UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

Superfund Records Center
SITE: So Weymouth OU10
BREAK: 8.3
OTHER: 506631

December 22, 2011

SDMS DocID 506631

Rachel Marino, Chief
Environmental Branch
USCG CEU Providence
300 Metro Center Boulevard
Warwick, RI 02886

Re: *First Five-Year Review Report*
United States Coast Guard Buoy Depot
South Weymouth, Massachusetts

Dear Ms. Marino:

Thank you for the opportunity to review the *First Five-Year Review Report for the United States Coast Guard (USCG) Buoy Depot, South Weymouth, Massachusetts.* EPA reviewed this document for compliance with the *Comprehensive Five-Year Guidance* (OSWER No. 9355.7-03B-P dated June 2001). This statutory review is consistent with the guidance provided in the OSWER directives. Upon review, EPA concurs with the findings that the remedy that has been implemented at the USCG South Weymouth Buoy Depot is protective of human health and the environment. The remedy is considered protective because there is no evidence that the engineering controls and land-use controls (LUCs) are not effective.

In addition to the items noted in Section 9.0 of the draft Five-Year Review Report, EPA identified several issues during its review and recommendations were outlined in EPA's December 1, 2011 comment letter on the draft report. Per the USCG's responses to EPA's comments, Section 10.0 will be amended to include the specific recommendations and follow-up actions necessary to maintain the long-term protectiveness of the remedy set forth in the September 29, 2006 Record of Decision (ROD) for the Buoy Depot site. Upon receipt of the final Five-Year Review Report, the EPA will be reporting to Congress the protectiveness determination for the site.

Rachel Marino, Chief
Environmental Branch
USCG CEU Providence

This first five-year review requirement was prompted by the remedial action start for the site. Therefore, consistent with Section 121(c) of CERCLA, the next Five-Year Review must be finalized on or before December 22, 2016.

Sincerely,

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

cc: Dave Chaffin, MADEP, Boston, MA
Brian Helland, USN-BRAC, Philadelphia, PA
David Barney, USN, South Weymouth, MA
Kevin Donovan, SSTTDC, South Weymouth, MA
Rona Gregory, USEPA, Boston, MA
Bryan Olson, USEPA, Boston, MA

Final First Five Year Review

United States Coast Guard Buoy Depot
South Weymouth, Massachusetts
Contract No.: HSCGG1-11-C-3RX003
Watermark Project No.: 11017-00

Watermark
Engineering • Construction • Operations

Prepared by:

Watermark
175 Cabot Street
Lowell, MA 01854

Prepared for:

United States Coast Guard
Civil Engineering Unit Providence
300 Metro Center Boulevard
Warwick, RI 02886

TABLE OF CONTENTS

SECTION ..... PAGE

CONCURRENCES iii

LIST OF ACRONYMS iv

EXECUTIVE SUMMARY v

FIVE YEAR REVIEW – SUMMARY FORM vii

1.0 INTRODUCTION 1-1

2.0 SITE CHRONOLOGY 2-1

3.0 BACKGROUND 3-1

3.1 Physical Characteristics 3-1
3.2 Land and Resource Use 3-1
3.3 History of Contamination 3-1
3.4 Initial Response 3-2
3.5 Basis for Taking Action 3-2

4.0 REMEDIAL ACTIONS 4-1

4.1 Remedy Objectives 4-1
4.2 Selected Remedy 4-2
4.3 Remedy Implementation 4-2
4.3.1 Institutional Controls 4-2
4.3.2 Engineering Controls 4-2
4.3.3 Long-Term Monitoring 4-2
4.3.4 Five-Year Reviews 4-3
4.4 Operation and Maintenance 4-3
4.5 Progress Since Completion of Remedial Action 4-4

5.0 PROGRESS SINCE THE PREVIOUS FIVE-YEAR REVIEW 5-1

6.0 FIVE-YEAR REVIEW PROCESS 6-1

6.1 Administrative Components 6-1
6.2 Community Involvement 6-1
6.3 Document Review 6-1
6.4 Data Review 6-1
6.4.1 Wetland Soil Sampling 6-1
6.4.2 Swale Soil Sampling 6-2
6.4.3 Surface Water Sampling 6-3
6.4.4 Groundwater Sampling 6-4
6.4.5 Annual Land Use Inspections 6-4
6.4.6 Stormwater System Maintenance/Inspection Logs 6-4
6.4.7 Buoy Management 6-5
6.4.8 Soil Management 6-5
6.4.9 Engineering Evaluation – Vortechs Unit 6-6
6.5 Applicable or Relevant and Appropriate Requirement Review 6-6
6.5.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements 6-6
6.5.2 Location-Specific Applicable or Relevant and Appropriate Requirements 6-6
6.5.3 Action-Specific Applicable or Relevant and Appropriate Requirements 6-7
6.6 Site Inspection 6-7
6.6.1 Vortechs Stormwater Treatment System 6-7
6.6.2 Polydrain 6-7
6.6.3 Catch Basin and Deep Sump Catch Basins 6-7
6.6.4 Crushed Gravel Areas 6-7

6.6.5 Earthen and Asphalt Berms *6-8*
6.6.6 Infiltration Trenches *6-8*
6.6.7 Wetland and Swale Soil Sampling Points *6-8*
6.7 Site Interview 6-8

7.0 TECHNICAL ASSESSMENT 7-1

7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents? 7-1
7.2 Question B: Are the Assumptions Used at the Time of Remedy Selection Still Valid? 7-3
7.3 Question C: Has Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy? 7-4
7.4 Technical Assessment Summary 7-4

8.0 INSTITUTIONAL CONTROLS 8-1

8.1 Types of Institutional Controls in Place at the Site 8-1
8.2 Effect of Future Land Use Plans on Institutional Controls 8-1
8.3 Plans for Changes to Site Contamination Status 8-2

9.0 ISSUES 9-1

10.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS 10-1

11.0 PROTECTIVENESS STATEMENT 11-1

12.0 NEXT REVIEW 12-1

13.0 REFERENCES 13-1

TABLES

Table 1 Chronology of Site Events
Table 2 Recommendations and Follow-up Actions

FIGURES

Figure 1 Site Locus Map
Figure 2 Site Map
Figure 3 Swale Surface and Wetland Surface Soil Sample Locations
Figure 4 Confirmation Soil and Surface Water Sample Locations
Figure 5 Groundwater Sample Locations

APPENDICES

Appendix A Public Notice Announcement for Five-Year Review for the Buoy Depot Site
Appendix B Mann-Kendall Trend Analysis
Appendix C Applicable or Relevant and Appropriate Requirements to be Considered Guidance for Selected Remedy
Appendix D Site Inspection Checklist
Appendix E Site Inspection Photographs
Appendix F Site Interview Responses
Appendix G Responses to Comments Draft Five-Year Review

CONCURRENCES

Document Prepared By:

Rachel Marino Date: 2-15-12

Rachel Marino
U.S. Coast Guard Civil Engineering Unit Providence
Chief, Environmental Branch

Concur By:

Date: 2-23-12

James Owens
U.S. Environmental Protection Agency, New England
Director, Office of Site Remediation and Restoration

LIST OF ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
Buoy Depot site	U.S. Coast Guard South Weymouth Buoy Depot site
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituent of concern
COPC	Constituent of potential concern
CEU	Civil Engineering Unit (Providence)
EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
ft	Feet(foot)
ft^2	Square feet(foot)
in.	Inch(es)
LBP	Lead-based paint
LTMP	Long-Term Monitoring Plan
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MassDEP	Massachusetts Department of Environmental Protection
O&M	Operation and maintenance
PAL	Project Action Limit
QAPP	Quality Assurance Project Plan
ROD	Record of Decision
USCG	U.S. Coast Guard
Watermark	Watermark Environmental

EXECUTIVE SUMMARY

The U.S. Coast Guard (USCG) has conducted the first Five-Year Review of the remedial action implemented at the USCG South Weymouth Buoy Depot in South Weymouth, Massachusetts (Buoy Depot site). The purpose of this first Five-Year Review is to determine whether the selected remedy is protective of human health and the environment. This statutory review was conducted from June to August 2011, and its findings and conclusions are documented in this report. The first Five-Year Review period is from December 2006 to December 2011.

The Buoy Depot site is the USCG's principal facility in the Northeast for storing, cleaning, repairing, and painting navigational buoys. The Buoy Depot is located on the USCG's property and is approximately 5 acres in size. There is a two-story, steel and concrete block building occupying approximately 20,000 square feet (ft^2) on the northwestern portion of the property. Asphalt and concrete paved driveways surround the building. Most of the property is a dirt and gravel-covered buoy storage area to the south and east of the building. The property is relatively flat with topographic relief gently sloping toward a wetland area to the southeast. A drainage swale abuts the southern fence line of the site and receives intermittent stormwater runoff from the buoy storage area. The drainage swale runs from west to east and discharges stormwater to the forested wetland.

A Record of Decision (ROD) selecting the remedy was signed on 29 September 2006 (USCG 2006). The components of the selected remedy include implementing land use controls (LUCs) including institutional controls and engineering controls, conducting long-term monitoring of the surface soils in the stormwater drainage swale and wetland area immediately adjacent to the property, and conducting five-year reviews in accordance with Comprehensive Environmental Response, Compensation, and Liability Act Section 121(c). The remedy has been implemented since 2006. A Land Use Control and Implementation Plan (LUCIP) was developed in draft format in 2006 and finalized in 2010. Five rounds of long-term monitoring of the soils in the swale and wetland were conducted between 2007 and 2010 in accordance with the Long-Term Monitoring Plan (LTMP) (EA 2007a) and Quality Assurance Project Plan (QAPP) developed for the site (EA 2007b).

This first five-year review includes the following components: document review, data review, applicable or relevant and appropriate requirements (ARARs) review, site inspection, and interviews. Documents reviewed for this five-year review included, but were not limited to, the following: ROD, LUCIP, LTMP, QAPP, long-term monitoring reports, quarterly and annual operation and maintenance (O&M) reports, and Annual LUC Inspection Reports. This first five-year review focuses on the data obtained during routine monitoring events and O&M activities conducted during the 2006–2011 timeframe.

The most recent long-term monitoring sampling event occurred in June 2011. This sampling event occurred outside of the five-year review period, and the monitoring data were not available for review at the time of this report. The results from prior groundwater and surface water sampling events, from 2006 to 2010, have been reviewed.

Available data suggest the selected remedy is performing as intended, with the following issues noted:

1. **Increasing trend for chromium, copper, nickel, and zinc at sample location LTM-WSS-02**—From the Mann-Kendall analysis for trend at the 95 percent confidence level, wetland soil sample LTM-WSS-02 showed increasing concentrations of chromium, copper, nickel, and zinc; no trend was identified for lead. All of the wetland soil sampling locations are located around the perimeter of the wetland. Wetland soil sample LTM-WSS-02 is located in the northern boundary of the wetland. Sample locations LTM-WSS-03, LTM-WSS-04, and LTM-WSS-01, all of which showed no trend for any of the constituents of concern (COCs), are located immediately adjacent to the west and east of sample location LTM-WSS-02 which showed the only increasing trends in the swale and wetland. It was observed during the site inspection that the hay bale check dams located in the swale and wetland are causing the stormwater runoff to flow preferentially toward LTM-WSS-02. This may account for the increasing trend observed in the statistical analysis. Additionally, many sampling points indicate that no trend can be established with the available data; therefore, additional monitoring will provide more data that are necessary to define concentration trends.

2. **Solids removal from Vortechs and catch basins**—O&M activities at the site are focused on the stormwater conveyance system and the Vortechs unit. In reviewing the inspection logs, the Vortechs unit has never been pumped to remove collected solids because the solids never reached a thickness that required removal. There is evidence that, on occasion when solids collect in the Vortechs unit, they may be transported to the swale and wetland since the measured amount of solids decreased from one quarterly inspection to the next. However, based on the analysis of the long-term monitoring results for soils in the swale and wetland, there is no evidence the material is impacting the swale or wetland soils. In order to minimize the potential for solids to be transported downgradient, it is recommended that the Vortechs and catch basins have collected solids removed at least once per year.
3. **Hay bale check dams**—There are hay bale check dams in the swale to help control erosion. The placement of these hay bales seems to be creating preferential flow paths in the lower section of the swale and into the entrance of the wetland. In addition, wetland sample LTM-WSS-02, which is at the top of the wetland, is located in an area of preferential flow. This may be why this sample has shown some indication of increasing trends for chromium, copper, nickel, and zinc. The continued use of these hay bales, along with other options for erosion control, will be evaluated to determine if the water can flow in a more natural sheet flow pattern. Erosion control options will be evaluated in an attempt to decrease the impact of the preferential flow and lessen the potential to channelize the flow into the wetland.
4. **Berms/curbing and fence repairs**—In reviewing the quarterly inspections and during the site inspection, the berms/curbing were noted in need of repair along the northern side of the property. These repairs are needed to ensure stormwater is contained onsite. In addition, the fence along the swale should be repaired to mitigate the potential for a trespasser to enter the Buoy Depot site through this area.
5. **Concrete repair**—The concrete along portions of the polydrain system is cracking or deteriorating. The concrete should be repaired to ensure ongoing structural integrity of the polydrain system.

Based on the issues identified, the following recommendations are made for the site:

1. **Continue implementation of institutional controls, long-term monitoring, and five-year reviews**—The remedy should continue as presented in the ROD. There are not enough data to definitively determine any trends in the drainage swale or wetland. The institutional and engineering controls should remain in place until monitoring indicates stable or decreasing trends in COCs, especially lead.
2. **Continue implementation of Lead-Based Paint Buoy Management Plan**—Testing of incoming buoys has not indicated any buoys containing lead-based paint (LBP). In addition, all buoys stored on-site containing LBP were removed from the Buoy Depot site and scrapped in 2008. In order to ensure that all buoys containing LBP have been removed from service and can no longer be a source of contamination at the Buoy Depot, Appendix C of the LUCIP (LBP Buoy Management Plan) will be implemented for three more years, or through 2014. At that time, the USCG will review the buoy logs to ensure that no buoys have been received that contain LBP. If no buoys have been received, then upon receiving approval from the U.S. Environmental Protection Agency (EPA) and concurrence from Massachusetts Department of Environmental Protection (MassDEP), the LBP Management Plan will no longer be implemented.
3. **Increasing trend for chromium, copper, nickel, and zinc at sample location LTM-WSS-02**—This condition merits further monitoring to determine if the increasing trend continues or is an anomaly due to the small sample set.
4. **Solids removal from Vortechs and catch basins**—The collected solids should be removed at least annually from the Vortechs and catch basins to ensure that collected solids are not transported downgradient.

5. **Hay bale check dams**—The continued use of the hay bale check dams in the swale and entrance to the wetland will be evaluated along with other erosion control options to minimize the preferred flow and potential channelization at the toe of the swale and entrance to the wetland.
6. **Berms/curbing and fence repairs**—The berm/curbing along the northern border of the Buoy Depot site and the fence along the southern boundary along the drainage swale should be repaired to ensure stormwater remains contained on the site.
7. **Concrete repair**—The concrete around the polydrain system should be repaired to ensure that the structural integrity of the polydrain remains intact.

Five-Year Review Summary Form		
Site Identification		
Site Name (from WasteLAN): USCG South Weymouth Buoy Depot Site		
EPA ID (from WasteLAN): MA0690330758		
Region: 1	**State:** Massachusetts	**City/County:** South Weymouth
Site Status		
NPL Status: ☒ Final ☐ Deleted ☐ Other (specify) _____		
Remediation Status (choose all that apply): ☐ Under Construction ☒ Operating ☐ Complete		
Multiple Operable Units? ☐ YES ☒ NO	**Construction Completion Date:** April 2006	
Has site been put into reuse? ☐ YES ☒ NO		
Review Status		
Reviewing Agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency USCG		
Author Name: Rachel Marino		
Author Title: Chief, Environmental Branch	**Author Affiliation:** U.S. Coast Guard	
Review Period:* June–September 2011		
Date(s) of Site Inspection: 27 July 2011		
Type of Review: ☒ Statutory ☐ Policy ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review Number: ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____		
Triggering Action: ☒ Actual Remedial Action On-site Construction at Operable Unit ☐ Actual Remedial Action Start ☐ Construction Completion ☐ Previous Five-Year Review Report ☐ Other (specify)_____		
Triggering Action Date (from WasteLAN): 22 December 2006		
Due Date (Five Years After Triggering Action Date): 22 December 2011		
* The review period refers to the period during which the Five-Year Review was conducted.		

Five-Year Review Summary Form

Issues:

1. **Increasing trend for chromium, copper, nickel, and zinc at sample location LTM-WSS-02**—From the Mann-Kendall analysis for trend at the 95 percent confidence level, wetland soil sample LTM-WSS-02 showed increasing concentrations of chromium, copper, nickel, and zinc; no trend was identified for lead. All of the wetland soil sampling locations are located around the perimeter of the wetland. Wetland soil sample LTM-WSS-02 is located in the northern boundary of the wetland. Sample locations LTM-WSS-03, LTM-WSS-04, and LTM-WSS-01, all of which showed no trend for any of the COCs, are located immediately adjacent to the west and east of sample location LTM-WSS-02 which showed the only increasing trends in the swale and wetland. It was observed during the site inspection that the hay bale check dams located in the swale and wetland are causing the stormwater runoff to flow preferentially toward LTM-WSS-02. This may account for the increasing trend observed in the statistical analysis. Additionally, many sampling points indicate that no trend can be established with the available data; therefore, additional monitoring will provide more data that are necessary to define concentration trends.
2. **Solids removal from Vortechs and catch basins**—O&M activities at the site are focused on the stormwater conveyance system and the Vortechs unit. In reviewing the inspection logs, the Vortechs unit has never been pumped to remove collected solids because the solids never reached a thickness that required removal. There is evidence that, on occasion when solids collect in the Vortechs unit, they may be transported to the swale and wetland since the measured amount of solids decreased from one quarterly inspection to the next. However, based on the analysis of the long-term monitoring results for soils in the swale and wetland, there is no evidence the material is impacting the swale or wetland soils. In order to minimize the potential for solids to be transported down gradient, it is recommended that the Vortechs and catch basins have collected solids removed at least once per year.
3. **Hay bale check dams**—There are hay bale check dams in the swale to help control erosion. The placement of these hay bales seems to be creating preferential flow paths in the lower section of the swale and into the entrance of the wetland. In addition, wetland sample LTM-WSS-02, which is at the top of the wetland, is located in an area of preferential flow. This may be why this sample has shown some indication of increasing trends for chromium, copper, nickel, and zinc. The continued use of these hay bales, along with other options for erosion control, will be evaluated to determine if the water can flow in a more natural sheet flow pattern. Erosion control options will be evaluated in an attempt to decrease the impact of the preferential flow and lessen the potential to channelize the flow into the wetland.
4. **Berms/curbing and fence repairs**—In reviewing the quarterly inspections and during the site inspection, the berms/curbing were noted in need of repair along the northern side of the property. These repairs are needed to ensure stormwater is contained onsite. In addition, the fence along the swale should be repaired to mitigate the potential for a trespasser to enter the Buoy Depot site through this area.
5. **Concrete repair**—The concrete along portions of the polydrain system is cracking or deteriorating. The concrete should be repaired to ensure ongoing structural integrity of the polydrain system.

Recommendations and Follow-up Actions:

Based on the issues identified, the following recommendations are made for the Buoy Depot site:

1. **Continue implementation of institutional controls, long-term monitoring, and five-year reviews**—The remedy should continue as presented in the ROD. There are not enough data to definitively determine any trends in the drainage swale or wetland. The institutional and engineering controls should remain in place until monitoring indicates stable or decreasing trends in COCs, especially lead.
2. **Continue implementation of Lead-Based Paint Buoy Management Plan**—Testing of incoming buoys has not indicated any buoys containing LBP. In addition, all buoys stored on-site containing LBP were removed from the Buoy Depot site and scrapped in 2008. In order to ensure that all buoys containing LBP have been removed from service and can no longer be a source of contamination at the Buoy Depot, Appendix C of the LUCIP (LBP Buoy Management Plan) will be implemented for three more years through 2014. At that time, the USCG will review the buoy logs to ensure that no buoys have been received that contain LBP. If no buoys have been received that contain LBP then, upon receiving approval from the EPA and concurrence from MassDEP, the LBP Management Plan will no longer be implemented.
3. **Increasing trend for chromium, copper, nickel, and zinc at sample location LTM-WSS-02**—This condition merits further monitoring to determine if the increasing trend continues or is an anomaly due to the small sample set.
4. **Solids removal from Vortechs and Catch Basins**—The collected solids should be removed at least annually from the Vortechs and catch basins to ensure that collected solids are not transported downgradient.
5. **Hay bale check dams**—The continued use of the hay bale check dams in the swale and entrance to the wetland will be evaluated along with other erosion control options to minimize the preferred flow and potential channelization at the toe of the swale and entrance to the wetland.
6. **Berms/curbing and fence repairs**—The berm/curbing along the northern border of the Buoy Depot site should be repaired to ensure stormwater remains contained on the Buoy Depot site. In addition, the fence along the southern boundary should be repaired to mitigate the potential for a trespasser to enter the Buoy Depot site through this area.
7. **Concrete repair**—The concrete around the polydrain system should be repaired to ensure that the structural integrity of the polydrain remains intact.

Protectiveness Statement:

Based on the information available during the First Five-Year Review, the selected remedy for the USCG South Weymouth Buoy Depot site is currently performing as intended. The remedy is considered protective because there is no evidence the engineering controls and LUCs are not being effective. In addition, the results of the long-term monitoring in the swale and wetland indicate increasing trends of chromium, copper, nickel, and zinc at one sample location in the wetland. However, the primary COC, lead, is not increasing at any sample location. These trends will continue to be evaluated as part of the Five-Year Review process via statistical analysis of historic and future monitoring results, to ensure that any metals trending above action levels are addressed appropriately. The recommendations and follow-up actions identified in this Five-Year Review process should be addressed or continued for long-term remedy protectiveness of human health and the environment until remedial action objectives are met.

1.0 INTRODUCTION

This First Five-Year Review Report was prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 42 United States Code § 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations Part 300 et seq., as amended. The regulatory program performed under the context of these combined laws and regulations is commonly referred to as "Superfund." This Five-Year Review, prepared by EA Engineering, Science, and Technology, Inc. (EA) under contract to the U.S. Coast Guard (USCG) Civil Engineering Unit (CEU) Providence, and Watermark Environmental (Watermark) evaluates the effectiveness of the selected remedy at the USCG South Weymouth Buoy Depot site (Buoy Depot site). The selected remedy for the Buoy Depot site includes land use controls (LUCs), long-term monitoring, and five-year reviews. The selected remedy was set forth in the Record of Decision (ROD) signed 29 September 2006 (USCG 2006). The date of the first five-year review is December 2011.

EA conducted the five-year review from June to September 2011. The purpose of a five-year review is to determine whether the selected remedy at a site remains protective of human health and the environment. This Five-Year Review Report identifies issues found during EA's review, documents results, and makes recommendations to address these in accordance with U.S. Environmental Protection Agency (EPA) guidance.

This is the first five-year review for the Buoy Depot site. The period addressed by this five-year review extended from December 2006 to December 2011. The triggering action for this review was the final ROD, which was signed 29 September 2006 (USCG 2006). The most recent long-term monitoring sampling event occurred in June 2011. This sampling event occurred outside of the five-year review period, and the monitoring data were not available for review at the time of this report. The results from prior groundwater and surface water sampling events, from 2006 to 2010, have been reviewed. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

2.0 SITE CHRONOLOGY

Table 1 presents a chronology of significant events for the Buoy Depot site.

3.0 BACKGROUND

This section discusses the physical characteristics of the Buoy Depot site, including land and resource use and environmental setting. Additionally, the history of site contamination, initial response action taken at the site, and basis for the response action are described. Remedial actions conducted following the initial response action at the site are discussed in Section 4.

3.1 Physical Characteristics

The site is located on Rear Main Street (also known as Trotter Road) in South Weymouth, Massachusetts (Figures 1 and 2). The national Superfund electronic database identification number for the site is MA0690330758. The Buoy Depot property was formerly part of the Naval Air Station South Weymouth, and the site is part of the Naval Air Station South Weymouth National Priorities List site.

3.2 Land and Resource Use

The Buoy Depot site is comprised of the USCG Buoy Depot property in South Weymouth as well as the stormwater drainage swale and the affected portion of the downstream wetland located to the south on adjacent property controlled by the Navy (Figure 2), also in South Weymouth. The USCG Base Support Unit Boston operates the Integrated Support Detachment South Weymouth Buoy Depot on the Buoy Depot property. USCG is the lead agency, with EPA as the support agency, for site investigation and restoration under CERCLA. USCG is the sole source of funding for the investigation and response actions at the site.

USCG leased the Buoy Depot property from the Navy beginning on 1 March 1972. In October 2000, the USCG Buoy Depot property was transferred to USCG from the Navy through a Federal Agency to Federal Agency Transfer. Upon transfer of the property from the Navy, USCG also assumed responsibility for the CERCLA investigation and response actions at the Buoy Depot site through a Federal Facility Agreement with EPA.

The Buoy Depot is the USCG's principal facility in the Northeast for storing, cleaning, repairing, and painting navigational buoys. The Buoy Depot is located on the USCG's property (Buoy Depot property) and is approximately 5 acres in size. The adjacent land is mostly forested to the north and south. There are wetlands to the south and southeast, an open field to the east, and a commuter rail line and commercial businesses to the west (Figure 2). A chain-link fence with lockable gates surrounds the Buoy Depot property. There is a two-story, steel and concrete block building occupying approximately 20,000 square feet (ft^2) on the northwestern portion of the property. Asphalt and concrete paved driveways surround the building. Most of the property is a dirt and gravel-covered buoy storage area to the south and east of the building. The property is relatively flat with topographic relief gently sloping toward a wetland area to the southeast. A drainage swale (a low-lying area or ditch) abuts the southern fence line of the Buoy Depot property and received intermittent stormwater runoff from the buoy storage area. The drainage swale runs from west to east and discharges stormwater to the forested wetland. The swale and a portion of the wetland on Navy property had been impacted by the Buoy Depot facility operations and are, therefore, part of the Buoy Depot site.

3.3 History of Contamination

Since facility construction was completed (1972-1973), Buoy Depot operations have included buoy rehabilitation (e.g., "shot blasting" to remove old paint, welding, painting, and electrical wiring), minor vehicle and equipment maintenance, waste generation (steel shot blast residue, waste oils, paint-related waste) and fuel storage, warehousing, outdoor scrap metal storage, and administrative use. Most of the buoys are constructed of steel and range in size from 3 feet (ft) to greater than 30 ft in length and can weigh up to 20,000 pounds. Old or damaged buoys that are beyond repair are stored at the Buoy Depot pending sale as scrap metal.

As a result of facility operations (i.e., buoy storage, refurbishment, and scrapping), lead and paint chips were present in the surface soil of the buoy storage area. Due to stormwater runoff, surface soil of an adjacent drainage swale and wetland were impacted with metals, primarily lead, from the buoy storage area. The USCG stopped buying lead-based paint (LBP) and primers for buoys in 1986. The USCG was required to deplete this existing paint inventory by 1988. Buoys are refurbished every 6-8 years. Therefore, most of the USCG's buoys that are now received at the Buoy Depot have already been cycled through the system and repainted with

non-LBP. As part of the Land Use Control Implementation Plan (LUCIP), the USCG has developed and implemented procedures to manage the limited number of buoys with residual LBP coating that may be processed at the Buoy Depot in the future.

3.4 Initial Response

The site has been the subject of a Remedial Investigation (EA 2001) and Feasibility Study, an Engineering Evaluation/Cost Analysis (EA 2002), and both Time-Critical and Non-Time-Critical Removal Actions (EA 2003) to address lead in soil associated with facility use of lead-based primers through the mid-1980s.

USCG excavated lead-contaminated soil from around a former dust collection system, removed and decommissioned the building's floor drain system, and excavated soil posing unacceptable human health and ecological risks in the stormwater drainage swale and wetland area on abutting Navy property. Accordingly, no risk concerns remain for ecological receptors in the swale or wetland. The USCG also reduced the potential for recontamination of the swale and wetland through the construction of a stormwater control system, which will reduce the transport of soil particles and paint chips from the buoy storage area to the drainage swale. The swale and wetland portions of the site have been cleaned up to residential remedial goals and ecological remediation goals and, therefore, are suitable for unlimited use and unrestricted exposure.

The current and planned future use of the USCG property is industrial and, based on the results of the Human Health Risk Assessment, the environmental conditions of the Buoy Depot property are suitable (i.e., do not exceed CERCLA risk benchmarks) for continued industrial operations. However, EPA and USCG have agreed that the buoy storage portion of Area of Concern (AOC) 3 may not be suitable for unlimited use and unrestricted exposure due to the remaining lead concentrations and paint chips (potentially lead-based) present in surface soil. Based on data from the Remedial Investigation, the average lead concentration in surface soil in the buoy storage area does not exceed EPA's screening level of 400 milligrams per kilogram lead in soil. However, in a hypothetical future scenario in which the Buoy Depot property is transferred and then subdivided and/or redeveloped into small residential lots, average lead concentrations in soil could be higher in some small lots if soil lead conditions are not further mitigated. Paint chips are potentially present in surface soil throughout the buoy storage area. Some of these paint chips may contain lead and could pose a hazard under a future reuse scenario where young children are present.

3.5 Basis for Taking Action

Some remaining risk concerns have been identified for hypothetical, future, and non-commercial/industrial reuse scenarios associated with the residual lead and paint chips in the surface soil of the buoy storage yard. The presence of lead and paint chips in surface soil, if not addressed by implementing the LUCs, long-term monitoring, and five-year reviews specified in the ROD (USCG 2006), may present an endangerment to public health, welfare, or the environment.

The selected remedy addresses these concerns by preventing land use that could result in unacceptable exposure to lead or paint chips in soil by sensitive receptors (i.e., certain non-commercial/industrial uses as specified in Section 2.12.2.2.1 of the ROD [USCG 2006]), and by preventing migration of soil from the buoy storage area to adjacent property. In addition, the selected remedy includes long-term monitoring of the swale and wetland which will monitor the effectiveness of the selected remedy for preventing recontamination of the adjacent stormwater drainage swale and downstream wetland areas.

4.0 REMEDIAL ACTIONS

This section discusses the remedy objectives, selection, and implementation of the selected remedy for AOC 3 (i.e., buoy, equipment, and scrap metal storage area). It also describes the ongoing operation and maintenance (O&M) activities and progress since completion of the remedial action.

4.1 Remedy Objectives

Based on preliminary information relating to types of environmental media of concern and potential exposure pathways, response action objectives, both removal action and remedial action objectives, were developed to aid in the development and screening of alternatives. These response action objectives were developed to mitigate, restore, and/or prevent existing and future potential threats to human health and the environment. The following goals were developed during the Engineering Evaluation/Cost Analysis (EA 2002) for the Non-Time-Critical Removal Action (EA 2003) completed in 2003:

- Prevention, to the extent practicable, of direct contact with and ingestion of surficial soil that presents unacceptable risks to human health and/or ecological receptors (i.e., the soil of the swale and wetlands)
- Prevention of potential future impacts to groundwater beneath the site through removal of impacted soil and sludge associated with existing floor drains beneath the site building
- Mitigation of ongoing migration of metals (primarily lead) from the buoy storage area to the adjacent drainage ditch and the downstream wetland, and prevention of future migration to the extent possible.

The Non-Time-Critical Removal Action (EA 2003) achieved the above goals through excavation of the swale soil and wetland hydric soil, removal of the building's floor drain system, and installation of the stormwater management system. Subsequent to the Non-Time-Critical Removal Action, USCG issued a Feasibility Study to address the remaining portion of the AOC that was not yet addressed through the completed removal actions (i.e., the buoy storage area of AOC 3). The Feasibility Study presented the following response action objectives for AOC 3:

- Prevent future human (residential) exposure to lead and potential LBP chips in soil of the buoy storage area
- Prevent constituents of concern (COCs) in on-site soil from migrating off the Buoy Depot property.

Achieving the combination of all these goals provides for a complete site remedy, which is protective of human health and the environment and which complies with Applicable or Relevant and Appropriate Requirements (ARARs). The completed removal actions mitigated the unacceptable human health (cancer and non-cancer) and ecological risks associated primarily with lead in soil at the site. The selected remedy effectively mitigates the remaining risk concerns associated with various hypothetical future use scenarios to lead and/or paint chips in surface soil of the buoy storage area. At present, the USCG has no plans to transfer the Buoy Depot property and the current industrial operations will continue into the future. The removal actions have already restored the swale/wetland areas so that potential risks to human health or the environment do not exceed EPA's threshold risk levels for any of the evaluated use scenarios. Therefore, the swale/wetland areas of the Buoy Depot site are deemed to be acceptable for unlimited use and unrestricted exposure. Furthermore, the risk assessments demonstrated that the Buoy Depot property portion of the site is suitable for continued industrial use because risk levels do not exceed EPA's threshold risk levels for a commercial/industrial use scenario. The selected remedy mitigates the remaining risk concerns via LUCs that include institutional controls to ensure proper (acceptable) use of the property in the future, and engineering controls to maintain preventative measures for the migration of lead and paint chips in buoy storage area soil to offsite areas via stormwater runoff. No response action objectives were required for groundwater because the identified risks in groundwater were associated with constituent of potential concern (COPC) concentrations that were consistent with background levels.

4.2 Selected Remedy

A ROD for the site was signed by EPA and USCG on 29 September 2006 (USCG 2006). The MassDEP concurred with the ROD. The Selected Remedy includes No Further Action for AOC 1 (i.e., building and adjacent areas to the south); No Action for AOC 2 (i.e., septic system tank, piping, and leach field); and LUCs (institutional and engineering controls), long-term monitoring, and five-year reviews for AOC 3 (i.e., buoy, equipment, and scrap metal storage area). The selected remedy, combined with the completed removal actions, comprises a comprehensive remedy.

The selected remedy addresses the remaining risk concerns associated with lead and LBP chips in surface soil under certain reuse scenarios. Specifically, the ROD (USCG 2006) specifies LUCs that include establishment of institutional controls to prohibit current and future uses that could result in unacceptable risks to certain potentially sensitive receptors, and engineering controls to manage potential migration of soil from the buoy storage area to the drainage swale and wetland on adjacent Navy property. The ROD also specifies long-term monitoring and five-year reviews to ensure the long-term effectiveness of the remedy. The LUCs apply to the USCG Buoy Depot property portion of the site.

4.3 Remedy Implementation

USCG established LUCs that apply to the USCG Buoy Depot property. The LUCs consist of institutional and engineering controls. The USCG developed a LUCIP (EA 2010b) for implementing the LUCs.

4.3.1 Institutional Controls

USCG implemented institutional controls in the form of a USCG Instruction delineating the property use restrictions while the property is controlled by the USCG and deed restrictions in the event of any transfer of the Buoy Depot property. These controls prohibit future uses of the Buoy Depot property for which concentrations of lead and the presence of paint chips in soil may be unacceptable. Prohibited uses of the Buoy Depot site include residential use; certain recreational uses; agricultural use; use involving facilities with children under the age of 6, such as daycare centers or playgrounds; or use as wildlife habitat without further evaluation. The institutional controls remain in effect unless and until mitigation measures are taken to reduce lead concentrations in soil to levels that allow for unlimited use and unrestricted exposure on the property. The institutional controls are implemented in accordance with the LUCIP.

4.3.2 Engineering Controls

USCG implemented engineering controls on the Buoy Depot property to prevent unauthorized access to the site and to manage potential migration of soil from the buoy storage area to the drainage swale and wetland on adjacent Navy controlled property. These engineering controls include continuing O&M of the stormwater control system, facility fencing and gates, soil management procedures for operations or construction activities that could disturb soil in the buoy storage area, and procedures for managing the future refurbishment of those limited number of buoys with residual LBP coating. The buoy and soil management procedures are outlined in the LUCIP. The LUCIP includes a USCG Instruction mandating these engineering controls. The engineering controls remain in effect unless and until mitigation measures are taken to reduce concentrations of lead in soil to levels that allow for unlimited use and unrestricted exposure on the property. If the property is transferred in the future to another entity by deed, then the USCG would continue to implement the engineering controls (via deed restrictions) unless and until mitigation measures were taken to reduce concentrations of lead in the soil to levels that allow for unlimited use and unrestricted exposure on the property.

4.3.3 Long-Term Monitoring

USCG is conducting annual long-term monitoring of the surface soil in the stormwater drainage swale and downstream wetland area located on adjacent property controlled by the Navy. The swale and wetland are sampled annually until the first five-year review (the subject of this report), at which time the data are reviewed, and statistical analysis performed to determine future monitoring requirements. The initial round of this sampling included several soil samples from the stormwater drainage swale in support of the Non-Time-Critical Removal Action (EA 2003). The long-term monitoring samples consist of six soil samples collected in the

swale and six soil samples collected in the remediated wetland (Figure 3). In accordance with the LTMP (EA 2007a), the first monitoring event (ME-01) included collecting one round of groundwater samples at selected wells for target COCs. In addition, the first monitoring event included collecting surface water samples from the wetland. The ROD (USCG 2006) required the groundwater and surface water samples to be collected once prior to each five-year review. Subsequent monitoring events (ME-02, ME-03, ME-04, and ME-05) collected soil samples only from the swale and wetland. The sampling is conducted in accordance with the LTMP (EA 2007a).

Five monitoring events have been completed during the first five-year review period. The first two monitoring events (ME-01 and ME-02) occurred in 2007. ME-03 occurred in 2008, ME-04 occurred in 2009, and ME-05 occurred in 2010. To date, one concern has been identified. During ME-01, one wetland sample (LTM-WSS-06) had a lead exceedance more than two times the Project Action Limit (PAL) of 302 milligrams per kilogram. In accordance with the LTMP (EA 2007a), three additional samples were collected in the vicinity of this sample during ME-02. These three additional samples were collected during ME-02 instead of ME-01 since there was only three months' difference between the ME-01 and ME-02 sampling events. During ME-02, a statistical analysis of the three additional samples, along with the results from the original sample location LTM-WSS-06, indicated that this location is a potential "hot spot." The USCG, in consultation with EPA and MassDEP, agreed to relocate future samples from LTM-WSS-06 to the interior of the wetland to more accurately sample the remediated portion of the wetland.

During ME-03 in 2008, the new sample location LTM-WSS-06 did not exceed the PAL. At the request of EPA and MassDEP, three additional samples were collected outside the remediated wetland in the vicinity of former LTM-WSS-06. One of these samples (LTM-WSS-09) did exceed the PAL for chromium and lead. In accordance with the LTMP, future monitoring events were used to determine what actions, if any, are required in this area of the wetland. In addition, a spatial and temporal trend analysis was used to analyze the data from ME-01 through ME-05.

4.3.4 Five-Year Reviews

USCG will conduct five-year reviews in accordance with CERCLA and the ROD (USCG 2006) for as long as the site conditions are not suitable for unlimited use and unrestricted exposure (i.e., unless and until mitigation measures are taken to reduce concentrations of lead in soil to levels that allow for unlimited use and unrestricted exposure on the site). The results of the long-term monitoring sampling form the foundation of the five-year review. A statistical trend analysis using the Mann-Kendall trend analysis of the 95 percent confidence level on the soil samples collected in the swale and wetland is performed to identify any potential trends in the data. In addition, the five-year review assesses compliance with the engineering controls established for the Buoy Depot, including maintenance of the stormwater control system, soil management, and lead-contaminated buoy management. After the five-year review, and in consult with EPA and MassDEP, the monitoring may continue as planned, or the frequency and/or location of the samples may be changed.

Each five-year review will involve inspection of the site use and abutting (Navy-owned) property to determine property use, reviews of LUC compliance reports, and analyses of the results from the long-term monitoring program conducted in the swale and wetland. The USCG documents the results of the five-year review in a report to be submitted to EPA for approval and to MassDEP for comments. This document represents the first Five-Year Review for the USCG Buoy Depot property.

4.4 Operation and Maintenance

The engineering controls implemented as part of the LUC include ongoing O&M of the stormwater control system, and performing annual LUC inspections. The O&M activities of the stormwater conveyance system have occurred since September 2006. These long-term O&M tasks are required to preserve the effectiveness of the remedy. The O&M tasks include:

- Quarterly inspection of the accumulated solids in the Vortechs stormwater treatment system; polydrain; catch basin CB-1; and deep sump catch basins CB-2, CB-3, and CB-4

- Cleanout (as necessary) of the Vortechs stormwater treatment system; polydrain, catch basin CB-1; and deep sump catch basins CB-2, CB-3, and CB-4 with a vacuum truck
- Repairing (as necessary) the gravel cover in areas where settlement and erosion occurred
- Bi-annual inspection of the detention gallery or when the effectiveness of the detention gallery is determined to be questionable
- Repairing (as necessary) the earthen berm along the perimeter fence, if erosion or settlement occurs
- Removing silt and sediment from the infiltration trench (as necessary).

The annual costs of O&M from 2006 through December 2010 are provided in the table below:

Annual System Operations/O&M Costs			
Year	**Action**	**Action Type**	**Cost ($)**
2006	Quarterly inspections	Routine inspection	3,228
2006	Repair erosion	Maintenance and repair	13,779
2006	**TOTAL**		**17,007**
2007	Quarterly inspections	Routine inspection	3,325
2007	Sediment Sampling Work Plan	Routine inspection	588
2007	Long-term monitoring	Monitoring and analysis	40,104
2007	**TOTAL**		**44,017**
2008	Quarterly inspections	Routine inspection	3,425
2008	Quarterly swale inspections	Routine inspection	1,200
2008	Clean detention gallery	Maintenance and repair	13,000
2008	Long-term monitoring	Monitoring and analysis	12,150
2008	**TOTAL**		**29,775**
2009	Quarterly inspections	Routine inspection	3,528
2009	Long-term monitoring	Monitoring and analysis	13,661
2009	**TOTAL**		**17,189**
2010	Quarterly inspections	Routine inspection	3,634
2010	Long-term monitoring	Monitoring and analysis	13,676
2010	**TOTAL**		**17,310**
5-YEAR TOTAL			**125,298**

The costs include, but are not limited to, O&M activities, groundwater sampling and analysis, and consulting and reporting activities. The estimated annual O&M costs in the ROD were $122,029 for years one through five (USCG 2006). The annual O&M costs incurred have been slightly more than the estimate presented in the ROD.

4.5 Progress Since Completion of Remedial Action

Since the ROD was signed on 29 September 2006 (USCG 2006), the following actions have occurred:

- Preparation of a LTMP and QAPP (EA 2007a and EA 2007b, respectively)
- Preparation of a LUCIP (EA 2010b)
- Preparation of an O&M Plan for the stormwater control system (EA2010c)

- Monitoring Event 1, June 2007 (EA 2007c)
- Monitoring Event 2, September 2007 (EA 2008a)
- Monitoring Event 3, June 2008 (EA 2008b)
- Monitoring Event 4, June 2009 (EA 2009)
- Monitoring Event 5, June 2010 (EA 2010a)
- Five-Year Review.

These actions have been implemented as the remedy for the site to cover the requirements of incorporating institutional controls, engineering controls, long-term monitoring, and five-year reviews as required by the ROD (USCG 2006).

5.0 PROGRESS SINCE THE PREVIOUS FIVE-YEAR REVIEW

This is the first five-year review for the Buoy Depot site.

6.0 FIVE-YEAR REVIEW PROCESS

This section presents the process and findings of the first five-year review; specifically, the findings of the document review, data review, ARARs review, site inspection, and site interviews.

6.1 Administrative Components

This five-year review was led by Ms. Rachel Marino, USCG CEU Providence. EA and Watermark assisted in the review process. EA's team members included Mr. Richard Waterman and Ms. Meghan Travers. Mr. Larry Pannell of Watermark was also on the team.

In June 2011, the review team established the review schedule, which included the following components:

- Document review
- Data review
- ARARs review
- Site inspection
- Interviews.

6.2 Community Involvement

A public notice announcing the initiation of the five-year review for the Buoy Depot site was published in the local newspaper, *The Weymouth News,* on 8 June 2011 (Appendix A).

A public notice will be placed in the local newspaper upon completion of the five-year review process and local contacts will be notified by letter.

Upon signature, a copy of the First Five-Year Review Report will be available in the Administrative Record.

6.3 Document Review

The five-year review included a review of relevant decision documents, implementation documents, remedy performance documents (monitoring documents), O&M documents, and legal documents. The document review focused on the documents required to implement the remedy including monitoring data, institutional controls, and engineering controls.

6.4 Data Review

The selected remedy for the site includes LUCs (i.e., institutional and engineering controls), long-term monitoring, and five-year reviews. Data were reviewed supporting LUC and the long-term monitoring program. In order to evaluate the data collected from the soil sampling in the swale and wetland, the Mann-Kendall test for trend at the 95 percent confidence level was performed as part of the five-year review.

The purpose of annual surface soil monitoring is to monitor for the potential migration of soil from the buoy storage area to the drainage swale and wetland on neighboring Navy property. Additionally, once prior to this first five-year review, one round of groundwater sampling for COPCs was performed, as well as one round of surface water sampling. This sampling is to ensure that COPCs that may be present in the soil at the buoy storage area have not leached into the groundwater. Samples collected as part of the annual soil monitoring events were analyzed for arsenic, chromium, copper, lead, nickel, and zinc.

6.4.1 Wetland Soil Sampling

EA compared measured COPC concentrations in the wetland with remedial goals, and performed a trend analysis for the COCs at each of the sample locations shown in Figure 3 (LTM-WSS-01, LTM-WSS-02, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05). Because sample location LTM-WSS-06 was relocated after the second sample session, there were insufficient sample events at the new sample location to assess trends at LTM-WSS-06. EA used the Mann-Kendall test for trend at the 95 percent confidence level. The Mann-Kendall test is only valid providing that annual samples have been taken for at least four years and at least 60 percent of the sample results are above the analytical detection limit. While adequate annual samples have been taken, one

COC (arsenic) did not meet the requirement of at least 60 percent detections in the wetland (detection frequency 13 percent); therefore, the Mann-Kendall test was not used to analyze arsenic trends. All other COCs (chromium, copper, lead, nickel, and zinc) were detected at a frequency of 100 percent. The following summarizes the findings from the Mann-Kendall test:

- Chromium concentrations were found to be increasing at location LTM-WSS-02. No trend could be determined for chromium concentration in wetland soil sample locations LTM-WSS-01, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05.
- Copper concentrations were found to be increasing at wetland soil sample location LTM-WSS-02. No trend could be determined for copper concentration in wetland soil sample locations LTM-WSS-01, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05.
- No trend could be determined for lead concentration at any wetland soil sample location. Lead was found to have no trend at location LTM-WSS-02, unlike any of the other COCs which showed increasing trends at this location.
- Nickel concentrations are increasing at wetland soil sample location LTM-WSS-02. No trend could be determined for nickel concentration at wetland soil sample locations LTM-WSS-01, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05.
- Zinc concentrations are increasing at wetland soil sample location LTM-WSS-02. No trend could be determined for zinc concentration at wetland soil sample locations LTM-WSS-01, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05.

Four of the wetland soil sample locations did not produce any trends for any of the COCs (LTM-WSS-01, LTM-WSS-03, LTM-WSS-04, and LTM-WSS-05). Wetland soil sample location LTM-WSS-02 showed increasing concentrations of chromium, copper, nickel, and zinc; no trend was identified for lead. The table below summarizes the results of the Mann-Kendall test for the wetland soil sampling.

Mann-Kendall Test Results for Wetland Soil Sampling					
Sample Location	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
LTM-WSS-01	No trend	No trend	No trend	No trend	No trend
LTM-WSS-02	Increasing	Increasing	No trend	Increasing	Increasing
LTM-WSS-03	No trend	No trend	No trend	No trend	No trend
LTM-WSS-04	No trend	No trend	No trend	No trend	No trend
LTM-WSS-05	No trend	No trend	No trend	No trend	No trend

All of the wetland soil sampling locations are located around the perimeter of the wetland (Figure 3). Wetland soil sample location LTM-WSS-02, the only location which showed increasing trends in the wetland, is located in the northern boundary of the wetland. Sample locations LTM-WSS-03, LTM-WSS-04, and LTM-WSS-01 are located immediately adjacent to the west and east of sample location LTM-WSS-02 and all showed no trends for any of the COCs. It is unclear from these data why there appears to be an increasing trend at LTM-WSS-02 while there are no trends or stable conditions at the other sampling locations. As discussed in Section 6.6.7, the increasing metal concentrations may be associated with preferential water flow around hay bales at the toe of the swale. The number of samples used for this analysis, while adequate for running the Mann-Kendall test for variance, is the lowest number of values allowed to perform the test. Additional monitoring will be needed to develop a large enough data set for further statistical analysis. Data and charts related to the Mann-Kendall trend analysis are included as Appendix B.

6.4.2 Swale Soil Sampling

EA compared measured COC concentrations in the wetland with remedial goals, and performed a trend analysis for the COCs at each of the sample locations shown in Figure 3 (LTM-SSS-01, LTM-SSS-02, LTM-SSS-03, LTM-SSS-04, LTM-SSS-05, and LTM-SSS-06). EA used the Mann-Kendall test for trend at the 95 percent

confidence level. As noted in the wetland sample discussion, the Mann-Kendall test is only valid providing that annual samples have been taken for at least four years, and at least 60 percent of the sample results are above the analytical detection limit. While adequate annual samples have been taken, one COC (arsenic) did not meet the requirement of at least 60 percent detections in the swale (7 percent detections); therefore, the Mann-Kendall test could not be used to analyze arsenic trends. Based on the results of the Mann-Kendall test, no trend could be determined for chromium, copper, lead, nickel, or zinc concentrations in any swale soil sample location.

The table below summarizes the results of the Mann-Kendall test for the swale soil sampling.

Mann-Kendall Test Results for Swale Soil Sampling					
Sample Location	**Chromium**	**Copper**	**Lead**	**Nickel**	**Zinc**
LTM-SSS-01	No trend	No trend	No trend	No trend	No trend
LTM-SSS-02	No trend	No trend	No trend	No trend	No trend
LTM-SSS-03	No trend	No trend	No trend	No trend	No trend
LTM-SSS-04	No trend	No trend	No trend	No trend	No trend
LTM-SSS-05	No trend	No trend	No trend	No trend	No trend
LTM-SSS-06	No trend	No trend	No trend	No trend	No trend

The Mann-Kendall test for the metals in the swale identified no trend for all six sample locations. None of the sample locations indicated an increasing or decreasing concentration for any of the metals. As noted above, the number of samples used to perform the statistical test is the lowest number allowed. Additional monitoring is necessary in order to provide more data to define concentration trends (if there are any). Data and charts related to the Mann-Kendall trend analysis are included as Appendix B.

6.4.3 Surface Water Sampling

The surface water sampling was conducted on 7 June 2007, when standing water was present in the swale and wetland. According to the LTMP (EA 2007a), three surface water samples were to be collected from standing water one time before the first five-year review. It should be noted that the swale and wetland were not flooded at the time of sampling, but there was standing water in the swale and wetland. Surface water samples were collected in areas that had sufficient standing water to allow adequate and representative sample volumes to be collected in the swale and wetland. Due to the low volume of water in the swale and wetland, two samples were collected instead of three samples (Figure 4). The samples were collected at the locations consistent with the LTMP (EA 2007a) and QAPP (EA 2007b). One sample was collected in the swale approximately 105 ft from the headwall of the swale between surface soil samples LTM-SSS-02 and LTM-SSS-03. The second sample was collected in standing water at the "toe" of the wetland. Surface water samples were collected with a peristaltic pump in the location of standing water. Care was exercised to minimize turbidity during sampling activities. Samples were collected for both total and dissolved metals in accordance with the procedures in the QAPP. The results of the surface water sampling are presented below:

Analyte Detected (parts per billion)	SWS-01 Total	SWS-01 Dissolved	SWS-02 Total	SWS-02 Dissolved	PAL[a]
Arsenic	1.1	3.0	1.8	1.3	150
Chromium	<10	<10	<10	<10	11
Copper	**176**	**141**	**77**	**42**	9
Lead	**15.0**	**9.2**	**21.1**	**9.0**	2.5
Nickel	3	2	1	1	52
Zinc	**162**	**163**	70	60	120

(a) PAL = EPA Chronic Water Quality Criteria.
NOTE: Numbers in bold indicate values above PAL.

Chromium was not detected in any surface water sample, and the detection limit for chromium was lower than the PAL. All other metals were detected in the total and dissolved fractions of both samples. Comparison of dissolved copper and lead (the appropriate media for metal comparison to water quality criteria) shows that both water samples exceeded the chronic water quality criteria. In addition, zinc at SWS-01 exceeded the zinc water quality criterion.

Surface water is not normally present in the wetland and swale. It is unclear whether the fact that lead and copper were present above the PAL is of significance since surface water is not normally present. Moreover, the related soil samples collected in the vicinity of these surface water samples did not exceed the PAL for copper and lead.

6.4.4 Groundwater Sampling

Groundwater sampling activities were conducted on 6 and 7 June 2007 for seven of eight wells (Figure 5) in accordance with the general methodologies established in the QAPP (EA 2007b). Peristaltic pumps were utilized for groundwater sample collection. Samples were unfiltered and analyzed for total metals.

Arsenic and manganese were detected in each of the samples collected and lead in four of seven wells. Manganese levels were above the PAL in MW-04S, MW-05S, MW-10S, and MW-10D. None of the arsenic or lead concentrations (detected or detection limit) were above the PAL.

6.4.5 Annual Land Use Inspections

The LUCIP requires an annual land use inspection to be performed starting in September 2007. The September 2007 inspection was not conducted. The following land use inspections were performed:

- **25 September 2008**—Noted that the bi-yearly inspection for the detention gallery was not completed. In addition, noted that the 2007 inspection was not performed. No other issues were identified.
- **16 September 2009**—Noted that the detention gallery was cleaned in March 2009. No other issues were identified.
- **15 September 2010**—Noted that berms and fencing around the facility needed to be repaired in some locations. No other issues were identified.

6.4.6 Stormwater System Maintenance/Inspection Logs

As part of the five-year review process, EA reviewed maintenance and inspection logs which were required to be conducted on a quarterly basis during the five years of monitoring in accordance with the LUCIP. The quarterly inspections include:

- Vortechs stormwater treatment system
- Polydrain
- Catch basins (CB-1)
- Deep sump catch basins (CB-2, CB-3, and CB-4)
- Crushed gravel areas
- Earthen and asphalt berms
- Infiltration trenches.

Included in the inspection logs were solids thicknesses found in the Vortechs stormwater treatment system and in the drainage system catch basins. The Vortechs system has three manholes (MH-1, MH-2, and MH-3) and the drainage system has four catch basins (CB-1, CB-2, CB-3, and CB-4). Each manhole and catch basin has a designated solids thickness which, when reached, requires maintenance activities including removal of all solids.

During the five-year review period, quarterly inspections were performed routinely to ensure proper performance of the installed engineering controls. Twenty inspections were performed during the five-year review period. During this time, the collected solids in the Vortechs system were never cleaned or vacuumed because the solids thickness never reached its limit. Two of the four catch basins in the drainage system were

cleaned. CB-1 was cleaned twice (June 2006 and July 2007) and CB-2 was cleaned once (March 2008). The remaining two catch basins were never cleaned out during the five-year period.

Examination of the quarterly inspection records indicates that solids settled in the Vortechs system can be mobile and may migrate downgradient of the stormwater treatment system. On 10 occasions, solids thickness in a subsequent quarter was less than the previous quarter, indicating that 2+ inches (in.) of solids were transported from the stormwater system. This movement of solids occurred in all three manholes of the Vortechs system. For example, in MH-2, the September 2009 inspection log indicated that 16 in. of solids were present inside the manhole. The following December 2009 inspection only indicated a solids thickness of 4 in. in the same MH-2 manhole.

The drainage system catch basins inspection logs also indicate that solids may be migrating downgradient from these locations. Collected solids appear to be migrating from the catch basins downgradient of the system.

The detention gallery is required to be inspected every two years (bi-annually). Upon review of the maintenance and inspection logs, the detention gallery has not been inspected on schedule. In December 2005, the inspection log indicates that the detention gallery was not checked due to frozen ground, and the clean-outs were not able to be excavated. The inspection logs from 2006, 2007, and 2008 indicate that the detention gallery was not inspected. In December 2008, although the inspection log comments specify that the system was not inspected, there is an additional note with direction to clean out the detention gallery upon favorable weather. In March 2009, the inspection log indicates that a cleaning had been scheduled for 27 March 2009. Documentation exists to confirm this cleaning. The September 2009 inspection logs are the first to indicate when a detention gallery inspection is due (recorded as due September 2011). An inspection was instead performed in September 2010 which indicated 2 in. of solids were present in each catch basin. At least 3 in. of solids are required to schedule a clean-out. Subsequent inspection logs from December 2010 and March/June 2011 begin to track when the next inspection is required (September 2012).

In general, tracking of the detention gallery inspection schedule was poor for several years and documentation exists for only one cleaning (March 2009) during the five-year period. The tracking of the inspection schedule of the detention gallery needs to continue to improve to adhere to requirements of the LUCIP.

6.4.7 Buoy Management

The LUCIP includes a Buoy Management Plan, which provides best management practices for storage and scrapping of buoys manufactured prior to 1988 that are suspected to contain LBP. The Buoy Depot has maintained a log of all buoy serial numbers, date received, whether it is manufactured pre-1988, and if it is in storage or refurbished back for use. If the buoy is pre-1988, the Buoy Depot performs a "swab test" to determine if the buoy contains LBP.

A review of the Incoming Buoy Log from 2006 to 2011 did not indicate any buoys containing LBP were received at the Buoy Depot. In addition, interviews with Buoy Depot staff indicated that the number of pre-1988 buoys still in service has been declining each year.

In addition, in 2007, all buoys in storage at the Buoy Depot were tested for the presence of LBP. Over 100 buoys in storage were identified as containing LBP. In 2008, those buoys identified as containing LBP were separated, removed from the Buoy Depot site, and scrapped. To the knowledge of the Buoy Depot staff, there are no longer any buoys containing LBP present at the facility.

6.4.8 Soil Management

The LUCIP includes a Soil Management Plan that establishes protocols for the safe management of soil containing lead and paint chips (potentially lead-based) in the buoy storage area of the site. The Soil Management Plan includes procedures for regrading, dust control, and excavation of soils at the Buoy Depot. The only element of the Soil Management Plan that has been needed is for dust control. No regrading or excavation has occurred in the past five years.

6.4.9 *Engineering Evaluation – Vortechs Unit*

In 2008, an Engineering Evaluation of the Vortechs Unit was performed (EA 2008c). The objective of the study was to determine if the unit is functioning as designed. The study reviewed the design criteria, collected samples of sediment and water, reviewed maintenance records, and developed conclusions and recommendations. The study concluded that the unit was operating properly; however, samples of sediment and water collected in the unit exceeded the PALs for chromium, copper, and lead. Recommendations for improving the Vortechs operation included: (1) removing collected sediment at least once per year from each manhole in the Vortechs unit, (2) continue monitoring of the swale and wetland soils, and (3) an optional recommendation was to install filter inserts in the catch basins immediately upstream of the Vortechs to reduce the amount of solids reaching the unit.

6.5 Applicable or Relevant and Appropriate Requirement Review

As part of this five-rear review, ARARs identified in the ROD (USCG 2006) were reviewed to determine if any newly promulgated or modified requirements of federal and state environmental laws have significantly changed the protectiveness of the remedies implemented.

The ROD divided ARARs pertaining to remedial activities for the site into chemical-, location-, and action-specific categories. Appendix C provides a summary table for site ARARs as presented in the ROD (USCG 2006).

6.5.1 *Chemical-Specific Applicable or Relevant and Appropriate Requirements*

Chemical-specific ARARs are usually health or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment. The ROD (USCG 2006) identified three chemical-specific ARARs pertaining to the site: (1) Risk Assessment Guidance – Cancer Slope Factors and Reference Doses, (2) EPA Region III Risk-Based Concentrations, (3) and EPA Region IX Preliminary Remediation Goals. The Risk Assessment Guidance is used in human health as guidance values to evaluate the potential carcinogenic hazard caused by exposure to COCs. EPA Region III Risk-Based Concentrations are used as screening values to evaluate the potential hazards caused by exposure to COCs. EPA Region IX Preliminary Remediation Goals are generic risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements. Since the ROD was finalized, EPA Region III Risk-Based Concentrations and IX Preliminary Remediation Goals (plus EPA Region VI Medium-Specific Screening Levels) have been consolidated into one country-wide screening level list available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. The screening levels listed in these tables are updated to account for modified toxicity values or other factors. None of the screening values for the COCs at the Buoy Depot site (arsenic, chromium, copper, lead, nickel, and zinc) have changed since the ROD was finalized.

Further, the remedial action objectives for the Buoy Depot site were driven by ecological concerns; therefore any change to the above mentioned chemical-specific ARARs related to human health would have no impact on the implemented remedy at the site.

6.5.2 *Location-Specific Applicable or Relevant and Appropriate Requirements*

Location-specific ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. The ROD identified five location-specific ARARs pertaining to the Buoy Depot site: Endangered Species Act of 1973, Executive Order 11990 Wetlands Protection, Fish and Wildlife Coordination Act of 1958 Protection of Wildlife Habitats, Massachusetts Wetlands Protection Regulations – 310 Code of Massachusetts Regulations, and Massachusetts Endangered Species Act 321 Code of Massachusetts Regulations 10.00. The Endangered Species Act requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Executive Order 11990 (Title 40, Code of Federal Regulations, Part 6, Appendix A) requires that no remedial alternative adversely affect a wetland if another practicable alternative exists. If no such alternative exists, impacts from implementation must be mitigated. The Fish and Wildlife

Coordination Act of 1958 (16 United States Code 661) requires consultation with federal and state conservation agencies if alteration of a body of water, including the installation of monitoring wells in a wetland and/or discharge of pollutants into a wetland, will occur in order to provide adequate protection of fish and wildlife resources. Massachusetts Wetlands Protection Regulations (310 Code of Massachusetts Regulations 10.51–10.60) outlines requirements for all inland work that will remove, fill, dredge, or alter any bank, bordering vegetated wetland, land under water bodies and waterways, land subject to flooding, or riverfront area. The Massachusetts Species Act (321 Code of Massachusetts Regulations 10.00) prohibits the "taking" of any rare plants or animals listed as endangered, threatened, or special concern by the Massachusetts Division of Fisheries and Wildlife.

No changes to these regulations or other location-specific ARARs were identified during this review.

6.5.3 Action-Specific Applicable or Relevant and Appropriate Requirements

Action-specific ARARs are usually technology- or activity-based requirements, or limitations on actions or conditions involving specific substances. These requirements are triggered by the particular remedial activities that are selected to accomplish the remedy. Remedial construction is complete and the remedial action is ongoing; therefore, the action-specific ARARs are still applicable.

6.6 Site Inspection

A site inspection was conducted on 27 July 2011 to assess site conditions and the effectiveness of measures employed to protect human health and the environment. Attendees included: Mr. Keith Girouard (USCG Base Support Unit Boston), Mr. Roger Dingy (USCG South Weymouth Buoy Depot), Mr. Michael Andrews, P.E. (USCG CEU Providence), Mr. Larry Pannell, PG, PMP (Watermark), and Mr. Richard Waterman and Ms. Meghan Travers (EA).

The site inspection checklist is provided in Appendix D. The site inspection photographs are provided in Appendix E.

6.6.1 Vortechs Stormwater Treatment System

The Vortechs stormwater treatment system components were operable and in good condition at the time of the inspection. Photographs 1 and 2 (Appendix E) show Vortechs manholes 2 and 3, respectively, both securely shut and in good condition. Photographs 3 and 4 (Appendix E) depict the visual inspection of Vortechs manhole 1. Upon visual inspection, no evidence of large debris or any other potential hazard to the system was found.

6.6.2 Polydrain

Visual inspection of the polydrain indicated that it was operable and in fair condition. No debris or clogging was noted in the drain; however, the surrounding concrete is beginning to deteriorate (Appendix E, Photograph 5). The USCG is in the planning process for making necessary repairs to the polydrain.

6.6.3 Catch Basin and Deep Sump Catch Basins

The catch basin and deep sump catch basins were operable and in generally good condition at the time of the inspection. Catch basin 1 and deep sump catch basins 2 and 3 were secure and showed no evidence of debris or clogging (Appendix E, Photographs 6, 7, and 8, respectively). The asphalt and concrete berm surrounding three edges of deep sump catch basin 4 were cracked and damaged on the southwestern corner (Appendix E, Photograph 9). EA recommends that the berm be repaired to maintain the integrity of the containment system.

6.6.4 Crushed Gravel Areas

The crushed gravel areas were in good condition at the time of the inspection. No deficiencies were noted (Appendix E, Photographs 10 and 11).

6.6.5 *Earthen and Asphalt Berms*

The asphalt berm was noted to be damaged and in need of repair at the time of the inspection. The berm that extends along the northern boundary of the site was cracked in several places (Appendix E, Photographs 12 and 13). EA recommends that the asphalt berm be repaired to ensure runoff is being directed to the stormwater treatment systems and contained onsite.

6.6.6 *Infiltration Trenches*

The infiltration trenches along the western boundary of the site were operable and in good condition at the time of the inspection (Appendix E, Photographs 14 and 17). The concrete berm located along the eastern edge of the infiltration gallery was in good condition and showed no cracks or signs of damage (Appendix E, Photograph 18). The polyvinyl chloride pipe which connects the northern and southern portion of the infiltration trench was observed to be in good condition with no debris or blockage present (Appendix E, Photographs 15 and 16). Standing water was observed in the northern portion of the infiltration gallery (Appendix E, Photograph 19).

6.6.7 *Wetland and Swale Soil Sampling Points*

The wetland and swale soil sampling points along the eastern boundary of the site were in good condition at the time of the inspection. The chain-link fence along the eastern and southern boundary of the site that separates the wetland from the gravel areas was damaged and in need of repair (Appendix E, Photograph 20). Vegetation is also overgrown along the fence (Appendix E, Photograph 21).

The placement of hay bales in the swale and wetland is causing preferential flow through the toe end of the swale and wetland, concentrating flow toward wetland soil sampling point LTM-WSS-02 (Appendix E, Photograph 22). This preferential flow could explain the increasing levels of COCs present in LTM-WSS-02. The Mann-Kendall test for trend at the 95 percent confidence level showed increasing trends for four out of five COCs for which the test was performed. The hay bales should be removed to prevent runoff from becoming channelized.

6.7 Site Interview

In accordance with the requirements of the five-year review process, EA conducted interviews to gain additional information about the status of the Buoy Depot site. Three USCG employees familiar with the Buoy Depot operations and stormwater management system were interviewed for the first five-year review.

The responses that were received (Appendix F) did not express concerns regarding past or ongoing activities at the site. Mr. Keith Girouard, Environmental Protection Specialist at the USCG Buoy Depot site, indicated that the USCG Command had been notified of the need for repair of the deteriorating concrete by the polydrain and the broken asphalt berm along the northern fence line (the USCG is in the planning process for making the necessary repairs). Mr. Girouard also indicated that the Soil Management Plan had not been used because no soil has ever left the Buoy Depot property.

Mr. Girouard further indicated that all lead swab tests that have been performed on the pre-1988 buoys have come back negative. Mr. Roger Dingy, Buoy Depot Supervisor, confirmed that no buoys have tested positive for lead, and he indicated that the number of pre-1988 buoys in service has been steadily declining. Buoys cycle through the Buoy Depot once every six years. As a result, the likelihood of finding a buoy with LBP will be extremely low after all the pre-1988 buoys have been removed from service.

7.0 TECHNICAL ASSESSMENT

Conclusions presented in this section support the determination that the selected remedy for the site is currently protective of human health and the environment. Continued O&M of the site is required to maintain the remedy effectiveness. EPA guidance indicates that to assess the protectiveness of a remedy, three questions (Questions A, B, and C identified in the sections below) shall be answered.

7.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The results of the site inspection and review of the ARARs and site data indicate that the remedy is functioning as intended by the ROD (USCG 2006).

- **Remedial Action Performance**—Based on review of documents, ARARs, and the site inspection and interviews, the selected remedy is being implemented in accordance with the ROD (USCG 2006). The LUCs include both institutional controls and engineering controls. The institutional controls prohibiting non-commercial/industrial use of the property are still in place. The property is still used as an industrial operation by the USCG to re-condition buoys. The engineering controls including the stormwater conveyance system and Vortechs unit, which were installed to prevent the migration of contaminated soil from the buoy storage area to the swale and wetland, appear to be working as intended. The stormwater system performance would likely improve with routine removal of solids from the Vortechs and catch basins.

  The second component of the remedy was long-term monitoring of surface soil in the stormwater drainage swale and wetland on the adjacent Navy property. With the exception of increasing concentrations of chromium, copper, nickel, and zinc at location LTM-WSS-02 (which may be the result of channeling caused by the placement of hay bales [Section 6.6.7]), the Mann-Kendall statistical analysis of the first five years of soil monitoring does not show any definitive trends as to increasing or decreasing concentrations of contaminants. Monitoring should continue to establish any definitive trends.

  The last component of the remedy is performing five-year reviews. This is the first five-year review.

- **System O&M**—O&M activities at the site are focused on the stormwater conveyance system and the Vortechs unit. Reviewing the O&M plan for the site and the periodic inspection reports (quarterly, annual, bi-annual) indicated that the proper procedures are used. In reviewing the inspection logs, the Vortechs unit has never been pumped to remove collected solids. There is evidence that when solids collect in the Vortechs unit they may be transported to the swale and wetland on occasion since the measured amount of solids decreased from one quarterly inspection to the next. However, based on the statistical analysis of the long-term monitoring results for soils in the swale, there is no evidence the material is impacting the swale or wetland soils. In order to minimize the potential for solids to be transported downgradient, it is recommended that the Vortechs and catch basins have collected solids removed at least once per year. In addition, there are hay bale check dams in the swale to help control erosion. The placement of these hay bales seems to be creating preferential flow paths in the lower section of the swale and into the entrance of the wetland. In addition, wetland sample LTM-WSS-02, which is in the north portion of the wetland, is located toward the end of an area of preferential flow. This may be why this sample has shown some indication of increasing trends for chromium, copper, nickel, and zinc. The continued use of these hay bales and alternative options for controlling erosion in the swale and wetland should be evaluated. The selected erosion control options should allow the water to flow in a more natural sheet flow pattern to decrease the impact of the preferential flow.

- **Cost of O&M**—According to financial information obtained during the five-year review, the average cost for O&M and quarterly groundwater monitoring has been approximately $25,059 per year for the first five years of operation. The average annual O&M costs estimated in the ROD were approximately $24,405 (USCG 2006). The annual O&M costs that have been incurred are in line with the estimate presented in the ROD. The annual O&M costs are presented in Section 4.4 of this report. The cost is considered representative of the effort and generally adequate in maintaining the remedial measures.

- **Implementation of Institutional Controls and Other Measures**—Engineering controls and LUCs were part of the remedy for the site. These LUCs are intended to ensure the property is used for industrial/commercial purposes and to reduce the potential for contaminant migration from the buoy storage area. In general, the engineering controls are being implemented as intended. The LUCIP describing the specific LUC procedures was not finalized until 2010. However, the LUC procedures were being implemented since 2006 as outlined in the Draft LUCIP. The reason for the delay in issuing the final LUCIP was to receive the final USCG Instruction signed by a Senior USCG Officer for implementing the LUCs. This delay in finalizing the USCG Instruction and LUCIP did not adversely affect the implementation of the remedy.

  The site inspection and review of the annual LUCIP inspection forms indicated minor improvements are needed to ensure the institutional controls remain in place. Specifically, repair to curbing (berms) and fencing are needed in some locations at the site. In addition, the site did not perform the annual LUCIP inspection in 2006 and 2007. The annual LUCIPs have been performed for the past three years. Missing the 2006 and 2007 LUCIP inspections did not appear to affect the implementation of the remedy.

- **Monitoring Activities**—The long-term monitoring of surface soil in the drainage swale and wetland on the adjacent Navy property has been performed since 2007. Five rounds of monitoring have been completed in accordance with the LTMP (EA 2007a) and QAPP (EA 2007b) developed for the site.

  The six monitoring locations in the drainage swale are appropriate for monitoring the surface soils in the drainage swale. The Mann-Kendall statistical analysis of the results from the surface soil swale samples indicated no trend regarding the COCs being monitored. The monitoring program should continue as designed to determine if there are any definitive trends in COC concentration.

  The six monitoring locations in the wetland are appropriate for monitoring the wetland surface soil samples. Sample location LTM-WSS-06 was relocated after the second round of long-term monitoring to a position that is more representative of the remediated wetland. Consequently, LTM-WSS-06 could not be examined statistically. All of the wetland soil sampling locations are located around the perimeter of the wetland. Wetland soil sample location LTM-WSS-02, the only location which showed increasing trends in the wetland, is located in the northern boundary of the wetland. Sample locations LTM-WSS-03, LTM-WSS-04, and LTM-WSS-01 are located immediately adjacent to the west and east of sample location LTM-WSS-02 and all showed no trend for any of the COPCs. During the site inspection, it was observed that the hay bales located in the drainage swale are creating a preferred path of flow for water at the bottom of the swale and into the wetland which ends in the vicinity of LTM-WSS-02. Additional monitoring will be needed to develop a large enough data set for further statistical analysis to determine if the increasing trends observed at LTM-WSS-02 continue over time. Additionally, many sampling points indicate that no trend can be established with the available data; therefore, additional monitoring will provide more data that are necessary to refine concentration trends, if any.

- **Opportunities for Optimization**—The remedy is currently being implemented according to the ROD (USCG 2006). During the conduct of the five-year review, the following opportunities for optimizing the remedy were noted:

  — Twenty inspections were performed during the five-year review period. During this time, the collected solids in the Vortechs system were never cleaned or vacuumed because the solids thickness never reached its limit. Two of the four catch basins in the drainage system were cleaned. CB-1 was cleaned twice and CB-2 was cleaned once. The remaining two catch basins were never cleaned out during the five-year period. In reviewing the inspection logs, there is a potential for the collected solids to be transported downgradient. The Vortechs unit and each catch basin in the system should be cleaned with a vacuum truck at least once per year to help reduce the potential for any collected solids to be transported downgradient.

— In reviewing the quarterly inspections and during the site inspection, the curbing/berms were noted in need of repair along the northern side of the property. In addition, the fence along the swale should be repaired.

— The hay bale check dams located in the swale and the entrance to the wetland are creating a preferred flow path that is scouring the surface soil. As a result, the stormwater is not allowed to flow naturally into the wetland. In addition, Mann-Kendall statistical analysis of wetland surface soil sample LTM-WSS-02 indicated an increasing trend for four metals. This may be due to the flow of water ending at this sample point. The continued use of the hay bales and other devices for reducing erosion will be evaluated to ensure that flow through the swale and wetland does not cause erosion.

- **Early Indicators of Potential Issues**—There are no clear early indicators of potential issues. The recommendations and opportunities for optimization should be followed along with continued implementation of the remedy to reduce the potential for any future issues.

7.2 Question B: Are the Assumptions Used at the Time of Remedy Selection Still Valid?

- **Changes in Standards, Newly Promulgated Standards, and To-Be-Considered**—The remedial action objectives for the Buoy Depot site were driven by ecological concerns; therefore, any change to the chemical-specific ARARs related to human health would have no impact on the implemented remedy at the site. There are no changes to the location- or action-specific standards that would affect the remedial action objectives for the site.
- **Changes in Exposure Pathways**—There have been no changes in exposure pathways since the remedy was selected and implemented. The institutional and engineering controls put in place as part of the remedy and confirmed to be working through the long-term monitoring appear to be working as intended in the ROD (USCG 2006).
- **Changes in Toxicity and Other Contaminant Characteristics**—No changes in toxicity and other contaminant characteristics have occurred. The primary contaminants monitored during the five-year review period are lead, chromium, copper, nickel, zinc, and arsenic.
- **Changes in Land Use**—No changes in land use were identified.
- **New Contaminants and/or Contaminant Sources**—No new contaminants or contaminant sources have been identified.
- **Expected Progress Toward Meeting Remedial Action Objectives**—According to the ROD, the remedial action objectives are to:

  — Prevent future human (residential) exposure to lead and potential LBP chips in soil of the buoy storage area.

  — Prevent COCs in onsite soil from migrating off the Buoy Depot property.

At present, the USCG has no plans to transfer the Buoy Depot property and the current industrial operations will continue into the future. The swale/wetland areas of the Buoy Depot site are already deemed acceptable for unlimited use and unrestricted exposure. The selected remedy mitigates risk concerns through institutional controls to ensure proper (acceptable) use of the property in the future, and engineering controls to maintain preventative measures for the migration of lead and paint chips in the buoy storage area to off-site areas via stormwater runoff.

The USCG tested and removed all remaining buoys in storage that contained LBP. Review of the Incoming Buoy Log from 2006 to 2010 indicated that no buoys have been received containing LBP. As a result, continued implementation of the remedy along with implementation of recommended actions from the five-year review should meet the remedial action objectives for the site.

7.3 Question C: Has Any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

No other information has come to light as part of this first five-year review for the site that would call into question the protectiveness of the site remedy.

7.4 Technical Assessment Summary

After documents and data were reviewed and the site inspection and interviews completed, it appears that the remedy is functioning as intended by the ROD (USCG 2006). There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

There are improvements to the O&M of the engineering controls that would improve the performance of the stormwater system. Notably, the curbing/berms on the north side of the site and the fence along the drainage swale should be repaired. In addition, the Vortechs and catch basins should have the solids removed at least once per year to avoid the potential for solids being transported downgradient. Lastly, the continued use of the hay bale check dams in the swale and wetland should be evaluated along with alternative erosion control methods to help reduce the scour effect of the drainage through the swale and wetland.

The results of the Mann-Kendall statistical analysis do not indicate any clear trends of COCs increasing in the swale or wetland soils. Only one sample location in the wetland, LTM-WSS-02, indicates any potential increase in metal concentrations. However, lead concentrations show no trend at this location.

8.0 INSTITUTIONAL CONTROLS

Institutional controls are non-engineered instruments such as legal and administrative tools that do not involve construction or physical changes to the site, and which help minimize the potential for human exposure to contamination. Additionally, institutional controls protect the integrity of a remedy by limiting land and/or resource use, and may include easements, restrictions, or other conditions on deeds, and/or groundwater, and/or land use restriction documents (EPA 2000). The following sections describe the institutional controls implemented at the site, potential effect of future land use plans on institutional controls, and any plans for changes to site contamination status.

8.1 Types of Institutional Controls in Place at the Site

USCG implemented institutional controls in the form of a USCG Instruction delineating the property use restrictions while the property is controlled by the USCG and deed restrictions in the event of any transfer of the Buoy Depot property. These controls prohibit future uses of the Buoy Depot property for which lead and paint chips in soil may be unacceptable. These uses include residential use; certain recreational uses; agricultural use; use involving facilities with children under the age of 6, such as daycare centers or playgrounds; or use as wildlife habitat without further evaluation. The institutional controls remain in effect unless and until mitigation measures are taken to reduce lead concentrations in soil to levels that allow for unlimited use and unrestricted exposure on the property. The institutional controls are implemented in accordance with the LUCIP.

The final LUCIP was issued in December 2010 (EA 2010b) and provides the plans and procedures for implementing the controls. The LUCIP provides the rationale, applicability, and implementation of the LUCs. In addition, since the implementation of LUCs is a requirement of the ROD (USCG 2006), the LUCIP provides detailed procedures and plans including:

- Soil Management Plan
- LBP Buoy Management Plan
- O&M Plan for the Stormwater Management System
- Annual LUC Compliance Checklist.

The draft LUCIP (EA 2010b) was prepared within 90 days of the signing of the ROD as required by the ROD (USCG 2006). The delay in issuing the final LUCIP was due to the fact that a senior USCG officer was not available to review the USCG Instruction and provide signature of authorization to the instruction. However, the elements of the LUCIP have been in place and implemented since 2006.

8.2 Effect of Future Land Use Plans on Institutional Controls

The current land use of the Buoy Depot property is industrial. Since 1972, the Buoy Depot has been the USCG's principal facility in the Northeast for storing, cleaning, repairing, and painting navigational buoys. The USCG plans to continue the current industrial operations at the Buoy Depot property.

The portion of the site on Navy property (i.e., the stormwater drainage swale and wetland areas that were remediated under the Non-Time-Critical Removal Action) is currently open space. The Navy plans to transfer this property to the local re-development authority in accordance with the Base Realignment and Closure Act. There are various plans for redevelopment, including potential residential use, for the property abutting the USCG facility. Under the current reuse plan and approved zoning and reuse bylaws, the wetland and a portion of the swale that is within 50 ft (buffer zone) of the delineated wetland boundary is now zoned as Open-Space-Weymouth District. The portion of the swale that is not within the 50 ft of the delineated wetland is currently zoned Village Center District. The swale and wetland portions of the site have been cleaned up to residential standards and, therefore, are suitable for unlimited use and unrestricted exposure.

The Buoy Depot property itself was already transferred from the Navy to the USCG in accordance with the Base Realignment and Closure Act, and is not currently available for transfer. The USCG has no plans to transfer the Buoy Depot property; and, as the property remains governmentally owned, it is exempt from local zoning

requirements. If it were transferred at some time in the future, the land would be zoned as Village Center District.

8.3 Plans for Changes to Site Contamination Status

No changes to the status of the contamination at the site are anticipated.

9.0 ISSUES

Based on this first five-year review, it appears that the remedy at the Buoy Depot site has been implemented as planned and is functioning in accordance with the requirements stated in the ROD (USCG 2006). No major deficiencies or concerns with the remedy or O&M procedures were identified for the site.

During this first five-year review, the following issues are noted:

1. **Increasing trend for chromium, copper, nickel, and zinc at sample location LTM-WSS-02**—From the Mann-Kendall analysis for trend at the 95 percent confidence level, wetland soil sample location LTM-WSS-02 showed increasing concentrations of chromium, copper, nickel, and zinc; no trend was identified for lead. All of the wetland soil sampling locations are located around the perimeter of the wetland. Wetland soil sample location LTM-WSS-02 is located in the northern boundary of the wetland. Sample locations LTM-WSS-03, LTM-WSS-04, and LTM-WSS-01, all of which showed no trend for any of the COCs, are located immediately adjacent to the west and east of sample location LTM-WSS-02 which showed the only increasing trends in the swale and wetland. It was observed during the site inspection that the hay bale check dams located in the swale and wetland are causing the stormwater runoff to flow preferentially toward LTM-WSS-02. This may account for the increasing trend observed in the statistical analysis. Additionally, many sampling points indicate that no trend can be established with the available data; therefore, additional monitoring will provide more data that are necessary to define concentration trends.

2. **Solids removal from Vortechs and catch basins**—O&M activities at the site are focused on the stormwater conveyance system and the Vortechs unit. In reviewing the inspection logs, the Vortechs unit has never been pumped to remove collected solids because the solids never reached a thickness that required removal. There is evidence that, on occasion when solids collect in the Vortechs unit, they may be transported to the swale and wetland since the measured amount of solids decreased from one quarterly inspection to the next. However, based on the analysis of the long-term monitoring results for soils in the swale and wetland, there is no evidence the material is impacting the swale or wetland soils. In order to minimize the potential for solids to be transported downgradient, it is recommended that the Vortechs and catch basins have collected solids removed at least once per year.

3. **Hay bale check dams**—There are hay bale check dams in the swale to help control erosion. The placement of these hay bales seems to be creating preferential flow paths in the lower section of the swale and into the entrance of the wetland. In addition, wetland sample location LTM-WSS-02, which is at the top of the wetland, is located in an area of preferential flow. This may be why this sample has shown some indication of increasing trends for chromium, copper, nickel, and zinc. The continued use of these hay bales and other options will be evaluated to determine if water can flow in a more natural sheet flow pattern. Erosion control options will be evaluated in an attempt to decrease the impact of the preferential flow and lessen the potential to channelize the flow into the wetland.

4. **Berms/curbing and fence repairs**—In reviewing the quarterly inspections and during the site inspection, the berms/curbing were noted in need of repair along the northern side of the property. These repairs are needed to ensure stormwater is contained on-site. In addition, the fence along the swale should be repaired to mitigate the potential for a trespasser to enter the Buoy Depot site through this area.

5. **Concrete repair**—The concrete along portions of the polydrain system is cracking or deteriorating. The concrete should be repaired to ensure ongoing structural integrity of the polydrain system.

10.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 2 presents the recommendations and follow-up actions associated with the site that were identified during the first five-year review.

11.0 PROTECTIVENESS STATEMENT

Based on the information available during the first five-year review, the selected remedy for the USCG South Weymouth Buoy Depot site is currently performing as intended. The remedy is considered protective because there is no evidence the engineering controls and LUCs are not being effective. In addition, the results of the long-term monitoring in the swale and wetland indicate increasing trends of chromium, copper, nickel, and zinc at one sample location in the wetland. However, the primary COC, lead, is not increasing at any sample location. These trends will continue to be evaluated as part of the Five-Year Review process via statistical analysis of historic and future monitoring results, to ensure that any metals trending above action levels are addressed appropriately. The recommendations and follow-up actions identified in this five-year review process should be addressed or continued for long-term remedy protectiveness of human health and the environment until remedial action objectives are met.

12.0 NEXT REVIEW

The USCG South Weymouth Buoy Depot site requires subsequent five-year reviews. The next review will be conducted within the next five years, but no later than December 22, 2016.

13.0 REFERENCES

Baker Environmental. 1991. Site Investigation at Naval Air Station South Weymouth, Massachusetts. December 1991

EA Engineering, Science, and Technology, Inc. (EA). 2001. Final Remedial Investigation Report. February 2001

EA 2002. Final Engineering Evaluation/Cost Analysis, U.S. Coast Guard Buoy Depot, Naval Air Station South Weymouth. December 2002

EA 2003. Revised Final Non-Time Critical Action Memorandum for the Swale and Wetland Soil and the Building Floor Drain System, U.S. Coast Guard Industrial Support Detachment Buoy Depot, South Weymouth, Massachusetts. November 2003

EA 2007a. Final Long-Term Monitoring Plan for the U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. September 2007

EA 2007b. Final Quality Assurance Project Plan for Long-Term Monitoring, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. September 2007

EA 2007c. Final Monitoring Event 01 – June 2007, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. November 2007

EA 2008a. Final Monitoring Event 02 – September 2007, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. March 2008

EA 2008b. Final Monitoring Event 03 – June 2008, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. November 2008

EA 2008c. Technical Memorandum, Engineering Evaluation, Vortechnics Model 11000, ISD S. Weymouth Buoy Depot. July 2008

EA 2009. Final Monitoring Event 04 – June 2009, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. August 2009

EA 2010a. Final Monitoring Event 05 – June 2010, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. December 2010

EA 2010b. Land Use Control Implementation Plan, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. December 2010

EA 2010c. Operations and Maintenance Manual, Stormwater Management System, U.S. Coast Guard South Weymouth Buoy Depot Site, South Weymouth, Massachusetts. December 2010

Nobis Engineering, Inc. (Nobis). 2004. Final Work Plan, Hydric Soil Excavation and Offsite Treatment/Disposal Swale and Wetlands at the U.S. Coast Guard Integrated Support Detachment South Weymouth Buoy Depot, South Weymouth, Massachusetts. June 2004

Nobis 2006. Final Removal Action Completion Report, Stormwater System Installation and Hydric Soil Excavation and Offsite Treatment/Disposal, Swale and Wetlands, at the U.S. Coast Guard Integrated Support Detachment, South Weymouth Buoy Depot, South Weymouth, Massachusetts. April 2006

PSI, Inc. 1996. Initial Assessment Survey, Buoy Depot, South Weymouth, Massachusetts. February 2006

U.S. Coast Guard (USCG). 1993. Environmental Compliance Evaluation (ECE), U.S. Coast Guard Buoy Depot, South Weymouth. April 1993

USCG 2006. Final Record of Decision for the U.S. Coast Guard South Weymouth Buoy Depot Site. September 2006

U.S. Environmental Protection Agency (EPA) Region 1 New England. 1996. Revised Data Validation Functional Guidelines for Evaluating Environmental Analyses. 1996

EPA 2000. Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups, EPA 540-F-00-005, OSWER 9355.0-74FS-P. September 2000

EPA 2001. Comprehensive Five-Year Review Guidance. EPA 540-R-01-007, OSWER No. 9355.7-03B-P. June 2001

EPA 2004. Guidance for Monitoring at Hazardous Waste Sites. OSWER Directive No.9355.4-28. January 2004

EPA 2006. Guidance on Systematic Planning using the Data Quality Objectives Process (QA/G-4) EPA/240/B-06/001. February 2006

Watermark

TABLES

Table 1
Chronology of Site Events
First Five Year Review
USCG Buoy Depot, South Weymouth, Massachusetts

Date	Event
1972 - 1973	Buoy Depot Site facility construction completed.
1973 - 1986	Site operations include buoy rehabilitation (e.g. "shot blasting" to remove old paint, welding, painting, electrical wiring); minor vehicle and equipment maintenance; waste generation (steel shot blast residue, waste oils, paint-related waste) and fuel storage; warehousing; outdoor scrap metal storage; and administrative use. Old or damaged buoys beyond repair are stored at Buoy Depot pending sale as scrap metal. During this time the USCG used lead-based paint and primers for buoys.
1986	The USCG stopped buying lead-based paint and primers.
1988	The USCG is required to deplete their existing lead paint inventory.
16 April 1988	The Potential Hazardous Waste Site Preliminary Assessment (PA) report identified the facility's United States Environmental Protection Agency (EPA) identification number as MA069033078. The PA reported the use and generation of "solvents", "paint chips", and residue from "sandblasting", "lead-based paint," and "waste lubrication oil". The report noted that there were "about 30 ft^2 of soil that appeared to have been contaminated by waste oil from the facility. Indications are that it was less than 55 gal and that it only affected the surface soil."
December 1991	The Site Investigation Report (Baker 1991), based on a limited number of monitoring wells, suggested that groundwater flowed generally towards the northeast in the vicinity of the Navy's West Gate Landfill. Baker Environmental reported no significant levels of groundwater contaminants present in two monitoring wells located hydrologically upgradient of the Landfill. These two wells are located downgradient of the Buoy Depot.
April 1993	The brief Environmental Compliance Evaluation (USCG 1993) indicated that painting-related solvents were being recycled and that the "sandblasting" waste generated on the site was non-hazardous. The report indicates a description of the use of waste oil as a form release agent for concrete buoy sinker castings. The report indicates that no waste paint or waste solvent was generated, and that small amounts of batteries were occasionally collected and recycled.
February 1996	The Initial Assessment Survey (PSI 1996) contains most of the features of a Phase I Environmental Site Assessment or Environmental Baseline Survey (EBS) type investigation including a site inspection, interviews, and records review. The report recommended performance of a subsurface evaluation due to the age (1973) of the building. Figures and photographs indicated that the southernmost portion of the Buoy Depot had not been filled and brought to its current grade at the time of this inspection. Also the small swale, which formerly directed surface water flow from east to west across the southern end of the Buoy Depot, and the former railroad spur were still present.

Table 1 *Continued*

Date	Event
November 1996	The Navy EBS presents the findings of the EBS for the entire NAS and includes a section on the USCG Buoy Depot (identified in "Zone F"). The Phase I EBS identified three Phase II review item areas (RIAs) pertaining to the Buoy Depot. RIA 57 was listed as waste oil-stained soil associated with concrete sinker fabrication. A removal action was completed in accordance with the Massachusetts Contingency Plan [MCP]; RIA 58 was listed as a second onsite septic system (does not exist and no further action required); and RIA 59 was listed as a reported hazardous waste container storage (no further action has been proposed).
1996	Since most buoys are refurbished every 6 to 8 years, by this time most of the USCG's buoys in the storage area have been cycled through the system and have been re-painted with non-lead-based paint.
April 1997	The Environmental Inspection report identified a "6-ft diameter area of contaminated soil outside of the paint mixing area" related to past fueling practices where diesel fuel was formerly dispensed from a 55-gal drum.
June 1997	The Environmental Compliance Evaluation report indicates that the petroleum-impacted (i.e., diesel fuel) soils mentioned in previous reports would be removed on 18 June 1997. The report states that the process of plugging floor drains with concrete was being performed (although they had been reportedly plugged with debris for some time).
28 July 1997	The Release Tracking Number (RTN) associated with the 1997 Release Abatement Measure was 3-15182. The Class A-2 Response Action Outcome (RAO) was submitted 7/28/97. The report details the excavation, sampling, and disposal of the surficially impacted soils (diesel fuel) identified in several previous reports. The impacted area was found to be roughly 18 ft in width and length and extended to a depth of 8 ft below grade. The report concludes that although low levels of fuel constituents were still present in soil and groundwater, applicable remediation standards had been met and the expenses associated with additional remediation were not warranted. 185.47 Tons or 115 yd^3 of soil were removed.
March 1998	The USCG EBS was performed as part of an evaluation of the 5.5 acres of land that was under lease by the USCG from the NAS South Weymouth in anticipation of acquiring the land when the Base closed. The EBS identified eight Areas of Environmental Concern (AECs). • AEC 1 (Building and adjacent areas to south) - use/storage of paint, thinners, and oils, as well as the former generation of D008 hazardous wastes. • AEC 2 (Septic tank) - the potential discharges of hazardous substances to the septic tank. • AEC 3 (Possible former septic system) - potential discharges of hazardous substances to a septic system. Found not to have been installed. • AEC 4 (Sandblast residue piles) required appropriate characterization and disposal. Residue from sandblasting was observed beneath the dust collector located on the southwest corner of the building and piles of apparent sandblast wastes were noted immediately west of this area. • AEC 5 (Staining around dust collection system) pertains to rust-colored staining observed on the concrete pad beneath the former dust collection system, as well as on the adjacent asphalt and process stone surfaces. The USCG determined that this staining originated from rusting steel grit that was used for sandblasting.

Table 1 *Continued*

Date	Event
	• AEC 6 (Soil remediation area) was remediated/closed as part of a Release Abatement Measure (RAM) completed in July 1997 in accordance with the MCP. Also, in 1981 the USCG filed a Part A Permit for the storage of waste batteries containing potassium hydroxide electrolyte. This permit filing indicated that a 12,100-gal tank had been used for storage of electrolyte. The EBS research indicated that the permit was filed under the incorrect assumption that the cumulative volume of electrolyte in individual batteries and subsequently, the total volume of caustic electrolyte to be stored, constituted hazardous waste container storage (i.e., tank storage). No storage tank was actually present onsite and no releases of electrolyte fluid were noted or reported during HRP's EBS. Therefore, no additional investigation of this hazardous waste container storage area was required. • AEC 7 (Septic leach field) pertains to unknown potential discharges, including former floor drain discharges. According to USCG, the floor drains near the overhead doors in the main building never discharged to the septic leach field, as was formerly believed. Soil and groundwater samples were recommended to be collected directly beneath these two floor drains and beneath a third floor drain which formerly discharged via pipeline from the Electrical Room to the former drainage swale along the western property boundary. • AEC 8 (Buoy, equipment, and scrap metal storage area) pertains to historic flaking of lead-based paint on buoys and in the construction debris disposal area, drums of metal turnings, and former solvent still present in the area. According to USCG, the container observed on the southeast corner of the Buoy Depot during the EBS was incorrectly identified as a solvent still. Solvent still bottoms are accumulated in a 90-day storage room inside the southeast corner of the building.
September 1998	The Phase II Environmental Site Assessment was conducted in July 1998 to determine the environmental impact, if any, from the AECs documented in the EBS. On-site activities included a ground-penetrating radar (GPR) investigation and the installation of test borings to collect soil and groundwater samples. Groundwater conditions in the area of the suspected former septic system/leach field could not be evaluated due to the presence of buoys. A record search identified "as-built" drawings with only one leach field installed in the existing location. On 2 November 1998, the USCG excavated a trench in the assumed location of the suspected former septic system/leach field (AEC 3). No gravel or piping was encountered in the trench and no other visible evidence of a septic system/leaching field was observed, thereby confirming that a leaching field was not installed in this area. At the time of the Phase II EBS, the operations at the USCG Buoy Depot and surrounding properties placed the Buoy Depot's soil and groundwater in MCP reporting categories RCS-2 and RCGW-2, respectively. Based upon the results of this investigation, there were some surficial lead concentrations in soil above 2,000 mg/kg. In the area of the dust collector and in the southeast corner of the property, lead concentrations exceeded the MCP's RCS-2 value of 600 mg/kg. Lead was also reported in four groundwater samples (GW3-1, GW3-2, GW7-2, and GW8-8) above the RCGW-2 reporting limit of 0.03 mg/L. Accordingly, HRP recommended additional investigation and that the scope should include the installation of permanent monitoring wells. The lead was reported in turbid, unfiltered groundwater samples that were collected using direct-push techniques.

Table 1 *Continued*

Date	Event
	Therefore, the results may not have been representative of the actual conditions in groundwater (lead concentrations may potentially have been in the soil matrix but reported in groundwater due to the sampling technique). Since the time when the EBS report was published, MADEP assigned the GW-1 classification to groundwater beneath the Buoy Depot and has determined that the facility is located within an aquifer protection district. Details were provided in MADEP's "Groundwater Use and Value Determination" (letter to EPA dated 13 January 1999).
February 1999	The State of Massachusetts inspected the existing subsurface sewage disposal system on 5 February 1999. The documentation indicates that the system passed an onsite Subsurface Sewage Disposal System Inspection; therefore, the septic system meets the State of Massachusetts Title V requirements. The recommendation called for slight regrading to eliminate ponding in the leach field area.
March 1999	Tetra Tech NUS, Inc. issued a Phase I Initial Site Investigation Report on the Jet Fuel Pipeline Site. This site is located approximately 150 ft from the Buoy Depot's eastern gate. The results of this investigation concluded that residual petroleum concentrations contained within the soil and groundwater are in excess of applicable MCP Method 1 standards. Further investigations were recommended.
1999	EA collected water levels at 36 wells and piezometers in the area for a Groundwater Flow Evaluation. However, only one well was located on the USCG property. Given the locations of the available data points, the study was limited. Based on the available data, EA interpreted the groundwater flow to be generally to the southeast across the Buoy Depot.
1999	The USCG contracted Clean Harbors to conduct soil testing and a final "vacuum sweep" outside of the USCG Buoy Depot's property boundary for the USCG Paint Chip Removal Action. Prior to removal of the paint chips, Clean Harbors collected two soil samples and two paint chip samples and sent them to the laboratory to be analyzed for TCLP-lead.
1999	TGG Environmental Inc. (TGG) was contracted by Unified to summarize and evaluate information generated by a sampling subcontractor, South Shore Lead Paint, and Logano Waste Management, the waste transporter and landfill management company in the USCG Dust Collection System Removal Action. During construction activities associated with the replacement of the dust collection system, soil was excavated and stockpiled in drums, on 6-mil polyethylene sheeting and subsequently in rolloff containers. Prior to any excavation, in March 1999 contractors collected 4 soil samples from the perimeter of the original concrete pad holding the baghouse. Total lead content of these samples ranged from 10,748 to 26,417 mg/kg. On 29 March 1999, Unified received permission from the USCG to remove soil. Reportedly, in April, soil and gravel to a depth of 15 in. were removed from a 2-ft area surrounding the concrete pad and placed in 6 steel drums and then to rolloffs. Unified removed another 6 in. of soil in the 44 × 50 ft area, prior to installing the concrete pad now in place. The USCG issued a final Time-Critical Removal Action Memorandum in June 2004 to retroactively document the decision for the completed removal action.

Table 1 *Continued*

Date	Event
June 1999	In the Phase II EBS Field Reports, the Navy limited the investigation to surface water and sediment sample collection and analysis south of the USCG parcel and installation of two wells, one well at the southwestern corner of the USCG property, and one offsite and upgradient of the parcel.
February 2001	The purpose of the Remedial Investigation (RI) Report was to evaluate the nature and extent of chemical constituents related to AOCs identified in previous investigations that may pose a threat to public health and the environment and to quantify the potential risk to human health and the environment from exposure to these chemicals. The RI included site characterization, baseline human health, and ecological risk assessments, an evaluation of chemical fate and transport, and preliminary identification of potential remedial alternatives. Field activities for the RI included field screening for metals in soil and volatile organic compounds (VOCs) in soil, groundwater, and hydric soil sampling; monitoring well and piezometer installation; groundwater gauging and water level measurements; hydraulic conductivity testing; and a professional land survey of the sampling locations and monitoring wells.
January 2002	Supplemental sampling to support the Feasibility Study (FS) was performed by EA in January 2002 in support of the Feasibility Study for the Buoy Depot. This investigation consisted of the following activities: • Sampling of shallow subsurface soil on-depot and analysis for methyl isobutyl ketone (MIBK, or 4-methyl-2-pentanone) to address MADEP concerns regarding a previous detection at location SB017. • Sampling of hydric soil within the drainage swale and analysis for six COC metals to delineate impacts and support selection of the appropriate remedial alternative. • Sampling of hydric soil and surface water to assess the extent of impacts in the wetland. Soil sampling was performed but, to date, insufficient precipitation has occurred to allow collection of surface water samples. • Installation of two additional monitoring wells and sampling of the new and existing monitoring wells to support the risk assessments for ground water. The compound 1,4-dioxane was added to the analyte list at the request of the MADEP.
December 2002	The Engineering Evaluation/Cost Analysis (EE/CA) was conducted in accordance with CERCLA/SARA to provide the basis for a Non-Time Critical Removal Action (NTCRA) for hydric soil/sediment in the swale and wetland area as well as subsurface soil around the floor drain system of the Buoy Depot building. The USCG also incorporated the results of the supplemental sampling round and the updated human health and ecological risk assessments.
January 2003	The Wetland Assessment, Appendix A of the Non-Time Critical Action Memorandum, was conducted in the swale and wetland area in late 2002 to support the non-time critical removal action and evaluate potential impacts of the action.
August 2004	In February 2003, the USCG conducted a CERCLA Non-Time Critical Removal Action that included the removal of the building's floor drain system, the floor drains' contents (sludge/sediment), and some of the surrounding soil. Excavated materials were transported offsite for final disposal.
29 September 2006	Record of Decision (ROD) selecting the final remedy (land-use controls, long-term monitoring, and Five-Year Reviews) signed
April 2007	Planting of 60 containerized plants in swale

Table 1 *Continued*

Date	Event
June 2007	Long-Term Monitoring Event No. 1 – groundwater, surface water, soil in swale, and wetland sampled
August 2007	Long-Term Monitoring Event No. 1 report submitted.
September 2007	Long-Term Monitoring Event No. 2 – swale and wetland soils sampled
September 2007	Final Long-Term Monitoring Plan
March 2008	Draft Land Use Control Implementation Plan
June 2008	Long-Term Monitoring Event No. 3 – swale and wetland soils sampled
June 2009	Long-Term Monitoring Event No. 4 – swale and wetland soil sampling
June 2010	Long-Term Monitoring Event No. 5 – swale and wetland soil sampling
December 2010	Final Land Use Control Implementation Plan
June 2011	Long-Term Monitoring Event No. 6 – swale and wetland soil sampling
September 2011	First Five-Year Review

Watermark

Table 2
Recommendations and Follow-Up Actions
First Five Year Review
USCG Buoy Depot, South Weymouth, Massachusetts

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Remedy Protectiveness (Yes/No)	
					Short-Term	Long-Term
Continue implementation of institutional controls, long-term monitoring, and five-year reviews	The remedy should continue as presented in the ROD. There is not enough data to definitively determine any trends in the drainage swale or wetland. The institutional and engineering controls should remain in place until monitoring indicates stable or decreasing trends in COCs, especially lead.	USCG	EPA	Within next five-year review period	No	No
Continue Implementation of Lead-Based Paint Buoy Management Plan	Testing of incoming buoys has not indicated any buoys containing lead-based paint. In addition, all buoys stored on site containing lead-based paint were removed from the Site and scrapped in 2008. In order to ensure that all buoys containing lead-based paint have been removed from service and can no longer be a source of contamination at the Buoy Depot Appendix C of the Land Use Control Implementation Plan, the Lead-Based Paint Buoy Management Plan, will be implemented for three more years or through 2014. At that time, the USCG will review the buoy logs to ensure that no buoys have been received that contain lead-based paint. If no buoys have been received then upon receiving approval from the EPA and concurrence from the MassDEP the Lead-Based Paint Management Plan will no longer be implemented.	USCG	EPA	January 2015 and upon EPA concurrence	No	No
Increasing trend for chromium, copper, nickel, and zinc at sample location WSS-02	This condition merits further monitoring to determine if the increasing trend continues or is an anomaly due to the small sample set.	USCG	EPA	Within next five-year review period	No	No

Notes:
ROD = Record of Decision
COC = Constituent of Concern
USCG = U.S. Coast Guard
EPA = U.S. Environmental Protection Agency

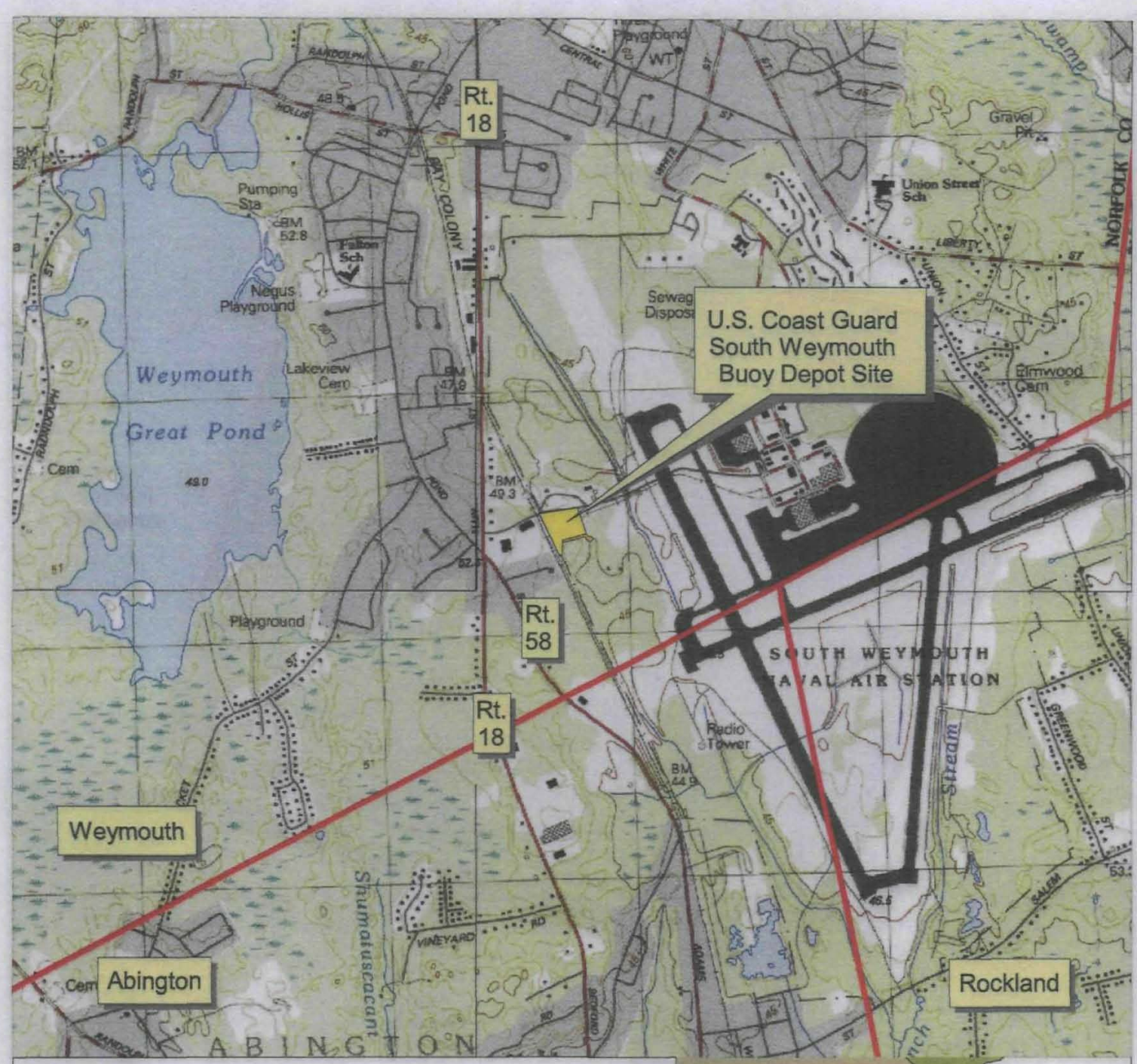
Table 2 *Continued*
Recommendations and Follow-Up Actions
Draft First Five Year Review
USCG Buoy Depot, South Weymouth, Massachusetts

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Remedy Protectiveness (Yes/No)	
Solids removal from Vortechs and catch basins	The collected solids should be removed at least annually from the Vortechs and catch basins to ensure that collected solids are not transported downgradient.	USCG	EPA	Within 1 year of Final First Five-Year Review Report	No	No
Hay bale check dams	The continued use of the hay bale check dams in the swale and entrance to the wetland will be evaluated along with other erosion control options to minimize the preferred flow and potential channelization at the toe of the swale and entrance to the wetland.	USCG	EPA	Within 1 year of Final First Five-Year Review Report	No	No
Berms/curbing and fence repairs	The berm/curbing along the northern border of the site and should be repaired to ensure stormwater remains contained on the site. In addition, the fence along the southern boundary (along the drainage swale) should be repaired to minimize the potential for trespassers to access the Site in this area.	USCG	EPA	Within 1 year of Final First Five-Year Review Report	No	No
Concrete repair	The concrete around the polydrain system should be repaired to ensure that the structural integrity of the polydrain remains intact.	USCG	EPA	Within 1 year of Final First Five-Year Review Report	No	No

Notes: ROD = Record of Decision
COC = Constituent of Concern
USCG = U.S. Coast Guard
EPA = U.S. Environmental Protection Agency

Watermark

FIGURES



2000 0 2000 Feet

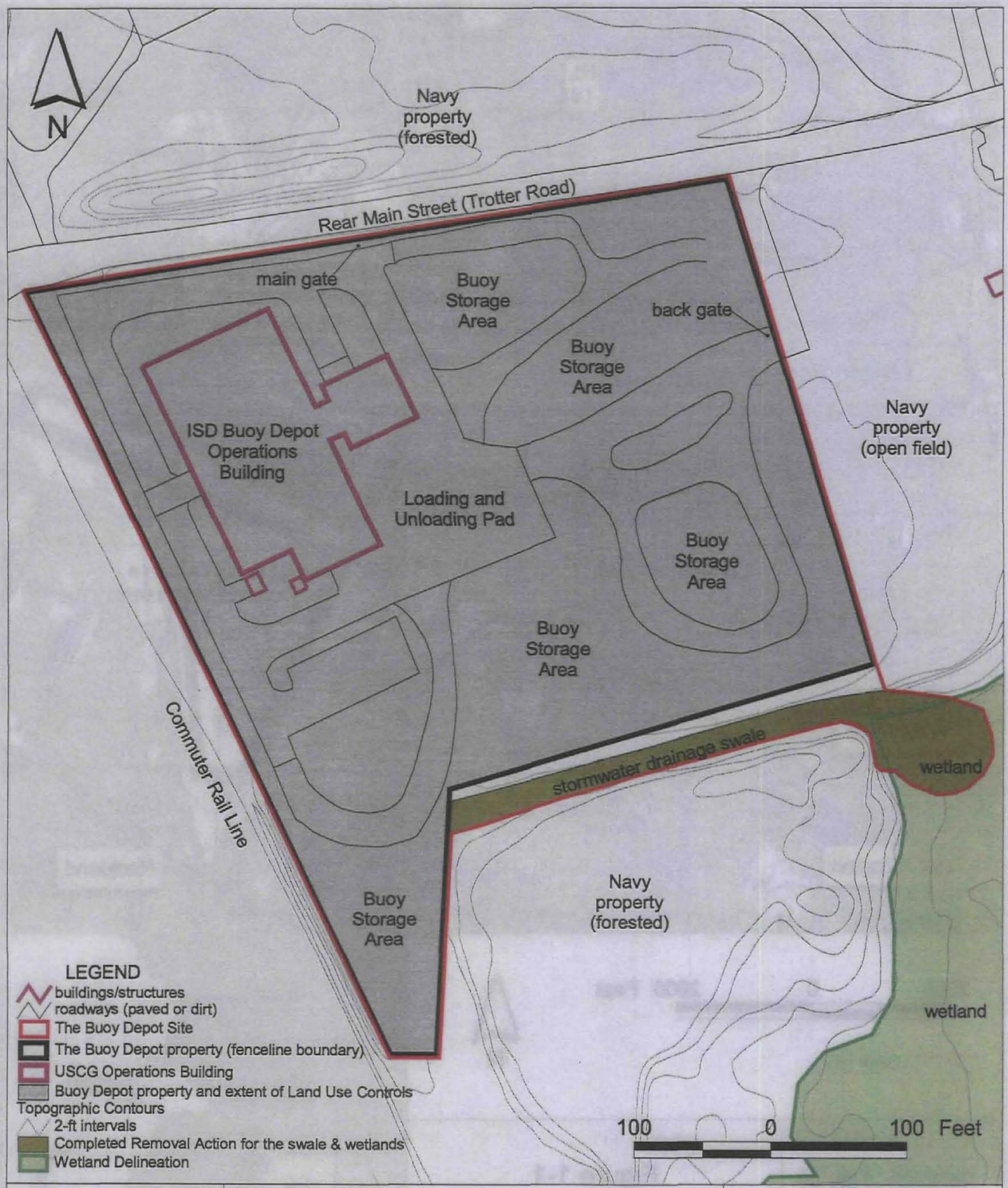
town line

N

Figure 1-1

Site Locus Map

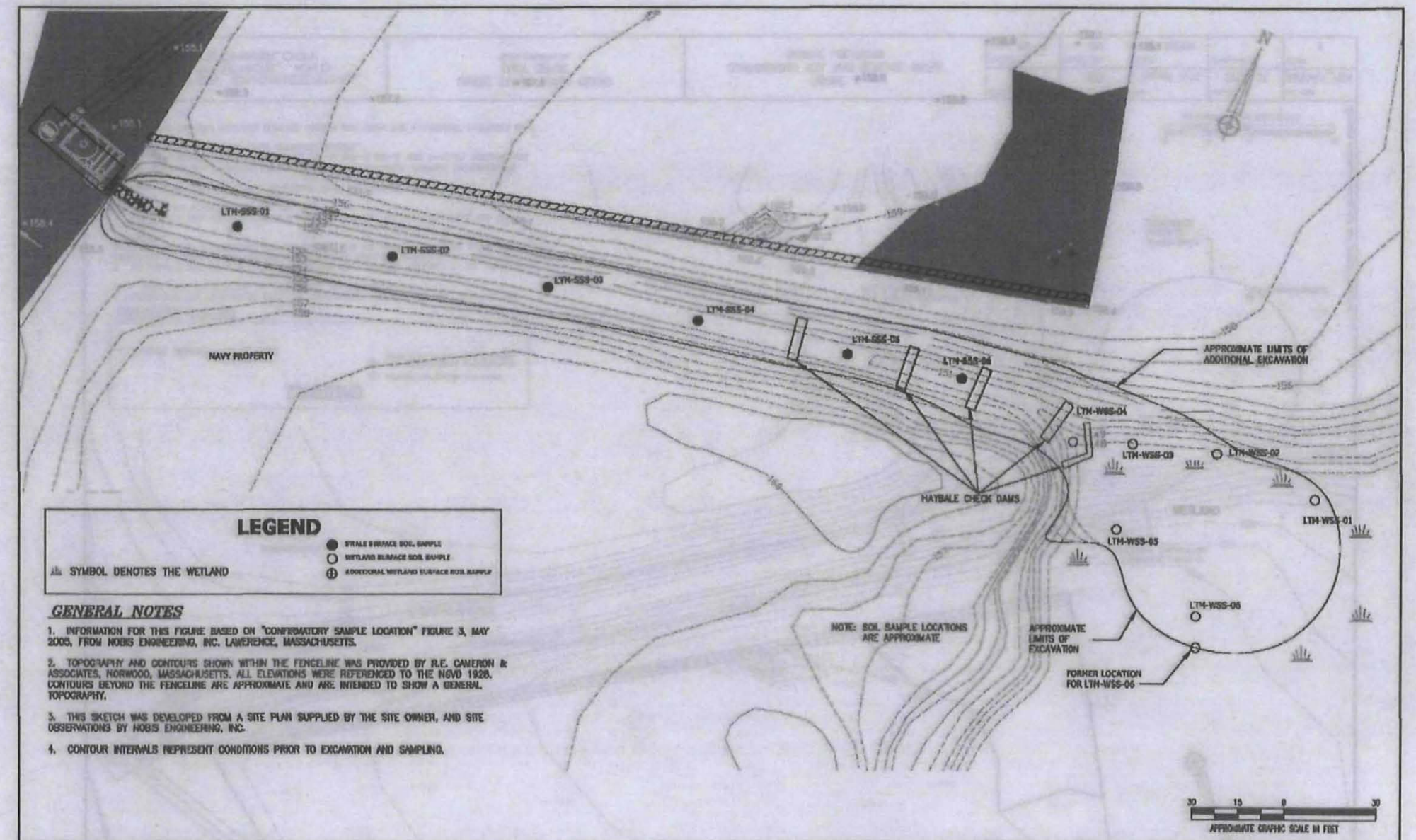
12/21/06



U.S. Coast Guard
South Weymouth Buoy Depot Site
South Weymouth, MA

12/21/06

Figure 1-2
Site Map



GENERAL NOTES

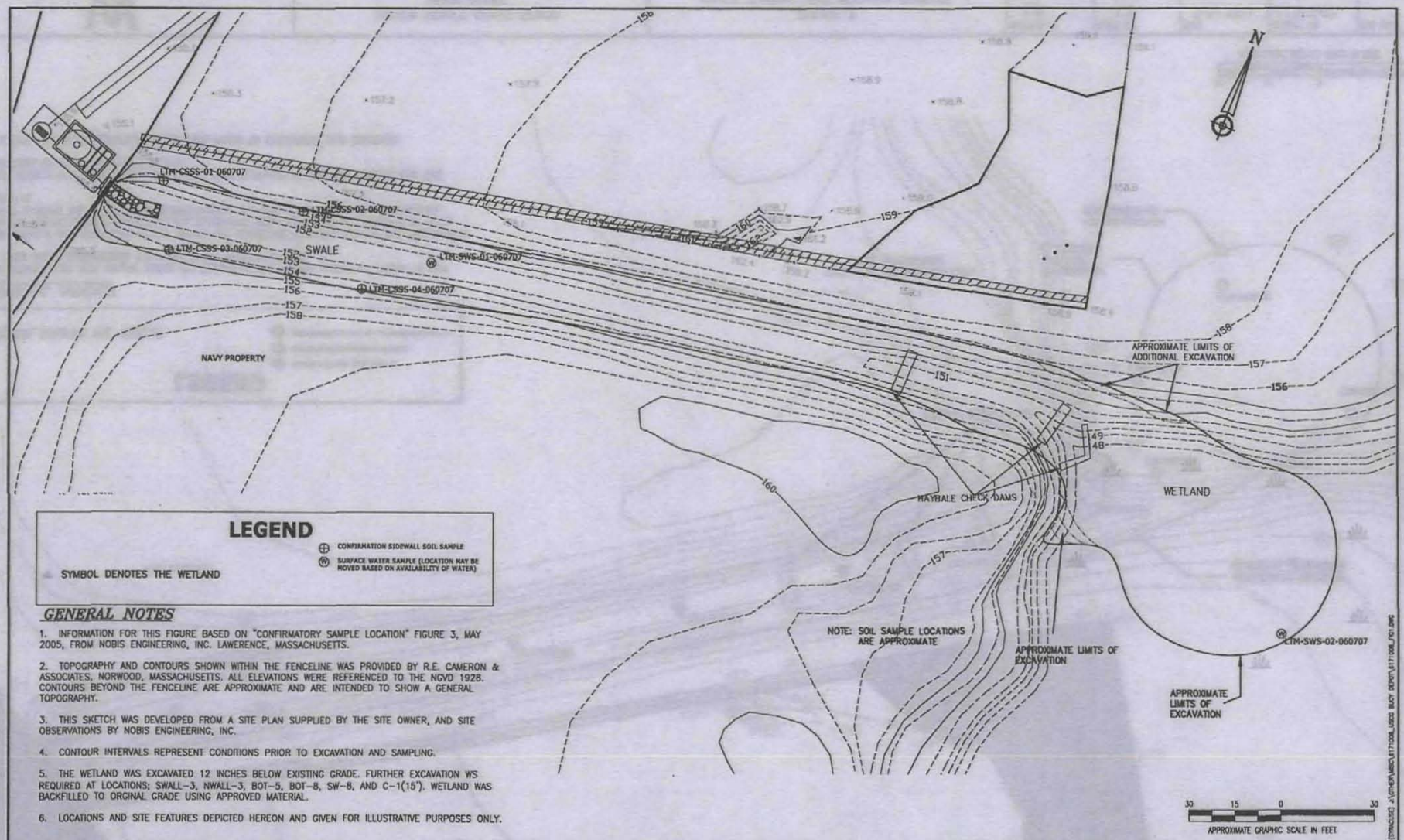
1. INFORMATION FOR THIS FIGURE BASED ON "CONFIRMATORY SAMPLE LOCATION" FIGURE 3, MAY 2005, FROM NOBIS ENGINEERING, INC. LAWRENCE, MASSACHUSETTS.

2. TOPOGRAPHY AND CONTOURS SHOWN WITHIN THE FENCELINE WAS PROVIDED BY R.E. CAMERON & ASSOCIATES, NORWOOD, MASSACHUSETTS. ALL ELEVATIONS WERE REFERENCED TO THE NGVD 1928. CONTOURS BEYOND THE FENCELINE ARE APPROXIMATE AND ARE INTENDED TO SHOW A GENERAL TOPOGRAPHY.

3. THIS SKETCH WAS DEVELOPED FROM A SITE PLAN SUPPLIED BY THE SITE OWNER, AND SITE OBSERVATIONS BY NOBIS ENGINEERING, INC.

4. CONTOUR INTERVALS REPRESENT CONDITIONS PRIOR TO EXCAVATION AND SAMPLING.

Watermark	UNITED STATES COAST GUARD BUCY DEPOT SOUTH WEYMOUTH, MA	FIGURE 3 SWALE SURFACE AND WETLAND SURFACE SOIL SAMPLE LOCATIONS	DESIGNED BY LT	DRAWN BY LT	DATE July 2011	PROJECT NO. 11017-00	FILE NAME
			CHECKED BY LP	PROJECT MGR. LP	SCALE As Shown	DRAWING NO. -	FIGURE 3



LEGEND

⊕ CONFIRMATION SIDEWALL SOIL SAMPLE

Ⓦ SURFACE WATER SAMPLE (LOCATION MAY BE MOVED BASED ON AVAILABILITY OF WATER)

SYMBOL DENOTES THE WETLAND

GENERAL NOTES

1. INFORMATION FOR THIS FIGURE BASED ON "CONFIRMATORY SAMPLE LOCATION" FIGURE 3, MAY 2005, FROM NOBIS ENGINEERING, INC. LAWERENCE, MASSACHUSETTS.

2. TOPOGRAPHY AND CONTOURS SHOWN WITHIN THE FENCELINE WAS PROVIDED BY R.E. CAMERON & ASSOCIATES, NORWOOD, MASSACHUSETTS. ALL ELEVATIONS WERE REFERENCED TO THE NGVD 1928. CONTOURS BEYOND THE FENCELINE ARE APPROXIMATE AND ARE INTENDED TO SHOW A GENERAL TOPOGRAPHY.

3. THIS SKETCH WAS DEVELOPED FROM A SITE PLAN SUPPLIED BY THE SITE OWNER, AND SITE OBSERVATIONS BY NOBIS ENGINEERING, INC.

4. CONTOUR INTERVALS REPRESENT CONDITIONS PRIOR TO EXCAVATION AND SAMPLING.

5. THE WETLAND WAS EXCAVATED 12 INCHES BELOW EXISTING GRADE. FURTHER EXCAVATION WS REQUIRED AT LOCATIONS; SWALL-3, NWALL-3, BOT-5, BOT-8, SW-8, AND C-1(15'). WETLAND WAS BACKFILLED TO ORGINAL GRADE USING APPROVED MATERIAL.

6. LOCATIONS AND SITE FEATURES DEPICTED HEREON AND GIVEN FOR ILLUSTRATIVE PURPOSES ONLY.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	UNITED STATES COAST GUARD BUOY DEPOT SOUTH WEYMOUTH, MA.	FIGURE 4 CONFIRMATION SOIL AND SURFACE WATER SAMPLE LOCATIONS	DESIGNED BY MET	DRAWN BY WEL	DATE August 2011	PROJECT NO. 62534.01	FILE NAME 6253401_FIG4
			CHECKED BY RW	PROJECT MGR. RW	SCALE AS SHOWN	DRAWING NO. –	FIGURE 4

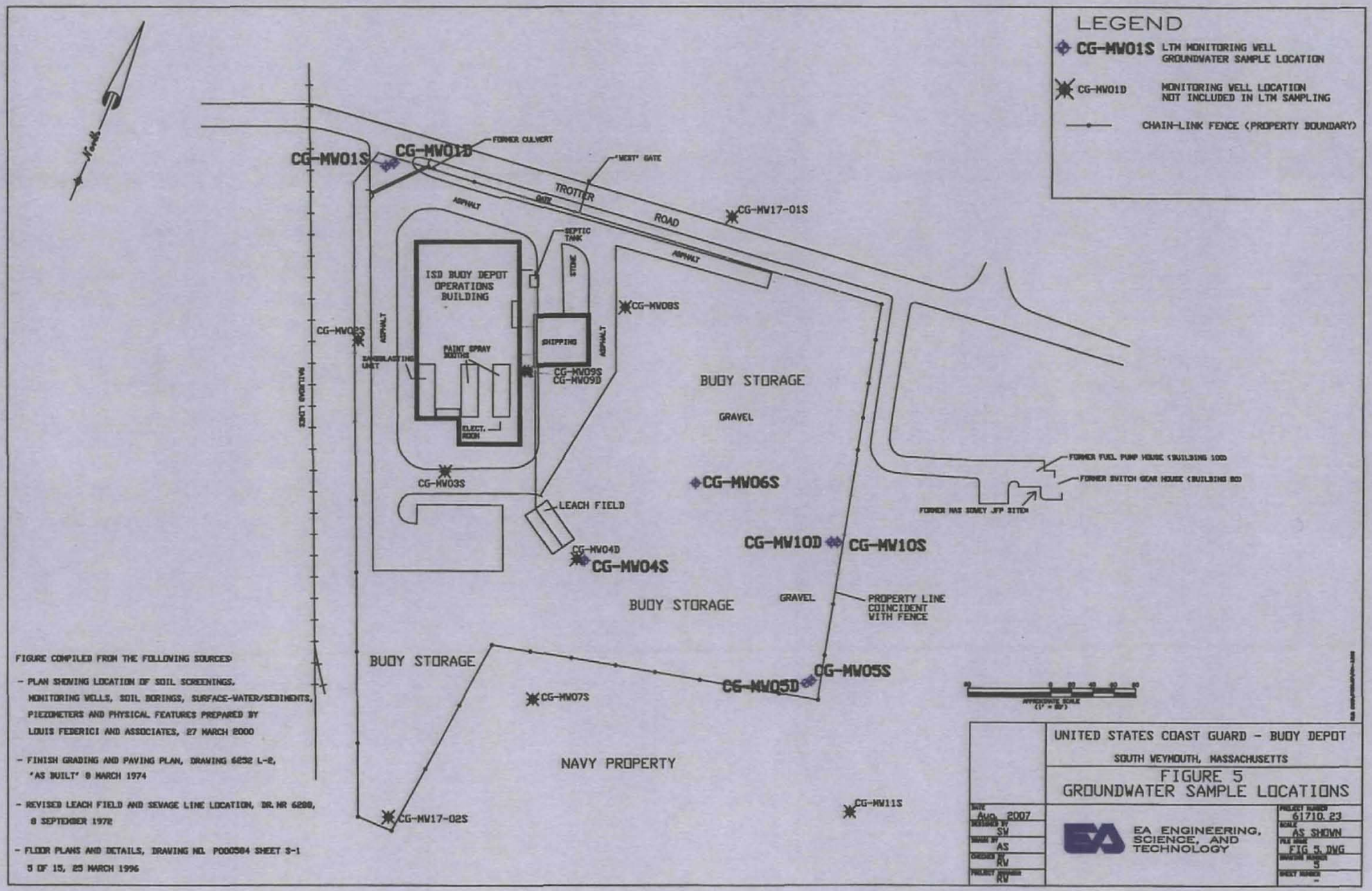


FIGURE COMPILED FROM THE FOLLOWING SOURCES:

- PLAN SHOWING LOCATION OF SOIL SCREENINGS, MONITORING WELLS, SOIL BORINGS, SURFACE-WATER/SEDIMENTS, PIEZOMETERS AND PHYSICAL FEATURES PREPARED BY LOUIS FEDERICI AND ASSOCIATES, 27 MARCH 2000
- FINISH GRADING AND PAVING PLAN, DRAWING 6252 L-2, "AS BUILT" 8 MARCH 1974
- REVISED LEACH FIELD AND SEWAGE LINE LOCATION, DR. NR 6288, 8 SEPTEMBER 1972
- FLOOR PLANS AND DETAILS, DRAWING NO. P000584 SHEET 3-1 5 OF 15, 25 MARCH 1996

Watermark

APPENDIX A

Public Notice Announcement for Five-Year Review for the Buoy Depot Site

BUOY DEPOT SITE, SOUTH WEYMOUTH

LEGAL NOTICE
FIVE-YEAR REVIEW NOTICE
FOR UNITED STATES COAST GUARD (USCG) SOUTH WEYMOUTH BUOY DEPOT SITE, SOUTH WEYMOUTH, MA

The USCG is conducting a Five-Year Review for the USCG South Weymouth Buoy Depot Site located on Trotter Road (Rear Main Street) in South Weymouth, Massachusetts, EPA ID No. MA0690330758.

The Five-Year Review will evaluate the implementation and performance of the selected remedy in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, and the associated laws and regulations commonly known as "Superfund" to determine if the remedy is protective of human health and the environment. The Record of Decision ROD) was signed 29 September 2006. The Selected Remedy includes Land Use Controls (Institutional Controls and Engineering Controls), Long-Term Monitoring, and Five-Year Reviews for AOC 3 (Buoy, Equipment, and Scrap Metal Storage Area). The Five-Year review process will be completed by September 2011. The public is encouraged to review the information provided in the Administrative Record, which is available for review at the Former Naval Air Station, South Weymouth, MA, and at local library information repositories:

Navy Caretaker
Site Office
c/o David Barney
1134 Main Street,
Building 11
South Weymouth, MA
02190
(617) 753-4656

Watermark

APPENDIX B

Mann-Kendall Trend Analysis

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

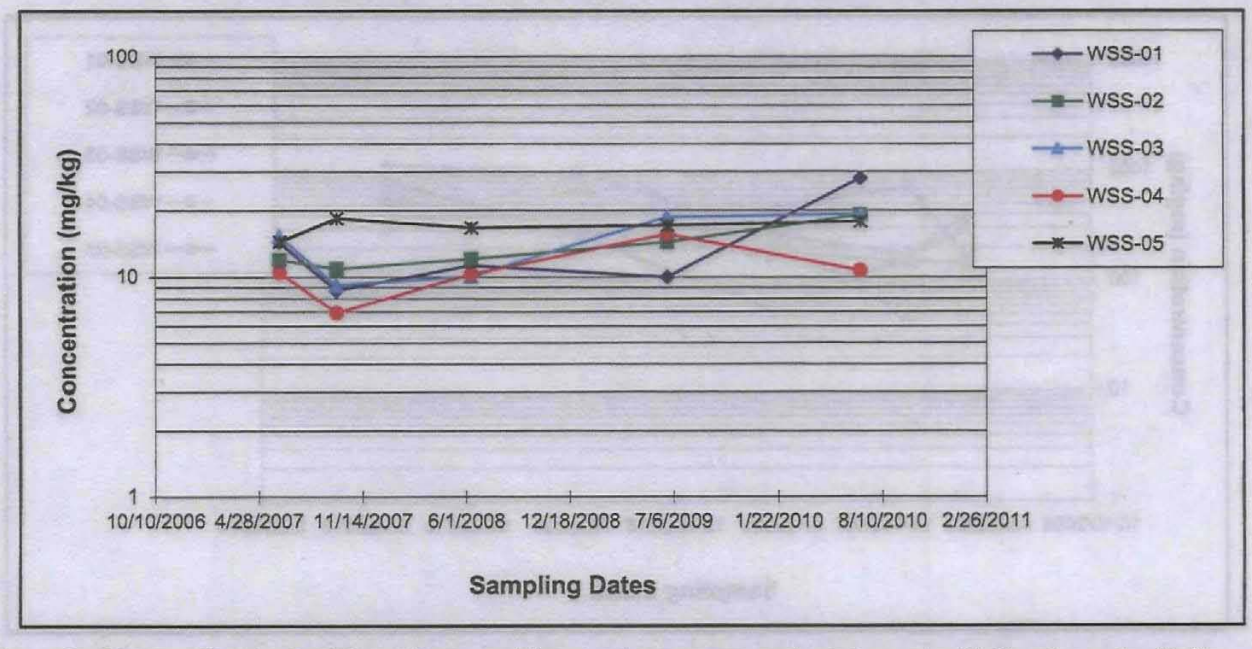
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	WSS-01	WSS-02	WSS-03	WSS-04	WSS-05		

Sampling Event	Date	CHROMIUM CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	14.4	12.0	15.3	10.5	14.4		
ME-02	25-Sep-07	8.7	10.9	9.2	6.9	18.4		
ME-03	11-Jun-08	11.3	12.1	10	10.3	16.7		
ME-04	24-Jun-09	10	14.4	18.7	15.6	17.1		
ME-05	29-Jun-10	28.1	19.1	19.3	10.7	17.8		
Coefficient of Variation:		0.54	0.24	0.32	0.29	0.09		
Mann-Kendall Statistic (S):		2	8	6	4	4		
Confidence in Trend:		59.2%	95.8%	88.3%	75.8%	75.8%		
Concentration Trend:		No Trend	Increasing	No Trend	No Trend	No Trend		



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

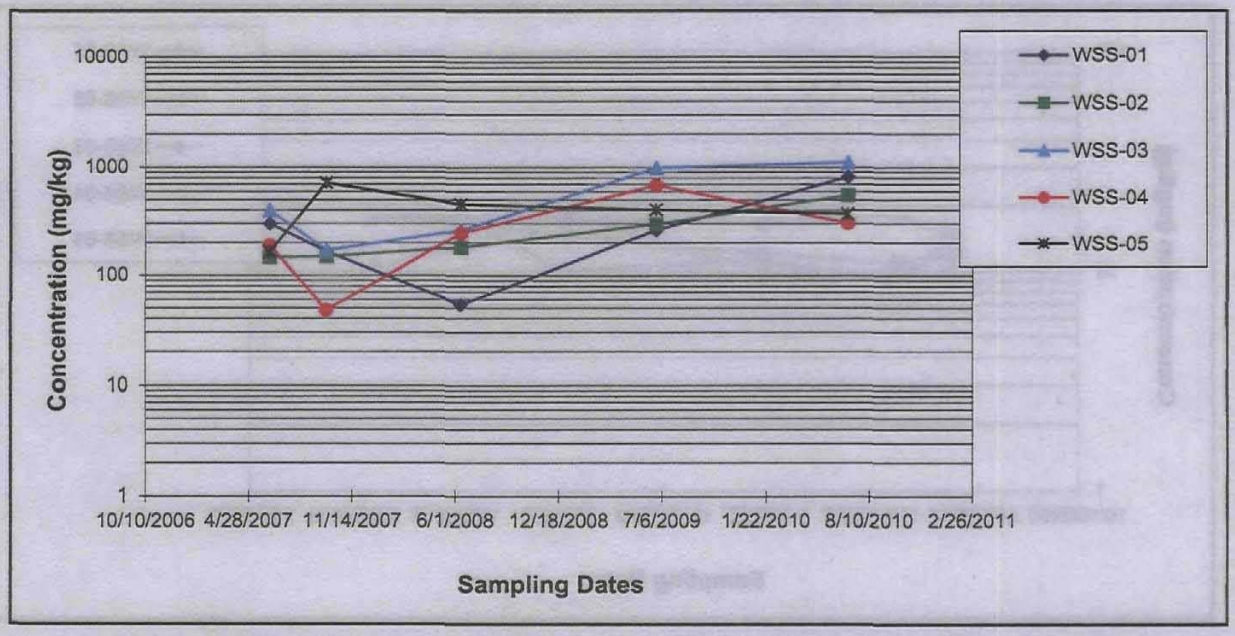
ADEQUACY OF DATABASE FOR TREND ANALYSIS

■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	WSS-01	WSS-02	WSS-03	WSS-04	WSS-05		
Sampling Event / **Date**	**COPPER CONCENTRATION (mg/kg)**						
ME-01 / 7-Jun-07	302.0	147.0	402.0	190.0	164.0		
ME-02 / 25-Sep-07	166.0	150.0	171.0	48.2	721.0		
ME-03 / 11-Jun-08	53.8	181.0	261	246.0	455.0		
ME-04 / 24-Jun-09	263	299.0	997	688	407.0		
ME-05 / 29-Jun-10	825	557.0	1,120.0	308	374		
Coefficient of Variation:	0.92	0.65	0.74	0.81	0.47		
Mann-Kendall Statistic (S):	2	10	6	6	-2		
Confidence in Trend:	59.2%	99.2%	88.3%	88.3%	59.2%		
Concentration Trend:	No Trend	Increasing	No Trend	No Trend	No Trend		



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

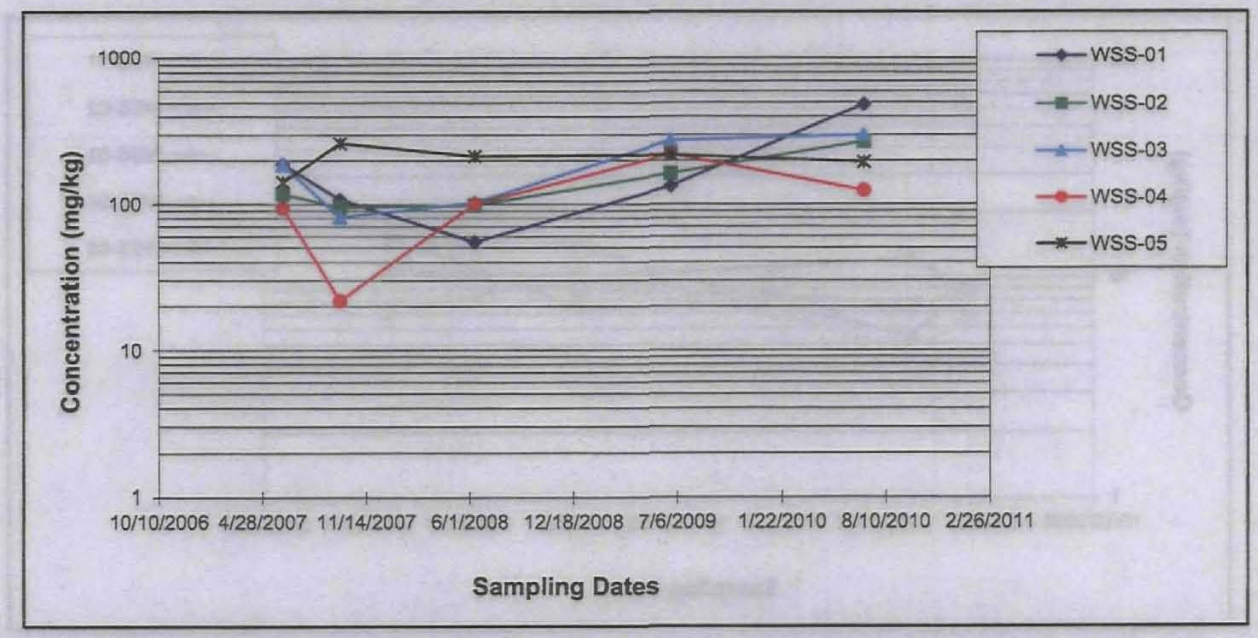
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	WSS-01	WSS-02	WSS-03	WSS-04	WSS-05		

Sampling Event	Date	LEAD CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	191.0	119.0	191.0	94.4	142.0		
ME-02	25-Sep-07	109.0	96.3	82.5	21.8	263.0		
ME-03	11-Jun-08	55.2	99.6	104	101.0	214.0		
ME-04	24-Jun-09	135	165.0	278	223	219.0		
ME-05	29-Jun-10	486	272.0	301.0	125	195		
Coefficient of Variation:		0.87	0.49	0.52	0.64	0.21		
Mann-Kendall Statistic (S):		2	6	6	6	0		
Confidence in Trend:		59.2%	88.3%	88.3%	88.3%	40.8%		
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend		



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

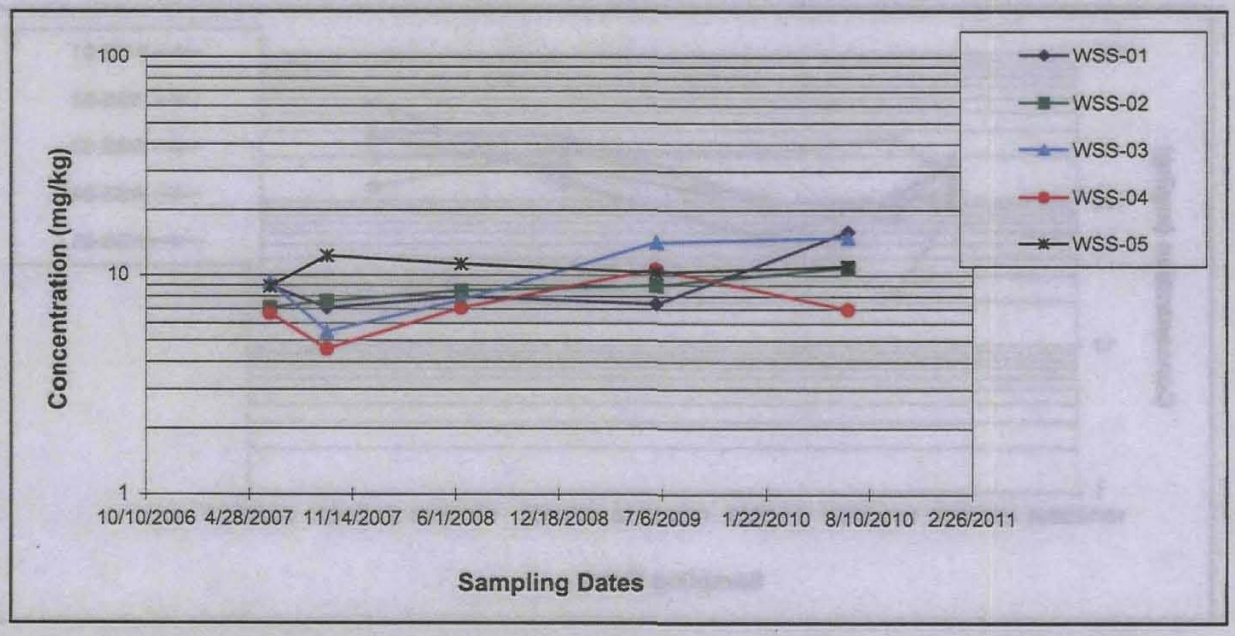
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	WSS-01	WSS-02	WSS-03	WSS-04	WSS-05		

Sampling Event	Date	NICKEL CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	9.0	7.1	9.3	6.7	8.9		
ME-02	25-Sep-07	7.1	7.6	5.5	4.6	12.3		
ME-03	11-Jun-08	8.0	8.5	8	7.1	11.3		
ME-04	24-Jun-09	7.4	9.0	14.2	10.7	10.3		
ME-05	29-Jun-10	15.9	10.9	14.9	7	11		
Coefficient of Variation:		0.39	0.17	0.40	0.30	0.12		
Mann-Kendall Statistic (S):		2	10	6	4	0		
Confidence in Trend:		59.2%	99.2%	88.3%	75.8%	40.8%		
Concentration Trend:		No Trend	Increasing	No Trend	No Trend	No Trend		



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

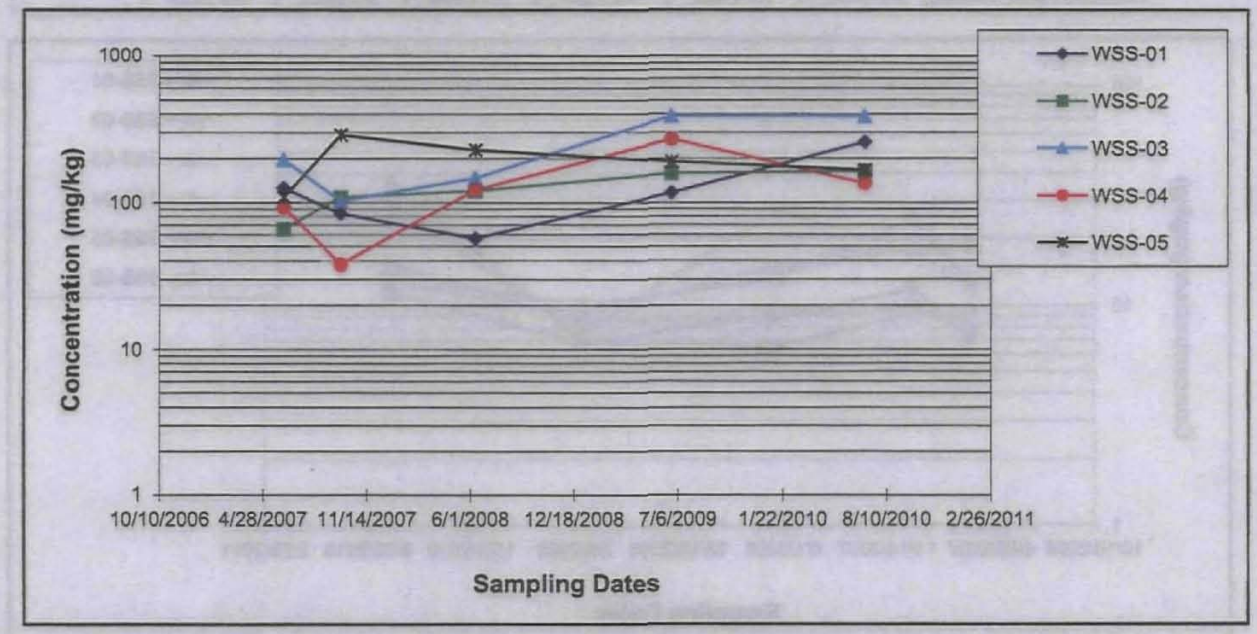
ADEQUACY OF DATABASE FOR TREND ANALYSIS

■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	WSS-01	WSS-02	WSS-03	WSS-04	WSS-05		
Sampling Event / **Date**	**ZINC CONCENTRATION (mg/kg)**						
ME-01 / 7-Jun-07	126.0	65.4	196.0	91.8	109.0		
ME-02 / 25-Sep-07	83.7	109.0	103.0	37.5	288.0		
ME-03 / 11-Jun-08	56.3	121.0	147	122.0	228.0		
ME-04 / 24-Jun-09	117	159.0	387	269	191.0		
ME-05 / 29-Jun-10	257	164.0	385.0	135	167		
Coefficient of Variation:	0.60	0.33	0.55	0.65	0.34		
Mann-Kendall Statistic (S):	2	10	4	6	-2		
Confidence in Trend:	59.2%	99.2%	75.8%	88.3%	59.2%		
Concentration Trend:	No Trend	Increasing	No Trend	No Trend	No Trend		



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

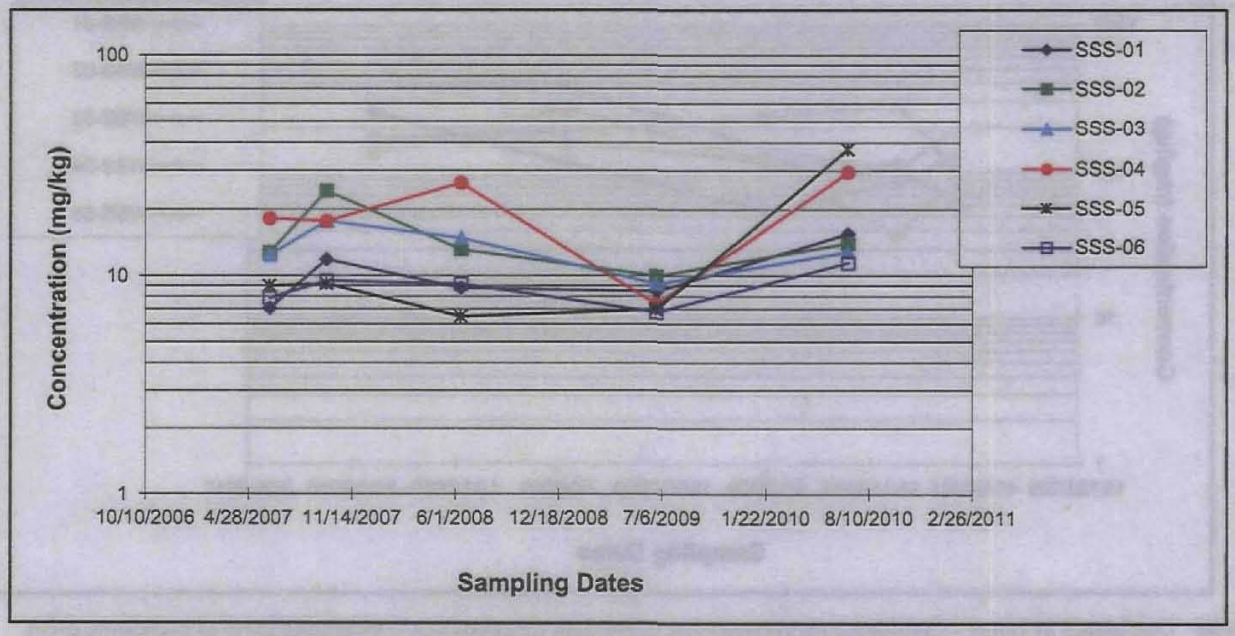
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	SSS-01	SSS-02	SSS-03	SSS-04	SSS-05	SSS-06	
Distance from Source (ft.)	31	82	133	183	233	283	

Sampling Event	Date	CHROMIUM CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	7.1	12.8	12.5	18.3	9.0	7.9	
ME-02	25-Sep-07	11.9	24.4	17.8	17.8	9.2	9.5	
ME-03	11-Jun-08	8.8	13.2	15	26.6	6.5	9.2	
ME-04	24-Jun-09	8.5	10.0	9.2	7.4	7.0	6.8	
ME-05	29-Jun-10	15.6	14.1	12.9	29.8	37.6	11.5	
Coefficient of Variation:		0.33	0.37	0.24	0.44	0.96	0.20	
Mann-Kendall Statistic (S):		4	0	-2	2	2	2	
Confidence in Trend:		75.8%	40.8%	59.2%	59.2%	59.2%	59.2%	
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

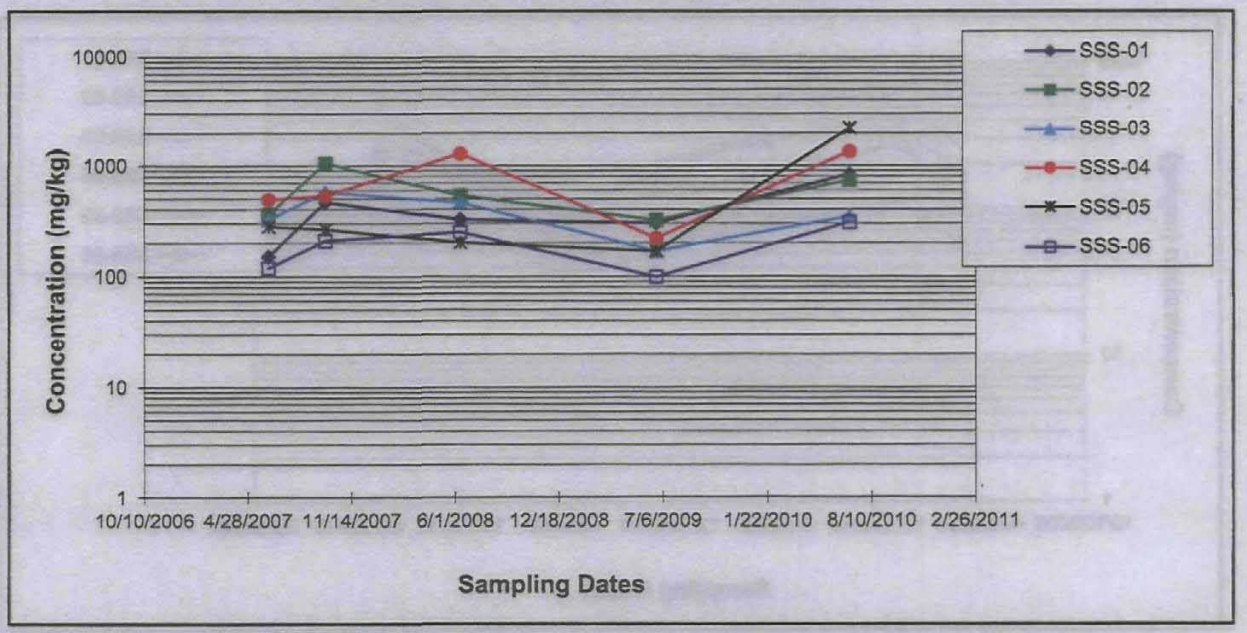
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	SSS-01	SSS-02	SSS-03	SSS-04	SSS-05	SSS-06	
Distance from Source (ft.)	31	82	133	183	233	283	

Sampling Event	Date	COPPER CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	152.0	365.0	327.0	493.0	280.0	120.0	
ME-02	25-Sep-07	471.0	1,070.0	584.0	535.0	264.0	211.0	
ME-03	11-Jun-08	328.0	541.0	467	1,300.0	201.0	252.0	
ME-04	24-Jun-09	304	324.0	171	220	168.0	100.0	
ME-05	29-Jun-10	844	747.0	351.0	1360	2210	309	
Coefficient of Variation:		0.63	0.50	0.41	0.66	1.42	0.44	
Mann-Kendall Statistic (S):		4	0	-2	4	-2	4	
Confidence in Trend:		75.8%	40.8%	59.2%	75.8%	59.2%	75.8%	
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

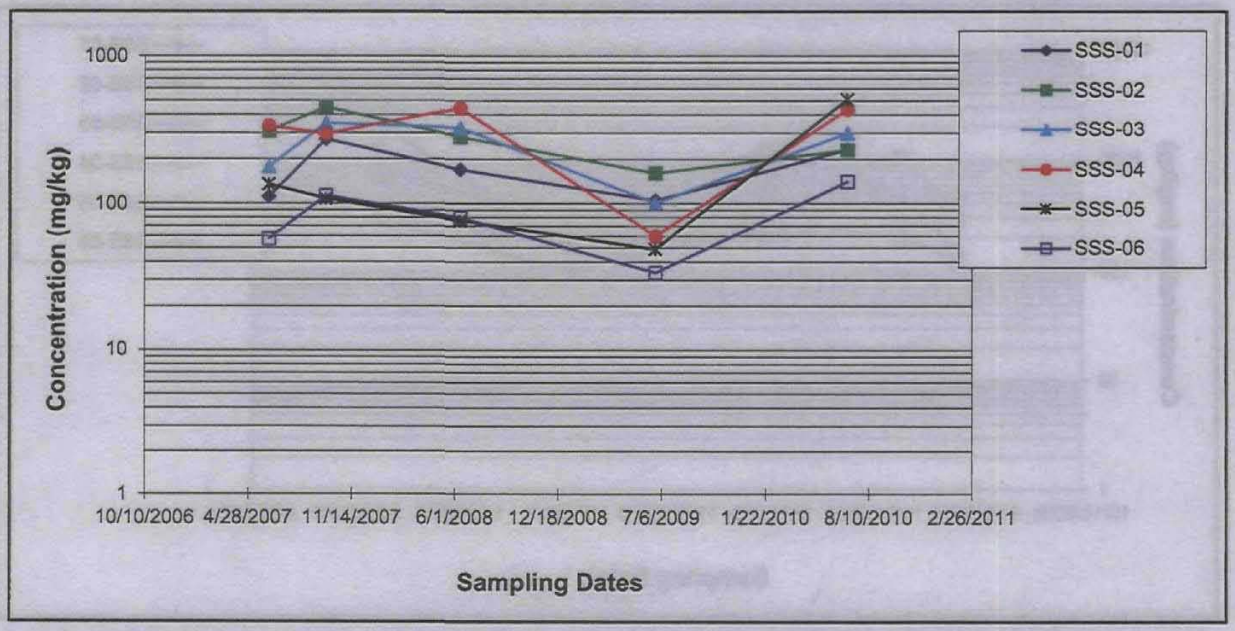
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	SSS-01	SSS-02	SSS-03	SSS-04	SSS-05	SSS-06	
Distance from Source (ft.)	31	82	133	183	233	283	

Sampling Event	Date	LEAD CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	111.0	309.0	178.0	335.0	135.0	57.5	
ME-02	25-Sep-07	272.0	450.0	351.0	296.0	108.0	113.0	
ME-03	11-Jun-08	170.0	282.0	326	444.0	76.1	79.8	
ME-04	24-Jun-09	105	161.0	101	59.8	49.0	33.8	
ME-05	29-Jun-10	232	230.0	300.0	437	509	141	
Coefficient of Variation:		0.41	0.38	0.43	0.50	1.08	0.50	
Mann-Kendall Statistic (S):		0	-6	-2	0	-2	2	
Confidence in Trend:		40.8%	88.3%	59.2%	40.8%	59.2%	59.2%	
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

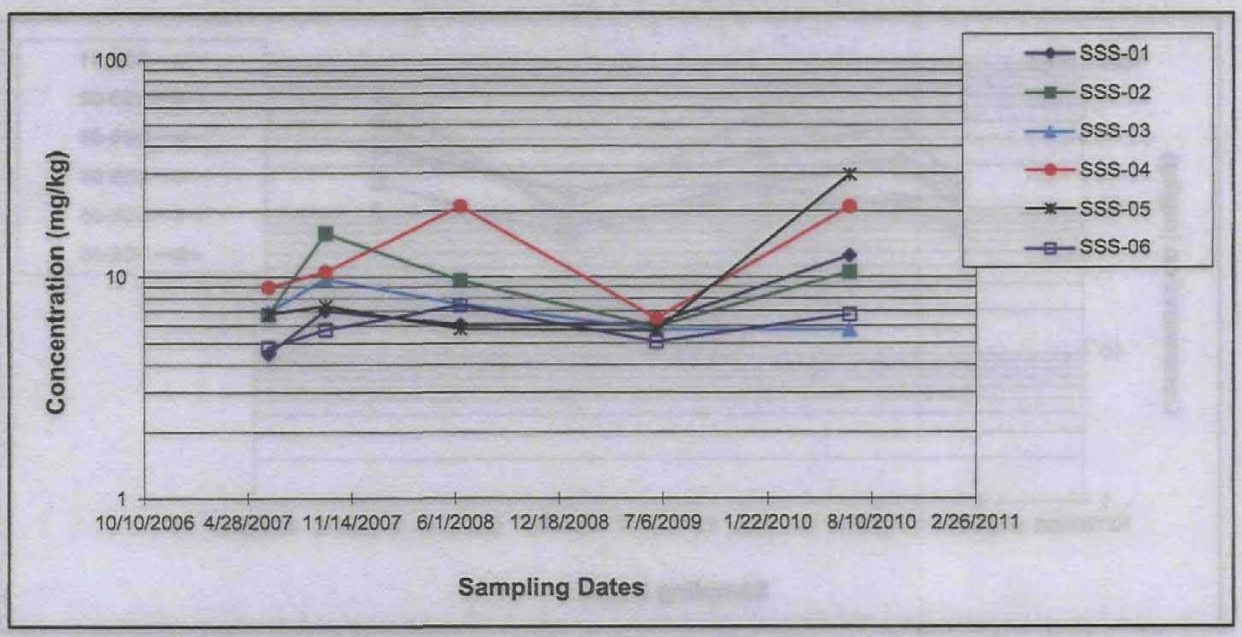
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	SSS-01	SSS-02	SSS-03	SSS-04	SSS-05	SSS-06	
Distance from Source (ft.)	31	82	133	183	233	283	

Sampling Event	Date	NICKEL CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	4.5	6.8	7.0	9.0	6.8	4.8	
ME-02	25-Sep-07	7.1	16.0	9.9	10.6	7.4	5.8	
ME-03	11-Jun-08	6.1	9.7	8	21.1	5.8	7.5	
ME-04	24-Jun-09	6.2	6.0	5.8	6.5	5.7	5.1	
ME-05	29-Jun-10	12.6	10.6	5.8	21.1	29.5	6.8	
Coefficient of Variation:		0.43	0.40	0.23	0.51	0.94	0.19	
Mann-Kendall Statistic (S):		6	0	-5	3	0	4	
Confidence in Trend:		88.3%	40.8%	82.1%	67.5%	40.8%	75.8%	
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

HISTORICAL SOIL SAMPLING DATABASE AND TREND ANALYSIS

ADEQUACY OF DATABASE FOR TREND ANALYSIS

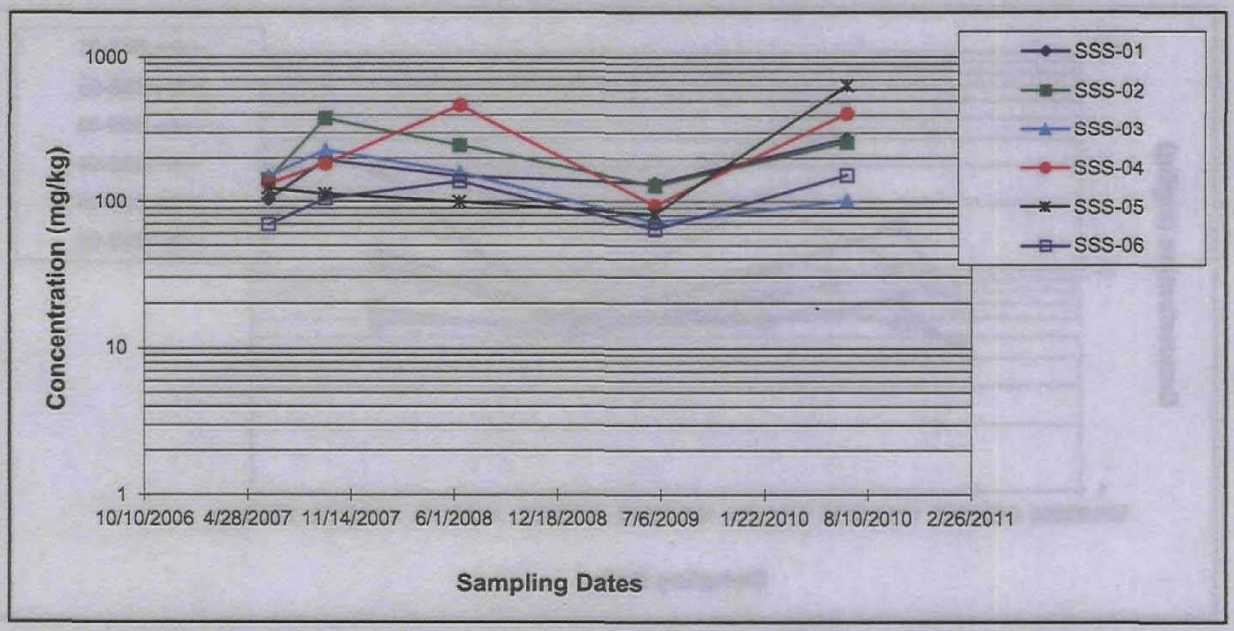
■ **Sufficient Data Available:** At least three sampling locations with four or more independent sampling events per location

☐ **Insufficient Data Available:** Fewer than three sampling locations or fewer than 4 independent sampling events per locati available.

HISTORICAL SURFACE SOIL SAMPLING DATA

SAMPLE ID:	SSS-01	SSS-02	SSS-03	SSS-04	SSS-05	SSS-06	
Distance from Source (ft.)	31	82	133	183	233	283	

Sampling Event	Date	ZINC CONCENTRATION (mg/kg)						
ME-01	7-Jun-07	104.0	142.0	150.0	133.0	124.0	69.6	
ME-02	25-Sep-07	194.0	379.0	228.0	183.0	113.0	105.0	
ME-03	11-Jun-08	150.0	246.0	159	467.0	100.0	138.0	
ME-04	24-Jun-09	133	128.0	71.9	93.6	81.4	64.4	
ME-05	29-Jun-10	274	257.0	101.0	409	641	152	
Coefficient of Variation:		0.39	0.44	0.42	0.66	1.13	0.37	
Mann-Kendall Statistic (S):		4	0	-4	2	-2	4	
Confidence in Trend:		75.8%	40.8%	75.8%	59.2%	59.2%	75.8%	
Concentration Trend:		No Trend	No Trend	No Trend	No Trend	No Trend	No Trend	



Note: Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0).
> 90% = Probably Increasing or Decreasing; >95% = Increasing or Decreasing

Watermark

APPENDIX C

ARARs to be Considered Guidance for Selected Remedy

APPENDIX C

Applicable or Relevant and Appropriate Requirements and to be Considered Guidance for the Selected Remedy: Land Use Controls (Institutional Controls and Engineering Controls), Long-Term Monitoring, and Five-Year Reviews

CHEMICAL SPECIFIC					
Authority	**Applicability**	**ARAR**	**Requirement Synopsis**	**Action to be taken to attain ARAR**	**Status**
Federal	All	Risk Assessment Guidance - Cancer Slope Factors and Reference Doses	Used in human health risk assessments as guidance values to evaluate the potential carcinogenic hazard caused by exposure to chemicals of concern (COCs).	None (used for risk calculations)	To Be Considered
Federal	All	EPA Region III Risk-Based Concentrations	Used as screening values to evaluate the potential hazards caused by exposure to COCs.	None (used for risk calculations)	To Be Considered
Federal	All	EPA Region IX Preliminary Remediation Goals	Generic risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements.	None (used for risk calculations)	To Be Considered
LOCATION SPECIFIC					
Authority	**Applicability**	**ARAR**	**Requirement Synopsis**	**Action to be taken to attain ARAR**	**Status**
Federal	Species, Habitat	Endangered Species Act of 1973	Requires federal agencies, in consultation with the USFWS and/or NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.	*No federally-listed endangered species have* been identified in the vicinity of the Buoy Depot. However, endangered or threatened federally-listed migratory bird species may pass through this area. Therefore, appropriate measures must be taken during monitoring events or future actions to ensure that such species and their habitat are not adversely affected.	Relevant and Appropriate
Federal	Wetlands	Executive Order 11990; Wetlands Protection, 40 Code of Federal Regulations (CFR) Part 6, Appendix A	Requires that no remedial alternative adversely affect a wetland if another practicable alternative exists. If no such alternative exists, impacts from implementation must be mitigated.	No wetlands are located on the Buoy Depot; however, wetlands are located adjacent to the Buoy Depot. Potential impacts to wetlands from monitoring events or any future actions at the Site will be avoided, , in accordance with this order. If there is no practicable alternative to such remedial actions, unavoidable impacts to wetlands from these actions will be mitigated.	Relevant and Appropriate

APPENDIX C *Continued*

LOCATION SPECIFIC *(Continued)*					
Authority	**Applicability**	**ARAR**	**Requirement Synopsis**	**Action to be taken to attain ARAR**	**Status**
Federal	Wetlands	Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661) Protection of Wildlife Habitats	Requires that the United States Fish and Wildlife Services and National Marine Fisheries Service be consulted if alteration of a body of water, including the installation of monitoring wells in a wetland and/or discharge of pollutants into a wetland will occur. This is to provide adequate protection of fish and wildlife resources. Requires consultation with state agencies to develop measures to prevent, mitigate, or compensate for project-related losses to fish and wildlife.	No wetlands are located on the Buoy Depot; however, wetlands are located adjacent to the Buoy Depot. Potential impacts to wetlands from monitoring events or any future actions at the Site will be avoidedin accordance with this order. If there is no practicable alternative to such remedial actions, unavoidable impacts to wetlands from these actions will be mitigated.	Relevant and Appropriate
State	Wetlands	Massachusetts (MA) Wetlands Protection Regulations - 310 Code of MA Regulations (CMR) 10.51 - 10.60	Outlines requirements for all inland work that will remove, fill, dredge or alter and bank, bordering vegetated wetland, land under water bodies and waterways, land subject to flooding, or riverfront area.	No wetlands are located on the Buoy Depot; however, wetlands are located adjacent to the Buoy Depot. Potential impacts to wetlands from monitoring events or any future actions at the Site will be avoided, to the extent possible, in accordance with this order. If there is no practicable alternative to such remedial actions, unavoidable impacts to wetlands from these actions will be mitigated.	Relevant and Appropriate
State	Wetlands	MA Endangered Species Act (MESA) 321 CMR 10.00	Prohibits the "taking" of any rare plants or animals listed as Endangered, Threatened, or Special Concern by the MA Division of Fisheries and Wildlife. This also protects designated endangered/threatened species populations.	No state-listed endangered species have been identified in the vicinity of the Buoy Depot. However, appropriate measures must be taken during monitoring events and any future actions to ensure that state-listed threatened species (northern harrier) and state-listed species of special concern (spotted turtle and eastern box turtle) and their habitat are not adversely affected by any remedial actions. Although these species have not been identified onsite, they have been identified within the extent of the adjacent Navy base. Other listed migratory species may also pass through this area.	Relevant and Appropriate

APPENDIX C *Continued*

ACTION SPECIFIC					
Authority	**Applicability**	**ARAR**	**Requirement Synopsis**	**Action to be taken to attain ARAR**	**Status**
Federal	Soil	Resource Conservation and Recovery Act (RCRA) - Generator Requirements for Manifesting Waste for Offsite Disposal (40 CFR 262)	Standards for manifesting, marking, and recording hazardous waste shipments for offsite treatment/disposal.	If the monitoring events require offsite treatment/disposal of hazardous wastes (investigation-derived), then generator requirements will be followed.	Applicable
Federal	Soil	RCRA - Subpart I, Use and Management of Containers (40 CFR 264, Subpart I)	Outlines use and management standards applicable to owners and operators of all hazardous waste facilities that store containers of hazardous waste.	If monitoring events require storage of hazardous waste (investigation-derived) in containers, then the substantive requirements of these regulations will be followed.	Applicable
Federal	Soil	RCRA - Identification and Listing of Hazardous Wastes, Toxicity Characteristic (40 CFR 261.24)	These requirements identify the maximum concentrations of contaminants for which a waste would be considered a RCRA characteristic waste due to toxicity. The analytical test specified in Appendix II of 40 CFR 61 is referred to as the Toxic Characteristic Leaching Procedure (TCLP).	Investigation-derived waste will be analyzed by the TCLP to determine whether it is characteristic hazardous waste under RCRA. Wastes that are determined to exceed TCLP allowable concentrations (and are therefore hazardous) will be disposed of offsite in a RCRA Subtitle C or state equivalent treatment, storage, or disposal facility (TSDF). Wastes that are determined to be below TCLP allowable concentrations (and therefore non-hazardous) will be disposed of offsite in a RCRA Subtitle D or state equivalent TSDF.	Applicable
Federal	Soil	RCRA Standards Applicable to Generators of Hazardous Waste (40 CFR 262)	Massachusetts has been delegated the authority to administer these RCRA standards through its state hazardous waste management regulations. The relevant and appropriate provisions of 40 CFR 262 are incorporated by reference.	Investigation-derived waste may be characterized as hazardous waste. If so, the material will be handled in compliance with the substantive requirements of these standards.	Applicable

APPENDIX C *Continued*

ACTION SPECIFIC *(Continued)*					
Authority	**Applicability**	**ARAR**	**Requirement Synopsis**	**Action to be taken to attain ARAR**	**Status**
Federal	Soil	EPA Office of Solid Waste and Emergency Response (OSWER) Publication 9345.3-03 FS (January 1992)	Management of wastes generated during remedial activities must ensure protection of human health and the environment.	Investigation-derived wastes would be managed in accordance with these requirements.	To Be Considered
State	Soil	Hazardous Waste Management Rules; Requirements for Generators; 310 CMR 30.300	These regulations contain requirements for generators of hazardous waste. The regulations apply to generators of sampling waste and also apply to the accumulation of waste prior to offsite disposal.	Investigation-derived wastes that are determined to be hazardous would be managed in accordance with the substantive requirements of these regulations.	Applicable
State	Soil	Hazardous Waste Management Rules; Use and Management of Containers; 310 CMR 30.689	These regulations establish requirements for the use and management of containers at hazardous waste facilities.	If monitoring events require storage of hazardous waste (investigation-derived) in containers, then management procedure requirements will be followed.	Applicable

Watermark

APPENDIX D

Site Inspection Checklist

APPENDIX D
Site Inspection Checklist

Overall Observations

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The Site remedy is to accomplish three primary goals:

1. Prevention to the extent practicable, of direct contact with and ingestion of surficial soil that presents unacceptable risks to human health and/or ecological receptors (*i.e.*, the soil of the swale and wetlands).
2. Prevention of potential future impacts to groundwater beneath the Site through removal of impacted soil and sludge associated with existing floor drains beneath the Site building.
3. Mitigation of ongoing migration of metals (primarily lead) from the buoy storage area to the adjacent drainage ditch and the downstream wetland, and prevention of future migration to the extent possible.

Based on this first Five-Year Review, it appears that the remedy at the USCG South Weymouth Buoy Depot Site has been implemented as planned and is functioning in accordance with the requirements stated in the ROD. No major deficiencies or concerns with the remedy or O&M procedures were identified for the Site.

One issue noted during the Five-Year Review relates to the hay bale check dams in the swale to help control erosion. The placement of these hay bales seems to be creating preferential flow paths in the lower section of the swale and into the entrance of the wetland. In addition, wetland sample WSS-02, which is at the top of the wetland, is located in an area of preferential flow. This may be why this sample has shown some indication of increasing trends for chromium, copper, nickel, and zinc, according to the Mann-Kendall analysis for trend at the 95% confidence level. These hay bales should be removed to allow the water to flow in a different pattern in an attempt to decrease the impact of the preferential flow and lessen the potential to channelize the flow into the wetland.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Operation and maintenance activities at the site are focused on the stormwater conveyance system and the Vortechs unit. In reviewing the inspection logs, the Vortechs unit has never been pumped to remove collected solids. There is evidence that on occasion when solids collect in the Vortechs unit they may be transported to the swale and wetland since the measured amount of solids decreased from one quarterly inspection to the next. However, based on the analysis of the long-term monitoring results for soils in the swale and wetland, there is no evidence the material is impacting the swale or wetland soils. In order to minimize the potential for solids to be transported down gradient, it is recommended that the Vortechs and catch basins have collected solids removed at least once per year.

In reviewing the quarterly inspections and during the site inspection the berms/curbing were noted in need of repair along the northern side of the property. In addition, the fence along the swale should be repaired. These repairs are needed to ensure stormwater is contained on site.

Overall Observations
The concrete along portions of the polydrain system is cracking or deteriorating. The concrete should be repaired to ensure ongoing structural integrity of the polydrain system.
Early Indicators of Potential Remedy Problems
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. No unexpected changes in the cost or scope of O&M were observed during this Five-Year Review. Additionally, there was no high frequency of unscheduled repairs that would suggest the protectiveness of the remedy may be compromised in the future.
Opportunities for Optimization
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. During quarterly inspections, EA recommends recording dates of previous inspections and/or clean outs for the various stormwater treatment systems and drainage systems implemented at the Site. Specifically, inspections of the detention gallery must be accurately tracked because it is only inspected every two years.

Watermark

APPENDIX E

Site Inspection Photographs

APPENDIX E
Site Inspection Photographs

Photograph No. 1: Vortechs Manhole #3

Photograph No. 2: Vortechs Manhole #1

Photograph No. 3: Visual Inspection of Vortechs Manhole #2

Photograph No. 4: Visual Inspection of Vortechs Manhole #2

Photograph No. 5: Polydrain Concrete Deteriorating and In Need of Repair

Photograph No. 6: Catch Basin #1

Watermark

Photograph No. 7: Catch Basin #2

Photograph No. 8: Catch Basin #3

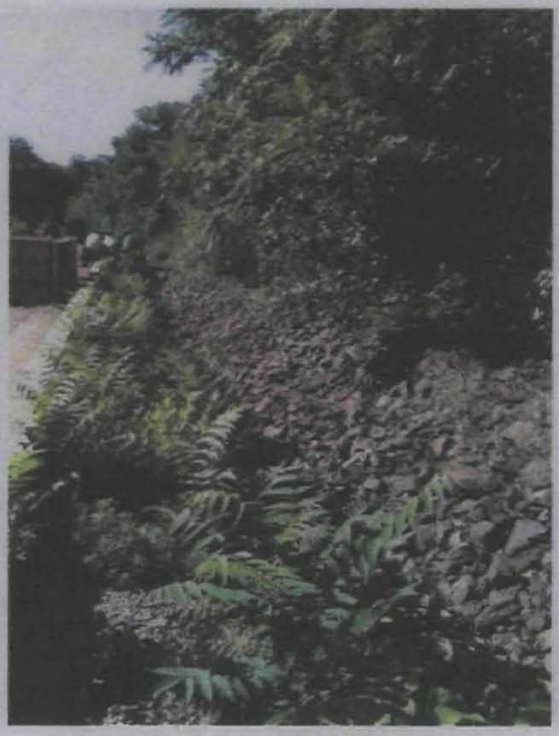
Photograph No. 9: Catch Basin #4

Photograph No. 10: Gravel Area and Concrete/Asphalt Area Around the Site Building

Photograph No. 11: Additional Gravel Area in Good Condition

Photograph No. 12: Asphalt Berm Which Runs Along the Northern Boundary of the Site

Photograph No. 13: Additional Cracking and Damage in the Asphalt Berm

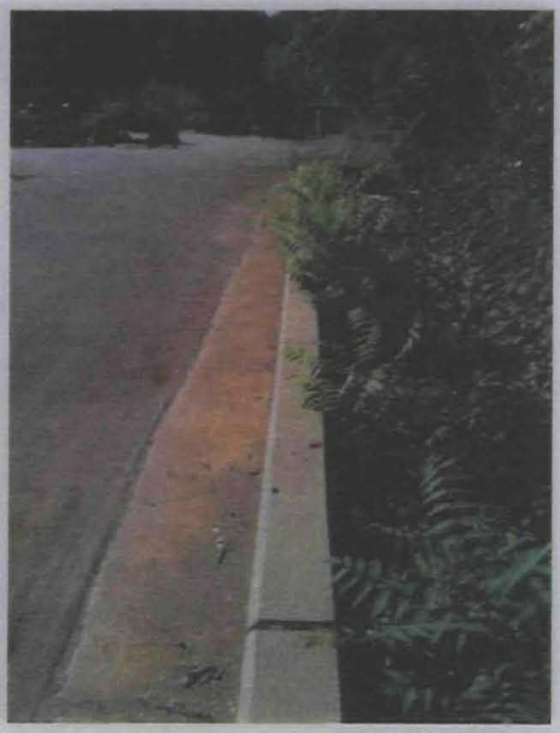


Photograph No. 14: Infiltration Gallery Located Along the Western Border of the Site Property (Northern Portion)

Photograph No. 15: North Side of the PVC Pipe which Connects the Two Infiltration Galleries.

Photograph No. 16: South Side of the PVC Pipe which Connects the Two Infiltration Galleries.

Photograph No. 17: Infiltration Gallery Located Along the Western Border of the Site Property (South Portion)



Photograph No. 18: Concrete Berm Located Along Eastern Edge of Infiltration Gallery in Good Condition

Photograph No. 19: Standing Water Observed in the Northern Portion of the Infiltration Gallery

Photograph No. 20: Chain Link Fence Along Southern and Eastern Boundary of the Site in Need of Repair in Some Areas

Photograph No. 21: Chain Link Fence in Need of Repair. Overgrown Vegetation.

Photograph No. 22: Placement of Hay Bales in the Wetland and Swale Which is Causing Preferential Flow.

Watermark

APPENDIX F

Site Interview Responses

APPENDIX F:
Site Interview Responses

Interview Documentation Form			
The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.			
Keith Girouard	Environmental Protection Specialist	USCG Base Support Unit Boston	27 July 2011
Name	**Title/Position**	**Organization**	**Date**
Roger Dingy	Buoy Depot Supervisor	USCG Buoy Depot Site	27 July 2011
Name	**Title/Position**	**Organization**	**Date**
Michael D. Andrews, P.E.	Environmental Engineer	USCG Civil Engineering Unit Providence	27 July 2011
Name	**Title/Position**	**Organization**	**Date**

Interview Record			
Site Name: USCG South Weymouth Buoy Depot Site		**EPA ID No.:** MA0690330758	
Subject: Five-Year Review		**Time:** 9:00AM	**Date:** 7-27-11
Type: Visit **Location of Visit:** South Weymouth Buoy Depot Site; Trotter Rd.			
Contact Made By:			
Name: Dick Waterman	**Title:** Vice President	**Organization:** EA	
Individual Contacted:			
Name: Keith Girouard	**Title:** Environmental Protection Specialist	**Organization:** USCG Base Support Unit Boston	
Telephone No: 617-223-3387 **Fax No:** **E-Mail Address:** Keith.Girouard@uscg.mil	**Street Address:** 427 Commercial Street **City, State, Zip:** Boston, MA 02109-1081		

Summary Of Conversation

Visual inspection of the polydrain indicated that the surrounding concrete is beginning to deteriorate. Mr. Girouard indicated that the USCG Command was notified of the deteriorating concrete. The asphalt berm was noted to be damaged and in need of repair at the time of the inspection. The berm which extends along the northern boundary of the Site was cracked in several places. Mr. Girouard indicated that the USCG was also notified of the cracked asphalt berm.

Mr. Girouard indicated that the Soil Management Plan had not been used because no soil has ever left the Buoy Depot property. Mr. Girouard further indicated that all lead swab tests that have been performed on the pre-1988 buoys have come back negative.

Interview Record			
Site Name: USCG South Weymouth Buoy Depot Site		**EPA ID No.:** MA0690330758	
Subject: Five-Year Review		**Time:** 9:00AM	**Date:** 7-27-11
Type: Visit **Location of Visit:** South Weymouth Buoy Depot Site; Trotter Rd.			
Contact Made By:			
Name: Dick Waterman	**Title:** Vice President	**Organization:** EA	
Individual Contacted:			
Name: Roger Dingy	**Title:** Buoy Depot Supervisor	**Organization:** USCG Buoy Depot Site	
Telephone No: **Fax No:** **E-Mail Address:**		**Street Address:** Trotter Road **City, State, Zip:** S. Weymouth, MA 02190	
Summary Of Conversation			
Mr. Dingy confirmed that no buoys have tested positive for lead, and he indicated a steady decline in the number of pre-1988 buoys in service. Buoys cycle through the Buoy Depot once every six years. As a result, the likelihood of finding a buoy with LBP is extremely low.			

Watermark

Interview Record			
Site Name: USCG South Weymouth Buoy Depot Site		**EPA ID No.:** MA0690330758	
Subject: Five-Year Review		**Time:** 9:00AM	**Date:** 7-27-11
Type: Visit **Location of Visit:** South Weymouth Buoy Depot Site; Trotter Rd.			
Contact Made By:			
Name: Dick Waterman	**Title:** Vice President	**Organization:** EA	
Individual Contacted:			
Name: Michael D. Andrews, PE	**Title:** Environmental Engineer	**Organization:** USCG Civil Engineering Unit Providence	
Telephone No: (401) 736-1706 **Fax No:** **E-Mail Address:** Michael.Andrews@uscg.mil		**Street Address:** 300 Metro Center Blvd. **City, State, Zip:** Warwick, RI 02886	
Summary Of Conversation			
The responses that were received from Mr. Andrews did not express concerns regarding past or ongoing activities at the Site.			

Watermark

APPENDIX G

Responses to Comments Draft Five-Year Review

RESPONSES TO EPA COMMENTS ON THE DRAFT FIVE-YEAR REVIEW REPORT USCG BUOY DEPOT SITE, SOUTH WEYMOUTH, MA

EPA GENERAL COMMENTS

1. **EPA Comment:**

Based on the documentation and data provided in the above referenced document, the EPA concurs with the USCG's conclusion that remedy set forth in the September 2009, Record of Decision (ROD) for the U.S. Coast Guard, South Weymouth Buoy Depot Site remains protective of human health and the environment. However, based on the concentrations of contaminants detected in the swale and wetland samples, there appear to be several deficiencies that must be addressed prior to EPA's approval of the final document. This request is supported by the following comparison of data presented in Table 2-10 of the ROD and the monitoring data presented in Appendix B of this five-year review.

Wetland samples:

a. Chromium: the risk-based clean-up goal is 17 milligrams per kilogram (mg/kg) and the maximum value detected for post-cleanup confirmation samples was 15.6 mg/kg. Four of the five samples assessed for the 2010 monitoring event exceeded the cleanup goal. The value for the sixth location was not reported.
b. Copper: the risk-based clean-up goal of 1,950 mg/kg has not been exceeded; however, the maximum value of 305 mg/kg detected for post-cleanup confirmation samples has been exceeded in 44% of the 25 monitoring samples reported.
c. Lead: the risk-based clean-up goal of 302 mg/kg has only been exceeded once and that occurred during the 2010 monitoring event; however, the average of the wetland samples during each of the five monitoring events has exceeded the average post-cleanup confirmation sample concentration of 92 mg/kg.
d. Nickel: no exceedances of the 245 mg/kg cleanup goal have been reported.
e. Zinc: no exceedances of the 1,050 mg/kg cleanup goal have been reported; however, 56% of the 25 monitoring event samples have exceeded the maximum post-cleanup confirmation sample concentration of 123 mg/kg.

Swale samples:

a. Chromium: the risk-based clean-up goal is 16 mg/kg and the maximum value detected for post-cleanup confirmation samples was 11.9 mg/kg. Two of the six samples exceeded the cleanup goal for the 2010 monitoring event and five of six samples for the 2010 monitoring event exceeded the maximum post-cleanup confirmation sample concentration.
b. Copper: the risk-based clean-up goal is 1,020 mg/kg and the maximum value detected for post-cleanup confirmation samples was 418 mg/kg. Two of the six samples exceeded the cleanup goal for the 2010 monitoring event and four of six samples for the 2010 monitoring event exceeded the maximum post-cleanup confirmation sample concentration.
c. Lead: the risk-based clean-up goal is 302 mg/kg and the maximum value detected for post-cleanup confirmation samples was 213 mg/kg. Two of the six samples for the 2010 monitoring event exceeded the cleanup goal and five of six samples for the 2010 monitoring event exceeded the maximum post-cleanup confirmation sample concentration.
d. Nickel: no exceedances of the 230 mg/kg cleanup goal have been reported; however, four of six samples for the 2010 monitoring event exceeded the maximum post-cleanup confirmation sample concentration of 7.3 mg/kg.

e. Zinc: no exceedances of the 738 mg/kg cleanup goal have been reported; however, four of six samples for the 2010 monitoring event exceeded the maximum post-cleanup confirmation sample concentration of 157 mg/kg.

These data suggest that the concentration of metals in the swale and wetland have increased since the removal action was conducted and that the remedy may not be operating as intended. However, the EPA believes that the exceedances of risk-based cleanup goals, as noted, can be effectively addressed through the modification and implementation of several maintenance-related actions discussed below.

USCG Response:

The Long Term Monitoring Plan requires the monitoring data to be analyzed using robust statistical methods, specifically the Mann-Kendall Test. The Mann-Kendall Test "normalizes" the data and accounts for potential temporal variability in the data. While the comparison of metal concentrations in the swale and wetland against the associated PALs provide a general indication of trends, the Mann-Kendall Test must be performed on a larger data set than presently available in order to develop more certain conclusions. As discussed in the five-year review, there is insufficient data available to determine if these metals are increasing as a function of time for all swale or wetland sample locations. The only location indicating any trend based on the current data set is sampling point LTM-WSS-02. It was suggested that preferential water movement by the hay bales may be responsible for this increasing trend at LTM-WSS-02. Any perceived trends at other sample locations resulting from comparing individual metal concentrations against the PAL may simply represent sample and analytical variability. As discussed in the five-year review, additional data will be necessary to determine if there are significant increasing trends for these metals in these other locations.

2. **EPA Comment:**

As currently written, there appears to be a disconnect between the issue of lead and the issue of the contaminants of concern [chromium, copper, nickel, and zinc] that are increasing in value at the one sampling point. On the one hand, the document states that lead has been successfully remediated and that the remedy is operating as intended. On the other hand, it highlights the upward trending of the four metals. Although lead was the major contaminant of concern driving the remedy, the Coast Guard should amend the draft document, where applicable, to clearly explain that any and all metals detected above action levels will be addressed, if deemed necessary, based on additional monitoring results.

USCG Response:

Lead is the principle contaminant of concern since it was determined through the risk analysis that it is the only contaminant of concern at the Buoy Depot that resulted in unacceptable risk to both human health and ecological receptors. The project action limit (PAL) for lead was driven by both receptor groups, and represents the Background Threshold Value (BTV). Chromium, copper, nickel, and zinc were determined to be ecological risks and the project action limits (PAL) for these metals were determined based on ecological risk. The increasing trend for chromium, copper, nickel, and zinc were observed in a single sample location (LTM-WSS-02), and may be the result of preferential water flow caused by the hay bale location. The review recommends removal of the hay bales to allow for the free flow of discharge from the swale into the wetland, possibly eliminating a depositional zone near LTM-WSS-02. The Final Five-Year Review Report; however, will be amended to explain that metals will be addressed as necessary, based on statistical analysis of present and future monitoring results.

3. **EPA Comment:**

The draft document should be amended to include a brief summary of the Vortechs Unit evaluation that was conducted in 2008. During this study, which included the collection of solid samples from the Vortechs Unit and aqueous samples from the Vortechs Unit and its outfall, exceedances of the risk-based

cleanup goals were detected for both solid and aqueous samples. The cleanup goals for solids were exceeded by a factor of 2 to 5 for chromium, copper, and lead. The aqueous cleanup goals for copper and lead were exceeded by a factor of 10 and 2, respectively, for dissolved solids samples collected at the outfall of the Vortechs Unit. Although the technical memorandum documenting this study recommended that the solids in the Vortechs Unit be removed once per year, it doesn't appear that solids have ever been removed from the Vortechs Unit. This maintenance practice (or lack thereof) is unacceptable and warrants immediate attention and modification.

The manufacturer's recommended process for removing solids from the Vortechs Unit appears to be grossly inadequate for this application. Solids cannot be permitted to accumulate to manufacturer-recommended levels. To minimize the amount of solids collecting in the unit (and, in turn, discharging to the swale), the unit should be pumped more frequently.

USCG Response:

A brief summary of the Vortechs Unit evaluation performed in 2008 will be included in the Final Five-Year Review. The USCG agrees that the solids should be removed from the Vortechs at least once per year and this recommendation is included in the Five-Year Review.

4. **EPA Comment:**
   This report recommends that the Lead-Based Paint Buoy Management Plan be discontinued because no buoys checked since 2007 have had lead paint and most pre-1988 buoys have had lead-based paint removed or been taken out of service. However, the life cycle for buoys between servicing is said to be six to eight years suggesting that some lead-containing buoys could still be in service. EPA recommends that the Lead-Based Paint Buoy Management Plan continue to be implemented for at least three more years (through 2014) before termination to ensure that all buoys have cycled through the system before terminating the plan.

USCG Response:

None of the buoys received at the Buoy Depot since 2006 have tested positive for lead-based paint. The USCG believes that there is a very low likelihood that there are any lead-based paint buoys remaining in service. However the USCG agrees to continue implementation of the Lead-Based Paint Buoy Management Plan through 2014.

5. **EPA Comment:**

   For reasons previously discussed, EPA supports the USCG's recommendation to remove solids from the Vortechs Unit and catch basins annually to minimize the loss of solids to the swale and wetland. The loss of solids from the Vortechs Unit constitutes the greatest liability for the USCG and there is some evidence from the measurements of solids' levels in the unit and from contaminant concentrations detected in the swale and wetland that solids have been migrating off the Buoy Depot property.

USCG Response:

The USCG will remove solids from the Vortechs Unit at least annually and more frequently if solids are accumulating. The O&M procedures will be modified accordingly.

6. **EPA Comment:**

   The five-year review recommends that the hay bale check dams be removed from the swale to allow free flow of runoff through the swale. EPA is concerned that the concentrated runoff discharging from the Vortechs Unit is eroding the swale. The USCG should present a more comprehensive recommendation to address erosion of the swale in concert with the removal of the check dams.

USCG Response:

The hay bale check dams were installed immediately after the removal action in order to control erosion with the understanding that their need would be evaluated after the swale and wetland areas were re-vegetated. The swale and wetland have both revegetated and the only evidence of erosion is along a very short section of sidewall immediately adjacent to a former hay bale dam (all hay bale dams were washed out during a late summer 2011 storm event). The location of this minor erosion suggests that it was caused by preferential flow of water migrating around the top and side of the hay bale dam prior to its collapse. The USCG will evaluate alternatives to removing the hay bale check dams to ensure that runoff is not being concentrated and to lessen potential impacts from the runoff.

7. **EPA Comment:**

The June 2011 monitoring event occurred well before this draft five-year review report was issued so the results of that monitoring event should be presented in this report; however, EPA recognizes that the evaluation in Appendix B was likely completed before the June 2011 results were available so EPA is not requesting that Appendix B be revised.

USCG Response:

In accordance with EPA's process, the first five-year review evaluated the first five year's data. The results of the June 2011 monitoring event will be included in the second five-year review. Additionally, the first five-year review, including historical data review, technology evaluation, and statistical analysis, all commenced before the June 2011 monitoring event occurred.

Specific Comments:

8. **EPA Comment:**

p. 6-2, §6.4.1: The partial paragraph at the top of the page states that the detection frequency for arsenic in wetland samples was 13 percent. Please clarify how the detection frequency can be 13 percent when five monitoring events were evaluated (trends were evaluated separately in Appendix B for each sample location). What additional samples were considered? Please confirm that all of the annual monitoring results for arsenic has been incorporated into this report.

USCG Response:

No additional samples were considered. There are five monitoring events, and six sampling locations, totaling 30 readings in the five years (5 x 6 = 30). Of these 30 readings, 4 were detections. 4/30 = 13.3% = total detection frequency. The detection frequency for each sample location is: WSS-01 = 40%; WSS-02 = 0%; WSS-03 = 0%; WSS-04 = 0%; WSS-05 = 20%; WSS-06 = 20%. These detection frequencies do not meet the requirement for the Mann-Kendall analysis (60%).

9. **EPA Comment:**

p. 6-3, §6.4.2: The partial paragraph at the top of the page states that the detection frequency for arsenic in swale samples was 7 percent. Please clarify how the detection frequency can be 7 percent when five monitoring events were evaluated (trends were evaluated separately in Appendix B for each sample location). What additional samples were considered? Please confirm that all of the annual monitoring results for arsenic have been incorporated into this report.

USCG Response:

No additional samples were considered. There are five monitoring events, and six sampling locations, totaling 30 readings in the five years (5 x 6 = 30). Of these 30 readings, 2 were detections, 2/30 = 6.7% =

total detection frequency. By sample location: WSS-01 = 0%; WSS-02 = 20%; WSS-03 = 0%; WSS-04 = 20%; WSS-05 = 0%; WSS-06 = 0%. These detection frequencies do not meet the requirement for the Mann-Kendall analysis (60%).

10. EPA Comment:

p. 6-6, §6.5.2: Location-specific Applicable or Relevant and Appropriate Requirements - The summaries of the Endangered Species Act, the Fish and Wildlife Coordination Act, and the executive order governing wetlands are not accurate. If nothing else, the words *when plausible* in line 6 and *(whenever possible)* in lines 7-8 should be eliminated.

The following summaries, from various EPA sources, are provided for reference and should be reflected in the revised document:

Endangered Species Act - The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species."

Executive Order 11990 - "Requires that no remedial alternative adversely affect a wetland if another practicable, alternative exists. If no such alternative exists, impacts from implementation must be mitigated."

Fish and Wildlife Coordination Act - "Requires that the United States Fish and Wildlife Services and National Marine Fisheries Service be consulted if alteration of a body of water, including the installation of monitoring wells in a wetland and/or discharge of pollutants into a wetland will occur. This is to provide adequate protection of fish and wildlife resources. Requires consultation with state agencies to develop measures to prevent, mitigate, or compensate for project-related losses to fish and wildlife."

USCG Response:

The descriptions of these Acts and Executive Order in the Final Five-Year Review will be updated to reflect the summaries provided above.

EPA Comment:

p. 7-2, §7.0: The first sentence in the second paragraph refers to institutional controls; however, the subsequent discussion addresses engineering controls. Please correct the first sentence to refer to engineering controls.

USCG Response:

This section will be edited to reflect "engineering controls" and to be consistent with the remedy.

EPA Comment:

p. 7-3, §7.2: The last paragraph on the page refers to a review of the incoming buoy log from 2006 to 2010; however, page 6-5 in Section 6.4.7 refers to a review of the incoming buoy log from 2007 to 2010. Please review and correct for consistency and indicate when the buoy log was originated.

USCG Response:

The buoy logs started in 2006. The paragraph will be corrected to state that the logs from 2006-2010 were reviewed.

11. EPA Comment:

p. 7-4, §7.4: The third sentence in the second paragraph apparently mistakenly includes the detention gallery when discussing the removal of solids annually. The monitoring plan only requires the biennial inspection of the detention basin. Elsewhere in this document the detention basin is not included when discussing the annual removal of solids. Please correct as appropriate.

USCG Response:

The sentence should read "..the Vortechs and catch basins should have the solids removed at least once per year....". The detention gallery does not require the removal of solids as part of the O&M for the equipment.

12. EPA Comment:

Figure 4: It is not apparent what this figure is intended to present. General note #1 refers to a 2005 figure while the sample identification numbers shown in Figure 4 appear to be samples collected June 7, 2007. Please edit this figure to clarify what information is being presented.

USCG Response:

This figure shows where confirmatory samples and wetland samples were collected in 2007. The ROD and Long-Term Monitoring Plan required one round of confirmatory samples, surface water samples (and groundwater samples) to be collected one time in the first five years of monitoring. The General Note #1 is provided because the baseline information (base map, elevations, etc.) were based on a plan developed in 2005 by Nobis Engineering that showed where confirmatory samples were collected immediately after the removal action was completed in 2005. The title of the Nobis drawing coincidently matches the title of the EA drawing. This figure is accurate as noted and does not require editing.

13. EPA Comment:

Appendix B:

a) For clarity, please change the sample identification titles on all pages from "Well ID" to "Sample ID" because none of these sample locations are wells.

b) There is considerable uncertainty associated with the trend assessment calculations because of the limited data available for the swale and wetland samples. EPA concurs that a larger database will be required to calculate more reliable trend statistics, and assessments in addition to the Mann-Kendall test may be warranted to provide a more robust analysis.

USCG Response:

a) *The Final Five-Year Review Appendix B will include "Sample ID" instead of "Well ID."*

b) *Agree. A larger data set is needed to perform more reliable trend statistics and to allow the Mann-Kendall test to provide a more robust analysis.*

RESPONSES TO MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MassDEP) COMMENTS ON THE DRAFT FIVE-YEAR REVIEW REPORT USCG BUOY DEPOT SITE, SOUTH WEYMOUTH, MA

MASSDEP GENERAL COMMENTS

1. **MassDEP Comment:**

   Section 1.0, Final Paragraph: The statement indicating that the June 2011LTM sample event occurred outside of the five year review period is inconsistent with the statement indicating the five year review period extends from September 2006 to September 2011, and it is not apparent why the results from the samples collected in June 2011 could not be included in a report submitted in September 2011. The results from these samples should be included in the five-year review so that the protectiveness evaluation is based on the most recent data available.

USCG Response:

In accordance with EPA's process, the first five-year review evaluated the first five year's data. The results of the June 2011 monitoring event will be included in the second five-year review. Additionally, the first five-year review, including historical data review, technology evaluation, and statistical analysis, all commenced before the June 2011 monitoring event occurred.

2. **MassDEP Comment:**

   Section 4.3.3: The statement indicating that the five sampling events have been completed to date should be corrected. A sixth monitoring event was completed in June 2011.

USCG Response:

As mentioned in the response to Comment 1, the June 2011 data will not be included in this report. The sentence will be corrected to state, "Five monitoring events have been completed during the first five-year review period."

3. **MassDEP Comment:**

   Section 6.4.3: The results from the June 2007 surface water samples are relevant to the protectiveness evaluation. The report should include a table that presents the results from the samples and the associated water quality criteria.

USCG Response:

A table showing the results of the surface water sampling and the associated water quality criteria will be included.

4. **MassDEP Comment:**

   Section 7.1: Information provided in the report indicates that the answer to Question A (*Is the Remedy Functioning as Intended by the Decision Documents?)* is **No**. In particular, the stormwater treatment system has failed to prevent site contaminants in on-site soil from migrating off the buoy depot property as required by the record of decision (refer to Section 4.1):

   - Analytical results from the 2008 detention gallery sediment sample confirmed that the stormwater system is capturing sediment containing contaminants (chromium, copper, nickel, and lead) with concentrations exceeding remedial goals.

- Significant quantities of contaminated sediment have been released from the stormwater treatment system to the swale and wetland areas on numerous occasions (Section 6.4.6).

- Concentrations of several site contaminants (chromium, copper, lead, and zinc) in samples collected from one or more sample locations are approaching or have exceeded the risk-based remediation goals.
- A statistically significant increasing trend of contaminant concentrations has been established at one long-term wetland monitoring sample location (WSS-02, Section 6.4), and similar trends are now apparent at most of the other sample locations (Appendix B).
- Surface water sample results indicate that contaminants are migrating off the buoy depot in surface water (Section 6.4.3).

USCG Response:

There is not enough data collected to conclude that the remedy is NOT functioning as intended. The Long Term Monitoring Plan requires the monitoring data to be analyzed using robust statistical methods, specifically the Mann-Kendall Test. The Mann-Kendall Test "normalizes" the data and accounts for potential temporal variability in the data. While the comparison of metal concentrations in the swale and wetland against the associated PALs provide a general indication of trends, the Mann-Kendall Test must be performed on a larger data set than presently available in order to develop more certain conclusions. As discussed in the five-year review, there is insufficient data available to determine if these metals are increasing as a function of time for all swale or wetland sample locations. The only location indicating any trend based on the current data set is sampling point LTM-WSS-02. It was suggested that preferential water movement by the hay bales may be responsible for this increasing trend at LTM-WSS-02. Any perceived trends at other sample locations resulting from comparing individual metal concentrations against the PAL may simply represent sample and analytical variability. As recommended in the five-year review, additional data will be necessary to determine if there are significant increasing trends for these metals in these other locations. Consequently, continuation of monitoring was recommended.

The sediment samples from the Vortechs unit may be expected to exceed PALs for the metals since the purpose of this unit is to capture potential contaminants that may migrate off site. Section 6.4.6 of the Five-Year Review simply indicates that based on the review of the quarterly inspection records it appears that some collected solids may be transported downgradient. The Five-Year Review also recommends increased frequency (annually) for the removal of the solids from the Vortechs and catch basins to minimize the potential for transporting these solids downgradient.

5. **MassDEP Comment:**

   Section 7.4: Information provided in the report indicates the answer to Question C (*Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?*) is **Yes**. The information compiled in the report demonstrates that the stormwater treatment system is not capable of preventing or adequately mitigating migration of contaminants from the buoy depot. Contaminant concentrations are increasing in the swale and wetland areas due to migration from the buoy depot, and risk-based remediation goals may be exceeded during the next five-year review period, calling the continued protectiveness of the remedy into question (refer to Comment 4).

USCG Response:

Refer to the USCG response to Comment 4. The Long-Term Monitoring Plan presents methodology for evaluating the effectiveness of the remedy. Specifically, the statistical analysis of the annual monitoring results using the Mann-Kendall test for trend would be used by the EPA and the USCG to evaluate the

effectiveness of the remedy. There is not enough data collected to definitively state that the system is or is not operating as intended. Furthermore, improvements to maintaining the stormwater management system including more frequent removal of collected solids will mitigate the potential for transporting solids downgradient. Continuation of the monitoring has been recommended to verify or negate the conclusion that the level of protectiveness is adequate. There is no indication of immediate issues (with the exception of sample location LTM-WSS-02) associated with the remedy.

6. **MassDEP Comment:**

   Section 9.0: The recommendation to remove solids at least once a year from the stormwater treatment system and catch basins is insufficient to improve the performance of the system to function as intended. Quarterly inspections indicate that the significant sediment losses occur much more frequently, possibly as frequently as during each storm event. An annual removal would not capture the sediment generated by most of these events. Consequently, a more reliable approach is necessary.

USCG Response:

Solids have not been removed from the Vortechs or catch basins; therefore, there is no operational data to determine if annual removal of solids will improve the system's performance. The frequency of solids removal will be increased, if needed, depending on the rate of deposition. The O&M procedures will be modified accordingly.

7. **MassDEP Comment:**

   Section 9.0: The recommendation to remove the hay bale check dams to prevent channeling is not acceptable. The primary purpose of the hay bales is to control stormwater flow velocities in the swale sufficiently to prevent erosion and sediment deposition in the wetland area. The prevention of such erosion and deposition is necessary to comply with state wetland regulations [310 CMR 10.05(6)(k)], which are a ROD-specified ARAR for the site remedy (Appendix C). Removal of hay bales would only make a poorly controlled situation worse and would accelerate the movement of contaminated sediment through the swale and into the wetland. Corrective action (e.g., rip-rap lining, level spreader) should be taken to control stormwater flow in the swale.

USCG Response:

The hay bale check dams were installed immediately after the removal action in order to control erosion with the understanding that their need would be evaluated after the swale and wetland areas were re-vegetated. The swale and wetland have both revegetated and the only evidence of erosion is along a very short section of sidewall immediately adjacent to a former hay bale dam (all hay bale dams were washed out during a late summer 2011 storm event). The location of this minor erosion suggests that it was caused by preferential flow of water migrating around the top and side of the hay bale dam prior to its collapse. The USCG will evaluate alternatives to removing the hay bale check dams to ensure that runoff is not being concentrated and to lessen potential impacts from the runoff.

8. **MassDEP Comment:**

   Section 9.0: MassDEP endorses the recommended repairs to berms, fencing, and concrete.

USCG Response:

The comment is noted.

9. MassDEP Comment:

Section 11.0: As explained in Comments 4 and 5, the information assembled for the five year review indicates that the remedy is not functioning as intended and is failing to prevent migration of site contamination off the buoy depot property resulting in concentrations of site contaminants in swale and wetland sediment that exceed risk-based cleanup goals. USEPA guidance explicitly characterizes these conditions as not protective (Section 4.5, *Comprehensive Five-Year Review Guidance*); therefore, the Protectiveness Statement should indicate that the remedy is not protective and the report should include recommendations for corrective action.

USCG Response:

As indicated in the USCG responses to Comments 4 and 5 there is insufficient data collected to conclude that the remedy is not protective. In addition, the USCG has agreed to annual clean-out of the Vortechs unit as a preventative measure to eliminate the possibility of transport of contaminated sediments off-site.

10. MassDEP Comment:

Appendix A: The report should include a copy of the notice published in the newspaper; the text provided to the newspaper is insufficient to demonstrate publication.

USCG Response:

A photocopy of the notice will be included in Appendix A.

11. MassDEP Comment:

Appendix B: As specified by the quality assurance project plan, the risk-based remedial goals should be identified (e.g., on concentration plots) to facilitate interpretation of trend data.

USCG Response:

Appendix B provides the results of the Mann-Kendall Test for trend. The important information in these tables are the results of the Mann-Kendall Test for trend. It is inappropriate to compare this data against the PAL since these tables show the relative concentrations of metals over time that were used for the Mann-Kendall analysis. Providing each metal's PAL on these tables could lead the reviewer to make an inappropriate comparison of each point against the PAL instead of focusing on the results of the Mann-Kendall analysis. Each monitoring event report does show the PAL for each metal in accordance with the QAPP.