## Bernhardt, Aaron

**From:** Keckler.Kymberlee@epamail.epa.gov
**Sent:** Monday, June 28, 2010 5:19 PM
**To:** james.gravette@navy.mil; richard.conant@navy.mil; Bernhardt, Aaron; mark.lewis@po.state.ct.us
**Cc:** Peterson.David@epamail.epa.gov; Vu.Chau@epamail.epa.gov; Hoskins.Bart@epamail.epa.gov
**Subject:** EPA comments on the Area A Wetland ROD
**Attachments:** DraftAreaAWetlandROD.pdf

I only made changes to the text and Appendix E. In Appendix D, the human health RAGS D tables are incomplete and out of order. Tables 1, 2, 4s and the risk summary tables are missing. Please provide the missing tables or properly reference the RI Update/FS Report.

PRGs become RGs in the ROD, so please make sure that all references to the cleanup levels state RGs.

(See attached file: DraftAreaAWetlandROD.pdf)

These are EPA's formal comments on the ROD. I do not plan to issue a letter on this (only this e-mail). Please call me if you would like to discuss anything. Thanks.

Kymberlee Keckler, Chemical Engineer
Federal Facilities Superfund Section
U.S. Environmental Protection Agency, Region 1
5 Post Office Square, Suite 100
Mail Code: OSRR07-3
Boston, MA 02109-3912

Telephone: 617.918.1385
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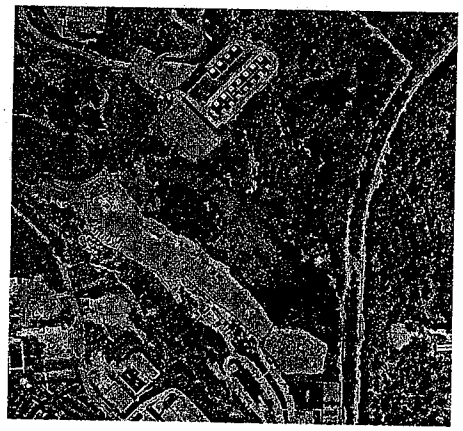
Only printed text and Appendix E
- no comments in other sections

# RECORD OF DECISION
## SITE 2B - AREA A WETLAND
NAVAL SUBMARINE BASE - NEW LONDON, GROTON, CONNECTICUT

NAVFAC
Naval Facilities Engineering Command



JUNE 2010

Summary of Comments on NAS Pensacola

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Page: 2

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, Operable Unit (OU) 12

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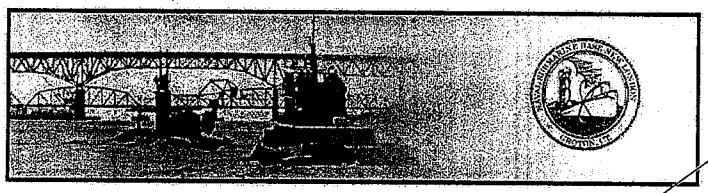


# 1.0 DECLARATION

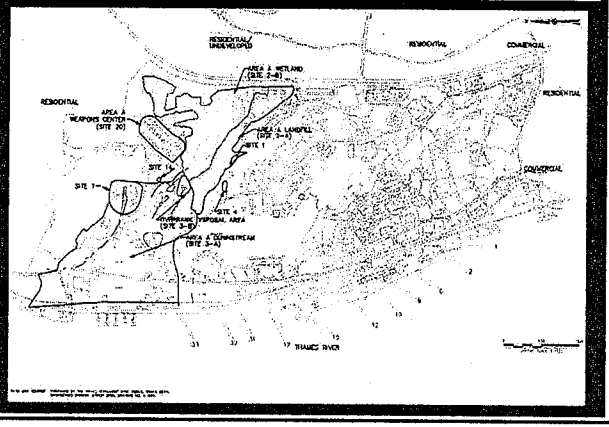
## 1.1 SITE NAME AND LOCATION

Naval Submarine Base-New London (NSB-NLON)
EPA ID No. CTD980906515
Operable Unit (OU) 12
Area A Wetland - Site 2B
Groton, Connecticut

## 1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the Selected Remedy for sediment at Area A Wetland - Site 2B (see Figure 1-1), which was chosen by the Navy and United States Environmental Protection Agency (EPA) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), and ~~to the extent practicable~~, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 et seq., as amended. This decision is based on information contained in the Administrative Record for the site. The Connecticut Department of Environmental Protection (CTDEP) concurs with the Selected Remedy (see Appendix A).

**FIGURE 1-1. SITE LOCATION MAP**



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Area A Landfill,

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for this OU12 ROD

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CERCLA. Compliance with CERCLA includes achieving Applicable or Relevant and Appropriate Requirements (ARARs) identified in Appendix E of this ROD.

## 1.3 ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. A CERCLA action is required because concentrations of polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, and metals in sediment pose unacceptable risk to current and future to ecological receptors (i.e., sediment invertebrates).

Groundwater at Area A Wetland – Site 2B was addressed as part of the Basewide Groundwater Operable Unit 9. As documented in the OU9 ROD signed in September 2008, groundwater monitoring at Site 2B will continue as required by the OU1 ROD. ~~However, because it was determined that groundwater in the dredged material at Site 2B was not a concern, groundwater monitoring in the Area A Wetland will not be included in the future long-term monitoring for Area A Landfill.~~

Surface water at the Area A Wetland is currently being monitored under the Area A Landfill long-term monitoring program (OU1). Surface water is not considered further for Site 2B because previous evaluations of surface water data concluded that potential risks to terrestrial and aquatic receptors were not great enough to warrant further evaluation of these receptors at the Area A Wetland. Also, risks to human receptors (construction workers and older child trespassers) from exposure to chemicals in surface water were acceptable.

## 1.4 DESCRIPTION OF SELECTED REMEDY

The major components of the Selected Remedy for Site 2B include the following:

- Excavation of contaminated sediment greater than preliminary remediation goals (PRGs) and transport of sediment off-site for proper disposal.
- Restoration of excavated areas to pre-existing elevations with clean organic soil.
- Seed the restored area to establish native wetland vegetation.
- Monitoring of the area to ensure that the native wetland vegetation has been established.
- Land use controls (LUCs) to prevent future residential use of the Area A Wetland.

The Selected Remedy eliminates unacceptable ecological risk by removing all sediment associated with unacceptable risk. The cleanup of Site 2B will not adversely impact the current and reasonably anticipated future land use of the site as a wetland. The Selected Remedy is expected to achieve substantial long-term risk reduction and allow the property to be used for the reasonably anticipated future land use of the site as a wetland. This ROD documents the final remedial action for Site 2B and does not include or affect any other sites at the facility. Implementation of this remedy is consistent with current use and the overall cleanup strategy for NSB-NLON to cleanup sites to achieve compliance with ~~State of Connecticut Remediation Standard Regulations and other Applicable or Relevant and Appropriate Requirements (ARARs).~~

## 1.5 STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The Selected Remedy does not satisfy the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances, pollutants, and contaminants. The Selected Remedy would not achieve reduction

in contaminant toxicity, mobility, or volume through treatment, except to the extent water from the dewatering process requires treatment or sediment stabilization reduces the mobility of contaminant within the treated sediment. Based on the type of contamination at the Area A Wetland (PAHs, PCBs, pesticides, and metals), the silt and fines content of the sediment, and the large volume of contaminated sediment, the Navy concluded that it was impracticable to excavate and treat the chemicals of concern in a cost-effective manner.

Because the human health assessment conducted ~~for the Area~~ A Wetland ~~did not include a residential~~ scenario, Land Use Controls (LUCs) would ~~be required~~ for the ~~entire wetland~~ until it is demonstrated that the entire wetland, or a portion ~~of the wetland presents~~ acceptable residential risk. At that time, the LUCs can be removed ~~for the portion of the~~ wetland where risks to residential receptors are found to be acceptable. ~~Because of the implementation of LUCs to prevent future residential use of the Area A Wetland~~ 5-year reviews would be required under this alternative ~~to evaluate the effectiveness of the LUCs~~.

## 1.6 ROD DATA CERTIFICATION CHECKLIST

The locations in Section 2.0, Decision Summary, of the information required to be included in the ROD are summarized in Table 1-1. Additional information can be found in the Administrative Record file for NSB-NLON.

**TABLE 1-1. ROD DATA CERTIFICATION CHECKLIST**

| DATA | LOCATION IN ROD |
|---|---|
| Chemicals of concern (COCs) and their respective concentrations | Sections 2.5 and 2.7 |
| Baseline risk represented by the COCs | Section 2.7 |
| Cleanup levels established for COCs and the basis for these levels | Section 2.8 |
| How source materials constituting principal threats are addressed | Section 2.11 |
| Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the risk assessment | Section 2.6 |
| Potential land and groundwater uses that will be available at the site as a result of the Selected Remedy | Section 2.12.3 |
| Estimated capital, operating and maintenance (O&M), and total net present worth (NPW) costs; discount rate; and number of years over which the remedy costs are projected | Appendix F |
| Key factors that led to the selection of the remedy | Section 2.12.1 |

If contamination posing an unacceptable risk to human health or the environment is discovered after execution of this ROD and is shown to be a result of Navy activities, the Navy will undertake the necessary actions to ensure continued protection of human health and the environment.

## 1.7 AUTHORIZING SIGNATURES

The signatures provided on the following pages validate the selection of the final remedy for sediment at OU12, Site 2B, by the Navy and EPA. CTDEP concurs with the Selected Remedy.



Page: 4

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waste will be left in place that may not allow for unrestricted use,

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As part of this decision document the Navy finds under the Section 404 of the federal Clean Water Act that the remedy required in this ROD is the least environmentally damaging practicable alternative to protecting wetland resources because all CERCLA-related contamination detected at concentrations exceeding RGs will be removed from the site, wetlands will be restored in place, invasive species will be controlled, and LUCs will be established to prevent residential development within the wetland area.

EPA finds, as documented on page ___ of this ROD, under the Toxic Substances Control Act that the Navy's proposed risk-based cleanup level of 532 ppb for total PCBs used for the remedy will not pose an unreasonable risk of injury to health or the environment.

Page: 5

Author: kkeckler Subject: Inserted Text Date: 6/9/2010 4:46:11 PM
Concur and recommend for implementation:

Marc W. Denno USN
Commanding Officer
Naval Submarine Base – New London

Date

Page: 6

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:19:11 PM
EPA finds under the Toxic Substances Control Act that the risk-based cleanup level for total PCBs in the Area A Wetland will not pose an unreasonable risk of injury to human health or the environment pursuant to 40 C.F.R. Section 761.61 (c).

Concur and recommend for implementation:

James T. Owens, III, Director
Office of Site Remediation and Restoration
EPA Region 1

Date

# 2.0 DECISION SUMMARY

## 2.1 SITE NAME, LOCATION, AND BRIEF DESCRIPTION

NSB-NLON, EPA ID number CTD980906515, is located in southeastern Connecticut in the Towns of Ledyard and Groton and is situated on the eastern bank of the Thames River, approximately 6 miles north of Long Island Sound. It is bordered to the east by Connecticut Route 12, to the south by Crystal Lake Road, and to the west by the Thames River. NSB-NLON currently provides base command for Naval submarine activities in the Atlantic Ocean. It also provides housing for Navy personnel and their families and supports submarine training facilities, military offices, medical facilities, and facilities for the submarine maintenance, repair, and overhaul.

The Area A Wetland is approximately 26 acres ~~in size~~. The Area A Weapons Center (Site 20) is located northwest of the Area A Wetland, and the Area A Landfill (Site 2A) is adjacent to the western boundary of the Area A Wetland. Water from the wetland ultimately drains to a channel located in the western portion of the landfill and then discharges through an earthen dike via four 24-inch metal culverts to the Area A Downstream Watercourses (Site 3). These watercourses subsequently discharge into the Thames River. The Area A Wetland is a relatively flat-lying, swampy, vegetated area with areas of open water (generally shallow) scattered across the wetland unit. The soft organic sediments that characterize these wetlands support a monoculture of the reed *Phragmites communis*, which dominates all other vegetative forms.

NSB-NLON is an active facility, and environmental investigations and remediation at the base are funded under the Installation Restoration (IR) Program. The Navy is the lead agency for CERCLA activities at the facility, and EPA and CTDEP are support agencies.



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, OU8

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, OU1

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, OU3

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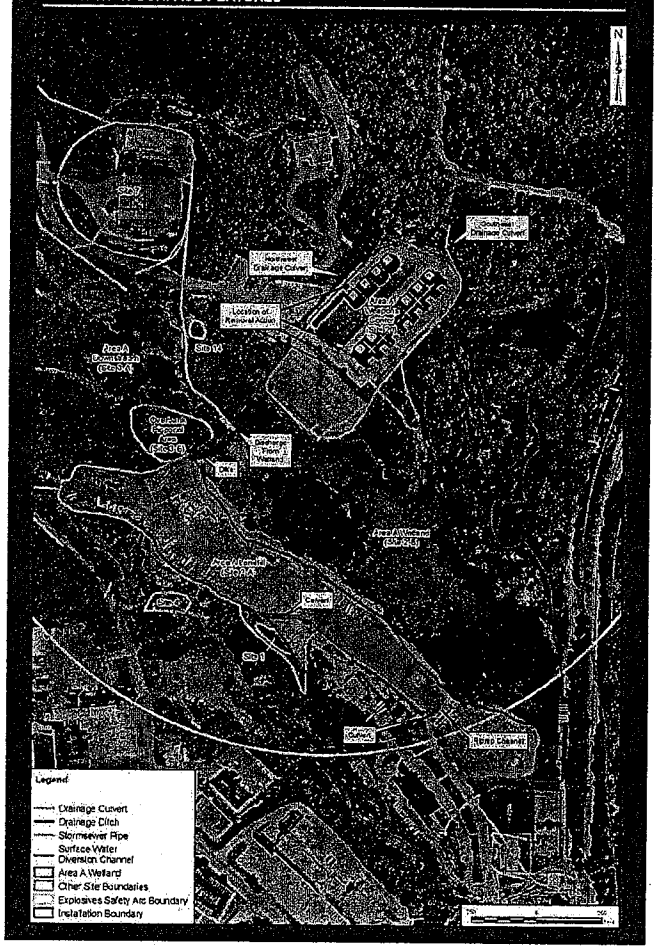
**FIGURE 2-1. SURFACE FEATURES**



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## 2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Table 2-1 provides brief summaries of previous investigations at Site 2B. Results of these investigations indicated that elevated concentrations of PAHs, PCBs, pesticides, and metals were present in sediment at the site.

**TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION**

| INVESTIGATION | DATE | ACTIVITIES |
|---|---|---|
| **Phase I Remedial Investigation (RI)** | 1990 - 1992 | Phase I RI field activities included advancement of test borings, monitoring well installation, and the collection of **41 soil and sediment, 2 surface water and 7 groundwater samples.** The Phase I RI concluded that several risk exposure scenarios exceeded acceptable regulatory levels and that a Feasibility Study (FS) should be performed for the Area A Wetland site. |
| **Phase II RI** | 1993 | Phase II RI field activities included advancement of test borings, installation of four monitoring wells, and the collection of 29 sediment, 9 surface water, and 20 groundwater samples. Human Health and Ecological Risk Assessments (HHRA and ERA) were conducted as part of the Phase II RI Report. The Phase II RI concluded that little evidence of surface water or groundwater contamination exists at the site, that the site may pose a risk to construction workers due to potential exposure to manganese in groundwater, and that significant pesticide, PCB, and PAH concentrations exist in site soil and sediment. The ERA concluded that aquatic and terrestrial receptors were at potential risk from chemicals in the surface water, sediment, and soil surface. The Phase II RI recommended that an FS be conducted to evaluate a limited action alternative, including groundwater monitoring and access/use restrictions. |
| **Focused Feasibility Study (FFS) for Area A Downstream/Over Bank Disposal Area (OBDA)** | 1994 | Four sediment samples were collected from the southwestern portion of the Area A Wetland (along the earthen dike) as part of the Area A Downstream/OBDA FFS. |
| **FFS for Area A Landfill** | 1995 | A FFS for the Area A Landfill (Atlantic, 1995c) was completed in response to the recommendations of the Phase I and Phase II RIs. **Twenty sediment samples** were collected from 10 transects across the Area A Landfill/Area A Wetland boundary as part of the Area A Landfill FFS. Four sediment samples were collected from the southwestern portion of the Area A Wetland (along the earthen dike). Two sediment samples were collected from each transect, one from the wetland boundary and one approximately 20 feet from the wetland boundary, within the wetland area. |
| **Area A Monitoring Program** | 1999-Present | **Groundwater and surface water monitoring** has been conducted since 2000 to monitor the remedy in place at the Area A Landfill. Monitoring has been conducted at approximately 21 wells located in the Area A Wetlands to monitor potential contaminant migration. The data do not indicate any significant contaminant migration issues. |
| **Phase III RI Technical Memorandum** | 2007 | A Phase III investigation of sediments in the Area A Wetland was conducted in October 2007 to further refine the nature and extent of contamination and to provide sufficient data to determine potential risks to ecological receptors from contaminated sediments. 16 surface and 9 subsurface sediment samples were collected. A secondary objective of the investigation was to determine the thickness of the overlying organic layer that has formed above the dredged material. |
| **Phase IV RI** | 2008 | Phase IV RI field activities consisted of collecting 24 sediment samples for chemical analysis and a subset of the samples were selected for whole **sediment toxicity testing.** The greatest concentrations of most chemicals were immediately adjacent to the Area A Landfill and/or Area A Weapons Center. Elevated total DDT concentrations were also detected along the dike in the western portion of the wetland. |



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**TABLE 2-1. PREVIOUS INVESTIGATIONS AND SITE DOCUMENTATION**

| INVESTIGATION | DATE | ACTIVITIES |
|---|---|---|
| Remedial Investigation Update/Feasibility Study | 2010 | The RI Update/FS was conducted in 2010 to evaluate existing data to determine whether the sediment was toxic to sediment invertebrates. The RI Update/FS included an updated HHRA that included an evaluation of groundwater, surface water, and sediment data, and an ERA that included an evaluation of sediment data. No unacceptable risks were identified for the receptors evaluated in the HHRA (construction workers and older child trespassers). Unacceptable risks were identified for sediment invertebrates so PRGs were developed as part of the ERA. The FS was conducted to develop and evaluate remedial alternatives for the sediment in the Area A Wetland. |

On August 30, 1990, NSB-NLON was placed on the National Priorities List by the EPA pursuant to CERCLA of 1980 and SARA of 1986. The National Priorities List is a list of uncontrolled or abandoned hazardous waste sites identified by EPA as requiring priority remedial actions. The Navy, EPA, and State of Connecticut signed the Federal Facility Agreement for NSB-NLON in 1995 (EPA, 1995). The agreement is used to ensure that environmental impacts associated with past and present activities at NSB-NLON are thoroughly investigated and that the appropriate remedial action is pursued to protect human health and the environment. In addition, the Federal Facility Agreement establishes a procedural framework and timetable for developing, implementing, and monitoring appropriate responses at NSB-NLON, in accordance with CERCLA (and SARA amendment of 1986, Public Law 99-499), 42 USC §9620(e)(1); NCP, 40 CFR 300; Resource Conservation and Recovery Act, 42 USC §6901 et seq., as amended by the Hazardous and Solid Waste Amendment of 1984, Executive Order 12580; and applicable state laws. There have been no cited violations under federal or state environmental law or any past or pending enforcement actions pertaining to the cleanup of Site 2B.

## 2.3 COMMUNITY PARTICIPATION

The Navy has been conducting community relations activities for the IR Program at NSB-NLON since the program began. From 1988 to November 1994, Technical Review Committee meetings were held on a regular basis. In 1994, a Restoration Advisory Board (RAB) was established to increase public participation in the IR Program process. Many community relations activities for NSB-NLON involve the RAB, which historically met quarterly and recently has met at least annually on an as needed basis. The RAB provides a forum for discussion and exchange of information on environmental restoration activities ~~between~~ the Navy, regulatory agencies, and the community, and it provides an opportunity for individual community members to review the progress and participate in the decision-making process for various IR Program sites, including Sites 2B.

The following community relations activities are conducted at NSB-NLON as part of the Community Relations Plan:

**Information Repositories:** The Public Libraries in Groton and Ledyard are the designated information repositories for the NSB-NLON IR Program. All pertinent reports, fact sheets, and other documents are available at these repositories.

**Key Contact Persons:** The Navy has designated information contacts related to the NSB-NLON. Materials distributed to the public, including any fact sheets and press releases, will indicate these contacts. The Public Affairs Officer will maintain the site mailing list to ensure that all interested individuals receive pertinent information on the cleanup.

**Mailing List:** To ensure that information materials reach the individuals who are interested in or affected by the cleanup activities at the NSB-NLON, the Navy maintains and regularly updates the site mailing list.

**Regular Contact with Local Officials:** The Navy arranges regular meetings to discuss the status of the IR Program with the RAB.



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**Press Releases and Public Notices:** The Navy issues press releases as needed to local media sources to announce public meetings and comment periods, the availability of reports, and to provide general information updates.

**Public Meetings:** The Navy conducts informal public meetings to keep residents and town officials informed about cleanup activities at NSB-NLON, and at significant milestones in the IR Program. Meetings are conducted to explain the findings of the RI; to explain the findings of the FS; and to present the Proposed Plan, which explains the preferred alternatives for cleaning up individual sites.

**Fact Sheets and Information Updates:** The Navy develops fact sheets to mail to public officials and other interested individuals and/or to use as handouts at the public meetings. Each fact sheet includes a schedule of upcoming meetings and other site activities. Fact sheets are used to explain certain actions or studies, to update readers on revised or new health risks, or to provide general information on the ~~IR Program~~ process.

**Responsiveness Summary:** The Responsiveness Summary for the Proposed Plan summarizes public concerns and issues raised during the public comment period and documents the Navy's formal responses. The Responsiveness Summary may also summarize community issues raised during the course of the FS.

**Announcement of the ROD:** The Navy announces the signing of the ROD through a notice in actions or studies, to update readers on revised or new health risks, or to a major local newspaper of general circulation and a press release sent to everyone on the mailing list. The Navy places the signed ROD in the information repositories before any remedial actions begin.

**Public Comment Periods:** Public comment periods allow the public an opportunity to submit oral and written comments on the proposed cleanup options. Citizens have at least 30 days to comment on the Navy's preferred alternatives for cleanup actions as indicated in the Proposed Plan.

**Technical Assistance Grant:** A Technical Assistance Grant from the EPA can provide up to $50,000 to a community group to hire technical advisors to assist them in interpreting and commenting on site reports and proposed cleanup actions. ~~Currently, no Technical Assistance Grant funds have been awarded.~~

**Site Tours:** The Office of Public Affairs periodically conducts site tours for media representatives, local officials, and others.

A notice of availability of the Proposed Plan for Sites 2B (Navy, 2010) was published on June 9, 2010, in *The New London Day* and the *Norwich Bulletin* newspapers. The Proposed Plan and other documents related to these sites are available to the public in the NSB-NLON Information Repositories located at the Groton Public Library in Groton, Connecticut, and the Bill Library in Ledyard, Connecticut. The notice also announced the start of the 30-day comment period that ended on July 9, 2010. A copy of the notice and the Proposed Plan are included in Appendix B of this ROD.

The Proposed Plan notice of availability invited the public to attend a public meeting at the Best Western Olympic Inn on Route 12 in Groton, Connecticut on June 17, 2010 from 6:30 pm to 7:00 pm. The public meeting presented the proposed remedies and solicited oral and written comments. At the public meeting, personnel from the Navy, EPA, and the CTDEP answered questions from the attendees during the informal portion of the meeting. In addition, public comments on the Proposed Plan were formally received and transcribed. The transcript for the public meeting is provided in Appendix C. Responses to the comments received during the public comment period are provided in the Responsiveness Summary in Section 3.0.

## 2.4 SCOPE AND ROLE OF OPERABLE UNIT

Site 2B is part of a comprehensive environmental investigation and cleanup program currently being performed at NSB-NLON under CERCLA authority pursuant to the Federal Facility Agreement dated



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environmental cleanup

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Although EPA has offered TAGs to the RAB, to date, none have been requested or awarded.

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January 11, 1995. IR Program cleanup activities are being performed under CERCLA, and 23 IR Program sites within 12 OUs have been identified at NSB-NLON. Sediment at Site 2B is classified as OU12, and groundwater at Site 2B is part of the Basewide Groundwater OU9, which also includes groundwater at Sites 2A, 3, 7, 9, 14, 15, 18, 20, and 23. Final remedies were selected for groundwater at all OU9 sites in the Final ROD (Navy, 2008). Sites in the FS stage include OU4 ~~which includes~~ Sites 10, 11, 13, 17, 19, 21, 22, 24, and 25. No Further Action (NFA) Decision Documents have been signed for Sites 1, 3 [New Source Area soil], 4, 14, 15, 16, 18 (soil). Remedies selected for the following sites have been documented in separate RODs: Site 2 (soil), Site 3 (soil and sediment), Site 4, Site 6, Site 8, and Site 20 (soil and sediment). A non-time-critical removal action was conducted for Site 3 (OBDA Debris), and is considered Response Complete. Other Response Complete sites include Site 7 (soil) and Site 9 (soil). The Site Management Plan for NSB-NLON further details the schedule for IR Program activities and is updated ~~annually~~.

Investigations at Site 2A indicated the presence of sediment contamination that poses unacceptable risk to current and future ecological receptors (sediment invertebrates). No previous actions have been taken in response to the contamination at Site 2B. The remedy documented in this ROD will achieve the Remedial Action Objectives (RAOs) for Site 2B, as listed in Section 2.8. Implementation of this remedy will allow continued use of this site as a wetland, which is consistent with current and reasonably anticipated future use and the overall cleanup strategy for NSB-NLON, which is to cleanup sites to achieve compliance with ~~State of Connecticut Remediation Standard Regulations and other ARARs to support base operations~~.

## 2.5 SITE CHARACTERISTICS

### 2.5.1 Physical Characteristics

Site 2B is underlain by dredged material that consists of silt and clay with traces of fine sand and shell fragments. The dredged material extends across the site to the southeast and southwest beneath the Area A Landfill. The thicknesses of the dredged material are 25 to 35 feet on the southern side of the wetland and 10 to 15 feet on the northeastern side of the wetland. Where dredged material does not directly overlie bedrock, they are underlain by a thin remnant of topsoil consisting of organic-rich silt, clay, and traces of roots and underlain by alluvial deposits. The alluvial deposits consist primarily of sand with silt and/or gravel and are significantly coarser grained than the overlying dredged material. The thickness of the alluvium in Site 2B borings ranged from 10 to 36 feet. The bedrock surface slopes to the valley occupied by the wetland from northern, eastern, and central bedrock highs toward the center of the wetland.

Groundwater is present within the overburden and bedrock underlying the Area A Wetland, and the water table is close to the ground surface throughout most of the area. Groundwater flow in the overburden is from the northeast, southeast, and southwest into the wetland and then northwest toward Site 3. Groundwater flow in the bedrock mimics the shallow overburden pattern and flows from higher elevations toward the bedrock valley and ultimately to Site 3 through a combination of discharge to local streams and aquifer underflow.

Storm water runoff from the Site 2A landfill cap surface discharges as sheet flow to the north into the Area A Wetland. Two drainage culverts collect runoff from the surrounding hillsides and from the Area A Weapons Center and discharge it to the Area A Wetland. Water typically flows in these drainage culverts only immediately following precipitation events. The drainage culvert along the northwestern side discharges to a storm sewer that passes along the southern side of the Area A Weapons Center and eventually discharges into the Area A Wetland. The drainage culvert along the southeastern side of the Area A Weapons Center collects runoff from the hillside north of the Area A Weapons Center and continues along the southeastern side of the Area A Weapons Center, eventually discharging to the Area A Wetland.



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CERCLA. Compliance with CERCLA includes achieving Applicable or Relevant and Appropriate Requirements (ARARs) identified in Table E.1 of this ROD.

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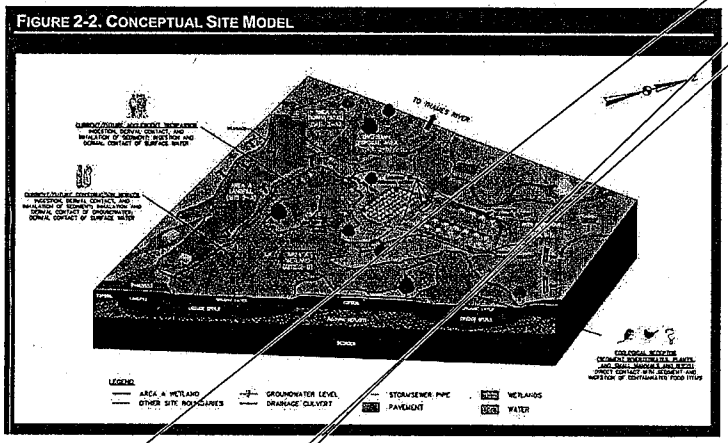
### 2.5.2 Conceptual Site Model

Figure 2-2 presents the Site 2B conceptual site model (CSM), which identifies contaminant sources, contaminant release mechanisms, transport routes, and receptors under current and future land use scenarios. The three primary sources of contamination to the Area A Wetland were: (1) placement of DDT bricks, (2) runoff from the Area A Landfill, and (3) runoff from the Area A Weapons Center. The chemical concentrations in the dredged material are much lower than concentrations in surface sediment. Human health and ecological risk estimates are discussed in Sections 2.7.1 and 2.7.2, respectively.

**FIGURE 2-2. CONCEPTUAL SITE MODEL**




Items containing PCBs, PAHs, and metals were stored on, placed in, or poured from containers at the Area A Landfill ~~prior to the landfill being~~ capped. Because runoff from the landfill drained as overland flow to the north into the Area A Wetland, contaminants from the landfill would have migrated to the southwestern part of the wetland ~~prior to the landfill being capped~~. It is unlikely that the contaminants would have migrated very far into the wetland because organic sediment binds contaminants making them less mobile. This is supported by the analytical data collected as part of Site 2B investigations.

The two drainage culverts (one along the northwestern side and one along the southeastern side of the Area A Weapons Center) that collect runoff from the surrounding hillsides and from the Area A Weapons Center discharge to the Area A Wetland. The drainage culvert along the northwestern side discharges to a storm sewer that passes along the southern side of the Area A Weapons Center and eventually discharges into the Area A Wetland. The drainage culvert along the southeastern side of the Area A Weapons Center collects runoff. Water typically flows in these drainage culverts only immediately following precipitation events. Elevated levels of PAHs were detected in some of the sediment samples from the drainage culvert from the Area A Weapons Center during the Phase II RI (Brown and Root Environmental, March 1997), suggesting that the Weapons Center was historically a source of PAHs to the Area A Wetland. These samples were located downstream of the sediment (with elevated levels of PAHs) that was removed during the 2001 removal action from drainage swales at the Area A Weapons Center.

Based on current and potential future land use, older child trespassers ~~(e.g., teenagers)~~ and construction workers were considered potential receptors that may be exposed to contaminated sediment, surface water, and groundwater within the study area. Based on the results of the HHRA, no chemicals in sediment, surface water, or groundwater are causing significant risks to human receptors. Potential ecological receptors in the Area A Wetland include mammals, birds, amphibians, reptiles, plants, and sediment invertebrates. Unacceptable risks were identified for sediment invertebrates that may be exposed to contaminated sediment. Surface water and groundwater are not a concern for ecological receptors.

### 2.5.3 Nature and Extent and Fate and Transport of Contamination

PAHs, PCBs, pesticides, and metals were identified ~~in the RI~~ as chemicals of concern in sediment. Items stored and/or disposed ~~of~~ at the Area A Landfill resulted in the release of PCBs, metals, petroleum compounds, sulfuric acid solution, and other chemicals to the underlying soil and the adjacent Area A Wetland. PAHs, pesticides, PCBs, and metals were detected in several sediment samples at concentrations that exceed ecological sediment benchmarks. The greatest concentrations of most of the chemicals were detected in samples immediately adjacent to the Area A Landfill and/or Area A Weapons Center. Elevated levels of total DDT also were found along the dike at the western portion of the wetland.

The areal extent of contaminated sediment in Area A Wetland is shown on Figure 2-3. Because deeper dredged material are less contaminated than surface sediment, contaminants in the Area A Wetland sediment are assumed to be associated with surface releases such as runoff and the placement of pesticide bricks ~~and not~~ contaminated dredged material or groundwater discharge. Based on RI results, sediment contamination is assumed to extend ~~to a depth of no more than~~ approximately 2 feet below ground surface (bgs). Estimates of the volume of contaminated sediment were generated during the RI Update/FS after calculation of PRGs ~~for protection of sediment invertebrates~~. The volume of ~~PAH-, DDT-, and Aroclor-~~contaminated sediment required to be addressed to eliminate risk to ecological receptors is approximately 3,240 cy.

PCBs and PAHs are non-polar hydrocarbons that have a strong affinity for sediment and suspended solid particles. PAHs are somewhat more susceptible to biodegradation, but both classes of compounds are considered persistent in the environment. PCBs and PAHs (with the exception of naphthalene) are only slightly volatile and have very low aqueous solubilities. Metals are also highly persistent and when released to the environment also generally adsorb to the soil matrix and remain bound to particulate matter. Pesticides are not considered to be very mobile in the environment and tend to remain affixed to soil particles. Because of this, they tend to migrate from source areas via bulk movement processes (e.g., transport by wind erosion or with suspended particulates in water) and, if leaching from soil to groundwater occurs, it usually ~~results in transportation over relatively short distances~~.

## 2.6 Current and Potential Future Site and Resource Uses

NSB-NLON is currently an active Navy base and is expected to remain so into the foreseeable future. Adjacent to the northern, southern, and eastern boundaries of NSB-NLON, land uses include residential, commercial, recreational, and open space. ~~Currently, the Site 2B is a jurisdictional wetland regulated under Section 404 of the Clean Water Act and will remain a wetland.~~ Based on the proximity of the site to the Area A Weapons Center, most of the wetland is located within the Navy's explosive arc exclusion zone, and because the site is a jurisdictional wetland, it is not likely that the site will ever be used for residential development. There is no current recreational use in the wetland, and construction activities within the wetland are not anticipated, other than those associated with remediating and restoring the wetland.

CTDEP has classified groundwater beneath the Area A Wetland as within a GB-classified area (a non-drinking water source area) (CTDEP, October 1996), which indicates that the area has been used for long-term intense industrial or commercial development and that a public water supply service is available. Such groundwater may **not suitable for human consumption** without treatment ~~due to~~ waste discharges, spills, or leaks of chemicals or land use impacts. Water beneath the wetland is not currently



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Currently, the Area A Wetland is both a federal jurisdictional wetland regulated under Section 404 of the federal Clean Water Act and a state jurisdictional wetland regulated under the Connecticut Inland Wetlands and Watercourses Act. Owing to area development restrictions, it is anticipated that the area will remain a wetland.

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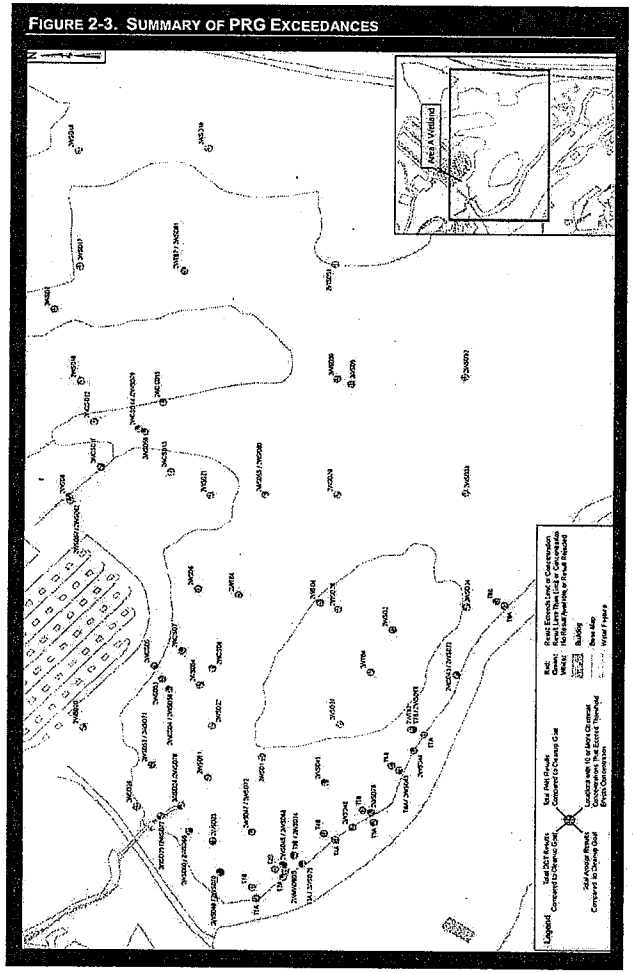
because of

**FIGURE 2-3. SUMMARY OF PRG EXCEEDANCES**

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used for domestic, commercial or industrial purposes and it is not anticipated that the water will be used for these purposes in the future. The Groton Water Department supplies potable water to NSB-NLON. The primary sources of the Groton water supply are surface water reservoirs, which are supplemented with wells. The water supplies are located within the Poquonock River Watershed, 3 miles east of NSB-NLON, and not within the NSB-NLON watershed. Groundwater and surface water at NSB-NLON are not used for drinking water and flow towards the Thames River.

## 2.7 SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks the site poses if no action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The most recent risk assessment was performed for Site 2B for the RI Update/FS in 2010 (TtNUS, May 2010) to estimate the probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the site.

### 2.7.1 Summary of Human Health Risk

The major components of an HHRA include data evaluation, exposure assessment, toxicity assessment, risk characterization, and uncertainty analysis. Data evaluation is a task that uses a variety of information to determine which of the chemicals detected in site media are most likely to present a risk to potential receptors. The end result of the evaluation is a list of contaminants of potential concern (COPCs) and representative exposure point concentrations for each medium. During the exposure assessment, potential human exposure pathways are identified at the source areas under consideration. Chemical-specific toxicity criteria for the identified COPCs are identified during the toxicity assessment and are used in the quantification of potential human health risks. Risk characterization involves quantifying the risks associated with exposure to the COPCs using algorithms established by EPA ~~and CTDEP~~. Risks from chemicals are calculated for either carcinogenic or noncarcinogenic effects. The uncertainty analysis identifies limitations in the risk assessment that might affect the final risk results. The final result of the risk assessment is the identification of medium-specific COCs and exposure pathways that need to be addressed by a remedial action. Tables summarizing data used in the HHRA and associated results are presented in Appendix D.

#### Identification of COCs

In general, all available validated data collected during investigations conducted from 1990 through 2008 were used to identify COPCs for the site. Both federal and CTDEP criteria were used for COPCs selection. Federal criteria include Maximum Contaminant Levels (MCLs) and Oak Ridge National Laboratory Regional Screening Levels, and EPA soil screening levels for inhalation (soil to air). CTDEP criteria include values for direct exposure, pollutant mobility, groundwater protection, and surface water protection.

Tables 3-1 through 3-4 in Appendix D present exposure point concentrations (EPCs) for the COCs identified at Site 2B in surface sediment. EPCs are the concentrations used in the risk assessment to estimate exposure and risk from each COC. For each COC, information in the tables includes the range of detected concentrations, frequency of detection (i.e., the number of times the chemical was detected in samples collected at the site), EPC, and how the EPC was derived. In accordance with EPA's Pro-UCL guidance and based on the statistical distributions of the data maximum detected concentrations or 95-percent upper confidence limits ~~(UCLs)~~ on the mean (calculated using various statistical methods) were used as the EPCs for Site 2B COCs.

#### Exposure Assessment

During the exposure assessment, current and potential future exposure pathways through which humans might come into contact with the COPCs identified in the previous step were evaluated, and the results of the exposure assessment for Site 2B were used to refine the CSM (Figure 2-2). Potential receptors under future land use were construction workers and older child trespassers. Because the site is a wetland and



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located within the Navy's explosive arc zone for the Area A Weapons Center, residential land use was not evaluated in the HHRA. Current future exposure pathways at Site 2B are summarized in Table 2-2.

**TABLE 2-2. RECEPTORS AND EXPOSURE ROUTES EVALUATED IN THE 2010 HHRA**

| RECEPTOR | EXPOSURE ROUTE |
|---|---|
| Older Child Trespasser (7 to 17 years) (current and future land use) | Soil/sediment dermal contact (surface)<br>Soil/sediment ingestion (surface)<br>Surface water (dermal contact)<br>Surface water (ingestion) |
| Construction Worker (future land use) | Soil/sediment dermal contact (surface and subsurface)<br>Soil/sediment ingestion (surface and subsurface)<br>Inhalation of air/dust/emissions (surface and subsurface soil/sediment)<br>Groundwater (dermal contact)<br>Groundwater (inhalation in a trench)<br>Surface water (dermal contact) |

### Toxicity Assessment

Toxicity assessment involves identifying the types of adverse health effects caused by exposure to site COPCs and determining the relationship between the magnitude of exposure and the severity of adverse effects (i.e., dose-response relationship) for each COC. Quantitative toxicity values [oral cancer slope factors (CSFs), oral reference doses (reference doses [RfDs], cancer inhalation unit risks, and non-cancer inhalation reference concentrations) determined during this component of the risk assessment were integrated with outputs of the exposure assessment to characterize the potential for adverse health effects for each receptor group.

Tables 6.1 and 6.2 in Appendix D provide carcinogenic risk information relevant to the Site 2B COCs for oral/dermal and inhalation exposure. At this time, CSFs and RfDs are not available for the dermal route of exposure; therefore, dermal slope factors were extrapolated from oral values. An adjustment factor is sometimes applied to extrapolate the dermal values from oral values, dependent on how well the chemical is absorbed via the oral route. However, no adjustment factor was required for Site 2B COCs; the oral CSFs were used as the dermal CSFs.

Tables 5.1 and 5.2 provide non-carcinogenic hazard information relevant to the Site 2B COCs for oral/dermal and inhalation routes of exposure, respectively. As was the case for carcinogenic data, dermal RfDs can be extrapolated from oral RfDs by applying an adjustment factor as appropriate. Several metals required adjustment factors ranging from 0.007 to 0.15.

### Risk Characterization

During the risk characterization, the outputs of the exposure and toxicity assessments are combined to characterize the baseline risk (**cancer risks and non-cancer hazards**) at the site if no action was taken to address the contamination. Potential cancer risks and non-cancer hazards were calculated based on reasonable maximum exposure (RME) and central tendency exposure (CTE) assumptions. The RME scenario assumes the maximum level of human exposure that could reasonably be expected to occur, and the CTE scenario assumes a median or average level of human exposure.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:



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Risk = CDI x CSF

where: Risk = a unitless probability (e.g., 2 x $10^{-5}$) of an individual developing cancer
CDI = chronic daily intake averaged over 70 years (in mg/kg-day)
CSF = slope factor (in mg/kg-day$^{-1}$)

~~These calculated risks are probabilities that are usually expressed in scientific notation (e.g., 1 x $10^{-5}$). An excess lifetime cancer risk of 1 x $10^{-5}$ under an RME scenario indicates that an individual experiencing the reasonable maximum exposure estimate has an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site related exposures is 1 x $10^{-4}$ to 1 x $10^{-6}$.~~

Tables 8.1 through 8.9 in Appendix D provide RME cancer risk estimates for the significant receptors and routes of exposure developed by taking into account various conservative assumptions about the frequency and duration of exposure for each receptor about the toxicity of the COCs. Total risk estimates for all applicable exposure routes were 1 x $10^{-5}$ for construction workers and 3 x $10^{-5}$ for older child trespassers. These risk levels indicate that if no cleanup action was taken, the increased probabilities of developing cancer as a result of site-related exposure would range from approximately 1 in 100,000 to 3 in 100,000, **within EPA's acceptable risk range.**

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., a lifetime) to an RfD derived for a similar exposure period. An RfD represents a level to which an individual may be exposed that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ ~~less than 1~~ indicates that ~~a receptor's~~ dose of a single contaminant is ~~less than the RfD and that~~ toxic non-carcinogenic effects from that chemical ~~are unlikely~~. The hazard index (HI) is generated by adding the HQs for all chemicals that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may be reasonably exposed. An HI less than 1 indicates that, based on the sum of all HQs from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

Non-cancer HQ = CDI / RfD

where: HQ = hazard quotient
CDI = chronic daily intake
RfD = reference dose

CDIs and RFDs are expressed in the same units and represent the same exposure period (i.e., chronic, sub-chronic, or short-term).

Tables 7.1 through 7.9 in Appendix D also provide RME non-cancer HQs for the each receptor and route of exposure and total HIs for all routes of exposure. Total HIs for all applicable exposure routes were 2 for construction workers (although the HIs for exposures to the individual media were less than or equal to unity) and 0.3 for older child trespassers.

No major sources of uncertainty, other than those typically associated with risk assessment estimates, were identified for the 2010 Site 2B HHRA. Based on the results of the HHRA, no cancer risks or non-cancer hazards were identified for current or potential future human receptors.

### 2.7.2 Summary of Ecological Risk

Potential ecological risks for both aquatic and terrestrial receptors were initially evaluated in the Screening Level ERA included as part of the Phase II RI (Brown and Root Environmental, March 1997).



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is unlikely to result in

The 1997 SERA concluded that chemicals in the surface water, sediment, and surface soil at the Area A Wetland represented a potential risk to both aquatic and terrestrial receptors.

Ecological risks were updated in the SERA conducted as part of the Phase III RI QAPP (Tetra Tech, October 2007) [Steps 1, 2, and 3a of the ERA process], because the Navy determined that the ERA should be updated using current methodologies and toxicity data because the initial SERA was more than 10 years old. **Exposure pathways** for terrestrial receptors include direct contact with contaminated surface soil and sediment, ingestion of contaminated food items (aquatic prey), and ingestion and direct contact with surface water. Exposure pathways for aquatic receptors included direct contact and incidental ingestion of contaminated sediment and ingestion and direct contact with surface water. The habitats present at the Area A Wetland consist of terrestrial habitats such as forested and open areas with grasses and shrubs surrounding the wetland, and aquatic habitats consisting of drainageways, areas with ponded water, and a small pond. These habitats support a variety of receptors. Representative receptors evaluated for Site 2B included small birds and mammals, soil invertebrates, sediment invertebrates, fish and other aquatic organisms. Potential risks to terrestrial plants/invertebrates and sediment invertebrates resulting from exposure to chemicals were initially evaluated by comparing chemical concentrations to ecological screening levels. Risk to terrestrial receptors for exposure to COPCs in surface soil, sediment, and surface water were determined using food chain models to estimate the CDI and compare the CDI to toxicity reference values representing acceptable daily doses in mg/kg-day. The SERA also included a refinement of the conservative exposure assumptions/concentrations to evaluate the potential risks to ecological receptors (i.e., plants, invertebrates, and wildlife receptors), which is termed Step 3a. Several chemicals were initially selected as COPCs because they were detected at concentrations that exceeded their respective screening levels. However, during the Step 3a evaluation, it was determined that the primary risk drivers were PAHs, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, PCBs, and metals. Also, it was determined that the primary receptors of concern were sediment invertebrates. Risks to the other receptors were not great enough to warrant further risk evaluation.

Ecological risks were further evaluated as part of the Phase III RI Technical Memorandum for the Area A Wetland (Tetra Tech, February 2008) using existing data and data collected as part of the Phase III RI. Representative receptors at Site 2B that were evaluated in the SERA included invertivorous birds and mammals, herbivorous birds and mammals, and sediment invertebrates. The SERA prepared as part of the Phase III Technical Memorandum concluded that PAHs, select pesticides (chlordane, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT), PCBs, and metals were detected in several samples at concentrations that exceeded sediment benchmarks based on risks to sediment invertebrates. As noted earlier, the greatest concentrations for most of the chemicals were immediately adjacent to the Area A Landfill, the Area A Weapons Center, and along the dike in the western portion of the wetland. Based on the comparison of chemical concentrations in sediment to sediment benchmarks, risks to sediment invertebrates in the area of the elevated chemical concentrations were expected. However, there was uncertainty in that expectation because site-specific characteristics of the sediment (i.e., total organic carbon, sulfides, etc.) may make the sediment more or less toxic than predicted from the sediment benchmarks. The Phase III RI Technical Memorandum for Area A Wetland (Tetra Tech, February 2008) concluded that risks to wildlife were acceptable so risks to those receptors did not need to be further evaluated.

A decision to proceed to the Baseline ERA (BERA) was made after the results of the Phase III SERA were evaluated. Based on the conclusions of that SERA, it was agreed by the project team that sediment invertebrates were the only receptors that needed to be further evaluated in the BERA, and the BERA would focus on risks from PAHs, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, PCBs, and metals. These conclusions were used to focus the BERA on the receptors most likely at risk (sediment invertebrates). Toxicity tests were conducted on sediment samples collected from 12 site locations and two reference locations collected as part of the Phase IV RI. The results of the tests were used to determine whether the chemicals in the sediment within the Area A Wetland were impacting sediment invertebrates, and to use that data to develop site-specific risk-based cleanup goals. Site-specific cleanup goals were developed by linking chemical concentrations in the sediment to toxicity test results. Toxicity testing involved sending samples of sediment from the Area A Wetland to a laboratory where a known number of sediment invertebrates were added to the sediment. After the tests were completed, the invertebrates that



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survived were counted and weighed to evaluate whether the samples were toxic to those invertebrates. The chemical data were evaluated to determine which chemicals (and their associated concentrations) could be related to the toxicity test results so that no observed effects concentrations (NOECs) and lowest observed effects concentrations (LOECs) could be developed. The geometric means of the NOECs and LOECs were then selected as the PRGs. In addition, it was agreed by the project team that samples with ten or more chemicals that exceed threshold effects concentrations (TECs) would be considered impacted, unless toxicity testing at that location indicated that the sample was not toxic. This would help account for some of the impacts that may be occurring from a combination of chemicals detected at elevated concentrations in the samples. No major sources of uncertainty, other than those typically associated with risk assessments were identified in the Site 2B BERA.

### 2.7.3 Basis for Action

Unacceptable risks ~~due~~ to levels of PAHs, PCBs, pesticides, and metals were determined for sediment invertebrates at Site 2B. Because risks were identified under the current land use scenario for ecological receptors, a response action is necessary to protect the environment from actual or threatened releases of hazardous substances into the environment that may present an imminent and substantial endangerment. Because the human health assessment conducted for the Area A Wetland did not include a residential scenario, Land Use Controls (LUCs) would be required for the entire wetland until it is demonstrated that the entire wetland, or a portion of the wetland, presents acceptable residential risk. At that time, the LUCs can be removed for the portion of the wetland where risks to residential receptors are found to be acceptable. Because of the implementation of LUCs to prevent future residential and recreational use of the Area A Wetland 5-year reviews would be required under this alternative to evaluate the effectiveness of the LUCs.

## 2.8 Remedial Action Objectives

RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. RAOs specify the COCs, potential exposure routes and receptors, and acceptable concentrations (i.e., cleanup levels) for a site and provide a general description of what the cleanup will accomplish. RAOs typically serve as the design basis for the remedial alternatives described in Section 2.9. The RAOs developed for the Area A Wetland sediment considering the current and future land use at the NSB-NLON are as follows:

- Reduce risks to sediment invertebrates from exposure to COCs in the Area A Wetland ~~to acceptable levels~~.
- Mitigate the potential for COCs in Area A Wetland sediment to migrate to less impacted areas of the Area A Downstream Watercourses (specifically Site 3, which was previously remediated) and cause adverse effects to receptors in these areas.

No unacceptable risks were identified for human receptors. These RAOs are based on current and reasonably anticipated future non-residential site uses. To achieve the RAOs, ecological cleanup goals were developed for each COC.

The COCs identified for Area A Wetland after the BERA are PAHs, total Aroclor, the pesticides 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT, and metals. The pesticides were grouped and labeled total DDT, which represents the sum of detected concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. COC-specific PRGs for sediment are identified below and are based on the results of sediment toxicity tests and analytical data NOECs and LOECs. For the BERA sediment toxicity tests were conducted on sediment samples collected from 12 site locations and two reference locations. The results in the site samples were compared to the results in the reference samples to determine whether survival and/or growth of sediment invertebrates was reduced in the site samples compared to the reference samples. The chemical data were then evaluated to determine which chemicals (and their associated concentrations) could be related to the toxicity test results so that NOECs and LOECs could be developed. The geometric



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above the following remedial goals:
Total PAHs - 6585 ug/kg
Total DDT - 1504 ug/kg
Total Aroclor - 532 ug/kg

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Prevent residential exposure to contaminants in the Area A Wetland sediments.

means of the NOECs and LOECs were then selected as the PRGs (See Table 2-3). Based on this evaluation, the following PRGs were developed:

- Total PAHs – 6,585 µg/kg
- Total DDT – 1,504 µg/kg
- Total Aroclor – 532 µg/kg

**TABLE 2-3. ECOLOGICAL PRG DEVELOPMENT**

| Sample ID | Sample Concentration (µg/kg) Total PAHs | Total DDT | Total Aroclor |
|---|---|---|---|
| **Non-Toxic Samples** | | | |
| SD60 | 4,564 | NA | NA |
| SD68 | 5,735 | 39.7 | NA |
| SD72 | 5,176 | 671 | 480 |
| SD73 | 1,499 | 24.3 | NA |
| SD80 | 4,372 | 12.6 | NA |
| SD81 | 2,930 | 18.6 | NA |
| **NOEC[1]** | **5,735** | **671** | **480** |
| **Toxic Samples** | | | |
| SD62 | 38,215 | 8.5 | NA |
| SD66 | 3,392 | 137 | 480 |
| SD69 | 4,556 | 640 | 590 |
| SD70 | 9,342 | 252 | 1,100 |
| SD74 | 30,284 | 3,390 | NA |
| SD75 | 50,953 | 3,370 | NA |
| SD76 | 7,561 | 511 | 180 |
| SD79 | 63,873 | NA | NA |
| **LOEC[2]** | **7,561** | **3,370** | **590** |
| **Geometric Mean of NOEC and LOEC - PRG** | **6,585** | **1,504** | **532** |

1 Maximum concentration in a non-toxic sample.
2 Lowest concentration in a toxic sample that is greater than the maximum concentration in a non-toxic sample.
NA Not applicable.

The Navy also agreed that samples with 10 or more chemicals (total PAHs, 4,4'-DDT, total DDT, arsenic, cadmium, chromium, copper, lead, nickel, and zinc) that exceed TECs would be considered impacted, unless toxicity testing at that location indicated that the sample was not toxic. Figure 2-3 ~~is a summary of~~ depicts the locations where PRGs were exceeded.

A few locations require further discussion as presented below:

- Whether the location at 2WSD47/2WSD72 is considered to be impacted is questionable for reasons discussed in the BERA. Because of the uncertainty in whether this location is impacted, additional samples will be collected at and adjacent to this location as part of the pre-design investigation (PDI). Based on the results of the re-sampling, this area will either be characterized as impacted or not-impacted.

- Although the location at T7B/2WSD68 is not considered to be impacted, the Navy agreed to expand the excavation area at this location by 5 feet on both sides (to north and east) to ensure that this sample location is included in the excavation.



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depicts

- The location of 2WSD43/2SWSD73 is considered to be impacted. The area around this sample (to west, north, and east) will be better defined as part of the PDI.

## 2.9 DESCRIPTION OF ALTERNATIVES

To address potential unacceptable ecological risks associated with sediment at Site 2B, a preliminary technology screening evaluation was conducted in the RI Update/FS. The general response actions are presented in Table 2-4. In-situ treatment options were not considered based on the type and volume of contamination at Site 2B.

**TABLE 2-4. GENERAL RESPONSE ACTIONS**

| GENERAL RESPONSE ACTION | TECHNOLOGY | PROCESS OPTIONS |
|---|---|---|
| No Action | None | Not Applicable |
| Limited Action | LUCs | Institutional Controls |
| | | Engineered Controls |
| | Monitoring | Sampling and Analysis |
| | Monitored Natural Recovery | Naturally Occurring Processes |
| Containment | Covering | Sediment Cover |
| Removal | Bulk Excavation | Excavation |
| | Water Removal | Dewatering |
| Ex-Situ Treatment | Pretreatment | Dewatering |
| | Physical/Chemical | Sediment Washing/Solvent Extraction |
| | | Chemical Stabilization/Solidification |
| | Thermal | Incineration |
| Disposal | Landfill | Off-Site Landfilling |
| Re-Use | Re-Use Untreated Sediment | Use in Asphalt Batch Plant |
| | | Use in Concrete Manufacturing |
| | Re-Use Treated Sediment | Fill After Treatment |

The technologies and process options retained after detailed screening were assembled into three sediment alternatives. Consistent with the NCP, the no action alternative was evaluated as a baseline for comparison with other alternatives during the comparative analysis. Table 2-5 describes the major components and provides estimated costs for each remedial alternative identified for Site 2B sediment.



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Author: kkeckler Subject: Cross-Out Date: 6/28/2010 4:29:45 PM

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:30:16 PM
contamination exceeding CERCLA risk levels would remain in place.

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:32:08 PM
native

**TABLE 2-5. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED**

| ALTERNATIVE | COMPONENTS | DETAILS | COST |
|---|---|---|---|
| **Alternative 1: No Action**<br>*No action to address contaminated sediment and no use restrictions* | Five-year reviews | Five-year reviews would be conducted because site would remain in IR Program. | Capital: $0<br>Every 5 Years: $25,300<br>30-Year NPW: $97,700<br>Discount Rate: 2.7%<br>Time Frame: NA |
| **Alternative 2: Soil Cover, Wetlands Mitigation, and LUCs**<br>*Installation of a soil cover and LUCs to prevent unauthorized access and digging within the cover limits* | Placement of soil covers over four areas of the site | Installation of 12-inch soil covers over 1.3 acres of contaminated sediment. | Capital: $1,672,440<br>1st Year: $27,010<br>2nd Year: $21,050<br>3rd Year: $33,590<br>Years 4 through 30: $13,110<br>Every 3 Years: $3,960<br>Every 5 Years: $25,300<br>30-Year NPW: $2,103,580<br>Discount Rate: 2.7%<br>Time Frame[1]: 4 months |
| | Wetland mitigation and flood storage | Construction of an additional 2.6 acres of wetlands at NSB-NLON to mitigate loss of wetlands due to the cover systems. | |
| | LUCs and inspections | Implementation of LUCs to provide maintenance and inspections of the soil covers, and to prohibit disturbance of the cover. LUCs would also be implemented to prevent the potential future residential use of the Area A Wetland. | |
| | Long-term monitoring | Annual monitoring of sediment to confirm that the remedy remains protective and that contaminants are not migrating. | |
| | Five-year reviews | Five-year reviews would be conducted because contamination would remain in excess of levels that allow for unrestricted use and unlimited exposure. | |
| **Alternative 3: Excavation, Off-Site Disposal, and Site Restoration**<br>*Excavation to meet cleanup goals, off-site disposal of contaminated sediment, and site restoration* | Excavation and off-site disposal | Excavation of 3,200 cy of sediment such that cleanup goals are achieved and off-site disposal of excavated sediment. | Capital: $1,773,800<br>1st Year: $7,960<br>2nd Year: $4,990<br>3rd Year: 17,530<br>Every 5 Years: $25,300<br>30-Year NPW: $1,900,180<br>Discount Rate: 2.7%<br>Time Frame[1]: 3 months |
| | Site restoration | Re-grade areas to existing elevation with clean organic soil, seed the area with native wetland vegetation, and monitor to ensure the wetland vegetation has been established. | |
| | LUCs | LUCs would be implemented to prevent the potential future residential use of the Area A Wetland. | |
| | Monitoring | Monitoring to ensure that the native wetland vegetation has been re-established and that *Phragmites* is being controlled within the restored area. | |
| | Five-year reviews | Five-year reviews would be conducted because contamination would remain in excess of levels that allow for unrestricted use and unlimited exposure | |

1 The estimated time frame listed in Table 2-5 is for the duration of construction activities only. Additional time would be required to prepare the necessary work plan and other administrative documents.

## 2.10 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-6 and subsequent text in this section summarize the comparison of the remedial alternatives with respect to the **nine CERCLA evaluation criteria** outlined in the NCP at 40 CFR 300.430 (e)(9)(iii) and categorized as threshold, primary balancing and modifying. Further information on the detailed comparison of remedial alternatives is presented in the RI Update/FS.

**TABLE 2-6. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

| CERCLA CRITERION | ALTERNATIVE 2: SOIL COVER, WETLANDS MITIGATION, AND LUCS | ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL, AND SITE RESTORATION |
|---|---|---|
| Overall Protection of Human Health and the Environment | O | ● |
| Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) | ● | ● |
| Long-Term Effectiveness and Permanence | O | ● |
| Reduction of Toxicity, Mobility, and Volume through Treatment | NA | Only to the extent water from the dewatering process requires treatment or sediment stabilization reduces the mobility of contaminant within the treated sediment. |
| Short-Term Effectiveness | O | O |
| Implementability | O | ● |
| Total Cost (Present Net Worth) | $2,103,580 | $1,900,180 |
| State Acceptance | ● | ● |
| Community Acceptance | ● | ● |

● - ~~High.~~ O - ~~Medium.~~ ○ - ~~Low.~~ NA – Not Applicable

### Threshold Criteria

***Overall Protection of Human Health and the Environment.*** Alternative 1 would not be protective of human health or the environment because no action would be conducted to address site risks. Alternative 1 would not achieve RAOs because the no action alternative would not be protective of ecological receptors and would not protect the downstream watercourse from the migration of contaminated sediment.

Alternative 2 would be less protective than Alternative 3 because it would leave contamination in place and rely on administrative controls to prevent exposure to contamination. Under Alternative 3 sediment causing an ecological risk would be permanently removed from the Site preventing ecological receptors from being exposed to unacceptable levels of contamination.

***Compliance with ARARs.*** ARARs include any federal or state standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate to the site or remedial action. Alternatives 2 and 3 would comply with all **chemical-, location-, and action-specific ARARs** as long as



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Author: kkeckler Subject: Sticky Note Date: 6/28/2010 4:33:17 PM
This Table needs to include the No Action alternative.

Author: kkeckler Subject: Replacement Text Date: 6/28/2010 4:33:35 PM
Meets the criterion

Author: kkeckler Subject: Replacement Text Date: 6/28/2010 4:33:47 PM
Partially satisfies the criterion

Author: kkeckler Subject: Replacement Text Date: 6/28/2010 4:34:34 PM
Does not meet the criterion

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:40:45 PM
engineering and

adequate mitigation is conducted to compensate for altered wetland and floodplain resources and to control *Phragmites* in the mitigated or remediated areas. ~~Alternative 3 is the least damaging practicable alternative to protecting wetland resources because CERCLA related contamination detected at concentrations exceeding PRGs (except where noted) will be removed from the site and wetlands will be restored in place, versus Alternative 2, which relies on covering contamination within the existing wetland and creating new wetlands from the upland area adjacent to the Area A Wetland.~~

### Primary Balancing Criteria

***Long-Term Effectiveness and Permanence.*** Alternative 1 would have no long-term effectiveness and permanence because no contaminant removal or contact restrictions would occur. Alternative 3 would provide more long-term effectiveness and permanence than Alternative 2 because contaminated sediment would be completely removed from the site and wetland. Alternative 2 would require engineered and administrative controls to be an effective and permanent remedy in the long-term. LUCs implemented under Alternatives 2 and 3 would prevent site development for other uses that could provide unacceptable exposure to future site users (including residential users) to site contamination, and ~~5-year reviews under both alternatives would ensure the adequacy of the remedy to provide continuing protection for ecological receptors and downstream watercourses.~~

***Reduction in Toxicity, Mobility, or Volume Through Treatment.*** None of the alternatives would utilize treatment to reduce the toxicity, mobility, or volume of COCs except to the extent water from the dewatering processed and/or potential sediment stabilization under Alternative 3, meets this criterion.

***Short-Term Effectiveness.*** Alternative 1 would adversely impact environmental receptors in the short term and could also potentially impact downstream environmental receptors because no action would be performed to reduce site risks. Implementation of Alternatives 2 and 3 would expose site workers to physical risks, and removing vegetation for the implementation of these alternatives could increase the potential for the migration of contaminated sediment to the downstream watercourse. However, the physical risk associated with these potential exposures under Alternatives 2 and 3 could be effectively controlled by using personal protection equipment, complying with proper site-specific health and safety procedures, and utilizing proper best management practices to prevent the migration of contamination through erosion during monitoring and construction activities. There would be no short-term risk to construction workers associate with working with or coming into contact with the site contaminants. Alternative 2 would have an approximate construction duration of 4 months and Alternative 3 would have an approximate construction period of 3 months.

***Implementability.*** Alternative 1 would be readily implementable. Technical and administrative ~~resources~~ for developing and initiating five-year reviews are readily available. Alternative 2 would be considered the most difficult to implement because this alternative requires wetland mitigation activities, the construction of a barrier layer, preparing the contaminated areas for barrier layer construction, and long-term inspection and operation, monitoring, and maintenance (OM&M) of the cover. The wetland mitigation activities for Alternative 2 require a 2 to 1 mitigation ratio. To construct the required wetlands, 2.6 acres of land will have to be excavated to create a wetland habitat and restore the flood storage capacity of the Area A Wetland. Alternative 3 would be less difficult to implement than Alternative 2 because this alternative requires a 1:1 restoration of impacted wetlands and the flood storage capacity of the Area A Wetland will not be affected. The components of Alternative 3 include the excavation, processing, off-site transportation and disposal of contaminated sediment, restoring excavated areas to pre-existing elevations with clean organic soil, seeding with native wetland vegetation, and monitoring to ensure the vegetation has been established and *Phragmites* is controlled in this area. All alternatives can be implemented using conventional and locally available equipment and materials.

Both Alternative 2 and Alternative 3 require ~~the usage of~~ heavy equipment and trucks to move contaminated sediment and/or clean fill material. Alternative 2 would require more fuel energy than Alternative 3 for onsite activities because the same type of equipment would run a month longer for Alternative 2 than it would for Alternative 3. However, Alternative 3 requires transportation of excavation soils to a landfill for disposal and transportation of clean soil to the site for backfill and Alternative 2 only



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Author: kkeckler Subject: Cross-Out Date: 6/28/2010 4:41:01 PM

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The Navy finds that under the Section 404 of the federal Clean Water Act Alternative 3 is the least environmentally damaging practicable alternative to protect wetland resources because CERCLA-related contamination detected at concentrations exceeding RGs will be removed from the site, wetlands will be restored in place, invasive species will be controlled, and LUCs will be established to prevent residential development within the wetland area. In comparison, Alternative 2 is less practicable because it relies on covering contamination within the existing wetland and creating new wetlands from the upland area adjacent to the Area A Wetland. Both Alternatives 2 and 3 use a total PCB cleanup level of 532 ppb that has been determined by EPA to meet TSCA standards and will not pose an unreasonable risk of injury to health or the environment.

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Five-year reviews under Alternative 2 would ensure the adequacy of the containment remedy to protect ecological receptors and downstream watercourses from wastes left in place under the cover. Five-year reviews for both Alternatives 2 and 3 would ensure that LUCs remained protective by preventing residential exposure to remaining contaminants throughout the Area A Wetland.

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:36:10 PM
LUCs will prevent residential exposure to site contaminants.

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, egineering, and

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controls

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:48:53 PM
The establishment of LUCs for Alternative 3 and 4 would be easily implementable as long as the Navy owns the property. If the property were ever transferred from Navy control, implementation of the LUCs would need to be in the form of deed restrictions that would require additional measures to meet State property law requirements.

Author: kkeckler Subject: Cross-Out Date: 6/16/2010 3:25:55 PM

requires transportation of clean fill to the site for cover construction. As a result Alternative 3 with an estimated number of truck trips equal to 406 would use more fuel energy than Alternative 2, which requires an estimated 363 truck trips. Minimal energy usage would also be required under Alternatives 2 and 3 to perform periodic monitoring and maintenance activities. Not including Alternative 1, for the life of the remedies it is estimated that Alternative 3 has a smaller remedial carbon foot-print than Alternative 2.

***Cost.*** The estimated present-worth cost is greatest for Alternative 2 at $2,103,580, and lowest for Alternative 1 at $97,700. Alternative 3 has an estimated present-worth cost of $1,900,180.

### Modifying Criteria

***State Acceptance.*** State involvement has been solicited throughout the CERCLA process. CTDEP, as the designated support agency in Connecticut, concurs with the Selected Remedy.

***Community Acceptance.***

**[ADDITIONAL INFORMATION WILL BE ADDED TO THIS SECTION AS APPROPRIATE.]**

## 2.11 PRINCIPAL THREAT WASTE

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure. The NCP at 40 CFR 300.430(a)(1)(iii)(A) establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. At Site 2B, the contaminant concentrations are not highly toxic or highly mobile; therefore, principal threat wastes are not present at the site.

## 2.12 SELECTED REMEDY

### 2.12.1 Rationale for Selected Remedy

The Selected Remedy for Site 2B is Alternative 3, excavation, off-site disposal, and site restoration, which was selected because it provides the best balance of tradeoffs with respect to the nine evaluation criteria and will allow for unrestricted use of the property. The remedy will meet the RAOs by excavating contaminated sediment causing unacceptable ecological risk within the limits of the Area A Wetland.

The principal factors in the selection of this remedy included the following:

- Implementation will reduce current potential unacceptable risk to ecological receptors in a relatively short time frame (estimated construction period of 3 months) with minimal disturbance of existing habitat.
- Excavation and off-site disposal of contaminated sediment will eliminate future exposures and be protective of the environment by removing the possibility of contaminated sediment eroding to downgradient locations.
- The remedy is consistent with the reasonably anticipated future non-residential use of the site.
- The remedy achieves greater protection than covering at a lower cost ($1,900,180 compared to $2,103,580).
- The remedy achieves a level of protection similar to the soil cover alternative but allows for continued use of the property as a wetland without the need for long-term soil cover inspections and maintenance.



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Author: kkeckler Subject: Cross-Out Date: 6/16/2010 3:26:17 PM

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, and LUCs,

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to

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:49:44 PM
successfully create replacement wetland and carry out

### 2.12.2 Description of Selected Remedy

The Selected Remedy includes five major components: (1) excavation of sediment causing unacceptable ecological risk, (2) dewatering of excavated sediment (addition of drying agent as appropriate), (3) off-site disposal of sediment, (4) site restoration and monitoring, (5) and LUCs.

Excavation will consist of removal of an estimated 3,240 cy of sediment within five areas from 0 to 2 feet bgs, as shown on Figure 2-4. The estimated volume of sediment to be removed is based on data from previous investigations; the final limits of excavation will be determined based on the results of a PDI conducted during the remedial design phase. The purpose of the PDI is to further define the lateral extent of contamination where data gaps currently exist. Due to the density of the sampling to be conducted as part of the PDI and the visual evidence associated with exposing the dredged material, it is assumed that post-removal verification samples would not be required to determine the removal of contaminated sediment. The Team has agreed that excavation will be conducted laterally to pre-determined sample locations, and vertically to the dredge material underlying these wetland sediments. During excavation, it is assumed that three existing dredge material wells in the Area A Wetland will require abandonment. The project team agreed that these wells are no longer needed for long term monitoring at Area A Landfill, and, therefore these wells will not be replaced.

Excavated sediment will be transported to a dewatering pad constructed on the adjacent Area A Landfill cap where it will be mixed with a drying agent to absorb excess moisture to facilitate transportation. It is assumed this process will add an additional 5 percent to the excavated volume; therefore, the disposal volume is estimated to be 3,280 cy. Toxicity Characteristic Leaching Procedure testing will be conducted to verify disposal requirements. Based on existing data, it is assumed that all of excavated sediment will be transported to an off-site Resource Conservation and Recovery Act Subtitle D non-hazardous waste disposal facility. The excavated areas will be backfilled with clean organic soil to pre-excavation elevations, and seeded with native wetland vegetation. Monitoring would be conducted annually to ensure that the wetland vegetation has been established and that *Phragmites* is being controlled within the restored area. LUCs would be implemented to prevent the potential future residential use of the Area A Wetland.



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d

Author: kkeckler Subject: Replacement Text Date: 6/28/2010 4:52:30 PM
It has been determined

Author: kkeckler Subject: Cross-Out Date: 6/16/2010 3:27:31 PM

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:55:06 PM
(Please describe how the LUCs will be established in greater detail. Include the Navy process of establishing and enforcing restrictions while the Navy owns the property and the process for establishing deed restrictions meeting State property law requirements if the property were ever transferred.)

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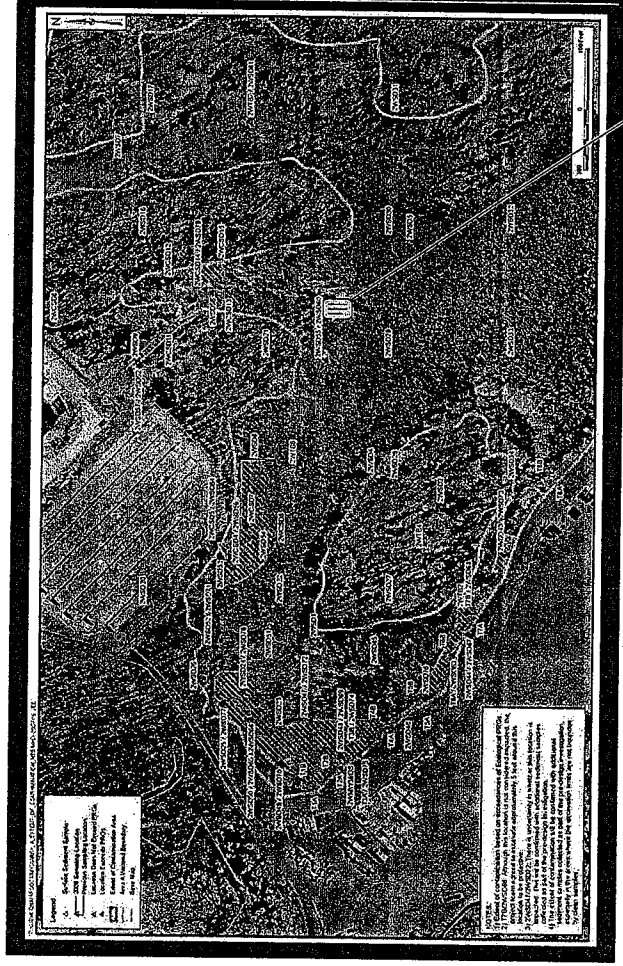
Author: kkeckler Subject: Sticky Note Date: 6/28/2010 4:56:03 PM
Please indicate where the entire boundary of the LUC residential use restriction will be.

**FIGURE 2-4. IMPACTED AREA CONSIDERED IN THE FS**



### 2.12.3 Expected Outcomes of Selected Remedy

The current use of the site as a wetland, which will be supported by the Selected Remedy, is expected to continue at Site 2B, and there are no other planned land uses in the foreseeable future. Groundwater at the site is not used and is not expected to be used in the future, and the Selected Remedy will have no impact on current or future groundwater uses available at the site. There are no socio-economic, community revitalization, or economic impacts or benefits associated with implementation of the Selected Remedy. It is estimated that the RAOs for Site 2B will be achieved within a construction period of approximately 3 months. Table 2-7 describes how the Selected Remedy mitigates risk and achieves RAOs for Site 2B.

**TABLE 2-7. HOW SELECTED REMEDY MITIGATES RISK AND ACHIEVES RAOS**

| RISK | RAO | COMMENTS |
|---|---|---|
| Unacceptable ecological risks to sediment from direct exposure to and ingestion of contaminated sediment. | Reduce risks to sediment invertebrates from exposure to COCs in the Area A Wetland to acceptable levels. | Excavation of contaminated sediment to meet the established PRGs will eliminate the risk to sediment invertebrates. |
| | Mitigate the potential for COCs in Area A Wetland sediment to migrate to less impacted areas of the Area A Downstream Watercourses (specifically Site 3, which was previously remediated) and cause adverse effects to receptors in these areas. | Excavation of contaminated sediment to achieve PRGs will remove contaminated sediment from the site that would otherwise be available to migrate via erosion. |

However, if proposed land use changes in the future and uses other than as a wetland are expected, additional excavation or other remedial approaches may be required.

## 2.13 STATUTORY DETERMINATIONS

In accordance with the NCP, the Selected Remedy meets the following statutory determinations:

- **Protection of Human Health and the Environment** – Excavation of sediment to achieve PRGs will be conducted, and the site will be restored to create an improved wetland habitat. The Selected Remedy will prevent current and future ecological risks to sediment invertebrates from exposure to contaminated sediment, and protect the environment by removing the possibility of contaminated sediment eroding to downgradient locations.
- **Compliance with ARARs** – The Selected Remedy will attain all identified federal and state ARARs, as presented in Appendix E.
- **Cost-Effectiveness** – The Selected Remedy represents the most reasonable value for the money by providing the greatest degree of protection at the lowest cost. Detailed costs for the Selected Remedy are presented in Appendix F.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable** – The Selected Remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practical manner at Site 2B. Based on the type of contamination at the Area A Wetland, the silt and fines content of the sediment, and the large volume of contaminated sediment, in-situ treatment alternatives were screened out during the technology screening phase of the FS.



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Author: kkeckler Subject: Sticky Note Date: 6/28/2010 4:57:07 PM
See previous comment that added a new RAO for the residential exposure and insert here.

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 4:59:42 PM
As part of this decision document the Navy finds under the Section 404 of the federal Clean Water Act that the remedy called for in this ROD is the least environmentally damaging practicable alternative to protect wetland resources because CERCLA-related contamination detected at concentrations exceeding RGs will be removed from the site, wetlands will be restored in place, invasive species will be controlled, and LUCs will be established to prevent residential development within the wetland area.

EPA finds under the Toxic Substances Control Act that the Navy's proposed risk-based cleanup level of 532 ppb for total PCBs used for the remedy will not pose an unreasonable risk of injury to health or the environment.

Excavation and off-site disposal provides the best balance of tradeoffs for long-term effectiveness and permanence with ease of implementation for reasonable cost.

- **Preference for Treatment as a Principal Element** – Treatment is not a principal element of the Selected Remedy for sediment at Site 2B because there are no principal threat wastes at the site, and excavation and off-site disposal provides the best balance of tradeoffs with respect to long-term effectiveness and permanence at a reasonable cost.

- **Five-Year Review Requirement** – Five-year reviews would be conducted because contamination would remain in excess of levels that allow for unrestricted use and unlimited exposure.

### 2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

~~CERCLA Section 117(b) requires an explanation of significant changes from the selected remedy presented in the Proposed Remedial Action Plan that was published for public comment.~~

~~[ADDITIONAL INFORMATION WILL BE ADDED TO THIS SECTION AS APPROPRIATE.]~~

# 3.0 RESPONSIVENESS SUMMARY

### 3.1 STAKEHOLDER COMMENTS AND LEAD AGENCY RESPONSES

Participants in the public meeting held June 17, 2010, included members of the public (e.g., RAB members) and representatives of the Navy, EPA, and CTDEP. Questions and concerns raised at the meeting were addressed at the meeting, as summarized in Table 3-1.

**TABLE 3-1. SUMMARY OF QUESTIONS FROM PUBLIC INFORMATION SESSION**

| QUESTION | RESPONSE |
|---|---|
| | |
| | |
| | |

### 3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues associated with the Site 2B ROD were identified.



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The Proposed Plan for the Area A Wetland was released on June 9, 2010. The Proposed Plan identified excavation,off-site disposal, site restoration, and LUCs as teh proposed remedy for Site 2B, Operable Unit 12.

The Navy and EPA reviewed all written and verbal comments submitted during the public comment period and determined that no significant changes to this decision, as originally identified in the Proposed Plan, were necessary or appropriate.

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# Appendix E
# ARARs

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Author: kkeckler Subject: Cross-Out Date: 6/28/2010 5:07:53 PM

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 5:08:28 PM
Excavation, off-site disposal, and LUCs will address risks identified using these standards.

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Author: kkeckler Subject: Inserted Text Date: 6/28/2010 5:08:42 PM
Excavation, off-site disposal, and LUCs will address risks identified using these standards.

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Author: kkeckler Subject: Inserted Text Date: 6/28/2010 5:08:51 PM
Excavation, off-site disposal, and LUCs will address risks identified using these standards.

Author: kkeckler Subject: Cross-Out Date: 6/28/2010 5:08:56 PM

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Excavation, off-site disposal, and LUCs will address risks identified using these standards.

Author: kkeckler Subject: Cross-Out Date: 6/28/2010 5:09:31 PM

Author: kkeckler Subject: Inserted Text Date: 6/28/2010 5:09:41 PM
Excavation, off-site disposal, and LUCs will address risks identified using these standards.

TABLE E.1

ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL AND SITE RESTORATION
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs AND TBCs
AREA A WETLAND
NSB-NLON, GROTON, CONNECTICUT
PAGE 1 OF 7

| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| **FEDERAL CHEMICAL-SPECIFIC ARARs and TBCs[1]** | | | | |
| Cancer Slope Factors (CSFs) | None | To be considered (TBC) | These are guidance values used in Human Health Risk Assessment (HHRA) to evaluate the potential carcinogenic hazard caused by exposure to contaminants. | Primary basis for evaluating carcinogenic human health risks at these sites from contaminated sediment and groundwater. ~~Risk calculations can be used to establish Preliminary Remediation Goals (PRGs).~~ |
| Reference Doses (RfDs) | None | TBC | These are guidance values used in HHRA to evaluate the potential non-carcinogenic hazard caused by exposure to contaminants. | Primary basis for evaluating noncarcinogenic human health risks at these sites to contaminated sediment and groundwater. ~~Risk calculations can be used to establish PRGs.~~ |
| Guidelines for Carcinogen Risk Assessment | EPA/630/P-03/001F (March 2005) | TBC | These guidelines are used to perform HHRA. They provide a framework for assessing possible cancer risks from exposures to pollutants or other agents in the environment. | Primary basis for evaluating carcinogenic human health risks at these sites from contaminated sediment and groundwater. ~~Risk calculations can be used to establish PRGs.~~ |
| Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens | EPA/630/R-03/003F (March 2005) | TBC | These guidelines are used to perform HHRA and address a number of issues pertaining to cancer risks associated with early-life exposures in general and provide specific guidance on potency adjustment for carcinogens acting through a mutagenic mode of action. | Primary basis for evaluating carcinogenic human health risks at these sites from contaminated sediment and groundwater. ~~Risk calculations can be used to establish PRGs.~~ |
| Threshold Effects Concentration (TEC) and Probable Effects Concentration Quotients (PEC-Qs) | MacDonald, et al., 2000 and Ingersoll et al., 2000. | TBC | Provide guidance values for identifying potential risk to ecological receptors exposed to contaminated sediments. | Primary basis for evaluating risk to aquatic ecological receptors. ~~Guidance can be used to establish PRGs.~~ |

This page contains no comments

TABLE E.1

ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL AND SITE RESTORATION
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs AND TBCs
AREA A WETLAND
NSB-NLON, GROTON, CONNECTICUT
PAGE 2 OF 7

| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| **STATE CHEMICAL-SPECIFIC ARARS AND TBCs** | | | | |
| Connecticut Remediation Standard Regulations | Connecticut General Statutes (CGS) 22a-133k; Regulations of Connecticut State Agencies (RCSA) 22a-133k-1 through 3 (Appendices A & B) | Relevant and Appropriate for sediment standards; Applicable for groundwater standards. | These regulations establish Direct Exposure Criteria (DECs) and Pollutant Mobility Criteria (PMCs) for contaminated soil based on either industrial or residential use of the site. The regulations also establish remediation standards for groundwater. Requirements are based on groundwater in the area being classified by the state as GB. | The sediment excavation remedy and LUCs would address any contaminant risks posed at the Site. |
| **FEDERAL LOCATION-SPECIFIC ARARs and TBCs** | | | | |
| Fish and Wildlife Coordination Act | 16 United States Code (USC) Part 661 et seq.; 40 Code of Federal Regulations (CFR) 122.49 | Applicable | Requires coordination with federal state fish and wildlife resource agencies to protect fish and wildlife from projects affecting streams or rivers. | The United States Fish and Wildlife Service (FWS) and appropriate Connecticut departments would be consulted on how to minimize impacts from the excavation alternative on any fish and wildlife resources that may be dependent on Area A Wetland. |
| Clean Water Act (CWA), Section 404, Guidelines for Specification of Disposal Sites for Dredged or Fill Material | 33 USC 1344; Section 404(b)(1); 40 CFR Part 230, 231 and 33 CFR Parts 320-323 and 332 | Applicable | These regulations outline the requirements for the discharge of dredged or fill materials into surface waters including Federal jurisdictional wetlands. No activity that impacts waters of the United States shall be permitted if a practicable alternative that has less adverse impact exists. If there is no other practicable alternative, the impacts must be mitigated. | The excavation and off-site disposal of contaminated sediments will meet the requirements of these standards. The Navy has determine that this alternative is the least damaging practicable alternative to protect wetland resources from Site contamination |

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TABLE E.1

ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL AND SITE RESTORATION
CHEMICAL, LOCATION AND ACTION-SPECIFIC ARARs AND TBCs
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| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| **STATE LOCATION-SPECIFIC ARARs and TBCs** | | | | |
| Inland Wetlands and Watercourses Act and Regulations | CGS 22a-37 through 45 RCSA 22a-39-1 through 15 | Applicable | These rules regulate activities in State jurisdictional wetlands and watercourses. | Remedial alternatives considered for Area A Wetland sediment would include removal activities. The substantive requirements of the standards would be met if any alterations were made to the wetland. |
| **FEDERAL ACTION-SPECIFIC ARARs and TBCs** | | | | |
| Clean Water Act (CWA), Section 402, National Pollution Discharge Elimination System (NPDES) | 33 USC 1342; 40 CFR Parts 122 through 125, 131 | Applicable | NPDES permits are required for any discharges to navigable waters. If remedial activities include such a discharge, the NPDES standards would be ARARs. Standards would be enforced through the State Program. | If water management is required during sediment excavation and the water is to be discharged directly to a surface water body, then treatment in accordance with these regulations will likely be required. |
| CWA Pretreatment Regulations | 40 CFR Part 403 | Applicable | General pretreatment requirements for discharge to publicly-owned treatment works. If remedial activities include such a discharge to the local sanitary sewer, pretreatment standards would be ARARs. Standards would be enforced through the State program. | If water management is required during sediment excavation and the water is to be discharged to a sanitary sewer system, then treatment in accordance with these regulations may be required. |
| CWA National Recommended Water Quality Criteria (NRWQC) | 33 USC 1251 *et seq.*; 40 CFR § 122.44 | Relevant and Appropriate | Used to establish water quality standards for the protection of aquatic life. | Water quality monitoring would be conducted to ensure that these criteria are not exceeded during excavation activities |

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| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| Toxic Substances Control Act (TSCA); PCB Remediation Waste | 15 USC 2601 *et seq.*; 40 CFR 761.61(c) | Applicable | This section of the TSCA regulations provides risk-based cleanup and disposal options for PCB remediation waste based on the ecological risks posed by the concentrations at which the PCBs are found. Written approval for the proposed risk-based cleanup must be obtained from the Director, Office of Site Remediation and Restoration, United States Environmental Protection Agency (USEPA) Region 1. | The proposed remedy would include a finding that the excavation remedy's PCB cleanup level of 532 µg/kg under TSCA risk-based standards would not pose an unreasonable risk of injury to health or the environment. |
| Management of Undesirable Plants on Federal Lands | 7 USC 2814 | Relevant and Appropriate | Requires federal agencies to establish integrated management systems to control or contain undesirable plant species on federal lands under the agency's jurisdiction. | Measures will be taken to control the reestablishment of *Phragmites* within the remediated area of wetland. Such measures may include seeding the excavated area with wetland vegetation and controlling *Phragmites* in that area. This will be helped by controlling *Phragmites* in the entire wetland as part of the natural resources program. An invasive species control plan will be developed as part of the long-term O&M for this site. |

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| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| STATE ACTION-SPECIFIC ARARs and TBCs | | | | |
| Hazardous Waste Management: Generator Standards | RCSA 22a-449(c) 100 through 102 | Applicable | Connecticut is delegated to administer the Federal Resource Conservation and Recovery Act (RCRA) statute through its state regulations. These sections establish standards for listing and identification of hazardous waste. The standards of 40 CFR 260-262 are incorporated by reference | Excavated sediments would be tested for hazardous waste characteristics (i.e. TCLP criteria). If sediments were determined to be a hazardous waste, then they would be excavated, stored, transported, and disposed off site in accordance with hazardous waste regulations. |
| Solid Waste Management Regulations | RCSA 22A-209-1 through 15 | Relevant and Appropriate | These sections establish standards for management of non-hazardous waste. | Alternative 3 will meet these standards as long as sediment determined to be non-hazardous is managed and disposed off-site in accordance with these standards. |
| Water Pollution Control | RCSA 22a-430-1 through 8 and 416 through 599 | Applicable | The regulations govern the treatment and discharge of water into surface water bodies in the state. | If water management is required during sediment excavation and is to be discharged to a POTW, then the applicable pre-treatment sections of the POTW permit would apply. |
| Water Quality Standards | Connecticut General Statutes (CGS) 22a-426 | Applicable | Connecticut's Water Quality Standards establish specific numeric criteria, designated uses, and anti-degradation policies for surface water. | Discharges of treated water to a surface water body may occur for alternatives that would require water management during sediment excavation. The substantive requirements would be met if any discharges of treated water to surface water bodies are required. |

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**TABLE E.1**

**ALTERNATIVE 3: EXCAVATION, OFF-SITE DISPOSAL AND SITE RESTORATION**
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| Requirement | Citation | Status | Synopsis of Requirement | Evaluation/Action to Be Taken |
|---|---|---|---|---|
| Connecticut Invasive Plant Act, Prohibited Actions Concerning Certain Invasive Plants | CGS 22a-381d | Applicable | Prohibited actions concerning certain invasive plants. No person shall import, move, sell, purchase, transplant, cultivate or distribute any of the following invasive plants:...(29) common reed (*Phragmites australis*).... | Measures will be taken to control the re-establishment of *Phragmites* within the remediated area of wetland. Such measures may include seeding the excavated area with wetland vegetation and controlling *Phragmites* in that area. This will be helped by controlling *Phragmites* in the entire wetland as part of the natural resources program. |
| Connecticut Non-Native Plant Species Policy | None | TBC | This policy provides guidance for any activities that could introduce or cause the spread of invasive species in the State. Department activities involving soil or vegetation disturbances shall consider and, to the extent practical, minimize the spread of non-native invasive populations either within or adjacent to an area to be modified. | Measures will be taken to control the re-establishment of *Phragmites* within the remediated area of wetland. Such measures may include seeding the excavated area with wetland vegetation and controlling *Phragmites* in that area. This will be helped by controlling *Phragmites* in the entire wetland as part of the natural resources program. |
| Control of Airborne Particulate Matter and Fugitive Particulate Matter | RCSA 22a-174-18c | Applicable | This regulation requires that reasonable precautions be implemented to prevent particulate matter from becoming airborne. | These guidelines would be incorporated into any remedial design for the Area A Wetland that would involve excavation activities. An appropriate ~~erosion and sedimentation~~ control program would be developed and would comply with this guidance. |
| Connecticut Guidelines for Sediment Erosion and Sediment Control | Connecticut Council on Soil and Water Conservation | TBC | Technical and administrative guidance for development, adoption and implementation of erosion and sediment control program. | The excavation activities associated with Alternative 3 would include an appropriate erosion and sedimentation control program that would comply with this guidance. |

~~1 Alternative 3 meets all chemical specific standards.~~

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| ARAR | Applicable or Relevant and Appropriate Requirement | CGS | Connecticut General Statutes |
| CFR | Code of Federal Regulations | CSF | Cancer Slope Facto |
| CWA | Clean Water Act | DEC | Direct Exposure Criteria |
| EPA | Environmental Protection Agency | HHRA | Human Health Risk Assessment |
| NPDES | National Pollution Discharge Elimination System | NRWQC | National Recommended Water Quality Criteria |
| PEC-Q | Probable Effects Concentration Quotients | PMC | Pollutant Mobility Criteria |
| POTW | Publicly-owned Treatment Works | RCRA | Resource Conservation and Recovery Act |
| RCSA | Regulations of Connecticut State Agencies | TBC | To be considered |
| TEC | Threshold Effects Concentration | TSCA | Toxic Substances Control Act |
| USEPA | United States Environmental Protection Agency | FWS | Fish and Wildlife Service |
| USC | United States Code | | |