2014-2015 OU2 GROUNDWATER INVESTIGATION RE122D1, RE122D2, RE122D3 (VPB156) INSTALLATION REPORT

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NY

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Atlantic
9324 Virginia Avenue
Building Z-144
Norfolk, Virginia 23511

January 2016

2014-2015 OU2 GROUNDWATER INVESTIGATION
RE122D1, RE122D2, RE122D3 (VPB156)
INSTALLATION REPORT

NWIRP
SITE 1 OU2
BETHPAGE, NY

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Atlantic
9324 Virginia Avenue
Building Z-144
Norfolk, Virginia 23511

Prepared by:

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Contract Number: N62470-11-D-8013
CTO WE15

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Contract Task Order Manager

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List of Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COR	Continuously Operating Reference
EPA	Environmental Protection Agency, United States
ft	feet
GOCO	Government-Owned Contractor-Operated
GPS	Global Positioning System
IDW	Investigation Derived Waste
IR	Installation Restoration
Katahdin	Katahdin Analytical Services
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Command
NG	Northrop Grumman
NTU	nephlometric turbidity units
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
ONCT	On-site Containment Treatment System
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
POTW	Publicly Owned Treatment Works
ppb	parts per billion
PPE	Personal Protective Equipment
PVC	Polyvinylchloride
SAP	Sampling and Analysis Plan
SVOC	Semivolatile Organic Compounds
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
UFP	United Federal Programs
US	United States
VOC	Volatile Organic Compounds
VPB	Vertical Profile Boring

1.0 PROJECT BACKGROUND

Resolution Consultants has prepared this Data Summary Report for the Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic under contract task order WE15 Contract N62470-11-D-8013. This report describes the installation of three monitoring wells and one quarterly groundwater monitoring event (specifically at the Vertical Profile Boring [VPB] 156 location) in 2014 and 2015 for the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Operable Unit (OU) 2 Site 1 offsite plume. NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1).

1.1 Scope and Objectives

This report provides information on the installation of RE122D1, RE122D2 and RE122D3. The purpose of this investigation was to ascertain subsurface conditions and contaminant levels south of the On-site Containment Treatment system (ONCT) and to help ascertain the effectiveness of the ONCT. In addition, these wells help define the northwestern extent of the RE108 Hot Spot (defined as an area >1,000 parts per billion [ppb] of total volatile organic compounds [VOCs] north of Hempstead Turnpike). The locations of RE122D1, RE122D2 and RE122D3, VPBs and monitoring well locations are shown in Figure 2.

The field investigation included completing three monitoring wells, well development, soil/groundwater analysis, groundwater grab samples, and surveying. Field tasks were conducted in 2014 and 2015 in accordance with the *United Federal Programs Sampling and Analysis Plan (UFP SAP)*, Bethpage, New York (Resolution Consultants, 2013a). In addition, the work adhered to the following UFP SAP Addendums: Groundwater Sampling Using Low Stress (Low Flow) *Purging and Sampling Protocol* (Resolution Consultants, 2013b) and *Installation of Vertical Profile Borings and Monitoring Wells* (Resolution Consultants, 2013c).

Documentation of these activities is included in Appendix A of this report.

1.2 Site History

NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was the research, prototyping, testing, design, engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing, a group of quality control laboratories, two warehouse complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings.

The Navy's property originally totaled 109.5 acres and was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former NG facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Installation Restoration (IR) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern [AOC] 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Steel Equities; however, a small portion is still owned by Nassau County. Access to the NWIRP is from South Oyster Bay Road.

1.3 Geology and Hydrogeology

Overburden at the site consists of well over 1,000 feet (ft) of unconsolidated deposits overlying crystalline bedrock of the Hartland Formation. Overburden is divided into four geologic units: the upper Pleistocene deposits, the Magothy Formation, the clay member of the Raritan Formation ("Raritan Clay") and the Lloyd Sand member of the Raritan Formation ("Lloyd Sand") (Geraghty and Miller, 1994).

The upper Pleistocene ranges in thickness from approximately 50 to 100 ft and consists of till and outwash deposits of medium to coarse sand and gravel with lenses of fine sand, silt and clay (Smolensky and Feldman, 1990); these deposits form the Upper Glacial Aquifer. Directly underlying this unit is the Magothy Formation with a thickness of 650 to 900 ft and lower extent of 700 to 1000 ft below ground surface (bgs) observed onsite. The Magothy is characterized by fine to medium sands and silts interbedded with zones of clays, silty sands and sandy clays. Sand and gravel lenses are found in some areas between depths of 600 and 880 ft bgs; these deposits form the main producing zones of the Magothy Aquifer.

Investigations performed by the Navy since 2012 indicate that the bottom of the Magothy (top of the Raritan Clay) can extend to depths of 700 to greater than 1,000 ft bgs. The top of the Raritan Clay deepens to the south-southeast, as evidenced by clay depths of 1,000 ft bgs (or more) in borings installed offsite. The Raritan Clay Unit is of continental origin and consists of clay, silty clay, clayey silt, and fine silty sand. This member acts as a confining layer over the Lloyd Sand Unit. The Lloyd Sand Unit is also of continental origin, having been deposited in a large fresh water lacustrine environment. The material consists of fine to coarse-grained sands, gravel, inter-bedded clay, and silty sand. These deposits form the Lloyd Aquifer.

The Upper Glacial Aquifer and the Magothy Aquifer comprise the aquifers of interest at the NWIRP. Regionally, these formations are generally considered to form a common, interconnected aquifer as the coarse nature of each unit near their contact and the lack of any regionally confining clay unit allows for the unrestricted flow of groundwater between the formations.

The Magothy Aquifer is the major source of public water in Nassau County. The most productive water bearing zones are the discontinuous lenses of sand and gravel that occur within the siltier matrix. The major water-bearing zones are coarse sand and gravel lenses located in the lower portion of the Magothy. The Magothy Aquifer is commonly regarded to function overall as an unconfined aquifer at shallow depths and a confined aquifer at deeper depths. The drilling program at the NWIRP has revealed that clay zones beneath the facility are common but laterally discontinuous. No confining clay units of facility-wide extent have been encountered. This is also the case for borings installed offsite.

Groundwater is encountered at a depth of approximately 50 ft bgs at the facility. Historically, because of pumping and recharge at the facility, groundwater depths have been measured to range from 40 to 60 ft bgs. The groundwater flow in the area is to the south-southeast.

2.0 FIELD PROGRAM

Three monitoring wells were installed in the vicinity of VPB156 between December 2014 and January 2015. Field investigation activities consisted of drilling, well installation, well development, sampling, soil/groundwater analysis, and surveying. Drilling during this investigation was performed by Delta Well and Pump Company of Ronkonkoma, New York. A description of these tasks is provided below.

2.1 Drilling and Well Construction

Monitoring wells RE122D1, RE122D2 and RE122D3 were installed using mud rotary drilling techniques (Figure 2). Depths of monitoring wells RE122D1, RE122D2 and RE122D3 were 545 ft, 615 ft and 740 ft, respectively. Well construction details are summarized in Table 1. Boring logs with lithologic descriptions of the well screen interval are included in the Appendix A. *Data Summary Report for VPB156* (Resolution Consultants, 2014) documents the installation of this VPB including detailed lithologic descriptions, continuous gamma plot and multiple VOC sample results over the entire boring length.

Prior to installing each monitoring well, the results of the groundwater samples, the geophysical logs, lithology and field data from the vertical profile borings were analyzed. Screen intervals were determined based on this analysis, intervals with the highest VOC concentrations as measured in the hydropunch samples, and coincident intervals with the highest apparent permeability based on the gamma logs. During the monitoring well installation, split spoon samples were collected every 5 ft in the screen interval. One soil sample per monitoring well was analyzed for Total Organic Carbon (TOC) via United States (US) Environmental Protection Agency (EPA) series SW-846 method 9060A by Katahdin Analytical Services (Katahdin). Data validation of TOC data was performed by Resolution Consultants. Data validation packages and analytical data tables are included in Appendix A.

Wells were constructed of 4-inch diameter, Schedule 80, National Sanitation Foundation-approved polyvinylchloride (PVC) riser pipe and .010-slot well screen. Wells were completed at the surface with a 12-inch diameter steel curb box. Well risers were set below grade and fit with lockable J plugs. Detailed monitoring well construction diagrams are included in Appendix A.

2.2 Well Development

Following installation, all monitoring wells were developed to evacuate silts and other fine-grained materials and to establish the filter pack to promote a hydraulic connection between the well and

the surrounding aquifer. Well development was not initiated until at least 24 hours after well installation.

Monitoring well screens were developed using a combination of air lifting, manual surging, and pumping with a submersible pump. Turbidity was monitored during development to determine stabilization. In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells were developed until turbidity was less than 50 nephlometric turbidity units (NTUs) if possible. Table 2 summarizes total pumped volume from air and pump development and final turbidity. Well development logs are included in Appendix A.

2.3 Sampling

Following development, wells were allowed to stabilize for at least 2 weeks prior to groundwater sampling in accordance with low flow sampling procedures. Wells were purged using a bladder pump with a drop tube intake placed at the approximate midpoint of the screened interval. The following water quality parameters were continuously measured: water temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen and turbidity. Groundwater analytical samples were collected when water quality parameters stabilized. Samples were analyzed for VOCs via method 8260B and 1,4-dioxane via Method 8270C by Katahdin. All development and purge water was managed as investigation derived waste (IDW). Groundwater sample logs and data validation packages are included in Appendix A.

Monitoring wells RE122D1, RE122D2 and RE122D3 are sampled quarterly as part of the Navy's ongoing Environmental Restoration Program. Resolution Consultants sampled these three wells during the March 2015 quarterly monitoring event. Analytical results and stabilized field parameters for these data are summarized in Table 3 and 4, respectively. Data validation is documented in Appendix A.

2.4 Decontamination and Investigation Derived Waste (IDW)

Resolution Consultants utilized dedicated and disposable sampling equipment when possible to avoid the potential for cross-contamination of samples. The sampling equipment included dedicated plastic scoops, disposable Teflon or polyethylene tubing, disposable gloves, and laboratory supplied sample bottles. Hand held equipment and split spoons were decontaminated using Liquinox and water wash, a potable water rinse, followed by a distilled water rinse. Water was collected in 5-gallon pails or 55-gallon drums. Non dedicated sampling equipment was decontaminated as outlined in the *UFP SAP Addendum - Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol* (Resolution Consultants, 2013b).

As part of the IDW management practices and in accordance with the SAP, the investigation waste (consisting of soil cuttings, drilling muds, IDW fluids, and personal protective equipment [PPE]) generated during the groundwater monitoring well installation and sampling was containerized and staged at NWIRP Bethpage.

IDW solids were containerized in roll offs. Representative samples from each roll off were submitted to Katahdin for analysis of:

- Target Compound List (TCL) VOCs
- TCL Semi-volatile Organic Compounds (SVOCs)
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- Polychlorinated Biphenyls (PCBs)
- Total petroleum hydrocarbons
- Corrosivity
- Ignitability
- Reactive Cyanide
- Reactive Sulfide
- Paint Filter

IDW fluid generated during well development and purging was containerized in frac tanks and stored at NWIRP Bethpage for characterization and ultimate disposal to the Publicly Owned Treatment Works (POTW), in accordance with the facilities existing discharge permit. A representative water sample was collected from each frac tank and submitted to Katahdin for analysis of VOCs via Method SW 624, pH via Method SW 9040B, PCBs via Method 8082 and Total Metals via Method SW 846. All analytical criteria were met for disposal of water.

2.5 Surveying

A survey of the monitoring well locations was conducted at the end of fieldwork by C. T. Male, Inc., of Latham, NY, under the direct supervision of Resolution Consultants. The locations were tied into the existing base map developed for this investigation. The survey elevation is referenced to the North American Vertical Datum (NAVD) 1988 and has a vertical accuracy of 0.01 foot. Vertical control is based on observations of the Continuously Operating Reference (COR) Stations Queens and Central Islip. The horizontal location is referenced to the North American Datum (NAD) 1983

(2011) N.Y. Long Island Zone 3104 and has an accuracy of 0.1 foot. Local horizontal and vertical control is based on Global Positioning System (GPS) observations using the NYSNet Real Time Network.

A table of survey data (latitude/longitude, northing/easting, elevations of ground, rim and PVC) and a survey map is included in Appendix A.

3.0 REFERENCES

Geraghty and Miller, Inc., 1994. *Remedial Investigation Report, Grumman Aerospace Corporation, Bethpage, New York*. Revised September 1994.

Naval Facilities Engineering Command (NAVFAC), 2003. *Record of Decision Naval Weapons Industrial Reserve Plant Bethpage, New York, Operable Unit 2 – Groundwater*, NYS Registry: 1-30-003B. April 2003.

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Smolensky, D., and Feldman, S., 1990. *Geohydrology of the Bethpage-Hicksville-Levittown Area, Long Island, New York, U.S*. Geological Survey Water-Resourced Investigations Report 88-4135, 25 pp.

Tables

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
2014-2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	WELL COMPLETION DATE	GROUND ELEVATION (MSL)	PVC ELEVATION (INNER CASING) (MSL)	WELL DEPTH (ft bgs)	CASING DEPTH (ft bgs)	SCREEN INTERVAL (ft bgs)	SUMP DEPTH INTERVAL (ft bgs)	BORING DEPTH (ft bgs)
RE122D1	1/29/2015	97.74	97.42	545	53	520 - 540	540 - 545	557
RE122D2	1/14/2015	97.70	97.35	615	53	590 - 610	610 - 615	627
RE122D3	12/11/2014	97.62	97.27	740	53	715 - 735	735 - 740	752

MSL - mean sea level
ft bgs - feet below ground surface

TABLE 2
MONITORING WELL DEVELOPMENT SUMMARY
2014-2015 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	AIR DEVELOPMENT		PUMP DEVELOPMENT			APPROX. TOTAL DEVELOPMENT VOLUME (GAL)	FINAL TURBIDITY (NTUs)
	DATE	APPROX. VOLUME (GAL)	DATE	FINAL PUMP DEPTH (FT BGS)	APPROX. VOLUME (GAL)		
RE122D1	2/9/2015	4,500	2/13/2015	520-540	3,500	8,000	0.02
RE122D2	2/10/2015	5,500	2/18/2015	590-610	4000	9,500	0.02
RE122D3	2/10/15 & 2/11/15	7,000	2/19/15 & 2/23/15	715-735	7000	14,000	20.15

GAL - gallon
FT BGS - feet below ground surface
NTUs - Nephelometric Turbidity Units

Table 3. Analytical Data Summary

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE122D1	RE122D2	RE122D3
Sample Date		3/24/2015	3/24/2015	3/24/2015
Sample ID		RE122D1-GW-032415	RE122D2-GW-032415	RE122D3-GW-032415
Sample type code		N	N	N
VOC 8260C (ug/L)				
1,1,1-TRICHLOROETHANE	5	< 0.50 U	**0.71 J**	< 0.50 U
1,1,2,2-TETRACHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**7.2**	**31**	< 0.50 U
1,1,2-TRICHLOROETHANE	1	**0.40 J**	**2.8**	< 0.50 U
1,1-DICHLOROETHANE	5	< 0.50 U	**1.7**	< 0.50 U
1,1-DICHLOROETHENE	5	< 0.50 U	**8.7**	< 0.50 U
1,2,4-TRICHLOROBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***< 0.75 U***	***< 0.75 U***	***< 0.75 U***
1,2-DIBROMOETHANE	NL	< 0.50 U	< 0.50 U	< 0.50 U
1,2-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U
1,2-DICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U
1,2-DICHLOROETHENE, TOTAL	5	**2.0**	**6.0**	< 1.0 U
1,2-DICHLOROPROPANE	1	< 0.50 U	< 0.50 U	< 0.50 U
1,3-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U
1,4-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	**8.1**	**14**	< 0.19 U
2-BUTANONE	50	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ
2-HEXANONE	50	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ
4-METHYL-2-PENTANONE	NL	< 2.5 U	< 2.5 U	< 2.5 U
ACETONE	50	< 2.5 UJ	< 2.5 UJ	< 2.5 UJ
BENZENE	1	< 0.50 U	< 0.50 U	< 0.50 U
BROMODICHLOROMETHANE	50	< 0.50 U	< 0.50 U	< 0.50 U
BROMOFORM	50	< 0.50 U	< 0.50 U	< 0.50 U
BROMOMETHANE	5	< 1.0 UJ	< 1.0 UJ	< 1.0 UJ
CARBON DISULFIDE	60	< 0.50 UJ	< 0.50 UJ	< 0.50 UJ
CARBON TETRACHLORIDE	5	< 0.50 U	**1.5**	< 0.50 U
CHLOROBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U
CHLOROETHANE	5	< 1.0 UJ	< 1.0 UJ	< 1.0 U
CHLOROFORM	7	**0.62 J**	**2.4**	< 0.50 U
CHLOROMETHANE	5	< 1.0 UJ	< 1.0 UJ	< 1.0 UJ
CIS-1,2-DICHLOROETHENE	5	**2.0**	**6.0**	< 0.50 U
CIS-1,3-DICHLOROPROPENE	0.4	***< 0.50 U***	***< 0.50 U***	***< 0.50 U***
CYCLOHEXANE	NL	< 0.50 UJ	< 0.50 UJ	< 0.50 UJ
DIBROMOCHLOROMETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U
DICHLORODIFLUOROMETHANE	5	< 1.0 UJ	< 1.0 UJ	< 1.0 UJ
ETHYLBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U
ISOPROPYLBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U
M- AND P-XYLENE	NL	< 1.0 U	< 1.0 U	< 1.0 U
METHYL ACETATE	NL	< 0.75 U	< 0.75 U	< 0.75 U
METHYL CYCLOHEXANE	NL	< 0.50 U	< 0.50 U	< 0.50 UJ
METHYL TERT-BUTYL ETHER	10	< 0.50 U	< 0.50 U	< 0.50 U
METHYLENE CHLORIDE	5	< 2.5 U	< 2.5 U	< 2.5 U
O-XYLENE	NL	< 0.50 U	< 0.50 U	< 0.50 U
STYRENE	5	< 0.50 U	< 0.50 U	< 0.50 U
TETRACHLOROETHENE	5	**1.3 J**	**2.7 J**	< 0.50 UJ
TOLUENE	5	< 0.50 U	**0.63 J**	**0.37 J**
TRANS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U	< 0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***< 0.50 U***	***< 0.50 U***	***< 0.50 U***
TRICHLOROETHENE	5	**570 J**	**4600 J**	**6.8**
TRICHLOROFLUOROMETHANE	5	< 1.0 U	< 1.0 U	< 1.0 U
VINYL CHLORIDE	2	< 1.0 U	< 1.0 U	< 1.0 U
XYLENES, TOTAL	5	< 1.5 U	< 1.5 U	< 1.5 U

Notes:

1 New York State Department of Environmental Conservation Division of Water Technical and Operation Guidance series (6 NYCRR 700-706, Part 703.5 summarized in TOGS 1.1.1)
Ambient water quality standards and groundwater effluent limitations, class GA; NL = Not Listed

Bold = Detected; ***Bold and Italics*** =Not detected exceeds NYS Groundwater Standards or guidance value

Yellow highlighted values exceed Groundwater Standards or guidance value

Sample type codes: N - normal environmental sample, FD - field duplicate

U = Nondetected result. The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

M = the matrix spike or matrix spike duplicate did not meet recovery or precision requirements.

Table 4
Stabilized Field Parameters

Well	Date	Temperature (°C)	pH	Specific Conductance (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Depth to water (ft bgs)	Flow rate (ml/min)
RE122D1	3/24/2015	12.90	6.5	0.153	6.35	144.7	25.8	39.27	500
RE122D2	3/24/2015	12.81	5.65	0.121	5.09	-15.3	3.86	39.58	500
RE122D3	3/24/2015	12.52	5.55	0.051	2.82	200.7	95.4	40.7	500

°C - degrees Celsius
µS/cm - Microsiemens per Centimeter
mg/L - milligrams per liter
mV - Millivolts
NTU - Nephelometric Turbidity Unit
ft bgs - feet below ground surface
ml/min - mililiters per minute

Figures

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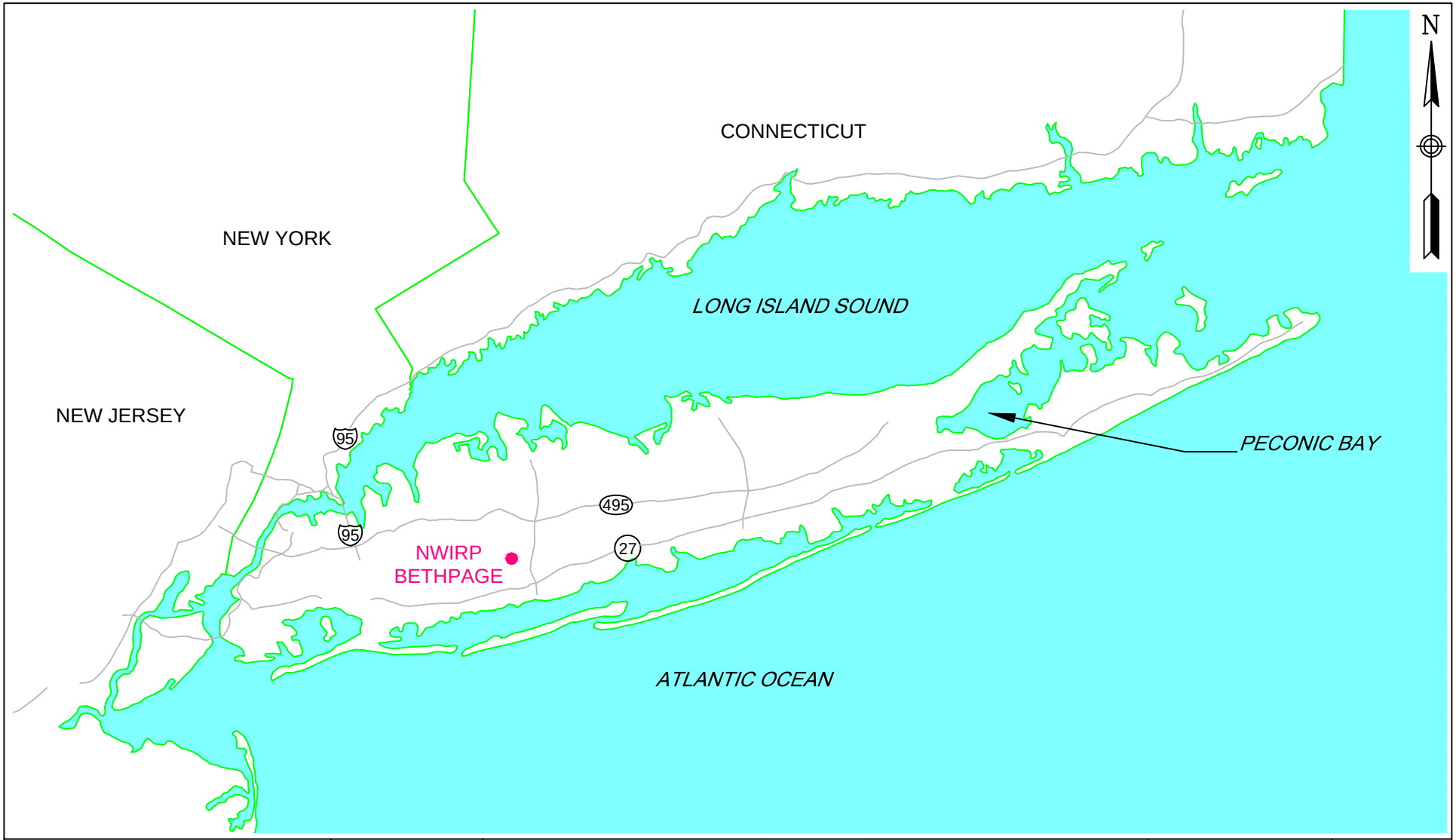


0 15 30

SCALE IN MILES

NAVFAC

GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D-8013	WE15
APPROVED BY --	DATE --
APPROVED BY --	DATE --
FIGURE NO. 1	REV 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\Location Maps\F2 RE122 2015 08 17 R1.mxd

Former Naval Weapons Industrial Reserve Plant

Former Northrop Grumman Site

RE122D1
RE122D2
RE122D3

Inset: RE122D1, RE122D2, and RE122D3 Location

0 750 1,500 3,000 Feet

0 375 750 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Vertical Profile Boring - Proposed
- Water Supply Well
- Extraction Well

RE122D1, RE122D2, AND RE122D3 LOCATION MAP
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: PS	DATE: 8/18/2015
APPROVED BY: —	DATE: —
FIGURE NO.: 2	REV: 0

Appendix A
RE122D1, RE122D2, RE122D3

Section 1

Boring Logs

Resolution Consultants

Boring Log

BORING #: RE122D1
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.74	**Well Screen Interval (ft):** 520-540
Start Date: 1/21/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/29/2015	**Northing:** 207818.19 **Easting:** 1124982.02	**Total Depth (ft):** 557.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-523 ft bgs: See VPB156 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							4" Diameter Schedule 80 PVC Riser
450							

Resolution Consultants

Boring Log

BORING #: RE122D1
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.74	**Well Screen Interval (ft):** 520-540
Start Date: 1/21/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/29/2015	**Northing:** 207818.19 **Easting:** 1124982.02	**Total Depth (ft):** 557.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
456					0-523 ft bgs: See VPB156 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
458							
460							
462							
464							
466							#0 Filter Sand
468							
470							
472							
474							
476							
478							
480							
482							
484							
486							
488							
490							
492							
494							
496							
498							#1 Filter Sand
500							
502							
504							
506							
508							
510							
512							
514							
516							
518							
520							
522			CH		Light grey (10 YR 7/2) fat CLAY, trace Silt		
524	0.0		SW		Light brown (10 YR 6/2) fine to medium well-graded SAND, trace Silt		
526							
528					White (10 YR 8/1) poorly graded fine SAND		
530	0.0		SP				4" Diameter Schedule 80 PVC, 10 Slot Well Screen (520-540 ft bgs)
532							
534	0.0		SP		Yellowish brown (10 YR 5/8) poorly graded fine SAND		
536			SP		White (10 YR 8/1) poorly graded fine SAND		
538							
540	0.0		SP		White (10 YR 8/1) poorly graded fine SAND, iron banding		
542							Sump
544							
546							
548							
550							#1 Sand to bottom
552							
554							
556							
					End of boring at 557.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE122D2
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.7	**Well Screen Interval (ft):** 590-610
Start Date: 1/5/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/14/2015	**Northing:** 207789.07 **Easting:** 1124979.19	**Total Depth (ft):** 627.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-593 ft bgs; See VPB 156 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							4" Diameter Schedule 80 PVC Riser
500							

Resolution Consultants

Boring Log

BORING #: RE122D2
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.7	**Well Screen Interval (ft):** 590-610
Start Date: 1/5/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/14/2015	**Northing:** 207789.07 **Easting:** 1124979.19	**Total Depth (ft):** 627.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
548					0-593 ft bgs; See VPB 156 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
550							
552							
554							
556							
558							#0 Filter Sand
560							
562							
564							
566							
568							
570							
572							
574							
576							
578							#1 Filter Sand
580							
582							
584							
586							
588							
590							
592							
594	0		SM		Light brownish grey (10 YR 6/2) silty fine SAND, lean Clay, trace iron/lignite banding		
596							
598							
600	0		SM		Light brownish grey (10 YR 6/2) silty fine SAND, trace lean Clay, iron/lignite banding		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (590-610 ft bgs)
602							
604	0		SW		Grey (10 YR 6/1) fine to medium SAND, trace Silt and subrounded coarse sand		
606							
608	0		SW		Grey (10 YR 6/1) fine to medium SAND, trace Silt		
610							Sump
612							
614							
616							
618							
620							
622							#1 Sand to bottom
624							
626							

End of boring at 627.0 ft. bgs.

Resolution Consultants

Boring Log

BORING #: RE122D3
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.62	**Well Screen Interval (ft):** 715-735
Start Date: 12/2/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 12/11/2014	**Northing:** 207774.53 **Easting:** 1124980.64	**Total Depth (ft):** 752.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-718 ft bgs: See VPB156 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							
500							
550							4" Diameter Schedule 80 PVC Riser
600							
650							

Resolution Consultants

Boring Log

BORING #: RE122D3
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Curtis Pl and Hayden Dr, Bethpage, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 97.62	**Well Screen Interval (ft):** 715-735
Start Date: 12/2/2014	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 12/11/2014	**Northing:** 207774.53 **Easting:** 1124980.64	**Total Depth (ft):** 752.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
686					0-718 ft bgs: See VPB156 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
688							
690							
692							
694							#0 Filter Sand
696							
698							
700							
702							
704							
706							
708							#1 Filter Sand
710							
712							
714							
716							
718	0		SP		Poorly graded medium SAND		
720							
722							
724	0		SP		Poorly graded medium SAND, Iron banding ~6-7"		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (715-735 ft bgs)
726							
728							
730							
732							
734							
736							
738							Sump
740							
742							
744							
746							#1 Sand to bottom
748							
750							
752					End of boring at 752.0 ft. bgs.		

Section 2

Monitoring Well Construction Logs

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE122D1***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Curtis Pl. and Hayden Dr., Bethpage		Date Installed: 1/21/2015 - 1/29/2015
	Method: MUD ROTARY		Inspector: V. VARRICCHIO
	Coords: Northing: 207818.1929 Easting: 1124982.01		Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL

	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box and Ground Surface (G.S.)	0.00	97.74
Top of Riser Pipe fit with locking j-plug	0.32	97.42
Riser Pipe: Length 520 feet; Inside Diameter (ID) 4 inch; Type of Material PVC		
Bottom of Steel Surface Casing	53	44.7
Bottom of Bentonite Grout	458.0	-360.3
Bottom of 0 Filter Sand/Top of #1 Filter Sand	475	-377.3
Top of Screen	520	-422.3
▲ Stabilized Water Level		
Screen: Length 20 feet; Inside Diameter (ID) 4 inch; Slot Size 10; Type of Material PVC		
Type/Size of Sand #1; Sand Pack Thickness 82 feet		
Bottom of Screen	540	-442.3
Bottom of Sump:	545	-447.3
Bottom of Borehole	557	-459.3

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

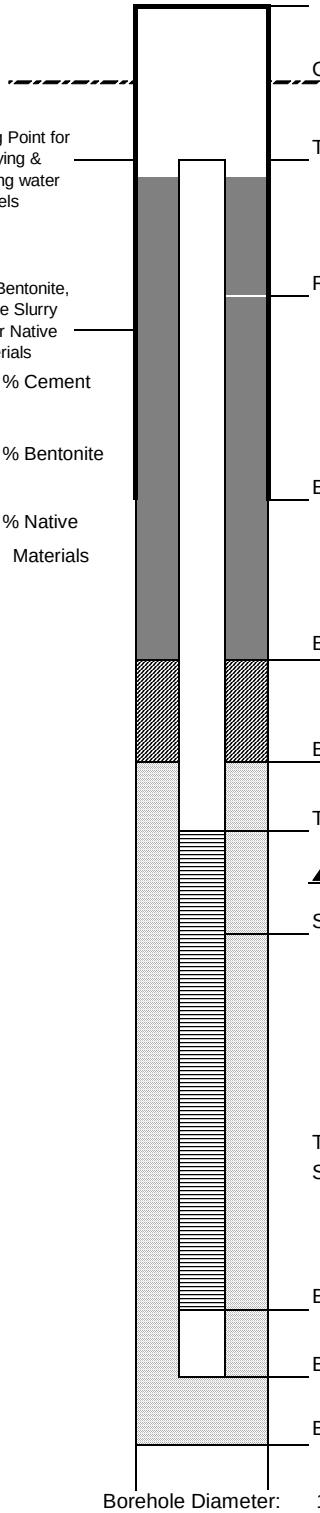
Signature

Date

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: RE122D2***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Curtis Pl. and Hayden Dr., Bethpage		Date Installed: 1/5/2015 - 1/14/2015	
Method: MUD ROTARY		Inspector: V. VARRICCHIO	
Coords: Northing: 207789.07	Easting: 1124979.19	Contractor: DELTA WELL & PUMP	

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.03	97.73
Ground Surface (G.S.)	0.00	97.7
Top of Riser Pipe fit with locking j-plug	0.35	97.35
Riser Pipe:		
Length: 590 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	53	44.7
Bottom of Bentonite Grout	551.0	-453.3
Bottom of 0 Filter Sand/Top of #1 Filter Sand	565	-467.3
Top of Screen	590	-492.3
▲ Stabilized Water Level		
Screen:		
Length: 20 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 62 feet		
Bottom of Screen	610	-512.3
Bottom of Sump:	615	-517.3
Bottom of Borehole	627	-529.3

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

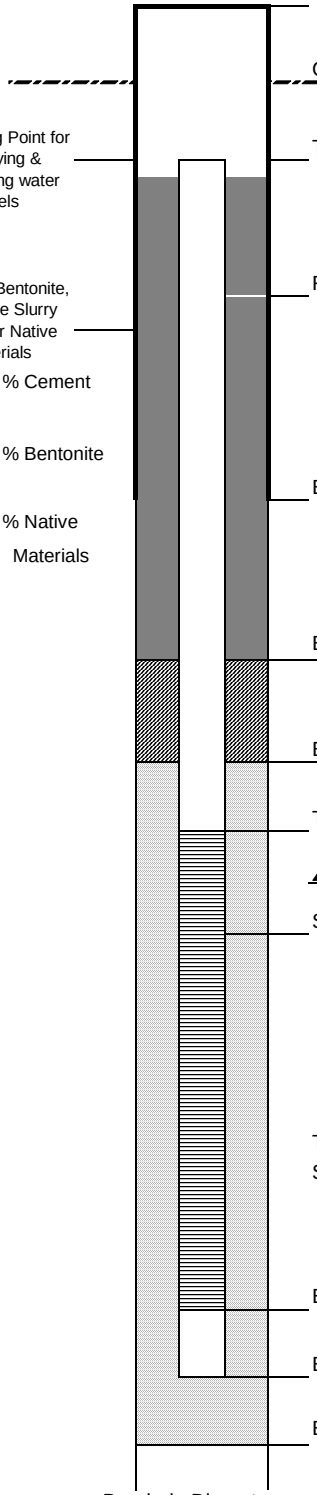
Ground Surface

Signature

Date

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE122D3***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Curtis Pl. and Hayden Dr., Bethpage		Date Installed: 12/2/2014 - 12/11/2014
	Method: MUD ROTARY		Inspector: V. VARRICCHIO
	Coords: Northing: 207774.52 Easting: 1124980.63		Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.04	97.66
Ground Surface (G.S.)	0.00	97.62
Top of Riser Pipe fit with locking j-plug	0.35	97.27
Riser Pipe:		
Length: 715 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	53	44.6
Bottom of Bentonite Grout	690.0	-592.4
Bottom of 0 Filter Sand/Top of #1 Filter Sand	700	-602.4
Top of Screen	715	-617.4
▲ Stabilized Water Level		
Screen:		
Length: 20 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 52 feet		
Bottom of Screen	735	-637.4
Bottom of Sump:	740	-642.4
Bottom of Borehole	752	-654.4

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

Signature

Date

Section 3

Groundwater Sample Log Sheets

RESOLUTION CONSULTANTS

Well ID: RE122P1

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage | Date: 3/24/15 | Time: Start 8:15 am/pm | Finish 12:15 am/pm
Project No: 60266526
Site Location: Curtis & Hayden
Weather Conds: sunny 25° | Collector(s): JC

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 545 | c. Length of Water Column _____ (a-b) | Casing Diameter/Material 4-inch PVC

b. Water Table Depth 39.26 | d. Calculated System Volume (see back) 20ft screen 13.1gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556 MPS	55474
	Hanna	HI 98703	89177

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
0900		10.33	7.76	0.158	11.10	190.4	2.00	400	39.35	clear
0910		11.42	6.08	0.153	10.54	172.1		400	39.45	
0915		12.20	5.79	0.153	9.78	168.2	9.83	500	39.45	cloudy
0920		12.26	5.79	0.153	9.80	168.1		500	39.45	"
0925		12.16	6.13	0.235	9.16	165.8	>50	500	39.25	"
0930		12.34	6.76	0.242	8.69	168.3		500	39.25	"
0935		12.37	6.75	0.241	8.76	167.2	>50	500	39.25	"

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

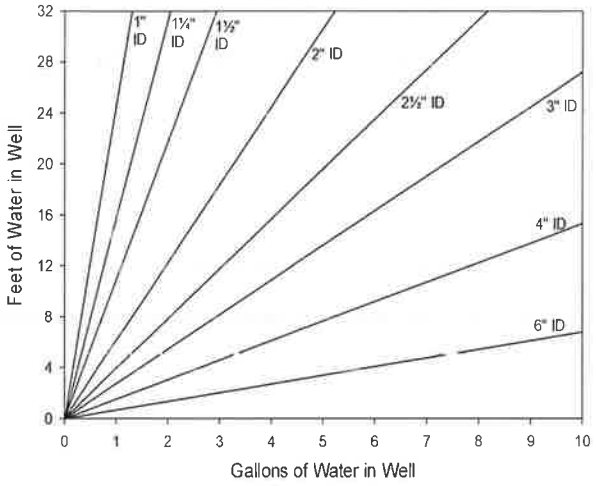
3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE122D1-GW-032415	40-mL vial	3	HCl	VOCs	1105
RE122D1-GW-032415	1-L amber	2	none	1,4-Dioxane	1105

Comments: hit bottom ~15ft too long ~535 of tubing

Signature _____ Date 3/24/15

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = [redacted] / 9.8 G
20 ft = [redacted] / 13.1 G
25 ft = [redacted] / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
0940	5G	12.14	6.74	0.239	8.73	163.2		500	39.25	cloudy
1000		12.29	6.61	0.157	7.84	170.4		500	39.27	
1010		12.74	6.53	0.157	6.91	173.7		500	39.27	cloudy - clearing
1015		12.73	6.51	0.155	6.54	172.5	234	500	39.27	"
1020		12.71	6.51	0.153	6.57	161.4	225	500	39.27	"
1025		12.69	6.51	0.155	6.49	152.8	228	500	39.27	"
1030	10 G	12.89	6.49	0.154	6.54	148.1	94.4	500	39.27	"
1035		12.78	6.50	0.154	6.47	145.8	63.0	500	39.27	"
1040		12.92	6.50	0.154	6.43	145.2	64.6	500	39.27	"
1045		12.66	6.49	0.153	6.36	145.6	32.5	500	39.27	"
1050		12.84	6.50	0.154	6.39	145.1	29.0	500	39.27	"
1055		12.90	6.50	0.153	6.35	144.7	25.8	500	39.27	"

RESOLUTION CONSULTANTS

Well ID: RE122D2

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage Date: 3 / 24 / 15 Time: Start 815 am/pm
Project No: 60266526 Finish 1200 am/pm
Site Location: Curtis & Hayden
Weather Conds: Sunny 45° Collector(s): Paul Kareth

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 615 c. Length of Water Column _____ (a-b)

Casing Diameter/Material: 4-inch PVC

b. Water Table Depth 39.53 d. Calculated System Volume (see back) 20ft screen, 13.1 gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556MPS	71124
	Hanna	HI 98703	69177

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
925	ON									
0935		9.37	7.07	0.158	1582	-54.6	3.86	480	39.78	clear
0940		11.64	6.17	0.153	10.47	-43	2.75		39.45	"
0945		10.38	5.59	0.150	7.01	-32.3		350		
0950		10.41	5.60	0.150	7.20	-31.4			39.44	
1000								450		air in tube adjust hose fitting
1010		11.12	5.85	0.120	5.70	-36.9				

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

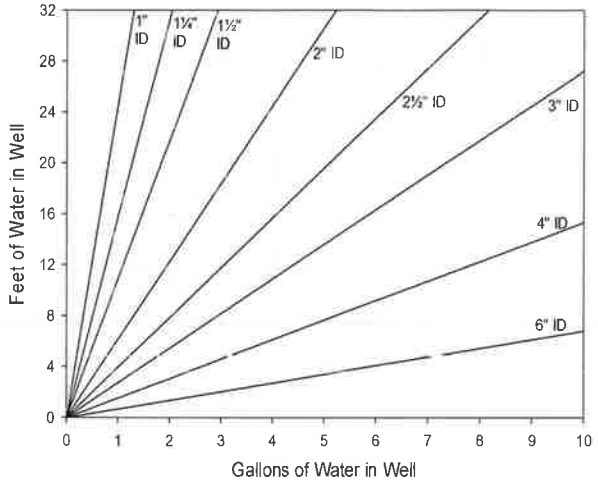
3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE122D2-GW-032415	40-mL vial	9	HCl	VOCs	1130 MS, MSD
RE122D2-GW-032415 MS,MSD	1-L amber	6	none	1,4-Dioxane	1130 MS, MSD

Comments: hit bottom, tubing was not cut

Signature: Paul Kareth Date: 3/24/15

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = [redacted] / 9.8 G
20 ft = [redacted] / 13.1 G
25 ft = [redacted] / 16.3 G

Well ID: RE-122020 925

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1015		11.31	5.74	0.117	5.59	-33.3	15.1		39.51	
1020	5gal	12.01	5.71	0.119	5.32	-30.9		500		
1020		11.99	5.68	0.119	5.57	-29.0	14.6			
1025		12.59	5.68	0.121	5.41	-28.4				
1030		12.70	5.67	0.121	5.32	-27.6				
1035		12.51	5.67	0.121	5.31	-25.2			39.52	
1040		12.77	5.66	0.121	5.27	-23.5	5.62			
1045		12.41	5.65	0.120	5.25	-21.9		500		
1050		12.70	5.65	0.120	5.22	-20.9				
1055	10gal	12.79	5.65	0.120	5.19	-19.2				
1100		12.83	5.65	0.121	5.17	-18.4	3.86			
1105		12.62	5.65	0.121	5.10	-16.6				
1110		12.81	5.65	0.121	5.09	-15.3		500	39.58	
1115										
1130										Sample MS, MSD

RESOLUTION CONSULTANTS

Well ID: RE122-03

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage | Date: 3 / 24 / 15 | Time: Start 915 am/pm | Finish 1215 am/pm
Project No: 60266526
Site Location: Curtis & Hayden
Weather Conds: Sunny ~5°C | Collector(s): SC

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 240 c. Length of Water Column _____ (a-b)

Casing Diameter/Material: 4-inch PVC

b. Water Table Depth 40.19 d. Calculated System Volume (see back) 20ft screen 13.1gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI 556	~~6820-10~~ X	~~60233644~~ 71977
	Hann ~~MPS~~	HI 54589 X	~~14521~~ 69177

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
9570										
1000		11.63	5.99	0.055	8.55	149.1	>50	500	40.26	cloudy
1005		11.43	5.82	0.054	8.72	155.6	305			
1010		11.72	5.47	0.050	5.86	185.3	291	500	40.70	cloudy
1020		11.42	5.56	0.051	5.62	187.8	299	500	40.70	"
1025		11.91	6.13	0.087	5.32	167.9			40.70	"
1030	5G	12.22	5.89	0.063	4.92	177.2	141	500	40.70	

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

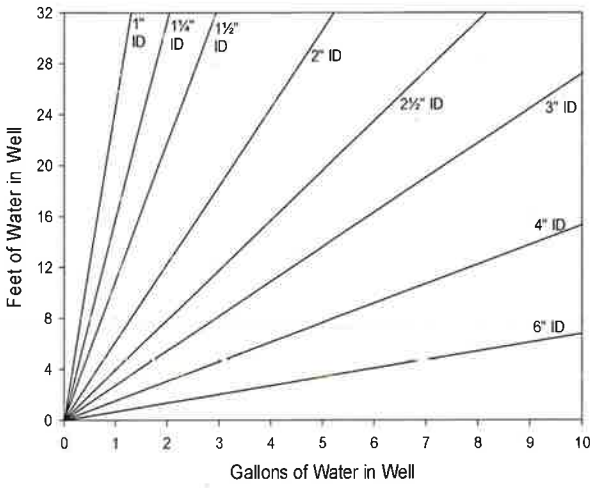
3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE122D3-GW-032415	40-mL vial	3	HCl	VOCs	1150
RE122D3-GW-032415	1-L amber	2	none	1,4-Dioxane	1150

Comments: tubing kit bottom ~3-4ft too long

Signature _____ Date 03/24/15

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = [redacted] / 9.8 G
20 ft = [redacted] / 13.1 G
25 ft = [redacted] / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1035		11.72	5.62	0.054	4.91	185.6		500	40.70	
1040		12.19	5.55	0.053	4.57	191.2	93.8	500	40.70	
1045		12.15	5.57	0.053	4.29	196.3				
1050		12.16	5.59	0.053	4.35	195.2		1	40.70	
1055		12.13	5.56	0.053	4.23	195.1	112	500	40.70	
1100		12.14	5.56	0.052	3.97	196		500	40.70	
1105	106	12.33	5.56	0.051	3.82	197.2	101	500	40.70	
1110		12.31	5.58	0.051	2.89	196.3		500	40.70	
1115		12.36	5.55	0.051	2.85	199.7	97.1	500	40.70	
1120		12.48	5.56	0.051	2.82	199.0				
1125		12.51	5.55	0.051	2.83	199.2	90.4	500	40.70	
1130		12.49	5.55	0.050	2.80	200.3	92.3	500	40.70	
1135		12.52	5.55	0.050	2.80	201.0		500	40.70	
1140	146	12.52	5.55	0.051	2.82	200.7	95.4	500	40.70	
										Sample at
										1150

Section 4

Analytical Data Validation

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SI1843	
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 06/08/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI1843_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 24 March 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Matrix/Sample Type	Analysis
DUPLICATE-GW-032315	Field Duplicate	8260C / 8270D_SIM
RE103D1-GW-032315	Groundwater	8260C / 8270D_SIM
RE103D2-GW-032315	Groundwater	8260C / 8270D_SIM
RE103D3-GW-032315	Groundwater	8260C / 8270D_SIM
RE104D1-GW-032315	Groundwater	8260C / 8270D_SIM
RE104D2-GW-032315	Groundwater	8260C / 8270D_SIM
RE104D3-GW-032315	Groundwater	8260C / 8270D_SIM
RE122D1-GW-032415	Groundwater	8260C / 8270D_SIM
RE122D2-GW-032415	Groundwater	8260C / 8270D_SIM
RE122D3-GW-032415	Groundwater	8260C / 8270D_SIM
TT101D1-GW-032415	Groundwater	8260C / 8270D_SIM

Sample ID	Matrix/Sample Type	Analysis
TT101D2-GW-032415	Groundwater	8260C / 8270D_SIM
TT101D-GW-032415	Groundwater	8260C / 8270D_SIM
TRIPBLANK031615	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency* (U.S. EPA) *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody)/sample integrity
- ✓ Holding times and sample preservation
- ✓ Gas chromatography/Mass spectrometer performance checks
- ✗ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks/trip blanks
- ✗ Surrogate spike recoveries
- ✓ Matrix spike and/or matrix spike duplicate results
- ✗ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- ✓ Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met;
- the initial calibration verification (ICV) standard percent recovery acceptance criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and response factor acceptance criteria were met; and
- the retention time method acceptance criteria were met.

Data qualification to the analytes associated with the specific calibration verification was as follows:

ICV Recovery Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
Recovery >120%	J	UJ
Recovery < 80%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

CCV Linearity Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%Difference or %Drift > 20%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICV and CCV non-conformances are summarized in Attachment A in Table's A-1 and A-2.

Surrogate Spike Recoveries

Surrogates provide information needed to assess the accuracy of analyses. Known amounts of surrogate compounds, or compounds which are not likely to be found in the actual samples, are added to each organic sample to check for accuracy. If surrogate percent recoveries (%Rs) are close to the known concentrations, the reported target compound concentrations are assumed to be accurate. Data qualification on the basis of surrogate recovery was as follows:

Surrogate Recovery Non-conformance Chart:

Criteria	Action	
	Detected	Non-detected
% R > UL	J	No qualification
20%< %R < LL	J	UJ
%R < 20%	J	Rejected

Notes:

%R	=	Percent recovery
UL	=	Upper limit
LL	=	Lower limit
J	=	Estimated
UJ	=	Undetected and estimated

Surrogate recovery non-conformance is summarized in Attachment A in Table A-3.

Laboratory Control Samples / Laboratory Control Sample Duplicate

LCS %Rs is used to monitor the overall accuracy and performance of each step during analysis, including sample preparation. The laboratory analyzed LCSs in duplicate when matrix spike/matrix spike duplicates were not reported. In these instances, the laboratory determined precision between the duplicated values. Non-conformance is summarized in Attachment A in Table A-4. Data qualification to the analytes associated with the specific LCS / LCS duplicate was as follows:

Laboratory Control Sample / Laboratory Control Sample Duplicate Non-conformance Chart:

Criteria	Action	
	Detected	Non-detected
%R or RPD > UL	J	No qualification
%R < LL	J	UJ
%R < 20%	J	Rejected

Notes:

%R	=	Percent recovery
RPD	=	Relative percent difference
UL	=	Upper limit
LL	=	Lower limit
J	=	Estimated
UJ	=	Undetected and estimated

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Final data review qualifiers used to describe results and how they should be interpreted by the end data user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Initial Calibration Verification Non-Conformance

Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	DUPLICATE-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE103D1-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE103D2-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE103D3-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE104D1-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE104D2-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE104D3-GW-032315	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE122D1-GW-032415	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE122D2-GW-032415	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	RE122D3-GW-032415	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	TT101D1-GW-032415	J
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	TT101D2-GW-032415	J
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	TT101D-GW-032415	UJ
8260C	Dichlorodifluoromethane	WG160458-7	132.53	80-120	TRIPBLANK031615	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	DUPLICATE-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE103D1-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE103D2-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE103D3-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE104D1-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE104D2-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE104D3-GW-032315	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE122D1-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE122D2-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	RE122D3-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	TT101D1-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	TT101D2-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	TT101D-GW-032415	UJ
8260C	Chloromethane	WG160458-7	121.77	80-120	TRIPBLANK031615	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	DUPLICATE-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE103D1-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE103D2-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE103D3-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE104D1-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE104D2-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE104D3-GW-032315	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE122D1-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE122D2-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	RE122D3-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	TT101D1-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	TT101D2-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	TT101D-GW-032415	UJ
8260C	Bromomethane	WG160458-7	130.01	80-120	TRIPBLANK031615	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	DUPLICATE-GW-032315	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE103D1-GW-032315	J
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE103D2-GW-032315	J
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE103D3-GW-032315	J
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE104D1-GW-032315	UJ

Table A-1
Initial Calibration Verification Non-Conformance

Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE104D2-GW-032315	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE104D3-GW-032315	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE122D1-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE122D2-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	RE122D3-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	TT101D1-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	TT101D2-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	TT101D-GW-032415	UJ
8260C	Carbon Disulfide	WG160458-7	544.89	80-120	TRIPBLANK031615	UJ
8260C	Acetone	WG160458-7	137.34	80-120	DUPLICATE-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE103D1-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE103D2-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE103D3-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE104D1-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE104D2-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE104D3-GW-032315	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE122D1-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE122D2-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	RE122D3-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	TT101D1-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	TT101D2-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	TT101D-GW-032415	UJ
8260C	Acetone	WG160458-7	137.34	80-120	TRIPBLANK031615	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	DUPLICATE-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE103D1-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE103D2-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE103D3-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE104D1-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE104D2-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE104D3-GW-032315	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE122D1-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE122D2-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	RE122D3-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	TT101D1-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	TT101D2-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	TT101D-GW-032415	UJ
8260C	2-Butanone	WG160458-7	134.65	80-120	TRIPBLANK031615	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	DUPLICATE-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE103D1-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE103D2-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE103D3-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE104D1-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE104D2-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE104D3-GW-032315	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE122D1-GW-032415	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE122D2-GW-032415	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	RE122D3-GW-032415	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	TT101D1-GW-032415	UJ

Table A-1 Initial Calibration Verification Non-Conformance						
Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	Cyclohexane	WG160458-7	193.37	80-120	TT101D2-GW-032415	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	TT101D-GW-032415	UJ
8260C	Cyclohexane	WG160458-7	193.37	80-120	TRIPBLANK031615	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	DUPLICATE-GW-032315	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE103D1-GW-032315	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE103D2-GW-032315	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE103D3-GW-032315	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE104D1-GW-032315	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE104D2-GW-032315	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE104D3-GW-032315	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE122D1-GW-032415	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE122D2-GW-032415	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	RE122D3-GW-032415	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	TT101D1-GW-032415	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	TT101D2-GW-032415	UJ
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	TT101D-GW-032415	J
8260C	Tetrachloroethene	WG160458-7	124.99	80-120	TRIPBLANK031615	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	DUPLICATE-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE103D1-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE103D2-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE103D3-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE104D1-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE104D2-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE104D3-GW-032315	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE122D1-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE122D2-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	RE122D3-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	TT101D1-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	TT101D2-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	TT101D-GW-032415	UJ
8260C	2-Hexanone	WG160458-7	130.94	80-120	TRIPBLANK031615	UJ

Notes:

ICV = Initial calibration verification

%R = Percent recovery

J = Detected analyte in associate sample qualified estimated ”J” due to potential bias.

UJ = Non-detected analyte in associated sample qualified estimated “UJ” due to potential bias.

Table A-2 Continuing Calibration Verification Non-Conformance						
Method	Analyte	CCV ID	%D	Limit	Associated Samples	Qualifier
8260C	Methyl cyclohexane	C2012.D	49.68	20	RE104D2-GW-032315	UJ
8260C	Methyl cyclohexane	C2012.D	49.68	20	RE122D3-GW-032415	UJ
8260C	Methyl cyclohexane	C2012.D	49.68	20	TRIPBLANK031615	UJ
8260C	Methyl cyclohexane	C2012.D	49.68	20	TT101D1-GW-032415	UJ
8260C	Methyl cyclohexane	C2012.D	49.68	20	TT101D2-GW-032415	UJ
8260C	Chloroethane	C1970.D	40.73	20	RE103D1-GW-032315	UJ
8260C	Chloroethane	C1970.D	40.73	20	RE103D2-GW-032315	UJ
8260C	Chloroethane	C1970.D	4.073	20	RE103D3-GW-032315	UJ
8260C	Chloroethane	C1986.D	36.53	20	DUPLICATE-GW-032315	UJ

Table A-2
Continuing Calibration Verification Non-Conformance

Method	Analyte	CCV ID	%D	Limit	Associated Samples	Qualifier
8260C	Chloroethane	C1986.D	36.53	20	RE104D1-GW-032315	UJ
8260C	Chloroethane	C1986.D	36.53	20	RE104D3-GW-032315	UJ
8260C	Chloroethane	C1986.D	36.53	20	RE122D1-GW-032415	UJ
8260C	Chloroethane	C1986.D	36.53	20	RE122D2-GW-032415	UJ
8260C	Chloroethane	C1986.D	36.53	20	TT101D-GW-032415	UJ

Notes:
CCV = Continuing calibration verification
%D = Percent difference
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias.

Table A-3
Surrogate Non-Conformance

Method	Analyte	%R	Limits	Associated Sample	Qualifier
8260C	1,2-Dichloroethane-d4	123	70-120	RE103D1-GW-032315 (diluted run)	Trichloroethene qualified J
8260C	1,2-Dichloroethane-d4	126	70-120	RE103D2-GW-032315 (diluted run)	Trichloroethene qualified J
8260C	1,2-Dichloroethane-d4	127	70-120	RE103D3-GW-032315 (diluted run)	Trichloroethene qualified J
8260C	1,2-Dichloroethane-d4	124	70-120	RE122D1-GW-032415 (diluted run)	Trichloroethene qualified J
8260C	1,2-Dichloroethane-d4	122	70-120	RE122D2-GW-032415 (diluted run)	Trichloroethene qualified J
8260C	1,2-Dichloroethane-d4	129	70-120	TT101D1-GW-032415 (diluted run)	Trichloroethene qualified J
8260C	Dibromofluoromethane	117	85-115	RE103D2-GW-032315 (diluted run)	Trichloroethene qualified J
8260C	Dibromofluoromethane	116	85-115	RE122D1-GW-032415 (diluted run)	Trichloroethene qualified J
8260C	Dibromofluoromethane	118	85-115	TT101D1-GW-032415 (diluted run)	Trichloroethene qualified J

Notes:
%R = Percent recovery
J = Detected analyte qualified estimated "J" because %R is greater than the upper control limit in associated sample.

Table A-4
Laboratory Control Sample Non-Conformance

LCS	Batch	Analyte	%R	Limits	Associated Sample	Qualifier
WG160459-1	WG160459	Carbon Disulfide	534	35-160	RE103D1-GW-032315	J
WG160459-1	WG160459	Carbon Disulfide	534	35-160	RE103D2-GW-032315	J
WG160459-1	WG160459	Carbon Disulfide	534	35-160	RE103D3-GW-032315	J
WG160576-1	WG160576	Methyl cyclohexane	50.2	73-125	RE104D2-GW-032315	UJ
WG160576-1	WG160576	Methyl cyclohexane	50.2	73-125	RE122D3-GW-032415	UJ
WG160576-1	WG160576	Methyl cyclohexane	50.2	73-125	TT101D1-GW-032415	UJ
WG160576-1	WG160576	Methyl cyclohexane	50.2	73-125	TT101D2-GW-032415	UJ

Notes:
LCS = Laboratory control sample
%R = Percent recovery
J = Detected analyte qualified estimated "J" because %R is greater than the upper control limit in associated sample.
UJ = Non-detected analyte in associated sample qualified estimated "UJ" because %R is lower than lower control limit.

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-1 RE103D3-GW-032315 3/23/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	3.5		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	J	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.69	J	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.2	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.31	J	l,c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.9	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.2		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.47	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	570	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	1.3		

		Sample Delivery Group		SI1843		
		Lab ID		SI1843-2		
		Sample ID		RE103D2-GW-032315		
		Sample Date		3/23/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	8.1		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.54	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.92	J	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	1.6		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.9	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.47	J	l,c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	1.2		
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.9		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	1.1	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	940	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	3		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-3 RE103D1-GW-032315 3/23/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.53	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	16		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.77	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	1.1		
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	6.8		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	3.9		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.56	J	l,c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.76	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	3.9		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	4.6	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	900	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	19		

		Sample Delivery Group		SI1843		
		Lab ID		SI1843-5		
		Sample ID		RE104D1-GW-032315		
		Sample Date		3/23/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.27	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	6.2		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.8	J	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.5	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.5		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	2.4	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	110		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	9.7		

		Sample Delivery Group		SI1843		
		Lab ID		SI1843-6		
		Sample ID		RE104D2-GW-032315		
		Sample Date		3/23/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.2	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.2		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	UJ	l,c
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	3		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.12	J	

		Sample Delivery Group		SI1843		
		Lab ID		SI1843-7		
		Sample ID		RE104D3-GW-032315		
		Sample Date		3/23/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.46	J	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.19	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-8 DUPLICATE-GW-032315 3/23/2015 Field Duplicate		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.3	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.3		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	3.1		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.096	J	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-9 RE122D1-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	7.2		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.4	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	2		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.62	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	2		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	1.3	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	570	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	8.1		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-10 RE122D2-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.71	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	31		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	2.8		
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	1.7		
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	8.7		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	6		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	1.5		
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	2.4		
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	6		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	2.7	J	c
8260C	TOLUENE	108-88-3	UG_L	0.63	J	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	4600	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	14		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-11 RE122D3-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	UJ	l,c
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.37	J	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	6.8		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.19	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-14 TT101D1-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.68	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	21		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.49	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.71	J	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	4.9		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1.8	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.89	J	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.92	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	1.8		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	2.1	J	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	UJ	l,c
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	170		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	8.7		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-12 TT101D2-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.44	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	25		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.62	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.75	J	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	4		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	2		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.36	J	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.82	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	2		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.47	J	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	480	J	s
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	2.4		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI1843 SI1843-13 TT101D-GW-032415 3/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.36	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	22		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.78	J	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	3.5		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	3		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	J	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	3		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	2.1	J	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	UJ	l,c
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	61		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	9.7		

		Sample Delivery Group		SI1843		
		Lab ID		SI1843-15		
		Sample ID		TRIPBLANK031615		
		Sample Date		3/24/2015		
		Sample Type		Trip Blank		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	UJ	c
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	c
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	c
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	UJ	c
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	UJ	c
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	c
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	UJ	l,c
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	c
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L			

Notes:
UG_L = Micrograms per liter
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI0198	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/26/2015 Revised on: 10/27/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI0198_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 9 January 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
RE122D2-SOIL-010915-593-595	SI0198-1	Soil	9060A
RE122D2-EB-010915	SI0198-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
NA	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Katahdin Analytical discovered a QC error in Total Organic Carbon calculations, informed us, and has implemented corrective action provided in Attachment A. Attachment B provides final results after data review.

ATTACHMENTS

Attachment A: Katahdin Analytical Corrective Action Report

Attachment B: Final Results after Data Review

Attachment A
Katahdin Analytical Corrective Action Report

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Problem Identification (Person initiating CAR) Name: Leslie Dimond Date: 08/28/2015

Discovered by Laboratory | X Discovered by Client (Complaint) | Other

Details of Problem:

On August 28, 2015, a client called regarding several TOC results. They thought the results for their samples seemed to be off by a factor of ten. George Brewer looked into the matter and found that their sample results were calculated incorrectly. Calculations are set up to be performed automatically in KIMS. Each product code for a test contains information such as the method name, LOQ, LOD, MDL, limits and a specific process chain for reporting to the either the LOQ, LOD or MDL (i.e. three process chains). This process chain contains all of the calculations associated with a test including separate calculations for sample results, adjusted LOQs, LODs and MDLs, and results for QC samples. In October of 2014, a client asked why the lab was not adjusting LOQs, LODs and/or MDLs for the sample amount used, but only for an instrument dilution and total solids. The lab had felt that there wasn't really a standard weight amount, so this was not incorporated. After numerous discussions, the lab decided to change this and use 500 mg as the standard and to incorporate any different amount into the LOQ/LOD/MDL adjustment. MIS was asked to revise this TOC calculation in our Laboratory Information System (KIMS). The incorrect information was given to MIS, so the adjusted LOQ/LOD/MDL calculation was wrong.

The formula was: ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (Sample amount / 1000) * (100/TS).

During data review, sample results that are calculated automatically by KIMS, are checked at a frequency of 10% of all calculations. Sample results are checked in this manner, but adjusted limits are not necessarily checked. In December of 2014, a data reviewer noticed that some adjusted limits were not correct. This issue was reviewed with MIS, and it was discovered that the calculation was incorrect. It was corrected at this time and changed to:

ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (500 / Sample Amount) * (100/TS) (where 500 is the standard sample amount).

At the time this change was made, MIS was under the impression that the sample calculation was also incorrect and also needed to be corrected.

The formula for the sample result was: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

This was incorrectly changed to: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(500 / Sample Amount)}}$ * TS

From December 29, 2014 to April 13, 2015, this error was often discovered during data review and manually corrected. The problem was not addressed with the MIS department. However, there were several cases where this error was not caught during data review and results were reported incorrectly. On April 13, 2015, this issue was brought to the attention of MIS and the sample calculation was corrected back to:

Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

Blanks and LCSs were not affected by these changes because they are calculated using different calculations since total solids is not used in these situations. Duplicates and MS/MSD samples are also not affected because they use different calculations since these calculation strings involve recoveries, RPDs, etc.

Associated Non-Conformances: List logbook and page numbers

There are no non-conformances associated with this corrective action.

Root Cause Investigation & Determination (To be completed by Department Manager, Operations Manager and/or QA Officer)

Review the 6 "M's" below and investigate to determine whether one of them, or more than one, could be the cause of the problem.

Possible Causes	Details

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Machine (Instrument)	KIMS – incorrect formulas were entered into the process chains for TOC in soil.
Method (or Process)	Katahdin's policy for data review: From the QAM: "For data that are reduced via computer, calculations are checked by the analyst (or designee) assigned to this task at a frequency designed to assure that the final data generation is valid." From SOP SD-904, Data Reduction, Review and Reporting: "All manual integrations, calculations and transcriptions are checked and 10% of all spreadsheet calculations are checked. The remainder of spreadsheet calculations is spot checked for potential anomalies." Katahdin does not have a formal process for handling calculation changes to process changes in KIMS. A verbal request is made to MIS and the change is made. Although the KIMS system does have an audit trail to track dates of changes and calculation changes, the request for these is not documented.
Materials	Not Applicable
Maintenance (Is something not working correctly?)	Not Applicable
Man (training, human error)	All personnel involved with data review are aware of the requirement to hand check 10% of the sample results. In some cases this appears to have been done and when the results did not calculate correctly, they were corrected in KIMS. There was no communication that the error may affect other batches of samples. In other sample batches, the 10% hand check must not have occurred.
Mother Nature (accidents, power issues, beyond our control)	Not Applicable

Corrective Action Plan: Name: Leslie Dimond Date: 08/28/2015

Details of Corrective Action Plan –

Querries were run through KIMS to generate lists for TOC in soil data entered into KIMS between two timeframes:

10/23/14 to 12/29/14 (incorrect LOQ/LOD/MDL adjustment) – 14 Work Orders were found in this timeframe

12/29/14 and 4/13/15 (incorrect sample calculation) - 16 Work Orders were found in this timeframe

The lab has reviewed all TOC in soil data from these time periods for accuracy. Some inaccurate data was found (as expected from the incorrect formulas). Some data was found to be correct. In these cases, MIS was able to determine, through the KIMS audit trail, that the data had been manually corrected.

A new form has been created for personnel to fill out when requesting calculation changes in KIMS. This form will ensure that MIS is clear on exactly what needs to be changed in KIMS. Through KIMS we are currently able to track formula changes (ie. the formula before and after the change) and when the change occurred. This new form will allow Katahdin to track the changes made by person requesting the change and why the change was necessary. Supervisor and QA/Management approval are required on these forms.

There also will be a mandatory retraining for all employees on Katahdin's policy for data review, stressing that 10% of all results generated from KIMS and spreadsheets need to be confirmed. Also, this retraining will stress the need for communication. If a problem is discovered with one batch of samples, then it might also be affecting other batches.

Additionally, when calculation changes are made, Katahdin must establish a time frame of 30 days or 10 workorders where

senior management or the Quality Assurance Officer must also check the new calculations.

Review & Approval of Corrective Action Plan

Supervisor Approval:	Date: 09.11.15
Operations Manager Approval: Deborah J. Nadeau	Date: 9.11.15
Quality Assurance Officer: Susie Dimond	Date: 09.11.15

Monitoring of Corrective Action (To be completed by QA Officer and/or Operations Manager): List details of follow-up

Corrective Action Effective	Return to Control – Yes No	Further Monitoring Needed/Additional Corrective Action

QA Approval: Date:

Additional Information:

Attachment B
Final Results after Data Review

			Sample Delivery Group	SI0198	SI0198
			Lab ID	SI0198-1	SI0198-2
			Sample ID	RE122D2-SOIL-010915-593-595	RE122D2-EB-010915
			Sample Date	1/9/2015	1/9/2015
			Sample Type	Soil	Equipment Blank
Method	Analyte	CAS No	Units	Result	Result
5310B	TOTAL ORGANIC CARBON	-28	MG_L	NA	0.27 J
9060A	TOTAL ORGANIC CARBON	-28	UG_G	630	NA

Notes:

ID = Identification
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
J = The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI0594	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/26/2015 Revised on: 10/27/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI0594_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 23 January 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
RE122D1-SOIL-012315-528-530	SI0594-1	Soil	9060A
RE122D1-EB-012315	SI0594-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
NA	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Katahdin Analytical discovered a QC error in Total Organic Carbon calculations, informed us, and has implemented corrective action provided in Attachment A. Attachment B provides final results after data review.

ATTACHMENTS

Attachment A: Katahdin Analytical Corrective Action Report

Attachment B: Final Results after Data Review

Attachment A
Katahdin Analytical Corrective Action Report

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Problem Identification (Person initiating CAR) Name: Leslie Dimond Date: 08/28/2015

Discovered by Laboratory | X Discovered by Client (Complaint) | Other

Details of Problem:

On August 28, 2015, a client called regarding several TOC results. They thought the results for their samples seemed to be off by a factor of ten. George Brewer looked into the matter and found that their sample results were calculated incorrectly. Calculations are set up to be performed automatically in KIMS. Each product code for a test contains information such as the method name, LOQ, LOD, MDL, limits and a specific process chain for reporting to the either the LOQ, LOD or MDL (i.e. three process chains). This process chain contains all of the calculations associated with a test including separate calculations for sample results, adjusted LOQs, LODs and MDLs, and results for QC samples. In October of 2014, a client asked why the lab was not adjusting LOQs, LODs and/or MDLs for the sample amount used, but only for an instrument dilution and total solids. The lab had felt that there wasn't really a standard weight amount, so this was not incorporated. After numerous discussions, the lab decided to change this and use 500 mg as the standard and to incorporate any different amount into the LOQ/LOD/MDL adjustment. MIS was asked to revise this TOC calculation in our Laboratory Information System (KIMS). The incorrect information was given to MIS, so the adjusted LOQ/LOD/MDL calculation was wrong.

The formula was: ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (Sample amount / 1000) * (100/TS).

During data review, sample results that are calculated automatically by KIMS, are checked at a frequency of 10% of all calculations. Sample results are checked in this manner, but adjusted limits are not necessarily checked. In December of 2014, a data reviewer noticed that some adjusted limits were not correct. This issue was reviewed with MIS, and it was discovered that the calculation was incorrect. It was corrected at this time and changed to:

ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (500 / Sample Amount) * (100/TS) (where 500 is the standard sample amount).

At the time this change was made, MIS was under the impression that the sample calculation was also incorrect and also needed to be corrected.

The formula for the sample result was: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

This was incorrectly changed to: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(500 / Sample Amount)}}$ * TS

From December 29, 2014 to April 13, 2015, this error was often discovered during data review and manually corrected. The problem was not addressed with the MIS department. However, there were several cases where this error was not caught during data review and results were reported incorrectly. On April 13, 2015, this issue was brought to the attention of MIS and the sample calculation was corrected back to:

Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

Blanks and LCSs were not affected by these changes because they are calculated using different calculations since total solids is not used in these situations. Duplicates and MS/MSD samples are also not affected because they use different calculations since these calculation strings involve recoveries, RPDs, etc.

Associated Non-Conformances: List logbook and page numbers

There are no non-conformances associated with this corrective action.

Root Cause Investigation & Determination (To be completed by Department Manager, Operations Manager and/or QA Officer)

Review the 6 "M's" below and investigate to determine whether one of them, or more than one, could be the cause of the problem.

Possible Causes	Details

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Machine (Instrument)	KIMS – incorrect formulas were entered into the process chains for TOC in soil.
Method (or Process)	Katahdin's policy for data review: From the QAM: "For data that are reduced via computer, calculations are checked by the analyst (or designee) assigned to this task at a frequency designed to assure that the final data generation is valid." From SOP SD-904, Data Reduction, Review and Reporting: "All manual integrations, calculations and transcriptions are checked and 10% of all spreadsheet calculations are checked. The remainder of spreadsheet calculations is spot checked for potential anomalies." Katahdin does not have a formal process for handling calculation changes to process changes in KIMS. A verbal request is made to MIS and the change is made. Although the KIMS system does have an audit trail to track dates of changes and calculation changes, the request for these is not documented.
Materials	Not Applicable
Maintenance (Is something not working correctly?)	Not Applicable
Man (training, human error)	All personnel involved with data review are aware of the requirement to hand check 10% of the sample results. In some cases this appears to have been done and when the results did not calculate correctly, they were corrected in KIMS. There was no communication that the error may affect other batches of samples. In other sample batches, the 10% hand check must not have occurred.
Mother Nature (accidents, power issues, beyond our control)	Not Applicable

Corrective Action Plan: Name: Leslie Dimond Date: 08/28/2015

Details of Corrective Action Plan –

Querries were run through KIMS to generate lists for TOC in soil data entered into KIMS between two timeframes:

10/23/14 to 12/29/14 (incorrect LOQ/LOD/MDL adjustment) – 14 Work Orders were found in this timeframe

12/29/14 and 4/13/15 (incorrect sample calculation) - 16 Work Orders were found in this timeframe

The lab has reviewed all TOC in soil data from these time periods for accuracy. Some inaccurate data was found (as expected from the incorrect formulas). Some data was found to be correct. In these cases, MIS was able to determine, through the KIMS audit trail, that the data had been manually corrected.

A new form has been created for personnel to fill out when requesting calculation changes in KIMS. This form will ensure that MIS is clear on exactly what needs to be changed in KIMS. Through KIMS we are currently able to track formula changes (ie. the formula before and after the change) and when the change occurred. This new form will allow Katahdin to track the changes made by person requesting the change and why the change was necessary. Supervisor and QA/Management approval are required on these forms.

There also will be a mandatory retraining for all employees on Katahdin's policy for data review, stressing that 10% of all results generated from KIMS and spreadsheets need to be confirmed. Also, this retraining will stress the need for communication. If a problem is discovered with one batch of samples, then it might also be affecting other batches.

Additionally, when calculation changes are made, Katahdin must establish a time frame of 30 days or 10 workorders where

senior management or the Quality Assurance Officer must also check the new calculations.

Review & Approval of Corrective Action Plan

Supervisor Approval:	Date: 09.11.15
Operations Manager Approval: Deborah J. Nadeau	Date: 9.11.15
Quality Assurance Officer: Susie Dimond	Date: 09.11.15

Monitoring of Corrective Action (To be completed by QA Officer and/or Operations Manager): List details of follow-up

Corrective Action Effective	Return to Control – Yes No	Further Monitoring Needed/Additional Corrective Action

QA Approval: Date:

Additional Information:

Attachment B
Final Results after Data Review

			Sample Delivery Group	SI0594		SI0594	
			Lab ID	SI0594-1		SI0594-2	
			Sample ID	RE122D1-SOIL-012315-528-530		RE122D1-EB-012315	
			Sample Date	1/23/2015		1/23/2015	
			Sample Type	Soil		Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual	Result	Qual
5310B	TOTAL ORGANIC CARBON	-28	MG_L	NA		0.24	J
9060A	TOTAL ORGANIC CARBON	-28	UG_G	250	J	NA	

Notes:

ID	=	Identification
MG_L	=	Milligrams per liter
UG_G	=	Micrograms per gram
NA	=	Not analyzed
Qual	=	Final qualifier

Final Qualifier:

J	=	The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	TH0533	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/3/2015 Revised on: 10/27/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: TH0533_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 5 December 2014 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
RE122D3-SOIL-120514-718-720	TH0533-1	Soil	9060A
RE122D3-EB-120514	TH0533-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
NA	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Katahdin Analytical discovered a QC error in Total Organic Carbon calculations, informed us, and has implemented corrective action provided in Attachment A. Attachment B provides final results after data review.

ATTACHMENTS

Attachment A: Katahdin Analytical Corrective Action Report

Attachment B: Final Results after Data Review

Attachment A
Katahdin Analytical Corrective Action Report

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Problem Identification (Person initiating CAR) Name: Leslie Dimond Date: 08/28/2015

Discovered by Laboratory | X Discovered by Client (Complaint) | Other

Details of Problem:

On August 28, 2015, a client called regarding several TOC results. They thought the results for their samples seemed to be off by a factor of ten. George Brewer looked into the matter and found that their sample results were calculated incorrectly. Calculations are set up to be performed automatically in KIMS. Each product code for a test contains information such as the method name, LOQ, LOD, MDL, limits and a specific process chain for reporting to the either the LOQ, LOD or MDL (i.e. three process chains). This process chain contains all of the calculations associated with a test including separate calculations for sample results, adjusted LOQs, LODs and MDLs, and results for QC samples. In October of 2014, a client asked why the lab was not adjusting LOQs, LODs and/or MDLs for the sample amount used, but only for an instrument dilution and total solids. The lab had felt that there wasn't really a standard weight amount, so this was not incorporated. After numerous discussions, the lab decided to change this and use 500 mg as the standard and to incorporate any different amount into the LOQ/LOD/MDL adjustment. MIS was asked to revise this TOC calculation in our Laboratory Information System (KIMS). The incorrect information was given to MIS, so the adjusted LOQ/LOD/MDL calculation was wrong.

The formula was: ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (Sample amount / 1000) * (100/TS).

During data review, sample results that are calculated automatically by KIMS, are checked at a frequency of 10% of all calculations. Sample results are checked in this manner, but adjusted limits are not necessarily checked. In December of 2014, a data reviewer noticed that some adjusted limits were not correct. This issue was reviewed with MIS, and it was discovered that the calculation was incorrect. It was corrected at this time and changed to:

ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (500 / Sample Amount) * (100/TS) (where 500 is the standard sample amount).

At the time this change was made, MIS was under the impression that the sample calculation was also incorrect and also needed to be corrected.

The formula for the sample result was: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

This was incorrectly changed to: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(500 / Sample Amount)}}$ * TS

From December 29, 2014 to April 13, 2015, this error was often discovered during data review and manually corrected. The problem was not addressed with the MIS department. However, there were several cases where this error was not caught during data review and results were reported incorrectly. On April 13, 2015, this issue was brought to the attention of MIS and the sample calculation was corrected back to:

Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

Blanks and LCSs were not affected by these changes because they are calculated using different calculations since total solids is not used in these situations. Duplicates and MS/MSD samples are also not affected because they use different calculations since these calculation strings involve recoveries, RPDs, etc.

Associated Non-Conformances: List logbook and page numbers

There are no non-conformances associated with this corrective action.

Root Cause Investigation & Determination (To be completed by Department Manager, Operations Manager and/or QA Officer)

Review the 6 "M's" below and investigate to determine whether one of them, or more than one, could be the cause of the problem.

Possible Causes	Details

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

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Review & Approval of Corrective Action Plan

Supervisor Approval:	Date: 09.11.15
Operations Manager Approval: Deborah J. Nadeau	Date: 9.11.15
Quality Assurance Officer: Susie Dimond	Date: 09.11.15

Monitoring of Corrective Action (To be completed by QA Officer and/or Operations Manager): List details of follow-up

Corrective Action Effective	Return to Control – Yes No	Further Monitoring Needed/Additional Corrective Action

QA Approval: Date:

Additional Information:

Attachment B
Final Results after Data Review

				Sample Delivery Group		TH0533		TH0533	
				Lab ID		TH0533-1		TH0533-1	
				Sample ID		RE122D3-SOIL-120514-718-720		RE122D3-EB-120514	
				Sample Date		12/5/2014		12/5/2014	
				Sample Type		Soil		Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual	Result	Qual		
5310B	TOTAL ORGANIC CARBON	-28	MG_L	NA		0.30	J		
9060A	TOTAL ORGANIC CARBON	-28	UG_G	280	J	NA			

Notes:

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NA	=	Not analyzed
Qual	=	Final qualifier

Final Qualifier:

J	=	The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

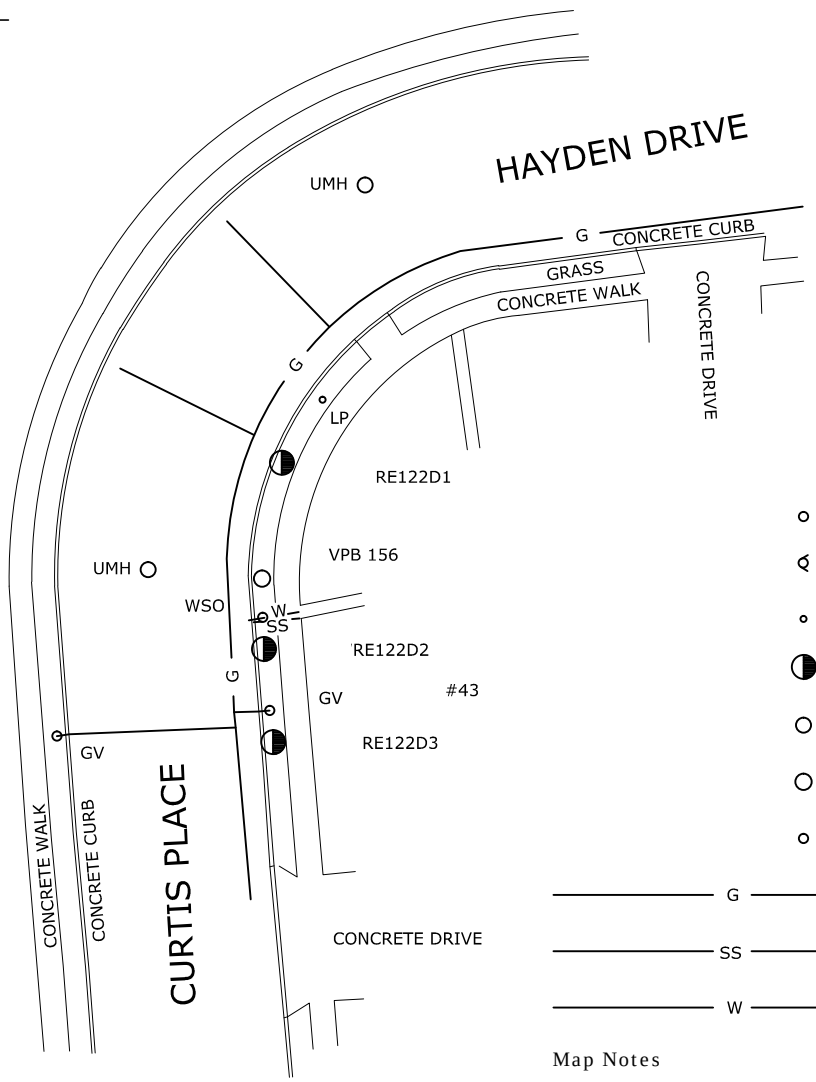
Section 5

Survey

NONE :XREFS

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
VPB 156	207800.08	1124978.89	N40-44-09.31	W73-29-31.89	97.43	NA	NA
RE122D1	207818.19	1124982.01	N40-44-09.49	W73-29-31.85	97.74	97.74	97.42
RE122D2	207789.07	1124979.19	N40-44-09.20	W73-29-31.89	97.70	97.73	97.35
RE122D3	207774.52	1124980.63	N40-44-09.06	W73-29-31.87	97.62	97.66	97.27



BENCHMARK FOUND
"X-CUT" NHOA ON HYDRANT
ELEVATION=100.40'

Legend

o	GV	Gas Valve
⊲	HYD	Hydrant
o	LP	Light Post
◑	MW	Monitoring Well
○	UMH	Unknown Manhole
○	VPB 156	Vertical Profile Boring
o	WSO	Water Shutoff
—— G ——		Underground Gas Line
—— SS ——		Underground Sanitary Line
—— W ——		Underground Water Line

BAR SCALE
30 0 15 30 60
1 inch = 30 ft.

Map Notes

1. Information shown hereon was compiled from an actual field survey conducted from September 23-25, 2014.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88 as obtained from GPS observations.

DWG NO. 14-498

Date	RECORD OF WORK	Appr.
7-7-15	ADDITIONAL FIELD WORK	JFC

VERTICAL PROFILE BORING 156 SURVEY LOCATION
43 CURTIS PLACE

TOWN OF BETHPAGE | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
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Drafter: LMK | Checker: JFC
Appr. by: JFC | Proj. No. 14.4121
SCALE: 1"=30' | DATE: SEPT. 24, 2014

CAD DWG. FILE NAME: K:\Projects\14412\1\Survey\Drawings and Maps\VPB 156.dwg