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Executive Office of Energy & Environmental Affairs

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Commissioner

**Memorandum**

From: Paul Craffey, BWSC

To: File

Subject: TSCA Determination and PCB Concentrations greater than 50 ppm in the Navigational CAD Cells

Date: May 25, 2012

As part of the state enhanced remedy for the New Bedford Harbor site, confined aquatic disposal (CAD) cells were to be constructed for the management of sediments that would be removed during the navigational dredging. In consideration that the dredged sediments potentially could contain PCB concentrations greater than or equal to (≥) 50 parts per million (ppm), it was concluded that a federal TSCA determination under 40 CFR Part 761 would be required for disposal of the dredged sediments into the CAD cells.

To date, two TSCA Determinations have been issued by EPA, dated January 12, 2005 and November 12, 2008 (see attached). The January 12, 2005 determination includes the filling of the Borrow Pit CAD cell and the construction and filling of CAD Cell #1, and various navigational dredging projects. The November 12, 2008 determination includes the construction and filling of CAD cell #2, and various navigational dredging projects.

The EPA TSCA determinations concluded that disposal of PCB contaminated sediments in the specified CAD cells would not pose an unreasonable risk to human health or the environment provided that certain conditions were met, which included but were not limited to, compliance with construction performance standards, and water quality and turbidity performance standards. Monitoring was performed during the navigational dredging and demonstrated compliance with performance standards, see summaries of monitoring results attached.

The following tables provide a summary of the PCB data associated with the Borrow Pit CAD cell and CAD cells #1 and #2.



## PCB Concentration Ranges in Borrow Pit CAD Cell and Dredge Locations

| Dredge Location | Est. Final Volume Dredged (cubic yards) | PCB Pre-Dredge Conc. Average [1,2] (ppm) | PCB Pre-Dredge Conc. Range (ppm) | Total Number of Samples / PCB Concentrations in Samples ≥ 50 ppm | Post-Dredge Conc.[3,4] (ppm) |
|---|---|---|---|---|---|
| Fish Island North | 12,501 | 39 | 0.5 - 77 | 7<br>77, 71, 59, & 74 ppm | 3 |
| Top of CAD Cell #1 | 19,731 | 14 | 2 - 52 | 6<br>52 ppm | 0 |
| Total in Cell | 32,232 | 22 (Avg. in Cell) | 0.5 - 77 | 13 | |

## PCB Concentration Ranges in CAD Cell #1 and Dredge Locations

| Dredge Location | Est. Final Volume Dredged (cubic yards) | PCB Pre-Dredge Conc. Average [1,2] (ppm) | PCB Pre-Dredge Conc. Range (ppm) | Total Number of Samples / PCB Concentrations in Samples ≥ 50 ppm | Post-Dredge Conc.,[3,4] (ppm) |
|---|---|---|---|---|---|
| White Terminal | 11,604 | 23 | 0.5 - 46 | 2 | 2 |
| Marine Terminal | 1,784 | 34 | 0.5 - 68 | 8<br>68 ppm | 3 |
| Federal Channel South of Route 6 | 5,430 | 41 | 0.5 - 81 | 10<br>54, 61, 70, 75, 81 ppm | 2 |
| Pease Park | 5,038 | 1 | 0.2 - 3 | 2 | 1 |
| Linberg Marine | 4,297 | 1 | 0.6 - 2 | 2 | 1 |
| Niemiec Marine | 821 | 23 | 23 | 1 | 0.4 |
| Kelly & Son | 10,436 | 2 | 0.7 - 3 | 2 | 1 |
| Warren Alexander | 401 | 5 | 5 | 1 | 1 |
| Top of CAD #2 | 34,210 | 26 | 26 | 1 | 0 |
| Total in Cell #1 | 74,021 | 19 (Avg. in Cell) | 0.2 - 81 | 29 | |

[1] Concentration averages were determined by averaging total number of samples at each location.

[2] Sediment PCB concentrations were obtained from EPA 2002 and Apex 2010 pre-dredge sampling data.

[3] Post-dredge conc. was not required. One sample was typically collected at each dredged location.

[4] The Top of CAD Cell post dredge conc. was determined from Suitability Determination sampling.

## PCB Concentration Ranges in CAD Cell #2 and Dredge Locations

| Dredge Location | Est. Final Volume Dredged (cubic yards) | PCB Pre-Dredge Conc. Average [1,2] (ppm) | PCB Pre-Dredge Conc. Range (ppm) | Total Number of Samples<br>PCB Concentrations in Samples ≥ 50 ppm | Post-Dredge Conc.[3] (ppm) |
|---|---|---|---|---|---|
| South Terminal | 2,691 | 8 | 8 | 1 | 2 |
| Union Warf | 1,109 | 11 | 5 - 17 | 2 | 5 |
| Tonnessen Park | 1,266 | 22 | 22 | 1 | 0.03 |
| Gifford St. Boat Ramp | 10,880 | 7 | 7 | 1 | 2 |
| Olde North Wharf | 1,295 | 9 | 4 - 13 | 3 | 2 |
| Warren Alexander | 2,142 | 13 | 0.2 - 18 | 5 | 3 |
| Olde North Wharf | 108 | 5 | 4 - 13 | 3 | 2 |
| Niemiec Marine | 2,312 | 1 | 1 | 1 | N/S |
| Fairhaven Shipyard | 344 | Not Sampled (N/S) | Not Sampled | Not Sampled | N/S |
| Linberg Marine | 1,773 | Not Sampled | Not Sampled | Not Sampled | N/S |
| Packer Marine | 2,288 | 59 | 57 - 61 | 2<br>57 & 61 ppm | 0.1 |
| Sawyer St Rowing[2] | 4,190 | Estimated 27 (see Note)[2] | (see Note)[2] | (see Note)[2] | 12 |
| Steamship Authority | 5,686 | 13 | 7 - 18 | 2 | 3 |
| Steamship Authority | 16,695 | 0.2 | 0.21 – 0.23 | 2 | 0.2 |
| Total in Cell #2 | 52,779 | 8 (Avg. in Cell) | 0.2 - 61 | 23 | |

[1] Concentration averages were determined by averaging total number of samples at each location.

[2] Sediment PCB concentrations were obtained from EPA 2002 and Apex 2010 pre-dredge sampling data, except for the Sawyer St. pre-dredge concentration. The Sawyer St. area actually dredged was smaller than the area in the original planned dredged footprint. As a result of this change in size of this area, there was no pre-dredge PCB concentration from the dredged area. An estimated pre-dredge average concentration was calculated using sediment concentrations (7 sample locations) currently next to the Sawyer St. dredged area using EPA 2010 data.

[3] Post-dredge conc. was not required. One sample was typically collected at each dredged location.

# Appendix A - TSCA 761.61(c) Determination

Consistent with Section 761.61(c) of the Toxic Substances Control Act (TSCA), I have reviewed the pertinent documents regarding the state enhanced remedy for the New Bedford Harbor site and considered the proposed confined aquatic disposal cells (CAD cells) for the dredged PCB-contaminated sediments set out in the October 2004 Work Plan for New Bedford Harbor Dredge - Phase II, North Terminal Maintenance Dredge. I have also reviewed a map of the location of the CAD cells which is attached hereto as Attachment A. As required by that section of TSCA, I have determined that the Work Plan's proposed method of disposing of the PCB-contaminated sediments in CAD cells north of Route 6 in New Bedford Harbor does not pose an unreasonable risk to human health or the environment as long as the following conditions are met:

1. Compliance with the Work Plan's water quality and turbidity performance standards is maintained during all dredging and disposal activities;

2. The CAD cells are capped with clean, suitable material of sufficient thickness to isolate the PCB-contaminated sediments physically, chemically and biologically from the surrounding benthic environment. The placement of these underwater caps shall be timed such that sufficient consolidation of the underlying dredged material has taken place to physically support the cap material. A bathymetric survey shall be performed upon completion of the cap placement;

3. The CAD cell caps are monitored to demonstrate their physical, chemical and biological quality. This monitoring shall include bathymetric surveys, chemical sampling and sediment camera work (as an alternative to benthic faunal enumeration). The frequency of this cap monitoring shall be at least annually for the first three years after cap placement, unless otherwise directed by EPA New England. After three years, the Commonwealth may proposed a revised schedule for monitoring;

4. An annual report summarizing the CAD cell cap placement or CAD cell cap monitoring shall be submitted to EPA New England beginning with placement of the cap material. This report shall include a summary discussion of all activities associated with the cap placement or cap monitoring, and shall include if needed any recommendations for corrective action to maintain the physical, chemical or biological quality of the caps. A draft and final version of each such annual report shall be submitted, with the final version incorporating all comments received from EPA New England.

5. Corrective actions recommended in the annual reports, or alternatively, those required by EPA New England based on information in the annual reports, shall be implemented in a timely manner.

6. The City of New Bedford/Harbor Development Commission coordinates with the Department of Commerce through the National Oceanic and Atmospheric Administration, National Ocean Service and the U.S. Coast Guard to ensure that the as-built locations of the CAD cells become included in all future nautical charts of New Bedford Harbor.

This determination is based on the information contained in the December 2004 Work Plan. Any

proposed change(s) to the 2004 Work Plan shall be provided to EPA. Upon review, EPA may find it necessary to revise this determination or issue a new TSCA determination based on the proposed change(s).

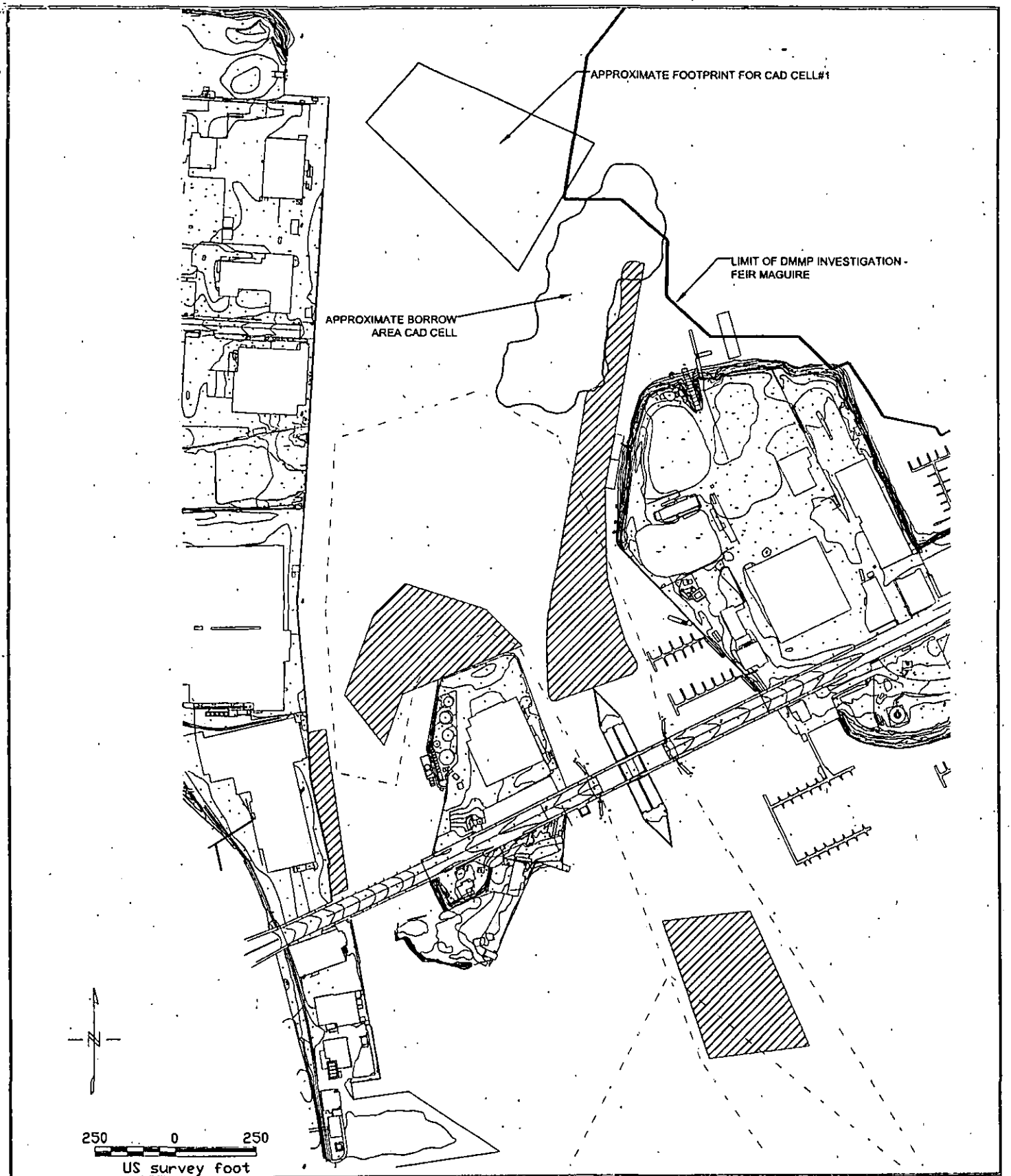
Robert W. Varney

Robert W. Varney
Regional Administrator, EPA New England

1-12-05

Date

Attachment A - State Enhanced Remedy Initial CAD cells and dredging areas



# Appendix A - TSCA 761.61(c) Determination

Consistent with Section 761.61(c) of the Toxic Substances Control Act (TSCA) I have reviewed the pertinent documents regarding the state enhanced remedy for the New Bedford Harbor site and considered the proposed confined aquatic disposal cells (CAD cells) for the dredged PCB-contaminated sediments set out in the draft April 2007 CAD Cell #2 Pre-Design Work Plan and Section 01135 of the November 2008 Phase III Contact Specifications for the New Bedford Harbor navigational dredging. I have also reviewed a map of the location of the CAD cells which is attached hereto as Attachment A. As required by that section of TSCA, I have determined that the proposed method of disposing of the PCB-contaminated sediments in a CAD cell(s) north of Route 6 in New Bedford Harbor does not pose an unreasonable risk to human health or the environment as long as the following conditions are met:

1. Compliance with the Work Plan's and Contract Specification's water quality and turbidity performance standards is maintained during all dredging and disposal activities;

2. Any dredged material that accidently comes to be located outside of CAD cell #1 or #2 during disposal (e.g., "missing" the cell during placement or from "surge" related overflow during placement) is removed and placed into the CAD cell(s);

3. The CAD cells are capped with clean, suitable material of sufficient thickness to isolate the PCB-contaminated sediments physically, chemically and biologically from the surrounding benthic environment. The placement of these underwater caps shall be timed such that sufficient consolidation of the underlying dredged material has taken place to physically support the cap material. A bathymetric survey shall be performed upon completion of the cap placement;

4. The CAD cell caps are monitored to demonstrate their physical, chemical and biological quality. This monitoring shall include bathymetric surveys, chemical sampling and sediment camera work (as an alternative to benthic faunal enumeration). The frequency of this cap monitoring shall be at least annually for the first three years after cap placement, unless otherwise directed by EPA New England. After three years, the Commonwealth may proposed a revised schedule for monitoring;

5. An annual report summarizing the CAD cell cap placement or CAD cell cap monitoring shall be submitted to EPA New England beginning with placement of the cap material. This report shall include a summary discussion of all activities associated with the cap placement or cap monitoring, and shall include if needed any recommendations for corrective action to maintain the physical, chemical or biological quality of the caps. A draft and final version of each such annual report shall be submitted, with the final version incorporating all comments received from EPA New England.

6. Corrective actions recommended in the annual reports, or alternatively, those required by EPA New England based on information in the annual reports, shall be implemented in a timely manner. Corrective actions could include, but not be limited to, installation of additional controls or excavation and disposal of dredged PCB-contaminated sediments from the CAD cells

if information indicates that the CAD cells are not effective in isolating and/or controlling migration of PCBs from the CAD cells into the harbor.

7. The City of New Bedford/Harbor Development Commission shall coordinate with the Department of Commerce through the National Oceanic and Atmospheric Administration, National Ocean Service and the U.S. Coast Guard to ensure that the as-built locations of the CAD cells become included in all future nautical charts of New Bedford Harbor.

This determination is based on the information contained in the April 2007 Work Plan and the November 2008 Contract Specifications. Any proposed change(s) to the Work Plan's or Contract Specifications shall be provided to EPA. Upon review, EPA may find it necessary to revised this determination or issue a new TSCA determination based on the proposed change(s).

James T. Owens, III
Director, Office of Site Remediation and Restoration

11-12-08
Date

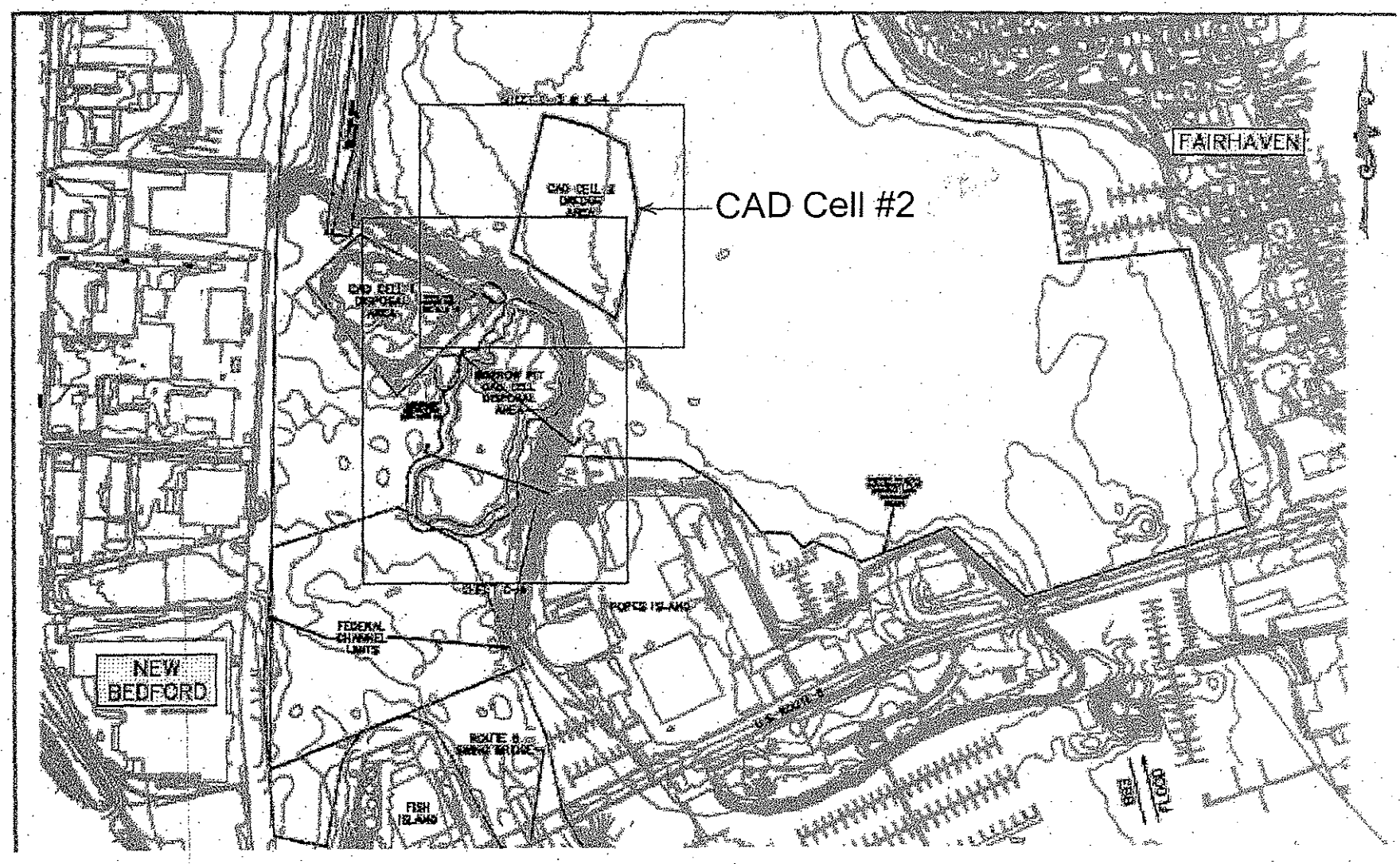



**Figure 1: CAD #2 Location**

# New Bedford Harbor Dredge Project – Phase II

**November 2006**

## 4.0 Monitoring Results

The water quality was monitored during the dredging and material placement operations for the New Bedford Harbor Dredge – Phase II from January 13, 2005 through January 17, 2006. Water quality monitoring was performed in accordance with the Water Quality Monitoring Plan (WQMP) dated 01/05/05. Following the guidelines of the WQMP, monitoring locations for water turbidity recorded an average turbidity over various water depths, up and down-current from the dredge or material placement operations, depending on tide. The values recorded as the Reference Site Turbidity were taken from up-current monitoring locations, or from monitoring events which occurred before dredge or material placement operations began. The Reference Turbidity Value was then compared to down-current turbidity values measured at regular time intervals after operations had begun.

The monitoring results were broken up into 4 periods of dredging and material placement that Apex oversaw in New Bedford Harbor during Phase II of the State Enhanced Remedy Dredge Project. At each monitoring location, various samples around the area were taken in order to get a thorough indication of water quality.

The first period took place between 1/13/05 and 2/15/05 and included approximately 32,000 cubic yards of material being dredged from Fish Island Terminal and the "top" of CAD Cell #1. This was then placed in the "Borrow Pit" northwest of Pope's Island. In monitoring the water quality for the dredging, only one exceedance of the project turbidity occurred. A down-current turbidity of 40 NTUs was recorded, which was 9.8 NTUs over the permissible turbidity increase. Additional monitoring was performed at this location 15 and 30 minutes after the exceedance. 15 minutes after the exceedance, the average turbidity at the same location measured 20.0 NTUs (3.9 NTUs below the up-current reference turbidity value of 23.9 NTUs). 30 minutes after the exceedance event, the average turbidity down-current measured 15.0 NTUs (8.9 NTUs below the up-current reference turbidity value), well within the permissible limits set forth in the WQMP.

Water quality monitoring for placement operations also followed the guidelines set forth in the WQMP. Silt curtains were utilized during placement operations, bringing the down-current monitoring locations to within 15 feet of the curtains. Disposal events were monitored on four days, during which, there were no turbidity exceedances to report from any of the disposal events. All values recorded were below the down-current permissible turbidity increase of 40 NTUs.

The second period took place between 6/27/05 and 7/22/05 and involved the dredging of CAD Cell #1 and the capping of the PCB contaminated EPA Operable Unit #3 (OU#3). This portion of the project

involved dredging clean material from CAD Cell #1 northwest of Pope's Island and placing the material (approximately 84,000 cubic yards) over a 19 acre area south of the Hurricane Barrier. Apex monitored the water quality for both dredging (on ten days) and material placement (for fifteen events). None of these monitoring events yielded turbidity exceedances.

The third period involved the dredging of material from 6 sites around New Bedford Harbor. They include; Maritime and White's Terminals north of Route 6, a shoal south of the Route 6 Bridge, and Pease Park boat ramp, Linberg Marine, and D.N. Kelley and Sons Shipyard all located in Fairhaven. Approximately 35,000 cubic yards of material was dredged from these areas, and disposed of in CAD Cell #1, northwest of Pope's Island. This portion of dredging and placement occurred between 9/6/05 and 10/21/05. Monitoring of water quality during dredging operations was conducted on 12 days, and showed no turbidity exceedances. Water quality monitoring of the placement events occurred during 12 events, again with no turbidity exceedances to report.

The fourth and final period occurred between 12/19/05 and 1/19/06 and involved the dredging of material from three locations in New Bedford Harbor, including Niemiec Marine on the north side of Pope's Island, Warren Alexander's Property in Fairhaven, and the remainder of D.N. Kelley and Sons Shipyard. Approximately 5,000 cubic yards of material was dredged from these locations and placed in CAD Cell #1 northwest of Pope's Island. Dredging operations were monitored for water quality on 5 days at each dredging location, with no turbidity exceedances to report during the dredging events.

For this part of the project, dredged material was not immediately disposed of in the CAD Cell as it was in the previous portions of dredging. Instead, a scow transfer system was put in place. Water quality was closely monitored during these scow transfer events, similar to placement events. Four days of water quality monitoring for these transfer events showed no turbidity exceedances. After this middle step, placement did occur, and Apex monitored one of the two placement events for water quality. No turbidity exceedances were reported from this final event.

Of all the events that took place during this Dredge Project, only one exceedance was recorded at the very beginning. Immediately following the turbidity exceedance, the water quality was even more closely observed and tested, and within 30 minutes, the quality of the water was back to normal. Following that peak, proper measures were taken to ensure no repeat incidents would occur.

# Post-Dredge/Existing Conditions Report

## New Bedford Harbor Dredge Project – Phase III

**March 2010**

### 5.0 Monitoring Results

The water quality was monitored during CAD Cell construction, and during the dredging and material placement operations for the New Bedford Harbor Dredge – Phase III from June 13, 2008 through August 25, 2009. Water quality monitoring was performed in accordance with the following Water Quality Monitoring Plans (WQMP):

- Top of CAD Water Quality Monitoring Plan: May 2008
- Steamship Authority Water Quality Monitoring Plan: July 2008
- Bottom of CAD Water Quality Monitoring Plan: August 2008
- Navigational Dredging Water Quality Monitoring Plan: February 2009

Following the guidelines of the respective WQMP, monitoring locations for water turbidity recorded an average turbidity over various water depths, up and down-current from the dredge or material placement operations, depending on tide. The values recorded as the Reference Site Turbidity were taken from up-current monitoring locations, or from monitoring events which occurred before dredge or material placement operations began. The Reference Turbidity Value was then compared to down-current turbidity values measured at regular time intervals after operations had begun.

The monitoring results were broken up into 5 periods of dredging and material placement that Apex oversaw in New Bedford Harbor during Phase III of the State Enhanced Remedy Dredge Project (Top of CAD, Steamship Authority, Bottom of CAD, Part B of Navigational Dredging and Part A of Navigational Dredging). At each monitoring location, various samples around the area were taken in order to get a thorough indication of water quality.

The Top of CAD project took place between June 13, 2008 and July 13, 2008 and included approximately 34,210 cubic yards of material being dredged from the area in which CAD Cell #2 was to be constructed, and placed into CAD Cell #1. In monitoring the water quality, no exceedances of the WQMP turbidity guidelines were detected for either dredging or disposal operations.

The Steamship Authority navigational dredge project took place between July 31, 2008 and September 11, 2008 and involved the dredging areas north and south of the Steamship Authority pier and placement of that material within CAD Cell #1. This portion of the project involved dredging 22,381 cubic yards of material. In monitoring the water quality for the dredging, no exceedances of the WQMP turbidity guidelines were detected for either dredging or disposal operations. On 8/26/08, turbidity measurements at the Steamship Authority down-current location [18.47 NTU] were 18.17 NTU higher than the measurements at the up-current location [0.3 NTU]. This event represented the greatest difference between up-current and down-current turbidity monitoring detected during Phase III dredging; however, the difference was not greater than the WQMP turbidity guidelines [which

stipulates that if the reference site turbidity is less than 10 NTU, that the permissible turbidity increase is no more than the reference plus 20 NTU].

The Bottom of CAD project took place between August 26, 2008 and October 9, 2008 and involved the excavation of clean material from CAD Cell #2, and the use of that material either during the placement of a pilot cap at the Borrow Pit or the transportation and disposal of the material at the Cape Cod Bay Disposal Site (CCBDS). In monitoring the water quality, no exceedances of the WQMP turbidity guidelines was detected for Bottom of CAD operations.

The Navigational Dredge – Part B project took place between March 20, 2009 and April 14, 2009 and involved the dredging of 4,190 cubic yards from the New Bedford Rowing Facility area and the placement of that material within CAD Cell #2. In monitoring the water quality, exceedances of the WQMP turbidity guidelines were not detected for the Navigational Dredge – Part B operations.

The Navigational Dredge – Part A project took place between April 20, 2009 and September 24, 2009 and involved the dredging of 26,208 cubic yards from Packer Marine, Tonnesson Park, South Terminal, Gifford Street Boat Ramp, and Niemiec Marine in New Bedford and Linberg Marine, Olde North Wharf Fisheries, Fairhaven Shipyard, Union Wharf, and Warren Alexander (South) in Fairhaven and the placement of that material within CAD Cell #2. In monitoring the water quality, exceedances of the WQMP turbidity guidelines were not detected for the Navigational Dredge – Part A operations.

Copies of the water quality monitoring sheets completed in the field are attached as Appendix B. Water quality monitoring data is summarized within Table 7.

# TABLE 7 - NEW BEDFORD HARBOR DREDGE - PHASE III

## Water Quality Monitoring - Turbidity Measurements

### June 12, 2008 -- August 25, 2009

| Date | Time of Up Current | Average of Up Current | Time of Down Current | Average of Down Current | Difference (Down Current - Up Current) | Time of Disposal Location | Average of Disposal Location | Project Title | Project and/or Location |
|---|---|---|---|---|---|---|---|---|---|
| 06/13/08 | 11:15 | 0.00 | 10:45 | 0.00 | 0.00 | - | - | TOP of CAD II | TOP of CAD II |
| 06/14/08 | 7:20 | 0.00 | 8:25 | 0.23 | 0.23 | - | - | TOP of CAD II | TOP of CAD II |
| 06/14/08 | 10:15 | 0.90 | 10:35 | 2.00 | 1.10 | - | - | TOP of CAD II | TOP of CAD II |
| 06/14/08 | 12:40 | 0.00 | 12:50 | 1.00 | 1.00 | - | - | TOP of CAD II | TOP of CAD II |
| 06/14/08 | 16:30 | 2.03 | 16:55 | 1.17 | -0.87 | - | - | TOP of CAD II | TOP of CAD II |
| 06/16/08 | 16:45 | 14.63 | 16:30 | 0.00 | -14.63 | 17:00 | 1.29 | TOP of CAD II | CAD I (Disposal Only) |
| 06/19/08 | 8:00 | 6.07 | 8:30 | 2.17 | -3.90 | - | - | TOP of CAD II | TOP of CAD II |
| 06/19/08 | 12:00 | 23.43 | 12:30 | 4.23 | -19.20 | 12:05 | 1.77 | TOP of CAD II | CAD I (Disposal Only) |
| 06/24/08 | 7:50 | 0.07 | 8:00 | 0.20 | 0.13 | - | - | TOP of CAD II | TOP of CAD II |
| 06/24/08 | 10:00 | 0.57 | 10:10 | 0.23 | -0.33 | - | - | TOP of CAD II | TOP of CAD II |
| 06/26/08 | 10:05 | 1.67 | 10:10 | 0.47 | -1.20 | - | - | TOP of CAD II | TOP of CAD II |
| 06/26/08 | 11:50 | 0.67 | 11:55 | 3.17 | 2.50 | - | - | TOP of CAD II | TOP of CAD II |
| 06/26/08 | 18:00 | 0.00 | 18:05 | 6.60 | 6.60 | - | - | TOP of CAD II | TOP of CAD II |
| 06/26/08 | 16:00 | 0.00 | 16:07 | 5.10 | 5.10 | - | - | TOP of CAD II | TOP of CAD II |
| 06/30/08 | 7:00 | 0.00 | 7:10 | 0.27 | 0.27 | - | - | TOP of CAD II | TOP of CAD II |
| 06/30/08 | 16:10 | 4.33 | 16:05 | 0.23 | -4.10 | - | - | TOP of CAD II | TOP of CAD II |
| 06/30/08 | 14:25 | 2.87 | 14:20 | 2.73 | -0.13 | - | - | TOP of CAD II | TOP of CAD II |
| 06/30/08 | 12:15 | 6.87 | 12:20 | 2.10 | -4.77 | - | - | TOP of CAD II | TOP of CAD II |
| 06/30/08 | 10:00 | 0.63 | 10:04 | 1.70 | 1.07 | - | - | TOP of CAD II | TOP of CAD II |
| 07/03/08 | 15:40 | 4.17 | 15:55 | 6.13 | 1.97 | - | - | TOP of CAD II | TOP of CAD II |
| 07/03/08 | 13:30 | 5.50 | 13:35 | 4.93 | -0.57 | - | - | TOP of CAD II | TOP of CAD II |
| 07/03/08 | 12:20 | 1.77 | 12:40 | 3.60 | 1.83 | 12:30 | 20.97 | TOP of CAD II | CAD I (Disposal Only) |
| 07/03/08 | 10:40 | 0.00 | 10:45 | 4.50 | 4.50 | - | - | TOP of CAD II | TOP of CAD II |
| 07/03/08 | 8:40 | 15.03 | 8:45 | 6.00 | -9.03 | - | - | TOP of CAD II | TOP of CAD II |
| 07/03/08 | 6:46 | 0.83 | 6:55 | 0.97 | 0.13 | 6:50 | 6.77 | TOP of CAD II | CAD I (Disposal Only) |
| 07/08/08 | 12:00 | 0.30 | 12:10 | 1.53 | 1.23 | 12:25 | 7.17 | TOP of CAD II | CAD I (Disposal Only) |
| 07/08/08 | 10:05 | 14.33 | 10:23 | 7.60 | -6.73 | - | - | TOP of CAD II | TOP of CAD II |
| 07/08/08 | 7:40 | 0.93 | 7:45 | 0.87 | -0.07 | - | - | TOP of CAD II | TOP of CAD II |
| 07/08/08 | 7:05 | 3.10 | 7:25 | 2.10 | -1.00 | 7:32 | 19.13 | TOP of CAD II | CAD I (Disposal Only) |
| 07/31/08 | 7:10 | 0.40 | 7:20 | 0.20 | -0.20 | - | - | Steamship | Steamship |
| 07/31/08 | 9:10 | 8.86 | 9:25 | 0.10 | -8.76 | - | - | Steamship | Steamship |
| 07/31/08 | 11:10 | 1.15 | 11:17 | 0.00 | -1.15 | - | - | Steamship | Steamship |
| 07/31/08 | 14:18 | 0.30 | 14:25 | 5.26 | 4.96 | - | - | Steamship | Steamship |
| 07/31/08 | 16:45 | 2.43 | 16:35 | 0.43 | -2.00 | - | - | Steamship | Steamship |
| 08/04/08 | 12:00 | 2.53 | 12:35 | 0.53 | -2.00 | 12:25 | - | Steamship | CAD I (Disposal Only) |
| 08/05/08 | 7:40 | 0.26 | 7:50 | 0.00 | -0.26 | - | - | Steamship | Steamship |
| 08/05/08 | 9:40 | 1.33 | 9:50 | 1.63 | 0.30 | - | - | Steamship | Steamship |

# TABLE 7 - NEW BEDFORD HARBOR DREDGE - PHASE III

## Water Quality Monitoring - Turbidity Measurements

### June 12, 2008 -- August 25, 2009

| Date | Time of Up Current | Average of Up Current | Time of Down Current | Average of Down Current | Difference (Down Current - Up Current) | Time of Disposal Location | Average of Disposal Location | Project Title | Project and/or Location |
|---|---|---|---|---|---|---|---|---|---|
| 08/05/08 | 12:00 | 22.40 | 12:10 | 2.53 | -19.87 | - | - | Steamship | Steamship |
| 08/05/08 | 14:05 | 1.17 | 14:20 | 16.20 | 15.03 | - | - | Steamship | Steamship |
| 08/05/08 | 16:46 | 2.53 | 16:55 | 0.66 | -1.87 | 16:45 | - | Steamship | CAD I (Disposal Only) |
| 08/07/08 | 10:00 | 0.00 | 10:30 | 0.00 | 0.00 | - | - | Steamship | Steamship |
| 08/07/08 | 11:45 | 0.03 | 12:00 | 0.83 | 0.80 | - | - | Steamship | Steamship |
| 08/07/08 | 14:20 | 0.00 | 14:30 | 0.93 | 0.93 | - | - | Steamship | Steamship |
| 08/07/08 | 15:30 | 0.00 | 15:55 | 6.70 | 6.70 | 0.65 | - | Steamship | CAD I (Disposal Only) |
| 08/07/08 | 17:15 | 0.00 | 17:25 | 0.00 | 0.00 | - | - | Steamship | Steamship |
| 08/08/08 | 7:15 | 0.00 | 7:25 | 0.00 | 0.00 | - | - | Steamship | Steamship |
| 08/08/08 | 13:30 | 0.16 | 13:40 | 11.07 | 10.91 | - | - | Steamship | Steamship |
| 08/08/08 | 15:45 | 0.30 | 16:01 | 0.93 | 0.63 | | - | Steamship | Steamship |
| 08/11/08 | 8:50 | 4.00 | 8:40 | 0.00 | -4.00 | - | - | Steamship | Steamship |
| 08/11/08 | 16:30 | 1.23 | 16:50 | 2.00 | 0.77 | - | - | Steamship | Steamship |
| 08/12/08 | 11:20 | 0.00 | 11:30 | 1.40 | 1.40 | - | - | Steamship | Steamship |
| 08/12/08 | 13:40 | 0.00 | 13:30 | 2.93 | 2.93 | - | - | Steamship | Steamship |
| 08/12/08 | 15:30 | 0.00 | 15:40 | 4.26 | 4.26 | - | - | Steamship | Steamship |
| 08/18/08 | 8:30 | 0.00 | 8:40 | 0.96 | 0.96 | - | - | Steamship | Steamship |
| 08/18/08 | 10:30 | 8.53 | 10:44 | 0.00 | -8.53 | | | Steamship | Steamship |
| 08/18/08 | 12:30 | 5.93 | 12:40 | 2.97 | -2.96 | - | - | Steamship | Steamship |
| 08/18/08 | 15:28 | 5.90 | 15:32 | 2.70 | -3.20 | | | Steamship | Steamship |
| 08/18/08 | 17:34 | 0.83 | 17:40 | 2.97 | 2.14 | | - | Steamship | Steamship |
| 08/21/08 | 9:50 | 1.03 | 10:15 | 0.13 | -0.90 | - | - | Steamship | Steamship |
| 08/21/08 | 12:45 | 3.90 | 12:50 | 0.00 | -3.90 | - | - | Steamship | Steamship |
| 08/21/08 | 14:59 | 5.53 | 14:50 | 0.63 | -4.90 | - | - | Steamship | Steamship |
| 08/21/08 | 17:22 | 5.60 | 17:26 | 0.83 | -4.77 | - | - | Steamship | Steamship |
| 08/21/08 | 16:04 | 2.20 | 17:04 | 2.86 | 0.66 | 16:00 | - | Steamship | CAD I (Disposal Only) |
| 08/26/08 | 7:00 | 4.10 | 7:10 | 0.50 | -3.60 | - | - | Steamship | Steamship |
| 08/26/08 | 8:55 | 0.30 | 9:02 | 18.47 | 18.17 | - | - | Steamship | Steamship |
| 08/26/08 | 11:05 | 4.97 | 11:15 | 5.43 | 0.46 | - | - | Steamship | Steamship |
| 08/26/08 | 13:00 | 2.77 | 13:12 | 9.73 | 6.96 | - | - | Steamship | Steamship |
| 08/28/08 | 7:30 | 3.77 | 7:40 | 3.37 | -0.40 | - | - | Steamship | Steamship |
| 08/28/08 | 9:30 | 5.10 | 9:35 | 6.30 | 1.20 | - | - | Steamship | Steamship |
| 08/28/08 | 11:40 | 2.67 | 11:35 | 6.27 | 3.60 | - | - | Steamship | Steamship |
| 08/28/08 | 15:35 | 10.10 | 15:28 | 6.50 | -3.60 | - | - | Steamship | Steamship |
| 08/28/08 | 8:50 | 24.10 | 8:57 | 9.63 | -14.47 | - | - | Steamship | Steamship |
| 09/03/08 | 9:00 | 1.03 | 9:11 | 6.57 | 5.54 | - | - | Steamship | Steamship |
| 09/03/08 | 11:25 | 1.00 | 11:32 | 16.13 | 15.13 | - | - | Steamship | Steamship |

# TABLE 7 - NEW BEDFORD HARBOR DREDGE - PHASE III

## Water Quality Monitoring - Turbidity Measurements

### June 12, 2008 -- August 25, 2009

| Date | Time of Up Current | Average of Up Current | Time of Down Current | Average of Down Current | Difference (Down Current - Up Current) | Time of Disposal Location | Average of Disposal Location | Project Title | Project and/or Location |
|---|---|---|---|---|---|---|---|---|---|
| 09/03/08 | 13:52 | 1.47 | 13:44 | 1.27 | -0.20 | - | - | Steamship | Steamship |
| 08/27/08 | 13:47 | 2.83 | 13:40 | 8.57 | 5.74 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/27/08 | 15:42 | 2.10 | 15:35 | 4.23 | 2.13 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/27/08 | 17:30 | 2.23 | 17:42 | 3.16 | 0.93 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/28/08 | 8:00 | 1.90 | 8:10 | 1.53 | -0.37 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/28/08 | 10:30 | 4.23 | 10:24 | 3.17 | -1.06 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/28/08 | 12:22 | 3.73 | 12:27 | 2.23 | -1.50 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/28/08 | 14:45 | 9.00 | 14:50 | 1.83 | -7.17 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 08/28/08 | 16:40 | 1.60 | 16:50 | 4.13 | 2.53 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/03/08 | 8:10 | 3.33 | 8:05 | 19.23 | 15.90 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/03/08 | 10:54 | 4.10 | 11:02 | 1.93 | -2.17 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/03/08 | 13:05 | 1.63 | 13:17 | 9.13 | 7.50 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/11/08 | 8:22 | 1.63 | 8:49 | 4.67 | 3.04 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/11/08 | 10:40 | 1.67 | 10:32 | 1.63 | -0.04 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/11/08 | 13:00 | 1.30 | 13:05 | 1.73 | 0.43 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/11/08 | 16:42 | 2.33 | 17:00 | 3.80 | 1.47 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/16/08 | 9:50 | 1.50 | 10:00 | 2.37 | 0.87 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/16/08 | 11:50 | 3.50 | 11:56 | 1.67 | -1.83 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/16/08 | 14:41 | 10.20 | 14:30 | 3.60 | -6.60 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/16/08 | 16:20 | 5.33 | 16:16 | 4.73 | -0.60 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/18/08 | 11:40 | 1.13 | 11:50 | 2.10 | 0.97 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 09/18/08 | 15:36 | 3.20 | 15:45 | 3.57 | 0.37 | N/A*[2] | N/A*[2] | BOC II | BOC II |
| 03/23/09 | *[1] | 1.45 | *[1] | 1.85 | 0.40 | - | N/A*[3] | PH III PART B | NBRF |
| 03/25/09 | 11:25 | 1.10 | 12:25 | 3.59 | 2.49 | 12:15 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 03/27/09 | 12:20 | 0.40 | 12:30 | 0.30 | -0.10 | 12:14 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 04/05/09 | 11:40 | 1.55 | 13:00 | 1.73 | 0.18 | 11:55 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 04/08/09 | 13:20 | 2.94 | 13:35 | 2.43 | -0.51 | 13:25 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 04/10/09 | 14:15 | 1.10 | 14:50 | 1.33 | 0.23 | 14:25 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 04/13/09 | 14:20 | 1.04 | 14:45 | 1.75 | 0.71 | - | N/A*[3] | PH III PART B | NBRF |
| 04/14/09 | 17:00 | 3.63 | 17:30 | 2.39 | -1.24 | 17:15 | N/A*[3] | PH III PART B | NBRF (Disposal Only) |
| 04/21/09 | 10:14 | 2.21 | 11:00 | 5.05 | 2.84 | 10:50 | N/A*[3] | PH III PART A | Gifford St. |
| 04/22/09 | 8:15 | 1.70 | 8:28 | 4.07 | 2.37 | 8:20 | N/A*[3] | PH III PART A | Gifford St. |
| 04/22/09 | 13:50 | 1.60 | 14:10 | 2.17 | 0.57 | - | N/A*[3] | PH III PART A | Gifford St. |

# TABLE 7 - NEW BEDFORD HARBOR DREDGE - PHASE III

## Water Quality Monitoring - Turbidity Measurements

### June 12, 2008 -- August 25, 2009

| Date | Time of Up Current | Average of Up Current | Time of Down Current | Average of Down Current | Difference (Down Current - Up Current) | Time of Disposal Location | Average of Disposal Location | Project Title | Project and/or Location |
|---|---|---|---|---|---|---|---|---|---|
| 04/23/09 | * [1] | 1.83 | * [1] | 2.00 | 0.17 | 7:35 | N/A*[3] | PH III PART A | Gifford St., South Terminal |
| 04/24/09 | 8:35 | 1.43 | 9:35 | 1.73 | 0.30 | 9:25 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 04/26/09 | 12:25 | 0.85 | 13:05 | 1.37 | 0.52 | 12:45 | N/A*[3] | PH III PART A | Gifford St., South Terminal |
| 05/04/09 | 11:30 | 3.02 | * [1] | 1.22 | -1.80 | 11:45 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 05/06/09 | 11:45 | 1.70 | 12:00 | 1.80 | 0.10 | 11:50 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 05/06/09 | 16:45 | 2.50 | 16:58 | 14.30 | 11.80 | - | N/A*[3] | PH III PART A | Gifford St. |
| 05/07/09 | 15:00 | 13.00 | 15:20 | 2.73 | -10.27 | - | N/A*[3] | PH III PART A | South Terminal |
| 05/13/09 | 13:30 | 1.37 | 13:50 | 1.47 | 0.10 | 13:36 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 05/14/09 | 8:20 | 0.60 | 8:45 | 2.27 | 1.67 | 8:35 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 05/16/09 | 12:30 | 2.09 | 13:25 | 0.61 | -1.48 | - | N/A*[3] | PH III PART A | Union Wharf |
| 05/20/09 | 14:00 | 21.60 | 14:20 | 3.19 | -18.41 | - | N/A*[3] | PH III PART A | Gifford St. |
| 05/22/09 | 8:00 | 0.81 | 8:15 | 0.29 | -0.52 | 8:05 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 05/28/09 | 10:13 | 1.09 | 10:25 | 1.85 | 0.76 | - | N/A*[3] | PH III PART A | Linberg Marine |
| 05/28/09 | 14:00 | 1.06 | 14:45 | 1.71 | 0.65 | 14:20 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 06/04/09 | 14:35 | 1.60 | 14:52 | 3.53 | 1.93 | - | N/A*[3] | PH III PART A | Linberg Marine |
| 06/04/09 | 16:20 | 1.90 | 16:55 | 3.13 | 1.23 | 16:35 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 06/06/09 | 14:05 | 1.47 | 14:30 | 3.76 | 2.29 | - | N/A*[3] | PH III PART A | Linberg Marine |
| 06/14/09 | 8:40 | 3.07 | 9:15 | 3.17 | 0.10 | 8:50 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 06/17/09 | 15:25 | 2.99 | 15:40 | 4.05 | 1.06 | - | N/A*[3] | PH III PART A | WA-S |
| 06/18/09 | 8:30 | 0.87 | 9:00 | 1.30 | 0.43 | 8:45 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 06/22/09 | 11:15 | 1.66 | 11:35 | 1.04 | -0.62 | - | N/A*[3] | PH III PART A | ONWF |
| 06/24/09 | 10:10 | 4.54 | 10:25 | 0.46 | -4.08 | - | N/A*[3] | PH III PART A | Gifford St. |
| 07/01/09 | 14:40 | 2.88 | 15:17 | 3.83 | 0.95 | - | N/A*[3] | PH III PART A | Gifford St. |
| 07/02/09 | 16:45 | 2.28 | 17:15 | 5.23 | 2.95 | - | N/A*[3] | PH III PART A | Gifford St. |
| 07/08/09 | 11:55 | 1.93 | 12:15 | 1.83 | -0.10 | - | N/A*[3] | PH III PART A | NL |
| 07/08/09 | 14:33 | 3.60 | 14:40 | 18.00 | 14.40 | 14:35 | N/A*[3] | PH III PART A | CAD II (Disposal only) |
| 07/10/09 | 9:30 | 0.73 | 10:15 | 1.05 | 0.32 | - | N/A*[3] | PH III PART A | Packer Marine |

# TABLE 7 - NEW BEDFORD HARBOR DREDGE - PHASE III

## Water Quality Monitoring - Turbidity Measurements

### June 12, 2008 -- August 25, 2009

| Date | Time of Up Current | Average of Up Current | Time of Down Current | Average of Down Current | Difference (Down Current - Up Current) | Time of Disposal Location | Average of Disposal Location | Project Title | Project and/or Location |
|---|---|---|---|---|---|---|---|---|---|
| 07/15/09 | 13:58 | 1.97 | 14:05 | 5.57 | 3.60 | - | N/A*[3] | PH III PART A | Gifford St. |
| 07/17/09 | 13:48 | 2.13 | 14:05 | 1.59 | -0.54 | - | N/A*[3] | PH III PART A | WA-S |
| 07/22/09 | 13:35 | 2.59 | 14:00 | 3.63 | 1.04 | - | N/A*[3] | PH III PART A | South Terminal |
| 07/23/09 | 15:30 | 4.22 | 15:40 | 2.70 | -1.52 | - | N/A*[3] | PH III PART A | South Terminal |
| 07/28/09 | 8:55 | 4.62 | 9:10 | 4.35 | -0.27 | - | N/A*[3] | PH III PART A | South Terminal |
| 08/12/09 | 13:40 | 2.90 | 14:10 | 4.51 | 1.61 | - | N/A*[3] | PH III PART A | Gifford St. |
| 08/13/09 | 17:48 | 1.90 | 18:05 | 2.60 | 0.70 | - | N/A*[3] | PH III PART A | South Terminal |
| 08/17/09 | 10:10 | 0.77 | 10:25 | 2.07 | 1.30 | - | N/A*[3] | PH III PART A | Packer Marine |
| 08/20/09 | 14:25 | 2.28 | 14:45 | 2.79 | 0.51 | - | N/A*[3] | PH III PART A | Packer Marine |
| 08/25/09 | 16:46 | 5.62 | 17:00 | 3.23 | -2.39 | - | N/A*[3] | PH III PART A | South Terminal |

**Comments:**

- Denotes a non-disposal event

*[1] Time field left blank on original field sheet/log-book

*[2] Bottom of CAD disposal events were off shore and water quality montitoring was not completed

*[3] PH III Part A and Part B Dredging were completed with a silt curtain around CAD II therefore no disposal location readings were taken (up-current and down-current measurements were taken outside the silt curtain.