2015-2016 OU2 GROUNDWATER INVESTIGATION RE126D1, RE126D2, RE126D3 (VPB160) INSTALLATION REPORT

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (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

August 2016

2015 - 2016 OU2 GROUNDWATER INVESTIGATION
RE126D1, RE126D2, RE126D3 (VPB160)
INSTALLATION REPORT

NWIRP BETHPAGE
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

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

August 2016

Brian Caldwell
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	nephelometric turbidity units
NWIRP	Naval Weapons Industrial Reserve Plant
NYS	New York State
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 initial groundwater monitoring event (specifically at the Vertical Profile Boring [VPB] 160 location) in 2015 and 2016 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 RE126D1, RE126D2 and RE126D3. 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 northern 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 RE126D1, RE126D2 and RE126D3, as well as other 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 2015 and 2016 in accordance with the *United Federal Programs Sampling and Analysis Plan (UFP SAP)*, Bethpage, New York (Resolution, 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 1,000 ft below ground surface (bgs), as observed at the former NWIRP and extending southeast to areas south of Southern State Parkway. Locally at the RE126 locations, the bottom of the Magothy (top of the Raritan Clay) is encountered at approximately 869 feet bgs. 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 VPB160 between December 2015 and March 2016. 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 RE126D1, RE126D2 and RE126D3 were installed using mud rotary drilling techniques (Figure 2). Depths of monitoring wells RE126D1, RE126D2 and RE126D3 were 525 ft, 580 ft and 665 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. *2015 OU2 Groundwater Investigation VPB160* (Resolution Consultants, 2016) 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 nephelometric 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 8270D SIM 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 RE126D1, RE126D2 and RE126D3 were sampled by Resolution Consultants on April 21, 2016. Analytical results and stabilized field parameters for these data are summarized in Table 3 and 4, respectively. Data validation is documented in Appendix A. These monitoring wells will be included in quarterly sampling as part of the Navy's ongoing Environmental Restoration Program.

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 Luminox 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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Tables

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
2015 - 2016 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)
RE126D1	1/8/2016	101.65	101.03	525	53	500-520	520 - 525	538
RE126D2	3/4/2016	101.74	101.39	580	53	555-575	575 - 580	593
RE126D3	2/15/2016	101.66	101.10	665	52.5	640-660	660 - 665	680

MSL - mean sea level

ft bgs - feet below ground surface

TABLE 2
MONITORING WELL DEVELOPMENT SUMMARY
2015- 2016 OU2 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)		
RE126D1	3/10/2016	2,500	3/15/2016	500-520	5,000	7,500	3.5
RE126D2	3/14/2016	2,500	3/17/2016	555-575	5,000	7,500	5.27
RE126D3	3/11/16, 3/14/16	3,000	3/16/2016	640-660	3,500	6,500	11.42

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

TABLE 3. ANALYTICAL DATA SUMMARY
2015-2016 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE126D1	RE126D2	RE126D3
Sample Date		4/21/2016	4/21/2016	4/21/2016
Sample ID		RE126D1-GW-042116	RE126D2-GW-042116	RE126D3-GW-042116
Sample type code		N	N	N
VOC 8260C (ug/L)				
1,1,1-TRICHLOROETHANE	5	<0.50 U	<0.50 U	<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	<0.50 U	**0.90 J**	**0.84 J**
1,1,2-TRICHLOROETHANE	1	<0.50 U	**0.38 J**	<0.50 U
1,1-DICHLOROETHANE	5	<0.50 U	**2.0**	<0.50 U
1,1-DICHLOROETHENE	5	<0.50 U	<0.50 U	**0.38 J**
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	<1.0 U	**2.2**	<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	**4.8**	**3.7 J**	**1.6**
2-BUTANONE	50	<2.5 U	<2.5 U	<2.5 U
2-HEXANONE	50	<2.5 U	<2.5 U	<2.5 U
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 U	<1.0 U	<1.0 U
CARBON DISULFIDE	60	<0.50 U	<0.50 U	<0.50 U
CARBON TETRACHLORIDE	5	<0.50 U	<0.50 UJ	<0.50 U
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U
CHLOROETHANE	5	<1.0 U	<1.0 U	<1.0 U
CHLOROFORM	7	<0.50 U	<0.50 U	<0.50 U
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U
CIS-1,2-DICHLOROETHENE	5	<0.50 U	**2.2**	<0.50 U
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U
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 U
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	**3.6**	**3.4**	**2.8**
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U
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	**33**	**500**	**4.6**
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.

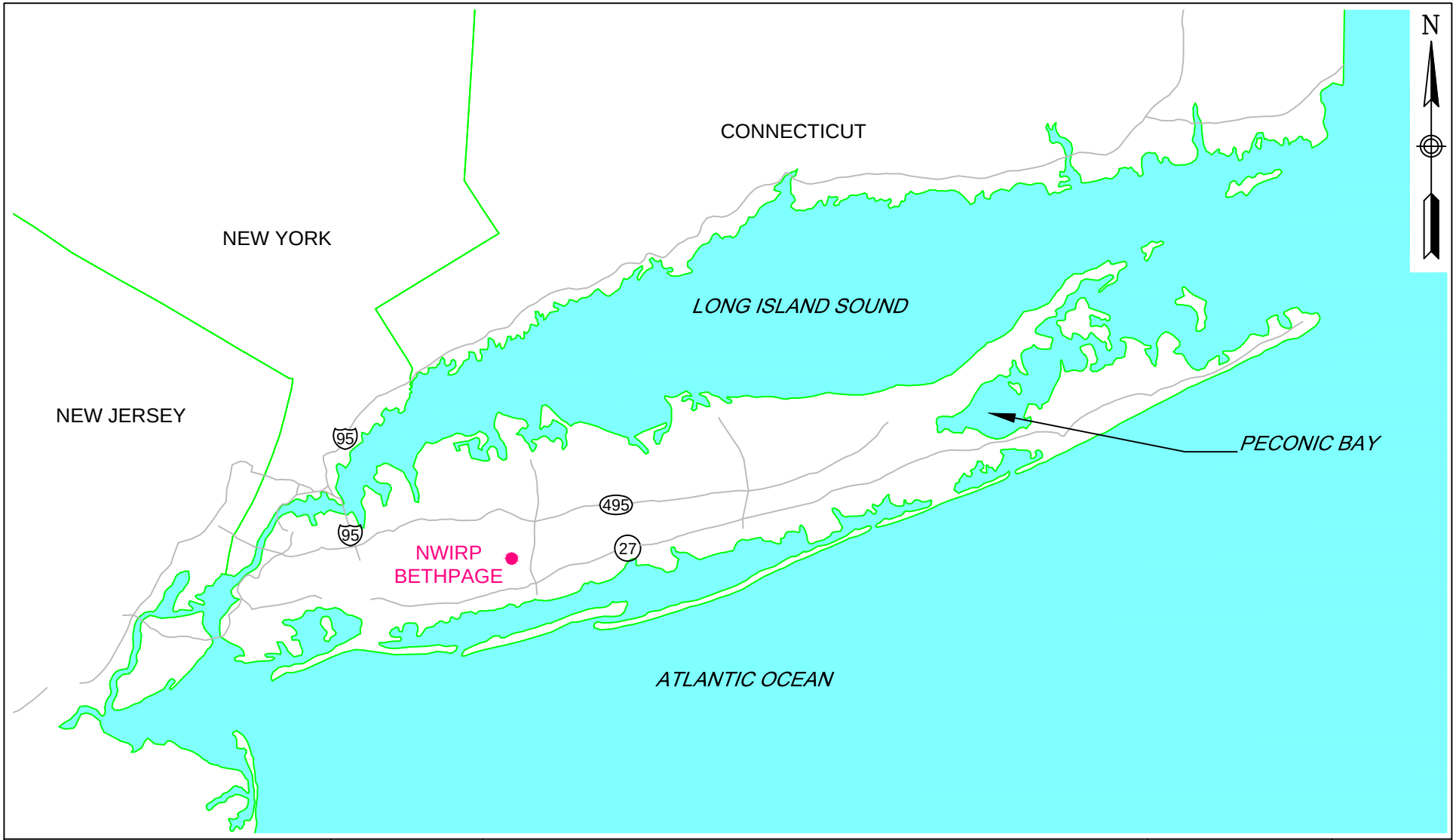
TABLE 4
STABILIZED FIELD PARAMETERS
2015 - 2016 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

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)
RE126D1	4/21/2016	14.75	5.66	97	8.65	229.5	8.53	47.74	650
RE126D2	4/21/2016	14.45	5.96	0.125	1.47	198.3	3.89	47.05	600
RE126D3	4/21/2016	15.95	4.99	0.047	6.90	281.2	89.6	46.72	600

°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

112G00622\0510\112G00622CM01.DWG 08/02/10 MKB



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 RE126 2016 07 13 R1.mxd

Former Naval Weapons Industrial Reserve Plant

Former Northrop Grumman Site

RE126D1
RE126D2
RE126D3

Old Bethpage

Bethpage

South Farmingdale

Plainedge

Levittown

North Wantagh

State Hwy 135

Southern State Pkwy

Hempstead Tpke

Central Ave

Powell Ave

Broadway

Stewart Ave

Wantagh Ave

Hicksville Rd

Seamans Neck Rd

Access Rd

Quaker Meeting House Rd

Bethpage State Pkwy

Sunshine Rd

Sunrise Way

Grumman Rd E

Harrison Ave

Wilford St

Sunny Ln

Sunbeam Ave

Monika Ct

Perry Ave

Lynn Pl

Laurel Pl

Willow St

Schrerer St

Edward St

Hayden Dr

Corona Dr

Jean Ave

Central Blvd

Fulton St

Conklin St

Merritts Rd

Motor Ave

Miller Pl

N Jerusalem Rd

Cherry Ave

Plainview Rd

0 750 1,500 3,000 Feet

0 375 750 Feet

Inset: RE126D1, RE126D2, and RE126D3 Location

Legend

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

NAVFAC

RE126D1, RE126D2, AND RE126D3 LOCATION MAP
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: PS	DATE: 7/13/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 2	REV: 0

Appendices

Appendix A

RE126D1, RE126D2, RE126D3

Section 1

Boring Logs

Resolution Consultants

Boring Log

BORING #: RE126D1
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.65	**Well Screen Interval (ft):** 500-520
Start Date: 12/28/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/8/2016	**Northing:** 208553.86 **Easting:** 1125643.00	**Total Depth (ft):** 538.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-502 ft bgs: See VPB 160 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							4" Diameter Schedule 80 PVC Riser

Resolution Consultants

Boring Log

BORING #: RE126D1
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.65	**Well Screen Interval (ft):** 500-520
Start Date: 12/28/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 1/8/2016	**Northing:** 208553.86 **Easting:** 1125643.00	**Total Depth (ft):** 538.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
466					0-502 ft bgs: See VPB 160 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
468							
470							
472							
474							
476							
478							#00 Filter Sand
480							
482							
484							
486							
488							
490							
492							#1 Filter Sand
494							
496							
498							
500							
502							
504	0.0		SP		Light gray (10YR 7/2), poorly graded SAND, subangular to angular medium Sand, trace coarse sand		
506							
508	0.0		SP-SM		Light gray (10YR 7/2), poorly graded SAND with SILT, angular medium Sand, little subangular to subrounded coarse sand, 10% silt		4" Diameter schedule 80 PVC, 10 Slot Well Screen (500-520 ft bgs)
510							
512							
514			SP-SM		Light gray (10YR 7/2), poorly graded SAND with SILT, angular medium Sand, little subangular coarse sand, 10% silt		
516							
518	0.0		SM		Light gray (10YR 7/1) and yellow (10YR 7/6), SILTY SAND, fine Sand, 30% silt, muscovite flakes; 1" layer of reddish yellow (7.5YR) SAND near bottom of sample		Sump
520							
522							
524							
526							
528							
530							
532							#1 Sand to Bottom
534							
536							
538					End of boring at 538.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: **RE126D2**
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.74	**Well Screen Interval (ft):** 555-575
Start Date: 2/24/2016	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/4/2016	**Northing:** 208584.28 **Easting:** 1125643.78	**Total Depth (ft):** 593.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-560 ft bgs: See VPB 160 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 #: **RE126D2**
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.74	**Well Screen Interval (ft):** 555-575
Start Date: 2/24/2016	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/4/2016	**Northing:** 208584.28 **Easting:** 1125643.78	**Total Depth (ft):** 593.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
534					0-560 ft bgs: See VPB 160 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
536							
538							
540							
542							
544							#00 Filter Sand
546							
548							
550							#1 Filter Sand
552							
554							
556							
558	0.0		SP-SM		Light gray (7.5YR 7/1), poorly graded SAND with SILT, angular medium Sand with orange stained seams, one lignite seam (0.25")		
560			SM		Light gray (7.5YR 7/1), SILTY SAND, subangular fine to medium Sand, muscovite flakes, 25% fines (silt)		
562							
564	0.0		SP-SM		Light gray (10YR 7/1), poorly graded SAND with SILT, angular medium Sand, few fine sand, fines (10-15%), one band (1") orange stained sand		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (555-575 ft bgs)
566							
568	0.0		SM		Light gray (10YR 7/1), SILTY SAND, angular medium Sand, muscovite flakes, trace coarse sand, fines (20%) silt		
570			SP-SM		Very pale brown (10YR 7/3), poorly graded SAND with SILT, angular medium Sand, 1.0" band of orange stained medium sand, 0.25" Lignite seam		
572							
574	0.0		SM		Light gray (10YR 7/1), SILTY SAND, several faint orange stained layers; angular medium Sand, muscovite flakes, 30% fines (silt)		Sump
576							
578							
580							
582							
584							
586							#1 Sand to Bottom
588							
590							
592							
					End of boring at 593.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE126D3
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.66	**Well Screen Interval (ft):** 640-660
Start Date: 1/18/2016	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 2/15/2016	**Northing:** 208568.11 **Easting:** 1125643.60	**Total Depth (ft):** 680.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-643 ft bgs: See VPB160 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							
500							4" Diameter Schedule 80 PVC Riser
550							

Resolution Consultants

Boring Log

BORING #: RE126D3
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: S. Nassau St & Lynn Pl, Bethpage, NY		**Drilling Company:** Delta Well & Pump
Project #: 60266526	**Ground Elevation (msl):** 101.66	**Well Screen Interval (ft):** 640-660
Start Date: 1/18/2016	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 2/15/2016	**Northing:** 208568.11 **Easting:** 1125643.60	**Total Depth (ft):** 680.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
590					0-643 ft bgs: See VPB160 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
592							
594							
596							
598							
600							
602							
604							
606							
608							
610							
612							
614							
616							
618							#00 Filter Sand
620							
622							
624							
626							
628							
630							
632							#1 Filter Sand
634							
636							
638							
640							
642							
644	0.0		SP-SM		Pink (7.5YR 7/3), poorly graded SAND with SILT and GRAVEL, angular medium Sand, little coarse sand, subrounded fine to coarse gravel, silt (10-15%)		
646							
648	0.0		GW		White (10YR 8/1), GRAVEL, poor recovery		
650							4" Diameter Schedule 80 PVC, 10 Slot Well Screen (640-660 ft bgs)
652							
654	0.0		GW		Pinkish gray (7.5YR 7/2), widely graded GRAVEL with SAND, subrounded fine to coarse gravel, angular coarse sand, little medium sand, trace silt		
656							
658	0.0		SM		Light gray (10YR 7/2), SILTY SAND with GRAVEL, angular medium Sand, little coarse sand, little fine to coarse gravel, little silt		
660							
662							Sump
664							
666							
668							
670							
672							#1 Sand to Bottom
674							
676							
678							
680					End of boring at 680.0 ft. bgs.		

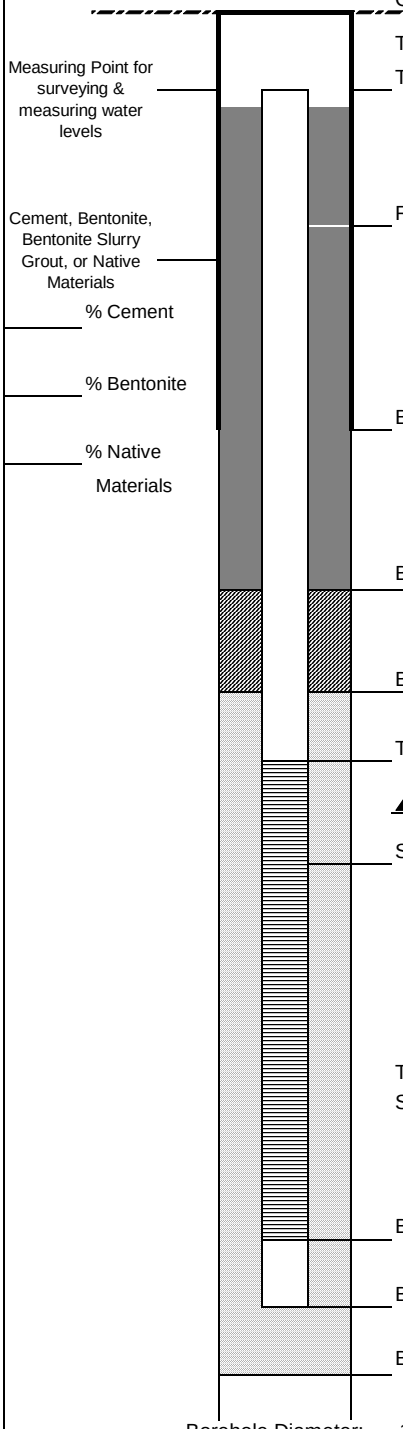
Section 2

Monitoring Well Construction Logs

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE126D1***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: S. Nassau St & Lynn Pl, Bethpage		Date Installed: 12/28/15-1/8/16 *
	Method: MUD ROTARY		Inspector: V. Thayer
	Coords: Northing: 208553.86	Easting: 1125643.00	Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL

* Casing installed with Auger rig 12/7/15 - 12/9/15



	Depth from G.S. (feet)	Elevation(feet) Datum
Ground Surface (G.S.)	0.00	101.65
Top of 12 inch diameter Steel Curb Box		
Top of Riser Pipe fit with locking j-plug	0.00	101.65
Riser Pipe:		
Length: 500		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of 10 inch diameter Steel Surface Casing	53	48.7
Bottom of Bentonite Grout	473	-371.4
Bottom of #00 Filter Sand/Top of #1 Filter Sand	484	-382.4
Top of Screen	500	-398.4
▲ Stabilized Water Level		
Screen:		
Length: 20		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 54		
Bottom of Screen	520	-418.4
Bottom of Sump:	525	-423.4
Bottom of Borehole	538	-436.4

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

Signature

Date

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE126D2***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: S. Nassau St & Lynn Pl, Bethpage		Date Installed: 2/24-3/4/16 *
	Method: MUD ROTARY		Inspector: V. Thayer
	Coords: Northing: 208584.28	Easting: 1125643.78	Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL

* Casing installed with Auger rig 12/9/15 - 12/10/15

	Depth from G.S. (feet)	Elevation(feet) Datum
Ground Surface (G.S.)	0.00	101.74
Top of 12 inch diameter Steel Curb Box		
Top of Riser Pipe fit with locking j-plug	0.35	101.39
Riser Pipe:		
Length: 555		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of 10 inch diameter Steel Surface Casing	53	48.7
Bottom of Bentonite Grout	543	-441.3
Bottom of #00 Filter Sand/Top of #1 Filter Sand	545	-443.3
Top of Screen	555	-453.3
▲ Stabilized Water Level		
Screen:		
Length: 20		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 48		
Bottom of Screen	575	-473.3
Bottom of Sump:	580	-478.3
Bottom of Borehole	593	-491.3

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

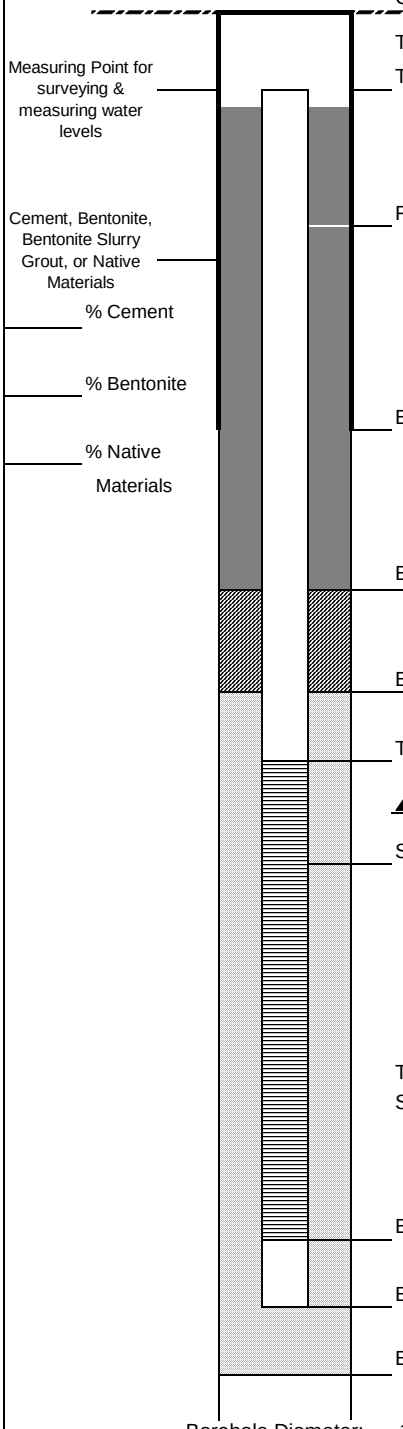
Signature

Date

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE126D3***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: S. Nassau St & Lynn Pl, Bethpage		Date Installed: 1/18-2/15/16 *
	Method: MUD ROTARY		Inspector: VT/MZ
	Coords: Northing: 208568.11	Easting: 1125643.60	Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL

* Casing installed with Auger rig 12/11/15 - 12/14/15



		Depth from G.S. (feet)	Elevation(feet) Datum
Ground Surface (G.S.)		0.00	101.66
Top of 12 inch diameter Steel Curb Box			
Top of Riser Pipe fit with locking j-plug		0.56	101.10
Riser Pipe:			
Length	640		
Inside Diameter (ID)	4 inch		
Type of Material	PVC		
Bottom of 10 inch diameter Steel Surface Casing		52.5	49.2
Bottom of Bentonite Grout		610	-508.3
Bottom of #00 Filter Sand/Top of #1 Filter Sand		625	-523.3
Top of Screen		640	-538.3
▲ Stabilized Water Level			
Screen:			
Length	20		
Inside Diameter (ID)	4 inch		
Slot Size	10		
Type of Material	PVC		
Type/Size of Sand	#1		
Sand Pack Thickness	55		
Bottom of Screen		660	-558.3
Bottom of Sump:		665	-563.3
Bottom of Borehole		680	-578.3

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

Signature

Date

Section 3

Groundwater Sample Log Sheets

Well ID: RE12601

Low Flow Ground Water Sample Collection Record

Client: NWIRP - Bethpage | Date: 4-21-16 | Time: Start 800 am/pm | Finish 1120 am/pm
Project No: 60266526
Site Location:
Weather Conds: Sunny 50° | Collector(s): FB

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

a. Total Well Length 525 c. Length of Water Column _____ (a-b)

b. Water Table Depth 46.23 d. Calculated System Volume (see back) 13 l/gal

Casing Diameter/Material 4" PVC (500-520)

2. WELL PURGE DATA

a. Purge Method: Low Flow

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556 MPS	16444 0
	Hanna	–	463984X

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
845	Start	Purge	Transducer pulled out							ON
900	–	14.53	5.74	96	9.47	208.0	11.3	400	45.72	Clear
905	–	14.56	5.56	95	9.44	211.8	–	650	45.50	
910	–	14.59	5.56	96	9.31	206.4	31.8	650	45.57	Cloudy
915	–	14.64	5.76	98	9.30	196.5	11.9	500	45.72	Cloudy
920	–	14.67	5.60	96	9.28	215.6	20.1	650	45.73	
925	5 Gal	14.72	5.57	95	9.16	219.8	–	650	45.72	Cloudy

(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.

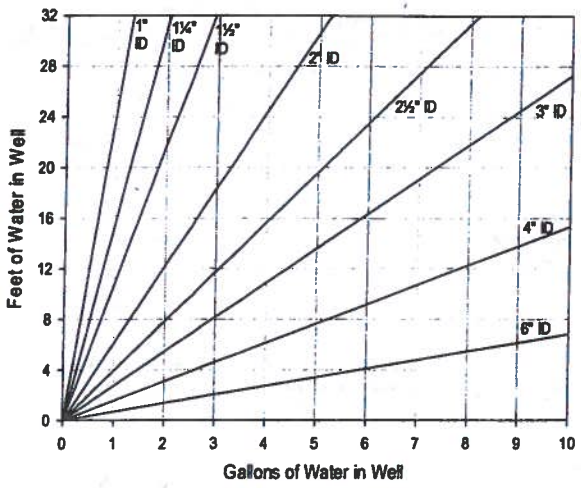
3. SAMPLE COLLECTION: Method: _____

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE12601-GW-042116	1 L Amber (2)		None	1,4-Dioxane	1010
RE12601-GW-042116	VOA	(3)	HCl	VOC	

Comments _____

Signature _____ Date 4/21/2016

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 = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 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
9:30	–	14.68	5.56	95	8.94	221.7	12.6	650	45.67	Clear, no odor
0935	–	14.74	5.59	96	8.85	223.5	11.6	650	45.78	Clear
0940	–	14.74	5.61	96	8.88	224.4	–	650	–	
0945	–	14.74	5.62	97	8.87	225.2	11.5	650	45.76	
0950	–	14.71	5.64	96	8.89	226.4	9.75	650	–	
0955	10Gal	14.76	5.65	96	8.87	227.9	9.49	650	47.79	
1000	–	14.71	5.66	96	8.60	228.7	8.83	650	–	
1005	–	14.75	5.66	97	8.65	229.5	8.53	650	47.74	
1010	Sample Time.									

Well ID: RE126D2

Low Flow Ground Water Sample Collection Record

Client: NWIRP - Bethpage Date: 4-21-16 Time: Start 800 am/pm
Project No: 60266526 Finish 1110 am/pm
Site Location: Lynn Pl
Weather Conds: Sunny 50° Collector(s): JC

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

a. Total Well Length 580 c. Length of Water Column 532.95 (a-b) Casing Diameter/Material 4" PVC (555-575)

b. Water Table Depth 47.05 d. Calculated System Volume (see back) 13.1 Gal

2. WELL PURGE DATA

a. Purge Method: Bladder Pump

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	16571SX
Hanna		

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
~~820~~		1						500		ON
830		14.07	5.54	0.132	5.22	242.9				
840		14.04	5.45	0.104	4.81	278.6				
845	JC	14.10	5.90	0.123	2.37	217.2	16.60		47.08	
850	~~500~~ 971	14.14	5.90	0.125	2.14	211.7				
855		14.12	5.91	0.124	2.06	208.2	12.9	600	47.07	clear
900		14.12	5.92	0.125	1.90	205.6	7.81	600	47.07	"

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)

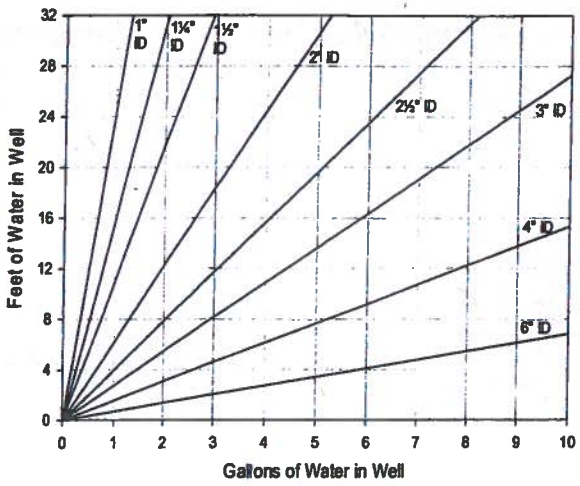
3. SAMPLE COLLECTION: Method: Low Flow

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE126D2-GW-042116	1L AG	2	—	1,2 Dioxane	945
RE126D2-GW-042116	40 mL VOA	3	HCl	VOCs	945
RE126D2-GW-042116 MS	1L/40mL	2/3	—/HCl	1,2 Dioxane/VOCs	945
RE126D2-GW-042116 MSD	1L/40mL	2/3	—/HCl	1,2 Dioxane/VOCs	945

Comments: Hit bottom w/ new tubing

Signature Date 4/21/2016

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 = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 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
905		14.14	5.93	0.126	1.81	204.3	5.85	600	47.06	clear / none
910		14.15	5.93	0.124	1.72	203.7	4.88	600	47.05	"
915		14.30	5.93	0.126	1.65	202.8	4.58	600	47.05	"
920	10 gal	14.35	5.93	0.127	1.58	202.2	4.94	600	47.05	"
925		14.39	5.94	0.125	1.55	200.9	5.05	600	47.05	"
930		14.41	5.95	0.125	1.49	199.6	3.70	600	47.05	"
935		14.44	5.95	0.125	1.50	198.4	3.71	600	47.05	"
940	13.5 gal	14.45	5.96	0.125	1.47	198.3	3.89	600	47.05	"

Well ID: RE12603

Low Flow Ground Water Sample Collection Record

Client: NWIRP - Bethpage Date: 4-21-16 Time: Start 800 am/pm
Project No: 60266526 Finish 1110 am/pm
Site Location:
Weather Conds: Sunny 50° Collector(s): PK

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

a. Total Well Length 665 c. Length of Water Column _____ (a-b)

Casing Diameter/Material 4" PVC (640-660)

b. Water Table Depth 46.72 d. Calculated System Volume (see back) 49.62 / 13.1 gal

2. WELL PURGE DATA

a. Purge Method: _____

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10%
- pH	± 1.0 unit	- ORP	± 10mV
- Sp. Cond.	3%	- Drawdown	< 0.3'

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556	08325 3X
	Hanna	98703	0C3984X

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. ~~mS~~S/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Drawdown (feet)	Color/Odor
835								550		ON
845		15.41	5.45	0.047	7.53	310.4		660	46.72	
850		15.47	5.20	0.046	8.17	313.9	16.1			
855		15.42	5.01	0.045	8.00	320.5			46.73	
900		15.52	4.41	0.045	7.82	339.9	40.7		46.72	
905		15.56	4.17	0.045	7.70	346.8				
910	5gal	15.62	4.67	0.045	7.66	317.7	29.4		46.72	

d. Acceptance criteria pass/fail

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

(continued on back)

If no or N/A - Explain below.

Turbidity was high but stable

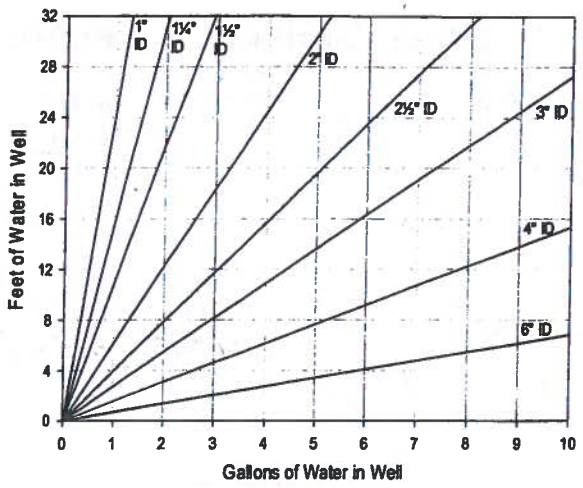
3. SAMPLE COLLECTION: Method: _____

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE12603-GW-042116	VOC vials	3	HCl	1,2 DCE	1015
	1 Liter amber glass	2	none	1,4-Dioxane	

Comments Core length is off by ~5ft, hit bottom, check/measure the lengths

Signature Paul Kauth Date 4-21-16

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 = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: TT126.03 835 (1035)

(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
915		15.67	4.74	0.045	7.63	312.9		600	46.72	
920		15.74	4.79	0.045	7.49	310.5	41.3		46.73	
925		15.76	4.77	0.045	7.46	310.5				
930		15.67	4.70	0.045	7.47	312.2	46.3			
935	10gal	15.70	4.72	6.045	7.29	310.1	59.2		46.72	
940		15.78	4.98	0.046	6.75	285.9	71.1			
945		15.76	5.05	0.047	6.65	277.0	119	600	46.73	
950	13gal	15.79	5.07	0.047	6.54	272.3	108			
955		15.86	5.08	0.047	6.53	272.1	99.3			
1000		15.86	4.87	0.047	7.74	283.6	98.7		46.72	empty flow cell
1005		15.95	4.96	0.047	7.15	280.0	91.7			
1010	17gal	15.95	4.99	0.047	6.90	281.2	89.9		46.72	
1015										sample

Section 4

Analytical Data Validation

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SJ2726	
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: 05/31/2016
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SJ2726_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 21 April 2016 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-042116	Duplicate of RE131D1-GW-042116	8260C, 8270D_SIM
FB03-042116	Field Blank	8260C, 8270D_SIM
RE126D1-GW-042116	Groundwater	8260C, 8270D_SIM
RE126D2-GW-042116	Groundwater	8260C, 8270D_SIM
RE126D3-GW-042116	Groundwater	8260C, 8270D_SIM
RE131D1-GW-042116	Groundwater	8260C, 8270D_SIM
RE131D2-GW-042116	Groundwater	8260C, 8270D_SIM
RE131D3-GW-042116	Groundwater	8260C, 8270D_SIM
TRIP BLANK 042116	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* (United States Environmental Protection Agency [U.S. EPA] 2006), *SW-846 Method 8270D, Semi volatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA 2007), *U.S. Environmental Protection Agency Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (U.S. EPA, 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 (ICAL) / initial calibration verification (ICV) / continuing calibration verification (CCV)
✗	Laboratory blanks / trip blanks / field blanks
✓	Surrogate spike recoveries
✗	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample / laboratory control sample duplicate 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 (*X*) 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/ Initial Calibration Verification / Continuing Calibration Verification

The ICAL is evaluated to ensure that the instrument was capable of producing acceptable quantitative data prior to the analysis of environmental samples. The ICV is evaluated to assess the accuracy of the ICAL standards. The CCV is evaluated to determine whether the instrument was within acceptable calibration throughout the period in which samples were analyzed.

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

- The ICAL percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met
- The ICV standard percent recovery acceptance criteria were met
- The CCV method percent difference or percent drift and response factor acceptance criteria were met
- The retention time method acceptance criteria were met

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

ICAL Linearity Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%RSD >15% and quantitation based on mean response factor	J	UJ

Notes:
%RSD = Relative standard deviation
J = Estimated
UJ = Undetected and estimated

Data qualification to the analytes associated with the specific ICV 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

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

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 non-conformances are summarized in Attachment A in Table A-1.

Laboratory Blanks / Trip Blanks / Field Blanks

Blanks are assessed to determine the existence and magnitude of contamination of contamination problems and measure of the representativeness of the analytical process. Laboratory blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. Trip blanks and field blanks help determine how much, if any, contamination was introduced in the field and laboratory activities. All results associated with a particular blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data. Samples were flagged in accordance with *Functional Guidelines* (shown below) where detections were not believed to be site-related.

Blank Non-conformance Charts:

For common lab contaminants (methylene chloride, acetone, 2-butanone):			
Blank type	**Blank result**	**Sample result**	**Action for samples**
Method, Storage, Trip, Field, or Equipment	Detects	Not detected	No qualification
	≤ 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and ≤ 4x the LOQ	Report the sample result with a U**
		≥ 4x the LOQ	No qualifications
	> 2x LOQ	< LOD	Report sample LOD value with a U**
		≥ LOD and < 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and < blank contamination	Report the blank result with a U or reject the sample result as unusable R
		≥ 2x LOQ and ≥ blank contamination	If the result is ≤2x blank result, report the sample result U.** If the result is > 2x blank result, no qualification is required.**
****Based on Resolution Consultants professional judgment**			

Notes:

LOQ	=	Limit of quantitation
LOD	=	Limit of detection
U	=	Undetected
R	=	Rejected

Lab blank, trip blank, and field blank non-conformances are summarized in Attachment A in Table A-2.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD percent recoveries (%Rs) assess the effect of the sample matrix on the accuracy of the analytical results and %Rs above the laboratory control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. The relative percent differences (RPDs) between the MS and MSD results are evaluated to assess sample precision. The MS/MSD %Rs and RPDs were reviewed for conformance with the QC acceptance criteria. Data qualification to the analytes associated with the specific MS/MSD non-conformances were as follows:

MS/MSD Non-conformances Chart:

Criteria	Action	
	Detected Compounds	Non-detected Compounds
%R>Upper Limit	J	No qualification
20% ≤ %R < Lower Limit	J	UJ
%R <20%	J	Rejected

Notes:

%R	=	Percent recovery
RPD	=	Relative percent difference
J	=	Estimated
UJ	=	Undetected and estimated

MS/MSD non-conformances are summarized in Attachment A in Table A-3.

Qualifications Actions

The data were reviewed independently from the laboratory to assess data quality. All analytes 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. Data not qualified during data review are considered usable by the project. 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. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. EPA 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

Analyte	ICV ID	%R	Limit	Associated Samples	Lab ID	Qualifier
DICHLORODIFLUOROMETHANE	P5447A	73.49	80-120	RE126D1-GW-042116	SJ2726-2	Non-detects: UJ
DICHLORODIFLUOROMETHANE	P5447A	73.49	80-120	RE126D2-GW-042116	SJ2726-3	Non-detects: UJ
DICHLORODIFLUOROMETHANE	P5447A	73.49	80-120	FB03-042116	SJ2726-5	Non-detects: UJ
DICHLORODIFLUOROMETHANE	P5447A	73.49	80-120	RE131D1-GW-042116	SJ2726-6	Non-detects: UJ
DICHLORODIFLUOROMETHANE	P5447A	73.49	80-120	RE131D2-GW-042116	SJ2726-7	Non-detects: UJ
ACETONE	P5447A	128.63	80-120	RE126D1-GW-042116	SJ2726-2	Non-detects: UJ
ACETONE	P5447A	128.63	80-120	RE126D2-GW-042116	SJ2726-3	Non-detects: UJ
ACETONE	P5447A	128.63	80-120	FB03-042116	SJ2726-5	Detects: J
ACETONE	P5447A	128.63	80-120	RE131D1-GW-042116	SJ2726-6	Detects: J
ACETONE	P5447A	128.63	80-120	RE131D2-GW-042116	SJ2726-7	Non-detects: UJ
DICHLORODIFLUOROMETHANE	T7138A	78.07	80-120	TRIP BLANK 042116	SJ2726-1	Non-detects: UJ
DICHLORODIFLUOROMETHANE	T7138A	78.07	80-120	DUPLICATE-042116	SJ2726-9	Non-detects: UJ
DICHLORODIFLUOROMETHANE	T7138A	78.07	80-120	RE126D3-GW-042116	SJ2726-4RA	Non-detects: UJ
DICHLORODIFLUOROMETHANE	T7138A	78.07	80-120	RE131D3-GW-042116	SJ2726-8RA	Non-detects: UJ
ACETONE	T7138A	152.32	80-120	TRIP BLANK 042116	SJ2726-1	Detects: J
ACETONE	T7138A	152.32	80-120	DUPLICATE-042116	SJ2726-9	Non-detect: UJ
ACETONE	T7138A	152.32	80-120	RE126D3-GW-042116	SJ2726-4RA	Non-detects: UJ
ACETONE	T7138A	152.32	80-120	RE131D3-GW-042116	SJ2726-8RA	Non-detects: UJ

Notes:
ICV ID = Initial calibration verification identification
%R = Percent recovery
UJ = Qualified non-detect and estimated
J = Detected analytes qualified estimated

Table A-2
Blank Non-Conformance

Blank ID	Analyte	Blank Result (UG_L)	LOQ	Detected Associated Sample	Qualifier
WG182433-9	METHYLENE CHLORIDE	1.9	5.0	FB03-042116	UJ
FB03-042116	ACETONE	6.0	5.0	DUPLICATE-042116	UJ
FB03-042116	ACETONE	6.0	5.0	RE126D1-GW-042116	UJ
FB03-042116	ACETONE	6.0	5.0	RE126D2-GW-042116	UJ
FB03-042116	ACETONE	6.0	5.0	RE126D3-GW-042116	UJ
FB03-042116	ACETONE	6.0	5.0	RE131D2-GW-042116	UJ
FB03-042116	ACETONE	6.0	5.0	RE131D3-GW-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	DUPLICATE-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	RE126D1-GW-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	RE126D2-GW-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	RE126D3-GW-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	RE131D2-GW-042116	UJ
TRIP BLANK 042116	ACETONE	7.6	5.0	RE131D3-GW-042116	UJ

Notes:
UG_L = Micrograms per liter
LOQ = Limit of quantitation
UJ = Analyte qualified as non-detect and estimated due to blank contamination.

Table A-3 Matrix Spike/Matrix Spike Duplicate Non-Conformance							
Spiked Sample	Analyte	Sample Result (UG_L)	Spike Added	MS %R	MSD %R	%R Limits	Qualifier
RE126D2-GW-042116	1,4-DIOXANE	3.7	2.10	68.9	106*	10 – 90	J
RE126D2-GW-042116	CARBON TETRACHLORIDE	< 0.50	50.0	66.6	61.2*	65 - 140	UJ

Notes:

UG_L = Micrograms per liter
MS = Matrix spike
MSD = Matrix spike duplicate
%R = Percent recovery
Bold* = Percent recovery not within control limit
J = Detected analyte in associated sample qualified as estimated because the MSD %R is greater than the control limit.
UJ = Analyte in associated sample qualified non-detect and estimated "UJ" because the MSD %R is lower than the 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
bm	Missing blank information
bt	Trip blank contamination
c	Calibration issue
cr	Chromatographic resolution
d	Reporting limit raised due to chromatographic interference
dt	Dissolved result > total over limit
e	Ether interference
ej	Above calibration range; result estimated.
f	Presumed contamination from FB or ER.
fd	Field duplicate RPDs
h	Holding times
hs	Headspace greater than 6mm in all sample vials
i	Internal standard areas
ii	Injection internal standard area or retention time exceedance
it	Instrument tune
k	Estimated maximum possible concentrations (EMPC)
l	LCS recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
mc	Deviation from the method
md	MS/MSD RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
p-h	Uncertainty near detection limit (< Reporting Limit), historical reason code applied.
pe	Post Extraction Spike
q	Quantitation issue
r	Dual column RPD
rt	SIM ions not within + 2 seconds
s	Surrogate recovery
sp	Sample preparation issue
su	Evidence of ion suppression
t	Temperature Preservation Issue
x	Low % solids
y	Serial dilution results
z	ICS results

Attachment D
Final Results after Data Review

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-1		
		Sample ID		TRIP BLANK 042116		
		Sample Date		4/21/2016		
		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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	7.6	J	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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
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	U	
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	U	
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	NA		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-2		
		Sample ID		RE126D1-GW-042116		
		Sample Date		4/21/2016		
		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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
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	U	
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	3.6		
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	33		
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	4.8		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-3		
		Sample ID		RE126D2-GW-042116		
		Sample Date		4/21/2016		
		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	0.9	J	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.38	J	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	2		
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	2.2		
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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	UJ	m
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	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	2.2		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
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	3.4		
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	500		
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	3.7	J	m

Notes:
UG_L = Micrograms per liter
NA = Not applicable
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RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-4RA		
		Sample ID		RE126D3-GW-042116		
		Sample Date		4/21/2016		
		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	0.84	J	
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	0.38	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	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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
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	U	
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	2.8		
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	4.6		
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	1.6		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-5		
		Sample ID		FB03-042116		
		Sample Date		4/21/2016		
		Sample Type		Field 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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	6	J	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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
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	U	
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	UJ	bl
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	U	
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	0.2		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-6		
		Sample ID		RE131D1-GW-042116		
		Sample Date		4/21/2016		
		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	4.4		
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	0.71	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	4.1		
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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	3.5		
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	4.1		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
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	7.6		
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	88		
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		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-7		
		Sample ID		RE131D2-GW-042116		
		Sample Date		4/21/2016		
		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	1	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	3.8		
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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	3.8		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
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	6		
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	41		
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	8.2		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-8RA		
		Sample ID		RE131D3-GW-042116		
		Sample Date		4/21/2016		
		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	91		
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	0.54	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	0.24	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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.24	J	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
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	1.5		
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	3.8		
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	1.1		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

SJ2726
Final Results after Data Review
NWIRP Bethpage OU 2 Regional Groundwater Investigation

		Sample Delivery Group		SJ2726		
		Lab ID		SJ2726-9		
		Sample ID		DUPLICATE-042116		
		Sample Date		4/21/2016		
		Sample Type		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	4.2		
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	0.56	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	3.4		
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	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	UJ	bf,bt,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	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
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	3.5		
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	3.4		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
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	6.5		
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	79		
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	10		

Notes:
UG_L = Micrograms per liter
NA = Not applicable
Qual = Final qualifiers (See Attachment B)
RC = Reason codes (See Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SJ1453	
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:	2	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 05/25/2016
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SJ1453_ 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 1 March 2016 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
RE126D2-SOIL-030116-558-560	SJ1453-2	Soil	9060A, 2540G
RE126D2-EB-030116	SJ1453-1	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
NA	Initial calibration/continuing calibration verification
✗	Laboratory blanks/equipment 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. 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.

Laboratory Blanks/Equipment Blanks

Laboratory blanks and equipment blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data. Samples were flagged in accordance with *Functional Guidelines* (shown below) where detections were not believed to be site-related.

Blank Non-conformance Charts:

For common lab contaminants (methylene chloride, acetone, 2-butanone):			
Blank type	**Blank result**	**Sample result**	**Action for samples**
Method, Storage, Trip, Field, or Equipment	Detects	Not detected	No qualification
	≤ 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and ≤ 4x the LOQ	Report the sample result with a U**
		≥ 4x the LOQ	No qualifications
	> 2x LOQ	< LOD	Report sample LOD value with a U**
		≥ LOD and < 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and < blank contamination	Report the blank result with a U or reject the sample result as unusable R
		≥ 2x LOQ and ≥ blank contamination	If the result is ≤2x blank result, report the sample result U.** If the result is > 2x blank result, no qualification is required.**
****Based on Resolution Consultants professional judgment**			

For all other compounds:			
Blank type	Blank result	Sample result	Action for samples
Method, Storage, Trip, Field, or Equipment	Detects	Not detected	No qualification
	< 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ	Use professional judgment
	> 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and < blank contamination	Report the blank result with a U or reject the sample result as unusable R
		≥ 2x LOQ and ≥ blank contamination	If the result is ≤2x blank result, report the sample result U. If the result is > 2x blank result, no qualification is required.
	= 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ	Use professional judgment
	Gross contamination	Detects	Qualify results as unusable R

Notes:
LOQ = Limit of quantitation
LOD = Limit of detection
U = Undetected
R = Rejected

TOC was detected in the equipment blank but professional judgement was used not to qualify the associated sample as undetected. Lab blank non-conformances are summarized in Attachment A in Table A-1.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. One sample was qualified as non-detect and estimated due to lab blank contamination. All analytes 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. Data not qualified during data review are considered usable by the project for their intended purpose, according to U.S. EPA and Department of Defense guidelines. Final results after data review are provided in Attachment B.

ATTACHMENTS

Attachment A: Non-Conformance Summary Table

Attachment B: Table B-1, Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Lab Blank Non-Conformance

Blank	Batches	Method	Analyte	Blank Result (MG_L)	LOQ	Associated Samples	Detected Associated Sample Result (MG_L)	LOQ	Qualifier
WG180357-1	WG180357	5310B	TOTAL ORGANIC CARBON	0.13	1.0	RE126D2-EB-030116	0.36	1.0	UJ

Notes:
MG_L = Milligrams per liter
LOQ = Limit of quantitation
UJ = The analyte was found in a sample at a concentration less than five times the blank concentration and qualified non-detect and estimated.

Attachment B
Final Results after Data Review

Table B-1
Final Results after Data Review
Regional Groundwater Investigation NWIRP Bethpage

			Sample Delivery Group	SJ1453			SJ1453		
			Lab ID	SJ1453-1			SJ1453-2		
			Sample ID	RE126D2-EB-030116			RE126D2-SOIL-030116-558-560		
			Sample Date	3/1/2016			3/1/2016		
			Matrix	Equipment Blank			Soil		
Method	Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC
2540G	TOTAL SOLIDS	-29	PCT				84		
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.5	UJ	bl			
9060A	TOTAL ORGANIC CARBON	-28	UG_G				330	J	

Notes:

ID = Identification
Qual = Final interpreted qualifier
RC = Validator reason code (See definition below)
PCT = Percent
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
UJ = Non-detect and estimated value
J = Estimated value; the reported value is greater than or equal to the laboratory method limit but less than the quantitation limit.

Reason Code

bl = Flagged non-detect and estimated due to lab blank contamination.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SJ0104	
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:	2	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 02/3/2016
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SJ0104_ 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 January 2016 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
RE126D1-EB-010516-503-505	SJ0104-1	Equipment Blank	5310B
RE126D1-SO-010516-503-505	SJ0104-2	Soil	9060A, 2540G
RE126D1-DUP-010516	SJ0104-3	Field Duplicate	9060A, 2540G

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
NA	Initial calibration/continuing calibration verification
✗	Laboratory blanks/equipment blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample / laboratory control sample duplicate results
✓	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. 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.

Laboratory Blanks/Equipment Blanks

Laboratory blanks and equipment blanks were analyzed with samples to assess contamination imparted by sample preparation and/or analysis. All results associated with a particular blank were evaluated to determine whether there was an inherent variability in the data, or if a problem was an isolated occurrence that did not affect the data. Samples were flagged in accordance with *Functional Guidelines* (shown below) where detections were not believed to be site-related.

Blank Non-conformance Charts:

For common lab contaminants (methylene chloride, acetone, 2-butanone):			
Blank type	**Blank result**	**Sample result**	**Action for samples**
Method, Storage, Trip, Field, or Equipment	Detects	Not detected	No qualification
	≤ 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and ≤ 4x the LOQ	Report the sample result with a U**
		≥ 4x the LOQ	No qualifications
	> 2x LOQ	< LOD	Report sample LOD value with a U**
		≥ LOD and < 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and < blank contamination	Report the blank result with a U or reject the sample result as unusable R
		≥ 2x LOQ and ≥ blank contamination	If the result is ≤2x blank result, report the sample result U.** If the result is > 2x blank result, no qualification is required.**
****Based on Resolution Consultants professional judgment**			

For all other compounds:			
Blank type	Blank result	Sample result	Action for samples
Method, Storage, Trip, Field, or Equipment	Detects	Not detected	No qualification
	< 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ	Use professional judgment
	> 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ and < blank contamination	Report the blank result with a U or reject the sample result as unusable R
		≥ 2x LOQ and ≥ blank contamination	If the result is ≤2x blank result, report the sample result U. If the result is > 2x blank result, no qualification is required.
	= 2x LOQ	< 2x LOQ	Report sample LOQ value with a U
		≥ 2x LOQ	Use professional judgment
	Gross contamination	Detects	Qualify results as unusable R

Notes:

LOQ	=	Limit of quantitation
LOD	=	Limit of detection
U	=	Undetected
R	=	Rejected

TOC was detected in the equipment blank but professional judgement was used not to qualify the associated sample as undetected. Lab blank non-conformances are summarized in Attachment A in Table A-1.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. One sample was qualified as non-detect and estimated due to lab blank contamination. All analytes 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. Data not qualified during data review are considered usable by the project for their intended purpose, according to U.S. EPA and Department of Defense guidelines. Final results after data review are provided in Attachment B.

ATTACHMENTS

Attachment A: Non-Conformance Summary Table

Attachment B: Table B-1, Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Lab Blank Non-Conformance

Blank	Batches	Method	Analyte	Blank Result (MG_L)	LOQ	Associated Samples	Detected Associated Sample Result (MG_L)	LOQ	Qualifier
WG177533-1	WG177533	5310B	TOTAL ORGANIC CARBON	0.14	1.0	RE126D1-EB-010516-503-505	0.34	1.0	UJ

Notes:
MG_L = Milligrams per liter
LOQ = Limit of quantitation
UJ = The analyte was found in a sample at a concentration less than five times the blank concentration and qualified non-detect and estimated.

Attachment B
Final Results after Data Review

Table B-1
Final Results after Data Review
Regional Groundwater Investigation NWIRP Bethpage

			Sample Delivery Group	SJ0104			SJ0104			SJ0104		
			Lab ID	SJ0104-1			SJ0104-2			SJ0104-3		
			Sample ID	RE126D1-EB-010516-503-505			RE126D1-SO-010516-503-505			RE126D1-DUP-010516		
			Sample Date	1/5/2016			1/5/2016			1/5/2016		
			Sample Type	Equipment Blank			Soil			Field Duplicate		
Method	Analyte	CAS No	Units	Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
2540G	TOTAL SOLIDS	-29	PCT	NA			85			86		
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.5	UJ	bl	NA			NA		
9060A	TOTAL ORGANIC CARBON	-28	UG_G	NA			400	J		440	J	

Notes:

ID = Identification
Qual = Final interpreted qualifier
RC = Validator reason code (See definition below)
PCT = Percent
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
UJ = Non-detect and estimated value
J = Estimated value; the reported value is greater than or equal to the laboratory method limit but less than the quantitation limit.

Reason Code

bl = Flagged non-detect and estimated due to lab blank contamination.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SJ0691	
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:	2	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 03/04/2016
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SJ0691_ 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 27 January 2016 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
RE126D3-SOIL-012716-643-645	SJ0691-2	Soil	9060A, 2540G
RE126D3-EB-012716	SJ0691-1	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
NA	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
NA	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. TOC was detected in the equipment blank but professional judgement was used not to qualify the associated sample as undetected. 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. Attachment A, Table A-1 provides final results after data review.

ATTACHMENTS

Attachment A: Table A-1, Final Results after Data Review

Attachment A
Final Results after Data Review

Table A-1
Final Results after Data Review
Regional Groundwater Investigation NWIRP Bethpage

			Sample Delivery Group	SJ0691	SJ0691
			Lab ID	SJ0691-1	SJ0691-2
			Sample ID	RE126D3-EB-012716	RE126D3-SOIL-012716-643-645
			Sample Date	1/27/2016	1/27/2016
			Sample Type	Equipment Blank	Soil
Method	Analyte	CAS No	Units	Result	Result
2540G	TOTAL SOLIDS	-29	PCT	NA	87
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.47 J	NA
9060A	TOTAL ORGANIC CARBON	-28	UG_G	NA	170 J

Notes:

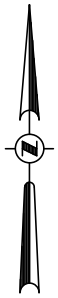
ID = Identification
PCT = Percent
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
J = Estimated value – value was below the limit of quantitation.

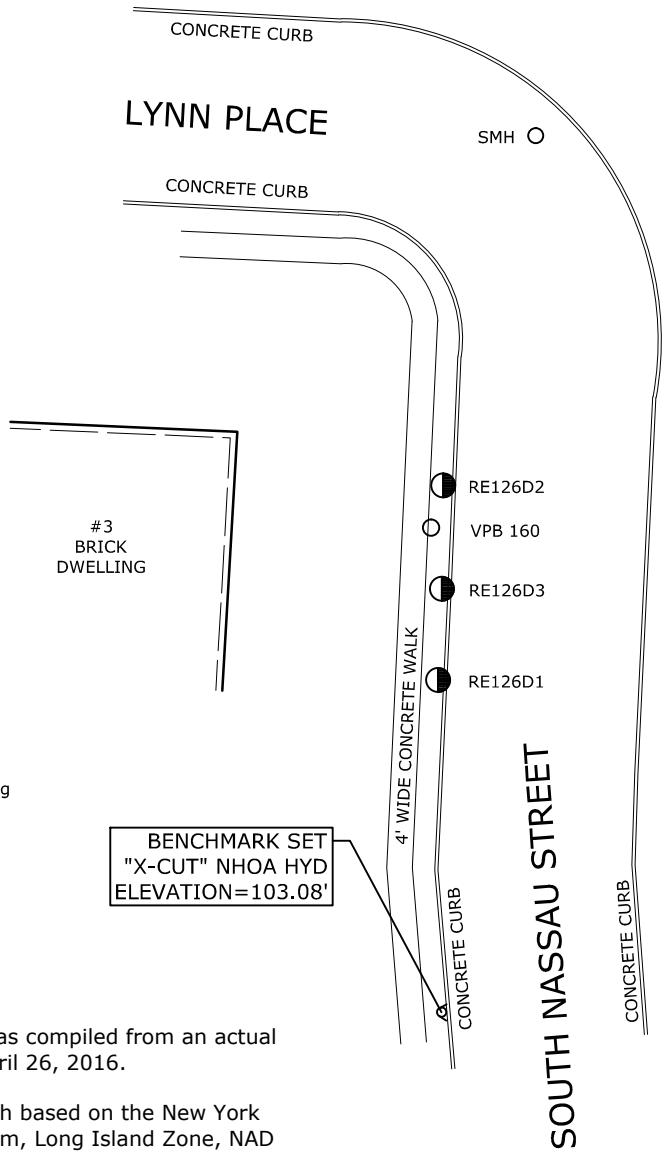
Section 5

Survey

NONE :XREFS

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
VPB 160	208577.64	1125641.89	N40-44-16.96	W73-29-23.22	101.68	NA	NA
RE126D1	208553.86	1125643.00	N40-44-16.72	W73-29-23.21	101.65	101.65	101.03
RE126D2	208584.28	1125643.78	N40-44-17.02	W73-29-23.19	101.74	101.74	101.39
RE126D3	208568.11	1125643.60	N40-44-16.86	W73-29-23.20	101.66	101.66	101.10



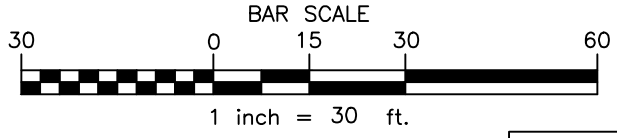


Legend

◑		Monitoring Well
○	SMH	Sanitary Manhole
○	VPB 160	Vertical Profile Boring

Map Notes

1. Information shown hereon was compiled from an actual field survey conducted on April 26, 2016.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83(2011) epoch 2010.00 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88(Geoid12A) as obtained from RTK GPS observations using the Queens CORS as a base station.



DWG NO. 16-326

Date	RECORD OF WORK	Appr.

Drafter: LMK | Checker: JFC

Appr. by: JFC | Proj. No. 14.4121

VERTICAL PROFILE BORING 160 SURVEY LOCATION
3 LYNN PLACE

TOWN OF OYSTER BAY | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

SCALE: 1"=30' | DATE: APRIL 26, 2016

CAD DWG. FILE NAME: K:\Projects\144121\Survey\Drawings and Maps\VPB 160.dwg