name and Site Address	**10. US EPA ID Number**	**C. Facility's Phone**
VALICOR (MONROE) 1045 REED ROAD, MONROE, OH 45050	OHR000200386	(513) 733-4666

11. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON HAZARDOUS, NON D.O.T. REGULATED MATERIAL (WATER) VESLFP-11441		004	DM	200	G Gal
b.					
c.					
d.					
e.					

15. Special Handling Instructions and Additional Information

ENVSRV POS 0041332

16. GENERATOR CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national governmental regulations.

Printed/Typed Name	Signature	Month	Day	Year
X Kathryn S. Tait	X Kathryn S. Tait	12	21	17

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
DAVID MEIER	[illegible]	12	21	17

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

DESIGNATED FACILITY

19. Discrepancy

19a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

19b. Alternate Facility (or Generator) — US EPA ID Number

Facility's Phone:

19c. Signature of Alternate Facility (or Generator)	Signature	Month	Day	Year

20. Facility Owner or Operator: Certification of receipt of materials covered by this manifest except as noted in Item 19a

Printed/Typed Name	Signature	Month	Day	Year

GENERATOR'S COPY

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APPENDIX F

COMMENT RESPONSE TABLE AND CORRESPONDENCE

(To be provided later)

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APPENDIX G

MONITORING WELL LOGS AND CONSTRUCTION DETAILS

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TEC-Weston Joint Venture

June 16, 2017

Mark Leeper, P.G., MBA
Team Lead, Cleanup and Restoration Branch ARNG Directorate
111 South George Mason Drive
Arlington, VA 22204

Subject: **Groundwater Monitoring Well Installation, Facility-Wide Groundwater Monitoring Program RVAAP-66, Portage and Trumball Counties, Ohio Contract Number: W9133L-14-D-0008 Delivery Order: 0003**

ATTN: Mark Leeper:

The TEC-Weston Joint Venture (TEC-Weston JV) is submitting this Technical Memorandum to document the installation of new groundwater monitoring wells at the RVAAP-66 Facility-Wide Groundwater Area of Concern (AOC) at the Former Ravenna Army Ammunition Plant (RVAAP) in accordance with the Performance Work Statement (PWS), Contract Number W9133-14-D-0008 Delivery Order Number 0003.

Between August and December 2016, 15 new groundwater monitoring wells were installed at the RVAAP. Attachment A summarizes the well constructions details, Attachment B contains the soil boring logs, Attachment C contains the monitoring well construction forms, and Attachment D contains the survey data.

We appreciate the opportunity to work with you. If you have any questions or comments regarding this deliverable, please feel free to contact me by telephone (512) 651-7108 or email at Brent.Ferry@westonsolutions.com.

Sincerely,

Brent C. Ferry, PG, PMP
Environmental Restoration Project Manager,
TEC-Weston Joint Venture
Direct 512-651-7108 Mobile 309-236-9235 Fax 512-651-7101
Address 2705 Bee Cave Road, Suite 100, Austin, TX 78746-5685

Attachment A: Monitoring Well Construction Details
Attachment B: Geologic Logs
Attachment C: Well Construction Forms
Attachment D: Survey Data

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Attachment A: Monitoring Well Construction Details

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Attachment A. Monitoring Well Construction Details

Monitoring Well	Easting	Northing	Ground Surface Elevation (survey ft)	Top of Casing Elevation (survey ft)	Total Depth (ft below ground surface)	Screen Interval (ft below ground surface)
BKGmw-022 (BKG-HSS1)	559,378.40	2,331,517.26	1164.62	1167.32	37.5	27.5 - 37.5
BKGmw-023 (BKG-HSS2)	560,638.87	2,335,771.51	1181.07	1183.62	43.5	33.5 - 43.5
BKGmw-024 (BKG-SCON1)	570,728.76	2,355,029.69	1041.19	1043.78	156.3	146.3 -156.3
BKGmw-025 (BKG-SCON2)	554,845.62	2,328,408.97	1107.99	1110.60	277	267 - 277
FWGmw-017 (FWG-SCON3)	557,518.22	2,375,792.88	958.53	961.26	143.5	133.5 - 143.5
FWGmw-018 (FWG-SCON4)	554,933.24	2,369,793.44	981.12	984.03	146.2	136.2 - 146.2
FWGmw-019	555,486.89	2,356,265.25	1129.58	1132.23	234.5	224.5 - 234.5
FWGmw-020 (FWG-SS/C3)	554,944.12	2,369,769.12	981.73	984.58	44.7	34.7 - 44.7
FWGmw-021 (FWG-SS/C4)	555,708.43	2,371,551.33	984.88	987.97	44.4	34.4 - 44.4
FWGmw-022	555,466.61	2,356,276.69	1129.61	1132.31	163.8	153.8 - 163.8
FWGmw-023	553,999.50	2,351,494.36	1149.66	1152.37	213.5	203.5 - 213.5
FWGmw-024 (FWG-SS/C8)	557,546.23	2,375,717.99	960.30	963.16	33.7	23.7 - 33.7
LL1mw-089	563,639.31	2,378,139.92	977.54	980.29	36.5	26.5 - 36.5
LL2mw-272	560,599.71	2,373,808.49	1015.00	1017.80	29.2	19.2 - 29.2
NTAmw-120	551,376.89	2,347,141.08	1072.67	1075.20	119.5	109.5 - 119.5

Notes:
The coordinates are based on the Ohio State Plane Coordinate System - Ohio North North American Datum (NAD 83).
The elevations are based on the National Geodetic Vertical Datum of 1988.
Both the coordinates and the elevations were adjusted to match the information provided by the Army Corp of Engineer for monument - RAV 2.
Some monitoring wells were renamed after installation. For those wells, the original name is included in parenthesis.

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Attachment B: Geologic Logs

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TEC-Weston Joint Venture

(BKGmw-024)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON1

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6" bottom 24'
Total Depth (Feet)	164'	Date/Time Drilling Started	8/2/16 - 13:30
Date/Time Total Depth Reached	8/10/16 15:00 164'		

Depth (feet)	Sampling % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
	100%			0.0 ppm				(0.0-0.85') Topsoil, brown to tan, top 0.4' contains roots and grass, silty to sandy with occasional subangular sandstone boulders, dry	
1.0	100%			0.0 ppm			ML	(0.85'-1.80'): Sandy silt, light brown to slightly orange, dry, occasional angular sandstone boulders	
2.0	100%			0.0 ppm			SM	(1.80'-3.0'): Silty sand, tan to slightly orange, numerous angular/subangular sandstone boulders, micaceous, dry, top of weathered bedrock at 3.0'	Top of weathered and soft sandstone bedrock at 3.0'
3.0 4.0 5.0	0.0%			0.0 ppm (at borehole)			Lost Core (SS)	(3.0'-5.75'): Lost core. Recovered core above and below this zone indicates likely sandstone.	Lost Core
6.0 7.0 8.0 9.0 10.0	100%			0.0 ppm			Sandstone (SS)	(5.75'-10.0'): Sandstone, Tan to light brown with orange streaks (thin green sandstone lense at ~8.0'), weathered, medium to coarse grained, moderately soft, scattered red-brown streaks, becoming more firm and competent downward	- Began drilling with water at 8.0' - Temporary 10" steel casing installed to 8.0'.

TEC-Weston Joint Venture

(BKGmw-024)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON1

Company/Project: TEC-Weston Joint Venture / Facility-Wide Groundwater Monitoring			Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cordes)		Drilling Company: Duncan Brothers Drilling, Inc
Drilling Foreman: Mark Michaud	Ground Surface Elevation:		Datum: —
Sampling Device: Drill: Versa Sonic Model 1211	Borehole Diameter (Inches): 6" bottom 24"		Total Depth (Feet): 164'
Date/Time Drilling Started: 8/2/16 - 13:30		Date/Time Total Depth Reached: 8/10/16 15:00 164'	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
10.0	70%			0.0 ppm			Sandstone (SS)/ Lost Core	(10.0'-20.0'): Sandstone, tan with scattered orange streaks, medium to coarse grained, friable, moderately hard, gravel and fracture zone at ~12.0'	Lost ~3.0' Core
20.0	100%			0.0 ppm			Sandstone (SS)	(20.0'-30.0'): Sandstone, tan with scattered orange streaks decreasing downward, medium to coarse grained, less friable than above and becoming more competent, micaceous, argillaceous	Drilling stopped at 30' on 8/2/16
30.0	100%			0.0 ppm			Sandstone (SS)	(30.0'-40.0'): Sandstone, tan with rare orange streaks, medium to coarse grained, moderate cementation, slightly friable, very slightly argillaceous and micaceous	1.0' thick claystone from 36.72'-37.72', gray, soft, iron stain at base, massive
40.0	50%			0.0 ppm			Sandstone (SS)/ Lost Core	(40.0'-50.0'): Sandstone, tan with red-orange stains, medium to coarse grained, somewhat friable and weathered, slightly micaceous and argillaceous	Lost 5.0' Core. Material that came out of hole was completely unconsolidated sand (likely from base)
50.0	50%			0.0 ppm			Sandstone (SS)/ Lost Core	(50.0'-60.0') Sandstone. Light brown to red-orange, only ~2.0' of entire run contained consolidated rock (most unconsolidated sand). Some sub-to well rounded quartz pebbles (up to 1/4")	Lost 5.0' core. Most was completely unconsolidated sand. Drilling stopped at 60' on 8/3/16
60.0								General Note: The unconsolidated sand discussed above is likely resultant from the sonic drilling, and is not formation washout zone.	
60.0	70%			0.0 ppm			Sandstone (SS)/ Lost Core	(60.0-70.0') Sandstone. Gray to slightly light brown, very rare orange streaks, massive, hard, competent and well cemented, fine to medium grained, micaceous, argillaceous, mostly unweathered (few slight Fe stains)	Lost ~3.0' Core
70.0	100%			0.0 ppm			Sandstone (SS)	(70.0-80.0') Sandstone, gray with tan lenses, hard, competent and well cemented, fine to medium grained, rare cross bedding, argillaceous, mostly unweathered	Driller set temporary outer 8" steel casing to 80'
80.0	12.5%			0.0 ppm			Sandstone (SS) and Lost Core	(80.0'-90.0): Sandstone to silty sandstone, dark gray, very fine grained, very hard and well cemented, very rare quartz pebbles, unweathered, some tan coloration in fractures. Some broken pieces within recovered core were tan / light brown	Lost 8.75' Core. Unable to determine where lost core was located within the 10' run, but based on return water color the darker rock was encountered near base of run.
90.0									
9..0									

TEC-Weston Joint Venture

(BKGmw-024)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCDN 1

Company/Project: TEC-Weston Joint Venture (Facility-Wide Groundwater Monitoring	Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio	
Establishing Company: —	Geologist: Steve Stansfield (Cardno) / Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: — / Datum: —
Sampling Device: Drill: Versa Sonic Model 1111	Borehole Diameter (Inches): 6" bottom 24' / Total Depth (Feet): 164'
Date/Time Drilling Started: 8/2/16 - 13:30	Date/Time Total Depth Reached: 8/10/16 15:00 164'

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
90.0	N/A			0.0 ppm			Sandstone (SS)	(90.0'-100.0'): Sandstone, light brown, well cemented, slightly conglomeratic, very hard, micaceous. Bottom 7.3' appears to be gray with light brown to tan streaks. This section of core was originally slipped out of the core barrel during extraction from the borehole and driller had to overdrill it to retrieve it.	This resulted in almost complete pulverization of this interval. Any small intact pieces were very well cemented. Drilling stopped at 100' on 8/4/16.
100.0									
100.0	12.5			0.0 ppm			Sandstone (SS)/ Lost Core	(100.0'-110.0') Sandstone, gray to slightly light brown, well cemented and hard, some conglomerate in the intact and recovered core. Core recovery issue same as above. Most core lost or	pulverized during recovery attempt. Drilling stopped at 110' on 8/5/16.
110.0	12.5			0.0 ppm			Sandstone (SS)/ Lost Core	(110.0'-120.0') Sandstone, gray to tan, well cemented and hard, mostly fine to slightly medium grained, some sub-angular quartz pebbles. Core recovery issue same as above.	
120.0	0.0			0.0 ppm			Lost Core	(120.0'-130.0') Lost all core. Cutting and water returns indicate likely gray sandstone. Driller reports hard rock.	
130.0	0.0			0.0 ppm			Lost Core	(130.0'-140.0') Lost all core. Cutting and water returns indicate likely gray sandstone. Driller reports hard rock.	6" temporary steel casing installed to 140'. Drilling stopped at 140' on 8/9/16
140.0	100			0.0 ppm			Sandstone (SS)	(140.0'-142.25'): Sandstone, gray, hard, moderate cemented, rare brown streaks, medium-coarse grained, conglomeratic at immediate base	Began conventional core drilling at 140'. Used wireline. No sonic.
142.25	100			0.0 ppm			Sandstone (SS)	(142.25'-145.66'): Sandstone, light brown to tan, fractured, medium grained, moderate cementation, subangular quartz pebbles scattered throughout, scattered iron staining	
145.66	100			0.0 ppm			Sandstone (SS)	(145.66'-156.53'): Sandstone, gray to light gray, medium grained, hard and well cemented, well rounded quartz pebbles at base, coal spar at 148.6', quartz inclusions increasing downward	
156.53	100			0.0 ppm			Conglomerate	(156.53'-159.43'): Conglomerate, light gray, coarse grained, very heavy inclusions of rounded and subangular quartz pebbles (some up to 1/4"), rare coal spars, and pyrite, siderite nodules and bands,	sharp basal contact. Base of Sharon Conglomerate
159.43	100			0.0 ppm			Claystone	(159.43'-164'): Claystone, gray to dark gray, soft, massive bedding, broken, bottom of hole.	[illegible]
164.0									

Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.

TEC-Weston Joint Venture

(BKGmw-022)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-HSS1

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (25'-38')	Total Depth (Feet): 38'
Date/Time Drilling Started: 8/16/16 1250		Date/Time Total Depth Reached: 8/16/16 1625	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
2.0	100%			0.0 ppm			Silty Sand (SM)	(0.0-3.1'): Silty sand, light brown becoming slightly orange at ~2.6', dry, occasional roots at top, sub-rounded to sub-angular sandstone cobbles throughout (1/8"-1/2"), slightly micaceous	
4.0	100%			0.0 ppm			Silty Sand (SM)	(3.1'-5.0'): Silty sand, slightly orange with gray sandstone cobbles, (fine grained), dry, occasional quartz pebbles up to 1/4"	
6.0	100%			0.0 ppm			Sand (SW)	(5.0'-8.0'): Sand, light brown with tan streaks, very slightly moist, fine to medium grained, scattered orange angular sandstone pieces (<1/8"), micaceous, becoming very moist from 6.3' to 7.3'	
8.0									
10.0	100%			0.0 ppm			Silty Sand (SM)	(8.0'-12.7'): Silty sand, light brown with scattered orange zones, moist, weathered sandstone cobbles (typically <1/8")	
12.0									
14.0	100%			0.0 ppm			Silty Sand (SM)	(12.7'-15.0'): Silty sand, slightly moist, medium stiff, micaceous, occasional subrounded to rounded pebbles (up to 1/2")	
16.0	100%			0.0 ppm			Clayey Sand (SC)	(15.0'-20.0'): Clayey sand, brown at top grading to light gray downward, slightly moist to increasing moisture downward, weathered, medium stiff, scattered quartz pebbles (some up to 1/4")	Driller began drilling with water at 20.'
18.0									
20.0									

TEC-Weston Joint Venture

(BKGmw-022)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-HSS1

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud	Ground Surface Elevation	— Datum: —
Sampling Device	Drill: Versa Sonic Model 1411	Borehole Diameter (inches)	6 7/8" (25'-38') Total Depth (Feet): 38'
Date/Time Drilling Started	8/16/16 1250	Date/Time Total Depth Reached	8/16/16 1625

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
22.0 – 24.0	10%			0.0 ppm			Lost Core and Sandstone	(20.0'-25.0'): Driller drilled from 20'-25', but only recovered 0.5'. That core was sandstone: gray, hard, mostly well cemented, mostly fine grained, unweathered.	Driller reported competent bedrock at ~22'. Temporary 8" Steel Casing set to 25'
26.0 – 28.0	100%			0.0 ppm			Sandstone (SS)	(25.0'-29.0'): Sandstone, top ~3' brown and becoming gray at base, slightly weathered at top to unweathered downward, fine to medium grained (Note: some of core crushed by drill).	
30.0 – 32.0 – 34.0 – 36.0 – 38.0	100%			0.0 ppm			Sandstone (SS)	(29.0'-38.0'): Sandstone, gray, mostly unweathered, medium grained, hard, fractured at top (some high angle), large near-vertical fracture from ~34.7' to 35.6' (this zone took return water). Coal seams at base. Moderate cementation, slightly micaceous, bottom of borehole.	- Temporary 6" Steel casing installed to 35' - Driller lost return water at large vertical fracture zone - Bottom of borehole
								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(BKGmw-023)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-HSS2

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud	Ground Surface Elevation: —	Datum: —
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches): 6 7/8" (29'-44')	Total Depth (Feet): 44'
Date/Time Drilling Started	8/17/16 1320	Date/Time Total Depth Reached	8/17/16 1615

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
	100%			0.0			Topsoil	(0.0'-0.5') Topsoil, dark brown, moist, numerous roots	
	100%			0.0			CL	(0.5'-1.15') Clayey silt, brown, stiff, dry	
2.0 / 4.0	100%			0.0 ppm			Silty Sand (SM)	(1.15'-5.85'): Silty sand, light brown, mostly dry, stiff, scattered orange subangular sandstone pebbles, rare quartz pebbles (subrounded up to 1/4")	
6.0 / 8.0	100%			0.0 ppm			Silty Clay (CL)	(5.85'-10.0'): Silty clay, light brown, very slightly moist, medium stiff, scattered light gray clay inclusions, becoming crumbly near base.	
10.0 / 12.0 / 14.0 / 16.0 / 18.0 / 20.0	100%			0.0 ppm			Clayey Sand (SC)	(10.0'-20.0'): Clayey Sand, gray to light gray becoming brown downward, very soft, slightly moist becoming wetter downward, last 1.0' becoming more silty with abundant sandstone pebbles (< 1/4").	Note: Driller had to use water to get material out of core barrel.

Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.

TEC-Weston Joint Venture

(BKGmw-023)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-H552

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist Steve Stansfield (Cardno)	Drilling Company Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud	Ground Surface Elevation —	Datum —
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches) 6 7/8" (29'-44')	Total Depth (Feet) 44'
Date/Time Drilling Started	8/17/16 1320	Date/Time Total Depth Reached	8/17/16 1615

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
22.0 24.0 26.0	100%			0.0 ppm			Sand	(20.0'-26.0') Sand: mainly unconsolidated and poorly cemented, gray, weathered with occasional unweathered/subrounded sandstone chips (< 1/8") and rounded quartz pebbles up to 1/4", micaceous.	Note: Driller had to use water to get material out of core barrel. Top of incompetent bedrock at 26'
28.0	100%			0.0 ppm			Sandstone (SS)	(26.0'-28.5') Sandstone, highly weathered and poorly cemented (crumbly and friable), maroon with occasional orange streaks, coal specs at base, becoming more competent downward	-Driller set 8" temporary water casing to 29'. -Driller began drilling with water at 29'.
	100%			0.0			SS	(28.5-29') Sandstone, orangish, more competent than above	Top of competent bedrock at 29'
30.0	100%			0.0 ppm			Siltstone	(29.0'-30.3') Siltstone, dark gray, very fine grained, hard, completely broken	
32.0 34.0 36.0	0.0%						Lost Core	(30.3'-36.3'). Lost core. Driller lost 6.0' of core in 9.0' run.	Driller temporarily lost returns at ~36'
38.0 40.0	100%		0.0 ppm				Sandstone (SS)	(36.3'-42.1'): Sandstone, tan with gray interbeds, fine to medium grained, fractured throughout (some high angle to near vertical), iron stains throughout, micaceous, rare coal	
42.0								specs in bedding planes, weathered, moderate cementation.	
44.0	100%		0.0 ppm				Sandstone (SS)	(42.1'-44') Sandstone, gray, hard, well cemented, unweathered, fine to medium grained, rare coal specs.	Bottom of borehole at 44'

TEC-Weston Joint Venture

(BKGmw-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON2

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud / John Keifer	Ground Surface Elevation: —	Datum: —
~~Sampling Device~~	Drill: Versa Sonic Model 111	Borehole Diameter (inches): 6 7/8 (Screened Inter.)	Total Depth (Feet): 282.5
Date/Time Drilling Started	8/19/16 0905	Date/Time Total Depth Reached	8/30/16 1410

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
	100%			0.0			Topsoil	(0.0'-0.5') Topsoil, dark brown, dry, numerous roots	
	100%			0.0			Silty Sand (SM)	(0.5'-1.9'): Silty sand, light brown, dry, crumbly and loose, scattered gray clay inclusions, occasional subrounded sandstone pebbles (1/8")	
2.0	100%			0.0			Silty Sand (SM)	(1.9'-4.5'): Silty sand, tan to slight orange, dry, moderately dense, scattered gray clay inclusions, occasional subrounded sandstone sandstone pebbles	
4.0									
6.0	100%			0.0			Clayey Sand (SC)	(4.5'-11.5'): Clayey sand, tan with occasional orange sandstone chip inclusions, slightly moist, stiff, some subrounded quartz pebbles (< 1/8")	Driller set temporary 10" outer steel casing to 5'
8.0									
10.0									
12.0	100%			0.0			Silty Clay (CL)	(11.5'-19.0'): Clayey silt, gray, slightly moist, medium stiff to soft, becoming more sandy and loose downward	Driller had to use water to get material out of core barrel
14.0									
16.0									
18.0									
20.0								see page 2 for 19'-21'	

TEC-Weston Joint Venture

(BKGMW-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON2

Company/Project	TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud / John Keifer	Ground Surface Elevation: —	Datum: —
~~Sampling Device~~	Drill: Versa Sonic Model 1411	Borehole Diameter (inches): 6 7/8 (Screened Int.)	Total Depth (Feet): 282.5
Date/Time Drilling Started	8/19/16 0905	Date/Time Total Depth Reached	8/30/16 1410

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
20.0	100%			0.0			SM	(19.0'-21.0'): Silty sand, mostly dry, brown to tan, stiff, occasional orange sandstone inclusions	Began drilling with water at 19'
22.0 24.0 26.0	100%			0.0			Silty Clay (CL)	(21.0'-27.2'): Clayey silt, gray, soft, moderate plasticity	
28.0 30.0 32.0 34.0 36.0 38.0	32%			0.0			Clayey Sand (SC) and Lost Core	(27.2'-39.0'): Clayey sand, gray, fine grained, loose, rare subrounded quartz pebbles (some up to 1/2"), crumbly. Comes out of core barrel as soft, unconsolidated clayey sand that can be molded	Driller only recovered 3.8' of this unit (32%)
40.0								See page 3 for 39'-49'	

TEC-Weston Joint Venture

(BKGmw-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCDN2

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program

Location Type: —

Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio

Establishing Company: —

Geologist: Steve Stansfield (Cardno)

Drilling Company: Duncan Brothers Drilling, Inc.

Drilling Foreman: Mark Michaud / John Keifer

Ground Surface Elevation: —

Datum: —

Sampling Device: Drill: Versa Sonic Model 1411

Borehole Diameter (inches): 6 3/4 (Screened Int.)

Total Depth (Feet): 282.5

Date/Time Drilling Started: 8/19/16 0905

Date/Time Total Depth Reached: 8/30/16 1410

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40.0	12.5%			0.0 ppm			Conglomerate and Lost Core	(39'-49'): Conglomerate, numerous subangular to rounded quartz pebbles (coarse to 1/2"), matrix is rather loose and rock is semi-consolidated, poor core recovery.	- Recovered 12.5%. - Top of bedrock may be within 39' to 49' core run
50.0	0.0%			0.0 ppm			Lost Core	(49'-60'): Driller lost all core. Cuttings suggest a possible gray sandstone with a possible very thin coal.	- Driller switched from Sonic to Conventional Wireline Core drilling at 60'
60.0	0.0%			0.0 ppm			Lost Core	(60'-65'): Lost core. May possibly be mostly broken shale	- Driller lost core via conventional coring methods
	100%			0.0			Claystone	(65'-66.6'): Claystone, dark gray, soft to very soft, badly broken	
70.0	100% (66.6'-70') 50% (70'-80') 50% (80'-90')			0.0 ppm (67'-70') 0.0 ppm (70'-80') 0.0 ppm (80'-90')			Shale and Lost Core	(66.6'-90'): Shale and Lost Core. Gray to dark gray with moderately hard and soft zones; high clay content; fissile; thinly bedded and broken over most of the interval; clay to near mud seams scattered throughout	- Stopped drilling at 70' on 8/19 - Poor core recovery - Difficult to drill; core gets stuck in barrel during drilling and does not advance for additional core to enter barrel. Stopped drilling at 90' on 8/22
80.0									
90.0	12.5%			0.0 ppm			Shale/ Cannel Coal/ Lost Core	(90'-100'): Most of interval lost core. Recovered core consisted of Cannel Coal (broken, blocky) with pyrite. Base of interval was a gray, firm shale	- Driller began Sonic drilling at 90'.
100	0.0%			0.0 ppm			Lost Core	(100'-110'): Driller lost all core returns. Cuttings suggest a firming of rock and becoming slightly sandy.	- Sonic drilling from 100'-110'
110	18%			0.0 ppm			Shale; Silty Shale; Lost Core	(110'-120'): Shale and Silty Shale; dark gray to gray; moderately firm; rare siderite nodules; some sandy/silty laminations; recovered only 1.8'	- Sonic drilling from 110'-120'. - Switched to Conventional Core Drilling at 120'
120	42%			0.0 ppm			Shale; Lost Core	(120'-127.75'): Shale, with sandy streaks, gray, moderately firm, broken at top, sand streaks decreasing downward. Poor core recovery	- Driller installed new drill bit (for soft rock drilling)
130	78%			0.0			Shale/LC	(127.75'-130') Dark gray/near black, moderately soft, somewhat rusted. Stopped drilling at 130 on 8/23	
	18%			0.0 ppm			Shale & Lost Core	(130'-136.7') Shale, gray moderately firm, sandstone streaks throughout, thin bedded	- Driller lost ~5.5' - Base of shale at 136.7'
140	100%			0.0 ppm			Sandstone	(136.7'-140'): Sandstone, moderately hard, fine grained, micaceous, argillaceous, rare coal specs, thin shale interbeds, high to near vertical fracture at base.	- Installed temporary 8" Outer casing to 140'

TEC-Weston Joint Venture

(BKGmw-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON2

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud / John Keifer	Ground Surface Elevation	—
Sampling Device	Drill: Versa Sonic Model 1411	Borehole Diameter (inches)	6 7/8 (Screened Int.)
Date/Time Drilling Started	8/19/16 0905	Date/Time Total Depth Reached	8/30/16 1410
Datum	—	Total Depth (Feet)	282.5

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
140	70%			0.0 ppm			Sandstone/ Lost Core	(140'-150'): Sandstone, gray, hard, well cemented, unweathered, fine grained, slightly micaceous, argillaceous, very rare coal spars, somewhat broken	- Driller installed new "hard-rock" drill bit at 140'. Lost ~3.0'
150	100%			0.0 ppm			Sandstone	(150'-153'): Sandstone, same as above	
160	74%			0.0 ppm			Sandstone/ Lost Core	(153'-160'): Sandstone, gray, hard, well cemented, fine grained with medium grained lenses, micaceous, broken near top, siderite nodules near base; argillaceous	- Driller lost ~1.8' - Stopped drilling at 160' on 8/24
170	66%			0.0 ppm			Sandstone/ Lost Core	(160'-170'): Sandstone, gray, hard, well cemented, fine to medium grained downward, unweathered, micaceous, argillaceous, broken near center, high to near vertical fracture near top	- Driller lost ~3.4'
180	100%			0.0 ppm			Sandstone	(170'-180'): Sandstone, hard, well cemented, fine grained, intact and unweathered, micaceous, argillaceous, very rare coal spars in top 3'	
190	82%			0.0 ppm			Sandstone/ Lost Core	(180'-190'): Sandstone, gray, hard, well cemented, fine to medium grained, argillaceous, unweathered	- Driller lost ~1.8'
200	93.5%			0.0 ppm			Sandstone/ Lost Core	(190'-200'): Sandstone, gray, hard, well cemented, fine to medium grained, micaceous, argillaceous, unweathered, very rare coal spars near base	- Driller lost ~0.65'
210	100%			0.0 ppm			Sandstone	(200'-210'): Sandstone, gray, hard, mod. cementation, mostly medium grained, unweathered, slightly micaceous, argillaceous	- Stopped drilling at 210' on 8/25
220	100%			0.0 ppm			Sandstone	(210'-220'): Sandstone, hard, well cemented, rare coal spars, slightly micaceous, argillaceous, broken at top. Fine grained becoming medium grained and slightly conglomeratic at ~213.8'	
230	100%			0.0 ppm			Sandstone	(220'-230') Sandstone, gray, hard, mostly well cemented, medium grained, rare coal spars at ~223', slightly argillaceous, Conglomeratic from ~223'-223.8' which is coarse grained and fairly poorly cemented	
240	93.5%			0.0 ppm			Sandstone/ Lost Core	(230'-240') Sandstone, gray, hard, bottom 7.8' well cemented and fine grained, rare quartz pebbles, micaceous, argillaceous. Top ~2.2' is coarse and conglomeratic w/poor cementation.	Driller lost ~0.65'

TEC-Weston Joint Venture

(BKGmw-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCON2

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud / John Keifer
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6 7/8 (Screened Int.)
Total Depth (Feet)	282.5		
Date/Time Drilling Started	8/19/16 0905	Date/Time Total Depth Reached	8/30/16 1410

Depth (feet)	Sampling % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
240	66%			0.0 ppm			Sandstone/ Lost Core	(240'-250'): Sandstone, gray, hard, well cemented, fine grained becoming medium grained downward, very rare quartz pebbles, slightly micaceous, argillaceous, broken near top	- Driller lost ~3.4'. - Stopped drilling at 250' on 8/29
250	66%			0.0 ppm			Sandstone/ Lost Core	(250'-260'): Sandstone, gray, hard, well cemented, matrix but broken zones, medium grained becoming coarser downward slightly conglomeratic at base with rare quartz pebbles (up to 1/4"), micaceous, a few high angle fractures	- Driller lost ~3.4'
260 262	100%			0.0 ppm			Sandstone	(260'-262.85'): Sandstone, gray, hard, medium grained, moderate cementation, some large diameter subrounded quartz pebbles (up to 1/2") at immediate base	
264	41%			0.0 ppm			Conglomerate Lost Core	(262.85'-263.95') Conglomerate, mostly unconsolidated, large quartz pebbles (1/2" and greater), coal specs	- Driller lost ~0.65'
266 268	100%			0.0 ppm			Sandstone	(263.95'-270'): Sandstone, gray, hard, moderate cementation, medium grained fining downward, slightly conglomeratic at top, argillaceous	
270 272 274	100%			0.0 ppm			Sandstone	(270'-274.5'): Sandstone, gray, hard, well cemented, fine grained, scattered quartz pebbles, (most < 1/8")	
276								(274.5'-279.75') See p. 6	

TEC-Weston Joint Venture

(BKGmw-025)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: BKG-SCDN2

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company: —	Geologist: Steve Stansfield (Cardno)	Drilling Company: Dunsen Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1311	Borehole Diameter (inches): 6 7/8 (Screened Int.)	Total Depth (Feet): 282.5
Date/Time Drilling Started: 8/19/16 0905	Date/Time Total Depth Reached: 8/30/16 1410	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
276	100%			0.0 ppm			Conglomerate	(274.5-277.75) Conglomerate, gray, hard, fine to medium grained matrix, numerous subrounded quartz pebbles (1/8"-3/4"), unconsolidated thin zone at immediate top, siderite nodules and clay clasts, sharp basal contact, slightly pyritic	- Installed temporary outer 6" casing to 277.5 - Base of Sharon Conglomerate
278 280 282	67%			0.0 ppm			Shale and Lost Core	(277.75'-282.5'): Shale, dark gray to near black, moderately soft to soft, slightly rooted, high clay content, bottom of borehole	- Driller lost ~1.55'
284								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(FWGmw-017)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON3

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program
Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio
Establishing Company	—
Geologist	Steve Stansfield (Cardno)
Drilling Company	Dunson Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud
Ground Surface Elevation	—
Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111
Borehole Diameter (inches)	6 7/8 (Serrated Int.)
Total Depth (Feet)	148'
Date/Time Drilling Started	9/11/16 0810
Date/Time Total Depth Reached	9/13/16 1820

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
	100%			0.0 ppm			Topsoil	(0.0-0.65') Topsoil, dark brown, slightly moist, root matter	
2.0 4.0	100%			0.0 ppm			Sandy Silt (SM)	(0.65'-4.45'): Sandy silt, light brown to tan, dry, medium stiff, rare angular sandstone fragments (1/4"-1/2")	-Driller used Sonic drilling methods from 0'-50'.
	100%			0.0 ppm			Silty Sand (SM)	(4.45'-5.75') Silty sand, tan/orange, moist, medium stiff, 1/4" angular sandstone fragments	
6.0 8.0	100%			0.0 ppm			Silty Sand (SM)	(5.75'-8.00') Silty sand, brown with a slight orange tint, medium stiff, wet	
10.0	0%			0.0 ppm			Lost Core	(8.00'-10.00'): Lost core. Unable to determine where core loss occurred within top 10'	Lost core.
12.0 14.0 16.0	100%			0.0 ppm			Clayey Sand (SC)	(10.00'-16.5'): Clayey sand, gray, wet, soft, medium grained, slightly micaceous, top of bedrock, can be molded	Top of Bedrock
	100%			0.0			Sandstone	(16.5'-17.0') Sandstone, gray, drier than above, medium grained, friable, crumbly	
18.0 20.0	0.0%			0.0 ppm			Lost Core	(17.0'-20.0'): Lost core. Driller reports this zone was hard and likely sandstone at base that was lost	Lost Core Installed temporary 8" Outer Casing to 20'

TEC-Weston Joint Venture

(FWGMW-017)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON3

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6 7/8" (Screened 2d)
Total Depth (Feet)	148'		
Date/Time Drilling Started	9/11/16 0810	Date/Time Total Depth Reached	9/13/16 1820

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
20.0	65%			0.0 ppm			Sandstone Lost Core	(20.0'-22.0') Sandstone, gray, wet, hard, fine grained, top 0.3' conglomeratic, micaceous, argillaceous, well cemented and mostly unweathered	Driller lost ~0.7' - Driller began drilling with water at 22'
22.0 24.0	0.0%			0.0 ppm			Lost Core	(22.0'-24.35'): Lost Core	Driller lost ~2.35'
26.0	100%			0.0 ppm			Conglomerate	(24.35'-26.65'): Conglomerate, gray, moderately well cemented and hard, broken, numerous quartz (<1/8") pebbles	
28.0 30.0	100%			0.0 ppm			Sandstone	(26.65'-30.0'): Sandstone, gray, hard, well cemented, micaceous, argillaceous, unweathered scattered small quartz pebbles (<1/8"), some high angle fractures near base	
40.0	56.5%			0.0 ppm			Sandstone Lost Core	(30.0'-40.0') Sandstone, gray, hard, well cemented, fine to medium grained downward, high angle fractures near top, unweathered, micaceous, slightly conglomeratic at base	Driller lost ~4.35'
50.0	45%			0.0 ppm			Sandstone Lost Core	(40.0'-50.0'): Sandstone, gray, hard, fine grained, well cemented, micaceous, broken (may be broken by drill), thin coal within interval (not recovered)	Driller lost ~5.5' - Start wireline core drilling at 50' stopped on 9/12
	65%			0.0			Sandstone LC	(50.0'-52.0') Gray, hard, well cemented, scatt. qtz. pebbles	Driller lost ~0.7'
60.0	100%			0.0 ppm			Sandstone	(52.0'-62.0') Sandstone, gray, hard, well cemented, to fairly loose cementation at immediate base, medium to coarse grained, numerous quartz pebbles throughout (<1/8"-3/4"), highly conglomeratic lost 0.3'	
70.0	100%			0.0 ppm			Sandstone	(62.0'-72.0') Sandstone, gray, hard, well cemented except in conglomeratic zones, medium grained, conglomeratic from 62'-63.1'; 68.8'-69.2'; and 70.6'-70.75'; rare coal spars	
80.0	100%			0.0 ppm			Sandstone	(72.0'-82.0') Sandstone, gray, hard, well cemented, mostly fine grained with occasional medium grained bases, slightly conglomeratic with <1/8" quartz pebbles, argillaceous, ill...	

TEC-Weston Joint Venture

(FWGmw-017)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON3

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type —
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist Steve Stansfield (Cardno)	Drilling Company Duncan Brothers Drilling, Inc.
Drilling Foreman	Mark Michaud	Ground Surface Elevation —	Datum —
Sampling Device	Drill: Versa Sonic Model 1111	Borehole Diameter (Inches) 6 7/8" (Screened Int.)	Total Depth (Feet) 148'
Date/Time Drilling Started	9/11/16 0810	Date/Time Total Depth Reached	9/13/16 1820

Depth (feet)	Sampling % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
80.0									
	100%			0.0 ppm			Sandstone	(82.0'-88.9'). Gray, hard, well cemented, fine grained, occasional broken zones, rare quartz pebbles (<1/8"), micaceous, moderately sharp basal contact	
90.0	100%			0.0 ppm			Conglomerate	(88.9'-92.0') Gray, coarse grained, numerous quartz pebbles (<1/8"-1/2"), occasional clay clasts, poor cementation	
	100%			0.0 ppm			Sandstone	(92.0'-97.65') Gray, hard, fine to medium grained, well cemented, scattered quartz pebbles (up to 1/4") rare coal specs	
100.0	100%			0.0			Conglomerate	(97.65'-100.2): Gray, coarse, numerous qtz. pebbles (up to 1")	unconsolidated gravel zone
	0.0%			0.0			Lost Core	(100.2'-102'): Lost core.	Driller lost core.
110.0	89%			0.0 ppm			Sandstone/ Lost Core	(102'-112'): Sandstone, hard, well cemented, fine grained, micaceous, argillaceous, large quartz pebbles (up to 1") at immediate base, minor iron stains throughout	- Driller lost ~1.1' - Driller reported top ~6' drilled very hard - Stopped drilling on 9/12
120.0	75%			0.0 ppm			Sandstone/ Lost Core	(112'-122'): Sandstone, gray, hard, very well cemented, fine to medium grained, scattered, rare clay clasts and bands, quartz pebbles (1/4"-1/2") at ~117'	- Driller lost ~2.5'
130.0	100%			0.0 ppm			Sandstone	(122'-132'): Sandstone, gray, hard, medium grained, mod. cemented, micaceous, occasional coal streaks, quartz pebbles (~1/2") at ~125.5', high angle fracture at immediate base	
140.0	100%			0.0 ppm			Sandstone	(132'-142.5'): Sandstone, gray, hard, moderate cemtation, medium grained, subrounded scattered quartz pebbles throughout from <1/8"-1/4"	
	100%			0.0			Conglomerate	(142.5'-143.70') Conglomerate, gray, hard, coarse grained, numerous quartz pebbles (<1/8"-1/4"), occasional clay clasts, slightly pyritic, sharp basal contact	- Base of Sharon Conglomerate
	63%			0.0					
150.0							Shale/ Lost Core	(143.70'-148') Shale: dark gray, soft, high clay content (core crushed by drilling).	- Driller lost ~1.6' - Bottom of hole
								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(FWGmw-024)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SS/C8

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
Sampling Device: Drill: Versa Sonic Model 1111		Borehole Diameter (Inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 35'
Date/Time Drilling Started: 9/15/16 0835		Date/Time Total Depth Reached: 9/15/16 1115	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0.0	100%			0.0			Sandy Silt	(0.0-0.95') Tan, mostly dry, rare orange streaks, rare sandstone fragments, crumbly	
	100%			0.0			Sandy Silt	(0.95'-2.30'): Brown with orange inclusions, scattered angular/sub-angular sandstone fragments (1/4" or less), rare clay inclusions	
4.0	100%			0.0 ppm			Sandy Silt (SM)	(2.30'-6.0'): Sandy silt, brown to dark brown, becoming moist, stiff, becoming more sandy downward, scattered large sandstone boulders (>1.5"), crumbly	
8.0	100%			0.0 ppm			Silty Sand (SM)	(6.0'-10.0'): Silty sand, brown with rare orange inclusions, wet, medium stiff, contains very little sandstone fragments of appreciable diameter	
12.0	100%			0.0 ppm			Clayey Sand (SC)	(10.0'-15.0'): Clayey sand, gray, wet, soft, very rare subrounded sandstone fragments (<1/4"), weathered, can be molded	
16.0	100%			0.0 ppm			Clayey Sand	(15-16.5'): Brown to gray, wet, becoming more sandy downward, moderately soft	
	100%			0.0			Clayey Sand	(16.5'-17.0'): Clayey sand, moist, medium stiff, becoming more firm at base	Top of Bedrock (17.0')
	80%			0.0 ppm			Sandstone/ Lost Core	(17.0'-20.0') Sandstone, gray, moist, at top becoming drier downward, very rare orange inclusions, fine grained, broken	- Driller lost ~0.6' - Installed temporary 8" Outer Casing to 20'
20.0 24.0 28.0	30%			0.0 ppm			Sandstone and Lost Core	(20.0'-30.0'): Recovered sandstone is light brown, moderately hard, fine to medium grained, with scattered coarse sized quartz pebbles, moderately weathered, broken, actual matrix is moderately well cemented. A portion of the 20'-30' interval that was recovered contains completely unconsolidated (sub-angular to subrounded) brown sandstone fragments up to 1/2"	- Driller lost ~7.0' - Unable to determine where the recovered rock occurs within the 20'-30' interval.
32.0	100%			0.0 ppm			Sandstone	(30.0-35.0) Sandstone, slightly tan and weathered, hard, medium grained, moderate cementation, scattered coarse size quartz pebbles throughout, broken at ~32.3' and high angle fracture at immediate base, rare coal specs (some in fracture planes).	- Bottom of hole at 35'
36.0								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(FWGmw-021)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SS/C4

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8 (Screened Int.)	Total Depth (Feet): 45'
Date/Time Drilling Started: 9/21/16 1300		Date/Time Total Depth Reached: 9/21/16 1620	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0.0	100%			0.0 ppm			Topsoil	(0.0'-0.75'): Dark brown, slightly moist, numerous root structures	
2.0	100%			0.0 ppm			Sandy Silt (SM)	(0.75'-2.55'): Sandy silt, light tan, mostly dry, moderately loose, very rare sub-rounded sandstone fragments (~1/8"), crumbly	
4.0	100%			0.0 ppm			Silty Sand (SM)	(2.55'-5.0'): Silty sand, tan/orange, mostly dry, crumbly, moderately loose, very rare sub-rounded sandstone fragments (<1/8"-1/4")	
6.0 8.0	100%			0.0 ppm			Silty Sand (SM)	(5.0'-10.0'): Silty sand, tan, not as orange as above and moisture content increasing, crumbly, medium dense, sub-angular sandstone fragments (<1/8"-1/4") increasing throughout	
10.0	100%			0.0 ppm			Silty Sand (SM)	(10.0'-11.5'): Silty sand, darker than above, slightly moist, crumbly, medium dense, scattered sub-angular sandstone fragments (up to 1/4")	
12.0	100%			0.0 ppm			Clayey Sand (SC)	(11.5'-13.5'): Clayey sand, gray, moderately wet, soft, can be molded, very small subrounded sandstone fragments (<1/8")	
14.0	100%			0.0 ppm			Silty Sand (SM)	(13.5'-15.8'): Silty sand, light brown, not as wet as above unit, medium dense, rare subrounded sandstone fragments (typically <1/8")	
16.0 18.0 20.0	76%			0.0 ppm			Silty Sand (SM)/ Lost Core	(15.8'-20.0'): Silty sand, tan, moderately wet, dense, sandstone boulders (sub-angular and >1/2") increasing downward, weathered	- Driller lost ~1.0' - Driller began using water at 20'

TEC-Weston Joint Venture

(FWGmw-021)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SS/C4

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Dunson Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (Ground Int.)	Total Depth (Feet): 45'
Date/Time Drilling Started: 9/21/16 1300		Date/Time Total Depth Reached: 9/21/16 1620	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
20.0 – 24.0 – 28.0	30%			0.0 ppm			Sand and Sandstone / Lost Core	(20.0'-30.0'): Driller only recovered 3.0', tan, mostly unconsolidated and weathered, loose, scattered large sub-angular sandstone boulders (>1")	- Driller lost ~7.0' - Driller reports top of firm rock at ~27' - Partial loss of drill return water
32.0 – 36.0	12.5%			0.0 ppm			Sandstone / Lost Core	(30.0'-40.0'): Driller only recovered 1.25', tan with iron stains, broken, weathered, recovered core was mostly sub-angular to angular, medium grained	- Driller lost ~8.75' - Installed temporary 8" outer casing to 30' - Several small voids encountered at ~33' and 37'
40.0 – 44.0	0.0%			0.0 ppm			Lost Core (Sandstone)	(40.0'-45.0'): Driller lost all core, but rock appeared firm and intact with no voids encountered.	- Driller lost 5.0' - Bottom of hole at 45'
48.0								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(FWGMW-018)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON4

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program			Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cardno)		Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —		Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111	Borehole Diameter (inches): 6 7/8" (Screened 2nd)		Total Depth (Feet): 154'
Date/Time Drilling Started: 9/22/16 1000		Date/Time Total Depth Reached: 9/24/16 1105	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0.0	100%			0.0			Topsoil	(0.0'-0.5'): Dark brown, dry, rare sandstone fragments, root matter	
2.0, 4.0	100%			0.0 ppm			Sandy Silt (SM)	(0.5'-5.0'): Sandy silt, light brown to tan, medium dense, mostly dry, rare orange inclusions, rare sub-angular sandstone fragments, (<1/4"), crumbly	
6.0	100%			0.0 ppm			Silty Sand (SM)	(5.0'-6.25'): Light brown, medium dense, rare orange inclusions and sandstone fragments, slightly moist, crumbly	
	100%			0.0			Sand	(6.25'-6.75') Sand, tan/orange, loose, medium grained, moist	
8.0, 10.0	100%			0.0 ppm			Silty Sand (SM)	(6.75'-10.9'): Silty sand, brown, moist, medium stiff, very rare sub-angular sandstone fragments (<1/8")	
12.0, 14.0	100%			0.0 ppm			Clayey Sand (SC)	(10.9'-13.9'): Clayey sand, gray, moderately wet, fairly soft (can be slightly molded), weathered	
16.0	100%			0.0 ppm			Silty Sand (SM)	(13.9'-16.7'): Silty sand, brown, medium dense, slightly moist, very rare orange inclusions	
	100%			0.0			Sand	(16.7'-17.0): Sand, tan/orange, moist, loose, medium grained	
18.0, 20.0	100%			0.0 ppm			Sandy Silt (SM)	(17.0'-20.7): Sandy silt, tan to brown, slightly moist, occasional orange inclusions, medium stiff, rare sandstone fragments (<1/8")	

Cardno TEC WESTON
TEC-Weston Joint Venture

(FWGmw-018)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON4

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type: —	
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.	
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —	Datum: —	
~~Sampling Device~~ Drill: Versa Sonic Model 1111.	Borehole Diameter (inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 154'	
Date/Time Drilling Started: 9/22/16 1000	Date/Time Total Depth Reached: 9/24/16 1105		

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
20	100%			0.0 ppm			Sand	(20.7'-21.2'): Sand, tan/orange, loose, medium grained, slightly moist	
22.0 – 24.0	100%			0.0 ppm			Silty Sand (SM)	(21.2'-25.7'): Silty sand, light brown to gray, very slightly damp, becoming firmer, scattered sub-angular sandstone fragments up to 1/4", bottom ~1.0' is semi-consolidated	
26.0	100%			0.0 ppm			Sandstone	(25.7'-27.0'): Sandstone, gray, broken, weathered, semi-consolidated, moist, medium-grained	- Driller reports firm bedrock at ~27'
28.0	0.0%			0.0 ppm			Lost Core	(27.0'-30.0'): Lost core. Driller reports firm rock.	- Installed temporary 8" outer casing to 30'
30.0 – 40.0	0.0%			0.0 ppm			Lost Core	(30.0'-40.0'): Lost core. Driller reports firm rock.	- Driller lost all core (slipped out of core barrel when retrieving). - Temporarily lost - drill return water - Driller stopped Sonic coring at 40' and began conventional wire line coring at 40'

TEC-Weston Joint Venture

(FWGmw-018)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON4

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling~~ Device: Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (Screened 2in)	Total Depth (Feet): 154'
Date/Time Drilling Started: 9/22/16 1000		Date/Time Total Depth Reached: 9/24/16 1105	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40.0	80%			0.0 ppm			Sandstone/ Lost Core	(40.0'-50.0') Sandstone, gray, mostly unweathered, moderately well cemented matrix, broken at top and fractured throughout, some cross bedding, argillaceous	- Driller lost ~2' of core
50.0	100%			0.0			Sandstone	(50'-51'): Gray, hard, unweathered, moderately well cemented, medium grained	
60.0	80%			0.0 ppm			Sandstone/ Lost Core	(51'-61'): Sandstone, gray, hard, unweathered, moderately well cemented, fractured throughout (some low angle), medium grained, argillaceous	- Driller lost ~2' of core
	100%			0.0 ppm			Sandstone	(61'-66.90'): Same description as above	
70.0	84%			0.0 ppm		Conglomerate/ Lost Core		(66.9-71.0): Gray, moderately hard and poorly cemented, numerous subrounded quartz pebbles (some >1"), rare clay clasts and coal spars, trace pyrite, top 0.3' unconsolidated	- Driller lost ~0.65' of core - Stopped drilling at 71' 1" on 9/22/16
80.0	60%			0.0 ppm			Sandstone/ Lost Core	(71.0'-81.0'): Gray with tan weathered lense at ~71.5', moderately hard, coarse grained, poorly cemented slightly conglomeratic, fractured (some low angle near top) scattered quartz pebbles (up to 1/4") and coal spars	- Driller lost ~4' of core - Temporarily lost water returns at ~71.5'
90.0	89%			0.0 ppm		Conglomerate/ Lost Core		(81.0'-91.0'): Gray, mod. hard, coarse grained, poorly cemented, numerous subrounded quartz pebbles (up to 1"), occasional coal spars and clay clasts	- Driller lost ~1.1' of core - Temporary loss of water returns
100.0	36%			0.0 ppm			Sandstone/ Lost Core	(91.0'-101.0'): Gray, hard, recovered portion moderately well cemented, medium grained, high angle fracture, scattered subrounded quartz pebbles (most <1 1/4"), unconsolidated quartz pebbles (up to 1") found within 10' interval.	- Driller lost ~6.4' of core
	100			0.0			Sandstone	(101'-102.1'): Gray, hard, moderately well cemented, fine grain, argillaceous	
	100%			0.0 ppm		Conglomerate		(102.1'-102.65'): Gray, moderately hard, poorly cemented, numerous large qtz. pebbles/clay clasts	
110	78%			0.0 ppm			Sandstone	(102.65-108.7'): Gray, hard, mostly well cemented, fine grained, ~0.15' mudstone lense at 106.3', rare coal streaks	
120	80%			0.0 ppm		Conglomerate/ Lost Core		(108.7-111.0): Gray, moderately hard, medium to coarse grained, poorly cemented, scattered quartz pebbles throughout (<1/8"-3/4"), occasional clay clasts/coal spars	- Driller lost ~0.5' of core
130	97%			0.0 ppm			Sandstone/ Lost Core	(111'-121'): Gray, hard, fine grained, moderately well cemented, slightly micaceous, argillaceous, rare coal spars in fractures, rare clay clasts	- Driller lost ~2.0' of core
140	89%			0.0 ppm			Sandstone/ Lost Core	(121'-131'): Gray, hard, fine to medium grained, downward, moderately well cemented, argillaceous clay clasts and coal spars increasing near base	- Driller lost ~0.3' of core
							Sandstone/ Lost Core	(131'-140'): Gray, hard, fine grained, moderately well cemented, slightly micaceous, argillaceous, occasional coal spars and rare clay clasts - Temporary loss of water returns at ~135'	- Driller lost ~1.0' of core - Stopped drilling at 140' on 9/23/16

TEC-Weston Joint Venture

(FWGmw-018)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SCON4

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~: Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 154'
Date/Time Drilling Started: 9/22/16 1000		Date/Time Total Depth Reached: 9/24/16 1105	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
140, 142, 144	100%			0.0 ppm			Sandstone	(140'-144.92'): Sandstone, gray, hard, medium grained, fairly poor cementation, fractured, somewhat conglomeratic, argillaceous, several large subangular quartz pebbles (up to 1") near base, rare clay clasts	
	100%			0.0 ppm			Shale	(144.92'-145.52'): Black to dark gray, moderately soft, fractured	
146	100%			0.0 ppm		Con	Sandstone/ Conglomerate	(145.52'-146.86'): Gray, moderately hard, poorly cemented, scattered quartz pebbles (≤ 1/8"), numerous clay clasts and coal streaks, pyritic at base	- Base of Sharon Conglomerate
148, 150	33%			0.0 ppm			Shale/ Lost Core	(146.86'-151'): Black to dark gray, soft, high clay content, thinly bedded	- Driller lost ~2.79' of core
152, 154	67%			0.0 ppm			Shale/ Lost Core	(151'-154'): Dark gray, soft, high clay content, thinly bedded	- Driller lost ~1.0' of core - Bottom of hole
								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

(FWGmw-020)

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWG-SS/C3

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio	
Establishing Company: —	Geologist: Steve Stansfield (Cardno) / Drilling Company: Dunson Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: — / Datum: —
~~Sampling Device~~: Drill: Versa Sonic Model 1111	Borehole Diameter (inches): 6 7/8" (Screened Int.) / Total Depth (Feet): 45.7'
Date/Time Drilling Started: 9/25/16 1145	Date/Time Total Depth Reached: 9/25/16 1430

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	100%			0.0			Topsoil	(0.0'-0.5'): Dark brown, dry, rare sandstone fragments, root matter	
2.0 / 4.0	100%			0.0 ppm			Sandy Silt (SM)	(0.5'-5.0'): Sandy silt, light brown to tan, medium dense, dry to very slightly moist downward, orange inclusions, scattered sub-angular sandstone fragments (<1/8")	
6.0 / 8.0 / 10.0	100%			0.0 ppm			Silty Sand (SM)	(5.0'-11.2'): Silty sand, brown, medium stiff, becoming more moist at 8.0', orange inclusions throughout, scattered sub-angular sandstone fragments (<1/4")	
12.0 / 14.0	100%			0.0 ppm			Clayey Sand (SC)	(11.2'-14.1'): Clayey sand, gray, stiff, moderately wet, weathered, can be molded.	
16.0	100%			0.0 ppm			Silty Sand (SM)	(14.1'-15.9'): Silty sand, brown to orange, moist, medium dense, small angular sandstone fragments	
18.0 / 20.0	100%			0.0 ppm			Sandy Silt (SM)	(15.9'-20.8'): Sandy silt, tan to brown, moist, scattered orange inclusions, medium stiff, rare sandstone fragments (<1/8")	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: (FWGmw-020) FWG-55/C3

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6 7/8" (Screened Int.)
Total Depth (Feet)	45.7'	Date/Time Drilling Started	9/25/16 1145
Date/Time Total Depth Reached	9/25/16 1430		

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
20.0	100%			0.0			Sand	(20.8-21.3): Tan/orange, loose, moist, medium	grained
24.0	100%			0.0 ppm			Silty Sand (SM)	(21.3'-25.5'): Light brown to gray, becoming more firm downward, slightly moist, subangular scattered sandstone fragments (up to 1/4")	
	100%			0.0 ppm			Sandstone	(25.5'-27): Gray, weathered, semi-consolidated, moist, medium grained	- Top of Bedrock at 27.0'
28.0	78%			0.0 ppm			Sandstone/ Lost Core	(27.0'-30.0'): Gray, broken, moist, medium grained	- Driller lost ~ 0.65' of core - Installed temporary 8" outer casing to 30'
32.0 36.0 40.0	60%			0.0 ppm			Sandstone/ Lost Core	(30.0'-40.0'): Sandstone, gray, moderately hard, mostly unweathered, medium grained, moderately well cemented matrix, fractured, rare subangular quartz pebbles (<1/8"), broken in various zones within interval, some sand-filled fractures	- Driller lost ~ 4.0' of core
44.0	0.0			0.0 ppm			Lost Core	(40.0'-45.7'): Driller lost all core. Return water indicates core was sandstone.	- Driller lost all core. - Bottom of hole at 45.7'
48.0								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: NTAmw-120

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 120
Date/Time Drilling Started: 10/11/16 1020		Date/Time Total Depth Reached: 10/13/16 1025	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0.0 – 4.0	83%			0.0 ppm			Silty Clay (CL)	(0'-6.0'): Silty clay; tan to orange to gray, slightly moist, medium stiff, primarily absent of rock fragments	- Temporary 10" outer steel casing installed to 5.0' - Driller lost ~1.0' of core
8.0	100%			0.0 ppm			Silty Clay (CL)	(6.0'-10.0'): Brown, slightly moist becoming slightly wet at ~9.0', medium stiff, very rare orange inclusions, little structure	
12.0	100%			0.0 ppm			Sandy Clay (SC)	(10.0'-15.0'): Tan at top becoming gray at ~11', slightly wet with fine grained sandstone fragments, medium stiff, very rare subrounded quartz pebbles at base	
16.0	100%			0.0 ppm			Clayey Silt (CL)	(15.0'-18.2') Brown with rare orange inclusions, moist (not as moist as above), stiff, occasional shale chips	
20.0	100%			0.0 ppm			Silty Clay	(18.2'-20.0'): Brown, slightly wet (more wet than above), medium stiff	
24.0	100%			0.0 ppm			Clayey Sand (SC)	(20.0'-27.8'): Gray, slightly moist, medium stiff, rare subrounded sandstone fragments (up to 1/2"), and abundant small (<1/4") shale chips	- Driller began adding water at 20' during casing advancement.
28.0	100%			0.0			Silty Sand	(27.8'-28.8'): Gray, loose (somewhat unconsolidated) moist, medium grained	
32.0 – 36.0 – 40.0	80%			0.0 ppm			Clayey Silt (CL) / Lost Core	(28.8'-50.0'): Gray, moist, medium stiff, scattered subangular shale chips (<1/8" up to 1/2"), rare subrounded quartz pebbles (<1/4") increasing downward	- Driller lost ~4.0' of core

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: NTAmw-120

Company/Project	TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stonefield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6 7/8" (Screened Int.)
Total Depth (Feet)	120	Date/Time Drilling Started	10/11/16 1020
Date/Time Total Depth Reached	10/13/16 1025		

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40.0								See page 1 for description from 28.8'-50.0'	
44.0									
48.0									
52.0	100%			0.0 ppm			Silty Sand (SM)	(50'-63.0'): Gray, unconsolidated, thin (~0.4') orange zone at ~66.5', loose, scattered rounded quartz pebbles, (up to 1/2") throughout and subrounded sandstone fragments (up to 1")	
56.0									
60.0									
64.0	100%			0.0 ppm			Silt	(63.0'-66'): Gray, moderately hard and dense but unconsolidated, scattered subrounded quartz pebbles (<1/4")	and shale chips
68.0	100%			0.0 ppm			Sand	(66'-69.5'): Tan-orange to gray, completely loose, medium grained, large orange stained sandstone cobble (~0.25') at base	
	100			0.0			Silt	(69.5'-70.0): Gray, moderately hard and dense, fine grained, scattered subrounded quartz pebbles (<1/4") and shale	chips
72.0	100%			0.0 ppm		Conglomeratic	Silt	(70.0'-75.0'): Gray with red inclusions, semi-consolidated, numerous sandstone and quartz pebbles (typically <1/4"), occasional shale chips	
76.0	100%			0.0 ppm			Silt	(75.0'-79.5'): Dark gray to gray, moderately semi-consolidated, dry, occasional orange inclusions, occasional subrounded quartz pebbles (up to 1") (Core crushed by drilling)	hard and dense, — Top of competent bedrock
80.0	100			0.0			Sandstone	(79.5'-80.0): Gray, wet, medium grained (core crushed by drilling)	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: NTAmw-120

Company/Project	TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stonsfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 120
Date/Time Drilling Started: 10/11/16 1020		Date/Time Total Depth Reached: 10/13/16 1025	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
80.0 – 88.0	85%			0.0 ppm			Shale/ Lost Core	(80.0'-89.5'): Dark gray, dry, fairly dense and firm, occasional thin fine grained sandstone lenses (core crushed by Sonic drilling)	- Driller began rock coring with air at 81'. Water still used during casing advancement. - Driller lost ~1.4' of core - Driller stopped at 90' on 10/11/16.
88.0 – 92.0	14%			0.0 ppm			Shale with Sandstone Streaks/Lost Core	(89.5'-93.0'): Most core not recovered, but small recovered pieces indicate hard, moderately well cemented matrix (	- Driller lost ~3.0' of core
92.0 – 100.0	0.0%			0.0 ppm			Lost Core (Shale with Sandstone Streaks)	(93.0'-100.0'): Core not recovered, but small recovered pieces indicate intact sandy shale with sandstone lenses that had orange weathering. Based on return water, there may be a thin coal near the top of the interval.	- Driller lost all 7.0' of core while retrieving from core barrel. Air buildup in core barrel expelled crushed core into mud tub
100.0 – 104	100%			0.0 ppm			Shale w/ Sandstone Streaks	(100.0'-102.7'): Dark gray, firm, scattered sandstone streaks throughout, matrix becoming more sandy downward	
104 – 112	78%			0.0 ppm			Sandstone/ Lost Core	(102.7'-115'): Gray, moderately hard, slightly weathered, fine grained, moderately well cemented, slightly micaceous, argillaceous, broken, shale streaks at ~114'	- Driller lost ~2.7' of core - 8" temporary outer casing installed to 105' - 6" temporary casing installed to 115' - Driller stopped at 115' on 10/12/16
112 – 120	0.0%			0.0 ppm			Lost Core (Sandstone)	(115'-120'): Core not recovered. Return water and cuttings indicate sandstone, orange-gray, weathered, medium to coarse grained. Bottom of borehole.	- Driller lost 5' of core - Water producing zone (~10-15 gpm)

Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
Sampling Device	Drill: Versa Sonic Model 1111	Borehole Diameter (inches)	6 7/8" (Screen Int.)
Total Depth (Feet)	215'		
Date/Time Drilling Started	10/17/16 0830	Date/Time Total Depth Reached	10/28/16 1300

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	100%			0.0			Topsoil	(0-1'): Dark brown, slightly moist, root matter, orange inclusions	
4	100%			0.0 ppm			Silty Sand (SM)	(1-4'): Tan to slightly orange tint, fairly loose; slightly moist; medium grained; scattered subangular sandstone fragments (up to 2")	
	100%			0.0 ppm			Silty Sand (SM)	(4'-6'): Light brown, slightly moist, medium grained scattered subangular sandstone fragments (up to 1/2")	- Temporary 10" outer casing installed to 5'
8	100%			0.0 ppm			Silty Sand (SM)	(6'-10'): Red-brown with light brown lenses, loose, slightly moist, medium grained, moderately weathered, scattered subangular sandstone fragments (up to 2")	- Top of Bedrock at ~10'
12	80%			0.0 ppm			Sandstone / Lost Core	(10'-15'): Brown, weathered, some iron staining, medium grained, poorly cemented, broken, some zones semi-consolidated, red lenses at base	- Driller cored with water from 10' to 20' - Driller lost ~1.0' core
16	60%			0.0 ppm			Sandstone / Lost Core	(15'-20'): Tan with orange inclusions, only semi-consolidated, loose, weathered, medium grained, some 1/4" subrounded sandstone fragments.	- Driller lost ~2.0' of core
20 24	72%			0.0 ppm			Sandstone / Lost Core	(20'-27.15'): Immediate top gray with tan lenses, remainder is red-brown, weathered, fractured, medium grained, poorly cemented, orange staining in fractures	- Driller began Sonic coring with air at 20' - Driller lost ~2.0' of core
28 32 36 40	81%			0.0 ppm			Sandstone / Lost Core	(27.15'-40.0'): Tan to orange, scattered gray lenses, weathered, poorly cemented, medium grained, fractured (with high-angle fracture near top), slightly micaceous, argillaceous, rare coal spars	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGMW-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type —
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company —		Geologist Steve Stonsfield (Cardno)	Drilling Company Duncan Brothers Drilling, Inc.
Drilling Foreman Mark Michaud		Ground Surface Elevation —	Datum —
~~Sampling Device~~ Drill: Versa Sonic Model 1111		Borehole Diameter (Inches) 6 7/8" (Screen Id.)	Total Depth (Feet) 215'
Date/Time Drilling Started 10/17/16 0830		Date/Time Total Depth Reached 10/28/16 1300	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40, 44, 48	0.0%			0.0 ppm			Lost Core (Sandstone)	(40'-50'): Lost core. Core was stuck in core barrel and could not be recovered intact. Few chipped pieces and returns indicate interval is comprised of sandstone	
52, 56, 60	0.0%			0.0 ppm			Lost Core	(50'-60'): Lost core. Portions of 10' interval are sandstone. Unable to determine lithology type throughout run.	- Driller cored with air and water from 57'-60.'
64	94%			0.0 ppm			Sandstone/ Lost Core	(60'-65.3'): Gray, some light tan lenses, medium grained, moderately well cemented, hard, mostly unweathered, micaceous, argillaceous, scattered coal streaks, moderately sharp basal contact	- Driller lost ~0.3' of core
68	100%			0.0 ppm			Sandy Shale	(65.3'-68.45'): Gray, moderately hard and intact, sandstone streaks throughout, some cross bedding, bottom 0.17' soft mudstone lense, sharp basal contact	
	100%			0.0			Sandstone	(68.45-70.0): Gray, moderately hard, medium grained, moderately well cemented, slightly micaceous	- Driller stopped at 70' on 10/27/16.
72, 76, 80	0.0%			0.0 ppm			Lost Core	(70.0'-80.0'): Lost core, Unable to determine lithology type.	- Possible water "take" zone at ~75' as determined during casing installation.

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model 1411		Borehole Diameter (inches): 6 7/8" (Screen Int)	Total Depth (Feet): 215'
Date/Time Drilling Started: 10/17/16 0830		Date/Time Total Depth Reached: 10/28/16 1300	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
80–88	5%			0.0 ppm			Lost Core	(80'-90'): Lost core. Driller recovered 0.5' of sandstone, but unable to determine location within the 10' interval. Sandstone is medium grained, gray, hard, moderately well cemented, unweathered, micaceous	- Encountered ~5-10 gpm water between 85'-90'
92–100	100%			0.0 ppm			Sandstone	(90'-102.4'): Gray, hard, well cemented, unweathered, medium grained with fine zones, micaceous, argillaceous, scattered clay clasts, siderite nodules, and coal spars; coal spars increasing at ~95', broken at ~97', clay clasts and siderite nodules increasing at immediate base.	
104	0.0%			0.0 ppm			Lost Core	(102.4'-107.4'): Lost core. Unable to determine lithology type	- Driller lost 5' of core
	100%			0.0			Cannel Coal	(107.4'-107.55'): Cannel coal, black, moderately hard, blocky, pyritic	
108	100%			0.0			Sandstone	(107.55'-108.65'): Gray, moderately hard, medium grained, coal streaks, sharp contact	
112–120	52%			0.0 ppm			Shale/ Lost Core	(108.65'-120'): Dark gray, moderately hard and firm, planar, scattered sandstone streaks, slightly micaceous, siderite bands and nodules, thinly laminated, ~0.45' thick soft lense near top with mudstone clasts	- Driller lost 5.5' of core - Driller stopped at 120' on 10/19/16

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type —
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company —		Geologist Steve Stansfield (Cardno)	Drilling Company Duncan Brothers Drilling, Inc.
Drilling Foreman Mark Michaud		Ground Surface Elevation —	Datum —
~~Sampling Device~~ Drill: Versa Sonic Model: 1311		Borehole Diameter (inches) 6 7/8" (Screen Int.)	Total Depth (Feet) 215'
Date/Time Drilling Started 10/17/16 0830		Date/Time Total Depth Reached 10/28/16 1300	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
120									
124	70%			0.0 ppm			Shale/ Lost Core	(120'-130'): Dark gray with light gray sandstone streaks, firm, thin soft lense at top, siderite decreasing, burrowed, some broken zones (may be drilling induced)	- Driller lost 3' of core.
128									- Driller stopped at 130' on 10/20/16
132									
136	20%			0.0 ppm			Shale/ Lost Core	(130'-140'): Dark gray to gray, moderately firm, sandstone streaks decreasing, planar, micaceous, dry (core broken but may be drilling induced)	- Driller lost ~8' of core
140									
144	67.5%			0.0 ppm			Shale/ Lost Core	(140'-150'): Gray, moderately firm, becoming more sandy than above interval, planar, micaceous, occasional siderite nodules, some carbonized plant fragments in fractures, slightly rooted near base	- Driller lost 2.5' of core - Driller began coring with air and water at 140'
148									
152	100%			0.0 ppm			Shale	(150'-152.25'): Dark gray, high angle fracture near top, firm, planar, slightly micaceous, fractured, thinly	occasional sandy zones, laminated
	0%			0.0 ppm			Lost Core	(152.25'-155.05'): Driller lost core Note: Borehole making ~5-10 gpm of water between	- Driller lost 2.8' of core 150'-155'
156	100%			0.0 ppm			Shale with Sandstone Interbeds	(155.05'-158.6'): Gray, moderately hard, broken near top, some cross bedding, thin sandstone lenses, moderately sharp basal contact	
160									- Driller stopped at 160' on 10/25/16

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model: 1111	Borehole Diameter (inches)	6 7/8" (Screened Int.)
Total Depth (Feet)	215'		
Date/Time Drilling Started	10/17/16 0830	Date/Time Total Depth Reached	10/28/16 1300

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
160	100%			0.0 ppm			Sandstone	(158.6'-163'): Top 1' gray then becoming slightly brown, becoming coarse and conglomeratic at ~161.2', scattered subrounded quartz pebbles (<1/4") near base	fractured at top, fine grained - Some water between ~162'-164'
164 – 168	43%			0.0 ppm			Shale and Lost Core	(163'-170'): Recovered shale (~3.0') is dark gray, hard and firm, intact, planar, very slightly sandy	- Driller lost ~4.0' of core
172 – 176 – 180	56.5%			0.0 ppm			Shale and Lost Core	(170'-180'): Recovered shale (~5.65') is gray but color lightens downward, dense and firm, intact top, some carbonized plant fragments in fractures, scattered sandstone streaks	- Driller lost ~4.35' of core
184 – 188	36%			0.0 ppm			Shale and Lost Core	(180'-190'): Recovered shale (~3.6') is gray, dense and firm, intact, scattered mudstone clasts and rare siderite nodules, sandstone content increases downward	- Driller lost ~6.4' of core
192 – 196 – 200	47.5%			0.0 ppm			Sandstone and Shale/ Sandy Shale/ Lost Core	(190'-200'): Recovered rock (~4.75') contains ~1.0' of sandstone; 2.35' of shale/sandy shale and ~1.4' of sandstone (in descending order) Gray, hard, moderately well cemented, fine grained, scattered coal specs at top. Shale is dark gray, firm, planar, intact.	- Driller lost ~5.25' of core - 8" temporary outer casing installed to 200' - Driller stopped at 200' on 10/26/16

Note: Top of Sharon Conglomerate occurs somewhere within the 190'-200' interval.

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-023

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1411	Borehole Diameter (inches)	6 7/8" (Secured Int.)
Total Depth (Feet)	215'	Date/Time Drilling Started	10/17/16 0830
Date/Time Total Depth Reached	10/28/16 1300		

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
200 202 204 206 208 210	20%			0.0 ppm		Sandstone and Lost Core		(200'-210'): Recovered rock (~2.0') contains, in descending order: Sandstone (0.6' thick): Gray, medium grained, broken, somewhat loosely cemented, coal specs with pyrite Shaley Sandstone (0.73' thick): Gray, fine grained, scattered coal specs Sandstone (0.67' thick): Light tan, slightly weathered, coarse grained, loosely cemented, friable - Note: Unable to determine where, within interval, the above occurred.	- Driller lost ~8.0' of core - Drill cuttings indicate the entire 10' interval is sandstone. - Water at ~205'
212 214	4%			0.0 ppm		Sandstone and Lost Core		(210'-215'): Only 0.2' of sandstone recovered. Light tan, coarse grained, loosely cemented, slightly weathered, somewhat friable.	- Driller lost ~4.8' of core - Additional water encountered within 5' interval - Bottom of Borehole
216								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

Cardno WESTON
TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program		Location Type: —	
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.	
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —	Datum: —	
~~Sampling Device~~ Drill: Versa Sonic Model: 1111	Borehole Diameter (Inches): 6 7/8" (Screened Int)	Total Depth (Feet): 240'/16 1040	
Date/Time Drilling Started: 11/1/16 1300	Date/Time Total Depth Reached: 11/15/16 1040		

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	100%			0.0			Topsoil	(0-0.75'): Dark brown, moist, numerous root matter	
	100%			0.0			Sand	(0.75'-1.75'): Red-orange, loose, moist, clayey downward	sandstone fragments
	100%			0.0			Sandy Clay CL	(1.75'-2.65'): Red-orange at top becoming brown downward, medium stiff; can be slightly molded, mostly free of rock fragments	
	100%			0.0					
4	0.0%						Silty Clay ML	(2.65'-3.6'): Gray to brown, moist, medium stiff, very rare and small (<1/8) sandstone fragments	
	100%			0.0			No Core	(3.6'-5.0'): Lost core	Driller lost 1.4' of core
							Silty Clay ML	(5.0'-6.1'): Gray, moist, medium stiff, very rare and small sandstone fragments (<1/8")	
8	100%			0.0 ppm			Clayey Sand (SC)	(6.1'-10.7'): Brown to gray, slightly moist, stiff, mostly free of rock fragments	
12	100%			0.0 ppm			Silty Sand (SM)	(10.7'-15'): Tan/brown, slightly moist, micaceous, sandstone fragments increasing downward (some up to 2"); possible thin coal remnants	- Driller installed 10" temporary casing to 15'.
16	100%			0.0 ppm			Sand	(15'-18'): Tan, ~50% loose and 50% is large subangular sandstone boulders (up to 3"), micaceous	- Driller stopped at 18' on 11/1/16
20	29%			0.0 ppm			Sandstone and Lost Core	(18'-23'): Tan/Brown, moderately weathered, medium grained, moderately soft, micaceous, argillaceous, fractured (drill cuttings indicate lost core is brown sandstone)	- Top of bedrock at 18' - Began core drilling with air at 18' - Driller lost ~3.55' of core
24 28	19%			0.0 ppm			Sandstone and Lost Core	(23'-30'): Recovered portion is gray, not as weathered as above interval, iron staining mainly in fractures, broken, fine grained, moderate cementation (drill cuttings indicate lost core is sandstone)	- Water at ~29' - Driller lost ~5.7' of core
32 36 40	40%			0.0 ppm			Sandstone and Lost Core	(30'-40'): Based on recovered 4.0': Top 1.8': Tan, weathered, medium grained, poorly cemented, coal spars, scattered quartz pebbles (<1/8"), fractured (with high angle fracture) Bottom 2.2': Gray, slightly weathered, fine grained with coarser lenses, scattered quartz pebbles near top (<1/8"), fractured, mudstone streaks, moderate cementation	- Driller lost ~6.0' of core. - Drill cuttings indicate lost core is sandstone

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
Sampling Device: Drill: Versa Sonic Model: 1111		Borehole Diameter (Inches): 6 7/8" (Screened Int.)	Total Depth (Feet): 240'
Date/Time Drilling Started: 11/1/16 1300		Date/Time Total Depth Reached: 11/15/16 1040	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40, 44, 48	18%			0.0 ppm			Sandstone/ Sandy Shale and Lost Core	(40'-50'): Based on recovered 1.8': Top 1.0': Sandstone, gray, fine grained, mudstone streaks, moderate cementation. Bottom 0.8': Sandy shale/silty shale, gray, somewhat firm, planar, micaceous. - Note: May be thin coal between 40'-50' based on returns (core not recovered)	- Core likely broken by drilling - Sandstone-Shale contact between 41'-49' - Driller lost ~8.2' of core - Driller stopped at 50' on 11/2/16
52, 56, 60, 64, 68	84%			0.0 ppm			Shale with Mudstone Lenses/ Lost Core	(50'-70'): Based on recovered 16.8' Top 0.45': Mudstone, dark gray and moderately soft, slightly rooted. Next 0.6': Mudstone, light gray, slightly rooted, soft. Remainder: Shale, gray, firm, planar, moderately dense, occasional mudstone clasts and sandy streaks, unweathered, rare siderite nodules, some burrowing, brittle	- Driller lost ~3.2' of core
72, 76, 80	30%			0.0 ppm			Shale and Lost Core	(70'-80'): Based on recovered 3.0' Shale, gray, unweathered, somewhat firm, some burrowing, some rare carbonized plant fragments in fractures, large vertical fracture 1.3' from top, some pyrite flakes in fractures, brittle	- Driller lost ~7.0' of core - Easily breaks along bedding planes - Return water during casing installation indicates a thin coal seam between about 75' to 80' (not recovered)

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project: TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program			Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cardno)		Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —		Datum: —
Sampling Device: Drill: Versa Sonic Model: 1111	Borehole Diameter (Inches): 6 7/8" (Screened Int.)		Total Depth (Feet): 240'
Date/Time Drilling Started: 11/1/16 1300		Date/Time Total Depth Reached: 11/15/16 1040	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
80	100%			0.0 ppm			Shale	(80'-90'): Gray, unweathered, somewhat firm, somewhat burrowed, very slightly micaceous, brittle (easily breaks along bedding planes)	- Driller stopped at 90' on 11/3/16
84, 88									
92, 96, 100	84%			0.0 ppm			Shale/ Mudstone/ Lost Core	(90'-102'): Gray, mainly unweathered, somewhat firm and burrowed, high clay content, very slightly micaceous. From 95'-105', the shale is black	- Driller lost ~1.9' of core.
104	100%			0.0 ppm			Shale	(102'-105'): Gray, silty, more firm than above units, unweathered, slightly micaceous, planar, vertical fracture at ~103'	
108	73%			0.0 ppm			Shaley Sandstone/ Sandy Shale/LC	(105'-111'): Gray, hard, unweathered, slightly micaceous, fine grained, moderately well cemented, broken at ~109', some carbonized plant fragments in fractures	- Driller lost ~1.6' of core
112, 116, 120	47%			0.0 ppm			Shale/ Lost Core	(111'-120') Based on recovered 4.2' Gray, firm, scattered sandstone streaks decreasing downward, unweathered, slightly rooted near base, very rare siderite nodules	- Driller lost ~4.8' of core

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project: TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program			Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stansfield (Cardno)		Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —		Datum: —
~~Sampling Device~~ Drill: Versa Sonic Model: 1111	Borehole Diameter (inches): 6 7/8" (Ground Int)		Total Depth (Feet): 240'
Date/Time Drilling Started: 11/1/16 1300		Date/Time Total Depth Reached: 11/15/16 1040	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
120	100%			0.0 ppm			Shale	(120'-130'): Gray, firm, scattered sandstone streaks increasing downward, slightly silty lenses with trace mica, slightly rooted, carbonized plant fragments in fractures, vertical fractures at ~106' and 109', bottom 0.2' broken and sandy	
124									
128									
132	100%			0.0 ppm			Sandstone/ Conglomerate	(130'-135.5'): Light gray, medium to coarse grained, poor cementation, very slightly micaceous, rare coal specs and occasional mudstone streaks, quartz pebbles (<1/8") throughout, friable	- Zone produces some water
136	100%			0.0 ppm			Shale with Sandstone Streaks	(135.5'-142.0'): Gray to dark gray, some burrowing, firm, slightly micaceous, carbonized plant fragments in fractures, alternating gray to black shale lenses ("zebra" rock)	
140									
144	100%			0.0 ppm			Shale	(142'-147.3'): Light gray, soft, planar, brittle, breaks easily along bedding planes	
148	0%			0.0 ppm			Lost Core	(147.3'-149.8'): Lost core	Driller lost ~2.5' of core
	100%			0.0			Sandstone	(149.8'-150.7): Gray, fine grained, fair cementation, argillaceous, sharp basal contact	
152	100%			0.0 ppm			Conglomerate	(150.7'-163.6): Gray to tan, coarse, poorly cemented, numerous subrounded quartz pebbles (up to 1/8"), some fine grained lenses, vertical fractures at ~156' and 158', friable, moderately sharp basal contact.	- Driller lost ~ of core - Installed temporary 8" casing to 155' - Driller stopped at 160' on 11/8/16
156									
160									

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project	TEC-Weston Joint Venture/Facility-Wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model: 1111	Borehole Diameter (Inches)	6 7/8" (Screened Int.)
Total Depth (Feet)	240'		
Date/Time Drilling Started	11/1/16 1300	Date/Time Total Depth Reached	11/15/16 1040

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
160								(160.7-163.6'): See P.4	
164	100%			0.0			Sandstone	(163.6'-164.65'): Gray, fine grained, conglomeratic base near top, moderately well cemented	
168	0.0%			0.0 ppm			Lost Core	(164.65'-170'): Driller lost core. Returns indicate sandstone.	- Driller lost ~5.35' of core - Borehole making water between 160'-170'
172 176	70%			0.0 ppm			Conglomerate/ Silty Shale/ Sandstone/ Lost Core	(160'-170'): Based on recovered 7.0' Top 2.25': Conglomerate, tan to light gray, coarse grained, numerous quartz pebbles (up to 1/8"), poorly cemented/friable Middle 2.0': Silty Shale, gray, dense, moderately firm, bottom 0.2' is black, scattered siderite Bottom 2.75': Sandstone, fine grained, hard, moderately well cemented, argillaceous, scattered coal spars, broken at base	- Driller lost ~3.0' of core - Borehole making water between 170'-180'
180 184 188	36%			0.0 ppm			Sandstone and Lost Core	(180'-190'): Based on recovered 3.6' Tan/gray to tan, medium grained, slightly conglomeratic with scattered quartz pebbles (<1/8"), argillaceous, rare carbonized plant fragments in fractures	- Driller lost ~6.4' of core
192 196 200	100%			0.0 ppm			Sandstone	(190'-200'): Gray, medium grained to fining downward, well cemented, hard, massive, slightly argillaceous, occasional coal spars near base, scattered quartz pebbles (<1/8")	- Driller stopped at 200' on 11/9/16

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-019

Company/Project	TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist	Steve Stansfield (Cardno)
Drilling Company	Duncan Brothers Drilling, Inc.	Drilling Foreman	Mark Michaud
Ground Surface Elevation	—	Datum	—
~~Sampling Device~~	Drill: Versa Sonic Model 1411	Borehole Diameter (inches)	6 7/8" (Second Int.)
Total Depth (Feet)	240'	Date/Time Drilling Started	11/1/16 1300
Date/Time Total Depth Reached	11/15/16 1040		

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
200–208	70%			0.0 ppm			Sandstone/ Lost Core	(200'-210'): Gray, fine grained, moderately well cemented, hard, scattered coal spars throughout (some containing pyrite), argillaceous,	- Driller lost ~3.0' of core - Zone produces water
212–220	82%			0.0 ppm			Sandstone/ Lost Core	(210'-220'): Gray, fine grained coarsening towards bottom and becoming slightly conglomeratic, moderately well cemented becoming mostly poorly cemented at base, scattered quartz pebbles (< 1/8") near base, very rare coal spars in fractures, argillaceous	- Driller lost ~1.8' of core
224–228	82%			0.0 ppm			Sandstone/ Conglomerate/ Lost Core	(220'-230'): Gray, medium grained, subrounded quartz pebbles (up to 1") beginning at ~224', tan inclusion (ironstone) & vertical fracture (water zone) at ~225', mostly poorly cemented, some quartz veins near base	- Driller lost ~1.8' of core - Water zone at ~225' - Driller stopped at 230' on 11/14/16
232–236	100%			0.0 ppm			Conglomerate	(230'-235.4'): Gray, medium to coarse grained, poorly cemented, numerous subrounded quartz pebbles (up to 1/4"), scattered siderite, occasional coal spars in fractures, pyritic at immediate base.	- Base of Sharon Conglomerate
236–240	35%			0.0 ppm			Shale/ Lost Core	(235.4'-240'): Gray to dark gray downward, planar at top becoming slightly rooted and softer at base (1.6' recovered, but drill cuttings indicate shale from 235.4'-240').	- Driller lost ~3.0' of core - Bottom of hole at 240'

Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.

WESTON
TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FW.Gmw-022

Company/Project	TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type	—
Location Description	Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio		
Establishing Company	—	Geologist: Steve Stansfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud		Ground Surface Elevation: —	Datum: —
Sampling Device: Drill: Versa Sonic Model 1311		Borehole Diameter (inches): 6 7/8" within Sonic	Total Depth (Feet): 165'
Date/Time Drilling Started: 11/17/16 1300		Date/Time Total Depth Reached: 11/30/16 1050	

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL-TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	26%			0.0 ppm		Top	soil/Fill and Lost Core	Top 0.4': Topsoil, dark brown, moist, plant and root matter. Bottom 0.9': Fill material with fill gravel	- Driller lost ~3.7' of core
4	100%			0.0 ppm			Silty Clay	(5-6.3'): Brown, medium stiff, rare small sandstone fragments (<1/8")	
8	84%			0.0 ppm			Clayey Sand (SC)	(6.3'-10'): Brown, stiff, mostly dry, very rare sandstone fragments, scattered orange inclusions	- Driller lost ~0.6' of core
12	100%			0.0 ppm			Clayey Sand (SC)	(10'-12.85'): Brown w/ gray lenses, medium stiff, moist, occasional sandstone fragments, crumbly	
16	100%			0.0 ppm			Silty Sand (SM)	(12.85'-18'): Tan-brown, slightly moist, crumbly, slightly micaceous, sandstone fragments increasing downward (some up to 2")	- Driller installed temporary 10" outer casing to 15'
20	100%			0.0 ppm			Sand	(18'-20'): Tan, slightly moist, ~50% loose and rest is large sandstone fragments, highly weathered	- Driller started rock coring at 20'
24 28	47.5%			0.0 ppm			Sandstone/ Lost Core	Description based on recovered core: Top 2.5': Sandstone, highly iron stained and weathered, fine grained, moderately poorly cemented, fractured (vertical fracture near base of recovered core), very slightly micaceous. Bottom 2.25': Sandstone, gray with occasional iron stains, slightly weathered, fine grained, some cross bedding, fractured	- Driller lost ~5.25' of core - Water encountered at ~29'-30'
32 36 40	30%			0.0 ppm			Sandstone/ Conglomerate/ Lost Core	Description based on recovered core: Top 2.6': Conglomerate, coarse grained, poorly cemented, carbonized plant fragments and coal spars in fractures, pyritic, in places fractured, quartz pebbles (<1/8") throughout. Bottom 0.4': Sandstone, slightly silty, fine grained, moderately well cemented, hard, cross bedded	- Driller lost ~7.0' of core

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: FWGmw-022

Company/Project: TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program			Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company:	Geologist: Steve Stansfield (Caldwell)		Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: —		Datum: —
~~Sampling Device~~: Drill: Versa Sonic Model: 1311	Borehole Diameter (Inches): 6 7/8" (Screened 5.3)		Total Depth (Feet): 165'
Date/Time Drilling Started: 11/17/16 1300		Date/Time Total Depth Reached: 11/30/16 1050	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL-TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
40								Description based on recovered core:	- Driller lost ~6.0' of core
44	40%			0.0 ppm		Sandstone/ Sandy	Shale/ Shale/ Lost Core	Top 1.7': Sandstone, very fine grained, moderately well cemented, slightly micaceous, hard, silty. Middle 0.4': Sandy shale, gray, moderately firm, broken, occasional coal specs. Bottom 1.9': Shale, dark gray at top and gray downward, thinly bedded and soft at top, brittle, occasional sandstone streaks at top, becoming firm and planar downward	
48									
52								Note 1: From 50' to total depth (165') used displacement drill bit and no core recovered. For core descriptions below 50', see geologic log for FWGmw-019 which is located ~25'-30' laterally from FWGmw-022. Note 2: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: LL2mw-272

Company/Project: TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program	Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio	
Establishing Company: —	Geologist: Steve Stansfield (Cardno) / Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud	Ground Surface Elevation: — / Datum: —
Sampling Device: Drill: Versa Sonic Model: 1111	Borehole Diameter (Inches): 6 7/8" (Screened Int) / Total Depth (Feet): 30'
Date/Time Drilling Started: 12/5/16 0918	Date/Time Total Depth Reached: 12/5/16 1205

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL-TYPE, modifiers/grain-size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	100%			0.0			Topsoil	(0'-0.8') Brown, wet, numerous plant roots, occasional fill stone	
4	100%			0.0 ppm			Clayey Silt (SC)	(0.8'-7.5'): Brown to tan with scattered orange inclusions, wet at top becoming dry downward, stiff, very rare subangular sandstone fragments (<1/4")	- Driller installed temporary 10" outer casing to 5'
8	100%			0.0 ppm			Clayey Silt (SC)	(7.5'-11.65'): Brown to tan with orange inclusions, moist, medium stiff, sandstone fragments increasing downward	
12	100% 0% 58%			0.0 0.0 0.0 ppm			Silty Sand (SM)	(11.65'-13'): Tan with orange inclusions, slightly moist, mostly loose, numerous subangular sandstone fragments (up to 2")	- Top of Bedrock at 13' - Began using water to drill at 13'
16							Lost Core	(13'-14'): Lost Core	- Driller lost 1' of core
20	80%			0.0 ppm			Sandstone/ Lost Core	(14'-15.9'): Tan/brown, weathered, fine grained, poorly cemented, broken, iron stained	- Driller lost 0.8' of core - Driller installed temporary 8" Casing to 15'
24	22.5%			0.0 ppm			Sandstone/ Lost Core	(15.9'-20'): Top 0.75' tan and slightly weathered, remainder is gray, fine grained, mostly poorly cemented, occasional small coal specs in fractures	- Driller lost ~0.8' of core. - Water-bearing zone at ~19'
28							Sandstone/ Lost Core	(20'-30'): Based on recovered core: slightly tan to slightly gray, fine grained, broken (some drilling induced), moderately good cementation, thin dark grey silty lenses near base of recovered core	- Driller lost ~7.5' of core
32									- Bottom of hole at 30'
								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: LL1mw-089

Company/Project: TEC-Weston Joint Venture / Facility-Wide Groundwater Monitoring Program		Location Type: —	
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio			
Establishing Company: —	Geologist: Steve Stanfield (Cardno)	Drilling Company: Duncan Brothers Drilling, Inc.	
Drilling Foreman: Alex Duncan	Ground Surface Elevation: —	Datum: —	
Sampling Device: Drill: Versa Drill V-1000X Air Rotary	Borehole Diameter (inches): 6" (Screened Int.)	Total Depth (Feet):	
Date/Time Drilling Started: 12/16/16 1210		Date/Time Total Depth Reached:	

Depth (feet)	Sampling: % Recov	Sample Depth	Blow Counts	PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0, 4, 8, 12, 16, 20, 24				0.0 ppm				Note: Borehole is located ~10' north of plugged and abandoned borehole LL1sb-089. For geologic descriptions of the top 25', see the geologic borehole log for LL1sb-089.	- Top 25' drilled with 7 5/8" tri-cone air rotary bit. - 6 5/8" temporary outer steel casing installed to 25' - Encountered very slight moisture at 16', but not viable for well installation.
28, 32, 36	84%			0.0 ppm			Sandstone & Lost Core	(25'-37'): Tan, medium grained, slightly conglomeratic, poorly cemented, slightly weathered, scattered subrounded quartz pebbles (<1/4") throughout, coal spar in fracture near top, orange bands increasing downward	- Begin core drilling with air at 25' - Driller lost ~1.9' of core. - Water encountered at ~27' - Bottom of hole at 37'
40								Note: In instances where core loss occurred and where "lost core" does not have its own entry, it is not possible, to determine where the core loss occurred within a respective core run.	

WESTON
TEC-Weston Joint Venture

GEOLOGIC BOREHOLE LOG

Borehole (Location) ID: LL158-089

Company/Project: TEC-Weston Joint Venture/Facility-wide Groundwater Monitoring Program
Location Type: —
Location Description: Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio
Establishing Company: —
Geologist: Steve Stansfield (Cardno)
Drilling Company: Duncan Brothers Drilling, Inc.
Drilling Foreman: Mark Michaud
Ground Surface Elevation: —
Datum: —
Sampling Device: Drill: Verra Sonic Model 1411
Borehole Diameter (Inches): 6 7/8" (Screened 2in.)
Total Depth (Feet): 25'
Date/Time Drilling Started: 12/6/16 1245
Date/Time Total Depth Reached: 12/6/16 1440

Depth (feet)	Sampling: % Recov	Sampling: Sample Depth	Sampling: Blow Counts	Sampling: PID	Graphic	ASTM CODE	Lithologic Codes	Lithology Description: SOIL-TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing	Remarks: Drilling Problems, Equipment, Water levels, Time Samples Collected, Weather
0	100%			0.0			Topsoil	(0-1.0'): Brown, wet, numerous plant roots	
4	100%			0.0 ppm			Silty Sand (SM)	(1.0'-4.0'): Light brown with occasional orange and red inclusions, stiff, becoming dry downward, subangular sandstone fragments increasing downward	- Installed temporary outer 8" casing to 4'. - Top of Bedrock at 4'
8	8%			0.0 ppm			Sandstone/ Lost Core	(4'-10') Based on only 0.5' Recovery. Brown, weathered, fine grained, moderately well cemented, some iron staining in fractures	- Driller lost ~5.5' of core. - Began using water to drill at 4'
12 16	56.5%			0.0 ppm			Sandstone/ Lost Core	(10'-20'): Top 4.3': Tan, fine grained, weathered, highly fractured, iron stained, matrix moderately well cemented. Bottom 1.35': Dark brown, highly weathered, fractured, iron stained, argillaceous, very rare subrounded quartz pebbles (<1/8")	- Driller lost ~4.35' of core
20 24	45%			0.0 ppm			Sandstone/ Lost Core	(20'-25'): Top 1.15': Tan, medium grained, slightly weathered, occasional iron stains, very rare and small (<1/8") quartz pebbles, some cross bedding. Bottom 1.1': Tan, conglomeratic, mostly poor cementation, medium grained, quartz pebbles (<1/8") increasing in frequency, ironstone nodules (<1/8") throughout	- Driller lost ~2.75' of core
28									- Bottom of hole at 25'
								Note: In instances where core loss has occurred and where "lost core" does not have its own entry, it is not possible to determine where the core loss occurred within a respective core run.	

Note 2: Borehole abandoned

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Attachment C: Well Construction Forms

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Cardno TEC WESTON
TEC-Weston Joint Venture

Well Construction Details

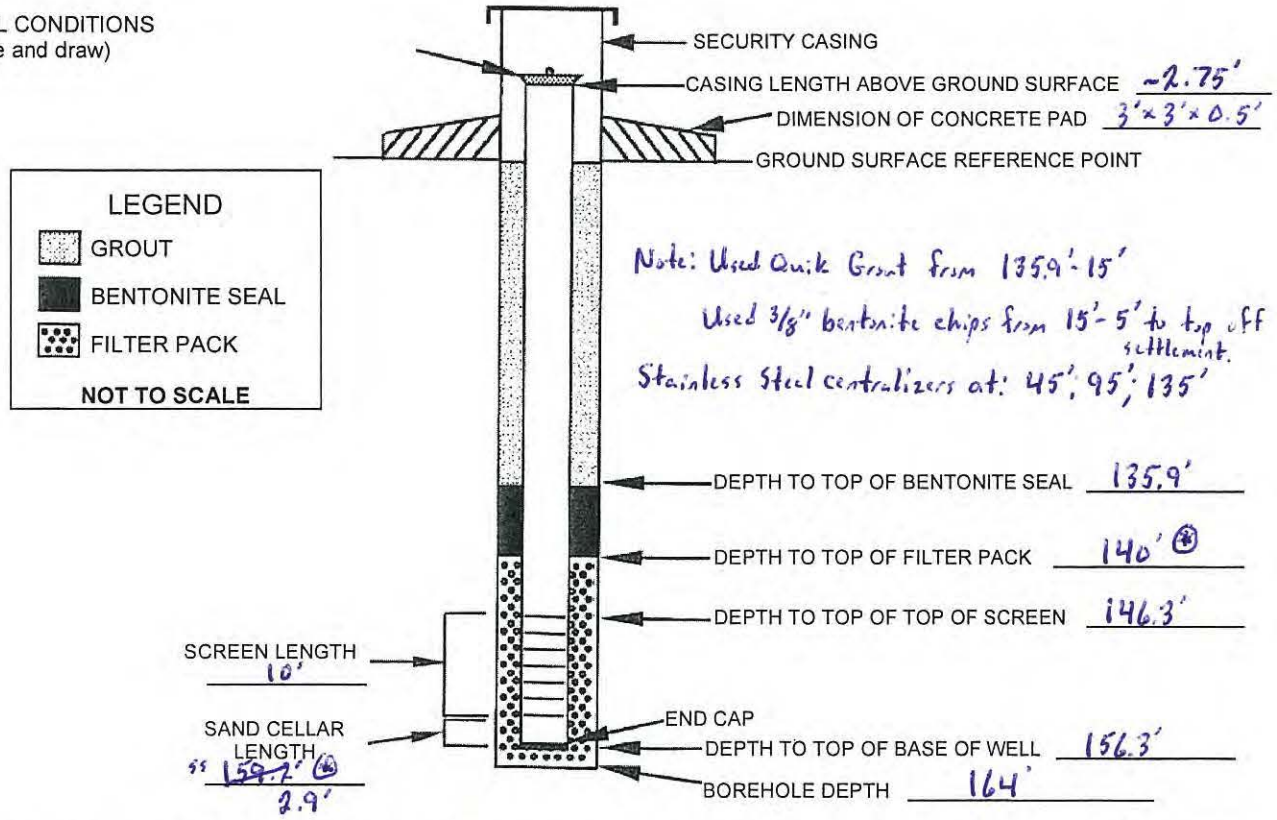
FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling
DRILLING TECHNIQUE: Sonic / Conventional Wireline Core
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: BKG-SCON 1 (BKGmw-024)
BOREHOLE DIAMETER: 6" within screened zone
WELL IDENTIFICATION: BKG-SCON 1 (BKGmw-024)
WELL CONSTRUCTION START DATE: 8/11/16
WELL CONSTRUCTION COMPLETE DATE: 8/26/16

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12×20
AMT. OF FILTER PACK USED: 4-50 lb. bags
TYPE OF BENTONITE: 3/4" chips
AMT. OF BENTONITE USED: 1-50 lb. bag (Filter Pack Seal) 23.5 bags Annular Seal
TYPE OF CEMENT: N/A (Used bentonite grout)
AMT. OF CEMENT USED: N/A (Used bentonite grout)
GROUT MATERIAL USED: Baroid Quik-Grout 20% High Solids / 3/8" Bentonite Chips
DIMENSIONS OF SECURITY CASING: 8' × 6"

SCREEN MATERIAL: 2" Schedule 80 PVC (0.010" slot)
SCREEN DIAMETER: "2" 1.94" ID; 2.38" OD
STRATUM-SCREENED INTERVAL (FT): 10' Screen
CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: "2" 1.94" ID; 2.38" O.D.

TYPE OF WELL CAP: ~~Com~~ 2" Torque Well Plug
TYPE OF END CAP: PVC Threaded
COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES: ⊛ From 164-159.2', borehole backfilled with bentonite chips (3/4"). Sand pack interval from 159.2'-140' mixed with formation sand that could not be flushed from borehole.

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: BKG-HS51 (BKGmw-022)

BOREHOLE DIAMETER: 6 7/8" within screened interval

WELL IDENTIFICATION: BKG-HS51 (BKGmw-022)

WELL CONSTRUCTION START DATE: 8/17/16

WELL CONSTRUCTION COMPLETE DATE: 8/26/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.010" slot)

SCREEN DIAMETER: 2.07" ID / 2.38" O.D.

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC

CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: 7.5 - 50 lb. bags

TYPE OF BENTONITE: 3/8" Chips

AMT. OF BENTONITE USED: 11 - 50 lb. bags

TYPE OF CEMENT: N/A

AMT. OF CEMENT USED: N/A

GROUT MATERIAL USED: 3/8" Bentonite Chips

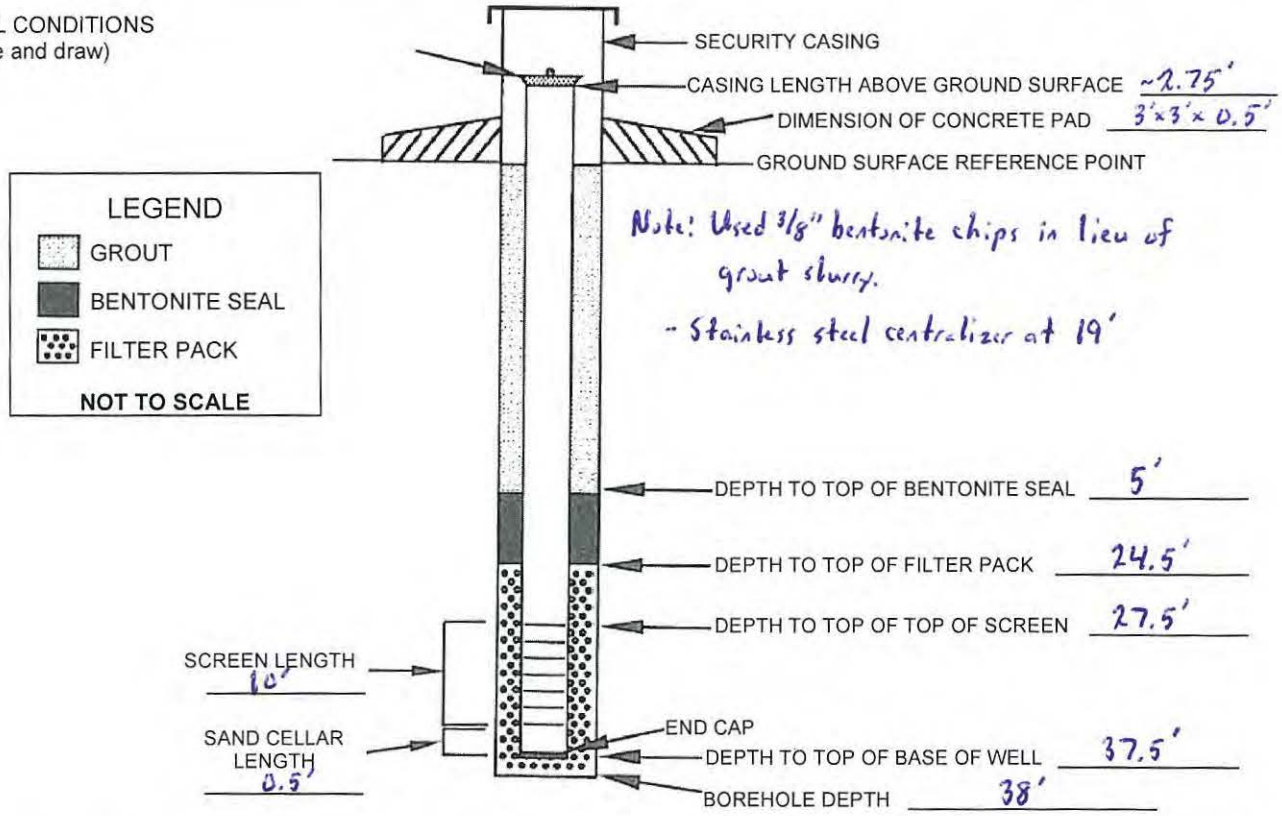
DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Starsfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: BKG-HSS2 (BKGmw-023)
BOREHOLE DIAMETER: 6 3/8" within Screened Interval
WELL IDENTIFICATION: BKG-HSS2 (BKGmw-023)

WELL CONSTRUCTION START DATE: 8/18/16
WELL CONSTRUCTION COMPLETE DATE: 8/26/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.01" Slot)
SCREEN DIAMETER: 2.07" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC
CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12×20
AMT. OF FILTER PACK USED: 5.5-50 lb. bags

TYPE OF BENTONITE: 3/8" Chips
AMT. OF BENTONITE USED: 14-50 lb. bags

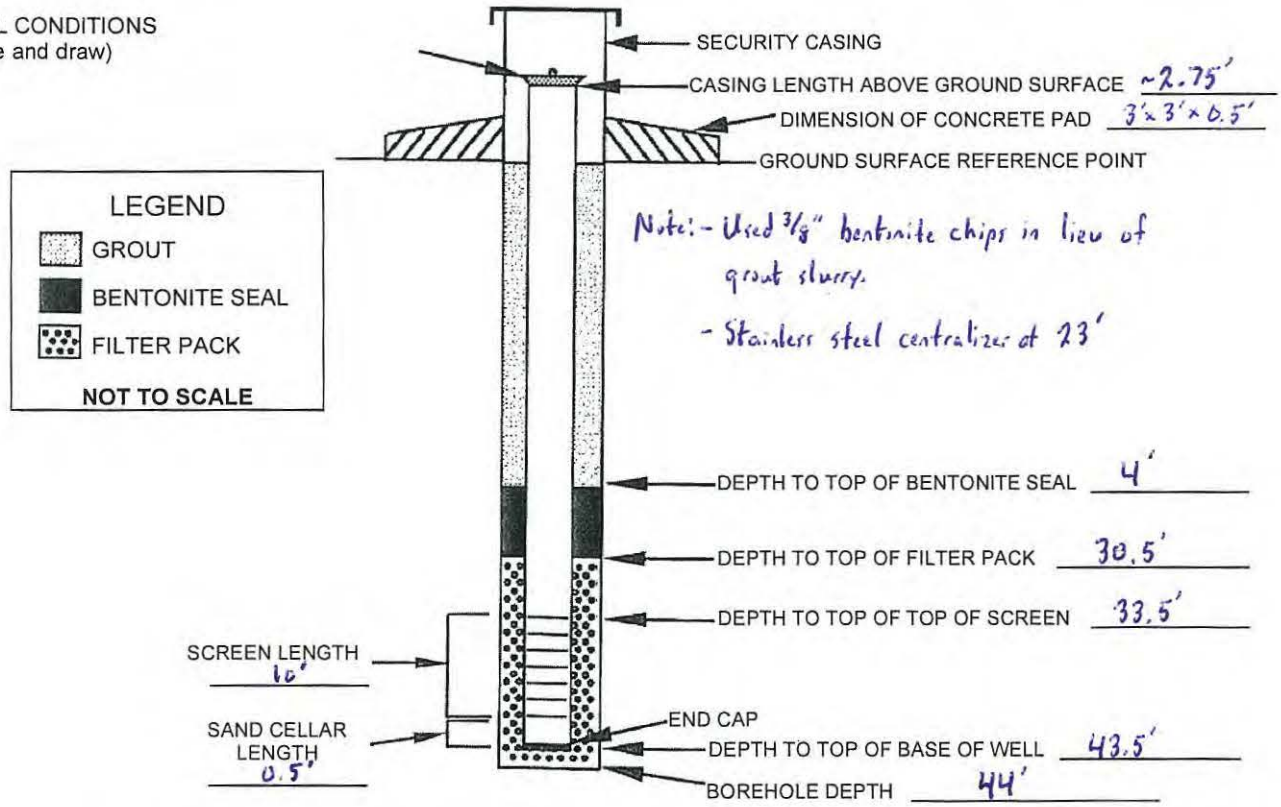
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: 3/8" Bentonite Chips

DIMENSIONS OF SECURITY CASING: 8' × 6"

TYPE OF WELL CAP: 2" Torque Well Plug
TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Starsfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic/Conventional Wireline Core

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: BKG-SCON2 (BKGmw-025)

BOREHOLE DIAMETER: 6 7/8" within screened zone

WELL IDENTIFICATION: BKG-SCON2 (BKGmw-025)

WELL CONSTRUCTION START DATE: 9/7/16

WELL CONSTRUCTION COMPLETE DATE: 9/8/16

SCREEN MATERIAL: 2" Schedule 80 PVC (Slot 0.010")

SCREEN DIAMETER: 1.94" ID; 2.38" O.D.

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 80 PVC

CASING DIAMETER: 1.94" I.D.; 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: 7.5 - 50 lb. bags

TYPE OF BENTONITE: 3/8" chips

AMT. OF BENTONITE USED: 2-50 lb. bags (Filter Pack Seal)

TYPE OF CEMENT: N/A (Used bentonite grout)

AMT. OF CEMENT USED: N/A (Used bentonite grout)

GROUT MATERIAL USED: Baroid Quik-Grout 20#s High Solids / 3/8" Bentonite Chips

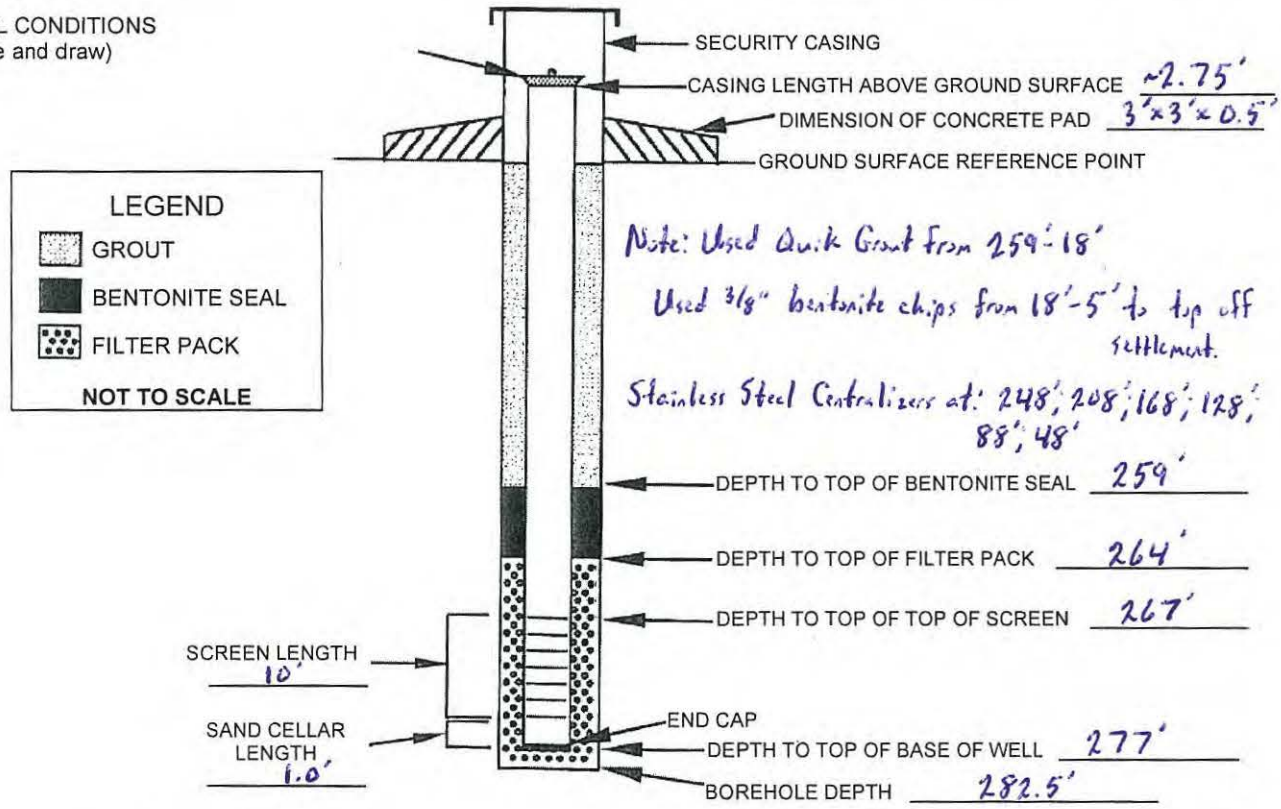
DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES: Borehole backfilled with 3/8" bentonite chips from 282.5'-278'

Cardno TEC WESTON
TEC-Weston Joint Venture

Well Construction Details

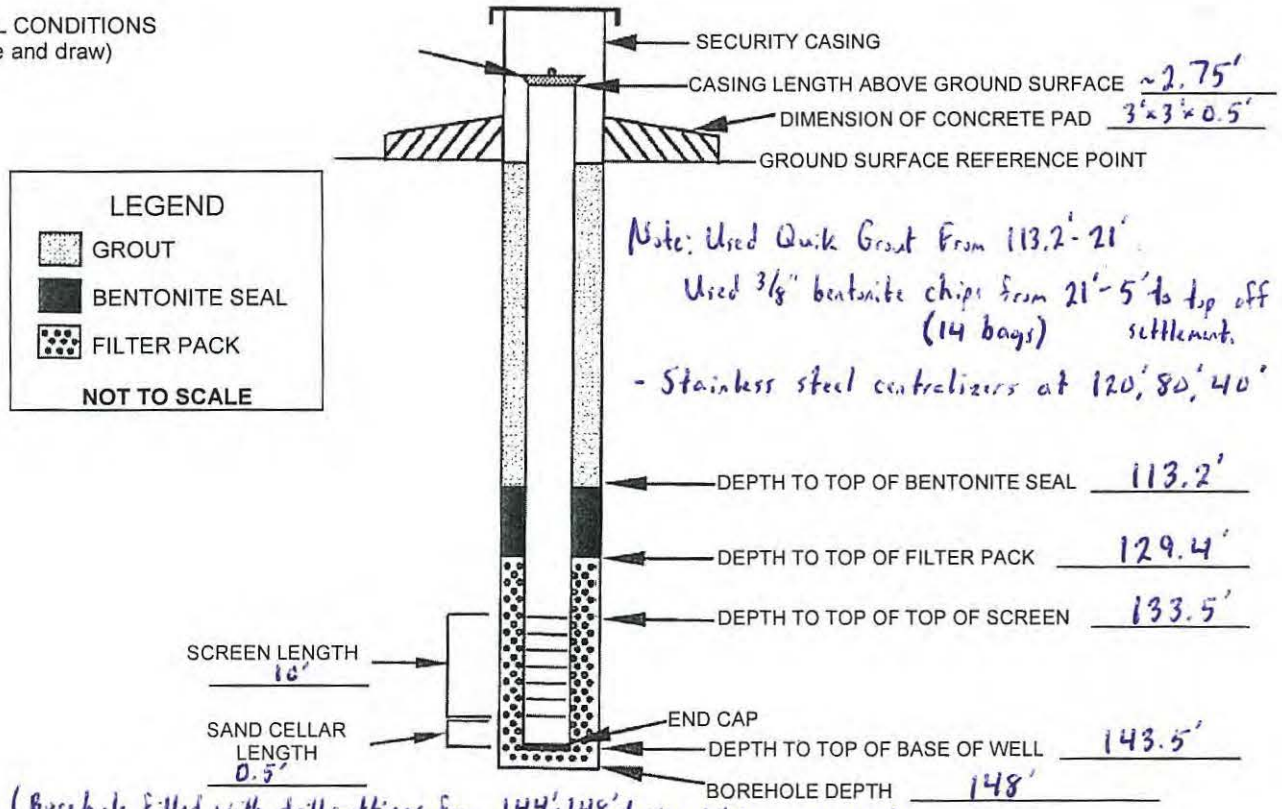
FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling
DRILLING TECHNIQUE: Sonic / Conventional Wireline Coring
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: FWG-SCON3 (FWGmw-017)
BOREHOLE DIAMETER: 6 7/8" Within Screened Interval
WELL IDENTIFICATION: FWG-SCON3 (FWGmw-017)
WELL CONSTRUCTION START DATE: 9/14/16
WELL CONSTRUCTION COMPLETE DATE: 9/16/16

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 7-50 lb. bags
TYPE OF BENTONITE: 3/8" chips
AMT. OF BENTONITE USED: 5-50 lb. bags
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Baroid Quik-Grout 20% High Solids / 3/8" Bentonite Chips
DIMENSIONS OF SECURITY CASING: 8' x 6"

SCREEN MATERIAL: 2" Schedule 80 PVC (0.01" slot)
SCREEN DIAMETER: 1.94" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen
CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: 1.94" I.D. / 2.38" O.D.

TYPE OF WELL CAP: 2" Torque Well Plug
TYPE OF END CAP: PVC Threaded
COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



(Borehole filled with drill cuttings from 144'-148' during 6" Casing Install)

INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: FWG-SS/C8 (FWGmw-024)

BOREHOLE DIAMETER: 6 7/8" within screened interval

WELL IDENTIFICATION: FWG-SS/C8 (FWGmw-024)

WELL CONSTRUCTION START DATE: 9/15/16

WELL CONSTRUCTION COMPLETE DATE: 9/16/16

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: 5.5 - 50 lb. bags

TYPE OF BENTONITE: 3/8" chips

AMT. OF BENTONITE USED: 7 - 50 lb. bags

TYPE OF CEMENT: N/A

AMT. OF CEMENT USED: N/A

GROUT MATERIAL USED: 3/8" Bentonite Chips

DIMENSIONS OF SECURITY CASING: 8' x 6"

SCREEN MATERIAL: 2" Schedule 40 PVC (0.010" slot)

SCREEN DIAMETER: 2.07" I.D. / 2.38" O.D.

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC

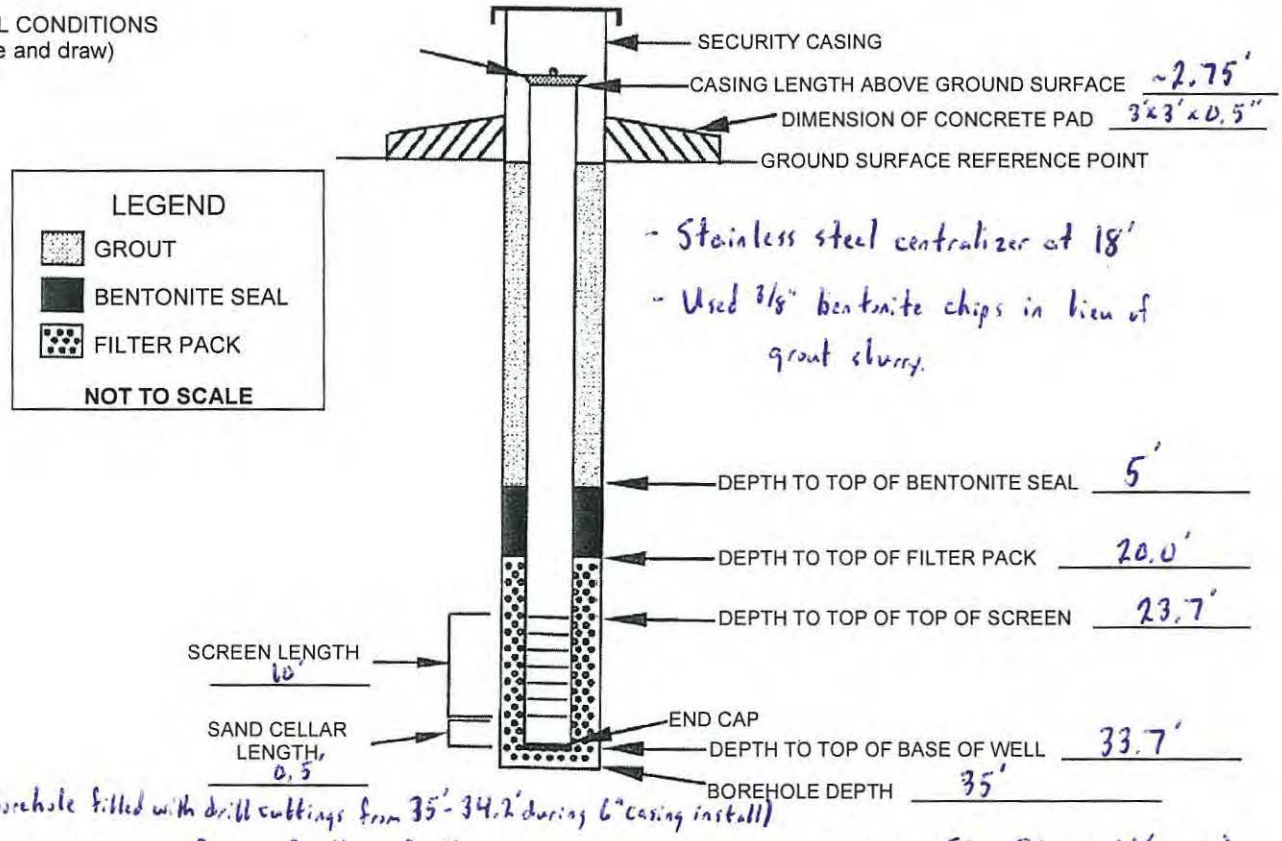
CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF WELL CAP: 2" Torquer Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



(Borehole filled with drill cuttings from 35'-34.2' during 6" casing install)

INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

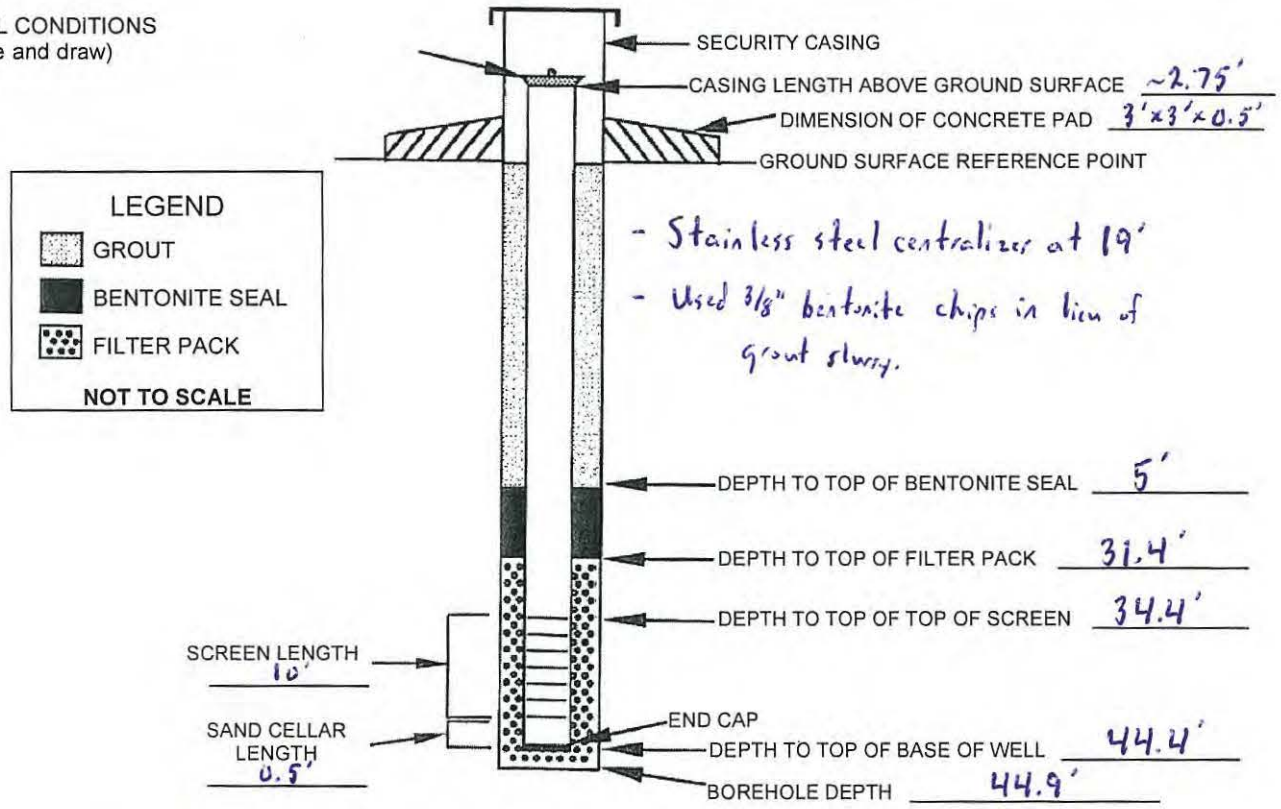
FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling
DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: FWG-SS/C4 (FWGmw-021)
BOREHOLE DIAMETER: 6 7/8" within screened interval
WELL IDENTIFICATION: FWG-SS/C4 (FWGmw-021)
WELL CONSTRUCTION START DATE: 9/21/16
WELL CONSTRUCTION COMPLETE DATE: 9/27/16

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 7.25 - 50 lb. bags
TYPE OF BENTONITE: 3/8" chips
AMT. OF BENTONITE USED: 12 - 50 lb. bags
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: 3/8" Bentonite Chips
DIMENSIONS OF SECURITY CASING: 8' x 6"

SCREEN MATERIAL: 2" Schedule 40 PVC (0.010" slot)
SCREEN DIAMETER: 2.07" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen
CASING MATERIAL: 2" Schedule 40 PVC
CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF WELL CAP: 2" Turquoise Well Plug
TYPE OF END CAP: PVC Threaded
COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brother Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

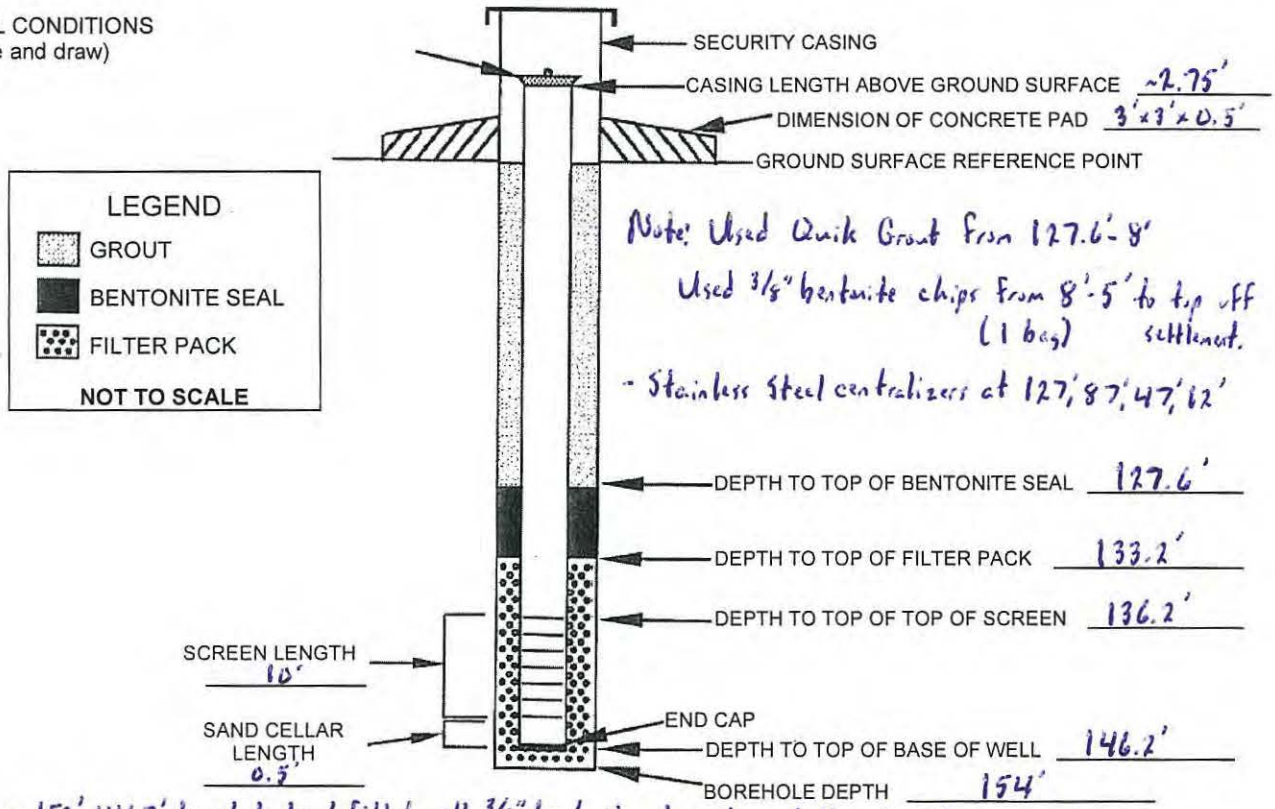
Cardno TEC WESTON
TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling
DRILLING TECHNIQUE: Sonic / Conventional Wireline Casing
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: FWG-SCON 4 (FWGmw-018)
BOREHOLE DIAMETER: 6 7/8" Within Screened Interval
WELL IDENTIFICATION: FWG-SCON 4 (FWGmw-018)
WELL CONSTRUCTION START DATE: 9/24/16
WELL CONSTRUCTION COMPLETE DATE: 9/27/16
SCREEN MATERIAL: 2" Schedule 80 PVC (0.01" slot)
SCREEN DIAMETER: 1.94" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen
CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: 1.94" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 6 - 50 lb. bags
TYPE OF BENTONITE: 3/8" chips
AMT. OF BENTONITE USED: 2 - 50 lb. bags
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Baroid Quik-Grout 20% High Solids / 3/8" Bentonite Chips
DIMENSIONS OF SECURITY CASING: 8' x 6"
TYPE OF WELL CAP: 2" Torquer Well Plug
TYPE OF END CAP: PVC Threaded
COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



From 152'-146.7', borehole backfilled with 3/8" bentonite chips tremied through 6" temporary casing

INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: FWG-55/C3 (FWGmw-020)

BOREHOLE DIAMETER: 6 7/8" within screened interval

WELL IDENTIFICATION: FWG-55/C3 (FWGmw-020)

WELL CONSTRUCTION START DATE: 9/25/16

WELL CONSTRUCTION COMPLETE DATE: 9/27/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.010" slot)

SCREEN DIAMETER: 2.07" ID / 2.38" OD

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC

CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: 6 - 50 lb. bags

TYPE OF BENTONITE: 3/8" chips

AMT. OF BENTONITE USED: 13 - 50 lb. bags

TYPE OF CEMENT: N/A

AMT. OF CEMENT USED: N/A

GROUT MATERIAL USED: 3/8" Bentonite chips

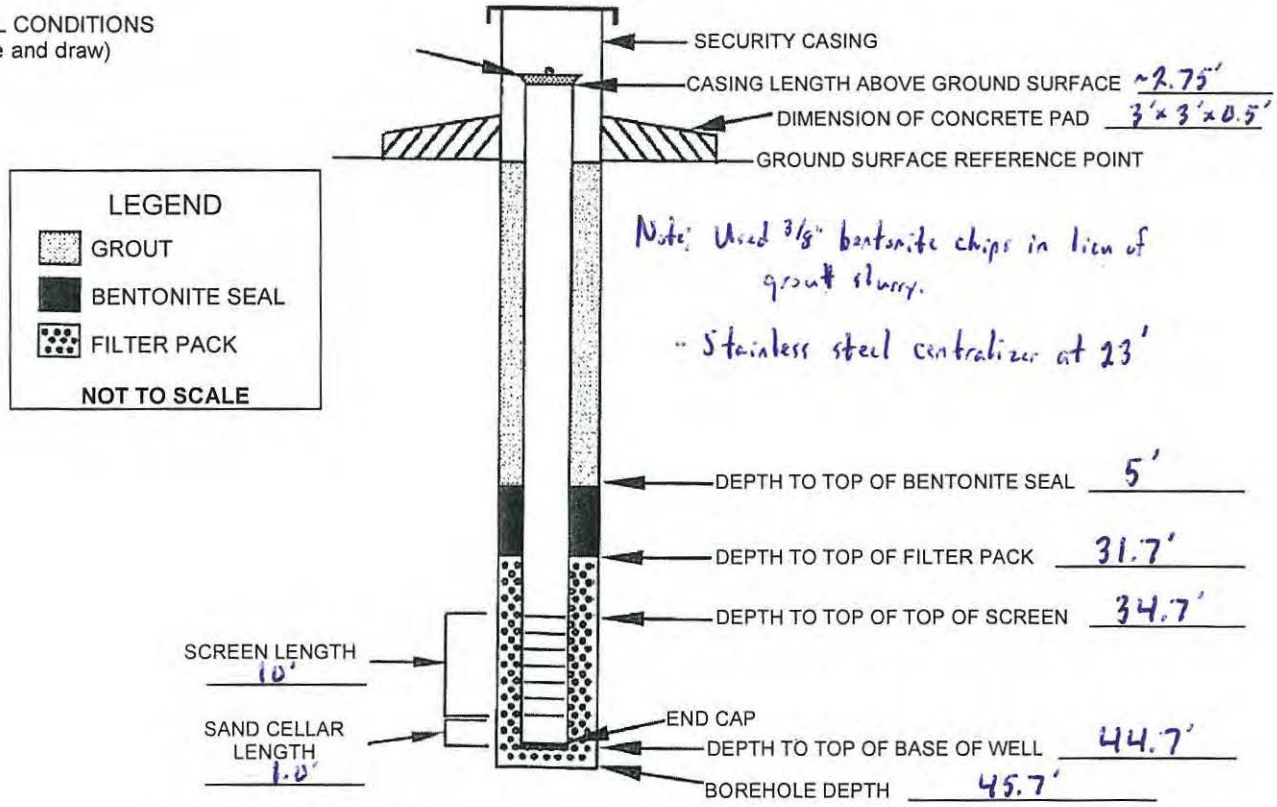
DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torque Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: NTAmw-120
BOREHOLE DIAMETER: 6 7/8" within screened zone
WELL IDENTIFICATION: NTAmw-120

WELL CONSTRUCTION START DATE: 10/13/16
WELL CONSTRUCTION COMPLETE DATE: 10/18/16

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 4.25 - 50 lb. bags

TYPE OF BENTONITE: 3/8" Chips
AMT. OF BENTONITE USED: 3 - 50 lb bags

TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Bariod Quik-Grout 20% High Solids / 3/8" Bentonite chips

DIMENSIONS OF SECURITY CASING: 8' x 6"

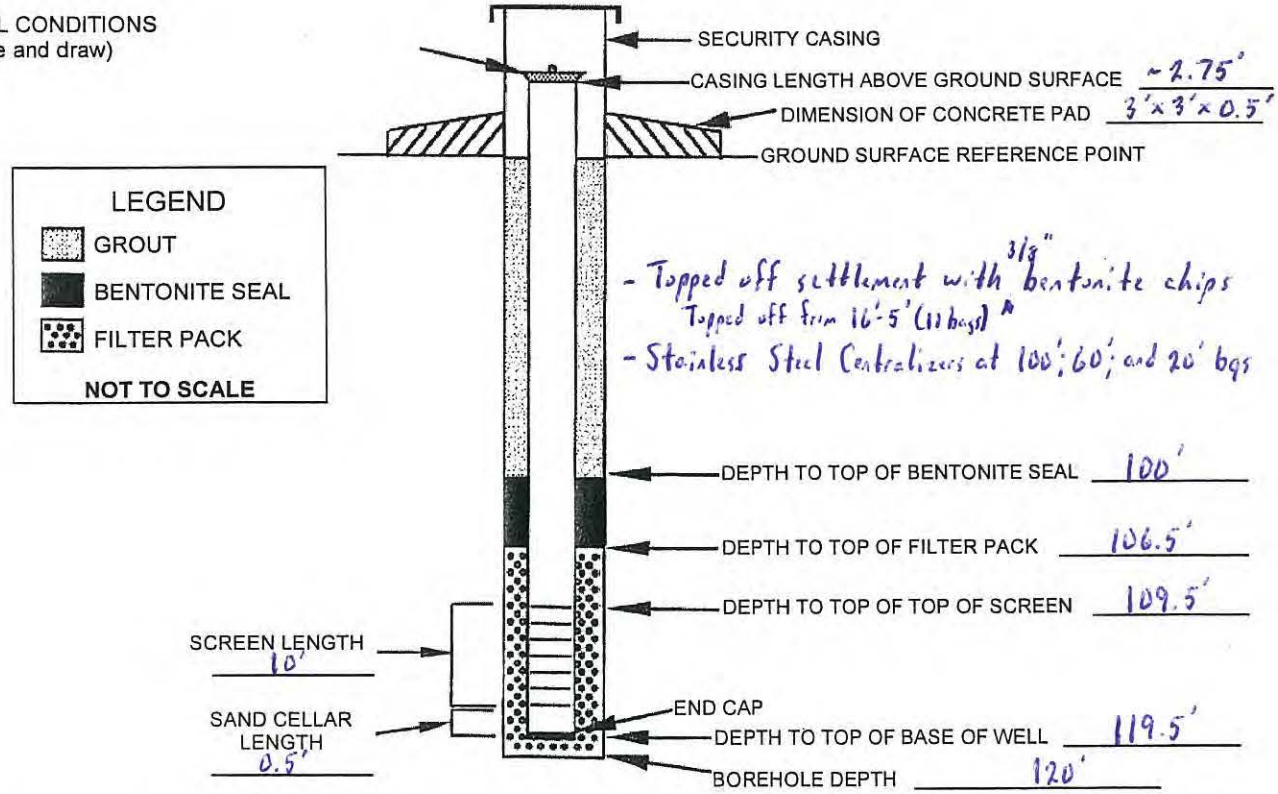
SCREEN MATERIAL: 2" Schedule 40 PVC (0.010" slot)
SCREEN DIAMETER: 2.07" I.D / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC
CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF WELL CAP: 2" Torquer well Plug
TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: FWGmw-023
BOREHOLE DIAMETER: 6 7/8" within screened zone
WELL IDENTIFICATION: FWGmw-023

WELL CONSTRUCTION START DATE: 10/28/16
WELL CONSTRUCTION COMPLETE DATE: 12/9/16

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12×20
AMT. OF FILTER PACK USED: 6-50 lb. bags

TYPE OF BENTONITE: 3/8" chips
AMT. OF BENTONITE USED: 2-50 lb. bags

TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Bariod Quik-Grout 20% High Solids

DIMENSIONS OF SECURITY CASING: 8' x 6"

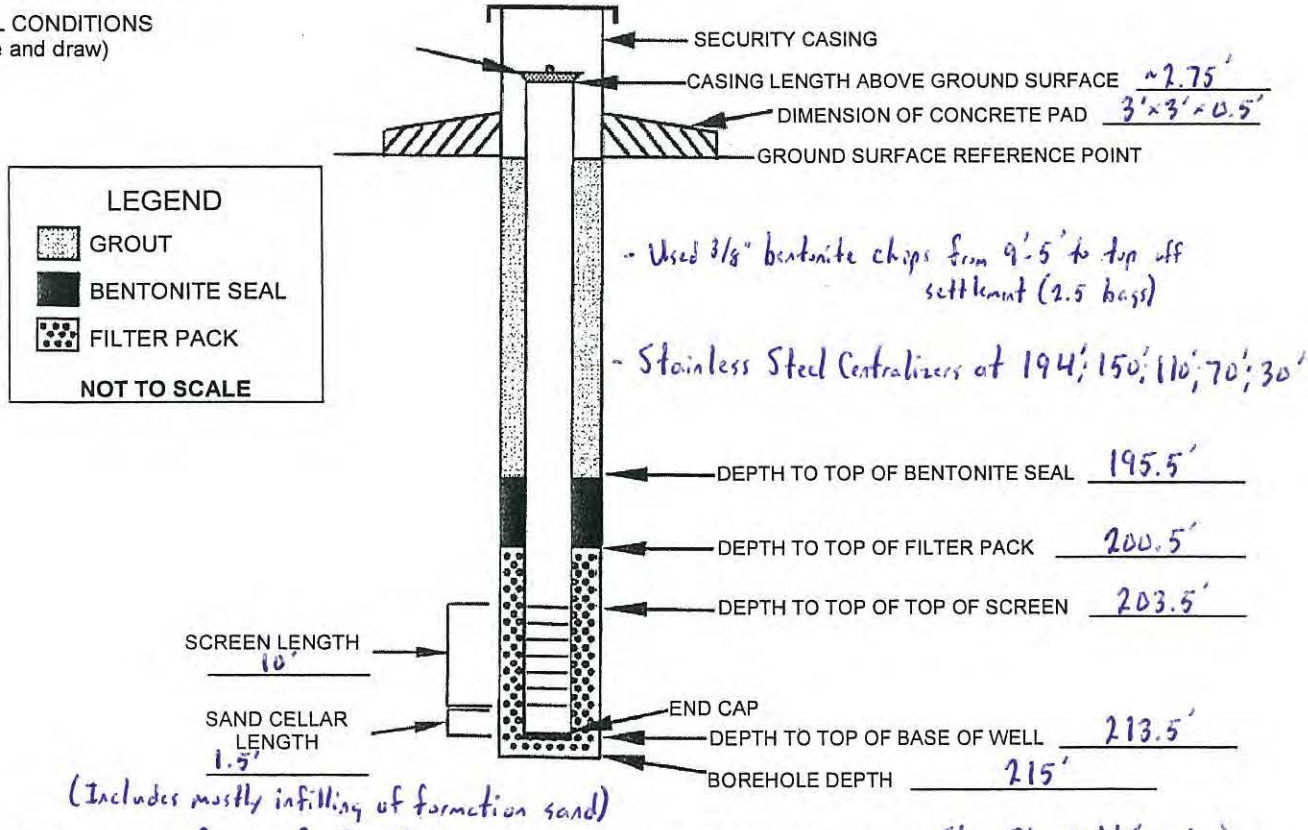
SCREEN MATERIAL: 2" Schedule 80 PVC (0.010" slot)
SCREEN DIAMETER: 1.94" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

TYPE OF WELL CAP: 2" Torquer Well Plug
TYPE OF END CAP: PVC Threaded

CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: 1.94" I.D. / 2.38" O.D.

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



(Includes mostly infilling of formation sand)

INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: FWGmw-019
BOREHOLE DIAMETER: 6 7/8" within screened zone
WELL IDENTIFICATION: FWGmw-019

WELL CONSTRUCTION START DATE: 11/15/16
WELL CONSTRUCTION COMPLETE DATE: 12/8/16

SCREEN MATERIAL: 2" Schedule 80 PVC (0.010" slot)
SCREEN DIAMETER: 1.94" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: 1.94" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 7-50 lb. bags

TYPE OF BENTONITE: 3/8" Chips
AMT. OF BENTONITE USED: 2-50 lb bags

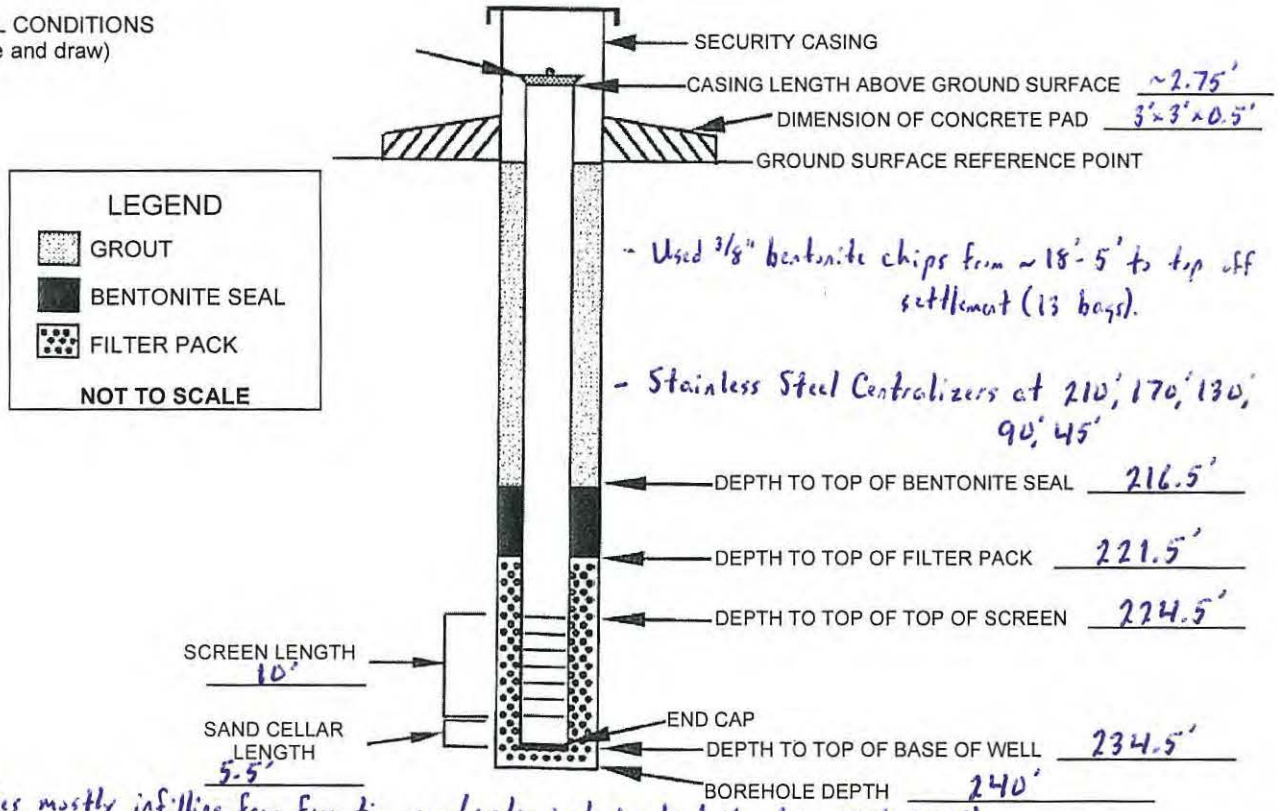
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Baroid Quik-Grout 20% High Solids / 3/8" chips to "top off" settlement

DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug
TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



(Includes mostly infilling from formation sand; also includes bentonite chips 236'-235.5')

INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic
AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: FWGmw-022
BOREHOLE DIAMETER: 6 7/8" within screened zone
WELL IDENTIFICATION: FWGmw-022

WELL CONSTRUCTION START DATE: 12/1/16
WELL CONSTRUCTION COMPLETE DATE: 12/8/16

SCREEN MATERIAL: 2" Schedule 80 PVC (0.010" slot)
SCREEN DIAMETER: 1.94" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 80 PVC
CASING DIAMETER: 1.94" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 6 - 50 lb. bags

TYPE OF BENTONITE: 3/8" Chips
AMT. OF BENTONITE USED: 2 - 50 lb. bags

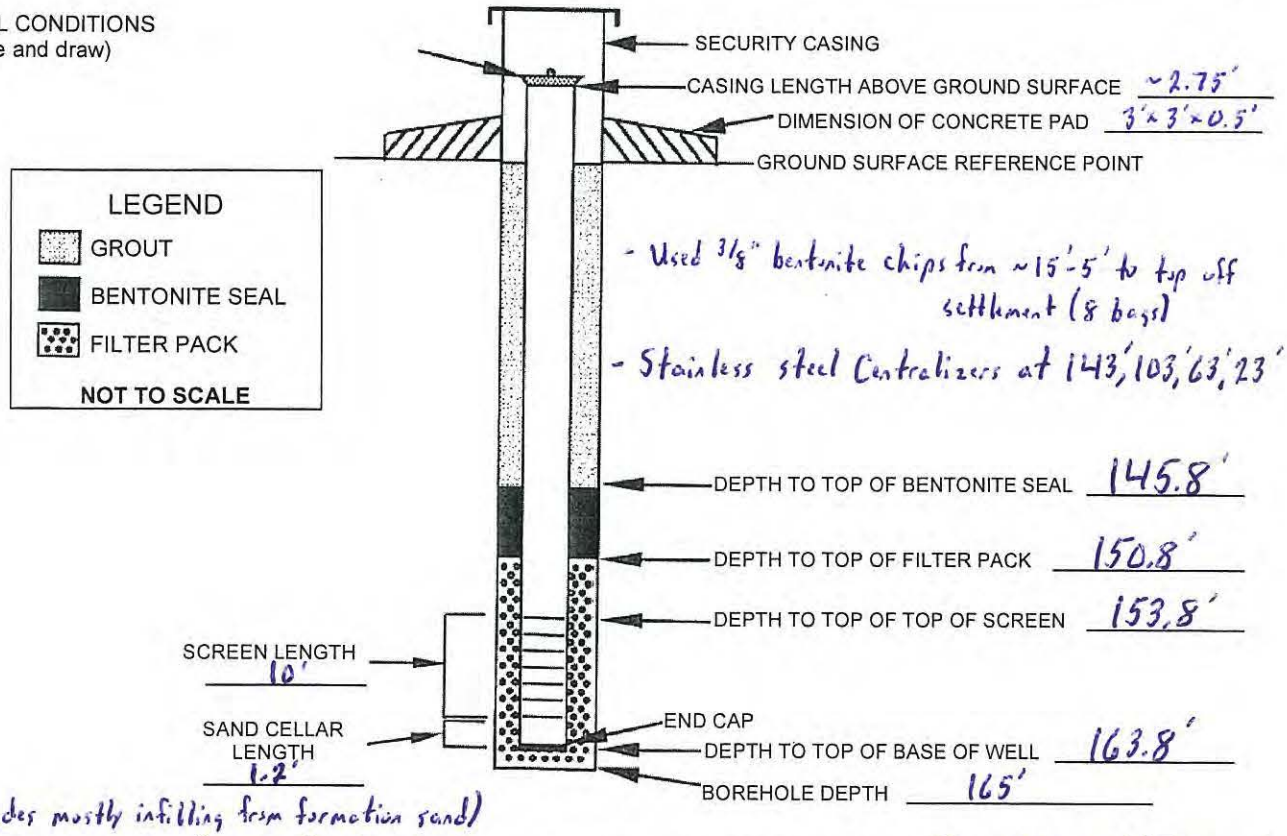
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: Baroid Quik-Grout 20% High Solids / 3/8" chips to "top off" settlement

DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torque Well Plug
TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



(Includes mostly infilling from formation sand)

INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: LL2mw-272

BOREHOLE DIAMETER: 6 7/8" within screened interval

WELL IDENTIFICATION: LL2mw-272

WELL CONSTRUCTION START DATE: 12/5/16

WELL CONSTRUCTION COMPLETE DATE: 12/7/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.01" slot)

SCREEN DIAMETER: 2.07" I.D / 2.38" O.D.

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC

CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: ~~16~~ - ~~50~~ 5.5-50 lb. bags

TYPE OF BENTONITE: 3/8" Chips

AMT. OF BENTONITE USED: 6-50 lb. bags

TYPE OF CEMENT: N/A

AMT. OF CEMENT USED: N/A

GROUT MATERIAL USED: 3/8" Bentonite Chips

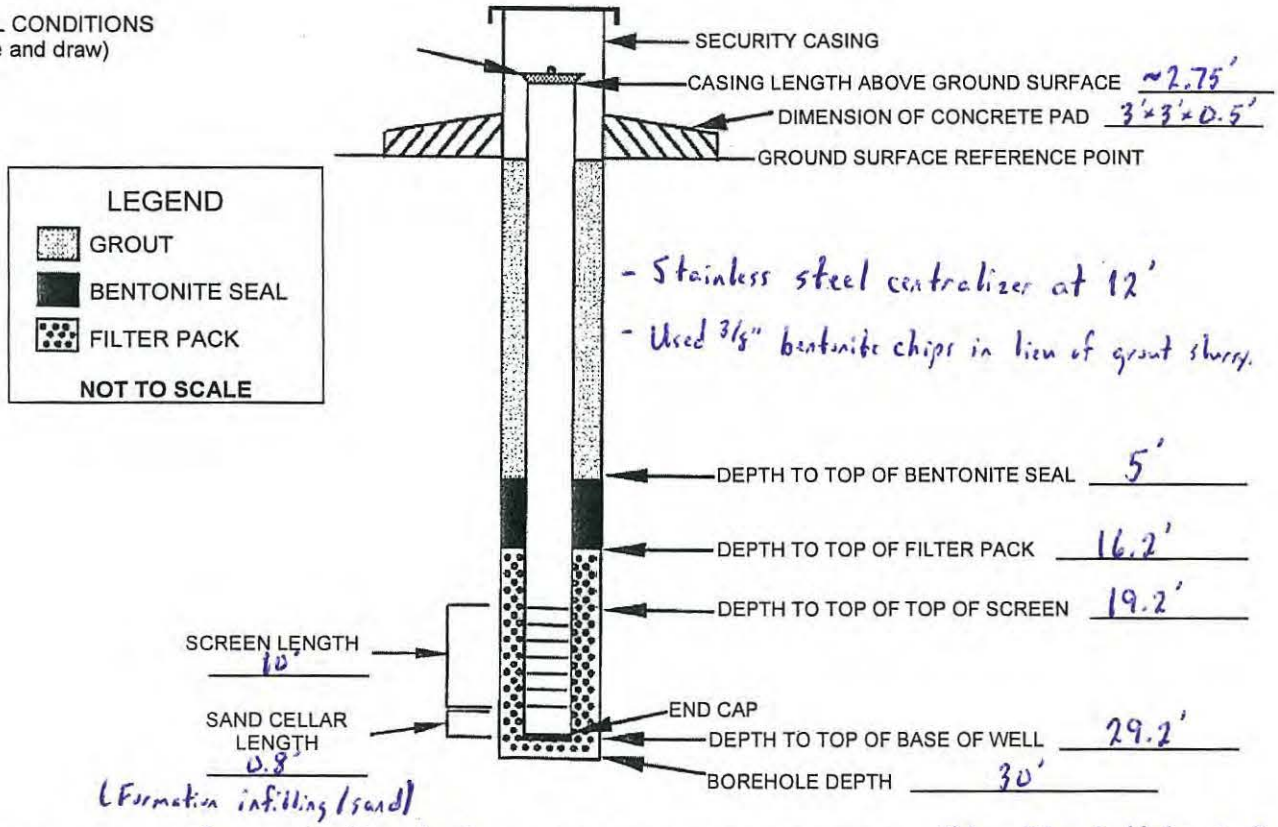
DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)
DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Air Rotary w/ Core
AUGER SIZE AND TYPE: N/A
BOREHOLE IDENTIFICATION: ~~6" within screened interval~~ LL1mw-089
BOREHOLE DIAMETER: 6" within screened interval
WELL IDENTIFICATION: LL1mw-089

WELL CONSTRUCTION START DATE: 12/19/16
WELL CONSTRUCTION COMPLETE DATE: 12/19/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.01" slot)
SCREEN DIAMETER: 2.07" I.D. / 2.38" O.D.
STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC
CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand
GRADATION: 12 x 20
AMT. OF FILTER PACK USED: 5-50 lb. bags

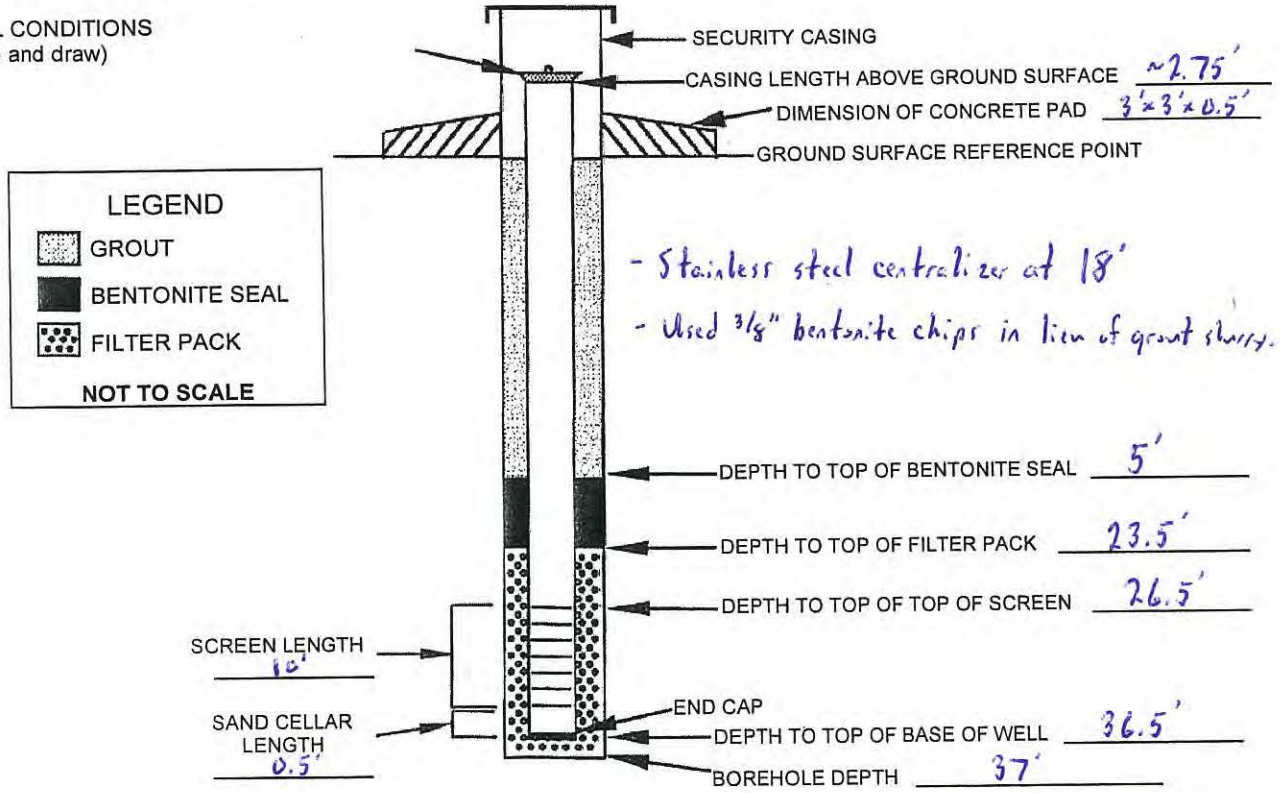
TYPE OF BENTONITE: 3/8" Chips
AMT. OF BENTONITE USED: 9-50 lb bags
TYPE OF CEMENT: N/A
AMT. OF CEMENT USED: N/A
GROUT MATERIAL USED: 3/8" Bentonite Chips

DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug
TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling
INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)
DISCREPANCIES:

TEC-Weston Joint Venture

Well Construction Details

FIELD REPRESENTATIVE: Steve Stansfield (Cardno)

DRILLING CONTRACTOR: Duncan Brothers Drilling

DRILLING TECHNIQUE: Sonic

AUGER SIZE AND TYPE: N/A

BOREHOLE IDENTIFICATION: ss ~~LL1mw-089~~ LL25B-089

BOREHOLE DIAMETER: 6 7/8" within screened interval

WELL IDENTIFICATION: ss ~~LL1mw-089~~ LL25B-089

WELL CONSTRUCTION START DATE: 12/6/16

WELL CONSTRUCTION COMPLETE DATE: Abandoned 12/16/16

SCREEN MATERIAL: 2" Schedule 40 PVC (0.01" slot)

SCREEN DIAMETER: 2.07" I.D. / 2.38" O.D.

STRATUM-SCREENED INTERVAL (FT): 10' Screen

CASING MATERIAL: 2" Schedule 40 PVC

CASING DIAMETER: 2.07" I.D. / 2.38" O.D.

TYPE OF FILTER PACK: Global #5 Sand

GRADATION: 12 x 20

AMT. OF FILTER PACK USED: 6.5 - 50 lb. bags

TYPE OF BENTONITE: 3/8" Chips

AMT. OF BENTONITE USED: 3 - 50 lb bags.

TYPE OF CEMENT: N/A

AMT. OF CEMENT USED: N/A

GROUT MATERIAL USED: 3/8" Bentonite Chips

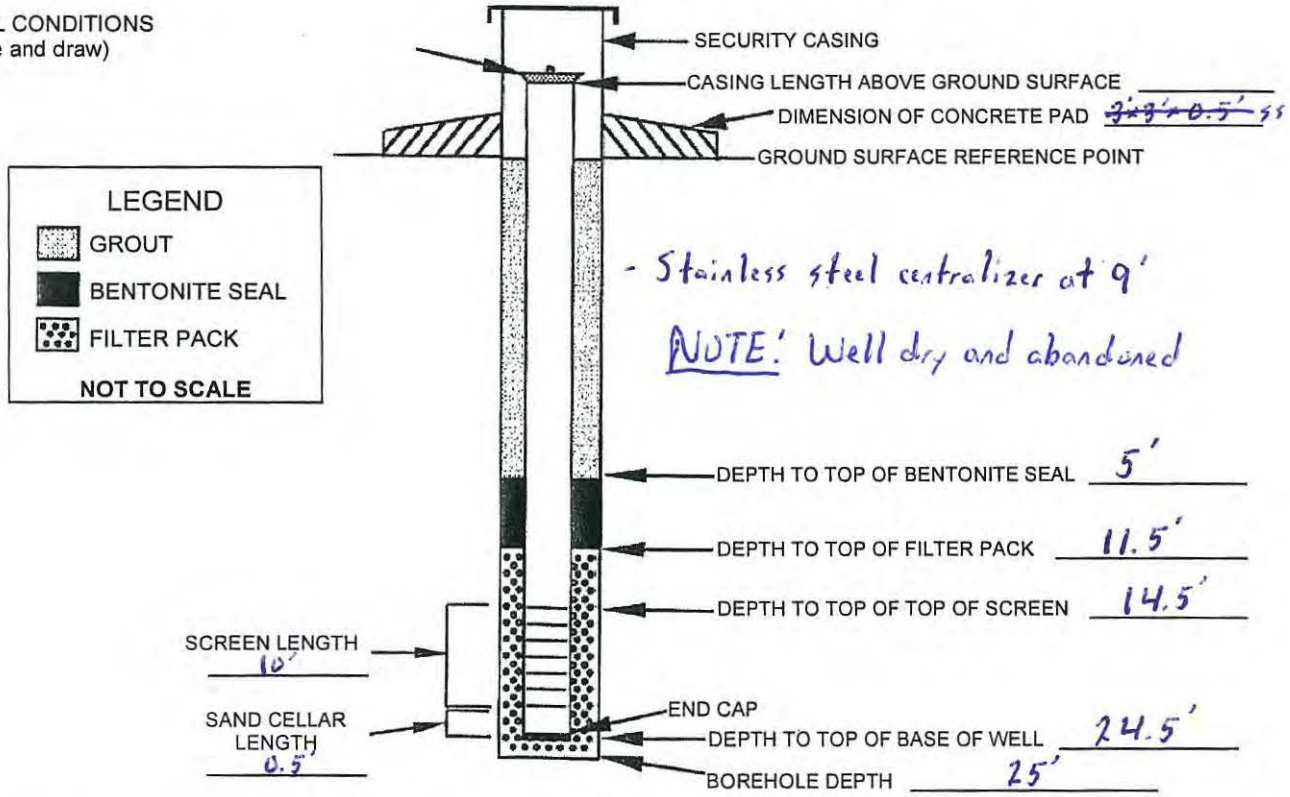
DIMENSIONS OF SECURITY CASING: 8' x 6"

TYPE OF WELL CAP: 2" Torquer Well Plug

TYPE OF END CAP: PVC Threaded

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: Duncan Brothers Drilling

INSTALLATION OBSERVED BY: Steve Stansfield (Cardno)

DISCREPANCIES:

Attachment D: Survey Data

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Camp Ravenna
Monitoring Well Survey
Groundwater and Environmental Investigation Services
Former Ravenna Army Ammunition Plant/Camp Ravenna
Portage and Trumbull Counties, Ohio

Monitoring well location ID	Easting	Northing	Ground surface elevation (survey ft.)	Top of casing elevation (Survey ft.)
BKG-022	559,378.40	2,331,517.26	1164.62	1167.32
BKG-023	560,638.87	2,335,771.51	1181.07	1183.62
BKG-024	570,728.76	2,355,029.69	1041.19	1043.78
BKG-025	554,845.62	2,328,408.97	1107.99	1110.60
FWG-017	557,518.22	2,375,792.88	958.53	961.26
FWG-024	557,546.23	2,375,717.99	960.30	963.16
FWG-018	554,933.24	2,369,793.44	981.12	984.03
FWG-020	554,944.12	2,369,769.12	981.73	984.58
FWG-019	555,486.89	2,356,265.25	1129.58	1132.23
FWG-022	555,466.61	2,356,276.69	1129.61	1132.31
FWG-021	555,708.43	2,371,551.33	984.88	987.97
FWG-023	553,999.50	2,351,494.36	1149.66	1152.37
LL1-089	563,639.31	2,378,139.92	977.54	980.29
LL2-272	560,599.71	2,373,808.49	1015.00	1017.80
NTA-120	551,376.89	2,347,141.08	1072.67	1075.20

The map coordinates are based on the Ohio State Plane Coordinate System - Ohio North
North American Datum (NAD 83)

The Elevations are based on the National Geodetic Vertical Datum of 1988

Both the Coordinates and the Elevations were adjusted to meet the local Coordinates provided
by the Army Corp of Engineer monument - RAV 2.

Beth A. Pearson, PS
Pearson Surveying, LLC
April 30, 2017

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