

# WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

MassDEP File Number

Document Transaction Number

Amesbury

City/Town

## A. General Information (continued)

6. General Project Description:

See Appendix 1

7a. Project Type Checklist:

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Single Family Home                | 2. <input type="checkbox"/> Residential Subdivision                   |
| 3. <input type="checkbox"/> Limited Project Driveway Crossing | 4. <input type="checkbox"/> Commercial/Industrial                     |
| 5. <input type="checkbox"/> Dock/Pier                         | 6. <input type="checkbox"/> Utilities                                 |
| 7. <input type="checkbox"/> Coastal Engineering Structure     | 8. <input type="checkbox"/> Agriculture (e.g., cranberries, forestry) |
| 9. <input type="checkbox"/> Transportation                    | 10. <input checked="" type="checkbox"/> Other                         |

7b. Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1.  Yes  No If yes, describe which limited project applies to this project:

Excavation of contaminated soil and backfilling to within approx. 0.5 feet of existing grade.

2. Limited Project

8. Property recorded at the Registry of Deeds for:

Essex South

a. County

53/110

c. Book

b. Certificate # (if registered land)

32703/15

d. Page Number

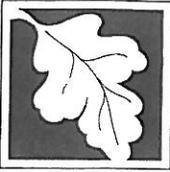
## B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. <input type="checkbox"/> Bank	1. linear feet	2. linear feet
b. <input type="checkbox"/> Bordering Vegetated Wetland	1. square feet	2. square feet
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. linear feet	2. linear feet
	3. cubic yards dredged	



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**B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)**

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
d. <input checked="" type="checkbox"/> Bordering Land Subject to Flooding	60,984 1. square feet N/A 3. cubic feet of flood storage lost	60,984 2. square feet N/A 4. cubic feet replaced
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. <input checked="" type="checkbox"/> Riverfront Area	<u>Powow River</u> 1. Name of Waterway (if available)	

2. Width of Riverfront Area (check one):

- 25 ft. - Designated Densely Developed Areas only
- 100 ft. - New agricultural projects only
- 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 14,350  
square feet

4. Proposed alteration of the Riverfront Area:

8,495 (within 25 feet)      57,400      Less than 6,700  
a. total square feet      b. square feet within 100 ft.      c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI?       Yes  No

6. Was the lot where the activity is proposed created prior to August 1, 1996?       Yes  No

3.  Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. <input type="checkbox"/> Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. <input type="checkbox"/> Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	1. square feet	2. cubic yards dune nourishment



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## B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
f. <input type="checkbox"/> Coastal Banks	1. linear feet _____	
g. <input type="checkbox"/> Rocky Intertidal Shores	1. square feet _____	
h. <input type="checkbox"/> Salt Marshes	1. square feet _____	2. sq ft restoration, rehab., creation _____
i. <input type="checkbox"/> Land Under Salt Ponds	1. square feet _____	
	2. cubic yards dredged _____	
j. <input type="checkbox"/> Land Containing Shellfish	1. square feet _____	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged _____	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet _____	
4. <input type="checkbox"/> Restoration/Enhancement	If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.	
	N/A _____	N/A _____
	a. square feet of BVW	b. square feet of Salt Marsh

## C. Other Applicable Standards and Requirements

### Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

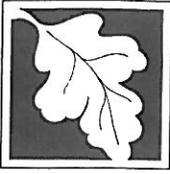
1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to <http://www.mass.gov/dfwele/dfw/nhosp/nhreqmap.htm>.

a.  Yes  No **If yes, include proof of mailing or hand delivery of NOI to:**

**Natural Heritage and Endangered Species Program  
Division of Fisheries and Wildlife  
Route 135, North Drive  
Westborough, MA 01581**

2008 \_\_\_\_\_  
b. Date of map

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.C, and include requested materials with this Notice of Intent (NOI); OR complete Section C.1.d, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*



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City/Town

## C. Other Applicable Standards and Requirements (cont'd)

1. c. Submit Supplemental Information for Endangered Species Review \*

1.  Percentage/acreage of property to be altered:

(a) within wetland Resource Area

\_\_\_\_\_   
percentage/acreage

(b) outside Resource Area

\_\_\_\_\_   
percentage/acreage

2.  Assessor's Map or right-of-way plan of site

3.  Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work \*\*

(a)  Project description (including description of impacts outside of wetland resource area & buffer zone)

(b)  Photographs representative of the site

(c)  MESA filing fee (fee information available at:

<http://www.mass.gov/dfwele/dfw/nhesp/nhenvmesa.htm>)

Make check payable to "Natural Heritage & Endangered Species Fund" and **mail to NHESP** at above address

*Projects altering 10 or more acres of land, also submit:*

(d)  Vegetation cover type map of site

(e)  Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the Following

1.  Project is exempt from MESA review.

Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <http://www.mass.gov/dfwele/dfw/nhesp/nhenvexemptions.htm>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2.  Separate MESA review ongoing.

\_\_\_\_\_  
a. NHESP Tracking Number

\_\_\_\_\_  
b. Date submitted to NHESP

3.  Separate MESA review completed.

Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

\* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see [www.nhosp.org](http://www.nhosp.org) regulatory review tab). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

\*\* MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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City/Town \_\_\_\_\_

## C. Other Applicable Standards and Requirements (cont'd)

2. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a.  Not applicable – project is in inland resource area only

b.  Yes  No If yes, include proof of mailing or hand delivery of NOI to either:

South Shore - Cohasset to Rhode Island, and the Cape & Islands:

North Shore - Hull to New Hampshire:

Division of Marine Fisheries -  
Southeast Marine Fisheries Station  
Attn: Environmental Reviewer  
838 South Rodney French Blvd.  
New Bedford, MA 02744

Division of Marine Fisheries -  
North Shore Office  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a.  Yes  No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC \_\_\_\_\_

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

a.  Yes  No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

a.  Yes  No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

a.  Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1.  Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

2.  A portion of the site constitutes redevelopment

3.  Proprietary BMPs are included in the Stormwater Management System.

b.  No. Check why the project is exempt:

1.  Single-family house

2.  Emergency road repair

3.  Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

Online Users:  
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.



\_\_\_\_\_  
 MassDEP File Number

\_\_\_\_\_  
 Document Transaction Number

\_\_\_\_\_  
 City/Town

**D. Additional Information**

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

**Online Users:** Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1.  USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2.  Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
3.  Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4.  List the titles and dates for all plans and other materials submitted with this NOI.

Lower Millyard Remediation, 25 & 31 Water Street, Amebury, MA - Sedimentation & Erosion Control Plan (Sheet 1 of 1)

Vanasse Hangen Brustlin, Inc.

b. Prepared By

September 13, 2013

d. Final Revision Date

c. Signed and Stamped by

scale in feet as indicated

e. Scale

Notice of Intent, Limited Project Status Filling, Narrative and Alternatives Analysis - 25-31 Water Street, Amesbury, Massachusetts

September 12, 2013

g. Date

5.  If there is more than one property owner, please attach a list of these property owners not listed on this form.
6.  Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7.  Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
8.  Attach NOI Wetland Fee Transmittal Form
9.  Attach Stormwater Report, if needed.

**E. Fees**

1.  Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

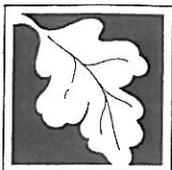
3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name



# WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

City/Town

## F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

9/5/13

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

5. Signature of Representative (if any)

6. Date

### For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

### For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

### Other:

If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

MASSDEP REGIONAL OFFICE  
13 SEP 03 10:11:12  
MASSDEP REGIONAL OFFICE



**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**Important:**  
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



**A. Applicant Information**

1. Applicant:

Thatcher \_\_\_\_\_ Kezer, III \_\_\_\_\_  
 a. First Name b. Last Name  
 Mayor - City of Amesbury \_\_\_\_\_  
 c. Organization  
 City Hall - 62 Friend Street \_\_\_\_\_  
 d. Mailing Address  
 Amesbury \_\_\_\_\_ MA \_\_\_\_\_ 01913  
 e. City/Town f. State g. Zip Code  
 (978) 388-8110 \_\_\_\_\_ mayor@amesburyma.gov  
 h. Phone Number i. Fax Number j. Email Address

2. Property Owner (if different):

\_\_\_\_\_ \_\_\_\_\_  
 a. First Name b. Last Name  
 \_\_\_\_\_  
 c. Organization  
 \_\_\_\_\_  
 d. Mailing Address  
 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_  
 e. City/Town f. State g. Zip Code  
 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_  
 h. Phone Number i. Fax Number j. Email Address

3. Project Location:

25 - 31 Water Street \_\_\_\_\_ Amesbury \_\_\_\_\_  
 a. Street Address b. City/Town

**B. Fees**

The fee should be calculated using the following six-step process and worksheet. **Please see Instructions before filling out worksheet.**

**Step 1/Type of Activity:** Describe each type of activity that will occur in wetland resource area and buffer zone.

**Step 2/Number of Activities:** Identify the number of each type of activity.

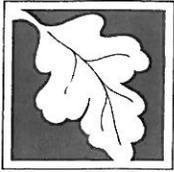
**Step 3/Individual Activity Fee:** Identify each activity fee from the six project categories listed in the instructions.

**Step 4/Subtotal Activity Fee:** Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

**Step 5/Total Project Fee:** Determine the total project fee by adding the subtotal amounts from Step 4.

**Step 6/Fee Payments:** To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



**Massachusetts Department of Environmental Protection**  
 Bureau of Resource Protection - Wetlands  
**NOI Wetland Fee Transmittal Form**  
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

**B. Fees** (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**Step 5/Total Project Fee:** \_\_\_\_\_

**Step 6/Fee Payments:**

Total Project Fee: \_\_\_\_\_  
 a. Total Fee from Step 5

State share of filing Fee: \_\_\_\_\_  
 b. 1/2 Total Fee **less** \$12.50

City/Town share of filling Fee: \_\_\_\_\_  
 c. 1/2 Total Fee **plus** \$12.50

**C. Submittal Requirements**

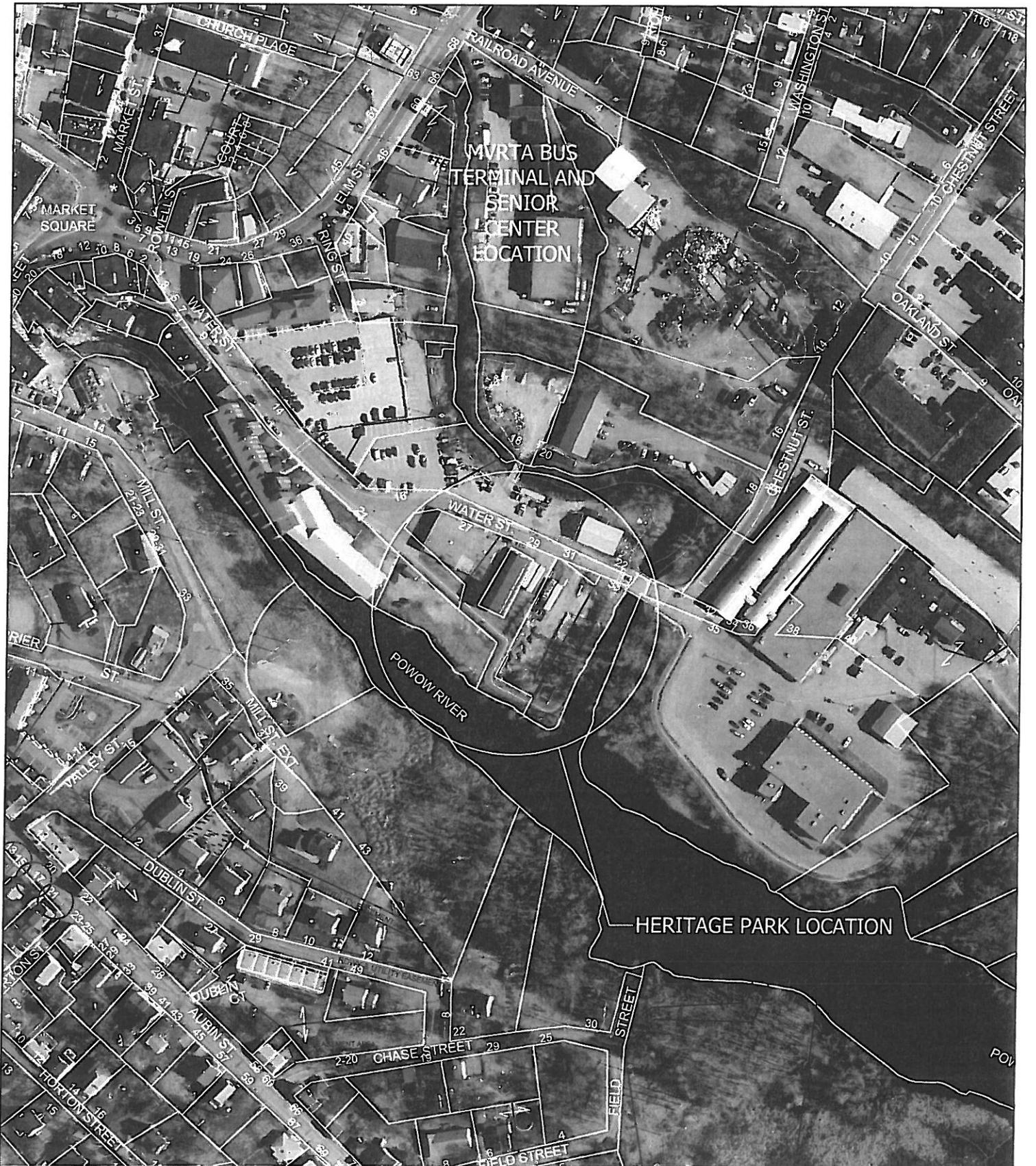
- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection  
 Box 4062  
 Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

**To MassDEP Regional Office** (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

Appendix 1  
General Project Description



CITY OF AMESBURY, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS - ENGINEERING

---

PROPOSED HERITAGE PARK

## LOCUS PLAN

DWG HERITAGE PARK	SCALE: 1"=200'	DR. BY PM	CK. BY PM
			DATE 9-25-2013



SHEET 1 OF 1





**NOTICE OF INTENT**

**LIMITED PROJECT STATUS FILING  
NARRATIVE AND ALTERNATIVES ANALYSIS**

**25-31 WATER STREET  
AMESBURY, MASSACHUSETTS**

**PREPARED FOR:**

**THE CITY OF AMESBURY  
MASSACHUSETTS, 01913**

**PREPARED BY:**

**HIGGINS ENVIRONMENTAL ASSOCIATES, INC.  
19 ELIZABETH STREET  
AMESBURY, MASSACHUSETTS 01913**

**September 12, 2013**

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## 1.0 INTRODUCTION

Higgins Environmental Associates, Inc. (HEA) has prepared this Notice of Intent - Limited Project Status filing on behalf of the City of Amesbury. The Limited Project is related to completion of Massachusetts Contingency Plan (310 CMR 40.0000) Response Actions related to oil and hazardous material (OHM) impacted soil on a proposed waterfront park area of Amesbury (Heritage Park). The proposed park will consist of approximately 1.4 acres of land on properties including 25 to 31 Water Street in Amesbury. This is an historically-developed brownfield area. Two tidally-influenced, fresh water rivers bound the proposed Heritage Park, the Back River and the Powow River. The Back River bounds the eastern border of the proposed park and the Powow River bounds the southern part. A majority of the area is within a surveyed 100 year flood plain and within 25 to 100 foot setbacks from the approximate mean high water mark of each river.

This Notice of Intent (NOI) has been filed to cover work on this Limited Project within lands potentially subject to flooding and within the 25 to 100 foot buffer zones from each river. While the surveyed elevation indicates that the proposed park area is within the 100 year flood plain, the Federal Emergency Management Agency (FEMA) mapped 100-year flood plain actually does not extend across the proposed park area other than slight edge effects near the mean high water mark of each river. The area is also not known to flood during the knowledge of City officials. In any event, the surveyed elevation for the 100-year flood plain includes the proposed park area and as such, the proposal park area is considered as Bordering Land subject to flooding under the Wetlands Protection Act.

Approximately 14,350 square feet or 23 percent of the proposed park's river front area is within the 25 foot buffer from the Back and Powow Rivers top of bank. Approximately 8,495 square feet of this riverfront area, or 60 percent will be altered via soil excavation of OHM-impacted soil within the riverfront area. Remaining areas of the approximately 1.4 acre proposed park, outside the 25 foot buffer will also be subject to excavation of OHM-impacted fill materials and backfilling. When excavation and backfilling are complete, the existing grade of the majority of the proposed park area will be dropped by approximately one half foot to allow for finishing of the park by others with landscaped surfaces, topsoil and grass. A separate NOI will be filed for completion of the proposed park area including reconstruction of engineered river bank structures and construction of a dock into the Powow River.

## 2.0 LIMITED PROJECT STATUS FILING

### 2.1 Location and Legal Description

The proposed park area includes all or portions of properties located between 25 to 31 Water Street in Amesbury. The proposed park includes approximately 1.4 acres of land.

The general location of the proposed park area is depicted on **Figure 1 - General Site Location**. The approximate locations of pertinent Site features and combined property boundaries are depicted on **Figure 2 - Site Plan**. Figures are attached. The geographical location of the approximate center of the proposed park can be referenced as  $-70^{\circ} 55' 41.16''$  longitude and  $42^{\circ} 51' 22.32''$  latitude. The Universal Trans Mercator coordinates are 4746651 Northing and 342476 Easting in Zone 19.

According to Amesbury's Assessors Office, the Site is identified on Map 53 as Lots 103, 104, 105, and 110.

### 2.2 Physical Setting

The park area is located within the downtown, Lower Millyard area of Amesbury. The Park Area has been historically developed for industrial uses and commerce since the late 1800s. Two of the formerly occupied properties within the park area are now vacant, empty lots with direct frontage on either the Back or Powow Rivers. A paved, municipal river walk and bikeway runs through the park area. The Powow and Back Rivers are located off the immediate southern and eastern limits of the park area. The majority of the remaining area of the park area is covered by the concrete slab floor from the historic building structure at 31 Water Street, the vacant lot at 25 Water Street, the City's Department of Public Works facility at 27 Water Street, and a three-story, brick building currently housing the Amesbury Carriage Museum (not currently open to the public). A smaller percentage of the park area is unpaved (approximately 10 percent of land area) land between or behind buildings.

Depth to ground water below grade has ranges between 3 to 7 feet and is tidally-influenced proximate to the Back and Powow Rivers. Land use surrounding the Park Area is mixed commercial, municipal public works related, or industrial.

Storm water flow would follow topographic relief indicating flow to the southeast. The topography of the Park Area is relatively level and characterized predominantly by two brick buildings, storage piles of sand, gravel and pavement grindings used by the City on the 27 Water Street parcel, and the paved river walk. Topographic relief across the Park Area is approximately one foot with a drop in elevation from northwest to southeast. Site topography has been influenced by paving, landscaping, and grading activities.

Based on information provided on MassGIS data layers there are two natural resource areas mapped within 500 feet of the park area; the Back and Powow Rivers. The park area is not located within a Potentially Productive Aquifer or Interim Well Head Protection Area. There are no mapped vernal pools, Sole Source Aquifers, or habitats of Species of Special Concern or Threatened Species within 500 feet of the park area. The park area is not within 500 feet of a Zone II area, or a Zone A area.

Based on regional topography and interpreted surface water drainage patterns, the regional ground water flow direction is interpreted as towards the southeast, along the Powow River and towards the Merrimack River. Based on linear interpolation and triangulation of elevation corrected depth to ground water measurements to date, shallow ground water in the Park Area Site is flowing southeasterly towards the confluence of the Back and Powow Rivers.

## **3.0 DESCRIPTION OF PROPOSED WORK ACTIVITIES**

Based on environmental assessment activities to date within the park area, granular fill materials throughout the park area have been impacted by OHMs at concentrations which pose a risk to human health. Proposed work activities are designed to limit risks to future use of the park area. Based upon an Alternatives Analysis, as summarized in Section 4.0, the most feasible alternative to address risks is to excavate OHM-impacted materials to varying depths across the park area and to replace excavated materials with clean fill. Because the park area is within a surveyed elevation below the 100-year FEMA flood plain, the final grade of the park area will remain essentially unchanged from existing grades.

### **3.1 Contaminated Soil Excavation and Backfilling**

We estimate that up to approximately 1.5 feet of OHM-impacted soil from across the majority of the site will be excavated and transported offsite for disposal or reuse. Actual depths of excavation will vary across the site but should amount to approximately 3,400 cubic yards (5,000 tons). Clean backfill materials will be brought in and graded over excavation areas to restore the grade surface to within approximately one half foot of existing grade. The final grade elevation will be brought up to existing grades using topsoil and landscaped surfaces under a future NOI for park completion. Backfilled areas will be seeded with winter rye or equivalent pending completion of the park.

At present, the sequence of soil excavation will begin at 25 Water Street and move easterly to 31 Water Street. Trucks to haul away excavated soil will be loaded on 31 Water Street and leave the park area via Water Street.

An Earth Filling Special Permit has already been filed with Amesbury's Planning Board.

### **3.2 Erosion and Sedimentation Controls**

Siltation logs will be used to separate the proposed soil excavation and backfilling area from the Back and Powow Rivers. Existing stormwater flow patterns would carry storm water runoff into the proposed siltation logs. Under soil excavation and backfilling activities as part of this NOI and Limited Project, grades will be dropped by approximately one half foot on the upgradient, storm water flow side of the siltation logs and the Back and Powow Rivers. This drop in grade will further limit uncontrolled erosion and storm water flows from the Limited Project area. As an additional measure, once backfilling is complete, the area will be seeded with winter rye or equivalent.

Erosion and sedimentation controls during this temporary, Limited Project, will be inspected daily during work activities, and on a weekly basis until such time that the final grades of the park are completed by others.

### **3.3 Storage and Handling of Oil and Hazardous Material Impacted Soil and Debris**

All OHM-Impacted soil and debris such as concrete associated with historic buildings will be either loaded directly onto trucks for transport and disposal or recycling offsite or they will be excavated and staged on, and covered by, 6-millimeter thick plastic sheeting until they can be loaded and shipped offsite. All soil or debris temporary storage onsite would occur within the area of erosion controls. Additional silt logs or equivalent may be used around the perimeter of any temporary soil/debris storage areas.

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## 4.0 ALTERNATIVES ANALYSIS

This Limited Project under the Wetlands Protection Act is being proposed to address risks posed by OHM-impacted soil in the park area. A formal “Analysis of Brownfield Cleanup Alternatives (ABCA)” has already been completed for the majority of the proposed park area. This ABCA was documented in a November 29, 2012 report prepared by HEA for the City of Amesbury. This ABCA analysis is suitably analogous to the Alternatives Analysis under the Wetlands Protection Act and as such, the November 29, 2012 ABCA is being provided as an attachment to this report.

To summarize the ABCA, excavation of soils up to three feet below grade within the majority of the proposed park area is the most feasible and appropriate alternative in consideration of risks, costs and wetland resources. Other than a temporary reduction in grades associated with this NOI Limited Project, final grades of the completed park will remain essentially unchanged from existing grades. If final grades were to change, these proposed changes would be part of a future NOI filing for that park completion work by others.

**Alternative Analysis is Attached**

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## 5.0 CONCLUSIONS

A Notice of Intent - Limited Project filing is appropriate for this proposed OHM-impacted soil remediation activity under the Massachusetts Contingency Plan (MCP) because the proposed work activities are located both within: 1) the 25 and 100 foot buffer zone from the Back and Powow Rivers; and 2) Based on an elevation survey, the proposed work activity area is within the 100-year flood plain or Bordering Lands subject to flooding under the Act. The Limited Project Status and related reduction in NOI filing requirements is also appropriate as existing OHM conditions pose a risk and need to be addressed under the MCP.

Proposed work activities will involve excavation of soil up to approximately 3 feet below existing grades followed by backfilling with clean fill to within approximately one half foot of the existing grade. Erosion and sedimentation storm water controls will include the use of siltation logs, best management practices and frequent inspections combined with use of seeding of the disturbed areas with winter rye or equivalent at the completion of work activities.

This NOI Limited Project is a temporary project designed to address risks posed by OHM-impacted materials (primarily soil and fill materials onsite). It will be conducted in a manner that minimizes the potential for additional or consequential impacts under the Act. Under a separate NOI filing, the proposed park area grades will be brought up to existing grades using topsoil and landscape surfaces. These additional and future activities are not part of this Limited Project NOI filing.

## ATTACHMENTS

**FIGURE 1 - GENERAL SITE AREA**

**FIGURE 2 - SITE PLAN**

**NOVEMBER 29, 2012, ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES  
(substitute for NOI Alternatives Analysis)**

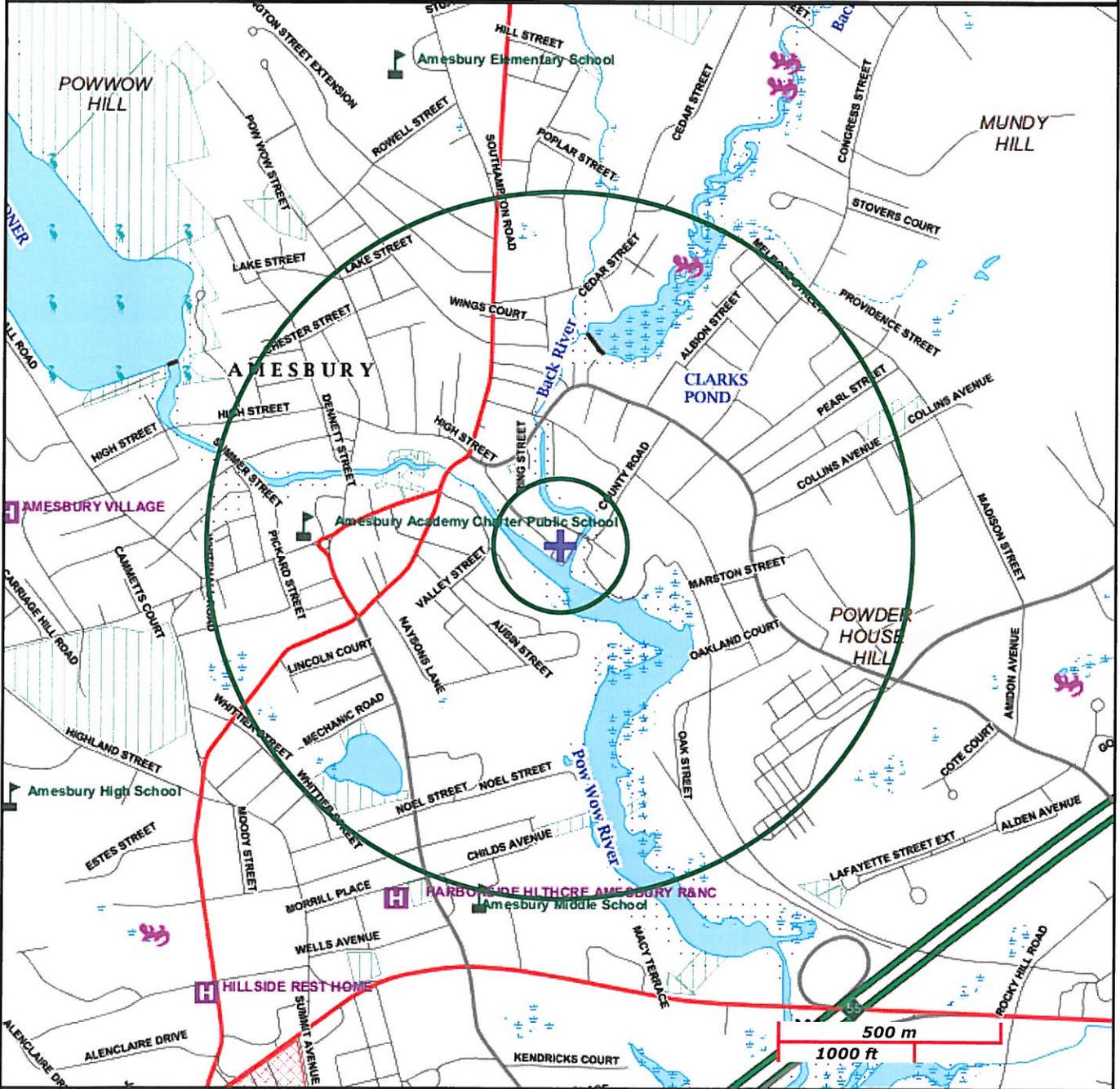
# MassDEP - Bureau of Waste Site Cleanup

## MCP Numerical Ranking System Map: 500 feet & 0.5 Mile Radii

**Site Information:**  
 FIGURE 1 - GENERAL HERITAGE PARK AREA  
 27-31 WATER STREET AMESBURY, MA

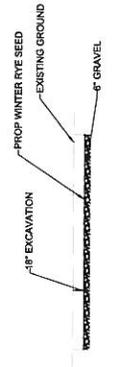
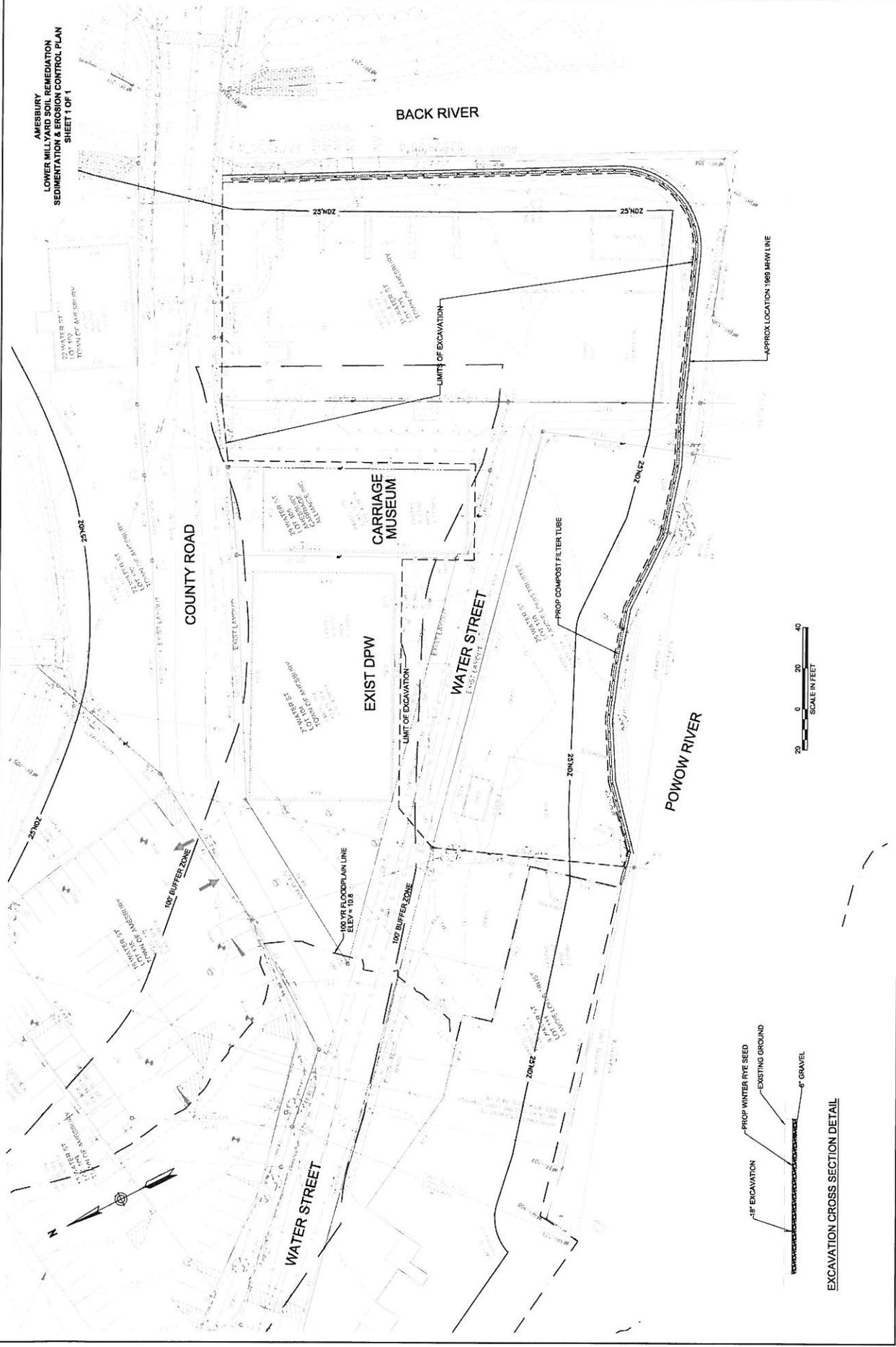
**NAD83 UTM Meters:**  
 4746640mN, 342523mE (Zone: 19)  
 November 27, 2012

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: <http://www.mass.gov/mgis/>



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail	PWS Protection Areas: Zone II, MWPA, Zone A			
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct	Hydrography: Open Water, PWS Reservoir, Tidal Flat			
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam	Wetlands: Freshwater, Saltwater, Cranberry Bog			
Aquifers: Medium Yield, High Yield, EPA Sole Source	FEMA 100yr Floodplain; Protected Open Space; ACEC			
Non Potential Drinking Water Source Area: Medium, High (Yield)	Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert, Potential			
	Solid Waste Landfill; PWS: Com. GW, SW, Emerg, Non-Com.			

AMESBURY  
LOWER MILLYARD SOIL REMEDIATION  
SEDIMENTATION & EROSION CONTROL PLAN  
SHEET 1 OF 1





**ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES**

**CITY OF AMESBURY**

**PROPOSED HERITAGE PARK DEVELOPMENT**

**25-31 WATER STREET  
AMESBURY, MASSACHUSETTS**

**PREPARED FOR:**

**CITY OF AMESBURY  
62 FRIEND STREET  
AMESBURY, MASSACHUSETTS 01913**

**PREPARED BY:**

**HIGGINS ENVIRONMENTAL ASSOCIATES, INC.  
19 ELIZABETH STREET  
AMESBURY, MASSACHUSETTS 01913**

**November 29, 2012**

**HEA**

**Analysis of Brownfield Cleanup Alternatives  
Proposed Heritage Park Development**

**Approval Page**

**Preparer of Document:** \_\_\_\_\_ **Date:** 11/29/2012  
Signature, For: Higgins Environmental Associates, Inc.

**Project Manager Representing  
Brownfields Grant Borrower**

\_\_\_\_\_ **Date:** \_\_\_\_\_  
Signature, For: City of Amesbury

# HEA

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## EXECUTIVE SUMMARY

Higgins Environmental Associates, Inc. (HEA) has completed an Analysis of Brownfield Cleanup Alternatives (ABCA) for the contiguous properties designated as 27, 29 and 31 Water Street in Amesbury, Massachusetts (collectively the “Park Area”). The ABCA also includes an adjacent parcel at 25 Water Street though testing to evaluate soil quality on that parcel has not yet been authorized for release due to pending property transaction requirements. The Park Area is an historically-developed, industrial area within Amesbury’s Lower Millyard. The City of Amesbury is moving forward with development of this area into a publically-accessible waterfront park to be known as Heritage Park.

HEA has recently completed an ASTM Phase I for the 25 Water Street property, and an ASTM Phase II for the Park Area subject to this ABCA. The Park Area includes approximately one acre of historically-developed, industrial land fronting on two tidal, freshwater rivers (Back and Powow Rivers). The additional 25 Water Street parcel consists of approximately 0.4 acres.

Based on available municipal records, there have been mill building structures and industrial uses in the Park Area since the late 1800s. Municipal sewer services were first noted as being provided to property buildings in the early 1900s. Municipal water, sewer and private natural gas services are currently available to the Park Area. Currently, approximately one half of the Park Area is vacant land where historic buildings had fallen into disrepair and succumbed to the elements or were taken down by previous property owners. There are two, currently utilized buildings in part of the Park Area: the City’s Department of Public Works facility at 27 Water Street; and the Carriage House at 29 Water Street. Remaining areas of the Park Area, not occupied by the mill buildings or vacant lots are occupied by a paved, pedestrian walkway or general shrub landscaping or mowed grass.

The property is zoned for industrial or commercial use (Zoning Code IC) and has typically been used for light industrial and commercial purposes. Surrounding property use is also consistent with industrial and commercial purposes. The nearest residential structure is located approximately 350 feet south, across the Powow River from the Park Area.

Based on sampling and laboratory analysis of soil and ground water from the Park Area, and of sediment from two adjacent rivers (Back and Powow Rivers), impacts by oil or hazardous material (OHMs) are present within shallow urban fill materials in the Park Area. Ground water is not impacted by OHMs at concentrations warranting further assessment or response actions. Sediment is not impacted by potential Park Area OHMs at concentrations greater than established Local Conditions. OHM impacts to urban fill appear concentrated primarily on the 31 Water Street parcel (former Wharf Building) but with the exception of petroleum hydrocarbons, OHM impacts can reasonably be attributed to Massachusetts Contingency Plan (MCP) Reporting Exemptions (310 CMR 40.0317(9) or representative of background (310 CMR 40.0006) for this urban area with fill materials containing coal ash. However, these urban impacts to fill materials still represent a risk to future development and use of this area as a public Park so further assessment and response actions are warranted due to the

presence of petroleum hydrocarbons on 31 Water Street and overall presence of urban fill materials with coal ash throughout the Park Area.

The recently completed ASTM Phase II has addressed ASTM Phase I-defined *recognized environmental conditions* (REC) identified as part of the recent 25 Water Street Phase I assessment which included a supplementary assessment of 27, 29 and 31 Water Street conditions related to the widespread presence of urban fill materials with coal ash, documented impacts by OHMs to urban fill materials (31 Water Street) and overall historical use of the Park Area which included potential OHM sources since the mid to late 1800s.

Based on this ABCA assessment, the recommended remedial alternative is to remove OHM-impacted fill materials to at most three feet below grade but less in selected areas where OHM impacts are less than MCP Method 1 Risk Characterization criteria. This recommended action is referred to as Scenario 1 - Removal of Surficial Urban Fill in Park Area.

The purpose of this ABCA was to provide HEA's recommended remedial alternative assessment to the City of Amesbury for their consideration of future development of this historic brownfield area as a public, waterfront park. This report and assessment findings are subject to HEA's contract for services with our client the City of Amesbury and Limitations, Conditions, and Exceptions noted in this report and in **Appendix C**. No other party may rely on this document or HEA's findings unless authorized in writing by both HEA and HEA's client. In no event shall this report or the findings herein be relied upon by any party after November 2013, one year after completion of this report.

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## 1.0 SITE CHARACTERIZATION

### 1.1 Introduction and Statement of Objectives

Higgins Environmental Associates, Inc. (HEA) has completed an American Society for Testing and Materials (ASTM) Phase I and Phase II Environmental Site Assessments in the Park Area in order to assess potential risks and cleanup costs associated with this historically-developed, waterfront, brownfield property in Amesbury, Massachusetts. The Park Area includes the contiguous properties located at 25, 27, 29 and 31 Water Street in Amesbury, Massachusetts (collectively the “Park Area”).

HEA’s client, the City of Amesbury is seeking to develop these historically urban, brownfield sites into a community, waterfront park (“Heritage Park”). Although not included within the recently completed ASTM Phase II assessment, the City is currently in negotiations to add an additional and abutting property at 25 Water Street to the proposed Park Area. The environmental condition of each of these properties within the proposed Park Area has been previously assessed by HEA for the City of Amesbury or others. Under separate cover, HEA has recently completed an ASTM Phase I for the 25 Water Street parcel and as part of the ASTM Phase I gathered supplemental information (updated records review) for the 27, 29 and 31 Water Street properties. An ASTM Phase II was recently completed for the 27, 29 and 31 Water Street property portions within the Park Area.

The City of Amesbury Assessors Office currently identifies the 25 Water Street property on Map 53 as Lot 110 . The “Park Area” is identified as Map 53 Lots 110, 104, 105 and 103 respectively. Two maps are provided in **Appendix A** which illustrate the general site location and separately, pertinent site features.

The objective of this ABCA assessment is to evaluate and recommend response actions alternatives that if implemented, would address oil and hazardous material (OHM) impacts within the Park Area relative to future development of this area as a public, waterfront park. Although this assessment includes the ABCA default “No Action” alternative, this alternative would not meet the objective of this ABCA assessment relative to documented OHM impacts to urban fill within the Park Area.

### 1.2 Site Description

The ABCA assessed the area of the proposed Heritage Park located on 27, 29 and 31 Water Street in Amesbury, and included by contingency, the abutting 25 Water Street property. This 27-31 Water Street portion of the Park Area consist of approximately 0.98 acres of land. 25 Water Street consists of approximately 0.4 acres of land. The proposed Park Area is currently either vacant (25 and 31 Water Street and portions of 27 Water Street), occupied by a three story brick building at 29 Water Street (currently Amesbury’s Carriage Museum), or for 27 Water Street, occupied in part by a single-story brick building used by Amesbury’s Department of Public Works facility.

The general location of the Park Area is depicted on **Figure 1 - General Site Location**. The approximate locations of pertinent Site features and combined property boundaries are depicted on

**Figure 2 - Site Plan.** Figures are provided in **Appendix A**. The geographical location of the Park Area can be referenced as  $-70^{\circ} 55' 41.16''$  longitude and  $42^{\circ} 51' 22.32''$  latitude. The Universal Trans Mercator coordinates are 4746651 Northing and 342476 Easting in Zone 19.

The Park Area is located within the downtown, Lower Millyard area of Amesbury. The Park Area has been historically developed for industrial uses and commerce since the late 1800s. Two of the formerly occupied properties within the Park Area are now vacant, empty lots with direct frontage on either the Back or Powow Rivers. A paved, municipal river walk and bikeway runs through the Park Area. The Powow and Back Rivers are located off the immediate southern and eastern limits of the Park Area. The majority of the remaining area of the Park Area is covered by the concrete slab floor from the historic building structure at 31 Water Street, the vacant lot at 25 Water Street, the City's Department of Public Works facility at 27 Water Street, and a three-story, brick building currently housing the Amesbury Carriage Museum (not currently open to the public). A smaller percentage of the Site is unpaved (approximately 10 percent of land area) land between or behind buildings.

Depth to ground water below grade has ranges between 3 to 7 feet and is tidally-influenced proximate to the Back and Powow Rivers. Land use surrounding the Park Area is mixed commercial, municipal public works related, or industrial.

Pertinent Site features and surrounding property uses are depicted on **Figure 2**.

Storm water flow would follow topographic relief indicating flow to the southeast. The topography of the Park Area is relatively level and characterized predominantly by two brick buildings, storage piles of sand, gravel and pavement grindings used by the City on the 27 Water Street parcel, and the paved river walk. Topographic relief across the Park Area is approximately one foot with a drop in elevation from northwest to southeast. Site topography has been influenced by paving, landscaping, and grading activities.

Based on information provided on MassGIS data layers there are two MCP natural resource areas mapped within 500 feet of the Site; the Back and Powow Rivers. The Site is not located within a Potentially Productive Aquifer or Interim Well Head Protection Area. There are no mapped vernal pools, Sole Source Aquifers, or habitats of Species of Special Concern or Threatened Species within 500 feet of the Site. However, the Back and Powow Rivers are both listed as Endangered Species Habitat. The Site is not within 500 feet of a Zone II area, or a Zone A area. Based on records maintained by Amesbury's Board of Health, there are no private potable water supply wells within 500 feet of the Site.

Based on regional topography and interpreted surface water drainage patterns, the regional ground water flow direction is interpreted as towards the southeast, along the Powow River and towards the Merrimack River. Based on linear interpolation and triangulation of elevation corrected depth to ground water measurements to date, shallow ground water in the Park Area Site is flowing southeasterly towards the confluence of the Back and Powow Rivers. This flow direction is consistent with flow directions depicted previously by others (2000 Brownfield Site Assessment report). The interpreted direction of local ground water flow is presented on **Figure 4**.

### 1.3 *Source, Nature and Extent of Contamination*

Other than the quality of urban fill in the Park Area, there have been no confirmed or known releases of oil or hazardous materials (OHMs) to the environment within the Park Area itself. There have been documented releases of OHM outside the Park Area at 27 Water Street (former underground storage tank release), or as represented by a punctured drum (Threat of Release Condition) within the former Wharf Building at 31 Water Street but based on previously documented environmental conditions and testing results of the recently completed ASTM Phase II, these documented incidents have not impacted soil or ground water quality within the Park Area.

OHM impacts to granular fill material, either visually through the presence of coal and coal ash, or through laboratory testing results of granular fill materials in the Park Area represent a *recognized environmental condition* which warranted completion of the ASTM Phase II assessment.

Environmental assessments to date in the Park Area indicate that the quality of granular fill has been impacted by historical site use and by the presence of coal, coal and wood ash. While impacts to soil attributable to the later (coal and coal/wood ash) represent an exemption from reporting under the Massachusetts Contingency Plan (MCP), these impacts still represent a risk particularly with redevelopment of the general area as a park for the general public.

Some impacts to granular fill are also not attributable to the presence of coal or coal ash, such as the presence of polychlorinated biphenyls, total petroleum hydrocarbons, and some semivolatile organic compounds. Granular fill materials containing coal, coal and wood ash were confirmed by HEA to be present throughout the Park Area from depths of at grade to upwards of eight feet below grade near Water Street and soil boring SB1 and BC230. Previous ground water sampling and laboratory results did not indicate the presence of ground water impacts in excess of MCP Reportable Concentrations. Assessments to date also included an assessment of surface water and sediment quality proximate to, downstream of, and upstream of the Park Area. Impacts to surface water and sediment from Park Area environmental conditions were not apparent.

### 1.4 **Exposure Pathways of Concern**

Both children and adults are considered potential human receptors. Activities by children and adults at the Park Area would be consistent with recreational uses of walking, biking, sitting down and playing. Future use as a public park with a hand-carried canoe and kayak launch, public benches and landscaped areas would provide a higher exposure potential for contact by adults and children with granular fill materials than current exposure scenarios. A paved, public walkway bisects the Park Area and is used by the general public. This walkway would be an integral part of the proposed Heritage Park but would be relocated within the same Park Area.

The Back and Powow River are located immediately proximate to the Park Area. Impacts to these resources were assessed as part of another Brownfield Assessment by HEA for an upstream property by collection and laboratory analysis of multiple surface water and sediment samples. These samples are located at, downstream and upstream of the Park Area. Increases in impacts attributable to Park Area Conditions were not apparent. Ground water within the Disposal Site also did not contain impacts in

excess of applicable MCP Reportable Concentrations.

There are no schools, drinking water resource areas, or farms within 500 feet of the Park Area. The Park Area is not within a mapped ground water protection or Zone II well head protection area. The nearest residence is located approximately 350 feet to the south, southwest, across the Powow River from the Park Area.

Given the presence of OHM-impacted fill material exposed at grade within the Park Area and potential receptors including children, adults, and women of child bearing age, the primary exposure pathways of concern include: direct contact with OHM-impacted urban fill and inhalation of dust generated from exposure to OHM-impacted urban fill.

### Reportable Concentration Categories

Soil and ground water Reportable Concentrations (RCs) for the Park Area were assessed based upon the requirements of the MCP. Based upon HEA's assessment and information provided in recently completed ASTM Phase I and II assessments, soil and ground water in the Park Area would meet the requirements of an RCS-1 and RCGW-2 area. MassGIS-type map information is provided on **Figure 1**.

## **1.5 Summary of Available Sample Analytical Results**

### Soil Quality

A total of twenty two (22) hand auger or soil probe borings were advanced on proposed grid sampling or monitoring well locations. Sample locations are depicted on **Figure 2**. Urban fill consisting primarily of a grey-brown, coarse to fine sand, with varying proportions of gravel, coal, coal clinkers and slag, brick, and ash was present throughout surficial soils in the Park Area. Urban fill was noted at upwards of 8 feet was noted beneath and proximate to the former Amesbury Wharf Building and Water Street. Otherwise, urban fill thickness typically were less than 3 feet below grade.

There were no areas of elevated PID screening results indicative of a potential source area, hotspot, or gross area of VOC contamination. PID results for all soil samples ranged between non-detectable (1 part per billion) to 2,350 ppb at grid sample F080. Discrete samples of soil were selected for laboratory analysis of VOCs by EPA Method 8260 from locations B260, BC230, D240, F080, D080 and A000. A duplicate sample from F080, designated F080D, was also submitted for VOC analysis. These locations were selected based on PID screening results and their overall locations being representative of soils across the Park Area as a whole. Laboratory Results are summarized on **Table 1 - ASTM Phase II Soil Analytical Results**.

In addition to discrete samples of soil for VOC analysis, a discrete sample of urban fill was collected from 3-8 feet at location BC230 using the geoprobe rig to get past a shallow refusal by the hand augering method. The grey-brown granular fill with coal ash and clinkers extended to 8 feet at this location. This sample interval was submitted for all soil analytical parameters, as summarized on **Table 1**.

In the absence of apparent sources, hotspot or gross areas of potential contaminant impacts and to assess future use risks posed by the widespread occurrence of urban fill with previously documented impacts on 31 Water Street, the Park Area was divided into four separate regions (A1, B1, C1N, and C1S) as noted on **Figure 3**. Shallow soil samples (top 3 feet or less depending upon urban fill thickness) within each area was then composited into one sample per area for a total of four composite samples (A1, B1, C1N and C1S) and one duplicate sample of C1S designated as C1SD. All soil samples analytical results are summarized on **Table 1**. This table includes Massachusetts Contingency Plan (MCP) Reportable Concentrations for S-1 category soil (typical of residential exposure potential), and MCP Method 1 Risk Characterization criteria for S-1, S-2 and S-3 soils in GW-2 and GW-3 ground water areas (no potable water uses or exposure potential).

Based upon a comparison of soil analytical results to MCP Reportable Concentrations and Method 1 Risk Characterization criteria, the following compounds were noted at concentrations in excess of these guidelines (maximum detected concentration noted) : Total petroleum hydrocarbons (TPHs) at 1,990 milligrams per kilogram (mg/kg); Benzo(a)pyrene at 4.6 mg/kg; Dibenzo(a,h)anthracene at 0.89 mg/kg; polychlorinated biphenyls (PCBs) at 4.6 mg/kg; cadmium at 2.26 mg/kg; and, lead at 847 mg/kg.

### Ground Water Quality

A total of four ground water samples were collected from monitoring wells HMW1, HMW2, HMW3 and HMW4. A duplicate sample of ground water was collected from HMW2, and designated as HMW2D. Analytical results of ground water are summarized on **Table 3 - 2012 Ground Water Analytical Results**.

There was no visual or PID evidence of overt contaminant impacts to ground water. Basic field geochemical readings obtained just prior to sample collection are also summarized on **Table 3**. PID results for screening of air within each well casing, just prior to sampling, are also provided on **Table 3**.

**Table 3** includes applicable MCP Reportable Concentrations for GW-2 ground water areas and MCP Method 1 Risk Characterization data for GW-2 and GW-3 areas. All results from 2012 were less than applicable MCP criteria. Previous ground water sampling results within the Park Area on 31 Water Street obtained by HEA and an EPA contractor as part of a Brownfield Site Assessment or MCP filings, were also less than applicable MCP criteria for reporting or risk characterization.

## 2.0 IDENTIFICATION AND ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

The following sections describe an assessment of potential remedial action alternatives, including the default “No Action” Alternative. Costs associated with each evaluated remedial action are summarized on **Table 6**.

### 2.1 No Action

This is the default, no action alternative assessment required by ABCA assessment guidelines.

#### Effectiveness

No action would leave OHM-impacted granular fill materials exposed at grade. OHM impacts to urban fill exceed applicable MCP Method 1 Risk Characterization criteria so “No Action” would not address risks to future use posed by impacted fill materials.

#### Implementability

No Action does not require implementation of a remedial action.

#### Cost

No Action does not have an associated remedial action cost for development of the proposed Park. However, some action would eventually be needed due to existing OHM-impacts to urban fill within the Park Area as recently confirmed by ASTM Phase II testing results.

### 2.2 Scenario 1: Removal of all OHM-impacted fill material up to three feet below grade

This alternative would remove urban fill from each of the four primary areas delineated in the Park Area as A1, B1, C1N and C1S, as depicted on **Figure 3**, at prescribed depths of: For Area A1: zero feet or no removal; Area B1 one foot of fill removal; Area C1N three feet of fill removal; and, Area C1S three feet of fill removal. Additionally, as an assumption without the availability of confirmatory soil or ground water testing, this alternative includes estimated costs for removal of one foot of urban fill from the 25 Water Street Parcel.

#### Effectiveness

This would remove OHM-impacted urban fill and allow for replacement of the same volume of fill removed with clean, imported fill material. Depending upon confirmatory soil sampling results following soil removal actions, an institutional control (Activity and Use Limitation) may be needed for OHM impacts greater than 3 feet below grade within the Park Area. This remedial action would remove exposure pathways to receptors associated with either direct contact or inhalation of dust from OHM-impacted urban fill.

Construction controls, soil management and health and safety procedures during this removal scenario would limit potential risks to human health, public safety and the environment during remedial activities.

## Implementability

This would be a relatively shallow, soil removal project in an area of Amesbury's Lower Millyard where access to the area by the public could be controlled during remedial actions. There are no significant limitations on the implementation of this alternative.

Administrative activities associated with this alternative would include obtaining federal, and local permits for work activities within the buffer zone and river protection area associated with both the Back and Powow Rivers. These administrative activities are not atypical for similar construction activities and estimated costs for implementation of this alternative are summarized on **Table 6**.

## Cost

Total estimated costs for this alternative, which includes excavation and offsite disposal/recycling of 6,128 tons of soil (4,084 cubic yards) ranges between \$404,575 to \$461,291, including backfilling, grading, permitting, oversight and documentation.

### **2.3 Scenario 2: Removal of some OHM-impacted fill material up to three feet below grade**

This alternative would remove urban fill from each of the four primary areas delineated in the Park Area as A1, B1, C1N and C1S, as depicted on **Figure 3**, at prescribed depths of: For Area A1: zero feet or no removal; Area B1 one half foot of fill removal; Area C1N one half foot of fill removal; and, Area C1S three feet of fill removal. Additionally, as an assumption without the availability of confirmatory soil or ground water testing, this alternative includes estimated costs for removal of one half foot of urban fill from the 25 Water Street Parcel.

## Effectiveness

This would remove some of the OHM-impacted urban fill, limit risks posed by "No Action", and allow for replacement of the same volume of fill removed with clean, imported fill material. Depending upon confirmatory soil sampling results following soil removal actions, an institutional control (Activity and Use Limitation) may be needed for OHM impacts greater than 3 feet below grade within the Park Area. This remedial action would also remove exposure pathways to receptors associated with either direct contact or inhalation of dust from OHM-impacted urban fill.

Construction controls, soil management and health and safety procedures during this removal scenario would limit potential risks to human health, public safety and the environment during remedial activities.

## Implementability

This would be a relatively shallow, soil removal project in an area of Amesbury's Lower Millyard where access to the area by the public could be controlled during remedial actions. There are no significant limitations on the implementation of this alternative.

Administrative activities associated with this alternative would include obtaining federal, and local permits for work activities within the buffer zone and river protection area associated with both the Back and Powow Rivers. These administrative activities are not atypical for similar construction activities and estimated costs for implementation of this alternative are summarized on **Table 6**.

## Cost

Total estimated costs for this alternative, which includes excavation and offsite disposal/recycling of 3,660 tons of soil (2,438 cubic yards) ranges between \$278,017 to \$334,733, including backfilling, grading, permitting, oversight and documentation.

### **2.4 Scenario 3: Capping in Place and Institutional Controls**

This alternative would not remove any OHM-impacted fill material but instead would be designed to limit exposure pathways to OHM-impacted soil by capping the area with soil and institutional controls (Activity and Use Limitation). HEA has experience with two other similar remedial alternative analysis that included potentially capping and institutional controls on OHM-impacted soil located immediately proximate to the Powow River but downstream of the Park Area. In both instances, the alternative was not considered viable as :1) capping with imported fill would require replacement of equivalent compensatory land for restoration of wetland buffer and river front area, flood plain capacity; and 2) permitting costs for this alternative would be significant; approaching the total costs under Scenario No. 2 - Limited soil removal and replacement.

## Effectiveness

This would control exposure pathways to human receptors associated with direct contact or inhalation of OHM-impacted fill materials. There would some engineering risk that future flooding or riverbank scouring could impact the integrity of a cap. River scouring and bank erosion are already readily apparent on nearby portions of the Back and Powow Rivers.

Construction controls, soil management and health and safety procedures during this capping scenario would limit potential risks to human health, public safety and the environment during remedial activities.

## Implementability

This would be a relatively shallow, capping project in an area of Amesbury's Lower Millyard where access to the area by the public could be controlled during remedial actions. There are no physical limitations on the implementation of this alternative.

Administrative activities associated with this alternative would include obtaining federal, and local permits for work activities within the buffer zone and river protection area associated with both the Back and Powow Rivers; including compensatory wetland and river front flood plain replacement/restoration. These administrative activities could be substantial and approach overall costs compared to removal and replacement of fill materials (existing grades not changed).

## Cost

Total estimated costs for this alternative, which includes importing of three feet of clean fill material, grading, placement of a permeable demarcation barrier, some paving and permitted, are estimated to be in excess of \$500,000 as an equivalent area of land as the Park Area (1.4 acres with 25 Water Street figured in), within a similar wetland buffer, river front protection area would have to be identified, purchased, and as needed restored to a similar function as the current Park Area. From a cost benefit approach, capping and institutional controls is not considered a viable remedial alternative. Costs for this scenario are not summarized on **Table 6**.

---

### 3.0 RECOMMENDED REMEDIAL ACTION ALTERNATIVE

Based upon this ABCA assessment and documented OHM-impacts to urban fill throughout the Park Area, future use by children, adults and women of child bearing age, HEA recommends Scenario No. 1 - Removal of all urban fill to depths upwards of three feet below grade. Costs for this approach are approximately twice that for a minimum level of urban fill removal, noted in Scenario No. 2. There is no greater risk reducing advantage of Scenario No. 1 over No. 2 but Scenario No. 1 is more robust as once the urban fill is substantially removed it is less likely to pose a future risk than if some shallow urban OHM-impacted fill materials remain at depths less than 3 feet below grade and is disturbed by future use in the Park Area. Future use in the Park Area would include excavation for utilities and other Park features such as trees or sculpture.

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## 4.0 REFERENCES

HEA utilized the following documents as part of this ABCA:

1. ASTM E 1903-11, *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process*, 2011.
2. November 29, 2012 ASTM Phase II Environmental Site Assessment for 27, 29 and 31 Water Street, Amesbury, Massachusetts prepared by HEA for the City of Amesbury.
3. November 13, 2012 ASTM Phase I Environmental Site Assessment for 25 Water Street, Amesbury, Massachusetts prepared by HEA for the City of Amesbury.
4. Executive Office of Environmental Affairs, Massachusetts Geographical Information System (MassGIS) electronic files pertaining to environmental setting of the Park Area (aquifers, surface water bodies, public water supply sources).
5. MassDEP reports for 27 and 31 Water Street documented Disposal Site conditions.

# HEA

## APPENDIX A

### SITE MAPS

**27, 29 and 31 WATER STREET ANALYSIS OF BROWNFIELD CLEANUP  
ALTERNATIVES -HERITAGE PARK AREA  
AMESBURY, MASSACHUSETTS**

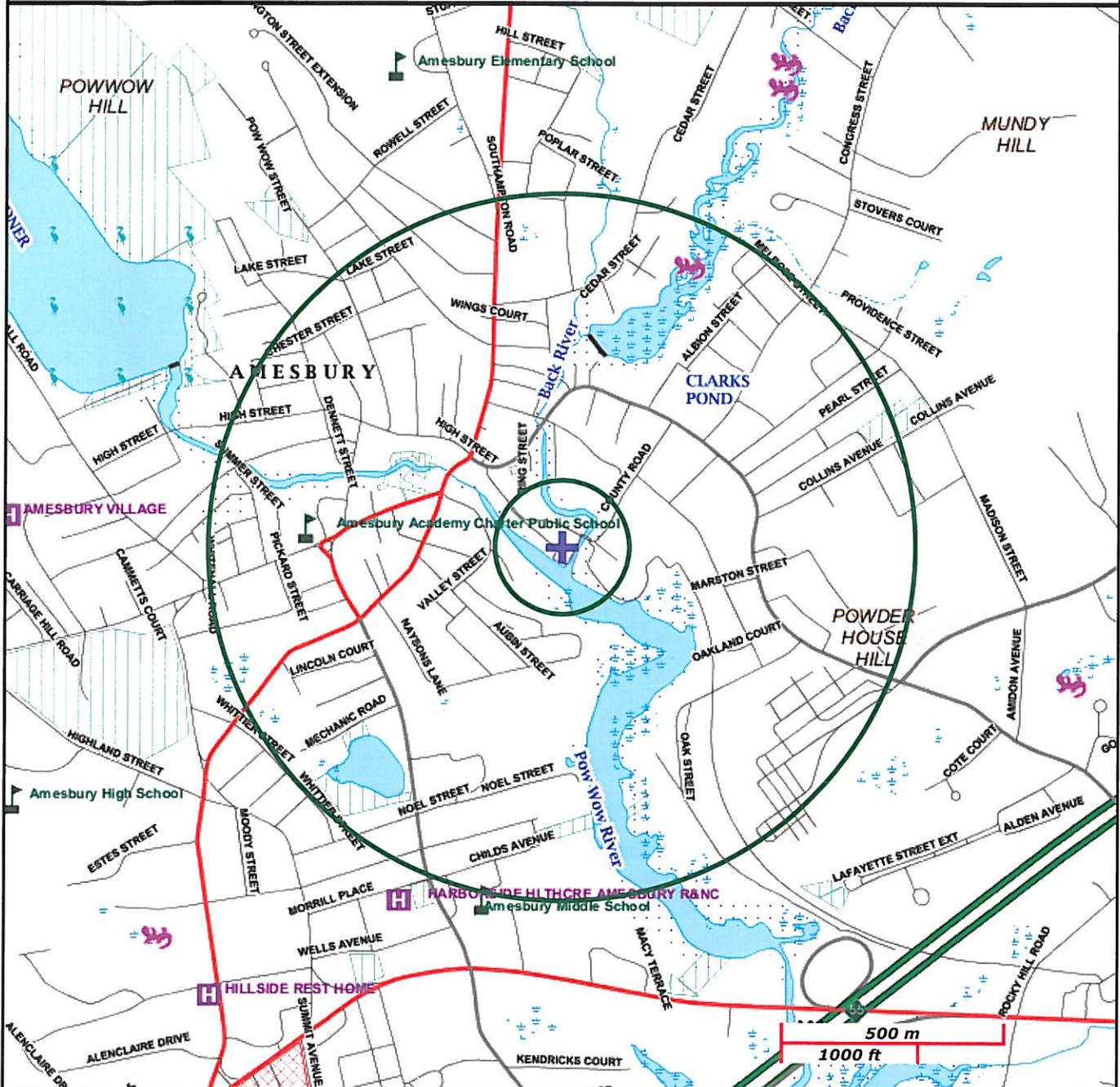
# MassDEP - Bureau of Waste Site Cleanup

## MCP Numerical Ranking System Map: 500 feet & 0.5 Mile Radii

**Site Information:**  
 FIGURE 1 - GENERAL HERITAGE PARK AREA  
 27-31 WATER STREET AMESBURY, MA

**NAD83 UTM Meters:**  
 4746640mN, 342523mE (Zone: 19)  
 November 27, 2012

The information shown is the best available at the date of printing. However, it may be incomplete. The responsible party and LSP are ultimately responsible for ascertaining the true conditions surrounding the site. Metadata for data layers shown on this map can be found at: <http://www.mass.gov/mgis/>.



Roads: Limited Access, Divided, Other Hwy, Major Road, Minor Road, Track, Trail	PWS Protection Areas: Zone II, WPA, Zone A			
Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct	Hydrography: Open Water, PWS Reservoir, Tidal Flat			
Basins: Major, PWS; Streams: Perennial, Intermittent, Man Made Shore, Dam	Wetlands: Freshwater, Saltwater, Cranberry Bog			
Aquifers: Medium Yield, High Yield, EPA Sole Source	FEMA 100yr Floodplain; Protected Open Space; ACEC			
Non Potential Drinking Water Source Area: Medium, High (Yield)	Est. Rare Wetland Wildlife Hab; Vernal Pool: Cert, Potential			
	Solid Waste Landfill; PWS: Com. GW, SW, Emerg., Non-Com.			

**Figure 2 - Site Plan, Heritage Park, Amesbury, MA**

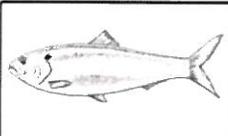


100 50 0 100 Feet  
1 inch equals 50 feet

-  **Approximate Heritage Park Area**
-  **Proposed Soil Probe Location**
-  **Soil Probe Location**
-  **Ground Water Monitoring Well**



**N**

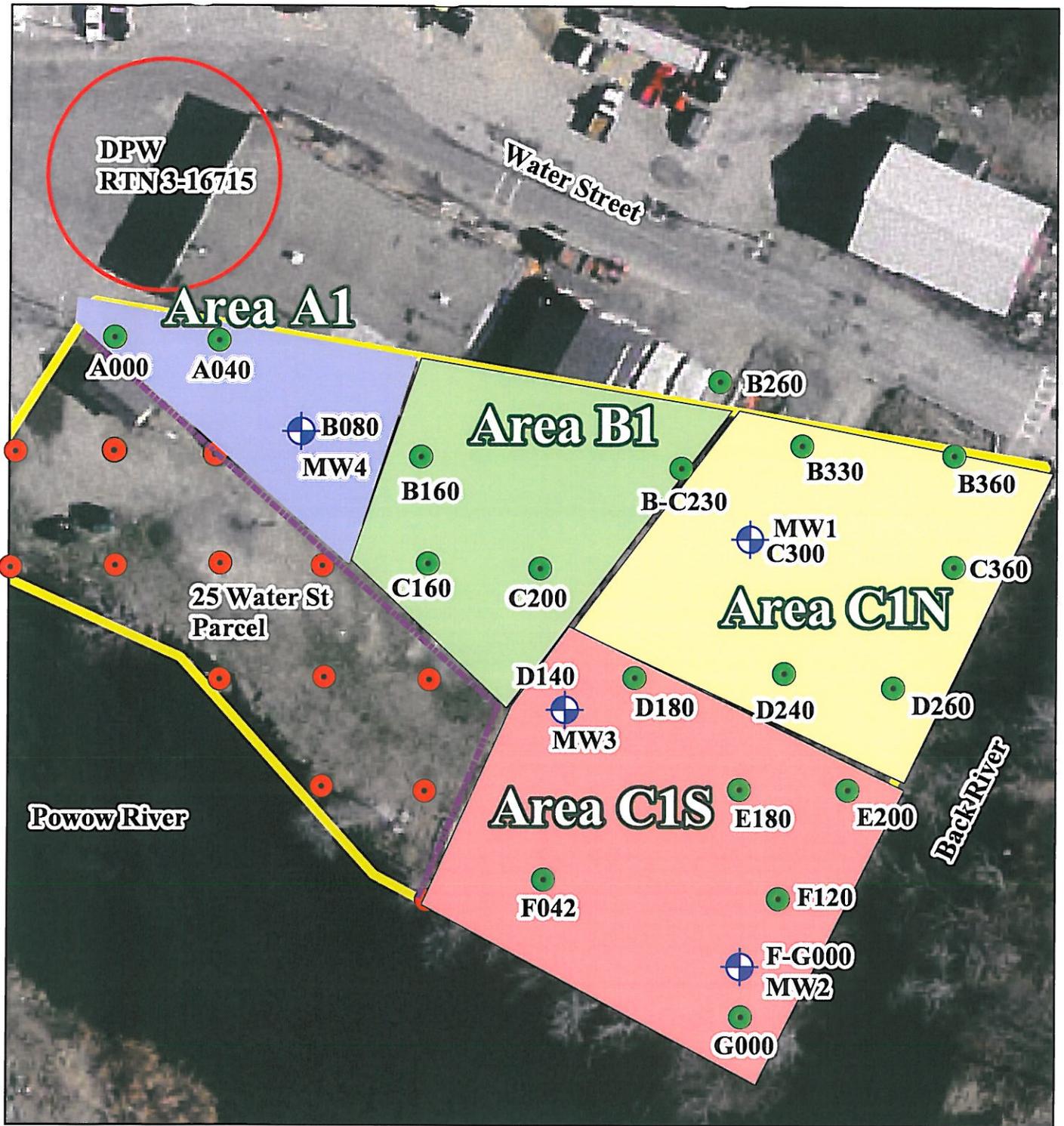





**Higgins  
Environmental  
Associates, Inc.**  
Environmental Science and Hydrogeology

Data Source: EOE/MassGIS Datalayers and HEA field measurements

**Figure 3 - Composite Soil Sample Areas**



100 50 0 100 Feet

1 inch equals 50 feet



**Approximate Heritage Park Area**



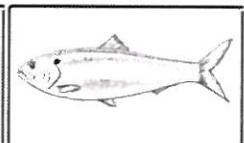
**Proposed Soil Probe Location**



**Soil Probe Location**



**Ground Water Monitoring Well**



**Higgins  
Environmental  
Associates, Inc.**  
Environmental Science and Hydrogeology

**Data Source: EOE/MassGIS Datalayers and HEA field measurements**

# Figure 4 - Ground Water Flow Direction, Heritage Park



100 50 0 100 Feet

1 inch equals 50 feet



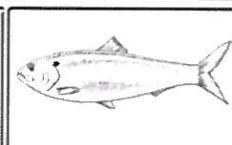
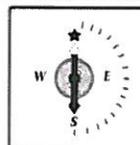
**Approximate Heritage Park Area**



**Ground Water Monitoring Well with corrected water elevation ###.# in feet**



**Interpreted Ground Water Elevation Contours with Elevation in ###.# feet and Flow Direction by Arrow**



**Higgins  
Environmental  
Associates, Inc.**

Environmental Science and Hydrogeology

**Data Source: EOEA/MassGIS Datalayers and HEA field measurements**

## APPENDIX B

### SUMMARY TABLES 27, 29 and 31 WATER STREET ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES -HERITAGE PARK AREA AMESBURY, MASSACHUSETTS

TABLE 1 - ASTM PHASE II SOIL ANALYTICAL RESULTS  
PROPOSED HERITAGE PARK, AMESBURY, MASSACHUSETTS

SAMPLE LOCATION DEPTH Date Collected	DISCRETE SAMPLES				COMPOSITE SAMPLES				MCP Method 1 Standards							
	B260 0-3 FT 10/31/2012	PC230 3-8 FT 10/31/2012	D240 0-7 FT 10/31/2012	F080 0-2 FT 10/31/2012	F080D 0-2 FT 10/31/2012	B080 4-5 FT 10/31/2012	A000 5 FT 10/31/2012	A1	B1	C1N	C1S	C1SD	REPORTABLE CONCENTRATIONS	S-1	S-2	S-3
<b>VOLATILE ORGANIC COMPOUNDS (only compounds detected at one or more locations shown)</b>																
Toluene	ND(0.053)	ND(0.063)	ND(0.071)	4	7.2	ND(0.038)	ND(0.033)	NT	NT	NT	NT	NT	3071000	500	1000	2,000
Ethylbenzene	ND(0.053)	ND(0.063)	ND(0.071)	0.14	0.22	ND(0.038)	ND(0.033)	NT	NT	NT	NT	NT	4641000	500	1000	1000
m,p-Xylene	ND(0.11)	ND(0.13)	ND(0.14)	0.63	0.97	ND(0.077)	ND(0.065)	NT	NT	NT	NT	NT	3002000	300	300	300
o-Xylene	ND(0.053)	ND(0.063)	ND(0.071)	0.12	0.18	ND(0.038)	ND(0.033)	NT	NT	NT	NT	NT	3003000	300	300	300
1,3,5-Trimethylbenzene	ND(0.053)	ND(0.063)	ND(0.071)	0.088	0.088	ND(0.038)	ND(0.033)	NT	NT	NT	NT	NT	NS	NS	NS	NS
Styrene	ND(0.053)	ND(0.063)	ND(0.071)	0.2	0.14	ND(0.038)	ND(0.033)	NT	NT	NT	NT	NT	440	40	40	40
<b>TOTAL PETROLEUM HYDROCARBONS</b>																
TPHs	NT	96	NT	NT	NT	NT	NT	983	937	1330	1460	1990	1000/2000	1000	3000	5000
<b>SEMI-VOLATILE ORGANIC COMPOUNDS (only compounds detected at one or more locations shown)</b>																
Naphthalene	NT	0.14	NT	NT	NT	NT	NT	ND(0.56)	0.14	ND(0.62)	ND(0.59)	ND(0.58)	440	40	40	40
2-Methylnaphthalene	NT	0.13	NT	NT	NT	NT	NT	ND(0.56)	ND(0.11)	ND(0.62)	ND(0.59)	ND(0.58)	0.780	80	80	80
Acenaphthylene	NT	ND(0.12)	NT	NT	NT	NT	NT	ND(0.56)	0.36	ND(0.62)	ND(0.59)	ND(0.58)	1/10	10	10	10
Acenaphthene	NT	0.31	NT	NT	NT	NT	NT	ND(0.56)	0.31	ND(0.59)	ND(0.58)	ND(0.58)	47000	1000	3000	5000
Dibenzofuran	NT	0.20	NT	NT	NT	NT	NT	ND(0.56)	0.2	0.76	ND(0.59)	ND(0.58)	NS	NS	NS	NS
Fluorene	NT	0.33	NT	NT	NT	NT	NT	ND(0.56)	0.34	0.98	ND(0.59)	ND(0.58)	1000/3000	1000	3000	5000
Phenanthrene	NT	2.40	NT	NT	NT	NT	NT	ND(0.56)	2.7	9.6	ND(0.59)	ND(0.58)	1000/3000	500	1000	3000
Anthracene	NT	0.57	NT	NT	NT	NT	NT	ND(0.56)	0.94	2.3	1.1	1.3	1000/3000	1,000	3,000	5,000
Di-methylphthalate	NT	ND(0.18)	NT	NT	NT	NT	NT	ND(0.84)	ND(0.17)	ND(0.93)	6.6	3.5	NS	NS	NS	NS
Fluoranthene	NT	3.60	NT	NT	NT	NT	NT	0.75	5.5	13	6.4	7.1	1000/3000	1000	3000	5000
Pyrene	NT	2.30	NT	NT	NT	NT	NT	1.5	3.4	7.7	4	4.6	1000/3000	1000	3000	5000
Benzo(a)anthracene	NT	1.20	NT	NT	NT	NT	NT	1.1	3	5	2.7	2.9	740	7	40	300
Chrysene	NT	1.10	NT	NT	NT	NT	NT	1.1	2.9	4.9	2.7	2.9	70400	70	400	3000
Benzo(b)fluoranthene	NT	ND(0.18)	NT	NT	NT	NT	NT	ND(0.84)	ND(0.17)	ND(0.93)	2.7	2.6	200/700	200	700	3000
Benzo(k)fluoranthene	NT	0.93	NT	NT	NT	NT	NT	1.3	2.7	5.5	3.2	3.3	740	7	40	300
Benzo(a)pyrene	NT	0.76	NT	NT	NT	NT	NT	ND(0.56)	1.6	1.9	1.1	1.2	70400	70	400	3000
Dibenz(a,h)anthracene	NT	1.20	NT	NT	NT	NT	NT	1.1	4.6	4.2	2.5	2.5	2/4	2	4	30
Indeno(1,2,3-cd)pyrene	NT	0.25	NT	NT	NT	NT	NT	ND(0.56)	0.89	0.78	ND(0.59)	ND(0.58)	0.7/4	0.7	4	30
Benzo(a)perylene	NT	0.80	NT	NT	NT	NT	NT	0.84	2.5	3.1	1.9	2	740	7	40	300
<b>POLYCHLORINATED BIPHENYLS</b>																
PCBs Total	ND(0.1)	NT	NT	NT	NT	NT	NT	ND(0.1)	0.144	1.36	4.6	2.24	2/3	2	3	3
Arochlors 1254	NT	NT	NT	NT	NT	NT	NT	0.144	1.36	4.6	2.24	2.24				
<b>PRIORITY POLLUTANT (E-List) METALS</b>																
Antimony	NT	ND(0.8)	NT	NT	NT	NT	NT	ND(0.78)	ND(0.73)	ND(0.75)	ND(0.84)	ND(0.66)	20/30	20	30	30
Arsenic	NT	16.6	NT	NT	NT	NT	NT	49.4	16.6	92.6	10.4	12.8	20/20	20	20	20
Barium	NT	65	NT	NT	NT	NT	NT	62	62	92.7	75.8	50.1	1000/3000	1,000	3,000	5,000
Beryllium	NT	ND(0.4)	NT	NT	NT	NT	NT	ND(0.39)	ND(0.36)	ND(0.37)	ND(0.33)	ND(0.33)	100/200	100	200	200
Cadmium	NT	1.42	NT	NT	NT	NT	NT	1.29	1.22	1.64	2.26	1.1	2/30	2	30	30
Chromium	NT	18.6	NT	NT	NT	NT	NT	16.3	15.8	20.6	24	19.3	30/200	30	200	200
Copper	NT	21.7	NT	NT	NT	NT	NT	78	171	847	203	165	300/300	300	300	300
Lead	NT	0.34	NT	NT	NT	NT	NT	0.178	0.221	0.447	0.489	0.248	20/30	20	30	30
Nickel	NT	13.3	NT	NT	NT	NT	NT	16.2	14.7	12.1	15.2	16.8	20/200	20	200	200
Selenium	NT	ND(0.8)	NT	NT	NT	NT	NT	ND(0.78)	ND(0.73)	ND(0.75)	ND(0.84)	ND(0.66)	20/200	20	200	200
Silver	NT	ND(0.4)	NT	NT	NT	NT	NT	ND(0.39)	ND(0.36)	ND(0.37)	ND(0.42)	ND(0.33)	100/200	100	200	200
Thallium	NT	ND(0.6)	NT	NT	NT	NT	NT	ND(0.16)	ND(0.15)	ND(0.15)	ND(0.17)	ND(0.13)	80/60	8	60	80
Vanadium	NT	13.7	NT	NT	NT	NT	NT	8.39	18.8	14.4	13	15.1	600/1000	600	1,000	1,000
Zinc	NT	231	NT	NT	NT	NT	NT	148	217	246	1320	176	2,500/5,000	2,500	3,000	5,000

Notes for Table 1

1. Results reported in milligrams per kilogram (parts per million)
2. All laboratory analysis completed using EPA-specified methods
3. Method 1 soil risk characterization criteria reported represent most stringent soil criteria in GW2 and GW3 areas. Results in bold are greater than one or more soil criteria.
4. ND(M) = Not detected at laboratory detection limit noted
5. NT = Not Tested. NS = No Standard. NA = Not Applicable or Available

**TABLE 2 - 2012 GROUND WATER ANALYTICAL RESULTS  
HERITAGE PARK, AMESBURY, MA**

SAMPLE LOCATION	HMW1	HMW2	HMW2D	HMW3	HMW4	MCP GW-2 REPORTABLE CONCENTRATIONS	MCP Method 1 Standards GW-2	GW-3
Date Collected	11/6/2012	11/6/2012	Duplicate	11/6/2012	11/6/2012			
<b>VOLATILE ORGANIC COMPOUNDS (only compounds detected in one or more samples shown)</b>								
Full 826(B) List	ND(Various)	ND(Various)	ND(Various)	ND(Various)	ND(Various)	NA	NA	NA
m & p-Xylenes	ND(2)	3.2	ND(2)	ND(2)	ND(2)	5.00	9.00	5.00
o-Xylene	ND(1)	1.1	1.2	ND(1)	ND(1)	5.00	9.00	5.00
<b>TOTAL PETROLEUM HYDROCARBONS</b>								
TPHs	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	5.00	5.00	5.00
<b>SEMIVOLATILE ORGANIC COMPOUNDS (only compounds detected in one or more samples shown)</b>								
Full 8270C List	ND(Various)	ND(Various)	ND(Various)	ND(Various)	ND(Various)	various	various	various
<b>PESTICIDES/POLYCHLORINATED BI-PHENYLS</b>								
PCBs Full 8082-List	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	ND(0.2)	0.01	0.01	0.01
<b>PRIORITY POLLUTANT 13-LIST METALS</b>								
Antimony	0.006	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)	8.00	NA	8.00
Arsenic	ND(0.003)	0.005	ND(0.003)	ND(0.003)	ND(0.003)	0.90	NA	0.90
Barium	0.049	0.057	0.053	0.055	0.01	50.00	NA	50.00
Beryllium	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.20	NA	0.20
Cadmium	0.002	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.004	NA	0.00
Chromium	0.002	0.003	0.003	ND(0.001)	0.002	0.30	NA	0.30
Lead	0.007	0.005	0.004	ND(0.001)	ND(0.001)	0.01	NA	0.01
Mercury	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)	ND(0.0002)	0.02	NA	0.02
Nickel	0.005	0.006	0.005	0.002	ND(0.001)	0.20	NA	0.20
Selenium	0.008	ND(0.003)	ND(0.003)	ND(0.003)	0.008	0.10	NA	0.10
Silver	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	0.01	NA	0.01
Thallium	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	3.00	NA	3.00
Vanadium	0.002	0.002	0.002	ND(0.001)	ND(0.001)	4.00	NA	4.00
Zinc	0.85	0.03	0.018	0.053	ND(0.005)	0.90	NA	0.90
<b>FIELD MEASUREMENTS</b>								
Temperature (deg. C)	12.94	14.62		15.18	15.8			
Conductivity (uS/cm)	487	469		698	180			
Dissolved Oxygen (%)	22.9	7.29		11.64	6.2			
Oxidation-Reduction Potential (mV)	87.3	-34		-77.7	-114			
Salinity (ppt)	0.33	0.3		0.47	0.1			
pH (standard units)	6.67	6.22		6.88	6.81			
Turbidity (NTU)	0.77	3.59		1.56	2.17			
Sample Flow Rate (ml/minute)	80	80		80	80			
Sample Intake (feet below standpipe)	8	8		8	8			
PID Downwell Screening (ppmv)	0.1	2.3		0.1	1.5			

NOTES FOR TABLE 2:

1. Results reported in milligrams per liter (equivalent to parts per million)
2. All laboratory analysis completed using EPA-specified methods and low stress sampling procedures
3. Ground water results in bold are greater than one or more ground water criteria
4. ND(#) - Not detected at laboratory, detection limit noted
5. NT = Not Tested, NS = No Standard, NA = Not Applicable/Available

**Table 3: 2012 Summary of Ground Water Elevations and Urban Fill Material Thickness in Observation Wells  
Heritage Park, Amesbury, MA**

Well Number	Date Installed	Measuring Point Elevation <sup>1</sup>	Ground Elevation <sup>1</sup>	11/16/2006			
				Depth to Water from Top of Casing (ft)	Ground Water Elevation (ft)	Depth of Urban Fill from Grade	Elevation of Base of Fill Materials
HMW1	10/31/2012	86.98	87.28	2.36	84.62	7.00	80.28
HMW2	10/31/2012	84.95	85.45	4.08	80.87	2.00	83.45
HMW3	10/31/2012	86.92	87.22	2.6	84.32	2.50	84.72
HMW4	10/31/2012	89.10	89.40	4.43	84.67	4.00	85.40

Notes:

1. Survey data is based on a level loop elevation survey conducted by Higgins Environmental Associates, Inc. on November 6, 2012.
2. Depth to water measurements with an electronic water level tape graduated in 1/100ths of a foot.

Table 4 - ASTM MCP Method 1 Risk Characterization Data for Soil (Includes prior data from

EXPOSURE POINT CONCENTRATIONS BY AREA										
SAMPLE LOCATION	A1	B1	C1N	C1N	C1S	25 Water	MCP Method 1 Standards			
	0-3 feet	0-3 feet	0-3 feet	3-8 feet	0-3 feet	0-3 feet	S-1	S-2	S-3	
Date Collected	#####	#####	#####	#####	10/31/2012	NA				
<b>VOLATILE ORGANIC COMPOUNDS</b>										
Toluene	NA	NA	2.19	NA	35.83	NT	500	1,000	2,000	
Ethylbenzene	NA	NA	NA	NA	5.91	NT	500	1,000	1,000	
Total Xylenes	NA	NA	2.11	0.64	39.7	NT	500	300	300	
1,3,5-Trimethylbenzene	NA	NA	NA	NA	0.088	NT	NS	NS	NS	
Naphthalene	NA	NA	NA	0.342	5.7	NT	40	40	40	
<b>TOTAL PETROLEUM HYDROCARBONS</b>										
TPHs	983	937	1330	96	1990	NT	1000	3000	5000	
<b>VOLATILE AND EXTRACTABLE PETROLEUM HYDROCARBONS (31 WATER STREET ONLY)</b>										
C5-C8 Aliphatics	NA	NA	ND	ND	122	NT	100	500	500	
C9-C12 Aliphatics	NA	NA	ND	ND	17.1	NT	1000	3000	5000	
C9-C10 Aromatics	NA	NA	ND	ND	38.5	NT	100	500	500	
C9-C18 Aliphatics	NA	NA	ND	ND	1.95	NT	1,000	3,000	5,000	
C19-C36 Aliphatics	NA	NA	137	409	7.8	NT	3,000	5,000	5,000	
C11-C22 Aromatics	NA	NA	80.65	160	140.44	NT	1000	3000	5000	
<b>SEMIVOLATILE ORGANIC COMPOUNDS</b>										
Naphthalene	NA	0.14	NA	0.14	5.7	NT	40	40	40	
2-Methylnaphthalene	NA	NA	NA	0.13	NA	NT	80	80	80	
Acenaphthylene	NA	0.36	NA	ND(0.12)	NA	NT	10	10	10	
Acenaphthene	NA	0.31	1	0.31	NA	NT	1000	3000	5000	
Dibenzofuran	NA	0.2	0.76	0.2	NA	NT	NS	NS	NS	
Fluorene	NA	0.34	0.98	0.33	NA	NT	1000	5000	5000	
Phenanthrene	NA	2.7	9.6	2.4	5.5	NT	500	1000	3000	
Anthracene	NA	0.94	2.3	0.57	1.3	NT	1,000	3,000	5,000	
Di-n-butylphthalate	NA	NA	NA	ND(0.18)	6.6	NT	NS	NS	NS	
Fluoranthene	0.75	5.5	13	3	7.1	NT	1000	3000	5000	
Pyrene	1.5	3.4	7.7	2.3	4.6	NT	1000	3000	5000	
Benzo(a)anthracene	1.1	3	5	1.2	2.9	NT	7	40	300	
Chrysene	1.1	2.9	4.9	1.1	2.9	NT	70	400	3000	
Bis(2-ethylhexyl)phthalate	NA	NA	NA	ND(0.18)	2.7	NT	200	700	3000	
Benzo(b)fluoranthene	1.3	2.7	5.5	0.93	3.3	NT	7	40	300	
Benzo(k)fluoranthene	NA	1.6	1.9	0.76	1.2	NT	70	400	3000	
Benzo(a)pyrene	1.1	4.6	4.2	1.2	2.5	NT	2	4	30	
Dibenzo(a,h)anthracene	NA	0.89	0.78	0.25	NA	NT	0.7	4	30	
Indeno(1,2,3-cd)pyrene	0.84	2.5	3.1	0.89	2	NT	7	40	300	
Benzo(g,h,i)perylene	0.84	1.8	2.7	0.8	1.8	NT	1000	3000	5000	
<b>POLYCHLORINATED BIPHENYLS</b>										
PCBs Total	NA	0.144	1.2	NA	5.4	NT	2	3	3	
<b>PRIORITY POLLUTANT 13-LIST METALS</b>										
Antimony	NA	NA	1.2	4.6	NA	NT	20	30	30	
Arsenic	NA	16.6	12.7	20.9	18.81	NT	20	20	20	
Barium	49.4	62	121.22	91.23	83.25	NT	1,000	3,000	5,000	
Beryllium	NA	NA	0.47	0.75	0.59	NT	100	200	200	
Cadmium	1.29	1.22	1.11	1.42	0.94	NT	2	30	30	
Chromium	16.3	15.8	22.7	31.47	33.8	NT	30	200	200	
Lead	78	171	422	324.8	128.98	NT	300	300	300	
Mercury	0.178	0.221	1.28	0.56	0.39	NT	20	30	30	
Nickel	16.2	14.7	18.17	30.9	13.35	NT	20	700	700	
Selenium	NA	NA	NA	NA	3.85	NT	400	800	800	
Silver	NA	NA	NA	1.2	NA	NT	100	200	200	
Thallium	NA	NA	1	NA	NA	NT	8	60	80	
Vanadium	8.39	18.8	14.4	13.7	15.1	NT	600	1,000	1,000	
Zinc	148	217	272.77	233.93	88.47	NT	2500	3,000	5000	
Total Cyanide	NT	NT	NA	NA	NA	NA	100	400	400	

Notes for Table 4

- Results reported in milligrams per kilogram (parts per million)
- All laboratory analysis completed using EPA-specified methods
- Method 1 soil risk characterization criteria reported represent most stringent soil criteria in GW2 and GW3 areas  
Results in bold are greater than one or more soil criteria
- ND(=) = Not detected at laboratory detection limit noted
- NT = Not Tested, NS = No Standard, NA = Not Applicable or Available
- Exposure point concentrations represent either the arithmetic average when a parameter was detected in three or more samples within each area, or was taken as the highest detected result when fewer than three positive results were obtained within each area, for each parameter
- There are exemptions from reporting due to coal and wood ash: 310 CMR 40.0317(9), for some parameters, particularly semivolatile organics

**TABLE 5 - SUMMARY OF LABORATORY RESULTS FOR SEDIMENT**  
**Back and Powow Rivers, Amesbury**  
**RTN 3-19634 (31 Water Street)**

Sample Designation Location Relative to Park Area Collection Date	POWOW RIVER SAMPLES				BACK RIVER SAMPLES				POWOW RIVER LOCAL CONDITIONS	BACK RIVER LOCAL CONDITIONS	EFFECTS RANGE LOW CONC.
	0300409- SEDI-S1 Downstream 7/12/2001	0300409- SED3-S1 Upstream 7/12/2001	0300409- SED4-S1 Upstream 7/12/2001	0300409- SED5-S1 Upstream 7/12/2001	0300412- SEDI-S1 Downstream 7/12/2001	0300412- SED2-S1 Upstream 7/12/2001	0300412- SED3-S1 Upstream 7/12/2001	0300412- SED4-S1 Upstream 7/12/2001			
<b>METALS</b>											
Beryllium	NT	NT	NT	NT	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	Not Listed
Lead	94.20	43.00	100.00	55.50	96.90	51.60	120.00	120.00	480.00	51.6-480	46.70
<b>Total Organic Carbon</b>											
TOC	1000.00	5800.00	6300.00	4100.00	1200.00	1800.00	1500.00	1800.00	2200.00	1500-2200	NA
<b>VOLATILE PETROLEUM HYDROCARBONS</b>											
C5-C8 Aliphatics	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
C9-C12 Aliphatics	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
C9-C10 Aromatics	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Methyl Tertiary Butylether	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Benzene	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Toluene	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Total Xylenes	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Ethylbenzene	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
Naphthalene	0.024	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	NA
<b>EXTRACTABLE PETROLEUM HYDROCARBONS</b>											
C9-C18 Aliphatics	ND(2)	ND(3)	ND(2)	ND(2)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	ND(3)	NA
C19-C36 Aliphatics	14.10	13.50	19.50	25.00	8.30	28.00	20.00	16.70	17.00	16.7 to 28	NA
C11-C22 Aromatics	13.30	ND(7)	5.88	8.94	ND(7)	ND(7)	7.10	3.20	14.50	3.2 to 14.5	NA
Naphthalene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.16
2-Methylnaphthalene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.07
Phenanthrene	2.16	0.80	0.67	0.76	0.82	0.67 to 0.82	0.50	0.48	1.87	0.48 to 1.87	0.24
Acenaphthene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.02
Acenaphthalene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.04
Anthracene	0.53	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.60	0.60	0.09
Benzo(a)Anthracene	1.21	0.46	0.60	0.70	0.82	0.46 to 0.82	0.62	0.41	0.98	0.41 to 0.98	0.26
Benzo(a)Pyrene	1.11	ND(0.4)	0.55	ND(0.4)	0.47	0.47 to 0.55	0.51	0.36	0.64	0.36 to 0.64	0.43
Benzo(b)Fluoranthene	1.36	0.56	0.67	0.50	0.92	0.5 to 0.92	0.44	0.57	0.57	0.44 to 0.57	NA
Benzo(g,h,i)Perylene	0.54	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	NA
Benzo(k)Fluoranthene	0.65	ND(0.4)	ND(0.4)	ND(0.4)	0.46	ND to 0.46	0.38	0.41	0.40	0.38 to 0.4	NA
Chrysene	1.28	0.51	0.62	0.73	0.86	0.51 to 0.86	0.41	0.41	0.98	0.41 to 0.98	0.38
Dibenz(a,h)Anthracene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.06
Fluoranthene	2.59	1.04	1.27	1.47	1.40	1.04 to 1.66	1.10	0.79	1.90	0.76 to 1.9	0.60
Fluorene	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	0.02
Indeno(1,2,3-cd)Pyrene	0.73	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	ND(0.4)	NA
Pyrene	1.96	0.84	1.07	1.23	1.42	0.84 to 1.42	1.50	0.92	2.40	0.92 to 2.4	0.67
<b>POLYCHLORINATED BIPHENYLS</b>											
PCBs	ND(1)	ND(1)	ND(1)	ND(1)	ND(0.9)	ND(1)	ND(1)	ND(1)	ND(1)	ND(1)	0.02

**NOTES**

1. Compounds in bold typeface represent Chemicals of Concern in either ground water or soil for this Disposal Site
2. Units are in milligrams per kilogram, equivalent to parts per million
3. Local Conditions represent the range of concentrations in COCs among upstream sediment samples. Samples designated with a "SEDI" are downstream of the ASTM Phase II Park Area
4. Effects Range Low represents a screening criteria for sediment, published in "Incidence of Adverse Biological Effects Within Ranges of Chemical Concentrations in Marine and Estuarine Sediments, Long et al. 1995, Environmental Management Volume 19, No. 1 pp 81-97. The use of these ERL guidelines is consistent with 310 CMR 40.0995(3)(1)b
5. Laboratory results for surface water samples from the Back and Powow Rivers were non detectable for COCs
6. Samples collected as composite samples (one foot by one foot by one half foot deep) from discrete sampling locations

**TABLE 6 - ABCA CLEANUP COST ESTIMATES, HERITAGE PARK AREA, AMESBURY, MASSACHUSETTS  
CLEANUP COST ESTIMATE SUMMARY TABLE**

Task	Park SubArea	Depth of Excavation	Estimated Quantity	Subtask	Unit Cost	Subtotal Cost	Total Cost
<b>1. No Action</b>	AI	NA	NA		NA	\$0.00	
	BI	NA	NA		NA	\$0.00	
	C1N	NA	NA		NA	\$0.00	
	C1S	NA	NA		NA	\$0.00	
	25 Water	NA	NA		NA	\$0.00	
						Subtotal No 1 =	\$0.00
					<b>Total No. 1 =</b>	<b>\$0.00</b>	
<b>2. FILL REMOVAL (recommended depths)</b>	AI	0.00	0.00 Tons	Disposal	\$33-55	\$0.00	
	BI	1 Foot	512 Tons		\$33-55	\$16,896.00	
	C1N	3 Feet	2,076 Tons		\$33-55	\$68,508.00	
	C1S	3 Feet	2,578 Tons		\$85,074-141,790	\$218,652.00	
	25 Water	1 Foot	962 Tons		\$33-55	\$31,746-52,910	
						Subtotal =	\$202,224-258,940
	AI	0.00	0.00 CY	Excavation	6.50 CY	\$0.00	
	BI	3-41 CY	341 CY		6.50 CY	\$2,217.00	
	C1N	1,384 CY	1,384 CY		6.50 CY	\$8,996.00	
	C1S	1,718 CY	1,718 CY		6.50 CY	\$11,167.00	
25 Water	641 CY	641 CY	6.50 CY		\$4,167.00		
					Subtotal =	\$16,547.00	
	AI	0.00	0.00 Tons	Backfill and Gravel	\$18 ton	\$0.00	
	BI	512 Tons	512 Tons		\$18 ton	\$9,216.00	
	C1N	2,076 Tons	2,076 Tons		\$18 ton	\$37,368.00	
	C1S	2,578 Tons	2,578 Tons		\$18 ton	\$46,404.00	
	25 Water	962 Tons	962 Tons		\$18 ton	\$17,316.00	
						Subtotal =	\$110,304.00
	All Areas		\$34,000	Permitting, Plans, A.I.	job	\$34,000.00	
						Subtotal =	\$34,000.00
	All Areas		\$41,500	Overnight, H.S.S.	job	\$41,500.00	
						Subtotal =	\$41,500.00
					<b>Total No. 2 =</b>	<b>\$104,575 - \$461,291</b>	

Notes for Cost Estimate Summary Table

1. All Quantities, Unit Costs, Estimated Quantities, Sub and Total Costs are estimates only. Actual costs will vary, depending upon bid estimates, prevailing wages and actual quantities removed or backfilled.

2. Based on our knowledge of site conditions and laboratory results for soil, we believe estimated costs are reasonable for planning purposes.

Summary of Cost Estimates Continued

Task	Park SubArea	Depth of Excavation	Estimated Quantity	Subtask	Unit Cost	Subtotal Cost	Total Cost
3. Minimum Required Fill Removal	A1	0.00	NA	Disposal	NA	\$0.00	
	B1	0.5 Feet	255 Tons		\$33/ton	\$8,426.00	
	C1N	0.5 Feet	346 Tons		\$33/ton	\$11,418.00	
	C1S	3 Feet	2578 Tons		\$55/ton	\$85,074-141,790	
	25 Water	0.5 Feet	481 Tons	\$33/ton	\$15,872.00		
					Subtotal No. 1 =	\$120,790 - \$177,506	
				Excavation			
	A1	0.00	0.0 CY	Excavation	6.50 CY	\$0.00	
	B1	0.5 Feet	170 CY		6.50 CY	\$1,105.00	
	C1N	0.5 Feet	230 CY		6.50 CY	\$1,495.00	
	C1S	3 Feet	1,718 CY		6.50 CY	\$1,167.00	
	25 Water	0.5 Feet	320 CY		6.50 CY	\$2,080.00	
					Subtotal =	\$15,847.00	
				Backfill and Grade			
	A1	0.00	NA	Backfill and Grade	\$18 ton	\$0.00	
	B1	0.5 Feet	255 Tons		\$18 ton	\$4,590.00	
	C1N	0.5 Feet	346 Tons		\$18 ton	\$6,228.00	
	C1S	3 Feet	2578 Tons		\$18 ton	\$46,404.00	
	25 Water	0.5 Feet	481 Tons		\$18 ton	\$8,658.00	
					Subtotal =	\$65,880.00	
				Permitting, Plans, A11			
	All Areas		\$34,000	job		\$34,000.00	
						Subtotal =	\$34,000.00
				Over-sight, H&S			
	All Areas		\$41,500	job		\$41,500.00	
						Subtotal =	\$41,500.00
						Total No. 3 =	\$278,017 - \$334,733

Range in Cost Estimates for Remedial Work = \$278,017 to \$461,291

# HEA

## APPENDIX C

**LIMITATIONS, CONDITIONS, AND EXCEPTIONS  
27, 29 and 31 WATER STREET ANALYSIS OF BROWNFIELD CLEANUP  
ALTERNATIVES -HERITAGE PARK AREA  
AMESBURY, MASSACHUSETTS**

## LIMITATIONS

1. Observations described in this document were made under the conditions stated herein. Findings presented in this document were based solely upon the services and sources of information described herein and not on scientific tasks or procedures beyond the scope of the described services or the time or budgetary constraints imposed by our client. The work described in this document was conducted in accordance with the agreed upon Terms and Conditions and applicable Addenda. Any additional information that becomes available concerning this Site should be provided to HEA so that our conclusions may be revised and/or modified, as necessary.
2. In preparing this document, HEA has relied upon certain information provided by parties referenced herein. Except as expressly stated in this document, HEA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of our services.
3. Except as expressly stated in this document, HEA did not perform any testing, screening, laboratory analyses, or other method to determine the presence or concentration of oil and hazardous materials including asbestos, asbestos-containing material, radon, lead, lead-enriched paints, molds, mildew, bacteria, ureaformaldehyde, or polychlorinated biphenyls (PCBs) at the Site.
4. Except as expressly stated in this document, the scope of work for this project did not include any attempt to check on the compliance of present or past owners or operators of the Site with any federal, state, or local laws, regulations, or ordinances, environmental or otherwise.
5. Except as expressly stated in this document, no file reviews or interviews at the local, state, federal, or any other level were conducted as part of these services.
6. Results stated in this document apply only to those portions of the Site monitored during this assessment. HEA does not and cannot represent that the Site contains no hazardous material or oil or other latent conditions beyond those tested, detected, or observed by HEA during our services.
7. This document is furnished solely for the exclusive, internal use and reliance of the City of Amesbury (hereinafter "Client"), their legal counsel, and for submittal to appropriate

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8. HEA's findings do not include the assessment of environmental conditions where access was restricted or limited by client or physical conditions such as buildings, snow cover, water, pavement, debris, or locking gates and fencing. HEA has not employed destructive or invasive assessment techniques to ascertain the environmental condition of the site or site structures.
  
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