Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Western Regional Office • 436 Dwight Street, Springfield MA 01103 • 413-784-1100

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Secretary

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May 27, 2022

City of Greenfield
14 Court Square
Greenfield, MA 01301
Attn: Roxann Wedegartner, Mayor

Re: **NOTICE OF AUDIT FINDINGS AND NOTICE OF NONCOMPLIANCE**
Greenfield
Former Lunt Silversmiths, Inc.
298 Federal Street
RTN 1-18869
ENF #00013226

Dear Mayor Wedegartner:

On March 16, 2022, the City of Greenfield (hereafter referred to as "you" or "your") was provided written notification that the Massachusetts Department of Environmental Protection (the Department, MassDEP) had begun a comprehensive audit of response actions conducted to address the release of oil and/or hazardous material at the location identified above. This Notice informs you of the results of the Department's audit.

VIOLATIONS IDENTIFIED

The Department has determined that response actions were not performed in compliance with the requirements of the Massachusetts Contingency Plan (MCP). The enclosed Notice of Noncompliance lists the violation(s) and those action(s) that are required to achieve compliance. Specifically, the Notice of Noncompliance contains: (1) the requirement violated, (2) the date and place that the Department asserts the requirement was violated, (3) either the specific actions which must be taken in order to return to compliance or direction to submit a written proposal describing how and when you plan to return to compliance and (4) the deadline for taking such actions or submitting such a proposal.

The Tier Classification, necessary for conducting MCP response actions, for release tracking number (RTN) 1-18869 expires on November 7, 2022. If a Permanent Solution, Temporary Solution, or Remedy Operation Status has not been achieved prior to expiration of the Tier Classification, a Tier Classification Extension must be submitted to the Department at least 45 days before the date of expiration of the Tier Classification.

LICENSED SITE PROFESSIONAL (LSP)

A copy of this Notice has been sent to Bruce Nickelsen, the current LSP-of-Record for the disposal site. However, you, not your LSP, are responsible for responding to this Notice of Noncompliance and correcting the violations identified therein.

LIMITATIONS

The Department's findings were based on the certainty of the information reviewed during the audit. These findings do not: (1) apply to actions or other aspects of the site that were not reviewed in the audit, (2) preclude future audits of past, current, or future actions at the site, (3) in any way constitute a release from any liability, obligation, action or penalty under M.G.L. c. 21E, 310 CMR 40.0000, or any other law, regulation, or requirement, or (4) limit the Department's authority to take or arrange, or to require any Responsible Party or Potentially Responsible Party to perform, any response action authorized by M.G.L. c. 21E which the Department deems necessary to protect health, safety, public welfare, or the environment.

If you have any questions regarding this Notice, please contact either Kimberly Longridge at (857) 268-3321 or Kimberly.Longridge@mass.gov or John Ziegler at (617) 874-6733 or John.Ziegler@mass.gov. Please reference RTN 1-18869 and Enforcement Document Number (ENF #) 00013226 in any future correspondence to the Department regarding the site.

Sincerely,

Elizabeth M. Stinehart
Deputy Regional Director
Bureau of Waste Site Cleanup

Certified Mail # 7019 2280 0002 1993 2852, Return Receipt Requested

Enc.: Notice of Audit Findings and Notice of Noncompliance
Comprehensive Audit Memorandum

e-cc: Eric Twarog, Greenfield Department of Planning & Development
Jennifer Hoffman, Greenfield Health Department
Bruce Nickelsen, LSP-of-Record, O'Reilly, Talbot & Okun Associates, Inc.
Raipher Pellegrino, 401 Liberty, LLC
Glen Ayers, Lunt Lead PIP Petitioner
Denise Andler, DEP-WERO
Data Entry: PSS/ACTAUD; AUDCOM/NAFNON; FLDRAN 4/13/22

NOTICE OF AUDIT FINDINGS AND NOTICE OF NONCOMPLIANCE

RTN 1-18869
ENF #00013226

THIS IS AN IMPORTANT LEGAL NOTICE.
FAILURE TO RESPOND COULD RESULT IN SERIOUS LEGAL CONSEQUENCES.

NAME OF ENTITY IN NONCOMPLIANCE:

City of Greenfield
14 Court Square
Greenfield, MA 01301

LOCATION WHERE NONCOMPLIANCE OCCURRED OR WAS OBSERVED:

298 Federal Street, Greenfield

DATES WHEN NONCOMPLIANCE OCCURRED OR WAS OBSERVED:

April 6, 2020 – Date the Phase II Comprehensive Site Assessment (CSA) Report and Release Abatement Measure Completion Report for the 298 Federal Street property was submitted to the Department.

DESCRIPTION OF REQUIREMENT(S) NOT COMPLIED WITH:

1. **310 CMR 40.0835(4)(b)** – The Phase II Report must include a detailed Disposal Site Map, depicting all investigatory and sampling points relevant to the Comprehensive Site Assessment, the boundaries of the Disposal Site in plan view, and, as appropriate, the vertical extent of contamination at the Disposal Site.

   The Phase II Comprehensive Site Assessment (CSA) includes reference to an "Approximate Site Boundary" as shown on Drawing No. 5. The Department assumes that the "Approximate Site Boundary" is intended to represent the boundaries of the Disposal Site, as no other information documenting the Disposal Site boundaries is presented. The term Disposal Site, as defined at 310 CMR 40.0006, includes all areas where hazardous materials have come to be located as the result of the release. The "Approximate Site Boundary" depicted in the Phase II CSA is generally limited to the former Lunt property boundaries and to portions of Kenwood Street immediately adjacent to the former Lunt facility. However, site-related contaminants trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA) have been detected in environmental media and at locations outside the depicted "Approximate Site Boundary" and must be included within the Disposal Site boundary:

   - water samples collected from catch basins for the storm sewer system along Kenwood Street, Davis Street, and Chapman Street;
   - a composite sediment sample collected from Kenwood Street catch basins;

- groundwater samples collected from monitoring wells located along Kenwood Street and Davis Street and monitoring well MW-9 located at 286 Federal Street; and
- indoor air samples collected from 20 Kenwood Street, 22 Kenwood Street, and 37 Forest Street.

As noted in the citations below, the Department believes that additional assessment of the Disposal Site is required to establish the boundaries of the Disposal Site, and therefore, the boundaries of the Disposal Site may extend beyond the areas identified above.

2. **310 CMR 40.0835(4)(e)2. –** The Phase II Report must identify and characterize existing and potential migration pathways of oil and/or hazardous material (OHM) at and from the Disposal Site, including, as appropriate, preferential migration pathways such as subsurface utility lines.

   The Department agrees that the storm sewer system located beneath Kenwood Street is a preferential pathway for TCE migration in groundwater. However, the Department also notes that other utilities located within the area of groundwater contamination depicted on Drawing No. 5 included with the Phase II CSA have not been assessed as preferential pathways for contaminant migration. Specifically, the Department notes that based on the utility plan included in site files, a subsurface water line is potentially present within the mapped groundwater contaminant area that connects to the water main beneath Norwood Street. Evaluation and characterization, as necessary, of this water line and other subsurface utilities at the former Lunt property and other areas where utilities may intersect contamination as preferential pathways for contaminant migration must be conducted. Further assessment may be necessary beyond these utility corridors depending on the results of characterization of these potential preferential migration pathways.

3. **310 CMR 40.0835(4)(d)3.a.** – The Phase II Report must include a comprehensive description and depiction of site hydrogeologic conditions, including groundwater potentiometric surface(s), gradients, flow rates, and flow direction(s).

   310 CMR 40.0835(4)(f) – A Phase II Report must include a characterization of the source(s), nature, and extent of OHM at the Disposal Site, the presence, distribution, and stability of non-aqueous phase liquids, tabulation of analytical testing results, and, where appropriate, a characterization of background OHM concentrations at the Disposal Site.

   Contaminant Sources

   The Phase II CSA concludes that "There are two main source areas for the TCE plume which discharges to the storm sewer, both of which were excavated to the extent considered feasible by EPA in 2015." The Phase II CSA also concludes that dense, non-aqueous phase liquid (DNAPL) may be present based on groundwater concentrations that exceed 1% of TCE solubility. As discussed in the attached memorandum, the Department does not agree that there are only two main source areas or that these areas were excavated to the extent feasible. The Department agrees that DNAPL, which would represent a significant source of contamination, may remain at the former Lunt property based on groundwater data. However, the presence, extent, and stability of DNAPL has not been assessed, as required.

The Department also notes that the Phase II CSA indicates that the former Lunt site included the use of five degreasers, which represent potential source areas. Only one degreaser could be located and was the presumed source of vapor intrusion into Unit C currently being mitigated by a passive venting system. As discussed in the attached memorandum, elevated soil, groundwater, and soil gas data are indicative of other potential source areas throughout the property, which require further characterization.

Extent of Contamination

The Conceptual Site Model (CSM) presented in the Phase II CSA for releases from the former Lunt property is key to establishing the extent of contamination resulting from releases at the former Lunt site and determining the adequacy of the assessment conducted. The CSM concludes the following:

- groundwater contaminated with chlorinated solvents (e.g., TCE) flows south/southwest within the upper portions of the unconfined aquifer where contaminated groundwater is captured by the storm sewer system located beneath Kenwood Street, which borders the former Lunt property.
- capture of contaminated groundwater by the storm sewer system prevents further migration of contaminated groundwater into the residential area south of the former Lunt property.
- contaminants present in groundwater captured by the storm sewer system are volatilized and/or diluted as contaminants are transported along the storm sewer system resulting in no exposure to human or environmental receptors.

The CSM assumes that the storm sewer system is acting as a gaining stream utilizing a theoretical groundwater flow net as evidence of capture of contaminated groundwater by the storm sewer system. No other data are presented to confirm that the storm sewer system is capturing the entirety of contaminated groundwater being discharged from the former Lunt site. The Department requires site-specific data to confirm the CSM. As discussed in the attached memorandum, data collected to date indicate the potential for contaminated groundwater to extend further south and beyond the storm sewer system. The Department also notes that additional investigation is required to establish the vertical extent of contamination given the potential presence for DNAPL.

4. **310 CMR 40.0840** – Upon completion of a Phase II Comprehensive Assessment, the requirements of a Permanent Solution under 310 CMR 40.1000 have been met, and a Permanent Solution Statement supported by information provided in the Phase II report will be submitted to the Department.

   The Phase II CSA concludes that conditions at the site will achieve the performance standards for a Permanent Solution at 310 CMR 40.1003 following recording of a Notice of Activity and Use Limitation (AUL). The Department does not agree with this conclusion. Specifically, continued discharge of contaminated groundwater to the storm sewer system does not meet the Permanent Solution performance standard for source control at 310 CMR 40.1003(5). For a Permanent Solution, 310 CMR 40.1003(5) requires that sources be either eliminated or eliminated to the extent feasible and controlled. Sources of contamination have

not been eliminated or fully evaluated, as discussed in Item 3. In addition, the Phase II CSA feasibility analysis evaluates the feasibility to achieve background, another Permanent Solution performance standard, but does not evaluate the feasibility to eliminate the source to the extent feasible. Moreover, the continued discharge of TCE-contaminated groundwater to the storm sewer system demonstrates that the sources of contamination are not controlled. The Department notes that the storm sewer system is not designed nor intended to serve as a contaminant control system, and therefore, reliance on the storm sewer system to control site contaminants may not be used to achieve a Permanent Solution.

In addition, for a Permanent Solution, 310 CMR 40.1003(6) requires that plumes of dissolved OHM in groundwater are stable or contracting. Demonstration of achievement of this performance standard cannot be met for groundwater until a complete assessment of the extent of groundwater contamination is achieved, as discussed in Item 3. The Department additionally notes that the limited groundwater quality data set indicates there are apparent increases in TCE concentrations in groundwater at the downgradient edge of the groundwater plume depicted on Drawing No. 5 of the Phase II CSA. Specifically, TCE concentrations at monitoring wells LS-20, LS-22, MW-101, MW-104 all indicate an apparent increase in TCE concentrations.

5. **310 CMR 40.0923(1)** – Site activities and uses identified and described in the risk characterization must include all current and reasonably foreseeable uses and activities occurring at the Disposal Site or in the surrounding environment that could result in exposure to OHM by human or environmental receptors.

   Utility worker exposures to groundwater, including dermal contact with groundwater and potential inhalation of volatiles released from groundwater in a trench, were not evaluated quantitatively. The risk characterization must include a utility worker scenario because TCE has been detected in shallow groundwater that may or has intersected subsurface utilities in both on-property and off-property locations.

6. **310 CMR 40.0926(3)** – In estimating the exposure point concentration, the objective shall be to identify a conservative estimate of the average concentration contacted by a receptor at the exposure point over the period of exposure.

   The risk characterization does not adequately document and justify the exposure point concentrations for each of the five soil exposure areas. For example, in Table 11 of Appendix J of the Phase II CSA, the calculated risk estimates for residential incidental ingestion and dermal contact with soil in the Southeastern Area (0-2’ horizon) appears to be the average of two data points (SB-4 and SB-2). However, only SB-4 is located within the Southeastern Area, and sample SB-2 was collected from the western portion of the Disposal Site. It is not clear to the Department why other soil data were not included in the exposure point concentration calculation.

ACTION(S) TO BE TAKEN AND DEADLINE(S) FOR TAKING SUCH ACTION(S):

1. **Within 60 days** of the date of this Notice, submit a conceptual Phase II Scope of Work pursuant to 310 CMR 40.0834, for the Department's review and approval.

2. Complete the actions specified above and submit a Post-Audit Completion Statement in accordance with 310 CMR 40.1170, on the form established by the Department (BWSC-111), **within 60 days** of the date of this Notice. Please visit MassDEP's website at https://www.mass.gov/lists/waste-site-cleanup-forms for more information on electronic submittal of forms and reports.

If the required actions are not completed by the deadlines specified, an administrative penalty may be assessed for every day after the date of this Notice that the noncompliance occurs or continues. The Department reserves its rights to exercise the full extent of its legal authority in order to obtain full compliance with all applicable requirements, including, but not limited to, criminal prosecution, civil action including court-imposed civil penalties, or administrative action, including administrative penalties imposed by the Department.

For the Department of Environmental Protection:

Date: May 27, 2022

By: Elizabeth M Stinehart

Elizabeth M. Stinehart
Deputy Regional Director
Bureau of Waste Site Cleanup

Comprehensive Audit Memorandum

To:	Site file, RTN 1-18869 Former Lunt Silversmiths, Inc. 298 Federal Street, Greenfield
Through:	Elizabeth Stinehart, Deputy Regional Director, BWSC
From:	John Ziegler, BWSC-Audit Section
Reviewed By:	Kimberly Longridge, BWSC-Audit Section
Date:	May 24, 2022
Re:	Comprehensive Audit File Review

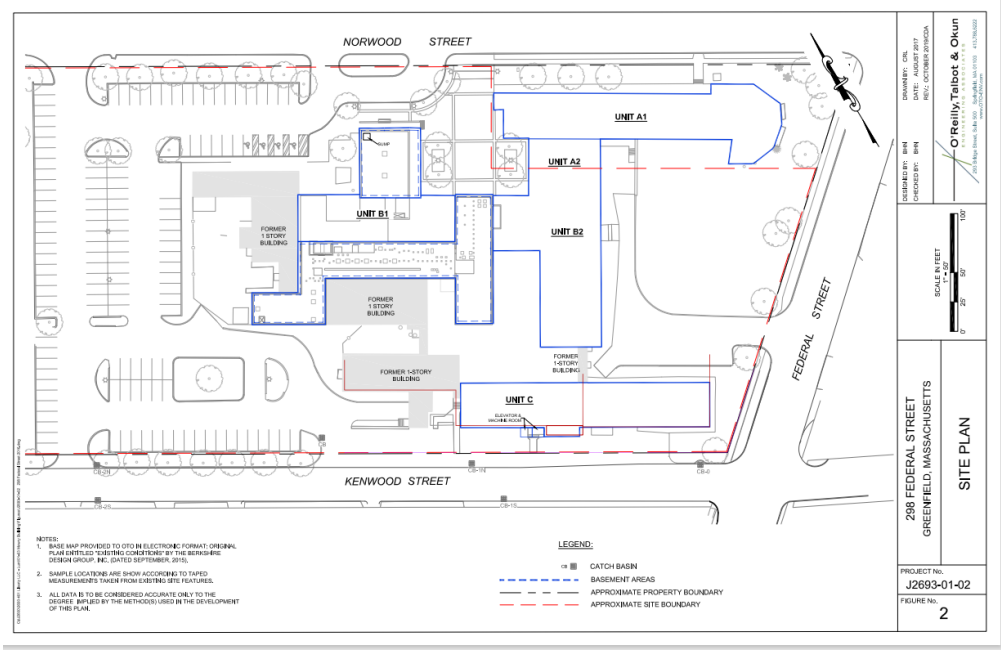
This memorandum presents a summary of the Bureau of Waste Site Cleanup's (BWSC's) comprehensive audit file review. Following designation of the site as a Public Involvement Plan (PIP) site on December 1, 2021, BWSC initiated a comprehensive audit of Massachusetts Contingency Plan (MCP) response actions conducted for the site. A Notice of Audit and Request for Information (RFI) were issued to the City of Greenfield on March 16, 2022. The RFI response was submitted to the Department on April 4, 2022. The audit included a review of site files, the RFI response, and a site inspection of the former Lunt Silversmiths property, which was conducted on April 13, 2022. The audit site inspection was attended by representatives of the following entities:

- MassDEP – Kimberly Longridge, John Ziegler
- City of Greenfield – Mayor Roxann Wedegartner, Eric Twarog, Jennifer Hoffman, Nancee Bershof, MD
- 401 Liberty, LLC – Raipher D. Pellegrino
- O'Reilly, Talbot, Okun & Associates, Inc. – Bruce Nickelsen, LSP

The audit site inspection included a discussion of the issues identified in the Department's Notice of Audit and preliminary audit findings, which are discussed and noted throughout this memorandum. The site inspection specifically included the basement areas of Unit B1, exterior portions of the former Lunt Silversmiths property, and the surrounding neighborhood, including a storm sewer outfall off Elm Street. No other interior spaces were inspected as they were not deemed necessary to complete this audit. During the inspection, a covered and bermed soil pile was observed within the parking area on the southern side of the property. The soil pile was generated by construction activities associated with a Release Abatement Measure submitted to the Department on November 18, 2021. Mr. Pellegrino indicated that the soil pile has been present for approximately 45 days. Mr. Nickelsen indicated that analytical data obtained for the soil pile indicates that all chemical constituents tested are below RCS-1 reportable concentrations and that on-site re-use of the soil is being considered.

Property Description and History

The former Lunt Silversmiths property is located at 298 Federal Street (identified as parcel 95-1-UTB and consisting of approximately 3.8 acres) in Greenfield, Massachusetts within an area designated for light commercial use. A plan, identified as Figure 2 in the Phase II Comprehensive Site Assessment (CSA), showing current and former building outlines is presented below:



Lunt Silversmiths ceased operations circa 2010, and the City of Greenfield took the property for non-payment of taxes in 2014 and initiated MCP response actions. The property was redeveloped by the City of Greenfield and 401 Liberty LLC beginning in 2015 with 401 Liberty LLC maintaining an option to purchase the property. Since July 2016, the buildings identified as Units B1, B2, and C have been occupied by Behavioral Health Network, a substance abuse treatment facility with patient stays up to 90 days. The Phase II CSA did not consider Units A1 or A2 as part of the Disposal Site because past manufacturing is reported to have not occurred within these areas. The Department is unaware of any documentation indicating manufacturing occurred within Units A1 and A2. The Department understands that the buildings have been redesignated as condominium Units A or B; however, for the purposes of the discussion contained in this memorandum, the building designations presented in the Phase II CSA are used.

Utilities contained within the property include sanitary and storm sewer lines that connect to municipal water and sewer systems beneath Norwood Street and Kenwood Street. In addition, the property is serviced by natural gas, electricity, and water.

As shown in the figure above, City streets bound the property to the north, east, and south with recreational fields to the west. Single family residential houses are located to the north, south, and west immediately beyond the street and recreational field borders. Primarily commercial properties are located further east of Federal Street.

Local topography is generally flat with a gentle slope downward to the west, toward the Green River, which is located approximately 4,800 feet to the west. The Disposal Site Conceptual Site Model (CSM), presented in the Phase II CSA and discussed in detail below, indicates that contaminated groundwater from the former Lunt property is transported to a storm sewer system that discharges off Elm Street in vicinity of the Green River.

Information regarding the Disposal Site's history was obtained from files contained within Department records under Release Tracking Number (RTN) 1-18869, specifically, the Phase II CSA, dated April 6, 2020, and prepared by O'Reilly, Talbot, & Okun Associates, Inc. (OTO) for the City of Greenfield. The Phase II CSA reports "… the original Site building was constructed in 1850. Multiple additions were made to the building over time. The former Lunt property was listed as having a finished area of approximately 74,280 square feet prior to demolition activities in 2015 and 2016 ...". Lunt Silversmiths is reported to have used the property for manufacturing beginning in the early 1900s to produce "…sterling, silver-plate and stainless-steel flatware, holloware, and giftware".

The Phase II CSA reports that "Past industrial processes identified at the property include cutting, stamping, degreasing, smelting, annealing, electroplating, buffing, and polishing." Chemicals reportedly used at the property included trichloroethene (TCE), used as a degreaser, 1,1,1-trichloroethane (1,1,1-TCA), cyanide, petroleum hydrocarbons, various metals, and nitric acid. Department records indicate that five TCE degreasing units were located at the property, only one of which was discovered and was located in the basement of the building referred to as Unit C (see figure above). Department records indicate that eleven cyclonic dust collectors were used in operations. Metals contaminated dust collected by these collectors is reported to have been sold to an off-site vendor for recycling.

Response Action Summary

Background

This section presents a summary of environmental investigations, which were conducted between 2012 and 2019 at the property and at off-property locations. Environmental investigations have included assessment of soil, groundwater, soil gas, indoor air, and stormwater. In addition, limited source removal action activities have been conducted, including removal of waste contained in drums and soil removal. Finally, passive venting systems to mitigate exposure to chlorinated volatile organic compounds (CVOCs), primarily TCE, were installed and are operational in a portion of Unit B1 and in Unit C.

Initial indication of a release to the environment having occurred at the former Lunt property was the submittal of a Downgradient Property Status (DPS) report filed on February 9, 2010, for

Goly's Garage, located south of the property at the corner of Kenwood Street and Federal Street. The DPS reported the detection of TCE in soil and groundwater (2.5 micrograms per liter (ug/l)) at location MW-9, located on the Goly's property and downgradient from the former Lunt property based on groundwater flow direction. TCE was detected at a higher concentration (80,800 ug/l) in groundwater collected from MW-6, located upgradient from MW-9 and on the former Lunt property. The Department assigned RTN 1-17758 to this release and required Lunt to perform a limited subsurface investigation of their property. Lunt did not perform this investigation.

On September 19, 2012, Lunt Silversmiths, Inc. reported a release of TCE, chromium, lead, nickel, and silver to the Department. The Department issued a Notice of Responsibility and assigned RTN 1-18869 to Lunt Silversmiths, Inc. on September 27, 2012. Representatives for Lunt Silversmiths, Inc. informed the Department on November 30, 2012, that Lunt Silversmiths, Inc. had filed for Chapter 11 bankruptcy protection on December 18, 2009 and could not perform necessary response actions.

As previously stated, the City of Greenfield took the property for non-payment of back taxes on November 24, 2014. The Department issued the City a Letter of Responsibility on March 6, 2015, identifying the City as a municipality with exempt status under c. 21E. The City has undertaken MCP response actions for the former Lunt property since issuance of the Letter of Responsibility. The focus of this audit is the MCP Phase II CSA submitted by OTO on behalf of the City on April 6, 2020. The conclusion of the Phase II CSA is that the City intends to file a Permanent Solution with Conditions and Notice of Activity and Use Limitation (AUL). A summary of response actions conducted to date, conclusions presented in the Phase II CSA, and the Department's analysis of the conclusions reached are presented below.

Conceptual Site Model

A CSM represents a site-specific description of what and how contaminants entered the environment, were transported and identifies potential routes of exposure to human and environmental receptors. The CSM provides a framework for assessing and addressing sources of oil and hazardous materials (OHM) and risk and is integral to achieving MCP performance standards for a Phase II CSA, Permanent Solution, or Temporary Solution.

The CSM presented in the Phase II CSA for releases associated with the Disposal Site includes the following:

- Releases of chlorinated solvents, principally TCE, and metals occurred because of former manufacturing activities conducted at the property which resulted in contamination of soil, groundwater, and indoor air.
- Contaminated soil within the top two feet has been remediated at the property where required to achieve MCP Method 1 risk standards; soil containing chlorinated solvents and metals remains at the property below a depth of two feet.
- A CVOC plume, consisting mainly of TCE, covers much of the former Lunt property (see pink shaded outline in figure below) and is the result of two on-property sources,

which were excavated to the extent feasible based on EPA's 2015 assessment. The CVOC plume flows to the south-southwest with regional groundwater flow and intercepts the storm sewer system located beneath Kenwood Street. Migration of the plume to the south beyond Kenwood Street is limited due to interception of the CVOC plume by the storm sewer system. Groundwater flow upgradient from the storm sewer system and to some extent downgradient from the storm sewer system discharges to the storm sewer system. Groundwater beneath the storm sewer system, which may be contaminated with CVOCs, is expected to discharge to the storm sewer system. Therefore, residential receptors south of Kenwood Street are not impacted by the release.

- Contaminated groundwater entering the storm sewer system is transported along the storm sewer piping beneath Kenwood Street. Once in the piping, CVOC contaminants are volatilized, diluted, or a combination of both, such that by the time water in the piping reaches the outfall to the Green River, approximately 6,600 feet to the southwest of the property, CVOCs are no longer detected.
- Elevated groundwater concentrations greater than TCE solubility indicate that dense, non-aqueous phase liquid (DNAPL) is likely present at the property, but its migration off-site is limited by the presence of glacial till.
- Vapor intrusion of CVOCs into property buildings is being mitigated by passive venting systems. Vapor intrusion of CVOCs either is not occurring or will not result in exceedance of MCP risk standards in off-property, residential structures.



Review of Conceptual Site Model and MCP Performance Standards

The Department's review of the CSM and MCP performance standards are discussed in this section. The Department believes there are significant data gaps regarding assessment of the source and extent of contaminants required to achieve Phase II performance standards. The Phase II CSA concludes that the performance standards for a Permanent Solution have been achieved. Although some contaminant sources have been removed from the property, there is evidence that potentially significant contaminant sources remain in the subsurface and are not being controlled as required to achieve a Permanent Solution for the release. In addition, the migration control requirements for a Permanent Solution have not been clearly achieved based on groundwater data collected from monitoring wells at the leading edge of the plume and other data discussed below that yield significant uncertainty with the completeness of the assessment and contaminant extent.

The Phase II CSA does not clearly define what is intended by the use of the term "Approximate Site Boundary," but the Department interprets this term to represent the Disposal Site boundary. The MCP Phase II performance standards require that the Disposal Site boundary, which represents the extent of contamination resulting from the release, be depicted in plan view. However, the Department notes that the "Approximate Site Boundary" shown in the Phase II CSA does not include all areas where site-related contaminants have been detected:

- catch basins along Kenwood Street where TCE, tetrachloroethene (PCE), and cis-1,2-dichlroethene (cis-1,2-DCE) were detected in a composite sediment sample (Table 9, 2017 Phase I Initial Site Investigation) and where TCE, PCE, cis-1,2-DCE, and vinyl chloride were detected in water samples (Table 14, Phase II CSA)
- monitoring well locations LS-22, LS-22, MW-6, MW-9, MW-100, MW-101, MW-102, MW-103, MW-105, MW-109, and MW-111 located along Kenwood Street and Davis Street where TCE was detected in groundwater (Drawing No. 5, Phase II CSA)
- 20 Kenwood Street, 22 Kenwood Street, and 37 Forest Street where TCE or 1,1,1-TCA were detected in indoor air samples (Table 18, Phase II CSA)

Contaminant Sources

The Phase II CSA identifies two main source areas located on the former Lunt property based on the following statement made on page 17: "There are two main source areas for the TCE plume which discharges to the storm sewer, both of which were excavated to the extent considered feasible by EPA in 2015." The Department notes that the 2015 soil excavation conducted by EPA's Superfund Technical Assessment and Response Team focused on removing contaminated soil in two areas of the former Lunt property, referred to as the west grid and south grid. Excavations in these areas were largely to a depth of two feet. EPA did not conclude that excavation of additional source material was not feasible, as reported by OTO, but that excavation was conducted to the "…extent practicable under the scope of this removal action…" (see Attachment H, Phase I Initial Site Investigation). The Department believes that excavation below a depth of two feet is feasible within these areas.

Information provided in the Phase II CSA indicates the potential for other significant sources of contamination to be present at the former Lunt property in addition to the shallow soil removed from the west grid and south grid. The Phase II CSA identifies five TCE degreasers were used at the former Lunt site but that only one of the five degreasers was discovered and located within Unit C; it is unlikely that the location of the remaining four degreasers can be determined from property records. Contaminated soil associated with former use of the degreaser in Unit C was the likely source of TCE detected in indoor air at this location. Absent historical information concerning the location of the remaining four degreasers or other potential sources, environmental sampling may provide indicators as to the presence of other sources of contamination. For example, TCE was detected in soil gas greater than sub-slab screening values at the following locations and may indicate the presence of a contaminant source: SG-4, SG-9, SG-10, and SG-11. The Department notes that SG-10 and SG-11 are within the footprint of condominium Units B1 and B2, respectively, and are outside the footprint of the passive venting system discussed further below. The Department also notes that the source of the detection of TCE in groundwater at monitoring wells LWP-107 and MW-108 is not identified or confirmed by sampling data.

The Phase II CSA also concludes that DNAPL is likely present at the site based on detection of elevated TCE concentrations in groundwater. DNAPL, if present, represents a potentially significant source of contamination to groundwater and indoor air. Specifically, the Phase II CSA cites the exceedance of 1% of TCE solubility (i.e., 11 milligrams per liter (mg/l) or 11,000 ug/l) as evidence of the likely presence of DNAPL. Groundwater concentrations at several monitoring wells exceeded this criterium on at least one occasion, including: LWP-101 (250,000 ug/l), LS-19 (107,000 ug/l), LS-24 (18,000 ug/l), MW-104 (45,000 ug/l), and MW-6 (80,800 ug/l reported for Goly's Garage, RTN 1-0001047, Downgradient Property Status/Class C-1 Response Action Outcome Statement). The presence of DNAPL was not assessed at these locations or any other locations despite the Phase II CSA's conclusion regarding the relationship of TCE solubility and groundwater concentrations. Furthermore, only monitoring well LS-24 is located within the two main source areas reported to result in TCE contamination of groundwater. The Phase II CSA also concludes that glacial till present in the subsurface represents a likely significant barrier to vertical migration of DNAPL; the Department agrees with this conclusion but notes that DNAPL stability pertaining to lateral migration of DNAPL has not been evaluated in more permeable subsurface materials, as required.

Available groundwater data indicate that metals remaining in site soil are not a significant source of groundwater contamination.

Contaminant Migration

The CSM assumes that contaminants associated with the former Lunt property are transported either with regional groundwater flow or as air-phase contaminants into on-property buildings. The CSM further assumes that any contaminated groundwater flows south-southwest toward Kenwood Street and intersects the storm sewer system where contaminated groundwater is captured and further transported along the storm sewer system. Prior to discharge at an outfall located approximately 6,600 feet from the former Lunt property, contaminants volatilize and/or

are diluted such that there is no exposure to human or environmental receptors. The Department's assessment of the groundwater and vapor intrusion contaminant migration pathways are discussed below.

Groundwater

The Department's assessment of the CSM concludes that data gaps remain to fully assess contaminant migration and potential risks to human and environmental receptors based on multiple lines of evidence, including the location of the monitoring well network in relation to suspected sources and determined groundwater flow direction, evidence for site contamination below the depth of the storm sewer piping, indoor air data, and groundwater data. The Department notes that groundwater contamination extends to the southern edge of Kenwood Street at monitoring wells MW-101 and LS-22, and the contaminant plume extends nearly the entire length of the property boundary along Kenwood Street. Based on groundwater flow direction, the Department notes that there are no monitoring wells beyond Kenwood Street downgradient from the likely source area marked by monitoring wells LS-19, LS-24, LWP-101, and MW-104 with exception of possibly monitoring well MW-116, located within Forest Street. In describing groundwater flow, the Phase II CSA includes a figure depicting only horizontal flow across the site based on a single groundwater gauging event in March 2013 and does not evaluate seasonal groundwater elevation fluctuation or flow direction.

The Department also reviewed boring logs for monitoring wells in proximity to or within Kenwood Street to evaluate the vertical distribution of contaminants and compared those data to the reported base of the storm sewer system, which is approximately 6 to 7 feet below ground surface, as shown on utility mapping resubmitted with the RFI response. The results of the Department's review indicate the presence of contamination, based on photoionization detector (PID) screening results for soil samples, below the depth of the storm sewer at several locations, including MW-6 (17 feet), LS-19 (11 feet), MW-100 (12.5 feet), MW-104 (20 feet), MW-105 (12.5 feet).

The Department also notes that potential transport of contaminants dissolved in groundwater or as air-phase contaminants along other utilities, which may serve as preferential pathways, is not discussed in the Phase II CSA. Drawings depicting other site subsurface utilities show that a subsurface water line may be present on the west side of a former one-story building in the vicinity of monitoring well LS-24, within the contaminated groundwater plume shown on Drawing No. 5 of the Phase II CSA. This water line is shown connecting to the water main located beneath Norwood Street, north of the site and opposite groundwater flow migration. Contaminants may be transported as dissolved-phase with groundwater or as a vapor-phase along utility corridors opposite expected migration pathways.

The Phase II CSA also uses a theoretical groundwater flow net for a gaining stream to conclude that groundwater flowing from the Lunt property, groundwater located downgradient from the property, and groundwater beneath the storm sewer system flows toward the storm sewer system, where it is captured. The Department agrees that at least some contaminated groundwater enters the storm sewer system based on the detection of TCE in water samples collected from catch

basins along this system. However, there are data potentially indicating that contaminated groundwater is not fully captured by the storm sewer system beneath Kenwood Street. These data include TCE detected in groundwater at Goly's Garage (discussed above) and the detection of TCE in indoor air samples collected in January 2013 from the basements of 20 and 22 Kenwood Street and 1,1,1-TCA detected in indoor air samples in January 2013 from 37 Forest Street. The Department further notes that the discharge of contaminated groundwater to the storm sewer system is presumed to be ongoing as neither the former Lunt Silversmiths nor the City have taken response actions to control this discharge.

In evaluating data presented for the Disposal Site, the Department notes that groundwater sampling of the existing monitoring well network included various sampling events conducted in 2012 and 2013 with subsequent sampling rounds conducted in 2016 (well points installed beneath Unit B2), 2018, and 2019. None of these sampling events represent a site-wide, comprehensive analysis of groundwater conditions. Additionally, there are insufficient data to draw any conclusions regarding groundwater contaminant concentrations trends. Although data for at least one monitoring well, LS-19, indicates an apparent decreasing trend from 107,000 ug/l TCE in 2012 to 2,700 ug/l TCE in 2019, there is significant variability in data obtained for this well, which was only sampled three times between 2012 and 2019. The second round of data collected in 2013 detected TCE at 3,400 ug/l; the two orders of magnitude decrease in TCE concentration at this location is not clearly the result of a decreasing trend. Other possibilities for the apparent decrease include seasonal variation or sampling error. The Department believes that additional site-wide comprehensive groundwater data must be obtained to reach any conclusions regarding groundwater contaminant trends. In addition, other monitoring wells, depicted as being at the downgradient edge of the contaminant plume, indicate an apparent increase in TCE concentrations:

- LS-20 – 0.199 ug/l in 2012 to 180 ug/l in 2018
- LS-22 – < 1 ug/l in 2012 and 2013 to 5.4 ug/l in 2019
- MW-101 – 1,000 ug/l in 2013 and September 2019 to 3,400 ug/l in December 2019
- MW-104 – 19,000 ug/l in 2013 to 45,000 ug/l in 2019

Indoor Air

The detection of TCE at a concentration of 8.7 micrograms per cubic meter (ug/m^3) in indoor air following redevelopment and occupancy of condominium Unit B1 required an Immediate Response Action (IRA), which initially consisted of venting the Unit B1 basement. The Department notes that testing of indoor air did not occur until after occupancy of the building despite the knowledge of TCE in indoor air prior to reconstruction. Testing of indoor air prior to building occupancy is the Department's recommended approach to avoid potential exposure to human receptors for even short periods of time. The Department acknowledges that indoor air concentrations tested approximately one month following the Imminent Hazard notification and with venting of the basement air space were less than Imminent Hazard concentrations. Ultimately, a passive system was installed and completed in January 2018 within the basement of Unit B1 to mitigate exposure to TCE in indoor air. Four rounds of indoor air samples, collected following installation of the passive system, demonstrate that the TCE indoor air

concentrations within Unit B1 are below Imminent Hazard and No Significant Risk concentrations. The last indoor air sampling event was completed on February 28, 2019, and an IRA Completion Report was submitted on April 16, 2019. Site maintenance personnel routinely inspect the basement areas of Unit B1 for the presence of cracks in the concrete floor that may result in reducing the effectiveness of the passive venting system. The Department's inspection of portions of the basement areas showed that the basement floor is being maintained as evidenced by the presence of sealant used to seal cracks. The Department's inspection revealed the basement floor in the areas inspected to be free of cracks exposing underlying material.

A passive venting system also was installed in condominium Unit C given the detection of TCE at 4.8 ug/m^3 prior to reconstruction of the building. With the passive venting system, TCE concentrations within Unit C were less than commercial/industrial indoor air threshold values for four sampling rounds conducted between March 2019 and December 2019 and are below Imminent Hazard and No Significant Risk concentrations. The condition of the floor in Unit C was not inspected by the Department as that passive venting system is covered by a finished floor. Cracks in the sub-floor would not be apparent, and therefore, maintenance of this passive system may require additional indoor air testing to ensure its effectiveness. The Department does note, however, unlike in other site buildings, source removal associated with a vapor degreaser was conducted within Unit C prior to re-development.

Limited sampling was performed in condominium Unit B2 to assess indoor air quality. The one indoor air sample collected to assess indoor air quality in condominium Unit B2 was not proximal to soil gas sample SG-11, where elevated TCE was detected in 2012.

Characterization of potential impacts to indoor air for select residences along Kenwood Street and Forest Avenue were conducted in 2013 by MassDEP and in 2014 by USEPA. Site-related contaminants, TCE and 1,1,1-TCA, were detected in residences at 37 Forest Street, 20 Kenwood Street, and 22 Kenwood Street above residential threshold values in the 2013, potentially indicating that CVOCs have been transported via groundwater not captured by the storm sewer system or transported via vapor migration along a preferential pathway that has not been assessed. OTO implies that the detection of 1,1,1-TCA at 37 Forest Street at a higher concentration on the first floor than in the basement is indicative of a source inside 37 Forest Street. The Department does not find this conclusion sufficiently supported given it is based upon a single sampling round and the concentration of 1,1,1-TCA was not significantly different on the first floor (4.42 ug/m^3) compared to the basement (3.82 ug/m^3). EPA's 2014 indoor air sampling of select homes along Davis Street, Forest Avenue, and Kenwood Street did not detect site-related contaminants in indoor air; however, details regarding EPA's sampling event are not available in the site file. The Department does not dispute the results of the 2013 or 2014 indoor air data. However, reliance on these two rounds of indoor air sampling is not sufficient to characterize indoor air at off-site properties given the absence of source assessment and elimination or control, the time that has passed since the indoor air samples were collected, and without better understanding of the site hydrogeology, preferential pathways assessment, and evaluation of the adequacy of the existing groundwater monitoring network.

Risk Assessment

The Department's Office of Research and Standards (ORS) conducted a review of the Method 3 Human Health Risk Characterization (HHRC) included with the Phase II CSA. ORS's findings are summarized below. Note that information received in response to the RFI addressed some of ORS's recommendations and findings summarized below. However, ORS was not asked to provide a follow up review at this time because of the significant assessment data gaps identified. Note that the tables referenced below are presented in Appendix J of the Phase II CSA.

- In Section 2.4.3 surface soil exposures are divided up into five exposure areas: the Central/Manufacturing Area, Southeastern Area, Northern Former Cyclone Area, Western Grid Excavation Area and the Southern Grid Excavation Area. However, the boundaries of these areas are not clearly delineated so it was not possible to reconstruct the Exposure Point Concentrations (EPCs). The Department acknowledges that this information was provided in the RFI response.
- The HHRC should include a discussion about why the site was divided into the five surface soil exposure areas and this discussion should be supported with a map or figure showing the delineation between the exposure areas identified on the Site (e.g., southeastern area, etc.). ORS recommends the HHRC be amended to clarify exposure areas so the reader/reviewer can follow and better understand how the human health risks were estimated.
- The report does not adequately document and justify the exposure point estimates for each of the five areas. For example, in Table 11, the calculated risk estimates for residential incidental ingestion and dermal contact with soil in the Southeastern Area (0-2' horizon) appears to be the average of two data points (SB-4 and SB-2) for an average lead concentration of 1,325 mg/kg. However, only SB-4 is located within the southeastern portion of the Site. SB-2 is located to the west of the Site and it is not clear why other soil data were not included in the EPC calculation.
- Table 7 appears to consist of nine different EPC tables. These should be given separate numbers or sub-titles (e.g., 7a, 7b, etc.) so the reader can track the risk assessment discussion and understand what specifically is being referenced when citing Table 7. The same is true for Tables 10, 11, 12 and 13.
- Table 13 provides the ShortForm Calculation of Risk Estimates for Resident - Inhalation of Vapors – Condominium B1 1st Floor Office. However, this exposure scenario is not included in Table 14 (Summary of Hazard Indices and Risk Estimates). The results of this risk estimate should be included in Table 14.
- Utility worker exposures to groundwater, including dermal contact with groundwater and potential inhalation of volatiles released from groundwater in a trench, were not evaluated quantitatively. A utility worker scenario should be assessed at this site because TCE has been detected within the storm sewer main along Kenwood Street.