DESIGN ANALYSIS REPORT

for

SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM AT SITE 1 – FORMER DRUM MARSHALLING AREA

NWIRP BETHPAGE
Bethpage, New York

Naval Facilities Engineering Command
Mid-Atlantic

Contract No. N62472-03-D-0057
Contract Task Order 002

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DESIGN ANALYSIS REPORT
SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM

**NAVAL FACILITIES ENGINEERING COMMAND
MID-ATLANTIC**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

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ACRONYMS

AS/SVE	air sparging/soil vapor extraction
bgs	below ground surface
CFM	cubic feet per minute
CLEAN	Comprehensive Long-Term Environmental Action Navy
CTO	contract task order
HS	Hand Switch
IR	Installation Restoration
lb/yr	pounds per year
MS	Moisture Switch
ND	Not Detected
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDOH	New York State Department of Health
PCE	tetrachloroethene
PCB	Polychlorinated biphenyls
PS	Pressure Switch
PVC	Polyvinyl chloride
ROD	Record of Decision
SVE	Soil Vapor Extraction
SVPM	Soil Vapor Pressure Monitor
TCA	1,1,1-trichloroethane
TCE	trichloroethene
VOC	volatile organic compound
WC	water column
$\mu g/m^3$	micrograms per cubic meter of air

1.0 INTRODUCTION

1.1 AUTHORIZATION

This Design Analysis Report has been prepared for Naval Facilities Engineering Command Mid-Atlantic under the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract number N62472-03-D-0057, Contract Task Order (CTO) 002. This Report presents the results of pilot-scale testing of a soil vapor extraction (SVE) system conducted in January 2009 and the design basis for a full-scale SVE containment system to address volatile organic compound (VOC) contaminants east of Installation Restoration (IR) Program Site 1 – Former Drum Marshalling Area at the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (Figures 1 and 2).

1.2 BACKGROUND

Remedial Investigations conducted in the early 1990s identified VOC-contaminated soils and shallow groundwater at Site 1 that were contributing to a regional groundwater plume [Halliburton NUS (HNUS) 1993]. To address this contamination, a 1995 Record of Decision (ROD) was prepared that included in-situ treatment of VOCs, excavation and offsite disposal of soils contaminated with polychlorinated biphenyls (PCBs), and placement of a permeable cover to address other residual contaminants including cadmium, chromium, and VOCs.

The in-situ treatment consisted of an air sparging/soil vapor extraction (AS/SVE) system that started operation in 1998. Remedial goals for this system were based on protection of groundwater and minimization of solvent emissions during a planned subsequent soil excavation to address the PCBs. The operation of the in-situ system achieved these goals and was shutdown in 2002 [Foster Wheeler Environmental Corporation (FWEC, 2003)]. Final actions to address cadmium-, chromium-, and PCB-contaminated soils, including excavation and capping are being evaluated by the Navy. Based on the distribution of other site contaminants, the area to be addressed by excavation and cover is anticipated to be most of Site 1 except for a 50-foot strip to the north and east of Site 1. Site photos are presented in Appendix A and Figure 3 shows the layout of Site 1 at the NWIRP Bethpage.

Soils at Site 1 consist mainly of unconsolidated sediments that overlie crystalline bedrock. The unconsolidated sediments consist of four distinct geologic units that in descending order are the Upper Glacial Formation, the Magothy Formation, the Raritan Clay, and the Lloyd Formation.

The Upper Glacial Formation, which is about 30 to 45 feet thick, consists chiefly of coarse sands and gravels. The Upper Magothy Formation consists chiefly of coarse sands to a depth of about 100 feet, below which finer sands, silts, and clay predominate. The clay is fairly common but laterally discontinuous; no individual clay horizon of regional extent underlies the NWIRP.

The Raritan Clay underlies the Magothy Formation at a depth of about 700 feet beneath the NWIRP and is reportedly 100 to 150 feet thick. The underlying Lloyd Sand Formation is reportedly about 300 feet thick.

For Site 1, a clay unit is present near the groundwater table [50 feet below ground surface (bgs)] at the southeast corner of the site. This clay unit is suspected to be a source of chlorinated solvents that are migrating into the overlying soil gas and the source of offsite VOCs in soil vapor. Log sheets for soil borings installed along the fence line and into the residential neighborhood are presented in Appendix B.

Chorinated solvents including trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane (TCA) have been identified as the VOCs of interest in soil gas at the site. Concentrations greater than 1,000 $\mu g/m^3$ (micrograms per cubic meter of air) have been directly associated with Site 1 activities and historical environmental data, and based on preliminary screening, exceed guidelines established by the New York State Department of Health (NYDOH) for subslab soil vapor concentrations. Of these chemicals, TCE is the primary VOC of concern. Addressing TCE contamination in accordance with DOH guidance should address the other VOCs associated with the site (NYSDOH, 2006). Positively detected VOCs for onsite and offsite soil gas are presented on Figure 4 (Tetra Tech NUS, Inc. [TtNUS], 2008 and TtNUS, 2009). Anticipated initial concentrations of extracted soil vapors are presented in Table 1-1 and are based on the mean chemical concentrations of the intermediate-depth and deep soil gas samples collected along the eastern fence line.

PCBs, cadmium, and chromium have also been identified in site soils at concentrations requiring remediation. The majority of these chemicals have been detected in the central portion of Site 1. Based on limited data, these chemicals are not expected to be present along the fence line at environmentally significant concentrations (i.e., trigger handling as hazardous water). Available analytical data for these soils is presented in Appendix C. This data consists of information collected from the Remedial Investigation of the Site in 1991 to 1994 and soil cores obtained during the January 2008 soil gas testing for disposal purposes (HNUS, 1993).

1.3 REMEDIAL OBJECTIVES

The remedial objectives for this project are as follows.

- Use an onsite soil vapor extraction system to prevent further offsite migration of VOC-contaminated soil vapor, and
- To the extent practical, capture contaminated soil gas that has migrated off site, with the primary goal being to capture soil gas with TCE at concentrations greater than 250 $\mu g/m^3$. A secondary goal is to address soil gas with TCE at a concentration greater than 5 $\mu g/m^3$.

Based on evaluation of offsite soil gas and subslab soil vapor test results, the extent of the 250 $\mu g/m^3$ TCE isoconcentration contour extends a maximum distance of approximately 270 feet in the deep soil gas (40 to 50 feet bgs) and 170 feet in the intermediate-depth soil gas (20 to 40 feet bgs). The extent of the 5 $\mu g/m^3$ TCE isoconcentration contour extends to a maximum distance of approximately 390 and 430 feet in the intermediate-depth and deep soil gas, respectively. For the secondary goal, natural attenuation factors including dispersion and scrubbing of the soil gas via precipitation infiltration may be required. Also, the effects of operating up to eight subslab depressurization units in the offsite area must be considered during the operation and evaluation of a soil vapor containment system. Plan view and cross sections of estimated TCE isoconcentration contours and subsurface lithology are presented in Figures 5 and 6.

1.4 SOIL VAPOR EXTRACTION PILOT-SCALE TEST

In January 2009, Tetra Tech conducted a pilot-scale test using two new soil vapor extraction wells located in the southeast corner of Site 1 (SVE1001-I and –D), a blower, and vapor phase carbon for off gas treatment. For monitoring, seven soil vapor pressure monitors (SVPM-2002-S, -I, and –D, SVPM-2003-I and –D, and SVPM-2007-I and –D) were installed east of Site 1 using direct push technology. Also, existing onsite monitoring points were also used as soil vapor pressure monitors and included soil vapor pressure monitors SVPM-11S, SVPM-11, SVPM-12S, and SVPM-12, and soil vapor extraction wells EW-1 and EW-5. Boring logs and well construction sheets for the new and existing wells are presented in Appendix B.

Four tests were conducted over a one-week period. The tests were conducted under conditions in which the ground surface was partially frozen and/or covered with snow. Also, during the week, a series of high and low pressure systems moved across the area, and residual pressure gradients from these system were noted in several of the monitoring points. Test conditions are summarized as follows.

Test No	SVE-1001I (25 to 35 feet bgs)		SVE-1001D (40 to 60 feet bgs)	
	Flow Rate (CFM)	Well Pressure (Inches WC)	Flow Rate (CFM)	Well Pressure (Inches WC)
1	0	0	20	Not measured
2	0	0	51	-22
3	20	Not measured	51	-20
4	44	-4	52	-20

WC – water column. A "-" indicates a vacuum.
CFM – cubic feet per minute.

Tables and graphs developed from the field tests are presented in Table 1-2 and Appendix D. Based on these test results, the design basis for the soil vapor extraction system has been established as follows.

1. Install soil vapor extraction wells in clusters of two, one screened from 25 to 35 feet bgs and a second one screened from 40 to 60 feet bgs. Based on pilot scale testing, the effectiveness of deep soil vapor extraction wells located at the southeast corner of Site 1 may be affected by local geology and the use of an intermediate-depth soil vapor extraction well is required to ensure effective capture zones. The deep soil vapor extraction wells may also be used as a monitoring well.

2. Install well clusters along the eastern boundary of Site 1 on 100-foot intervals to establish an effective containment system. Six well clusters, for a total of 12 wells will be required.

3. Operate each well at a design flow rate of 50 cubic feet per minute (CFM) for a total design flow rate of 600 CFM. Provide additional blower capacity in the event that higher than anticipated extraction rates are required to provide adequate capture.

4. To achieve the design soil vapor extraction rate, a vacuum of approximately 20 inches of water column are expected to be required for the 2 or 3 deep soil vapor extraction wells located along the southern portion of the extraction system and 4 inches of water column are required for the intermediate-depth extraction wells and remainder of the deep extraction wells.

5. Electrical power is available in an existing Navy-owned building approximately 1,300 feet west of the fence line. The building is large enough to house the anticipated blowers

and treatment equipment. No power is available at Site 1. Lighting, heating, and ventilation of the building will need to be upgraded.

1.5 REPORT FORMAT

This report is divided into four sections. Section 1.0 is this Introduction. A description of the remedial system is provided in Section 2.0. Permitting Requirements are presented in Section 3.0. The Schedule is provided in Section 4.0.

2.0 REMEDIAL SYSTEM DESCRIPTION

2.1 SUMMARY

The SVE Containment System will consist of the following elements:

- Soil vapor extraction wells;
- Moisture separator;
- Soil vapor extraction blowers;
- Interim vapor phase granular activated carbon off gas treatment; and
- Soil vapor pressure monitors.

The process flow schematic for the system is presented in Figure 7.

The soil vapor extraction wells are to be located along the eastern boundary of Site 1 (Figure 8). These wells are to be screened at depths of 25 to 35 feet (intermediate-depth wells) and 40 to 60 feet (deep wells)(Figure 9). The individual wells will discharge to the Flow Monitoring Station, located at the southeast corner of the Navy property where flow, vacuum, and soil gas quality can be measured (Figure 10). The flow will be combined at this location and discharged to the Treatment Building, located approximately 1,300 feet west. Within the Treatment Building (Figure 11), the extracted soil vapor with flow through a 1,000 gallon Moisture Separator to remove condensate. Two blowers (one operating and one auxiliary), each rated for 600 cubic feet per minute (CFM) will be used to convey the extracted soil vapor. The discharge from the blowers will be conveyed to a single stage 5,000 granular activated carbon unit and be vented to the atmosphere via a discharge stack. Use of granular activated carbon for off gas treatment is anticipated to be required for the first year of operation. After one year of operation, the granular activated carbon unit may be removed. The effectiveness of the soil vapor extraction system in containing contaminated soil vapor and remediating contaminated soil vapor location east of Site 1 will be evaluated by soil vapor pressure monitors located in the residential neighborhood (Figure 8).

2.2 SOIL VAPOR EXTRACTION WELLS AND FLOW MONITORING STATION

Reference: Figures 7 – Process Flow Schematic, Figure 8 – Proposed SVE Containment Well Location Map, Figure 9 – Proposed SVE Containment Wells Cross Section, and Figure 12 – Well Details.

Design Basis

The design basis for the extraction wells was developed using the pilot scale testing conducted in January 2009, see Section 1.4 and Appendix D. The system will be designed for continuous operation for up to four years.

Description

Twelve soil vapor extraction wells (SVE-101I and -101D to -106I and -106D) will be used to extract soil vapors from screen depths of 25 to 35 feet bgs (intermediate-depth) to 40 to 60 feet bgs (deep). Groundwater is present at a depth of approximately 50 feet bgs; therefore, the deep soil vapor extraction wells can also function as groundwater monitoring wells. Soil vapor extraction wells SVE-101I and 101D were installed in January 2009, but have not been completed or developed. The other soil vapor extraction wells will be installed as part of this project.

Construction and operation details for the soil vapor extraction wells are summarized as follows.

Parameter	Intermediate-Depth Wells	Deep Wells
Number	6, including one existing	6, including one existing
Vacuum	4 inches water column	4 to 20 inches water column
Flow Rate	50 CFM	50 CFM
Well Depth	35 feet bgs	60 feet bgs
Screening Interval	25 to 35 feet bgs	40 to 60 bgs
Screen	2 inch, 20 slot, PVC	2 inch, 20 slot, PVC
Riser	2 inch, schedule 40 PVC	2 inch, schedule 40 PVC
Sand Pack	No. 2 sand, to one foot above the well screen. A fine sand layer may also be placed above the sand and below the seal	No. 2 sand, to one foot above the well screen. A fine sand layer may also be placed above the sand and below the seal
Bentonite Seal	Minimum 2 feet	Minimum 2 feet
Boring Grout	Bentonite/cement to 4 feet bgs	Bentonite/cement to 4 feet bgs
Well finish	Leak tight threaded well cap and lockable stick up steel casing, grouted to 4 feet bgs	Leak tight threaded well cap and lockable stick up steel casing, grouted to 4 feet bgs

bgs – below ground surface
PVC – polyvinyl chloride

Each well will include a dedicated 2-inch buried schedule 40 PVC pipe to convey extracted soil vapors to the Flow Monitoring Station to be located in the southeast corner of NWIRP Property, approximately 20 feet south of Site 1.

Within the Flow Monitoring Station, the individual wells discharges will be equipped with a flow control valve and flow and vacuum monitoring port. Discharges from the individual soil vapor extraction wells will be combined into a 10-inch schedule 40 PVC header for flow conveyance to the Treatment Building located at Site 4. Flow and vacuum measurements will be conducted with a portable flow meter and vacuum gauge. Once the individual extraction well flow rates are established, only minor modifications are anticipated during operation. The 10-inch header will be equipped with a 10-inch air bleed line to allow flushing of condensate that may accumulate in the conveyance line to the Treatment Building.

The Flow Monitoring Station is anticipated to be a small unheated pre-fabricated metal shed with limited ventilation and located on a concrete slab and footer. 2-Inch piping from the SVE wells will enter the shed from the north and a 10-inch pipe will exit the building to the west. Above ground piping shall be insulated. If required during winter operation, a portable propane heater may be used to prevent condensate in the interior piping from freezing. The 10-inch pipe will be buried below the frost line. The exact route will be determined in the field based on utilities, but is be maintained a minimum of 4 feet on Navy property. A fence is currently located on top of the anticipated route. This fence will not have to be replaced.

The piping will be buried below the frost line, approximately 4 feet deep bgs. The piping shall be placed in a well graded sand from an off site source. Excavated soils from the trench may be considered for reuse for the remainder of excavation. Chemical test results from soils in the area along the eastern border of Site 1 are provided in Appendix C. The quality of the soil from the Flow Monitoring Station to the Treatment Building is unknown, but there have been no identified releases of hazardous materials in this area. Unless there is evidence of contamination during excavation of the piping trench (i.e., elevated photoioniziation detector readings, odors, staining, or debris, excess soil from the excavation can be used to regrade the area.

Operation and Controls

During the initial startup of the SVE Containment System, the control valves and flow ports located at the Flow Monitoring Station will be used to establish the flow rates for each well. After the initial startup, the flow rates will be measured quarterly, and adjusted as needed to maintain target flow rates. Individual well flow rates may also be modified as needed to enhance vacuums in the area east of Site 1 (e.g., provide more flow from the southeast corner of Site 1). Based on the pilot scale testing in January 2009 and historical operation of the full scale AS/SVE system most of the intermediate-depth and deep soil vapor extraction wells are anticipated to yield 50 CFM at a vacuum of approximately 4 inches of water column. Deep extraction wells located near the southeast corner of Site 1 may require approximately 20 inches of water column to achieve this flow rate.

The flow ports can also be used to collect soil vapor samples and measure vacuums at each well. Sampling of the soil vapors is anticipated to be quarterly for the first year and then annually for the duration of the operation.

2.3 1000-GALLON MOISTURE SEPARATOR

Reference: Figures 7 – Process Flow Schematic, Figure 10 – Piping Layout, and Figure 11 – Treatment Building Layout.

Design Basis

A Moisture Separator will be installed in the Treatment Building to remove free water that may be collected by the soil vapor extraction wells or form in the conveyance piping. Since most of the piping will be buried, the formation of condensate in the piping is not expected to be significant, with less than 100 gallons collected on a monthly basis from December to April. During other months, and in particular during the summer and fall when the ambient air temperature is typically greater than the soil and groundwater temperature, there is expected to be a net evaporation of water from the piping and Moisture Separator. If required, condensate will be removed on a periodic basis, tested, and disposed off site.

Description

One 1,000-gallon Moisture Separator tank will be installed in the Treatment Building. This tank will be anchored to the existing floor. Approximate tank dimensions are 5 feet in diameter and 7 feet high. It will be constructed of carbon steel and have interior and exterior coating to control corrosion. The soil vapor inlet to the tank will be at an angle to create a vortex within the tank to promote knockout of free water. The discharge from the tank will be from the top center. The tank will also be equipped with a top mounted, gasketed, inspection port, two-inch bottom sidewall drain, and a sight glass to indicate water level. The tank will normally operate under a maximum vacuum of 40 inches of water gauge. A vacuum relief valve located on the suction piping to the blowers will be used to control excessive vacuum on the tank.

Operation and Controls

Under normal operation, the Moisture Separator will operate as a flow through vessel. A sight glass will be used to allow visual determination of the buildup of condensate in the tank. In addition, a moisture switch will be located in the tank and interlocked to the blower to stop system operation in the event that a high condensate level occurs in the tank. If the tank requires to be drained, a portable pump will be lowered into the tank and the condensate pumped into either 55-gallon drums for temporary storage or directly into a truck for off site transportation and disposal. Under normal operation, it is expected that condensate will accumulate during winter operation and evaporate during summer operation. If off site disposal of the condensate is required, VOCs in the condensate can be purged by closing the valves to the SVE wells and opening the air bleed valve in the Flow Monitoring Station for a period of time before sampling and transfer (e.g., overnight).

2.4 BLOWERS

Reference: Figures 7 – Process Flow Schematic, Figure 10 – Piping Layout, and Figure 11 – Treatment Building Layout.

Design Basis

One blower will normally be used to extract a total of 600 CFM, with a suction vacuum and discharge pressure of 29 and 5 inches of water column, respectively. The 600 CFM is based on the 12 operating extraction wells each producing an average of 50 CFM. The pressure requirements are based on a sum of pressure losses as follows.

SVE Well operating vacuum:	4 to 20 inches water column
2-inch SVE piping to Monitoring Station:	1 to 5 inches water column
10-inch Header to Treatment Building:	2 inches water column
Moisture Separator:	2 inches water column
Vapor Phase Carbon Unit:	3 inches water column
8-inch Discharge Piping	2 inches water column
Total net pressure across blower:	34 inches water column

A second blower will be provided to supplement the first blower in the event that a higher flow (up to 1,000 CFM) is required to achieve the targeted capture zone. If required, the second blower would likely need to operate during hot and dry conditions in the summer during which surface infiltration will be the greatest.

Description

Two radial bladed pressure steel blowers will be procured and installed to extract contaminated soil vapors from the Soil Vapor Extraction wells. Under normal operation, the blower will transfer 600 CFM of soil vapor under a vacuum of 29 inches water column and a temperature of 60 degrees Fahrenheit and a discharge pressure of 5 inches of water column. The motor will be a 480 volt, 3-phase, and 7.5 horsepower. The Blowers will be located in the Treatment Building and anchored to the existing floor with adequate vibration suppression.

The blowers shall be equipped with a general coarse filter to prevent debris and sand from entering the blowers and Vapor Phase Carbon Unit.

Operation and Controls

Each blower will operate via an On-Off switch Hand Switch (HS). In the On position, the blower will be interlocked with the flowing sensors.

- MS – Moisture switch located in the Moisture Separator to stop blower operation in the event of high water level.
- PS – Pressure switch located on the discharge to the Blowers to stop blower operation in the event of a high discharge pressure, indicating blockage of the Vapor Phase Carbon Unit.
- A pressure relief valve will be located on the suction to the blower to allow air flow in the event that the suction piping or filter become restricted.
- A flow totalizer will be located on the blower discharge to measure and record total soil vapor flow through the system.

2.5 VAPOR PHASE CARBON UNIT

Reference: Figures 7 – Process Flow Schematic, Figure 10 – Piping Layout, and Figure 11 – Treatment Building Layout.

Design Basis

Vapor phase granular activated carbon will be used to treat extracted soil gas prior to discharge to the atmosphere, see Section 3.0 – Permitting Requirements. The vapor phase treatment is designed to handle an average flow rate of 600 CFM with a pressure drop of 3 inches of water column and a maximum flow rate of 1,000 CFM with a pressure drop of 5 inches of water column, see Appendix D for a typical pressure drop curve for Vapor Phase Carbon Unit. In addition, if needed, the vapor phase treatment system should contain sufficient carbon to allow reasonable time between change outs (greater than 6 months).

During the first year, approximately 809 pounds of TCE and 406 pounds of TCA are estimated to be extracted from the soil vapor extraction wells. The adsorption efficiency of the carbon is dependent on the vapor phase concentration. At the estimated initial concentration for TCE and TCA, the calculated carbon usage rates are 5.5 to 1 and 4.8 to 1 (pounds of carbon per pound of chemical), respectively. Based on these estimates, the 3,200 pounds of carbon would be used in the first six months of operation. Therefore, provide a 5,000-pound single-stage Vapor Phase Carbon Unit. Treatment may be required for approximately one year of operation, after which, the influent VOC concentrations may decrease to a level in which treatment is no longer required, see Section 3.0.

In calculating carbon usage rates, there are several offsetting factors to be considered. One factor is that the carbon to chemical adsorption ratios are based on air at 40 percent relatively humidity and 77 degrees Fahrenheit. The actual temperature of the gas is expected to be less than 77 degrees, which will increase the carbon adsorption efficiency. However, the actual relative humidity of the soil gas will be greater than 40 percent and may approach 100 percent during winter operation, and decrease the carbon adsorption efficiency. The second factor is that the concentrations of VOCs in the extracted soil vapors are expected to decrease over time. The decrease in VOC concentrations will correspond to decreased carbon consumption.

Description

A single 5,000-pound vapor phase granular activated Vapor Phase Carbon Unit will be used to treat the off gas prior to discharge. Approximate dimensions of this unit are 6 feet in diameter by 8 feet high.

Operation and Controls

Under normal operation the unit will operate as a flow through unit. A pressure switch located between the blowers and Vapor Phase Carbon Unit will be used to stop operation of the blowers in the event that flow through the Vapor Phase Carbon Unit becomes restricted. Sample ports are to be located on the inlet and outlet of the unit to allow sample collection for chemical analysis. On a monthly basis, the efficiency of the Vapor Phase Carbon Unit should be evaluated using a photoionization detector. On a quarterly basis for the first year and then annually thereafter, samples should be collected and analyzed for TO-15 VOCs.

Based on photoionization detector readings, if the influent VOC concentration is greater than 10 parts per million, the Vapor Phase Carbon Unit should achieve a minimum removal efficiency of 80 percent. Based on TO-15 analysis, if TCE, PCE, or TCA concentrations in the influent exceed 10,000 $\mu g/m^3$, the Vapor Phase Carbon Unit should achieve a minimum removal efficiency of 90 percent or 1,000 $\mu g/m^3$ for that chemical, which ever is greater. For chemicals at concentrations less than 1,000 $\mu g/m^3$, removal is not required. Additional detail is provided in Section 3.0 – Permitting Requirements.

Change out of the carbon should be considered when the removal efficiency decreases to 80 or 90 percent as described above, especially if carbon saturation is achieved in less than 6 months. When carbon saturation does occur, the concentration of untreated soil vapors should be evaluated using the DAR-1 procedure (Appendix E) and a determination made as to whether continuing treatment of the extracted soil vapors is required.

2.6 SOIL VAPOR PRESSURE MONITORS

Reference: Figures 7 – Process Flow Schematic, Figure 8 – Proposed SVE Containment Well Location Map, Figure 9 – Proposed SVE Containment Wells Cross Section, and Figure 12 – Well Details.

Design Basis

The purpose of the soil vapor pressure monitors is to confirm the capture of contaminated soil vapors in the area east of Site 1. The soil vapor pressure monitors are located near the boundary of the estimated isoconcentration contour of 250 $\mu g/m^3$ for TCE. The monitors will be installed to a total depth of approximately 10 feet, 25 feet, and 42 feet, with two-foot screen intervals. These depths correspond to the approximate depths of basement slabs within houses, the intermediate-depth soil vapor extraction wells, and the deep soil vapor extraction wells, respectively.

Description

Twelve soil vapor pressure monitors (SVPM-2002-S, I, and D, -2003S and I, -2004I and D, and -2007I and D, and SVPM 11S, 12, and 12S) will be used to monitor vacuums in the area east of Site 1 and along the Site 1 fence line. The soil vapor pressure monitors are screened at depths of 8 to 10 feet bgs (shallow), 23 to 25 feet bgs (intermediate-depth), and approximately 40 to 50 feet bgs. Groundwater is present at a depth of approximately 50 feet bgs. Soil vapor pressure monitors SVPM-2002S, I, and D, -2003S and I, and -2007I and D were installed in January 2009 using a direct push technology and temporary abandoned in February 2009 by filling the well with No. 2 sand, capping the well, and covering the monitor with soil. These monitors can be re-developed by removing the sand and installing a permanent flush mount casing. Soil vapor pressure monitors SVPM-2004I and D will need to be installed. The new wells can be installed using either a hollow stem auger and finishing them similar to a SVE well or direct push and finishing them similar to the existing monitors. The monitors will include a sealed cap, valve, and threaded sample port to measure pressure.

Operation and Monitoring

Pressure readings will be obtained using a portable pressure gauge accurate to 0.01 inches of water column. A sustained vacuum of 0.01 inch of water column or greater is a positive indication of soil vapor capture at that point. In addition, since under an operating SVE system, the source of the soil vapor is the atmosphere at ground surface, a confirmed vacuum at the intermediate-depth can be used as an indication that shallower soil vapors are being captured, even if the capture cannot be confirmed with a pressure meter.

Soil vapor pressure monitor readings will be obtained during startup and monthly during operation. The data will be used to ensure capture, and if needed, adjust of flow rates from the SVE wells to optimize capture of contaminated soil vapor.

The effects of winter operation (frozen ground and snow cover) and the residential subslab depressurization systems conditions must be considered in evaluating the data. In particular, the schedule estimate for achieving the Remedial Objectives (two years) was in part based on the need to operate the system through two winters in order to fully purge the offsite soil vapors. Winter conditions, by acting as a low permeable cap will extend the influence of SVE wells. Also, the subslab depressurization systems may cause measureable vacuums in the off site pressure monitors.

2.7 SOIL VAPOR EXTRACTION SYSTEM COMPLETION

The soil vapor containment system will be shut down when the following conditions have been achieved.

1. Under non-operating, winter conditions, offsite subslab and soil vapor pressure monitor concentrations are less than 50 $\mu g/m^3$ for TCA and PCE and 25 $\mu g/m^3$ for TCE. Measurements should be conducted when the SVE Containment System has been off for a period of at least one week.
2. Under non-operating, winter conditions, onsite soil vapor pressure monitor concentrations are less than 500 $\mu g/m^3$ for TCA and PCE and 125 $\mu g/m^3$ for TCE. Measurements should be conducted when the SVE Containment System has been off for a period of at least one week.
3. If conditions 1 and 2 are achieved, the system may operate longer with reduced monitoring if more than one pound per day of total VOCs are being removed

2.8 OTHER CONSIDERATIONS

General construction practices and other factors to be considered during construction and operation of the SVE Containment System are as follows.

1. Electrical power is only available at the NWIRP Bethpage in the area of the proposed Treatment Building. This power was installed in 2008 and is believed to be adequate to supply the needs of this project. The adequacy of the existing power supply needs to be determined. There is no power available in the area of Site 1. The components of the system at and near Site 1 should be constructed to operate without electrical power.
2. The proposed Treatment Building is unheated and lacks sufficient lighting. Building heat and an upgrade of the existing lighting is required.
3. The building does not have ventilation. The building should be modified to include mechanical ventilation to remove excess heat from operation of the blowers.

3.0 PERMITTING REQUIREMENTS

The system construction and operation are being conducted under the State Inactive Hazardous Waste Program. As such, permits are not required for onsite activities. However, the substantive requirements of an air discharge permit must be complied with and a letter from the state approving the action and operation of the system is required. A screening level evaluation to satisfy the substantive requirement of an air discharge permit is presented in Appendix E and summarized below.

Parameter	Initial Concentration of Extracted Soil Vapor (µg/m^3)	Estimated Discharge Requirement (µg/m^3)[1]
Trichloroethene	41,100	8,900
Tetrachloroethene	381	17,000
1,1,1-Trichloroethane	20,600	Greater than 20,000

1. Concentration is based on a flow of 600 CFM, with estimated discharge requirements calculated from the inputted initial concentration of extracted soil vapor data to achieve air quality requirements, see Appendix E. Stack height is 30 feet and the property line is assumed to be 100 feet.

Town of Oyster Bay road opening permits, including fees, will be required for installing and redeveloping soil vapor pressure monitors in the area east of Site 1.

During construction, soil trenches and soil borings will generate some waste. Based on existing data, none of the excavated soil is expected to be classified as a hazardous waste. Excavated soil can be screened as indicated in Section 2.2 and handled appropriately. Offsite soils must be brought on site, characterized, and disposed of off site. Condensate, if generated, should be handled as indicated in Section 2.3.

4.0 SCHEDULE

The estimated construction and startup schedule is presented as follows.

Activity	Schedule
Removal Action Work Plan	05/15 to 06/30/09
Construction	08/15 to 11/15/09
Startup	11/15 to 12/30/09

The schedule assumes an award date of May 15, 2009 and that a courtesy copy of the Removal Action Work Plan will be submitted to New York State Department of Environmental Conservation. The state will be provided with a 30-day review period.

REFERENCES

New York State Department of Health (NYSDOH), 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October.

Tetra Tech NUS, Inc. (TtNUS), 2008. Soil Vapor Investigation, NWIRP Bethpage, New York, March.

Tetra Tech NUS, Inc. (TtNUS0, 2009. Site 1 – Phase II Soil Vapor Testing Letter Report, NWIRP Bethpage, New York, January.

Halliburton NUS (HNUS), 1993. Phase 2 Remedial Investigation Report, for Naval Weapons Indusgtrial Reserve Plant, Bethpage NY, October.

Foster Wheeler Environmental Corporation (FWEC), 2003. Final Close-Out Report, Construction of a Soil Vapor Extraction/Air Sparging System at Naval Weapons Industrial Reserve Plant Bethpage, NY, December.

TABLES

TABLE 1-1
SOIL VAPOR CONCENTRATIONS
SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM
SITE 1 - FORMER DRUM MARSHALLING AREA
NWIRP BETHPAGE, NEW YORK

Chemical of Concern	Concentration Range (µg/m³)[1]		Mean Concentration (µg/m³)	Mass Loading - Initial (lb/yr)
	Minimum	Maximum		
Trichloroethene	ND	180,000	41,128	809
Tetrachloroethene	ND	1,200	381	8
1,1,1-Trichloroethene	ND	90,000	20,634	406

1. BPS1-SG1001 to -SG1004 (Depths of 20 and 45 feet), SVPM12, and SVPM12S (TtNUS, 2008 and 2009)
ND - Not detected
µg/m³ - micrograms per cubic meter
lb/yr - pounds per year

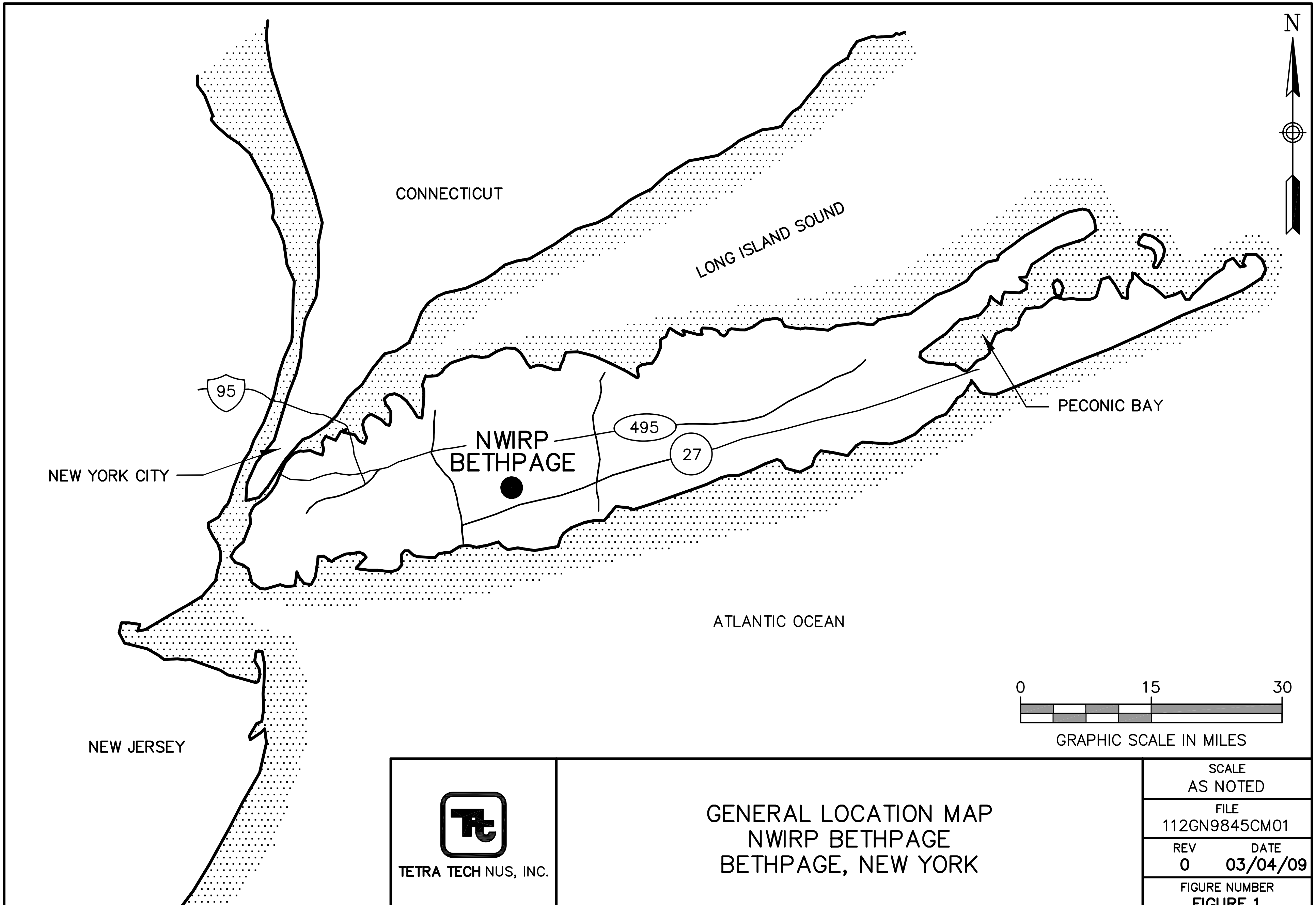
TABLE 1-2
RESULTS OF JANUARY 2009 SOIL VAPOR EXTRACTION PILOT-SCALE TESTING
SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM
SITE 1 – FORMER DRUM MARSHALLING AREA
NWIRP BETHPAGE, NEW YORK

Test No/ Well Flow Rate (CFM)	Pressure At SVPM 2002 (In WC)[2]	Maximum Measured Effect (feet)[3]	Estimated Capture Zone (feet)[1]	
			Intermediate-Depth[4]	Deep[4]
1. SVE1001I (0), SVE1001D (20)	-0.02	82	82	48
2. SVE1001I (0) SVE1001D (51)	-0.04	82	82	82
3. SVE1001I (20) SVE1001D (51)	-0.06	238	161	238
4. SVE1001I (44) SVE1001D (52)	-0.13	238	230	300

1. For Tests 1, 2, and 3, there was not enough data points demonstrating confirmed measurable vacuums to calculate the capture zone. As a result, the most distant soil vapor pressure monitor that had a demonstrated measurable vacuum (0.01 Inches WC) was used to establish the estimated capture zone.
2. SVPM 2002 is located 82 feet east of the soil vapor extraction wells in the residential neighborhood and is located within approximately 30 feet of one of the houses targeted for subslab depressurization. Vacuums achieved at this location provide an indication of the effects that the SVE Containment System will have on the subslab depressurization units. The subslab depressurization units are being sized to obtain a minimum vacuum of 0.025 inches water column under the basement slab at a depth of approximately 6 feet bgs. "-" indicates a vacuum.
3. The maximum measured effect corresponds to the distance in which a vacuum could be confirmed. A soil vapor pressure monitor at a distance of 270 feet showed evidence of a measurable vacuum under Test 4, but because of the short duration of the test and a series of weather systems that moved through the area, a vacuum could not be confirmed.
4. Intermediate-depth and deep zones correspond to approximately average depths of approximately 25 and 45 feet bgs, respectively.

FIGURES

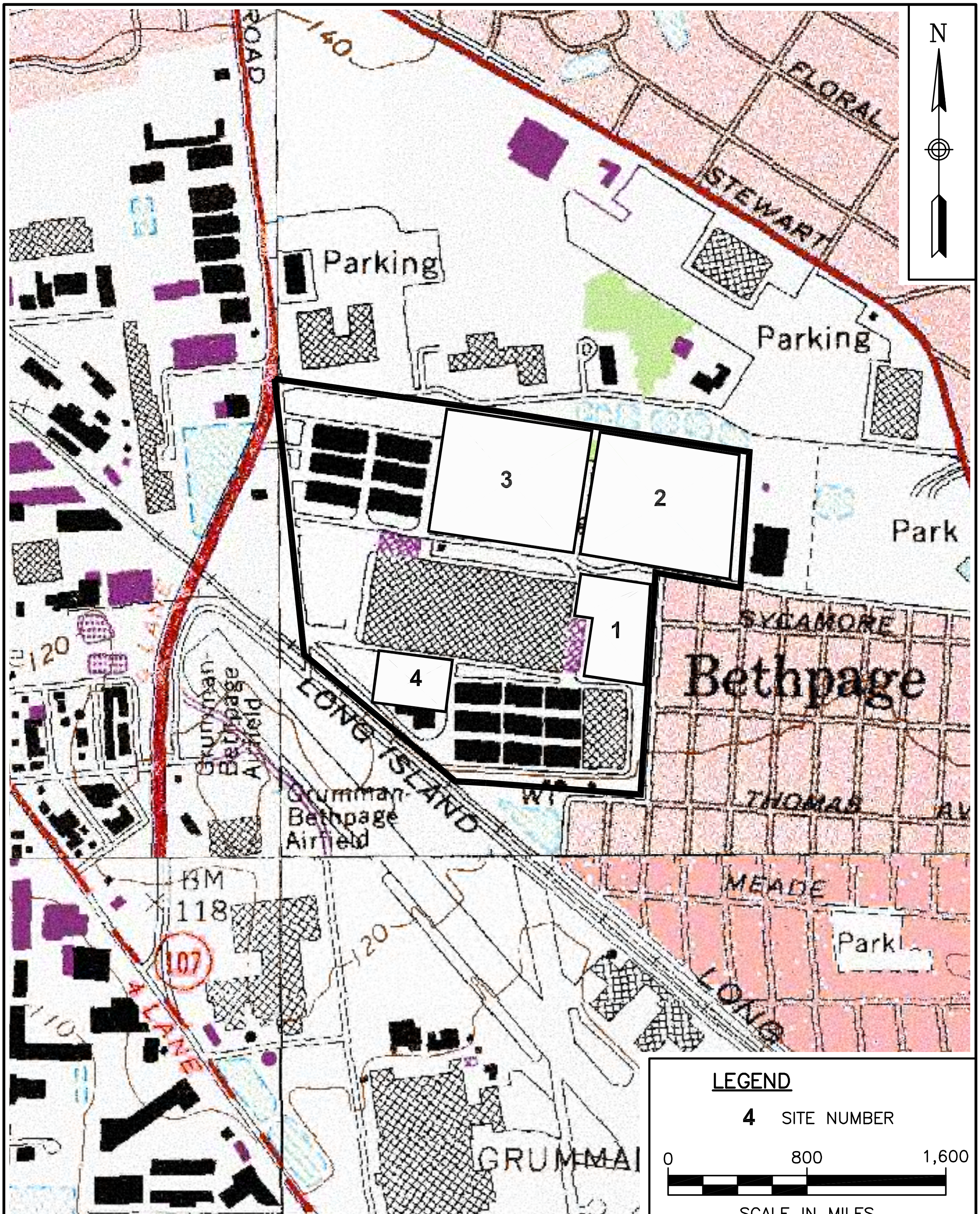
112GN9845\3110\112GN9845CM01.DWG 03/04/09 MKB



TETRA TECH NUS, INC.

GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

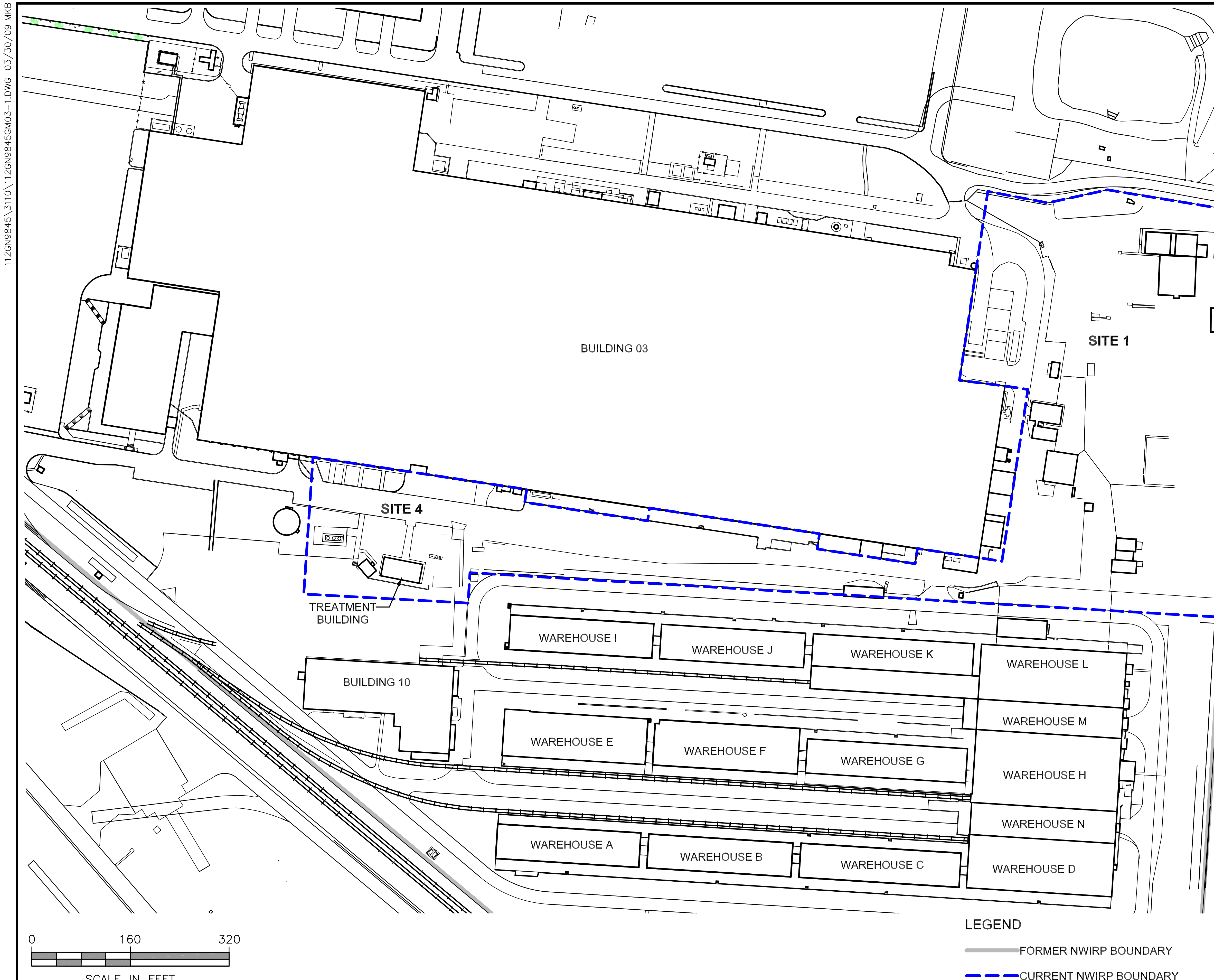
SCALE AS NOTED	
FILE 112GN9845CM01	
REV 0	DATE 03/04/09
FIGURE NUMBER FIGURE 1	



TETRA TECHNUS, INC.

SITE LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

SCALE	AS NOTED
FILE	112GN9845CM02
REV 0	DATE 03/04/09
FIGURE NUMBER	FIGURE 2

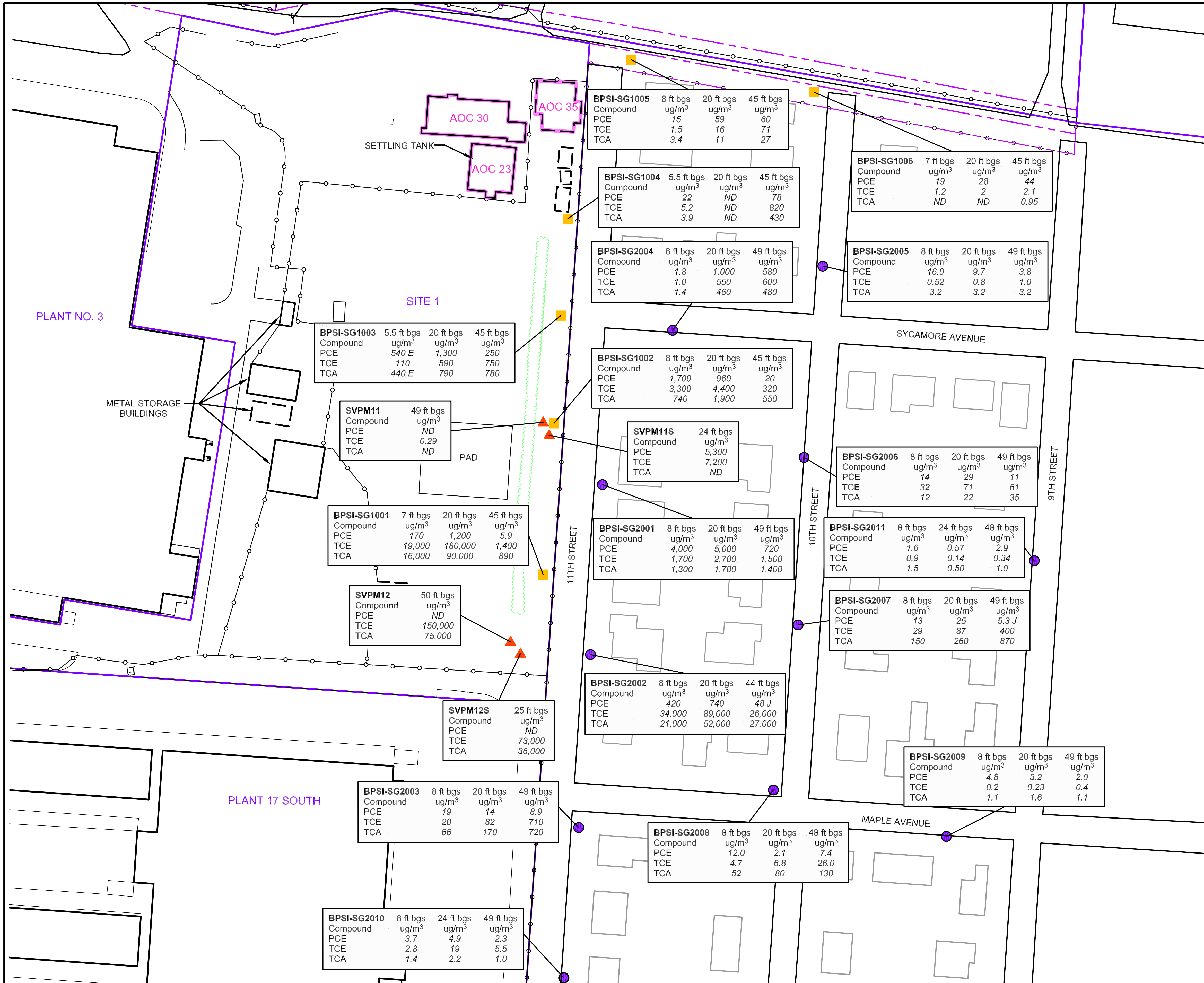


TETRA TECH NUS, INC.

FACILITY LAYOUT
SVE CONTAINMENT SYSTEM
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM03-1	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 3	0	03/30/09



LEGEND

- OFFSITE SOIL GAS SAMPLE LOCATION
- ONSITE SOIL GAS SAMPLE LOCATION
- SOIL VAPOR PRESSURE MONITORING POINT (SVPM)
- 420 — SOIL GAS VALUE in ug/m 3
- J — ESTIMATED VALUE
- bgs — BELOW GROUND SURFACE
- PCE — TETRACHLOROETHENE
- TCE — TRICHLOROETHENE
- TCA — 1,1,1 - TRICHLOROETHANE
- PROPERTY LINE
- FENCE LINE
- SITE BOUNDARY

PARAMETER	NYSDOH SUBSLAB VALUE	NYSDOH INDOOR AIR VALUE
Compound	ug/m³	ug/m³
PCE	1,000	100
TCE	250	5

NOTE:
NYSDOH HAS NOT ESTABLISHED A SCREENING VALUE FOR TCA. A PROJECT-SCREENING VALUE OF 5,200 UG/M³ FOR TCA HAS BEEN ESTABLISHED.

0 100 200
SCALE IN FEET

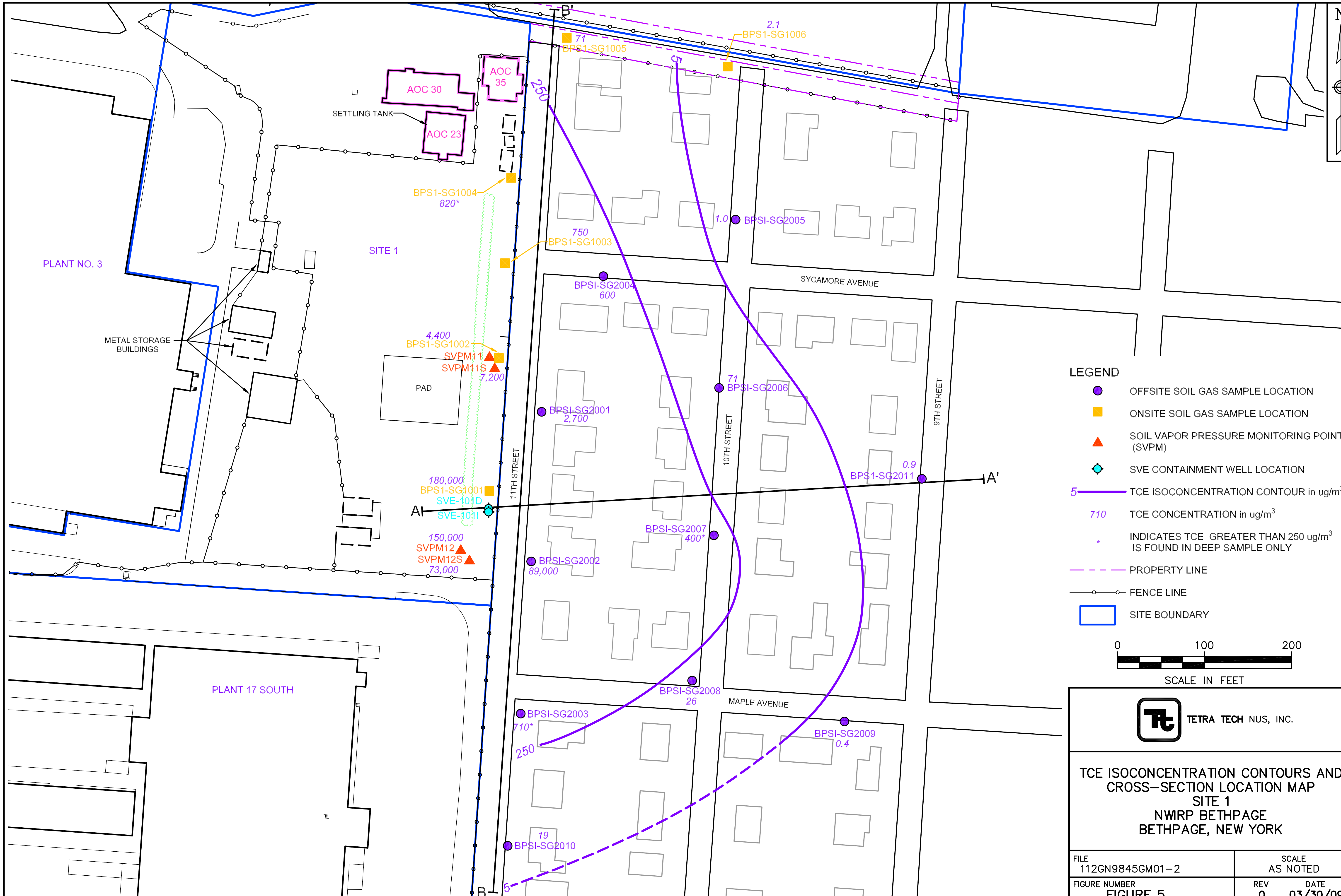
TETRA TECH NUS, INC.

SOIL GAS SAMPLING RESULTS
JANUARY 2008 TO JANUARY 2009
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM16	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 4	0	03/22/09

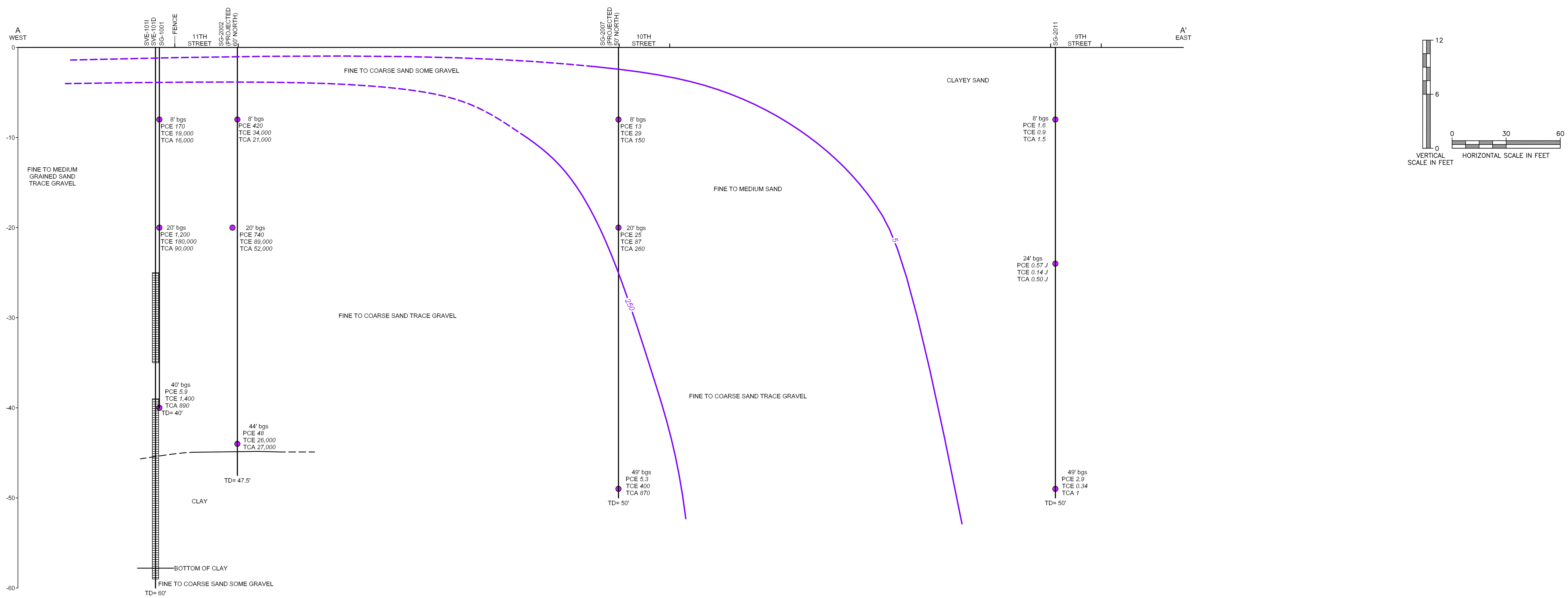
112GN9845/3110/112GN9845GM01-2.DWG 03/30/09 MKB



TCE ISOCONCENTRATION CONTOURS AND CROSS–SECTION LOCATION MAP
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM01–2	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 5	0	03/30/09



TETRA TECH NUS, INC.

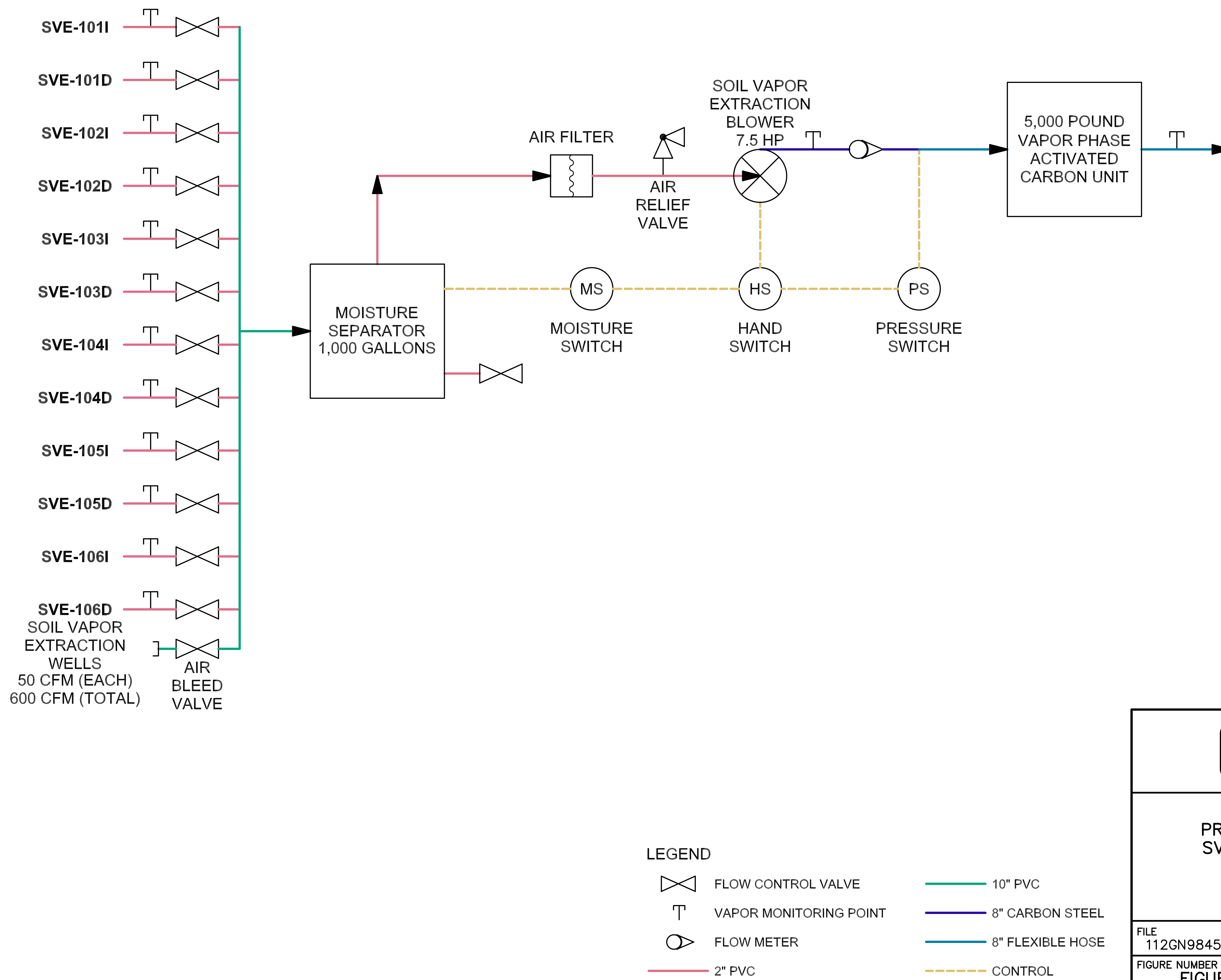
GEOLOGIC CROSS-SECTIONS
A – A' AND B – B'
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE 112GN9845GX03	SCALE AS NOTED	
FIGURE NUMBER FIGURE 6	REV 0	DATE 04/23/09

LEGEND

5 —— TCE ISOCONCENTRATION CONTOUR in ug/m

1. LITHOLOGY INTERPOLATED FROM GEOPHYSICAL LOGS, DRILL CUTTINGS, AND/OR MACROCORE SAMPLERS.
2. TD = TOTAL DEPTH.
3. PCE = TETRACHLOROETHENE.
4. TCE = TRICHLOROETHENE.
5. TCA = 1,1,1–TRICHLOROETHANE
6. SOIL GAS VALUE IN ug/m^3.
7. bgs = BELOW GROUND SURFACE.

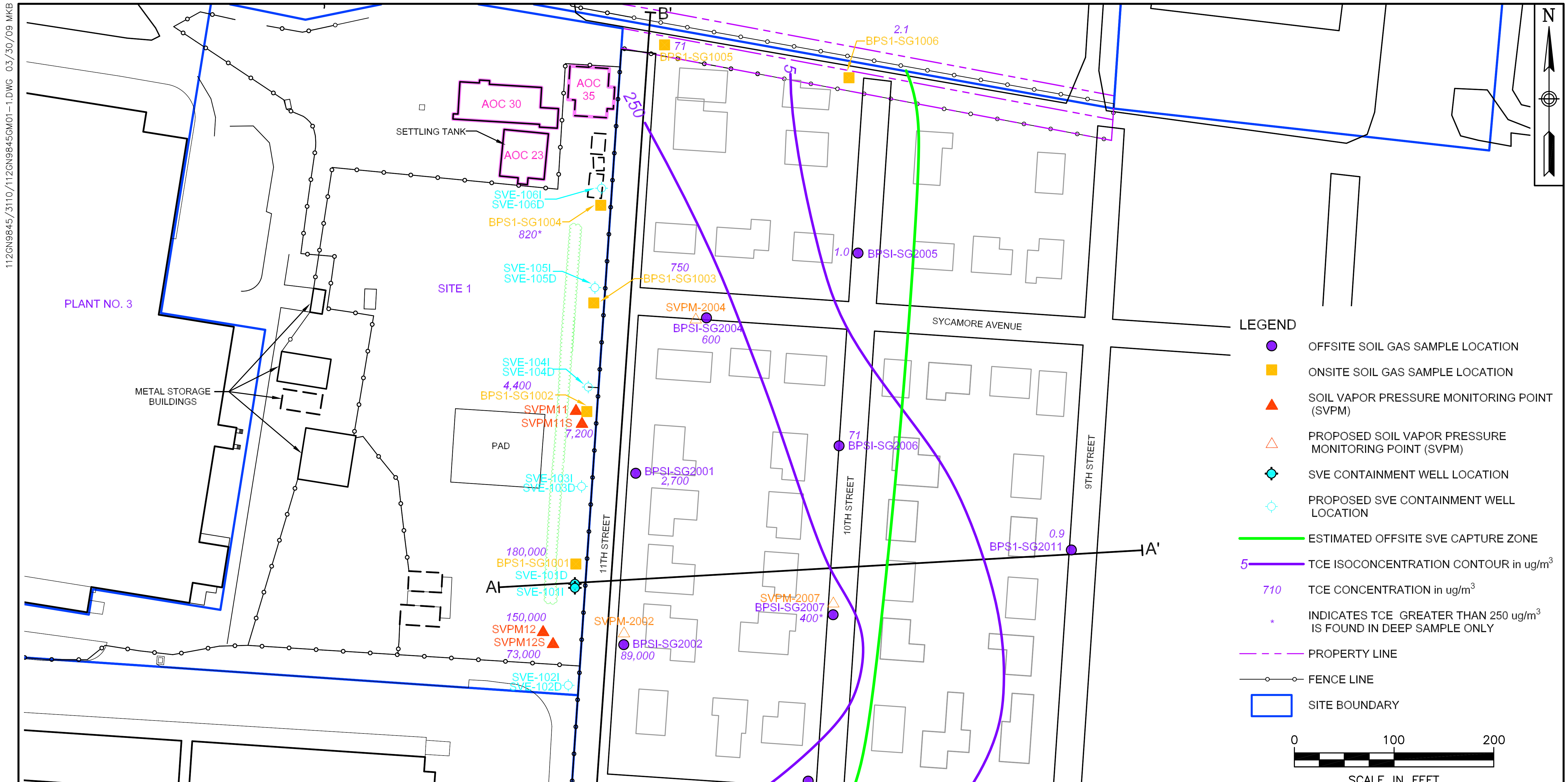


TETRA TECH NUS, INC.

PROCESS FLOW SCHEMATIC
SVE CONTAINMENT SYSTEM
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845CF02	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 7	0	04/07/09

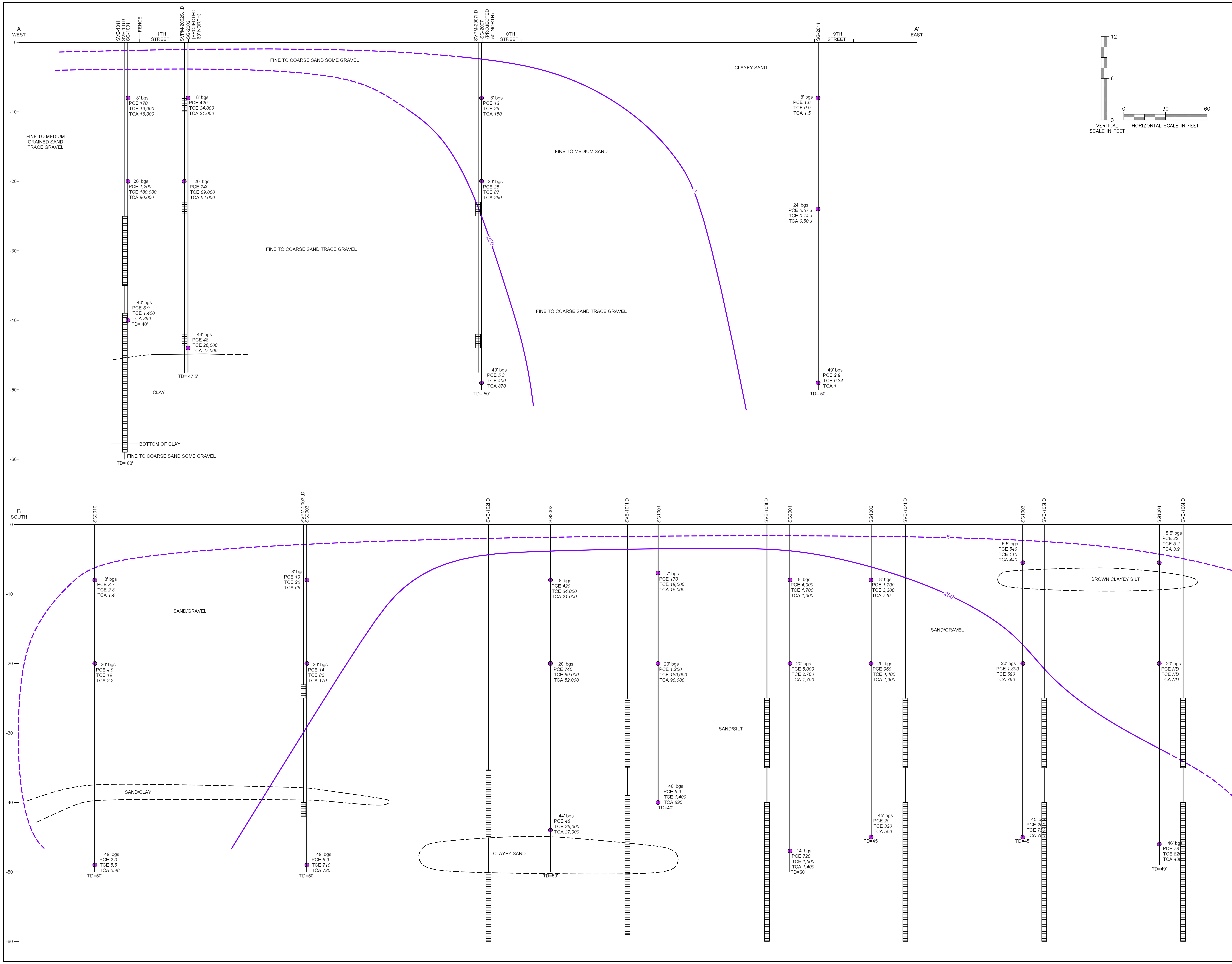


TETRA TECH NUS, INC.

PROPOSED SVE CONTAINMENT WELL LOCATION MAP
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM01-1	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 8	0	03/30/09



TETRA TECH NUS, INC.

PROPOSED SVE CONTAINMENT WELLS
CROSS–SECTIONS A – A' AND B – B'
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

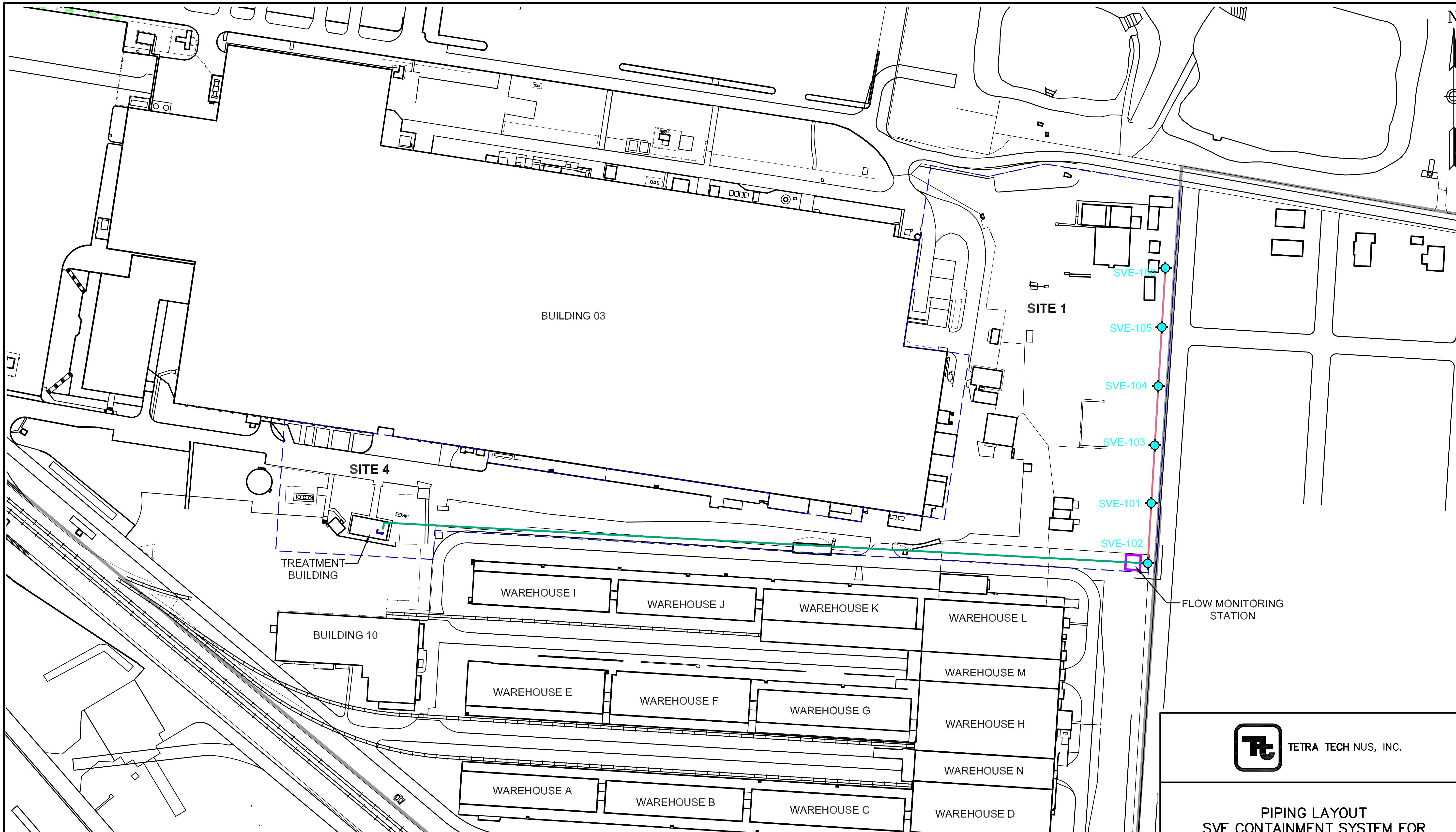
FILE 112GN9845GX04	SCALE AS NOTED	
FIGURE NUMBER FIGURE 9	REV 0	DATE 04/23/09

LEGEND

5 —— TCE ISOCONCENTRATION CONTOUR in ug/m

1. LITHOLOGY INTERPOLATED FROM GEOPHYSICAL LOGS, DRILL CUTTINGS, AND/OR MACROCORE SAMPLERS.
2. TD = TOTAL DEPTH.
3. PCE = TETRACHLOROETHENE.
4. TCE = TRICHLOROETHENE.
5. TCA = 1,1,1–TRICHLOROETHANE
6. SOIL GAS VALUE IN ug/m^3.
7. bgs = BELOW GROUND SURFACE.

112GN9845\3110\112GN9845GM03-3.DWG 03/30/09 MKB



LEGEND

FORMER NWIRP BOUNDARY

CURRENT NWIRP BOUNDARY

SVE CONTAINMENT WELL LOCATION

2" PVC

10" PVC

0 160 320

SCALE IN FEET

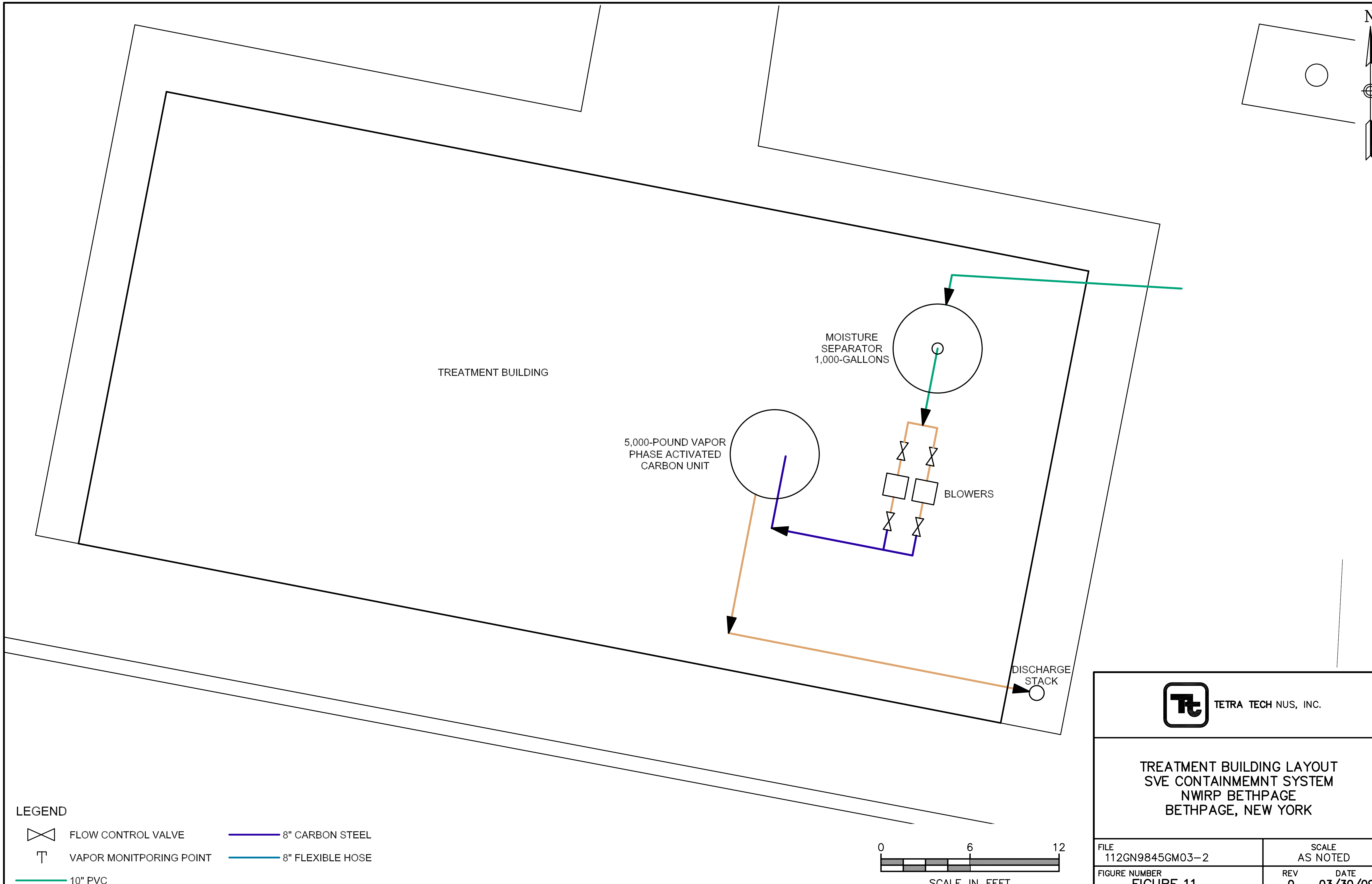
TETRA TECH NUS, INC.

PIPING LAYOUT
SVE CONTAINMENT SYSTEM FOR
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM03-3	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 10	0	03/30/09

112GN9845\3110\112GN9845GM03-2.DWG 03/30/09 MKB



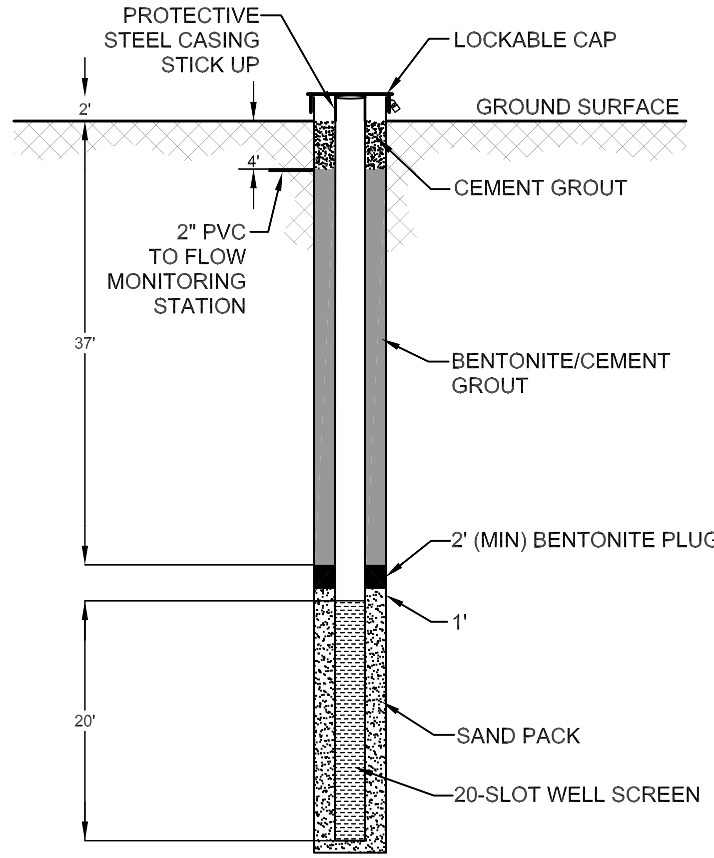
TETRA TECH NUS, INC.

TREATMENT BUILDING LAYOUT
SVE CONTAINMEMNT SYSTEM
NWIRP BETHPAGE
BETHPAGE, NEW YORK

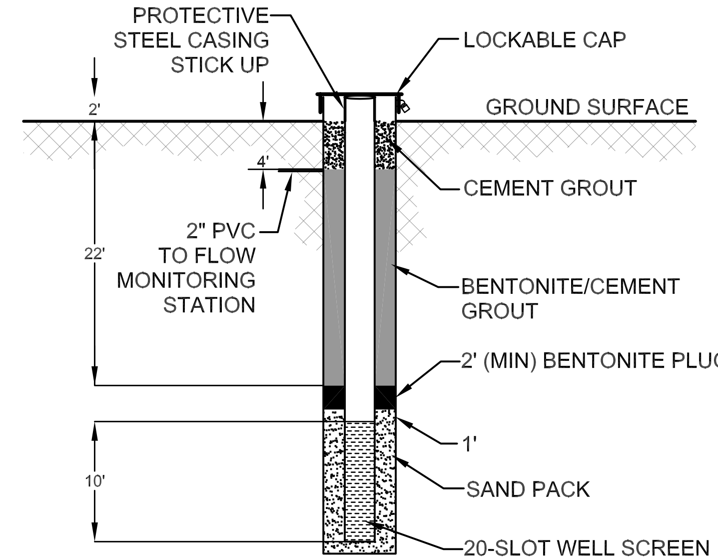
FILE	SCALE
112GN9845GM03-2	AS NOTED

FIGURE NUMBER	REV	DATE
FIGURE 11	0	03/30/09

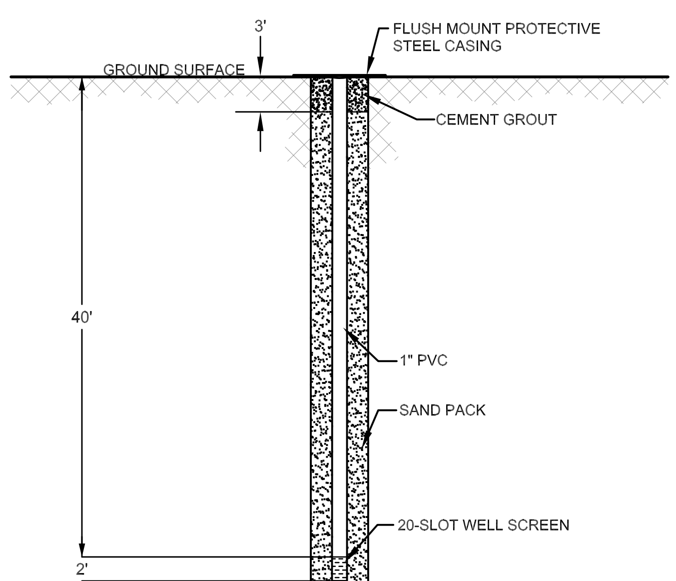
112GN9845/3110/112GN9845CF01.DWG 03/30/09 MKB



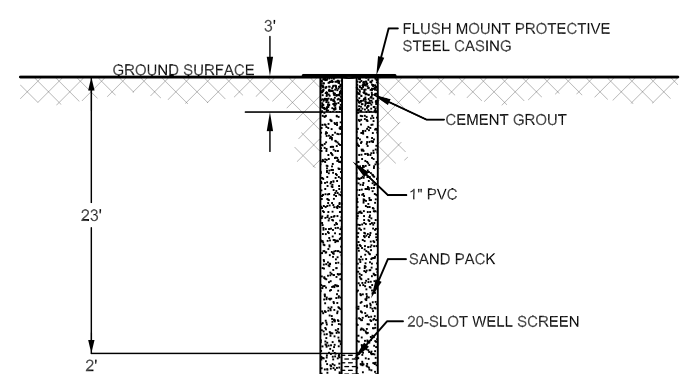
DEEP SOIL VAPOR EXTRACTION WELL DETAIL



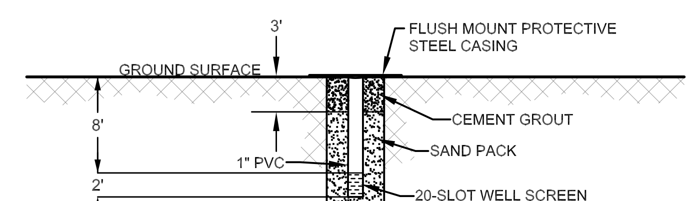
INTERMEDIATE DEPTH SOIL VAPOR EXTRACTION WELL DETAIL



DEEP SOIL VAPOR PRESSURE MONITOR



INTERMEDIATE DEPTH SOIL VAPOR PRESSURE MONITOR



SHALLOW SOIL VAPOR PRESSURE MONITOR

TETRA TECH NUS, INC.

WELL AND PRESSURE MONITOR DETAILS
SVE CONTAINMENT SYSTEM
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE	SCALE	
112GN9845CF01	AS NOTED	
FIGURE NUMBER	REV	DATE
FIGURE 12	0	03/30/09

APPENDIX A

SITE PHOTOS

Site 1 - Eastern Fence Line, looking southeast – Location of SVE Wells

Site 1 - Eastern Fence Line, looking southeast – Location of SVE Wells

Site 1 - Eastern Fence Line, looking southeast – Location of SVE Wells

Site 1 - Windrow and Fence Line in Background, looking east.

Site 1 – Southeast Corner of Site in left middle, looking east

Site 4 -Proposed Treatment Building, looking south

Site 4 – Proposed Treatment Building, looking northwest

APPENDIX B

SOIL BORING LOGS

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1001
DATE: 1-24-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
0920	S-1	1					DK Brn	Sandy Silt with Trace fine gravel (Fill)		moist	0	0	0	0
		3												
					- - -									
0925		5		48"/60"			Brn	FGR to CGR Sand and fine to course gravel Trace silt		moist	0	0	0	0
	S-2													
		7												
					- - -									
		9					Brn Gry	Sandy Silt - Trace fine gravel and clay		moist	0	0	0	0
0932				57"/60"	- - -									
	S-3	11					org Brn	FGR to CGR Sand and fine to course gravel Trace silt		moist	0	0	0	0
		13												
							org Brn	Same as above		moist	0	0	0	0
0938		15		45"/60"										
	S-4													
		17					org Brn	Same as above		moist	0	0	0	0
		19												
0944				46"/60"			org Brn	Same as above		moist	0	0	0	0
	S-5	21												
		23												
							org Brn	Same as above		moist	0	0	0	0
1005		25		44"/60"										

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Geoprobe DPT - 2"x5' macro-core discreet Interval sampler with Acetate sleeves

Drilling Area Background (ppm): 0

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe
BORING No.: BPS1-SG1001
DATE: 1-24-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	S-6						Org Brn	FGR to CGR Sand and Fine to course gravel Trace Silt		moist	0	0	0	0
		27												
		29					Org Brn	Same as above		moist	0	0	0	0
1020				45"/60"										
	S-7	31			----									
							Org Brn	FGR to MGR Sand with Trace CGR Sand - Gravel - Silt		moist	0	0	0	0
		33												

							Brn Tan	FGR to MGR Sand - Trace CGR Sand - Silt		moist				
1039		35		51"/60"	----						0	0	0	0
	S-8													
		37					Org Brn	FGR to CGR Sand and fine to course gravel Trace Silt.		moist	0	0	0	0
		39												
1418														
		41			EoB									
		43												
		45												
		47												
		49												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: (see page 1) Hit refusal at ~ 37 feet after collecting 35' to 40' sample and attempting to collect 40' to 45' sample

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe
BORING No.: BPS1-SG1002
DATE: 1-23-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Sample	Sampler BZ	Borehole**	Driller BZ**
0837	S-1	1					DK Brn	Sandy silt with		moist	0	0	0	0
								some fine gravel (grass + roots)						
		3			- - - -									
							org Brn	FGR to CGR sand and fine to course gravel		moist	0	0	0	0
		5		42"/60"				Trace silt						
0839	S-2													
		7					Brn	Same as above		moist	0	0	0	0
		9												
							Brn	Same as above		moist	0	0	0	0
0843	S-3	11		50"/60"										
							Gry Brn	Same as above (more silt)		moist	0	0	0	0
		13												
		15		51"/60"			org Brn	Same as above		moist	0	0	0	0
0847	S-4													
		17												
							org Brn	Same as above		moist	0	0	0	0
		19												
				41"/60"										
0948	S-5	21					org Brn	Same as above		moist	0	0	0	0
		23												
1010		25		47"/60"			org Brn	Same as above		moist	0	0	0	0

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Geoprobe DPT - 2"x5' macro-core discreet Interval sampler with Acetate sleeves

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage	BORING No.:	BPS1-SG1002
PROJECT NUMBER:	CTO-121	DATE:	1-23-08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Vince Shickora
DRILLING RIG:	Geoprobe	DRILLER:	Luke Reiss

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Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
S-6						org Brn	Same as above		moist	0	0	0	0
	27			- - -									
						Brn Tan	FGR to MGR Sand. Trace CGR Sand-silt		moist	0	0	0	0
	29						and gravel						
S-7	31					Brn Tan	Same as above		moist	0	0	0	0
	33												
						Brn Tan	Same as above		moist	0	0	0	0
	35						(more fine gravel)						
S-8													
	37			- - -		org Red	Silty CGR Sand with ~~Trace~~ gravel (Fine)			0	0	0	0
						Brn	Trace FGR to MGR sand						
	39					Brn							
						org Red	Same as above		moist	0	0	0	0
S-9	41			- - -									
						Tan Wht	FGR to MGR Sand Trace silt.		moist	0	0	0	0
	43												
						Wht	Same as above		moist	0	0	0	0
	45			EOB									
	47												
	49												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: (see page 1) Hit refusal at ~ 43' on way down to sample 45' to 50' interval

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1003
DATE: 1-21-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
1005	S-1	1					DK Brn	Sandy Silt with grass and roots		moist	0	0	0	0
		3					Brn	Clayey Silt with some sand + Fine gravel		moist	0	0	0	0
1015		5		37"/60"			Brn	Silty FGR to CGR Sand some fine gravel		moist	0	0	0	0
	S-2													
		7												
							Brn Gry	Clayey silt		moist	0	0	0	0
		9												
1020				44"/60"										
	S-3	11					Brn	FGR to CGR Sand Trace silt + fine gravel		moist	0	0	0	0
		13					Brn	Same as above		moist	0	0	0	0
1025		15		43"/60"			Brn	MGR to CGR Sand Trace silt + Fine gravel		moist	0	0	0	0
	S-4													
		17					Brn Tan	FGR to CGR Sand with Fine to course gravel Trace Silt		moist	0	0	0	0
		19												
1030				49"/60"										
	S-5	21					Brn Tan	Same as above		moist	0	0	0	0
		23												
1040		25		44"/60"			Brn Tan	Same as above		moist	0	0	0	0

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: Geoprobe DPT - 2" X 5' Macro-core discreet Interval Sampler with Acetate sleeve

Drilling Area Background (ppm): 0

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO - 121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1003
DATE: 1-21-08
GEOLOGIST: V. Shickora
DRILLER: L. Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Sample	PID/FID Sampler BZ	PID/FID Borehole**	PID/FID Driller BZ**
	S-6													
		27					Brn Tan	Same as above		moist	0	0	0	0
		29			- - - -									
1048							Tan	FGR to MGR Sand Trace silt + fine gravel		moist	0	0	0	0
	S-7	31												
							Tan	Same as above		moist	0	0	0	0
		33			- - - -									
							Brn Tan	FGR Sand with some silt - Trace fine gravel		moist	0	0	0	0
1100		35												
	S-8				- - - -									
		37					Brn Tan	FGR to CGR Sand and Fine to coarse gravel some silt.		moist	0	0	0	0
		39												
1120							Brn Tan	Same as above		moist	0	0	0	0
	S-9	41												
		43												
							Brn Tan	Same as above		moist	0	0	0	0
1150		45												
	~~S-10~~				EOB refusal									
		47												
		49												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: (see page 1)

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1004
DATE: 1-21-08
GEOLOGIST: Vince ShickorA
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	Sample	Sampler BZ	Borehole**	Driller BZ**
1400	S-1	1					Dk Brn	Sandy Silt with some gravel (Fill)		moist	0	0	0	0

		3												
							Brn	FGR to CGR Sand with some fine gravel and		moist	0	0	0	0
1403		5		39"/60"				Trace Silt.						
	S-2													
		7			----									
							Brn Gry	Clayey silt with Trace Sand / fine gravel		very moist	0	0	0	0
		9												
1407				51"/60"	----									
	S-3	11					org Brn	FGR to CGR Sand and fine to course gravel Trace silt		moist	0	0	0	0
		13												
1412		15		39"/60"			Brn Tan	Same as above		moist	0	0	0	0
	S-4													
		17												
							Brn Tan	Same as above		moist	0	0	0	0
		19						(more silt 16' to 18')						
1416				42"/60"										
	S-5	21					Brn Tan	Same as above		moist	0	0	0	0
		23			----		Brn	FGR to MGR Sand		moist	0	0	0	0
							Tan	Trace silt + fine gravel						
1427		25		45"/60"	----									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Geoprobe DPT - 2" x 5' Macro-core discreet Interval Sampler with Acetate sleeves

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1004
DATE: 1-21-08/1-22-08
GEOLOGIST: V. Shickora
DRILLER: L. Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	S-6						Brn Tan	FGR to CGR Sand and Fine to Coarse gravel Trace Silt.		moist	0	0	0	0
		27												
					- - - -									
		29					Brn Tan	FGR to MGR Sand Trace CGR Sand + Fine gravel Trace silt		moist	0	0	0	0
1441				45"/60"										
	S-7	31												
							Brn	Same as above		moist	0	0	0	0
		33												
1509		35		42"/60"			Brn	Same as above		moist	0	0	0	0
	S-8													
		37												
					- - -									
		39					Brn Tan	FGR to CGR Sand some Fine gravel - Trace Silt		moist	0	0	0	0
1540				46"/60"										
1-21-08 ↑		41												
							Brn Tan	Same as above		moist	0	0	0	0
		43												
					- - -									
1602		45		47"/60"			Brn Tan	FGR to MGR Sand Trace CGR sand + fine gravel		moist	0	0	0	0
0737 (1-22-08 ↓)														
		47					Brn Tan	Same as above		moist	0	0	0	0
					- - -									
		49					Brn	Sandy Silt - Trace clay + fine gravel		moist	0	0	0	0
0748					EoB									

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: (see page 1)

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG-1005
DATE: 1-23-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	Sample	Sampler BZ	Borehole**	Driller BZ**
1350	S-1	1					Dk Brn	Sandy Silt with some fine gravel		very moist	0	0	0	0
		3					Dk Brn	Same as above		very moist	0	0	0	0

1355		5		49"/60"										
	S-2						org Brn	FGR to CGR Sand and Fine to Medium gravel Trace Silt		moist	0	0	0	0
		7												
							org Brn	Same as above		moist	0	0	0	0
		9			---									
1359				47"/60"			org Gry	Sandy Silt with fine To Medium gravel		moist	0	0	0	0
	S-3	11					Brn	Trace clay						
		13			---									
							org Brn	FGR to CGR Sand and Fine to coarse gravel		moist	0	0	0	0
1404		15		48"/60"				Trace Silt						
	S-4													
		17												
							org Brn	Same as above		moist	0	0	0	0
		19												
1411				50"/60"										
	S-5	21					org Brn	Same as above		moist	0	0	0	0
		23												
							org Brn	Same as above		moist	0	0	0	0
1422		25		47"/60"										

PID/FID Reading (ppm): Sample, Sampler BZ, Borehole**, Driller BZ**

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Geoprobe DPT - 2" x 5' macro-core discreet Interval Sampler with Acetate Sleeves

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe

BORING No.: BPS1-SG1005
DATE: 1-23-08
GEOLOGIST: V. Shickora
DRILLER: L. Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	S-6						org Brn	Same as above		moist	0	0	0	0
		27												
		29					org Brn	Same as above		moist	0	0	0	0
1436				40"/60"										
	S-7	31												
							org Brn	Same as above		moist	0	0	0	0
		33												
1453		35		41"/60"			org Brn	Same as above		moist	0	0	0	0
	S-8				- - -									
		37					org Brn	FGR to CGR Sand and Fine gravel - Trace silt and Medium gravel		moist	0	0	0	0
		39												
1504				44"/60"			org Brn	Same as above		moist	0	0	0	0
		41												
		43					org Brn	Same as above		moist	0	0	0	0
1546		45		46"/60"										
					EoB									
		47												
		49												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: (See page 1) Refusal at 41' BGS between 40' to 45' sample and attempting 45' to 50' sample

Drilling Area Background (ppm): 0

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage
PROJECT NUMBER: CTO-121
DRILLING COMPANY: Zebra
DRILLING RIG: Geoprobe
BORING No.: BPS1-SG1006
DATE: 1-25-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
0900	S-1	1					DK Brn	Sandy Silt with some gravel (fill)		moist	0	0	0	0

		3					org Brn	FGR to CGR Sand and Fine to course gravel Trace Silt.		moist	0	0	0	0
0908		5		50"/60"			org Brn	Same as above		moist	0	0	0	0
	S-2													
		7					org Brn	Same as above		moist	0	0	0	0

		9					Brn Gry	Sandy Silt with Fine To medium gravel Trace clay		moist	0	0	0	0
0912				51"/60"	----									
	S-3	11												
							org Brn	FGR to CGR Sand and Fine to course gravel Trace Silt		moist	0	0	0	0
		13												
0917		15		49"/60"			org Brn	Same as above		moist	0	0	0	0
	S-4													
		17												
							org Brn	Same as above		moist	0	0	0	0
		19												
0937				51"/60"										
	S-5	21					org Brn	Same as above		moist	0	0	0	0
		23												
0955		25		48"/60"			org Brn	Same as above		moist	0	0	0	0

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: Geoprope DPT - 2" x 5' Macro-core discreet Interval sampler with Acetate sleeves

Converted to Well: Yes ______ No ______ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP [redacted] Bethpage
PROJECT NUMBER: 112G00903
DRILLING COMPANY: [redacted] Zebra
DRILLING RIG: Geoprobe
BORING No.: BPS1-SG1006
DATE: 1-25-08
GEOLOGIST: Vince Shickora
DRILLER: Luke Reiss

Time	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	S-6	26					org Brn	FGR to CGR Sand and fine to coarse gravel		moist	0	0	0	0
		27						trace silt						
		28												
		29					org Brn	Same as above		moist	0	0	0	0
1009		30		49"/60"										
	S-7	31												
		32												
		33					org Brn	Same as above		moist	0	0	0	0
		34			- - -									
1029		35		48"/60"			org Brn	FGR to CGR Sand and fine gravel - Trace silt		moist	0	0	0	0
	S-8	36						and medium gravel						
		37												
		38												
		39					org Brn	Same as above		moist	0	0	0	0
1049		40		46"/60"										
		41												
		42					org Brn	Same as above		moist	0	0	0	0
		43						(less CGR sand)						
		44												
1122		45		45"/60"			org Brn	Same as above		moist	0	0	0	0
		46			EOB									
		47												
		48												
		49												
		50												

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: (see page 1) Refusal at 41' BGS between 40' to 45' sample and attempting 45' to 50' sample

Converted to Well: Yes ______ No ______ Well I.D. #: ______

WELL NO.: SVPM-11

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
STICK-UP

Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage
PROJECT NO. CTO-0022
DATE BEGUN 1-22-08
FIELD GEOLOGIST
GROUND ELEVATION

LOCATION Site 1
BORING
DATE COMPLETED 1-22-08
DATUM

DRILLER Luke Pelss
DRILLING METHOD Geoprobe
DEVELOPMENT METHOD

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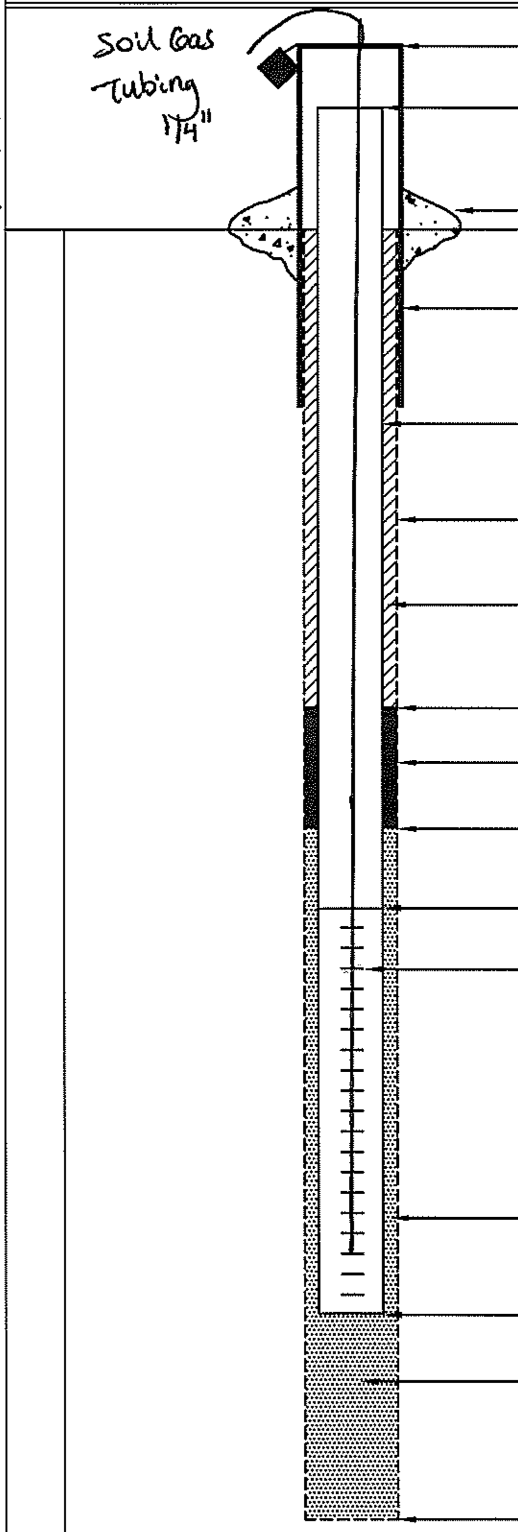


ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.:
TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 35'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 38'

ELEVATION/DEPTH TOP OF SCREEN: / 45'

TYPE OF SCREEN: Stainless Steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 49'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 50'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 50'

WELL NO.: SVPM-11S

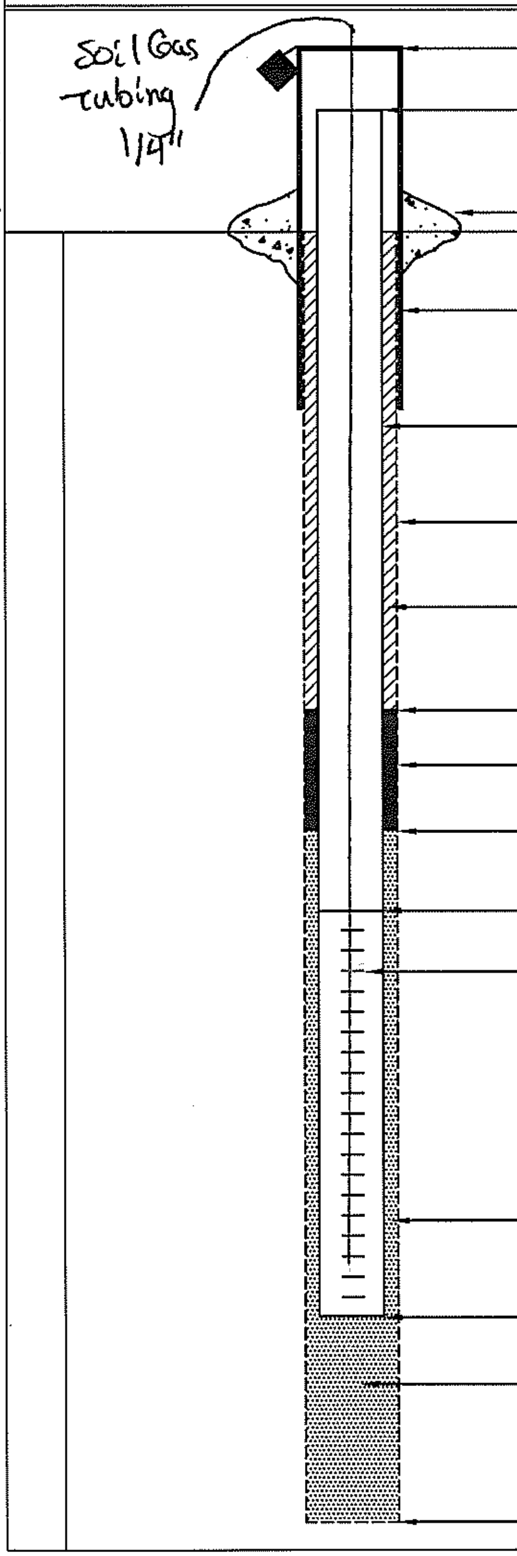
OVERBURDEN MONITORING WELL SHEET STICK-UP

Tetra Tech NUS, Inc. Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage
PROJECT NO. CTO-002
DATE BEGUN 1-22-08
FIELD GEOLOGIST
GROUND ELEVATION

LOCATION Site 1
BORING
DATE COMPLETED 1-22-08
DATUM

DRILLER Luke Reiss
DRILLING METHOD Geoprobe
DEVELOPMENT METHOD



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.:
TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 10'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 13'

ELEVATION/DEPTH TOP OF SCREEN: / 20'

TYPE OF SCREEN: Stainless Steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 24'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 25'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 25'

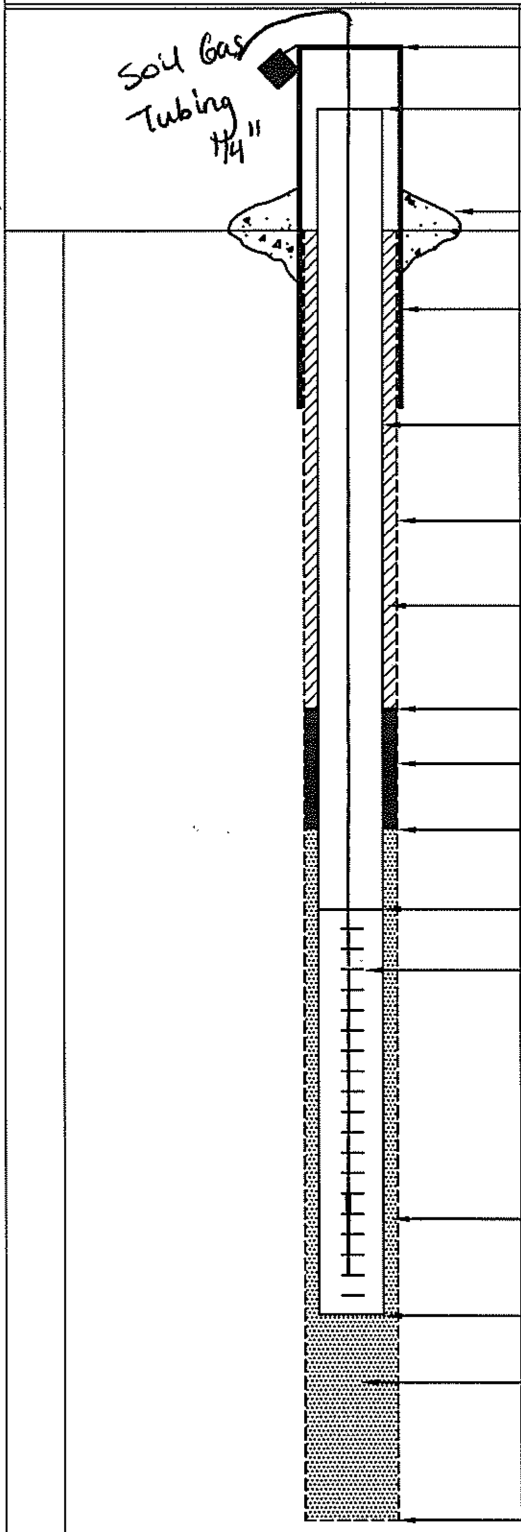
WELL NO.: SVPM-12

OVERBURDEN
MONITORING WELL SHEET
STICK-UP

Tetra Tech NUS, Inc.

Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage	LOCATION Site 1	DRILLER Luke Reiss
PROJECT NO. C70-002	BORING	DRILLING METHOD Geoprobe
DATE BEGUN 1-22-08	DATE COMPLETED 1-22-08	
FIELD GEOLOGIST		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:

TYPE OF SURFACE CASING:

RISER PIPE I.D.:

TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 37'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 40'

ELEVATION/DEPTH TOP OF SCREEN: / 46'

TYPE OF SCREEN: Stainless steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 50'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 52.1'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 52.1'

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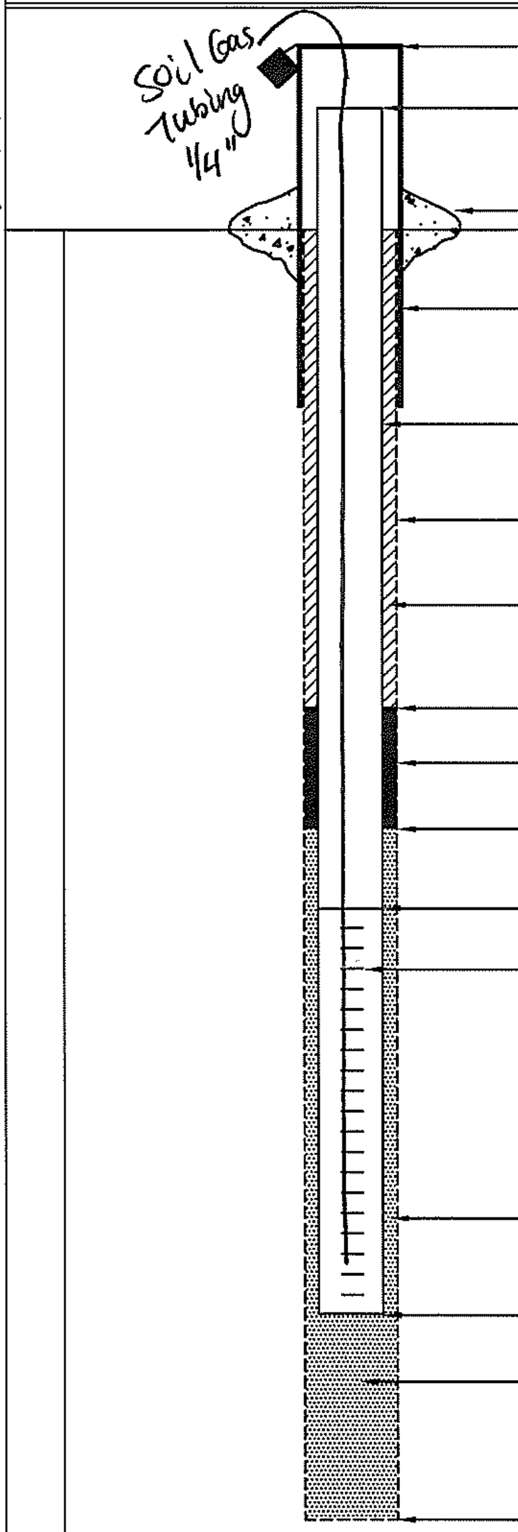
WELL NO.: SVPM-12S

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET STICK-UP

Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage LOCATION Site 1 DRILLER Luke Reiss
PROJECT NO. CTO-~~###~~ 002 BORING ______ DRILLING METHOD Geoprobe
DATE BEGUN 1-22-08 DATE COMPLETED 1-22-08
FIELD GEOLOGIST ______ DEVELOPMENT METHOD ______
GROUND ELEVATION ______ DATUM ______



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING: ______
TYPE OF SURFACE CASING: ______

RISER PIPE I.D.: ______
TYPE OF RISER PIPE: ______

BOREHOLE DIAMETER: ______

TYPE OF BACKFILL: ______

ELEVATION/DEPTH TOP OF SEAL: / 12'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 15'

ELEVATION/DEPTH TOP OF SCREEN: / 21'

TYPE OF SCREEN: Stainless steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 25'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 27.1'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 27.1'

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WELL NO.: SVPM-11

OVERBURDEN
MONITORING WELL SHEET
STICK-UP

Tetra Tech NUS, Inc. Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage	LOCATION Site 1	DRILLER Luke Pelss
PROJECT NO. CTO-0022	BORING	DRILLING METHOD Geoprobe
DATE BEGUN 1-22-08	DATE COMPLETED 1-22-08	
FIELD GEOLOGIST		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	

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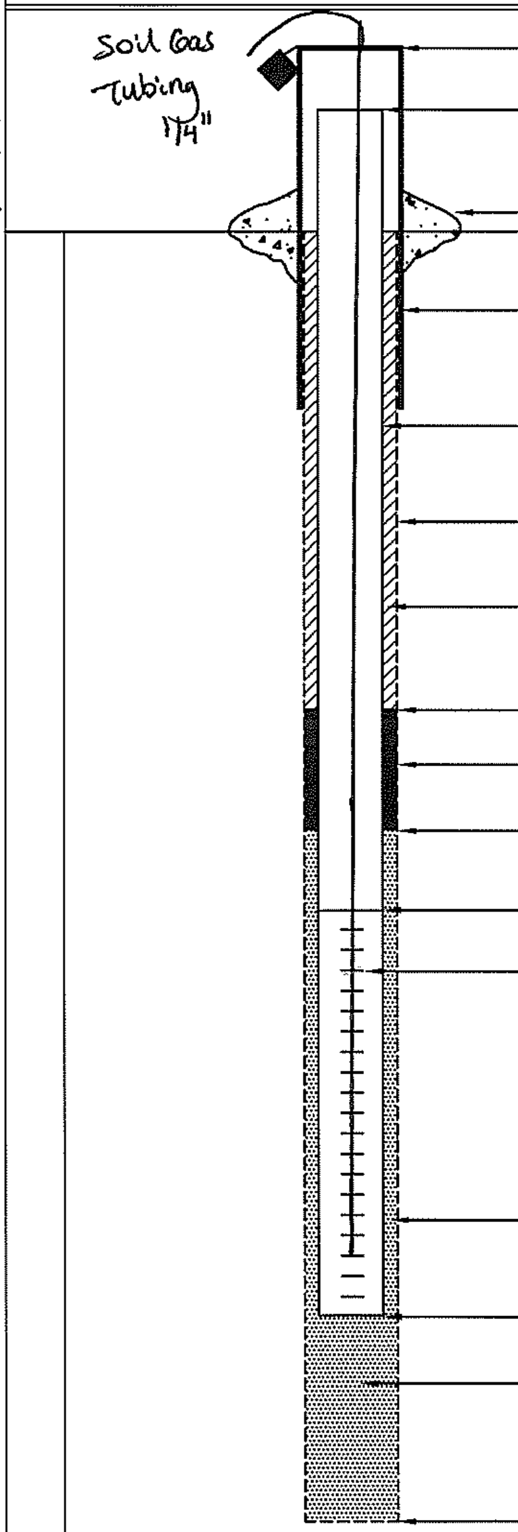


ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.:
TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 35'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 38'

ELEVATION/DEPTH TOP OF SCREEN: / 45'

TYPE OF SCREEN: Stainless Steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 49'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 50'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 50'

WELL NO.: SVPM-11S

OVERBURDEN MONITORING WELL SHEET STICK-UP

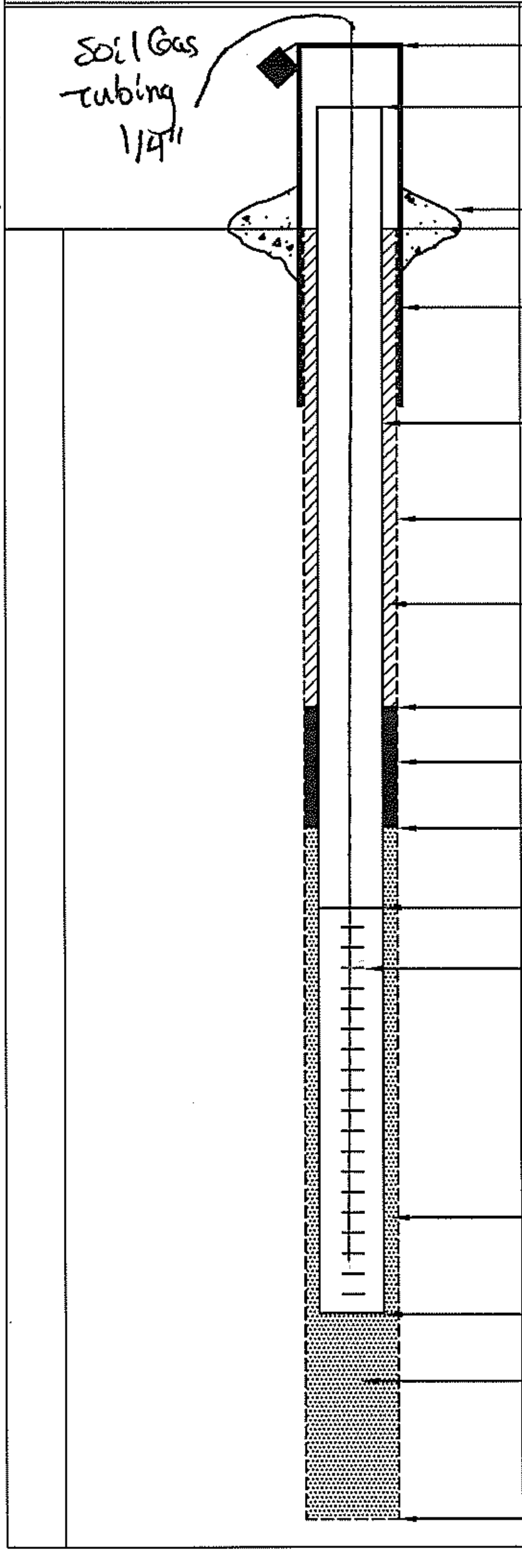
Tetra Tech NUS, Inc. Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage
PROJECT NO. CTO-002
DATE BEGUN 1-22-08
FIELD GEOLOGIST
GROUND ELEVATION

LOCATION Site 1
BORING
DATE COMPLETED 1-22-08
DATUM

DRILLER Luke Reiss
DRILLING METHOD Geoprobe
DEVELOPMENT METHOD

ACAD:FORM_MWSU.dwg 07/20/99 INL



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.:
TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 10'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 13'

ELEVATION/DEPTH TOP OF SCREEN: / 20'

TYPE OF SCREEN: Stainless Steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 24'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 25'
BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 25'

WELL NO.: SVPM-12

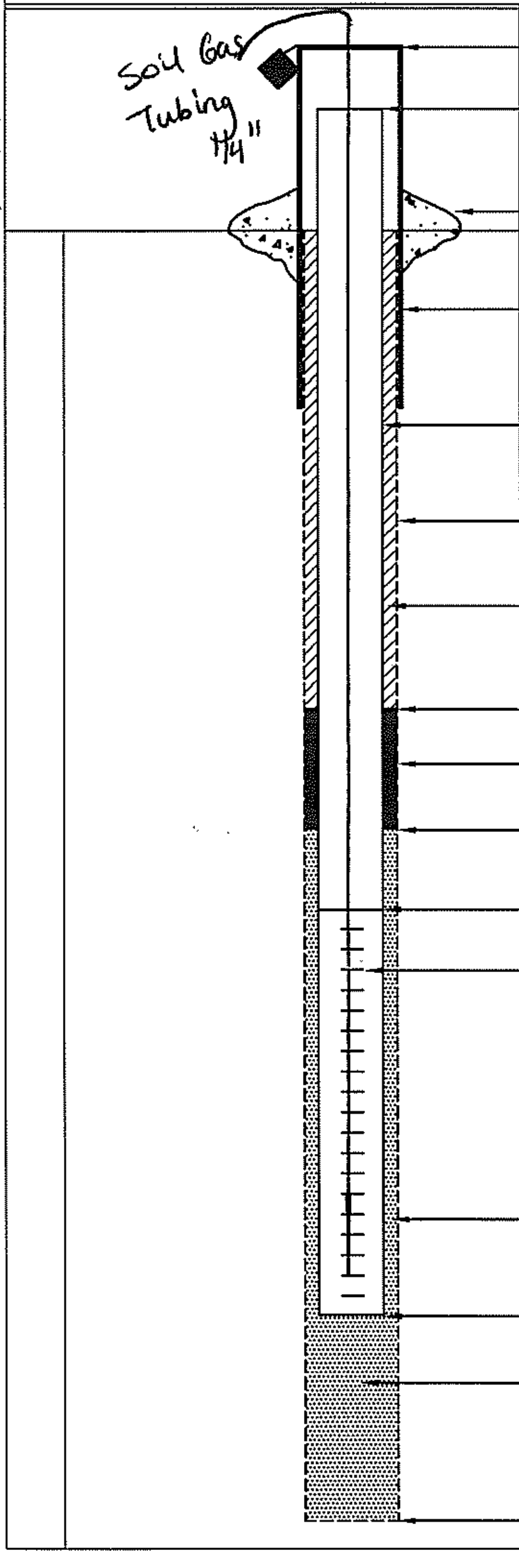
OVERBURDEN MONITORING WELL SHEET STICK-UP

Tetra Tech NUS, Inc.

Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage	LOCATION Site 1	DRILLER Luke Reiss
PROJECT NO. C70-002	BORING	DRILLING METHOD Geoprobe
DATE BEGUN 1-22-08	DATE COMPLETED 1-22-08	
FIELD GEOLOGIST		DEVELOPMENT METHOD
GROUND ELEVATION	DATUM	

ACAD:FORM_MWSU.dwg 07/20/99 INL



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: / NA

ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA

TYPE OF SURFACE SEAL: NA

I.D. OF SURFACE CASING:
TYPE OF SURFACE CASING:

RISER PIPE I.D.:
TYPE OF RISER PIPE:

BOREHOLE DIAMETER:

TYPE OF BACKFILL:

ELEVATION/DEPTH TOP OF SEAL: / 37'

TYPE OF SEAL: Bentonite

DEPTH TOP OF SAND PACK: 40'

ELEVATION/DEPTH TOP OF SCREEN: / 46'

TYPE OF SCREEN: Stainless steel

SLOT SIZE x LENGTH: NA

I.D. OF SCREEN: NA

TYPE OF SAND PACK: NA

ELEVATION/DEPTH BOTTOM OF SCREEN: / 50'

ELEVATION/DEPTH BOTTOM OF SAND PACK: / 52.1'

BACKFILL MATERIAL BELOW SAND: NA

ELEVATION/DEPTH OF HOLE: / 52.1'

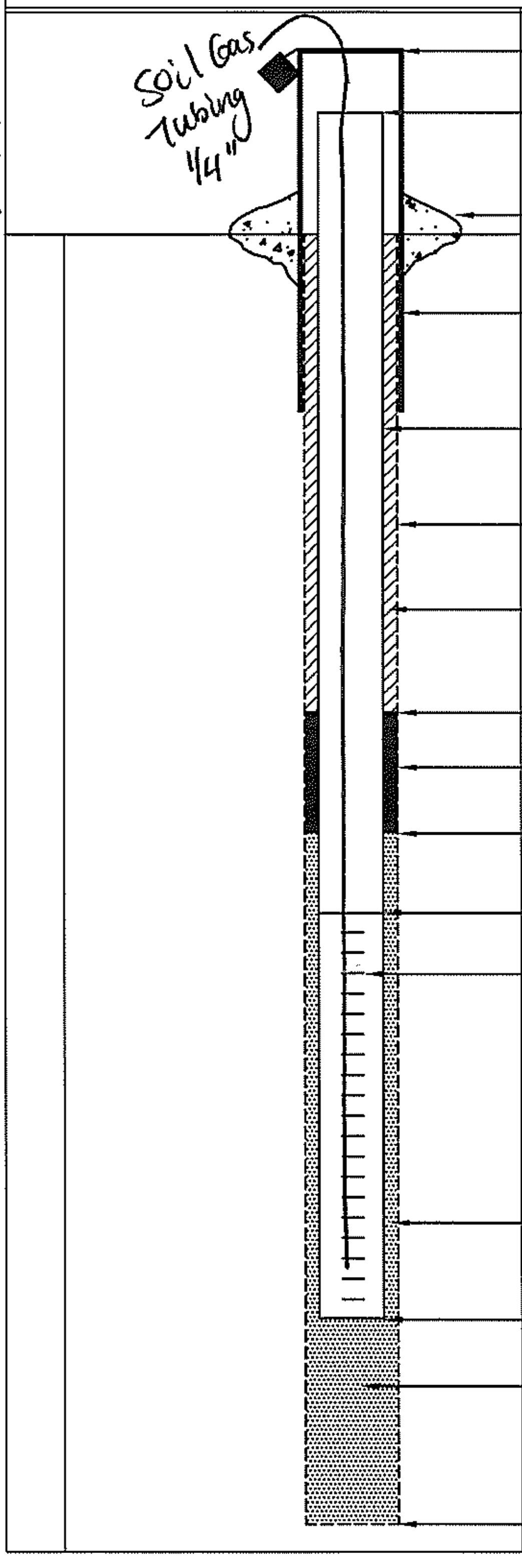
WELL NO.: SVPM-12S

OVERBURDEN MONITORING WELL SHEET STICK-UP

Tetra Tech NUS, Inc. Retrofitting for Permanent Soil Gas Monitoring Point

PROJECT NWIRP Bethpage LOCATION Site 1 DRILLER Luke Reiss
PROJECT NO. CTO-~~###~~ 002 BORING ____ DRILLING METHOD Geoprobe
DATE BEGUN 1-22-08 DATE COMPLETED 1-22-08
FIELD GEOLOGIST ____ DEVELOPMENT METHOD ____
GROUND ELEVATION ____ DATUM ____

ACAD:FORM_MWSU.dwg 07/20/99 INL



ELEVATION/HEIGHT OF TOP OF SURFACE CASING: /NA
ELEVATION/HEIGHT OF TOP OF RISER PIPE: / NA
TYPE OF SURFACE SEAL: NA
I.D. OF SURFACE CASING: ____
TYPE OF SURFACE CASING: ____
RISER PIPE I.D.: ____
TYPE OF RISER PIPE: ____
BOREHOLE DIAMETER: ____
TYPE OF BACKFILL: ____
ELEVATION/DEPTH TOP OF SEAL: / 12'
TYPE OF SEAL: Bentonite
DEPTH TOP OF SAND PACK: 15'
ELEVATION/DEPTH TOP OF SCREEN: / 21'
TYPE OF SCREEN: stainless steel
SLOT SIZE x LENGTH: NA
I.D. OF SCREEN: NA
TYPE OF SAND PACK: NA
ELEVATION/DEPTH BOTTOM OF SCREEN: / 25'
ELEVATION/DEPTH BOTTOM OF SAND PACK: / 27.1'
BACKFILL MATERIAL BELOW SAND: NA
ELEVATION/DEPTH OF HOLE: / 27.1'

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II**
PROJECT NUMBER: **112G01687**
DRILLING COMPANY: **Zebra**
DRILLING RIG: **DPT-Soil Gas**
BORING No.: **SG2001**
DATE: 10/28/08
GEOLOGIST: **Conti**
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	0				M DENSE	YELLOW BRN	4" TOPSOIL SILTY SAND-SOME GRAVEL - TR ROOTS.	SW	DAMP	0			
S-1 @ 0930			NA						1"Φ GRAVEL				
										0			
	5									0			
					DENSE	BRN TO ORANG BRN	F/C SAND - SOME GRAVEL	SW	DAMP				
S-2 @ 1100			3.8/5	⊙					1½" Φ GRAVEL SUB ROUND TO SUB ANG.	0			
										0			
	10												
						YELLOW BRN	SAME	SW	DAMP	0			
S-3 @ 1127			3/5						¾" Φ GRAVEL SUB ROUND SUB ANG.	0			
	15									0			
							SAME	SW	DAMP				
S-4 @ 1132			3.1/5						1 PC 1¾" Φ GRAVEL SUB ROUND SUB ANG.	0			
										0			
	20			⊙									
							SAME	SW	DAMP	0			
S-5 @ 1138			2.8/5							0			
	25									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SG SAMPLE

Drilling Area Background (ppm): 0

Remarks: DPT RIG TRACK MTD - DUAL TUBE SYSTEM TO ADVANCE BORING.

Converted to Well: Yes ____ No ____ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II**
PROJECT NUMBER: **112G01687**
DRILLING COMPANY: **Zebra**
DRILLING RIG: **DPT-Soil Gas**
BORING No.: **SG200** 1
DATE: 10/28/08
GEOLOGIST: **Conti**
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					DENSE	YELLOW BRN	F/C SAND - TR GR.	SW	DAMP	0			
S-6							TO						
@ 1145			3.2/5	± 28'					(GRADATIONAL)	0			
					DENSE		F/M SAND TR.	SW	DAMP				
	30						GRAVEL (LESS GRAVEL @ 28')		3/4" Φ	0			
									SUB ROUND SUB ANG				
S-7							SAME	SW	DAMP	0			
@ 1152			3.5/5						SAME				
										0			
	35												
					DENSE	TAN BRN	F/C SAND-TR	SW	DAMP	0			
S-8						TO	TO SOME GRAVEL		MORE C.SAND				
@ 1205			3.2/5			RED BRN			MORE GRAVEL THAN	0			
						TO			S-7. 3/4" Φ SUB				
	40					TAN BRN			ROUND SUB ANG.	0			
							F/C SAND - TR	SW	DAMP				
S-9 @			3/5			TO	FINE GRAVEL			0			
1215						RED							
						BRN				0			
	45												
					DENSE	YELLOW BRN	F/C SAND - TR	SW	DAMP	0			
S-10			2.5/5				F. GRAVEL						
@ 1222										0			
				⊙									
	50									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SG SAMPLE DEPTHS

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage II
PROJECT NUMBER: 112G01687
DRILLING COMPANY: Zebra
DRILLING RIG: DPT-Soil Gas

BORING No.: SG2002
DATE: 10-29-08
GEOLOGIST: Conti
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				DENSE	BRN	6" TOPSOIL	SW	DAMP	0			
S-1						TO YELLOW	F/C SAND-SOME		1 1/2" Φ GRAVEL				
@ 0930			NA			BRN	GRAVEL		SUB ROUND SUB ANG.	0			
	5									0			
					DENSE	YELLOW BRN	SAME	SW	DAMP				
S-2			3.1/5						SAME.	0			
@ 0940				⊙									
										0			
	10												
					DENSE		SAME	SW	DAMP	0			
S-3 @			4/5						1" Φ GRAVEL				
1015									SUB ROUND SUB ANG.	0			
	15									0			
							SAME	SW	DAMP				
S-4 @			2.5/5						SAME.	0			
1023													
										0			
	20			⊙		YELLOW							
					DENSE	BRN	SAME	SW	DAMP	0			
S-5 @									SAME.				
1030			3/5							0			
	25									0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SOIL GAS SAMPLE DEPTHS

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage II	BORING No.:	SG2002
PROJECT NUMBER:	112G01687	DATE:	10/29/08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Conti
DRILLING RIG:	DPT-Soil Gas	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25					TAN							
					DENSE	TO	F/C SAND - TR		DAMP	0			
S-6						YELLOW BRN	TO SOME GRAVEL		3/4" Φ GRAVEL				
@ 1040			3.5/5						SUB ANG TO SUB ROUND	0			
	30									0			
					DENSE		SAME	SW	DAMP				
S-7									SAME	0			
@ 1047			2.8/5										
										0			
	35												
					VERY DENSE		SAME	SW	DAMP	0			
S-8					(Based on	TO			SAME				
@ 1059			3/5		Drilling)				SL COLOR CHG	0			
						REDDISH BRN			@ 38' - VERY DENSE DRILLING				
	40								(36-40)	0			
							SAME	SW	DAMP				
S-9 @			4/5						SAME	0			
1117													
			44 →	①						0			
	45			45									
				46 ±	STIFF	RED GRAY	CLAYEY SAND	SC	DAMP	0			
S-10			3.5/5		DENSE	RED BRN		SW					
@ 1145				47.5						0			
				TD									
	50						TD @ 47.5						

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage II
PROJECT NUMBER: 112G01687
DRILLING COMPANY: Zebra
DRILLING RIG: DPT-Soil Gas

BORING No.: SG2003
DATE: 10/29/08
GEOLOGIST: Conti
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0				DENSE	BRN	6" TOPSOIL F/C SAND- SOME	SW	DAMP	0			
S-1						TO	GRAVEL						
@ 1310			NA			ORANG BRN				0			
	5									0			
					DENSE		SAME	SW	DAMP				
S-2									1 1/2 Φ SUB ANG	0			
@ 1325			3/5	0					SUB ROUND GRAVEL				
										0			
	10					ORANG							
					DENSE	BRN	SAME	SW	DAMP	0			
S-3									1 1/4" Φ SAME.				
@ 1345			3/5			TO				0			
						YELLOW BRN							
	15									0			
					DENSE		SAME	SW	DAMP				
S-4			2.8/5						1 1/4"	0			
@ 1351									SAME				
										0			
	20			0									
					DENSE		SAME.	SW	DAMP	0			
S-5			2.5/5										
@ 1400										0			
	25									0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II**
PROJECT NUMBER: **112G01687**
DRILLING COMPANY: **Zebra**
DRILLING RIG: **DPT-Soil Gas**
BORING No.: **SG2003**
DATE: 10/29/08
GEOLOGIST: **Conti**
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					DENSE	YELLOW BRN	F/C SAND -	SW	DAMP	0			
S-6			3.5/5				SOME GRAVEL		1 1/2" Φ SUB ANG TO				
@ 1405									SUB ROUND	0			
	30									0			
					DENSE		F/C SAND - TR.	SW	DAMP				
S-7							TO SOME GRAVEL		1" Φ SUB ANG	0			
@ 1413			3.1/5						SUB ROUND NOT AS MUCH				
									GRAVEL AS S-6.	0			
	35					GRAY							
					DENSE	ORANG BRN	F/C SAND - TR	SW	DAMP	0			
S-8 @			4/5				F. GRAVEL		1/4" GRAVEL				
1423										0			
	40			39.8		ORANG	TR CLAY @ 39.8'			0			
					STIFF	BRN GRAY	SANDY CLAY CLAYEY SAND	SC	DAMP				
S-9 @			4/5	41.5	DENSE	BRN				0			
1445						GRAY	SAND (F/C)	SM	VERY DENSE DRILLING 41-45				
								/SW	DAMP NO GRAVEL	0			
	45												
					DENSE	RED BRN	SAND (F/C)	SM	DAMP	0			
S-10			4/5			GRAY		/SW					
@ 1500										0			
	50									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II**
PROJECT NUMBER: **112G01687**
DRILLING COMPANY: **Zebra**
DRILLING RIG: **DPT-Soil Gas**

BORING No.: **SG2004**
DATE: 10/27/08
GEOLOGIST: **Conti**
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
					DENSE	BRN	6" TOPSOIL F/C SAND - SOME	SW	DAMP	0			
S-1						TO	GRAVEL-TR						
@			NA			YELLOW	ROOTS		1 1/2" GRAVEL SUB ROUND	0			
1110						BRN			SUB ANG.				
	5									0			
					DENSE		F/C SAND - SOME	SW	DAMP				
S-2							GRAVEL		1" MAX SUB ROUND	0			
@ 1125			3.1/5	⊙					TO SUB ANG GRAVEL.				
										0			
	10												
					DENSE		SAME	SW	DAMP	0			
S-3									1" Φ				
@ 1145			3/5							0			
									LESS GRAVEL				
	15								LAST 1' OF SAMPLE.	0			
					DENSE		SAME	SW	DAMP				
S-4 @			3.6/5						1 1/4" MAX SUB ROUND	0			
1200									SUB ANG GRAVEL				
										0			
	20			⊙									
					DENSE		SAME	SW	DAMP	0			
S-5									3/4" MAX				
@ 1202			3/5							0			
	25									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: ____________________

Drilling Area Background (ppm): 0

Converted to Well: Yes ______ No ✓ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage II
PROJECT NUMBER: 112G01687
DRILLING COMPANY: Zebra
DRILLING RIG: DPT-Soil Gas

BORING No.: SG2004
DATE: 10/27/08
GEOLOGIST: Conti
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Sample	Sampler BZ	Borehole**	Driller BZ**
	25				VERY DENSE	YELLOW BRN	F/M SAND-SOME GRAVEL	SW	DAMP	0			
S-6 @ 1215			3.5/5						3/4" MAX SUB ROUND/ ANG GRAVEL	0			
									NOT AS MUCH C. SAND AS PREVIOUS				
	30									0			
					DENSE		SAME	SW	SAME				
S-7 @ 1230			3.8/5							0			
										0			
	35												
					DENSE		F/C SAND-SOME GRAVEL	SW	DAMP	0			
S-8 @ 1238			3.5/5						3/4" MAX ROUND TO SUB ANG. GRAVEL	0			
	40									0			
					DENSE		SAME	SW	DAMP				
S-9 @ 1250			3/5						SUB ROUND TO SUB ANG 1" MAX GRAVEL	0			
										0			
	45												
					DENSE		SAME	SW	DAMP→MOIST	0			
S-10 @ 1300			3.2/5						SAME.	0			
				⊙									
	50			TD			TD @ 50'			0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SOIL GAS SAMPLE

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II**
PROJECT NUMBER: **112G01687**
DRILLING COMPANY: **Zebra**
DRILLING RIG: **DPT-Soil Gas**

BORING No.: **SG2005**
DATE: 10/24/08
GEOLOGIST: **Conti**
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
					DENSE	BRN	4" TOPSOIL SILTY SAND - SOME		HAND AUGER	0			
S-1							GRAVEL		TO 5' DAMP				
@ 1030			NA							0			
	5									0			
					DENSE	BRN	F/C SAND - TR	SW	DAMP				
S-2							TO SOME GRAVEL		3/4" MAX	0			
@ 1100			3/5	⊙					SUB ROUND SUB ANG				
										0			
	10					YELLOW							
					DENSE	BRN	F/C SAND - SOME	SW	DAMP	0			
S-3 @			2.8/5				GRAVEL		1" ⌀ MAX				
1110										0			
	15									0			
					DENSE		SAME	SW	DAMP				
S-4 @			3.2/5						SAME	0			
1115													
										0			
	20			⊙		TAN							
					DENSE	BRN	SAME	SW	DAMP	0			
S-5 @			3/5						SAME				
1122													
	25												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: ______

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ______

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	**NWIRP Bethpage II**	BORING No.:	**SG2005**
PROJECT NUMBER:	**112G01687**	DATE:	10/24/08
DRILLING COMPANY:	**Zebra**	GEOLOGIST:	**Conti**
DRILLING RIG:	**DPT-Soil Gas**	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					DENSE	TAN BRN	F/C SAND- SOME	SW	DAMP	0			
S-6			4/5				GRAVEL		1" Ø MAX SUB ROUND				
@ 1129									SUB ANG	0			
	30					TAN				0			
				- - -	DENSE		F/M SAND - TRACE	SM	DAMP				
S-7			3.2/5				GRAVEL	/SW	1/2" MAX	0			
@ 1135													
										0			
	35												
					DENSE		SAME			0			
S-8			2.5/5										
@ 1200										0			
	40			TD						0			
				@40'					STOP AT 40'				
									HAD TO PULL ALL RODS				
									DUE TO LINER STUCK IN BOTTM				
									ROD.				
				⊙									

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SOIL GAS SAMPLE.

Drilling Area Background (ppm): 0

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage II	BORING No.:	SG2006
PROJECT NUMBER:	112G01687	DATE:	10/23/08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Conti
DRILLING RIG:	DPT-Soil Gas	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
					DENSE	BRN	6" TOPSOIL		HAND AUGER	0			
S-1						TO YELLOW	SAND - SOME	SW	TO 5'				
@ 1340			NA			BRN	GRAVEL			0			
	5					YELLOW				0			
					DENSE	BRN	F/C SAND - SOME	SW	DAMP → MOIST				
S-2 @							GRAVEL		1 1/4" Φ MAX SUB ROUND TO	0			
1400			4/5						SUB ANG				
				⊙						0			
	10												
					DENSE		SAME	SW	SAME	0			
S-3 @			3/5						DAMP				
1410										0			
	15									0			
					DENSE		SAME	SW	DAMP				
S-4 @			3.2/5						1 1/2" Φ MAX	0			
1422									SUB ROUND TO SUB ANG				
									GRAVEL	0			
	20			⊙									
					DENSE		SAME	SW	DAMP	0			
S-5 @			2.8/5						1 1/4" MAX				
1427									SAME AS ABV.	0			
	25									0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: TRACK MTD DPT (GEOPROBE RIG) DUAL TUBE TO ADVANCE BORING

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage II
PROJECT NUMBER: 112G01687
DRILLING COMPANY: Zebra
DRILLING RIG: DPT-Soil Gas
BORING No.: SG2006
DATE: 10/23/08
GEOLOGIST: Conti
DRILLER: EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					DENSE	YELLOW BRN	F/M SAND -	SW	DAMP	0			
S-6			3.5/5				SOME GRAVEL		1 1/4" MAX Φ				
@ 1430									SUB ANG TO SUB ROUND	0			
	30									0			
					DENSE		SAME	SW	DAMP				
S-7			2.8/5							0			
@ 1435													
										0			
	35												
					DENSE		F/C SAND - TR TO		DAMP	0			
S-8			2.5/5				SOME GRAVEL		3/4" MAX Φ SUB ROUND -				
@ 1445									SUB ANG.	0			
	40									0			
					DENSE		F/M SAND TR TO		SAME				
S-9			3/5				SOME GRAVEL			0			
@ 1450													
										0			
	45												
					DENSE	BRN	SAME		DAMP	0			
S-10			2.5/5			TO			SAME				
@ 1510						RED BRN				0			
	50									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage II	BORING No.:	SG2007
PROJECT NUMBER:	112G01687	DATE:	10/23/08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Conti
DRILLING RIG:	DPT-Soil Gas	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
					LOOSE	BRN	6" TOPSOIL SAND-SOME	SW	HAND AUGER	0			
						TO	GRAVEL		TO 5'				
S-1 @			NA		M	ORANGE	TR CLAY FROM						
0910					DENSE	BRN	2 TO 3'			0			
	5												
					DENSE	ORANGE BRN	SILTY F/C SAND	SW	DAMP				
S-2						TO	SOME GRAVEL		1½" MAX SUB ANG TO	0			
@			4/5						SUB ROUND				
0925				⊙		YELLOW BRN				0			
	10												
					DENSE		SAME	SW	DAMP	0			
S-3									1" MAX SUB ROUND TO				
@ 0955			3.2/5						SUB ANG	0			
	15									0			
					DENSE		F/C SAND - SOME	SW	BOULDER PC STUCK IN DRIVE				
S-4							GRAVEL		SHOE OF DUALTUBE HAD	0			
@ 1050			3/5						TO PULL RODS TO CLEAR.				
									DAMP - 3/4" MAX GRAVEL	0			
	20			⊙		ORANG			SUB ROUND TO SUB ANG				
					DENSE	BRN	SAME	SW	DAMP	0			
S-5													
@ 1057			2.5/5							0			
						TAN BRN			LESS GRAVEL BOTM 1 FT				
	25									0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

⊙ SOIL GAS SAMPLE DEPTHS

Drilling Area Background (ppm): 0

Remarks: TRACK MTD DPT RIG (GEOPROBE) DUAL TUBE TO ADVANCE BORING

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage II	BORING No.:	SG2007
PROJECT NUMBER:	112G01687	DATE:	10/23/08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Conti
DRILLING RIG:	DPT-Soil Gas	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					DENSE	YELLOW BRN	F/C SAND - TR TO	SW	DAMP	0			
S-6							SOME GRAVEL		3/4" MAX SIZE				
@ 1105			3.5/5						SUB ROUND SUB ANG.	0			
	30									0			
					DENSE	TAN BRN	F/C SAND - SOME	SW	DAMP				
S-7 @							GRAVEL		1" MAX Φ	0			
1115			4/5						SUB ROUND SUB ANG.				
										0			
	35					TAN		- -					
					DENSE	YELLOW BRN	F/C SAND - TR	SW	DAMP	0			
S-8							TO SOME GRAVEL		3/4" MAX SIZE				
@ 1128			3/5						SUB ROUND SUB ANG.	0			
	40									0			
					DENSE	TAN BRN	SAME	SW	SAME	0			
S-9 @													
1135			3.3/5							0			
	45					YELLOW				0			
					DENSE	BRN	SAME	SW	SAME				
S-10 @			3.8/5							0			
1145													
				@			V.SL TR CLAY @			0			
	50			TD			≈ 50' BOTTOM OF SAMPLE						

* When rock coring, enter rock brokeness. 50

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: SET SG @ 8, 20, 49

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II** BORING No.: **SG2008**
PROJECT NUMBER: **112G01687** DATE: 10/21/08
DRILLING COMPANY: **Zebra** GEOLOGIST: **Conti**
DRILLING RIG: **DPT-Soil Gas** DRILLER: EICHLER

	Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness (Material Description)	Color (Material Description)	Material Classification (Material Description)	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
		0												
10/20						TAN BRN		6" TOPSOIL SILTY SAND-SOME GRAVEL		HAND AUGER	0			
	S-1					TR				TO 5'				
	@ 1545			—		ORANG BRN		SOME CLAY 2 TO 3'		DAMP.	0			
								SAND-SOME GRAVEL						
		5									0			
10/21						DENSE	YELLOW BRN	SILTY F/C SAND SOME GRAVEL	SW	DAMP				
	S-2 @									1" ϕ MAX	0			
	1315			1/5						SUB ROUND SUB ANG				
										GRAVEL	0			
		10												
							ORANG BRN	SAME	SW	DAMP	0			
	S-3									SAME AS				
	@ 1330			3/5						S-2.	0			
		15									0			
							YELLOW BRN	SAME	SW	DAMP				
	S-4 @			3.5/5						1 1/4" GRAVEL	0			
	1335									SAME AS S-3				
											0			
		20												
								SAME	SW	DAMP	0			
	S-5 @			2.8/5										
	1340										0			
		25									0			

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: TRACK MTD DPT (GEOPROBE) DUAL TUBE SYSTEM FOR ADVANCING BORING.

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME:	NWIRP Bethpage II	BORING No.:	SG2008
PROJECT NUMBER:	112G01687	DATE:	10/21/08
DRILLING COMPANY:	Zebra	GEOLOGIST:	Conti
DRILLING RIG:	DPT-Soil Gas	DRILLER:	EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	25					YELLOW							
					DENSE	BRN	F/M SAND-TR TO	SW	DAMP	0			
S-6			3/5				SOME GRAVEL		1" GRAVEL SUB ANG TO				
@ 1350									SUB ROUND	0			
	30									0			
							SAME	SW	DAMP				
S-7									SAME AS S-6	0			
@ 1400			3.2/5										
										0			
	35												
					DENSE		F/C SAND SOME	SW	DAMP	0			
S-8							GRAVEL		1"Φ GRAVEL				
@ 1405			4/5						SUB ROUND SUB ANG.	0			
	40									0			
							SAME	SW	DAMP				
S-9									3/4"Φ GRAVEL	0			
@ 1412			3/5										
										0			
	45					YELLOW							
					DENSE	BRN	F/M SAND - TRACE	SW	DAMP	0			
S-10			3/5				GRAVEL						
@ 1420										0			
									NO SIGN H_2O				
	50			TD			TR CLAY ~ 49-50		END @ 50'	0			

* When rock coring, enter rock brokeness. @ 50'

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks: ______

Drilling Area Background (ppm): 0

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP Bethpage II
PROJECT NUMBER: 112G01687
DRILLING COMPANY: Zebra
DRILLING RIG: DPT-Soil Gas
BORING No.: SG2009
DATE: 10/20/08
GEOLOGIST: Conti
DRILLER:

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
	0												
					LOOSE	TAN BRN	SILTY SAND - SOME	SM	HAND AUGER TO	0			
S-1							GRAVEL		5'.				
@ 1230			N/A						DRY → DAMP	0			
	5									0			
					LOOSE	YELLOW BRN	SILTY SAND - SOME	SW	DAMP				
S-2					/ M	TO	GRAVEL			0			
@ 1250			3/5		DENSE								
						BRN				0			
	10												
					M	YELLOW	F/C SAND -	SW	DAMP	0			
					DENSE	BRN	SOME GRAVEL		SUB ROUND GRAVEL				
S-3 @			3/5						1" MAX Φ TO	0			
1300									SUB ANG				
	15												
					M DENSE		SAME	SW	DAMP	0			
S-4			3.2						1 1/8" - MAX Φ				
@ 1315			/5						SUB ROUND GRAVEL TO	0			
									SUB ANG				
	20									0			
					M		SAME	SW	DAMP				
S-5 @			3.1		DENSE				SAME AS ABV.	0			
1320			/5										
										0			
	25												

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): 0

Remarks: TRACK MTD DPT (GEOPROBE) DUAL TUBE SYSTEM FOR ADVANCING BORING.

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II** BORING No.: **SG200 9**
PROJECT NUMBER: **112G01687** DATE: 10/20/08
DRILLING COMPANY: **Zebra** GEOLOGIST: **Conti**
DRILLING RIG: **DPT-Soil Gas** DRILLER: PETE EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Sample	Sampler BZ	Borehole**	Driller BZ**
	25												
					M DENSE	TAN BRN	F/M SAND - TR	SM	DAMP	0			
S-6			2.8/5				GRAVEL		3/4" MAX SIZE				
@ 1324									SUB ROUND/ SUB ANG	0			
									GRAVEL.				
	30									0			
S-7				32±									
@ 1330			3/5		M DENSE	ORANG BRN	F/C SAND - SOME	SW	DAMP	0			
							GRAVEL		1" GRAVEL SUB RND				
	35								SUB ANG.	0			
						YELLOW BRN	SAME	SW	DAMP				
S-8 @			3.1							0			
1336			/5										
									LESS GRAVEL LAST 2 FT.	0			
	40												
					M DENSE	TAN BRN	SILTY SAND F/M	SM	DAMP	0			
S-9 @			3.5				TR GRAVEL		3/4" GRAVEL				
1345			/5						SUB ROUND SUB ANG	0			
									MORE GRAVE				
	45								AT BOTM	0			
					M	ORANGE BRN	SILTY F/M SAND	SM					
S-10 @			4.5/5		DENSE		TR TO SOME GRAVEL		DAMP → MOIST	0			
1356													
								↓					
	50							SW		0			

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ✓ Well I.D. #: ____

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: **NWIRP Bethpage II** BORING No.: **SG2009**
PROJECT NUMBER: **112G01687** DATE: 10/20/08
DRILLING COMPANY: **Zebra** GEOLOGIST: **Conti**
DRILLING RIG: **DPT-Soil Gas** DRILLER: P. EICHLER

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness (MATERIAL DESCRIPTION)	Color	Material Classification	U S C S *	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
	50												
					M DENSE	ORANG BRN	SILTY F/M SAND	SM	MOIST	0			
5-11							TR GRAVEL		↓				
@ 1430			3.5/5							0			
	55			▼		PINK BRN			WET IN	0			
				TD					DRIVE SHOE				
							BOTM @ 55'						
									SLIGHT CHANGE				
									TO "PINK AT 55' ± BUT				
									WAS WET.				

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0

Converted to Well: Yes ______ No ✓ Well I.D. #:

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: BETHPAGE NWIRP
PROJECT NUMBER:
DRILLING COMPANY: UNI-TECH
DRILLING RIG: CME HSA

BORING No.: SVE 101 D
DATE: 1/6/0?
GEOLOGIST: CHARLIE WARING
DRILLER: DAN E.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	Sample	Sampler BZ	Borehole**	Driller BZ**
44.5-	46.5	7 / 9	75%		LOOSE	TAN	SAA	SW	MOIST				
		10 / 9			LOOSE	LT BROWN	F-C SUBROUNDED SAND W/ FINE ROUND GRAVEL TRACE SILT	SP	MOIST				
46.5-	48.5	10 / 9	80%										
		9 / 8				GRAY	48.0'-48.25 - GRAY						
							SILTY CLAY, MED PLASTICITY		MOIST				
48.5-	50.5	9 / 11	80%										
		9 / 11			LOOSE	BROWN	VF-M SAND, SUBROUNDED SOME SILT, TRACE CLAY		WET				
50.5-	52.5	5 / 8	100%			RED/ GRAY	F-C SAND, SUBROUNDED SOME F GRAVEL, ROUND		WET				
		12 / 16				BROWN	VF-M SILTY SAND SOME CLAY LAMINATIONS	SM	WET				
							SAND IS SUBROUNDED CLAY IS GRAY						
52.5-	54.5	5 / 3	80%										
		11 / 17			TIGHT	GRAY	SILTY, SANDY, CLAY MED PLASTICITY.	CL	MOIST				
54.5-	56.5	6 / 7			LOOSE	BROWN	VF-C SAND, SUBROUNDED, SILT	SM	WET				
		14 / 17					WITH <1" GRAY CLAY LAYERS THROUGHOUT						
56.5-	58.5	23 / 40			LOOSE	LT BROWN	F-C SUBROUNDED SAND		WET				
		47 / 48					SOME F GRAVEL - SUB ROUNDED						
58.5-	59.5	8 / 11											
							SAND IS HEAVING						
							OVERDRILLING HOLE TO	65'	BGS				

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks: 2" WELL SET @ 59' BGS 0.020" SCREEN TO 39' #2 SAND TO 37' BENTONITE TO 35' BGS, GROUT TO 2' BGS

Converted to Well: Yes X No ____ Well I.D. #: SVE 101D

SHALLOW 2" WELL SET @ 35' BGS, 10' 0.020 SCREEN

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: BETHPAGE NWIRP
PROJECT NUMBER:
DRILLING COMPANY: UNI-TECH
DRILLING RIG: CME HSA

BORING No.: SVE 101D
DATE: 1/6/09
GEOLOGIST: CHARLIE WARING
DRILLER: DAN E

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS*	Remarks	PID/FID Reading (ppm) Sample	Sampler BZ	Borehole**	Driller BZ**
0 -	25												
24.5-	26.5	4 / 4	50%		LOOSE	LT BROWN	F-C SAND, SUBROUNDED,	SP	MOIST				
		10 / 7					W/ F-M GRAVEL - SUBROUNDED						
26.5 -	28.5	9 / 13	75%										
		16 / 17			LOOSE	LT TAN	F-M SAND, SUBROUNDED	SW	MOIST				
28.5 -	30.5	6 / 10	75%		LOOSE	LT TAN	F-C SAND, SUBROUNDED	SP	MOIST				
		12 / 11					W/ F-M GRAVEL - SUBROUNDED						
30.5 -	32.5	11 / 12	75%										
		12 / 12											
32.5 -	34.5	4 / 8	75%										
		11 / 13											
34.5 -	36.5	10 / 9	75%										
		10 / 13			LOOSE	LT TAN	F-M SAND SUBROUNDED	SW	MOIST				
36.5 -	38.5	10 / 12	80%		LOOSE	TAN	F-C SAND, SUBROUNDED	SP	MOIST				
		13 / 15					W/ F-M SUBROUNDED GRAVEL						
38.5 -	40.5	10 / 15	75%		LOOSE	TAN/ GRAY	VF-M SAND SUBROUNDED	SW	MOIST				
		18 / 18											
40.5 -	41.5	14 / 19	75%				SIA, SOME RUST-ORANGE						
		23 / 22					COLORED LAMINATIONS						
42.5 -	44.5	15 / 21	75%										
		25 / 21											

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks:

Converted to Well: Yes ____ No ____ Well I.D. #:

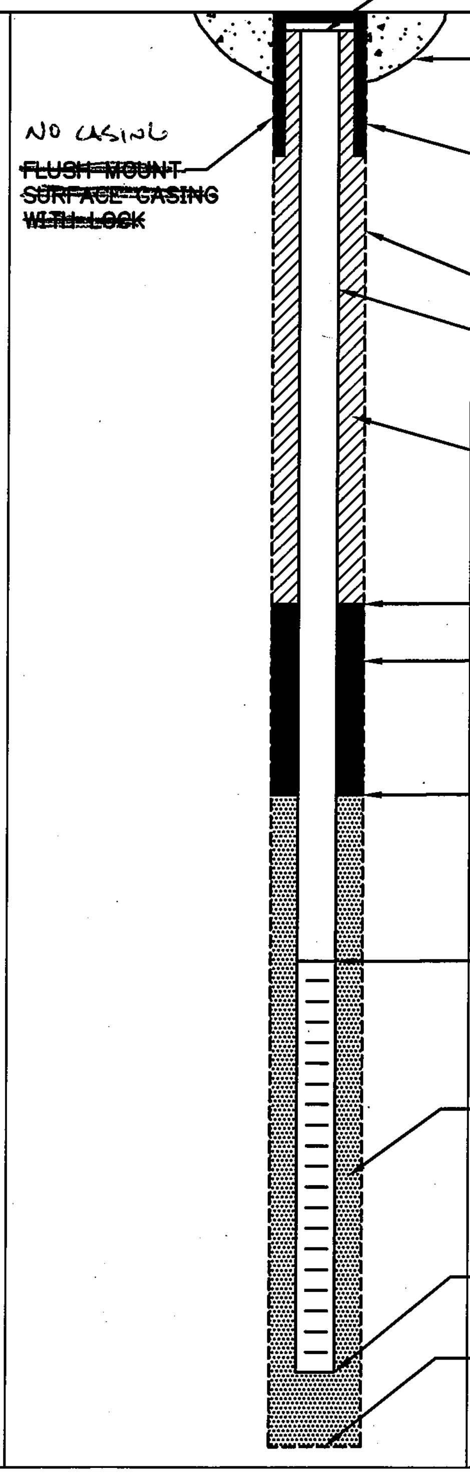
WELL NO.: SVE 101 D

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT NWIRP BETHPAGE
LOCATION SVE 101D
DRILLER DAN E. / UNI-TECH
PROJECT NO. ______
BORING ______
DRILLING METHOD HSA
DATE BEGUN 1/6/08
DATE COMPLETED 1/6/08
FIELD GEOLOGIST C. WARING
DEVELOPMENT METHOD —
GROUND ELEVATION ______
DATUM ______

ACAD:FORM_MWFM.dwg 07/20/99 INL



ELEVATION TOP OF RISER: ______

TYPE OF SURFACE SEAL: ______

TYPE OF PROTECTIVE CASING: ______

I.D. OF PROTECTIVE CASING: ______

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 35'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 37'

ELEVATION/DEPTH TOP OF SCREEN: / 39'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.020" x 20'

TYPE OF SAND PACK: # 2

DIAMETER OF HOLE IN BEDROCK: ______

ELEVATION / DEPTH BOTTOM OF SCREEN: / 59'

ELEVATION / DEPTH BOTTOM OF SAND: / 59'

ELEVATION/DEPTH BOTTOM OF HOLE: / 60'

BACKFILL MATERIAL BELOW SAND: SAND / NATURAL

Tetra Tech NUS, Inc.

BORING LOG

PROJECT NAME: NWIRP BETH PAGE
PROJECT NUMBER:
DRILLING COMPANY: UNI-TECH
DRILLING RIG: CME HSA

BORING No.: SVE 101
DATE: 1/2/08
GEOLOGIST: C. WARINO
DRILLER: DAN E.

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**
							SEE BORING LOG						
							FOR SVE 101D						
							FOR LITHOLOGY						
							35' BGS END OF BORING						

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm):

Remarks: 2" WELL SET @ 35' BGS 0.020" SCREEN TO 25' BGS
#2 SAND TO 23' BGS, BENTONITE TO 21' BGS, GROUT TO 3' BGS

Converted to Well: Yes X No ____ Well I.D. #: SVE 101

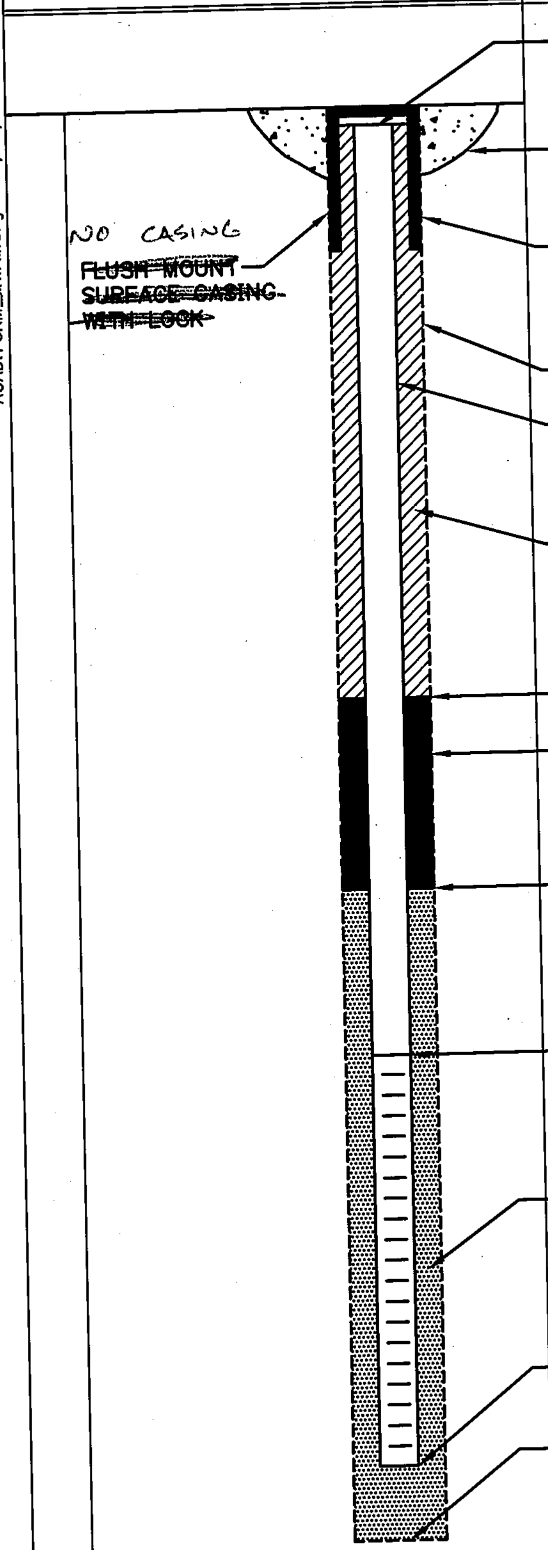
WELL NO.: SVE 101

Tetra Tech NUS, Inc.

OVERBURDEN MONITORING WELL SHEET FLUSH - MOUNT

PROJECT NWIRP BETHPAGE	LOCATION SVE 101	DRILLER DAN E / UNI-TECH
PROJECT NO.	BORING	DRILLING METHOD HSA
DATE BEGUN 1/6/08	DATE COMPLETED 1/7/08	DEVELOPMENT METHOD
FIELD GEOLOGIST G. WARINO		
GROUND ELEVATION	DATUM	

ACAD:FORM_MWFM.dwg 07/20/99 INL



ELEVATION TOP OF RISER:

TYPE OF SURFACE SEAL:

TYPE OF PROTECTIVE CASING:

I.D. OF PROTECTIVE CASING:

DIAMETER OF HOLE: 4 1/4"

TYPE OF RISER PIPE: PVC

RISER PIPE I.D.: 2"

TYPE OF BACKFILL/SEAL: GROUT

ELEVATION/DEPTH TOP OF SEAL: / 21'

TYPE OF SEAL: BENTONITE

ELEVATION/DEPTH TOP OF SAND: / 23'

ELEVATION/DEPTH TOP OF SCREEN: / 25'

TYPE OF SCREEN: PVC

SLOT SIZE x LENGTH: 0.020" x 10'

TYPE OF SAND PACK: # 2

DIAMETER OF HOLE IN BEDROCK:

ELEVATION / DEPTH BOTTOM OF SCREEN: / 35'

ELEVATION / DEPTH BOTTOM OF SAND: / 35'

ELEVATION/DEPTH BOTTOM OF HOLE: / 35'

BACKFILL MATERIAL BELOW SAND:

APPENDIX C

REFERENCED ANALYTICAL DATA

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Bc Lhygo
IDW

Client: Tetra Tech NUS, Inc
Project: CTO 449 & 450 NWIRP Calverton
PO No:
Sample Date: 02/19/08
Received Date: 02/21/08
Extraction Date:
Analysis Date: 21-FEB-2008 17:58
Report Date: 03/05/2008
Matrix: SOIL
% Solids: 96.4

Lab ID: SB0889-3
Client ID: BP-IDW-01
SDG: SB0889
Extracted by:
Extraction Method: SW846 5035
Analyst: SKT
Analysis Method: SW846 8260B
Lab Prep Batch: WG48623
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
75-71-8	Dichlorodifluoromethane	U	5	1.0	5	5	0.9
74-87-3	Chloromethane	U	5	1.0	5	5	2
75-01-4	Vinyl chloride	U	5	1.0	5	5	2
74-83-9	Bromomethane	U	5	1.0	5	5	2
75-00-3	Chloroethane	U	5	1.0	5	5	2
75-69-4	Trichlorofluoromethane	U	5	1.0	5	5	1.0
75-35-4	1,1-Dichloroethene	U	5	1.0	5	5	1
76-13-1	Freon-113	U	5	1.0	5	5	2
67-64-1	Acetone	U	26	1.0	25	26	8
75-15-0	Carbon Disulfide	U	5	1.0	5	5	1
79-20-9	Methyl Acetate	U	5	1.0	5	5	2
75-09-2	Methylene Chloride	U	26	1.0	25	26	2
156-60-5	trans-1,2-Dichloroethene	U	5	1.0	5	5	1
1634-04-4	Methyl tert-butyl ether	U	5	1.0	5	5	2
75-34-3	1,1-Dichloroethane	U	5	1.0	5	5	2
156-59-2	cis-1,2-Dichloroethene	U	5	1.0	5	5	1
540-59-0	1,2-Dichloroethylene (total)	U	10	1.0	10	10	1
78-93-3	2-Butanone	U	26	1.0	25	26	5
67-66-3	Chloroform	U	5	1.0	5	5	0.9
71-55-6	1,1,1-Trichloroethane	U	5	1.0	5	5	1
1735-17-7	Cyclohexane	U	5	1.0	5	5	1
56-23-5	Carbon Tetrachloride	U	5	1.0	5	5	1
71-43-2	Benzene	U	5	1.0	5	5	2
107-06-2	1,2-Dichloroethane	U	5	1.0	5	5	2
79-01-6	Trichloroethene	J	3	1.0	5	5	2
108-87-2	Methylcyclohexane	U	5	1.0	5	5	1
78-87-5	1,2-Dichloropropane	U	5	1.0	5	5	1
75-27-4	Bromodichloromethane	U	5	1.0	5	5	1
10061-01-5	cis-1,3-dichloropropene	U	5	1.0	5	5	1
108-10-1	4-methyl-2-pentanone	U	26	1.0	25	26	7
108-88-3	Toluene	U	5	1.0	5	5	2
10061-02-6	trans-1,3-Dichloropropene	U	5	1.0	5	5	1
79-00-5	1,1,2-Trichloroethane	U	5	1.0	5	5	1
127-18-4	Tetrachloroethene	U	5	1.0	5	5	2
591-78-6	2-Hexanone	U	26	1.0	25	26	5
124-48-1	Dibromochloromethane	U	5	1.0	5	5	0.9
106-93-4	1,2-Dibromoethane	U	5	1.0	5	5	0.8
108-90-7	Chlorobenzene	U	5	1.0	5	5	0.8
100-41-4	Ethylbenzene	U	5	1.0	5	5	1
	m+p-Xylenes	U	10	1.0	10	10	3
95-47-6	o-Xylene	U	5	1.0	5	5	1
1330-20-7	Xylenes (total)	U	16	1.0	15	16	1
100-42-5	Styrene	U	5	1.0	5	5	1

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 449 & 450 NWIRP Calverton
PO No:
Sample Date: 02/19/08
Received Date: 02/21/08
Extraction Date:
Analysis Date: 21-FEB-2008 17:58
Report Date: 03/05/2008
Matrix: SOIL
% Solids: 96.4

Lab ID: SB0889-3
Client ID: BP-IDW-01
SDG: SB0889
Extracted by:
Extraction Method: SW846 5035
Analyst: SKT
Analysis Method: SW846 8260B
Lab Prep Batch: WG48623
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
75-25-2	Bromoform	U	5	1.0	5	5	0.9
98-82-8	Isopropylbenzene	U	5	1.0	5	5	1
79-34-5	1,1,2,2-Tetrachloroethane	U	5	1.0	5	5	0.9
541-73-1	1,3-Dichlorobenzene	U	5	1.0	5	5	0.9
106-46-7	1,4-Dichlorobenzene	U	5	1.0	5	5	0.9
95-50-1	1,2-Dichlorobenzene	U	5	1.0	5	5	1
96-12-8	1,2-Dibromo-3-Chloropropane	U	5	1.0	5	5	1
120-82-1	1,2,4-Trichlorobenzene	U	5	1.0	5	5	2
1868-53-7	Dibromofluoromethane		76%				
17060-07-0	1,2-Dichloroethane-D4		88%				
2037-26-5	Toluene-D8		72%				
460-00-4	P-Bromofluorobenzene		65%				

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE ID: BP-IDW-01

Lab Name: KATAHDIN ANALYTICAL SERVICES   Lab Code: KAS

Project: CTO 449 & 450 NWIRP CALVERTON   SDG No.: SB0889

Matrix: (soil/water) SOIL   Lab Sample ID: SB0889-3

Sample wt/vol: 4.970(g/mL) G   Lab File ID: M6336

Level: (low/med) LOW   Date Received: 02/21/08

% Moisture: not dec. 4   Date Analyzed: 02/21/08

GC Column: RTX-VMS ID: 0.18 (mm)   Dilution Factor: 1.0

Soil Extract Volume:________(mL)   Soil Aliquot Volume: ________(uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kgdrywt

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I VOA-TIC

I

INORGANIC ANALYSIS DATA SHEET

Lab Name: Katahdin Analytical Services **Client Field ID:** BP-IDW-01

Matrix: WATER **SDG Name:** SB0889

Percent Solids: 0.00 **Lab Sample ID:** SB0889-003T

Concentration Units : ug/L

CAS No.	Analyte	Concentration	C	Q	M	DF	Adjusted PQL	Adjusted IDL
7440-38-2	ARSENIC, TCLP	8.50	U		P	5	40	8.50
7440-39-3	BARIUM, TCLP	143			P	5	25	1.40
7440-43-9	CADMIUM, TCLP	1.2	B		P	5	50	0.50
7440-47-3	CHROMIUM, TCLP	11.4	B		P	5	75	1.90
7439-92-1	LEAD, TCLP	7.8	B		P	5	25	7.00
7439-97-6	MERCURY, TCLP	0.02	U		CV	1	0.20	0.02
7782-49-2	SELENIUM, TCLP	11.00	U		P	5	50	11.00
7440-22-4	SILVER, TCLP	2.70	U		P	5	75	2.70

Bottle ID: B

Comments:

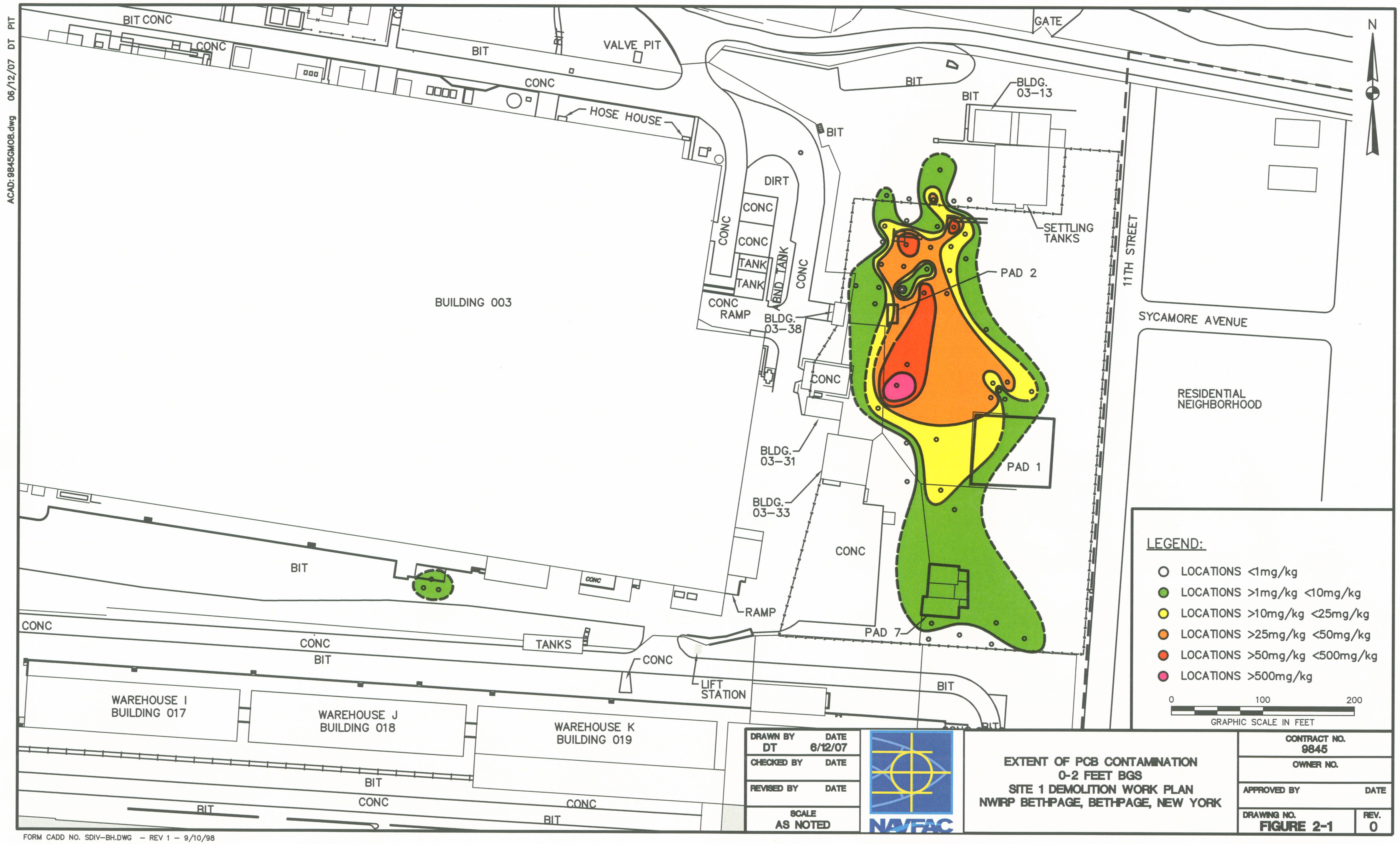
KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 449 & 450 NWIRP Calverton
PO No:
Sample Date: 02/19/08
Received Date: 02/21/08
Extraction Date: 02/25/08
Analysis Date: 29-FEB-2008 17:01
Report Date: 03/04/2008
Matrix: SOIL
% Solids: 96.4

Lab ID: SB0889-3
Client ID: BP-IDW-01
SDG: SB0889
Extracted by: KM
Extraction Method: SW846 3545
Analyst: SJC
Analysis Method: SW846 8082
Lab Prep Batch: WG48682
Units: ug/Kgdrywt

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
12674-11-2	Aroclor-1016	U	18	1.0	17	18	17
11104-28-2	Aroclor-1221	U	18	1.0	17	18	12
11141-16-5	Aroclor-1232	U	18	1.0	17	18	5.5
53469-21-9	Aroclor-1242	U	18	1.0	17	18	7.0
12672-29-6	Aroclor-1248		52	1.0	17	18	5.9
11097-69-1	Aroclor-1254	U	18	1.0	17	18	13
11096-82-5	Aroclor-1260	U	18	1.0	17	18	14
877-09-8	Tetrachloro-m-xylene		95%				
2051-24-3	Decachlorobiphenyl		84%				

Page 01 of 01 6BB5015.d



ACAD: 9845GM08.dwg 06/12/07 DT PIT
BIT CONC
CONC
BIT
VALVE PIT
CONC
HOSE HOUSE
GATE
BIT
BIT
BLDG. 03-13
BIT
DIRT
CONC
CONC
CONC
TANK
TANK
BND TANK
CONC
CONC RAMP
BLDG. 03-38
SETTLING TANKS
PAD 2
11TH STREET
SYCAMORE AVENUE
BUILDING 003
CONC
RESIDENTIAL NEIGHBORHOOD
BLDG. 03-31
PAD 1
BLDG. 03-33
CONC
BIT
CONC
RAMP
PAD 7
CONC
CONC
TANKS
BIT
CONC
LIFT STATION
BIT
WAREHOUSE I BUILDING 017
WAREHOUSE J BUILDING 018
WAREHOUSE K BUILDING 019
BIT
CONC
BIT
CONC
BIT
N
LEGEND:
LOCATIONS <1mg/kg
LOCATIONS >1mg/kg <10mg/kg
LOCATIONS >10mg/kg <25mg/kg
LOCATIONS >25mg/kg <50mg/kg
LOCATIONS >50mg/kg <500mg/kg
LOCATIONS >500mg/kg
0 100 200
GRAPHIC SCALE IN FEET
DRAWN BY DT
DATE 6/12/07
CHECKED BY
DATE
REVISED BY
DATE
SCALE AS NOTED
NAVFAC
EXTENT OF PCB CONTAMINATION
0-2 FEET BGS
SITE 1 DEMOLITION WORK PLAN
NWIRP BETHPAGE, BETHPAGE, NEW YORK
CONTRACT NO. 9845
OWNER NO.
APPROVED BY
DATE
DRAWING NO. FIGURE 2-1
REV. 0
FORM CADD NO. SDIV-BH.DWG - REV 1 - 9/10/98

ACAD:9845GM09.dwg 06/13/07 DT PIT

DRAWN BY: DT	DATE: 6/12/07
CHECKED BY	DATE
REVISED BY	DATE
SCALE: AS NOTED	

NAVFAC

EXTENT OF PCB CONTAMINATION
2-15 FEET BGS
SITE 1 DEMOLITION WORK PLAN
NWIRP BETHPAGE, BETHPAGE, NEW YORK

CONTRACT NO. 9845	
OWNER NO.	
APPROVED BY	DATE
DRAWING NO. FIGURE 2-2	REV. 0

FORM CADD NO. SDIV-BH.DWG – REV 1 – 9/10/98

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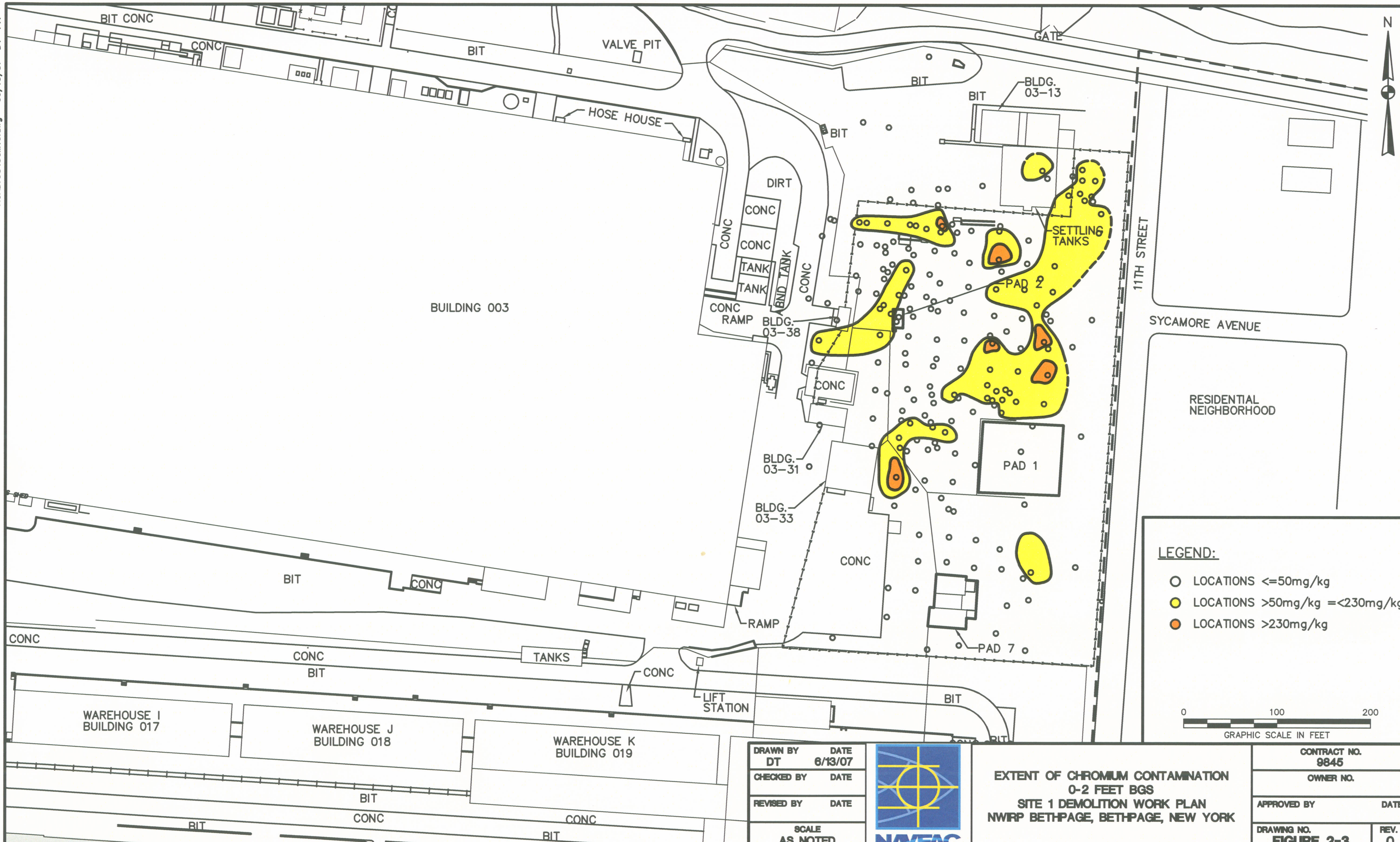

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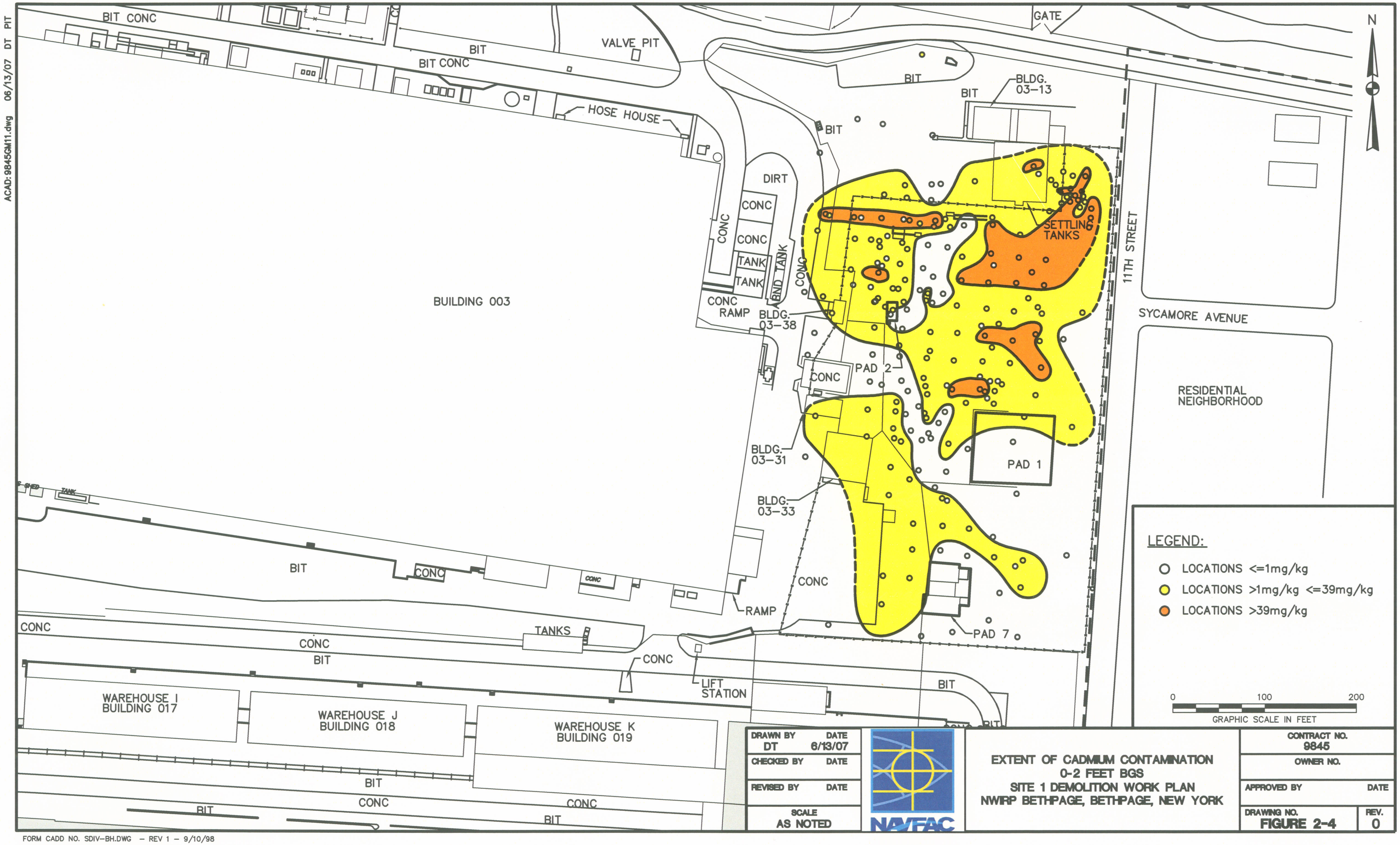
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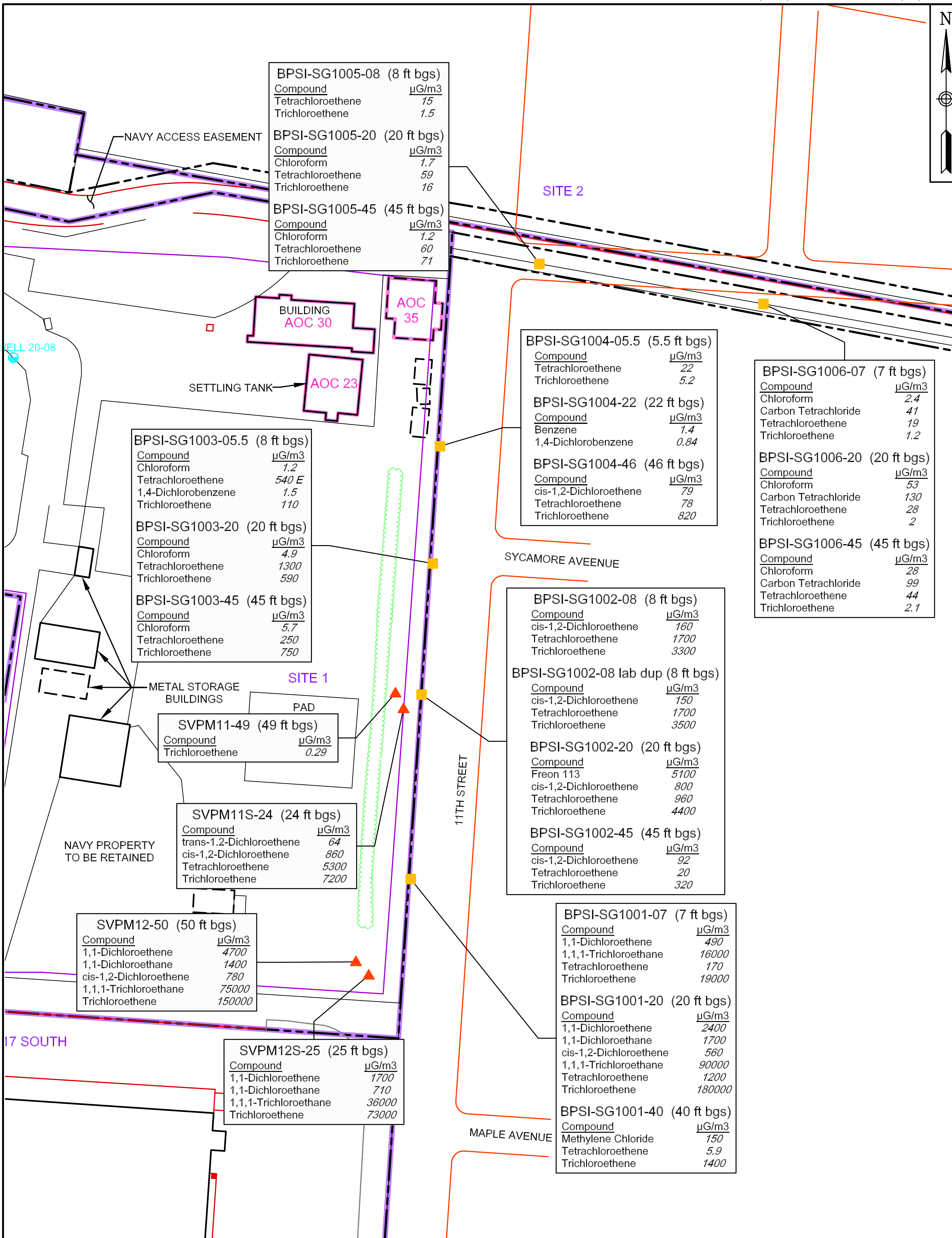
BIT CONC
BIT
BIT CONC
VALVE PIT
HOSE HOUSE
GATE
BIT
BIT
BLDG. 03-13
BIT
DIRT
CONC
CONC
CONC
TANK
TANK
BND TANK
CONC
CONC RAMP
BLDG. 03-38
SETTLING TANKS
11TH STREET
SYCAMORE AVENUE
BUILDING 003
PAD 2
CONC
RESIDENTIAL NEIGHBORHOOD
BLDG. 03-31
PAD 1
BLDG. 03-33
BIT
CONC
CONC
CONC
RAMP
PAD 7
CONC
TANKS
CONC
BIT
CONC
LIFT STATION
BIT
WAREHOUSE I BUILDING 017
WAREHOUSE J BUILDING 018
WAREHOUSE K BUILDING 019
BIT
CONC
BIT
CONC
BIT
N
LEGEND:
LOCATIONS <=1mg/kg
LOCATIONS >1mg/kg <=39mg/kg
LOCATIONS >39mg/kg
0 100 200
GRAPHIC SCALE IN FEET
DRAWN BY DT DATE 6/13/07
CHECKED BY DATE
REVISED BY DATE
SCALE AS NOTED
NAVFAC
EXTENT OF CADMIUM CONTAMINATION
0-2 FEET BGS
SITE 1 DEMOLITION WORK PLAN
NWIRP BETHPAGE, BETHPAGE, NEW YORK
CONTRACT NO. 9845
OWNER NO.
APPROVED BY DATE
DRAWING NO. FIGURE 2-4
REV. 0
FORM CADD NO. SDIV-BH.DWG – REV 1 – 9/10/98



LEGEND

- DRY WELL
- SOIL GAS SAMPLE LOCATION
- SOIL VAPR PRESSURE MONITOR
- PROPERTY LINE
- FENCE LINE
- SITE BOUNDARY
- AOC BOUNDARY

NOTE:
FIGURE PRESENTS VOLATILE ORGANIC COMPOUNDS THAT EXCEED EPA REGION 3 RBCs FOR INDOOR AIR. FOR COMPARISON, NEW YORK STATE DEPARTMENT OF HEALTH INDOOR AIR CRITERIA FOR TCE AND PCE ARE 5 µg/m³ AND 100 µg/m³ RESPECTIVELY.

0 80 160
SCALE IN FEET

TETRA TECH NUS, INC.

SOIL GAS RESULTS
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

FILE 112GN9845GM01
SCALE AS NOTED
FIGURE NUMBER FIGURE 4
REV 0
DATE 02/27/08

APPENDIX D

PILOT-SCALE TEST RESULTS

Test No. 1
Flow Rate BPS1-SVE101D: 20 CFM

Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
Intermediate						
SVPM 12S	48	0	-0.01	0	0	-0.005
BPS1-PZ2002I	82	0.02	0.01	0.02	0.02	0.015
SVPM 11S	161	0.02	0.01	-0.01	-0.01	0
BPS1-PZ2003I	238	-0.01	-0.02	0	0	-0.01
BPS1-PZ2007I	270	0.01		0		
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.03	0.02	0.01	0.01	0.015
SVPM 12	48	0.07	0.06	0	0	0.03
BPS1-PZ2002D	82	0.01	0.03	0	0	0.015
BPS1-MW1	92	0.02	0.02	0	0	0.01
EW-5	119	0	-0.01	0	0	-0.005
SVPM 11	161	0	-0.01	0	0	-0.005
BPS1-PZ2003D	238	-0.02	-0.03	0	0	-0.015
BPS1-PZ2007D	270	0.01		0		

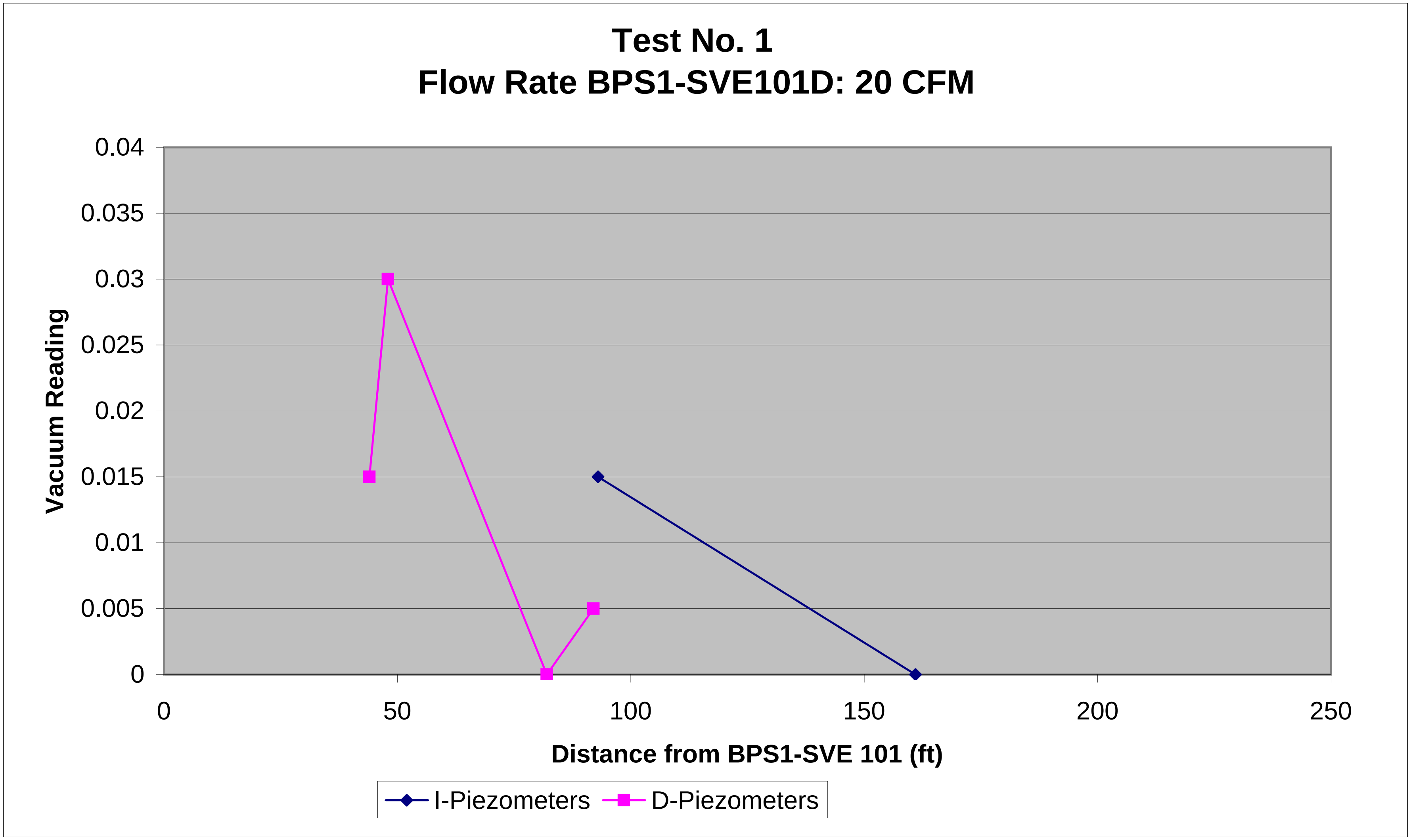
Notes:
Vacuum values showed as positive number

Adjusted Test No. 1
Flow Rate BPS1-SVE101D: 20 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
BPS1-PZ2002I	93	0.02	0.01	0.02	0.02	0.015
SVPM 11S	161	0.02	0.01	-0.01	-0.01	0
BPS1-PZ2007I	270	0.01		0		

Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.03	0.02	0.01	0.01	0.015
SVPM 12	48	0.07	0.06	0	0	0.03
BPS1-PZ2002D	82	0.01	0	0	0	0
BPS1-MW1	92	0.02	0.01	0	0	0.005
BPS1-PZ2007D	270	0.01		0		

Notes:
Vacuum values showed as positive number


Test No. 1
Flow Rate BPS1-SVE101D: 20 CFM
Vacuum Reading
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
50
100
150
200
250
Distance from BPS1-SVE 101 (ft)
I-Piezometers
D-Piezometers

Test No. 2
Flow Rate BPS1-SVE101D: 41-61 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	-0.01	0.01	0.01	0.01	0.01
BPS1-PZ2002I	82	0	0.02	0.04	0.04	0.03
SVPM 11S	161	-0.02	0	0	0	0
BPS1-PZ2003I	238	-0.03	-0.01	-0.02	-0.02	-0.015
BPS1-PZ2007I	270	-0.02		0		

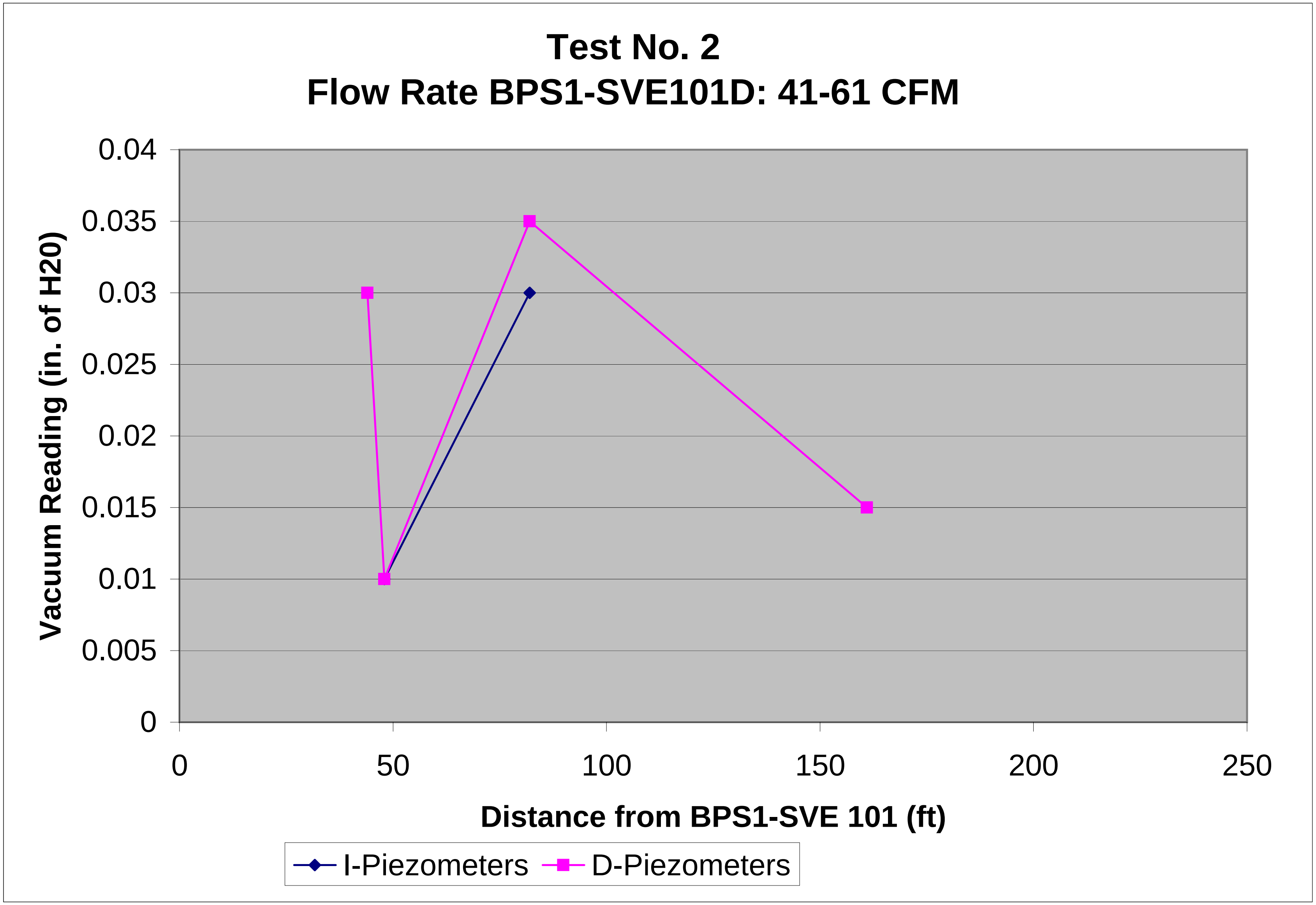
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0	0.03	0.03	0.03	0.03
SVPM 12	48	-0.01	0.02	0	0	0.01
BPS1-PZ2002D	82	0.01	0.05	0.03	0.04	0.045
BPS1-MW1	92	-0.06	-0.06	-0.03	-0.03	-0.045
EW-5	119	-0.08	-0.05	-0.01	-0.01	-0.03
SVPM 11	161	0	0.03	0	0	0.015
BPS1-PZ2003D	238	-0.04	-0.01	-0.01	-0.01	-0.01
BPS1-PZ2007D	270	-0.03		0		

Notes:
Vacuum values showed as positive number

Adjusted Test No. 2
Flow Rate BPS1-SVE101D: 41-61 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	-0.01	0.01	0.01	0.01	0.01
BPS1-PZ2002I	82	0	0.02	0.04	0.04	0.03
BPS1-PZ2007I	270	-0.02		0		
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0	0.03	0.03	0.03	0.03
SVPM 12	48	-0.01	0.02	0	0	0.01
BPS1-PZ2002D	82	0.01	0.04	0.03	0.03	0.035
SVPM 11	161	0	0.03	0	0	0.015
BPS1-PZ2007D	270	-0.03		0		

Notes:
Vacuum values showed as positive number



Test No. 2
Flow Rate BPS1-SVE101D: 41-61 CFM
Vacuum Reading (in. of H20)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
50
100
150
200
250
Distance from BPS1-SVE 101 (ft)
I-Piezometers
D-Piezometers

Test No. 3
Flow Rate BPS1-SVE101D: 41-61 CFM
Flow Rate BPS1-SVE101I: 20 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	0	-0.01	0.02	0.03	0.01
BPS1-PZ2002I	82	0.03	0.02	0.06	0.07	0.045
SVPM 11S	161	0.01	0	0	0.01	0.005
BPS1-PZ2003I	238	0.01	0	-0.03	-0.02	-0.01
BPS1-PZ2007I	270	0.01		-0.01		
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.07	0.06	0.07	0.09	0.075
SVPM 12	48	0.03	0.02	0.04	0.06	0.04
BPS1-PZ2002D	82	0.04	0.02	0.05	0.02	0.02
BPS1-MW1	92	-0.01	-0.01	0	0	-0.005
EW-5	119	0.05	0.04	0.02	0.04	0.04
SVPM 11	161	0	-0.01	0	0.02	0.005
BPS1-PZ2003D	238	0.02	0.01	0.03	0.05	0.03
BPS1-PZ2007D	270	0.01		-0.02		

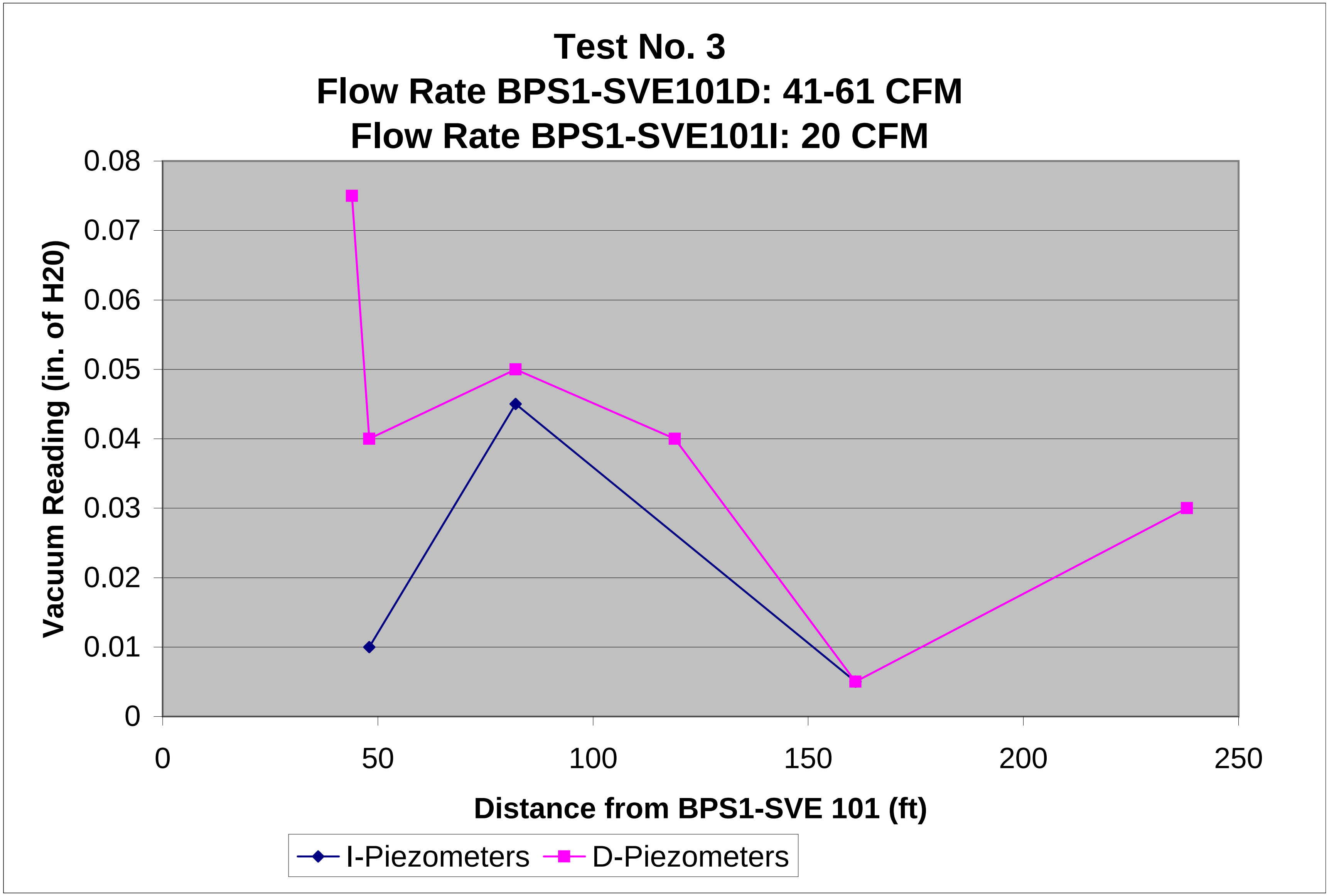
Notes:
Vacuum values showed as positive number

Adjusted Test No. 3
Flow Rate BPS1-SVE101D: 41-61 CFM
Flow Rate BPS1-SVE101I: 20 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	0	-0.01	0.02	0.03	0.01
BPS1-PZ2002I	82	0.03	0.02	0.06	0.07	0.045
SVPM 11S	161	0.01	0	0	0.01	0.005
BPS1-PZ2007I	270	0.01		-0.01		

Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.07	0.06	0.07	0.09	0.075
SVPM 12	48	0.03	0.02	0.04	0.06	0.04
BPS1-PZ2002D	82	0.04	0.03	0.05	0.07	0.05
EW-5	119	0.05	0.04	0.02	0.04	0.04
SVPM 11	161	0	-0.01	0	0.02	0.005
BPS1-PZ2003D	238	0.02	0.01	0.03	0.05	0.03
BPS1-PZ2007D	270	0.01		-0.02		

Notes:
Vacuum values showed as positive number



Test No. 3
Flow Rate BPS1-SVE101D: 41-61 CFM
Flow Rate BPS1-SVE101I: 20 CFM
Vacuum Reading (in. of H20)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
50
100
150
200
250
Distance from BPS1-SVE 101 (ft)
I-Piezometers
D-Piezometers

Test No. 4
Flow Rate BPS1-SVE101D: 13-44 CFM
Flow Rate BPS1-SVE101I: 48-55 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	0.1	0.1	0.09	0.08	0.09
BPS1-PZ2002I	82	0.04	0.04	0.06	0.05	0.045
SVPM 11S	161	0.02	0.02	0.02	0.01	0.015
BPS1-PZ2003I	238	0.02	0.02	0.02	0.01	0.015
BPS1-PZ2007I	270	0		0.01		

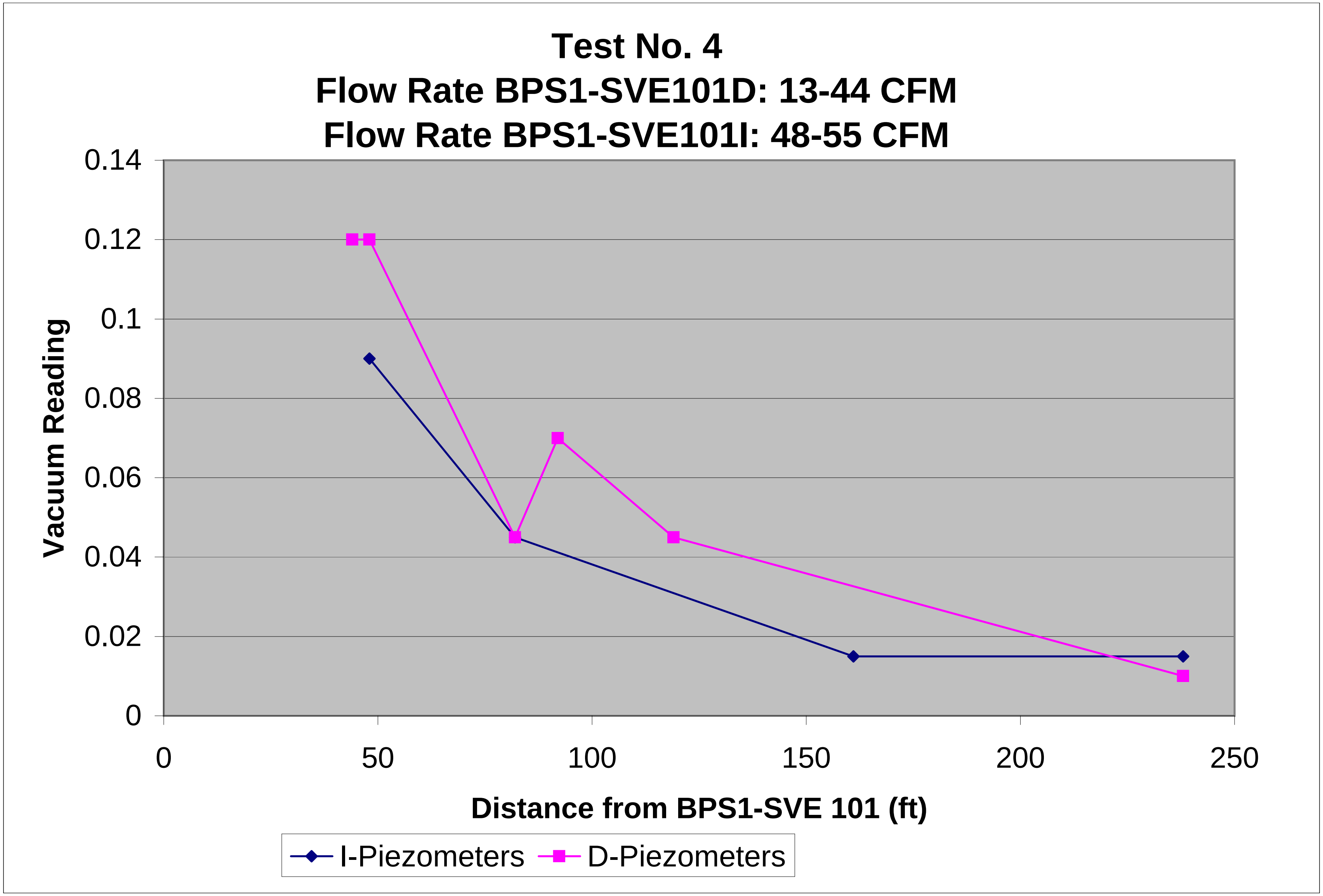
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.14	0.13	0.11	0.11	0.12
SVPM 12	48	0.13	0.12	0.12	0.12	0.12
BPS1-PZ2002D	82	0.04	0.03	0.06	0.01	0.02
BPS1-MW1	92	0.08	0.08	0.07	0.07	0.075
EW-5	119	0.05	0.04	0.05	0.05	0.045
SVPM 11	161	0	-0.01	0	0	-0.005
BPS1-PZ2003D	238	0.01	0	0.02	0.02	0.01
BPS1-PZ2007D	270	0.01		0		

Notes:
Vacuum values showed as positive number

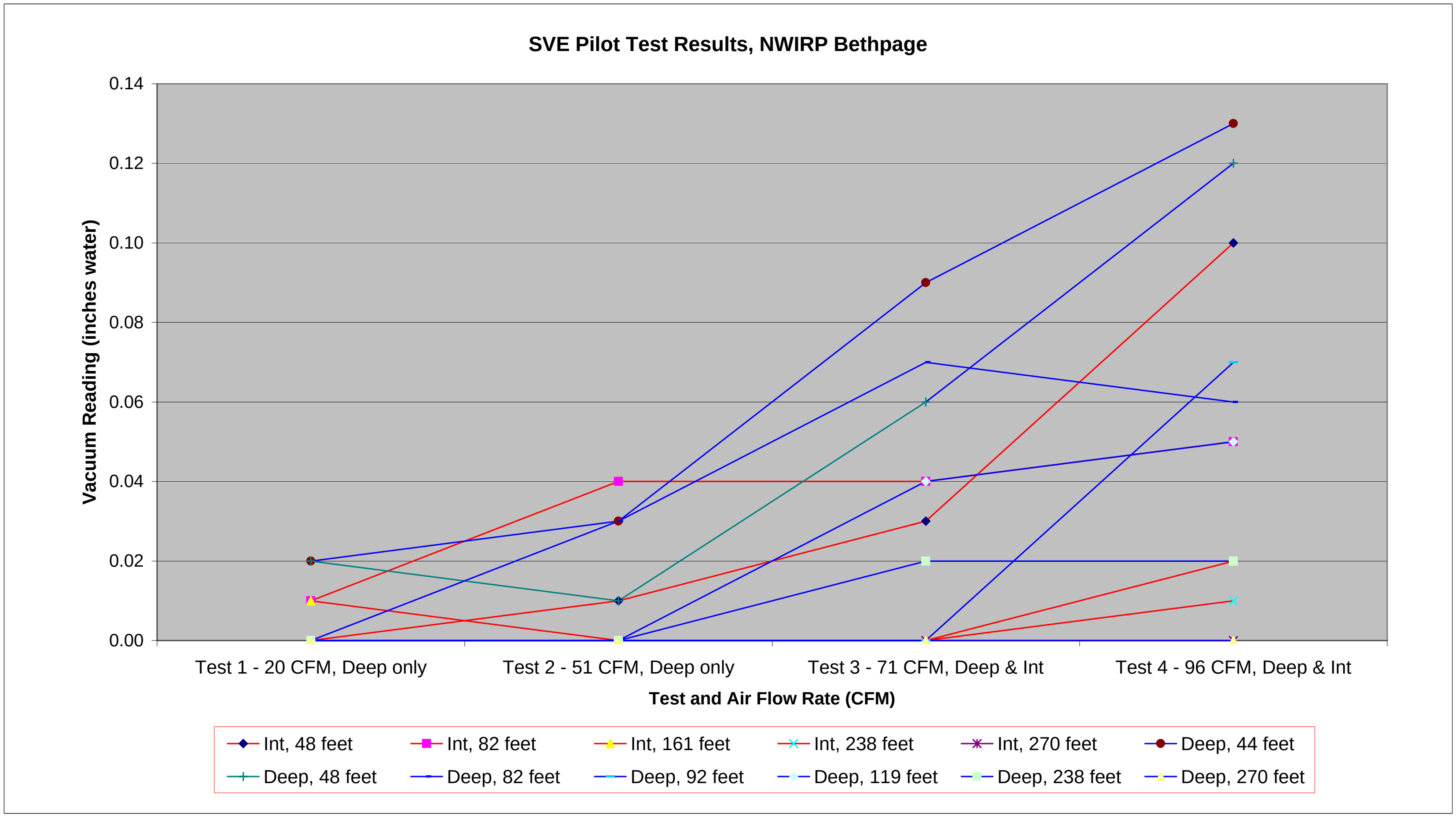
AdjustedTest No. 4
Flow Rate BPS1-SVE101D: 13-44 CFM
Flow Rate BPS1-SVE101I: 48-55 CFM

Intermediate						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
SVPM 12S	48	0.1	0.1	0.09	0.08	0.09
BPS1-PZ2002I	82	0.04	0.04	0.06	0.05	0.045
SVPM 11S	161	0.02	0.02	0.02	0.01	0.015
BPS1-PZ2003I	238	0.02	0.02	0.02	0.01	0.015
BPS1-PZ2007I	270	0		0.01		
Deep						
Well ID	Distance from BPS1-SVE 101 (ft)	1st Vacuum Reading (in. of H20)	1st Adjusted Vacuum Reading (in. of H20)	2nd Vacuum Reading (in. of H20)	2nd Adjusted Vacuum Reading (in. of H20)	Average Vacuum Reading (in. of H20)
EW-1	44	0.14	0.13	0.11	0.11	0.12
SVPM 12	48	0.13	0.12	0.12	0.12	0.12
BPS1-PZ2002D	82	0.04	0.03	0.06	0.06	0.045
BPS1-MW1	92	0.08	0.07	0.07	0.07	0.07
EW-5	119	0.05	0.04	0.05	0.05	0.045
BPS1-PZ2003D	238	0.01	0	0.02	0.02	0.01
BPS1-PZ2007D	270	0.01		0		

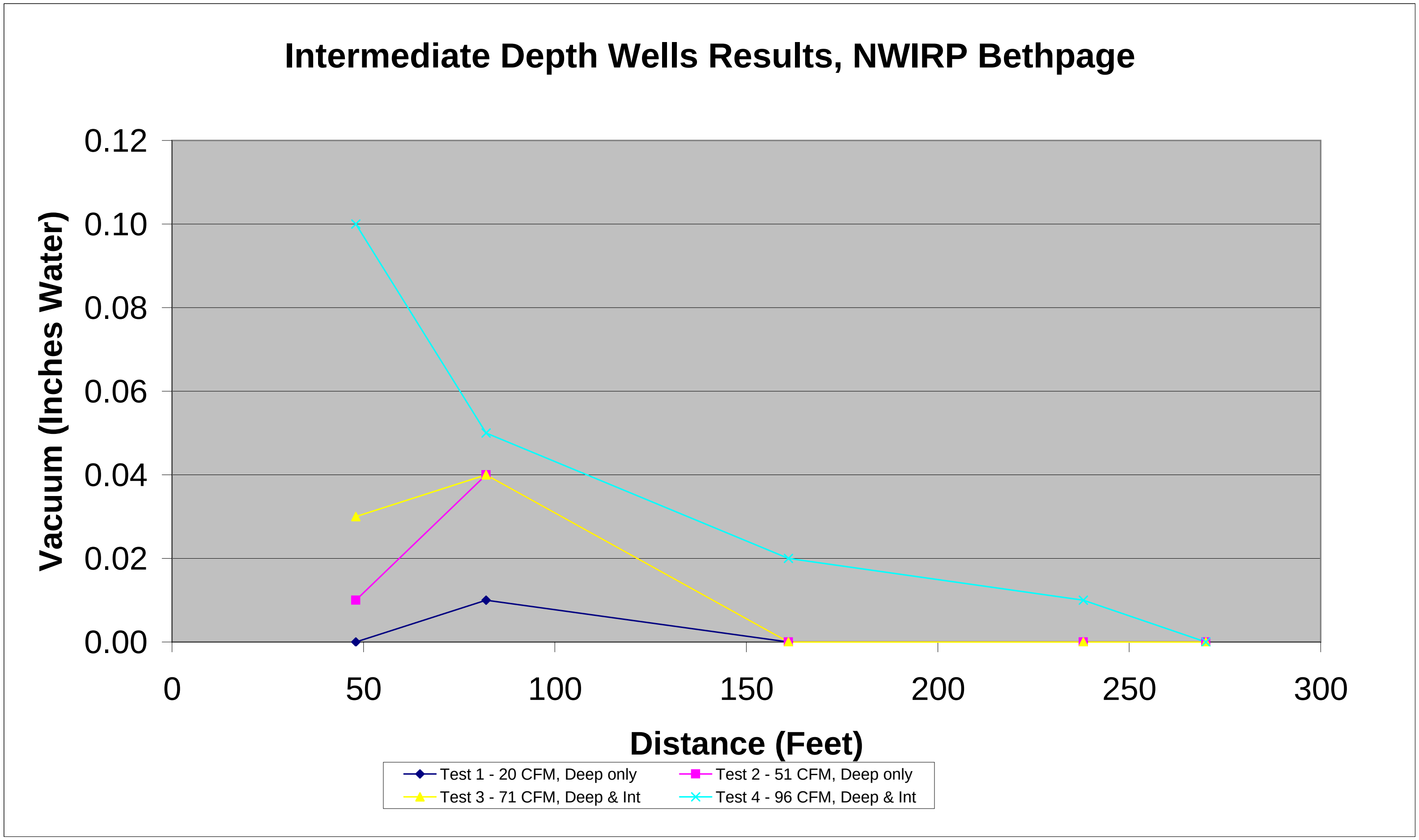
Notes:
Vacuum values showed as positive number


Test No. 4
Flow Rate BPS1-SVE101D: 13-44 CFM
Flow Rate BPS1-SVE101I: 48-55 CFM
Vacuum Reading
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
Distance from BPS1-SVE 101 (ft)
I-Piezometers
D-Piezometers

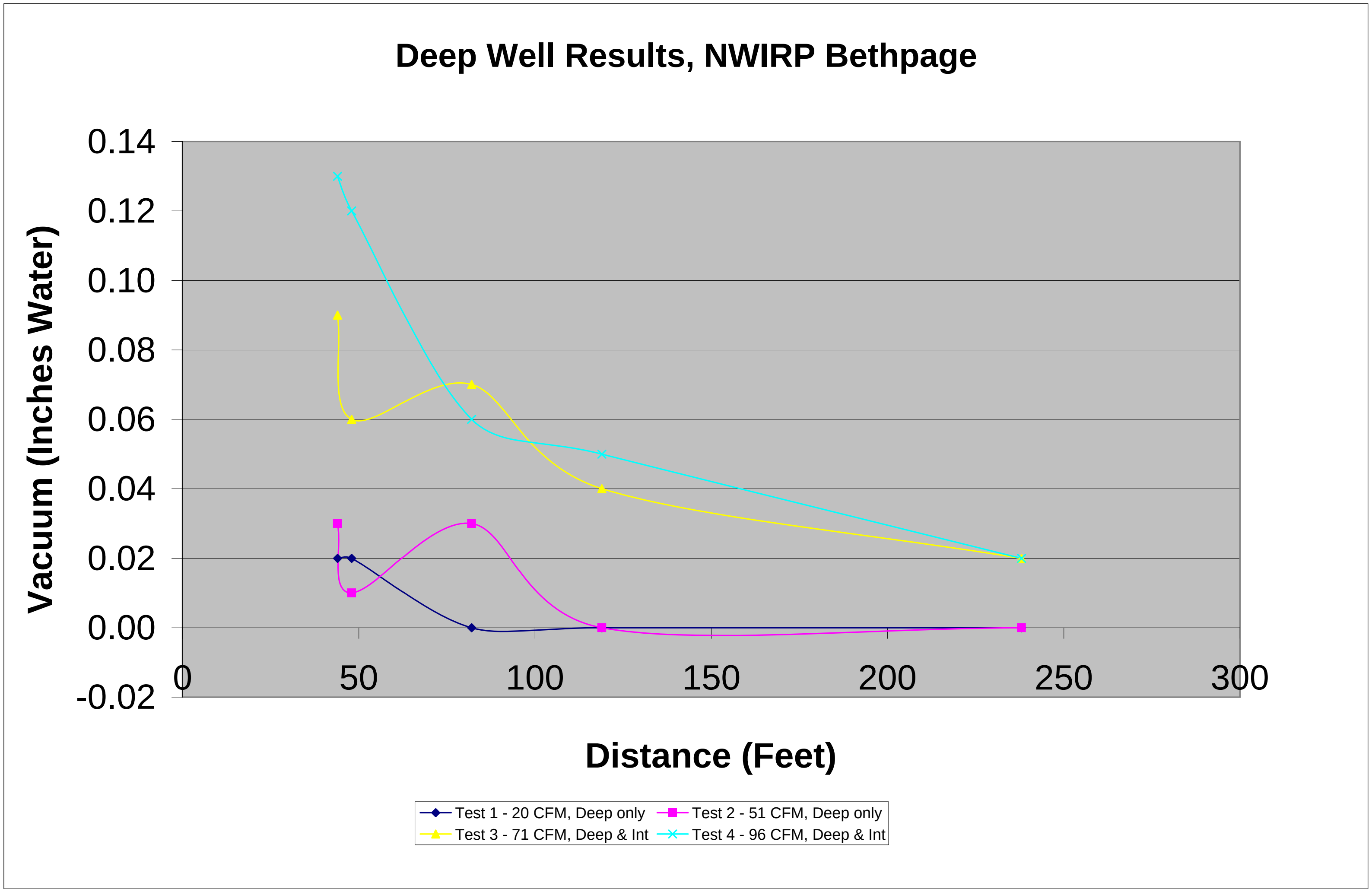
Flow Rate (CFM)	Int, 48 feet	Int, 82 feet	Int, 161 feet	Int, 238 feet	Int, 270 feet	Deep, 44 feet	Deep, 48 feet	Deep, 82 feet	Deep, 92 fee	Deep, 119 fee	Deep, 238 feet	Deep, 270 feet
Test 1 - 20 CFM, Deep only	0.00	0.01	0.01	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00
Test 2 - 51 CFM, Deep only	0.01	0.04	0.00	0.00	0.00	0.03	0.01	0.03	0.00	0.00	0.00	0.00
Test 3 - 71 CFM, Deep & Int	0.03	0.04	0.00	0.00	0.00	0.09	0.06	0.07	0.00	0.04	0.02	0
Test 4 - 96 CFM, Deep & Int	0.10	0.05	0.02	0.01	0.00	0.13	0.12	0.06	0.07	0.05	0.02	0



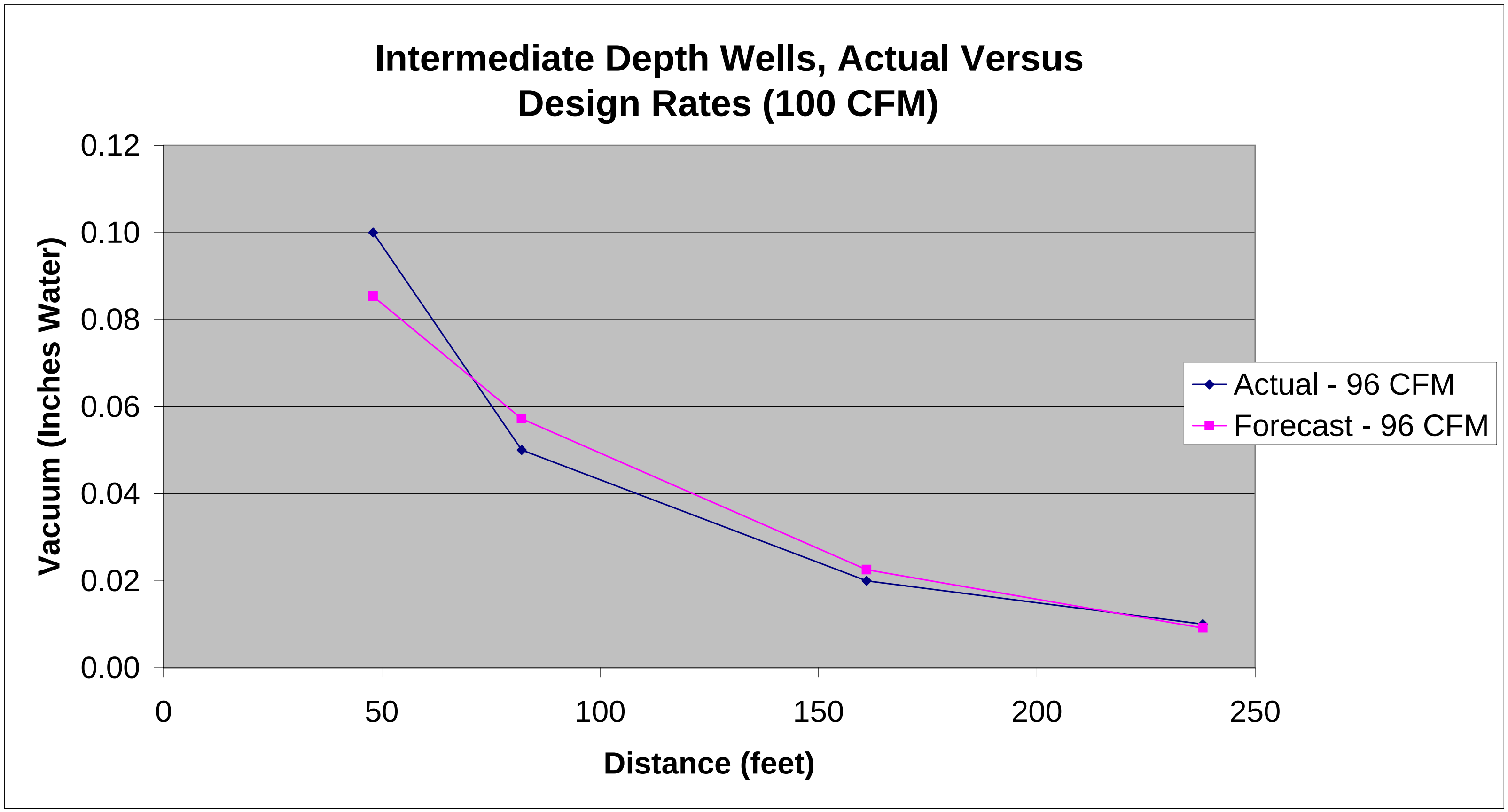
Flow Rate (CFM)	Int, 48 feet	Int, 82 feet	Int, 161 feet	Int, 238 feet	Int, 270 feet
	48	82	161	238	270
Test 1 - 20 CFM, Deep only	0.00	0.01	0.00	0.00	0.00
Test 2 - 51 CFM, Deep only	0.01	0.04	0.00	0.00	0.00
Test 3 - 71 CFM, Deep & Int	0.03	0.04	0.00	0.00	0.00
Test 4 - 96 CFM, Deep & Int	0.10	0.05	0.02	0.01	0.00



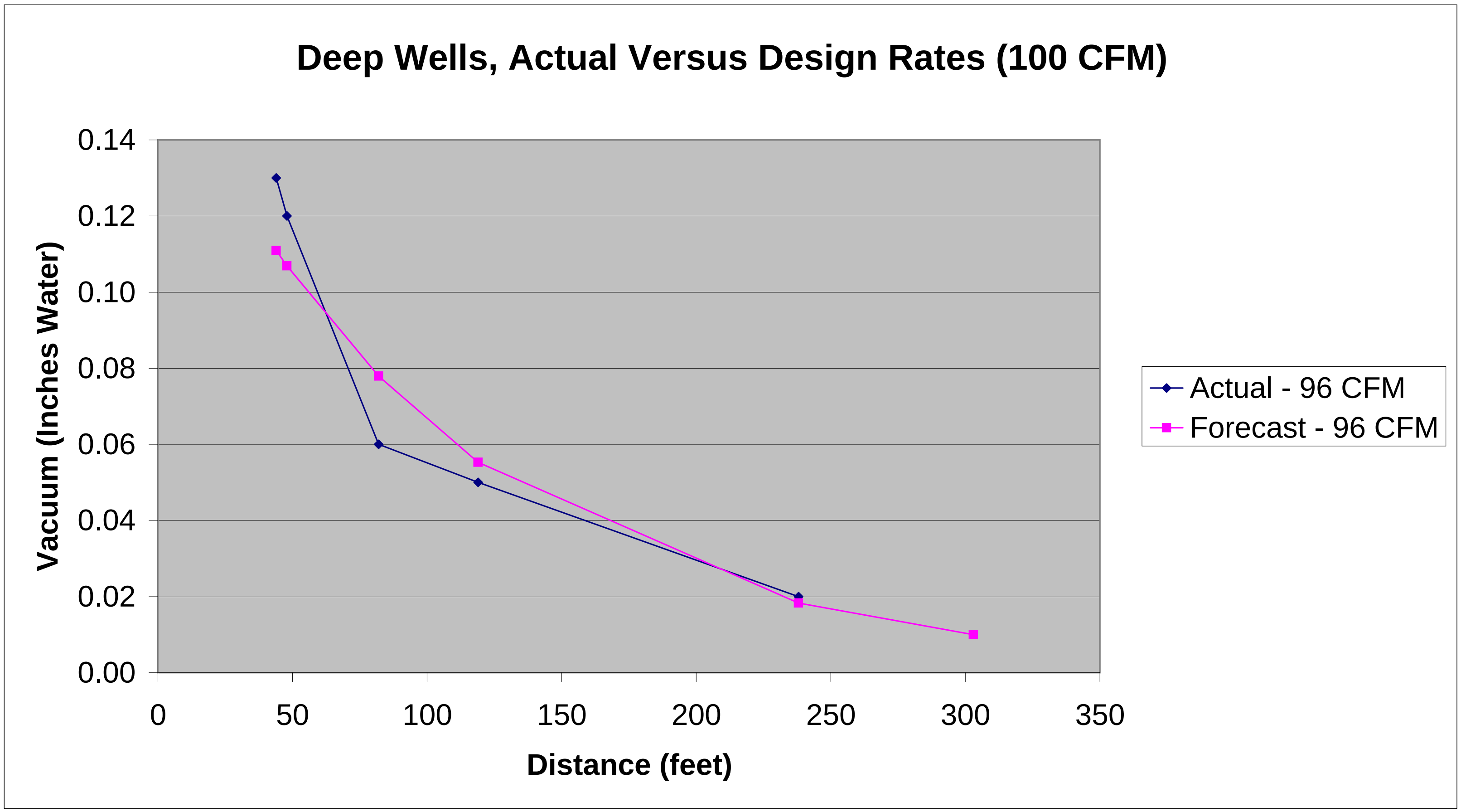
Flow Rate (CFM)	Deep, 44 feet	Deep, 48 feet	Deep, 82 feet	Deep, 119 fee	Deep, 238 feet	Deep, 270 feet
	44	48	82	119	238	270
Test 1 - 20 CFM, Deep only	0.02	0.02	0.00	0.00	0.00	
Test 2 - 51 CFM, Deep only	0.03	0.01	0.03	0.00	0.00	
Test 3 - 71 CFM, Deep & Int	0.09	0.06	0.07	0.04	0.02	
Test 4 - 96 CFM, Deep & Int	0.13	0.12	0.06	0.05	0.02	



Test 4 - 96 CFM, Deep & Int					
Flow Rate (CFM)	Int, 48 feet	Int, 82 feet	Int, 161 feet	Int, 238 feet	Int, 270 feet
Distance	48	82	161	238	270
Actual - 96 CFM	-1.00	-1.30	-1.70	-2.00	
Forecast - 96 CFM	-1.07	-1.24	-1.65	-2.04	
Actual - 51 CFM					
Forecast - 51 CFM					
	48	82	161	238	230
Actual - 96 CFM	0.10	0.05	0.02	0.01	0.00
Forecast - 96 CFM	0.0853	0.0572	0.0225	0.0091	0.0100
Actual - 51 CFM					
Forecast - 51 CFM					



Flow Rate (CFM)	Deep, 44 feet	Deep, 48 feet	Deep, 82 feet	Deep, 119 fee	Deep, 238 feet	
Distance	44	48	82	119	238	303
Actual - 96 CFM	-0.89	-0.92	-1.22	-1.30	-1.70	
Forecast - 96 CFM	-0.95	-0.97	-1.11	-1.26	-1.74	-2.00
Actual - 51 CFM						
Forecast - 51 CFM						
	44	48	82	119	238	303
Actual - 96 CFM	0.13	0.12	0.06	0.05	0.02	
Forecast - 96 CFM	0.111	0.107	0.078	0.055	0.018	0.010
Actual - 51 CFM						
Forecast - 51 CFM						



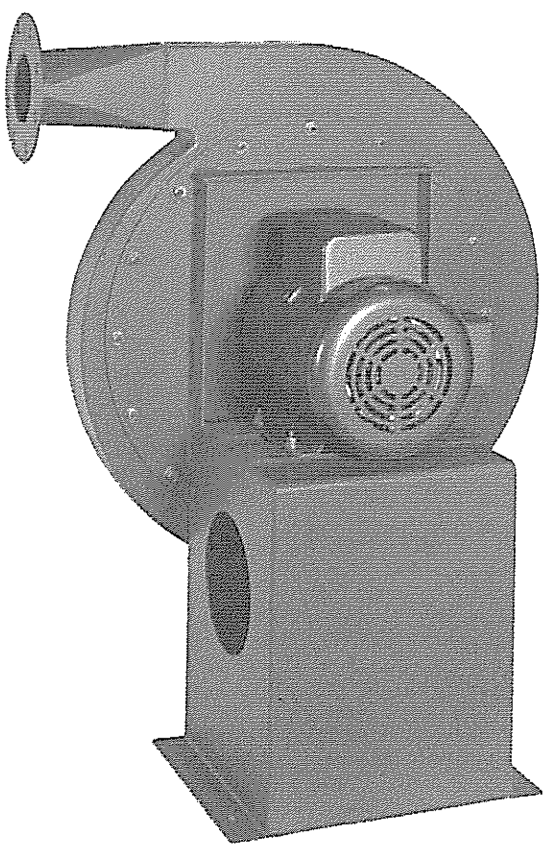
APPENDIX E

CATALOG CUTS

cincinnati fan

HP

SERIES II



HIGH PRESSURE BLOWERS

7697 Snider Road, Mason, OH 45040-9135

Telephone: 513-573-0600

Visit us at www.cincinnatifan.com for more information.

Cat. No. HP-II-908

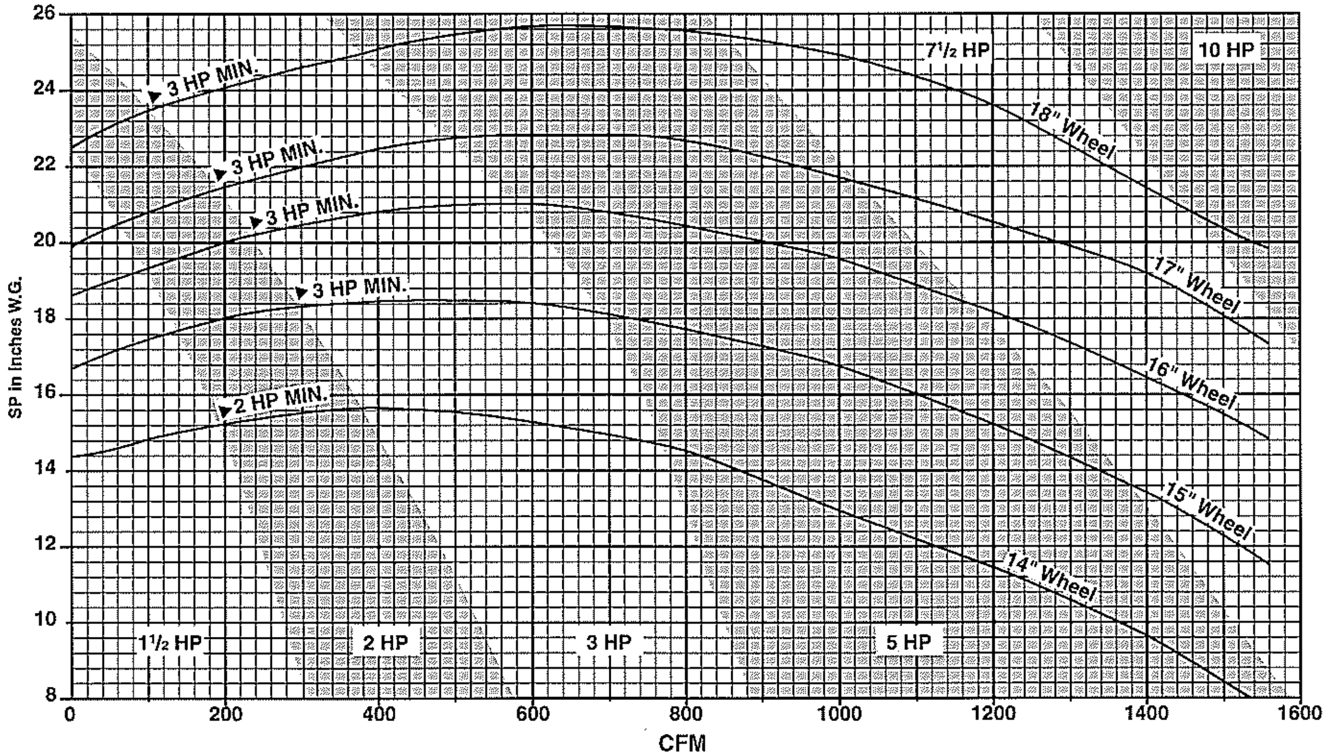
Supersedes HP-II-1104

DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

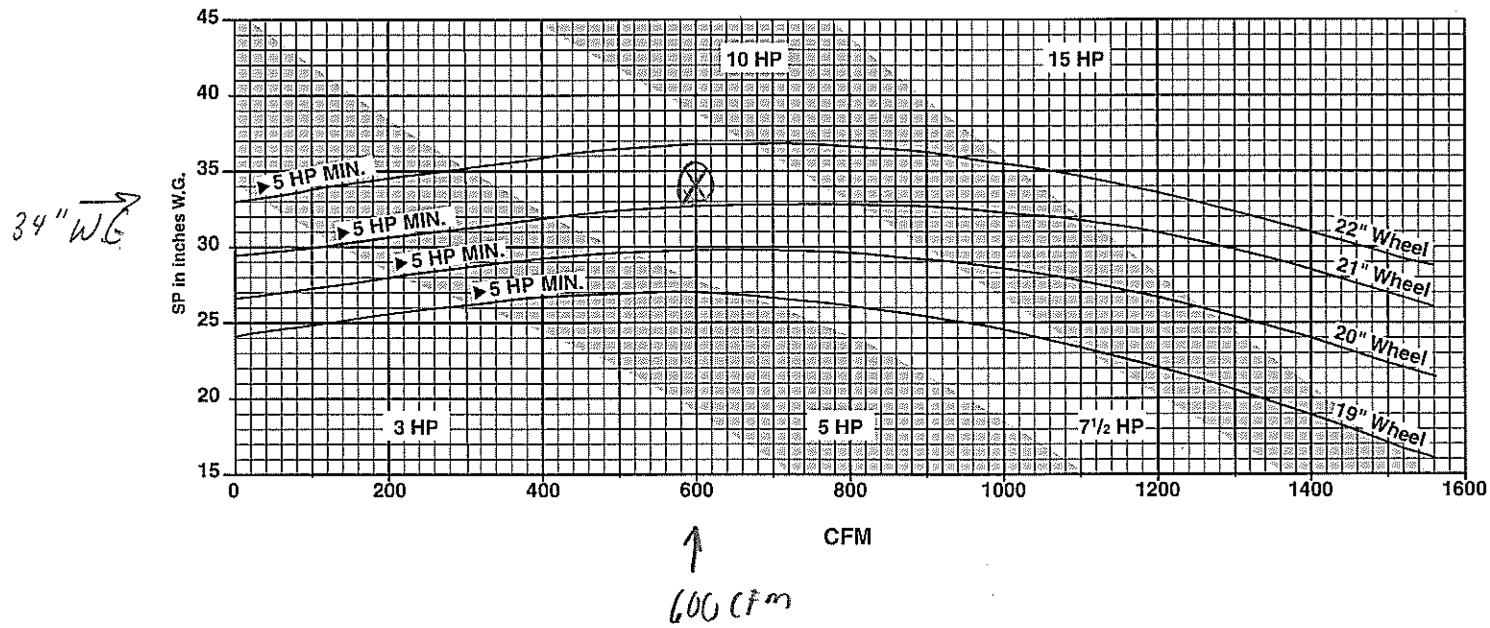
Model HP-6B

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-6C

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Protect™ VS Series
Vapor Phase Adsorbers

CalSolutions™

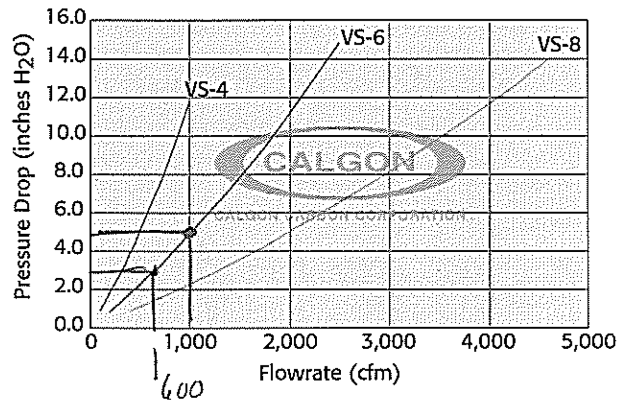
Description

The PROTECT™ VS series vessels are portable, low pressure vapor adsorbers that are easily put into service. These vessels hold from 2,000 to 8,000 pounds of activated carbon and are designed to operate at a maximum pressure of 5 psi, and maximum vacuum of 5" of mercury, with an operating temperature up to 150°F.

Features

- Durable carbon steel construction
- Upper and lower open-air plenum area for efficient carbon usage
- Rust-prohibitive exterior epoxy urethane coating
- 16" round inspection manway
- Condensate drain plug
- Forklift guides
- Lifting lugs to facilitate moving
- Fitting for sample port or Protect™ Carbon Saturation Indicator
- All models available to rent

Pressure Drop



Safety Message

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable Federal and State requirements.

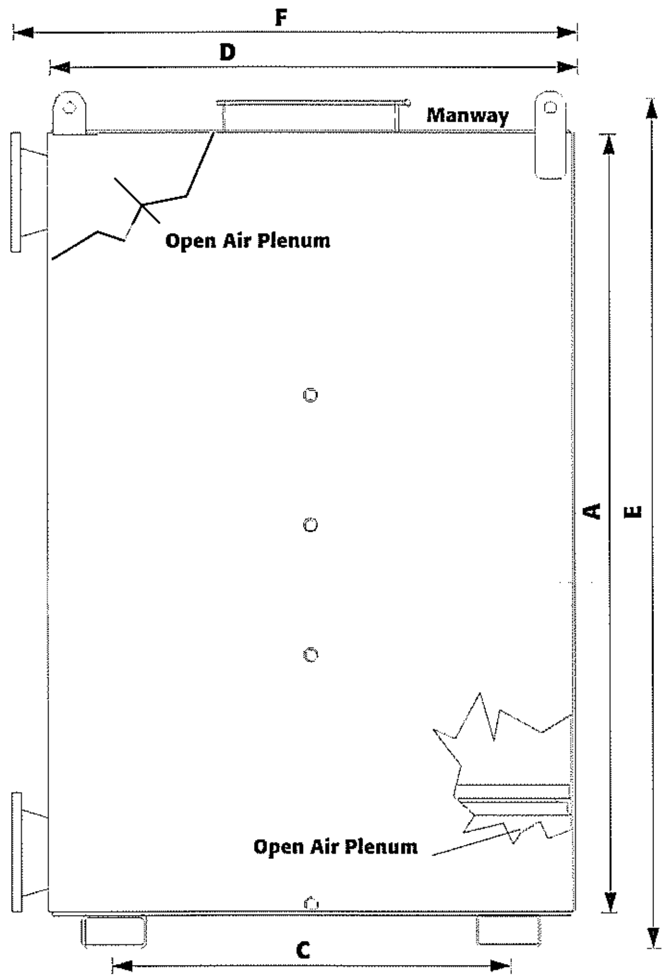
Specifications

Model	GAC ft³	GAC lbs.*	Recommended Maximum Flow Rate, cfm	Weight, lbs. (Empty / Operating)
VS-4	72	2,000	1,100	1,760 / 3,760
VS-6	180	5,000	2,500	3,340 / 8,340
VS-8	265	8,000	4,500	4,900 / 12,900

*Weight estimated based on vessel volume.

Protect™ VS Series
Vapor Phase Adsorbers

CalSolutions™



Vessel Dimensions

Model	Cross-Sectional Area, ft^2	Side Shell (A)	Inlet/Outlet (B)	Forklift Guides (C)	Overall Width (D)	Overall Height (E)	Overall Length (F)
VS-4	16	72"	6" 150# flg	36"	49" ±	79" ±	52" ±
VS-6	36	96"	8" 150# flg	48"	73" ±	103" ±	77" ±
VS-8	64	96"	12" 150# flg	48"	97" ±	103" ±	101" ±

CALGON
CALGON CARBON CORPORATION

Making Water and Air Safer and Cleaner

Your local office

Calgon Carbon Corporation
P.O. Box 717
Pittsburgh, PA USA 15230-0717
1-800-422-7266
Tel: 412-787-6700
Fx: 412-787-6713

Calgon Carbon Asia
65 Chulia Street
#37-03 OCBC Centre
Singapore 049513
Tel: +65 6 221 3500
Fx: +65 6 221 3554

Chemviron Carbon
European Operations of
Calgon Carbon Corporation
Zoning Industriel C de Feluy
B-7181 Feluy, Belgium
Tel: + 32 (0) 64 51 18 11
Fx: + 32 (0) 64 54 15 91

TCE c 41,000 ug/m³ x 0.19 PPb-v / 1.0 ug/m³ x PPm-v / 1000 PPb-v = 7.8 PPm-v

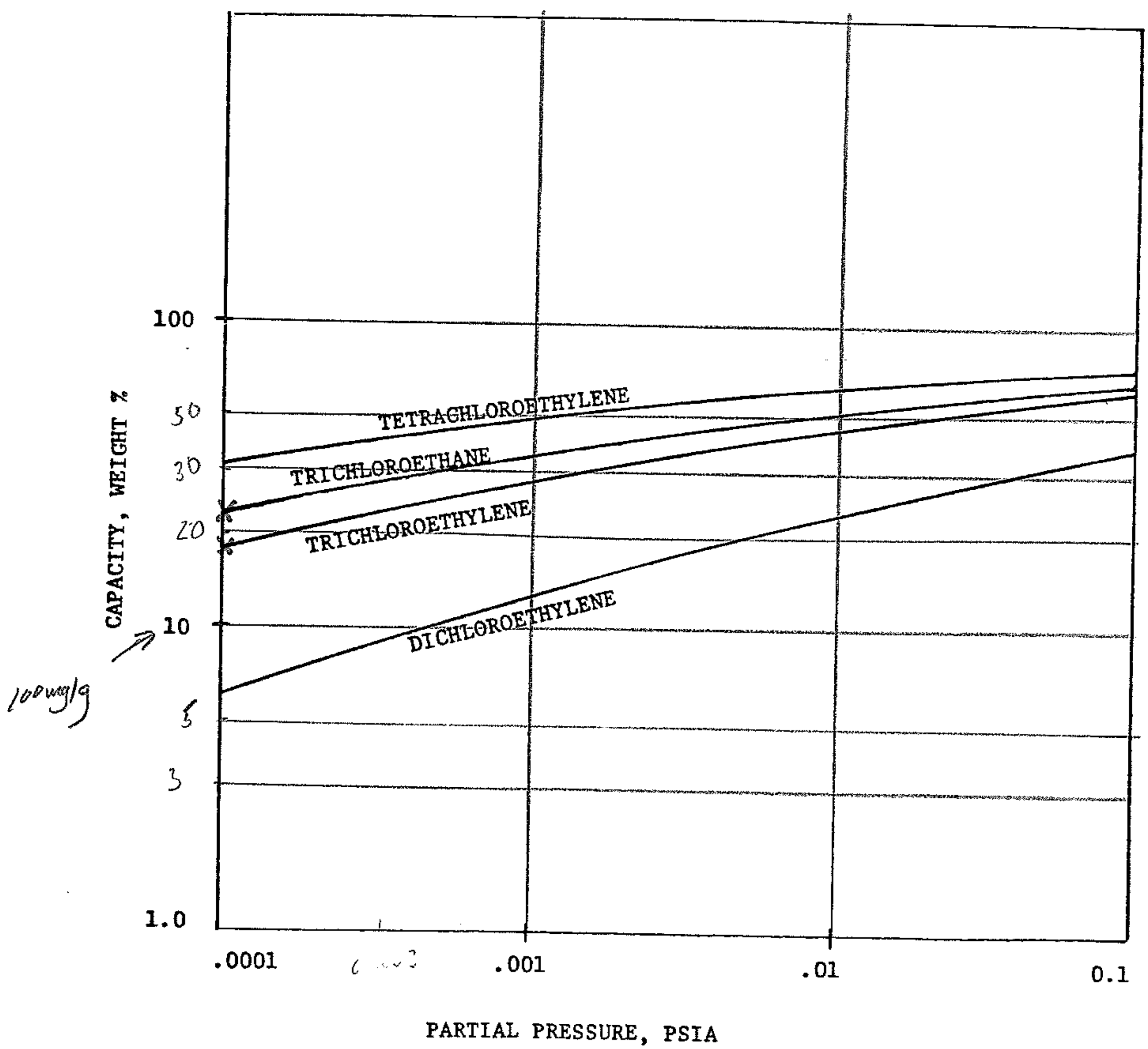
7.8 PPm-v x 14.7 PSI / 1000000 = 0.00011

FIGURE 2

VAPOR PHASE ISOTHERMS
ADSORPTION ON BPL CARBON
AT 77°F, RELATIVE
HUMIDITY 40%

x/m = 18% for TCE.

Use the same Concentration for TCA, x/m = 21% for TCA.



APPENDIX F

AIR PERMITTING CALCULATION

CONTAMINANT ASSESSMENT SUMMARY OF DAR-1 ANALYSIS 3/28/ 9

Page 1

SHORT-TERM CAVITY POINT or AREA SOURCE

CAS NUMBER	AGC ug/m3	MAXIMUM (Cav,Pt,Area) % OF SGC	ACTUAL ANNUAL % OF AGC	POTENTIAL ANNUAL % OF AGC	ACTUAL ANNUAL % OF AGC	
00071-55-6	1000.00000000	0.0873	0.0000	0.1147	0.1157	TCA
00079-01-6	0.50000000	0.8482	0.0000	458.6214	460.9003	TCE
00127-18-4	1.00000000	0.1162	0.0000	2.2433	2.2789	PCE
SUMMARY TOTALS		1.0517	0.0000	460.9793	463.2948	

CONTAMINANT IMPACT SUMMARY OF DAR-1 ANALYSIS 3/28/ 9

Page 1

SHORT-TERM CAVITY POINT or AREA SOURCE

CAS NUMBER	AGC ug/m3	MAXIMUM (Cav,Pt,Area) ug/m3	ACTUAL ANNUAL ug/m3	POTENTIAL ANNUAL ug/m3	ACTUAL ANNUAL ug/m3
00071-55-6	1000.00000000	59.37670900	0.00000000	1.14655352	1.15652355
00079-01-6	0.50000000	118.75341800	0.00000000	2.29310703	2.30450135
00127-18-4	1.00000000	1.16171813	0.00000000	0.02243257	0.02278864

****

EMISSION POINT = CAS NUMBER = 00079-01-6 SIC = 0

AGC = 0.500000000 ug/m3 SGC = 14000.000000 ug/m3

STACK: HA= 6., SH= 30., D= 8., T= 55., V= 28.00, q= 600.00
BUILDING: Dpl= 100., BW= 40., BL= 60., %CONTROL= 0.0000

** Reported Hourly Emission Rate (Q) is equal to 0.092000000 lbs/hour.

** Reported Annual Emission Rate (Qa) is equal to 809.000000 lbs/year.

II.B. REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).

II.B.1. Shortest Distance from building to Property Line (100. feet) exceeds the cavity length, or 3 times the building height (72. feet). Therefore, this buildings cavity impacts (if they occur) are confined to on site receptors. Computer will assume the CAVITY Annual Impact equals 0.00 ug/m3.

II.C. CAVITY Annual Impact (0.000 ug/m3) is less than AGC (0.500 ug/m3).

III.A. STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).

III.A.1.a. Plume rise should not be considered (hs/hb < 1.5).
Computer will assume: he = hs.

III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal to 2.305 ug/m3 for 8793. hours/year of operation.

III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal to 2.293 ug/m3 assuming 8,760 hours/year of operation.

III.A.4. Stack height to building height ratio is less than 1.5. Computer will not reduce impacts.

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact (2.305 ug/m3) is greater than AGC (0.500 ug/m3).

**** Refer to DAR-1 Section III.D.1. A refined site ****
**** specific modeling analyis may be required. ****

III.D. STANDARD POINT SOURCE Potential Annual Impact (2.293 ug/m3) is greater than AGC (0.500 ug/m3).

**** Potential Annual Impact is based upon 8760 hours/year ****
**** operation instead of reported 8793. hours/year. ****

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD. See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region: hs(30. feet) > hc(28. feet).

II.C. CAVITY Short-Term Impact (0.000 ug/m3) is less than SGC (14000.000 ug/m3).

2.3 Plume rise should not be considered (hs/hb < 1.5). Computer will assume: he = hs.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 29.644 ug/m3, for hs/hb = 1.25

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 122.111 ug/m3, for: hs/hb = 1.25 and ESH = 30. feet.

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 118.753 ug/m3, for: RF = 0.97

III.D. Maximum non-cavity Short-Term Impact (CST: 118.753 ug/m3) is less than the SGC (14000.000 ug/m3) for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 118.753 ug/m3 and is reported in the ANALYSIS MENU. This value is less than the SGC (14000.000 ug/m3).

****

EMISSION POINT = CAS NUMBER = 00127-18-4 SIC = 0

AGC = 1.000000000 ug/m3 SGC = 1000.000000 ug/m3

STACK: HA= 6., SH= 30., D= 8., T= 55., V= 28.00, q= 600.00
BUILDING: Dpl= 100., BW= 40., BL= 60., %CONTROL= 0.0000

** Reported Hourly Emission Rate (Q) is equal to 0.000900000 lbs/hour.

** Reported Annual Emission Rate (Qa) is equal to 8.000000 lbs/year.

II.B. REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).

II.B.1. Shortest Distance from building to Property Line (100. feet) exceeds the cavity length, or 3 times the building height (72. feet). Therefore, this buildings cavity impacts (if they occur) are confined to on site receptors. Computer will assume the CAVITY Annual Impact equals 0.00 ug/m3.

II.C. CAVITY Annual Impact (0.000 ug/m3) is less than AGC (1.000 ug/m3).

III.A. STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).

III.A.1.a. Plume rise should not be considered (hs/hb < 1.5). Computer will assume: he = hs.

III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal to 0.023 ug/m3 for 8889. hours/year of operation.

III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal to 0.022 ug/m3 assuming 8,760 hours/year of operation.

III.A.4. Stack height to building height ratio is less than 1.5. Computer will not reduce impacts.

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact (0.023 ug/m3) is less than AGC (1.000 ug/m3).

III.D. STANDARD POINT SOURCE Potential Annual Impact (0.022 ug/m3) is less than AGC (1.000 ug/m3).

**** Potential Annual Impact is based upon 8760 hours/year ****
**** operation instead of reported 8889. hours/year. ****

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region: hs(30. feet) > hc(28. feet).

II.C. CAVITY Short-Term Impact (0.000 ug/m3) is less than SGC (1000.000 ug/m3).

2.3 Plume rise should not be considered (hs/hb < 1.5).
Computer will assume: he = hs.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 0.290 ug/m3, for hs/hb = 1.25

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 1.195 ug/m3, for: hs/hb = 1.25 and ESH = 30. feet.

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 1.162 ug/m3, for: RF = 0.97

III.D. Maximum non-cavity Short-Term Impact (CST: 1.162 ug/m3) is less than the SGC (1000.000 ug/m3) for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 1.162 ug/m3

and is reported in the ANALYSIS MENU. This value is less than
the SGC (1000.000 ug/m3).

****

EMISSION POINT = CAS NUMBER = 00071-55-6 SIC = 0

AGC = 1000.000000000 ug/m3 SGC = 68000.000000 ug/m3

STACK: HA= 6., SH= 30., D= 8., T= 55., V= 28.00, q= 600.00
BUILDING: Dpl= 100., BW= 40., BL= 60., %CONTROL= 0.0000

** Reported Hourly Emission Rate (Q) is equal to 0.046000000 lbs/hour.

** Reported Annual Emission Rate (Qa) is equal to 406.000000 lbs/year.

II.B. REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).

II.B.1. Shortest Distance from building to Property Line (100. feet) exceeds the cavity length, or 3 times the building height (72. feet). Therefore, this buildings cavity impacts (if they occur) are confined to on site receptors. Computer will assume the CAVITY Annual Impact equals 0.00 ug/m3.

II.C. CAVITY Annual Impact (0.000 ug/m3) is less than AGC (1000.000 ug/m3).

III.A. STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).

III.A.1.a. Plume rise should not be considered (hs/hb < 1.5).

Computer will assume: he = hs.

III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal to 1.157 ug/m3 for 8826. hours/year of operation.

III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal to 1.147 ug/m3 assuming 8,760 hours/year of operation.

III.A.4. Stack height to building height ratio is less than 1.5. Computer will not reduce impacts.

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact (1.157 ug/m3) is less than AGC (1000.000 ug/m3).

III.D. STANDARD POINT SOURCE Potential Annual Impact (1.147 ug/m3) is less than AGC (1000.000 ug/m3).

**** Potential Annual Impact is based upon 8760 hours/year ****
**** operation instead of reported 8826. hours/year. ****

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region: hs(30. feet) > hc(28. feet).

II.C. CAVITY Short-Term Impact (0.000 ug/m3) is less than SGC (68000.000 ug/m3).

2.3 Plume rise should not be considered (hs/hb < 1.5).
Computer will assume: he = hs.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 14.822 ug/m3, for hs/hb = 1.25

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 61.056 ug/m3, for: hs/hb = 1.25 and ESH = 30. feet.

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 59.377 ug/m3, for: RF = 0.97

III.D. Maximum non-cavity Short-Term Impact (CST: 59.377 ug/m3) is less than the SGC (68000.000 ug/m3) for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 59.377 ug/m3 and is reported in the ANALYSIS MENU. This value is less than the SGC (68000.000 ug/m3).