FINAL Meeting Summary
[as revised on July 5, 2006]
CENTREDALE DIALOG Meeting #2
7 June 2006
RI DEM - Providence, RI

[prepared by Marion Cox, facilitator 6/15/06; reviewed by EPA case team 6/20/06; comments received from participants through 7/5/06.]

WELCOME AND INTRODUCTORY REMARKS

The meeting began shortly after 10:00 am at Rhode Island DEMs offices in Providence. The facilitator welcomed all participants, and thanked everyone for their patience in waiting for the meeting to begin - some participants were late due to rainy weather.

The facilitator reviewed the agenda, EPAs goals for the second dialog meeting and offered participants a last chance to make any comments or suggested changes to the meeting summary for the first Dialog meeting. Participants offered one additional comment on the meeting summary and the facilitator noted the comment would be incorporated into the final meeting summary document.

Next the facilitator restated the primary focus or purpose for this second meeting: EPAs presentation and participant discussion of the remedial alternatives currently under consideration by the Agency. Participants were offered a chance to suggest changes to the agenda - no comments were received.

EPA OVERVIEW OF ALTERNATIVES UNDER CONSIDERATION

The facilitator introduced Anna Krasko, EPA Project Manager for the Centredale site.

Anna began her remarks by telling participants how EPA has already begun using some of the comments and questions received during the first Dialog meeting. She focused her remarks on how EPA has been addressing the several comments made by participants regarding the October 2005 flood event. For example, EPA and its contractor team went back to the US Geological Survey web site to confirm the most current and verified data on that flood event. EPAs contractors were able to confirm that the computer models being used to evaluate the effectiveness of various alternatives under consideration do, in fact, take into account a flood event as bad, or worse, than the flood event of October 2005. EPA emphasized that these types of comments, by participants, are proving helpful to the Agency as work continues to narrow the range of alternatives for more detailed analysis.

After EPAs remarks, one participant noted that the storm drains were also affected by the October 2005 floods. The Town of N. Providence responded that the State and the Town have consulted each other over responsibility for maintaining the storm drains and that in future the State of Rhode Island will assume full responsibility for maintenance. [The State of Rhode Island Site Project Manager was not present at the June 7, 2006 meeting, and upon review of this draft

meeting summary requested that this statement be attributed only to the Town of N. Providence. The State would like more information as to the specific State staff person who accepted this responsibility on behalf of the State, and any additional information that the Town of N. Providence can provide.]

Next, Anna provided a brief overview of the process and actions EPA has taken leading up to an identification of the remedies currently under consideration by the Agency. She briefly reviewed the Agencys key findings from the site investigation including the Agencys key areas of concern regarding contamination and the RAOs.

Several questions were raised about whether or not EPA had taken real measurements on contamination in fish [e.g., at Allendale, Lyman Mill and Greystone] or had the Agency simply relied upon the calculated or modeled amount of contamination that should be found in fish. EPA noted that real measurements had been taken. Several participants noted they raise these questions because they believe that some residents still eat fish from the river.

Next, Anna briefly reviewed the NCP evaluation criteria - the factors that EPA must use as the basis for identifying options for remediation at this site. Following a few questions from participants on the availability of documents related to the site investigation, EPA agreed to make a list of site documents available to all participants.

Overview presentation of remedial alternatives under consideration

Anna introduced EPAs contractor, Deirdre Dahlen of Battelle, who presented the range of alternatives under consideration by EPA at this site. [Please refer to the presentation slides for a detailed outline of the presentation.]

At the beginning of the presentation, Deirdre emphasized a couple of points that apply to all alternatives under consideration:

- EPA considers the whole pond as the footprint that requires remediation. In other words, all alternatives under consideration by EPA include remediating the entire pond - not just some portions of the pond.
- Roughly 110,000 cubic yards of material need to be disposed of from the 2 ponds.
- EPA needs to find an area big enough to handle this volume of material.

Examples of questions raised during the discussion of alternatives:

- DId EPA consider sharing a space where other contaminated sediment is also being stored/placed [e.g., from other Superfund sites in the region]?
- Did EPA examine other dioxin incineration sites?
- What is the difference between dredging and excavation in these alternatives?
- Why is dredging no longer being considered as an option?
- Why did EPA rule out the 6-inch layer cap?
- How many years does long-term monitoring continue and what types of institutional controls are effective for 30 + years?

- How does EPA ensure that soft sediments dont travel or migrate further downstream during the period of remedial construction? [i.e., while the excavation and de-watering parts of construction are occurring].
- Why did EPA rule out monitored natural recovery or enhanced recovery?
- How did EPA consider the environmental impacts from moving and depositing contaminated soil sediments to a new location?
- What is more disruptive - moving contaminated soils somewhere new or simply capping contaminated soils in place?
- Is EPA applying flood storage recovery capacity equally among all alternatives?
- Are some alternatives too costly and too much effort for the result they will provide?

DISCUSSION FOLLOWING EPA PRESENTATION OF ALTERNATIVES

Next, the facilitator asked all participants to offer any comments, further questions, or even new ideas about alternatives - that were not presented as part of EPAs overview of alternatives under consideration.

Representatives of one of the PRPs offered the broad outline of an alternative that would eliminate the existing dams; cap some of the contamination in place; and create a new channel for the river. Several other participants offered comments, questions, and their perspectives on this type of an alternative. A robust discussion of this idea and related questions continued for about 45 minutes.

As the meeting drew to an end, the facilitator thanked all participants for their active participation in the discussion of alternatives.

The facilitator turned the meeting back to Anna Krasko of EPA. Anna emphasized that EPA is expecting participants to come to the next meeting prepared to:

- Ask more detailed questions, if necessary, about EPAs proposed alternatives
- Present their own ideas of different alternatives [similar to the discussion that began at the end of this meeting with the outline of a new alternative by one of the PRP representatives].
- Present the key elements or considerations that they [or the constituents they represent] need or want to see in any remedy that is ultimately selected by EPA for this site.
- Present any related ideas and considerations.

Anna also reminded participants that the purpose of this dialog is, in part, to seek discussion on and the perspective(s) of the participating parties on how EPA should be narrowing the range of alternatives the Agency will carry forward for a more detailed analysis in the Feasibility Study.

The facilitator reminded participants that she is available to assist any party who might want time on the agenda for the July dialog meeting, or to provide any related process assistance the parties might need in order to fully and meaningfully participate in the next meeting.

Participants were reminded that the next meeting is on July 12, 2006 again in Providence at the RI DEM Offices.

The meeting adjourned at approximately 3:50 pm.

ACTION ITEMS

Several action items were identified during the course of the meeting:

- EPA agreed to make an index of released site documents and recent reports available to all participants by email [Angela B. by 6/15/06]

- EPA will answer the question raised [by Eugenia Marks] about the Biowall alternative and the related questions about the contaminants of concern by media. [Angela B. by 6/15/06]
- EPA will send out an email containing the links to websites which Norm Richards of Battelle suggested participants might want to view for information on "dam removal." [Angela B. by 6/20/06]
- Before the July 12th meeting, EPA will forward websites or related information referenced by Ken Munney of the US FWS regarding additional information on dam removals at other projects. [Angela B, prior to 12 July 2006]

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FINAL Agenda
[as of 31 May 2006]
Centredale Dialog Meeting #2
7 June 2006
Providence, RI

Goal for meeting #2: The primary goal is to present and discuss all the remedial alternatives currently under consideration by the EPA Project Team.

10:00 am **Introductory Remarks**

- Review of agenda
- Review of action items
- Adoption of meeting summary from Meeting #1

10:10 am **EPA follow-up on first meeting**

Recap by EPA of how the questions, input, and comments from participants are important in helping EPA focus on a preferred alternative for this site, and how some of the specific questions and comments are being used.

10:15 am **EPA Overview**

- EPA overview of key "conclusions" from the site investigation
- EPA overview of Remedial Action Objectives
- EPA overview of Preliminary Remediation Goals
- EPA presentation of its timeline for finalizing the Feasibility Study
- Questions and discussion

10:45 am **Presentation of the Sediment Alternatives**

- Presentation by EPA contractor team
- Questions and discussion

12:30 pm LUNCH

1:15 pm **Presentation of the Floodplain and Oxbow Area Alternatives**

- Presentation by EPA contractor team
- Questions and discussion

2:45 pm BREAK

3:00 pm **Presentation of the Source Area Alternatives**

- Presentation by EPA contractor team
- Questions and discussion
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3:45 pm† **Review ideas for a next meeting**
4:00 pm† ADJOURN

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Table 5-1. Qualitative Screening of Preliminary Remedial Alternatives for Pond Sediments

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(1) No Further Action	**Not effective**	**Routine**	**Low**	**YES**	Required by NCP
(2) Limited Further Action	Low	Routine	Low	NO	Likely low effectiveness
(3a) Monitored Natural Recovery (MNR)	Low	Routine	Low	NO	Likely low effectiveness. Further, site conditions not conducive to MNR as follows: • Risks not likely to be reduced within acceptable time frame (relatively low sedimentation rates) • Human exposure risk is high • Elevated and widespread concentrations of COCs • COCs prone to bioaccumulation
(3b) Enhanced Natural Recovery (thin-layer capping)	Low	Routine	Moderate	NO	Same as Alternative 3(a). In addition, integrity of thin layer cap may be at risk for erosion during flooding.
(4) Isolation Capping	**High**	**Moderate to Routine**	**Moderate**	**YES**	Likely high effectiveness and implementability. Site conditions are generally conducive to sub-aqueous capping. Thicker cap likely more resistant to erosion.

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Table 5-1. Qualitative Screening of Preliminary Remedial Alternatives for Pond Sediments (cont)

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(5) Dredging and On-site Confinement	Moderate	Moderate	High	NO	Water quality impacts and residual risk concerns. May be difficult to achieve cleanup goals without additional dredging. The water level can be temporarily lowered in both ponds, so excavation is practical and would result in less suspended sediment in the water column, less post-removal residual contamination and lower costs. Therefore, dredging is eliminated and excavation retained.
(6) Dredging and On-site Thermal Treatment	Moderate to High	Moderate to Routine	Very High	NO	Same as 5. In addition, on-site treatment costs are substantially higher than on-site containment.
(7) Dredging and Off-site Disposal/Treatment	Moderate to High	Moderate to Routine	Very High	NO	Same as Alternative 5. Removal of contamination from site improves effectiveness and is more implementable compared to on-site containment. Costs are significantly higher for off-site disposal than for on-site confinement.
(8a) Excavation and Upland CDF	**High**	**Routine**	**High**	**YES**	Highly effective and implementable, with lower costs compared to dredging alternatives. Effective risk reduction by isolating contaminants from the environment.
(8b) Excavation and Nearshore CDF	**Moderate**	**Routine**	**N/A (c)**	**YES**	Same as 8a, although there is insufficient capacity for all the excavated sediment.

Table 5-1. Qualitative Screening of Preliminary Remedial Alternatives for Pond Sediments (cont)

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(8c) Excavation and Island CDF	Moderate	Moderate	N/A (c)	NO	Insufficient storage capacity for island CDF in pond areas.
(9) **Excavation and On-site Thermal Treatment**	**High**	**Moderate to Routine**	**Very High**	**YES**	Same as Alternative 8a, although disposal costs are significantly higher compared to on-site confinement. In addition, contaminated sediment removed from site and no future restrictions of site use.
(10) **Excavation and Off-site Disposal/Treatment**	**High**	**Moderate to Routine**	**Very High**	**YES**	Same as Alternative 9
(11) Partial Dredging, Isolation Capping and On-site Confinement	Moderate	Moderate	High	NO	Same as Alternative 5
(12) Partial Dredging, Isolation Capping and On-site Thermal Treatment	Moderate to High	Moderate	High	NO	Same as Alternative 6
(13) Partial Dredging, Isolation Capping and Off-site Disposal/Treatment	Moderate to High	Moderate	High	NO	Same as Alternative 7

Table 5-1. Qualitative Screening of Preliminary Remedial Alternatives for Pond Sediments (cont)

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(14a) **Partial Excavation, Isolation Capping and Upland CDF**	**High**	**Routine**	**High**	**YES**	Highly effective and implementable, with lower costs and short-term impacts compared to Excavation. In addition, targeted excavation will maintain flood flow capacity, flood storage and improve reliability of cap.
(14b) Partial Excavation, Isolation Capping and Nearshore CDF	**Moderate**	**Routine**	**High**	**YES**	Same as Alternative 8b, except that there is sufficient storage capacity under the partial excavation alternative.
(14c) Partial Excavation, Isolation Capping and Island CDF	Moderate	Moderate	N/A (c)	NO	Same as Alternative 8c.
(15) Partial Excavation, Isolation Capping and On-site Thermal Treatment	**High**	**Moderate**	**High**	**YES**	Same as Alternative 14a, although disposal costs are significantly higher costs compared to on-site confinement.
(16) Partial Excavation, Isolation Capping and Off-site Disposal/Treatment	**High**	**Moderate**	**High**	**YES**	Same as Alternative 14a, although disposal costs are significantly higher costs compared to on-site confinement.

(a) Alternatives are described in detail in Section 5.0. Short- and long-term monitoring and institutional controls are common elements to all of the potential alternatives, and are detailed by alternative in Section 5.0.
(b) Low Cost, <$10M; Moderate Cost, $10M to $25M; High Cost, $25M to $75M; and Very High Cost, >$75M.
(c) Costs not determined because on-site containment using a nearshore or Island CDF does not provide sufficient storage capacity for all excavated sediment.

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Table 5-2a. Qualitative Screening of Preliminary Remedial Alternatives for Allendale Floodplain Soils

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(1) No Further Action	**Not effective**	**Routine**	**Low**	**YES**	Required by NCP
(2a) Monitored Natural Recovery (MNR)	Low	Routine	Low	NO	Likely low effectiveness. Further, site conditions not conducive to MNR as follows: • Risks not likely to be reduced within acceptable time frame • COCs prone to bioaccumulation
(2b) Enhanced Natural Recovery (thin-layer capping)	Low	Routine	Moderate	NO	Will destroy existing floodplain habitat and reduce flood storage capacity.
(3) Isolation Capping	High	Moderate to Routine	Moderate	NO	Same as Alternative 2b.
(4a) Excavation and Upland CDF	**High**	**Routine**	**Moderate**	**YES**	Highly effective and implementable, with relatively low costs. Effective risk reduction by isolating contaminants from the environment. *Assumes floodplain habitat will be restored.*
(4b) Excavation and Nearshore CDF	Moderate	Routine	N/A (c)	NO	Building a CDF for only floodplain soils would not be practical and there is insufficient capacity for all excavated material (pond sediments and floodplain soils).
(4c) Excavation and Island CDF	Moderate	Moderate	N/A (c)	NO	Insufficient storage capacity for all excavated material.
(5) Excavation and On-site Thermal Treatment	**High**	**Moderate to Routine**	**Very High**	**YES**	Same as Alternative 4a, although disposal costs are significantly higher compared to on-site confinement.
(6) Excavation and Off-site Disposal/Treatment	**High**	**Moderate to Routine**	**High to Very High**	**YES**	Same as Alternative 5

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Table 5-2a. Qualitative Screening of Preliminary Remedial Alternatives for Allendale Floodplain Soils (cont)

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(7a) Partial Excavation, Isolation Capping and Upland CDF	High	Routine	N/A (d)	NO	Rationale to only excavate selected areas within the floodplain footprint is not evident, as with pond sediments where shallow areas and areas of higher erosion potential were used to delineate the partial excavation footprint. Further, insufficient chemical data to identify areas with relatively higher contaminant concentrations across the entire floodplain footprint.
(7b) Partial Excavation, Isolation Capping and Nearshore CDF	Moderate	Routine	N/A (d)	NO	Same as Alternatives 7a and 4b
(7c) Partial Excavation, Isolation Capping and Island CDF	Low	Moderate	N/A (d)	NO	Same as Alternatives 7a and 4c
(8) Partial Excavation, Isolation Capping and On-site Thermal Treatment	High	Moderate	N/A (d)	NO	Same as Alternative 7a
(9) Partial Excavation, Isolation Capping and Off-site Disposal/Treatment	High	Moderate	N/A (d)	NO	Same as Alternative 7a

(a) Alternatives are described in detail in Section 5.0. Short- and long-term monitoring and institutional controls are common elements to all of the potential alternatives, and are detailed by alternative in Section 5.0.
(b) Restoration costs associated with hand planting native species not included in costs evaluations at this phase of the analysis.
Costs are by acre. Low Cost, <$500,000; Moderate Cost, $500,000 to $2M; and High Cost, $2M to $5M and Very High >$5M.
(c) Costs not determined because on-site containment using a nearshore or Island CDF does not provide sufficient storage capacity for all excavated sediment.
(d) Costs not determined because there is not basis for selecting a partial dredge or excavation volume.

Table 5-2b. Qualitative Screening of Preliminary Remedial Alternatives for Oxbow Floodplain Soils

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Relative Cost (b)		
(1) No Further Action	**Not effective**	**Routine**	**Relatively Low**	**YES**	Required by NCP
(2a) Monitored Natural Recovery (MNR)	**Low to Moderate**	**Routine**	**Relatively Low**	**YES**	Site conditions may be conducive to monitored natural recovery (likely area of natural deposition and low erosion), especially with institutional controls (e.g., boardwalk) to restrict access and reduce human exposure. Consider erosion protection along river banks.
(2b) Enhanced Natural Recovery (targeted thin-layer capping)	**Low to Moderate**	**Routine**	**Relatively Moderate**	**YES**	Same as Alternative 2a. Target areas of elevated COC concentrations (e.g., depositional areas) for thin layer capping to reduce average exposure levels.
(3) Excavation and Upland CDF	High	Routine	Relatively Moderate	NO	Short-term destruction of habitat; less conceivable to restore floodplain habitat for Oxbow compared Allendale floodplain. Insufficient storage capacity.
(4) Excavation and On-site Thermal Treatment	High	Moderate to Routine	Relatively Very High	NO	Same as Alternative 3. Costs may be higher compared to on-site containment.
(5) Excavation and Off-site Disposal/Treatment	High	Moderate to Routine	Relatively Very High	NO	Same as Alternative 4

Table 5-2b. Qualitative Screening of Preliminary Remedial Alternatives for Oxbow Floodplain Soils (cont)

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Relative Cost (b)		
(6) Partial Excavation, Targeted Capping, and Upland CDF	**Moderate to High**	**Routine**	**Relatively Moderate**	**YES**	Target areas of elevated COC concentrations (e.g., depositional areas) to reduce average exposure levels. Moderate to high effectiveness and routine implementability.
(7) Partial Excavation, Targeted Capping, and On-site Thermal Treatment	**Moderate to High**	**Moderate**	**Relatively High**	**YES**	Same as Alternative 6, although costs expected to be higher compared to on-site containment.
(8) Partial Excavation, Targeted Capping, and Off-site Disposal/Treatment	**Moderate to High**	**Moderate**	**Relatively High**	**YES**	Same as Alternative 7

(a) Alternatives are described in detail in Section 5.0. Short- and long-term monitoring and institutional controls are common elements to all of the potential alternatives, and are detailed by alternative in Section 5.0.
(b) Costs for potential alternatives are presented on a *relative* basis, as the evaluation of the Oxbow area is ongoing and the actual remedial footprint is not determined as yet. Further, costs for restoration activities such as hand planting native species are not included in the costs evaluations at this phase of the analysis.

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Table 5-3. Qualitative Screening of Preliminary Remedial Alternatives for Source Area Soils

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/ Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(1) No Further Action	**Low**	**Routine**	**Low**	**YES**	Required by NCP
(2) Upgrade and Maintain Existing Caps and Parking Lots	**Moderate**	**Routine**	**Low**	**YES**	Effective in preventing direct contact and groundwater is protected with current caps. Interim caps are not equivalent to RCRA caps
(3) Convert to RCRA Caps and Maintain	**High**	**Routine**	**Moderate**	**YES**	Likely highly effective and implementable, upgrade caps to RCRA caps to provide protection needed.
(4) Excavate and On-site Thermal Treatment	Moderate	Improbable to Complex/Difficult	Very High	NO	Potential risks to residents and the community during construction. Significant logistical issues, including potential need to re-locate residents and utilities during construction.
(5) Excavate and Off-site Disposal/Treatment	Moderate	Improbable to Complex/Difficult	Very High	NO	Same as Alternative 4.

(a) Alternatives are described in detail in Section 5.0. Short- and long-term monitoring and institutional controls are common elements to all of the potential alternatives, and are detailed by alternative in Section 5.0.
(b) Low Cost, <$5M; Moderate Cost, $5M to $10M; and High Cost, $10M to $50M and Very High >$50M

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Table 5-4. Qualitative Screening of Preliminary Remedial Alternatives for Source Area Groundwater

Preliminary Alternative (a)	Qualitative Ranking			Carried Through to Detailed Analysis?	Rationale for Carrying/Not Carrying to Detailed Analysis
	Effectiveness	Implementability	Cost (b)		
(1) No Further Action	**Not effective**	**Routine**	**Low**	**YES**	Required by NCP
(2) Excavate/Dewater *(excavate soil for groundwater protection)*	**Moderate to High**	**Moderate**	**Moderate**	**YES**	Effective and would remove potential ongoing source of contamination in near-surface soils. Would need to mitigate potential risk to residents and community during construction. Additional data collection required to confirm excavation depth; costs assume average excavation depth of 4 ft.
(3a) Hydraulic Containment Barrier	**Moderate**	**Moderate**	**Moderate**	**YES**	Likely effective, implementable, and moderate cost. Barrier would need to surround source and area inside would be capped to prevent groundwater from leaching contaminants to the River.
(3b) Hydraulic Control	High	Moderate	High	NO	Relatively high costs associated with long-term ongoing operation.
(3c) Combined Hydraulic Barrier/ Hydraulic Control	High	Moderate	High	NO	Relatively high costs associated with long-term ongoing operation.
(4) Passive Reactive Barrier (Biowall)	**Moderate**	**Moderate**	**Low to Moderate**	**YES**	Likely effective, implementable, and low to moderate cost. Innovative and proven technology for VOCs; should also be effective for dioxin, although bench-scale testing would be required to demonstrate effectiveness of biowall for dioxin treatment. Long term monitoring would be required to evaluate the effectiveness of the biowall for dioxin removal.
(5) In-situ Chemical Oxidation	**Moderate**	**Moderate**	**Low to Moderate**	**YES**	Likely effective, although may require multiple injections. Routine implementability and low to moderate cost.

(a) Alternatives are described in detail in Section 5.0. Short- and long-term monitoring and institutional controls are common elements to all of the potential alternatives, and are detailed by alternative in Section 5.0.
(b) Low Cost, <$1.5M; Moderate Cost, $1.5M to $3M; and High Cost, >$3M.

Feasibility Study Presentation
Centredale Manor Restoration Project
North Providence, RI
June 7, 2006

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Agenda

- **Welcome & Introductions**
- **EPA Follow Up from First Meeting**
- **EPA Overview**
  - Remedial Action Objectives
  - Preliminary Remediation Goals
  - NCP evaluation criteria
  - Schedule for finalizing the Feasibility Study
- **Feasibility Study Presentation & Discussion**
  - Sediment alternatives
  - Floodplain and Oxbow area soil alternatives
  - Source Area alternatives
- **Review Ideas for a Next Meeting**

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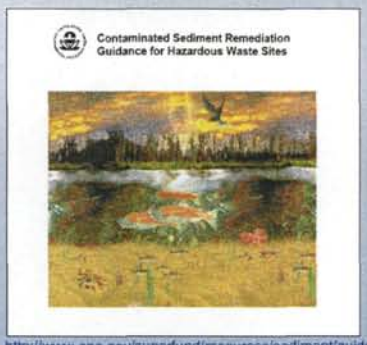
Introduction

- **Remedial Investigation Conclusions**
  - Human health risks
  - Ecological risks
- **Feasibility Study Process**



http://www.epa.gov/superfund/resources/sediment/guidance.htm

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Remedial Action Objectives

- **RAOs Describe What the Remedy is Expected to Accomplish**
- **Protective of Human Health and Environment**
- **RAOs Derived from CSM and Address Significant Exposure Pathways**
  - Prevent exposure to contaminated media
  - Prevent migration of Chemicals of Concern (COCs)

"Prevent exposure to residents living along the river and visiting recreational anglers to sediments, either by ingestion or dermal contact, that contain COCs at concentrations that would result in an unacceptable cancer and/or non-cancer risk".

"Reduce to acceptable levels the risks to animals living along the river that are exposed, either through contact, ingestion or uptake, to contaminated sediments at the site".

"By 2015, make the Woonasquatucket River fishable and swimmable". Governor's Narragansett Bay and Watershed Planning Commission.

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Preliminary Remediation Goals

- **RIDEM Regulatory Criteria**
  - Residential direct exposure criteria
  - GB leachability criteria
  - GB groundwater objectives
- **Risk-based, Contaminant-specific Remediation Goals**
  - Developed for range of risk values
  - Human health – sediments
  - Ecological – sediments and floodplain soils
- **Risk-based Preliminary Remediation Goals (PRGs) Frequently Below Background Concentrations**
- **EPA's Cleanup Goals are Based on Background for most Chemicals of Concern (COCs)**

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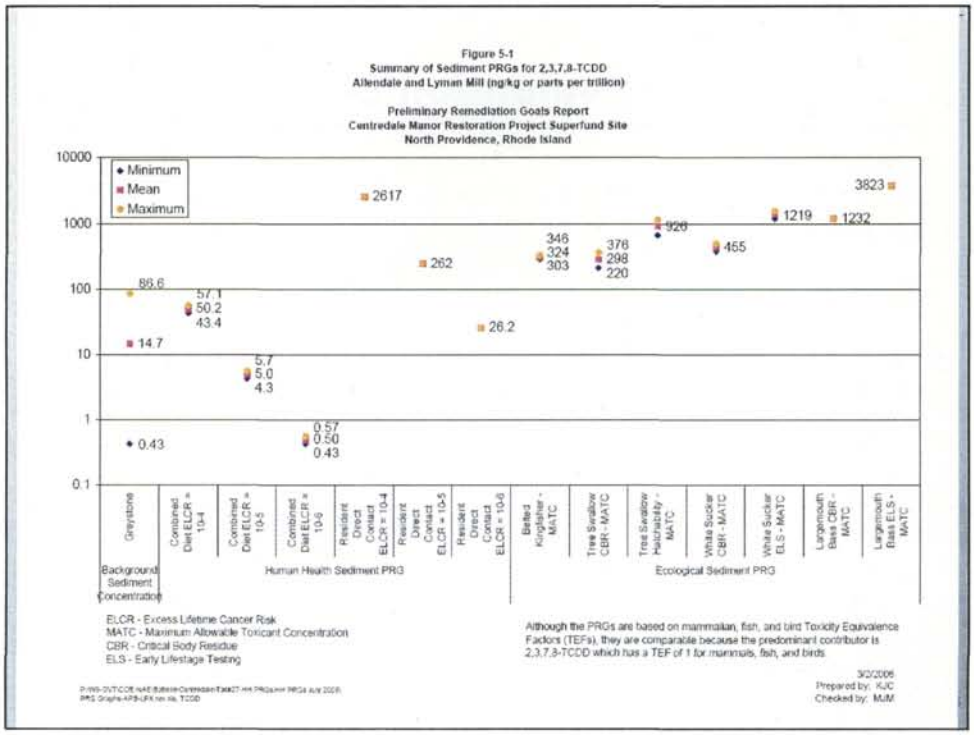
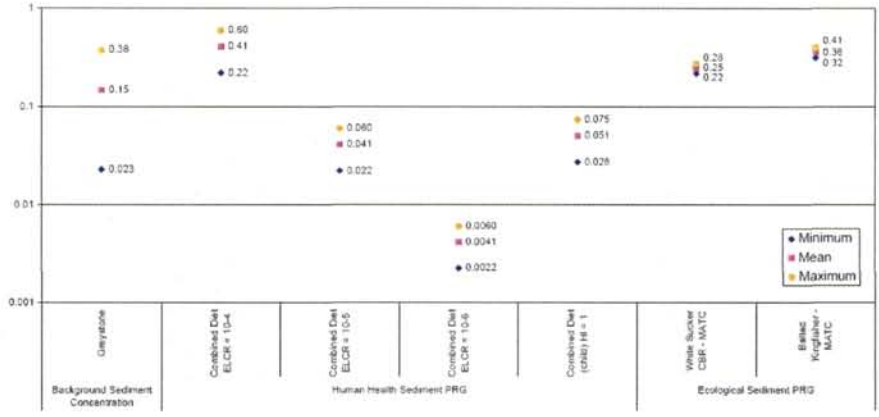


Figure 5-2
Summary of Sediment PRGs for Aroclor 1254
Allendale and Lyman Mill (mg/kg or parts per million)

Preliminary Remediation Goals Report
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island



ELCR - Excess Lifetime Cancer Risk
HI - Hazard Index
MATC - Maximum Allowable Toxicant Concentration
CBR - Critical Body Residue

3/2/2006
Prepared by: KJC
Checked by: MJM

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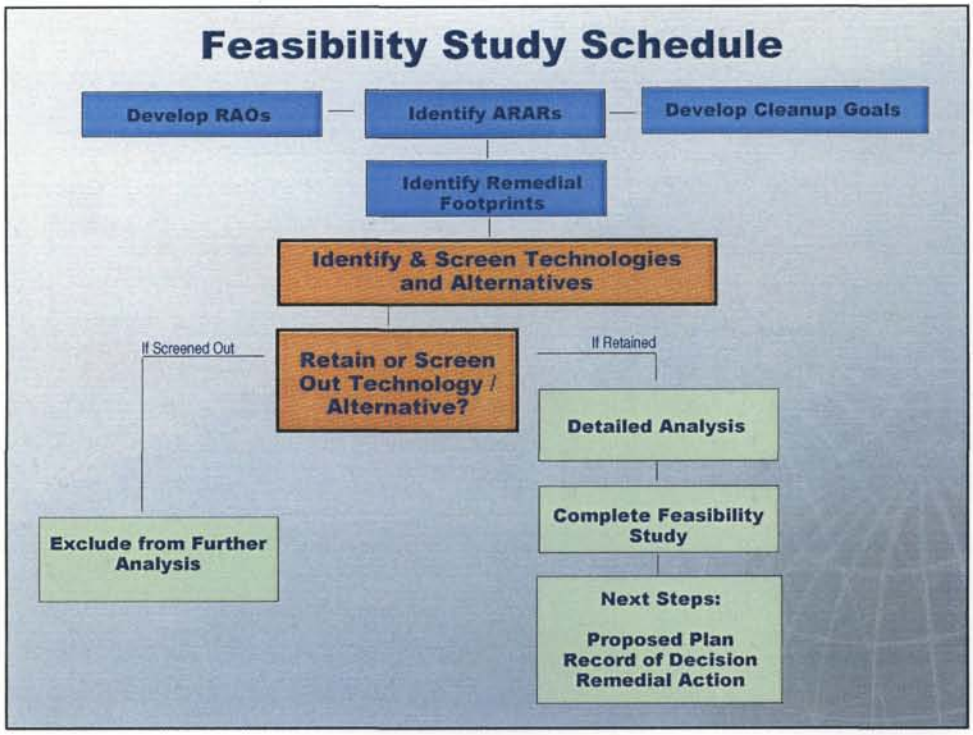
NCP Evaluation Criteria

- **Overall Protectiveness**
  - Elimination, reduction, and/or control of site risks
- **Compliance with ARARs**
  - Ability to meet Federal, State, and/or Local ARARs
- **Long-term Effectiveness and Permanence**
  - Residual risk after completion of remedy
- **Reduction of Toxicity, Mobility and Volume Through Treatment**
- **Short-term Effectiveness**
  - Effects to community, site workers, and/or environment during construction/implementation
- **Implementability**
  - Technical and administrative feasibility including potential technical difficulties, reliability, and availability of necessary goods and services
- **Cost**
- **Community Acceptance**
  - Public issues and concerns to be addressed in the Record of Decision (ROD)
- **State Acceptance**
  - Issues and concerns of the regulatory agencies to be addressed in the ROD

Feasibility Study Schedule



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General Categories of Remedial Approaches

- **No Further Action**
  - Required by NCP
  - No treatment, engineering controls or institutional controls
- **Removal Actions**
  - Dredging
  - Excavation
- **Non-removal Actions**
  - Capping
  - Monitored Natural Recovery
  - Institutional controls
- **Treatment**
  - Incineration
  - Biological treatment

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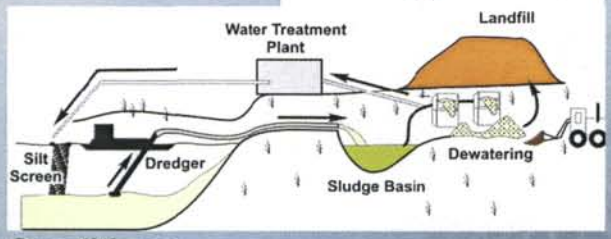
Removal Actions

- **Dredging or Excavation**
  - Removal and transport to shore
  - Dewatering
  - Treatment
  - Disposal
  - Backfill



- **Conducive Site Conditions**
  - Staging areas and disposal sites are available
  - Expected human exposure is substantial and/or not well controlled
  - Long-term risk reduction outweighs habitat disruption
  - Water diversion is practical

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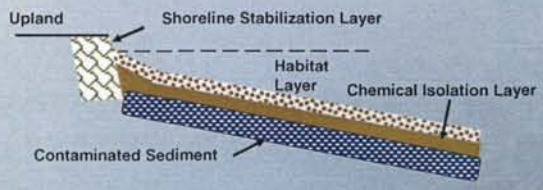
Non-removal Actions – Capping

- **Placement of Clean Material Over Contaminated Material**
- **Caps Reduce Risk by Physical Isolation, Stabilization, or Chemical Isolation**



- **Conducive Site Conditions**
  - Suitable cap materials are available
  - Long-term risk reduction outweighs habitat disruption
  - Cap design can accommodate hydrodynamic conditions
  - Contamination covers contiguous areas

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Non-removal Actions – Monitored Natural Recovery

- **Relies on Natural Processes to Reduce Risk**
  - Physical mechanisms
  - Biological mechanisms
  - Chemical mechanisms
- **Conducive Site Conditions**
  - Rate of natural recovery processes
  - Expected human exposure low and/or well controlled by institutional controls
  - Impact of hydrodynamic conditions to natural recovery
  - Concentrations of the COCs (e.g., dioxin, PCBs)
  - COCs ability to bioaccumulate

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Non-removal Actions – Institutional Controls

- **Government Controls**
  - Fish consumption advisories
  - Fishing bans
- **Proprietary Controls**
  - Use restrictions
  - Physical barriers
- **Enforcement and Permit Tools**
  - Dam maintenance
- **Information Devices**
  - Fact sheets
  - Public meetings

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Preliminary Evaluation and Screening

- **Identify Remedial Footprints**
- **Identify Potential Remedial Alternatives**
  - Pond sediments
  - Floodplain soils
  - Oxbow area soils
  - Source area soils
  - Source area groundwater
- **Preliminary Evaluation Against Threshold Criteria**
  - Effectiveness
  - Implementability
  - Cost

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Remedial Footprints

- **Compare Site Data to the Cleanup Goals**
- **Identify Areas and Volumes of Material That Need to be Addressed to Meet Cleanup Goals**
  - Sediments
    - entirety of both ponds are above background
  - Floodplain and Oxbow Area Soils
    - soil footprint is delineated by areas of ecological habitat
  - Source Area Soils
    - all capped areas and parking lots
  - Source Area Groundwater
    - area near well MW-05S

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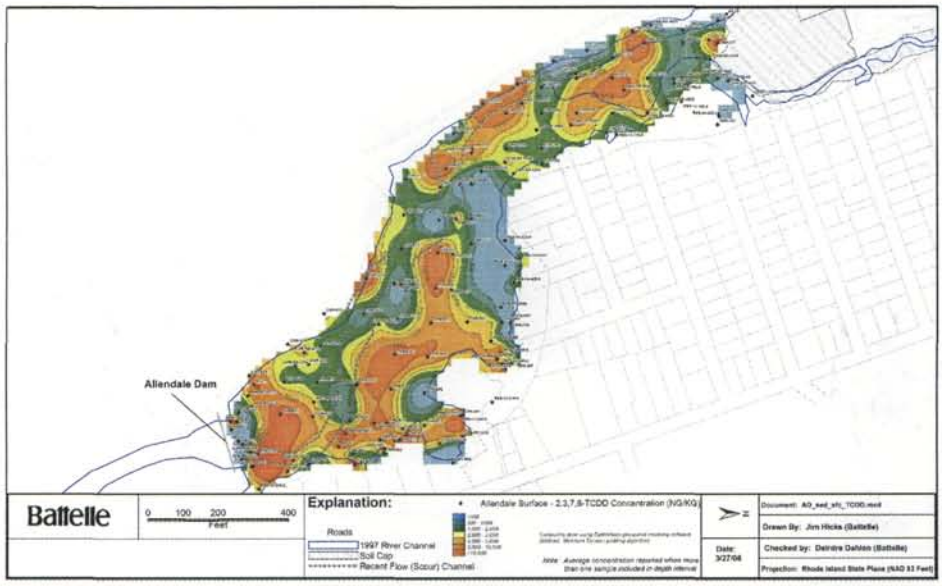
Remedial Footprint – Allendale Pond Sediments



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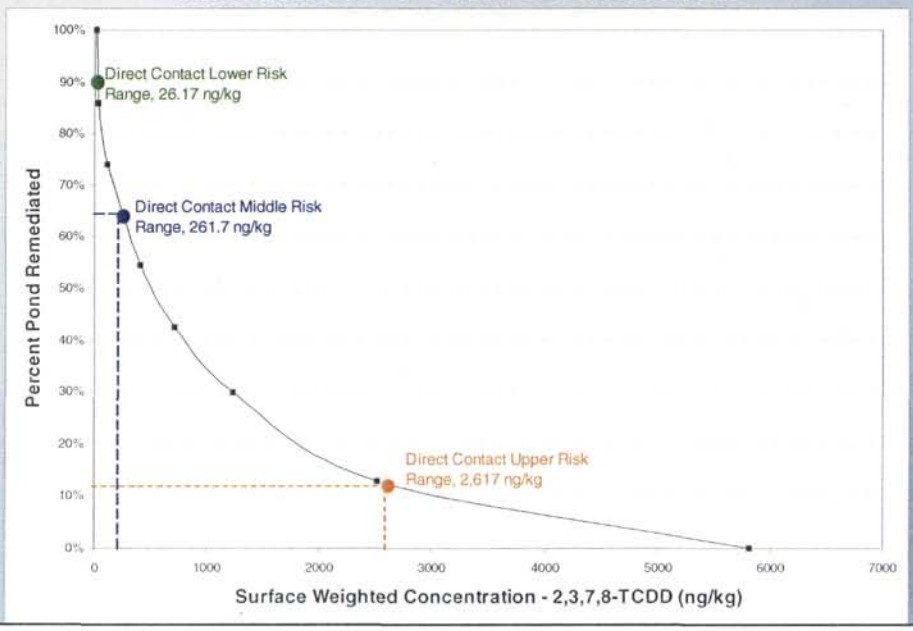
Remedial Footprint – Allendale Pond Sediments



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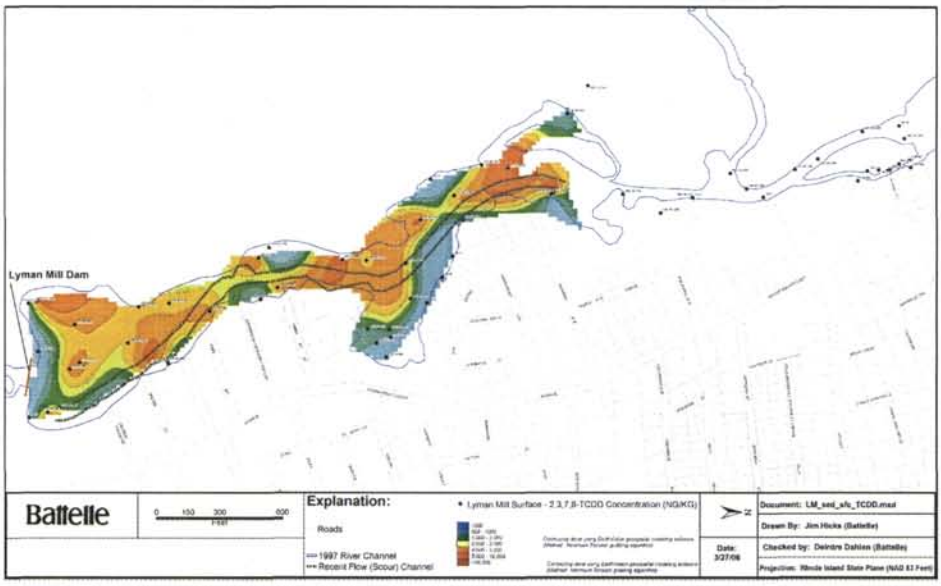
Remedial Footprint – Lyman Mill Pond Sediments



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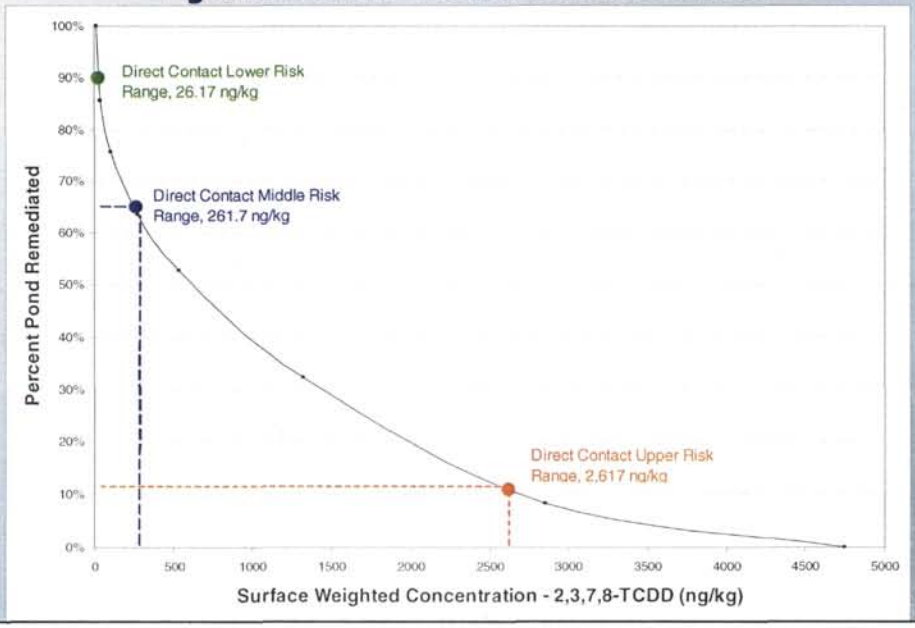
Remedial Footprint – Lyman Mill Pond Sediments



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Pond Sediment Alternatives

- **No Further Action (#1)**
  - No remediation, required by NCP
- **Dredging, Dewater and Disposal or Treatment**
  - Upland Confinement (#5)
  - On-site Thermal Treatment (#6)
  - Off-site Disposal/Treatment (#7)
- **Excavation, Dewater and Disposal or Treatment**
  - Upland CDF (#8a)
  - Nearshore CDF (#8b)
  - Island CDF (#8c)
  - On-site Thermal Treatment (#9)
  - Off-site Disposal/Treatment (#10)

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Pond Sediment Alternatives

- **Partial Dredging, Isolation Capping, Dewater, and Disposal or Treatment**
  - Upland Confinement (#11)
  - On-site Thermal Treatment (#12)
  - Off-site Disposal/Treatment (#13)
- **Partial Excavation, Isolation Capping, Dewater, and Disposal or Treatment**
  - Upland CDF (#14a)
  - Nearshore CDF (#14b)
  - Island CDF (#14c)
  - On-site Thermal Treatment (#15)
  - Off-site Disposal/Treatment (#16)
- **Isolation Capping (#4)**
- **Limited Further Action (#2)**
- **Monitored Natural Recovery (#3a)**
- **Enhanced Natural Recovery (#3b)**

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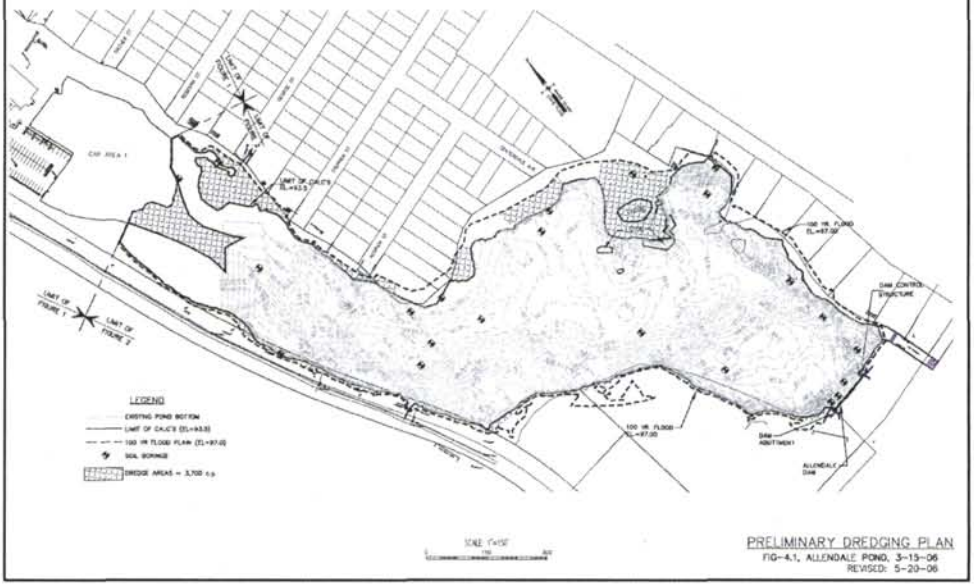
Remedial Footprint – Allendale Floodplain Soils



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Allendale Floodplain Soils Alternatives

- **No Further Action (#1)**
  - No remediation, required by NCP
- **Excavation, Dewater and Disposal or Treatment**
  - Upland CDF (#4a)
  - Nearshore CDF (#4b)
  - Island CDF (#4c)
  - On-site Thermal Treatment (#5)
  - Off-site Disposal/Treatment (#6)
- **Partial Excavation, Isolation Capping, Dewater, and Disposal or Treatment**
  - Upland CDF (#7a)
  - Nearshore CDF (#7b)
  - Island CDF (#7c)
  - On-site Thermal Treatment (#8)
  - Off-site Disposal/Treatment (#9)
- **Isolation Capping (#3)**
- **Monitored Natural Recovery (#2a)**
- **Enhanced Natural Recovery (#2b)**

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Remedial Footprint – Oxbow, *Not Determined Yet*

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Oxbow Floodplain Soils Alternatives

- **No Further Action (#1)**
  - No remediation, required by NCP
- **Excavation, Dewater and Disposal or Treatment**
  - Upland CDF (#3)
  - On-site Thermal Treatment (#4)
  - Off-site Disposal/Treatment (#5)
- **Partial Excavation, Targeted Capping, Dewater and Disposal or Treatment**
  - Upland CDF (#6)
  - On-site Thermal Treatment (#7)
  - Off-site Disposal/Treatment (#8)
- **Monitored Natural Recovery (#2a)**
- **Enhanced Natural Recovery (#2b)**

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Remedial Footprint – Source Area Soils

	AREA (s.f.)
CAP AREA 1	84,902 s.f.
CAP AREA 2	47,961 s.f.
CAP AREA 3	52,851 s.f.
Parking Lot/Paved Areas Southeast of Centredale Manor	33,417 s.f.
Parking Lot/Paved Areas North of Centredale Manor	28,413 s.f.
Parking Lot/Paved Areas South of Rhode Village	31,928 s.f.

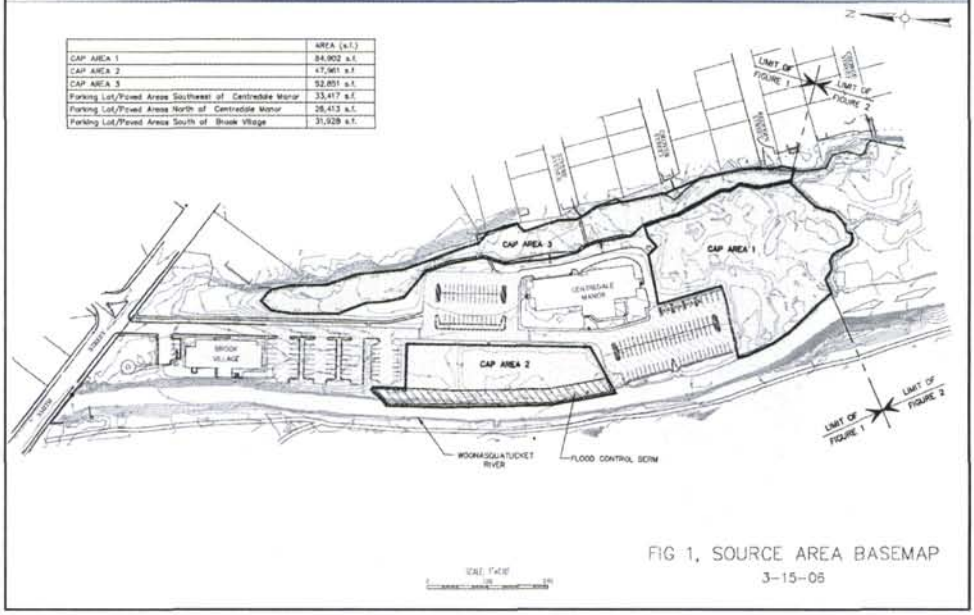

FIG 1, SOURCE AREA BASEMAP
3-15-06

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Source Area Soils Alternatives

- **No Further Action (#1)**
  - No remediation, required by NCP
- **Excavate and Disposal or Treatment**
  - On-site Thermal Treatment (#4)
  - Off-site Disposal/Treatment (#5)
- **Upgrade and Maintain Existing Caps and Parking Lots (#2)**
- **Convert to RCRA Caps and Maintain (#3)**

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Remedial Footprint – Source Area Groundwater

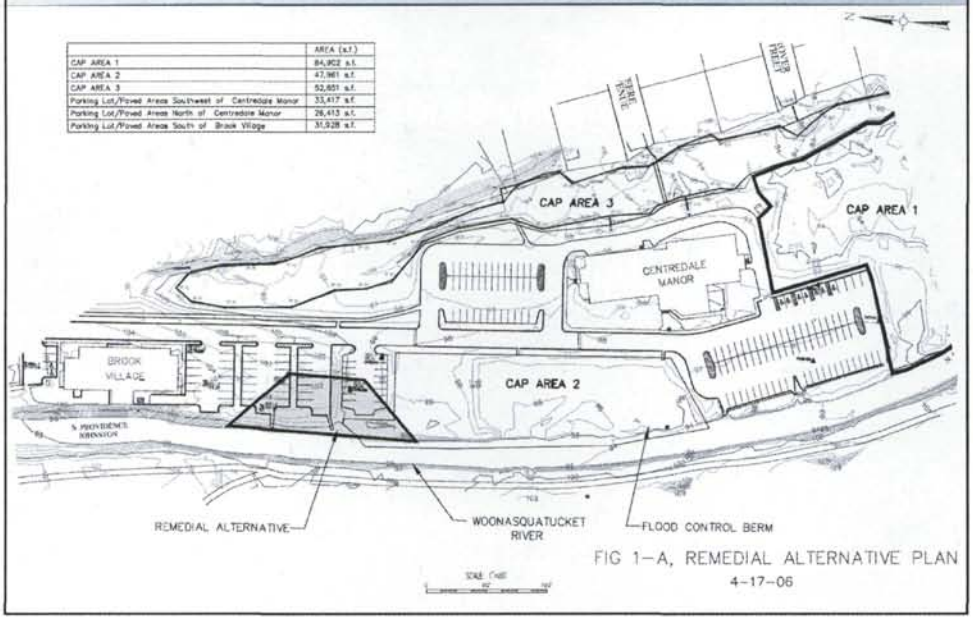

FIG 1–A, REMEDIAL ALTERNATIVE PLAN
4–17–06

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Source Area Groundwater Alternatives

- **No Further Action (#1)**
  - No remediation, required by NCP
- **Excavate, Dewater and Off-site Disposal/Treatment (#2)**
- **Hydraulic Containment Barrier (#3a)**
- **Hydraulic Control (#3b)**
- **Combined Hydraulic Barrier/Hydraulic Control (#3c)**
- **Passive Reactive Barrier (Biowall, #4)**
- **In-situ Chemical Oxidation (#5)**

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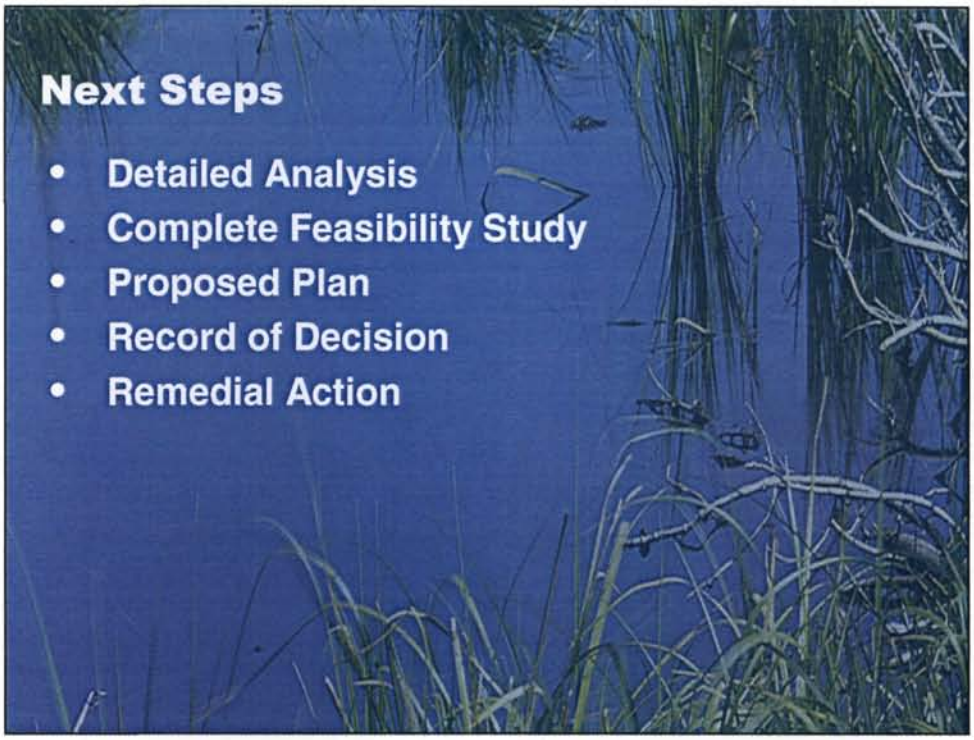
Next Steps
• Detailed Analysis
• Complete Feasibility Study
• Proposed Plan
• Record of Decision
• Remedial Action