

## Basis of Estimate for Proposed 2008 Excavation of VOC-impacted Sediments along Aerovox Shoreline

**Introduction** - The purpose of this **Basis of Estimate** is to outline the assumptions associated with excavating volatile organic compounds (VOC) - impacted sediments from the Aerovox shoreline. The VOC-impacted sediments also contain PCBs, but are differentiated from the other PCB-impacted sediments by their high VOC content. These sediments were encountered during the 2006 dredge season, but were not dredged.

**Background** – In 2006, VOCs were detected at high concentrations in the harbor sediments being dredged from approximately 100 feet off the shore of Aerovox. Dredging was ceased in this area due to VOC concentrations in air that warranted Level B worker protection. Battelle and Jacobs conducted a joint sampling effort in October 2006 to characterize the lateral and vertical extent of VOCs in the harbor sediment. The results of this 2006 investigation were presented in the January 2007 Jacobs document titled *2006 Dredge Season Data Submittal New Bedford Harbor Remedial Action*.

During this investigation, Battelle collected 16 push-core samples off the western shoreline and head space samples were screened from sediment samples collected from within the assumed PCB-impacted OL layer and the underlying OH layer. Based upon the head space concentrations, selected samples were submitted for VOC analysis. The following figures from the investigation report depicted the results of the October 2006 investigation:

- **Figures A-16 through A-19** presented the head space screening data collected from the various boring intervals;
- **Figure A-20** is the cross-section location map; and
- **Figures A-21 through A-26** presented Cross-sections A-A' through F-F', respectively, with both head space results and correlating analytical data.

Figures A-16 through A-26 are attached to this document for informational purposes.

The EPA requested that the NAE and Jacobs explore options for removing this material. On January 24, 2008, representatives of NAE, Jacobs, and Severson Environmental (SES) met at New Bedford to discuss how to perform this work within the 2008 budget. During this meeting, it was agreed that mechanical removal of the material was preferred over hydraulic dredging due the ability to better control the worker exposure to VOCs and H<sub>2</sub>S. The meeting was summarized by Mike Anderson of Jacobs in a January 24, 2008 e-mail to the meeting attendees. A copy of the e-mail is attached to this document for informational purposes. Based upon the direction given to Jacobs and SES during the January 24, 2008 meeting, Jacobs has prepared the following assumptions that will be used as a basis of estimate.

## Assumptions

1. **Lateral Extent of 2008 Activities** - The area to be excavated during the 2008 season is from the cove just north of Aerovox to the combined sewer overflow (CSO) located along the southern Aerovox property line. See attached **Figure 1**.
2. **Vertical Limits of 2008 Mechanical Excavation** – The assumption is to excavate to Zstar, which is defined as the vertical extent of PCB-impacted sediments, as defined by Foster Wheeler investigations. The EPA indicated that VOC-impacted sediment below this interface will be left in place and dealt with at a later time. Existing bathymetric data and water level elevations will be used to estimate dredge depth elevations, so a pre-dredge bathymetric survey will not be conducted. A post-dredge bathymetric survey will be conducted. Post-dredge sampling will not be conducted.
3. **Volume of VOC-impacted Sediment** – Approximately 3,700 cubic yards (cy) of sediment will be removed in 2008.
4. **Schedule** – The EPA would like this removal activity to be completed before the potential start of Aerovox demolition activities (late summer/early fall 2008)
5. **Construction Zone** – The operations will need a minimum of 100 feet west of the current fence line along the eastern boundary of the site. This area is shown in **Figure 1**. A figure depicting the layout of equipment is in production, and will be provided with the Execution Plan. The capped area directly east of the building will be needed for a truck-turn-around area. The existing equipment at the Aerovox booster pump pad will be dismantled and removed. The bermed booster pump pad will be modified so that another area will be set up for managing roll-offs, storing stabilizer material (Portland cement), and mixing. A ventilated building will be constructed to house the mixing equipment and activities. The ventilated building will be set up to provide mechanical removal and filtration of vapors, if necessary. Some or all of the chain-link fence bordering the site to the east will be removed for equipment logistics. Likewise, some or all of the sheet piles bordering the site along the water may be cut to grade for equipment logistics.
6. **Excavation Approach** – SES has proposed mechanical excavation off flexi-floats and handling and stabilization of the sediment on the Aerovox shoreline. A series of flexifloats will be positioned to form two parallel docks extending eastward from the Aerovox shoreline. Four flexi-floats will be joined to create one dock, 80 feet long. The set of two flexifloat docks will start at the northern end of the dredge footprint and be repositioned in a leap-frog fashion, moving southward through the dredge footprint. Debris removal will not be performed separately. Any debris will be removed by the excavator. Small debris items will be stabilized along with the sediment, and transferred to the disposal cell. Large debris items will be stock-piled at Aerovox and later moved to Area C. It is assumed that approximately 200 cy of sediment will be removed per day.
7. **Treatability Tests** – SES and Jacobs will collect sediments from two locations within the excavation footprint for the purpose of evaluating the following:
  - a. Percentage of stabilizing agent required;

- b. Anticipated off-gassing VOC concentrations at multiple stages and times after dredging, stabilizing, placing in cells, etc.;
  - c. Concentrations of VOCs, SVOCs, and PCBs in the stabilized sediments;
  - d. TCLP of stabilized sediment for evaluating disposal options and longevity in the cells; and
  - e. Potential PCB and VOC concentrations of decant water. This data will be used to assess the potential impact of these concentrations on the WWTP at Area D if the water is treated there, and determine if off-site disposal is preferable.
8. **Oversight of Excavation Activities** – Fish migration monitoring will not be required since the channel will not be blocked by the excavation activities. The following will be measured:
- a. **Exposure Control** - Jacobs health and safety personnel will conduct real-time monitoring of air concentrations for VOCs and hydrogen sulfide. The air monitoring will be conducted to determine exposure levels to workers and members of surrounding communities and businesses. It is assumed that the workers will work in Level B at Aerovox. Workers at Area C will have Level B PPE available, but it is assumed that workers will primarily work in modified Level D.
  - b. **Elevation Control** - The excavation will be conducted in the 25-by 25-foot blocks that are defined by Zstar elevations. SES will be conducting excavation with vertical control established by laser level (relative to NGVD 29). Jacobs will confirm elevations via GPS with rod and plate method.
  - c. **Oil Control** – SES will lay out oil booms around the perimeter of the excavation area to control anticipated oil releases.
  - d. **Silt Control** – Silt curtains may be used during excavation activities.
  - e. **Turbidity Monitoring** – Assumes that Jacobs personnel will conduct turbidity monitoring along the perimeter of the excavation with a YSI.
9. **Sediment Stabilization Approach** – Excavated material will be placed directly from the excavator bucket into water-tight roll-offs. Excess water will be decanted from the roll-offs, as possible, and stored in frac tanks at Aerovox. The disposal of the decant water will either be sent through the New Bedford Harbor dewatering system during hydraulic dredging operations or shipped off site to a disposal facility, as determined by results of the treatability testing. Portland cement will be added to and mixed in with the slurry in the water-tight roll-offs in the workspace designated in the Aerovox parking lot. The Portland cement stabilizes the sediment prior to transportation to and disposal in Area C.
10. **Transportation of Stabilized Sediment** – The sediment will be transported in water-tight roll-offs to Area C under manifest by a licensed hazardous waste hauler. This activity will not be performed by SES. Truck loads will be weighed to document the amount of material in the cell.
11. **Disposition of Stabilized sediment** – The EPA has indicated that the stabilized sediment will be placed in Cell #1 at Area C and covered with clean material. The

frequency for covering the sediment will be determined from the treatability tests. At this time, it is assumed that clean material will be placed at the end of each week. The amount of material will be measured with respect to weight and PCB concentration for documentation of cell contents. The cell will be filled from north to south. The areas filled with excavated material will also be delineated using a GPS for documentation.

**From:** Anderson, Michael (Boston)  
**Sent:** Thursday, January 24, 2008 3:54 PM  
**To:** Dave Dickerson (dickerson.dave@epa.gov); Elaine Stanley (stanley.elainet@epamail.epa.gov); Maurice Beaudoin (maurice.beaudoin@usace.army.mil); Paul L'Heureux (paul.g.l'heureux@usace.army.mil); K. C. Mitkevicius (K.C.Mitkevicius@nae02.usace.army.mil); Mike Crystal (mdcrystal@aol.com); Joe Burke (burkejw111@aol.com); Mike Elia Jr. (MCElia@sevenson.com); Fox, Steve (New Bedford); Gouveia, Mark; Wilson, Carl  
**Subject:** meeting summary

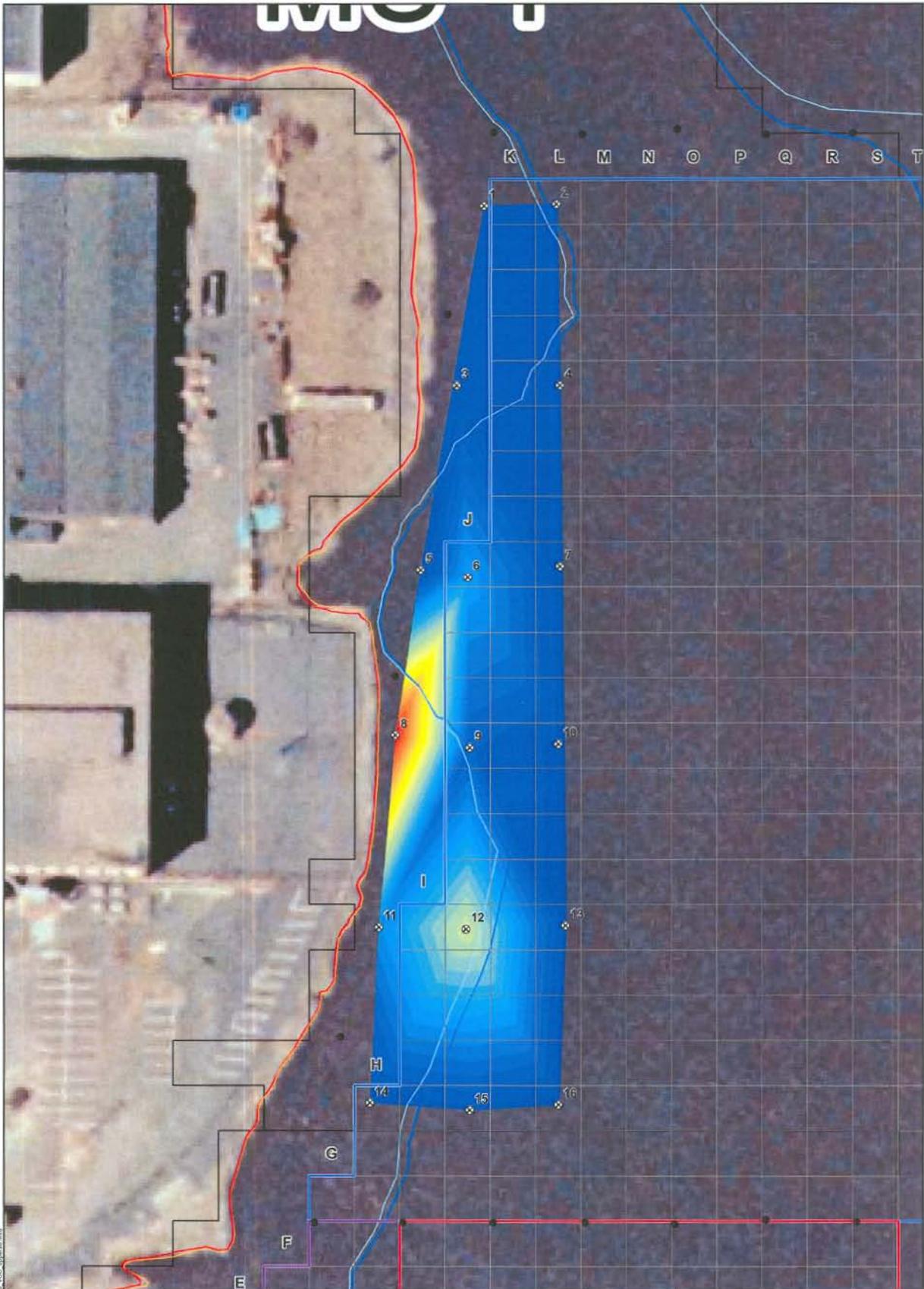
Hi everyone,

Just wanted to send out a brief meeting summary from today's 2008 dredging discussion and list the key direction taken.

1. It was decided that Jacobs/SES will proceed with an Execution Plan addendum that will include mechanical excavation of the shoreline at Aerovox and hydraulic dredging in Pierce Mill Cove (Apex CAD cell Alternative #1 footprint). Mechanical excavation at the Aerovox shoreline (excavating off of flexi-floats and handling material at the Aerovox parking lot) seems the best way to proceed due to more ability to control worker exposure to VOCs and H2S (limited to Aerovox rather than Areas C and D also).
2. To help plan the Aerovox shore operation, Jacobs will collect samples and send them to Sevenson as soon as possible. Sevenson will test the samples to better understand operational issues to be expected.
3. It appears the hydraulic dredge season may not be shortened dramatically if certain other issues are favorable. These issues include allowing stabilized material from the Aerovox shoreline to be placed in Cell 1, using NSTAR installation funds for dredging, and receiving State matching funds. The specifics won't be known until the work is planned and estimated but these factors could help significantly in getting a full 2 months of hydraulic dredging. Dave Dickerson will look into using Cell 1.
4. It would be advantageous to perform Aerovox shoreline work in the Spring and be done before the Aerovox building is demolished, which could happen this summer or fall. Securing enough funds to issue a timely RFP is critical. Expediting 2008 funding as well as rapid plan updates may be needed to perform the work in the Spring.
5. The initial plan for excavating around Aerovox will not include additional sheetpile installation, but rather will involve careful excavation knowing stability is a concern. This direction was tentatively chose with an understanding z\* would be the target depths, thereby avoiding deep excavation. 40-50' sheetpile installation along the entire shore could approach \$1M by rough calculations.

Thanks, Mike





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 Aerial Photography MASSGIS 2003

**Legend**

- Management Units
- 2006 Surveyed Sheet Piles
- Area A
- Area B
- Area C
- Area D
- Battelle Sampling Localion 10/02/06
- MLLW
- MLW
- MHW
- MHHW

**Head Space VOC Data Above Transition (ppm); 20 Minute Interval Data**

	2300 - 2400		1300 - 1400		600 - 700
	2200 - 2300		1200 - 1300		500 - 600
	2100 - 2200		1100 - 1200		400 - 500
	2000 - 2100		1000 - 1100		300 - 400
	1900 - 2000		900 - 1000		200 - 300
	1800 - 1900		800 - 900		100 - 200
	1700 - 1800		700 - 800		0 - 100
	1600 - 1700				
	1500 - 1600				
	1400 - 1500				

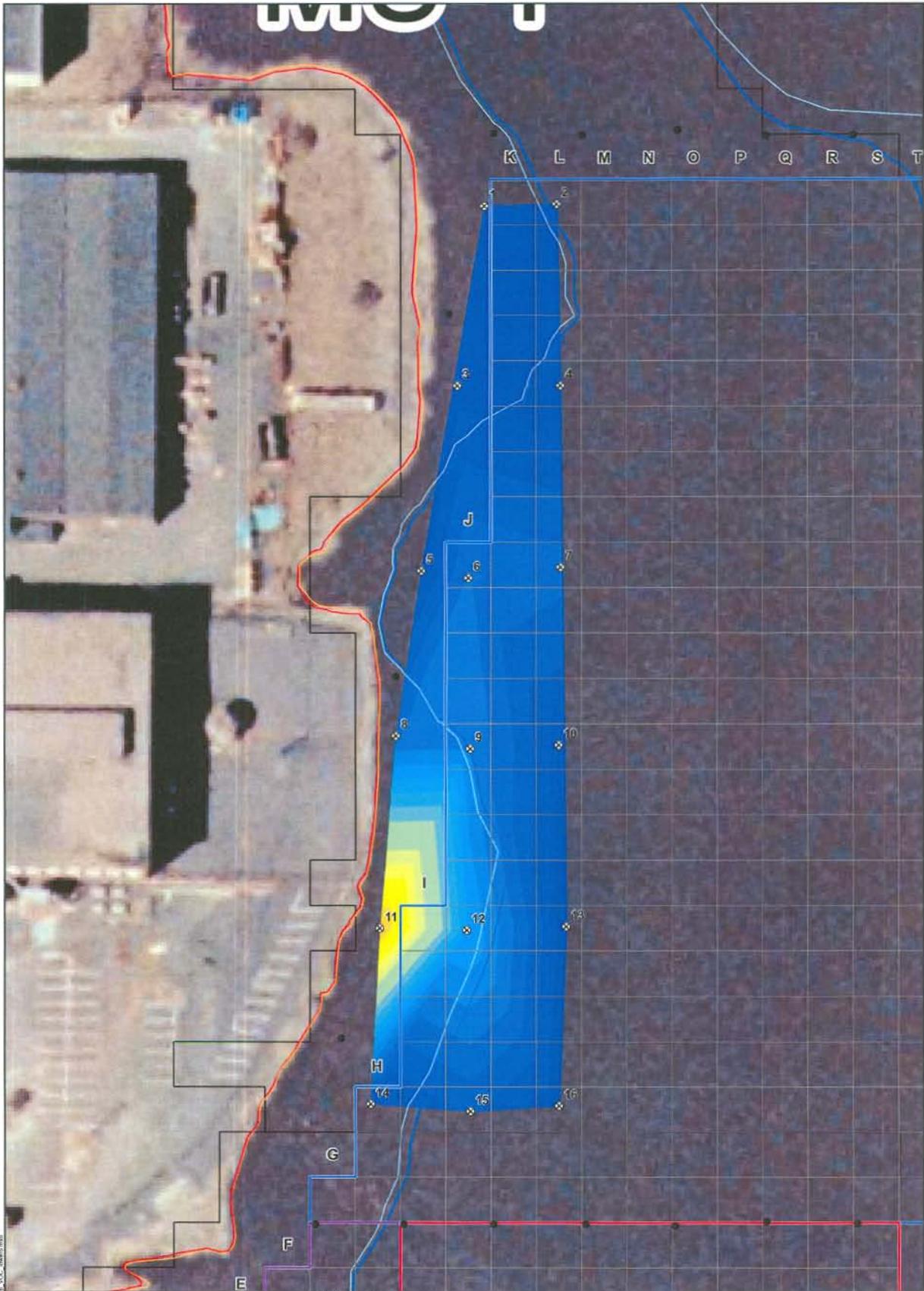
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**JE JACOBS**

Head Space VOC Data from 10/02/06 Cores; Above Transition - 20 Minute Interval

New Bedford Harbor Superfund Site

NAME: jhwhr DATE: 10/03/2008 A-17



**Legend**

- Management Units
- 2006 Surveyed Sheet Piles
- Area A
- Area B
- Area C
- Area D

- Battelle Sampling Location 10/02/06
- MLLW
- MLW
- MHW
- MHHW

**Head Space VOC Below Transition (ppm); 5 Minute Interval Data**

- 1700 - 1800
- 1600 - 1700
- 1500 - 1600
- 1400 - 1500
- 1300 - 1400
- 1200 - 1300
- 1000 - 1200

- 900 - 1000
- 800 - 900
- 700 - 800
- 600 - 700
- 500 - 600
- 400 - 500
- 300 - 400
- 200 - 300
- 100 - 200
- 0 - 100

**JE JACOBS**

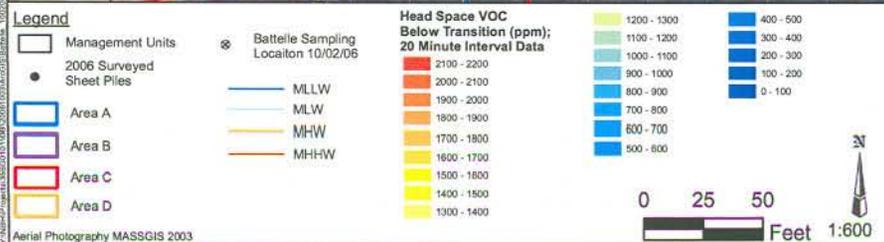
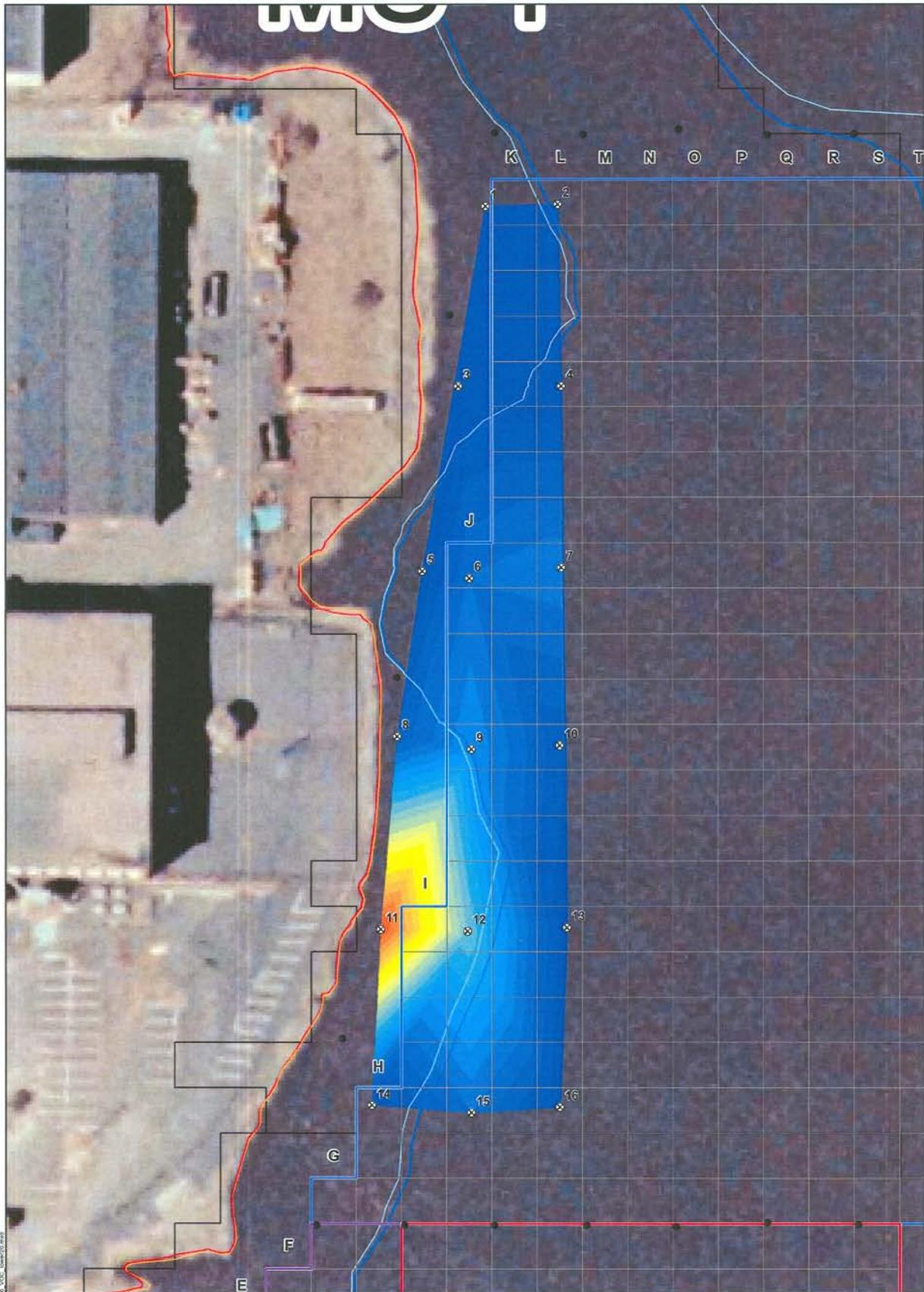
Head Space VOC Data from 10/02/06 Cores; Below Transition - 5 Minute Interval

New Bedford Harbor Superfund Site

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NAME: jacobr DATE: 10/03/06 A-18

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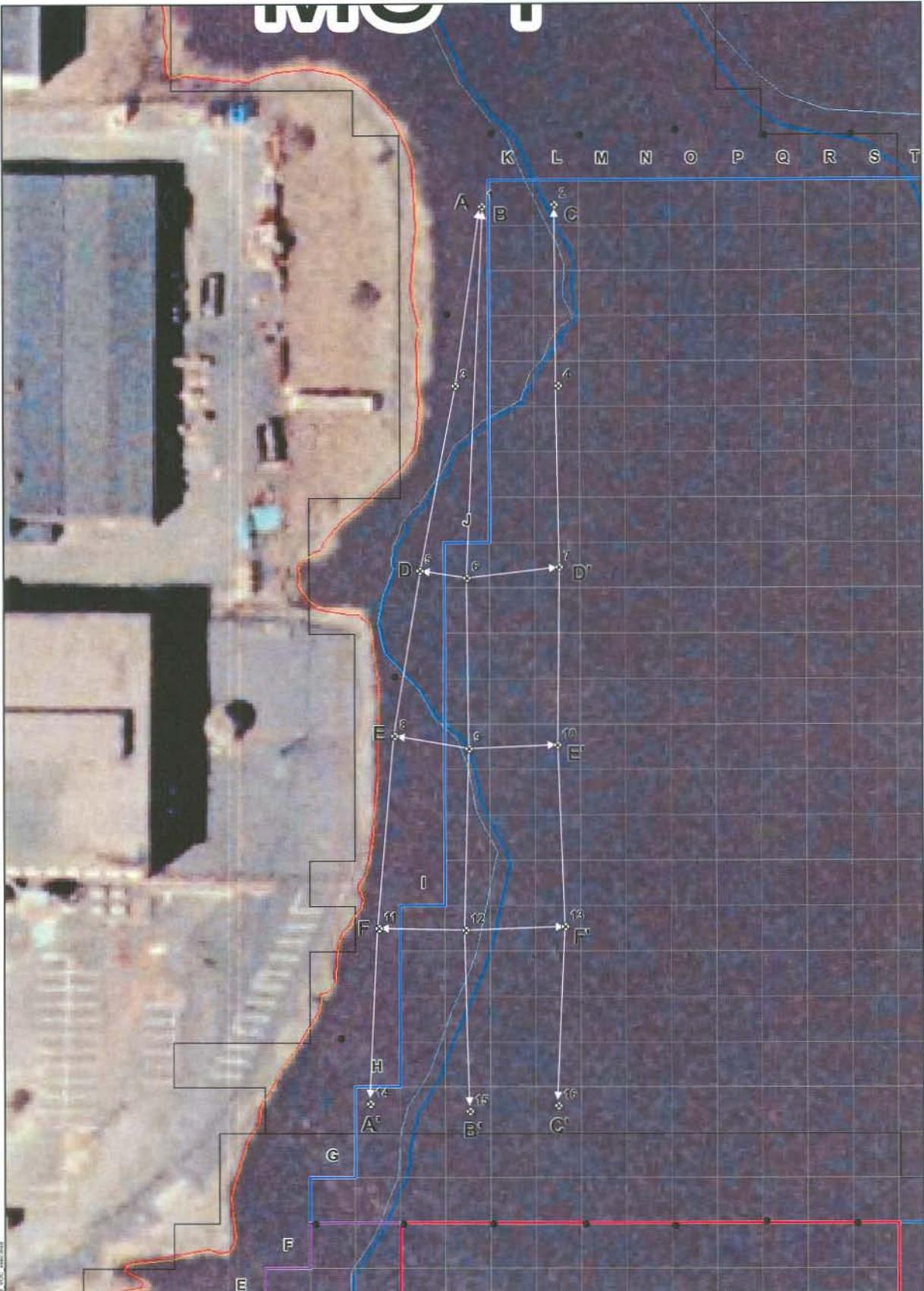
**JE JACOBS**

Head Space VOC Data  
from 10/02/06 Cores;  
Below Transition - 20 Minute Interval

New Bedford Harbor Superfund Site

NAME: *gmlrta* DATE: 10/03/2006 **A-19**

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 Aerial Photography MASSGIS 2003



**Legend**

- Management Units
- 2006 Surveyed Sheet Piles
- Area A
- Area B
- Area C
- Area D
- MLLW
- MLW
- MHW
- MHHW
- x Battelle Sampling Location 10/02/06
- ↔ Cross Section Locations

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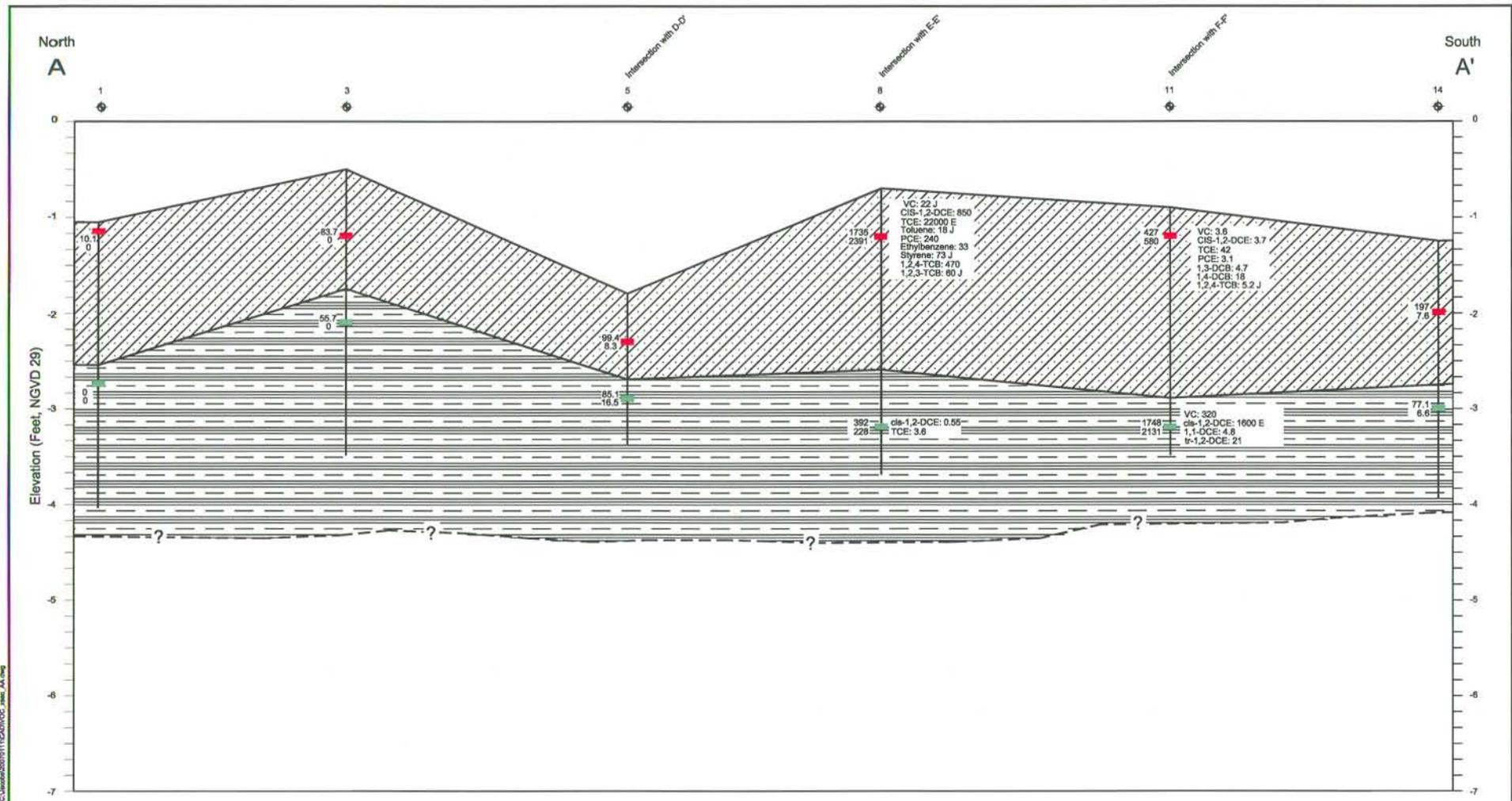
**JE JACOBS**

VOC Cores from 10/02/06;  
Cross Section Locations

New Bedford Harbor Superfund Site

NAME: gms/eta	DATE: 10/05/2006	A-20
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**Legend**

- Battelle Core Location
- Upper Sample Location
- Lower Sample Location
- OL Layer
- OH Layer
- Water
- Geologic Contact Inferred

**Headspace Screening**  
 5 min PPM in Air  
 20 min PPM in Air

**VOC Lab Data**  
 PPM as mg/Kg

J = Estimated Value  
 E = Exceeds Calibration Limit; Estimated Value

1,1-Dichloroethene = 1,1-DCE  
 trans-1,2-Dichloroethene = tr-1,2-DCE  
 cis-1,2-Dichloroethene = cis-1,2-DCE  
 1,4-Dichlorobenzene = 1,4-DCB  
 1,3-Dichlorobenzene = 1,3-DCB  
 1,2-Dichlorobenzene = 1,2-DCB

1,2,4-Trichlorobenzene = 1,2,4-TCB  
 1,2,3-Trichlorobenzene = 1,2,3-TCB  
 Trichloroethene = TCE  
 Tetrachloroethene = PCE  
 Vinyl chloride = VC

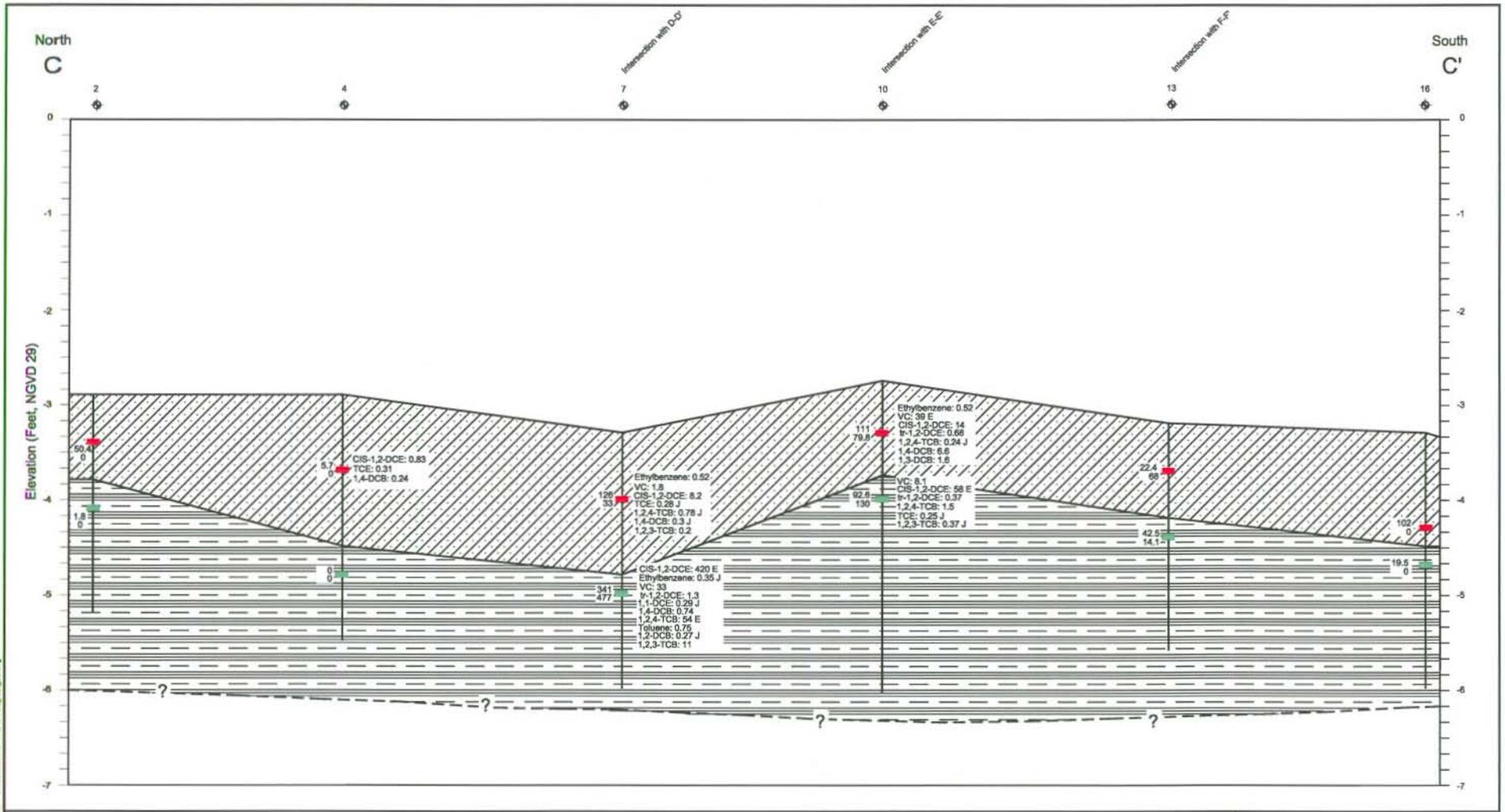
**Scale in Feet**  
 V: 1  
 H: 60

**JE JACOBS**  
 VOC Cross Section A-A' Illustrating OL Thickness and Sample Locations  
 New Bedford Harbor Superfund Site  
 01/25/07 CS VOC\_cross\_AA.dwg A-21

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Note: Unvalidated data used for cross section.





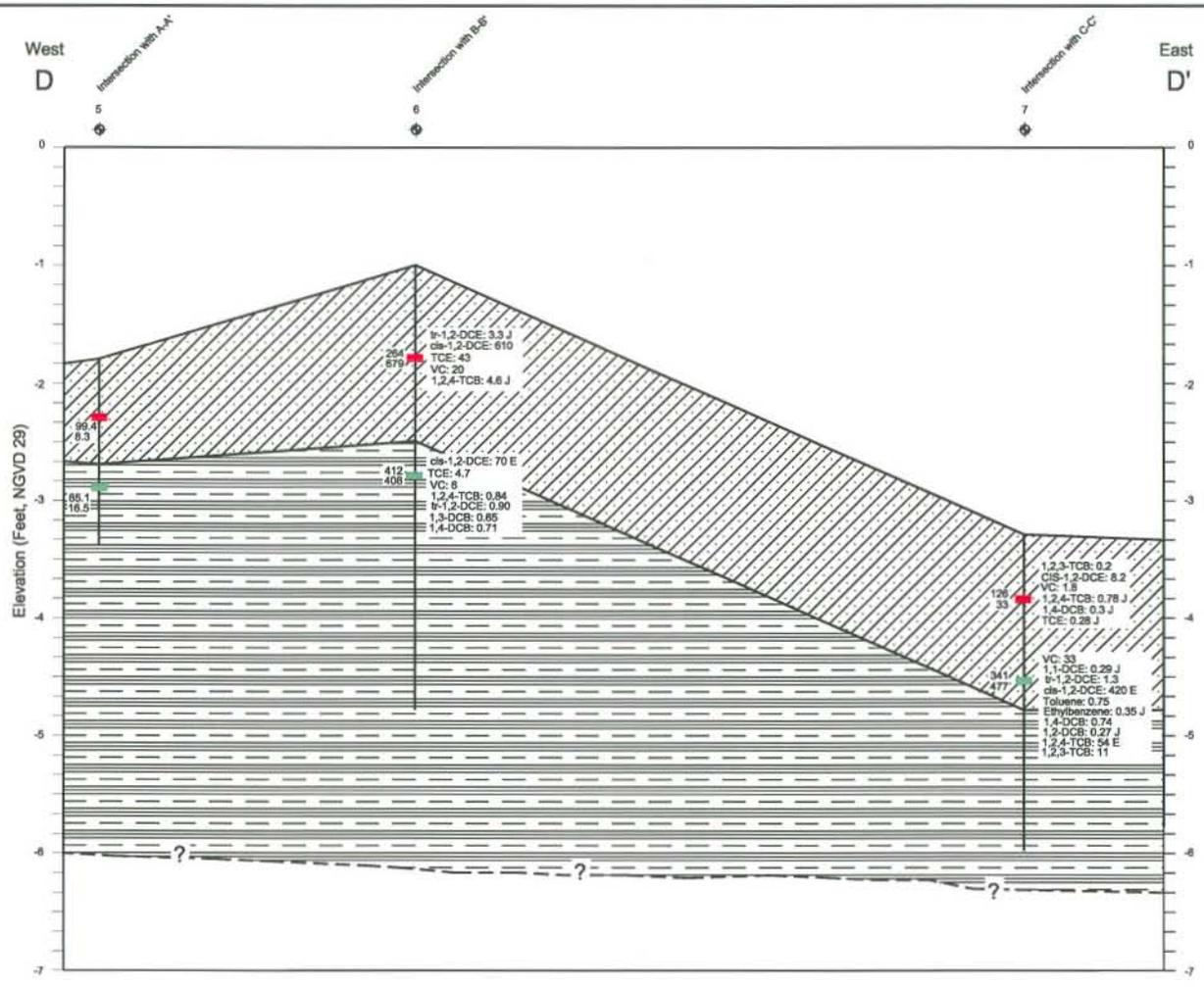
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<b>Legend</b> Battelle Core Location Upper Sample Location Lower Sample Location = Geologic Contact Inferred		OL Layer OH Layer Water		<b>Headspace Screening</b> 5 min PPM In Air 20 min PPM In Air  J = Estimated Value E = Exceeds Calibration Limit, Estimated Value		<b>VOC Lab Data</b> PPM as mg/Kg  1,1-Dichloroethene = 1,1-DCE trans-1,2-Dichloroethene = tr-1,2-DCE cis-1,2-Dichloroethene = cis-1,2-DCE 1,4-Dichlorobenzene = 1,4-DCB 1,3-Dichlorobenzene = 1,3-DCB 1,2-Dichlorobenzene = 1,2-DCB  1,2,4-Trichlorobenzene = 1,2,4-TCB 1,2,3-Trichlorobenzene = 1,2,3-TCB Trichloroethene = TCE Tetrachloroethene = PCE Vinyl chloride = VC	
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VOC Cross Section C-C' Illustrating OL Thickness and Sample Locations  
 New Bedford Harbor Superfund Site  
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Note: Unvalidated data used for cross section.



**Legend**

- Borehole Core Location
- Upper Sample Location
- Lower Sample Location
- OL Layer
- OH Layer
- Water
- ? = Geologic Contact Inferred

**Headspace Screening**  
 5 min PPM in Air  
 20 min PPM as mg/Kg

**VOC Lab Data**  
 PPM as mg/Kg

J = Estimated Value  
 E = Exceeds Calibration Limit; Estimated Value

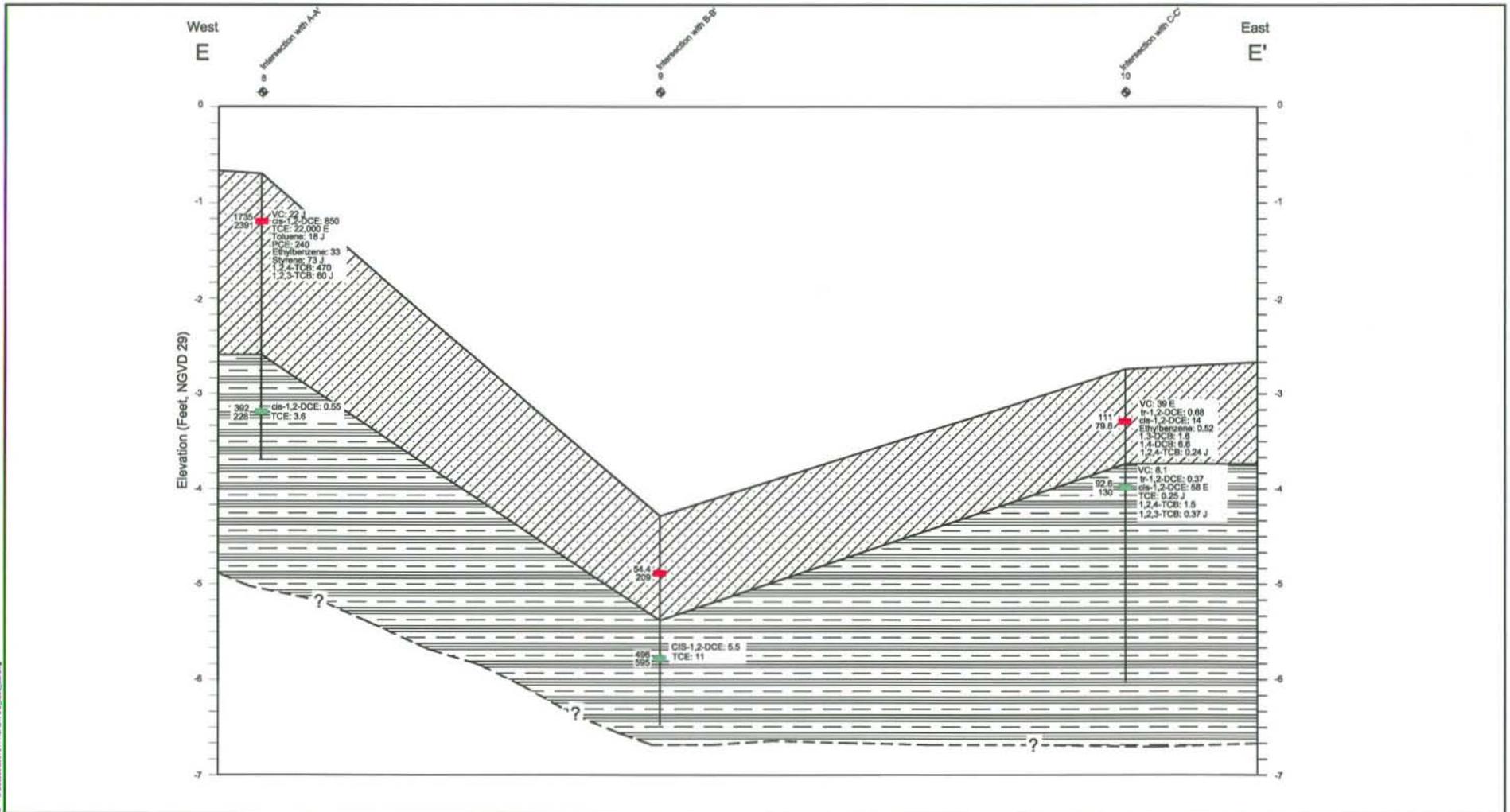
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 trans-1,2-Dichloroethene = tr-1,2-DCE  
 cis-1,2-Dichloroethene = cis-1,2-DCE  
 1,4-Dichlorobenzene = 1,4-DCB  
 1,3-Dichlorobenzene = 1,3-DCB  
 1,2-Dichlorobenzene = 1,2-DCB

1,2,4-Trichlorobenzene = 1,2,4-TCB  
 1,2,3-Trichlorobenzene = 1,2,3-TCB  
 Trichloroethene = TCE  
 Tetrachloroethene = PCE  
 Vinyl chloride = VC



VOC Cross Section D-D' Illustrating OL Thickness and Sample Locations  
 New Bedford Harbor Superfund Site

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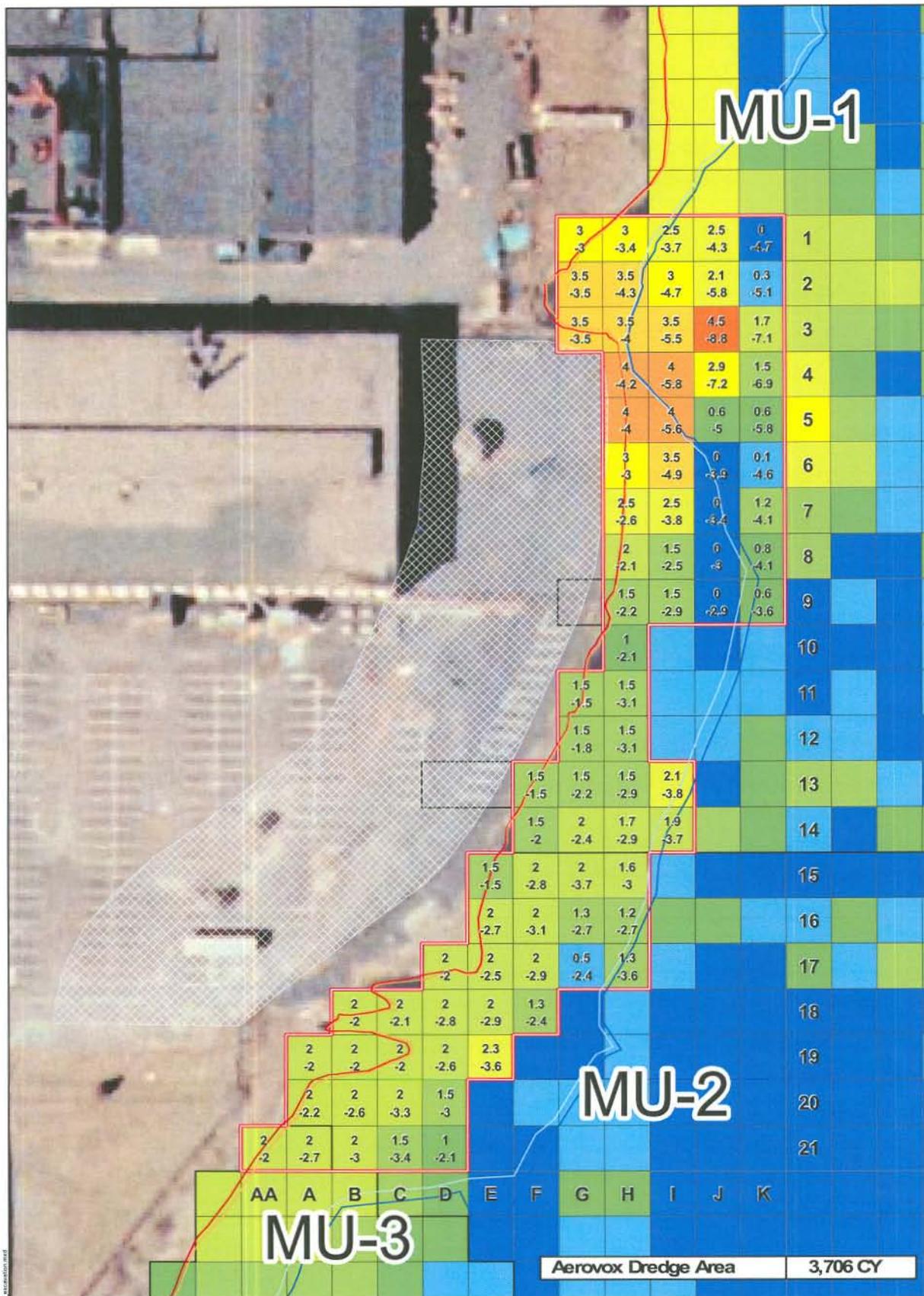
<p><b>Legend</b></p> <ul style="list-style-type: none"> <li> Borehole Core Location</li> <li> Upper Sample Location</li> <li> Lower Sample Location</li> <li> Geologic Contact Inferred</li> </ul>		<ul style="list-style-type: none"> <li> OL Layer</li> <li> OH Layer</li> <li> Water</li> </ul>		<p><b>Headspace Screening</b></p> <ul style="list-style-type: none"> <li> 5 min PPM in Air</li> <li> 20 min PPM in Air</li> </ul>		<p><b>VOC Lab Data</b></p> <ul style="list-style-type: none"> <li> PPM as mg/Kg</li> </ul>		<p>J = Estimated Value E = Exceeds Calibration Limit; Estimated Value</p>		<p>1,1-Dichloroethene = 1,1-DCE trans-1,2-Dichloroethene = tr-1,2-DCE cis-1,2-Dichloroethene = cis-1,2-DCE 1,4-Dichlorobenzene = 1,4-DCB 1,3-Dichlorobenzene = 1,3-DCB 1,2-Dichlorobenzene = 1,2-DCB</p>		<p>1,2,4-Trichlorobenzene = 1,2,4-TCB 1,2,3-Trichlorobenzene = 1,2,3-TCB Trichloroethene = TCE Tetrachloroethene = PCE Vinyl chloride = VC</p>		<p><b>JE JACOBS</b></p> <p>VOC Cross Section E-E' Illustrating OL Thickness and Sample Locations</p> <p>New Bedford Harbor Superfund Site</p> <p>01/22/07 CS_VOC_xsec_EE.dwg   A-25</p>	
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Note: Unvalidated data used for cross section.







**Legend**

- Proposed Aerovox Dredge Plan
- Construction Buffer Zone (100 ft from fence line)
- Management Units

- Zstar (ft)**
- 0
  - 0 - 0.5
  - 0.5 - 1.0
  - 1.0 - 1.5
  - 1.5 - 2.0
  - 2.0 - 2.5
  - 2.5 - 3.0
  - 3.0 - 3.5
  - 3.5 - 4.0
  - 4.0 - 4.5
  - 4.5 - 5.0
  - 5.0 - 5.5

**2008 Aerovox Dredge Grid Blocks**

- MLLW
  - MLW
  - MHW
  - MHHW
- Zstar ; Feet of sediment to remove  
 Target Elevations in feet (relative to 11/07/06 Bathymetric Survey, NGVD 29 - ft)

**DRAFT**



**JE JACOBS**

**Aerovox Shoreline Excavation Area**

New Bedford Harbor Superfund Site

NAME: croberts DATE: 02/02/2008 Figure 1

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