

**SAMPLING AND ANALYSIS PLAN  
FOR  
“Geotechnically Unsuitable Soils”**

**SAP**

**Massachusetts Clean Energy Center**

**New Bedford, Massachusetts  
August 12, 2013**

**Prepared by:  
Apex Companies, LLC  
New Bedford, Massachusetts  
Boston, Massachusetts**



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## 1.0 Introduction and Purpose

At the request of USEPA, this Sampling and Analysis Plan (SAP) has been prepared for sampling activities that will be performed to provide additional characterization of “geotechnically unsuitable soils” generated during earthwork operations at the South Terminal Confined Disposal Facility (CDF) in New Bedford, Massachusetts. Due to the presence of PCBs noted during initial investigation of the Main Facility Parcels of the project, EPA, within its “Final Determination for the South Terminal Project”, dated November 2012, issued as part of its TSCA Determination within Appendix J(1) condition 4 which stated the following:

“In the event it is determined that soils that are deemed to be “geotechnically unsuitable” must be removed and disposed off-site, the contractor shall submit a sampling and analysis plan for characterization of these soils to EPA for review and approval, unless characterization data exists which documents the PCB concentrations in the soils. If PCB concentrations in these soils are determined to be > 1 ppm but < 50 ppm, EPA approval will be required for disposal of these soils. If PCB concentrations are determined to be greater than or equal to ( $\geq$ ) 50 ppm, the soils shall be disposed of in accordance with 761.61(a)(5)(i)(B)(2)(iii).”

Thus, the purpose of this plan is to outline the procedures for characterization of “geotechnically unsuitable soils” as required within the above-cited Condition #4 of Appendix J(1). Subsequent to EPA approval of this plan, characterization activities will be initiated; should the characterization activities indicate PCB concentrations > 1 ppm but < 50 ppm, EPA approval will be sought for disposal of the soils. If PCB concentrations are determined to be greater than or equal to ( $\geq$ ) 50 ppm, the soils will be disposed of in accordance with 761.61(a)(5)(i)(B)(2)(iii).

### 1.1 Project Description

The South Terminal CDF project site is located within the inner portion of New Bedford Harbor in New Bedford, Massachusetts, as shown on **Figure 1**. A plan showing the proposed general layout of the proposed work is attached as **Figure 2**.

The South Terminal CDF is a filled structure located adjacent to the shoreline that will be bounded by sheet piling, and capped with crushed stone. Approximately 1,200 linear feet of berthing space will be available at the facility. The area to the east and south of

the CDF will be dredged to accommodate vessels of various sizes. Portions of the existing South Terminal Basin would be dredged in order to construct a channel connecting the new South Terminal CDF boat basin to the federal turning basin north of South Terminal.

Previous environmental assessment of the South Terminal CDF has shown that contaminated soil, groundwater, and sediment are present within the project footprint (including the presence of PCBs). Initial characterization was performed by the Commonwealth preceding the issuance of the Draft Determination. During that investigation, the presence of PCBs was detected within the Main Facility Parcels (the four most northern and eastern parcels, immediately adjacent to the water and north and east of Blackmer Street).

## **1.2 Document Purpose**

During the course of construction at the South Terminal CDF, some grading of existing “upper existing material” is anticipated. During the course of re-grading, some material was anticipated to be identified as “geotechnically unsuitable” for reuse at the facility. This is due to strictly geotechnical considerations; heavy loading anticipated in the future at the facility demands that highly compressible and/or non-granular materials be removed and disposed of offsite. As a result of the historic PCB concentrations in soil, as well as the limitations of existing site characterization, and the likelihood of generation of “geotechnically unsuitable soils”, this sampling and analysis plan has been prepared for the purpose of conducting additional characterization of such “geotechnically unsuitable soils” to provide EPA with additional information regarding the presence of PCBs in soils prior to determining the final disposal facility and the ultimate destination of such soils.

This document is intended to provide a work plan, which describes proposed sampling activities, sampling methods, laboratory parameters and field/laboratory quality assurance/quality control (QA/QC) procedures, as well as sampling frequencies, and a sampling schedule. This Sampling Plan is provide to the USEPA, and is intended to be used in the field during sampling activities for characterizing the areas of concern.

## **2.0 Project Organization and Responsibilities**

Apex Companies LLC will follow a well defined project management organization so that project goals are met during both the field sampling and the laboratory testing portions of the Sampling Plan. Project staff will be integrated into a project team, with individual members contributing their area of expertise to the overall sampling plan under the

supervision of a single project manager.

## **2.1 Project Organization and Key Personnel**

The personnel identified below are considered to be key members of the site characterization project team. The team will maintain an open communication line between the Client, Apex and the regulatory bodies which are engaged in the review process.

Mr. Jay Borkland is the Program Manager for the South Terminal CDF project at Apex Companies LLC. The Program Manager will be responsible for interacting with the regulatory bodies, and the client in resolving any issues which arise prior to and during the sample collection and analysis phase. Mr. Borkland will also ensure that the sampling plan is executed in conformance with this Plan through the Project Manager.

Mr. Chet Myers, P.E. is the Project Manager for the South Terminal CDF project and will oversee the overall project design including the site investigation. The field staff will report directly to Mr. Myers.

Mr. Michael Bingham, LSP, has been designated the Licensed Site Professional to oversee the investigation of the upland areas and to achieve or maintain regulatory compliance with the Massachusetts Contingency Plan. Mr. Bingham will implement the environmental investigations of the project site. As Project Manager, he will also manage the analytical laboratories for the soil and groundwater samples collected as described in this document.

### **3.0 Sampling and Analytical Program**

#### **3.1 Stockpile Creation**

During earthwork operations, the Owner (or its representative) will be overseeing the process to determine whether soils appear to be suitable or unsuitable. In some cases, sieve size analyses may be utilized to determine whether soil is “geotechnically suitable”. In other cases, visual screening may be applicable (such as when topsoil is being removed).

The specifications for the New Bedford Marine Commerce Terminal direct the Contractor for the project to segregate any soils designated as “geotechnically unsuitable” by the Owner (or its representative). Additionally, the Contractor has the latitude to segregate some soils (such as topsoil) if the Owner (or its representative) has given guidelines to the Contractor to do so, due to the unsuitability of the layer itself (often due to a high quantity of existing organic matter).

The specifications stipulate that the Contractor would segregate such soils into stockpiles that shall not exceed 500 cubic yards, however, as of August 9, 2013 a total of 11 stockpiles ranging from approximately 214 to 784 cubic yards had been generated. These stockpiles were placed either on asphalt or on top of poly sheeting and covered with poly sheeting. The location and source area of the stockpiles is shown on the attached **Figure 3**. The average height of these stockpiles is 10 feet.

The dimensions of the stockpile have been collected and are attached as **Table 1**. The volume of each stockpile will be used to estimate the number of samples to be collected for PCB analysis to characterize the material. In addition to the stockpile sampling and analysis for PCBs, a complete suite of analytical testing is being collected by the contractor for disposal characteristics, including: TPH, VOCs, SVOCs, metals, TCLP metals (as necessary) and conductivity on a 1 sample per 1,000 cubic yard basis.

#### **3.2 Sample Collection**

In order to provide additional characterization for EPA review, each stockpile will be divided into “quadrants” and three vertical levels (0-3’, 3-6’ and 6-10’). Three discrete samples will be collected from each quadrant/level and composited for laboratory analysis. The discrete samples will be retained in the event additional analyses are required. For most stockpiles, this method will result in 12 laboratory samples per

stockpile. Table 1 provides the estimated number of samples to be collected from each stockpile.

Each stockpile will be sampled and tracked individually. Sample numbers and labels will refer to the stockpile identification shown on **Figure 3** and grid location. Once a stockpile is divided into grid sections, three soil samples from each grid will be collected from shallow pits (up to 1-foot deep) from various heights within the grid area. Stockpile sampling will be completed as specified in the attached email and figure from the EPA (**Appendix B**). Since the stockpiles are up to 10 feet in height, each stockpile will also be divided vertically into approximately 3 foot layers. Enough material from each sample location will be collected to create a composite sample and have enough left over for a discrete sample. Each discrete sample will be submitted to the lab to be held in the event the composite sample exhibits elevated PCB concentrations.

Detailed field notes will document the sample locations from each stockpile.

### **3.3 Sample Handling**

Sampling equipment will be cleaned following standard decontamination procedures prior to individual sample collection. Soil samples will be logged and visually characterized prior to collection in laboratory-supplied pre-cleaned and pre-preserved jars. Samples will be stored at four (4) degrees Celsius in sample coolers on the vessel prior to shipment to the laboratory.

Samples for chemical analysis will be stored on ice from the time of sample collection until they are delivered to the laboratory. Samples will be collected and placed in the appropriate laboratory-provided sample container for each analytical method and sealed with the lid. The sealed container will then be labeled with indelible ink, with the sample location, depth interval and time of collection. The sample container will then be wrapped in protective shipping material (such as bubble wrap) and be placed in a cooler with ice. Ice will be placed in and around the samples to ensure uniform and quick chilling. Chemical ice shall not be used.

At the completion of daily sample collection events, all of the samples will be added to the Chain of Custody form with appropriate analytical testing methods noted. The Chain of Custody will be placed in a sealable watertight plastic bag, and affixed to the lid of the cooler. The cooler lid will be closed tightly, and taped shut with clear packing tape. Sample coolers will be shipped via courier or by overnight express service to an EPA certified laboratory for analysis. Standard quality control and quality assurance (QA/QC)

samples (including field and matrix spike duplicates) will be collected as part of the sampling protocol.

### **3.4 Sampling Quality Control**

QA/QC duplicate samples will be collected at the rate of up to **one duplicate for every ten samples** per sample matrix. Samples will be collected and labeled in such a manner as to make them easily associated with the primary samples.

Soil samples to be used for duplicate samples will be homogenized prior to being split into the primary and duplicate samples. Primary and duplicate samples will be transported and stored in the same manner. All duplicate samples will be run by the laboratory as “blind” samples.

Up to one half of the duplicate samples will be analyzed utilizing a different analytical laboratory to provide analytical quality assurance for the project.

### **3.5 Sample Analysis**

Samples will be sent to an offsite chemical analysis laboratory. Samples will be hand-delivered or couriered to the laboratory in sample coolers in order to maintain appropriate sample conditions. Samples requiring physical characterization will be sent to a qualified geotechnical laboratory.

In general, the compounds of concern will be addressed with the following chemical analysis:

- PCB Aroclors (EPA Method 8082 With Non-Target ECD Peaks Reported),

#### **3.5.1 Laboratory Methods**

Samples will be sent to a laboratory certified in Massachusetts to conduct the analysis listed above. Chemical analytical methods will be performed in accordance with USEPA protocols. Laboratory methods detection limits will meet applicable MassDEP regulatory criteria and the MDLs for each analysis and compound is attached as **Appendix A**.

# **FIGURE 1**

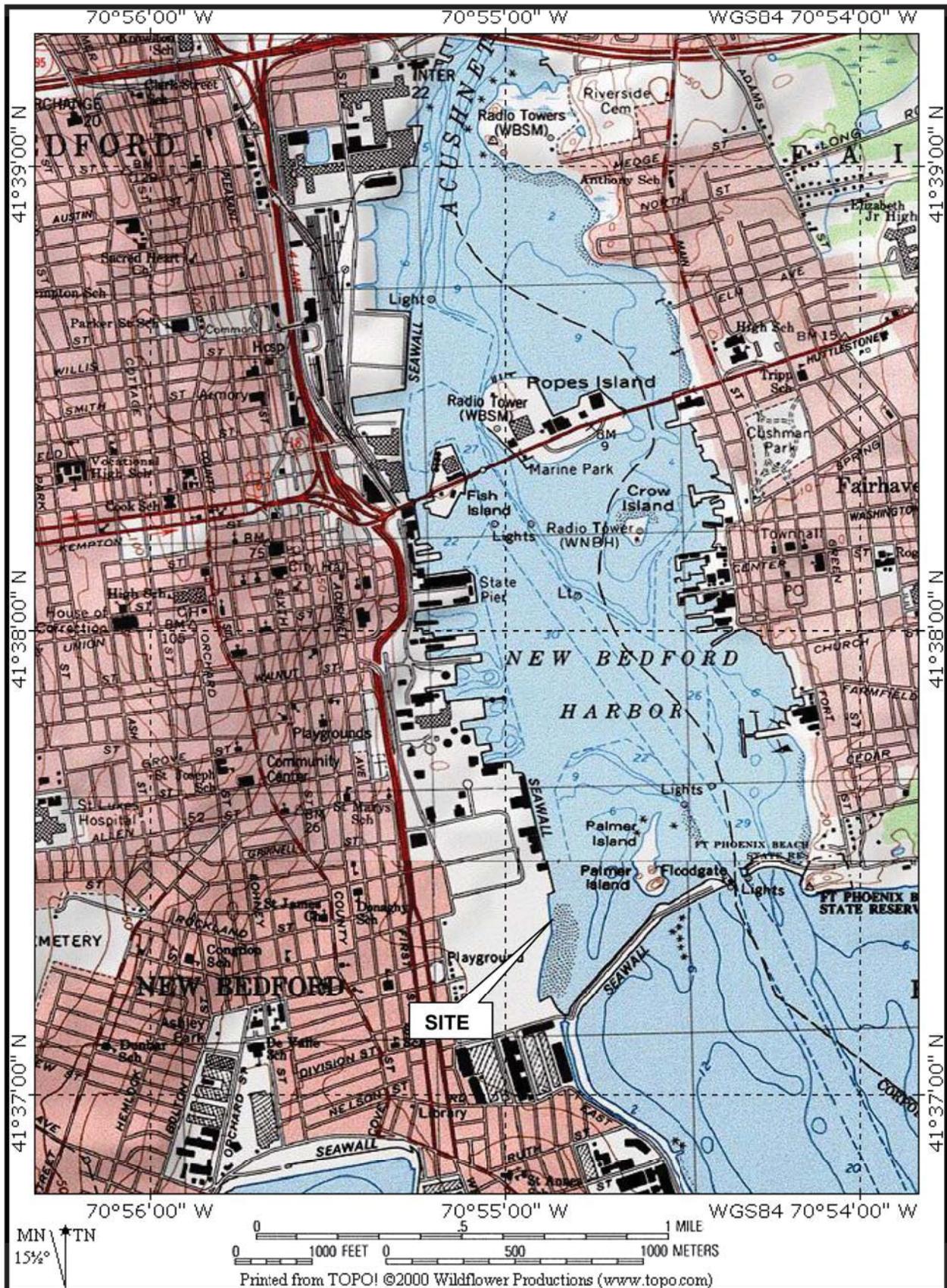
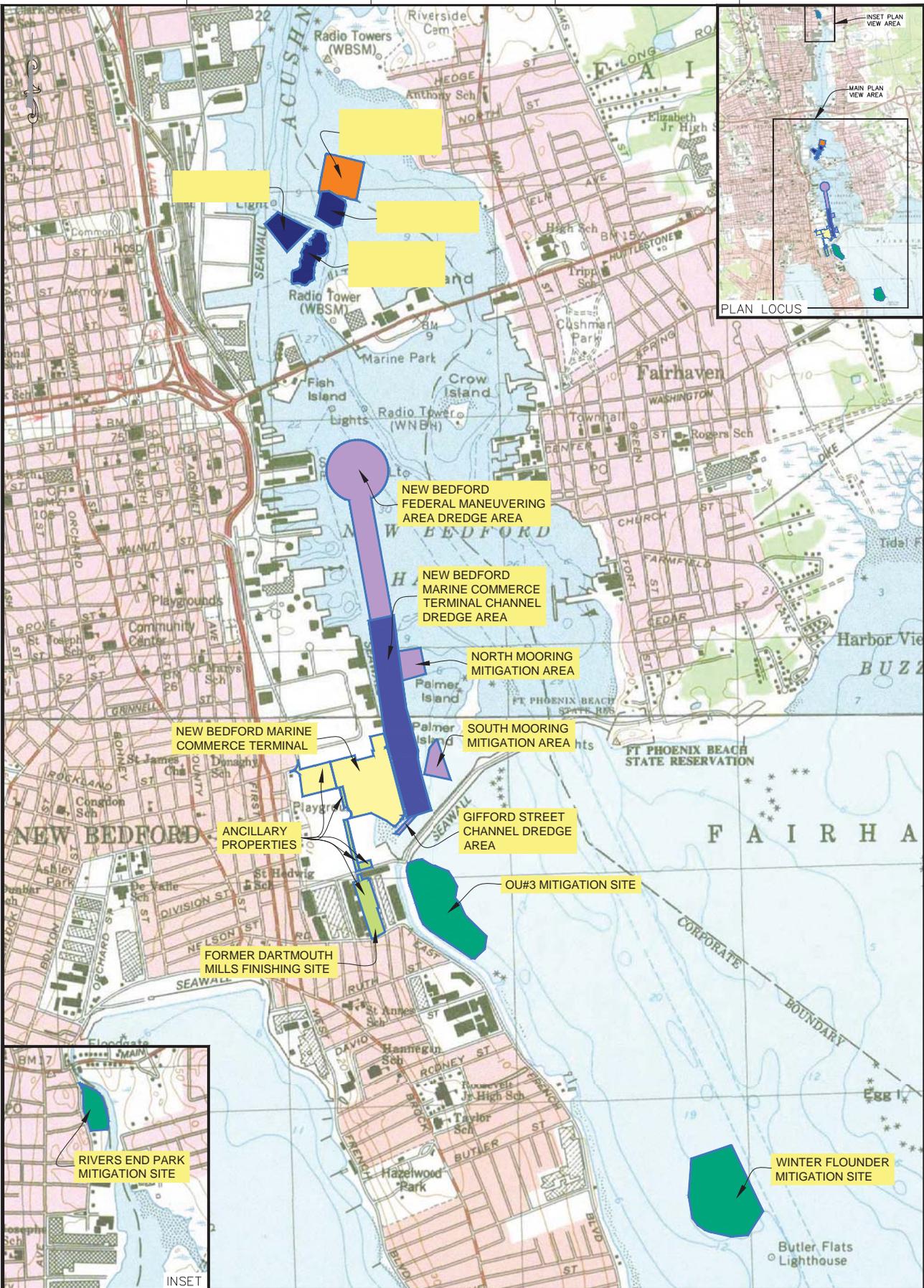


Figure 1: Site Location Map

## **FIGURE 2**



PROJECT		NEW BEDFORD MARINE COMMERCE TERMINAL	
OWNER		MASSACHUSETTS CLEAN ENERGY CENTER	
<p>PROJECT NO. 10/20/12          DATE 10/20/12          REVISIONS</p>			
NO.	DATE	DESCRIPTION	BY
1	10/20/12	PROG. UPDATE	
<p>PROJECT NO. 8898          COORD. FILE SITE FIGURE          DESIGNED BY GCD          DRAWN BY GCD          CHECKED BY          DATE 5/20/2012          DRAWING SCALE 1"=400 FEET</p>			
<p>GRAPHIC SCALE          SCALE: 1"=400'          0 200 400 600 800 1200</p>			
<p>SHEET TITLE          NEW BEDFORD MARINE COMMERCE TERMINAL GENERAL SITE PLAN          DRAWING NO. 1</p>			

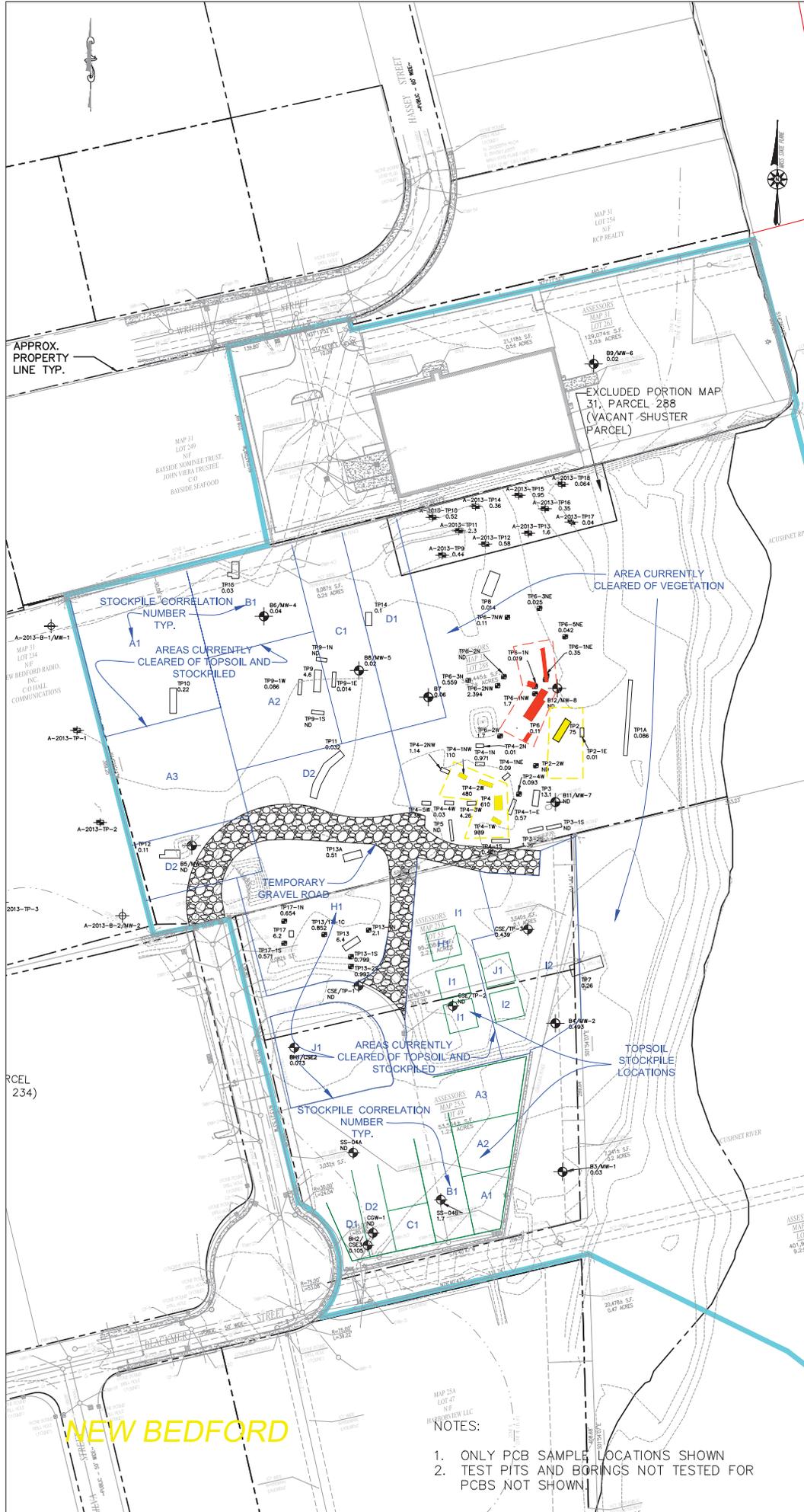
ROCKWELL AVENUE, CT, HARTFORD, MA  
 NEW BEDFORD, MA • HARTFORD, MA  
 860.234.1100  
 WWW.APEXENGINEERING.COM

## **FIGURE 3**

REVISIONS

#	DATE	DESCRIPTION
1	7/11/11	LAND BORINGS

THESE DRAWINGS PREPARED BY APEX FOR THIS PROJECT ARE INSTRUMENTS OF APEX'S SERVICE FOR USE SOLELY WITH RESPECT TO THIS PROJECT, AND APEX SHALL BE DEEMED THE AUTHOR OF THE DRAWING AND SHALL RETAIN ALL COMMON LAW, STATUTORY AND OTHER RESERVED RIGHTS WITH RESPECT THERETO, INCLUDING COPYRIGHT. THE DOCUMENTS SHALL NOT BE USED ON OTHER PROJECTS, FOR ADDITIONS TO THIS PROJECT OR FOR COMPLETION OF THIS PROJECT BY OTHERS, EXCEPT BY AGREEMENT IN WRITING AND WITH APPROPRIATE COMPENSATION TO APEX.



- NOTES:
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  3. BACKGROUND IMAGES SHOWN HEREON ARE PROVIDED COURTESY OF MASSGIS.
  4. STRUCTURES AND FEATURES LOCATED BEYOND THE PROJECT LIMITS, ARE TAKEN FROM AN AERIAL SURVEY CONDUCTED BY THE ARMY CORPS OF ENGINEERS AND SHOULD BE CONSIDERED APPROXIMATE.

- B9/MW-4 BORING/MONITORING WELL LOCATION
- A-2011-B15 RESONANCE - 30.55'
- OVER WATER GEOTECHNICAL BORING
- LARGE TEST PIT BOUNDARIES
- SMALL TEST PIT LOCATION

- PROPOSED EXCAVATION PCB CONCENTRATION > 50 PPM
- PROPOSED EXCAVATION EPH/TPH CONCENTRATION > 10,000 PPM

PREPARED FOR:  
**MASSACHUSETTS  
CLEAN ENERGY  
CENTER**

DRAWING TITLE:  
**NEW BEDFORD MARINE  
COMMERCE TERMINAL  
PCB SAMPLE  
RESULTS  
CONSTRUCTION  
PROGRESS**

Scale: 1"=50'  
0 25 50 100 150 FEET

Date 10/28/10	Drawing No.
Proj. Mgr.	CWM
Design	JAB
Check	GCD
Drawn	6690
Job No.	7/30/2013

FIG. 1

**NEW BEDFORD**

- NOTES:
1. ONLY PCB SAMPLE LOCATIONS SHOWN
  2. TEST PITS AND BORINGS NOT TESTED FOR PCBs NOT SHOWN

## **TABLE 1**

**TABLE 1**

## Stockpile Dimensions and Estimated Volumes

New Bedford Top Soil stockpile volume calculations.

Name	length	width	height	box volume (CY)	Est. Volume (CY)	Proposed # Stockpile samples
H-1	50	79	8	1170	784	12
I-2	33	83	10	1014	680	12
I-1	46	25	9	383	257	9
I-1 (a)	45	25	10	417	279	9
A-3	38	42	10	591	396	9
A-2	52	44	10	847	568	12
A-1	59	45	10	983	659	12
B-1	28	82	10	850	570	12
C-1	38	54	11	836	560	12
D-2	24	40	9	320	214	9
D-1	28	78	10	809	542	12
<b>Total</b>				<b>5509</b>	<b>5509</b>	<b>120</b>

Stockpiles measures 8/6/13 - Bingham.Wagenknecht

Estimated volume is "box" volume x 0.67 to account for sloping sides.

Stockpile sample number based on three levels and each composite sample is composed of three discrete sample locations from from a specific grid area.

Discreet stockpile samples will be stored in the event additional analysis is necessary.

# **Appendix A**

PCBs/22 NOAA Congeners (EPA Method 8270C Mod.)	Water Column Reporting Limit (ng/L)	Water Column Method Detection Limit	Sediment Reporting Limit (ug/kg)	Sediment Method Detection Limit
CI2-BZ#8-Cal	1	0.092	0.8	0.127
CI3-BZ#18	1	0.200	0.8	0.134
CI3-BZ#28	1	0.201	0.8	0.094
CI4-BZ#52	1	0.284	0.8	0.050
CI4-BZ#49	1	0.220	0.8	0.363
CI4-BZ#44	1	0.164	0.8	0.089
CI4-BZ#66	1	0.184	0.8	0.065
CI5-BZ#101	1	0.161	0.8	0.099
CI5-BZ#87-Cal	1	0.270	0.8	0.074
CI5-BZ#118	1	0.209	0.8	0.195
CI6-BZ#153	1	0.099	0.8	0.164
CI7-BZ#184	1	0.367	0.8	0.196
CI5-BZ#105	1	0.140	0.8	0.218
CI6-BZ#138	1	0.198	0.8	0.145
CI7-BZ#187	1	0.150	0.8	0.220
CI7-BZ#183	1	0.155	0.8	0.062
CI6-BZ#128	1	0.268	0.8	0.158
CI7-BZ#180	1	0.185	0.8	0.105
CI7-BZ#170	1	0.382	0.8	0.129
CI8-BZ#195	1	0.286	0.8	0.205
CI9-BZ#206-Cal/RTW	1	0.465	0.8	0.147
CI10-BZ#209-Cal/RTW	1	0.172	0.8	0.145

PCBs Aroclors (EPA Method 8082) With Non-Target ECD Peaks Reported	Soil Reporting Limit (ug/kg)	Groundwater Reporting Limit (ng/L)
Aroclor 1016	16	0.020
Aroclor 1221	16	0.020
Aroclor 1232	16	0.020
Aroclor 1242	16	0.020
Aroclor 1248	16	0.020
Aroclor 1254	16	0.020
Aroclor 1260	16	0.020
Aroclor 1262	16	0.020
Aroclor 1262	16	0.020

TPH (EPA Method 8015)	Water Reporting Limit (ug/L)	Water Method Detection Limit	Soil/Sediment Reporting Limit (ug/kg)	Soil/Sediment Method Detection Limit
TPH	500	75	33,300	5300

## **Appendix B**

## Michael Bingham

---

**From:** Tisa, Kimberly <Tisa.Kimberly@epa.gov>  
**Sent:** Thursday, August 08, 2013 4:36 PM  
**To:** Chet Myers; Michael Bingham  
**Attachments:** Example of Stockpile Sampling Grids.pdf

Chet/Mike-

EPA has reviewed the SAP for the stockpiled Geotechnically Unsuitable Soils dated August 5, 2013. Mike verbally provided to me today the current site conditions, which include 11 stockpiles of varying sizes and dimensions. The SAP indicates that a composite sample will be collected per every 100 cubic yards of soils.

Conceptually, the stockpile SAP currently being discussed would appear to be sufficient to determine whether a stockpile is < 50 ppm or > 50 ppm for off-site disposal purposes. However, as I discussed with Mike today, I believe that a more systematic approach to grid sampling of piles is more defensible than just using a volume estimate. Attached are examples of a sampling protocols for several different stockpiles varying in both size and dimension. The approximate # cubic yards per sample shown in these examples is smaller than 1 sample per 100 cubic yards, so I am willing to discuss once you have an opportunity to review. ( Please no comments on my artistic ability.....)

I did go back and look at all our previous correspondence regarding how the geotechnically unsuitable soils would be managed. By email dated July 3, 2012, APEX provided comments to EPA 6/23/2012 comments. Response 4 opined that the data from the test pits and soil borings indicated that more "materials" would be reused at the facility, but that if it was geotechnically unsuitable, it would be disposed off-site (i.e., not used as clean fill). In fact, the test pit sampling did identify PCB concentrations in other locations (e.g., 4.6 ppm in TP-9.) which is located in one of the stockpile area. EPA concurred with this, but required the SAP as part of the Determination.

If the Commonwealth is considering a different disposition of these geotechnically unsuitable soils (i.e., clean fill), EPA would require a much more stringent sampling protocol than what we indicated above.

At this point I would recommend developing the plan for off-site disposal incorporating the suggested sampling protocols that is attached, and see what the data results are. We can discuss the final sampling protocol once you have an opportunity to review the examples I've provided.

Of other consideration, of course, will be any other cocs that are present in these stockpiles. Will any samples be analyzed for other [non-PCB] cocs?

**Kimberly N. Tisa, PCB Coordinator (OSRR07-2)**

**USEPA**

**5 Post Office Square, Suite 100**

**Boston, MA 02109-3912**

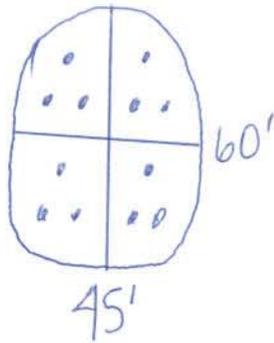
**(o) 617.918.1527**

**(f) 617.918-0527**

## Examples of stockpile sampling grids

Stockpile A1 : 60' x 45' x 10'

TOP VIEW

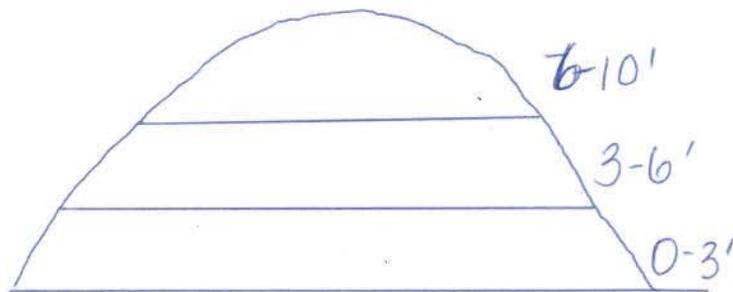


EACH SUBGRID = 30' x ~22.5'

4 grids total

3 "discrete sample" / grid

SIDE VIEW

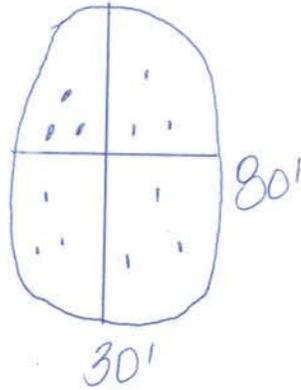


3 levels

- ∴ Each level has 4 grids x 3 levels = 12 "composite samples" total
- Each composite sample comprised of 3 discrete samples
- Each grid represents 75 yd<sup>3</sup> for this pile

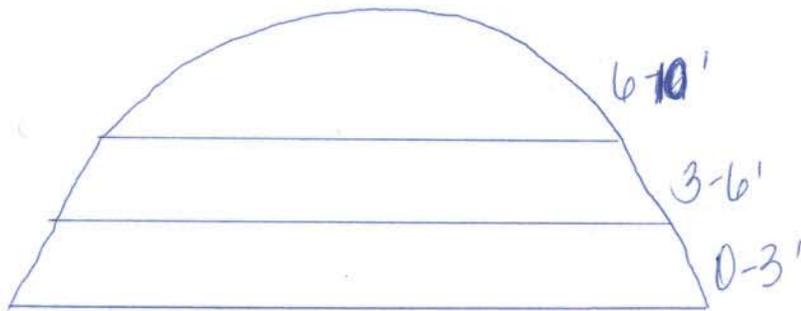
STOCKPILE B1: 30' x 80' x 10'

TOP VIEW



Each grid = 40' x 15'  
4 grids w/ 3 discrete samples/grid

SIDE VIEW



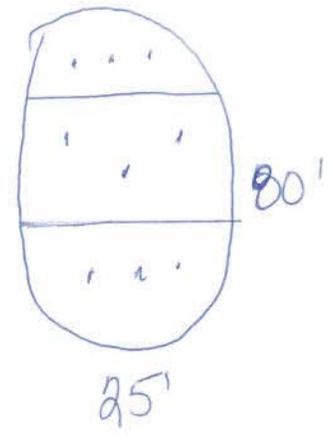
3 levels

Each grid represents ~ 67 yd<sup>3</sup>

∴ 4 grids/level x 3 levels = 12 "composite" samples

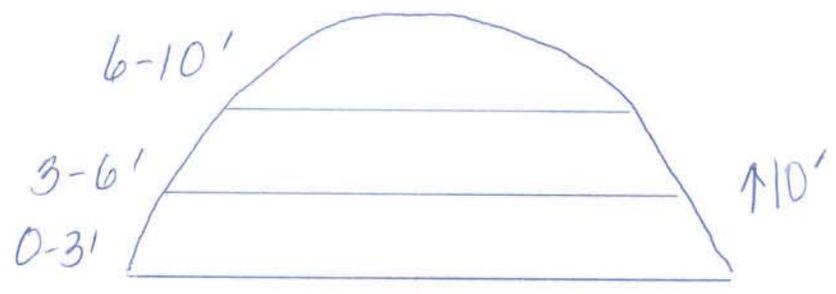
STOCKPILE **D1** 25' x 80' x 10'

TOP VIEW



3 grids : ~ 27' x 25'  
3 discretos/grid

SIDE VIEW



Each level has 3 grids x 3 levels = 9 samples (composite)

Each grid represents ~ 75 yd<sup>3</sup>