

**TECHNICAL MEMORANDUM
JUNE 30, 2011**

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U.S. ARMY CORPS OF ENGINEERS – NEW ENGLAND DISTRICT**

**REVIEW AND EVALUATION OF CLEANUP ALTERNATIVES
FOR IMPACTS UPON HISTORIC PROPERTIES**

**CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE, NORTH
PROVIDENCE, RHODE ISLAND**

The U.S. Army Corps of Engineers (Corps), New England District, is assisting the Environmental Protection Agency (EPA), Region 1 for compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and the guidance included in EPA's CERCLA Compliance with Other Laws Manual: Part II (Clean Air Act and Other Environmental Statutes and State Requirements) (EPA-540-G-89-009, OSWER Directive 9234.1-02, August 1989), for remediation of the Centredale Manor Restoration Project Superfund Site in North Providence, Rhode Island (RI). Elevated levels of dioxin and other contaminants have been detected in soil, sediments, groundwater, and surface water sampled along sections of the Woonasquatucket River in North Providence and Johnston, Rhode Island. The Centredale Manor site was listed on EPA's National Priority List in 2000.

At the request of EPA, the Corps has prepared this Technical Memorandum for review and evaluation of the cleanup alternatives documented in the project Feasibility Study (FS) (Battelle 2010) regarding potential impacts to historic and/or archaeological sites or properties. In cases where appropriate, this memorandum also includes possible mitigation recommendations for consideration with stakeholders to avoid, minimize, and/or mitigate for adverse effects of site cleanup on significant historic properties as defined by Section 106 of the NHPA and implementing regulations 36 CFR 800.

The Corps has previously prepared a Stage IA Cultural Resources Survey of the study area (Paiva 2011) in consultation with the EPA, RI State Historic Preservation Officer (SHPO), and the Narragansett Indian Tribe. The purpose of the Stage IA survey was to conduct a literature and historical map review to identify known or potential archaeological and historical resources as well as a pedestrian reconnaissance of the study area to observe conditions and assess the potential for historic and archaeological resources to be present within the area of potential effect. This information was then utilized in evaluating the various cleanup alternatives.

Elevated levels of dioxin, furans, pesticides, PCBs, VOCs, polycyclic aromatic hydrocarbons (PAHs), and various metals produced from operations in the Source Area along the Woonasquatucket River have been detected in soil, sediments and water sampled along sections of the River in North Providence and Johnston. The study area for purposes of the evaluation in



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this memo includes two former milldams and the locations of three former woolen and textile mills: Lyman Mill, Centredale Worsted Mill, and Allendale Mill. A chemical company and drum reclamation plant occupied the site of the Centredale Worsted Mill after a fire claimed the mill. The investigation extends from the former site of the Centredale Worsted Mill in the north to the Lyman Mill Dam (also known as the Lymansville Dam) in the south.

The evaluated remediation measures (discussed below) of capping, excavation, dam removal, and other significant alterations of the mill ponds and riverbanks in the Allendale Historic District and the Lymansville Mill area have the potential to adversely impact significant historic features and archaeological deposits. Coordination with the RI SHPO has also indicated the potential for project impacts upon undisturbed historic and archaeological resources associated with pre-colonial, colonial, and industrial era occupations along the river. Recommendations for the avoidance, minimization of impact, and mitigation options for these National Register listed and eligible properties, as well as for the potentially undisturbed resources along the river, will be included in this evaluation.

The Centredale Manor Superfund Site Cleanup Areas

The Site is organized into five cleanup areas:

- 1. Source Area Soil**

The nearly 9-acre Source Area is the main part of the Site where the contamination originally occurred and now includes two apartment buildings, paved and landscaped surfaces, and three temporary capped areas. These three temporary soil covers were constructed from the 1990s through mid-2000s in the area not occupied by buildings, parking lots, or roadways; soil was also removed under one of the parking lots in the late 2000s as part of the groundwater short-term cleanup. Most of the Source Area is located within the floodplain, and also includes riverbank wetlands.

- 2. Groundwater**

Groundwater is the water that is found beneath the surface of the ground. The groundwater area contaminated in excess of cleanup levels is located underneath the 8-acre Source Area which is bound by the River and streams. The 2009 short-term cleanup action addressed about 0.13 acres on the west side of the Brook Village parking lot where contaminated groundwater was flowing into the River.

- 3. Allendale Pond and Lyman Mill Pond Sediment**

This area includes all contaminated sediment in Allendale Pond and Lyman Mill Pond.

- 4. Allendale Floodplain Soil**

A floodplain is the flat or nearly flat land next to the River that floods easily. This cleanup area includes riverbank and floodplain areas next to the Woonasquatucket River along the Source Area and Allendale Pond.

- 5. Lyman Mill Stream Sediment and Floodplain Soil (including the Oxbow Area)**

This cleanup area includes the stream channel and old mill raceway connecting Allendale Pond and Lyman Mill Pond, the Oxbow Area, and riverbank and floodplain areas along

Lyman Mill Pond. The Oxbow Area is a large forested wetland area below the Allendale Dam.

Cleanup Alternatives

Below is a listing of the multiple active cleanup alternatives considered for each of the Site's five cleanup areas listed above. More detailed information on each of the alternatives can be found in the project FS (Battelle 2010) and Addendum (2011). No Action alternative was also evaluated for each cleanup area as required by NCP.

(1) Source Area Soil Cleanup Area

-**Alternative 3E** – Targeted Excavation, Upgrade and Maintain Existing Surfaces, and Off-Site Disposal and/or Treatment

-**Alternative 4E** – Targeted Excavation, Convert to Caps Designed to Cover Hazardous Waste, and Off-Site Disposal and/or Treatment.

(2) Groundwater Cleanup Area

Although construction of the groundwater portion of the cleanup has been implemented (with the exception of additional groundwater monitoring wells), the long-term parts of Alternative 2E, including monitoring, Land Use Controls and Five-Year Reviews, have not been put into place.

(3) Allendale and Lyman Mill Sediment Cleanup Area

-**Alternative 7** – Excavation and Disposal and/or Treatment

-**Alternative 8** – Partial Excavation, Isolation Capping, and Disposal and/or Treatment

-**Alternative 10** – Dam Replacement, Excavation and Disposal and/or Treatment

-**Alternative 11** – Dam Replacement, Partial Excavation, Isolation Capping, and Disposal and/or Treatment

(4) Allendale Floodplain Soil Cleanup Area

-**Alternative 5** – Excavation and Disposal and/or Treatment

(5) Lyman Mill Stream Sediment and Floodplain Soil (including Oxbow) Cleanup Area

-**Alternative 3** – Targeted Excavation, Enhanced Natural Recovery, and Disposal and/or Treatment

-**Alternative 5** – Partial Excavation, Enhanced Natural Recovery, and Disposal and/or Treatment

Disposal Options for Excavated Materials

All of the cleanup alternatives for **Allendale Pond and Lyman Mill Pond Sediment (Area 3)**, **Allendale Floodplain Soil (Area 4)**, and **Lyman Mill Stream Sediment and Floodplain Soil (including the Oxbow Area) (Area 5)** include the following disposal options:

- **Option A**: on-site containment in an Upland Confined Disposal Facility (an area located on higher land designed to permanently and securely contain excavated contaminated sediment/soil);
- **Option B**: on-site containment in a Near Shore Confined Disposal Facility (an area located along the riverbank designed to permanently and securely contain excavated contaminated sediment/soil);
- **Option D**: on-site thermal treatment (incineration process that uses very high heat); and
- **Option E**: off-site disposal and/or treatment.

On-site containment in an Island Confined Disposal Facility (Option C) was eliminated from consideration because it did not provide enough disposal space.

Alternative 11 for Allendale and Lyman Mill Sediment Cleanup Area included an additional disposal option:

- **Option F**: on-site consolidation within the new floodplain areas and capped in place.

All of the cleanup alternatives for **Source Area Soil (Area 1)** and **Groundwater (Area 2)** evaluated only off-site disposal and/or treatment (**Option E**).

Evaluation of Alternatives for Potential Impacts to Historic Properties

For purposes of this evaluation, the alternatives at the five cleanup areas have been grouped by type of remediation:

1. No action soil and sediment alternatives

Regarding the no action alternative, no further evaluation will be conducted as historic properties would not be impacted.

2. Capping or Covers of soil and/or sediment and/or Near-Shore or Upland Confined Disposal Facility (CDF) disposal options or Dam Replacement

The placement of capping or covers has the potential to adversely impact archaeological resources since it would prevent further access to and/or future study of those areas. In areas

where caps or covers are proposed, compliance with the NHPA would entail a Stage IB cultural resources survey (archaeological survey testing and excavation) in any undisturbed areas and/or historic recordation and documentation of any historic structures or sites that may be impacted along with coordination of the proper stakeholders.

Additionally, adverse effects would include visual impacts to the character and setting of historic properties such as changing the configuration of existing ponds within the Allendale Historic District and at Lymansville Mill. The qualities of setting, feeling and association that contribute to the historic integrity and significance of a historic property could be adversely impacted by this change in physical context. Mitigation for these types of impacts could be accomplished through historic recordation and documentation and/or the preparation of interpretive materials.

The construction of near-shore and/or upland CDFs also has the potential to impact significant historic properties. Prior to the construction of these facilities in undisturbed areas, it is recommended that a Stage IB cultural resources survey be conducted and coordinated with the project stakeholders. Mitigation for any identified properties could entail additional testing, research and documentation, and data recovery archaeological investigations if impacts are unavoidable.

Dam replacement also has the potential to impact significant historic properties, particularly those associated with the Allendale Historic District and Lymansville Mill. If the dam(s) in question are determined to be historically significant, historic recordation and documentation would be required prior to removal and/or replacement.

3. Excavation of soil or sediment and/or Near-Shore of Upland CDF disposal options or Dam Replacement.

In cases where undisturbed soil and/or sediment must be excavated, a Stage IB cultural resources survey would be recommended to determine if significant historic properties are present in these areas. If significant properties are identified, then additional testing, documentation and/or data recovery investigations should be implemented as mitigation if these properties cannot be avoided. Excavation alternatives could result in a greater adverse impact to historic properties (site destruction) than capping alternatives, and therefore may entail more significant and costly mitigation measures if significant historic properties are encountered.

The recommendations for CDF disposal and dam replacement/removal options are the same as for the previous set of alternatives above (#2 Capping and Covers...).

National Register Properties within the Centredale Manor Superfund Site

In correspondence with the RI SHPO (August 4, 2010 letter to Anna Krasko, EPA), it was determined that the principle historic resources to be considered within the Centredale area of potential effect are the Allendale Historic District and the Lymansville Company Mill. Maps of these two locations are attached to this memorandum.

“The Allendale Historic District consists of the early 19th Century mill village that grew up around the Allendale Mill. In addition to the mill, the district contains a number of workers cottages, a store and a chapel. The mill pond is a contributing resource in the district both as an integral part of the mill’s historic water power system and as a prominent feature in the village landscape. The Allendale Mill has been individually listed on the National Register of Historic Places and the historic district is considered eligible for the National Register.”

“The Lymansville Company Mill is a late 19th Century factory that possesses significance in the state’s textile manufacturing history. It is considered potentially eligible for listing on the National Register of Historic Places and the mill owners are currently undertaking the preparation of a National Register nomination.”

As indicated in the RI SHPO correspondence, the proposed remediation measures including capping, excavation, dam removal and “other significant alterations of the mill ponds and riverbanks in the Allendale Historic District and the immediate environs of the Lymansville Mill have the potential to adversely affect significant historic features and potential archaeological resources.” For each of these proposed remediation measures, it is recommended that a Phase IB Cultural Resources Survey be conducted in any undisturbed areas in coordination with the project stakeholders. The results of this survey may require additional testing and/or historic recordation and documentation as mitigation measures if impacts are unavoidable.

In addition, visual impacts to the Allendale Historic District and Lymansville Mill historic setting and context should be evaluated to determine if the characteristics that contribute to the resource’s significance will be adversely affected by the alternatives. In this case, capping may be more intrusive visually to the historic landscape than selective excavation of sediment. However, large-scale excavation, dam removal and other significant alterations to the ponds and riverbanks could all result in potentially adverse impacts as well.

Lastly, currently submerged areas in the ponds have the potential to contain archaeological resources. Correspondence from the RI SHPO indicates that “this is an aspect of the project that is going to require careful consideration...” (Letter from RI SHPO to Anna Krasko EPA dated April 19, 2011). All of the alternatives associated with the Allendale and Lyman Mill Ponds will require an evaluation of possible submerged resources as part of the Stage IB Cultural Resources Survey conducted for Cleanup Areas 3, 4, and 5 above.

Historic and Archaeological Sensitivity

In addition to the listed and recorded historic properties discussed above, there is also the potential that the project “may contain undisturbed archaeological resources with pre-colonial, colonial and industrial era occupations along the riverside.” The Phase IA Cultural Resources Survey conducted for Centredale identified several Native American archaeological sites recorded in close proximity to the area of potential effect (Johnston and Providence), though none specifically within the project limits. The existence of these sites indicates that Native

American populations made use of the Woonasquatucket River environs and undisturbed areas may contain archaeological sites.

The closest Native American site to the Centredale study area is known as the ***Clemence Prehistoric Site*** and is located in Johnston on the western side of the Woonasquatucket River. During a Phase I archaeological survey of the area surrounding the Clemence-Irons House, a 17th Century homestead on George Waterman Road, PAL identified an Early Woodland Period (circa 2,700 years Before Present (BP)) campsite on Assapumset Brook. Incidentally, this site is located on land purchased from the local Narragansett sachem in 1645 by Thomas Clemence.

The ***Ochee Spring Quarry or Johnston Soapstone Quarry*** is listed on the National Register of Historic Places and is within the town of Johnston to the south and west of the study limits near Interstate 195. The site consists of an exposed steatite (soapstone) quarry ledge and is one of only two known steatite quarries in Rhode Island. Soapstone bowls made at the site have been dated to circa 3,000 years Before Present (roughly between the Archaic and Woodland Period and within the Susquehanna Tradition).

The former ***Centre Cotton Manufacturing Company (1812)***, around which the village of Centredale emerged, was destroyed in a fire at the site in the early 1970's. Currently the site is occupied by two apartment complexes, Brook Village completed in 1977 and Centredale Manor constructed in 1982. This is the **Source Area** portion of the Centredale site where the contamination originated. Although most of this area has been disturbed by construction of the apartment complexes and parking lots, historic properties may be present in previously undisturbed areas of the site. Alternatives 3E and 4E (Targeted Excavation with upgrading surfaces [3E] or converting to RCRA caps [4E]), if selected as part of the proposed remedy for the Source Area, should be preceded by a Stage IB Cultural Resources Survey of undisturbed areas to identify any historic properties that may be impacted by the remediation.

Lastly, the Oxbow area (Cleanup Area 5) which is located between the Allendale Dam and Lyman Mill Pond contains areas that appear to be relatively undisturbed and may be the location of the original river channel prior to industrialization. For any of the alternatives associated with Cleanup Area 5 (Alternatives 3 and 5 – Targeted and Partial Excavation), a Phase IB survey is recommended to identify any historic properties that may be present and to determine whether these properties are eligible for listing on the National Register.

Please refer to the attached table that lists the various cleanup area alternatives with potential impacts, archaeological sensitivity, recommendations, and estimated costs.

Estimated Costs for Survey and Mitigation Measures

Due to the similarity between the various alternatives, it is possible to develop generalized estimates for performing a Phase IB archaeological survey (excavation) for the clean-up areas. The cost of conducting these surveys is based upon the actual acreage that will be remediated, whether via excavation or other ground-disturbing activity including the construction of caps or covers. Generally, the larger the amount of undisturbed soil or sediment to be tested, the larger

the cost of the survey. If historic properties are identified as a result of this testing, coordination and additional evaluation may be required to determine if the property is eligible for listing on the National Register of Historic Places.

If a property is determined eligible and will be adversely impacted by the proposed remedy, then an MOA is required documenting the mitigation measures agreed upon by the stakeholders. In the case of archaeological sites, mitigation is typically done as a Phase III data recovery investigation that excavates the entire site prior to remediation. For historic structures, buildings and landscapes, mitigation normally consists of documentation and recordation. Other specific measures may be developed during the coordination process.

Estimated Phase IB survey costs have been developed for the various clean-up area alternatives discussed in the project Feasibility Report. Please note that the cost of this survey includes background research, site mobilization, testing, analysis, and preparation of a technical report. These costs can be better refined during the design and construction phases.

Phase IB Survey Estimated Cost:

I. Source Area Soil

Alternative 3A: \$30-35,000

Alternative 4E: \$30-35,000

II. Groundwater

As this effort was mostly implemented by the Potentially Responsible Party, future actions are not expected to impact historic properties and no further evaluation is required.

III. Allendale Pond and Lyman Mill Pond Sediment

Alternative 7: \$70-80,000

Alternative 8: \$70-80,000

Alternative 10: \$90-100,000

Alternative 11: \$90-100,000

The cost for evaluating Disposal Options A, B, D, and E for Clean-Up Area II is included in the above estimates.

IV. Allendale Floodplain Soil

Alternative 5: \$60-75,000

The cost for evaluating Disposal Options A, B, D, and E for Clean-Up Area III is included in the above estimate.

V. Lyman Mill Stream Sediment and Floodplain Soil (including the oxbow)

Alternative 3: \$90-100,000

Alternative 5: \$90-100,000

The cost for evaluating Disposal Options A, B, D, E, and F for Clean-Up Area IV is included in the above estimates.

Mitigation Estimated Costs (including Phase II and III (Data Recovery) archaeological surveys and/or historic documentation and/or recordation):

I. Source Area Soil

Alternative 3A: \$90-100,000

Alternative 4E: \$90-100,000

II. Groundwater

As this effort was mostly implemented by the Potentially Responsible Party, future actions are not expected to impact historic properties and no further mitigation is required.

III. Allendale Pond and Lyman Mill Pond Sediment

Alternative 7: \$140-160,000

Alternative 8: \$140-160,000

Alternative 10: \$200-250,000

Alternative 11: \$200-250,000

The cost for mitigation Disposal Options A, B, D, and E for Clean-Up Area II is included in the above estimates.

IV. Allendale Floodplain Soil

Alternative 5: \$180-200,000

The cost for mitigation Disposal Options A, B, D, and E for Clean-Up Area III is included in the above estimate.

V. Lyman Mill Stream Sediment and Floodplain Soil (including the oxbow)

Alternative 3: \$200-250,000

Alternative 5: \$200-250,000

The cost for mitigation Disposal Options A, B, D, E, and F for Clean-Up Area IV is included in the above estimates.

Depending on the series of alternatives selected, the findings of the Phase IB survey and consultation with the RI SHPO and Narragansett Indian THPO, additional mitigation may be necessary. Please note that these costs are estimates only and will be further refined during the design and construction phases of the project and after review of the Phase IB survey results. The mitigation costs listed above include hypothetical Phase II and III surveys, if required, and/or historic documentation. In reality, some of the alternatives may not require all levels of mitigation listed. At this time, it is impossible to determine with certainty the level of mitigation required until the remedial action is selected and further evaluated.

Evaluation of the Potential Impacts to Historic Properties at the Centredale Manor Superfund Site, Rhode Island

Clean-Up Area Alternatives	Potential Impacts	Archaeological Sensitivity	Design Recommendations	Estimated Survey Costs	Mitigation Recommendations	Estimated Mitigation Costs
<u>I. Source Area Soil</u>						
3A – Targeted Excavation, Upgrade and Maintain Existing Surfaces, Off-Site Disposal and/or Treatment	Primarily undisturbed areas away from buildings and along the river	Low (buildings and parking lots) to Moderate (undisturbed areas)	Identify historic properties in undisturbed areas (Phase IB Survey) and determine significance	Phase IB Survey: \$30-35K	Additional testing (Phase II) and data recovery if unavoidable; Historic Documentation unlikely	Phase II and Data recovery for unavoidable impacts: \$90-100K
4E – Targeted Excavation, Convert to Hazardous Waste Caps, Off-Site Disposal and/or Treatment	Primarily undisturbed areas away from buildings and along the river	Low (buildings and parking lots) to Moderate (undisturbed areas)	Identify historic properties in undisturbed areas (Phase IB Survey) and determine significance	Phase IB Survey: \$30-35K	Additional testing (Phase II) and data recovery if unavoidable; Historic Documentation unlikely	Phase II and Data recovery for unavoidable impacts: \$90-100K
<u>III. Allendale Pond and Lyman Mill Pond Sediment</u>						
7 – Excavation and Disposal and/or Treatment	Allendale Historic District and Lymanville Mill; undisturbed soil/sediment and submerged areas of the ponds	High within Allendale HD and Lymanville, riverbanks and mill ponds	Identify historic properties including submerged resources; assess visual impacts	Phase IB: \$70-80K including historic inventory recordation	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Depending on Phase IB results and mitigation measures: \$140-160K

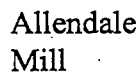
8 – Partial Excavation, Isolation Capping and Disposal and/or Treatment	Allendale Historic District and Lymanville Mill; undisturbed soil/sediment and submerged areas of the ponds	High within Allendale HD and Lymanville, riverbanks and mill ponds	Identify historic properties including submerged resources; assess visual impacts	Phase IB: \$70-80K including historic inventory recordation	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Depending on Phase IB results and mitigation measures: \$140-160K
10 – Dam Replacement, Excavation and Disposal and/or Treatment	Allendale Historic District and Lymanville Mill; undisturbed soil/sediment, and submerged areas of the ponds; dam replacement with smaller structure and loss of associated water surface in ponds would impact historic setting and context	High within Allendale HD and Lymanville, riverbanks and mill ponds	Identify historic properties including submerged resources; assess visual impacts	Phase IB: \$90-100K including historic inventory recordation	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Depending on Phase IB results and mitigation measures: \$200-250K
11 – Dam Replacement, Partial Excavation, Isolation Capping and Disposal and/or Treatment	Allendale Historic District and Lymanville Mill; undisturbed soil/sediment and submerged pond areas; dam replacement with smaller structures and loss of associated water surface in ponds would impact historic setting and context	High within Allendale HD and Lymanville, riverbanks and mill ponds	Identify historic properties including submerged resources; assess visual impacts	Phase IB: \$90-100K including historic inventory recordation	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Depending on Phase IB results and mitigation measures: \$200-250K

Disposal Options (Option C was eliminated)						
Option A – On-Site Containment in an Upland Confined Disposal Facility	Same as above; dependent on CDF location	Location would need to be evaluated	Identify historic properties including submerged resources; assess visual impacts	Evaluation of CDF site would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of CDF site would be included in cost
Option B – On-Site Containment in a Near Shore Confined Disposal Facility	Same as above; dependent on CDF location	Location would need to be evaluated	Identify historic properties including submerged resources; assess visual impacts	Evaluation of CDF site would be included in cost	Additional testing and evaluation, data recovery if unavoidable; Recordation	Evaluation of CDF site would be included in cost
Option D – On-Site Thermal Treatment	Same as above; dependent on CDF location	Low depending on site impacts if any	Identify historic properties including submerged resources; assess visual impacts	Evaluation of treatment would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of site treatment would be included in cost
Option E – Off-Site Disposal and/or Treatment	Same as above; dependent on CDF location	Depends on selected disposal site	Identify historic properties including submerged resources; assess visual impacts	Evaluation of disposal and treatment would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of disposal site would be included in cost
<u>IV. Allendale Floodplain Soil</u>						
5 – Excavation and Disposal and/or Treatment	Allendale Historic District and undisturbed areas	High within Allendale HD, riverbanks and mill ponds	Identify historic properties including submerged resources; assess visual impacts	Phase IB: \$60-75K including historic recordation	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Depending on Phase IB results and mitigation measures: \$180-200K

<i>Disposal Options (Option C was eliminated)</i>						
Option A – On-Site Containment in an Upland Confined Disposal Facility	Dependent on site location	Location would need to be evaluated	Identify historic properties at upland site; assess visual impacts	Evaluation of CDF site would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of CDF site would be included in cost
Option B – On-Site Containment in a Near Shore Confined Disposal Facility	Dependent on site location	Location would need to be evaluated	Identify historic properties at upland site; assess visual impacts	Evaluation of CDF site would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of CDF site would be included in cost
Option D – On-Site Thermal Treatment	Dependent on site location	Low, depending on site impacts if any	Identify historic properties at upland site; assess visual impacts	Evaluation of treatment would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of site treatment would be included in cost
Option E – Off-Site Disposal and/or Treatment	Dependent on site location	Location would need to be evaluated	Identify historic properties at upland site; assess visual impacts	Evaluation of disposal and treatment would be included in cost	Additional testing and evaluation, data recovery if unavoidable Documentation and recordation	Evaluation of disposal site would be included in cost
<u>V. Lyman Mill Stream Sediment and Floodplain Soil (incl. Oxbow)</u>						
3 – Targeted Excavation, Enhanced Natural Recovery and Disposal	Lymanville Mill area and Oxbow	High at Lymanville Area,	Identify historic properties, evaluate significance and access	Phase IB: \$90-100K including	Additional testing (Phase II) and data recovery if unavoidable;	Depending on Phase IB results and

and/or Treatment		submerged and undisturbed area	visual impacts	historic recordation	Documentation and recordation	mitigation measures: \$200-250K
5 – Partial Excavation, Enhanced Natural Recovery and Disposal and/or Treatment	Lymansville Mill area and Oxbow	High within Lymansville Mill Area, submerged and undisturbed area	Identify historic properties, evaluate significance and access visual impacts	Phase IB: \$90-100K including historic recordation	Additional testing (Phase II) and data recovery if unavoidable; Documentation and recordation	Depending on Phase IB results and mitigation measures: \$200-250K
Disposal Options for V						
Option A – On-Site Containment in an Upland Confined Disposal Facility	Dependent on site location	Location to be evaluated	Identify historic properties, evaluate significance and access visual impacts	Evaluation of CDF site would be included in cost	Additional testing (Phase II) and data recovery if unavoidable; Documentation and recordation	Evaluation of CDF site would be included in cost
Option B – On-Site Containment in a Near Shore Confined Disposal Facility	Dependent on site location	Location to be evaluated	Identify historic properties, evaluate significance and access visual impacts	Evaluation of CDF site would be included in cost	Additional testing (Phase II) and data recovery if unavoidable; Documentation and recordation	Evaluation of CDF site would be included in cost
Option D – On-Site Thermal Treatment	Dependent on site location	Low depending on site impacts if any	Identify historic properties, evaluate significance and access visual impacts	Evaluation of treatment would be included in cost	Additional testing (Phase II) and data recovery if unavoidable; Documentation and recordation	Evaluation of site treatment would be included in cost
Option E – Off-Site Disposal and/or Treatment	Dependent on site location	Location to be evaluated	Identify historic properties, evaluate significance and access visual impacts	Evaluation of disposal and treatment would be included in	Additional testing (Phase II) and data recovery if unavoidable; Documentation and recordation	Evaluation of disposal site would be included in cost

				cost		
Option F – On-Site Consolidation within New Floodplain Areas and Capped in Place	Dependent on site location	Location to be evaluated	Identify historic properties, evaluate significance and access visual impacts	Evaluation of new floodplain areas to be included in cost	Additional testing (Phase II) and data recovery if unavoidable; Documentation/record	Evaluation of disposal and capping site would be included in cost



Considered Eligible for listing on the National Register of Historic Places

