

ABBREVIATED WORK PLAN – OCTOBER 2018
VERTICAL PROFILE BORINGS (VPB172, VPB173, VPB174, VPB175, VPB176, VPB178,
VPB179 and VPB180)
PRE-DESIGN FIELD INVESTIGATION, OPERABLE UNIT 2 GROUNDWATER
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), BETHPAGE, NEW YORK

This abbreviated work plan has been prepared for the Mid-Atlantic Division of the Naval Facilities Engineering Command (NAVFAC) pursuant to Contract Task Order (CTO) WE15, issued under Comprehensive Long-term Environmental Action Navy (CLEAN) contract number N62470-11-D-8013. This abbreviated work plan will follow the requirements for installation and sampling of vertical profile borings (VPBs) and monitoring wells within Operable Unit (OU) 2, which are detailed in the Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP) Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, 2013a). This investigation is being conducted to better define the extent of solvent-contaminated groundwater off site of the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (NY) (Figure 1). Regional groundwater flow is south-southeast, but is locally affected by the operation of recharge basins and public water supply wells.

Scope and Objectives

The objectives of the field investigation are to better define the horizontal and vertical extent of groundwater contamination, evaluate migration, and determine concentrations of volatile organic compounds (VOCs) in groundwater that is south of the Navy and Northrop Grumman (NG) properties and to determine if there are VOCs migrating to the Onsite Containment Treatment System (ONCT) from the west. This contamination is up-gradient of several potable water supply wells in the area and continues to migrate to the south-southeast.

This investigation will consist of the installation of eight VPBs (VPBs 172, 173, 174, 175, 176, 178, 179 and 180) to a depth of approximately 1,000 feet (ft) below ground surface (bgs). This depth is required to confirm the depth of the Raritan Clay, which is the base of the hydrogeological flow system. During installation of the VPBs, groundwater samples will be collected for VOC analysis using Environmental Protection Agency (EPA) Method 8260C. Based on the groundwater sample results, permanent monitoring wells will be installed at the VPB locations. The permanent monitoring wells will be surveyed and one round of groundwater samples will be collected for VOC analysis.

Sampling Locations

The work will be conducted at up to eight locations, designated as VPBs 172, 173, 174, 175, 176, 178, 179 and 180. At each location, a VPB will be completed followed by installation of up to three

monitoring wells targeting different depths. Figure 2 provides the regional location of each of the proposed VPBs. The boring locations are shown aerially in Figure 3 for VPB172, Figure 4 for VPB173, Figure 5 for VPB174, Figure 6 for VPB175, Figure 7 for VPB176, Figure 8 for VPB178, Figure 9 for VPB179, and Figure 10 for VPB180. The accompanying monitoring wells are anticipated to be placed within 40 ft of each of the VPB locations. The accompanying monitoring wells may be installed at a later date. VPB180 is a contingency boring that the Navy may elect to install based on the results of the surrounding borings.

The VPBs and monitoring wells will be installed south and west of the NWIRP Bethpage and NG parcels. The VPBs are proposed at the following locations:

- VPB172 and up to three associated monitoring wells, (RE138D1, RE138D2, and RE138D3) will be located on the north side of Ludwig Lane, east of Ava Road in Bethpage, NY. The borings will be located in the right-of-way at the southeast corner of Ava Road to approximately 150 feet east of Ava Road.
- VPB173 and up to three monitoring wells (RE139D1, RE139D2, and RE139D3) will be located on the east side of Red Maple Drive East, south of Rib Lane in Levittown NY. The borings will be located in the right-of-way at the south east corner of Rib Lane and Red Maple Drive East to approximately 150 feet southeast of Rib Lane.
- VPB174 and up to three monitoring wells (RE140D1, RE140D2, and RE1409D3) will be located on the south side of Richard Lane, west of Libby Lane in Levittown NY. The borings will be located in the right-of-way at the northeast corner of Libby Lane and Richard Lane to approximately 100 feet east of Libby Lane.
- VPB175 and up to three monitoring wells (RE141D1, RE141D2, and RE141D3) will be located on the south side of Raven Street, west of Swan Place in Levittown NY. The borings will be located in the right-of-way at the southeast corner of Raven Street and Swan Place to approximately 100 feet east of Swan Place.
- VPB176 and up to three monitoring wells (RE142D1, RE142D2, and RE142D3) will be located on the north side of Ivy Drive west of West Ivy Court and east of West Ivy Court in Bethpage NY. The borings will be located in the right-of-way at the northwest corner of Ivy Drive and West Ivy Court extending to approximately 85 feet west of West Ivy Court and in the right-of-way at the northeast corner of Ivy Drive and West Ivy Court extending to approximately 85 feet east of West Ivy Court.
- VPB177 is associated with RW4. Information on VPB177 is provided under a separate work plan.

- VPB178 and up to three monitoring wells (RE144D1, RE144D2, and RE144D3) will be located on the west side of Dale Court North of Albert Road in Hicksville NY. The borings will be located in the right-of-way at the northwest corner of Dale Court and Albert Road extending to approximately 75 feet north of Albert Road.
- VPB179 and up to three monitoring wells (RE145D1, RE145D2, and RE145D3) will be located on the south side of Birchwood Drive and the west side of Woodbine Drive East in Hicksville NY. The borings will be located in the right-of-way at the southeast corner of Birchwood Lane and Woodbine Drive East and extend approximately 65 feet southwest of Woodbine Drive East and in the right-of-way at the southeast corner of Birchwood Lane and Woodbine Drive East extending to approximately 70 feet southeast of Birchwood Lane.
- VPB180 and up to three monitoring wells (RE146D1, RE146D2, and RE146D3) will be located on the west side of Taylor Avenue, north of Coleridge Street Levittown NY. The borings will be located in the right-of-way at the northwest corner of Taylor Avenue and Coleridge Street to approximately 150 feet north of Coleridge Street.

Site History

NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1). NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, NY. 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 the 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 Nassau County property. Access to the NWIRP is from South Oyster Bay Road.

Field Investigation Task Plan

Details of the field investigation are provided below. All aspects of the field investigation specified in the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, April 2013a) will be followed.

Vertical Profile Borings

The eight VPBs will be drilled to the top of the Raritan Clay Unit. Soil and groundwater samples will be collected during installation of the VPBs. Field sampling regimes are presented in Table 1. Sample nomenclature and analysis are presented in Table 2.

Soil Sampling

Up to 10 split spoon samples per VPB will be collected from ground surface to the top of the Raritan Clay (approximately 800 to 1,000 ft bgs). Verification of the Raritan Clay formation will be confirmed when three consecutive 5 ft split spoon samples are representative of a significant clay unit. Up to two soil samples for total organic carbon (TOC) analysis will be collected per VPB.

Groundwater Sampling during VPB Installation

For each VPB, groundwater grab samples will be collected for screening purposes from a hydropunch-type sampler at the following depth intervals:

- 50-Foot intervals from 50 to 200 ft bgs (four samples per boring).
- 20-Foot intervals from 200 up to 1,000 ft bgs (up to 40 samples per boring).

Groundwater samples will be analyzed by a local laboratory (48 hour turnaround time [TAT]) that is New York State and Navy approved for VOC analysis using the EPA Method 8260C method. Trip blanks will also be collected and submitted for VOC analysis with the sample shipment.

During the collection of groundwater samples, field parameters will be measured (pH, temperature, specific conductivity, oxidation reduction potential, dissolved oxygen, and turbidity) as volume permits.

Geophysical Logging

After encountering the Raritan Clay, borehole geophysical logs (specifically gamma activity logs) will be performed to determine lithology within each VPB boring.

Air Monitoring

One air sample per VPB will be collected to document ambient levels of VOCs in the work area air during installation of the VPB borings. A community air monitoring plan (CAMP) will also be followed during installation of the VPBs and monitoring wells; details of the CAMP are provided in the Health and Safety Plan – Site 1 OU-2 Off Site TCE Groundwater Plume Investigation (Resolution Consultants, 2012) which follows procedures outlined by the New York State Department of Environmental Conservation (NYSDEC) DER 10.

Monitoring Well Installation

Groundwater monitoring wells may be installed during this investigation at a later date (the anticipated number of wells at each VPB is shown in Table 3). The monitoring wells will be installed using mud rotary drilling techniques. Table 3 provides a summary of the proposed wells and screen intervals. Final screen intervals will be determined from lithology and groundwater data collected from the VPBs. A typical well construction detail is provided in Attachment 1.

The groundwater monitoring wells will be constructed of 4-inch diameter, schedule 80 National Sanitation Foundation (NSF)-grade polyvinyl chloride (PVC) well casing and screen. Well screen depths at each VPB location will be determined following completion of the VPB by evaluating the geologist log, the geophysical log, and the trichloroethene (TCE) profile from the hydropunch sampling. Well screens will be 10 slot (0.010 inches) with 20 feet of screen. After setting the well screen and casing, the sand pack (W.G. No. 1) will be placed within the boring annulus, to a depth as indicated in Table 3. The well gravel pack will be dependent on the total depth of the wells and will be placed as follows:

- Well total depth (TD) 50 to 350 ft bgs: to a minimum of 10 feet above top of screen.
- Well TD 350 to 600 ft bgs: to a minimum of 20 feet above top of screen.
- Well TD 600 to 850 ft bgs: to a minimum of 25 feet above top of screen.

A fine sand layer (finer than gravel pack) will be placed in the annulus on top of the gravel pack in the same manner as the gravel pack, as follows:

- Well TD 50 to 350 ft bgs: 5 feet thick above the top of the gravel pack.
- Well TD 350 to 600 ft bgs: 10 feet thick above the top of the gravel pack.
- Well TD 600 to 850 ft bgs: 15 feet thick above the top of the gravel pack.

The gravel pack and fine sand thickness may be changed based on subsurface conditions. A bentonite/cement grout will be installed within the annular space above the bentonite seal. Wells

will be completed at grade using a 12-inch diameter, locking curb box in place over the wells. Fine sand will be installed above the top of the box to drain. A 0.5-foot thick concrete apron measuring 2 ft by 2 ft square will be installed around each well. Well locks will be used to secure the wells.

Monitoring Well Groundwater Sample Collection and Analysis

Monitoring wells will be developed using a combination of air lift and mechanical surging. Field parameters, including pH, temperature, specific conductivity, oxidation reduction potential, dissolved oxygen and turbidity will be monitored and recorded throughout well development.

Well development will also include purging stagnant water from the well above the screen interval and rinsing the interior well casing above the water table using only water from that well. The well will be covered with a clean well cap.

In compliance with NYSDEC policy, wells will be developed until turbidity is less than 50 nephelometric turbidity units (NTU). However, in some instances, the 50 NTU standard may not be attainable. If after a "best well development effort", the 50 NTU standard cannot be attained and turbidity stabilizes (above the 50 NTU standard), the well will be considered acceptable.

After initial sampling, which will be conducted according to the UFP SAP Addendum - Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol (Resolution Consultants, 2013b), a dedicated sampling pump system may be installed in the monitoring wells. If installed, these pumps will be stainless steel bladder pumps equipped with a pump inlet drop tube. The pumps will be installed no deeper than 50 to 70 feet below the water table (approximately 100 ft bgs) and the drop tube inlet will extend to the middle of the screen interval.

All groundwater and quality assurance/quality control (QA/QC) samples will be analyzed by a New York State and Navy approved laboratory using EPA Methods 8260C and 8270C SIM.

Investigation Derived Waste

Investigation derived waste (IDW) accumulated during drilling activities will be collected, containerized, accumulated at NWIRP Bethpage, and disposed of off site. All IDW activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, 2013a).

Decontamination

A centrally-located decontamination pad at NWIRP Bethpage will be used for the collection of all decontamination-generated fluids. All decontamination fluids will be collected and staged for characterization and subsequent disposal. All decontamination activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, 2013a).

Surveying

The location of each VPB and all newly installed wells will be surveyed by a New York State licensed surveyor. All surveying activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, 2013a).

Data Validation

Data validation will be conducted for the groundwater and air samples. Data will be reviewed and qualified in accordance with the requirements of the EPA National Functional Guidelines, modified as appropriate for the DoD Quality Systems Manual (QSM) version 4.2 and method-specific requirements. Validation will consist of reviewing the associated QA/QC samples and measurement performance indicators as presented on the summary forms provided in the laboratory deliverable, and will not include confirmation of calculations or review of raw data. The results of the data validation will be documented in reports which will detail any issues impacting the data quality along with qualifications affecting data bias and usability. All data validation activities will be consistent with the UFP SAP Addendum – VPB and Monitoring Well Installation and Sampling (Resolution Consultants, 2013a).

Reporting

Form 1 results from the analytical lab will be provided as soon as the data are available. Subsequent summary reports including VPB and well installation and sampling results will be developed to provide documentation of this investigation. Documentation required to support this project will consist of the following items:

- Scanned copies of the field book during VPB and well installation. This may be presented as a separate deliverable.
- Updated cross sections based on the boring logs.
- Field copies of the boring log for each boring.
- Paired graphic of VPB VOC concentration in groundwater with gamma log.

- Groundwater, soil, and air sample log sheets.
- Well completion form for each well.
- Well development record.
- Initial well sampling results.
- Map identifying newly installed monitoring wells and VPBs.

References

Resolution Consultants, 2012. Health and Safety Plan – Site 1 OU-2 Off Site TCE Groundwater Plume Investigation. May 2012.

Resolution Consultants, 2013a. Uniform Federal Policy Sampling and Analysis Plan Addendum – VPB and Monitoring Well Installation and Sampling. April 2013.

Resolution Consultants, 2013b. Uniform Federal Policy Sampling and Analysis Plan Addendum – Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol. November 2013.

NYSDEC, 2010. DER-10, Technical Guidance for Site Investigation and Remediation. May 2010.

USEPA, 2017. EPA National Functional Guidelines for Organic Superfunds method Data Review (SOM02.4). January 2017.

DoD, 2010. General Data Validation Guidelines Quality Systems Manual version 4.2. October 2010.

Tables

Table 1
Vertical Profile Boring Sampling Program
Page 1 of 1

Boring Number	Drilling Method	Total Depth (feet) ⁽¹⁾	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample ⁽²⁾
VPB172	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB173	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB174	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB175	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB176	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB178	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
VPB179	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			
⁽³⁾ VPB180	MR	~1,000	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			200 to 800	Up to 5	20-foot intervals (40 samples)		
			800 to ~1,000	Up to 5, at 5 foot intervals			

Notes:

1. Total depth will be approximately 15 feet into the Raritan Clay Unit, at a depth of approximately 1,000 feet below ground surface.
 2. Work area summa canister (6 to 8 hours).
 3. VPB180 is a contingency boring to be installed pending results from VPB172, 173 and 174
- VPB: Vertical Profile Boring
MR: Mud Rotary
VPB177 is associated with RW4. Information on VPB177 is provided under a separate work plan.

Table 2
Vertical Profile Boring Analytical Summary
Page 1 of 1

Location ⁽⁵⁾	Sample ID	Matrix	Number of Samples		
			VOCs – Quick Turn ⁽¹⁾	TOC ⁽²⁾	VOCs – TO 15 ⁽³⁾
VPB172	VPB-172-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-172-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-172-AIR-MMDDYY	Air	--	--	1 per VPB
VPB173	VPB-173-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-173-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-173-AIR-MMDDYY	Air	--	--	1 per VPB
VPB174	VPB-174-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-174-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-174-AIR-MMDDYY	Air	--	--	1 per VPB
VPB175	VPB-175-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-175-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-175-AIR-MMDDYY	Air	--	--	1 per VPB
VPB176	VPB-176-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-176-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-176-AIR-MMDDYY	Air	--	--	1 per VPB
VPB178	VPB-178-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-178-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-178-AIR-MMDDYY	Air	--	--	1 per VPB
VPB179	VPB-179Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-179-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-179-AIR-MMDDYY	Air	--	--	1 per VPB
⁽⁴⁾ VPB180	VPB-180-Soil- MMDDYY XX-XX	Soil	--	0 to 2	--
	VPB-180-GW- MMDDYY XX-XX	Groundwater	~44	--	--
	VPB-180-AIR-MMDDYY	Air	--	--	1 per VPB

Notes:

1. 48-hour results from local laboratory via method SW846 8260C or equivalent method.
2. 21-day results from Navy-approved laboratory via 9060A.
3. 21-day results from Navy-approved laboratory via TO-15.
4. VPB180 is a contingency boring to be installed pending results from VPB172, 173 and 174.
5. VPB177 is associated with RW4. Information on VPB177 is provided under a separate work plan.

VOCs: Volatile organic compounds

TOC: Total organic carbon

MMDDYY: Sample date in month, day, and year. For example, April 1, 2015 would be 040115.

XX-XX: Bottom of sample interval, in feet. For example, a groundwater sample collected in VPB-162 at 100 to 102 feet below ground surface on April 1, 2016 would be VPB162-GW-0401165(100-102).

Table 3
Proposed Monitoring Well Installation Summary
Page 1 of 1

Location	VPB	Screened Interval (Feet)	Total Depth	Height of Sand (Feet)	Height of Fine Sand (Feet)
RE138D1	VPB172	20	TBD	10 feet above screened interval	5 feet above sand
RE138D2		20	TBD	20 feet above screened interval	10 feet above sand
RE138D3		20	TBD	25 feet above screened interval	15 feet above sand
RE139D1	VPB173	20	TBD	10 feet above screened interval	5 feet above sand
RE139D2		20	TBD	20 feet above screened interval	10 feet above sand
RE139D3		20	TBD	25 feet above screened interval	15 feet above sand
RE140D1	VPB174	20	TBD	10 feet above screened interval	5 feet above sand
RE140D2		20	TBD	20 feet above screened interval	10 feet above sand
RE140D3		20	TBD	25 feet above screened interval	15 feet above sand
RE141D1	VPB175	20	TBD	10 feet above screened interval	5 feet above sand
RE141D2		20	TBD	20 feet above screened interval	10 feet above sand
RE141D3		20	TBD	25 feet above screened interval	15 feet above sand
RE142D1	VPB176	20	TBD	10 feet above screened interval	5 feet above sand
RE142D2		20	TBD	20 feet above screened interval	10 feet above sand
RE142D3		20	TBD	25 feet above screened interval	15 feet above sand
RE144D1	VPB178	20	TBD	10 feet above screened interval	5 feet above sand
RE144D2		20	TBD	20 feet above screened interval	10 feet above sand
RE144D3		20	TBD	25 feet above screened interval	15 feet above sand
RE145D1	VPB179	20	TBD	10 feet above screened interval	5 feet above sand
RE145D2		20	TBD	20 feet above screened interval	10 feet above sand
RE145D3		20	TBD	25 feet above screened interval	15 feet above sand
RE146D1	*VPB180	20	TBD	10 feet above screened interval	5 feet above sand
RE146D2		20	TBD	20 feet above screened interval	10 feet above sand
RE146D3		20	TBD	25 feet above screened interval	15 feet above sand

Note:

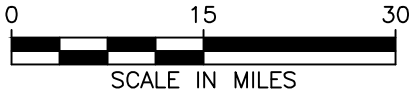
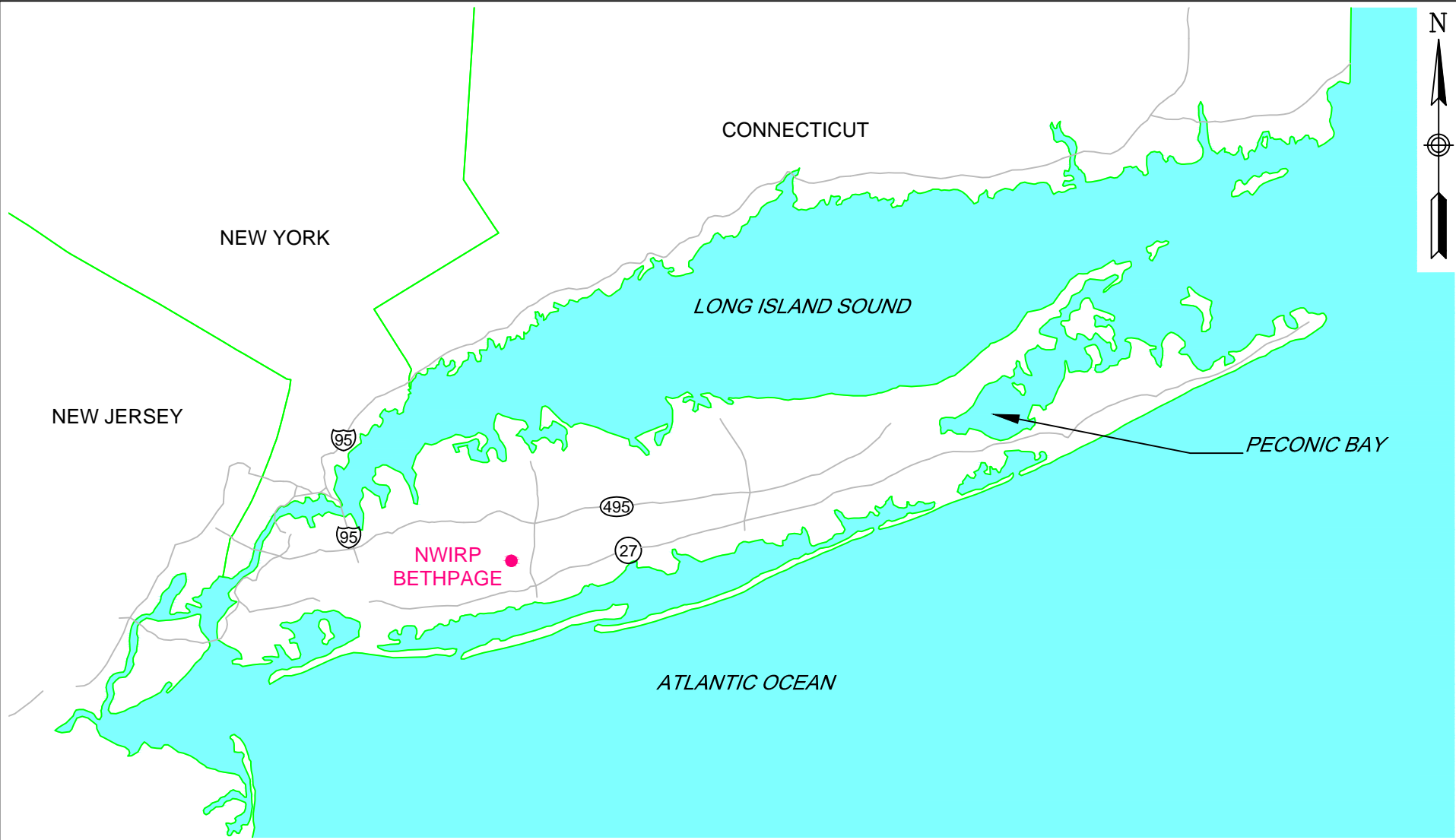
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Monitoring wells may be installed at a later date.

*VPB180 is a contingency boring to be installed pending results from VPB172, 173 and 174.

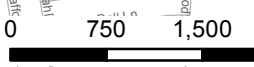
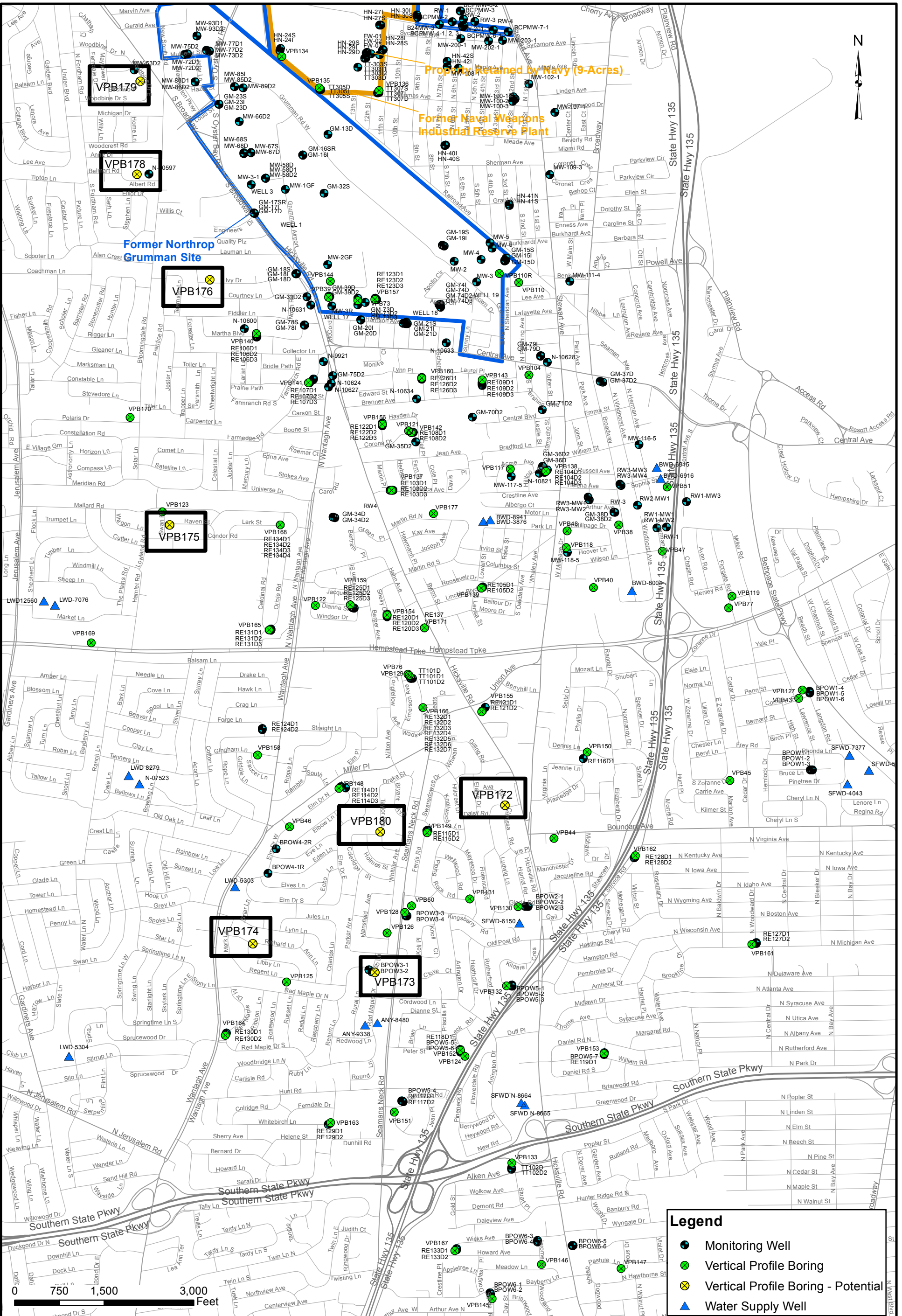
VPB177 is associated with RW4. Information on VPB177 is provided under a separate work plan.

Figures



GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

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

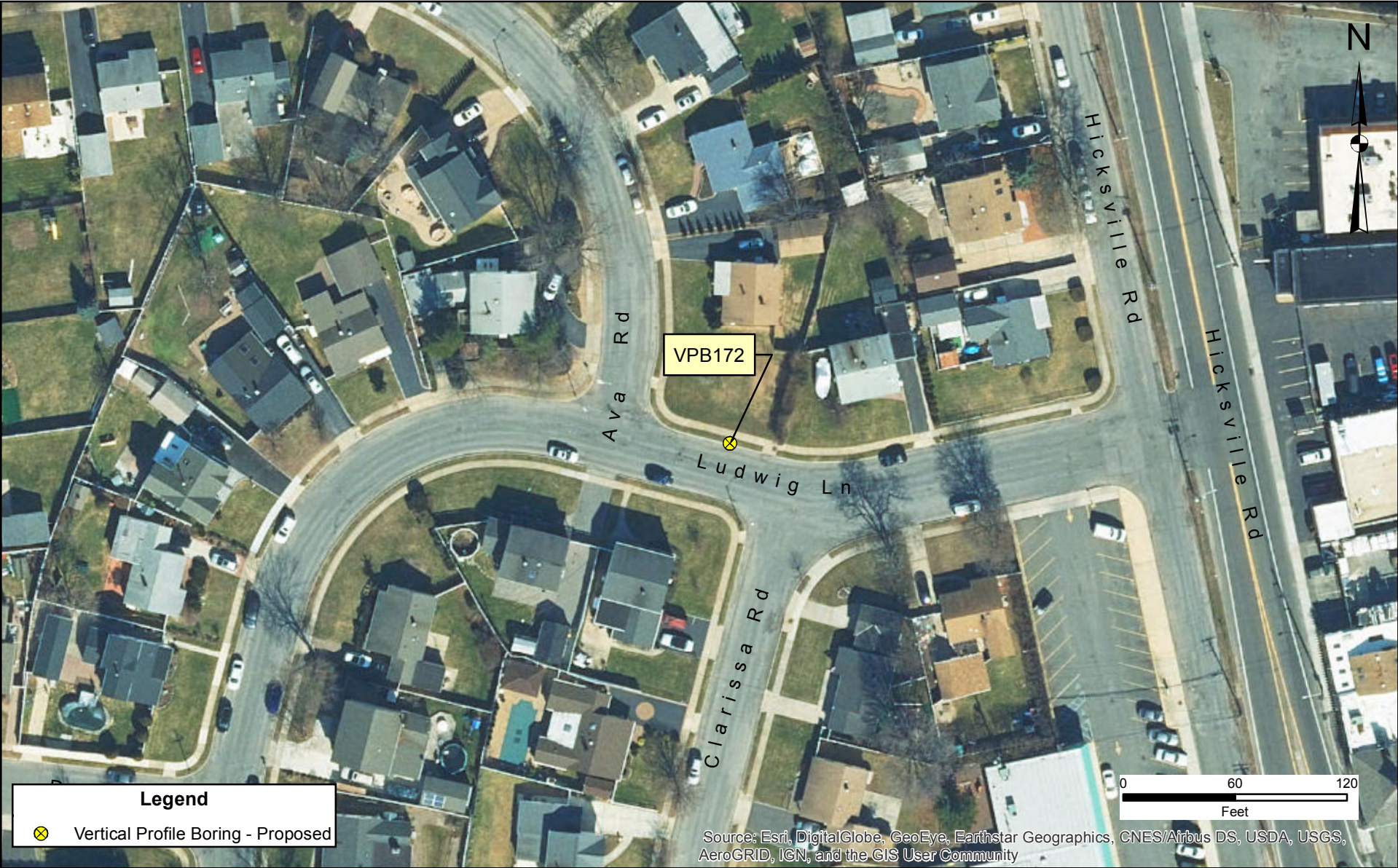


Legend	
	Monitoring Well
	Vertical Profile Boring
	Vertical Profile Boring - Potential
	Water Supply Well



POTENTIAL VERTICAL PROFILE BORINGS
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE 15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY	DATE
FIGURE NO. 2	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

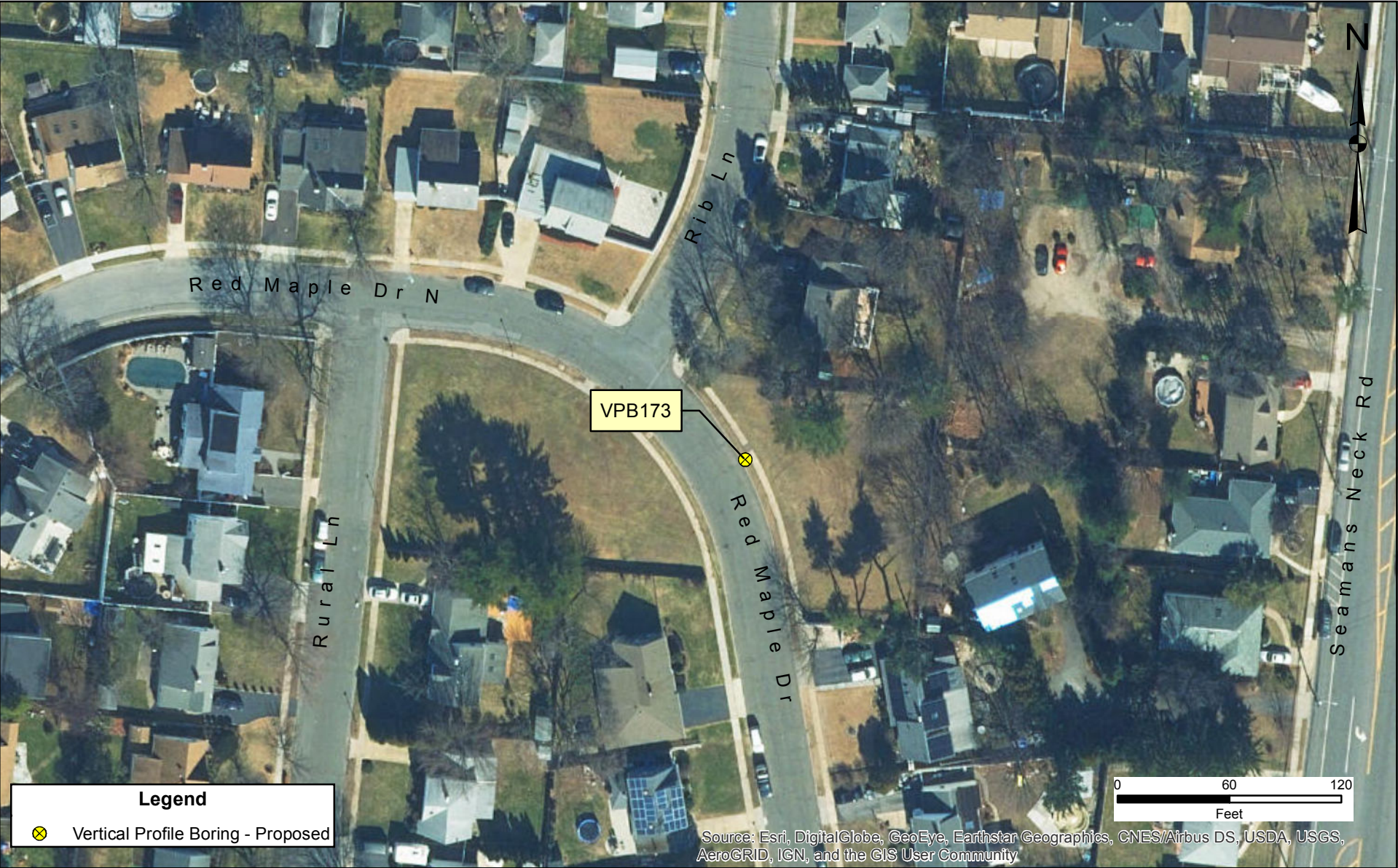
Legend

⊗ Vertical Profile Boring - Proposed



VPB172 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 3	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

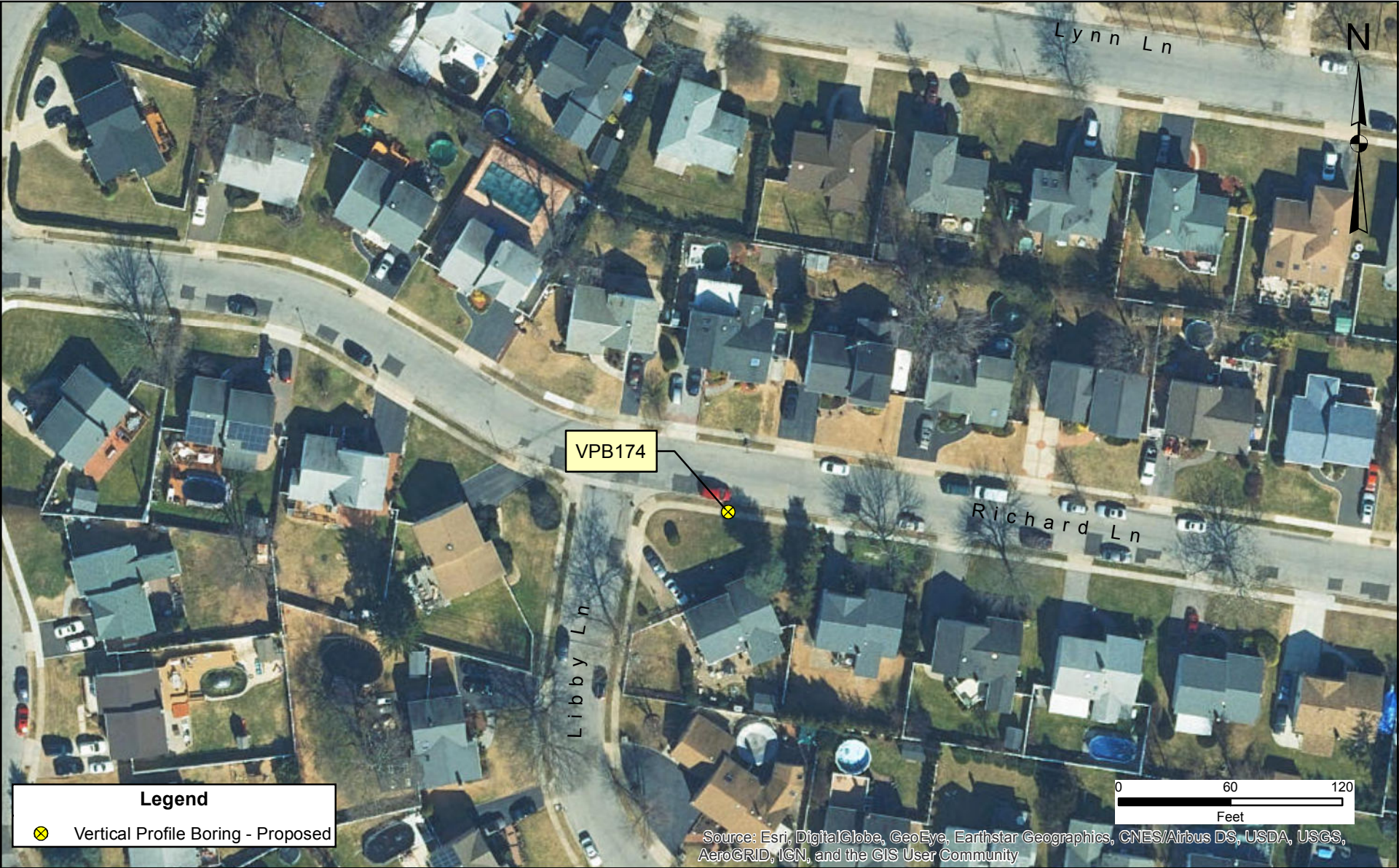
Legend

⊗ Vertical Profile Boring - Proposed



VPB173 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 4	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend	
	Vertical Profile Boring - Proposed



VPB174 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 5	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

 Vertical Profile Boring - Proposed



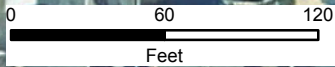
VPB175 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 6	REV 0



Legend

⊗ Vertical Profile Boring - Proposed

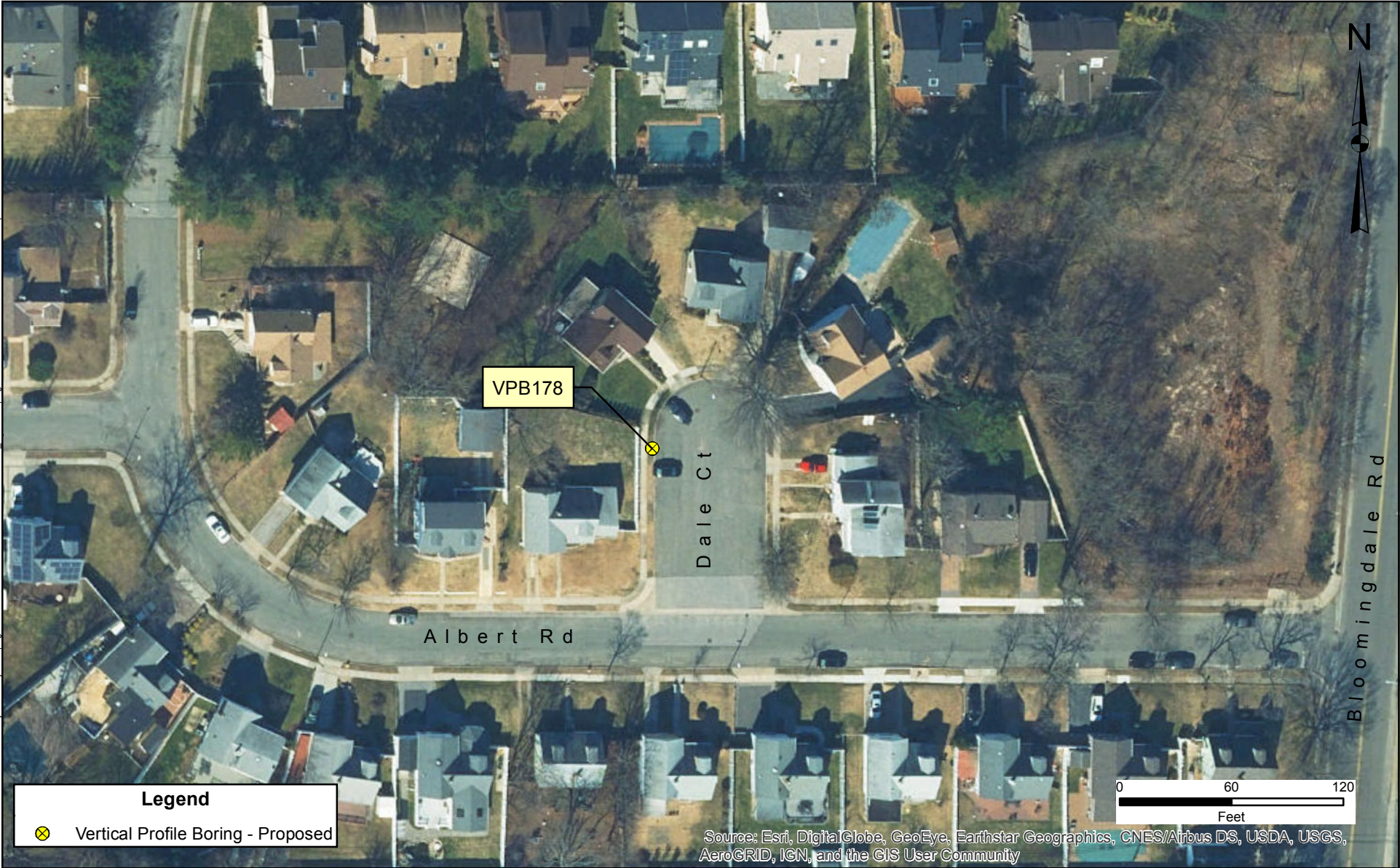


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




VPB176 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/25/2018
APPROVED BY —	DATE —
FIGURE NO. 7	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

 Vertical Profile Boring - Proposed



VPB178 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 8	REV 0



Legend

⊗ Vertical Profile Boring - Proposed




VPB179 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 9	REV 0



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

 Vertical Profile Boring - Proposed



VPB180 LOCATION MAP
 NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
 BETHPAGE, NEW YORK

CONTRACT NUMBER N62470-11-D8013	CTO NUMBER WE15
APPROVED BY EV	DATE 7/24/2018
APPROVED BY —	DATE —
FIGURE NO. 10	REV 0

Attachment 1
Well Construction Detail



Client:		WELL ID:
Project Number:		
Site Location:		Date Installed:
Well Location:		Inspector:
Method:		Contractor:

MONITORING WELL CONSTRUCTION DETAIL

	Depth from G.S. (feet)	Elevation(feet)
Top of Flush Mount Well Cap	0.0	
Top of Riser Pipe	0.000	
Riser Pipe:		
Length	0.00	
Inside Diameter (ID)	4-Inches	
Type of Material	PVC	
% Cement		
% Bentonite		
% Native		
Top of Bentonite		
Bentonite Seal Thickness		
Top of Sand		
Top of Screen		
▼ Stabilized Water Level		0
Screen:		
Length		
Inside Diameter (ID)		
Type of Material		
Bottom of Screen		
Bottom of Borehole		
Borehole Diameter: _____		
	_____	Date _____