N90845.AR.001575
NWIRP BETHPAGE
5090.3a

EMAIL AND COMMENTS FROM U S GEOLOGICAL SURVEY ON VPB-129 AND WELL SCREENS NWIRP BETHPAGE NY

10/25/2011
U S GEOLOGICAL SURVEY

Steven Scharf - RE: Navy\Bethpage\Eastern Nassau- VPB-129 and well screens

From: Frederick Stumm <fstumm@usgs.gov>
To: "Fly, Lora B CIV NAVFAC MIDLANT, IPTNE" <lora.fly@navy.mil>
Date: 10/25/2011 5:09 PM
Subject: RE: Navy\Bethpage\Eastern Nassau- VPB-129 and well screens
CC: <Alvey.Robert@epamail.epa.gov>, "Paul E Misut" <pemisut@usgs.gov>, <Poet...
Attachments: USGSlogs_VPB129.pdf

To All Concerned,

I wanted to summarize some of my comments at yesterday's conference call. According to the geophysical log suite I collected at VPB-129 there was a conductive anomaly detected from 50 to 275 feet below land surface. In general the resistivity logs appear to be suppressed with sand units indicating they are as electrically conductive as clay units. This suggests a possible water quality situation that is not typical for freshwater areas of Long Island. A very large spike in conductivity was indicated at 260 to 275 feet below land surface. At this depth the gamma log indicates a sandy unit which should have provided a very resistive zone. Below 275 feet the logs indicate somewhat resistive sand units. Without core samples it is difficult to determine if there is a slight water quality issue. The log suite indicates a very complex geology with highly variable lenses of clay and silt within the sands of the Magothy aquifer here. A spike at 450 feet below land surface in the EM log is due to metal in the borehole, perhaps from a drill bit or other metallic equipment that broke off or was dropped in the well. Below 715 feet below land surface the resistivity of the formation increases dramatically. Again, without core samples it is difficult to determine if this is due to a reduction in fines in the sand matrix and or any water quality effects. Based upon the geophysical log suite the most transmissive portion of the borehole was below 715 feet in the sand units.

As far as screen zone optimization is concerned it would be easier if I had the unvalidated VOC data set to work from. However based upon our discussion yesterday zones near the original screen zones that could have increased transmissivity would be 308-335 feet below land surface. 330 to 350 feet below land surface (BLS) may have increased fines and possibly lower transmissivity based upon gamma log response. The zone 570-590 ft BLS may have lower transmissivity due to electric and gamma log responses. In general 420-450 feet BLS, 515-530 ft BLS, 630-655 ft BLS, 660-680 ft BLS, 710-725 ft BLS, 730-785 ft BLS appear to be transmissive zones based upon the log responses. It is unclear due to a lack of core samples what the geology is below 785 ft BLS and the high resistivity responses with increased gamma responses. Please realize these are estimates of possible zones based upon geophysical log responses and my experience with open borehole logging and hydrogeologic mapping of the deep Cretaceous in Nassau and Suffolk Counties. I do not have the unvalidated VOC data to determine which zones are better than others listed.

I would suggest placing a 4 inch PVC casing with a deep screen zone in the vertical profile borings and the collection of core samples at various depths to help correlate the geophysical log responses to geology. Drilling into the Raritan Clay with increased core sample intervals would verify you have reached the base of the Magothy. The increased cost is minor in comparison to the added benefit of the cores, deeper geophysical logs, and hydraulic head measurements of the basal Magothy aquifer. The wider casing will reduce the amount of annular spacing to be grouted. Our borehole equipment can be used in 2 inch PVC wells if needed. Borehole geophysical log suites at more wells would also provide valuable stratigraphic correlation of some of the major clay units in the Magothy and any electrically anomalous zones. We are constantly adding to our pool of advanced borehole geophysical logging equipment. With deep cased wells we can return to these areas and measure other geophysical and hydrologic properties. When the deep Magothy water levels are combined with the other wells installed nearby vertical gradients between the possible compartments of the Magothy aquifer can be determined and a valuable understanding of how these various zones respond to transient pumping stresses and seasonal variations can be gained. If I can be of any more help please feel free to call or email me.

Fred

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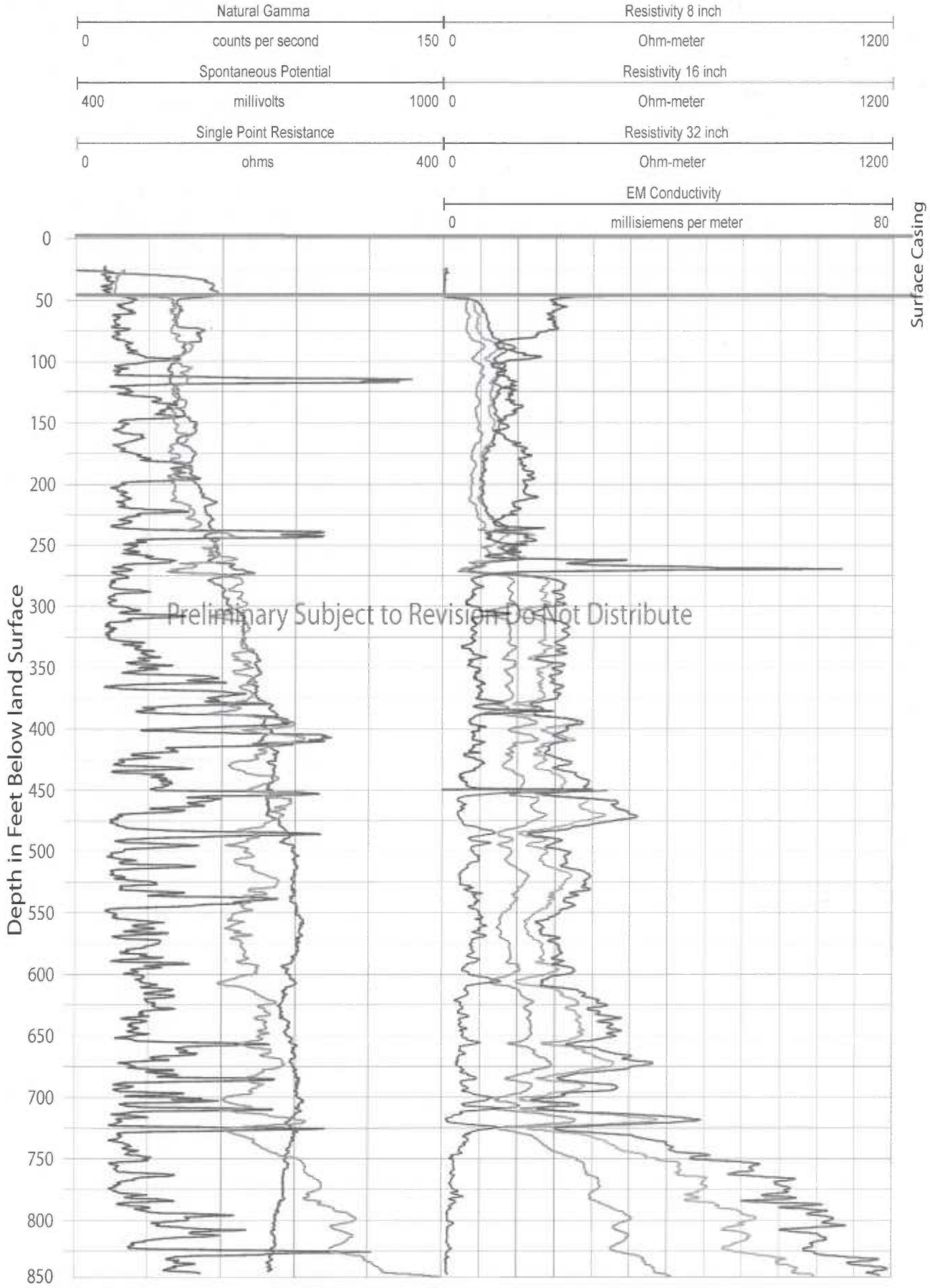
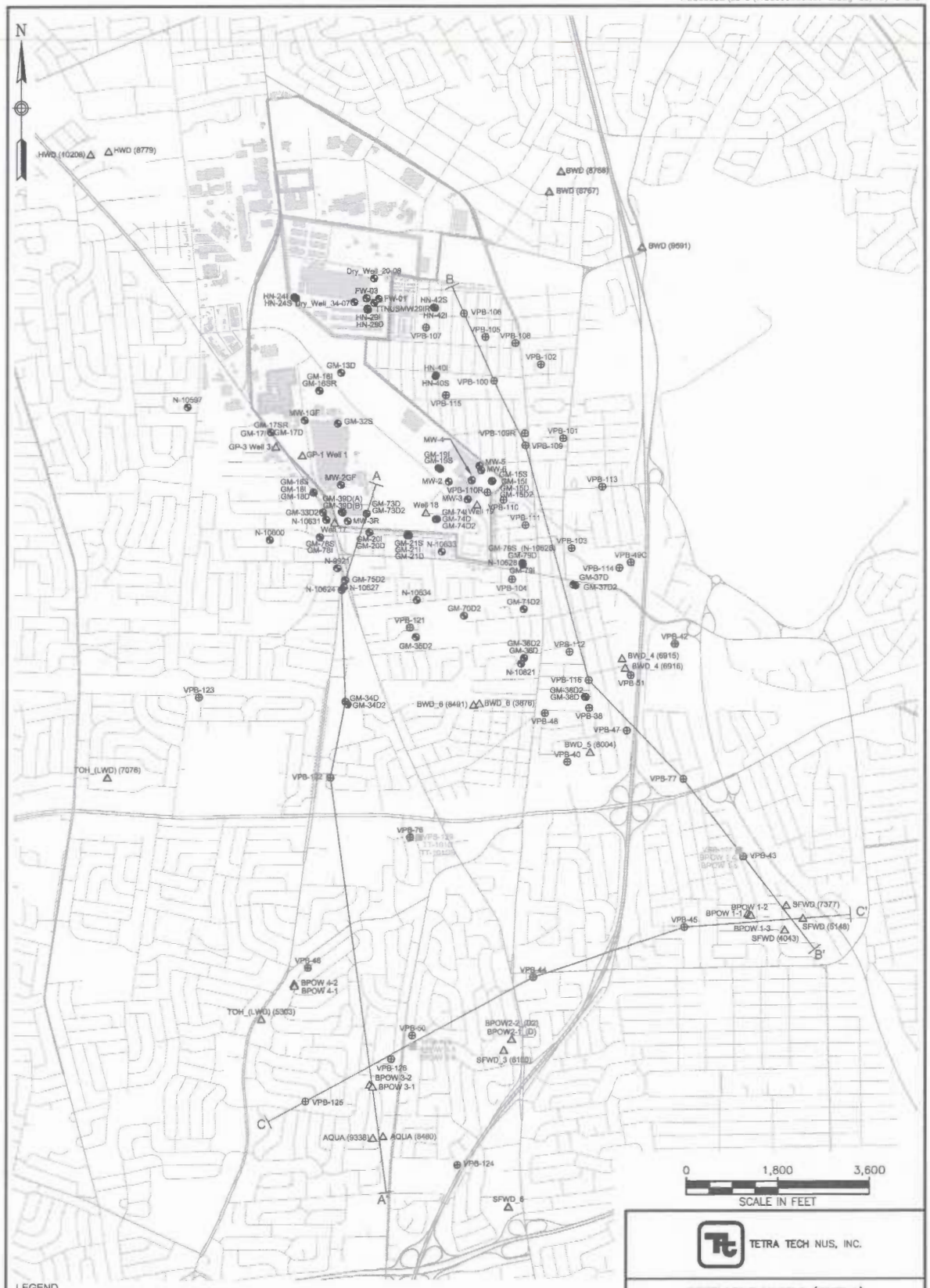
Test Boring VPB-129
Bethpage, NY
09/27/11



Suite of borehole geophysical logs of test boring VPB-129 Bethpage, NY.

1:2G00662\0510\112G00662GM01-2.dwg 03/16/10 MKB



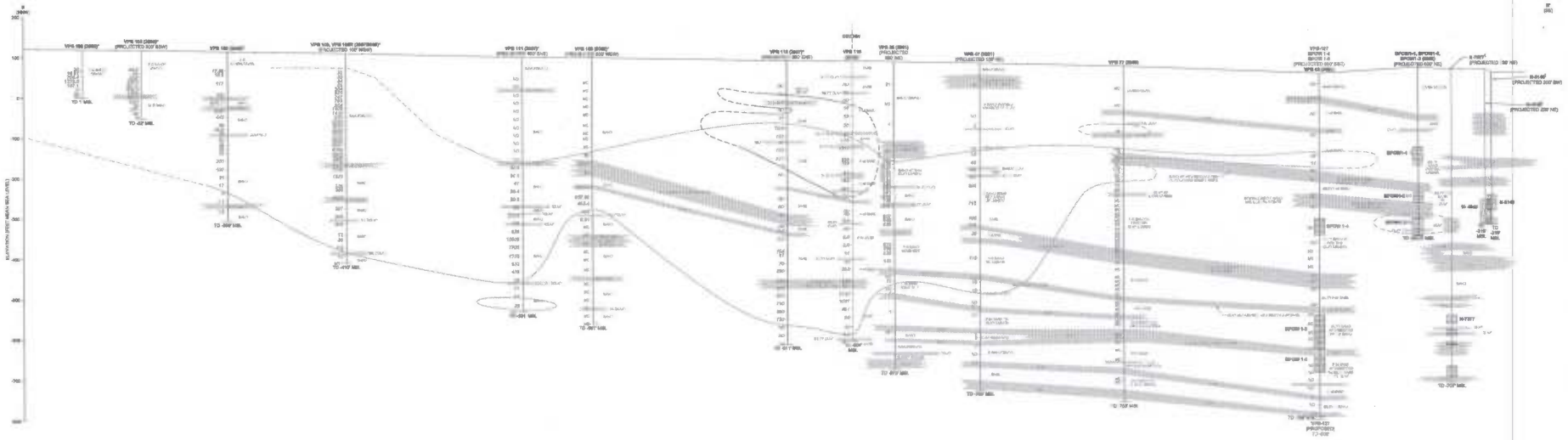
LEGEND

- GROUNDWATER SAMPLING LOCATION
- VERTICAL PROFILE BORING
- WATER SUPPLY WELL
- PROPOSED VERTICAL PROFILE BORING AND OUTPOST MONITORING WELL LOCATION
- BUILDING
- HIGHWAY
- MAJOR LOCAL ROAD
- MINOR LOCAL ROAD
- 1997 NORTHROP-GRUMMAN BETHPAGE BOUNDARY
- 1997 NWIRP BETHPAGE BOUNDARY

TETRA TECH NUS, INC.

OPERABLE UNIT 2 (SITE 1)
2010 PROPOSED VERTICAL PROFILE BORING AND OUTPOST MONITORING WELLS
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

FILE	SCALE
112G00662GM01-2	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 2	0 / 03/16/10



LEGEND

0M-7308 (2000)	MONITORING WELL VERTICAL PROFILE BORING (INSTALLATION YEAR)
	GROUND SURFACE
	LITHOLOGY
	CONFINING UNIT
474	VERTICAL PROFILE SCREEN TVOC RESULTS IN ug/L
	NOT DETECTED
	MIXED VOC PLUME (5 ug/L CONTOUR LINE)
	PCB PLUME (5 ug/L CONTOUR LINE)
0M-730 (1.4)	MONITORING WELL SCREEN (TOTAL VOC DATA FROM 2008 SAMPLING EVENT IN ug/L)
TD -485	TOTAL DEPTH FEET (MEAN SEA LEVEL)
1	ARCADIS CROSS SECTION (2004)
	TVOC DATA FROM ARCADIS
VPS-123 SPGW1-4	PROPOSED VERTICAL PROFILE BORING PROPOSED OUTPOST MONITORING WELL
SPGW1-4	PROPOSED MONITORING WELL SCREEN
TD -300	PROPOSED MONITORING WELL SCREEN

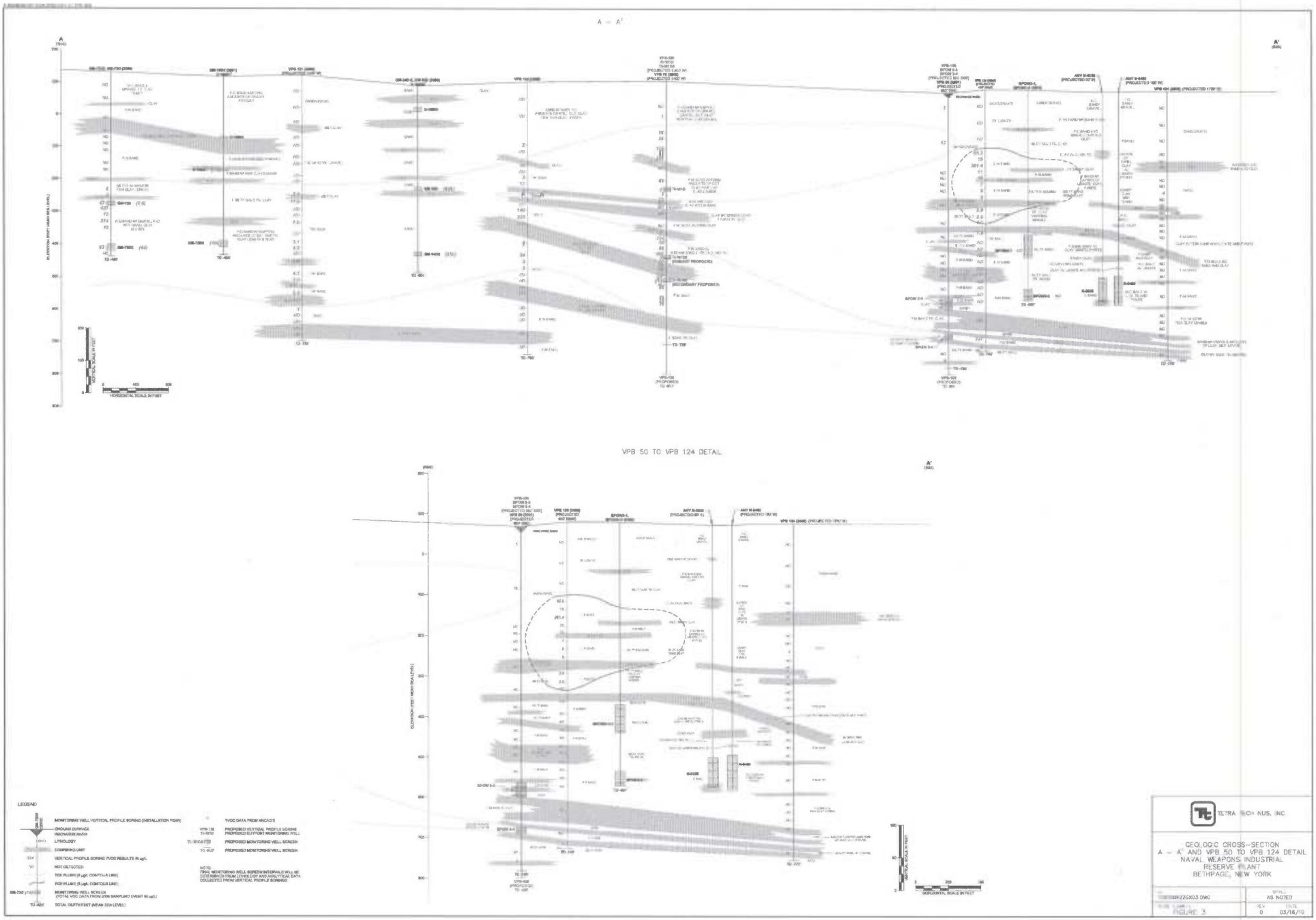
VERTICAL SCALE IN FEET

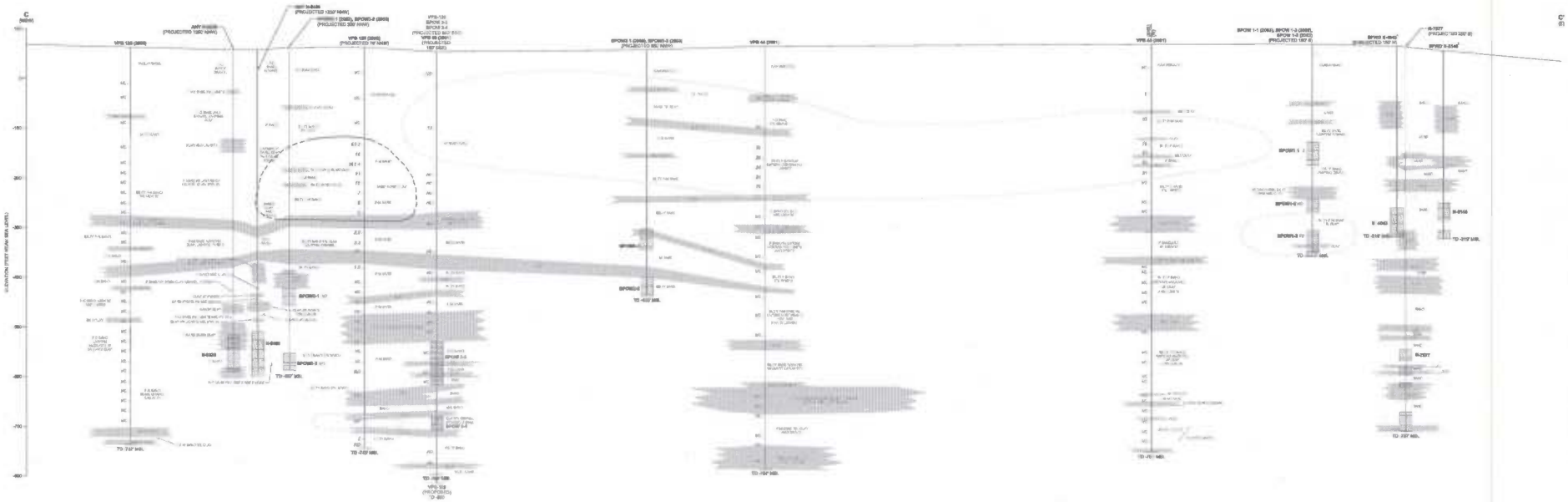
HORIZONTAL SCALE IN FEET

TETRA TECH NUS, INC.

GEOLOGIC CROSS SECTIONS
B – B
NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT
BETHPAGE, NEW YORK

112G00622GX02.DWG	AS NOTED
FIGURE 4	0 01/16/10


A – A'
VPB 50 TO VPB 124 DETAIL
LEGEND
MONITORING WELL VERTICAL PROFILE BORING (INSTALLATION YEAR)
GROUND SURFACE
RECHARGE BASIN
LITHOLOGY
COMPRING UNIT
VERTICAL PROFILE BORING TVOC RESULTS IN ug/L
NOT DETECTED
TCE PLUME (5 ug/L CONTOUR LINE)
PCE PLUME (5 ug/L CONTOUR LINE)
MONITORING WELL SCREEN
(TOTAL VOC DATA FROM 2006 SAMPLING EVENT IN ug/L)
TOTAL DEPTH FEET (MEAN SEA LEVEL)
TVOC DATA FROM ARCADIS
PROPOSED VERTICAL PROFILE BORING
PROPOSED OUTPOST MONITORING WELL
PROPOSED MONITORING WELL SCREEN
PROPOSED MONITORING WELL SCREEN
NOTE:
FINAL MONITORING WELL SCREEN INTERVALS WILL BE DETERMINED FROM LITHOLOGY AND ANALYTICAL DATA COLLECTED FROM VERTICAL PROFILE BORINGS.
TETRA TECH NUS, INC.
GEOLOGIC CROSS-SECTION
A – A' AND VPB 50 TO VPB 124 DETAIL
NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT
BETHPAGE, NEW YORK
AS NOTED
FIGURE 3
0
03/16/10



LEGEND

	MONITORING WELL VERTICAL PROFILE BORING (INSTALLATION YEAR)
	GROUND SURFACE
	LITHOLOGY
	CONFINING UNIT
274	VERTICAL PROFILE BORING TVOC RESULTS IN ug/l
	NOT DETECTED
	TOE PLUME (5 ug/L CONTOUR LINE)
	POR PLUME (5 ug/L CONTOUR LINE)
GIS-230	MONITORING WELL SCREEN (TOTAL VOC DATA FROM 2005 SAMPLING EVENT IN ug/l)
TD -480'	TOTAL DEPTH FEET (MEAN SEA LEVEL)
1	ANCADIS CROSS SECTION (2004)
1	ANCADIS CROSS SECTION (2004)
VPB-139 SPOW 3-3	PROPOSED VERTICAL PROFILE BORING PROPOSED OUTPOST MONITORING WELL
SPOW 3-4	PROPOSED MONITORING WELL SCREEN
TD -102'	PROPOSED MONITORING WELL SCREEN

VERTICAL SCALE IN FEET

HORIZONTAL SCALE IN FEET

TETRA TECH NUS, INC.

GEOLOGIC CROSS-SECTIONS
C – C'
NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT
BETHPAGE, NEW YORK

112G00822GX04.DWG	AS NOTED
FIGURE 5	REV 0 DATE 03/18/10