

**REMOVAL PROGRAM
AFTER ACTION REPORT
FOR THE
FAY STREET SITE
LOWELL, MIDDLESEX COUNTY, MASSACHUSETTS
15 JULY 2014 THROUGH 9 OCTOBER 2015**

Prepared For:

U.S. Environmental Protection Agency
Region I
Emergency Planning and Response Branch
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912

CONTRACT NO.: EP-S3-15-01

TDD NO.: TO1-01-15-07-0029

SITE ID. 01LH

TASK NO. 0031

DC NO. R-00116

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January 2016

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1.0 INTRODUCTION

The following report, entitled *Removal Program After Action Report for the Fay Street Site, Lowell, Middlesex County, Massachusetts, 15 July 2014 through 9 October 2015*, is a chronological summary of the response actions taken by the U.S. Environmental Protection Agency (EPA), Region I, Emergency Planning and Response Branch (EPRB). The report details the situation as it developed, actions taken, and resources committed.

Site activities included the following: mobilizing personnel and equipment; preparing a support zone, contamination reduction zone, and staging area; removing fencing, debris, tree stumps, and vegetation from the work areas; excavating contaminated soil; transporting the contaminated soil to a disposal facility; lining the excavated areas with Geotechnical fabric for demarcation; backfilling excavations with clean soil; conducting restoration activities; and demobilizing personnel and equipment.

2.0 SITE CONDITIONS AND BACKGROUND

2.1 Site Location and Description

The Fay Street site (the site) is comprised of 86 Fay Street, three residentially zoned properties, and a city-owned property located adjacent to 86 Fay Street, in Lowell, Middlesex County, Massachusetts (MA). The geographic coordinates, as measured from the approximate center of the 86 Fay Street property, are 42° 37' 26.3" north latitude and 71° 18' 10.2" west longitude (see Appendix A, Figure 1). The 86 Fay Street parcel is a vacant lot identified on the Lowell Tax Assessor's Office on Map Number (No.) 186, Lot No. 86. The three parcels that comprise the site are identified by the City of Lowell Tax Assessor's Office on Map No. 186 as Lot Nos. 74, 78, and 106. Lot Nos. 74 and 78 (74 Fay Street; Property F01) are a 0.28-acre and a 0.14-acre (respectively) residentially zoned lots, which combined contain a residence and lawn. Lot No. 106 (106 Lundberg Street; Property F03) is an approximately 2-acre parcel, and contains eight residential condominium buildings and associated grounds. Residential properties are located to the south and west of the site. A baseball field and Shaughnessy Elementary School are located to the north of the site, and railroad tracks owned by Massachusetts Bay Transportation Authority (MBTA) are located east of the site.

2.2 Site History/Previous Actions

The 86 Fay Street property is owned by the City of Lowell. Based on historical documents, the property was acquired by the City between 1945 and 1950 for tax purposes. Prior to the City's acquisition of the property, records indicate that the property was in the possession of the Thissel family from 1880 through 1943. Historical data indicate the property has been vacant since at least 1880. In 1896, the 106 Lundberg Street property, located to the south of the 86 Fay Street property, housed a structure known as J.A. Ready Boiler Works, which was demolished between 1904 and 1906. Additionally, the 1924 City of Lowell Atlas shows another building on the property, which was demolished by 1938. O'Donnell Park, located to the north of the 86 Fay Street property, was occupied by the Middlesex North Agricultural Fairgrounds from 1860 until approximately 1910, when it was divided by the North Land Company. The property is currently occupied by a baseball field, the Butler Middle School and Shaughnessy Elementary School. Previous site investigations and historical data suggest the property was used for land disposal of ash prior to 1938.

In 1988, a “Site Assessment” Report was generated for the Merrimack Valley Housing Authority Partnership (MVHP) for the property currently known as 106 Lundberg Street. This report mapped ash observed in the surface and subsurface soils. This property was sold in 1989 to the MVHP, and eight multi-unit housing buildings were constructed.

On 30 May 2006, as part of a limited environmental assessment on behalf of the City of Lowell, Engineering & Consulting Resources, Inc. (ECR) advanced four soil borings on the 86 Fay Street property, and installed groundwater monitoring wells (MW-1 through MW-4). As of 2012, the groundwater monitoring wells remained intact, with the exception of MW-2.

Soil samples collected during the ECR boring advancement indicated that soils on the site consist of approximately 3 feet of topsoil mixed with ash. The topsoil was laid over ash fill, which extended to a depth between 9 and 14 feet below ground surface (bgs). The ash fill was underlain by sand and silt to at least 20 feet bgs. Depth to groundwater on the site ranged from 9 to 14 feet. The water table was generally found to be within the ash layer. Analytical results of the soil samples indicated concentrations of arsenic, barium, cadmium, chromium, lead, nickel, thallium, and zinc above Massachusetts Contingency Plan (MCP) S-1 soil standards in at least one of the eight soil samples collected. Extractable petroleum hydrocarbons (EPHs) and polycyclic aromatic hydrocarbons (PAHs) were detected in two of four samples, with concentrations of benzo(a)anthracene, chrysene, benzo(b)fluoranthene, and benzo(a)pyrene above MCP S-1 soil standards. In addition, two of the soil samples with the highest total lead concentrations were also analyzed by toxicity characteristic leaching procedure (TCLP) with results indicating that lead and cadmium were detected, but below Resource Conservation and Recovery Act (RCRA) hazardous waste limits.

Analytical results of groundwater samples collected from the installed monitoring wells indicated the presence of barium, lead, and zinc in two of the monitoring wells. Lead was detected at a concentration greater than the MCP GW-3 standard in one sample. The barium and zinc concentrations were below GW-3 standards. Analytical results indicated that EPH and volatile petroleum hydrocarbons (VPH) were not detected in the groundwater samples.

On 20 July 2010, Hager Geosciences, Inc. conducted an electromagnetic (EM) and ground penetrating radar (GPR) survey at the 86 Fay Street property to assist in the evaluation of possible horizontal and vertical extents of the ash fill and other fill material, and to guide the selection of test pit excavations. Depth to the top of the ash fill layer was inferred to be between 3.5 and 4.5 feet bgs across the property, as surveyed by GPR. Depth to the bottom of the ash fill layer was inferred to be between 8.5 and 14.5 feet bgs, with the shallower measurements in the southern portion of the property, and the deeper measurements in the northern portion of the property. The thickness of the ash fill layer was inferred to be thinnest on the southern portion of the property (4-5 feet thick) and steadily increased to thickest on the northern portion of the property (9-10 feet thick) [8-10].

On 23 August 2010, 10 test pits (TP-1 through TP-10) were excavated to 5 feet bgs at the 86 Fay Street property by Mill City Environmental, Inc., under the supervision of a TRC Environmental Corporation (TRC) engineer. Soil samples were collected from the test pit excavations, and were submitted for analysis of MCP 14 metals and PAHs. Analytical results indicated that PAHs were identified at concentrations exceeding the applicable MCP soil standards. Arsenic, barium, cadmium, chromium, lead, and nickel were detected at concentrations exceeding applicable standards in at least one test pit location. In addition, TRC collected two debris pile samples (DP-1 and DP-2) from the piles observed on the property. The debris pile samples were submitted for

analysis of VOCs, MCP 14 metals, EPHs, and PAHs. Analytical results indicated that EPHs were identified in both samples at concentrations below applicable S-1 standards.

On 27 August 2010, TRC collected groundwater samples from monitoring wells MW-1 through MW-4. Groundwater samples were submitted for analysis of total lead and dissolved lead. Total lead and dissolved lead were detected at concentrations well below the applicable MCP GW-3 standards.

On 21 January 2011, TRC personnel collected five surface soil samples (SS-1 through SS-5) from the 86 Fay Street property, approximately 10 feet from the location of TP-1. Surface soil samples were submitted for arsenic analysis to evaluate possible imminent hazard (IH) conditions in the soil 0-3 feet bgs. On 7 March 2012, TRC personnel collected five surface soil samples (SS-6 through SS-10) along the slope of the northeastern boundary of the 86 Fay Street property. Surface soil samples were submitted for laboratory analysis of PAHs and MCP 14 metals. These samples were collected for evaluation of a surficial contaminant migration concern toward the wetland area located northeast of the site. Analytical results indicated the presence of arsenic, lead, nickel, benzo(a)pyrene, and dibenzo(a,h)anthracene at concentrations exceeding the applicable MCP soil standards at least one surface soil sample.

In June 2012, TRC completed a Phase I Site Investigation report. The report indicated that the property may have been used as local landfill for the Middlesex North Agricultural Fairgrounds located north of the site, which was in operation from approximately 1860 through 1910. TRC and other previous consultants observed surface debris including granite blocks, asphalt, electronic parts, used oil filters, television parts, plastic and glass bottles, and lawn clippings, indicating the potential of more recent dumping on the site.

The Phase I investigation completed by TRC indicated the presence of multiple metals and PAHs in soil at concentrations above the applicable MCP Method 1 S-1/GW-3 standards. This contamination is believed to be derived from historical fill at the site. Contaminants of concern were not detected in groundwater at concentrations above applicable MCP Method 1 GW-3 or Groundwater Reporting Category (RCGW)-2 criteria. Numerical Ranking System (NRS) Site Scoring resulted in a score of 308, classifying the site as a Tier II Disposal Site.

In 2012, a Release Abatement Measure (RAM) was completed at the site to achieve MCP Site closure by demonstrating that a condition of No Significant Risk to human health and the environment has been achieved. Excavation of the top 1.5-3 feet of soil was conducted to achieve final lead Exposure Point Concentrations (EPCs) of less than 400 milligrams per kilogram (mg/Kg) within the upper 3 feet of soil. On 12 through 18 December 2012, City of Lowell contractors Corporate Environmental Advisors (CEA), Inc., of West Boylston, MA, completed excavation of soil and ash fill to depths of approximately 1.5 to 3 feet in Areas 1 and 2. A total of 1,949.7 tons of soils were excavated and removed from the site for off-site disposal. Approximately 1,500 cubic yards (yd³) of soil were removed. Excavation activities were terminated at a maximum depth of approximately 3 feet below grade.

On 19 and 20 December 2012, the excavated areas were backfilled by CEA with an estimated 2,145 tons of imported clean backfill from Patterson's Construction. Clean backfill was spread with a bulldozer and compacted with a 10-ton vibratory roller. The site was left with a bare, clean, backfill gravel surface until redevelopment plans were finalized. On 28 December 2012, a post-RAM inspection conducted by TRC indicated that the clean fill cover was in good condition, with minor ½-inch erosion after several heavy precipitation events.

On 23 and 24 July 2013, EPA and Weston Solutions, Inc. (Weston) Region 1 Superfund Technical Assessment and Response Team (START) conducted surface and subsurface soil sampling on properties adjacent to the site using hand augers, at depths of 0-6 inches, 6-12 inches, and 12-24 inches below ground surface. Samples were collected from 25-foot grids established on each property, as well from locations based on visual observation and on-site X-Ray Fluorescence (XRF) Screening results. On 23 July 2013, START collected a total of 54 samples, including four field duplicates. Specifically, 41 soil samples, including three field duplicates, were collected from the property at 74-78 Fay Street; and 13 soil samples, including one field duplicate, were collected from the grassy area/field to the north of 86 Fay Street. On 24 July 2013, START personnel collected a total of 79 surface and subsurface soil samples, including six field duplicates, from these two properties and the condominium property at 106 Lundberg Street. Specifically, 12 soil samples, including one field duplicate, were collected from property 74-78 Fay Street; 26 soil samples, including two field duplicates, were collected from the field to the north; and 41 soil samples, including three field duplicates, were collected from 106 Lundberg Street. All of the soil samples were collected for on-site metals screening via XRF. Approximately 10% of the samples were selected for confirmatory metals analysis at the EPA Office of Environmental Measurement and Evaluation (OEME) laboratory located in North Chelmsford, Massachusetts.

Lead was detected in all 123 surface and subsurface soil samples that were screened on site with the XRF analyzer, ranging from 43 parts per million (ppm) to 3,205 ppm. Eighteen metals were detected in the confirmatory surface soil samples and include the following (maximum concentration in mg/Kg, and sample location in parentheses): aluminum (13,000 mg/Kg); arsenic (160 mg/Kg); barium (1,200 mg/Kg); beryllium (1.6 mg/Kg); calcium (8,500 mg/Kg); cadmium (13 mg/Kg); cobalt (16 mg/Kg); chromium (150 mg/Kg); copper (430 mg/Kg); iron (25,000 mg/Kg); magnesium (3,000 mg/Kg); manganese (1,110 mg/Kg); nickel (36 mg/Kg); lead (7,300 mg/Kg); antimony (10 mg/Kg); selenium (5.8 mg/Kg); vanadium (64 mg/Kg); and zinc (1,400 mg/Kg). Two metals (arsenic and lead) were detected above their respective Massachusetts Contingency Plan Soil Category S-2 (MCP S-2) standards in one or more surface and subsurface soil samples.

On 10 and 12 June 2014, EPA and START personnel conducted surface and subsurface soil extent-of-contamination sampling at 74-78 Fay Street and 106 Lundberg Street. A total of 96 samples were collected from 32 locations. Samples were screened on-site using the XRF analyzer. Screening results indicated the following metals above MCP S-1 criteria (maximum concentration in parentheses): lead (2,272 ppm); arsenic (40 ppm); chromium (146 ppm); and nickel (56 ppm). A portion of samples were sent to the OEME Laboratory for confirmatory analysis.

In April 2015, START personnel conducted additional surface and subsurface soil extent-of-contamination sampling at O'Donnell Park, located immediately north of 86 Fay Street. A total of 104 samples were collected from 34 locations at depths of 6 inches, 12 inches, and 18 inches bgs. At some locations, an additional sample was collected from 24 inches bgs. Lead was detected at concentrations above the MCP soil category S-1 standard in 27 of the samples, with a maximum concentration of 1,224 ppm. The S-1 standard was exceeded at 18 locations.

3.0 **SUMMARY OF FEDERAL RESPONSE ACTIONS**

3.1 **Organization of the Response**

ORGANIZATION OF THE RESPONSE		
Organization	Representatives	Responsibilities
U.S. Environmental Protection Agency (EPA) Emergency Planning and Response Branch (EPRB) 5 Post Office Square, Suite 100 Boston, Massachusetts 02109-3912 (617) 918-1265	Elsbeth Hearn	EPA On-Scene Coordinator (OSC) responsible for the initiation, oversight, and completion of all removal activities. The OSC coordinated with State and local officials.
Weston Solutions, Inc. (Weston) Superfund Technical Assessment and Response Team (START) 101 Billerica Avenue, Building 5, Suite 103 North Billerica, MA 01862 (978) 552-2104	Chris Dupree	START Site Leader that provided the OSC with technical assistance, site documentation, site health and safety monitoring, air monitoring, and draft and final report preparation.
Environmental Restoration, LLC Emergency Rapid Response Services (ERRS) 40 Messina Drive Braintree, MA 02184 (781) 794-1680	Rick Ramuglia Greg Sulon Blake MacKinney	Response Manager (RM) for the ERRS contractor that performed removal activities. The RM was responsible for oversight and organization of mobilization, demobilization, and waste removal activities.
Massachusetts Department of Environmental Protection (MassDEP) 205A Lowell Street Wilmington, MA 01887 (978) 694-3348	Valerie Thompson	State representative that provided support for removal activities.

3.2 **Mobilization and Site Preparation**

The site-specific removal health and safety plan (HASP) was reviewed and signed by all personnel before any work commenced. In addition, emergency telephone numbers and directions to the hospital were posted and work zones were delineated. All activities were performed in appropriate personal protective equipment (PPE) in accordance with the HASP. The HASP was prepared by START personnel as a separate document, entitled *Health and Safety Plan for the Fay Street Site, Lowell, Massachusetts*. On 15 July 2014, the mobilization and staging of Emergency Rapid Response Services (ERRS) equipment was initiated.

Site preparation activities conducted by ERRS personnel consisted of mobilizing personnel and equipment; preparing a support zone, contamination reduction zone, and staging area; and removing fencing, debris, tree stumps, and vegetation from the work areas

3.3 **Chronology of Removal Activities**

Week of 14 April 2014

EPA Office of Site Remediation and Restoration (OSRR) Division Director James T. Owens III signed the Action Memorandum approving the proposed removal action.

Week of 14 July 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – Environmental Restoration, LLC (ER LLC)	Rick Ramuglia
Crew – ER LLC	2 laborers

Equipment on site:

Type	Quantity
Skid-steer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1

Activities for the week included:

- Mobilizing personnel and equipment.
- Relocating trees in the support and staging area.
- Receiving and spreading gravel in the support area.
- Conducting background preliminary particulate air monitoring to provide baseline airborne particulate levels.
- Reviewing and signing of the site health and safety plan (HASP).
- Conducting extent-of-contamination (EOC) sampling on property F01.
- Analyzing collected samples on-site using an XRF.

Key Dates:

On 14 July 2014, a meeting was held to discuss the removal action with the residents of the condominiums at property F03.

Week of 21 July 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way
START – Weston	Andrew Danikas
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2

Type	Quantity
Generator	1
Excavator	1

Activities for the week included:

- Mobilizing personnel and equipment
- Removing fencing, and debris in the work areas.
- Excavating and stockpiling contaminated soil from property F01.
- Conducting perimeter and personal air sampling.
- Conducting perimeter particulate air monitoring using DataRAMS and the Viper system (conducted throughout removal activities).
- Collecting post-excavation samples and screening samples using the XRF.

Week of 28 July 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Removing vegetation and tree stumps from the excavation areas.

Key dates:

On 28 and 30 July 2014, MassDEP representative Valerie Thompson was on site to discuss progress and observe site activities.

On 31 July 2014, three EPA personnel were on site to observe site activities.

Week of 4 August 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Decontaminating and breaking down tree stumps, concrete pieces, and scrap metal from the excavations.
- Installing Geotechnical fabric as an excavation barrier and demarcation layer in the excavated areas.
- Backfilling excavated areas with clean soil.

Key dates:

On 4 and 6 August 2014, MassDEP representative Thompson was on site to observe site activities and progress.

On 7 August 2014, an arborist was on site to inspect and discuss the large silver maple located on property F01. It was determined that the soil surrounding the tree is contaminated, and will be removed with a vacuum truck, then backfilled immediately.

Week of 11 August 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way Catherine Young
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as an excavation barrier and demarcation layer in the excavated areas.
- Backfilling excavated areas with clean soil.

Key Dates:

On 11, 12, and 14 August, personnel from T.F. Moran, Inc. were on site to conduct boundary and topographic surveying of the work areas.

Week of 18 August 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers
Crew – TMC Environmental, LLC (TMC), Vactor Truck	2 personnel

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1
Vactor Truck	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavation.
- Backfilling excavated areas with clean soil.
- Containerizing and staging asbestos insulation from a water heater discovered during excavation of property F01.
- Removing soil, ash, and debris from the roots of the large silver maple on property F01 using a Vactor truck.
- Backfilling the area around excavated tree roots with clean material.

Key Dates:

On 18 August 2014, two personnel from TF Moran were on site to continue surveying activities.

Week of 25 August 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers
Crew – TMC, Vactor Truck	2 personnel

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Backfilling excavated areas with clean soil.
- Removing soil, ash, and debris from the roots of the large silver maple on property F01, using a Vactor truck.
- Backfilling the area around excavated tree roots with clean material.

Key Dates:

On 25 and 26 August 2014, two personnel from TF Moran were on site to continue surveying activities.

On 29 August 2014, City of Lowell Environmental Officer Sarah Brown, and Lowell Licensed Site Professional, TRC Environmental, were on site to discuss site activities and observe progress.

Week of 2 September 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers
Crew – TMC, Vactor Truck	2 personnel

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from the edge of Fay Street, adjacent to the southeast border of property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Removing soil, ash, and debris from the roots of the large silver maple on property F01 using a Vactor truck.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavation.
- Backfilling excavated areas with clean soil.

Key Dates:

On 2 September 2014, MassDEP representative Thompson visited the site.

Week of 8 September 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from the retaining wall area on property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil.

Key Dates:

On 10 September 2014, two personnel from TF Moran were on site to continue surveying activities.

On 10 and 12 September 2014, MassDEP representative Thompson visited the site.

Week of 15 September 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from properties F01 and F03.
- Backfilling excavations and spreading topsoil on property F01.
- Collecting and screening post-excavation samples using the XRF analyzer.

Key Dates:

On 17 September 2014, MassDEP representative Thompson visited the site.

On 18 September 2014, Weston Solutions, Inc. Engineer Tod Chase, START Project Manager (PM) Eric Ackerman, RM Ramuglia, SL Dupree, and OSC Hearn conducted a site walk to discuss the design and implementation of engineering controls to mitigate runoff from the 86 Fay Street site.

Week of 22 September 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn Karen Way Catherine Young
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil.
- Spreading topsoil on property F01.

Key Dates:

On 23 and 26 September 2014, MassDEP representative Thompson visited the site.

Week of 29 September 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree Eric Ackerman
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil.
- Spreading topsoil on property F01.

Key Dates:

On 30 September, START PM Ackerman was on site to conduct a site audit.

On 30 September and 2 October 2014, MassDEP representative Thompson visited the site.

Week of 6 October 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil.
- Spreading topsoil on property F01.
- Hydroseeding backfilled excavations on properties F01 and F03.
- Removing vegetation from the portion of property F02 located on the northern boundary of F01.

Key Dates:

On 7 October 2014, MassDEP representative Thompson visited the site.

Week of 14 October 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.
- Removing vegetation from the portion of property F02 located on the northern boundary of F01.
- Loading trucks with contaminated soil for transport to the disposal facility.

Key Dates:

Between 15 and 17 October 2014, a total of 36 truckloads of contaminated soil were transported to the Fitchburg/Westminster Landfill in Westminster, MA for disposal.

Week of 20 October 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Spreading grass seed on backfilled excavations on property F03.

Key Dates:

On 21 and 22 October 2014, MassDEP representative Thompson visited the site.

On 24 October, City of Lowell personnel Sarah Brown and Craig Thomas, and Mike Fugate of Butler Property Management visited the site to discuss site progress and resident concerns with OSC Hearn.

On 20 and 21 October 2014, a total of 13 truckloads of soil were transported to the disposal facility.

Week of 27 October 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.

Key Dates:

On 28 October 2014, MassDEP representative Thompson visited the site.

On 30 October 2014, a meeting was held with the resident board of Swede Village (property F03) to discuss resident concerns, site progress, and schedule.

Week of 3 November 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.
- Removing vegetation and small trees from property F03, between units 8 and 9.
- Spreading grass seed on backfilled excavations on property F03.

Key Dates:

On 5 November 2014, MassDEP representative Thompson visited the site.

Week of 10 November 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers
Crew – TMC, Vactor Truck	2 personnel

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1

Type	Quantity
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1
Vactor Truck	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Removing soil, ash, and debris from the roots of the trees in front of unit 9 on property F03, using a Vactor truck.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations. The demarcation layer was tied into the existing demarcation on 86 Fay Street.
- Backfilling excavated areas with clean soil, including topsoil.
- Removing vegetation and small trees from property F03, between units 8 and 9.

Key Dates:

On 10 and 12 November 2014, MassDEP representative Thompson visited the site.

Week of 17 November 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from properties F03 and F02.
- Collecting and screening post-excavation samples using the XRF analyzer.

- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations. The demarcation layer was tied into the existing demarcation on 86 Fay Street.
- Backfilling excavated areas with clean soil, including topsoil.
- Loading trucks with contaminated soil for transport to the disposal facility.

Key Dates:

On 18 November 2014, MassDEP representative Thompson visited the site.

On 18 November 2014, City of Lowell Electrician Steve Coutu was on site to discuss the location and direction of electrical conduit on property F02.

On 21 November 2014, the President of the Home Owners Association (HOA) of property F03 spoke with OSC Hearn and RM Ramuglia regarding residents' concerns over snow removal and project schedule. The high-visibility fencing was removed from some areas, and placed farther from walkways in other areas, to address the concerns.

On 21 November 2014, City of Lowell representative Brown and the City of Lowell LSP were on site to discuss potential remaining contamination on property F02.

Between 17 and 20 November 2014, a total of 13 truckloads of soil were transported to the disposal facility.

Week of 24 November 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations. The demarcation layer was tied into the existing demarcation on 86 Fay Street.
- Backfilling excavated areas with clean soil, including topsoil.
- Collecting additional samples from property F02 to further delineate the extent of contamination.

Key Dates:

On 24 November 2014, MassDEP representative Thompson visited the site.

On 25 November 2014, MassDEP representative Thompson was on site to determine extent-of-contamination sampling locations and to assist in sampling activities.

Week of 1 December 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations. The demarcation layer was tied into the existing demarcation on 86 Fay Street.
- Backfilling excavated areas with clean soil, including topsoil.

Key Dates:

On 2 December 2014, MassDEP representative Thompson visited the site.

On 3 December 2014, during excavation of property F03 grids V250 and V225, a large concrete drywell, approximately 8 feet in diameter, was uncovered. The drywell connects to the drainage basin in the northeast corner of the parking lot.

Week of 8 December 2014

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.
- Connecting unit downspouts to the existing drywell to minimize overland flow of rainwater.

Key Dates:

On 10 December 2014, MassDEP representative Thompson visited the site.

Week of 15 December 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Rick Ramuglia

Crew – ER LLC	2 operators 2 laborers
Crew – TMC, Vactor Truck	2 personnel

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1
Vactor Truck	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Removing soil, ash, and debris from the roots of the trees between units 12 and 13 on property F03, using a Vactor truck.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Removing sediment from the drywell located in the northeast corner of property F03.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Backfilling excavated areas with clean soil, including topsoil.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Loading a roll-off container with stumps and vegetation removed from the excavation areas, for transportation to a disposal facility.
- Installing replacement retaining walls in the hill on the north side of unit 11 on property F03.

Key Dates:

On 17 December 2014, MassDEP representative Thompson visited the site.

On 17 and 18 December 2014, a total of 22 truckloads of soil were transported to the disposal facility.

Week of 22 December 2014

Personnel on site:

OSC – EPA	Elsbeth Hearn
Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site:

Type	Quantity
Skidsteer	1

Type	Quantity
Storage Container	1
Office Trailer	1
Portable Toilet	2
Generator	1
Excavator	1
Mini-Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F03.
- Collecting and screening post-excavation samples using the XRF analyzer.
- Installing Geotechnical fabric as a excavation barrier and demarcation layer in the excavations.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Backfilling excavated areas with clean soil, including topsoil.
- Installing replacement retaining walls in the hill on the north side of unit 11 on property F03.
- Demobilizing personnel and equipment.

Week of 28 April 2015

Personnel on site:

Crew – ER LLC	2 operators 1 laborer
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Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	1
Mini-Excavator	1
Dump Truck	1

Activities for the week included:

- Installing/constructing swales on the southern and western borders of 86 Fay Street.
- Removing temporary fencing from the staging area.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Spreading topsoil and grass seed on low areas on property F03.
- Installing retaining walls on property F01, and grading the northeastern slope.

Week of 4 May 2015

Personnel on site: Same as previous week.

Equipment on site:

Type	Quantity
Skidsteer	1

Type	Quantity
Storage Container	1
Portable Toilet	1
Mini-Excavator	1
Dump Truck	1
Excavator	1

Activities for the week included:

- Removing temporary fencing from the staging area.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Loading a truck with scrap metal for recycling.
- Spreading topsoil and grass seed on low areas on property F03.
- Installing retaining walls on property F01, and grading the northeastern slope.
- Installing rain/drainage pipes and berms on the southern boundary of 86 Fay Street.
- Demobilizing equipment.

Week of 11 May 2015

Personnel on site:

Response Manager – ER LLC	Rick Ramuglia
Crew – ER LLC	2 operators 2 laborers

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	1
Mini-Excavator	1

Activities for the week included:

- Installing fence posts and chain-link fence on the western and southern borders of 86 Fay Street.
- Spreading topsoil and installing sod on property F03.
- Installing rain/drainage pipes in the northern portion of property F03.
- Demobilizing small equipment and materials.

Week of 18 May 2015

Personnel on site:

Crew – ER LLC	1 operator 3 laborers
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Equipment on site: Same as previous week.

Activities for the week included:

- Installing fence posts and chain-link fence on property F01.
- Spreading topsoil and installing sod on property F03.
- Installing retaining wall and access steps at condominiums 10 and 11 on property F03.
- Repairing downspouts of buildings of property F03.

Week of 26 May 2015

Personnel on site:

Crew – ER LLC	1 operator 2 laborers
---------------	--------------------------

Equipment on site: Same as previous week.

Activities for the week included:

- Installing fence posts and chain-link fence along the southern border of 86 Fay Street.
- Installing a swale/drainage trench along the southern boundary of 86 Fay Street.
- Installing and repairing fencing on property F01.
- Loading a truck with scrap metal for recycling.

Week of 1 June 2015

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Installing replacement plants and vegetation on properties F01 and F03.
- Spreading mulch around new plantings and trees on property F03.
- Demobilizing equipment and materials.

Week of 8 June 2015

Personnel on site:

Crew – ER LLC	2 laborers
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Equipment on site:

Type	Quantity
Storage Container	1
Portable Toilet	1

Activities for the week included:

- Installing replacement plants and vegetation on properties F01 and F03.
- Demobilizing equipment and materials.

Week of 13 July 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Greg Sulon
Crew – ER LLC	2 operators 1 laborer

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	2
Mini-Excavator	1

Activities for the week included:

- Mobilizing personnel and equipment to the site.
- Mobilizing the EPA Region 1 Mobile Command Post (MCP) to the site to be used as the site command post/office.
- Conducting perimeter air monitoring during excavation activities (conducted for the duration of the removal action).
- Excavating and stockpiling contaminated soil from property F02.
- Collecting and screening post-excavation samples using the XRF analyzer.

Week of 20 July 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Bill Mahany John Kelly
Response Manager – ER LLC	Greg Sulon
Crew – ER LLC	2 operators 1 laborer

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	2
Mini-Excavator	1
Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Collecting and screening post-excavation samples using the XRF analyzer.

Key Dates:

On 21 July 2015, MassDEP representative Thompson visited the site to discuss and observe progress.

Week of 27 July 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Greg Sulong
Crew – ER LLC	2 operators 1 laborer

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples using the XRF analyzer.

Week of 3 August 2015

Personnel on site: Same as previous week.

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples using the XRF analyzer.

Key Dates:

On 6 August 2015, MassDEP representative Thompson visited the site to discuss and observe progress.

Week of 10 August 2015

Personnel on site:

OSC – EPA	John McKeown
START – Weston	Chris Dupree
Response Manager – ER LLC	Greg Sulong
Crew – ER LLC	2 operators 1 laborer

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	2
Mini-Excavator	1
Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples using the XRF analyzer.

Week of 17 August 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Greg Sulon
Crew – ER LLC	2 operators 1 laborer

Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples using the XRF analyzer.

Key Dates:

On 18 August 2015, MassDEP representative Thompson visited the site to discuss and observe progress.

On 19 August 2015, City of Lowell Department of Public Works was on site to discuss capping of irrigation lines uncovered during excavation activities.

Week of 24 August 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree George Mavris
Response Manager – ER LLC	Greg Sulon

Crew – ER LLC	2 operators 1 laborer
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Equipment on site: Same as previous week.

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples.
- Loading trucks with contaminated soil for transport to the disposal facility.

Key Dates:

Between 24 and 28 August 2015, a total of 28 trucks were loaded for transportation and disposal (T&D) activities.

Week of 31 August 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Blake MacKinney
Crew – ER LLC	2 operators 1 laborer

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	2
Excavator	1

Activities for the week included:

- Excavating and stockpiling contaminated soil from property F02.
- Excavating the area of the planned rain garden on property F02 to the appropriate depth to allow proper drainage and retention.
- Lining completed excavations with Geotechnical fabric.
- Backfilling completed excavations with clean material.
- Collecting and screening post-excavation samples.

Week of 7 September 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree
Response Manager – ER LLC	Blake MacKinney

Crew – ER LLC	2 operators 1 laborer
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Equipment on site: Same as previous week.

Activities for the week included:

- Backfilling completed excavations on property F02 with clean material.

Week of 14 September 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree Bill Mahany
Response Manager – ER LLC	Blake MacKinney
Crew – ER LLC	1 operators 4 laborer

Equipment on site: Same as previous week.

Activities for the week included:

- Backfilling completed excavations with clean material.
- Installing chain-link fencing along the eastern border of property F02.
- Installing an overflow drainage channel on the eastern boundary of property F02.
- Excavating and backfilling a 3- by 3-foot drywell behind F03 Unit 3.

Key Dates:

On 18 September 2015, Weston Professional Engineer Arthur Cunningham visited the site to observe the grading and drainage channel of property F02, and to discuss the design sketches for the rain garden to be installed on property F02.

Week of 21 September 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
START – Weston	Chris Dupree Ken Robinson
Response Manager – ER LLC	Blake MacKinney
Crew – ER LLC	2 operators 1 laborer

Equipment on site: Same as previous week.

Activities for the week included:

- Backfilling completed excavations with clean material.
- Installing chain-link fencing along the eastern border of property F02.
- Re-grading the overflow drainage channel on the eastern boundary of property F02.
- Planting bushes, flowers, and seeds in the rain garden.
- Demobilizing the Mobile Command Post from the site.
- Loading trucks with contaminated soil for transport to the disposal facility.
- Installing a concrete bench in the rain garden.

Week of 28 September 2015

Personnel on site:

OSC – EPA	Elsbeth Hearn
Response Manager – ER LLC	Blake MacKinney
Crew – ER LLC	2 operators 1 laborer

Equipment on site:

Type	Quantity
Skidsteer	1
Storage Container	1
Portable Toilet	2
Excavator	1

Activities for the week included:

- Planting trees and bushes in the rain garden.
- Demobilizing equipment.
- Tilling 86 Fay Street (staging area), and spreading topsoil and meadow-mix seed.

Week of 5 October 2015

Personnel on site:

Crew – ER LLC	2 laborers
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Equipment on site:

Type	Quantity
Skidsteer	1
Portable Toilet	2

Activities for the week included:

- Planting trees and bushes in the rain garden.
- Hydroseeding property F02.
- Demobilizing equipment.
- Tilling 86 Fay Street (staging area), and spreading topsoil and meadow-mix seed.

4.0 ESTIMATED COSTS OF THE REMOVAL ACTION

EPA resources committed under this Removal Action are summarized below:

Cost Category	Ceiling	Costs Incurred	Remainder
Regional Removal Allowance Costs			
ERRS	\$1,408,146	\$1,277,894	\$130,252
START Contractor	\$230,300	\$221,550	\$8750
Engineering Costs	\$43,000	\$37,393	\$5,607
Other Extramural Costs Not Funded from the Regional Allowance			
Extramural Contingency	\$18,544	\$0	\$18,544
Total Removal Project Costs	\$1,699,990	\$1,536,837	\$163,153

This accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

Appendices

Appendix A

Figures

Figure 1 - Site Location Map

Figure 2 - Site Diagram

Figure 3 - Post-Excavation Sample Results, Property F01

Figure 4 - Post-Excavation Sample Results, Property F02

Figure 5 - Post-Excavation Sample Results, Property F03

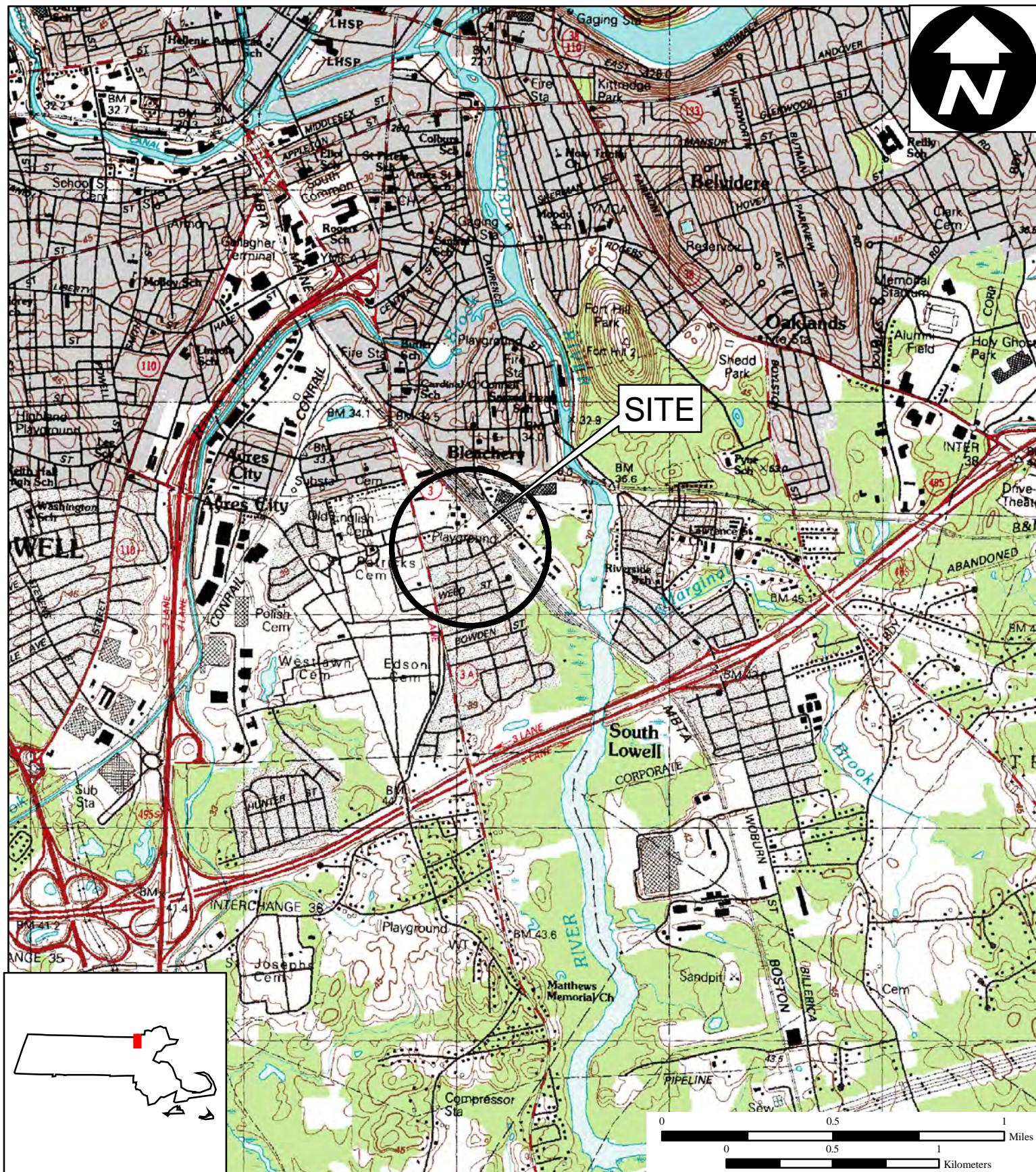


Figure 1

Site Location Map

**Fay Street
86 Fay Street
Lowell, Massachusetts**

**EPA Region I
Superfund Technical Assessment and
Response Team (START) IV
Contract No. EP-S3-15-01**

TDD Number: TO1-01-15-07-0029
Created by: C. Cardin
Created on: 13 June 2013
Modified by: C. Dupree
Modified on: 11 January 2016

Data Sources:

Topos: MicroPath/USGS
Quadrangle Names: Billerica and Lowell, MA
All other data: START





Figure 2

Site Diagram

**Fay Street
86 Fay Street
Lowell, Massachusetts**

**EPA Region I
Superfund Technical Assessment and
Response Team (START) IV
Contract No. EP-S3-15-01**

TDD Number: TO1-01-15-07-0029

Created by: B. Mace

Created on: 20 June 2013

Modified by: C. Dupree

Modified on: 11 January 2016

Legend

 **Property Boundary**



0 50 100
 Feet

Data Sources:

Imagery: Bing Maps Aerial (Microsoft)

Topos: MicroPath

All other data: START





Figure 3

Property F01
Post-Excavation Sample Results

Fay Street
86 Fay Street
Lowell, Massachusetts

EPA Region I
Superfund Technical Assessment and
Response Team (START) IV
Contract No. EP-S3-15-01

TDD Number: TO1-01-15-07-0029

Created by: C. Dupree

Created on: 26 November 2014

Modified by: C. Dupree

Modified on: 11 January 2016

Legend

- Sampling Grid
- Property Boundary

ppm parts per million.
* Result shown is an average of more than one analysis.
** Result shown is a secondary sample, collected after further excavation.

Samples collected were 5-point composite samples, from 25 by 25-foot grids.
All results shown are X-Ray Fluorescence analysis results for Lead.

0 20 40
Feet

Data Sources:

Imagery: Bing Maps Aerial (Microsoft)
Topos: MicroPath
All other data: START



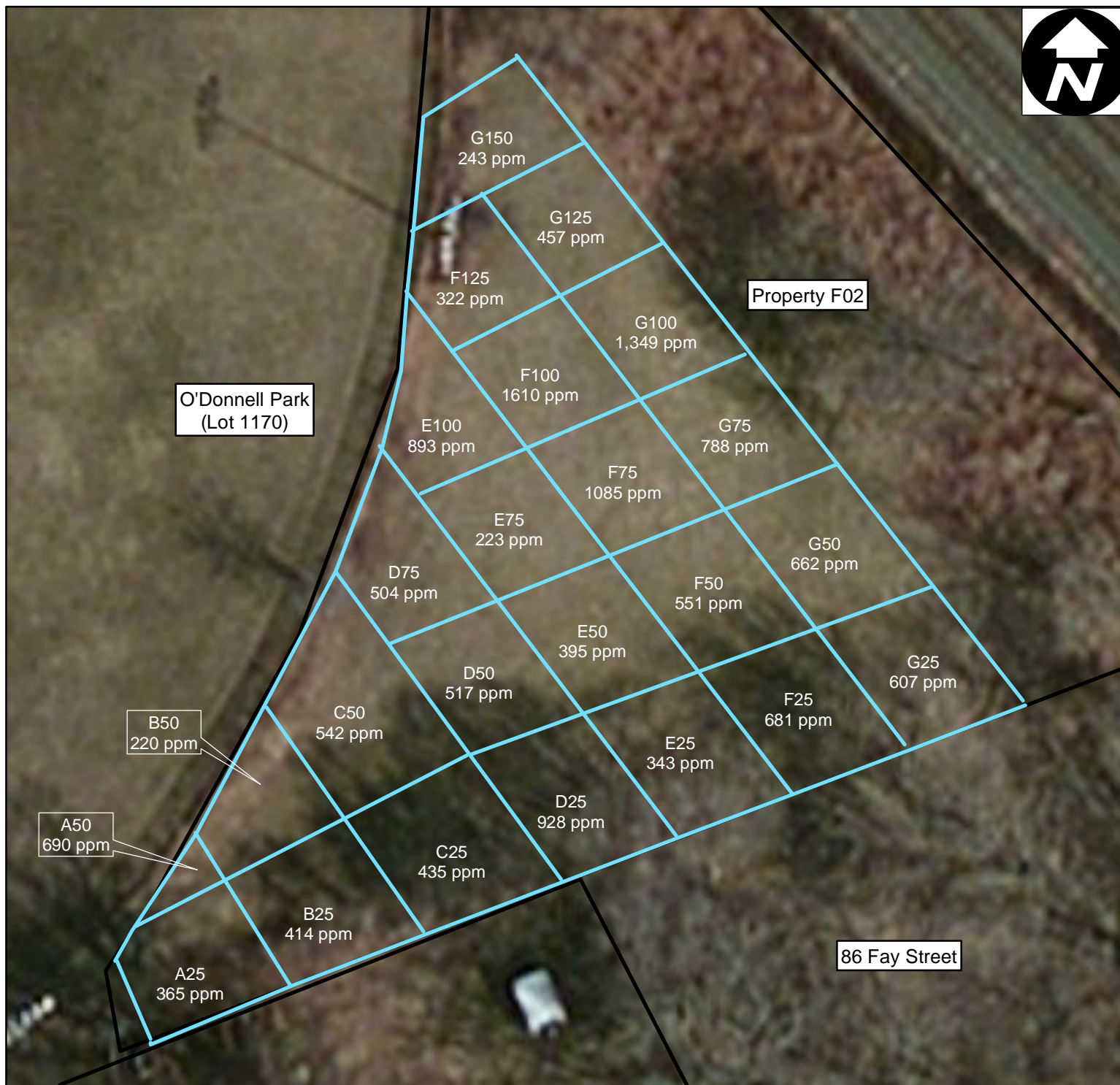


Figure 4

Property F02
Post-Excavation Sample Results

Fay Street
86 Fay Street
Lowell, Massachusetts

EPA Region I
Superfund Technical Assessment and
Response Team (START) IV
Contract No. EP-S3-15-01

TDD Number: TO1-01-15-07-0029

Created by: C. Dupree

Created on: 26 November 2014

Modified by: C. Dupree

Modified on: 11 January 2016

Legend

Sampling Grid

Property Boundary

ppm parts per million.

* Result shown is an average of more than one analysis.

Samples collected were 5-point composite samples, from 25 by 25-foot grids.

All results shown are X-Ray Fluorescence analysis results for Lead.

0 12.5 25 50 Feet



Data Sources:

Imagery: Bing Maps Aerial (Microsoft)

Topos: MicroPath

All other data: START



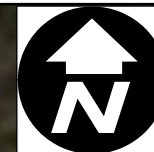


Figure 5

Property F03
Post-Excavation Sample Results

Fay Street
86 Fay Street
Lowell, Massachusetts

EPA Region I
Superfund Technical Assessment and
Response Team (START) IV
Contract No. EP-S3-15-01

TDD Number: TO1-01-15-07-0029

Created by: C. Dupree

Created on: 26 November 2014

Modified by: C. Dupree

Modified on: 21 January 2016

Legend

Sampling Grid

Property Boundary

ppm Parts per million.

" Inches (below ground surface)

Samples collected were 5-point composite samples. Grids shown on the map were used to determine sample location name, but samples were not collected from each grid; Samples were collected from each excavation area completed on a given day. The results shown are an average of the samples collected from the excavations within that approximate grid.

All results shown are X-Ray Fluorescence analysis results for Lead.

Grids without results were not excavated due to pre-removal results that did not exceed applicable standards, or due to existing structures (residences).

Data Sources:

Imagery: Bing Maps Aerial (Microsoft)

Topos: MicroPath

All other data: START



Appendix B

Photodocumentation Log

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the northern portion of Property F01. Photograph taken facing west.

DATE: 21 July 2014

PHOTOGRAPHER: A. Danikas

TIME: 1036 hours

CAMERA: iPhone 4s



SCENE: View of the southeastern portion of Property F01, and the site trailer staged on 86 Fay Street. Photograph taken facing east.

DATE: 22 July 2014

PHOTOGRAPHER: A. Danikas

TIME: 1202 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the excavated eastern portion of Property F01 and tree stump removal. Photograph taken facing northwest.

DATE: 30 July 2014

TIME: 1117 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 4s



SCENE: View of the excavation on Property F01, lined with geotechnical fabric as a demarcation layer. Photograph taken facing southeast.

DATE: 6 August 2014

TIME: 0732 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the southeastern portion of Property F01 during backfilling activities. Photograph taken facing east.

DATE: 11 August 2014

PHOTOGRAPHER: C. Dupree

TIME: 1509 hours

CAMERA: iPhone 4s



SCENE: View of the exposed tree roots of the silver maple located on Property F01. The roots were exposed using a vacuum truck to remove the soil. Photograph taken facing south.

DATE: 27 August 2014

PHOTOGRAPHER: C. Dupree

TIME: 1359 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the Grass Protecta[®] placed around the base of the silver maple on Property F01 to restrict access to the contaminated soil in the root system. Photograph taken facing northwest.

DATE: 2 October 2014

PHOTOGRAPHER: C. Dupree

TIME: 1240 hours

CAMERA: iPhone 4s



SCENE: View of Property F01 following hydroseeding activities. Photograph taken facing north-northwest.

DATE: 10 October 2014

PHOTOGRAPHER: C. Dupree

TIME: 1217 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of grass growth on Property F01 following hydroseeding. Photograph taken facing north.

DATE: 30 October 2014

TIME: 0707 hours

PHOTOGRAPHER: R. Ramuglia

CAMERA: Canon Powershot SX110



SCENE: View of Grids P100 through P150 on Property F03, prior to excavation. Photograph taken facing south.

DATE: 19 September 2014

TIME: 1348 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of Grids P100 through P150 on Property F03, near the completion of excavation to 6 inches below ground surface (bgs). Photograph taken facing south.

DATE: 23 September 2014

PHOTOGRAPHER: C. Dupree

TIME: 1409 hours

CAMERA: iPhone 4s



SCENE: View of Grids P100 through P150 on Property F03, backfilled with topsoil. Photograph taken facing south.

DATE: 7 October 2014

PHOTOGRAPHER: C. Dupree

TIME: 0816 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the excavation of Grids P250 and R250 on Property F03. Photograph taken facing east.

DATE: 10 November 2014

PHOTOGRAPHER: C. Dupree

TIME: 1333 hours

CAMERA: iPhone 4s



SCENE: View of the exposed roots of trees in Grid R200 on Property F03. The soil was removed from the root system using a vacuum truck. Photograph taken facing southwest.

DATE: 13 November 2014

PHOTOGRAPHER: C. Dupree

TIME: 1400 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of Grids P175 through R250 on Property F03, at the completion of backfill activities. Photograph taken facing southeast.

DATE: 25 November 2014

PHOTOGRAPHER: C. Dupree

TIME: 1605 hours

CAMERA: iPhone 4s



SCENE: View of the excavation of Grids U250 and V250 on Property F03. Photograph taken facing south-southwest.

DATE: 4 December 2014

PHOTOGRAPHER: C. Dupree

TIME: 1253 hours

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of Grid/excavation area T125N on Property F03, at the completion of backfill activities. The holly bush was re-planted in the original location after the soil had been removed from the roots. Photograph taken facing south-southwest.

DATE: 22 December 2014

TIME: 1318 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 4s



SCENE: View of the construction of replacement retaining walls in the northeastern corner of Property F03. Photograph taken facing east.

DATE: 22 December 2014

TIME: 1319 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 4s

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the excavation of Property F02. Photograph taken facing west.

DATE: 19 November 2014

PHOTOGRAPHER: C. Dupree

TIME: 1417 hours

CAMERA: iPhone 4s



SCENE: View of the backfilled excavation on Property F02. Photograph taken facing west-southwest.

DATE: 21 November 2014

PHOTOGRAPHER: R. Ramuglia

TIME: 1053 hours

CAMERA: Canon Powershot SX110

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the completed excavation of Grids A50, B50, and C50 on Property F02. Photograph taken facing west.

DATE: 28 July 2015

PHOTOGRAPHER: C. Dupree

TIME: 1138 hours

CAMERA: iPhone 4s



SCENE: View of Property F02 Grids A50, B50, and C50 during backfill activities. Photograph taken facing northwest.

DATE: 30 July 2015

PHOTOGRAPHER: C. Dupree

TIME: 0942 hours

CAMERA: iPhone 6

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of the completed excavation of grids along the baseball field fence on Property F02. Photograph taken facing west-southwest.

DATE: 6 August 2015

PHOTOGRAPHER: C. Dupree

TIME: 0850 hours

CAMERA: iPhone 6



SCENE: View of the grids along the baseball field fence on Property F02 during backfill activities. Photograph taken facing north-northwest.

DATE: 1 September 2015

PHOTOGRAPHER: C. Dupree

TIME: 0937 hours

CAMERA: iPhone 6

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of backfill activities on Property F02. The disposal soil stockpile is on the right. Photograph taken facing north.

DATE: 3 September 2015

TIME: 0941 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 6



SCENE: View of Property F02 at the completion of backfill activities. Photograph taken facing north.

DATE: 16 September 2015

TIME: 1312 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 6

PHOTODOCUMENTATION LOG
Fay Street Site • Lowell, Massachusetts



SCENE: View of property F02 at the completion of backfilling, with fencing installed along the eastern boundary. The baseball field is visible in the back left. Photograph taken facing north-northwest.

DATE: 18 September 2015

TIME: 0900 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 6



SCENE: View of the overflow channel on the eastern border of Property F02. Photograph taken facing east.

DATE: 22 September 2015

TIME: 0707 hours

PHOTOGRAPHER: C. Dupree

CAMERA: iPhone 6

Appendix C

Waste Disposal Summary Table

WASTE DISPOSAL SUMMARY TABLE
FAY STREET
LOWELL, MASSACHUSETTS

Wastestream	Matrix/ Material	Quantity (tons)	Number of Trucks/Loads	Bill of Lading/ Manifest Number	Treatment	Disposal
Contaminated Soil Non-Hazardous October - December 2014	Soil	2,677	84	101721MA	Recycled for landfill daily cover	Fitchburg/Westminster Landfill Route 31 Fitchburg Road Westminster, MA 01473
Contaminated Waste December 2014	PPE & Site Waste	1.57	1	104296MA	None	Fitchburg/Westminster Landfill Route 31 Fitchburg Road Westminster, MA 01473
Contaminated Soil Non-Hazardous May 2015	Soil	162.23	5	493543NH	None	Waste Management NH (Turnkey) 90 Rochester Neck Road Rochester, NH 03839
Contaminated Soil Non-Hazardous August 2015	Soil	1,409.48	43	101721MA	Recycled for daily cover at landfill	Fitchburg/Westminster Landfill 101 Fitchburg Road Westminster, MA 01473
Contaminated Soil, Hazardous September 2015	Soil	633.05	20	343570 - 343585	None	Waste Management NH 97 Rochester Neck Road Gonic, NH 03839
Contaminated Soil, Hazardous September 2015	Soil	133.42	4	343601 - 343604	None	Waste Management NH (Turnkey) 90 Rochester Neck Road Rochester, NH 03839