Analysis of Brownfields Cleanup Alternatives-Preliminary Evaluation
Nu-Style Jewelry Factory
21 Grove Street-Lot 22
Franklin, Massachusetts

I. Introduction & Background

Site Location

The Site is the Nu-Style Paint Factory, located at 21 Grove Street in Franklin, Massachusetts. The 0.8-acre Site is identified by the Town of Franklin Assessor as Lot 22 on Map 276 and improved by an approximate 4,300 square foot (SF) dilapidated and unoccupied industrial building. It is noted that the Site building shares a structural wall with the northerly portion of the building (outside of the Massachusetts Contingency Plan [MCP] Disposal Site) at Lot 28. The Site is located west of Grove Street in an area of mixed industrial, commercial and residential use. The property is abutted by the Massachusetts Bay Transportation Agency (MBTA) commuter rail line. The Town acquired the Site property on September 10, 2001.

A Vicinity Map and MassDEP Phase I Site Assessment Map, depicting the Site and surrounding area are attached

Forecasted Climate Conditions

According to the Massachusetts Climate Change Adaption Report[1], the impacts of climate change are wide-ranging and growing in severity in Massachusetts, with impacts from sea level rise, storm events, flooding, greenhouse gas emissions and changing weather patterns. As a coastal state, storm surges have broad implications and impacts to infrastructure, natural resources and ecosystems, including drinking water supplies. The financial impacts are expected to be very high. According to the Federal Emergency Management Agency (FEMA), the Site is abutted to the south by “Special Flood Hazard Areas” and “Floodway Areas in Zone AE” associated with Mine Brook.

Previous Site Use(s) and any previous cleanup/contamination

The Site was operated by Unionville Woolen Mills in the late 1800s. It is noted that the former industrial property comprised both Lot 22 (subject Site) and the abutting Lot 27 and Lot 28. The site was subsequently operated by Nu-Style Company, Inc. and Image Jewelry as a jewelry factory and Franklin Paint Company and a construction company for vehicle repair until the late 1980s. There is evidence of the historic use of chlorinated solvents, paints, dyes and fuel oil. Underground Storage Tanks (USTs) were removed from the subject property in 1990, according to records maintained at the Town Clerk’s office. The tanks included one 5,000-gallon, two 2,000-gallon, and one 1,000-gallon USTs.

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[1] Climate Change Adaptation Report. Executive Office of Energy and Environmental Affairs and the Adaptation Advisory Committee. September 2011

USEPA conducted an inspection of the subject property on January 8, 1992. According to Town files, the inspection revealed the presence of full and partially full labeled drums and containers as well as drums and containers with undocumented material. The inspection also included the observation of seven process tanks in the former plating department which contained undocumented liquids and/or sludges. Some of the chemicals identified at the subject property included: sodium cyanide, chromic acid, potassium cyanide, perchloroethylene (tetrachloroethylene; PCE), zinc cyanide, nickel sulfate, and copper cyanide. Following the inspection, USEPA conducted Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal actions at the subject property in 1992. Removal actions included the removal and offsite disposal of hazardous waste, contaminated soil and debris, and petroleum product from USTs.

The Lot 27 property building was demolished in 2012 under a Release Abatement Measure (RAM) Plan, which revealed the presence of an underground tunnel/raceway that extends to the eastern edge of the Lot 22 building footprint. Asbestos-containing materials (ACM) was present in building materials. Additional cleanup activities conducted under the RAM Plan included the excavation and off-Site disposal of contaminated raceway soils/sediments, along with the construction of a steel-reinforced concrete gravity wall under an EPA Brownfields Cleanup Grant for Lot 27.

Site Assessment Findings

Site assessment activities were conducted from 1990 to 2013, which included soil, groundwater (overburden and bedrock) and soil vapor investigations.

A release of tetrachloroethylene (PCE), trichloroethene (TCE), lead, nickel and some polycyclic aromatic hydrocarbons (PAH) to soil was discovered in January 2007 and reported to the Massachusetts Department of Environmental Protection (MassDEP), which assigned Release Tracking Number (RTN) 2-16694 to the release.

There is evidence of ACM in building materials. IN addition, Demolition of the Lot 22 Site building is necessary to remediate CVOC impacts to groundwater within the building footprint.

Project Goal (Site reuse plan)

The owner has established plans to clean up and redevelop the Site for mixed use development.

Applicable Regulations

Site Cleanup will be conducted pursuant to the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000. Additional applicable local, state and federal regulatory requirements will be adhered to, including the appropriate procurement of contractors.

Applicable Cleanup Standards

The applicable MCP Standards for the Site are Method 1 Soil Cleanup Standards and MCP Method 1 (S-1) Soil and Groundwater (GW-2/GW-3) Standards.

Cleanup Oversight Responsibility

In 1993, Massachusetts created a model program that privatized the cleanup of hazardous waste sites in the Commonwealth. Licensed Site Professionals (LSPs) are authorized by the Commonwealth to work on behalf of property owners, operators, and other responsible parties to oversee the assessment and cleanup of contamination that has been released into the environment. LSPs are scientists, engineers, and public health specialists with significant professional expertise in oil and hazardous material contamination. LSPs are governed by the Massachusetts Board of Registration of Hazardous Waste Site Cleanup Professionals, also known as the LSP Board. Assessment and cleanup activities are conducted pursuant to the Massachusetts Contingency Plan (MCP).

Cleanup Alternatives

Description of Cleanup Alternatives

Seven general classes of potentially applicable remedial technologies (RTs) for the Site have been identified and screened that may reduce levels of CVOCs and petroleum hydrocarbons to soil and groundwater. Technologies in each of these categories were evaluated during the preliminary screening to facilitate a comprehensive review of technologies applicable for the Site. Alternatives from the following categories were evaluated during the preliminary screening:

1. Alternative #1: No Remedial Action
2. Alternative #2: Institutional Controls
3. Alternative #3: Passive Containment
4. Alternative #4: Active Treatment/Removal/Containment Systems
5. Alternative #5: *Ex-Situ* Technologies
6. Alternative #6: In-Situ Treatment Technologies
7. Alternative #7: Monitoring

Alternative #1: No Remedial Action

The “No Remedial Action” alternative assumes that no additional remedial efforts are implemented to address contaminant impacts. The “No Action” alternative can provide a basis for assessing the effects of implementing remedial actions; however, it does not directly reduce the toxicity, mobility or volume of impacted soils or sediment. This response action alternative does not reduce Site risks associated with impacted soil or groundwater and provides no additional protection to human health or public welfare. Additionally, the contaminants of concern are at levels that are unlikely to attenuate below standards in a reasonable timeframe, and therefore, "No Action" would not reduce potential risk to human health and/or the environment in the long term.

Alternative #2: Institutional Controls

Institutional controls are mechanisms to limit access to impacted media and include alternatives such as fencing, barriers, and Activity and Use Limitations (AULs) in the form of deed restrictions. While institutional controls do not eliminate contamination, they can provide an effective, low cost means of reducing exposure potential, and thus risk, if properly maintained and enforced.

Institutional controls may be effective in mitigating exposure to contaminant impacts in locations at which it may be infeasible to reach MCP background conditions. Implementation of an AUL on a Site property to restrict access to impacted groundwater (other than as "exposure pathway elimination measures" or to restrict access to drinking water) is not supported by MassDEP. However, AULs may be implemented to ensure that engineering controls be maintained to mitigate potential risk.

Alternative #3: Passive Containment

The primary purpose of containment technologies is to isolate impacted media, and thus control potential exposure risks. Passive containment involves placement of horizontal physical barriers, such as a cap, sealant or membrane, or vertical barriers such as a grout curtain, slurry wall, or sheet piling in the areas of contamination. Asphalt pavement, concrete and building slabs also serve as barriers to contaminated soils.

Horizontal Barriers

The primary purpose of passive containment technologies is to isolate impacted media, and thus control potential exposure risks. Passive containment using horizontal barriers involves placement of physical barriers, such as a cap, in order to limit the potential for exposure to impacted media. A vapor barrier is considered as a horizontal barrier for future occupied buildings at the Site property and an engineered cap is considered for contaminated soils and transmission of VOCs.

The purpose of a cap is to protect human and environmental receptors from constituents of concern by means of physical separation. A cap consists of a physical barrier that can range widely in composition and can consist of a single or multiple layers. Caps are designed to be either permeable or impermeable. Permeable caps are intended to provide a physical barrier to exposure and typically consist of soil or stone, sometimes supplemented with synthetic materials (e.g. geotextiles). Impermeable caps are designed to prevent infiltration of precipitation or migration of gases and typically include a synthetic membrane or low-permeability soil layer. Caps are usually accompanied with an AUL in order to prevent the possibility of future exposure as a result of a change in Site use. In addition, a visual marker (i.e., geotextile fabric) is installed under the cap to delineate clean versus contaminated soil and assist in identifying when cap erosion has occurred.

Vapor barriers may be composed of high density polyethylene (HDPE), low density polyethylene (LDPE), very-low density polyethylene (VDPE) materials; spray-applied materials composed of a rubberized asphalt emulsion or epoxy (USEPA, 2008); or any other chemical resistant membrane that prevents the transmission of VOCs.

Passive Subslab Depressurization System (SSDS)

A Passive SSDS serves as a venting system to create a preferential pathway to divert the vapors from the subsurface to the ambient air above the building. Passive mitigation measures include the installation of a barrier or barriers to prevent the migration of contaminated vapors to the indoor air, or a venting system to create a preferential pathway to divert the vapors from the subsurface to the ambient air above the building. These measures are considered "passive" because they do not employ a fan or blower or other electro-mechanical device as a component of the mitigation system. Passive mitigation measures are considered Passive Exposure Pathway Mitigation Measures under the MCP (as defined at 310 CMR 40.0006(12)).

SSDSs are based on traditional radon-mitigation technology and consist of a fan or blower that draws soil vapor from beneath the building slab. When an existing building is retrofitted with an SSDS, extraction points are installed through the building slab. In most cases these points are installed vertically. In cases where vertical extraction points are not able to influence all areas where vapors enter through the slab, horizontal extraction points may be required.

Passive venting mitigates the vapor intrusion pathway by intercepting sub-slab soil gas with a series of perforated pipes (typically 4-in. diameter), installed below the slab within a permeable bedding material, such as sand or gravel. The perforated piping is typically connected to solid piping and vented to the atmosphere above the roof line. Where possible, a vapor barrier, should be used in conjunction with a passive venting system.A passive venting system relies on temperature and pressure differences, and wind speed to induce soil gas flow and removal. As a result, to ensure its effectiveness, the system must include sufficient interception piping and highly permeable bedding, and the barrier system must be properly installed. Passive venting systems should be designed so that a fan can be easily added to transform the system to an active SSDS if a greater reduction in the concentrations of VOCs is necessary to achieve mitigation goals.

Prefabricated floor systems that create a continuous aerated space beneath the slab or raised aerated floor above an existing slab are a form of passive venting system that eliminates the need for passive vent piping and permeable bedding material. Aerated floor systems may also, when fitted with a fan or blower, be converted to an active SSDS.

As with a vapor barrier, passive venting systems are more easily installed in and generally better suited to new construction, where the appropriate amount and type of sub-slab bedding material can be specified and verified and proper installation can be assured.

<u>Alternative #4: Active Treatment/Removal/Containment</u>

Building Abatement and Demolition and Structural Engineering Controls

Abatement of hazardous building materials (i.e., ACM) is performed in accordance with regulatory requirements. If abatement is infeasible (i.e, due to limited access associated with collapsing structures), demolition debris may be managed as hazardous (bulk waste) materials. Engineering controls, including dust suppression may be employed to mitigate risk of exposure to workers, receptors and the environment. Abatement monitoring is performed by licensed asbestos inspectors and monitors.

Structural engineering control measures may be implemented to ensure that building abatement and/or demolition does not pose a risk to the structural integrity of nearby or shared structures.

Groundwater Recovery and/or Treatment

Groundwater recovery may be utilized solely for containment purposes or may also be used for groundwater treatment. Groundwater extraction/recovery and treatment ("pump and treat") is a proven technology for the recovery of impacted groundwater. This method is also a conventional means to induce hydraulic containment of a groundwater table surface. Implementation of these systems may involve the installation of multiple large diameter extraction wells, treatment equipment, and a means to discharge treated effluent. The effectiveness of groundwater pump and treat systems is highly dependent on factors such as secondary groundwater quality (iron content, hardness, pH), source location and volume, and soil type, permeability and saturated thickness.

Soil permeability and well field design will directly influence well yields and determine whether the system will operate intermittently or continuously. Excessive intermittent operation of a system or "cycling" can be detrimental to system components. Although groundwater recovery and treatment is successful in establishing groundwater plume capture, the limitations and challenges of this technology include high utility costs, numerous extraction wells for larger plumes, and generation of high quantities of groundwater.

For soil excavations conducted within the water table, dewatering allows for additional soil excavation to be conducted "in the dry;" assists in stabilizing the structure of the excavation; and, serves to remediate groundwater through the use of granulated activated carbon units. Dewatered groundwater is temporarily stored on-Site using fractionation (frac) tanks and may be discharged to a municipal utility under a permit; to a catch basin/water body under an EPA Remediation General Permit (RGP); or, disposed to a licensed acceptance facility under a MCP Bill of Lading (BOL) and managed as hazardous remediation waste.

Active Exposure Pathway Mitigation Measures (AEPMMs)

An Active SSDS is effective at mitigating vapor intrusion impacts to receptors in buildings, due to volatile contaminants in groundwater that can accumulate in the vadose zone and impact indoor air. Vapor intrusion mitigation systems that employ a fan or blower to draw VOC vapors into collection points and discharge them away from the affected building are considered "active" mitigation systems. Active mitigation systems are considered Active Exposure Pathway Mitigation Measures or AEPMMs under the MCP (as defined at 310 CMR 40.0006(12)), measures directed at an Exposure Pathway which rely on the continual or periodic use of a mechanical or electro-mechanical device to reduce exposures and meet applicable performance standards. Active systems require ongoing monitoring and maintenance and the use of telemetry or remote monitoring measures.

Active sub-membrane depressurization (SMD) systems are typically used in buildings with dirt floor basements or crawlspaces. SMD systems are similar to SSD systems with the exception that depressurization occurs below an impermeable membrane instead of a concrete slab. The best approach for using an SMD system is to place various lengths of perforated piping horizontally over the dirt floor and cover the piping with a vapor barrier. To prevent the impermeable membrane from blocking the perforations in the piping when a vacuum is drawn, highly permeable material (gravel or pea stone) can be packed between and on top of the piping. Vapor barriers used in SMD systems should be chemical resistant membranes that prevent the transmission of VOCs.

Alternative #5: *Ex-Situ* Technologies

The primary purpose of ex-situ treatment technologies is to remove impacted media, and thus control potential exposure risks. Excavation involves the removal of impacted soil that presents a potential direct contact risk, along with soil which may serve as a continuing source of contaminant to Site groundwater. The impacted soil is removed from its current setting and transported off-Site for contaminant removal, recycling and/or disposal. However, since Site soils are classified as hazardous waste and contaminated soils are located at depths greater than 10 feet below ground surface (bgs) dewatering would be required, which would also require management of contaminated groundwater as hazardous waste. In addition, this technology would not address contaminated soils within the City ROW, due to the prevalence of underground utilities.

Alternative #6: *In-Situ* Treatment Technologies

In-situ (organic or inorganic/chemical) treatment or augmentation technologies are most dependent upon the ability to deliver the treatment material to the affected subsurface area, and the sustainability or effective life of the material. Petroleum hydrocarbon and VOC constituents in Site groundwater are amenable to aerobic biological technologies and chemical oxidative technologies (ozone, permanganate, persulfate, oxygen releasing compounds (ORC), and hydrogen peroxide). To effectively assess performance, bench-scale treatability studies and pilot testing is recommended prior to implementation.

ISCO is a remediation process in which contaminants are chemically converted to less toxic compounds (water, oxygen, and carbon dioxide). There are several types of commercially available oxidants that have been demonstrated to be effective in reducing VOC and petroleum hydrocarbon contamination in groundwater. Effective distribution of the reagents and the reactivity of the selected oxidant with the contaminant are crucial in achieving reduction in VOC concentrations. Soil oxidant demand varies with soil type, the nature of the site groundwater, and soil composition. Contaminant oxidant demand is based on total contaminant mass and mass distribution. Groundwater monitoring is essential in evaluating the performance of this remedy. Chemical oxidation typically involves reduction/oxidation (redox) reactions that chemically convert hazardous compounds to nonhazardous or less toxic compounds that are more stable, less mobile, or inert. Redox reactions involve the transfer of electrons from one compound to another. Specifically, one reactant is oxidized (loses electrons) and one is reduced (gains electrons). The oxidizing agents most commonly used for treatment of hazardous contaminants in soil and groundwater are zero valent iron, hydrogen peroxide, catalyzed hydrogen peroxide, potassium permanganate, sodium permanganate, sodium persulfate, and ozone. Each oxidant has advantages and limitations, and while applicable to soil contamination and some source zone contamination, they have been applied primarily toward remediating groundwater.

ISB uses microorganisms to degrade organic contaminants in soil, sludge, and solids either excavated or in situ. The microorganisms break down contaminants by using them as a food source or co-metabolizing them with a food source. Aerobic processes require an oxygen source, and the end products typically are carbon dioxide and water. Anaerobic processes are conducted in the absence of oxygen, and the end products can include methane, hydrogen gas, sulfide, elemental sulfur, and dinitrogen gas. In-situ techniques stimulate and create a favorable environment for microorganisms to grow and use contaminants as a food and energy source. Generally, this means providing some combination of oxygen, nutrients, and moisture, and controlling the temperature and pH adjustment. Sometimes, microorganisms that have been adapted for degradation of specific contaminants are applied to enhance the process.

Alternative #7: Monitoring

Groundwater monitoring is conducted for monitored natural attenuation (MNA) as a measure to assess the effectiveness of the cleanup. Groundwater is collected from monitoring wells at and/or hydraulically downgradient of the cleanup area. This option is also effective for assessing potential vapor intrusion.

a. Evaluation of Cleanup Up Alternatives

Effectiveness-Including Climate Change Considerations:

1. Alternative #1: No Remedial Action: This is ineffective at reducing Site contaminant concentrations.

2. Alternative #2: Institutional Controls: An AUL is low to moderately effective, if combined with another Alternative.

3. Alternative #3: Passive Containment: This technology is moderately effective at mitigating potential direct contact exposure to contaminated media (horizontal cap), and effective at mitigating contaminant migration (vertical cap), if combined with another Alternative.

4. Alternative #4: Active Treatment/Removal/Containment: This technology Building abatement/demolition) is effective to accommodate the implementation of other remedial alternatives.

5. Alternative #5: *Ex-Situ* Technologies: This Alternative is highly effective at remediating Site contaminants.

6. Alternative #6: *In-Situ* Technologies: This Alternative is moderately effective at remediating some contaminants in some media, but requires combination with other Alternatives to address source removal.

7. Alternative #7: Monitoring: Monitoring is effective to monitor the effectiveness of other Alternatives.

General Climate Consideration Notes:

Storm water design will be incorporated as part of Site development. In addition, the cleanup design will include the implementation of storm water controls.

Reliability : In accordance with 310 CMR 40.0858 (2), the short and long-term reliability for each of the alternatives were evaluated based on “(a) the degree of certainty that the alternative would be successful; and (b) the effectiveness of measures required to manage residues or remaining wastes or control emissions or discharges to the environment.” Specific factors considered in judging the short and long-term reliability include: protection of workers and the community during construction, environmental impacts resulting from implementation of the remedial response action, the time required to achieve protection and long-term reliability of management controls providing protection from residual wastes.

1. Alternative #1: No Remedial Action: This alternative is unreliable in reducing Site contaminant concentrations.
2. Alternative #2: Institutional Controls: An AUL is a moderately reliable measure to address engineering controls associated with contaminated soils and sediments.
3. Alternative #3: Passive Containment: This alternative has a moderate degree of certainty of success in reliability.
4. Alternative #4: Active Treatment/Removal/Containment: This alternative has a high degree of certainty of success in reliability.
5. Alternative #5: *Ex-Situ* Technologies: This technology is a highly reliable technology to remediate contaminant concentrations in soil.
6. Alternative #6: *In-Situ* Technologies: This technology has a moderate to high degree of certainty of success in reliability to remediate VOC groundwater contaminants.
7. Alternative #7: Monitoring: This alternative has a moderate degree of certainty of success in reliability since it relies on other technologies.

Implementability: In accordance with 310 CMR 40.0858(3), difficulty in implementation of each of the alternatives was evaluated based on: “(a) the technical complexity of the alternative; (b) where applicable the integration of the alternative with existing facility operations and other current or potential remedial actions; (c) any necessary monitoring, operations, maintenance or site access requirements or limitations; (d) the availability of necessary services, materials, equipment, or specialists; (e) the availability, capacity and location of necessary off-site treatment, storage and disposal facilities; and (f) whether the alternative meets regulatory requirements for likely approvals, permits or licenses required by MassDEP or other state, federal or local agencies."

1. Alternative # 1: No Remedial Action: This Alternative is readily implementable. However, there are issues and concerns associated with contaminant exposure associated with future development. Ongoing monitoring and inspection of the Site is required, along with access limitations.
2. Alternative # 2: Institutional Controls: There is low to moderate technical complexity associated with implementation and a Notice of AUL is easily integrated.
3. Alternative # 3: Passive Containment: There is moderate technical complexity and operation, monitoring & maintenance (OM&M) associated with implementation, including temporary access limitations. There are temporary access limitations and specialized materials, equipment and personnel required for implementation. A low to moderate level of capacity associated with off-site treatment, storage and disposal (TSD) facilities is required.
4. Alternative # 4: Active Treatment/Removal/Containment: There is moderate to high technical complexity and OM&M associated with implementation, including temporary access limitations. There are temporary access limitations and specialized materials, equipment and personnel required for implementation. A moderate to high level of capacity associated with off-site TSD facilities is required.
5. Alternative # 5: *Ex-Situ* Technologies: There is moderate to high technical complexity and OM&M associated with implementation, including temporary access limitations. There are temporary access limitations and specialized materials, equipment and personnel required for implementation. A moderate level of capacity associated with off-site TSD facilities is required.
6. Alternative # 6: *In-Situ* Technologies: There is moderate to high technical complexity and OM&M associated with implementation, including temporary access limitations. There are temporary access limitations and specialized materials, equipment and personnel required for implementation.
7. Alternative # 7: Monitoring: There is low to moderate technical complexity and OM&M associated with implementation, including temporary access limitations.

Cost: In accordance with 310 CMR 40.0858 (4), the cost to implement each alternative was evaluated based on (a) costs of implementing the alternative, including without limitation: design, construction, equipment, site preparation, labor, permits, disposal, operation, maintenance and monitoring costs; (b) costs of environmental restoration, potential damages to natural resources, including consideration of impacts to surface waters, wetlands, wildlife, fish and shellfish habitat; and (c) the relative consumption of energy resources in the operation of the alternatives, and externalities associated with the use of those resources.

1. Alternative # 1: No Remedial Action: There are low to moderate costs to implement this technology. The estimated cost to implement this technology ranges from $10K to $20K.

2. Alternative # 2: Institutional Controls: There are low to moderate costs to implement this technology ranging from $10K to $12K.

3. Alternative # 3: Passive Horizontal Containment: There moderate to high costs associated with this technology, ranging from $100K to 150K.

4. Alternative # 4: Active Treatment/Removal/Containment: There is moderate to high technical cost associated with this technology. Abatement, demolition and implementation of structural engineering controls is estimated at $200K to $300K.

5. Alternative # 5: *Ex-Situ* Technologies: There are high costs associated with this technology, ranging from $100K to $300K.

6. Alternative # 6: *In-Situ* Technologies: There are moderate to high costs associated with this technology, ranging from $50K to 75K.

7. Alternative # 7: Monitoring: There are low to moderate costs associated with monitoring and reporting, ranging from $30K to $50K.

b. Recommended Cleanup Up Alternative

1. Institutional Controls: An AUL is implemented at the Site as an administrative control and may or may not be combined with another Alternative.

2. Alternative # 4: Active Treatment/Removal/Containment: Building abatement and demolition and implementation of structural engineering controls is a feasible approach to address hazardous building materials impacts and access the building footprint to implement Ex-situ and In-Situ remedial technologies.

3. Passive Containment: A horizontal barrier (cap) may be implemented at areas for which *Ex-situ* technologies are infeasible (i.e., cost prohibitive) and as a measure to mitigate exposure to contaminants that are infeasible to remediate to background conditions.

4. *Ex-Situ* Technologies: The excavation of surficial soils within the building footprint is a feasible Alternative to achieve a level of NSR.

5. *In-Situ* Technologies: *In-Situ* technologies is a feasible technology to reduce VOC impacts to groundwater.

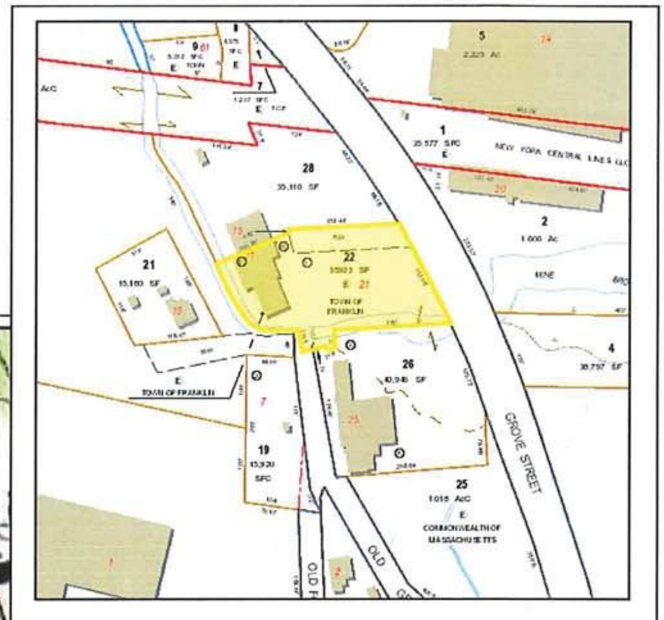
5. Monitoring: Groundwater monitoring may be conducted to assess the effectiveness of *in-situ* and/or *ex-situ* technologies.

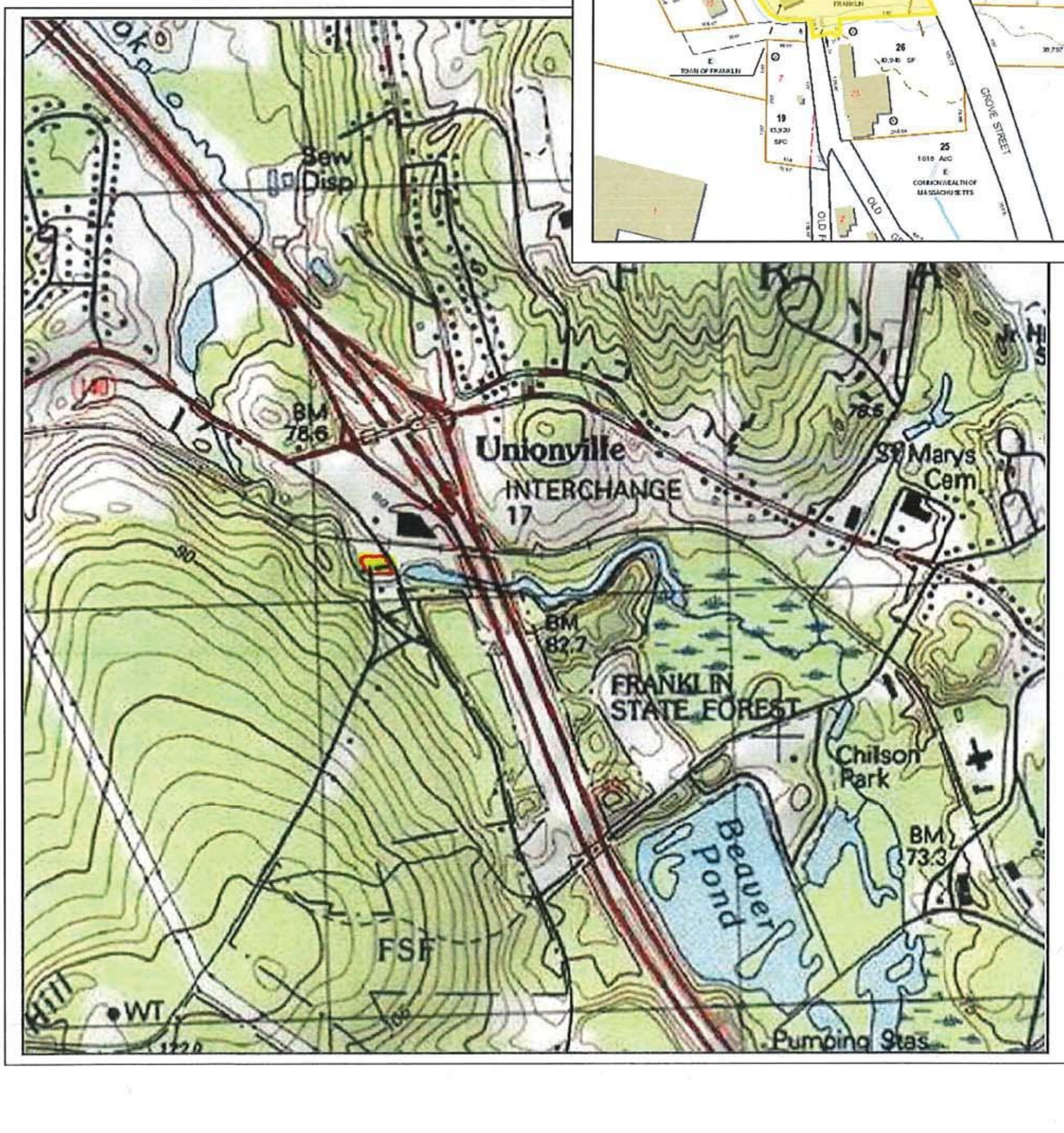
Attachment B

Former Nu-Style Property

21 Grove Street, Franklin, MA

Vicinity Map

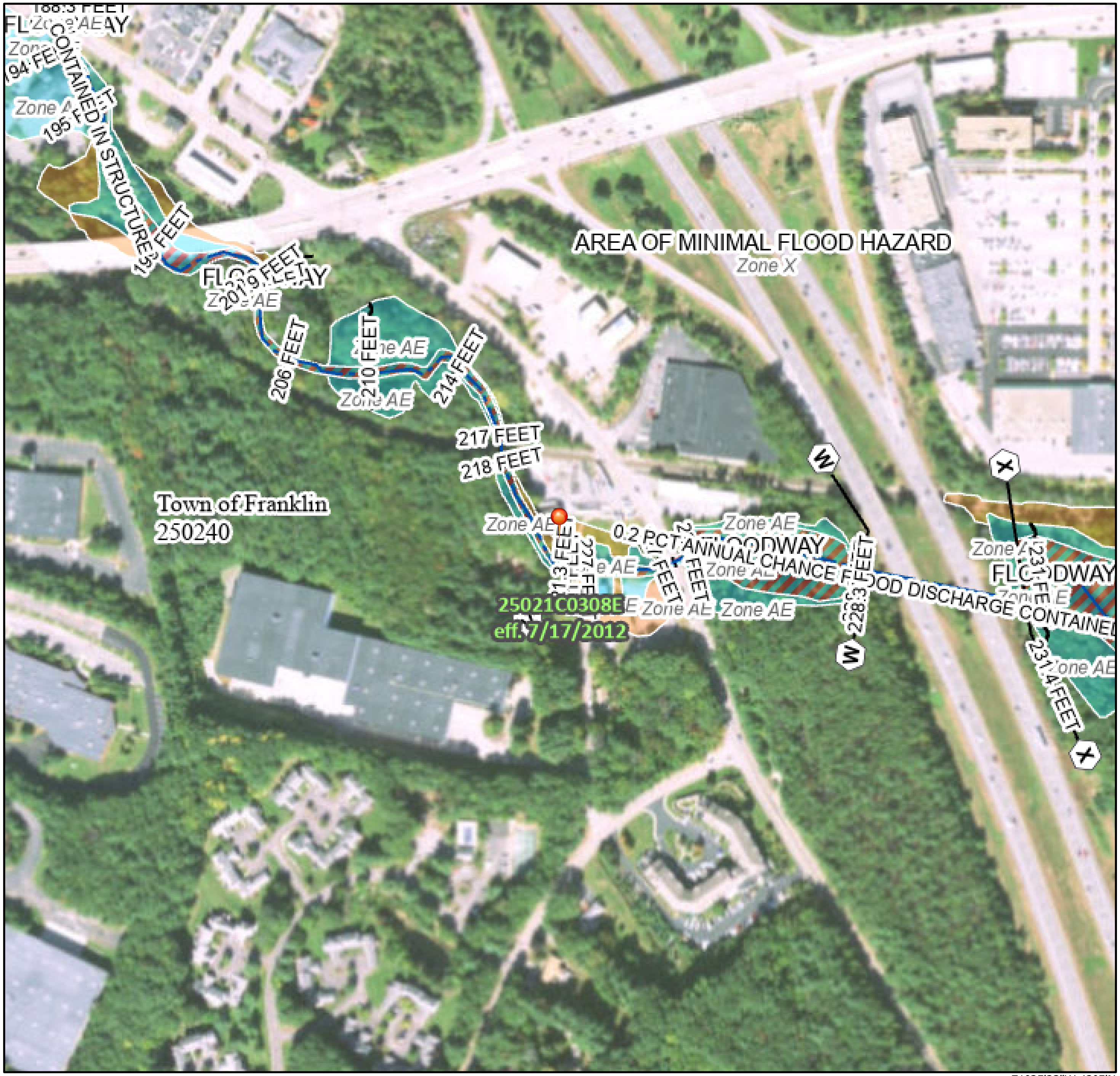




National Flood Hazard Layer FIRMette

FEMA

71°26'W 42°5'27"N



71°25'23"W 42°5'N

Feet 0 250 500 1,000 1,500 2,000

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/3/2022 at 11:36 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.