DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, MID-ATLANTIC
9742 MARYLAND AVENUE
NORFOLK, VA 23511-3095

5090 IN REPLY REFER TO:
15/OPNEEV4/6070

Mr. Steven Scharf
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Remedial Action A (BURA), 11th Floor
625 Broadway, Albany, New York 12233-7015

Dear Mr. Scharf,

Subj: DRAFT BETHPAGE GM-75 WORKPLAN

Please find enclosed the U.S. Navy's GM-75 Workplan that will provide the direction for additional investigation of off-site groundwater near NWIRP Bethpage. Boring locations and strategy were discussed with you at our February 1, 2007 meeting held at your office. Please review this document and return written comments back to this command no later than July 6, 2007 by either fax at 757-444-5822 or to my email address, susan.clarke1@navy.mil.

If you have questions, or require additional information, please contact me at telephone 757-444-4114.

Sincerely,

Susan W. Clarke

SUSAN W. CLARKE
Remedial Project Manager
By direction of the
Commanding Officer

Enclosure: Draft Bethpage GM-75 Workplan

Copy to:
NYSDEC (Albany), Henry Wilkie (w/enclosure)
NAVAIR, Joe Kaminski (w/o enclosure)
ECOR Solutions, Al Taormina (w/o enclosure)

LETTER WORK PLAN
PRE-DESIGN FIELD INVESTIGATION
OFF-SITE LOCATION GM-75
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

1.0 INTRODUCTION

This Work Plan has been prepared to describe pre-design field activities associated with installation of vertical profile borings (VPBs). These borings will be used to better define the extent of moderate-level solvent-contaminated groundwater off site of the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (see Figures 1 and 2). In particular, this investigation will address contamination in the GM-75 Area (near monitoring well GM-75D2) and the VPB-104 Area (near vertical profile boring VPB-104). In addition, contamination in the VPB-104 Area may extend southward to the GM-38 Area (near monitoring well GM-38) and therefore groundwater between GM-38 and VPB-104 Areas will also be investigated. These areas represent a relatively small portion of an approximately 3,000-acre plume that extends to a depth of approximately 600 feet below ground surface. The contamination has migrated beyond the limits of the Navy/Northrop Grumman property and is outside the extent of the Northrop Grumman groundwater collection system. In addition, the highly contaminated groundwater is migrating toward a local water supply well and may impact the well to an extent that an existing water treatment system cannot adequately address. Delineation and potential remediation of these areas are addressed under the Navy Operable Unit No. 2 Record of Decision.

The program will consist of the installation of up to six vertical profile borings to a depth of approximately 800 feet below ground surface. During installation of the boring, water samples will be collected on 20- to 50-foot intervals and analyzed for VOCs. Limited soil samples will also be collected and evaluated for physical characteristics.

1.1 SITE HISTORY

The NWIRP was established in 1933. Since its inception, the plant's primary mission has been 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. In 1998, operations ended at the facilities.

1.2 BACKGROUND

NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City. The Navy's property totaled approximately 109.5 acres and was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by the Northrop Grumman Corporation (NGC) until September 1998. NWIRP Bethpage is bordered on the north, west, and south by property owned or formerly owned by NGC that covered approximately 605 acres, and on the east by a residential neighborhood.

1.3 OBJECTIVE

The objective of the pre-design field investigation is to better define the extent of moderate-level volatile organic contamination (greater than 1,000 ug/L) that is south of the Navy/Northrop Grumman complex and that cannot be captured by the Northrop Grumman Onsite Groundwater Containment System. Migration of this contamination may adversely impact public water supply wells downgradient of the complex.

1.4 SAMPLING APPROACH

The three off-site locations addressed by this Work Plan are as follows:

- GM-38 Area
- GM-75 Area
- VPB-104 Area.

GM-38 Area: The GM-38 Area, with groundwater contamination at 300 to 500 feet, has been delineated to the south, east, and west, and the Navy is installing a groundwater extraction and treatment system to address this contamination. Design drawings are complete and the Navy is negotiating access agreements under a separate action. Until recently, it was believed that groundwater contamination in this area has been adequately delineated. However, based on

recent groundwater data to the north (VPB-104 Area), the northern extent of the deep groundwater may not be adequately delineated. This concern would not affect the design of the system, but could effect the duration of system operation. To better define the northern extent of the GM-38 Area contamination, vertical profile boring (VPB-120) will be installed between the VPB-104 Area and the GM-38 Area.

GM-75 Area: The GM-75 Area was first identified as a potential concern in 2003, when trichloroethene (TCE) at a concentration of 1,400 ug/L was detected in a newly installed monitoring well (GM-75D2). This well is screened from 525 to 545 feet below ground surface. Since that time, the concentration of TCE in GM-75D2 has decreased and in 2006 was 360 ug/L. Public water supply wells at BWD Plant 6 are located approximately 3,000 feet southeast of the GM-75 Area. The shallower BWD Plant 6 well (Well 6-1 screened from 328 to 381 feet) has been impacted by VOCs, and VOC treatment (air stripping tower) is currently being conducted to protect the water supply. A monitoring well (GM-35D2), which is screened at a depth of 330 feet, is located between the GM-75 Area and BWD Plant 6 and contains 300 ug/L of TCE. However, this screen interval is too shallow to evaluate potential migration to the deeper BWD Plant 6 well (Well 6-2 screened from 710 to 770 feet). At a minimum, investigation of deeper groundwater in this area is needed in the area of GM-35D2. To address this need, vertical profile boring (VPB-121) will be installed at the location of monitoring well GM-35D2.

Since 2003, concentrations of TCE in groundwater in the GM-34 Area (monitoring wells GM-34D and GW-34D2) have been increasing. This area is downgradient of the GM-75 Area, and based on TCE concentrations in the GM-75 Area, concentrations may continue to increase in the GM-34 Area. For well GM-34D, which is screened at a depth of 309 to 319 feet, TCE concentrations have increased from 210 ug/L in 2003 to 770 ug/L in 2006. For well GM-34D2, which is screened at a depth of 510 to 520 feet, TCE concentrations have also increased from 120 ug/L in 2003 to 290 ug/L in 2006. To better define the extent of this contamination, up to two vertical profile boring may be installed, one approximately 2500 feet south of the GM-34 Area and one between the GM-34 Area and BWD Plant 6.

VPB-104 Area: Based on past investigations and flow models, shallow (less than 300 feet) and low level groundwater VOC contamination (less than 100 ug/L) was expected to be present in this area. However, in 2006, VOCs at 6,300 ug/L and were identified at a depth of 560 feet in the area of VPB-104. As indicated above, one vertical profile boring (VPB-120) is planned

south of this area (north of the GM-38 Area). The source of the VPB-104 Area contamination is uncertain and may include the Navy property, the Bethpage Community Park, the north or south Northrop Grumman Complex, or another source. One pre-determined vertical profile boring will be installed (VPB-122). Based on the findings in VPB-122, additional vertical profile borings may be installed east and northwest of VPB-122.

2.0 FIELD ACTIVITIES

The scope of work consists of the drilling, sampling, and soil/groundwater analysis of up to six vertical profile borings. The specific activities to be conducted are as follows.

1. Identify planned and potential drilling locations.
2. Obtain permits and access agreements.
3. Install three vertical profile borings at planned locations.
4. Review analytical results during installation and based on the findings, select up to three additional vertical profile borings.
5. Manage investigation-derived waste.

Planned and potential boring locations are presented on Figure 2. Field activities by boring are presented in Table 1. Sample nomenclature and analysis are presented in Table 2. Field activities will be as follows.

- Install six borings to the top of the Raritan Clay layer (approximately 800 feet below ground surface).
- Collect groundwater samples at 50-foot intervals from 50 to 200 feet, (four samples per boring).
- Collect groundwater samples at 20-foot intervals from 200 to 800 feet, (30 samples per boring).
- Collect two to five split spoon samples per boring. The samples will be collected just above a groundwater sample. These samples will represent a range of subsurface conditions, based on the progress of the drilling.
- Submit groundwater samples to a local quick-turn laboratory that is New York State approved for volatile organic compound (VOC) analysis. Trip blanks will also be collected and submitted on a daily basis for VOC analysis.

- Submit 10 percent of the groundwater samples to a Navy approved laboratory for VOC analysis to confirm the quick-turn laboratory results.
- Measure typical field parameters (pH, temperature, conductivity, and turbidity) for groundwater samples as volume permits.
- Conduct gamma ray logging to determine lithology.
- Submit six of soil samples (total for all borings) for Total Organic Carbon (TOC) analysis.
- Collect additional split spoon samples at approximately 800 feet to determine the presence of the Raritan Clay Unit.
- Survey each boring (to be conducted by a New State licensed surveyor).
- Collect one air sample per boring and analyze for VOCs to evaluate potential emissions.

TABLE 1
PRE-DESIGN FIELD INVESTIGATION SAMPLING
NWIRP BETHPAGE, NEW YORK

Boring Number	Drilling Method	Total Depth (feet)[1]	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample[2]	Rationale
VPB-120	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Located between VPB-104 and GM-38.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			
VPB-121	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Located between GM-75D2 and BWD Plant 6.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			
VPB-122	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Located north (upgradient) of VPB-104.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			

TABLE 1
PRE-DESIGN FIELD INVESTIGATION SAMPLING
NWIRP BETHPAGE, NEW YORK

Boring Number	Drilling Method	Total Depth (feet)[1]	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample[2]	Rationale
VPB-123	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Contingent Location.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			
VPB-124	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Contingent Location.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			
VPB-125	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes	Contingent Location.
			220 to 600	1 to 2	20-foot intervals (20 samples)			
			620 to 780	1 to 2	20-foot intervals (9 samples)			
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.			

1. Total depth will be to the top of the Raritan Clay Unit, at a depth of approximately 800 feet below ground surface.
2. Work area summa canister (6 hours).

MR: Mud rotary.

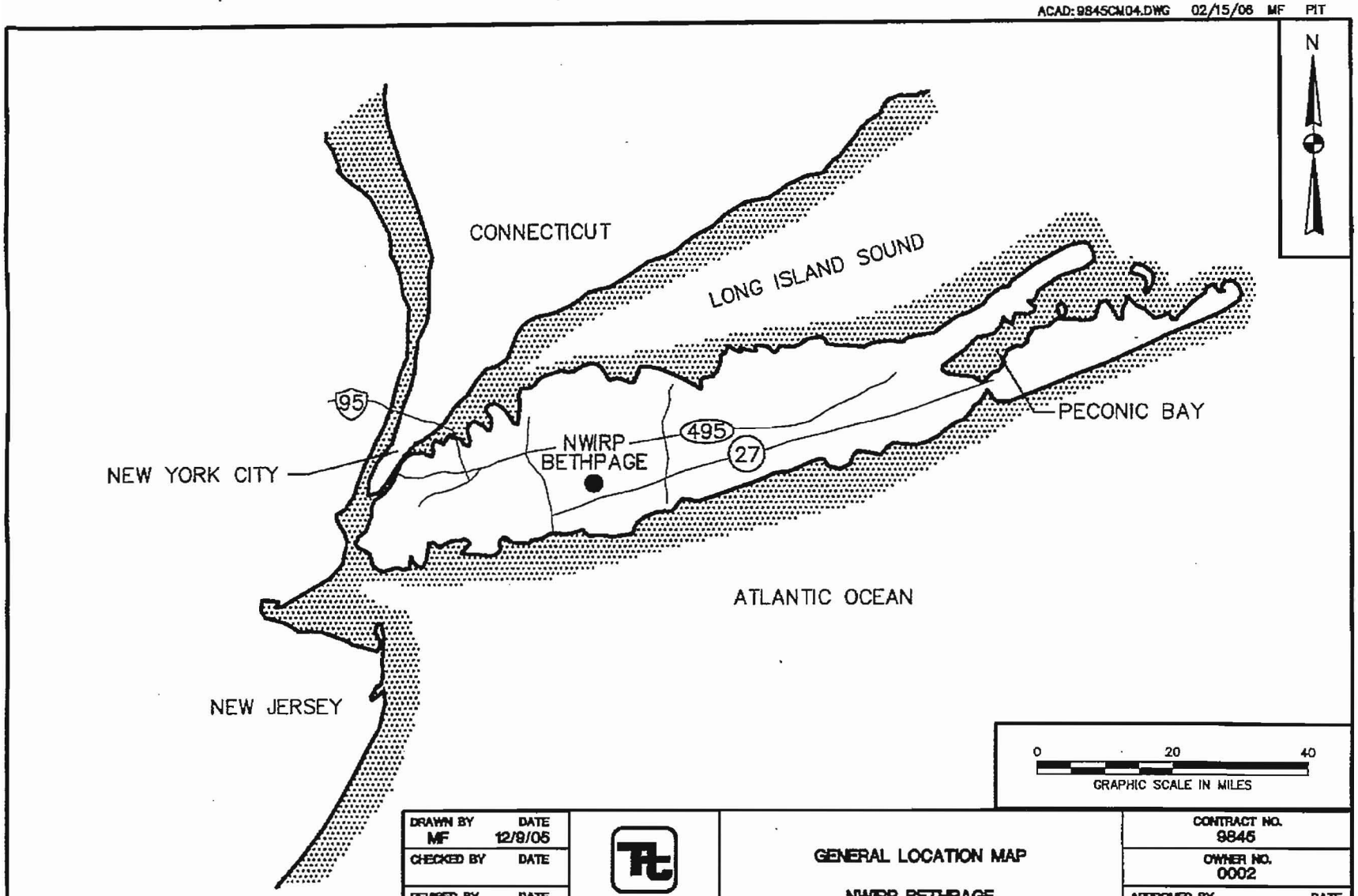
TABLE 2
PRE-DESIGN FIELD INVESTIGATION ANALYSIS
NWIRP BETHPAGE, NEW YORK

Location	Sample ID	Matrix	Number of Samples			
			VOCs - Quick Turn[1]	VOCs - Confirmation[2]	TOC[3]	VOCs - TO 15A[4]
VPB-120	BP-VPB120-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB120-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB120-AIR-MMDDYY	Air	--	--	--	1
VPB-121	BP-VPB121-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB121-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB121-AIR- MMDDYY	Air	--	--	--	1
VPB-122	BP-VPB122-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB122-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB122-AIR- MMDDYY	Air	--	--	--	1
VPB-123[5]	BP-VPB123-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB123-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB123-AIR- MMDDYY	Air	--	--	--	1
VPB-124[5]	BP-VPB124-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB124-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB124-AIR- MMDDYY	Air	--	--	--	1
VPB-125[5]	BP-VPB125-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB125-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB125-AIR- MMDDYY	Air	--	--	--	1

VOCs: Volatile organic compounds.
TOC: Total Organic Carbon.
XXX: Bottom of sample interval, in feet. For example, a groundwater sample collected in VPB 120 at 100 to 102 feet below ground surface would be BP-VPB120-GW-102.
MMDDYY: Sample date in month, day, and year. For example, July 28, 2007 would be 072807.

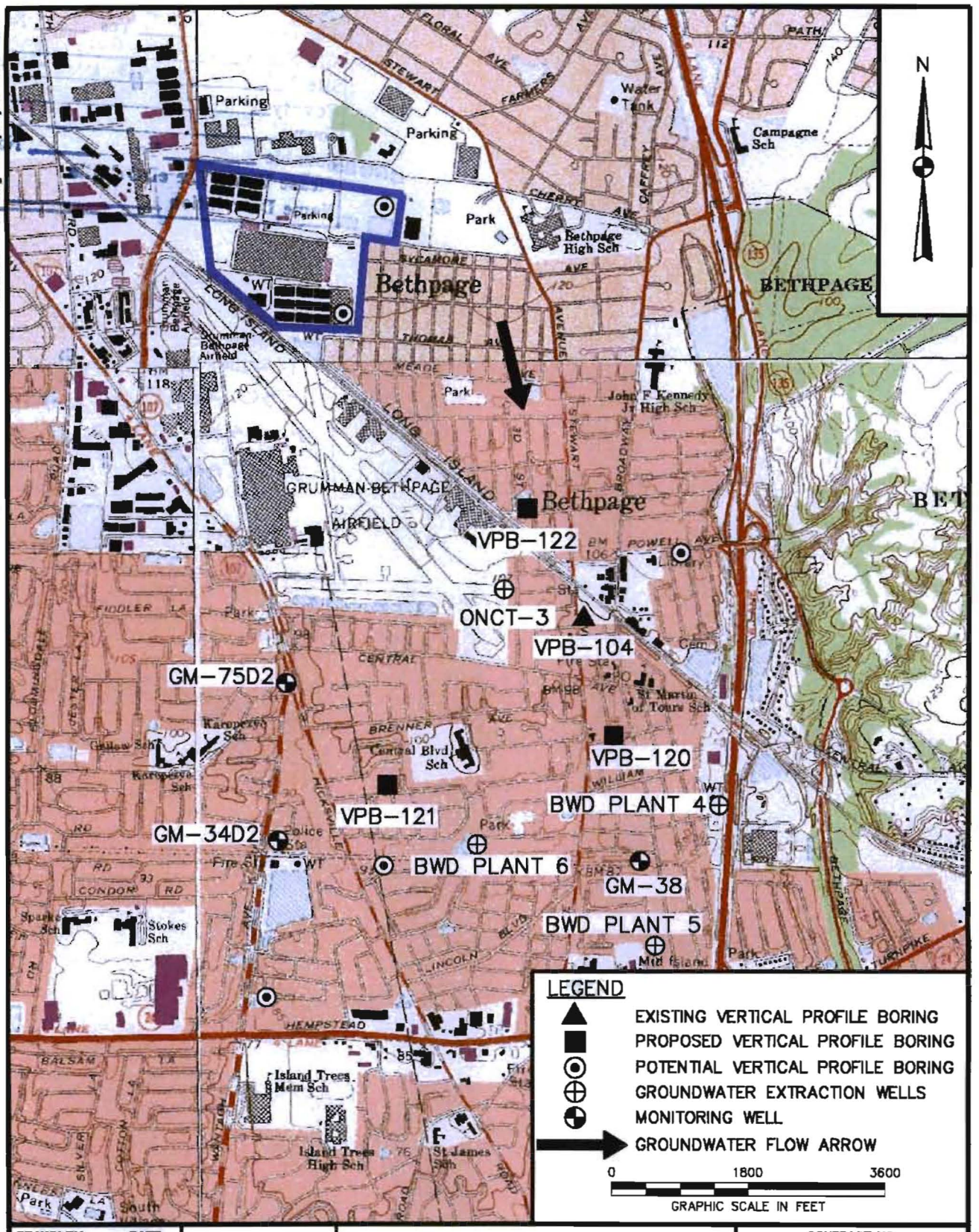
1) 48-Hour results from local laboratory via method SW846-8260B or equivalent method.
2) 21-Day results from Navy-approved laboratory via method SW-846 8260B.
3) 21-Day results from Navy-approved laboratory via Walkley-Black Method.
4) 21-Day results from Navy-approved laboratory via method TO-15A.
5) Contingent borings to be installed based on results from VPA-120, -121, and -122.

ACAD: 9845CM04.DWG 02/15/06 MF PIT



DRAWN BY MF DATE 12/9/05	Tetra Tech NUS, Inc.	GENERAL LOCATION MAP NWIRP BETHPAGE BETHPAGE, NEW YORK	CONTRACT NO. 9845
CHECKED BY DATE			OWNER NO. 0002
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

FORM CADD NO. TTNUS-AH.DWG - REV 1 -9/10/98



DRAWN BY MF	DATE 2/26/03	Tetra Tech NUS, Inc.	CONTRACT NO. 0622
CHECKED BY	DATE	PROPOSED BORING LOCATION GM-75 AREA NAVAL WEAPONS INDUSTRIAL RESERVE PLAN BETHPAGE, NEW YORK	OWNER NO.
REVISED BY	DATE		APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 REV. 0

FORM CADD NO. TTNUS-AV.DWG – REV 1 –9/10/98