

**Superfund Records Center**

**SITE:** IRON HORSE

**BREAK:** 8.3

**OTHER:** 295058



SDMS DocID

**295058**

**Third Five-Year Review Report**

**for**

**Iron Horse Park Superfund Site**

**Operable Units 1, 2, 3, and 4**

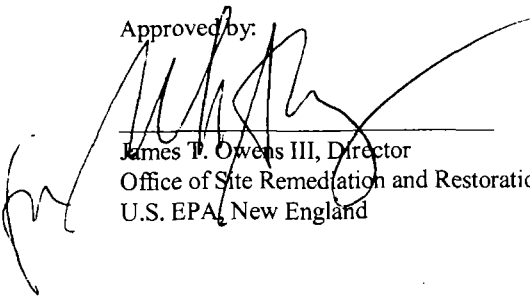
**North Billerica, Massachusetts**

**September, 2008**

**PREPARED BY:**

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\_\_\_\_\_  
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Date:

9-26-08

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## Executive Summary

The Iron Horse Park Superfund Site has been divided into four operable units (OUs). The remedy for OU-1, the B&M Wastewater Lagoons, included removal and off-site asphalt batching of contaminated soils. Construction of the OU-1 remedy was completed in 2003. The remedy for OU-2, the Shaffer Landfill, included capping of the landfill and long-term environmental monitoring. Construction of the OU-2 remedy was completed in 2003. The remedy for OU-3, the remaining source areas at the site, involves capping of landfills and contaminated soil at six different areas of concern, as well as maintenance of a landfill cap at a seventh area of concern. Design of the OU-3 remedy is currently under way. There has not yet been a remedy established for OU-4, which consists of site-wide surface water, sediment, soil (in areas not addressed in OUs 1 through 3), and groundwater. This is the third five-year review for the Iron Horse Park site. The triggering action for this review is the second five-year review which was signed on September 28, 2003.

The remedy at OU-1 is expected to be protective of human health and the environment from risks from CERCLA contaminants. Plans are currently being developed to evaluate and remove asbestos materials discovered during implementation of the OU-1 remedial action. Access will be restricted to the area until the asbestos materials are removed.

The remedy at OU-2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The landfill is fenced to prevent access, however, required institutional controls have not yet been established. Institutional controls will be created and recorded to restrict inappropriate land uses and protect the landfill cap and other components of the remedy. Operation and Maintenance activities have been initiated and will ensure that the landfill and associated components of the remedy remain in good condition. In addition, monitoring of groundwater and surface water to assess progress towards attainment of cleanup levels will continue.

At this time, remedy construction has not been implemented for OU-3. The Remedial Action Objectives (RAOs), Applicable and Relevant and Appropriate standards (ARARs) for the remedy established in the ROD, and established cleanup levels remain valid and protective. The remedy at OU-3 is expected to be protective upon completion.

The site has historically been identified with asbestos contamination due to asbestos landfilling operations by Johns-Manville over a 32-year period. Asbestos has been detected in multiple soil samples at the site and it is possible that the residual soil asbestos levels detected at this site may pose an unacceptable cancer risk to current and future receptor populations, especially considering that the site appears to be utilized for recreational purposes including dirt bike usage that can generate high levels of airborne dust. The risk posed by residual asbestos will be investigated and addressed as part of OU-4.



## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site name (from WasteLAN):</b> Iron Horse Park		
<b>EPA ID (from WasteLAN):</b> MAD051787323		
<b>Region:</b> 1	<b>State:</b> MA	<b>City/County:</b> Billerica/Middlesex
SITE STATUS		
<b>NPL status:</b> <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
<b>Remediation status</b> (choose all that apply): <input checked="" type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
<b>Multiple OUs?*</b> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>Construction completion date:</b> N/A	
<b>Has site been put into reuse?</b> Partial ecological reuse via wetland replication		
REVIEW STATUS		
<b>Lead agency:</b> <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
<b>Author name:</b> Don McElroy		
<b>Author title:</b> Remedial Project Manager	<b>Author affiliation:</b> EPA Region I	
<b>Review period:**</b> 04/23/08 to 09/28/08		
<b>Date(s) of site inspection:</b> 08/05/08		
<b>Type of review:</b>		
<input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
<b>Review number:</b> <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
<b>Triggering action:</b>		
<input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify) _____		
<b>Triggering action date (from WasteLAN):</b> September 28, 2003		
<b>Due date (five years after triggering action date):</b> September 28, 2008		

\* ["OU" refers to operable unit.]

\*\* [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

## Five-Year Review Summary Form, cont'd.

### Issues:

#### OU-1

There are no current issues which would prevent unrestricted use of the site based on CERCLA risks from the CERCLA contaminants addressed under the *OU-1 Record of Decision (ROD) and Explanation of Significant Differences (ESD)*. There is potential for exposure to the areas previously observed to contain asbestos materials. However, an action by the Settling Defendants is planned to remove these asbestos-containing materials in fall 2008.

#### OU-2

Institutional controls restricting inappropriate land uses and protecting the landfill cap and other components of the remedy need to be established.

#### OU-3

There are no current issues which would prevent the selected remedy at OU-3 from being considered protective.

If the extent of capping an AOC is based on the lead cleanup level for human health, it may be appropriate to calculate and establish a new lead cleanup level based on the additional population statistics under EPA's adult lead methodology.

Once construction of the remedy is completed, long-term institutional controls restricting inappropriate land uses and protecting the source area caps and other components of the remedy will need to be established.

### Recommendations and Follow-up Actions:

#### OU-1

Follow-up actions identified at OU-1 include evaluating and removing the asbestos deposits in the areas previously observed to contain asbestos materials (fall 2008).

#### OU-2

No recommendations or follow-up actions with regard to protectiveness have been identified for OU-2 other than the implementation of institutional controls. Discussions between EPA, MassDEP, and the property owners should be re-started in 2009. Upon completion of discussions between the parties, institutional controls should be established at OU-2 by the end of 2010.

#### OU-3

No recommendations or follow-up actions with regard to protectiveness have been identified for OU-3 other than evaluation of the lead cleanup level. A new lead cleanup level based on the additional population statistics under EPA's adult lead methodology will be evaluated in fall of 2008 by EPA. If a new cleanup level is required, it will be addressed in 2009 and incorporated into the *OU-3 Remedial Design (RD) and Remedial Action (RA)*.

## Five-Year Review Summary Form, cont'd.

### Protectiveness Statement(s):

#### OU-1

The remedy at OU-1 is expected to be protective of human health and the environment from risks from CERCLA contaminants. Plans are currently being developed to evaluate and remove asbestos materials discovered during implementation of the OU-1 remedial action. Access will be restricted to the area until the asbestos materials are removed.

#### OU-2

The remedy at OU-2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The landfill is fenced to prevent access, however, required institutional controls have not yet been established. Institutional controls will be created and recorded to restrict inappropriate land uses and protect the landfill cap and other components of the remedy. Operation and Maintenance activities have been initiated and will ensure that the landfill and associated components of the remedy remain in good condition. In addition, monitoring of groundwater and surface water to assess progress towards attainment of cleanup levels will continue.

#### OU-3

The remedy at OU-3 is expected to be protective upon completion. At this time, remedy construction has not been implemented. The Remedial Action Objectives (RAOs), Applicable and Relevant and Appropriate standards (ARARs) for the remedy established in the ROD, and established cleanup levels remain valid and protective.

#### OU-4

Due to the status of OU-4, a protectiveness statement cannot be generated at this time since no remedy has been selected.

### Other Comments:

None.

## 1.0 Introduction

EPA New England Region has conducted a third five-year review of the remedial actions implemented at the Iron Horse Park Superfund Site in Billerica, Massachusetts. This review was conducted from June 2008 through August 2008. This report documents the results of the review. The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 U.S.C. §§ 9601 *et seq.*, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 C.F.R. Part 300. Section 121(c) of CERCLA 42 U.S.C. 9622(c), states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP, at 40 C.F.R. §300.430(f)(4)(ii), states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the third five-year review for the Iron Horse Park site. The triggering action for this review is the second five-year review which was signed on September 28, 2003. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, a five-year review is required.

## 2.0 Background

The Iron Horse Park site, located in Billerica Massachusetts near the Tewksbury town line (Figure 1), is a 553-acre industrial complex which includes manufacturing and rail yard maintenance facilities, open storage areas, landfills, and former wastewater lagoons. A long history of activities at the site, beginning in 1913, has resulted in the contamination of soil, groundwater, sediment, and surface water. The Iron Horse Park site is bounded on the north by the B&M railroad tracks, on the west by High Street and an auto auction facility, on the east by Gray Street, and on the south by a wetland, Pond Street, and the Middlesex Canal (Figure 2). The Middlesex Canal flows through the site to the east, where it joins Content Brook at the southeastern edge of the Shaffer Landfill. There are abundant wetlands at the site.

The Iron Horse Park Superfund Site was historically surrounded by residential properties and wetlands. This situation remains today and is expected to continue in the future. The majority of the site itself has been historically utilized for commercial and industrial purposes, with an emphasis on rail-related activities. The commercial and industrial uses at the site are expected to continue in the future.

The Iron Horse Park site was listed on the NPL in 1984. In 1984, prior to final placement on the NPL, EPA conducted a removal effort, capping a 13.3-acre asbestos landfill. This area had been used as a landfill for asbestos sludge and other asbestos mill wastes generated by the Johns-Manville Products Corporation, which had a facility within Iron Horse Park. EPA capped this landfill in 1984 as part of an "Immediate Removal Action" under CERCLA.

Following an initial site-wide Remedial Investigation (Phase 1A RI; CDM, 1987), the site was divided into three operable units (OUs). Although part of the same NPL listing, each operable unit is essentially an independent site with separate usage and contamination histories. OU-1 - the B&M Wastewater Lagoons, consists of a former 15-acre wastewater lagoon area. OU-2 - the Shaffer Landfill, is a 60-acre landfill. The Remedial Action (RA) work for OU-1 has been completed, while at OU-2, construction activities were completed and operations and maintenance (O&M) is ongoing. OU-3 consists of the remainder of the source areas at the site. A Record of Decision (ROD) selecting the source control remedy at OU-3 was issued on September 30, 2004 which includes the capping of landfills and contaminated soil areas at six different areas of concern and maintenance of a landfill cap at a seventh area of concern. A settlement to implement the source control remedy at OU-3 was reached with PRPs in the fall of 2007. A fourth operable unit, OU-4, consists of site-wide surface water, sediment, soil (in areas not addressed in OUs 1 through 3), and groundwater. EPA has not yet selected a remedy for OU-4. Although some information regarding OU-4 will be presented in this review, this operable unit will not be the subject of a protectiveness finding.

### **3.0 Five-Year Review of the B&M Wastewater Lagoons (OU-1)**

#### **3.1 Background — OU-1**

OU-1 - the B & M Wastewater Lagoons is an approximately 15-acre area which consisted of 5 unlined lagoons (see figure in Appendix B.2). The lagoons were constructed and put into operation in 1915. During operations (until 1992), the lagoons received industrial and sanitary wastewater and some stormwater from the Iron Horse Park industrial complex via a piping system. The lagoons were dredged numerous times, with the material being placed in soil stockpiles adjacent to the lagoons. A focused Remedial Investigation was conducted at OU-1 in 1988 to determine the nature and extent of contamination in and around the B&M Lagoons (Phase 1B RI; CDM, 1988).

Hazardous substances which have been released at OU-1 in the following media include:

### Soil/Lagoon Sediment

Polycyclic Aromatic Hydrocarbons (PAHs)

Antimony

Arsenic

Cadmium

Chromium

Lead

### 3.2 Chronology — OU-1

DATE	EVENT
1915 (approx)	Lagoons begin operation
1915-1992	Lagoons receive wastewater. Periodically, material is dredged and placed in piles adjacent to lagoons
1984	Site listed on the National Priorities List
1988	EPA completes Remedial Investigation/Feasibility Study
1988	EPA signs Record of Decision choosing bio-remediation of soil/sludge as the remedy.
1990	Settlement reached via Consent Decree with Boston & Maine Corporation agreeing to perform cleanup.
1991	Remedial Design approved
1991(November)	Remedial Action initiated
1992	Discharges to the Lagoons cease
1991-1996	Bio-remediation remedy conducted. Progress slower than anticipated.
1997	EPA issues Explanation of Significant Differences (ESD) - revising remedy to Asphalt Batching
2002	Removal of final load of contaminated material
2003	Final round of confirmatory sampling to demonstrate completion of cleanup work
2003	Site Summary Report submitted in September 2003 to document completion of the Remedial Action

### **3.3 Remedial Actions — OU-1**

#### **3.3.1 Remedy Selection — OU-1**

On September 15, 1988, EPA signed a Record of Decision (ROD) choosing the remedy for OU-1. The remedy included the following:

1. Excavating lagoon sediments and contaminated soil piles to a constructed treatment cell;
2. Treating the contaminated material from the lagoons by bioremediation;
3. Returning the treated material to the lagoon area, covering it with clean soil, and establishing a vegetative cover;
4. Establish land use restrictions limiting disturbance of the treated material and cover soil without prior review by state and federal authorities; and,
5. Decontaminating the lagoon system's piping and pumps.

#### **3.3.2 Remedy Implementation — OU-1**

In a Consent Decree (CD) which was entered on September 13, 1990, Boston and Maine agreed to perform the remedial design/remedial action (RD/RA). The CD also established the following performance standards for the bioremediation remedy:

- 60-80% removal (or  $\leq 1$  ppm) of total PAHs; and
- 50-60% removal of total petroleum hydrocarbons (TPH).

TPH cleanup requirements were subsequently quantified (in July 1993), in alignment with Massachusetts requirements, at 5,000 ppm. This cleanup level is consistent with non-residential use under State regulatory standards. TPH remediation is under State regulatory authority, rather than CERCLA.

In the fall of 1991, the first contaminated material was placed into the bioremediation treatment cell. In the fall of 1994, as required by the ROD, the lagoon system distribution piping was removed, decontaminated, and sent off-site for recycling. The treatment process for contaminated soils and sediments was significantly slower than predicted and had difficulty in achieving cleanup levels. In 1996, it was determined that bioremediation would not achieve the PAH cleanup criterion in a timely manner. As a result, EPA initiated an evaluation of alternatives to

bioremediation which resulted in the issuance of an Explanation of Significant Differences (ESD) revising the remedy. The ESD for OU1 was signed by EPA on October 1, 1997.

The revised remedy specified in the ESD includes the following:

- Excavation of contaminated material, and transport off-site to an asphalt batching plant for treatment;
- Implementation of protective measures during excavation and transport of contaminated material, to prevent the creation of excess dust and spillage; and
- Verification sampling to ensure that all material requiring treatment has been excavated and that any material left at the lagoons does not contain contamination above cleanup criteria (based on non-residential use).

Following the ESD, an Asphalt Batching Work Plan was prepared to document activities to be conducted to implement the revised remedy. These activities included:

- Targeting soil removal areas;
- Soil Disposal Characterization sampling;
- Test pit excavation; and
- Post-excavation confirmatory sampling.

Soil areas to be remediated were delineated based on a review and evaluation of historical soil characterization data, as well as data collected in the early fall of 1997. Data were also used to characterize soils for acceptance at a soil recycling facility. Soil removal activities were conducted in October and November 1997 and were documented in a February 1998 report entitled, "Soil Excavation and Asphalt Batching Report."

In October 2000, additional soil excavation and confirmatory sampling were conducted. The purpose of this effort was to gather confirmatory samples to assess whether additional excavation was necessary and to evaluate potential risks associated with metals in soil. The results of the field work demonstrated that additional soil removal and re-sampling would be necessary.

In December 2001, the following activities were performed at the site:

- Limited additional excavation of soil piles;
- Collection of confirmatory soil samples for PAH and TPH; and



- Collection of limited confirmatory samples for lead.

The soils excavated in December 2001 were stockpiled at the site. In August 2002, the stockpiled soils were transported off-site for asphalt batching.

### **3.3.3 Operation and Maintenance — OU-1**

As documented in the Site Summary Report (ERM, 2003), confirmatory soil samples were collected and showed that soils with contaminants above cleanup requirements were removed from the site. There are no O&M requirements at OU-1.

### **3.4 Progress Since Last Five-Year Review — OU-1**

The previous five-year review for Iron Horse Park was completed in 2003. No further site activities have occurred at OU-1.

No recommendations or follow-up actions were identified at OU-1 in the previous five year review other than establishment of land use restrictions. These land use restrictions have not been established to date. Discussion of the potential need for land use restrictions is presented in Section 3.7 of this report.

The OU-1 protectiveness statement from the previous five-year review noted that review and approval of the Site Summary Report would confirm that the remedy for OU-1 was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection were noted to be valid and no changes to cleanup levels were warranted. The remedy at OU-1 was expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks were being controlled.

### **3.5 Five-Year Review Process — OU-1**

The Iron Horse Park five-year review was led by Don McElroy of EPA, Remedial Project Manager for the Iron Horse Park site, with support from Metcalf & Eddy (M&E), contractor to EPA Region I. This five-year review consisted of a site walkover, a review of relevant OU-1 documents (see Appendix B.1), a review of cleanup standards, and consultation with risk assessment personnel.

#### *Site Walkover*

Remedial activities (summarized above in the Remedy Implementation section) were completed in 2003. A brief site walkover was conducted by M&E and EPA on August 5, 2008 to support the evaluation of the remedy for the five-year review. Photos of the OU-1 area are included in Appendix A.1 and show that there is evidence of all-terrain vehicle (ATV) use. A Site Inspection Checklist was not completed for OU-1, as the PAH-contaminated soils were removed and there is no ongoing post-construction O&M.

During the remedial action excavation, asbestos materials were uncovered in two areas near the asbestos landfill and were subsequently covered with plastic sheeting and soil. During the site walkover, the plastic sheeting in these two areas was visible and not fully intact. Upon closer inspection, exposed asbestos materials were not visible.

### *Interviews*

Interviews regarding the entire Iron Horse Park site were performed on August 13, 2008 with Billerica, Massachusetts town officials. Results of these interviews are summarized in Appendix A.2.

### **3.6 Technical Assessment — OU-1**

*Question A: Is the remedy functioning as intended by the decision documents?*

Yes. The review of documents, ARARs, risk assumptions, and the results of site inspections performed during the remedial action, indicate that the OU-1 remedy was performed as intended by the ROD as modified by the ESD. Since no contaminated material above cleanup levels was left at OU-1, there is no ongoing remedy to “function.” The “construction” of the remedial action (which entails all cleanup activities) has been formally completed, as defined by review and approval of the Site Summary Report (ERM, 2003), which was submitted by the Settling Defendant. Confirmatory sampling results from the Site Summary Report have been included in Appendix B.2. In addition, Appendix B.3 contains groundwater sampling results from a monitoring well (MW-306S) installed in the area and sampled in February 2006. These groundwater results appear to show that the groundwater in the area is no longer being impacted by contaminants which were discharged in the lagoons. Analytes detected were low in concentration and similar to those found in other site monitoring wells.

*Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

Yes. The exposure assumptions used to evaluate risk at OU-1: current worker, future worker and future resident exposure to contaminated soil and sediment, are still valid, though conservative in the case of the future resident since residential land use is not anticipated.

Even though there have been changes in toxicity values and risk assessment methods since the OU-1 risk assessment, soils and sediments have been excavated and confirmatory sampling performed. The confirmatory sampling results and statistical evaluation performed indicate maximum exposure point concentrations for contaminants of concern as follows:

- Total PAHs - 0.91 mg/kg;
- Lead - 320 mg/kg
- Antimony - 2.2 mg/kg
- Arsenic - 5.3 mg/kg
- Cadmium - 0.37 mg/kg; and
- Chromium - 27 mg/kg.

For compounds other than total PAHs, exposure to these residual levels of contaminants would not pose a risk or hazard above EPA's risk management criteria for future commercial/industrial use of the site, based on a comparison to industrial risk-based concentrations developed by EPA (2008). EPA's risk-based concentrations have been developed using currently accepted risk assessment assumptions and methods, and using toxicity values that were selected following the hierarchy recommended by EPA (2003). Assuming that total PAHs are comprised of the most potent PAH, benzo(a)pyrene, the residual total PAH levels would also not pose a risk above EPA's risk management criteria, based on a comparison to the benzo(a)pyrene risk-based concentration for industrial land use. Even though future site use is unlikely to be residential, residual levels of PAHs (assumed to be benzo(a)pyrene) and metals would not pose a risk or hazard above EPA's risk management guidelines to future residents, based on a comparison to residential risk-based concentrations developed by EPA (2008). Elevated levels of TPH, which is regulated under state statute rather than CERCLA, may require additional measures under the Commonwealth's standards.

There are no currently complete groundwater exposure pathways since groundwater is not used at the site as a source of drinking water. However, the arsenic concentration detected in monitoring well MW-306S indicates a likely future risk should groundwater be used for potable purposes. OU-4 will address potential groundwater exposure pathways and risks on a site-wide basis. A groundwater remedy will be implemented, if indicated by the OU-4 evaluation.

The RAOs (at the time of the ROD these were called "remedial response objectives") were developed in response to existing or future risks and were utilized to develop remedial alternatives to address those risks. The RAOs for OU-1 are:

- To protect human health and the environment by stopping the ongoing discharge to the lagoons;
- To protect human health and the environment by reducing current and future risks due to contaminant levels found in soils and sludges from the B&M Lagoons;
- To protect human health and the environment by reducing current and future risks due to releases of contaminants to groundwater, surface water and air; and
- Meet State and federal applicable or relevant and appropriate environmental requirements (ARARs).

These RAOs and the risk-based cleanup levels for OU-1 are still valid for assumed

commercial/industrial land use.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

No. No other information has come to light that could call into question the protectiveness of the remedy at OU-1. Asbestos materials that were uncovered in two areas near the asbestos landfill and were subsequently covered with plastic sheeting and soil during the OU-1 remedial work will require additional action. Plans are currently being developed to evaluate and remove these asbestos deposits.

#### *Technical Assessment Summary*

The Remedy at OU-1 has been conducted as intended in the ROD, as amended by the ESD. The ROD for OU-1 cited a very limited list of ARARs. The ARARs cited had relevancy to conducting the remedial action and do not have current relevancy as all PAHs and metals above CERCLA risk levels for unrestricted use have been removed from the site and no further action under the OU-1 ROD is expected. The First Five-Year Review for Iron Horse Park (M&E, 1998) included the Safe Drinking Water Act (SDWA) as an ARAR even though it was not cited in the OU-1 ROD. However, since that time, OU-4 was established which will address all site groundwater, including any groundwater contamination that may be present under the area of OU-1. The SDWA, which is typically utilized to establish cleanup levels for groundwater, was not cited as an ARAR in the ROD for OU-1.

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (worker) and potential future exposures (worker and resident). Cleanup levels were developed based on assumed future commercial land use. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. When the remedy was changed from on-site bioremediation to excavation and off-site asphalt batching, all PAHs and metals exceeding CERCLA residential risk levels were removed from the site.

Because all material with contamination above cleanup levels has been removed from OU-1, there is no “operating” or “functioning” remedy. The Site Summary Report (ERM, 2003) was submitted by the Settling Defendant, reviewed and approved by EPA, thereby certifying that the performance standards related to construction have been met.

### **3.7 Issues — OU-1**

There are no current issues which would prevent unrestricted use of the site based on CERCLA risks from the CERCLA contaminants addressed under the OU-1 ROD and ESD. However, elevated levels of TPH may require additional action under State authority to allow unrestricted use of the site. Additionally, there is potential for exposure to the areas previously observed to contain asbestos materials. However, an action by the Settling Defendants is planned to remove

these asbestos-containing materials in fall 2008.

### 3.8 Recommendations and Follow-up Actions — OU-1

Follow-up actions identified at OU-1 include evaluating and removing the asbestos deposits in the areas previously observed to contain asbestos materials (fall 2008).

### 4.0 Five-Year Review of Shaffer Landfill (OU-2)

#### 4.1 Background — OU-2

OU-2- Shaffer Landfill is an approximately 60-acre former landfill, which was used for disposal of residential and commercial waste for more than 30 years. Shaffer Landfill stopped receiving waste in 1986. The landfill, which consists of two lobes, is located on a 106-acre property which is bordered by Pond Street to the west, the railroad tracks to the north, Gray Street to the east, and the Middlesex Canal to the south. A focused Remedial Investigation was conducted at OU-2 in 1989 to determine the nature and extent of contamination in and around the Shaffer Landfill (Phase 1C RI; CDM, 1989).

Hazardous substances which have been released at OU-2 in the following media include:

<u>Groundwater</u>	<u>Sediment</u>	<u>Surface Water</u>
Arsenic	acetone	barium
Benzene	toluene	mercury
1,2-Dichloroethane	PAHs	lead
1,2-Dichloroethene	arsenic	nickel
Ethylbenzene	lead	arsenic
Methylene Chloride	zinc	chromium
Toluene		
1,1,2-Trichloroethane		
Trichloroethene		
Vinyl Chloride		
Xylene		

#### 4.2 Chronology — OU-2

DATE	EVENT
From about 1946	Open burning dump
1966	Property purchased by Shaffer Realty Corporation
1966 – 1984	Waste disposal operations at a significant level

DATE	EVENT
1984	Site listed on the National Priorities List
1986	Waste disposal operations cease
1989	EPA completes Remedial Investigation
1991	EPA completes Feasibility Study
1991	EPA signs Record of Decision choosing remedy for Shaffer Landfill
1994	EPA reaches settlement (AOC) with PRP group to conduct Remedial Design
2000	Remedial Design Completed
2000	Settlement via Consent Decree. PRP group agrees to perform Remedial Action
2001	Remedial Action Started
2003	Construction Activities Complete
2003	O&M Initiated

### 4.3 Remedial Actions — OU-2

#### 4.3.1 Remedy Selection — OU-2

On June 27, 1991 EPA signed a ROD choosing the remedy for OU-2. The remedy, reconstructing the landfill cap, determined that reconstruction would be accomplished by:

1. Removing the existing topsoil layer exposing the existing in-place low-permeability soil;
2. Raising gas collection well heads as necessary up to reconstructed cap surface level;
3. Adding additional low-permeability soil;
4. Grading of low-permeability soil to:
  - a) Provide a 5% grade on the top of the landfill lobes, and
  - b) Provide a consistent smooth sub-grade on the landfill side slopes;

5. Installing an impermeable textured membrane liner over the entire landfill area;
6. Installing a 6-inch drainage layer on top of the textured membrane liner over the entire landfill area;
7. Installing a non-woven filter fabric between the drainage and topsoil layers;
8. Reinstalling the topsoil layer and adding additional topsoil to achieve a topsoil depth of 12 inches;
9. Reinstalling an upgraded surface drainage system; and
10. Reseeding of the disturbed areas.

The remedy also includes:

- Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made based upon the protectiveness and effectiveness of these components;
- Monitoring of the gas collection/flare system;
- Monitoring of groundwater and surface water quality;
- Construction, operation, and maintenance of leachate collection facilities;
- Off-site treatment and disposal of leachate;
- Construction of site perimeter security fence;
- Institutional Controls, and
- Post Closure Plan.

Groundwater is the only media for which cleanup levels were established in the ROD. Those cleanup levels are as follows:

Arsenic	50 ppb
Benzene	5 ppb
1,2-Dichloroethane	5 ppb
Methylene Chloride	5 ppb
Pentachlorophenol	1 ppb
1,1,2-Trichloroethane	3 ppb
Trichloroethene	5 ppb
Vinyl Chloride	2 ppb

### **4.3.2 Explanation of Significant Differences (ESD) — OU-2**

The ROD contains discussion regarding the leachate collection facilities which conceptualize a toe-drain system constructed to collect liquid from above the groundwater table. During the Remedial Design process, the design of the leachate toe-drain system posed a number of difficulties, most importantly disagreement over the final elevation of the collection system. There was a dual concern that the toe-drain system: a) would be relatively ineffective in collecting leachate from above the groundwater table (as required by the ROD); and b) carried the risk of being inundated by an elevated groundwater table. The first issue would limit greatly the volume of leachate subject to removal while the second issue would potentially necessitate the collection, treatment and disposal of large volumes of relatively clean groundwater. To reach resolution, on September 8, 2000, EPA issued an ESD modifying the remedy. The ESD modified the remedy so that leachate would be removed via extraction wells directly from the interior of the landfill. Under the modified remedy, leachate would still be collected at a central location for treatment and disposal offsite.

### **4.3.3 Remedy Implementation — OU-2**

The Remedial Design was approved by EPA in the fall of 2000. Also in the fall of 2000, a settlement, via a Consent Decree (CD), was reached with a group of PRPs. Under the terms of the CD, the Settling Defendants agreed to perform the Remedial Action at the Shaffer Landfill implementing the remedy selected in the ROD as modified by the ESD. Construction of the remedy at the Shaffer Landfill began in the spring of 2001. The Remedial Action Work Plan outlined a process whereby one of the landfill lobes would be capped in 2001 and the second lobe would be capped in 2002. Concurrent with the capping process, the other required elements of the remedy would be completed. These other elements included: installation of groundwater monitoring wells; wetland restoration activities; and initiation of periodic (groundwater and surface water) monitoring. The 2001 construction season proceeded as planned, with the substantial completion of construction activities on the first lobe of the landfill. In 2002, a design change which entailed capping a larger area, as well as the onset of wet fall/early winter weather, prevented completion of the second lobe. Construction of the landfill cap was completed during in the summer of 2003. The PRP group, which performed the construction, submitted a final construction report in September 2003 (GeoSyntec, 2003), documenting the construction activities and demonstrating compliance with the requirements of the project. This report was reviewed and approved by EPA, certifying completion of construction. Institutional Controls still have not been established for the landfill, although access is restricted by the Settling Defendants and O&M activities do also note whether trespassing or other disturbance of the remedy has occurred.

### **4.3.4 Operation and Maintenance — OU-2**

The Operation and Maintenance phase of the project began in the fall of 2003. This phase entails inspection and maintenance of the landfill cap and associated features of the remedy, as well as monitoring of groundwater, burning of landfill gas (via the on-site flare) and collection and



disposal of leachate. In addition, wetlands inspections and maintenance, and periodic monitoring of groundwater and surface water are also conducted. Under the terms of the CD, the Settling Defendants are performing the bulk of the required O&M activities for a 40-year period, after which the Commonwealth of Massachusetts (the Commonwealth) will assume responsibility for O&M. The exceptions to this are: landfill soil gas migration monitoring; flare compliance monitoring, and surface water monitoring, which are currently being conducted by the Commonwealth. In addition, depending on how quickly groundwater quality improves, in accordance with the CD, the Commonwealth will take over responsibility for groundwater monitoring activities between 8 and 15 years after the remedy is determined to be “working properly and as designed.”

#### **4.4 Progress Since Last Five-Year Review — OU-2**

Since the last five-year review conducted in 2003, the Final Construction Report was completed by the PRPs and O&M was initiated.

No recommendations or follow-up actions were identified at OU-2 in the previous five-year review other than establishment of land use restrictions. These land use restrictions have not been established to date. Discussion of the establishment of land use restrictions is presented in Section 4.6 through 4.8 of this report.

The OU-2 protectiveness statement from the previous five-year review noted that review and approval of the Final Remedial Construction Report would confirm that the remedy for OU-2 was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection were valid. The remedy at OU-2 was expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks were being controlled. Operation and Maintenance (O&M) activities were to be initiated upon the completion of construction. In addition, monitoring of groundwater to assess progress towards attainment of cleanup levels was to be ongoing. Since the previous five-year review, regular O&M and monitoring activities have occurred at the site.

#### **4.5 Five-Year Review Process — OU-2**

The Iron Horse Park five-year review was led by Don McElroy of EPA, Remedial Project Manager for the Iron Horse Park site, with support from M&E, contractor to EPA Region I. This five-year review consisted of a site walkover, a review of relevant OU-2 documents (see Appendix C.1), a review of cleanup standards, and consultation with risk assessment personnel.

##### *Site Walkover*

Remedial activities (summarized above in the Remedy Implementation section) were completed in 2003. A brief site walkover was conducted by M&E and EPA on August 5, 2008 to support the evaluation of the remedy for the five-year review. Photos of the OU-2 area are included in Appendix A.1 and show that the landfill cover, security fence, and operational systems appear to

be functioning properly and are well-maintained. No evidence of trespassing was observed at the time of the site walkover. The Site Inspection Checklist associated with OU-2 is included in Appendix C.4

#### *Interviews*

Interviews regarding the entire Iron Horse Park site were performed on August 13, 2008 with Billerica, Massachusetts town officials. Results of these interviews are summarized in Appendix A.2.

#### **4.6 Technical Assessment — OU-2**

*Question A: Is the remedy functioning as intended by the decision documents?*

Yes. The review of documents, ARARs, risk assumptions, and the results of site inspections indicate that the OU-2 remedy has been designed and constructed as intended in the ROD, as modified by the ESD. The construction of the remedy has been formally completed, as defined by the review and approval of the Final Remedial Construction Report (GeoSyntec, 2003), which was submitted by the Settling Defendant. However, Institutional Controls, as required under the ROD, have not been established yet.

Appendices C.2 and C.3 contain groundwater and surface water post-construction sampling results. The groundwater sampling results indicate the presence of chemical concentrations in excess of MCLs, most notably arsenic, benzene, trichloroethene, and vinyl chloride. These detections will continue to be monitored to evaluate progress towards achieving both interim cleanup levels (ICLs) and ARARs. VOCs, though sporadically detected in surface water, are present at low concentrations that do not exceed National Recommended Water Quality Criteria (NRWQC; formerly designated as Ambient Water Quality Criteria, or AWQC), and would not pose a risk or hazard to human health. However, arsenic surface water concentrations consistently exceed its NRWQC. Arsenic is often observed in water (both ground and surface) near landfills due to reducing conditions in the aquifer caused by the release of organics from landfill wastes. Many of the organics detected in groundwater around the landfill have been observed to have decreasing concentrations. Following further reduction of these organic concentrations, it is expected that arsenic concentrations will also begin to decrease.

Monthly O&M reports, which include review of landfill gas collection, the flare system, and leachate collection operations, have been reviewed as part of the five-year review of OU-2. All systems appear to be operating and maintained as designed, and wetlands mitigation appears to have been successful.

*Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

Yes. Risk assessment methodology and toxicity values have changed since the risk assessment

was performed for OU-2. However, because the landfill contents have been placed beneath an intact cap and surrounded by a security fence, there are no current exposures occurring to landfill waste. Institutional controls, preventing future land uses that would compromise the integrity of the current barriers to direct human contact, need to be implemented to assure remedy protectiveness in the future. In addition, the landfill gas and leachate collection systems are functioning as designed, preventing the completion of exposure pathways between humans and ecological receptors and these contaminated media. The exposure assumptions used at OU-2 for future use of groundwater, which assumes 70 years of consuming 2 liters per day of water, are still considered valid. Exposure (via dermal contact and incidental ingestion) by wading on a daily basis from June to September for contaminated sediment and surface water in the Middlesex Canal and Content Brook, was evaluated for children ages 6-15. No risk in excess of EPA's risk management criteria was shown to this receptor group. While still considered valid, this wetland area was re-evaluated as part of OU-3 in a site-wide wetland evaluation. Any potential requirement for remedial action in the wetland will be addressed as part of OU-4.

The groundwater cleanup levels established in the ROD are still valid, with the exception of arsenic. The MCL for arsenic is now 10 parts per billion (ppb). At the MCL of 10 ppb arsenic, the chosen remedy would not be different. When the ROD-established interim cleanup levels for groundwater are achieved, a risk assessment will be conducted at that time based upon the residual groundwater contamination and utilizing EPA's then-current risk assessment protocols, toxicity values, and risk management standards to ensure that the remedy is protective.

The RAOs for OU-2 which were utilized to develop remedial alternatives are:

- Prevent ingestion/direct contact with landfill waste contamination;
- Prevent migration of contamination via leachate which would result in groundwater concentrations in excess of federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards;
- Prevent migration of contamination via leachate to surface waters and sediments to ensure that NRWQCs are not exceeded due to the landfill;
- Prevent damage and loss of wetlands caused by eroding soil from the landfill cap, and meet all federal and state wetlands protection ARARs;
- Prevent ingestion of water having contamination in excess of federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards; and
- Restore groundwater aquifer beyond the point of compliance to contaminant concentrations below federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards.

These RAOs for OU-2 remain valid. Note, however, that the arsenic MCL has changed to 10 ppb.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

No. No other information has come to light that could call into question the protectiveness of the remedy.

#### *Technical Assessment Summary*

As indicated above, the Final Remedial Construction Report (GeoSyntec, 2003) has been reviewed and approved. The remedy was determined to have been designed and constructed as intended in the ROD, as modified by the ESD.

The RAOs remain valid. With the exception of the groundwater cleanup level for arsenic (discussed above), the established cleanup levels remain valid.

With the exception of ARARs establishing groundwater cleanup goals (e.g., Safe Drinking Water Act which establishes MCLs), ARARs have been addressed appropriately during the construction and O&M of the remedy. The closure/post-closure requirement to establish institutional controls still has not been met.

#### **4.7 Issues — OU-2**

There are no current issues which would prevent the remedy at OU-2 from being considered protective, except for the absence of institutional controls. Institutional controls restricting inappropriate land uses and protecting the landfill cap and other components of the remedy need to be established.

#### **4.8 Recommendations and Follow-up Actions — OU-2**

No recommendations or follow-up actions with regard to protectiveness have been identified for OU-2 other than the implementation of institutional controls discussed above. Discussions between EPA, MassDEP, and the property owners should be re-started in 2009. Upon completion of discussions between the parties, institutional controls should be established at OU-2 by the end of 2010.

#### **5.0 Five-Year Review of Site Wide Source Areas (OU-3)**

##### **5.1 Background — OU-3**

OU-3 is characterized by numerous potential source areas, multiple property owners, a complex history and widespread environmental impacts. This area of the site exhibits widespread environmental impacts to soils, sediment, surface water, and groundwater. During the Remedial Investigation/Feasibility Study (RI/FS) process for OU-3, EPA conducted a risk assessment for both human health and ecological receptors. Each potential source area (Area of Concern, or

AOC) in OU-3 is unique and in fact each area underwent an independent risk assessment. Under current and future exposure scenarios, there are numerous areas where the EPA risk range is exceeded.

Extensive sampling was conducted during 1993 to evaluate the levels, extent, potential sources, and possible means of migration of contamination in these media and associated with a number of source areas around Iron Horse Park. Additional investigations, including a risk assessment, began in 1994. A Remedial Investigation (RI) was completed in the fall of 1997. A Feasibility Study (FS) was completed in May 2004 to evaluate potential alternatives for the remediation of this area. In addition, a Proposed Plan recommending a series of cleanup alternatives was completed in May 2004. The Record of Decision (ROD) selecting the remedies for the affected media was signed on September 30, 2004. This ROD, which addressed the source areas only, chose capping in place as the remedy for the various source areas. A focused evaluation of ecological exposures to surface water and sediment, and a re-evaluation of site-wide groundwater contamination, were deferred to OU-4. In September 2007, EPA reached a settlement with responsible parties (PRPs), which requires the PRPs to implement the remedies chosen in the September 2004 ROD. Design of the remedy by responsible parties, with EPA oversight, is currently underway.

Areas of concern (AOCs) in OU-3 consist of the B&M Railroad Landfill, the B&M Locomotive Shop Disposal Areas (A and B), the RSI Landfill, the Old B&M Oil/Sludge Recycling Area, the Contaminated Soils Area, and the asbestos contamination areas (including the Asbestos Landfill and the Asbestos Lagoons). Surface water and sediment contamination by wetland group (West Middlesex, Wetland 2, East Middlesex, Richardson Pond, and Content Brook) will be addressed in OU-4. The media of concern in OU-3 is surface and subsurface soil, while groundwater, surface water, and sediment will be the media of concern in OU-4. Contaminants detected most frequently on site included volatiles, semi-volatiles, pesticides, polychlorinated biphenyls (PCBs), asbestos, and metals.

## 5.2 Chronology — OU-3

DATE	EVENT
1911	553 acres of land purchased by B&M Railroad.
1911 – mid-1970s	Area used for disposal of industrial wastes and oil and sludge recycling
1944	70 acres bought by Johns-Manville, which built three unlined lagoons for disposal of asbestos wastes
1984	EPA capped asbestos sludge landfill as part of “Immediate Removal Action”
1984	Site listed on the National Priorities List
1993	Extensive sampling program conducted.
1997	EPA completes the Remedial Investigation

DATE	EVENT
2004	EPA completes the Feasibility Study
2004	EPA signs the Record of Decision
2007	EPA reaches an agreement with the PRPs
2008	PRPs initiate the Remedial Design

### 5.3 Remedial Actions — OU-3

#### 5.3.1 Remedy Selection — OU-3

On September 20, 2004, EPA signed a ROD choosing the remedy for OU-3, which includes capping of landfills and contaminated soil areas at six different areas of concern (AOCs) and maintenance of an existing landfill cap at a seventh AOC. The major components of this remedy include:

1. Capping of source areas at the following AOCs, with capping standards that apply:
  - B&M Railroad Landfill – Hazardous Waste Cap – *Region 1 Alternative Cap Design/Solid Waste Disposal Act (SWDA), Subtitle C*
  - RSI Landfill, B&M Locomotive Shop Disposal Areas and the Asbestos Lagoons – Solid Waste Cap – *SWDA, Subtitle D*
  - Old B&M Oil/Sludge Recycling Area and the Contaminated Soils Area – Solid Waste/Asphalt Cap – *MassDEP Landfill Technical Guidance Manual/Solid Waste Disposal Act (SWDA), Subtitle D*
  - Asbestos Landfill – Maintenance of the existing *Toxic Substances Control Act (TSCA)* cap
2. Institutional Controls
3. Groundwater monitoring to assess effectiveness of source control actions.

Soil is the only media for which cleanup levels were established in the ROD. Those cleanup levels are as follows:

Lead                    1736 mg/kg – Applicable at B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area; based on commercial adult worker exposures

Cadmium	15.4 mg/kg – Applicable at B&M Railroad Landfill; based on ecological exposures
Copper	2213 mg/kg – Applicable at B&M Locomotive Shop Disposal Areas; based on ecological exposures
Lead	868 mg/kg – Applicable at B&M Locomotive Shop Disposal Areas; based on ecological exposures

### **5.3.2 Remedy Implementation — OU-3**

In September 2007, EPA reached a settlement with PRPs requiring them to implement the remedies selected in the September 2004 ROD. Design of the remedy by the PRPs, with EPA oversight, is currently ongoing.

### **5.4 Progress Since Last Five-Year Review — OU-3**

Since the five-year review conducted in 2003, a feasibility study was completed for OU-3 and a ROD was signed in 2004. Design of the remedy by responsible parties is ongoing.

### **5.5 Five-Year Review Process — OU-3**

The Iron Horse Park five-year review was led by Don McElroy of EPA, Remedial Project Manager for the Iron Horse Park site, with support from M&E, contractor to EPA Region I. This five-year review consisted of a site walkover, a review of relevant OU-3 documents (see Appendix D.1), a review of cleanup standards, and consultation with risk assessment personnel.

#### *Site Walkover*

A brief site walkover was conducted by M&E and EPA on August 5, 2008 to evaluate current conditions of the site at the time of five-year review. Photos of the OU-3 area are included in Appendix A.1 and show that site conditions have not changed significantly since previous investigation activities. A Site Inspection Checklist was not completed for OU-3, as the remedy has not yet been implemented.

The B&M Railroad Landfill, RSI Landfill, and B&M Locomotive Shop Disposal Areas were all well-vegetated, with some evidence of recent debris disposal in one area of the B&M Railroad Landfill.

At the Asbestos Lagoons, the berms and some portions of the inner areas are also well-vegetated. The signs designating the lagoons as containing asbestos have been covered by the vegetation.

The Old B&M Oil/Sludge Recycling Area has been developed since the previous five-year review. Shallow contaminated soils were excavated and a building was erected in the area. The contaminated soils were covered with an asphalt cap, the design of which was reviewed by EPA.

The cap was not intended to have materials stored on its surface (GEC, 2007), and nothing was being stored on the cap at the time of the site walkover.

Rail yard and lumber yard operations have continued at the Contaminated Soils Area.

The site water bodies and wetlands do not appear to have changed significantly since the Remedial Investigation, although there is some evidence of beaver activity.

The Asbestos Landfill cap is well-vegetated and appears to still be protective. However, there is evidence that ATV use is occurring in the area and locks/chains on fence gates have been cut. A detailed inspection of cap integrity will be performed as part of the remedy for this AOC.

### *Interviews*

Interviews regarding the entire Iron Horse Park site were performed on August 13, 2008 with Billerica, Massachusetts town officials. Results of these interviews are summarized in Appendix A.2.

## **5.6 Technical Assessment — OU-3**

*Question A: Is the remedy functioning as intended by the decision documents?*

Yes. The remedy will be protective. As described above, the design of the remedy is underway. Construction of the remedy at each AOC is anticipated to be complete by the next five-year review.

*Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

Yes. Exposure assumptions used at OU-3 for soil assumed 150 days per year of outdoor commercial use for 25 years. Youth trespasser (age 7 to 16) exposures to soil, sediment, and surface water were assumed to occur for 52 days per year (2 days per week for the warmest 6 months of the year) for 10 years. These assumptions remain valid, though assumptions used to evaluate dermal soil exposures (5800 cm<sup>2</sup> and 4100 cm<sup>2</sup> of skin contact for workers and trespassers, respectively; a dermal adherence factor of 1 mg/cm<sup>2</sup>) are more conservative than those used currently. No soil risk or hazard above EPA risk management criteria was shown for commercial receptors except for soil lead at the B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area for commercial workers. The lead cleanup level for human health was based on EPA's adult lead methodology which, while still valid, has incorporated additional population statistics into the calculations since the original cleanup level was established. As the remedy involves capping at the three AOCs associated with lead cleanup level exceedances, changes to the cleanup level will have no impact on the protectiveness of the remedy. However, if the extent of capping is based on the lead cleanup level for human health, or if the remedy is altered under an ESD to involve soil excavation or



treatment, it may be appropriate at that time to calculate and establish a new lead cleanup level based on the additional population statistics.

Ecological risks were identified for cadmium in soil at the B&M Railroad Landfill and for copper and lead in soil at the B&M Locomotive Shop Disposal Areas. Since the habitat conditions at the site have not substantially changed, the exposure assumptions used in developing the cleanup levels have not changed. Cleanup levels were developed to be protective of small mammals, as the primary receptors of concern. Although these levels are higher than conservative ecological screening level values for metals in soils (EPA Ecological Soil Screening Levels), the levels were based on assumptions consistent with site-specific conditions. These assumptions remain valid based on the habitat conditions at the site. The toxicity data used in developing the soil cleanup levels and the RAOs are also still valid. Capping of the AOCs will prevent contact with soils that contain cadmium, copper, and lead in excess of cleanup levels. Though surface water and sediment contaminant exposures for youth trespassers did not pose a risk or hazard in excess of EPA's risk management criteria, risk to ecological receptors exposed to contaminants in surface water and sediment was identified and slated for further evaluation as part of OU-4.

The RAOs for OU-3 which were utilized to develop remedial alternatives are:

#### Human Health

- Soil - Prevent ingestion of lead from soil-derived dust at the B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, and Contaminated Soils Area that results in estimated maternal blood levels of greater than 4.2 ug/dL, a site-specific level protective of a 95th percentile fetal blood lead level of 10 ug/dL. This results in preventing exposure to lead soil concentrations greater than 1,736 mg/kg.
- Soil - Prevent exposure to asbestos at the Asbestos Landfill.
- Soil - Prevent exposure to asbestos at the Asbestos Lagoons.
- Groundwater - Limit migration of contaminants in the B&M Landfill, RSI Landfill, B&M Locomotive Shop Disposal Areas, Old B&M Oil/Sludge Recycling Area, Contaminated Soils Area, and Asbestos Lagoons into groundwater.

#### Ecological

- Protect short-tailed shrews and other small mammals from exposure to levels of metals associated with a HQ greater than 1 (cadmium) in soils at the B&M Railroad Landfill.
- Protect short-tailed shrews and other small mammals from exposure to levels of metals associated with a HQ greater than 1 (copper and lead) in soils at the B&M Locomotive Shop Disposal Areas.

These RAOs for OU-3 remain valid.

*Question C: Has any other information come to light that could call into question the protectiveness of the remedy?*

No. No other information has come to light that could call into question the protectiveness of the remedy. Any detections of residual asbestos would need to be further investigated as part of a site-wide asbestos evaluation, as part of OU-4, (see Section 7.0) to determine magnitude of risk.

#### *Technical Assessment Summary*

At this time, remedy construction has not been implemented. The RAOs, ARARs, and established cleanup levels remain valid. As noted above, without further investigation, the risk posed by any detections of residual asbestos cannot be determined (see Section 7.0).

### **5.7 Issues — OU-3**

There are no current issues which would prevent the selected remedy at OU-3 from being considered protective. However, if the extent of capping an AOC is based on the lead cleanup level for human health, it may be appropriate to calculate and establish a new lead cleanup level based on the additional population statistics under EPA's adult lead methodology.

Once construction of the remedy is completed, long-term institutional controls restricting inappropriate land uses and protecting the source area caps and other components of the remedy will need to be established.

### **5.8 Recommendations and Follow-up Actions — OU-3**

No recommendations or follow-up actions with regard to protectiveness have been identified for OU-3 other than evaluation of the lead cleanup level. A new lead cleanup level based on the additional population statistics under EPA's adult lead methodology will be evaluated in fall of 2008 by EPA. If a new cleanup level is required, it will be addressed in 2009 and incorporated into the OU-3 Remedial Design (RD) and Remedial Action (RA).

## **6.0 Site-Wide Surface Water, Sediment, and Groundwater (OU-4)**

### **6.1 Background — OU-4**

OU-4 of Iron Horse Park includes site-wide surface water, sediment, and groundwater. With the many sources at the site (OU-1, OU-2, and OU-3), separate evaluation of these media was determined to be appropriate via development of a fourth operable unit. An Ecological Risk Assessment/Wetlands Remedial Investigation Addendum (ERA/WRIA; M&E, 2006a) was performed to more accurately determine the risk to ecological receptors exposed to contaminants in surface water and sediment throughout the site. Surface water exposures were not associated with significant ecological risk; however, a number of organics and metals were found to be associated with risk to benthic invertebrates in sediment. A Groundwater Data Evaluation report (M&E, 2006b) was generated in 2006 to provide a summary of groundwater sampling performed in the winter of 2005/2006. A Supplemental Human Health Risk Assessment (M&E, 2008) was

performed to determine risk drivers associated with future groundwater use, which include miscellaneous organics and metals. A focused Feasibility Study is currently being developed for OU-4.

Hazardous substances which have been released at OU-4 in the following media include:

<u>Groundwater</u>	<u>Sediment</u>
1,2-Dichloroethane	PAHs
1,4-Dichlorobenzene	PCBs
Benzene	4,4'-DDD
Carbon tetrachloride	Chromium
cis-1,3-Dichloropropene	Copper
Tetrachloroethene	Lead
Trichloroethene	Vanadium
Vinyl Chloride	Zinc
Atrazine	
Bis(2-chloroethyl)ether	
Dibenz(a,h)anthracene	
Dieldrin	
Arsenic	
Cadmium	
Lead	
Manganese	

## 6.2 Chronology — OU-4

DATE	EVENT
1997	EPA completes the Remedial Investigation for OU-3, initially including surface water, sediment, and groundwater
2004	EPA completes the Feasibility Study for OU-3, initially including surface water, sediment, and groundwater
2004	EPA signs the Record of Decision for OU-3, leaving surface water, sediment, and groundwater to be further evaluated as OU-4
2006	ERA/WRIA evaluating surface water and sediment completed
2006	Groundwater Data Evaluation report completed

## 6.3 Remedial Actions — OU-4

As this operable unit is still in the FS phase, there has been no remedy selected or implemented at this time.

#### **6.4 Progress Since Last Five-Year Review — OU-4**

Since the five-year review conducted in 2003, OU-4 has been created and progress has been made towards developing and evaluating remedial alternatives associated with the operable unit. As no remedy has been selected at this time for OU-4, the five-year review evaluations associated with the selected remedy will not be performed.

#### **7.0 Site-Wide Asbestos**

The site has historically been identified with asbestos contamination due to asbestos landfilling operations by Johns-Manville over a 32-year period. The Asbestos Landfill was the primary disposal area for asbestos-containing waste, however, three unlined lagoons received an asbestos slurry which was periodically dredged and disposed of in the landfill. The asbestos lagoons, one of which has been filled and covered, contain residual asbestos contamination. In addition, a deposit of asbestos was discovered during excavation of the B&M Wastewater Lagoons in 2003. The asbestos material was covered and left in place. Furthermore, historical information indicates that, between 1953 and 1964, the Zonolite Company leased a building on the B&M property for the manufacture of insulation, concrete, and fill material using asbestos-contaminated vermiculite.

To partially address the risk associated with asbestos-containing soils, EPA capped the Asbestos Landfill in 1984. However, random supplemental sampling in October/November 1985 and March 1986 (CDM, 1987) indicated the presence of asbestos in 28 of 40 surface soil samples (0-3 inches and 0-1 foot) collected across the site with six of the locations on the Johns-Manville (now BNZ Materials), Penn Culvert (now Cooperative Reserve Supply, Inc. [CRSI]), and B&M properties (see Figure 3) displaying asbestos at levels greater than one percent, the historical limit of detection for analytical methods available at the time. Surface soil sampling (0-3 inches) of 25 adjacent residential properties was conducted in December 1986 (see Figure 4), with asbestos only detected in a sample collected from a residence on High Street. In December 1986, focused sampling at the locations (see Figure 4) with asbestos levels greater than one percent confirmed the presence of asbestos at depths up to 24 inches below ground surface. Both chrysotile and amphibole asbestos fiber types have been detected in on-site soil samples. Only amphibole fibers were detected in the single residential soil sample with detectable asbestos, suggesting that this finding is not related to the site. In December 2000, EPA conducted surface soil sampling at the former Zonolite facility location (see Figure 5). Asbestos was detected in 8 of 12 surface soil samples collected. Asbestos content exceeded one percent in 2 of the 12 samples, with chrysotile and actinolite forms of asbestos identified in the other samples. These findings suggested that residual asbestos contamination remains on the Johns-Manville, CRSI (currently paved), and B&M properties. It is possible that there may have been wind-blown dispersion and deposition of asbestos to portions of the site adjacent to and down-wind of suspected asbestos source areas.

In 2004, EPA issued OSWER Directive Memorandum 9345.4-05 entitled "Clarifying Cleanup Goals and Identification of New Assessment Tools for Evaluating Asbestos at

Superfund Cleanups.” This memorandum indicates that soils containing less than one percent asbestos may pose an unreasonable risk to human health, should the fibers become airborne and be inhaled by workers, trespassers, or neighboring residents. Therefore, based on the current information available, it is possible that the residual asbestos poses a current or potential future human health risk, though it is not possible to quantify the risk at this time. Note that the limits of the OU-3 source control remedial actions do not include many of the locations where asbestos fibers have been detected in historic site-wide samples listed above.

Supplemental soil sampling using current analytical methods (e.g., Polarized Light Microscopy by method CARB 435) with detection limits of 0.25 percent or lower would provide a current and more accurate delineation of the extent of residual asbestos contamination. Any sampling program should consider the possible wind-blown transport of exposed asbestos fibers to sensitive receptors such as residential yards. Activity-based sampling is currently the recommended approach to characterize the inhalation risks associated with soil asbestos contamination, to determine whether current site conditions are protective of human health, and to document whether additional remedial actions or site controls are indicated to maintain protectiveness in the future.

It is possible that the residual soil asbestos levels detected at this site may pose an unacceptable cancer risk to current and future receptor populations, especially considering that the site appears to be utilized for recreational purposes including dirt bike usage that can generate high levels of airborne dust. The risk posed by residual asbestos will be investigated and addressed as part of OU-4.

## **8.0 Protectiveness Statement**

As described above, OU-1 and OU-2 are both completed with respect to implementation of the remedy. Institutional Controls need to be established at OU-2, and possibly at OU-1 for the remedies to be fully protective. Review and approval of final summary documents (*Site Summary Report* for OU-1, and *Final Remedial Construction Report* for OU-2) was performed by EPA. While construction of the remedy at OU-2 is complete, groundwater cleanup levels have not yet been attained.

### **8.1 OU-1**

The remedy at OU-1 is expected to be protective of human health and the environment from risks from CERCLA contaminants. Review and approval of the Site Summary Report (ERM, 2003) was performed by EPA, confirming that the remedy for OU-1 was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection are valid and no changes to cleanup levels are warranted. As required under the ROD, a post cleanup risk assessment still needs to be conducted to determine if sufficient risks still exist which would prevent unlimited use of the area and, if so, if institutional controls will need to be established. Plans are currently being developed to evaluate and remove asbestos deposits discovered during implementation of the OU-1 remedial action.

## **8.2 OU-2**

The remedy at OU-2 is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Review and approval of the Final Remedial Construction Report (GeoSyntec, 2003) was performed by EPA, confirming that the remedy for OU-2 was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection are valid. The change of the MCL for arsenic would not change the selected remedy. In addition, the new MCL will be considered in the risk assessment used to determine whether interim cleanup levels (set at the time of the ROD) are protective or require modification. Required institutional controls have not yet been established. Institutional controls will be created and recorded to restrict inappropriate land uses and protect the landfill cap and other components of the remedy. Operation and Maintenance activities have been initiated and will ensure that the landfill and associated components of the remedy remain in good condition. In addition, monitoring of groundwater and surface water to assess progress towards attainment of cleanup levels will continue.

## **8.3 OU-3**

The remedy at OU-3 is expected to be protective upon completion. At this time, remedy construction has not been implemented. The RAOs, ARARs, and established cleanup levels remain valid and protective.

## **8.4 OU-4**

As stated in Section 2.0, due to the status of OU-4, a protectiveness statement cannot be generated at this time since no remedy has been selected.

## **9.0 Next Review**

Five-year reviews are conducted every five years at sites where contaminant levels remain at concentrations that prevent unlimited, unrestricted use of the Site. The next five-year review for the Iron Horse Park Superfund Site should be conducted by 2013.

## **10.0 References**

Camp Dresser and McKee (CDM), 1987. *Draft Phase 1a Remedial Investigation for the Iron Horse site, Billerica, MA*. Report prepared for the U.S. Environmental Protection Agency. July 1987.

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Metcalf & Eddy (M&E), 1998. *First Five-Year Review Report, Iron Horse Park Superfund Site, Boston & Maine Lagoons (OU-1), North Billerica, Massachusetts*. September 28, 1998.

Metcalf & Eddy (M&E), 2006a. *Ecological Risk Assessment / Wetlands Remedial Investigation Addendum (ERA/WRIA), Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts*. September 2006.

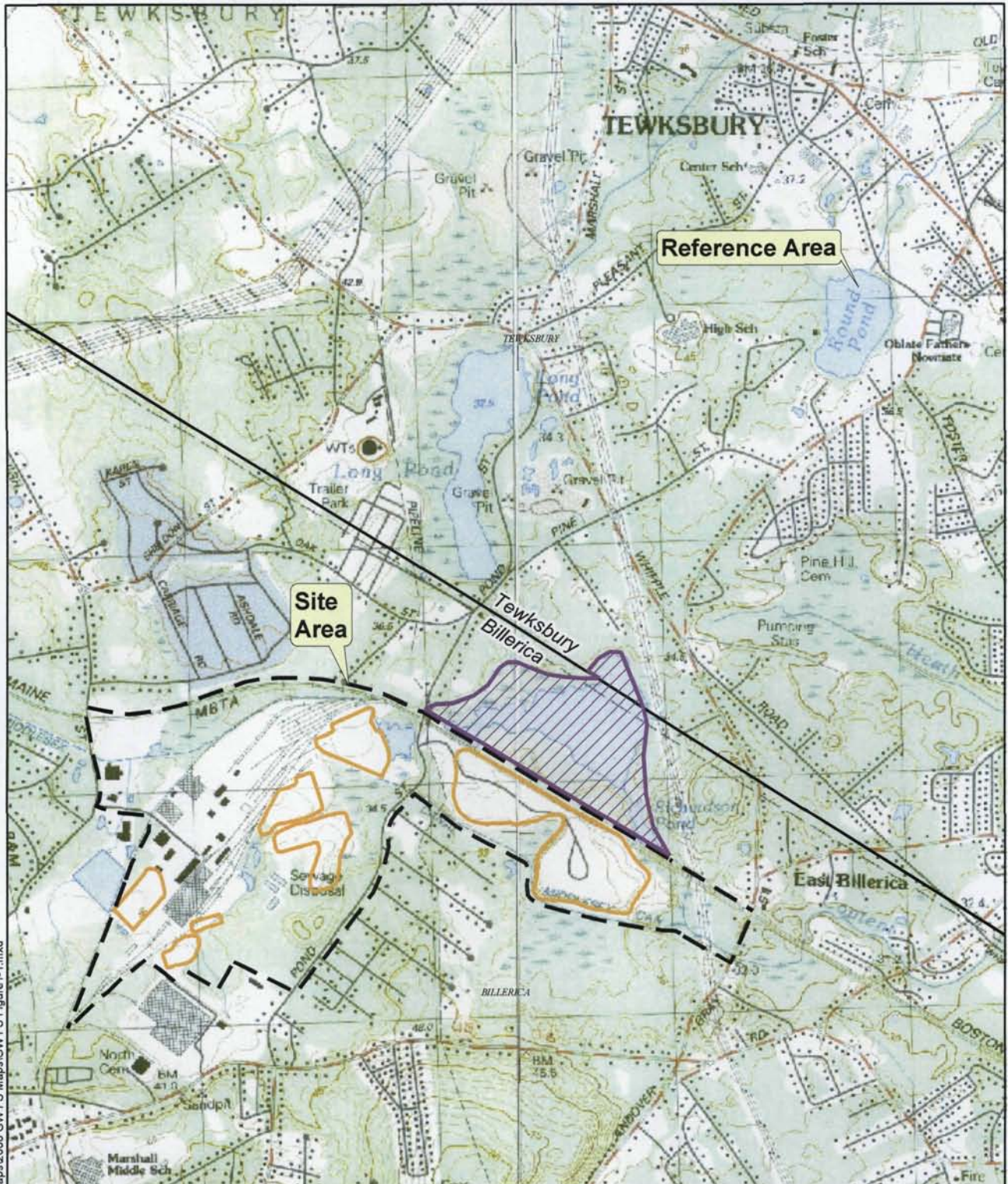
Metcalf & Eddy (M&E), 2006b. *Groundwater Data Evaluation Report, Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts*. September 2006.

Metcalf & Eddy (M&E), 2008. *Supplemental Human Health Risk Assessment, Iron Horse Park Superfund Site, Operable Unit 4, North Billerica, Massachusetts*. February 2008.

## FIGURES



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**LEGEND**

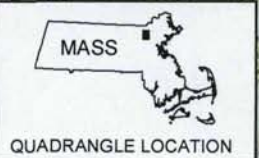
- Site Boundary
- Disposal Area Boundaries
- Part of Study Area

Source: MassGIS, Commonwealth of Massachusetts  
Executive Office of Environmental Affairs

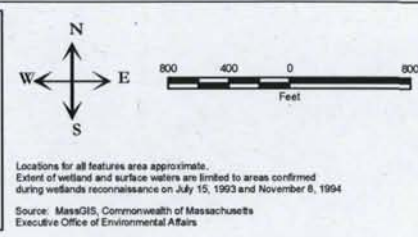
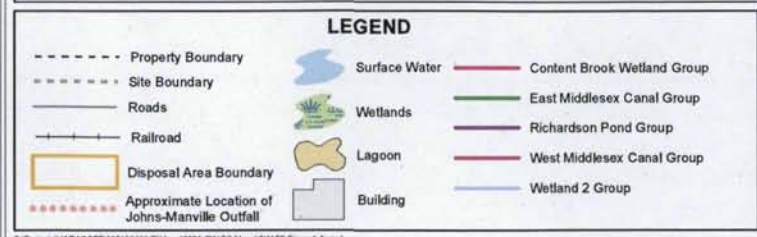
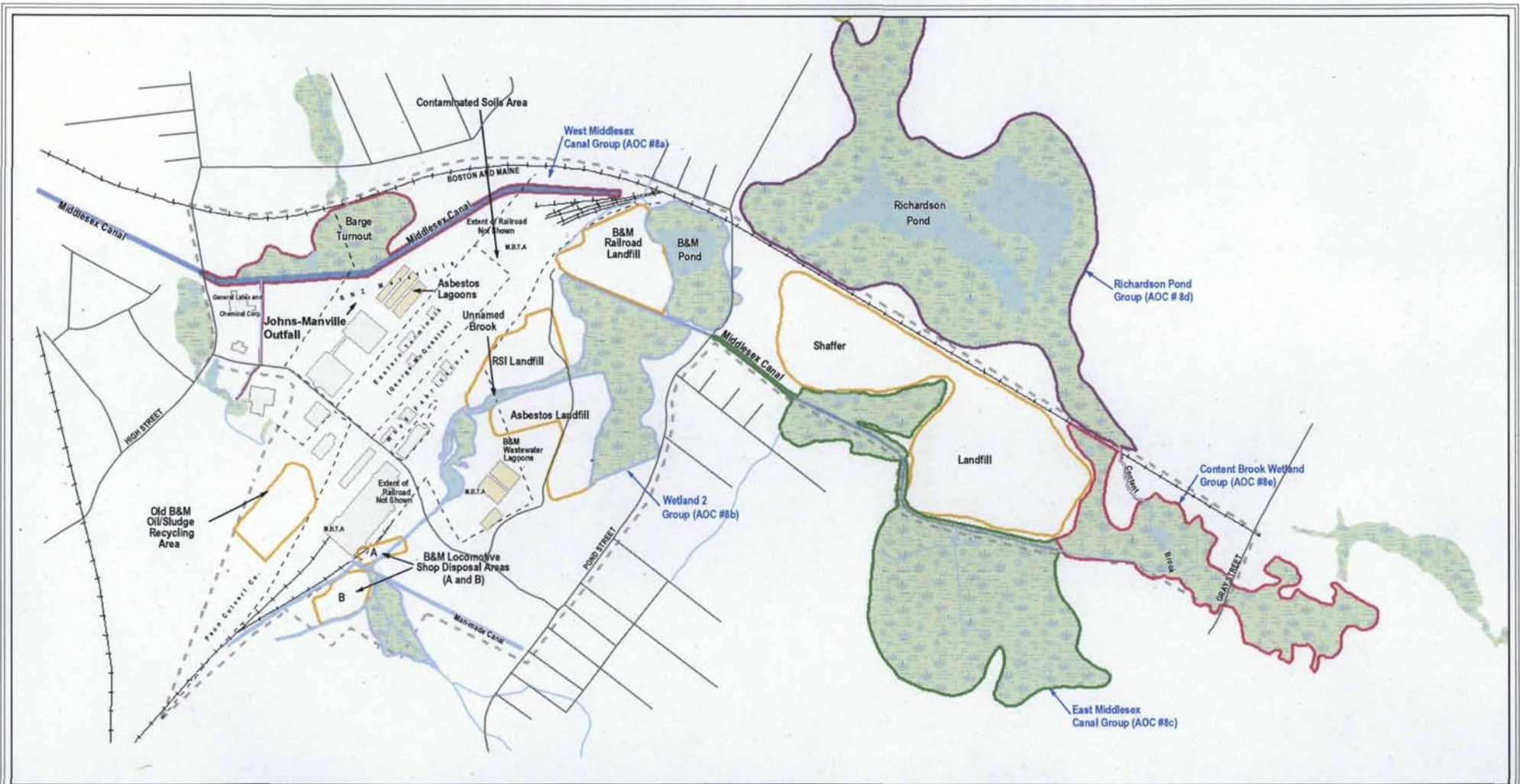
**FIGURE 1.**

**SITE LOCUS MAP**

Iron Horse Park Superfund Site  
t  
North Billerica, MA







**FIGURE 2**  
**SITE MAP**  
Iron Horse Park Superfund Site  
North Billerica, MA

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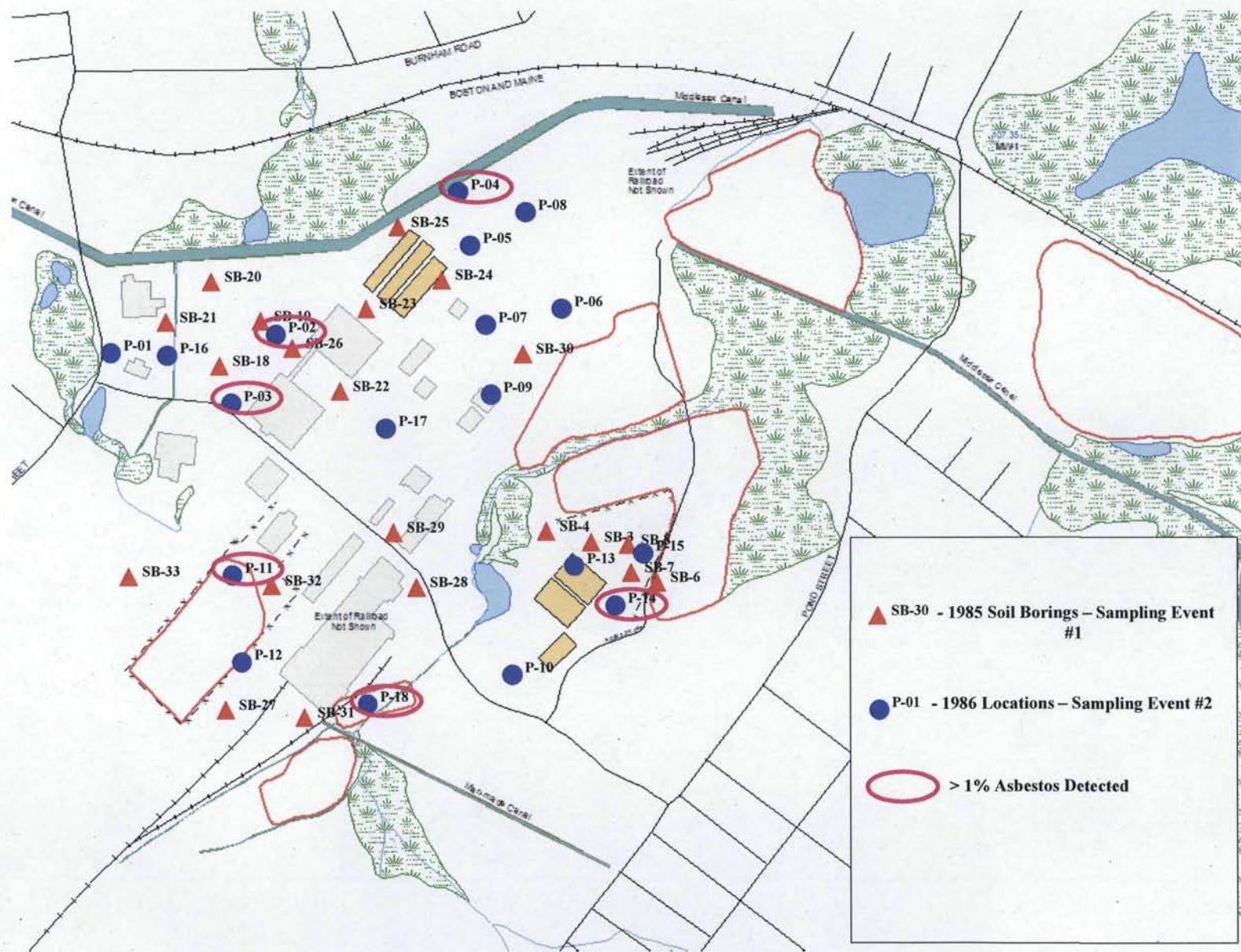


FIGURE 3. ASBESTOS SAMPLING DURING EVENTS #1 AND #2



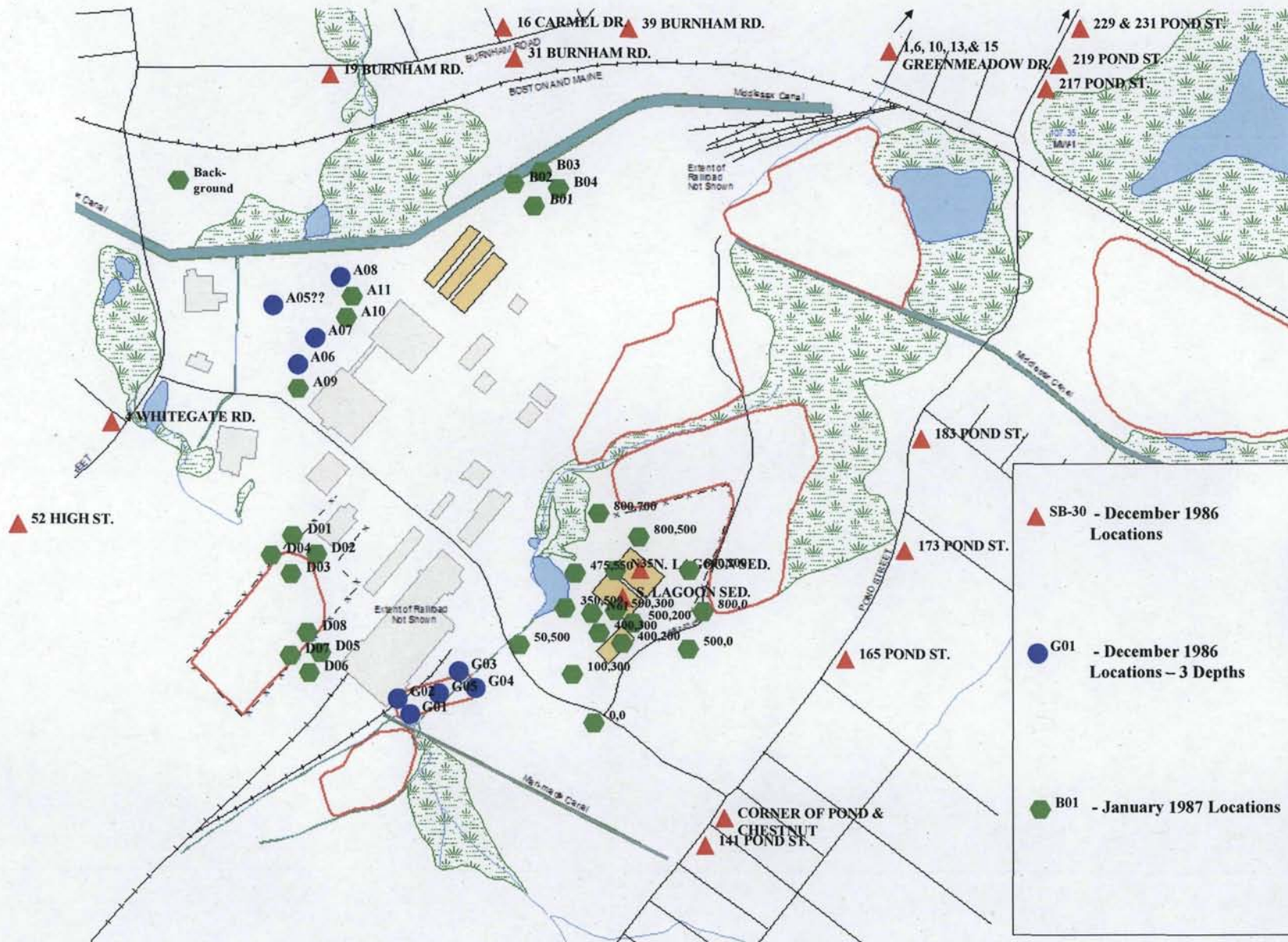


FIGURE 4. ASBESTOS SAMPLING DURING EVENT #5



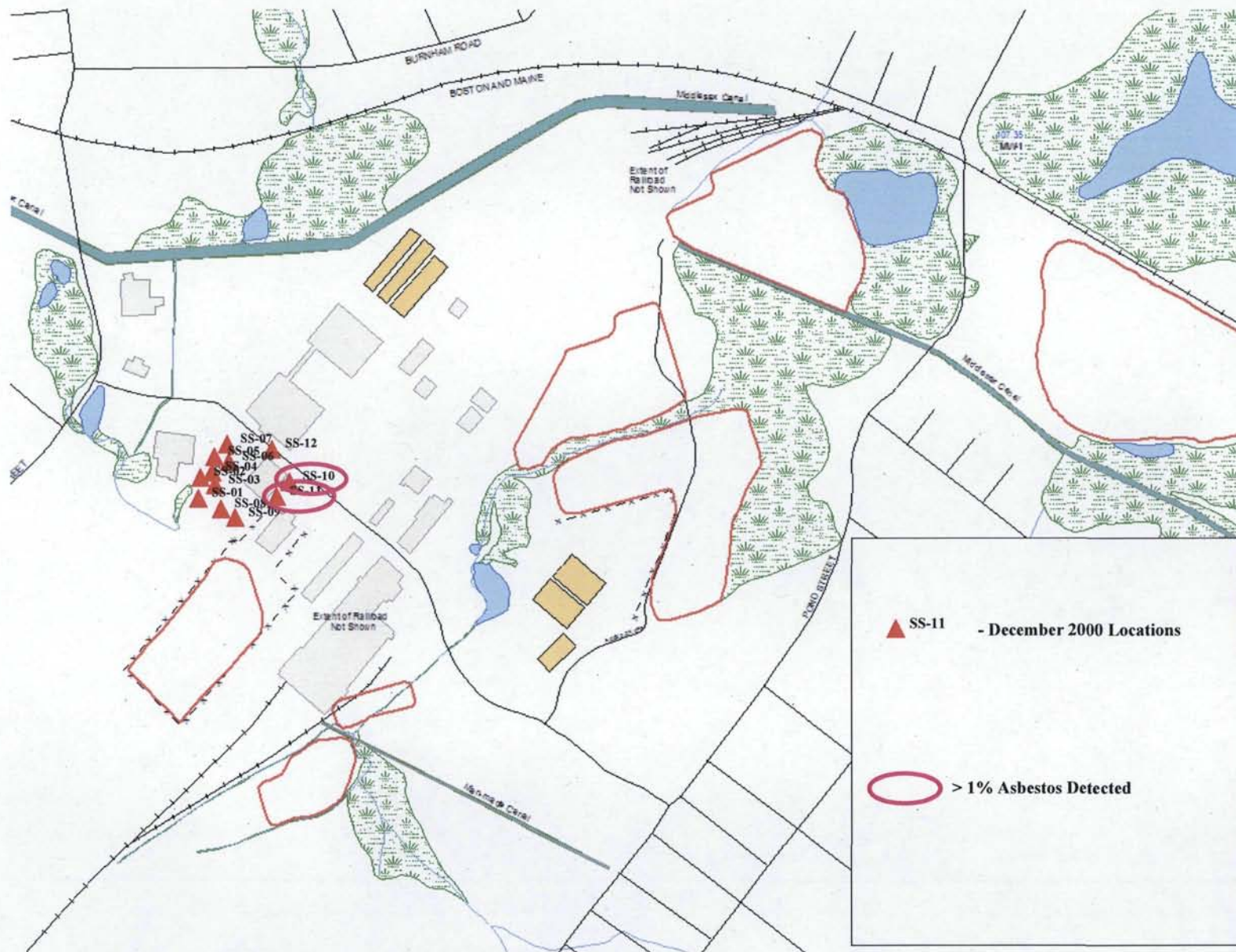


FIGURE 5. ASBESTOS SAMPLING AT ZONOLITE FACILITY

**Appendices for this Five-Year Review are available by placing a request using the Customized CERCLIS/RODS Report Order Form.**

**<http://www.epa.gov/superfund/sites/phonefax/rods.htm>**