TETRA TECH

April 16, 2018

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, Section B
625 Broadway
Albany, New York 12233-7015

Reference: CLEAN Contract No. N62470-16-D-9008
Contract Task Order WE13

Subject: 2018 On-Property Volatile Organic Compound (VOC), 1,4-Dioxane, and Radiological Groundwater Investigation Work Plans, Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, New York

Dear Mr. Pelton:

On behalf of the Department of the Navy, Tetra Tech is submitting the subject documents to the New York State Department of Environmental Conservation (NYSDEC). The following are responses to NYSDEC comments dated April 10, 2018. Also attached are the revised subject Work Plans. NYSDEC comments are provided in italic type followed by the Navy's responses in bold type.

Comment #1: The On-Property VOC and 1,4-Dioxane Groundwater Investigation work plan indicates that samples collected for 1,4-dioxane will be analyzed by SW846 8270D SIM. Samples should be analyzed by a New York State Department of Health ELAP approved laboratory and the method detection limit (MDL) for 1,4-dioxane should be no higher than 0.28 ppb. I have attached Department guidance that provides information on the analytical methods and reporting requirements for emerging contaminant sampling and analysis programs.

Response: 1,4-Dioxane samples will be analyzed via method 8270D SIM by Chemtech in Mountainside, NJ, a NY ELAP approved laboratory. 8270D SIM has a method detection limit of 0.0423 ug/L.

Comment #2: The second paragraph of the Radium and Other Radiological Materials Groundwater Investigation Letter Work Plan indicates that the radium drinking water standard was exceeded. For clarification, the NYSDOH maximum contaminant level (MCL) for combined radium is not a one-time exceedance. Instead, the exceedance of the MCL occurs when a running annual average of four quarterly samples exceeds 5 pCi/l. Although combined radium concentrations have intermittently exceeded 5 pCi/l, the running average has never exceeded the MCL.

Response: The text of the Work Plan will be revised to read:

"In 2013, a water supply well at Bethpage Water District Plant 4 was reportedly shut down due to the presence of radium. This water supply well is located to the southeast of the former NWIRP Bethpage, at annual average concentrations exceeding drinking water standards. As such, groundwater investigations upgradient of this location were initiated. To evaluate the presence and distribution of radionuclides in groundwater, samples were collected between 2013 and 2017

Tetra Tech, Inc.
5700 Lake Wright Drive, Suite 102 Norfolk, VA 23502
Tel 757.461.3768 Fax 757.461.4148 www.tetratech.com

from various wells in the vicinity of NWIRP Bethpage and tested for radionuclides. Samples were collected by the Navy, NG, and NYSDEC from monitoring wells, public supply wells, production wells, and recovery wells."

Comment #3: In both work plans, monitoring wells MW08D, AOC-22-MW01 and AOC-22-MW04 are included in Table 1, but are not included on Figure 2. Conversely, AOC22-MW11 and HN- 27I are included on Figure 2, but are not included in Table 1. Are these wells included as part of the sampling program? Please provide clarification.

Response: Monitoring wells HN-08D, AOC-22-MW01 and AOC-22-MW04 were added to Figure 2 and AOC22-MW11 and HN- 27I were added to Table 1.

Comment #4: In both work plans there are inconsistencies between Table 1 and Figure 2. Specifically, Table 1 identifies MW308, FW-01, and FW-02 and Figure 2 identifies MW308S, FWMW01, and FW-MW02. Please clarify if these refer to the same sampling locations.

Response: Table 1 and Figure 2 well names have been updated for consistency.

If you have any questions please contact Mr. Brian Murray, NAVFAC Mid-LANT, at Brian.S.Murray@navy.mil or (757) 341-0491.

Sincerely

David D. Brayack, P.E.
Project Manager

Enclosure: Final 2018 Volatile Organic Compound (VOC), 1,4-Dioxane, and Radiological Groundwater Investigation Work Plans

Distribution (email only):
NYSDEC, Don Hesler
NAVFAC Mid-Atlantic, Brian Murray
NYSDOH, Steve Karpinski
NCDOH, John Lovejoy
USEPA Region II, Lorenzo Thantu
KGS, Greg Pearman
Project File

LETTER WORK PLAN
2018 RADIUM AND OTHER RADIOLOGICAL MATERIALS
GROUNDWATER INVESTIGATION
FACILITY WIDE
NWIRP BETHPAGE, NEW YORK

Introduction

The Navy is conducting an investigation to evaluate the potential release of radium and other radiological materials at the facility using the existing groundwater monitoring well network located at the former Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, New York (Figures 1 and 2). The existing groundwater monitoring well network is currently used to evaluate the release and cleanup of select volatile organic compounds (VOCs), polychlorinated biphenyls, and/or metals in groundwater resulting from operations at former NWIRP Bethpage. This letter work plan was prepared by Tetra Tech, Inc. (Tetra Tech) under the Naval Facilities Engineering Command (NAVFAC) Atlantic Comprehensive Long-Term Environmental Action Navy (CLEAN) under Contract Number N62470-16-D-9008 Task Order WE13.

In 2013, a water supply well at Bethpage Water District Plant 4 was reportedly shut down due to the presence of radium. This water supply well is located to the southeast of the former NWIRP Bethpage, at annual average concentrations exceeding drinking water standards. As such, groundwater investigations upgradient of this location were initiated. To evaluate the presence and distribution of radionuclides in groundwater, samples were collected between 2013 and 2017 from various wells in the vicinity of NWIRP Bethpage and tested for radionuclides. Samples were collected by the Navy, NG, and NYSDEC from monitoring wells, public supply wells, production wells, and recovery wells.

The objective of this investigation is to determine whether there is any evidence of a source of radium or other radiological material that could result in a Maximum Contaminant Level (MCL) exceedance in either on property or off property groundwater. The data collected from this investigation will be used to support the development of a Preliminary Assessment/Site Investigation Report.

To address the objective, this investigation includes groundwater sample collection from the existing monitoring well network at the former NWIRP Bethpage and surface water sample collection from a manhole in the Recharge Basin Area. The existing monitoring well network provides upgradient and downgradient locations for the eastern portion of the facility and downgradient locations for the western portion of the facility, but lacks upgradient locations for the western portion of the facility. Therefore, if contamination is detected in the western portion of the facility, the investigation may not be able to conclude whether it originated on the former NWIRP Bethpage property. Also included in the investigation is the collection of water samples from the manhole near the northeast recharge basin. A continuous flow of water from Bethpage Community Park enters the manhole from the east. In addition, water from the Northrop Grumman North Campus has been observed to enter the manhole from the north. A sample will be collected from each source.

Proposed sample locations are presented on Figure 2. The well and sample location details, nomenclature, and analyses are summarized on Table 1.

Groundwater Sampling

Groundwater samples will be collected from all the usable monitoring wells within the existing on-property network (Figure 2). Monitoring wells will be investigated approximately two weeks before the sampling event, and if a well is determined to be damaged and cannot be readily repaired, it will not be sampled. In addition, for those monitoring wells that have not be sampled in the past 8 years (see Table 1), the well screen and casing will be purged approximately 2 weeks prior to the sampling event.

A down-hole, variable speed, submersible, centrifugal pump (e.g., Monsoon) with high-density polyethylene tubing will be used for groundwater purging and collection activities. The pump will be used in combination with a continuous flow-through cell suitable for taking water quality measurements (dissolved oxygen, oxidation-reduction potential, specific conductance, pH, temperature, and turbidity). Turbidity measurements will be made using a separate field turbidity meter specifically designated to measure turbidity only. Depending on stabilization of the groundwater parameters, two to five screen volumes may be purged prior to sample collection. The groundwater monitoring wells will be analyzed as indicated on Table 1.

Surface Water Sampling

Surface water will be collected from the manhole near the northeast recharge basin (Figure 2). Samples will be collected from the influent line prior to the water blending with other sources in the manhole. One sample will be collected from Bethpage Community Park influent water and one sample will be collected from the Northop Grumman North Campus influent water, if flow is observed. If active flow from another source is identified in the manhole, it will also be sampled. Samples will be collected with a stainless steel bailer and will be analyzed as indicated on Table 1. Water quality parameters (dissolved oxygen, oxidation-reduction potential, specific conductance, pH, temperature, and turbidity) will be collected directly from the bailer at the time of sample collection.

Quality Control Samples

Quality assurance and quality control samples will be collected for groundwater and surface water samples. Duplicate samples will be collected at 10 percent (1 per 10 samples). Matrix spike and matrix spike duplicate (MS/MSD) samples (i.e., triple volume) will be collected at a rate of 5 percent (1 per 20 samples). MS/MSDs will receive the same sample ID as the respective parent samples, and the triple volume will be noted in the field log book and on chain-of-custody form.

Equipment Decontamination

Reusable sampling equipment decontamination will consist of washing using a non-phosphate detergent followed by a rinse with deionized water provided by the laboratory.

Waste Management

Aqueous investigative-derived waste (IDW) will be generated during well sampling activities. The aqueous IDW will be containerized pending waste characterization analysis. IDW will be characterized for radiological materials, VOCs, semivolatile organic compounds, pesticides,

Target Analyte List metals, and reactivity. Based on the results of the waste characterization, the waste will be discharged via the local industrial wastewater discharge permit or transported offsite and appropriately disposed by the IDW subcontractor.

Reporting

The data collected will be evaluated and submitted in a Preliminary Assessment/Site Inspection Report. The evaluation will be based on direct comparison to New York State MCLs and United States Environmental Protection Agency MCLs. Pending review of analytical results and consultation with New York State Department of Environmental Conservation, a determination will be made whether additional sampling is to be conducted. Recommendations will be made on whether to proceed with additional action (e.g. another more refined round of sampling), remedial investigation, risk assessment, or a no action decision.

REFERENCES

Arcadis, 2016. *Review of Files Containing Radiological Information for Northrop Grumman Bethpage, NY Operations.* Administrative File Record Number N90845.AR.002016. September.

Sive Paget & Riesel, P.C., 2016. Letter to NYSDEC prepared by Sive Paget & Riesel on behalf of Northrop Grumman Re: Investigation of Radioactive Materials at Northrop Grumman's Bethpage Facility. September.

TABLES

This page is intentionally blank

TABLE 1
MONITORING WELL DETAILS AND SAMPLE NOMENCLATURE
FACILITY WIDE RADIUM AND RADIOLOGICAL MATERIAL INVESTIGATION
NWIRP BETHPAGE, NEW YORK

Sample ID Number/Nomenclature[1,2]	Matrix	Depth of Screened Interval (feet bgs)	Analysis[3]
HN-08D-2018MMDD	Groundwater	188	Radiological
MW301D-2018MMDD	Groundwater	210-220	Radiological
MW301I-2018MMDD	Groundwater	130-140	Radiological
MW301S-2018MMDD	Groundwater	51-61	Radiological
MW302D-2018MMDD	Groundwater	203-213	Radiological
MW302I1-2018MMDD	Groundwater	110-120	Radiological
MW302I2-2018MMDD	Groundwater	140-150	Radiological
MW302S-2018MMDD	Groundwater	41-51	Radiological
MW303D-2018MMDD	Groundwater	208-218	Radiological
MW303I1-2018MMDD	Groundwater	95-105	Radiological
MW303I2-2018MMDD	Groundwater	146-156	Radiological
MW303S-2018MMDD	Groundwater	46-56	Radiological
MW304D-2018MMDD	Groundwater	180-190	Radiological
MW304I1-2018MMDD	Groundwater	102-112	Radiological
MW304I2-2018MMDD	Groundwater	140-150	Radiological
MW304S-2018MMDD	Groundwater	43-53	Radiological
MW305D-2018MMDD	Groundwater	286-296	Radiological
MW305I-2018MMDD	Groundwater	190-200	Radiological
MW305S-2018MMDD	Groundwater	40-50	Radiological
MW306D-2018MMDD	Groundwater	284-294	Radiological
MW306I-2018MMDD	Groundwater	189-199	Radiological
MW306S-2018MMDD	Groundwater	50-60	Radiological
MW307D-2018MMDD	Groundwater	276-286	Radiological
MW307I-2018MMDD	Groundwater	188-198	Radiological
MW307S-2018MMDD	Groundwater	40.5-50.5	Radiological
MW308D-2018MMDD	Groundwater	250-260	Radiological
MW308I-2018MMDD	Groundwater	156-166	Radiological
MW308-2018MMDD	Groundwater	54-64	Radiological
MW309D-2018MMDD	Groundwater	252-262	Radiological
MW309I-2018MMDD	Groundwater	160-170	Radiological
MW309S-2018MMDD	Groundwater	53-63	Radiological
MW310S-2018MMDD	Groundwater	57.5-67.5	Radiological
MW311I-2018MMDD	Groundwater	160-170	Radiological
MW311S-2018MMDD	Groundwater	55-65	Radiological
MW312I-2018MMDD	Groundwater	160-170	Radiological
MW312S-2018MMDD	Groundwater	53-63	Radiological
MW313S-2018MMDD	Groundwater	53-63	Radiological
MW314I-2018MMDD	Groundwater	144-154	Radiological
MW314S-2018MMDD	Groundwater	55-65	Radiological
FW-MW03-2018MMDD	Groundwater	52-67	Radiological
FW-MW01-2018MMDD	Groundwater	48.5-63.5	Radiological
FW-MW02-2018MMDD	Groundwater	52-67	Radiological
HN-24IR-2018MMDD	Groundwater	148-158	Radiological
HN-24S-2018MMDD	Groundwater	48.6-58.6	Radiological
HN-27I-2018MMDD	Groundwater	100-110	Radiological
HN-29D-2018MMDD	Groundwater	210-220	Radiological

TABLE 1
MONITORING WELL DETAILS AND SAMPLE NOMENCLATURE
FACILITY WIDE RADIUM AND RADIOLOGICAL MATERIAL INVESTIGATION
NWIRP BETHPAGE, NEW YORK

Sample ID Number/Nomenclature[1,2]	Matrix	Depth of Screened Interval (feet bgs)	Analysis[3]
HN-29IR-2018MMDD	Groundwater	120-130	Radiological
AOC-22-MW01-2018MMDD	Groundwater	48-68	Radiological
AOC-22-MW02-2018MMDD	Groundwater	46-66	Radiological
AOC-22-MW03-2018MMDD	Groundwater	45.5-65.5	Radiological
AOC-22-MW04-2018MMDD	Groundwater	46-66	Radiological
AOC-22-MW05-2018MMDD	Groundwater	47-67	Radiological
AOC-22-MW06-2018MMDD	Groundwater	52-62	Radiological
AOC-22-MW07-2018MMDD	Groundwater	52-62	Radiological
AOC-22-MW08-2018MMDD	Groundwater	52-62	Radiological
AOC-22-MW09-2018MMDD	Groundwater	52-62	Radiological
AOC-22-MW10-2018MMDD	Groundwater	49-59	Radiological
AOC-22-MW11-2018MMDD	Groundwater	53-63	Radiological
BP-MH-SW4001-XXXX-2018MMDD	Surface Water	NA	Radiological
BP-MH-SW4001-XXXX-2018MMDD	Surface Water	NA	Radiological

Notes:

Shaded rows indicate wells that were installed prior to 2010. Wells that were installed prior to 2010, and that have not been sampled since 2010 will be subjected to an extended well screen and casing purge approximately two weeks prior to sampling.

1 MMDD is the two digit month and two digit day that the sample is collected. As an example, if BPTT-MW313S is sampled on April 10, 2018, the sample nomenclature would be BPTT-MW313S-20180410.

XXXX is the direction from which the influent is flowing into the manhole. As an example, if the sample is collected on April 10, 2018 from a source entering the manhole from the north, the sample nomenclature would BP-MH-SW4001-NORTH-20180410.

2 Locations where field duplicates will be collected will be determined in the field by the Tetra Tech FOL.

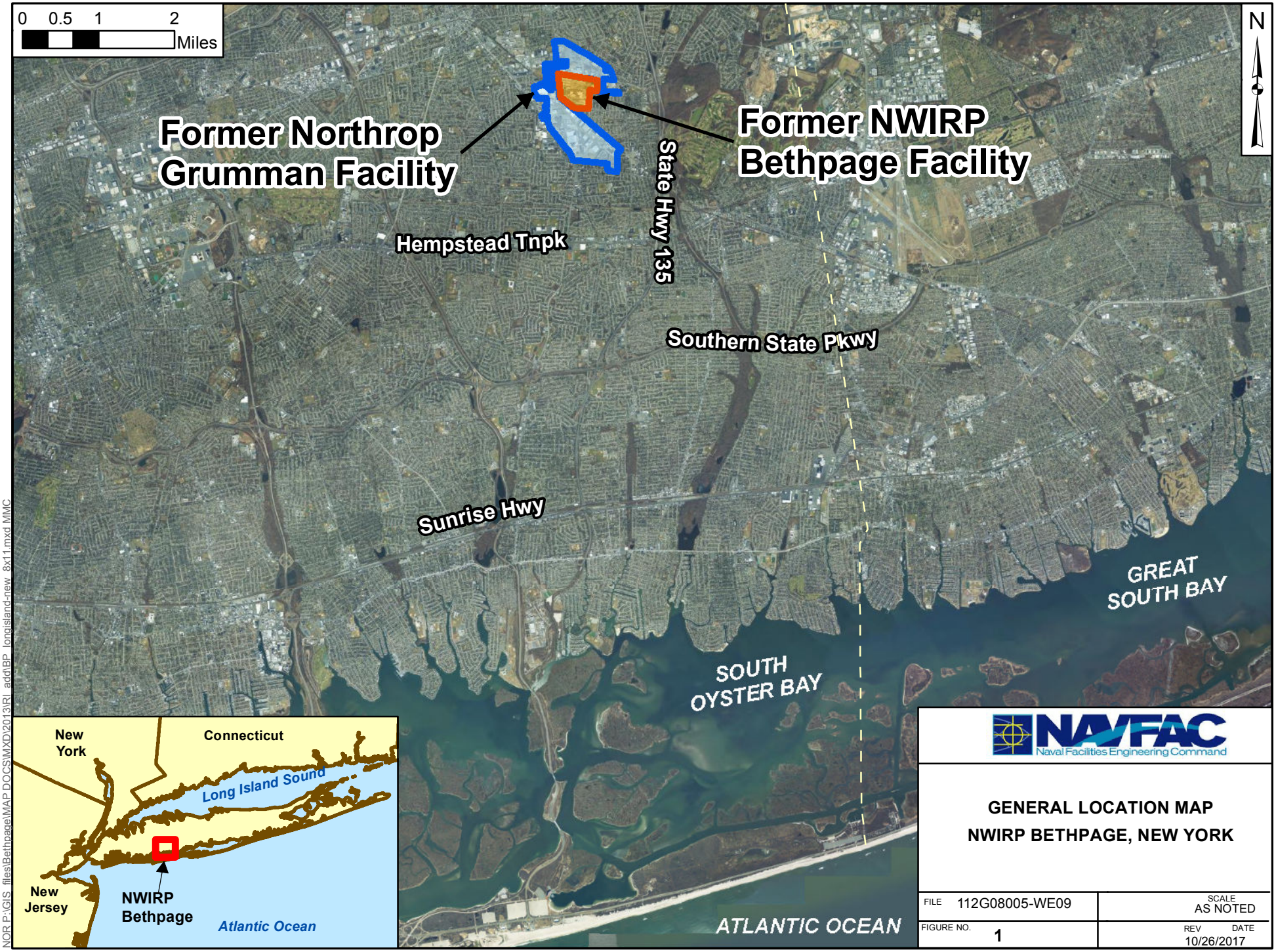
3 Water quality parameters consisting of dissolved oxygen, oxidation- reduction potential, specific conductance, pH, temperature, and turbidity will be collected at each location.

Radiological Analyses:

Radium-226 + Radium-228 by EPA Method 903.1 and 904.0
Isotopic Thorium (-228, -230, -232) by DOE Method HASL 300-Th-01
Isotopic Uranium (-233/234, -235/236, -238) by DOE Mehod HASL 300-U-02
Gross Alpha Activity (excluding uranium and radon) by EPA Method 900
Gross Beta Activity by EPA Method 900

FIGURES

This page is intentionally blank

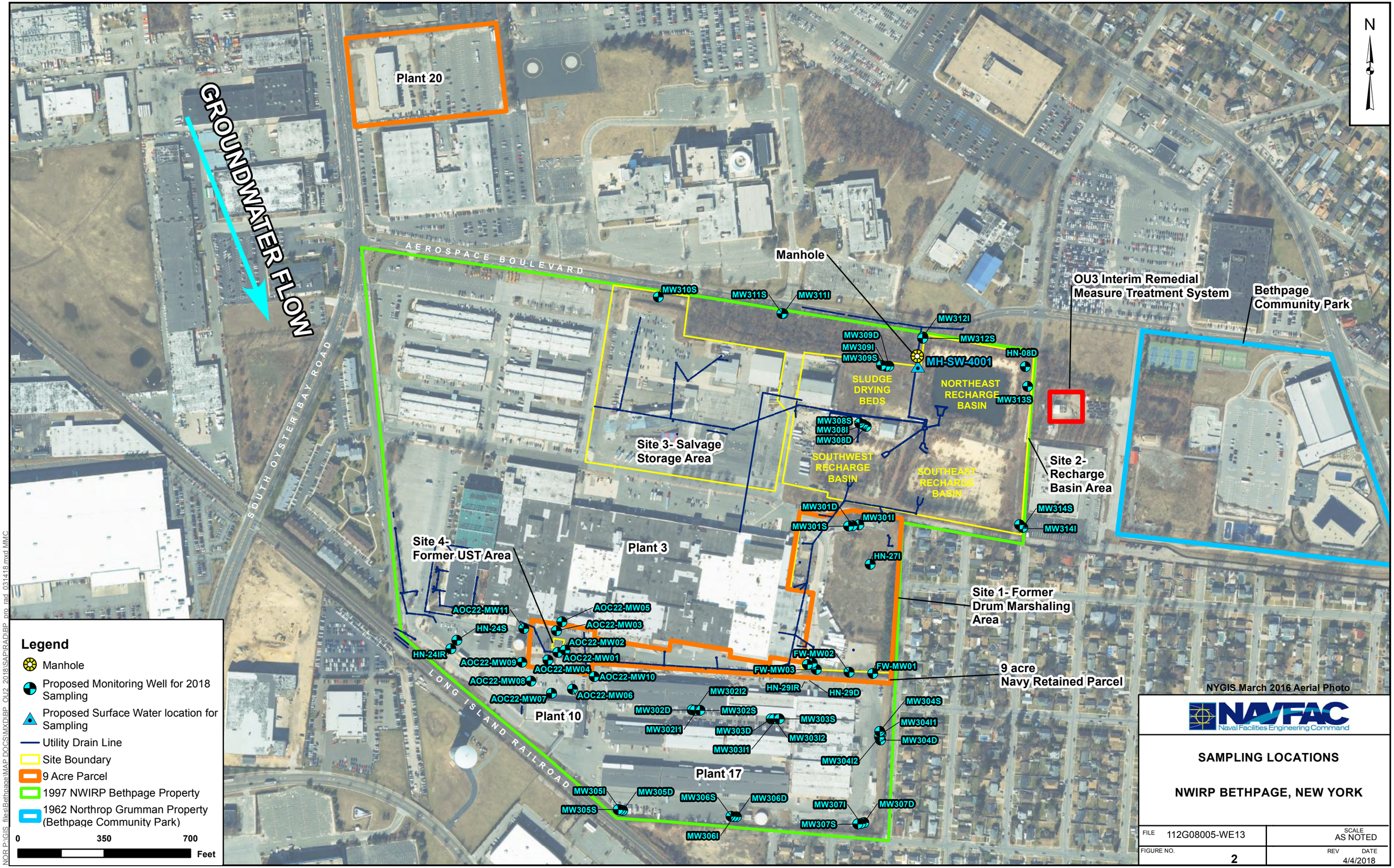


NAVFAC
Naval Facilities Engineering Command

GENERAL LOCATION MAP
NWIRP BETHPAGE, NEW YORK

FILE	112G08005-WE09	SCALE	AS NOTED
FIGURE NO.	1	REV DATE	10/26/2017

NOR P:\GIS_files\Bethpage\MAP DOCS\MXD\2013\RI_add\BP_longisland-new_8x11.mxd MMC


N
GROUNDWATER FLOW
Plant 20
AEROSPACE BOULEVARD
SOUTH OYSTER BAY ROAD
LONG ISLAND RAILROAD
Manhole
MW310S
MW311S
MW311I
MW312I
MW312S
MW309D
MW309I
MW309S
MH-SW-4001
HN-08D
MW313S
SLUDGE DRYING BEDS
NORTHEAST RECHARGE BASIN
SOUTHWEST RECHARGE BASIN
SOUTHEAST RECHARGE BASIN
MW308S
MW308I
MW308D
Site 3- Salvage Storage Area
OU3 Interim Remedial Measure Treatment System
Bethpage Community Park
Site 2- Recharge Basin Area
MW314S
MW314I
MW301D
MW301I
MW301S
HN-27I
Site 4- Former UST Area
Plant 3
Site 1- Former Drum Marshaling Area
AOC22-MW11
AOC22-MW05
AOC22-MW03
HN-24S
AOC22-MW02
HN-24IR
AOC22-MW09
AOC22-MW01
AOC22-MW04
AOC22-MW10
AOC22-MW08
AOC22-MW07
AOC22-MW06
FW-MW02
FW-MW03
FW-MW01
9 acre Navy Retained Parcel
HN-29IR
HN-29D
MW302I2
MW302D
MW302S
MW302I1
MW303D
MW303S
MW303I2
MW303I1
MW304S
MW304I1
MW304D
MW304I2
Plant 10
Plant 17
MW305I
MW305D
MW305S
MW306S
MW306D
MW306I
MW307I
MW307D
MW307S
NYGIS March 2016 Aerial Photo
Legend
Manhole
Proposed Monitoring Well for 2018 Sampling
Proposed Surface Water location for Sampling
Utility Drain Line
Site Boundary
9 Acre Parcel
1997 NWIRP Bethpage Property
1962 Northrop Grumman Property (Bethpage Community Park)
0
350
700
Feet
NAVFAC
Naval Facilities Engineering Command
SAMPLING LOCATIONS
NWIRP BETHPAGE, NEW YORK
FILE 112G08005-WE13
SCALE AS NOTED
FIGURE NO. 2
REV
DATE 4/4/2018
NOR P:\GIS_files\Bethpage\MAP DOCS\MXD\BP_OU2_2018\SAP\RAD\BP_pro_rad_031418.mxd MMC