DRAFT
ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

339 NORTH STREET
DALTON, MASSACHUSETTS

MASSDEP RTN 1-753

Prepared for:

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) prepared this Analysis of Brownfields Cleanup Alternatives (ABCA) report for the property located at 339 North Street in Dalton, Massachusetts (the "Site") on behalf of the Dalton Redevelopment Authority (the "DRA") as part of the DRA's Brownfields Cleanup Program funded by the United States Environmental Protection Agency (EPA).

1.1 Purpose

TRC was retained by the DRA to prepare an ABCA, a Massachusetts Contingency Plan (MCP) remedial work plan, bid specifications, and to oversee and document the results of remedial activities at the Site. The purpose of this ABCA is to evaluate and document practicable remedial alternatives for remediating the Site to limit exposure of Site contaminants to future users of the Site.

This document is intended to satisfy the EPA requirement for an alternatives analysis under the EPA Brownfields Cleanup Grant Program in accordance with the *Brownfields Cleanup Grant Major Tasks* checklist dated January 9, 2006. A separate document will be prepared to satisfy the requirements for a Release Abatement Measure (RAM) Plan under Section 310 CMR 40.0444 of the MCP.

1.2 Scope of Work

This document presents an evaluation of feasible remedial alternatives to address petroleum-impacted soil at the Site. Requirements of the analysis included the following:

- Identifying the objectives of the environmental response action and providing an analysis of cleanup alternatives;
- Documenting the contamination meets the need for an environmental response action;
- Providing information pertaining to the Site background; threats to public health and/or the environment posed by the Site; enforcement activities; and projected costs; and
- Identifying the proposed action, and explain the rationale for its selection.

Upon approval by EPA of the Draft ABCA, the selected cleanup alternative will be implemented under a RAM during redevelopment of the Site by the DRA.

2.0 BACKGROUND

2.1 Site Location and Description

The Site consists an approximate 0.35-acre irregular-shaped rectangle vacant lot, located at 339 North Street in the Town of Dalton, Massachusetts (Figure 1). According to information obtained from the Town's Assessor's Office, the Site is identified as Lot 155 on Map 104 and is identified on Page 342 in Book 1120 at the Middle Berkshire County Registry of Deeds. The Site consists of an inactive one-story garage containing two service bays surrounded by a parking lot which is unpaved except for a portion in the southern portion of the Site adjacent to the service bays. Access to the Site is presently unrestricted and can be obtained via North Street, also identified as State Route 8A and 9. A temporary chain-link fence will be erected prior to Site cleanup.

The Site is located in a mixed-use commercial and residential area of Dalton located approximately one mile north of the downtown area. Land in the immediate vicinity of the Site is generally flat, but surrounding areas are hilly to mountainous. The closest water body is Anthony Brook, which is located 75 feet east of the Site and is a tributary of the East Branch of the Housatonic River that flows west into Pittsfield, Massachusetts. Anthony Brook flows approximately 0.25 miles south of the Site to the Housatonic River and associated wetlands. The adjoining properties to the Site consist of residential housing, a commercial business, and open space. Residential housing is located south and west of the Site. Wooded open space is located north of the Site with additional residences beyond. A two bay, self-serve automobile wash is located adjacent to the eastern boundary of the Site. A Site Plan is provided as Figure 2.

The Site has a history of automotive repair, retail sales and rubbish removal. Specifically, from the 1950s to the late 1960s, the property was occupied by Cudsworth Garage and functioned primarily as automotive repair and retail fuel sales. Mr. Callahan (the former owner) reportedly purchased the Site in the late-1970s to early 1980s and leased the property to Berkshire Cleanway, a rubbish removal company. From the mid 1980s to the early 1990s, the property was occupied by Callahan Trucking Company and functioned primarily as a rubbish removal company. From the early 1990s to 2011, the property was occupied by Berkshire Motor Car Limited and functioned as an automotive repair and state inspection station. The DRA acquired the Site on October 7, 2010 due to back taxes. The Site was vacated by the former tenant, Chris Gero of Berkshire Motor Car Limited, in early 2012. The Site is subject to a 1990 gasoline release which was originally assigned Spill I.D. W90-023 and is now managed under Release Tracking Number (RTN) 1-753.

2.2 Land Use and Potential Receptors

The Site is currently vacant and there are no on-Site workers. According to the 2010 U.S. Census Bureau, Dalton is home to 6,756 year-round residents. Based on a total area of 21.9 square miles, Dalton's average population density is 309 residents per square mile. Therefore, there are approximately 243 residents within a one-half mile radius of the Site.

As part of a 2009 American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA) Update, TRC reviewed the Massachusetts Geographic Information Systems (MassGIS) *DEP Priority Resource Map*, obtained online, for information regarding the location of drinking water supplies and other resource areas in the vicinity of the Site. According to the map, the Site is not located within designated groundwater protection areas, interim wellhead protection areas, nor is it located within the limits of a productive or potentially productive aquifer, or within non-potential drinking water source areas. No institutions are located within 500 feet of the Site. The Site is located within the 100 year floodplain of Anthony Brook, and is located approximately 550 feet from a Non-Potential Medium Yield aquifer. No additional resource areas are depicted within 500 feet of the Site. A MassDEP Priority Resource Map is provided as Figure 3.

There are no documented private drinking water wells located on-Site or in the immediate vicinity of the Site. In addition, TRC did not identify current nor historical septic systems at the Site. The Site and properties in the surrounding area are serviced by the municipal water and sewer system. Electrical service at the Site is provided via overhead lines to the building.

The Site is not used for active recreation, although Site access is generally unrestricted with the exception of a wooden fence along the eastern and northern sides of the Site. Direct unrestricted access to the Site can be obtained from North Street to the south. Therefore, the Site is currently open to potential trespassers (including children). Because contamination exceeding S-1 cleanup standards may exist within the top 6 inches of the Site and access to the Site is not currently entirely restricted, there exists a potential for human exposure to contaminated soils at the Site. Possible exposure pathways to trespassers on the Site are dermal contact, incidental ingestion, and inhalation of contaminated soil-derived dust. However, a temporary six-foot high chain-link fence will be erected along North Street, preventing unauthorized entry before cleanup begins and will remain during remediation activities.

2.3 Summary of Site Assessment Activities and Results

On behalf of the Town of Dalton, TRC performed an ASTM Phase I ESA for the Site dated November 2006, and a Phase I Update dated December 2009 using EPA Brownfields petroleum assessment grant funding. TRC conducted initial Phase II subsurface Site investigation activities from November 18, 2009 through January 7, 2010, and Supplemental Phase II subsurface activities from June 17 to June 29, 2010. Please refer to Figure 2 for the soil boring and monitoring well locations installed.

TRC's ASTM Phase I ESA identified the known presence of petroleum impacts to Site soil and groundwater, the historic presence of up to four USTs on the Site, and the current and historic use of the Site as an automobile repair and State Inspection facility as a Recognized Environmental Condition (REC) associated with the Site. To investigate this REC, TRC conducted Phase II subsurface activities from November 18, 2009 through January 7, 2010. Based upon the findings of the initial Phase II ESA, a supplemental Phase II investigation was conducted from June 17 to June 29, 2010. During the Phase II activities, TRC installed six boring (B-1 through B-6). Three of the borings (B-1 through B-3) were completed as two-inch diameter polyvinyl chloride (PVC) monitoring wells (MW-1 through MW-3, respectively). Soil

samples were collected and submitted to Contest Analytical Laboratories for analysis of volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), polychlorinated biphenyl (PCBs), and MCP metals plus mercury. Groundwater samples were collected and submitted for laboratory analysis of volatile organic compounds (VOCs), VPH, EPH, PCBs, and total and dissolved MCP metals plus mercury.

Based upon the findings of the initial Phase II ESA, TRC conducted a Supplemental Phase II ESA investigation between June 17 and June 29, 2010 which included the advancement of eight additional soil borings (B-7 through B-14), three of which were converted to groundwater monitoring wells (MW-4 through MW-6). Analytical soil samples were collected and submitted to Contest Analytical Laboratory for analysis of VPH and EPH from each of the eight boring locations. Groundwater samples were collected and submitted to Contest Analytical Laboratory for analysis of VPH and EPH from each of the six wells. Petroleum-impacted soil was present between approximately five to eight feet below grade at boring B-2/MW-2 and nearby borings. Depth to groundwater measured in the six monitoring wells ranged from approximately eight to nine feet below grade. Groundwater concentrations were below applicable MCP GW-2 and GW-3 standards.

During the gauging event in June 2010, approximately one inch of non-aqueous phase liquid (NAPL) was measured in well MW-2. The NAPL was determined to be weathered gasoline based upon subsequent TPH fingerprint analysis by Contest Analytical Laboratories.

To address the presence of NAPL identified in monitoring well MW-2, TRC conducted Immediate Response Action (IRA) activities in January 2011. The purpose of the IRA was to provide a description of management procedures during the removal of NAPL from the Site groundwater. IRA activities in January 2011 included gauging of the on-Site monitoring wells to evaluate the presence of NAPL at the Site. IRA activities also included bailing or pumping out NAPL as necessary from MW-2.

On May 1, 2011, TRC conducted subsurface investigation to assess the potential presence of petroleum contamination beneath the concrete building slab associated with the automotive repair building on Site. The investigation included the advancement of four borings (B-15 through B-18) and the collection of soil samples for analysis of VPH and EPH from each of the four boring locations. No concentrations of VPH or EPH were identified above applicable MCP S-1 standards.

On March 29, 2012, TRC conducted one day of test pit excavation to assess the extent of contamination in the area surrounding well MW-2. The purpose of the investigation was to facilitate the collection of waste characterization samples from the soil near MW-2 and to provide information that would assist in designing remedial alternatives for the Site. Three test pits were excavated in the southern portion of the Site adjacent to MW-2 using a mini-excavator. Waste characterization soil samples were collected per MassDEP Policy #COMM-97-001. These results were compared to the disposal criteria for asphalt batching. No NAPL was observed in the test pits although elevated PID headspace readings were measured in the soil with visible petroleum-stained soils from approximately four to ten feet below grade. A slight sheen was observed on the water at the bottom of test pit No. 3. The excavations terminated at

approximately ten feet below grade (approximately one foot into the water table). Two metal pipes, suspected as being former gasoline product/vent lines, were uncovered in test pit No. 1 at approximately 8-inches below grade. Natural gas lines were uncovered in test pits No. 2 and No. 3 at approximately two feet below grade. These former product lines and natural gas lines were not revealed by a geophysical survey conducted in November 2009 nor were the natural gas lines marked by Digsafe.

2.4 Site Characteristics

2.4.1 Hydrogeologic Characteristics

Topographical conditions in the vicinity of the Site were evaluated using the United States Geological Survey (USGS) 7.5-minute series *Pittsfield East, Massachusetts*, topographic quadrangle map dated 1997. According to the 1997 USGS topographic map, the Site is located at an approximate elevation of 1,200 feet above mean sea level. Land in the immediate vicinity of the Site is generally flat, but surrounding areas are hilly to mountainous. The nearest water body is Anthony Brook, which flows to the south approximately 75 feet east of the Site.

Based on observations made by TRC field personnel during December 2009 and June 2010 soil boring activities, the northern, southern and western portion of the Site are underlain by fine to medium sand and gravel. Silty clay was observed at depths of 11 to 14 feet throughout the Site. The eastern portion of the Site is underlain by layers of fine to medium sand, urban fill consisting of coal and ash mixed in, and varying amounts of silt and gravel.

Groundwater at the Site flows towards the southeast, towards Anthony Brook.

The Site falls within a B2 Zoning District, making it part of a business zone. Surrounding properties are a mix of residential and commercial and include a car wash and a restaurant. The DRA intends to have the Site redeveloped into a small business or commercial property consistent with B2 Zoning District regulation.

2.5 Conceptual Site Model

The Site has been historically used as a retail gasoline service station and automotive repair facility. Releases of petroleum hydrocarbons to Site soil have occurred. The apparent sources of release are the former fuel island and/or USTs and their supply lines in the vicinity of soil boring and monitoring well B-2/MW-2.

A NAPL thickness of greater than one half inch is present in monitoring well MW-2 which exceeds the MCP Upper Concentration Limit (UCL) and must be reduced to less than one-half inch. Residual petroleum-impacted soil is present at depths of approximately four to ten feet below grade surrounding well MW-2, but does not currently pose a significant risk to current or future users of the Site if an Activity and Use Limitation (AUL) is implemented to restrict the ingestion of homegrown fruits and vegetables taken up from soil and addresses potential vapor intrusion concerns.

Petroleum hydrocarbons fractions and target compounds have not been identified in groundwater in Site monitoring wells above Method 1 GW-2 or GW-3 standards.

3.0 ALTERNATIVES ANALYSIS

3.1 Remedial Action Objective and Cleanup Goals

The objective of remediation at the Site is to achieve MCP Site closure by demonstrating that a condition of No Significant Risk has been achieved for current and future users of the property. To achieve a condition of No Significant Risk and subsequent Response Action Outcome (RAO), NAPL previously measured in well MW-2 must be reduced to less than one-half inch, the potential future vapor intrusion pathway must be mitigated, and exposure to low concentrations of non-petroleum related compounds in soil through the vegetable intake pathway must be prevented. If impacted soil will remain on the Site, the implementation of an AUL will be required.

3.2 Identification of Remedial Alternatives

Several potential alternatives were evaluated for addressing the petroleum-impacted soil at the Site. From that evaluation, TRC identified a limited number of practicable remedial alternatives that could be implemented at the Site based on available Site data and TRC experience. The "No Action" alternative was also included as part of the evaluation to establish a basis for conducting remedial actions at the Site. All scenarios will require applicable MCP regulatory submittals and shall be performed in accordance with applicable MCP deadlines. Although the DRA has indicated the existing building will likely be demolished, the potential remedial scenarios incorporate anticipated project limitations that may be associated with working adjacent to an existing structure. The remedial alternatives identified for consideration under this alternatives analysis include:

1. No action
2. Soil Excavation, Off-Site Recycling, and NAPL Extraction
3. Vacuum Extraction of NAPL and Vapor Mitigation
4. Vacuum Extraction of NAPL and Chemical Oxidation

3.3 Evaluation and Comparison of Remedial Alternatives

Each remedial alternative identified above was first evaluated to determine whether it could achieve a condition of No Significant Risk at the Site as required by the MCP. Those alternatives that were deemed capable of achieving no significant risk were further evaluated utilizing the comparative evaluation criteria specified at 310 CMR 40.0858 of the MCP. These criteria include: effectiveness, short- and long-term reliability, difficulty of implementation, cost, potential risks and timeliness. The cost estimates presented in this document are rough estimates that were prepared solely for the relative comparison of the identified alternatives and should not be used as design-level estimates. A table comparing the estimated costs for each alternative is provided as Table 1. A description of each alternative and the results of the comparative analysis are presented in the following subsections.

Remedial Alternative #1: Maintenance of Existing Site Controls and Implementation of Institutional Controls

This alternative involves no remedial actions, maintaining current Site conditions and implementing an AUL. Under the No Action alternative, the presence of NAPL greater than one-half inch at the Site is a risk to public welfare. The No Action alternative will not achieve a condition of No Significant Risk as required by the MCP and would not prevent exposure to Site contaminants. Therefore, the No Action alternative will not meet the remedial action objectives and cleanup goals and will not be evaluated further with respect to the comparative evaluation criteria.

Remedial Scenario #2 – Soil Excavation, Off-Site Recycling, and NAPL Extraction

NAPL has been identified in monitoring well MW-2 at a thickness greater than the MCP UCL of one-half inch. This alternative proposes to excavate and dispose of the soil surrounding well MW-2 containing visible NAPL, and remove visible NAPL from the open excavation. Shoring may be required along the buildings foundation to maintain structural stability. Additional costs associated with shoring and soil management may be incurred if work begins before the building is demolished or if the limits of excavation are expanded. The anticipated limit of the excavation area is depicted on Figure 2. Soil observed during ground intrusive work from the surface to approximately four feet below grade is a brown fine sand that will be stockpiled on-Site and reused as native backfill. Soil from four to ten feet below grade exhibited evidence of staining, which is likely due to the fluctuation of the water table between seasons spreading the NAPL vertically (a.k.a "smear zone"). As a method of achieving a condition of No Significant Risk, this soil would be excavated then transported to an off-Site facility where it could be recycled or disposed. For estimation purposes, it is assumed that soil removed from the Site will be acceptable for beneficial reuse at an asphalt batching facility. Before backfilling, liquids from the bottom of the excavation would be removed by a mobile vacuum truck and allowed to recharge until there is no longer evidence of NAPL. The excavation would be backfilled and compacted with certified clean, imported crushed stone and soil. The necessary backfill, waste characterization, and confirmation sampling will be performed in accordance with the MCP.

Under this scenario, some petroleum-impacted soil would remain in the subsurface beyond the limits of the excavation, requiring an evaluation for vapor intrusion and/or implementation of a subsurface vapor barrier/mitigation system and/or an AUL to mitigate the potential for vapor intrusion to future on-Site buildings. Depending on the future use of the Site and the location of future on-Site buildings, indoor air sampling may be required to verify that a Critical Exposure Pathway does not exist. Under this scenario, future on-Site buildings could be located away from the residual soil contamination to eliminate the requirement of installing a vapor barrier and/or a vapor mitigation system.

Monitoring well MW-2 is within the projected area of excavation and will be removed prior to remedial activities. Once backfilling is complete, a replacement monitoring well will be installed to replace MW-2, to be used for future groundwater monitoring. Four quarterly groundwater monitoring events are expected to confirm that NAPL does not return and the remedial activities did not adversely impact groundwater quality. After an expected four rounds

of groundwater monitoring when it has been confirmed that the NAPL has not returned, the six monitoring wells associated with the Site will be decommissioned. The costs associated with this alterative are summarized in Table 1.

Remedial Scenario #3 – Vacuum Extraction of NAPL and Future Vapor Mitigation

Under this remedial scenario, monitoring well MW-2 will be over-drilled to install a larger diameter monitoring and extraction well to enhance the efficiency of fluid extraction. Periodically, NAPL and underlying groundwater will be removed from this well by a mobile vacuum truck. The NAPL/groundwater mixture will be transported by the truck to an off-Site disposal facility.

Before this remedy could be implemented, the frequency of pumping events and mixture volumes destined for disposal would be estimated by additional characterization of the subsurface. It is expected that NAPL removal volumes will be more substantial at first, but decrease with successive pumping events, ultimately reaching a point of asymptotic diminishing returns. This remedy could take approximately 3-6 months to eliminate the NAPL UCL exceedance (i.e., reduce the NAPL thickness to less than one-half inch), but residual NAPL may remain in the soil following implementation. Therefore, the vapor intrusion pathway will need to be evaluated and/or a subsurface vapor barrier/mitigation system and/or an AUL could be required to mitigate the potential for vapor intrusion to future on-Site buildings. Depending on the future use of the Site and the location of future on-Site buildings, indoor air sampling may be required to verify that a Critical Exposure Pathway does not exist. Under this scenario, future on-Site buildings could be located away from the residual soil contamination to eliminate the requirement of installing a vapor barrier and/or a vapor mitigation system.

Four quarterly groundwater monitoring events are expected to confirm that NAPL does not return and the remedial activities did not adversely impact groundwater quality. After an expected four rounds of groundwater monitoring when it has been confirmed that the NAPL has not returned, the six monitoring wells associated with the Site will be decommissioned. The costs associated with this alterative are summarized in Table 1.

Remedial Scenario #4 – Vacuum Extraction of NAPL and Chemical Oxidation

This option is similar to Alternative #3, but incorporates measures to reduce residual petroleum in soil following NAPL- removal efforts to mitigate a potential future vapor intrusion pathway. Additional characterization of soil and groundwater chemistry in addition to bench scale testing will be required to design an oxidation program. Following vacuum extraction of NAPL to eliminate the UCL exceedence (i.e., reduce the NAPL thickness to less than one-half inch), a chemical injection well network consisting of approximately nineteen wells spaced ten feet apart would be installed in the impacted area (see Figure 2 for proposed injection locations). These injection wells will be screened to overlap the smear zone, approximately three to eleven feet below grade, to maximize the oxidant's contact with the contaminant.

Residual contamination would be addressed by injection of chemical oxidants, the amount and frequency of which would be determined by additional Site characterization studies and

professional design. While two rounds of oxidant injections are included in the cost estimate, additional injection rounds may be needed to reduce the petroleum impact in soil to levels which will not be a concern for vapor intrusion into a building. As petroleum-impacted soil can be a source of vapor intrusion, additional soil sampling would be conducted upon termination of the injections to validate the effectiveness of the program. If post-remedial soil sampling indicates that soil concentrations have been reduced to below MCP S-1 soil standards at the Site, then an AUL will likely not be required. If however, soil concentrations at the Site remain above MCP S-1 soil standards, then an AUL to restrict growing and consuming vegetables at the Site will be required.

Four quarterly groundwater monitoring events are expected to confirm that NAPL does not return and the remedial activities did not adversely impact groundwater quality. After an expected four rounds of groundwater monitoring when it has been confirmed that the NAPL has not returned, the six monitoring wells associated with the Site will be decommissioned. The costs associated with this alterative are summarized in Table 1.

3.3.1 Comparison to Comparative Evaluation Criteria

This Section presents a relative comparison of the selected remedial alternatives (Alternatives #2, #3, and #4). A remedial alternative evaluation matrix that compares each alternative based on these criteria is provided as Table 2.

Effectiveness – All three remedial alternatives will be effective at achieving a Permanent Solution under the MCP, 310 CMR 40.1000. Alternative #4 would be slightly more effective at reducing risk as the NAPL would be removed and residual soil would be treated to minimize vapor intrusion and reduce the restrictiveness of an AUL or possibly eliminate the necessity of an AUL. Alternative #2 would be almost as effective as the NAPL and residual soil within the excavation area would be removed, but some petroleum-impacted soils would remain in the subsurface requiring a vapor intrusion evaluation and an AUL. Alternative #3 would be the least effective alternative among the retained cleanup alternatives as the largest area of residual petroleum-impacted soil would remain.

Reliability – Remedial Alternative #2 is more reliable in preventing exposure to future users of the Site because the soil containing NAPL is directly targeted for removal. Because of the relatively simple nature of design and construction, there is very low potential for failure associated with Remedial Alternative #2. NAPL extraction from an excavation is more reliable than from a pumping well (e.g., Alternative #3) as an excavation allows for observation of the entire area of interest rather than at a single point such as a monitoring well. In-situ chemical oxidation relies on direct contact with the contaminated soil therefore, Alternative #4 has some uncertainty with regards to reliability since there may be some variability in the soil that may prevent or limit the distribution of the reagents.

Difficulty of Implementation – Due to the limited area targeted for removal, Alternative #2 would be moderately easy to implement and could be performed as part of the redevelopment of the Site, ideally after the building has been demolished. Alternative #3 would be easier to implement prior to re-development while the Site is vacant. Alternative #4 would be moderately

to highly difficult to implement as this alternative requires the use of specialized equipment and handling of reactive (oxidizing) chemicals and more intensive post-implementation monitoring.

Cost-Benefit – The cost to implement Remedial Alternative #2 would be lowest of the three alternatives. Alternative #4 would be the highest of the three alternatives but may achieve the desired effectiveness if a minimally restrictive AUL is preferred with the possibility of not requiring an AUL if all the remedial goals are successfully achieved.

Potential Risks – The potential short-term and long-term risks associated with each of the three alternatives are considered low to moderate. Potential short-term risks associated with soil excavation/disposal include possible accidental spills of contaminated soil during soil transport, which could result in short-term exposure to the contaminated soil by surrounding human populations. However, any accidental spill of contaminated soil would be immediately cleaned-up so the duration of any potential human exposure to the contaminated soil would be extremely short-term. The short term risks for chemical oxidation (Alternative #4) would be higher (i.e., moderate) due to concerns over worker health and safety while working with chemical reagents which are strong oxidizers.

Timeliness – The following estimated time frames are associated with implementation of each alternative:

- Remedial Alternative #2: Soil Excavation, Off-Site Recycling and NAPL Extraction – 1 to 2 weeks
- Remedial Alternative #3: Vacuum Extraction of NAPL and Vapor Mitigation – 3 to 6 months
- Remedial Alternative #4: Vacuum Extraction of NAPL and Chemical Oxidation – 6 to 12 months

Following each of the above alternatives, one-year of post-remedial monitoring will likely be required to demonstrate that the remedial objective has been met.

Based on the above, remedial Alternative #2 is considered the timeliest of the alternatives.

3.4 Selection of Remedial Alternative

The No Action Alternative (Remedial Alternative #1) was included in this analysis for comparative purposes only and is not a feasible alternative because it does not meet the remedial action objectives.

Remedial Alternatives #2, #3, and #4 were evaluated to address NAPL thickness of greater than one-half inch in monitoring well MW-2. Each deemed equally effective in terms of its ability to achieve a Permanent Solution and a level of No Significant Risk for NAPL. Alternatives #2 and #3 would require the implementation of an AUL to restrict certain residential uses and would require a vapor intrusion evaluation and/or implementation of a vapor mitigation system for future Site-building occupants. Alternative #4 would require the implementation of the least-restrictive AUL (or possibly not require an AUL) and not likely require a vapor intrusion

evaluation but has the highest cost, longest implementation time and is moderately more complex to implement.

Remedial Alternative #2 is slightly more reliable, moderately easy to implement and would take the least time to complete. Furthermore, based upon prior discussions with the DRA, the implementation of an AUL on the Site would be acceptable since the future use of this Site is intended to remain commercial. Plus, if future on-Site building(s) are located approximately 30 feet away from the targeted remediation area, a vapor intrusion evaluation may not be necessary. Therefore, Alternative #2 is chosen as the preferred remedial alternative.

TABLES

Table 1
Cost Summary of the Remedial Alternatives Proposed in the ABCA
339 North Street, Dalton, Massachusetts

Remedial Alternative	Approximate Estimated Cost
Remedial Scenario 2 - Excavation and Off-Site Disposal + NAPL Extraction via Vacuum Truck	$120,000
Remedial Scenario 3 - NAPL Extraction via Vacuum Truck and Future Vapor Mitigation	$130,000
Remedial Scenario 4 - NAPL Extraction via Vacuum Truck and Chemical Oxidation	$200,000

Notes:

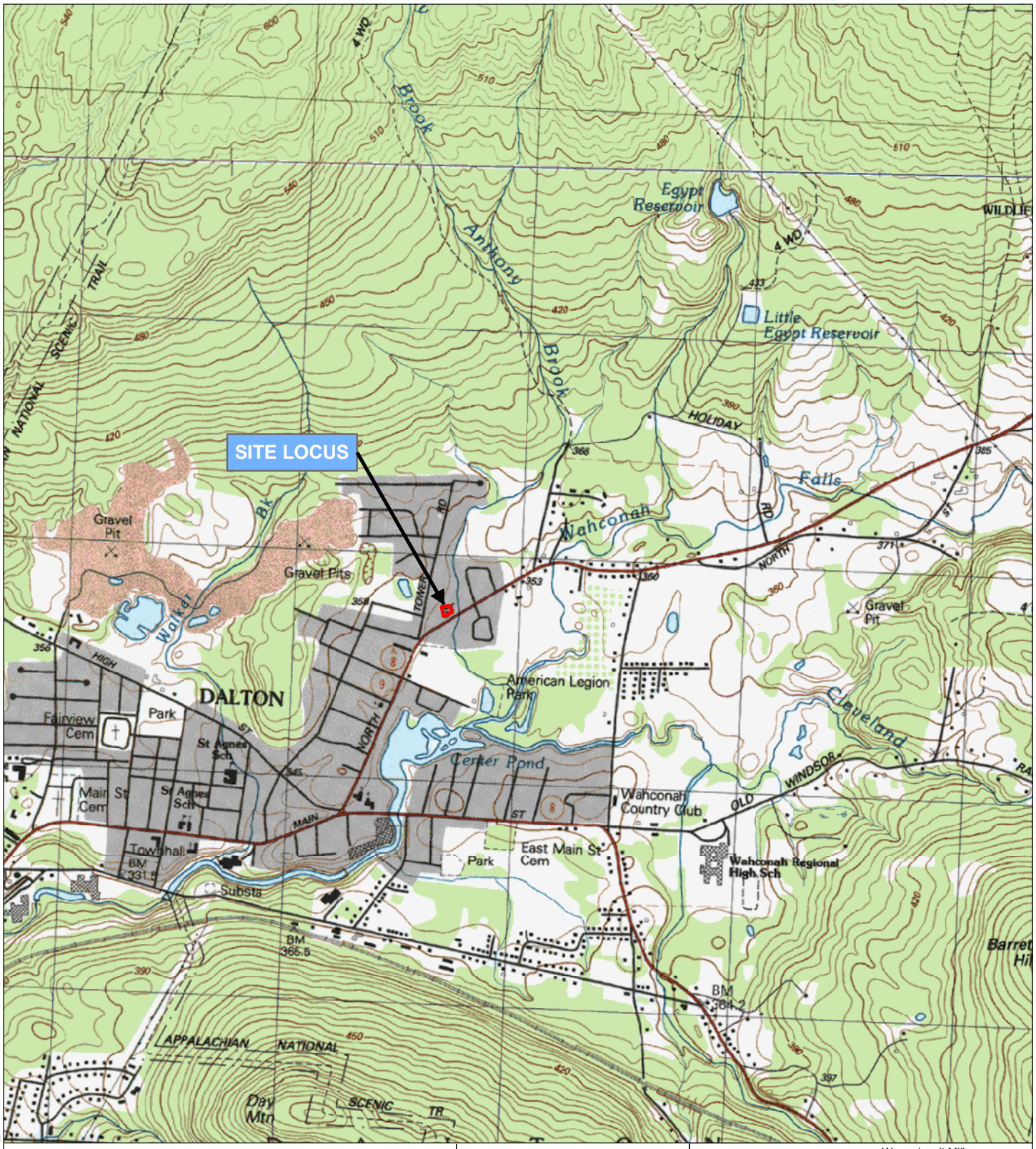
1 Base Year 2012, March
2 Costs do not include taxes, labor premiums, or contractor markups.
3 Finished grade elevations will meet those of the existing grade.
4 10% soils expansion factor for granular soils
5 Bulk mass density of soil is assumed to be 1.5 tons per cubic yard.
6 Bulk mass density of asphalt is assumed to be 145 pounds per cubic foot.
7 The frequency of post-remedial groundwater sampling is estimated to be quarterly for one year.
8 Vapor mitigation system, if necessary, will be installed concurrant with the new building construction
9 Soil meets standards for asphalt batch recycling

Table 2
Remedial Alternative Evaluation Matrix
339 North Street
Dalton, Massachusetts

	Comparative Evaluation Criteria*:	Comparative Effectiveness	Comparative Reliability	Comparative Difficulty of Implementation	Comparative Cost	Comparative Implementation Risks	Comparative Benefits	Comparative Timeliness	Notes
Remedial Action Alternative	#1 Maintenance of Existing Site Controls and Implementation of Institutional Controls	Low	Low	Low	Low	High	Low	Long	The No Action alternative will not achieve a condition of No Significant Risk as required by the MCP and would not prevent exposure to Site contaminants.
	#2 Excavation and Off-Site Disposal + NAPL Extraction via Vacuum Truck	Moderate to High	High	Low to Moderate	Low	Low	Moderate	Low 1-2 Weeks (Plus at least 1 year of additional monitoring)	This alternative has a moderately high effectiveness because soil containing free-phase NAPL will be removed from the site and replaced with clean backfill and some impacted soil will also be removed. The projected cost and timeliness of this alternative is the lowest of the feasible alternatives. The benefits for this alternative may be lower than those of Alternative #4 since an AUL is expected to be required.
	#3 NAPL Extraction via Vacuum Truck	Moderate	Moderate	Low	Low	Low	Moderate	Moderate 3-6 Months (Plus at least 1 year of additional monitoring)	This alternative offers the lowest degree of reliability and effectiveness since it is difficult to measure the volume of NAPL remaining in the ground. The benefits for this alternative are lower than those of Alternative #4 since an AUL is expected to be required.
	#4 Physical Removal of NAPL with a Contingency for Chemical Oxidation	High	Moderate to High	Moderate to High	High	Moderate	High	High 6-12 Months (Plus at least 1 year of additional monitoring)	This alternative has a high cost when compared to the others. Results from similar sites where chemical oxidation has been used indicate that the effectiveness and reliability are relatively high. The benefits are high because a less-restrictive AUL or possibly no AUL may be required. This alternative is less timely due to the time associated with designing and implementing the chemical oxidation plan.

* Effectiveness - the ability of the remedy to treat, destroy, detoxify, reuse, or recycle contaminants at the Site, and achieve a Permanent Solution under the MCP.
Reliability - the degree of certainty that the remedy will be successful over the short- and long-term timeframes.
Difficulty of Implementation - comparative difficulty in terms of technical complexity, integration with facility operations, monitoring requirements, and material and labor availability.
Relative Costs - Costs in terms of remedy design and implementation.
Implementation Risks - comparative risks posed by the Site to workers, the community, and the environment during and after remedy implementation.
Benefits - the comparative benefits of the alternative including the provision for productive Site reuse, restoration of natural resources, and other non-pecuniary benefits.
Timeliness - the relative time for the alternative to eliminate uncontrolled hazardous material and achieve a condition of No Significant Risk at the Site.

FIGURES



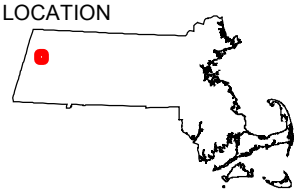
Approximate Site Boundary

N

0 0.5 1 Miles

Base map: USGS 7.5 Minute Topographic Quadrangles: Cheshire and Pittsfield East

SITE LOCATION



MASSACHUSETTS

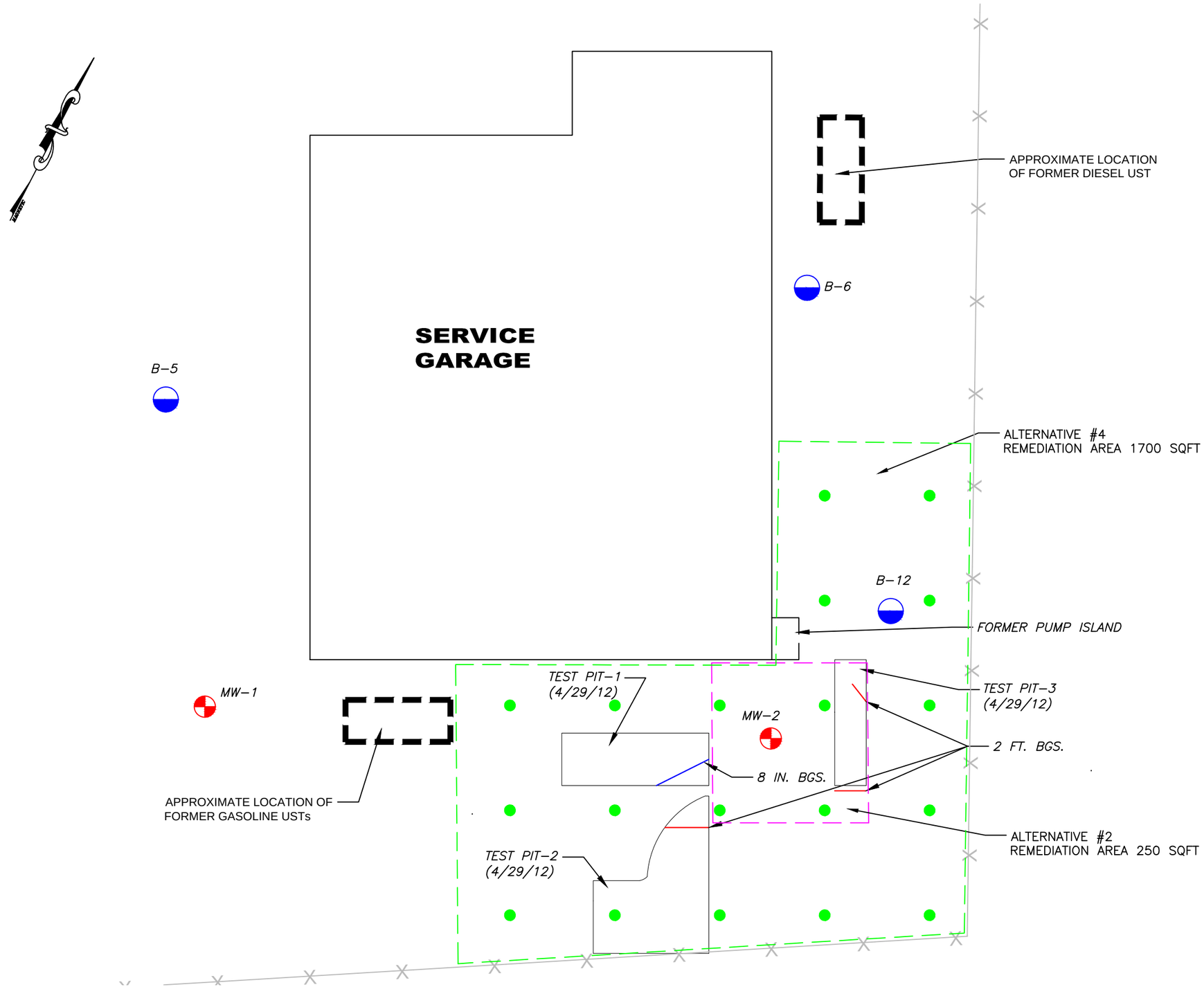
TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

SITE LOCATION MAP

339 NORTH STREET DALTON, MA

FIGURE 1	FEBRUARY 2010

R:\Projects\GIS_2009\169332_Dalton\MXD\Fig1_Dalton2.mxd



OBSERVED ASSUMED FORMER GASOLINE LINE

OBSERVED NATURAL GAS LINE

ALTERNATIVE #2: APPROXIMATE REMEDIATION AREA

ALTERNATIVE #4: PROPOSED CHEMICAL OXIDATION INJECTION WELL

EXISTING BORING

EXISTING MONITORING WELL

EXISTING AND PROPOSED FENCE

APPROXIMATE GRAPHIC SCALE

0' 5' 10' 20'

339 NORTH STREET
DALTON, MASSACHUSETTS

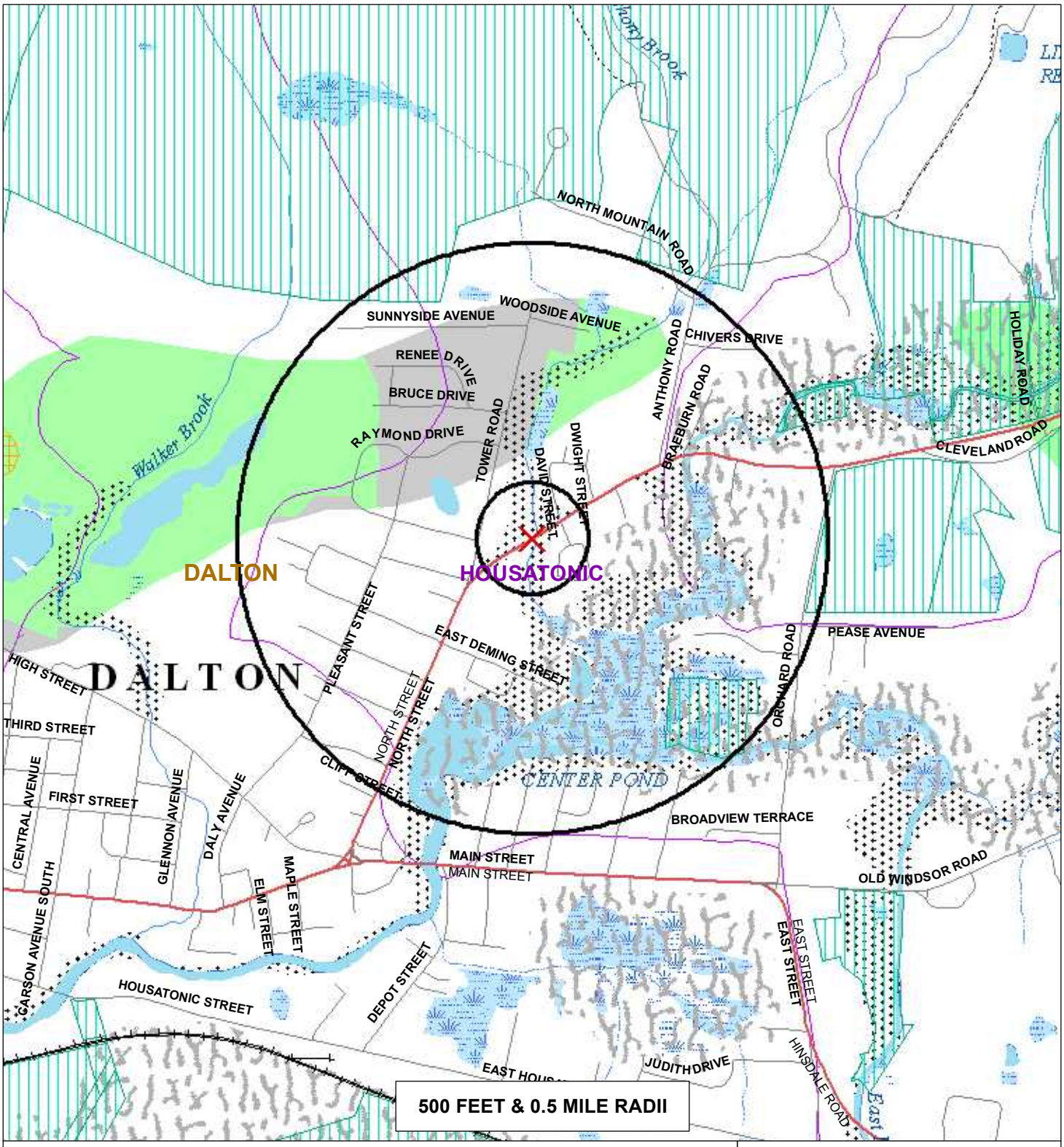
PROPOSED REMEDIATION SITE PLAN

TRC
Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
(978) 970-5600

DRAWN BY: SM
CHECKED BY: TB
DATE: APRIL 2012

FIGURE 2

FILE: \\LOWELL-FILE\projects\Projects\187956 - 339 North Street, Dalton Cleanup\CAD\Dalton_Berkshire Motor_REV1.dwg



Roads: Limited Access, Multi-Lane, Major/Minor, Track, Trail
Railroad, Pipline, Powerline
Major Basin, Sub Basin, Perennial Stream, Intermittent Stream, Shoreline, Man made Shore, Dam, Aqueduct
Wetland, Salt Wetland, Submerged Wetland, Open Water, Reservoir, Tidal Flat/Shoal
Potentially Productive Aquifers: Medium, High Yield
Non-Potential Drinking Water Source Area: Medium, High Yield
EPA Sole Source Aquifer, FEMA 100 Yr. Floodplain, DEP Solid Waste Facility
Approved Zone II, IWPA, Surface Water Supply Zone A
Protected Open Space, ACEC
Priority Habitat 2008, Certified Vernal Pool 2010
Boundaries: County and Town
Public Water Supplies: Ground, Surface, Non-Community (NTNC, TNC)

Source: MassGIS/EOEA

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Lowell, MA 01854
978-970-5600

FIGURE 3

MASSDEP PRIORITY RESOURCES MAP
339 NORTH ST
DALTON, MA

0 500 1,000 1,500
Feet