Phase (check one)	Type (check one)
❒ Initial Site Investigation	❒ Work Scope
☑ Corrective Action Feasibility Investigation	☑ Technical Report
☑ Corrective Action Plan	❒ PCF Reimbursement Request
❒ Corrective Action Summary Report	❒ General Correspondence
❒ Operations & Monitoring Report	

Analysis of Brownfields Cleanup Alternatives and Corrective Action Plan

64 Elm Street Brownfields Project
Brattleboro, Vermont
(VT DEC Site #2008-3834)

A Facility Owned By:

New England Youth Theater (NEYT)
100 Flat Street
Brattleboro, VT 05301
(802) 246-6398
Contact: Bari F. Shamas

Prepared By:

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NE2S Project #09011D03

July 2010

New England
ENVIROSTRATEGIES, INC.
One Tremont Street • 2nd Floor
Concord • NH 03301

Revised July 27, 2010
February 16, 2010
File No. 09011D03

Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, Vermont 05301

Attention: Susan McMahon, Associate Director

Subject: Analysis of Brownfields Cleanup Alternatives and Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

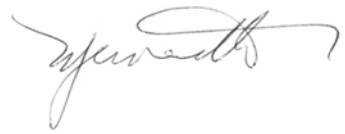
Dear Ms. McMahon:

Attached is the Analysis of Brownfields Cleanup Alternatives (ABCA) and Corrective Action Plan (CAP), herein referred to as the ABCA/CAP, for the 64 Elm Street Brownfields Project site (Site) in Brattleboro, VT. This report details four (4) remedial options for the Site, per discussions with you and Bari Shamas of the New England Youth Theater (NEYT). In general, these options are described and developed in the ABCA/CAP as: (1) demolition of part of the existing structure with renovation of the remainder while covering contaminated soils with a soil cap, (2) complete demolition of the existing structure and replacement with a structural slab encompassing the entire lot capable of carrying a new 2-story building, and (3) complete demolition of the existing structure and covering the entire lot with paving (either porous (Option 3A) or traditional bituminous (Option 3B)) to create parking. Based on New England EnviroStrategies' technical, implementability and cost screening of the remedial options, we recommend either Option 2 or Option 3B, depending on the intended future use of the property. We understand that NEYT wishes to select Option 2, so we have developed a schedule for its implementation as part of this ABCA/CAP.

The ABCA/CAP provides design details appropriate for this stage of the project, as well as cost estimates for each option. The ABCA/CAP also contains an Executive Summary that the ANR will use as a public notice for the ABCA/CAP. The public notice for the remedy will likely occur over a two week period and will also include mailing of the Executive Summary to "all interested/threatened parties and other appropriate Town officials".

If you have any questions regarding this ABCA/CAP, please do not hesitate to call me at 603-856-8815. It has been a pleasure working with you on this project.

Sincerely yours,
NEW ENGLAND ENVIROSTRATEGIES, INC.



Muriel S. Robinette, P.G.
President

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EXECUTIVE SUMMARY

A former industrial building and property located at 64 Elm Street in Brattleboro, VT has been the subject of environmental investigation culminating in this Analysis of Brownfields Cleanup Alternatives (ABCA) and Corrective Action Plan (CAP), herein referred to as the ABCA/CAP, within the State of Vermont Brownfields' Program. The property is currently owned by New England Youth Theater (NEYT), and is part of NYET's arts campus in downtown Brattleboro. The property and its two story brick and masonry building contain some residual compounds and materials from past industrial usages that must be abated prior to property reuse. The types, location and concentrations of these compounds affect the remedial options considered in this ABCA/CAP, in context with overall site redevelopment interests. Under VT ANR Guidance, analysis of remedial options for a site is done in a Corrective Action Feasibility Investigation (CAFI). Under the EPA Brownfields program, there is also an analysis of cleanup alternatives, called the ABCA, which for this site is fulfilled by the CAFI. By performing this remedial options analysis, funding from EPA is available to NEYT for cleaning up the 64 Elm Street site for redevelopment.

Residual compounds requiring abatement in site soils consist of petroleum compounds (six Polynuclear Aromatic Hydrocarbons (PAHs)), possibly from outdoor spillage of oils during historical building use as a machine shop. Elevated concentrations of arsenic and polychlorinated biphenyls (PCBs) do not have a clearly defined source, but may also be present due to historical uses in the building and area. Although PCBs exceeded the U.S. EPA regional human health risk-based screening levels (RSLs) of 0.74 mg/kg for industrial land use at only three of 22 soil sample locations, at one sample location they were present at a concentration exceeding 10 mg/kg (milligrams per kilogram), a level that that requires soil excavation, confirmatory sampling, and off-site disposal in a PCB-waste landfill. This work will be conducted under *Self-implementing on-site cleanup and disposal of PCB remediation waste* under Title 40 of Code of Federal Regulations section 761.61. Arsenic was found in all of nine soil samples, and is present in five soil samples in concentrations exceeding the U.S. EPA human health risk-based screening levels of 1.6 mg/kg for industrial land use. Lead was present in all of nine soil samples, but at levels below the EPA Industrial RSL of 800 mg/Kg. Off-site disposal of soils containing compounds exceeding Industrial RSLs and capping of soils containing compounds exceeding Residential RSLs is a part of all evaluated remedial options identified in this ABCA/CAP.

Groundwater is not a contaminated media at the site, based on multiple samples collected from six monitoring wells.

Residual compounds and materials requiring abatement in the masonry building include:

- Excess total petroleum hydrocarbon (TPH) concentrations in all second floor wooden joists and in two of five first floor joists, and in three composited wooden floor board samples;
- Excess PCB concentrations found in floor boards, floor joists, window caulking , window casing, painted cinderblock wall, the north end of the concrete basement floor, two areas of basement wall, and in sediments in two basement sumps;
- Asbestos-containing building materials found in insulation of one vertical pipe, window caulk in windows and doors, tile flooring and adhesive in the building addition, and suspected in roofing materials;
- Paint throughout the building with excess PCBs;

- Paint with lead throughout the building.

Due to the presence and concentrations of these compounds and materials, wooden flooring, a cinderblock building addition, sump sediment and section of basement wall and floor will require offsite disposal in a PCB-waste landfill. Asbestos- and lead-containing building materials will also require disposal in a designated landfill. A Soils and Materials Management Plan and Self Implementing Plan will be prepared during the Pre-Design stage of remediation, approved by the VTANR and EPA, which will provide detailed specifications and procedures for the handling and disposal of all site wastes.

The ABCA/CAP evaluates four (4) remedial options to address the site and building residuals. These options were developed in conjunction with NEYT's future plans for the property. In summary, the options are:

- Option 1 - Rehabilitation of the existing building by sandblasting of brick walls and removal and segregation of flooring, joists and asbestos building materials, coupled with demolition of the newer addition, removal of soils containing greater than 10 mg/kg Total PCBs, removal of identified locations of soil containing PAHs and/or metals exceeding Industrial RSLs and placement of a soil cap over the remainder of the lot (Estimated cost: $1,678,840)

- Option 2 - Demolition of the building coupled with removal of soils containing greater than 10 mg/kg Total PCBs, removal of identified locations of soil containing PAHs and/or metals exceeding Industrial RSLs, and construction of an expanded structural cap to the edges of the property covering all remaining lead and arsenic containing soils capable of supporting a new two story building (Estimated cost: $1,309,490)

- Option 3A - Demolition of the building coupled with removal of soils containing greater than 10 mg/kg Total PCBs, removal of identified locations of soil containing PAHs and/or metals exceeding Industrial RSLs, and construction of a parking lot comprised of porous pavement over the entire property (Estimated cost: $1,193,890)

- Option 3B - Demolition of the building coupled with removal of soils containing greater than 10 mg/kg Total PCBs, removal of identified locations of soil containing PAHs and/or metals exceeding Industrial RSLs, and construction of a parking lot comprised of traditional bituminous pavement over the entire property (Estimated cost: $1,157,230).

The ABCA/CAP compares and evaluates each of these remedial options in terms of ease of implementation, effectiveness in reducing site contamination, and relative costs. Each remedial option effectively reduces exposure to site contamination for site reuse. For soil contamination, concentrations of PCBs exceeding TSCA levels will be removed for offsite disposal. Soil with lead and arsenic levels that exceed industrial standards will be removed from identified locations, and soils containing compounds exceeding residential standards will be isolated by use of a cap. Overall remediation costs for any of the options are driven by mitigation of residual contaminants from within the former industrial building, particularly removal and disposal of paint, wooden flooring, joists, windows, and doors; and by building demolition.

Based on technical implementability and cost, the ABCA/CAP recommends Option 3B (site capping with traditional pavement), but due to the owner's business plan and preferences, the remedial alternative chosen is Option 2 for final site reuse. Key remedial components of Option 2 include:

- Remove and dispose offsite contaminated building materials (PCB, lead, TPH and asbestos wastes)
- Demolish building and dispose offsite
- Excavate PCB contaminated soil above TSCA concentrations and identified locations of metals- and PAH-, contaminated soils above Industrial RSLs, and dispose offsite
- Raise grade approximately one foot and pour footings and concrete slab for new two story building, effectively capping all remaining contaminated soil under the new building
- Put institutional controls in place.

EPA Brownfields funding is available to NEYT to help clean up the site which is scheduled to begin in the fall of 2010 once the public review process and agency approval of the ABCA/CAP is complete.

1. INTRODUCTION

This Analysis of Brownfields Cleanup Alternatives (ABCA) and Corrective Action Plan (CAP) addresses human health and environmental risk issues associated with contaminants found at the 64 Elm Street site (Site) in Brattleboro, Vermont (Figures 1 and 2). This ABCA/CAP was developed in general accordance with guidance documents from the State of Vermont Agency for Natural Resources (ANR), Waste Management Division (November, 1997). This report contains a summary of the results from analytical sampling from a series of earlier reports by others, a qualitative risk assessment along with a preliminary technical and cost analysis of remedial options. Based on evaluation of the options using criteria of technical implementability and effectiveness with respect to risk reduction and cost, and in concert with the owner's future site reuse and business plan, the selected option involves removal of the existing structure and capping the site with a structural slab covering the entire lot and capable of supporting a new building.

Following a Public Comment period and approval by ANR, final design and specifications development, including development of an EPA approved Self Implementing Plan for PCB cleanup, would take place prior to remedy implementation and redevelopment of the Site.

2. SITE CONCEPTUAL MODEL

2.1 Previous Site Investigation Efforts

This section provides a brief summary of the historical work by others as it relates to the 64 Elm Street location (Figures 1 and 2). Appendix A contains copies of the Executive Summaries of previous environmental reports that relate to the Site.

ERD Phase I/Phase II ESA (1996)

This Environmental Site Assessment (ESA) involved study of a larger subject parcel which included the 64 Elm Street site. Six (6) soil borings were advanced, with no significant findings or recommendations for further action. Polychlorinated biphenyls (PCBs) and semi volatile organics (SVOCs) were not sampled during this work.

ECS UST Tank Closure/Removal (June 2006)

Two (2) 1,000-gallon #2 fuel oil underground storage tanks (USTs) were removed from the alleyway immediately south of the Site. An environmental assessment was conducted by ECS during the removal. Key findings included the following.

- Field screening did not indicate presence of contamination at time of removal.
- USTs which had been previously filled with sand were opened, emptied, and the sand fill was transported and disposed off site.
- A third UST was located beneath the north side of the building which was filled in place at the same time as the removal of the two USTs.
- No environmental data were presented for the closed-in-place UST.
- No recommendations for further assessment were made by ECS.

GCM/KAS Phase I ESA (July 2008)

This Phase I identified several Recognized Environmental Conditions (RECs), including:

- Wood flooring on 1st, 2nd floors appears coated with petroleum compounds, likely from building usage for engine rebuilding and servicing by Tri-State Automotive.
- Historic paint spills observed down along walls and pillars of basement. Poured concrete floor appeared to post-date paint spills. Paint was assumed to contain high levels of lead and other metals.
- Sumps and open hole in the concrete floor of basement were potential “outlets” for spilled petroleum products or other chemicals.
- Suspect asbestos containing material (ACM) and mold in basement.

A Phase II was recommended to evaluate subsurface and building materials.

KAS Phase II ESA (May 2009)

This Phase II follow-up to the July 2008 Phase I included the following:

- Total of six (6) borings, all completed as monitoring wells. Borings SB 08-1 through SB 08-3 advanced outside the footprint of building with hollow stem augers (HSA) (2 soil samples taken from each). Borings SB 08-4 through SB 08-6 advanced in basement with geoprobe equipment (1 soil sample taken from each).

- Soil samples submitted for laboratory analysis of volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), metals.

- Indoor air testing, indoor surfaces sampling, wood floor sampling, concrete floor sampling, masonry wall and pillar sampling, floor joist sampling, window caulking sampling, window casing sampling, and paint sampling. Building surfaces and materials sampled using wipes and solid samples, submitted for various analysis including PCBs, SVOCs, total petroleum hydrocarbon (TPH), metals, and VOCs.

- Groundwater sampling for VOCs, SVOCs, PCBs, and total metals. PCBs detected in groundwater at concentrations up to 9 ug/l.

KAS Supplemental Phase II (October 2009)

The May 2009 Phase II was supplemented with the following work:

- Sandblasting and masonry wall profiling sampling (PCBs) in basement, 1st and 2nd floor.

- Groundwater sampling from Site wells (PCB investigation). Both filtered and unfiltered samples were non-detect for PCBs.

KAS Draft Corrective Action Plan (November 2009)

A draft CAP was produced by KAS, and submitted internally to the clients (Windham Regional Commission and NEYT). Key elements of the draft CAP included:

- Detailed summaries of the results of environmental testing, including building materials (masonry walls, paint, wooden flooring and joists, windows, doors, caulking, concrete) as well as Site soil and groundwater. (Summary data from the building material testing is reproduced in this report in Appendix B).

- Cost estimates for remedial options involving several scenarios involving building restoration for redevelopment by removing contaminated and hazardous materials, as well as an option of complete building demolition.

- All options included installation of a soil cap to isolate contaminated soils along with deed restrictions.

2.2 Site Geology and Hydrogeology

Based on previous subsurface investigations at the Site, overburden materials consist of dark brown silty sand with varying amounts of gravel (likely fill) underlain by medium brown/orange

mottled sandy silt to an undermined depth (at least 12 feet below ground surface (bgs)) (see cross sections in Figure 3). Bedrock has not been encountered by previous investigations. Bedrock materials have been reported as Silurian and Devonian slates intruded by granite and amphiboles, based on the Centennial Geologic Map of the State of Vermont. Overburden materials beneath the Site are mapped as littoral sediments and gravel according to the Surficial Geological Map of the State of Vermont.

Depth to groundwater is approximately 8.5 to 10 feet bgs. Based on previous gauging and survey data collected by KAS, groundwater flow is toward the northwest, implying that Whetstone Brook is a losing stream.

2.3 Site Contaminant Distribution (Soil and Groundwater)

Tables 1a through 1c and Table 2 provide a summary of Site analytical data for soils and groundwater. Additional information regarding contaminants in those media is provided below.

- PCBs: Figure 4 presents a posting map of PCB concentrations in Site soils. Aroclor 1254 has been detected in overburden soils throughout the Site at moderate concentrations exceeding Environmental Protection Agency Regional Screening Levels (RSLs) for residential and industrial use at depths ranging from 0 to 11 feet bgs. The distribution of PCBs in Site soil is not consistent with a specific source area, but is likely generally related to the historic use and handling of PCB-containing materials in and around the Site building during its industrial history.

- Petroleum-related compounds: Figure 5 presents a posting map of benzo(*a*)pyrene in Site soils as a surrogate for showing various polyaromatic hydrocarbons (PAHs). Low to moderate levels of various PAH compounds have been detected at concentrations exceeding the Industrial RSLs along the north and northeast side of the building (Figure 5 and Table 1c). Moderately-high concentrations of TPH (2700 mg/kg) and various PAHs were detected in sample SS-1 at a depth of 7 ft bgs. This boring location (SB08-1) is located near an access door on the northeast side of the building and may reflect release of waste oils in this area.

- VOCs: Only trace/ND concentrations of VOCs have been detected in Site soil.

- Metals: Figure 6 depicts arsenic concentrations in Site soils. Arsenic was detected in all soil samples. Four sampling locations had arsenic concentrations exceeding Residential RSLs, and five locations exceeding Industrial RSLs. The highest concentrations of arsenic were detected in the shallow subsurface at boring locations SB08-2 and SB08-3 (12 mg/kg, SS-9 Duplicate 29 mg/kg) on the northeast and north sides of the building. Figures 6 and 7 present posting maps of arsenic and lead concentrations, respectively, in Site soils. Moderate concentrations of lead were also detected in the sample SB08-2 (490 mg/kg) which exceeds Residential RSL, but is less than the Industrial RSL. Various metals were detected in other soil samples at concentrations below the residential RSLs.

- Groundwater: Site groundwater as measured in the onsite monitoring wells is generally free of contamination. PCB contamination was detected in four (4) of the six (6) monitoring wells as a result of the initial round of groundwater sampling conducted in January 2009. However, two (2) subsequent rounds of monitoring, conducted in September and October 2009 indicated concentrations of PCBs below laboratory reporting limits in all Site monitoring wells. It is possible that initial PCB detections resulted from cross-contamination of field sampling equipment or from an error in sampling protocol.

2.4 Contaminants in Building Materials

2.4.1 Description of Site Structure

The original building is a two-story, brick structure dating to the 19th century. The first and second floor heights are approximately 14 feet. The basement height is approximately 9 feet from floor to bottom of joists of first floor. A cinderblock addition was constructed on the north end of the building which has shorter walls. One must descend approximately four or five steps (about three feet) to the second floor of the addition, suggesting a wall height of eleven feet for the addition. The wall height in the addition is obscured by a ceiling, which the original building lacks.

The building has a granite block foundation approximately 8.5 feet high along Elm Street and the south side of the building. A partial (4 feet high) granite foundation comprises the opposite wall, which is also partly brick and contained windows that were bricked over and buried. The older portion of the building is approximately 107 feet long, 27 feet wide on the interior. The south end of the building juts out eastward and is 42 feet wide. The addition extends 20 feet northward from the former northern end of the building. It is 35 feet wide, and wraps around the east side of the original building. The addition does not extend into the basement.

Floor joists are roughly 11" x 8" in cross-section and positioned eight (8) ft on center. Tall windows, some filled with cinderblock, some boarded, are located between the joists. Floors are comprised of two-inch thick wooden planks, with approximately one inch of diagonally-placed subflooring and tongue in groove wood overlayment. Interior brick walls are located approximately 25 feet in from the northern end of original building. A cinderblock and brick wall is located on the north end of the basement.

2.4.2 Building Materials Contaminant Distribution

Appendix B provides a summary of analytical data collected on Site building materials. Figure 8 posts PCB concentrations within just the basement area of the existing structure. Figures from KAS showing contamination within the building are included in Appendix B. The following is a general summary of the scope of the building material contamination. If the building renovation option is selected as a component of the ultimate Site remedy, then reuse decisions must be made which will dictate if some building materials can be encapsulated or if they must be remediated by removal or replacement.

Contaminants in structural materials that are hazardous or exceed the Toxic Substances Control Act (TSCA) offsite disposal (>10 mg/kg) criteria, which will be disposed of offsite consist of:

- Total PCB concentrations of 180 mg/kg in two composited samples from grab samples taken from cinder block walls on the first floor of the addition. The office located in the northeast corner of the building was paneled and samples were not collected from the walls.

- TPH concentrations exceeding the 50,000 mg/kg hazard concentration in all second floor joists and two of five first floor joists

- Total PCB concentrations (20 to 89 mg/kg) and TPH concentrations (57,000 to 230,000 mg/kg) exceed hazardous levels in three composited wooden floor samples collected to a depth of one half inch. Two samples were composited from eleven first floor grab samples, and one sample was composited from five second floor grab samples.

- Total PCB concentrations (54 to 89 mg/kg) exceed hazardous levels in sump sediments. TPH concentrations in one of the three same sources exceed TPH hazardous concentration.

- An approximately 25-foot long section of masonry wall on the west side of the basement contains total PCB concentrations in excess of ten (10) mg/kg. One sample in the section contains a total PCB concentration of 8,300 mg/kg.

Building materials containing between ten (10) and 25 mg/kg of total PCBs which may require encapsulation or removal include:

- Window caulking from a sample from the new building contained 30 mg/kg total PCBs;

- Windows 1 and 6 each contained 11 mg/kg total PCBs.

- Paint spilled on first floor that seeped to the basement walls was sampled in three locations and each contained 12 to 39 mg/kg PCBs (Aroclor 1254) and TPH concentrations up to 19,000 mg/kg.

Building materials containing between one (1) and ten (10) mg/kg of total PCBs which may require encapsulation or removal under a renovation option include:

- Concrete floor in basement

- Floor joists (first and second floors)

- First floor walls of older building (associated with paint)

- Some portions of second floor walls of older building (associated with paint)

- Some portions of western basement wall and southeast basement wall near doorway and stairwell.

- Window caulking (one sample from a window on each floor of old building) contained 1.2 and 4.9 mg/kg total PCBs.

- Window casing shavings Windows 2,3,4,5 and 2 duplicate contained 2.0 to 7.9 mg/kg total PCBs. Concentrations were not grouped by KAS in one concentration range.

Two interior surveys and testing indicated that asbestos is present in insulation of piping found in the northeast corner of the old building, window caulk in windows and doors, and tile flooring and adhesive in the building addition. The roof could not be accessed during

the surveys, and for the purposes of estimating costs is assumed to be asbestos containing.

Lead was present in all paint samples collected. Lead concentrations ranged from 0.085 percent by weight (850 mg/kg) to 0.62 percent by weight (6,200 mg/kg), with one notable exception – one red paint sample from the western exterior of the addition. This sample contained 7.5 percent lead by weight, or 75,000 mg/kg. The exterior west wall of the addition painted red, as was the upper part of the second story of the exterior north wall. The rest was painted white, but it is not known if the white paint covers the red paint. Paint on the east exterior wall of the addition suggests that the red paint on the second story does not underlie the white paint covering the rest of the wall. The Vermont Occupational Safety and Health Administration (VOSHA) considers any amount of lead in paint to be hazardous, and has specific guidelines for removal contractors.

3. QUALITATIVE RISK ASSESSMENT

Concentrations in various media were compared to existing Vermont Groundwater Enforcement Standards (VTGES), Vermont Health Advisory Levels and EPA Maximum Concentration Levels, and/or risk-based guideline concentrations for soil, surface water, and indoor and outdoor air. Tables excerpted from the Phase II ESA and supplemental ESA compare concentrations of compounds and contaminants to appropriate regulatory standards.

3.1 Sources, Sensitive Receptors and Pathways

Sources of contaminants at the property are assumed to be associated with materials used in or produced by historical manufacturing processes. They are primarily present in the building materials either as original historical construction materials, paint application, or oils used in machining operations. Machining likely used "traditional" machining processes which use a cutting fluid to cool and lubricate the cutting tool (spattering the fluid). Dripping, spraying, spilling and disposal (pouring) also probably occurred over decades of site use.

Based on information provided in the 2009 Phase II Site assessment and Supplemental Site Assessment, the following are currently sources of hazardous materials and materials with low levels of associated hazard:

- A sensitive receptor risk assessment of the Site area was conducted during the KAS Phase II investigation. In the Phase II report by KAS, potential risks to identified receptors were based on proximity to compounds in groundwater, and contaminants in soils and building materials. Sensitive receptors include Site workers, Site visitors, passersby and (eventually) building workers or residents. KAS did not identify any environmental receptors. The property is located in an Urban zone, and the Phase II report indicated that jurisdictional wetlands were not observed in the immediate vicinity of the Site. Whetstone Brook is located approximately 300 feet south of the Site, but is not believed to be a potential receptor based on the northward groundwater flow direction coupled with the lack of VOCs exceeding VTGES in groundwater.

- Asbestos was used in building materials. Currently unconfirmed, the roof is the probable largest source of asbestos in the building. Other sources include pipe insulation, flooring and mastic in the addition, and window caulk from up to 83 windows and doors throughout the building.

- Sources of PCBs at the property include paint, window caulking, window (and probably door) casings, and floorboards and floor joists soaked with cutting fluids. Painted cinderblock on the north and west walls of the addition is TSCA hazardous (>100 mg/kg), and a limited section (probably less than 15 feet) of the western wall of the basement is also TSCA hazardous. Dust contains PCBs and in one sample exceeded the TSCA cleanup level for non-porous surfaces.

- TPHs are found in hazardous concentrations in wooden floor joists and floors.

- Sources of lead include paint and building dust.

- The presence of PCBs, TPHs, PAHs, and arsenic in soils may reflect historical disposal practices of used cutting oil. Decreasing arsenic concentrations with depth suggest releases at ground surface.

3.2 Assessment of Site Risk

The Site, as is, poses unacceptable risks to trespassers in the building due to contaminated dusts, potentially friable asbestos, contaminated oily surfaces and contaminated surfaces. Contaminated soil outside the building is a risk to workers digging into or disturbing the soil due to the presence of PCBs, metals and SVOCs.

Contaminant pathways for human health exposures during a renovation or demolition option include inhalation and ingestion of dust, possible absorption by dermal contact with contaminants in soil and building materials, and injection of contaminants from building materials via puncture wounds.

3.2.1 Building Material Risk During Site Work

The greatest risks are associated with Site building materials and sediment in the sump, all of which are slated to be disposed offsite in an appropriate landfill or disposal facility. Hazardous building materials including sandblasted masonry surfaces in specific locations, all floor joists, cinder block walls, putty and glazing on windows, painted window casings, wooden flooring, asbestos materials such as pipe insulation, floor tile in the addition, and potentially the roofing, will be disposed of offsite. If a building shell is left standing, then the hazardous PCB concentrations in the northeast section of masonry wall in the basement will be abraded and the underlying surface encapsulated, so as to retain structural integrity of the building.

Risks posed by hazardous building materials during renovation or construction will be minimized through use of personal protective equipment, construction management techniques, hazardous materials removal and disposal (and possibly encapsulation under a building reuse scenario, if that option is chosen), and engineering and institutional controls. A Health and Safety Plan (HASP) will be prepared and used by the building renovation or demolition contractor(s). In addition, perimeter air monitoring will occur during site remediation to screen for potential contaminants on dust escaping the work area.

3.2.2 Site Media Risk During Site Work and Subsequent Reuse

Table 3 provides a summary of risk exposure pathways and mitigative measures at the 64 Elm Street Site during remedial action measures. Risks associated with Site media other than building materials were rated for PAHs, PCBs, TPHs, priority pollutant metals and VOCs relative to Vermont guidelines for corrective action plans, and are listed on Table 4.

These risks will be addressed during Site redevelopment through the following measures:

- Groundwater and Indoor Air – VOC concentrations in indoor air samples, and VOC concentrations in groundwater indicate that risks to future occupants of the building are low relative to VOCs. The lack of data regarding hydrocarbon and SVOC concentrations in indoor air constitute a data gap and thus a vapor barrier will be specified in the construction of the slab, if it is the selected remedial option. Risks of worker exposure to the metals of arsenic, lead and potentially copper will be mitigated through use of personal protective equipment (PPE) and decontamination of equipment.

- Soils – Soils will be placed beneath a cap. In the building renovation scenario, soils exceeding 10 mg/kg PCBs and Industrial RSLs will be removed and disposed of offsite, the holes filled with clean soil, and the entire area capped with soil. In the demolition scenario, soils exceeding 10 mg/kg PCBs and Industrial RSLs will be removed and disposed of offsite, the holes filled with clean soil, and soils removed for foundation footings will be placed under the slab as part of new grade. In either the concrete slab or asphalt pavement scenario, the ground surface must be built up approximately one foot, due to the property's location in a Flood Hazard Area.

3.2.3 Site Occupancy Risk

Potential risk to human health posed by long-term uses following construction will be addressed through building decontamination and renovation or complete demolition, and use of an engineering control – a concrete or asphalt pavement slab with vapor barrier, under which contaminated soils will be placed. After Site remediation is complete, confirmatory perimeter soil samples will be collected to ensure that contaminated dusts/particles did not leave the construction site and impact adjacent areas.

4. CORRECTIVE ACTION FEASIBILITY INVESTIGATION

This section provides information pertaining to possible remedial options for the Site. ANR guidance requires a Corrective Action Feasibility Investigation (CAFI) as part of the CAP process and under the EPA Brownfields Program, the CAFI can serve as the Analysis of Brownfields Cleanup Alternatives (ABCA) requirement. .

4.1 Identification of Remedial Objectives

Remedial objectives for this brownfields redevelopment project include providing a safe environment that will promote future use by occupants of the property and users of adjacent properties. This will be accomplished by removing hazardous building materials and consolidating and isolating contaminated soils and foundation materials. Additionally, key objectives include maintaining the health and safety of temporary Site workers, utility workers and future users of the property, as well as incorporating an esthetically pleasing and locally consistent building exterior appearance. Finally, the project seeks to impose limited restrictions on the nature of future use of either the existing or future structures.

4.2 Remedial Alternatives

Four remedial alternatives for this Site have been developed. One involves retaining and renovating portions of the existing structure while capping the onsite contaminated soil. The other three incorporate removal of the current structure and either replacing it with a structural slab for a future building or capping the Site with either porous or conventional asphalt to create parking. The sections below provide additional details on the conceptual approach considered for each.

4.2.1 Option 1: Partial Structure Removal, Hazardous Materials Removal and Building Renovation, Soil Capping and Institutional Controls

- Provide air monitoring around perimeter of work area, place temporary stormwater controls.
- Additional hazardous materials testing for disposal (contractor responsibility in bid specs).
- Remove building addition.
- Remove hazardous building materials to 1 mg/kg total PCBs: four areas of basement wall, wooden flooring and joists of first and second floors; all windows (PCB caulk) and window casings, doors and door casings.
- Sandblast and cap concrete floor of basement.
- Remove and dispose of sump sediments.
- Remove PCB and lead paints on interior and exterior of brick building by sandblasting.
- Remove and dispose of roof (assumed to be asbestos) and asbestos containing building materials (ACBM).
- Remove PCB contaminated soil in excess of TSCA levels

- Remove arsenic, lead, and PAH- contaminated soils in excess of respective Industrial RSLs.

- Place a soil cap over soils contaminated above Residential RSLs.

- Provide an engineering review of structural stability of remediated building shell.

- Place institutional controls on Site regarding capped Site soils.

4.2.2 Option 2: Total Building Removal and Structural Cap for New Building, Institutional Controls

- Provide air monitoring around perimeter of work area, place temporary stormwater controls.

- Additional hazardous materials testing for disposal (contractor responsibility in bid specs).

- Remove and place in hazardous landfill or licensed disposal facility those hazardous building materials containing PCBs in concentrations over 50 mg/kg:

    - Section of cinderblock wall in building addition
    - Sump sediments
    - Single area of basement wall with high-PCBs sample
    - Wooden flooring and joists of first and second floor

- Remove and place in a non-hazardous landfill or licensed facility those building materials containing PCBs in concentrations of 50 mg/kg or less:

    - Remainder of building addition
    - Painted brick walls (PCB content uncertain)
    - Windows and window casings
    - Doors and door casings

- Remove and dispose of ACBM in appropriate licensed landfill.

- Cap municipal sewer and water lines, ‘cap’ and move electrical lines.

- Investigate soil bearing capacity for final geotechnical design of cap foundation.

- Remove west and south foundation walls of existing building, place in basement or dispose.

- Remove PCB contaminated soil in excess of TSCA levels

- Remove arsenic, lead, and PAH- contaminated soils in excess of respective Industrial RSLs.

- Place a soil cap over soils contaminated above Residential RSLs

- Excavate soil in locations of footings, frost wall, and new columns for foundation of new building. Place the soil under the slab as part of new grade.

- Remove top part of remaining building foundation, as needed for new construction. Use to fill in basement.

- Backfill basement with soil (crack slab to allow water flow), compact as necessary.

- Pour concrete slab for two story building.

- Put institutional controls in place.

4.2.3 Option 3: Total Building Removal and Site Paving, Institutional Controls

Option 3 has two subparts, one involving the use of porous pavement and the other with traditional asphalt paving

Option 3A: Porous Pavement Option

- Provide air monitoring around perimeter of work area, place temporary stormwater controls.

- Additional hazardous materials testing for disposal (contractor responsibility in bid specs).

- Remove and place in hazardous landfill or licensed disposal facility those hazardous building materials containing PCBs in concentrations over 50 mg/kg:

    - Section of cinderblock wall in building addition;
    - Sump sediments,
    - Single area of basement wall with high-PCBs sample
    - Wooden flooring and joists of first and second floor

- Test and dispose of or recycle existing pavement.

- Remove PCB contaminated soil in excess of TSCA levels

- Remove arsenic, lead, and PAH- contaminated soils in excess of respective Industrial RSLs.

- Place a soil cap over soils contaminated above Residential RSLs

- Remove top part of building foundation, as needed for new construction. Use to fill in basement.

- Backfill basement with soil (crack slab first, to allow water flow), compact soil as necessary.

- Place, grade and compact soil for porous asphalt sublayers.

- Place a layer of ‘marker’ fabric or other material to alert anyone in the future of nature of underlying contaminated materials.

- Place and finish porous asphalt parking area.

- Put institutional controls in place

Option 3B: Traditional Pavement Option

- Provide air monitoring around perimeter of work area, place temporary stormwater controls.

- Additional hazardous materials testing for disposal (contractor responsibility in bid specs).

- Remove and place in hazardous landfill or licensed disposal facility those hazardous building materials containing PCBs in concentrations over 50 mg/kg:

    - Section of cinderblock wall in building addition;
    - Sump sediments,
    - Single area of basement wall with high-PCBs sample
    - Wooden flooring and joists of first and second floor

- Test and dispose of or recycle existing pavement.

- Remove PCB contaminated soil in excess of TSCA levels

- Remove arsenic, lead, and PAH- contaminated soils in excess of respective Industrial RSLs.

- Place a soil cap over soils contaminated above Residential RSLs

- Remove top part of building foundation, as needed for new construction. Use to fill in basement.

- Backfill basement with soil (crack slab first, to allow water flow), compact soil as necessary.

- Place a layer of 'marker' fabric or other material to alert anyone in the future of nature of underlying contaminated materials.

- Place and finish asphalt parking area.

- Put institutional controls in place

4.3 Evaluation Criteria

Remedial alternatives identified in this CAFI were evaluated in a manner consistent with the intent of the VTANR Corrective Action Guidance and the EPA ABCA, as follows:

- Implementability: The implementability criterion addresses the technical complexity of the alternative; integration with existing Site uses or other remedial actions; operation, maintenance and monitoring of the alternative; Site access requirements and potential exposures to the public; availability of necessary services and materials; availability of off-

Site treatment, storage and disposal facilities; and whether the alternative meets regulatory requirements for permits required by local, state or federal agencies.

- Effectiveness/Risk Reduction This criterion addresses a remedial alternative's ability to achieve a permanent solution; its effectiveness in reusing, recycling, destroying, detoxifying, or treating the hazardous materials; and its effectiveness in reducing concentrations of residual contaminants.

- Cost: Costs considered include design, construction, equipment, site preparation, labor, permits and licenses, materials treatment/disposal, operation, maintenance, monitoring, and environmental restoration. The cost criterion also considers the relative consumption of resources in the operation of an alternative. Probable costs have been provided for each alternative based on available information and general assumptions (see Appendix C and Table 6).

4.4 Review and Summary of Remedial Alternatives

Table 5 summarizes the feasibility for Options 1 through 3B. Based on this information, two options can be identified as less feasible than the other two.

Option 1 is the most expensive and least feasible of all the options. Not only must all hazardous materials be removed and disposed (as is the case with other options), but the act of removal of joists and other supports brings into question the overall structural integrity of the building while it awaits rehabilitation. This option necessitates integrating building rehabilitation and new construction immediately after building remediation, since the building shell, with no roof, could not be safely left standing. Further, rendering the existing structure sufficiently clean to obtain the goal of no restrictions for future use of the renovated structure could result in more, unknown contamination being discovered, creating cost and schedule issues during remediation and renovation.

It is also suggested that Option 3B be eliminated due to difficult to moderate implementability associated with grade requirements for the porous pavement and water control associated with the contaminated soil it covers. The operations and maintenance of porous pavement also requires regular vacuuming of the pavement to ensure optimal operations, a maintenance step not required of traditional pavement. Also, its cost is the highest of the two paving options.

The remaining options (2 and 3B) fall relatively close in terms of the evaluation criteria. Both require removal of hazardous materials prior to building demolition. The slab in Option 2 removes the most contaminated soils, caps the remaining contaminated soil with a building, which is more permanent than pavement and thus eliminates operation and maintenance of the paving. Costs are slightly higher for Option 2 over paving because of the geotechnical and concrete design work relative to just paving, but the value-added aspect in terms of permanence of the cap, and the redevelopment benefit to the property owner and the Town of Brattleboro are mitigating factors.

5. RECOMMENDED REMEDIAL ACTION

Because the 64 Elm Street project is a brownfields redevelopment, the eventual disposition of the property has to meet the needs of the property owner while still adhering to applicable local, State and Federal regulations. Based on the evaluation conducted above, two options are technically preferable: Option 2 or Option 3B. Should the property owner desire redevelopment of the Site with a new structure, Option 2 would hold. If the property owner would prefer to have the Site become parking, Option 3B would be the logical choice. Accordingly, this ABCA/CAP provides the needed information for both options. Both options are structured to meet applicable environmental requirements, but the eventual choice would be dictated by the long term needs for the property.

Both options require removal of hazardous material from the structure prior to building demolition. Once the hazardous material was removed, the building itself would be demolished and that material taken from the Site for solid waste landfilling or recycling. From there, the approach for each option diverges.

Option 2 involves the eventual placement of a foundation capable of supporting a two-story building. Figure 9 provides a conceptual design for the foundation and cap. Construction of a foundation would require an investigation of the soil bearing capacity as well as accommodation for municipal utilities that would eventually need to be reconnected to a new building. Excavation spoils for footings, frost walls and foundation columns would be stockpiled and tested for possible off site disposal, but would be placed under the slab if no soil Industrial RSL exceedances are found. The basement would be backfilled with usable soil and the top part of the existing foundation prior to the pouring of concrete. To provide mitigation for possible vapor intrusion, a venting system would be recommended in the construction specifications of a new structure.

Option 3B is the simpler of the two options. The existing pavement would be tested and either recycled for onsite use or disposed offsite. The top part of the existing foundation would be removed and placed in the basement along with offsite clean soil as needed. A marker layer would be installed followed by asphalt to complete the capping of the area as a parking lot. Figure 10 provides a conceptual design for the pavement option, including typical sections.

The overall estimated cost for each option is found in Table 6 with detailed breakdowns of each option in Appendix C, along with typical specification language for building material demolition.

6. PERMIT REQUIREMENTS

Table 7 contains a list of anticipated permits from local, state and federal regulatory agencies which are applicable for either Option 2 or 3B.

7. PROPOSED SITE CONTRACTORS

Contractors for this ABCA/CAP have not yet been selected. Because this is a brownfields supported redevelopment project as well as an environmental project, the property owner will select from state-approved lists of contractors and consultants to perform the work. However, to meet the requirement of ANR guidance, a tentative list of possible contractors for this Corrective Action includes the following:

Possible Corrective Action Contractors		
EXCAVATION AND SITE RESTORATION		
Dave Manning, Inc	Contact: Dave Manning Brattleboro, VT 05301	802-258-3962
Gurney Brothers	Contact: Doug Gurney North Springfield, VT 05150	802-886-2210
HAZARDOUS MATERIALS CONSULTANT		
RPF Associates, Inc.	Contact: Roger Francoeur Northwood, NH.	(603) 942-5432
LABORATORY		
Eastern Analytical, Inc	Contact: Kathleen Noonan Concord, NH 03301	603-228-0525
Endyne, Inc	Contact: Mark Fausel Williston, VT 05495	802-879-4333
EMSL Analytical, Inc.	Contact: Chris Nardozzi Woburn, MA	781-933-8411
PAINT REMOVAL/ASBESTOS ABATEMENT		
Catamount Environmental, Inc	Contact: Dave Mack Wilmington, VT 05363	802-464-2754
EnviroVantage, Inc.	Contact: Scott Sancousie Epping, NH	800-640-5323
The DecTam Corporation	Contact: Brent Morgenstern North Reading, MA.	978-470-2860
WASTE DISPOSAL / LANDFILLS		
Enpro Services, Inc	Contact: Jeff Simone Williston, VT 05495	802-860-1200
Environmental Product and Services	Contact: Greg Klimas Williston, VT 05495	802-862-1212
TMC Services, Inc	Contact: Jason Scott South Burlington, VT 05403	802-863-5300
Casella Waste Management	Contact: Scott Sampson Chichester, NH 03258	603-798-4557
ESMI	Contact: Mike Phelps Louden, NH 03307	800-950-7645

Possible Corrective Action Contractors		
WSI Landfill, Moretown VT	Contact: Tom Bedowski Waterbury VT 05676	802-244-8888
Northampton Landfill	Contact: Patrick Kennedy Northfield, MA 01360	413-587-4005
New England Waste Services of Vermont	Airport Road Coventry, VT 05825	802-334-5795
PAVING CONTRACTORS		
Bazin Brothers	Contact: Bob Bazin Westminster, VT 05158	802-463-2077
Springfield Paving	Springfield, VT 05150	802-886-3300
CONCRETE CONTRACTORS		
Pioneer Valley Concrete	Chicopee, MA 01020-2217	413-534-8171
Valley Concrete	Wilmington, VT 05363-7943	802-464-5001
ENVIRONMENTAL AND ENGINEERING CONTRACTORS		
Geotechnical Engineer: Willis Consulting Engineers	Contact: Mike Willis Taftsville, VT 05073	802-457-1246
Structural Engineer: Schaal Engineering,	Contact: Tim Schaal White River Junction, VT 05001	802-295-2002
Civil Engineering: Pathways Consulting	Contact: A. Dana Arey Lebanon, NH 03766	603-448-2200
Environmental Consulting: New England EnviroStrategies, Inc.	Contact: Muriel Robinette Concord, NH 03301	603-856-8815
SURVEYING CONTRACTORS		
Eric M. Morse Surveying	Contact: Eric Morse Guilford, VT 05301	802-254-8477

8. POST REMEDIAL ACTIONS

After completion of the building demolition, confirmatory soil samples will be collected in the site vicinity to confirm that contaminated materials or dusts were not released from site operations. A Corrective Action Plan Implementation Report will be completed that documents site activities, including offsite disposal information for contaminated building materials. Appropriate institutional controls will be placed on the property to indicate that contaminated soil remains in place and describes safeguards for utility workers when digging onsite.

If the Remedial Option 3B is ultimately implemented, then an Operations and Maintenance Plan will be written to include appropriate care, monitoring and reporting of the asphalt cap integrity.

9. PROPOSED SCHEDULE

At the 64 Elm Street site, four options have been presented, all of which will meet the risk control needs of the site. Based on current information, the property owner prefers Option 2 consisting of demolition of the existing structures and the construction of a structural slab from which a new building could be launched, coupled with all the other elements of Option 2 (e.g. limited soil removal, institutional controls). Depending on the availability and timing of funding, the property owner intends to begin the remedial action and redevelopment process in the Fall of 2010. Figure 11 shows a start date of August 1, 2010 with expected completion of the structural slab ready for building by October, 2011.

The project requires a public comment process as well as a predesign step, all part of the redevelopment process prior to actual building demolition and construction of the slab. These tasks are included in the schedule shown on Figure 11. They include development of specifications for the final design of the slab, incorporating geotechnical borings and evaluation to ensure its capacity for load bearing. Additionally, a detailed Soil Materials and Management Plan (SMMP) will be required to address handling requirements for hazardous building materials. Finally, a Self-Implementing Cleanup Plan (SIP) for TSCA wastes at the site will be developed and submitted to EPA for approval, prior to bidding of remedial work.

All the deliverables from the predesign work, including the Self-Implementing Cleanup Plan, the SMMP and the design specifications for the slab will need to be submitted for review and approval by ANR and EPA personnel. As noted on the Figure 11 schedule, that period for submittal and review is slated to occur in February 2011. It should be emphasized that approval by ANR of these predesign steps constitutes a vital part of the overall remedy approval process under the Vermont Corrective Action Plan program. Following the demolition and slab construction work in the summer of 2011, the ‘as-built’ drawings and report will be submitted to ANR, tentatively by December 2011.

REFERENCES

KAS, Inc. May, 2009. Brownfields Phase II Environmental Site Assessment, 64 Elm Street, Brattleboro, Vermont, SMS # 2008-3834

KAS, Inc. October, 2009. Brownfields Supplemental Phase II Environmental Site Assessment, 64 Elm Street, Brattleboro, Vermont, SMS # 2008-3834

KAS, Inc. November, 2009. Corrective Action Plan, 64 Elm Street, Brattleboro, Vermont, SMS # 2008-3834

Code of Federal Regulations Title 40 CFR 761 Parts D, G, N O, and R

Town of Brattleboro Planning Services. July 1, 2007. Memorandum to Susan McMahon of the Windham Regional Planning Commission from Sue Fillion of the Planning Services Department regarding applicability of town zoning ordinance to proposed renovation, demolition, and/or construction at 64 Elm St.

Eric M. Morse Land Surveyor. August 9, 2007. Subdivision Plan Elm Street and Flat Street Brattleboro, NH Land of New England Youth Theater, Inc.

State of Vermont ANR. 1997. Corrective Action Guidance

Association for the Environmental Health of Soils. 1999. Study of State Soil Arsenic Regulations

Association for the Environmental Health of Soils. Undated. Contributions of Pesticide Use to Urban Background Concentrations of Arsenic in Denver, Colorado

New England Envirostrategies, Inc. February 5, 2010. Telephone memorandum, to Daniel Fekert, VTDEC Waste Management Division

TABLE 1a
Soil Analytical - PCBs
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Industrial RSL	Residential RSL	Units	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	Duplicate (SS-1)	Duplicate (SS-9)
Sample Date:				9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	1/27/2009	1/27/2009	1/27/2009	9/23/2008	1/27/2009
Depth (ft):				7	7	10	2.5	3	2	1	1	1	7	1
PCBs														
Aroclor-1016	**21**	**3.9**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Aroclor-1221	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Aroclor-1232	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Aroclor-1242	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Aroclor-1248	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Aroclor-1254	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	**0.3**	**0.1**	<0.1	<0.1	**0.1**	**6.6**	<0.1	<0.1	<0.1
Aroclor-1260	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1
Total PCBs	**NA**	**NA**	**mg/kg**	<0.1	<0.1	**0.3**	**0.1**	<0.1	<0.1	**0.1**	**6.6**	<0.1	<0.1	<0.1

Notes:

	Result exceeds Industrial RSL
	Result exceeds Residential RSL
NA	Not Applicable

TABLE 1a
Soil Analytical - PCBs
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Industrial RSL	Residential RSL	Units	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19
Sample Date:				9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009
Depth (ft):				0.2-0.5	0-0.5	0-0.5	0-0.5	6-7	0-0.5	0-0.5	0-0.5	6-7	0-0.5
PCBs													
Aroclor-1016	**21**	**3.9**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Aroclor-1221	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Aroclor-1232	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Aroclor-1242	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Aroclor-1248	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Aroclor-1254	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	**3.3**	<0.1	**0.3**	0.2	<0.1	<0.1	**14**	**0.4**
Aroclor-1260	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<0.1
Total PCBs	**NA**	**NA**	**mg/kg**	<0.1	<0.1	**3.3**	<0.1	**0.3**	0.2	<0.1	<0.1	**14**	**0.4**

Notes:

	Result exceeds Industrial RSL
	Result exceeds Residential RSL
NA	Not Applicable

TABLE 1a
Soil Analytical - PCBs
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Industrial RSL	Residential RSL	Units	SS-20	SS-21	SS-22	SS-23	SS-24	SS-25	SS-26	Duplicate (SS-14)	Duplicate (SS-18)
Sample Date:				9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009	9/24/2009
Depth (ft):				0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	6-7	6-7
PCBs												
Aroclor-1016	**21**	**3.9**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Aroclor-1221	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Aroclor-1232	**0.54**	**0.14**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Aroclor-1242	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Aroclor-1248	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Aroclor-1254	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1	**22**
Aroclor-1260	**0.74**	**0.22**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2
Total PCBs	**NA**	**NA**	**mg/kg**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.4**	<0.1	**22**

Notes:

	Result exceeds Industrial RSL
	Result exceeds Residential RSL
NA	Not Applicable

TABLE 1b
Soil Analytical - Metals
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Industrial RSL	Residential RSL	Units	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	Duplicate (SS-1)	Duplicate (SS-9)
Sample Date:				9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	1/27/2009	1/27/2009	1/27/2009	9/23/2008	1/27/2009
Depth (ft):				7	7	10	2.5	3	2	1	1	1	7	1
Metals														
Antimony	NA	NA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	1.6	0.39	mg/kg	4.4	3.7	1.4	0.8	0.8	0.8	9.7	12	9.1	2.8	29
Beryllium	NA	NA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	800	70	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	NA	NA	mg/kg	18	15	16	10	13	15	20	50	8.4	15	13
Copper	41000	3100	mg/kg	30	39	16	8.8	9.3	10	33	30	11	32	19
Lead	800	400	mg/kg	81	98	30	3.2	2	3.8	89	490	38	68	54
Mercury	34	5.6	mg/kg	0.3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.2	<0.1
Nickel	NA	NA	mg/kg	12	11	9.2	8.4	9	9.8	20	16	8.2	12	13
Selenium	5100	390	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Silver	5100	390	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium	NA	NA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Zinc	310000	23000	mg/kg	54	61	29	20	18	22	66	140	45	56	58

Notes:

	Result exceeds Industrial RSL
	Result exceeds Residential RSL
NA	Not Applicable

TABLE 1c
Soil Analytical - Organics
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Industrial RSL	Residential RSL	Units	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-9	Duplicate (SS-1)	Duplicate (SS-9)
Sample Date:				9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	9/23/2008	1/27/2009	1/27/2009	1/27/2009	9/23/2008	1/27/2009
Depth (ft):				7	7	10	2.5	3	2	1	1	1	7	1
VOCs														
Butylbenzene	NA	NA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Methyl tert butyl ether	220	43	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
trans-1,2-Dichloroethene	690	150	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
1,1-Dichloroethane	17	3.3	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
cis-1,2-Dichloroethene	10000	780	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Chloroform	1.5	0.29	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Benzene	5400	1100	ug/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<80
Trichloroethene	14	2.8	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Toluene	45000	5000	mg/kg	1.3	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.52	<0.05	0.2	<0.08
Tetrachloroethene	2.6	0.55	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Ethylbenzene	27	5.4	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
m,p-Xylenes	2700	630	mg/kg	0.11	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.05	<0.08
o-Xylene	19000	3800	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Isopropylbenzene	11000	2100	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
1,2,3-Trichloropropane	0.095	0.005	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
Propylbenzene	21000	3400	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
1,3,5-Trimethylbenzene	10000	780	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
tert-Butylbenzene	NA	NA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
1,2,4-Trimethylbenzene	260	62	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
sec-Butylbenzene	NA	NA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
4-Isopropyltoluene	NA	NA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08
1,2-Dichlorobenzene	9800	1900	mg/kg	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.05	<0.05	<0.05	<2	<0.08
1,4-Dichlorobenzene	12	2.4	mg/kg	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.05	<0.05	<0.05	<2	<0.08
PAH														
Naphthalene	18	3.6	mg/kg	9	<0.2	<0.2	<0.02	<0.02	<0.02	<0.1	<0.1	<0.1	9.7	<0.2
2-Methylnaphthalene	4100	310	mg/kg	3	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	3.6	<0.02
Acenaphthene	33000	3400	mg/kg	9	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	<0.2	<0.2	10	<0.2
Acenaphthylene	NA	NA	mg/kg	<2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<2	<0.02
Anthracene	170000	17000	mg/kg	28	<0.02	0.36	<0.02	<0.02	<0.02	<0.2	<0.2	<0.2	30	<0.2
Benz(a)anthracene	2.1	0.15	mg/kg	65	<0.2	0.5	<0.02	<0.02	<0.02	0.28	0.68	0.5	70	0.4
Benzo(a)pyrene	0.21	0.015	mg/kg	50	<0.2	0.3	<0.02	<0.02	<0.02	0.29	0.7	0.5	55	0.4
Benzo(b)fluoranthene	2.1	0.15	mg/kg	66	<0.2	0.39	<0.02	<0.02	<0.02	0.3	0.97	0.67	76	0.5
Benzo(g,h,i)perylene	NA	NA	mg/kg	23	<0.2	<0.2	<0.02	<0.02	<0.02	0.2	0.37	0.26	26	0.2
Benzo(k)fluoranthene	21	1.5	mg/kg	27	<0.2	<0.2	<0.02	<0.02	<0.02	<0.2	0.38	0.25	24	0.2
Carbazole	NA	NA	mg/kg	16	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	0.2	18	0.2
Chrysene	210	15	mg/kg	61	<0.2	0.39	<0.02	<0.02	<0.02	0.27	0.7	0.55	68	0.4
Dibenz(a,h)anthracene	0.21	0.015	mg/kg	8.7	<0.02	0.25	<0.02	<0.02	<0.02	<0.2	0.2	<0.2	9.9	<0.2
Dibenzofuran	1000	78	mg/kg	8	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	9	<0.2
Fluoranthene	22000	2300	mg/kg	150	<0.2	1.3	<0.02	<0.02	<0.02	0.5	1.3	1.3	170	0.95
Fluorene	22000	2300	mg/kg	14	<0.02	0.27	<0.02	<0.02	<0.02	<0.2	<0.2	<0.2	15	<0.2
Indeno(1,2,3-cd)pyrene	2.1	0.15	mg/kg	21	0.27	0.37	<0.02	<0.02	<0.02	0.2	0.39	0.3	25	0.26
Phenanthrene	NA	NA	mg/kg	140	<0.2	1.4	<0.02	<0.02	<0.02	0.35	0.96	0.86	150	0.6
Pyrene	17000	1700	mg/kg	110	<0.2	0.85	<0.02	<0.02	<0.02	0.39	0.98	0.8	130	0.6
Hydrocarbon														
TPH (C9-C40)	NA	NA	mg/kg	2700	50	<50	<50	<50	<50	190	130	<50	3000	<50

Notes:

	Result exceeds Industrial RSL
	Result exceeds Residential RSL
NA	Not Applicable

TABLE 2a
Groundwater Analytical - PCBs
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Enforcement Standard	Units	MW08-1			MW08-2		MW08-3			MW08-4		MW08-5		MW08-6	
Sample Date:			1/20/2009	3/5/2009	9/30/2009	1/20/2009	9/30/2009	1/20/2009	3/5/2009	9/30/2009	1/20/2009	9/30/2009	1/20/2009	9/30/2009	1/20/2009	9/30/2009
PCBs																
Aroclor-1016	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor-1221	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor-1232	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor-1242	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor-1248	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Aroclor-1254	**NA**	**ug/L**	9	<0.5	<0.5	1.7	<0.5	1	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5
Aroclor-1260	**NA**	**ug/L**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total PCBs	**0.5**	**ug/L**	9	<0.5	<0.5	1.7	<0.5	1	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5

Notes:
Result exceeds Enforcement Standard
NA Not Applicable

TABLE 2b
Groundwater Analytical - Various
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Sample Identification:	Enforcement		MW08-1	MW08-2	MW08-3	MW08-4	MW08-5	MW08-6	Duplicate
Sample Date:	Standard	Units	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008	10/8/2008
Metals									
Antimony	0.006	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.01	mg/L	0.002	0.002	0.003	<0.001	0.001	0.001	0.002
Beryllium	0.004	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	0.005	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	0.1	mg/L	0.008	0.004	0.004	0.001	<0.001	<0.001	0.005
Copper	1.3	mg/L	0.01	0.008	0.012	0.001	<0.001	<0.001	0.009
Lead	0.015	mg/L	0.012	0.012	0.011	<0.001	<0.001	<0.001	0.013
Mercury	0.002	mg/L	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	0.1	mg/L	0.008	0.002	0.003	0.002	0.002	<0.001	0.003
Selenium	0.05	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	0.1	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sodium	250	mg/L	250	190	40	75	100	49	210
Thallium	0.002	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	5	mg/L	0.018	0.005	0.021	<0.005	<0.005	<0.005	<0.005
Inorganics									
Chloride	250	mg/L	86	53	38	110	110	83	54
VOCs									
Butylbenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Dichlorodifluoromethane	1000	ug/L	<5	<5	<5	<5	<5	<5	<5
Chloromethane	30	ug/L	<2	<2	<2	<2	<2	<2	<2
Bromomethane	10	ug/L	<2	<2	<2	<2	<2	<2	<2
Chloroethane	2	ug/L	<2	<2	<2	<2	<2	<2	<2
Trichlorofluoromethane	2100	ug/L	<5	<5	<5	<5	<5	<5	<5
Diethyl ether	NA	ug/L	<5	<5	<5	<5	<5	<5	<5
Acetone	700	ug/L	<10	<10	<10	<10	<10	<10	<10
1,1-Dichloroethene	7	ug/L	<1	<1	<1	<1	<1	<1	<1
Methylene chloride	5	ug/L	<5	<5	<5	<5	<5	<5	<5
Carbon disulfide	NA	ug/L	<5	<5	<5	<5	<5	<5	<5
Methyl tert butyl ether	40	ug/L	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	100	ug/L	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloroethane	70	ug/L	<2	<2	<2	<2	<2	<2	<2
2,2-Dichloropropane	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
cis-1,2-Dichloroethene	70	ug/L	<2	<2	<2	<2	<2	<2	<2
2-Butanone	4200	ug/L	<10	<10	<10	<10	<10	<10	<10
Bromochloromethane	90	ug/L	<2	<2	<2	<2	<2	<2	<2
Tetrahydrofuran	NA	ug/L	<10	<10	<10	<10	<10	<10	<10
Chloroform	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
1,1,1-Trichloroethane	200	ug/L	<2	<2	<2	<2	<2	<2	<2
Carbon tetrachloride	5	ug/L	<2	<2	<2	<2	<2	<2	<2
1,1-Dichloropropene	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
Benzene	5	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichloroethane	5	ug/L	<2	<2	<2	<2	<2	<2	<2
Trichloroethene	5	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dichloropropane	5	ug/L	<2	<2	<2	<2	<2	<2	<2
Dibromomethane	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
Bromodichloromethane	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
4-Methyl-2-pentanone	560	ug/L	<10	<10	<10	<10	<10	<10	<10
cis-1,3-Dichloropropene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Toluene	1000	ug/L	<1	<1	<1	<1	<1	<1	<1
trans-1,3-Dichloropropene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,1,2-Trichloroethane	5	ug/L	<2	<2	<2	<2	<2	<2	<2
2-Hexanone	NA	ug/L	<10	<10	<10	<10	<10	<10	<10
Tetrachloroethene	5	ug/L	<2	<2	<2	<2	<2	<2	<2
1,3-Dichloropropane	0.5	ug/L	<2	<2	<2	<2	<2	<2	<2
Dibromochloromethane	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane	0.05	ug/L	<1	<1	<1	<1	<1	<1	<1
Chlorobenzene	100	ug/L	<2	<2	<2	<2	<2	<2	<2
1,1,1,2-Tetrachloroethane	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	700	ug/L	<1	<1	<1	<1	<1	<1	<1
m,p-Xylenes	NA	ug/L	<1	<1	<1	<1	1	<1	<1
o-Xylene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Styrene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Bromoform	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
Isopropylbenzene	NA	ug/L	<1	2	<1	<1	<1	<1	2
Bromobenzene	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
1,1,2,2-Tetrachloroethane	70	ug/L	<2	<2	<2	<2	<2	<2	<2
1,2,3-Trichloropropane	5	ug/L	<2	<2	<2	<2	<2	<2	<2
Propylbenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
4-Chlorotoluene	NA	ug/L	<2	<2	<2	<2	<2	<2	<2
1,3,5-Trimethylbenzene	4	ug/L	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	5	ug/L	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
4-Isopropyltoluene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Naphthalene	20	ug/L	<5	<5	<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	70	ug/L	<1	<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	NA	ug/L	<1	<1	<1	<1	<1	<1	<1

Notes:

Result exceeds Enforcement Standard

NA Not Applicable

TABLE 3
Site Risk Evaluation Summary
Analysis of Brownfields Cleanup Alternative/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

SENSITIVE RECEPTORS	SOURCES	PATHWAYS	MITIGATIVE MEASURES
Site Workers			
Demolition Crew and Supervisor	ACBM	Inhalation, ingestion	Personal Protective Equipment (PPE) (respirators)
	Wooden joists, boards (PCB, TPH, metals)	dermal contact, injection	PPE (gloves, steel-reinforced boots)
	Window Caulk (PCB)	dermal contact	PPE (gloves)
	Paint (PCB, lead)	inhalation, dermal contact	PPE (respirators, gloves)
	Dust (PCB, PAH, metals)	Inhalation, ingestion	PPE (respirators, gloves)
	Physical Hazards	injection, impact, falling object, contact	Awareness, physical barriers, health and safety training, PPE (hardhats, boots)
Engineering/Field Technicians	Soil	dermal contact, ingestion	PPE (gloves)
	Dust (PCB, PAH, metals)	Inhalation, ingestion	PPE (gloves, respirators as needed)
	Physical Hazards	injection, impact	PPE (gloves, steel-reinforced boots), awareness, communication
Utility Crew (for subsurface water, sewer and electricity lines)	Soil	dermal contact	PPE (gloves)
	Groundwater	dermal contact	Groundwater not impacted to level of contamination
	Physical Hazards	falling objects, collapse, contact	Awareness, work practices, engineered barriers, communications, PPE (hardhats)
Equipment Operators	Soil	dermal contact, inhalation, ingestion	Respirators, hygienic practices
	Physical Hazards	impact, falling object, contact	Awareness, work practices, engineered barriers, communications, PPE (hardhats)
Concrete/Pavement Crew(s)	Soil	incidental dermal contact, inhalation, ingestion	Engineered barrier, PPE (gloves)
	Physical Hazards	impact, burns	Awareness, work practices, temporary barriers, PPE (boots, clothing)
Site Visitors - in general, staying out of work zone (hot zone)			
Regulatory Agencies' Representatives, Owner's Representative(s), Municipal Officials	ACBM	Inhalation, ingestion	PPE (respirators)
	Dust (PCB, PAH, metals)	Inhalation, ingestion	PPE (respirators as needed)
	Physical Hazards	injection, contact	Awareness, temporary barriers, engineered barriers, PPE
Environmental and Engineering Consultants	Sump sediment (PCB, metals)	dermal contact	PPE (gloves)
	Dust (PCB, PAH, metals)	Inhalation, ingestion	PPE (respirators as needed)
	Soil	dermal contact, inhalation, ingestion	PPE (respirators, gloves)
	ACBM	Inhalation, ingestion	PPE (respirators)
	Paint (PCB, lead)	Inhalation, ingestion, dermal contact	PPE (respirators, gloves)
	Physical Hazards	impact, falling object, contact	Awareness, work practices, engineered barriers, communications, PPE
Passersby - staying off site is primary mitigative measure			
Theater patrons, schoolchildren, townspeople	Dust (PCB, PAH, metals)	Inhalation, ingestion	Perimeter barriers, perimeter air monitoring, use of wetting method during renovation or demolition; infrequency of exposure during demolition, elimination of hazard following site work
	Physical Hazards	Trucks, falling objects	Perimeter barriers, OSHA compliance during demolition, elimination of hazards following site work

TABLE 4
Screening Level Risk: Non-Building Material Media[1]
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Media	PCBs	PAHs	TPHs	VOCs	Metals	Comments
Soil	Unknown[2]	Moderate	Low	Low[3]	Low[4]	
Sump Sediment	High	High	High	Low[3]	Mixed[4]	
Groundwater	Low	Unknown[6]	Unknown[6]	Low[7]	Low to Moderate[8]	
Indoor Air	NA	NA	NA	Low[9]	NA	OSHA, VOSHA, NIOSH are standards used for comparison.

1. Relative risk, as defined by concentrations in media relative to regulatory standards: low if one order of magnitude less than standard, high if one order of magnitude or more greater than standard.

2. The PCBs detection limit of 0.1 mg/kg was approximately one half of the lowest EPA residential RSLs of 0.14 and 0.22 mg/kg.

3. Vinyl chloride had a detection limit exceeding the EPA residential RSL of 2.8 mg/kg; however, it is not a chemical of concern due to absence of source chlorinated VOCs.

4. Only arsenic, which generally exceeds regulatory EPA residential and industrial RSLs of 0.39 and 1.6 mg/kg, does not meet the criterion for low risk, and is considered a moderate risk.

5. Arsenic exceeds industrial RSLs by about an order of magnitude. Lead exceeds EPA residential RSLs up to an order of magnitude. Copper concentrations are near but less than the EPA residential RSL of 3,100 mg/kg. Arsenic concentrations in soil samples SS-1,7, 8 and 9 were approximately one order of magnitude above the residential RSL of 0.39 mg/kg, and arsenic in the duplicate of sample SS-9 exceeded an order of magnitude over the industrial RSL of 1.6 mg/kg.

6. Groundwater was not sampled for PAHs and TPHs.

7. Detection limit of benzene is half of VTGES.

8. Arsenic, lead, sodium and chloride concentrations approach their respective VGES standards.

9. Background concentrations of benzene in reference study exceed NIOSH REL. Detection limits of 2.4 ug/m3 chloroform may exceed the VOSHA standard of 2 ppm.

TABLE 5
Corrective Action Feasibility Evaluation
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Option	Description	Implementability	Effectiveness/Risk Reduction	Cost
1	Partial Building Demolition and Reuse, Soil Cap	Difficult Substantial potential weakening of existing structure from removal of structural members and reduction in brick strength. Longer project timeframe due to sandblasting and segregation of materials. Phasing with rehabilitation and new construction critical	Effective Reduces builiding contamination and site soil risk by capping. Most risky to implement, however, due to structural integrity issues during building remediation	Very High Considerable uncertainty due to structural concerns of building during renovation
2	Full Demolition and Placement of Structural Slab	Moderate Less segregation of materials and faster due to no remediation of existing materials. Some disturbance of contaminated soil for slab construction, but grade requirements facilitate soil reuse under slab.	Effective Eliminates builidng contamination and permanently reduces soil accessibility by placement of building over residual soil	High to Moderate Highest cost for site capping but provides greatest site reuse potential and permanent capping solution.
3A	Full Demolition and Placement of Porous Pavement	Moderate Segregation of materials is fairly simple. No remediation of existing materials. Placement, grading and compaction of porous pavement subbase creates more implementability issues with contaminated soil in place	Effective Eliminates building contamination and reduces soil accessibility with pavement. Some risk of soil saturation with porous pavement.	Moderate Higher cost than Option 3B due to porous pavement section requirements and O&M
3B	Full Demolition and Placement of Traditional Pavement	Moderate to Easy Segregation of materials is fairly simple. No remediation of existing materials. Less preparation is necessary for parking area, pavement reuse imparts few materials management issues for sequencing of work.	Effective Eliminates builidng contamination and reduces soil accessibility with pavement	Moderate Lowest cost of all options due to simplest construction and lowest O&M once building demolition is complete

TABLE 6
Corrective Action Options Cost Comparison Summary
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

	Option 1		Option 2		Option 3A		Option 3B	
	Building Rehabiitation Soil Cap		Building Demolition Structural Slab		Building Demolition Porous Pavement		Building Demolition Traditional Pavement	
Cost Element								
Building Demolition								
Construction	$ 1,243,580		$ 886,925		$ 875,925		$ 875,925	
Engr/Permitting	$ 186,540	15%	$ 133,040	15%	$ 87,590	10%	$ 87,590	10%
Contingency	$ 248,720	20%	$ 88,690	10%	$ 87,590	10%	$ 87,590	10%
Subtotal	$ 1,678,840		$ 1,108,655		$ 1,051,105		$ 1,051,105	
Site Capping								
Construction			$ 154,490		$ 114,230		$ 84,900	
Engr/Permitting			$ 23,170	15%	$ 11,420	10%	$ 8,490	10%
Contingency			$ 23,170 [1]	15%	$ 17,135	15%	$ 12,735	15%
Institutional Controls, Paving O&M					$ 29,500		$ 28,840	
Subtotal	$ -		$ 200,830		$ 142,785		$ 106,125	
TOTAL	**$ 1,678,840**		**$ 1,309,485**		**$ 1,193,890**		**$ 1,157,230**	

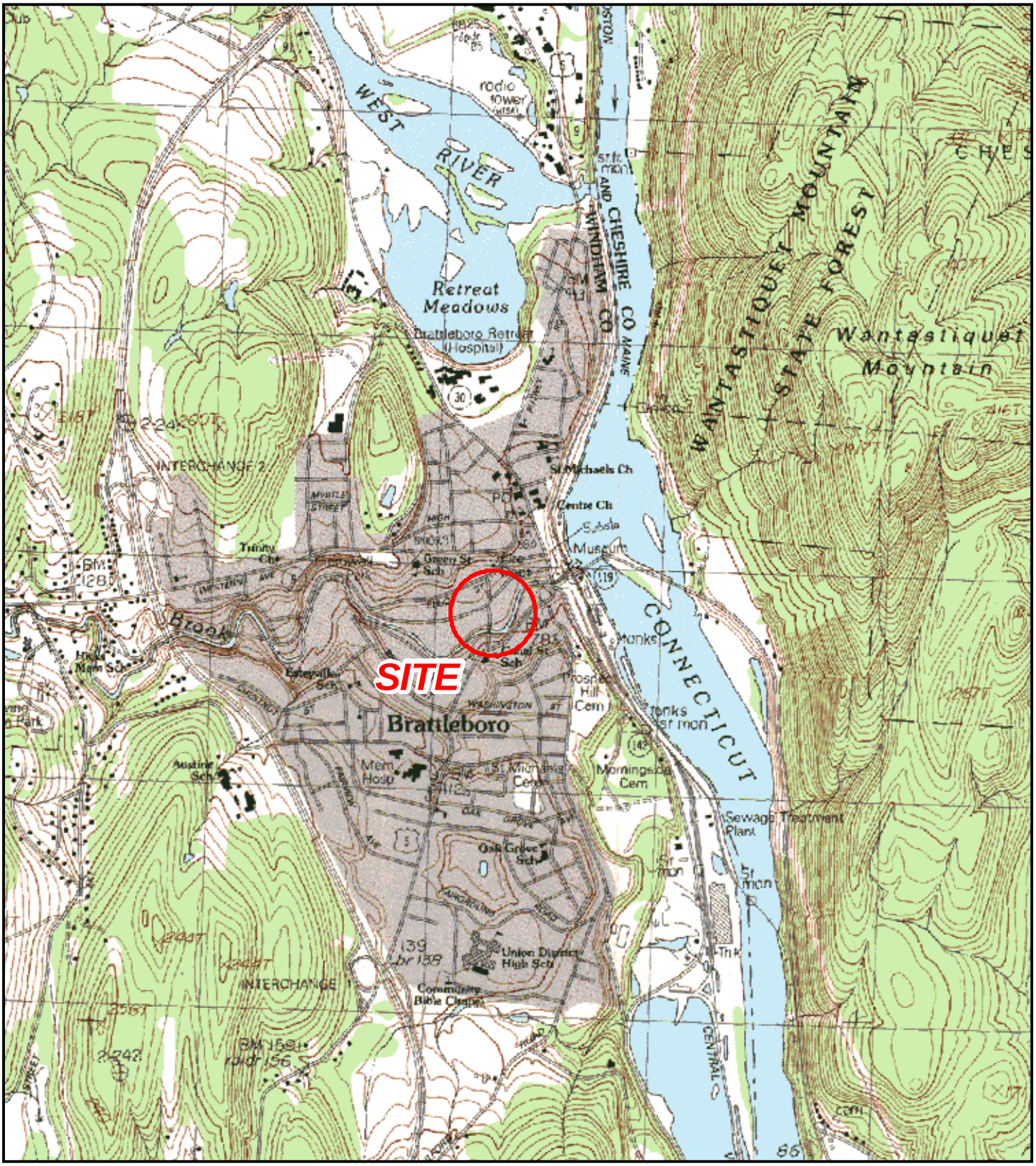
1. From Pathways Consultants, Inc. cost estimate details for a slab foundation (see Appendix C).

TABLE 7
Anticipated Permits
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Level	Regulatory Entity	Contact Name & Address	Permit or Requirement Description
Municipal			
	Planning Board or Zoning	Brian Bannon, Zoning Administrator Planning Services Dept., Municipal Center 230 Main Street, Brattleboro, VT 05301 (802) 254-4541	Major Site Permit: Proposed structure use, dimensions, floor area, and height; illumination, waste disposal, water supply, fuel storage, mechanical equipment; parking, daily traffic, noise level, hours of operation, total floor area, area of proposed use, property owner, site plan requirements - prepared by professional, property boundary and restrictions, site elevation and stormwater information, lighting and landscaping, traffic projections.
	Zoning	Brian Bannon (see above)	Flood Hazard Area Permit: requires that ground surface be raised to at least one foot above 100-year flood plain, and locate utilities to minimize flood damage. Requires 12 copies of plans drawn to scale showing nature, location, dimensions and elevations of lot, existing and proposed structures and lowest habitable floor elevation, extent of flood hazard area and base flood elevation, base flood elevation before and after development, and elevation certificates.
	Development Review Board	Brian Bannon (see above)	General Zoning Permit: Applicant and property owner information, current and proposed use of property, work proposed, zoning information, estimated cost of improvements.
State			
	Department of Health	Andy Schevrefils Asbestos and Lead Regulatory Program P.O. Box 70, 108 Cherry St . Burlington, VT 05402 802-863-7220	EXEMPT FROM FOLLOWING IF NO FRIABLE ASBESTOS PRESENT[1] (although specified practice procedures must be followed for asbestos removal). Permit Application for Asbestos Abatement Project: project diagram showing each containment area and amount of ACM; location of decontamination units and waste load-out; location of negative air filtration units and points of venting; entity, supervisor and consultant names, certification numbers, building name and address, location, types of ACM and abatement, work schedule and hours, disposal site, alternate work practices, regulation section number of general practices used, 24-hour notice to VTDOH of changes to notification. Work to be completed before demolition.
		See above	Lead Abatement Project Permit Application: Lead abatement contractor information, project designer/license number, schedule, dates, removal procedures, interim controls, renovation activities, name and license no. of site supervisor, address of storage and final waste disposal company, list of location (of building and within building), type and scope of activities, Notification to arrive at department at least ten working days before start of site work for the abatement project.
	Department of Environmental Conservation	Brownfields Response Program Hugo Martinez Cazon (802) 241-3892 Don Einhorn (802) 241-1093	Corrective Action Plan
		Waste Management Division, Solid Waste Program Dan Fekert	Demolition plan not required. Just use licensed landfills or facilities.
		Dan Mason VT DEC - Water Quality Division Stormwater Section 103 South Main Street, Building 10 North Waterbury, VT 05671-0408 Tel: 802-476-2678 dan.mason@state.vt.us	Site does not meet 1-acre requirement for Construction Stormwater Permit. Permit not required.
Federal			
	U.S. EPA	U.S. EPA Region 1 Demo/Reno Clerk (APC-2311) JFK Federal Building Boston, MA 02203	"NESHAP (National Emission Standard for Hazardous Air Pollutants) Notification" - Asbestos Demolition/Renovation Notification Form: Description of facility, asbestos contractor information, work practices and engineering controls to be used, amount of asbestos, schedule, identity of waste transporters and disposal facilities, contingency for unanticipated asbestos type and quantity. Notification must be typewritten and postmarked and delivered no later than ten (10) days before the start of work.
	U.S. EPA	Kimberly Tisa Regional PCB Coordinator USEPA EPA New England, Region 1, 5 Post Office Square - Suite 100 Mail Code: OSRR07-2 Boston, MA 02109-3912 617-918-1527 tisa.kimberly@epa.gov	Polychlorinated Biphenyl Self-Implementing Cleanup Notification and Certification: nature and kinds of materials contaminated, summary of procedures used to sample contaminated and adjacent areas and a table or cleanup site map showing PCB concentrations measured in all pre-cleanup characterization samples, sample collection and analysis dates; location and extent of the identified contaminated area, including topographic maps with sample collection sites cross referenced to the sample identification numbers in the data summary; a cleanup plan for the site, including schedule, disposal technology, and approach, with contingencies for discovery of unanticipated higher concentrations or wider distributions of PCB remediation waste; a written certification, signed by the owner of the property and the party conducting the cleanup, that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures, and instrumental/chemical analysis procedures used to assess or characterize the PCB contamination at the cleanup site, are on file at the location designated in the certificate, and are available for EPA inspection.

NOTES:
1. Exempt materials: vinyl asbestos flooring and mastics; exterior asbestos roofing materials; exterior asbestos cement piping; exterior asbestos transite board; asbestos cement piping and transite board in open air buildings.

2. USEPA: U.S. Environmental Protection Agency



N

0 0.25 0.5 1 Miles

0 1,000 2,000 4,000 Feet

1:24,000

SITE COORDINATES: 72°33'40.473"W 42°50'54.412"N

Data Source:
VCGI - Brattleboro Quadrangle (1985)
Political Boundaries

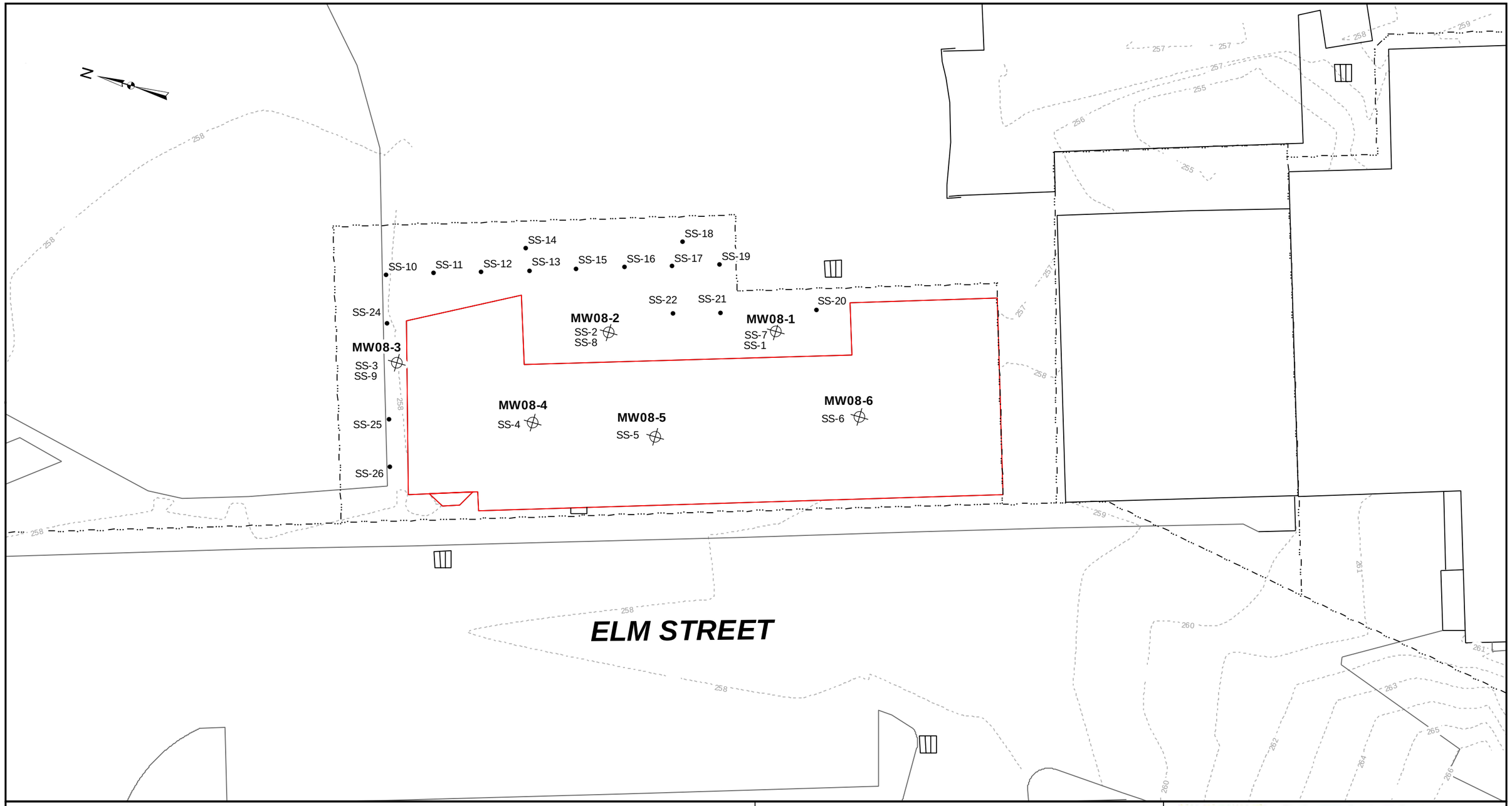
New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Site Locus

July 2010

Figure 1



Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Building
- Topographic Contour (1 ft)

Scale: 0 10 20 40 Feet

NOTES:
Basemap linetypes and annotation do not reflect those of the original survey plan.
Boring and monitoring well locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Boring and monitoring well locations based on various site figures produced by KAS Consulting Inc. as part of the Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009).

New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Site Plan

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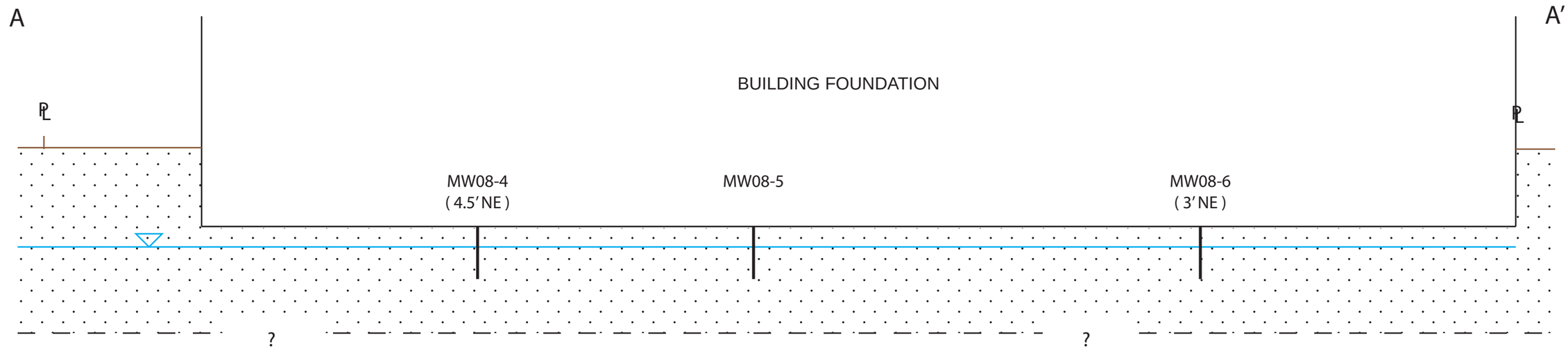
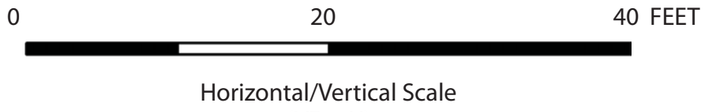
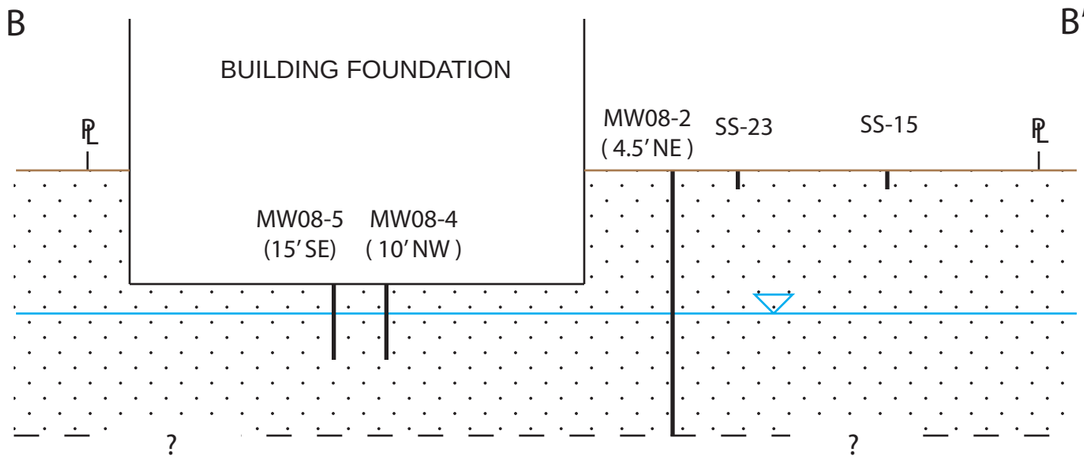
Figure 2

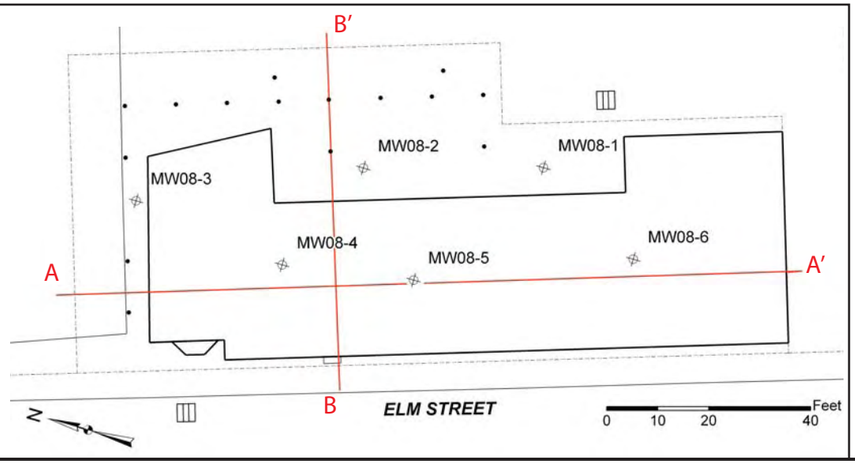




Horizontal/Vertical Scale
(VE=1X)



Line of Section Map Inset



LEGEND

- Ground Surface (approximate elevation 258 ft NGVD)
- PL — Property Line
- Water Table (approximate)
- Sandy Silt - Silty Sand with varying amounts of Gravel (from KAS boring logs)
- Monitoring Well and/or Soil Boring Location

New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Interpreted Cross Section A-A' and B-B'

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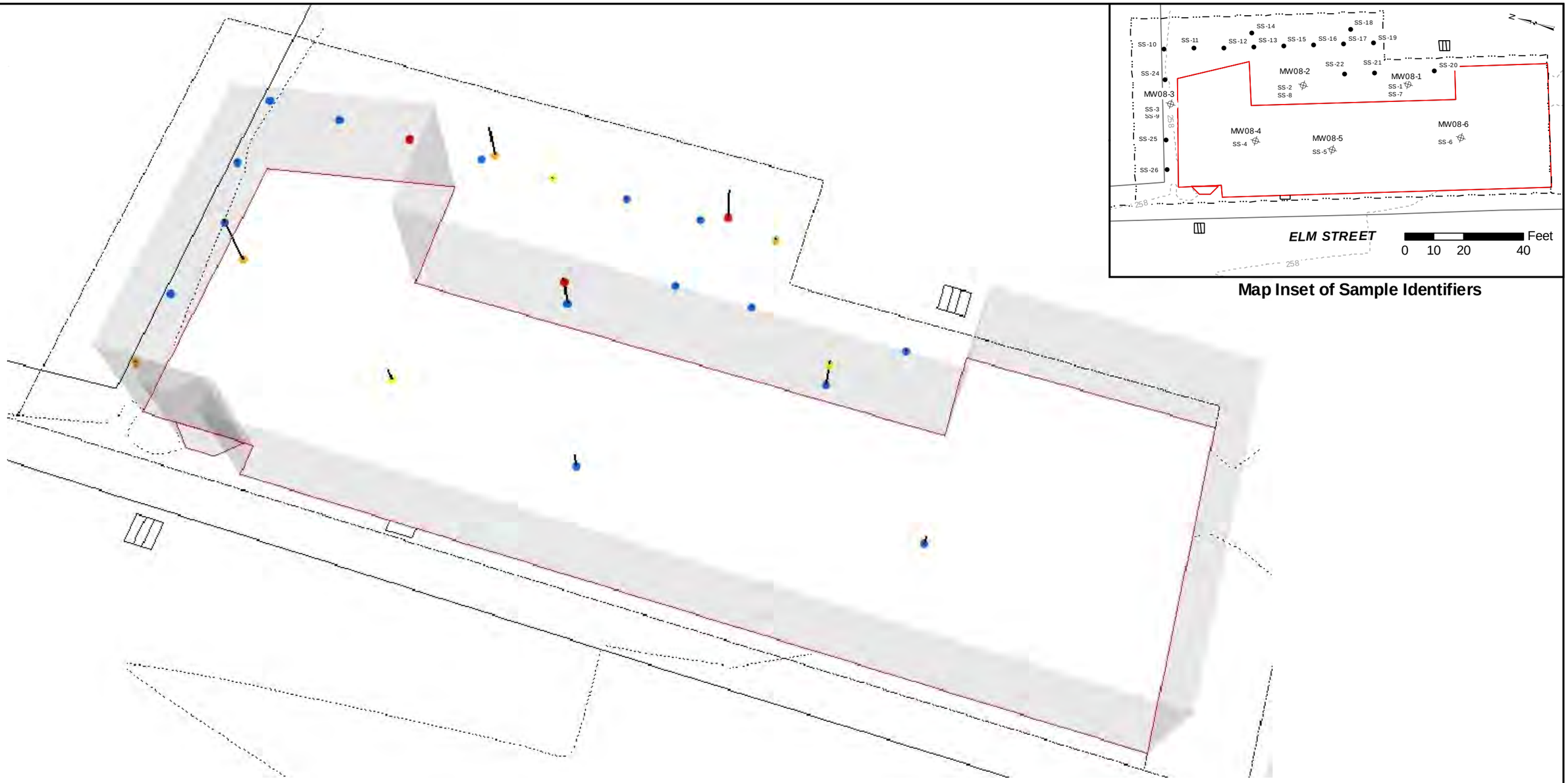
Figure 3



Map Inset of Sample Identifiers

Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Building
- Topographic Contour (1 ft)

Total PCBs (mg/kg)

- 0.00 - 0.10
- 0.11 - 0.22
- 0.23 - 0.74
- > 0.75 (all samples less than 25)

NOTES:
3D PERSPECTIVE NOT TO SCALE
Basemap linetypes and annotation do not reflect those of the original survey plan.
Boring and monitoring well locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Sample locations derived from Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009) reports by KAS Consulting Inc.
Analytical posting data based on project database generated from laboratory EDDs provided by Eastern Analytical Inc.

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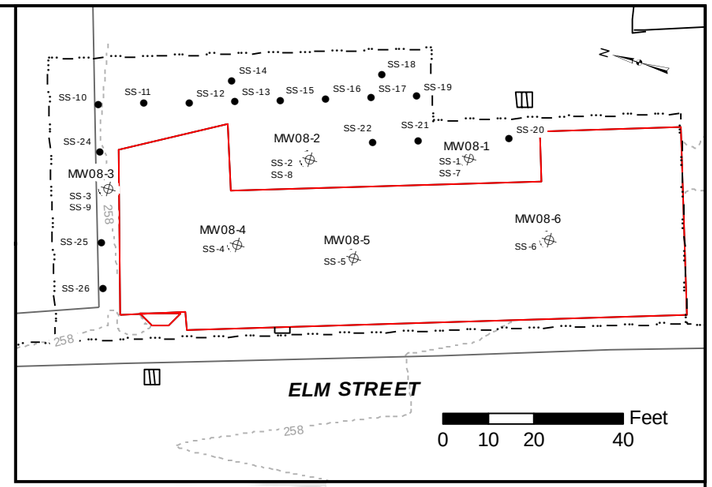
ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

PCB Concentrations in Site Soils

July 2010

Figure 4



Map Inset of Sample Identifiers

Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Building
- Topographic Contour (1 ft)

Benzo(a)pyrene (mg/kg)

- < 0.20
- 0.21 - 1.00
- 1.01 - 25.00
- > 25

NOTES:
3D PERSPECTIVE NOT TO SCALE
Basemap linetypes and annotation do not reflect those of the original survey plan.
Boring and monitoring well locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Sample locations derived from Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009) reports by KAS Consulting Inc.
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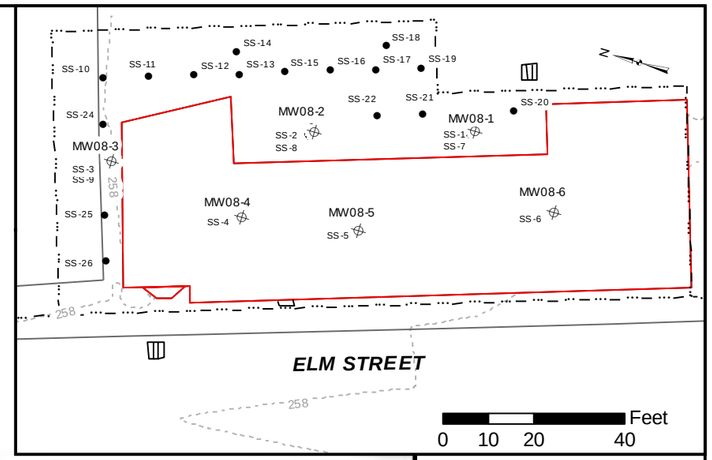
ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Benzo(a)pyrene Concentrations in Site Soils

July 2010

Figure 5



Map Inset of Sample Identifiers

Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Building
- Topographic Contour (1 ft)

Arsenic (mg/kg)

- **< 0.39**
- **0.40 - 1.60**
- **1.61 - 5.00**
- **> 5**

NOTES:
3D PERSPECTIVE NOT TO SCALE
Basemap linetypes and annotation do not reflect those of the original survey plan.
Boring and monitoring well locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Sample locations derived from Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009) reports by KAS Consulting Inc.
Analytical posting data based on project database generated from laboratory EDDs provided by Eastern Analytical Inc.

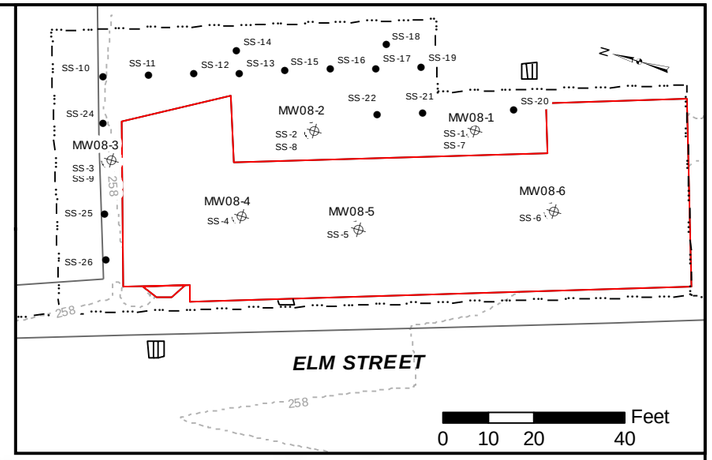
New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Arsenic Concentrations in Site Soil

July 2010

Figure 6



Map Inset of Sample Identifiers

Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Building
- Topographic Contour (1 ft)

Lead (mg/kg)

- 0 - 100
- 101 - 200
- 201 - 400
- 401 - 1,000

NOTES:
3D PERSPECTIVE NOT TO SCALE
Basemap linetypes and annotation do not reflect those of the original survey plan.
Boring and monitoring well locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Sample locations derived from Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009) reports by KAS Consulting Inc.
Analytical posting data based on project database generated from laboratory EDDs provided by Eastern Analytical Inc.

New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Lead Concentration in Site Soil

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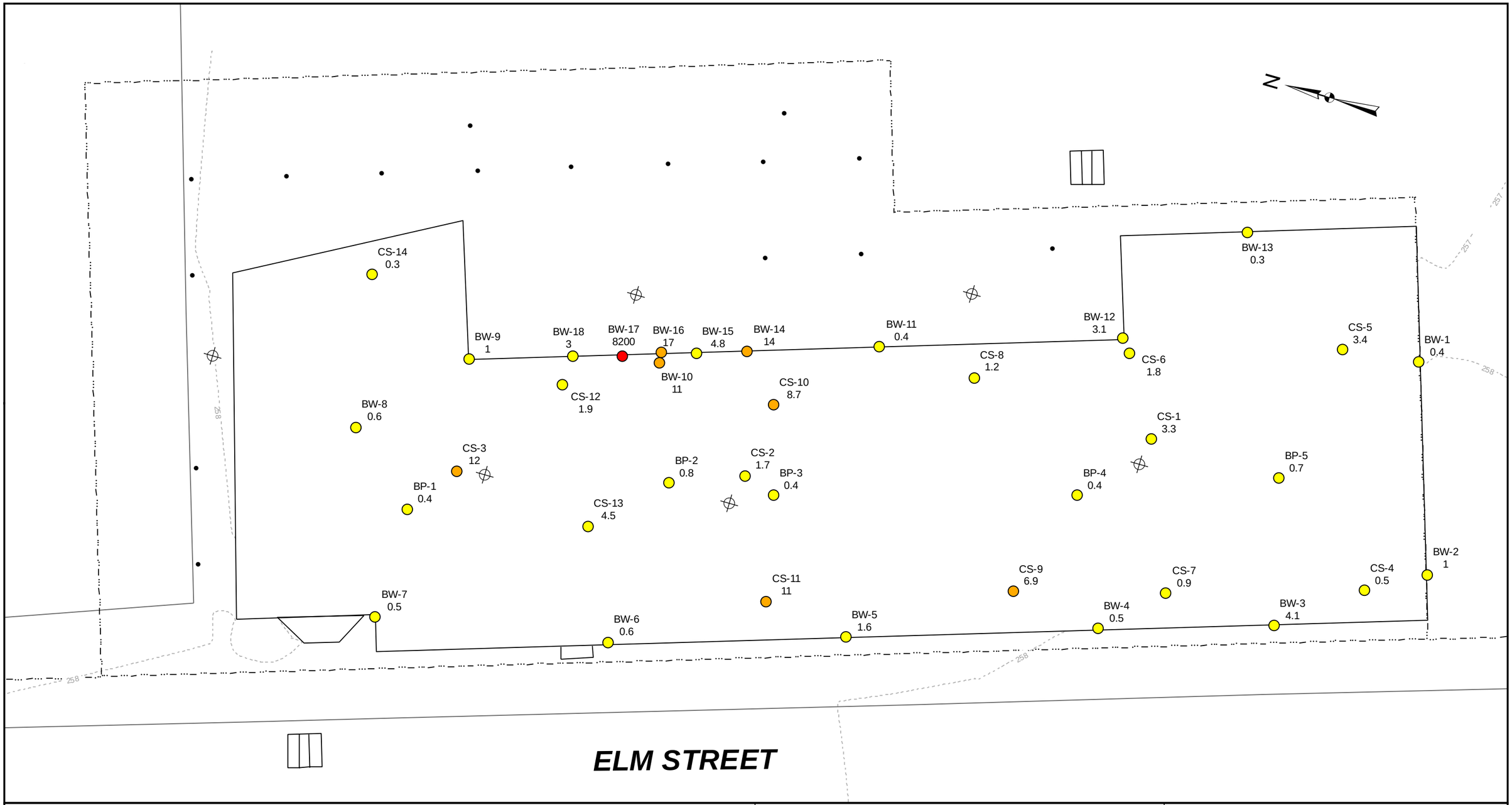
Figure 7



Legend

- Monitoring Well
- Soil Boring
- Catch Basin
- Property Boundary
- Edge of Pavement
- Current Site Building
- Topographic Contour (1 ft)

Total PCBs (mg/kg)

- **0.0 - 0.1**
- **0.2 - 5.0**
- **5.1 - 25.0**
- **> 25**

0 5 10 20 Feet

NOTES:
Basemap linetypes and annotation do not reflect those of the original survey plan.
Building material samples are composited from the general area indicated on the figure.
All locations are approximate.

DATA SOURCES:
Basemap from Subdivision Plan (.dwg) by Eric M. Morse, Land Surveyor, dated 8/9/07 (revised 5/5/09).
Composited sample locations derived from Phase II ESA (May 2009) and Supplemental Phase II ESA (October 2009) reports by KAS Consulting Inc.
Analytical posting data based on project database generated from laboratory EDDs provided by Eastern Analytical Inc.

New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Total PCBs in Basement Materials

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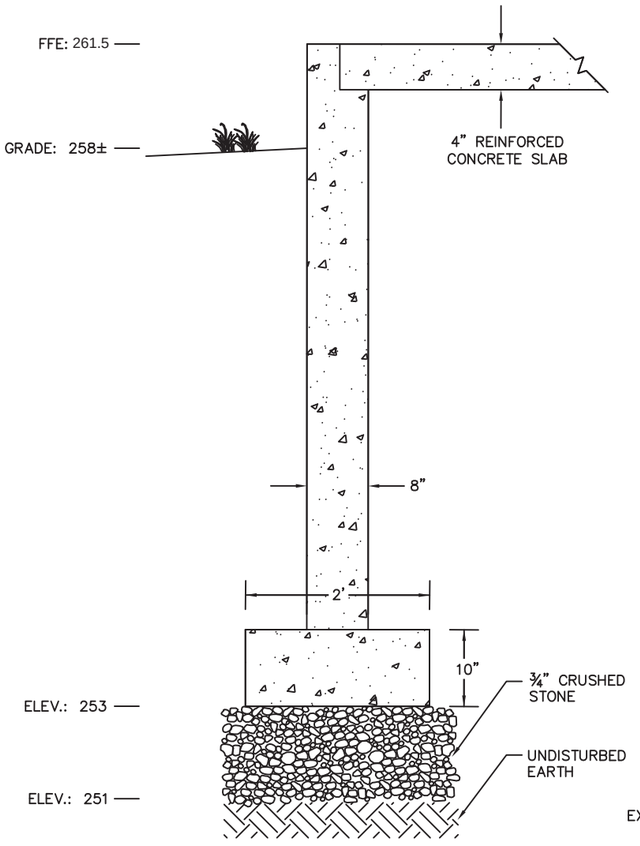
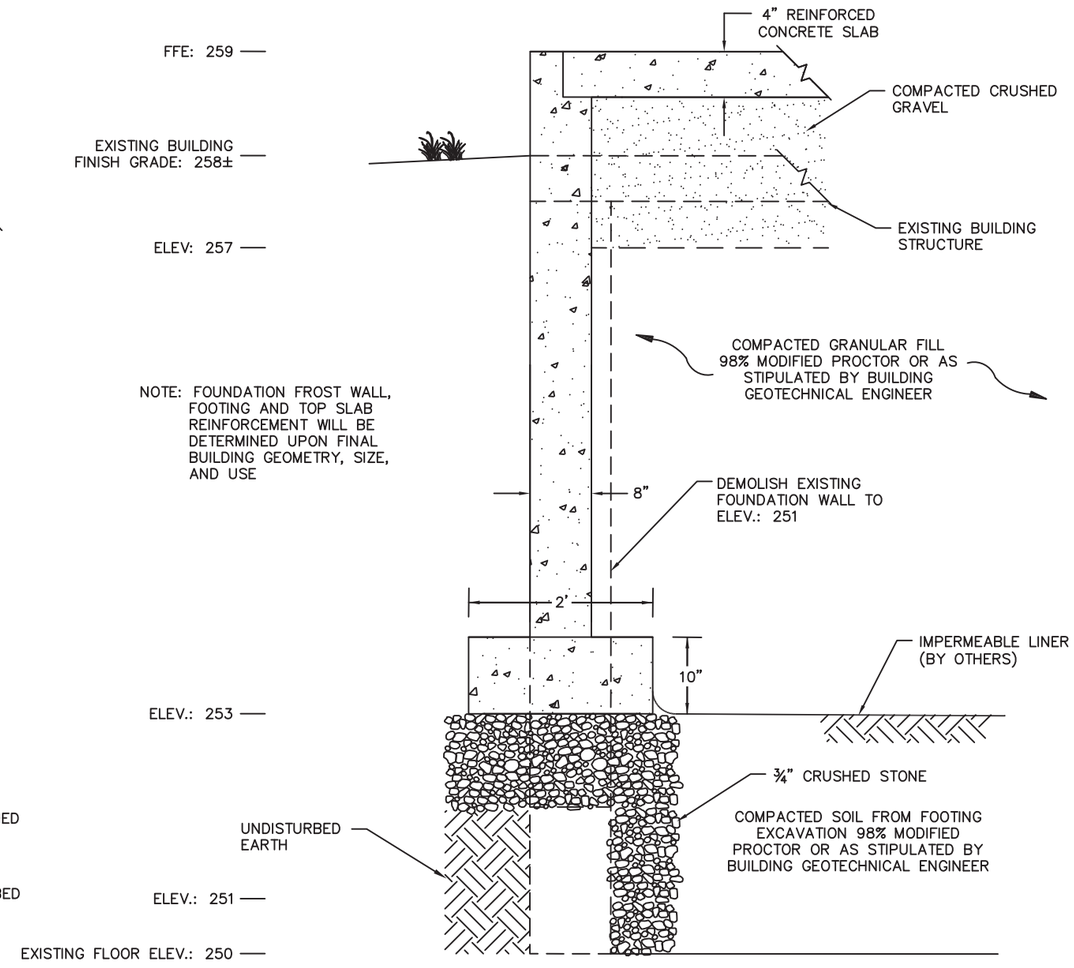
Figure 8

GENERAL NOTES

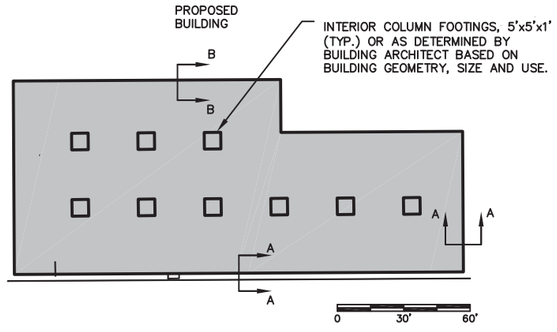
1. ASSUMED 100–YEAR FLOOD ELEVATION 260.5 MSL (FEMA MAP 5002C0506E).
2. THESE DETAILS ARE CONCEPTUAL ONLY AND ARE NOT TO BE USED AS FINAL BUILDING DESIGN OR CONSTRUCTION. FINAL BUILDING STRUCTURAL DETAILS WILL NEED TO BE DEVELOPED BASED ON ARCHITECTURAL BUILDING SIZE, USE, AND DESIGN.
3. CONCRETE WALL, FOOTING, AND SLAB REINFORCING SHALL BE DETERMINED ONCE BUILDING GEOMETRY, SIZE, AND USE ARE DETERMINED.



CONCEPTUAL BUILDING EXTERIOR WALL DETAIL B–B
N.T.S.



CONCEPTUAL BUILDING FOUNDATION WALL DETAIL A–A
N.T.S.



NOTES:
Conceptual design completed by Pathways Consulting LLC, Lebanon NH (February 2010)

New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

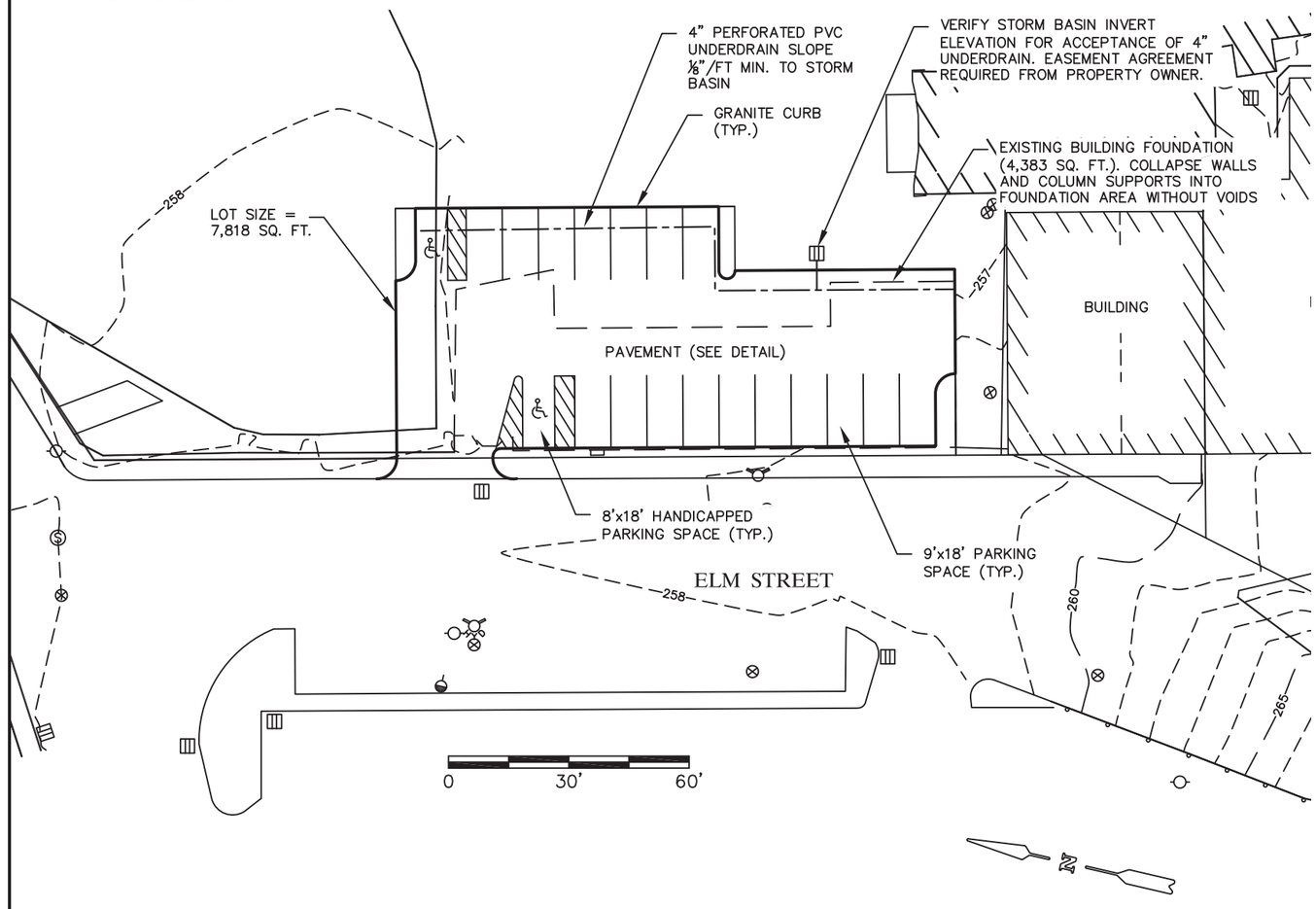
Conceptual Design: Structural Cap Option

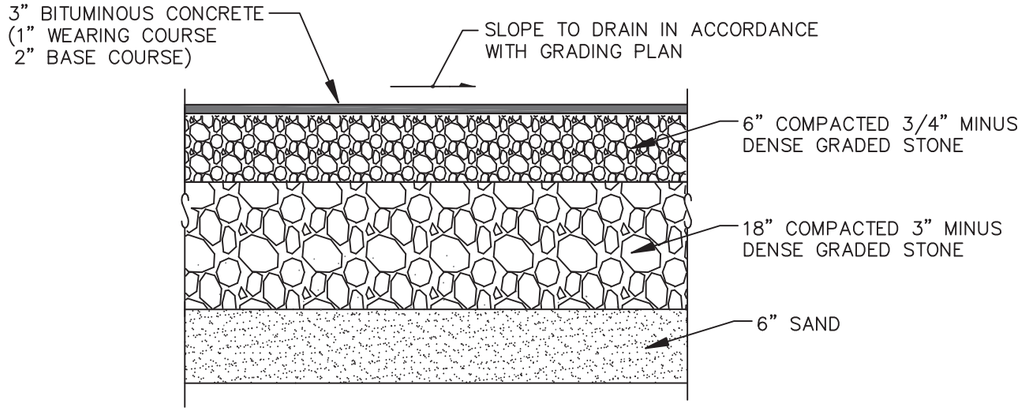
July 2010

Figure 9

CONSTRUCTION SEQUENCE

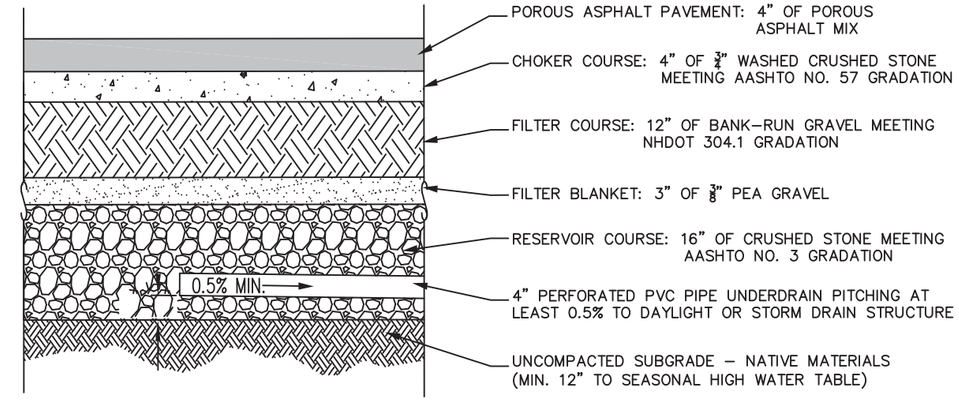
1. EXCAVATE EXISTING BITUMINOUS CONCRETE PAVEMENT AND DISPOSE OF IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS.
2. EXCAVATE TO POROUS ASPHALT PAVEMENT SUBGRADE, OR STANDARD BITUMINOUS CONCRETE PAVEMENT SUBGRADE. EXCAVATED FILL MATERIAL WILL BE USED AS COMMON FILL IN FOUNDATION AREA. COMPACT FILL IN 12" LIFTS WITH MECHANICAL VIBRATORY COMPACTOR TO 98% MODIFIED PROCTOR.





BITUMINOUS CONCRETE PAVEMENT SECTION

N.T.S.



POROUS ASPHALT PAVEMENT SECTION

N.T.S.

NOTES:
Conceptual design completed by Pathways Consulting LLC, Lebanon NH (February 2010)

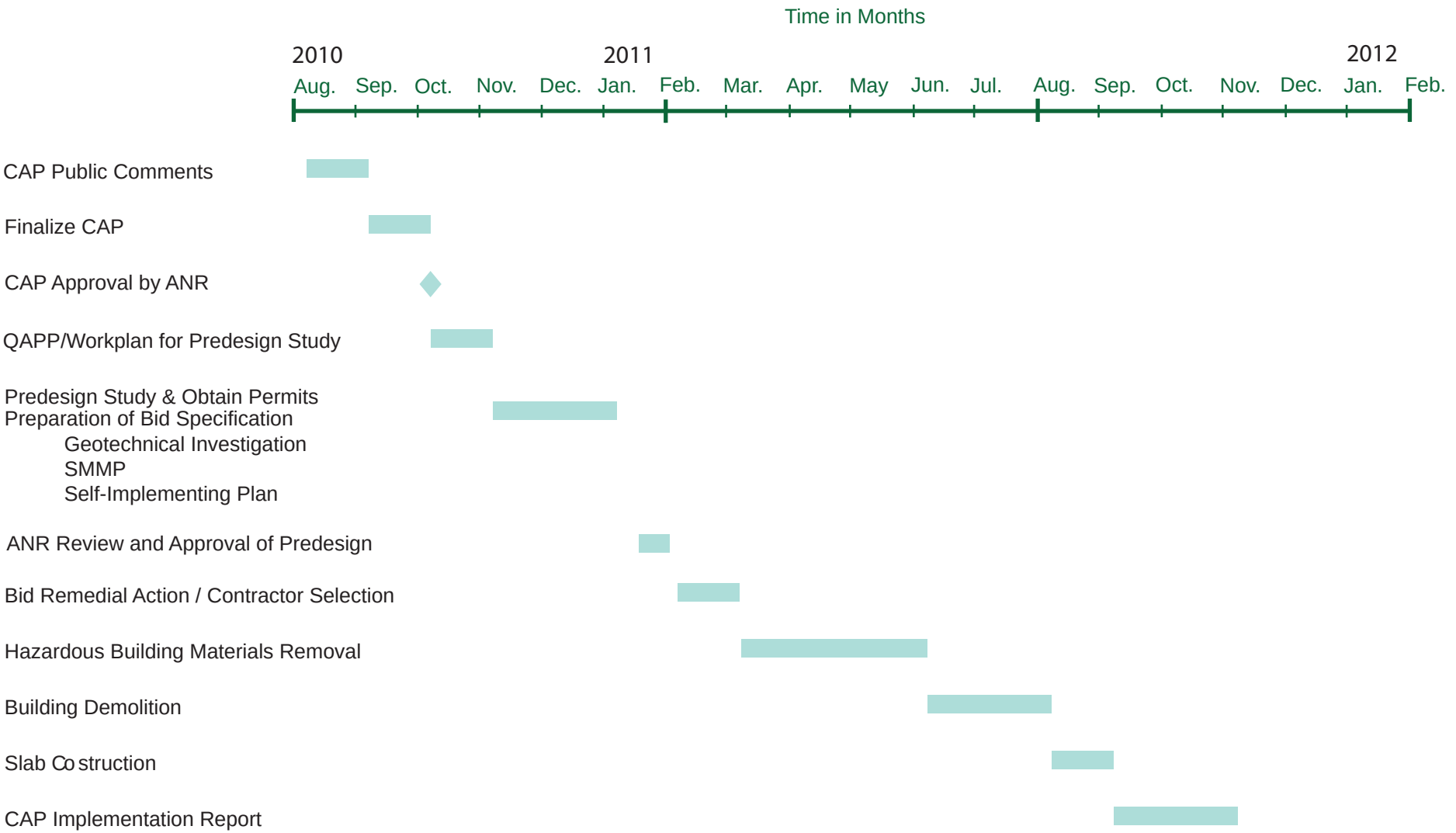
New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Conceptual Design: Paving Options

July 2010

Figure 10



New England ENVIROSTRATEGIES, INC.

ANALYSIS OF BROWNFIELDS CLEANUP
ALTERNATIVE/CORRECTIVE ACTION PLAN
64 ELM STREET BROWNFIELDS PROJECT
BRATTLEBORO, VERMONT

Project Schedule

July 2010

Figure 11

09011D_020810_jg

APPENDIX A

Executive Summaries of Previous Investigations

Phase I/Phase II Environmental Site Assessment
of
90 Flat Street
Brattleboro, Vermont

October 29, 1996

for

Mr. Joseph Pieciak
Elm Street Realty
P.O. Box 797
Brattleboro, VT 05302

by

ERD Environmental, Inc.
205 Main Street
Brattleboro, VT 05301

4. Risk Evaluation

4.1 Potential Sources

No significant soil contamination was detected by field screening during the installation of the soil borings. Minor amounts of o-chlorotoluene and tetrachloroethene were detected in the groundwater samples collected from the hydrologically downgradient wells, TS-5 and TS-6, respectively. The small quantity of contamination detected is likely the result of historical usage of the site by machine shops and industrial facilities and does not appear to be indicative of a major release. Based on the presence of minor amounts of barium in all of the samples submitted for analysis, it appears that the barium may have leached from the native soils.

4.2 Potential Receptors

The potential sensitive receptors of most immediate concern are the occupants of the site and properties that abut the site to the north and northeast. According to the town of Brattleboro records, there are no drinking water wells within one half mile of the site.

Whetstone Brook, located immediately to the south of the site, is the nearest sensitive environmental receptor. No evidence of seeps along the subject property adjacent to the brook were noted; however, due to the dense vegetation it was not possible to observe the entire bank.

5. Conclusions And Recommendations

Conclusions and recommendations of ERD Environmental, Inc. are based on the assumption that all information obtained during this site assessment is accurate. Conditions may change with time that may necessitate reevaluation of certain conclusions and recommendations made regarding the subject property.

5.1 Conclusions

Extensive oil staining was observed in the basement beneath machine shop #1 near the compressor and beneath the oil water separator. Oil globules and a slight sheen were observed in one of the sumps in the basement floor. The basement floor appears to be in good condition, but the sump presents a potential pathway for contaminant migration. However, no contaminants were detected in the downgradient monitoring wells TS-3 and

TS-4 at levels greater than applicable standards.

Containers of automobile maintenance fluids, waste oil, diesel fuel, hydraulic oil, and lubricants are stored throughout the site building. Staining was observed near several of the containers. No secondary containment was observed in any of the storage areas.

Two 1,000-gallon heating oil USTs are located on the site. No information was available from state or municipal records on the age of the USTs and no information on tightness testing of the USTs was discovered during this investigation.

Machine shops and light industrial facilities have been located on the site since at least 1885. However, no documentation of releases to the site was discovered during this investigation.

Suspected asbestos containing pipe insulation was observed near the furnace in the basement beneath machine shop #1. Numerous painted surfaces on the outside of the site buildings are cracked and peeling. Based on the age of these structures the paint may be lead-based.

Five monitoring wells were installed on the site on October 11, 1996. During installation of the borings, soil samples were collected at five foot intervals and screened with an OVM. No significant soil contamination was detected during installation of the soil borings. Groundwater samples were collected from the monitoring wells and submitted for laboratory analysis. Small quantities of o-chlorotoluene and tetrachloroethene, at levels below the PGQES, were detected in samples collected from two downgradient wells. Barium was reported in all of the samples at levels well below the PGQES.

The site and vicinity are served by municipal water and sewer systems. The nearest human receptors would be the occupants of the site. No drinking water wells are known to be located within a half-mile of the site. The nearest environmental receptor is Whetstone Brook which flows along the southeastern site boundary. The site is located within the 100-year floodplain.

5.2 Recommendations

Based on the findings of this investigation, ERD recommends the following:

- The oil observed in the basement of the site should be cleaned up with sorbents and properly disposed of. To prevent a recurrence of the spill, secondary containment should be installed around the drum receiving oil from the oil-water separator.

- No information on the age of the two 1,000-gallon fuel oil USTs was discovered during this investigation. However, based on the location of at least one of the tanks beneath the site building, the tank is expected to be at least fifteen years old. In order to prevent releases from occurring as the USTs age, the tank should be cleaned and closed in place. Once the tanks have been closed, the soil beneath and adjacent to the tanks should be screened to determine if any releases have occurred.

- The suspected asbestos pipe insulation should be tested and if asbestos is present it should be properly removed and disposed of.

- Secondary containment should be installed in the drum storage areas in order to minimize the potential of future releases adversely affecting the site soil and groundwater.

6. References

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Vermont Department of Environmental Conservation Pulled Underground Storage Tank list. September 27, 1996.

United States Geological Survey. Brattleboro, Vermont quadrangle. 1984.

E:\docs\960917\phase12.rep

ECS MARIN

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February 3, 2004
File: 04-201247.00
Document: Summaryreport.doc

Mr. Joseph Pieciak
Pieciak & Company, P.C.
10 Park Place
P.O. Box 797
Brattleboro, VT 05302

RE: Summary Report
Update of Phase I & II Env. Investigations
90 Flat Street
Brattleboro, VT

Dear Mr. Pieciak:

Environmental Compliance Services, Inc., dba ECSMarin has prepared this Summary Report with the findings from the updated Phase I and II environmental investigations conducted at the former Tri State Auto site (aka "subject site") located at 90 Flat Street, Brattleboro, VT. The proposal for this investigation was accepted by Mr. Joseph Pieciak on 12/03/03 and specifically includes the following scope of services:

Task 1. Update of Federal and State Records,
Task 2. Site Reconnaissance,
Task 3. Groundwater testing, and
Task 4. Report.

This Summary Report is made with specific reference to (and updated from) the "Phase I/Phase II Environmental Site Assessment of 90 Flat Street, Brattleboro, Vermont" report (aka "ERD Report") dated October 29, 1996 and completed by the former "ERD Environmental, Inc." for Mr. Joseph Pieciak of "Elm Street Realty". The ERD report is included as Appendix A.

1. Update of Federal and State Records

An Environmental FirstSearch™ computer database review of Federal and State records pertaining to hazardous material releases was performed on 12/24/03. The Environmental FirstSearch™ Report is included as Appendix B. Findings of the report are as follows:

On-Site

- The 90 Flat Street site has a RCRA Generator listed as "Tri State Automotive Svc." with the contact for the site being Peter Loring. The site is listed as a "Conditionally Exempt Small Quantity Generator: Generates less than 100 kg/month of hazardous waste."

Off-Site

- The nearest Leaking Underground Storage Tank site is the VFW at 15 Frost Street and located 0.09 miles southwest of the site.
- The nearest off-site RCRA Generator is 1st Advantage Dental at 80 Flat Street and located 0.10 miles northeast of the site.
- The nearest Registered Underground Storage Tank site is the Brattleboro central Fire Station at 103 Elliott Street and located 0.12 miles northeast of the site.

4. Conclusions and Recommendations

Conclusions

- Site conditions appear to have improved in general since the ERD Report in the fall of 1996. One building (Tri State Automotive Retail Sales Building) has been removed from the site as well as its corresponding furnace and #2 fuel oil UST.
- The furnace has been removed as well from Machine Shop #1. Also gone is the previously noted "overflowing 55-gallon drum." The UST which served the former furnace still remains, as well as the compressor and the sump near the former furnace. The concrete floor area around the perimeter of the compressor contains significant oil staining along with Speedi-Dri used to clean up the oil. The two (2) floor drains and one (1) of the sumps have been filled and are no longer operational. Two (2) 5-gallon buckets and a coffee can, which were noted in the area near the former furnace, contain what appears to be #2 heating oil.
- The Truck Bays building now has its one (1) floor drain sealed. Twelve (12) 55-gallon drums are housed within the Truck Bays area and are awaiting disposal via Safety-Kleen.
- Machine Shop #2 does not have any waste oil drums, antifreeze drums, or any other waste stored in its confines.
- The "wooden shed" has been removed from the site. The "three-sided metal shed" remains at the site and houses miscellaneous equipment.
- A total of twenty-six (26) sites were noted as being located within 1,000 feet of the subject property. Based on a review of these sites listed in the Environmental FirstSearch™ Report, it appears that none of the sites currently have or formerly had an impact on environmental conditions at the subject site.
- Only two (2) monitoring wells (TS-4 and TS-5) could be located at the site.
- Groundwater flow (in a northeast direction) appears to be the same as it was during the ERD gauging conducted on October 11, 1996.
- In the groundwater sampling conducted at the site on January 9, 2004, no VOCs or TPH were detected in the groundwater samples from either TS-4 or TS-5. The only metal detected was barium, at background levels
- The contaminant o-chlorotoluene, which was found in TS-5 when sampled on October 11, 1996, was not found during the sampling conducted on January 9, 2004.

Recommendations

Based on the findings of this investigation, ECSMarin recommends the following:

- The #2 fuel oil UST located off the northwest corner of Machine Shop #1 should be removed from the ground along with its associated piping. This UST serviced the former furnace located in the basement of this building. This furnace has been removed so that now the UST is no longer in use and by regulation must be removed. It is unknown whether the UST contains any

product at this time since elbows in the fill and vent piping prevent its direct access and measurement. When the UST is removed, the removal should be supervised by an environmental consultant and the ground subsurface soil inspected and analyzed for possible contamination. A subsequent UST Closure Report should be prepared documenting the UST closure procedure and findings. The closure report would be sent to the Vermont Department of Environmental Conservation so that the UST removal is documented and recorded.

- The air compressor has significant oil staining around its perimeter. This area should have a secondary mode of preventing the spread of contamination. The Speedi-Dri allows for quick clean-up of the contamination after the fact, but a bermed perimeter around the compressor would aid in limiting the spread of the contamination to other areas of the floor.
- The twelve (12) 55-gallon drums, housed within the Truck Bays building, should be disposed of by Safety-Kleen.
- The two (2) 5-gallon buckets and the coffee can, which are located in the area near the former furnace and contain #2 fuel oil, should be containerized properly for oil re-use or disposal.

If you have any questions or require any additional information, please contact the undersigned.

Sincerely
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

Bruce Tease, Ph.D, NHPG, LSP #4275
Branch Manager/Senior Environmental Scientist

Attachments

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August 25, 2006
File No. 04-203995
Document: USTClosure.rep

Ms. Susan Thayer
Waste Management Division
Vermont Department of Environmental Conservation
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

RE: UST Closure Report, Former Tri State Automotive (New England Youth Theater), 45 Elm Street, Brattleboro, VT

Dear Ms. Thayer:

On June 29, 2006, Bernie LaRock & Sons Inc. (LaRock) of Guilford, Vermont excavated two 1,000 gallon abandon #2 heating oil underground storage tanks (USTs) at the above referenced location (see enclosed topographical map). The USTs were located in an alleyway between two building (see site diagram). Environmental Compliance Services, Inc. (ECS) personnel perform field screening of the tank grave soils for Volatile Organic Compounds (VOCs). The Vermont Department of Environmental Conservation (VTDEC) UST permanent closure forms and photographic documentation of the UST closures is attached to this report.

FINDINGS

The findings of this assessment are summarized as follows:

- The USTs were found to be in good condition upon removal. No piping was observed in the excavation to be associated with the abandon USTs, which had been filled with sand. It should be noted a non-regulated 1,000 gallon heating oil tank was closed-in-place on the northend of the building on July 12, 2006.

- Photoionization detector (PID) headspace readings taken of soils in the tank graves did not indicate any levels of VOCs above 0.0 parts per million by volume (ppmv) for the excavation. As no soil contamination was detected confirmatory soil samples were not collected for laboratory analysis.

- Soils in the immediate vicinity of the former USTs consisted of dry brown coarse to medium-grained sands.

- Sand fill with in the tanks had an odor of paint thinner or lacquer. The ends of the USTs were cut open and the sand fill was polyencapsulated onsite. A sample of the sand fill was submitted to Spectrum Analytical of Agawam, Massachusetts for soil disposal analysis. Laboratory results are attached. After approval was granted by Andrew Shively of the VTDEC, the 22.86 tons of sand was transported to Environmental Soils Management Inc. of Loudon, NH for disposal on July 21, 2006.

- The site is serviced by public water and sewer systems.

- The cleaned tanks were disposed of at WTE Recycling Inc. of Greenfield, MA.

RECOMMENDATIONS

Based on the results of the UST removals and field screening, ECS believes that no further action is warranted at the site. Should you have any questions, please feel free to contact me at 1-802-257-1195.

Sincerely,
ENVIRONMENTAL COMPLIANCE SERVICES, INC.

David Balk, P.G., R.S.
Senior Project Manager

Enclosures

cc: Richard Barron, contact for New England Youth Theater

PHASE I
ENVIRONMENTAL SITE ASSESSMENT REPORT

64 Elm Street
Brattleboro, Vermont

Date

July 7, 2008

Prepared for:

Windham Regional Commission
Brattleboro, Vermont

Prepared by:

KAS INC
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1.0 EXECUTIVE SUMMARY

The property located at 64 Elm Street in Brattleboro Vermont has been used for various industrial manufacturing and equipment maintenance operations since the late 1880's. The prospective purchaser, Fulcrum Arts, intends to use this building for artistic endeavors such as an art studio, glass blowing and a possible café.

The building was originally part of a tissue manufacturing company and was later occupied for decades by C.E. Bradley Company where various formulations of paint were produced. The building was most recently used for truck maintenance and a machine shop for repairing engines and truck components.

Lumber production and storage occurred around this facility and continues today to the west of the property as Brattleboro Kiln Dry. Some of the original structures attached to this building were torn down over the recent past, most recently in 2006 when the present owners, New England Youth Theater, purchased the property and surrounding lots and renovated an adjacent building into a performing arts center. 64 Elm Street is currently used to store materials and props for the Theater.

Environmental issues have occurred as a result of the past uses; most notably the engine repair and machining that took place in the 1990's. This left the wooden floors of the building coated with what appears to be a petroleum product that could be of a high enough concentration to render the wood as a hazardous material. The contaminated flooring constitutes a Recognized Environmental Condition.

In addition to the flooring, there is ample evidence of paint that has run down walls and pillars through the first floor into the basement that is also questionable material based on an assumed high lead or other heavy metal content typical of paints from the era of manufacturing. The components of paint manufacturing (i.e. toluene, xylene, ethyl acetate, etc.) may also have been released inside the building. The paint present on the walls and pillars constitute a Recognized Environmental Condition.

Based on the investigation of the property at 64 Elm Street in Brattleboro, a Phase Two Investigation should take place to determine if the property and environment has been impacted by the past practices occurring in and outside of the building.

2.0 INTRODUCTION

KAS of Williston Vermont in association with **GCM** Environmental, LLC, of Ascutney, Vermont (**GCM**) conducted a Phase I Environmental Site Assessment (ESA) of land and premises at 64 Elm Street in Brattleboro, Vermont (**PROPERTY**; see Appendix Site Location Map and Site Plan). The ESA was conducted pursuant to the American Society of Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments: Phase I*

BROWNFIELDS
PHASE II ENVIRONMENTAL
SITE ASSESSMENT

64 ELM STREET
BRATTLEBORO, VERMONT
SMS # 2008-3834

KAS# 505080133

May 2009

Prepared for
Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, Vermont 05301

Prepared by

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EXECUTIVE SUMMARY

This report summarizes the results of the Brownfields Phase II Environmental Site Assessment (ESA) conducted from September 2008 through March 2009 at the 64 Elm Street Site (Site), in Brattleboro, Vermont. Investigative work was conducted for the Windham Regional Commission (WRC) according to KAS' Generic Quality Assurance Project Plan (RFA07264), KAS' Quality Assurance Project Plan Addendum #1 dated August 12, 2008, KAS' Quality Assurance Project Plan Addendum #3-2 dated January 7, 2009, and KAS' Quality Assurance Project Plan Addendum #3-3 dated January 12, 2009. This report represents the compilation of three separate investigations, which were performed simultaneously to expedite the development of the property. Conclusions presented in this assessment are based on the premise that the Site will be redeveloped as an artist studio requiring residential property consideration. The property boundaries used for this investigation are included in the attached Site Map. The prospective purchaser informed KAS of an expanded property boundary in April 2009, and a completed survey was provided to KAS in May 2009, which was after this investigation was completed.

The essential interior building findings of this study are as follows:

- The masonry walls contain concentrations of PCBs and TPH. PCB concentrations in the walls of the "newer" portion of the building imply the walls are considered hazardous waste. PCB concentrations in the walls of the "older" portion of the building are greater than the TSCA screening standard but lower than hazardous waste thresholds.
- The wooden floors contain concentrations of PCBs and TPH in excess of regulatory hazardous waste thresholds.
- The concrete floor in the basement contains concentrations of PCBs in excess of TSCA screening standards.
- Floor joists contain PCB concentrations in excess of TSCA screening standards. The floor joists also contain concentrations of TPH above the Vermont hazardous waste threshold.
- The sediment in the basement sumps contains PCB concentrations greater than hazardous waste thresholds. The sump sediment also contains concentrations of PAHs, TPH, and metals in excess of regulatory standards.
- Window caulking contains PCBs concentrations greater than TSCA screening standards but below the hazardous waste threshold.
- Window casings contain PCB concentrations greater than TSCA screening standards but below the hazardous waste threshold.
- Paint globs that were spilled from the first floor and dripped down to the basement contained PCBs in excess of TSCA screening standards but less than hazardous waste thresholds.
- Indoor air quality sampling revealed that none of the reported concentrations exceeded either the VTDOH median concentrations or the NIOSH guidance levels.
- Lead paint screening indicated the presence of lead in all of the paint in the building.
- The asbestos inspection determined that the caulking in the old portion of the building, floor tiles, and the associated mastic were asbestos containing materials. In addition, the roof has to be assumed to be asbestos containing until it is tested and found to be asbestos free.

The essential exterior findings of this study are as follows:

- Concentrations of PCB, PAH, arsenic, and TPH in excess of regulatory standards but less than hazardous waste standards were detected in shallow and deep soil the vicinity of the current on-site building.

- Groundwater flow was determined to flow to northwest at an approximately average hydraulic gradient of approximately 0.8-0.9%. The depth to groundwater ranged from 8.5 to 9.8 feet below existing grade.
- Groundwater in the vicinity of the site contains concentration of VOCs and metals lower than the VGES. PCBs were detected in some of the groundwater samples collected at the Site. However, follow-up sampling revealed that these concentrations were due to sediment in the samples.

Recommendations

- A Corrective Action Plan should be prepared after additional groundwater sampling, shallow soil sampling, and masonry wall profiling is conducted. More investigation has been requested by the VTDEC and the EPA needed before final remediation recommendations can be provided in regards to PCB concentrations in shallow soil, masonry walls, and groundwater sampling. The change in property boundaries also added the need to obtain additional soil data.
- A soil cap or soil excavation along with a deed restriction will be needed for the exterior portion of the property.
- Wooden floors, the masonry walls in the "newer" portion of the building, and sump sediment should be disposed of as hazardous waste. Window caulking in the "newer" portion of the building should be disposed of as PCB contaminated waste.
- Window caulking in the older building will need to be removed as asbestos waste if it is disturbed. If it is not disturbed the caulking will need to be sealed with epoxy and paint, and a deed restriction must be filed due to the presence of PCBs in the caulking.
- A concrete cap will need to be poured over the basement floors and walls, and some concrete will need to be cut and removed. This may require flood plan engineering considerations in the Corrective Action Plan.
- The paint globs in the basement will need to be scraped/sprayed drummed, and disposed of as contaminated waste
- Floor joists should be sealed with epoxy and paint, and a deed restriction must be filed. Alternatively, the floor joists can be removed and replaced with clean wood.
- The window casings should be replaced and the older window casings should be disposed of as PCB contaminated waste.
- Based on the architectural plans for the prospective redevelopment of the property, the proposed propane underground storage tank excavation should be examined and tested for contamination.
- The location of proposed utilities should be examined for soil contamination and incorporated in the Corrective Action Plan.
- The proposed installation of an elevator and new footings for the on-site building should be incorporated in the Corrective Action Plan.
- Dewatering during redevelopment may be needed due to the fairly shallow groundwater table. Considerations for dewatering should be incorporated into the Corrective Action Plan.

BROWNFIELDS
SUPPLEMENTAL PHASE II
ENVIRONMENTAL
SITE ASSESSMENT

FORMER TRI-STATE AUTO PARTS
64 ELM STREET
BRATTLEBORO, VERMONT
SMS # 2008-3834

KAS# 505080133

October 2009

Prepared for
Windham Regional Commission
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Prepared by

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EXECUTIVE SUMMARY

This report summarizes the results of a Brownfields Supplemental Phase II Environmental Site Assessment (ESA) conducted at the Former Tri-State Auto Parts Site (Site), located at 64 Elm Street in Brattleboro, Vermont. Investigative work was conducted for the Windham Regional Commission (WRC) according to KAS' Generic Quality Assurance Project Plan (RFA07264), and KAS' Addendum #3-4 dated August 17, 2009. Conclusions presented in this assessment are based on the premise that the Site will be redeveloped as an artist studio requiring residential property consideration.

Masonry Wall Profiling Samples Sandblasting

A portion of the masonry walls on the first and second floor of the on-site building were sandblasted to remove paint. The paint was believed to be a possible source of PCBs, and it is known to contain lead. After the paint was removed, masonry samples were obtained from the brick at the following intervals; from 0-1/8", 1/8"-1/4", and 1/4"-1/2" below the surface of the wall. The masonry wall profile samples obtained on September 10, 2009 were analyzed for the presence of PCBs via EPA method 8082.

Concentrations of PCBs were detected in four out of the six masonry samples. The highest concentration observed was 0.4 parts per million (ppm), which is below the TSCA standard of 1 ppm. The surface samples (0-1/8") had the highest concentrations of PCBs, and the concentrations decreased with depth. All of the reported PCB concentrations were lower than previously reported concentrations where the paint was not removed prior to sampling.

Masonry Wall Sampling in Basement

The on-site basement is slated to be used for storage in the redevelopment of the on-site building. Previous masonry samples have contained concentrations of PCBs, and one area of the wall contained concentrations in excess of 10 ppm. Additional masonry wall samples were obtained every five feet to delineate the PCB contamination. The masonry wall samples obtained on September 10, 2009 were analyzed for the presence of PCBs via EPA method 8082.

Each of the basement masonry wall samples contained concentrations of PCB. Three of the masonry samples contained PCB concentrations in excess of 10 ppm, and one sample contained a PCB concentration in excess of 50 ppm.

Additional Soil Sampling

KAS advanced soil borings around the exterior of the on-site building. Soils encountered during advancement of soil borings consisted of silty sand with varying amounts of gravel. One shallow sample was obtained from each boring from the 0-0.5 foot below grade (bg) horizon, and two deep soil samples were obtained from the soil/groundwater interface at the 6-7 feet bg horizon. Soil samples were submitted for laboratory analysis of PCBs via EPA Method 8082.

PCBs were detected in four out of fifteen shallow soil samples. Each of these PCB concentrations were above the Vermont Department of Health Soil Screening Levels. One of the soil samples, SS-12, contained PCB concentrations above the TSCA threshold of 1 ppm but below 10 ppm. Three of the soil samples, SS-15, SS-19, and SS-26 contained PCB concentrations above detection limits but below 1 ppm.

PCBs were detected in each of the two deeper soil samples. Each of these PCB concentrations were above the Vermont Department of Health Soil Screening Levels. Soil sample SS-14 contained PCB concentrations less than 1 ppm, while soil sample SS-18 contained PCB concentrations greater than 10 ppm but less than 50 ppm.

Groundwater Sampling

Groundwater samples were collected from monitoring wells monitoring wells MW08-1 through MW08-6. The groundwater samples were analyzed for the presence of PCBs via EPA Method 8082. No concentrations of PCBs above laboratory detection limits were reported in the groundwater samples obtained on September 30, 2009.

Recommendations

- A Corrective Action Plan is being prepared for this Site in conjunction with Site redevelopment.

- Since the Site is being redeveloped as an artist studio with live/work space, soil excavation and installation of a soil cap along with mitigation of hazardous building materials will be appropriate remediation measures for the Site. Monitoring wells will be abandoned during redevelopment and a land use restriction will be recorded following cleanup of the property.

- Personnel working in this area during cleanup must be educated on the presence of contamination, including the presence of asbestos and lead paint. Proper management practices should be in place prior to redevelopment.

CORRECTIVE ACTION PLAN
FORMER TRI-STATE AUTO PARTS
64 ELM STREET
BRATTLEBORO, VERMONT
(VTDEC Site #2008-3834)

November 20, 2009

Prepared for:
Windham Regional Commission
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Contact: Ms. Susan McMahon
(802) 257-4547

Responsible Party:
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KAS Project #505080133

EXECUTIVE SUMMARY

This Corrective Action Plan (CAP) addresses human health risk and contaminant migration issues posed by subsurface and building material contamination reported at the Former Tri-State Auto Parts Site, located at 64 Elm Street in the Town of Brattleboro, Vermont ("corrective action area"). This CAP contains a summary of the results of environmental testing and risk assessment in the corrective action area, and also contains qualitative technical and cost analyses of potentially applicable technologies to address the estimated human health risk posed by the contamination. Based on the qualitative technical and cost analyses, two remedial options are specified and a design is presented.

The corrective action area was extensively studied for environmental impacts in 2008 and 2009. A summary of the environmental studies performed during that time is included in this CAP. The building materials (masonry walls, paint, wooden floors, floor joists, windows, window caulking, and concrete floors) are considered contaminated and/or hazardous materials due to the concentrations of polychlorinated biphenyls (PCBs) and total petroleum hydrocarbons (TPH) and site users are at risk of exposure. Generally, soils beneath the corrective action area are contaminated with arsenic, TPH, PCBs, and polycyclic aromatic hydrocarbons (PAHs). These materials are close to the ground surface in some areas and inadvertent human exposure could result from excavation.

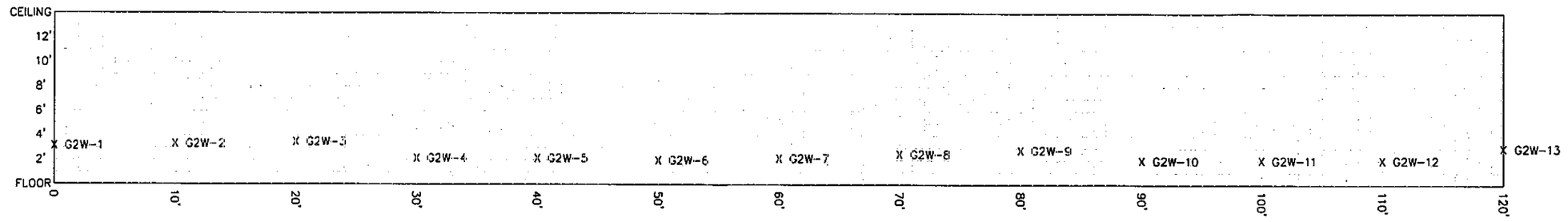
One remedial option reviewed in this CAP is restoring the current on-Site building for redevelopment by removing contaminated and hazardous materials. The second remedial option reviewed in this CAP involves demolishing the on-Site building. Both of these options include the installation of a soil cap with a minimum 12" thickness to isolate the contaminated soils, and the implementation of a deed restriction to limit the property uses in the vicinity of contaminated areas. These remedial options would isolate or remove contaminated materials from the subject property and mitigate the risks from direct human exposure.

The current redevelopment plan for the subject property involves the creation of a high occupancy artist studio and retail shop in the on-Site building. Soil and building disturbances will take place during redevelopment as a result of the construction.

APPENDIX B

Building Material Analytical Summary

S N



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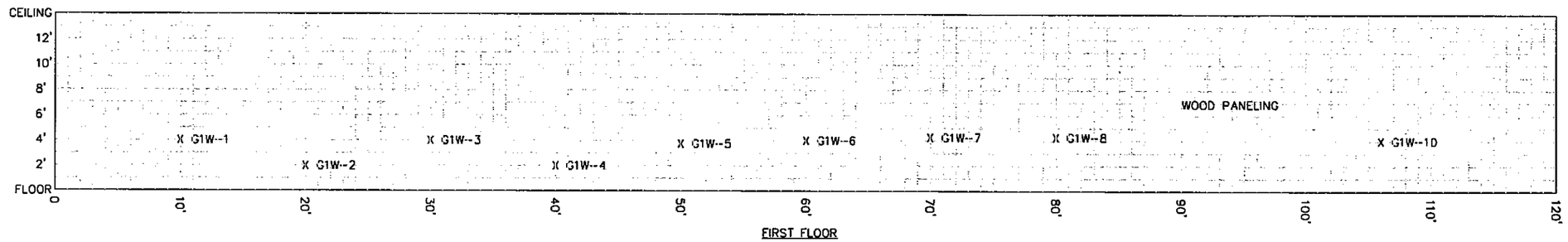
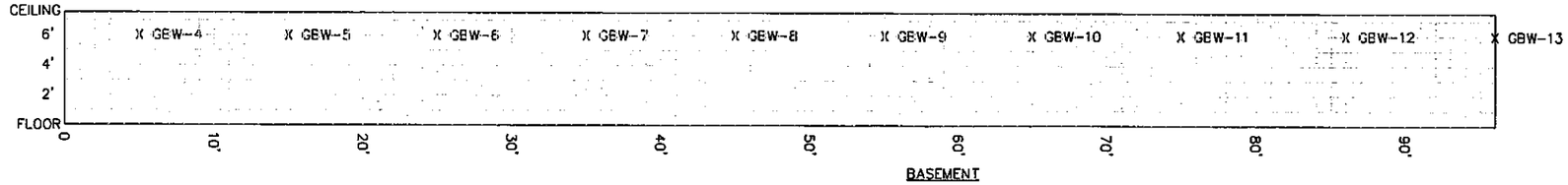


FIRST FLOOR



BASEMENT

WEST WALL

ESPC #: 20084264
KAS #: 505080133

KAS

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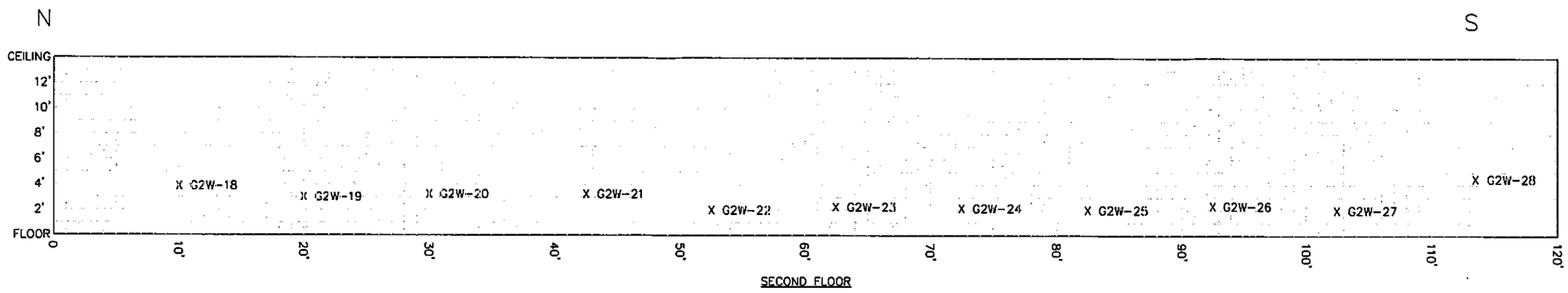
FORMER TRI-STATE AUTO PARTS

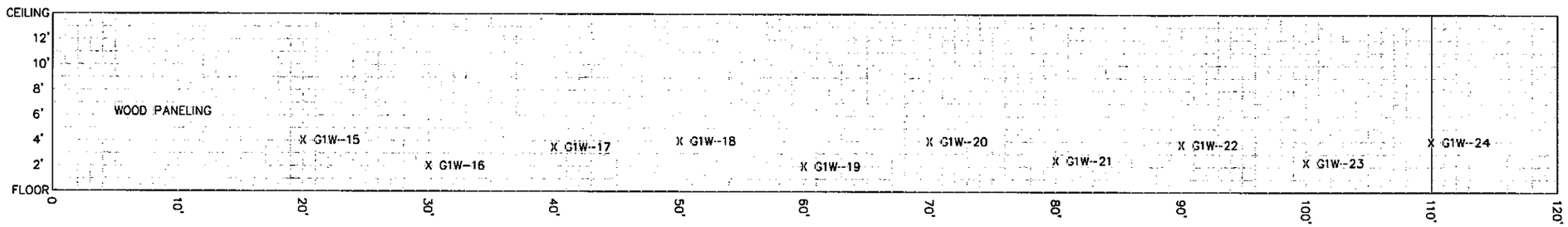
64 ELM STREET
BRATTLEBORO, VERMONT

WEST WALL GRAB SAMPLE LOCATION

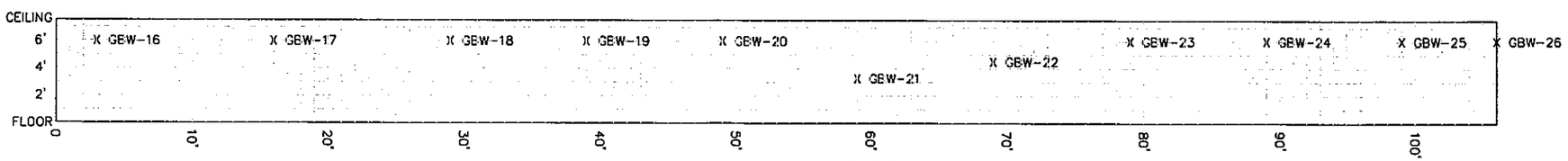
DATE: 12/3/08	DWG #: W1	SCALE: 1"=10'	DRN.: DM	APP.: AE



SECOND FLOOR



FIRST FLOOR



BASEMENT
EAST WALL

ESPC #: 20084264
KAS #: 505080133

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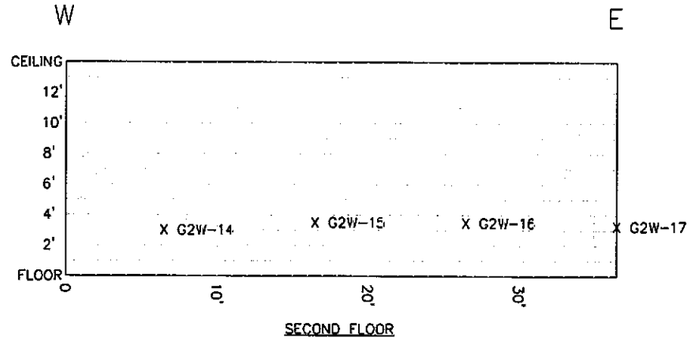
FORMER TRI-STATE AUTO PARTS

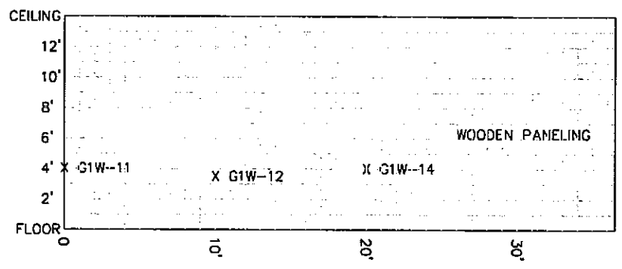
64 ELM STREET
BRATTLEBORO, VERMONT

EAST WALL GRAB SAMPLE LOCATION

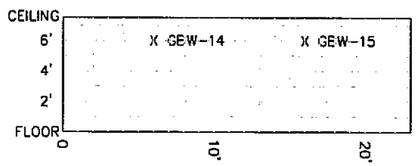
DATE: 12/3/08	DWG #: W2	SCALE: 1"=10'	DRN.: DM	APP.: AE



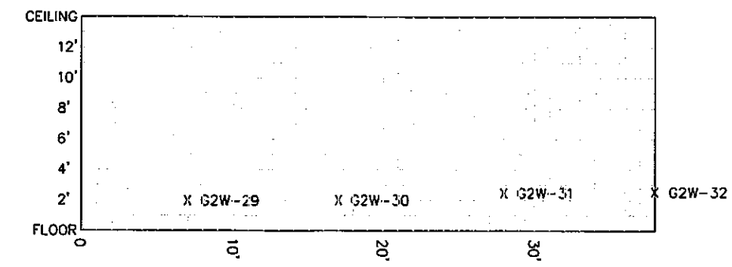
SECOND FLOOR



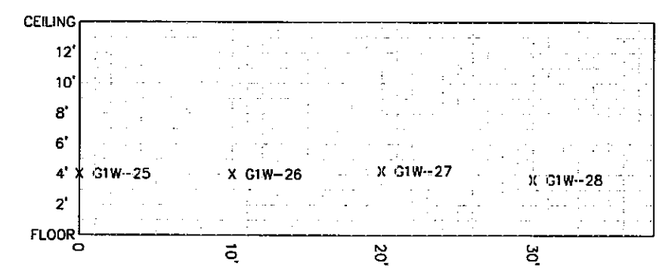
FIRST FLOOR



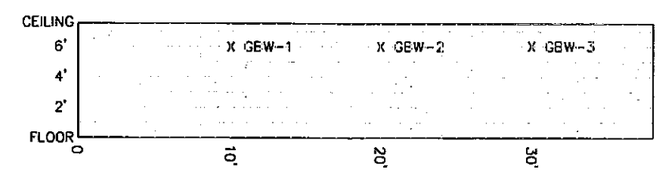
BASEMENT
NORTH WALL



SECOND FLOOR



FIRST FLOOR



BASEMENT
SOUTH WALL

ESPC #: 20084264
KAS #: 505080133

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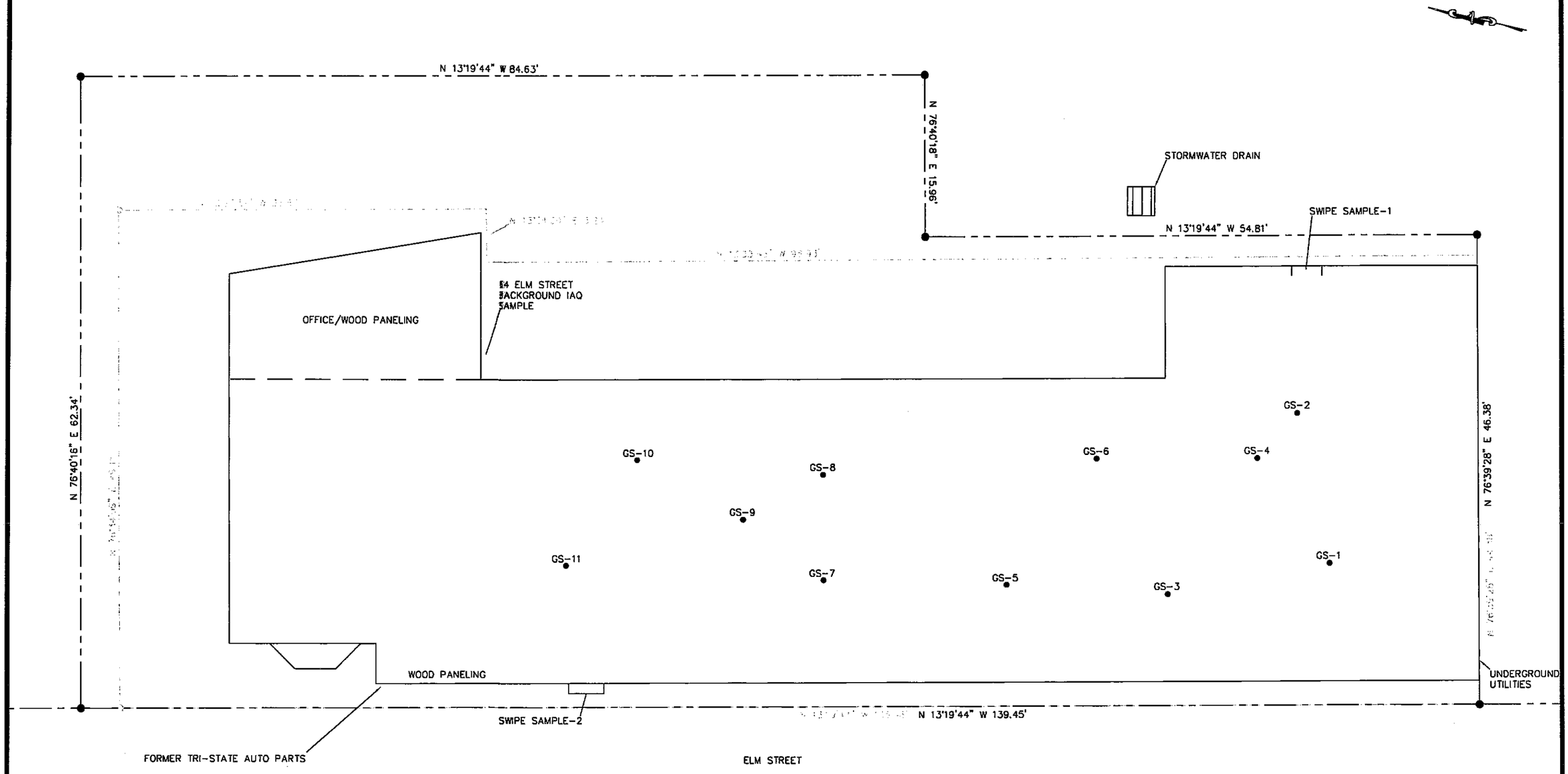
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

NORTH/SOUTH WALL GRAB SAMPLE LOCATION

DATE: 12/3/08	DWG #: W1	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

GS-3 GRAB WOOD FLOOR SAMPLE LOCATION

PROPERTY LINE

ESPC #: 20084264
KAS #: 505080133

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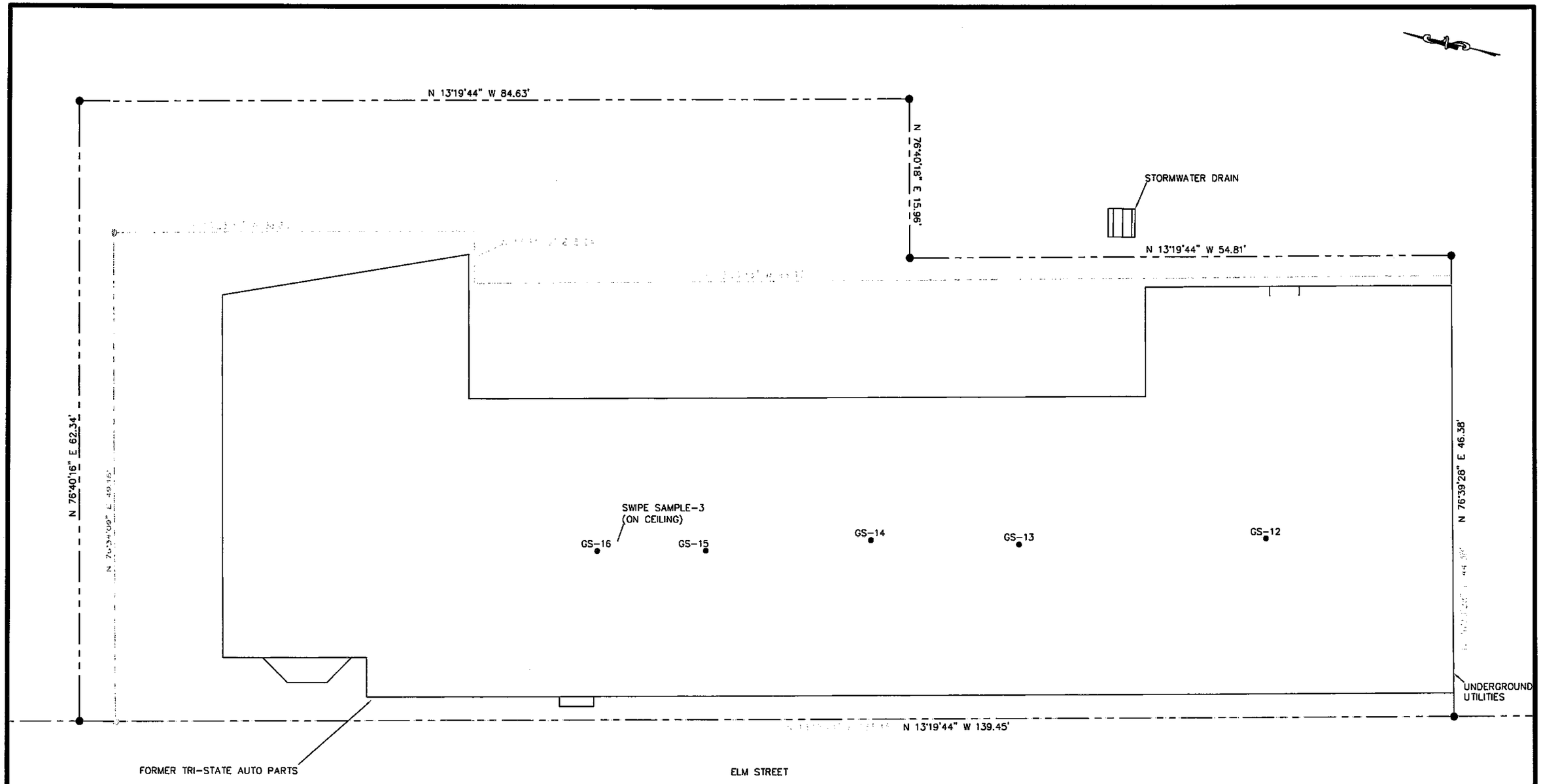
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

FIRST FLOOR SWIPE/GRAB WOOD FLOOR SAMPLE LOCATIONS SAMPLED: 9/17/08

DATE: 12/3/08	DWG #: 3	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

GS-3 GRAB WOOD FLOOR SAMPLE LOCATION

ESPC #: 20084264
KAS #: 505080133

KAS

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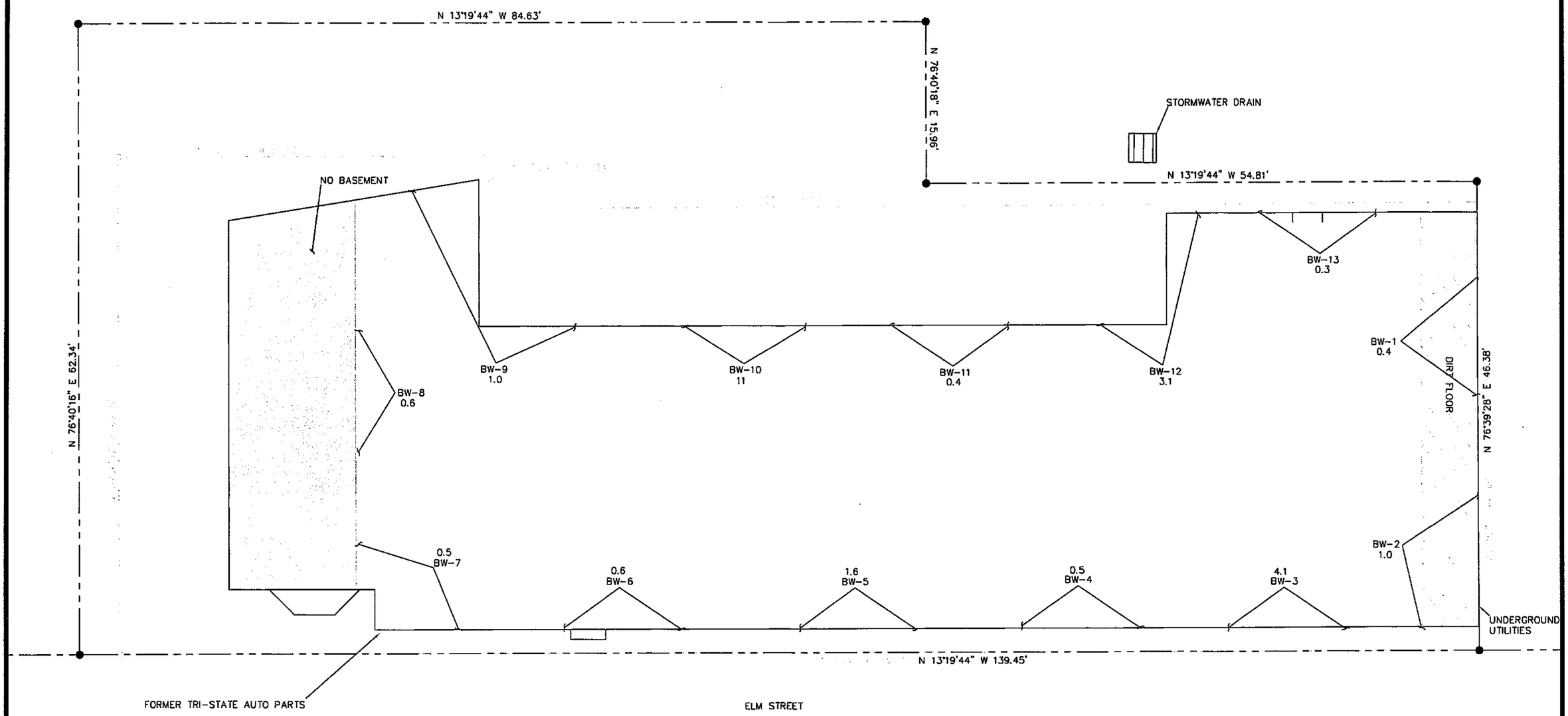
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

SECOND FLOOR SWIPE/GRAB WOOD FLOOR SAMPLE LOCATIONS

DATE: 12/3/08	DWG #: 4	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

MW08-6 — MONITORING WELL

——— FORMER PROPERTY LINE

— — — PROPERTY LINE (PER SUBDIVSION PLAN BY ERIC M. MORSE, LAND SURVEYOR DATED 8/9/2007)

0.6 BW-6 — COMPOSITE WALL SAMPLE LOCATION WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

ESPC #: 20084264
KAS #: 505080133

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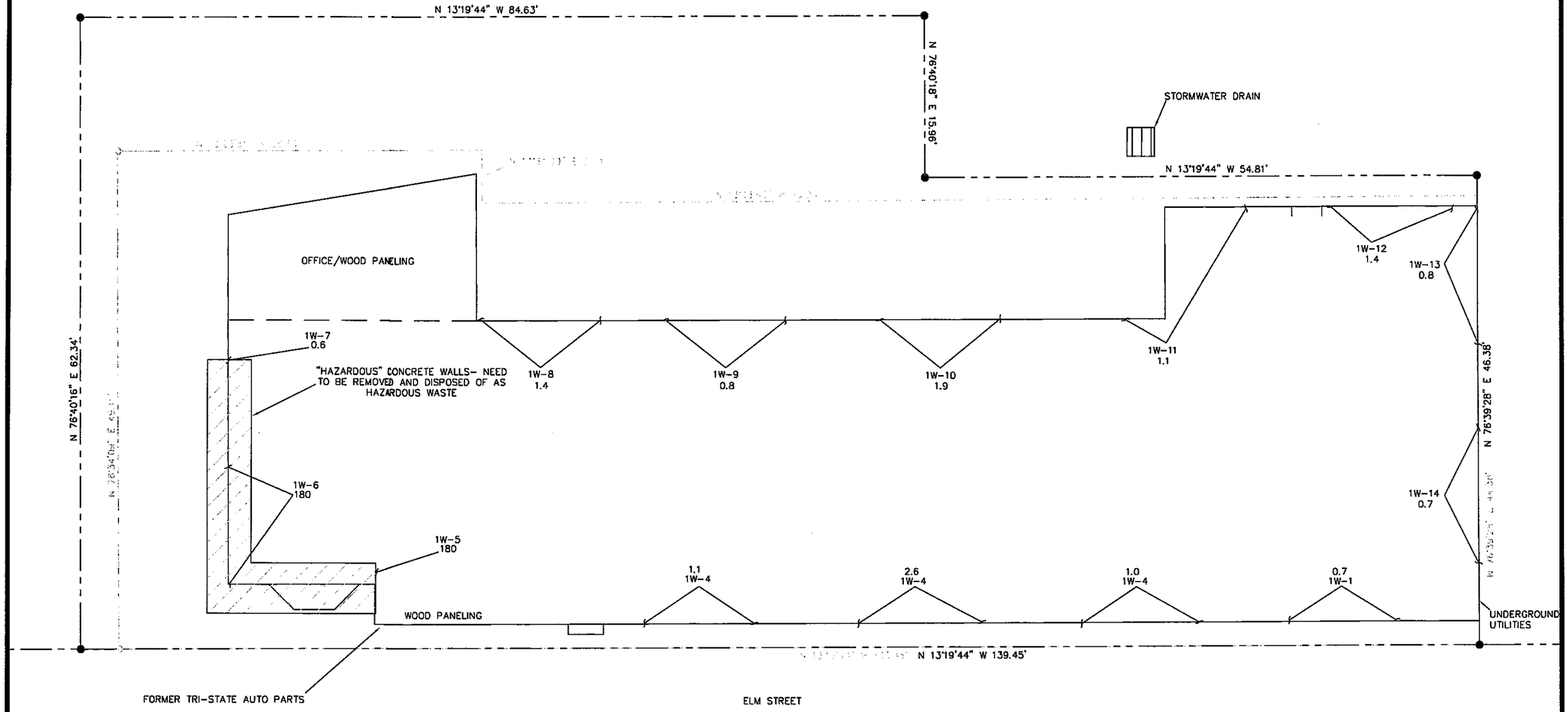
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

BASEMENT WALL PCB CONTAMINANT CONCENTRATION MAP
SAMPLED: 2/3/09 AND 2/11/09

DATE: 12/3/08	DWG #: 5	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

2.6 1W-3 COMPOSITE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm)

ESPC #: 20084264
KAS #: 505080133

KAS

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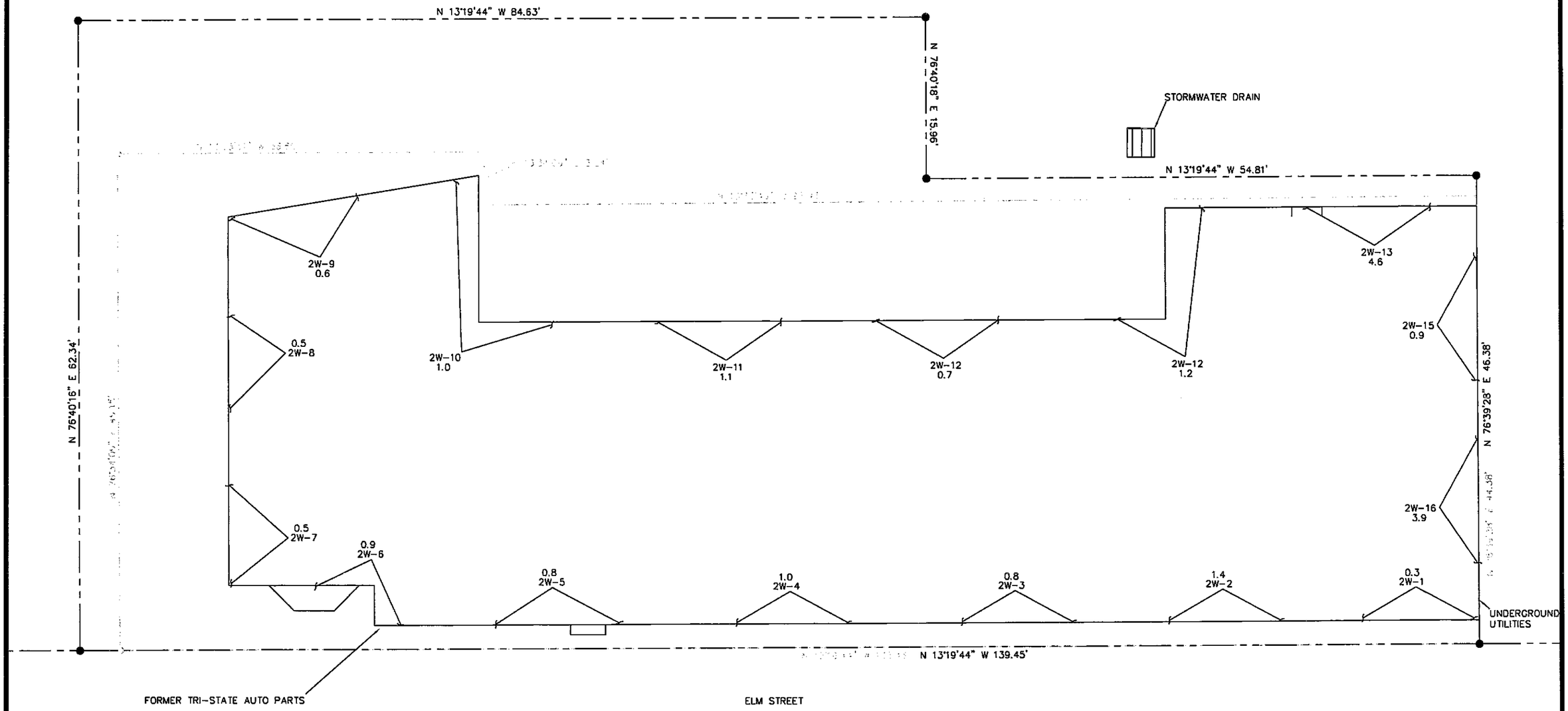
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

FIRST FLOOR WALL PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/4/09

DATE: 5/21/09	DWG #: 3	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

0.8 2W-3 COMPOSITE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

ESPC #: 20084264
KAS #: 505080133

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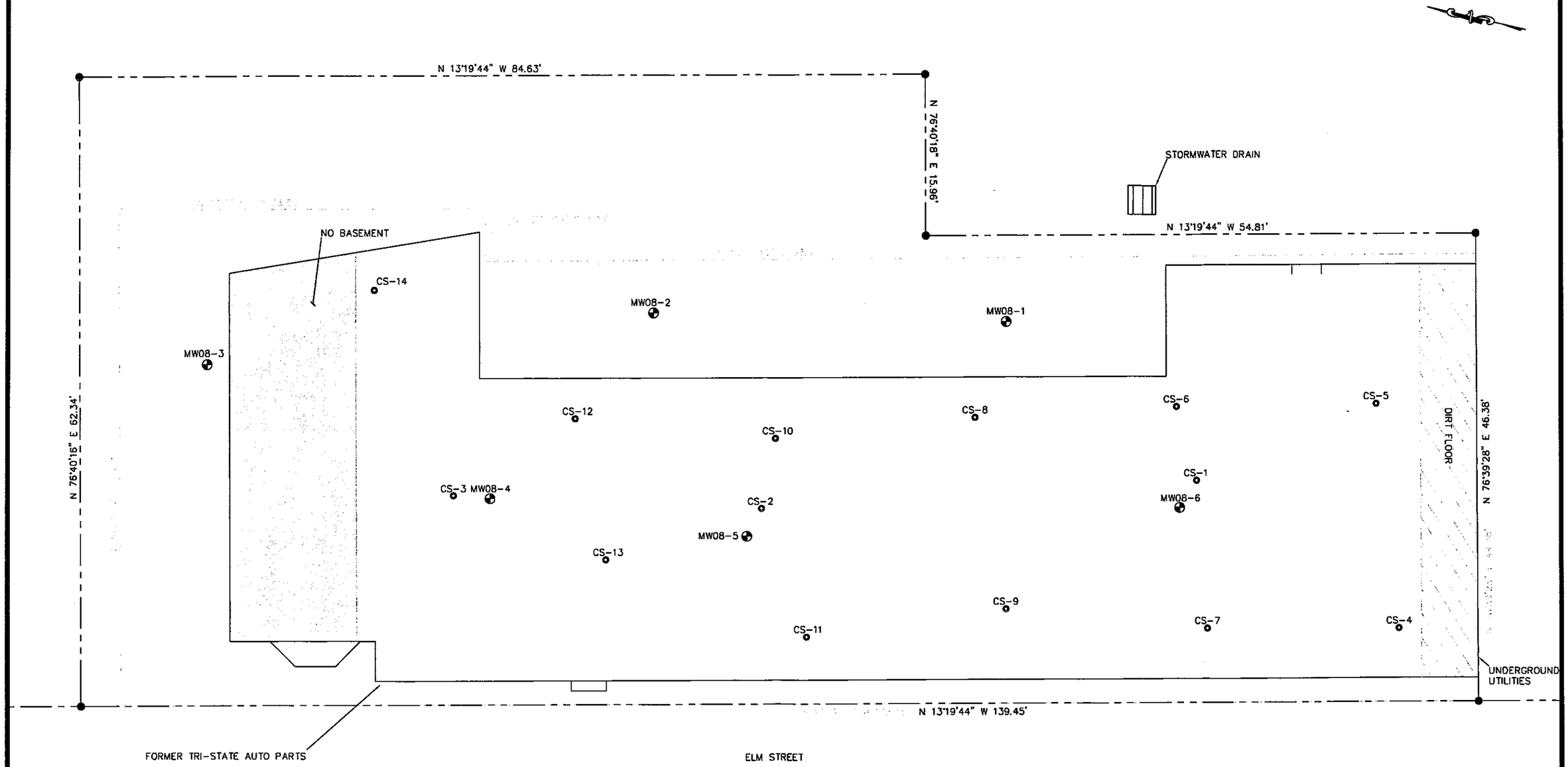
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

SECOND FLOOR WALL PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/11/09

DATE: 5/21/09	DWG #: 4	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

MW08-6 MONITORING WELL

CS-3 CONCRETE SAMPLE LOCATION

FORMER PROPERTY LINE

PROPERTY LINE (PER SUBDIVSION PLAN BY ERIC M. MORSE, LAND SURVEYOR DATED 8/9/2007)

ESPC #: 20084264
KAS #: 505080133

KAS

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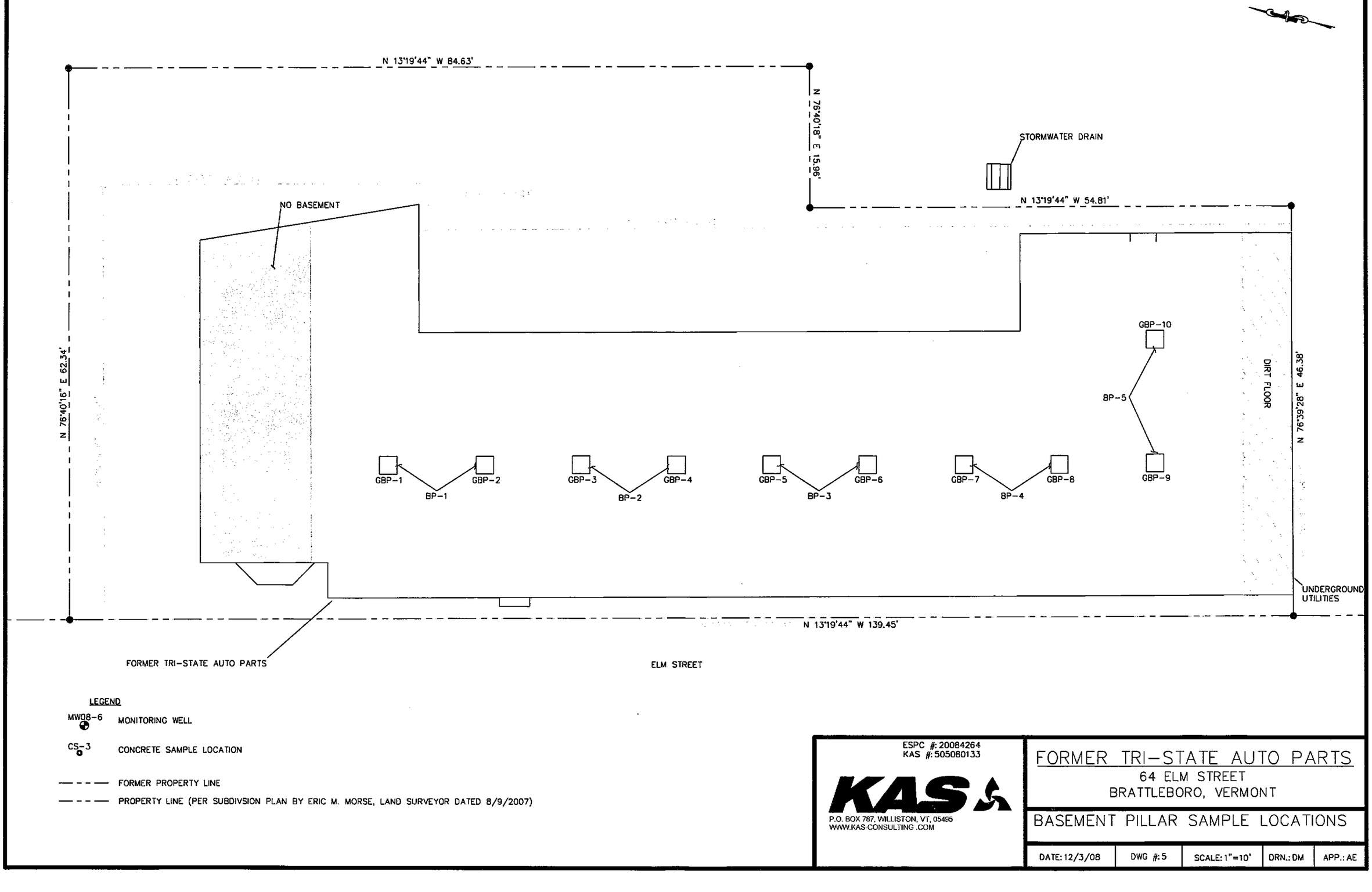
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

BASEMENT CONCRETE SAMPLE LOCATIONS

DATE: 12/3/08	DWG #: 5	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

MW08-6 MONITORING WELL

CS-3 CONCRETE SAMPLE LOCATION

FORMER PROPERTY LINE

PROPERTY LINE (PER SUBDIVSION PLAN BY ERIC M. MORSE, LAND SURVEYOR DATED 8/9/2007)

ESPC #: 20084264
KAS #: 505080133

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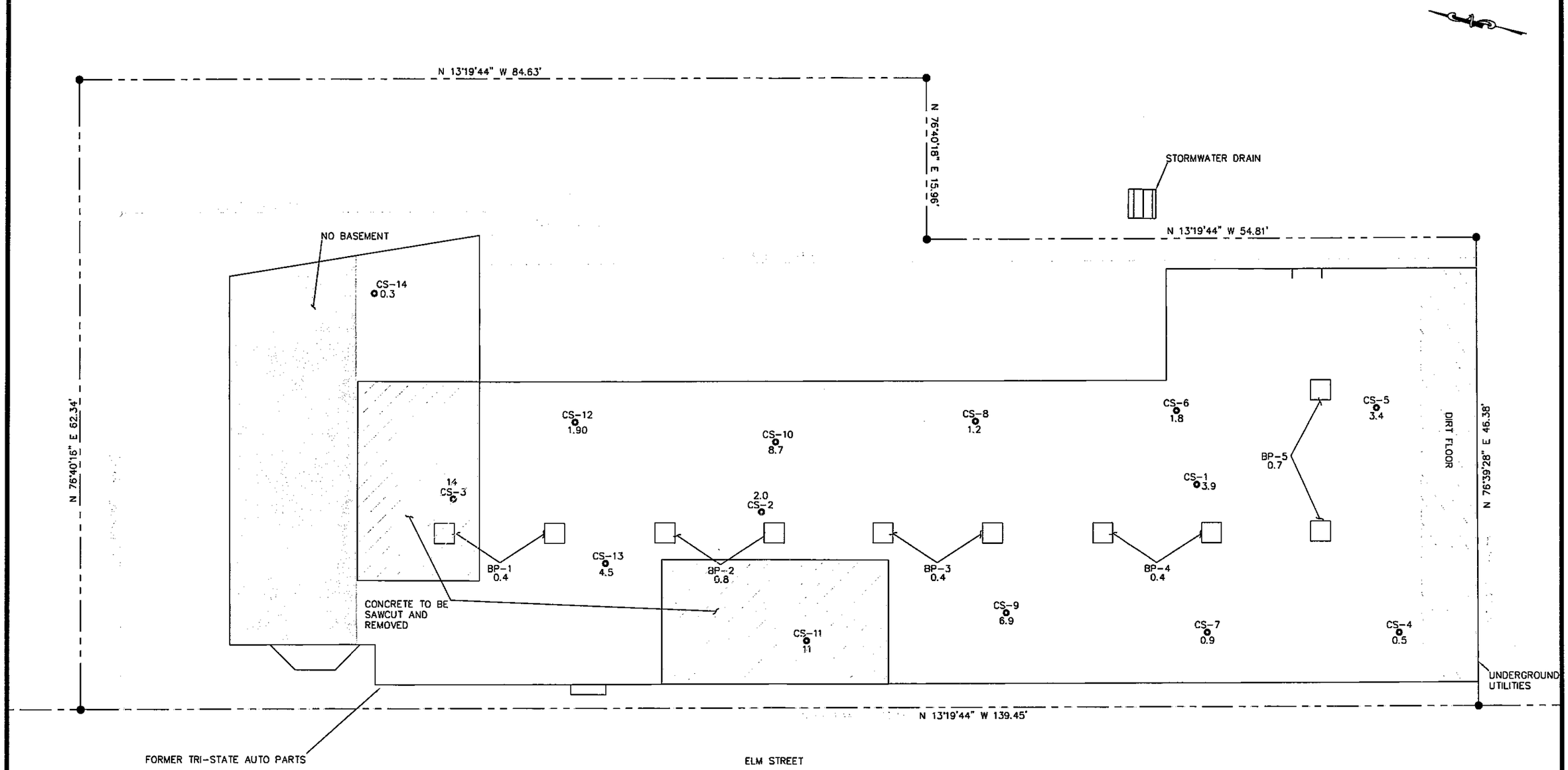
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

BASEMENT PILLAR SAMPLE LOCATIONS

DATE: 12/3/08	DWG #: 5	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

- MW08-6 — MONITORING WELL
- 4.1 BP-3 — COMPOSITE PILLAR SAMPLE LOCATION WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)
- FORMER PROPERTY LINE
- PROPERTY LINE (PER SUBDIVSION PLAN BY ERIC M. MORSE, LAND SURVEYOR DATED 8/9/2007)
- MASONARY PILLAR
- CS-3 14 — CONCRETE SAMPLE LOCATION WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

ESPC #: 20084264
KAS #: 505080133

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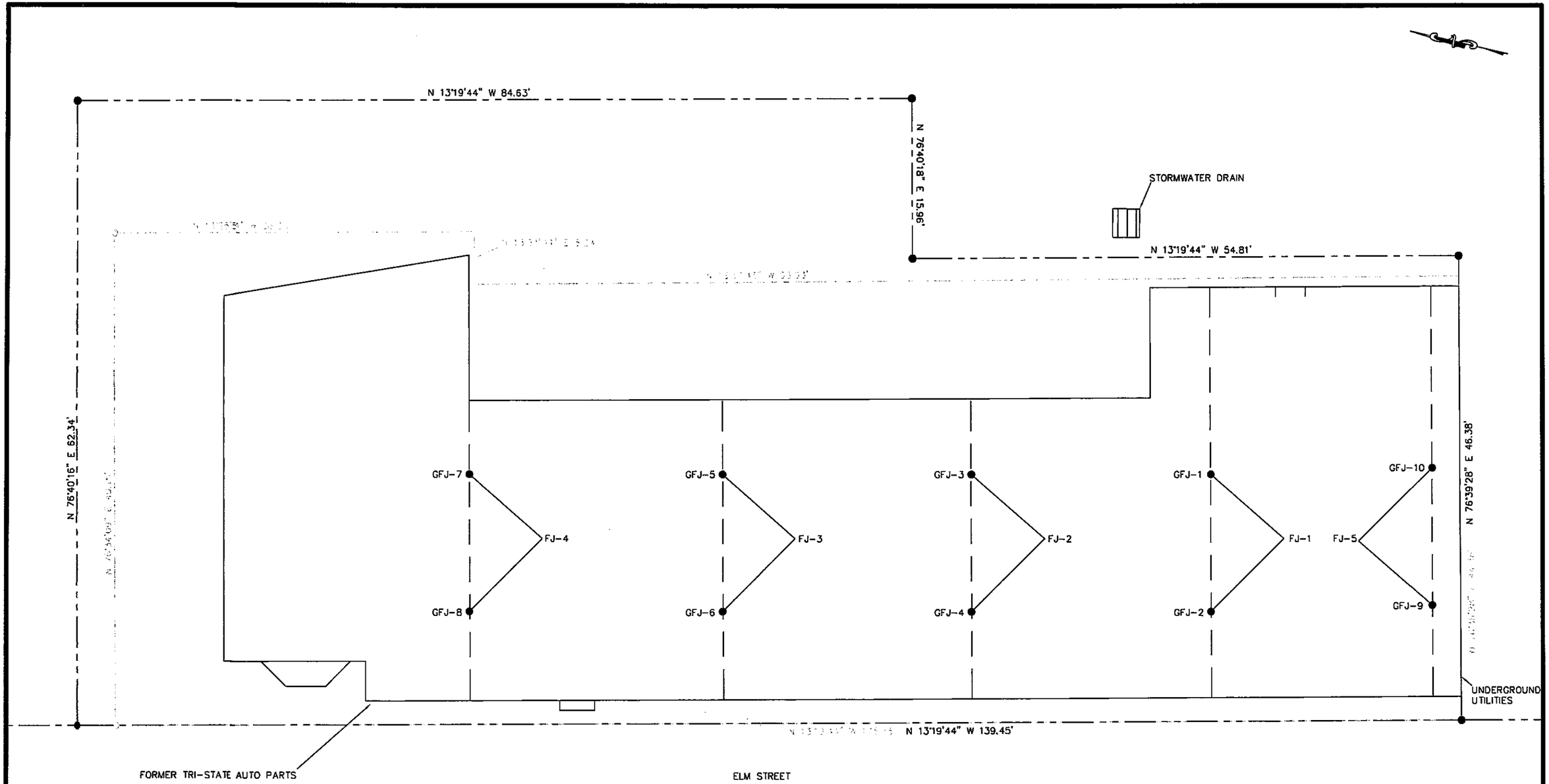
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

BASEMENT FLOOR/PILLAR PCB CONTAMINANT CONCENTRATION MAP
SAMPLED: 9/17/08, 10/8/08, AND 2/3/09

DATE: 5/21/09	DWG #: 5	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

0.2 FJ-4 — COMPOSITE FLOOR JOIST SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

GFJ-4 GFJ-3 GRAB FLOOR JOIST SAMPLE

ESPC #: 20084264
KAS #: 505080133

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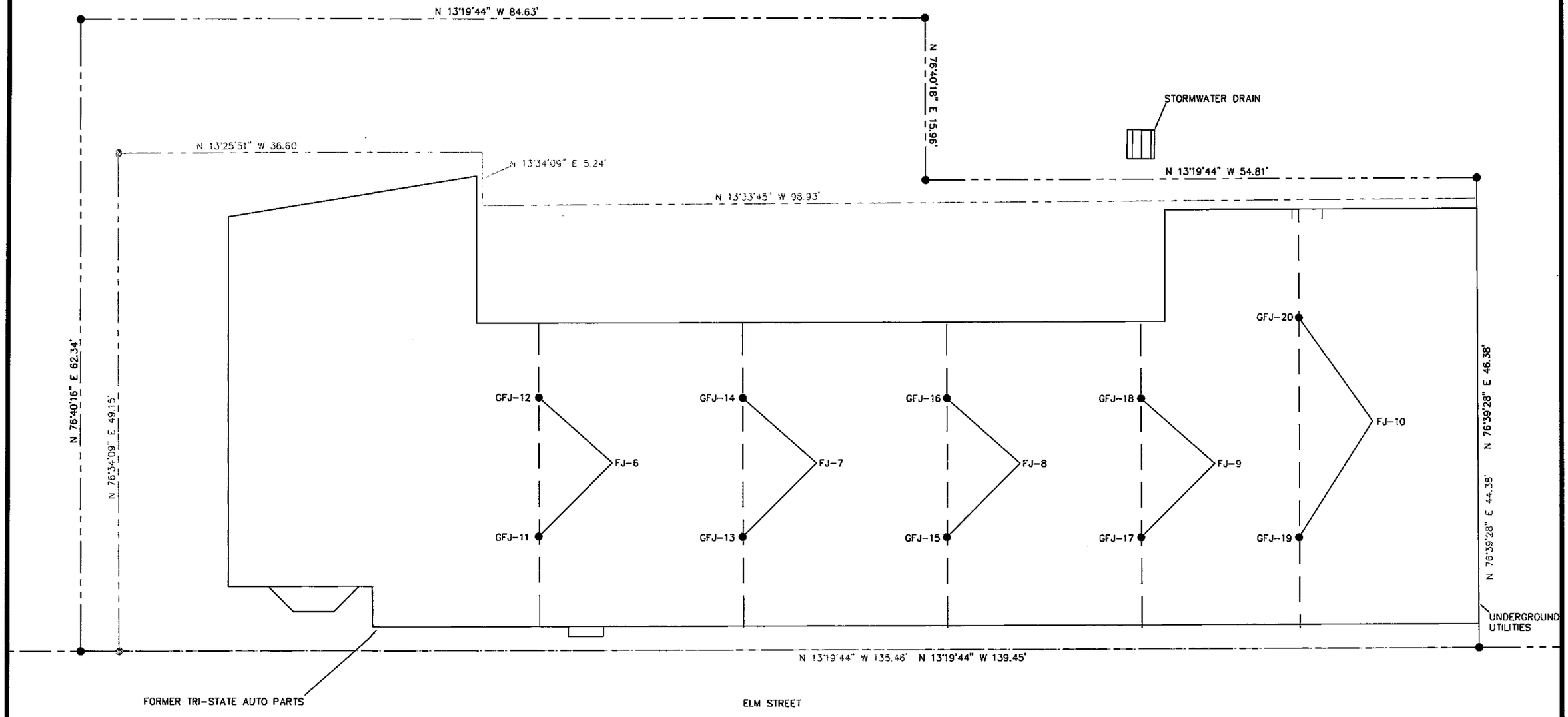
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

FIRST FLOOR JOIST SAMPLE LOCATION

DATE: 5/21/09	DWG #: 3	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

FJ-6 COMPOSITE FLOOR JOIST SAMPLE LOCATION

GFJ-12 GFJ-11 GRAB FLOOR JOIST SAMPLE

ESPC #: 20084264
KAS #: 505080133

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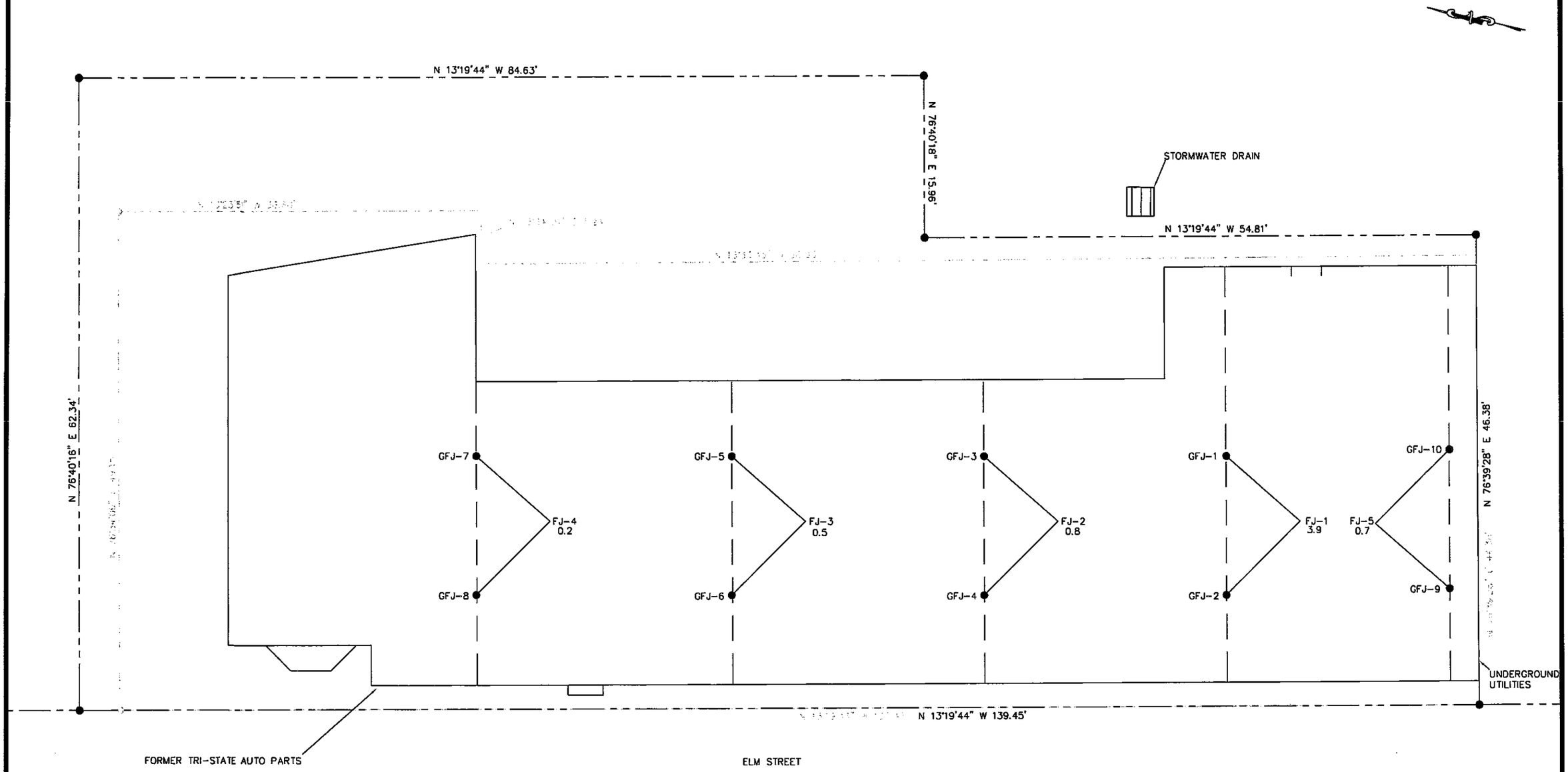
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

SECOND FLOOR JOIST SAMPLE LOCATION

DATE: 5/21/09	DWG #: 4	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

0.2 / FJ-4 — COMPOSITE FLOOR JOIST SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

GFJ-4 GFJ-3 GRAB FLOOR JOIST SAMPLE

ESPC #: 20084264
KAS #: 5050BD133

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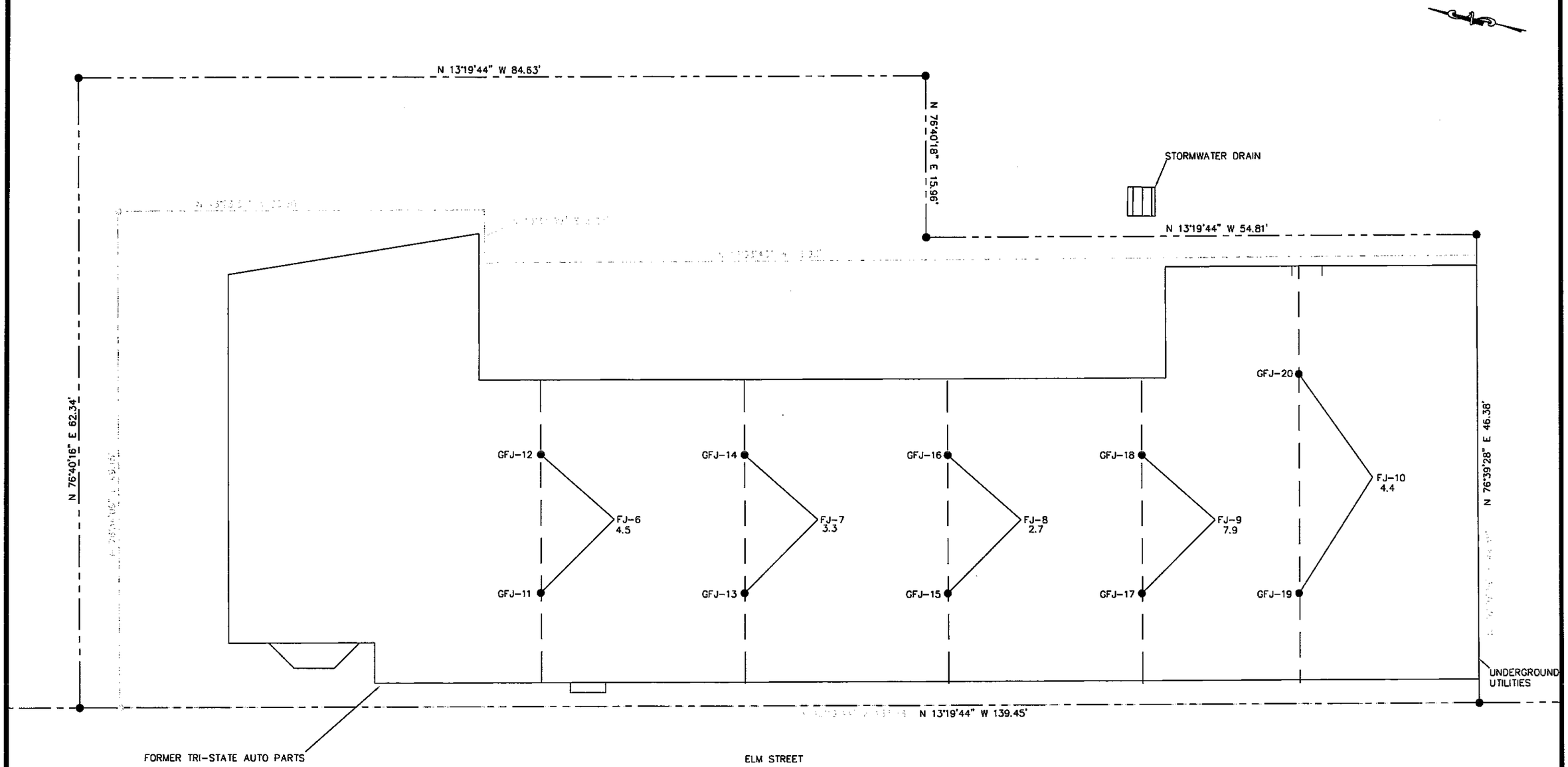
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

FIRST FLOOR JOIST PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/3/09

DATE: 5/21/09	DWG #: 3	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

4.5 / FJ-6 — COMPOSITE FLOOR JOIST SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

GFJ-12 GFJ-11 GRAB FLOOR JOIST SAMPLE

ESPC #: 20084264
KAS #: 505080133

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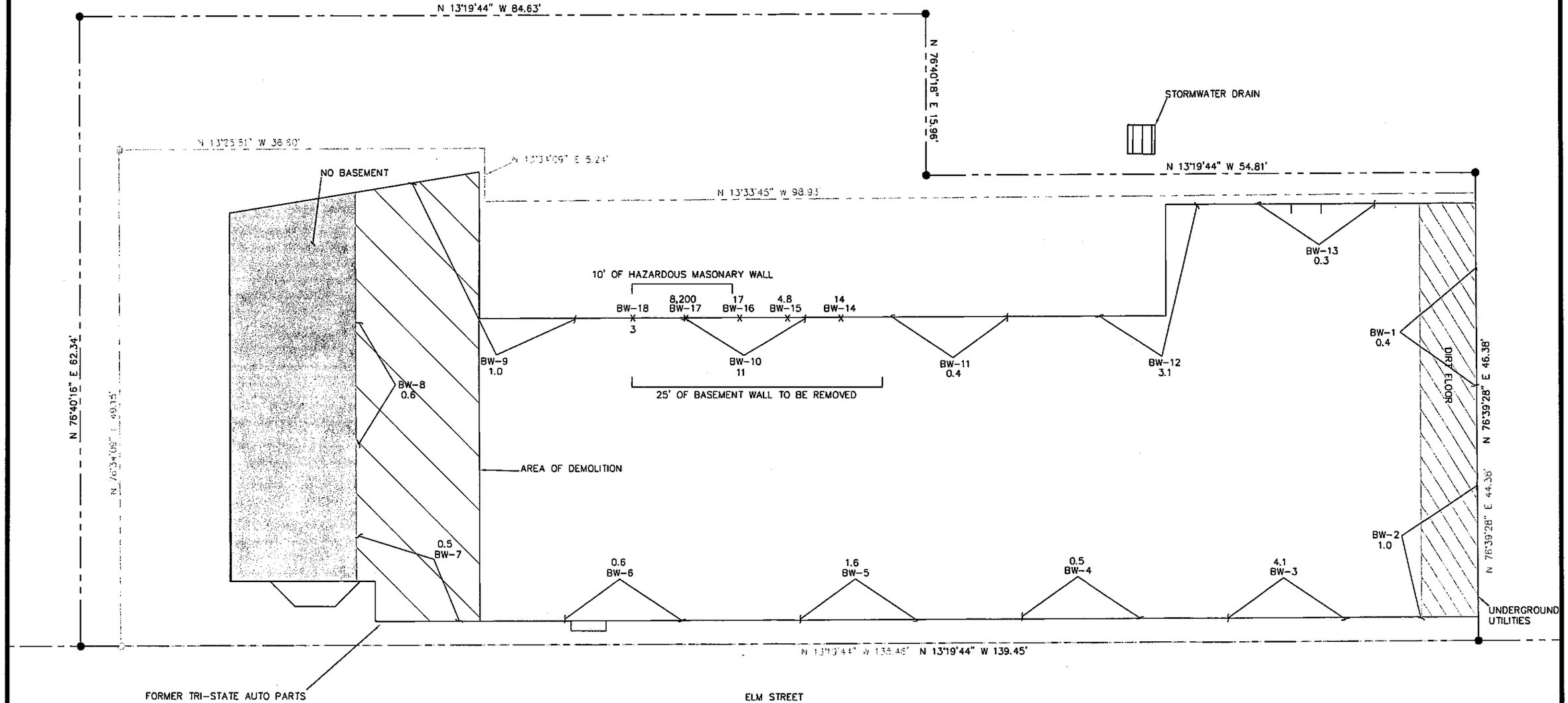
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

SECOND FLOOR JOIST PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/12/09

DATE: 5/21/09	DWG #: 4	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

- MW08-6 — MONITORING WELL
- FORMER PROPERTY LINE
- PROPERTY LINE (PER SUBDIVSION PLAN BY ERIC M. MORSE, LAND SURVEYOR DATED 8/9/2007)
- 0.6 BW-6 — COMPOSITE WALL SAMPLE LOCATION WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)
- BW-6 X 3 — GRAB WALL SAMPLE LOCATION WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

ESPC #: 20084264
KAS #: 505080133

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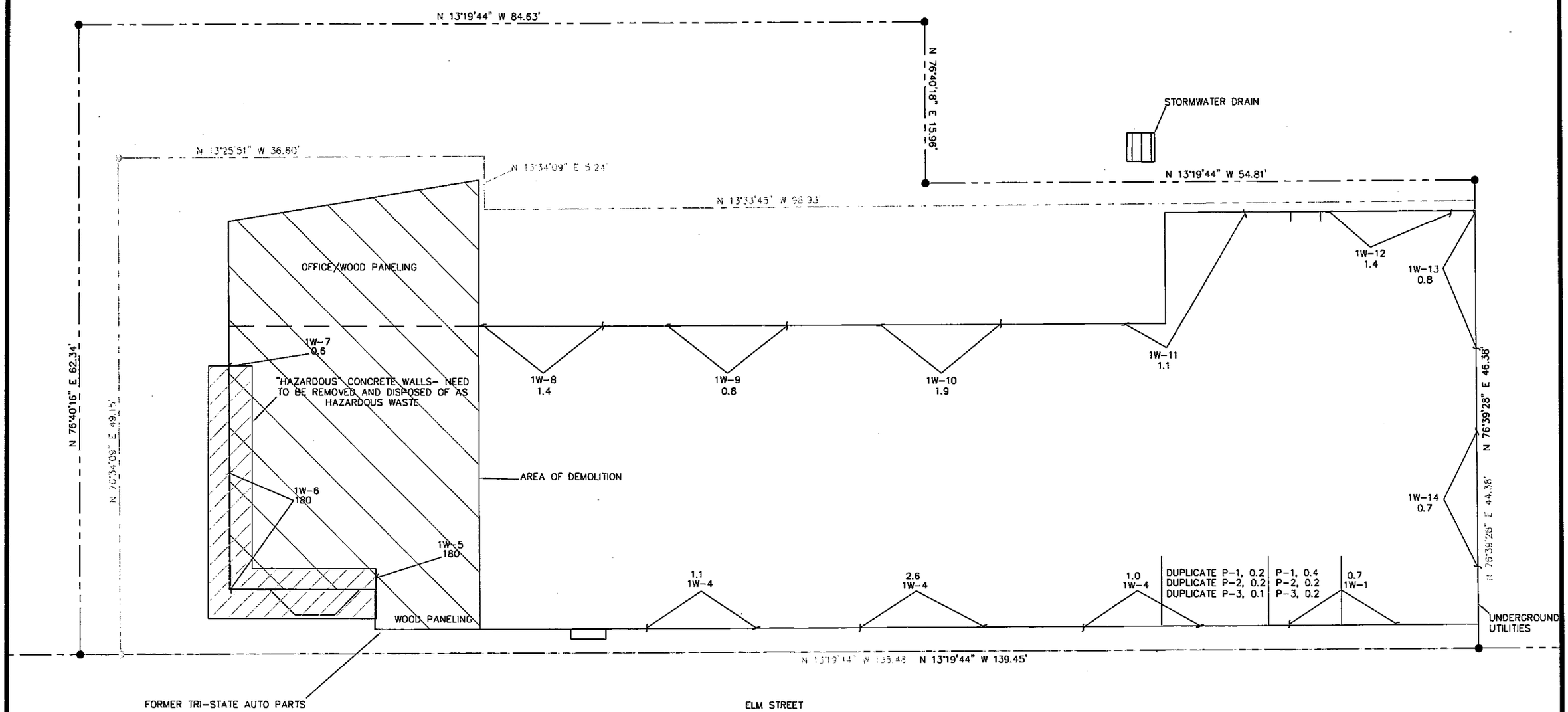
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

BASEMENT WALL PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/3/09, 2/11/09, AND 9/10/09

DATE: 10/7/09	DWG #: 5	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

2.6 1W-3 — COMPOSITE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm)

P-1 0.4 — PROFILE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm)

ESPC #: 20084264
KAS #: 505080133

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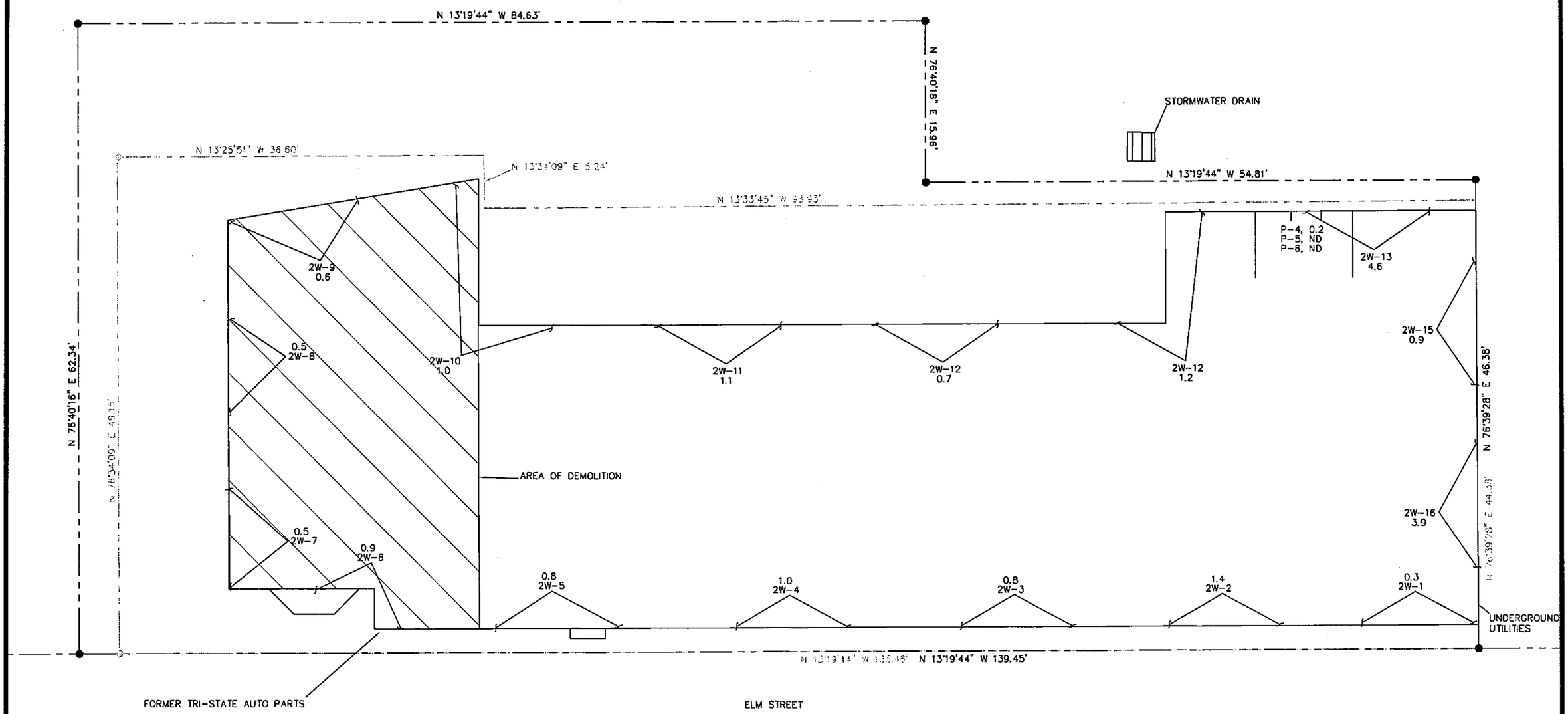
FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

FIRST FLOOR WALL PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/4/09 AND 9/10/09

DATE: 10/7/09	DWG #: 3	SCALE: 1"=10'	DRN.: DM	APP.: AE



LEGEND

PROPERTY LINE

0.8
2W-3
COMPOSITE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm) (M=8082)

P-4
0.2
PROFILE WALL SAMPLE WITH PCB CONTAMINANT CONCENTRATION (ppm)

ESPC #: 20084264
KAS #: 505080133

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FORMER TRI-STATE AUTO PARTS

64 ELM STREET
BRATTLEBORO, VERMONT

SECOND FLOOR WALL PCB CONTAMINANT CONCENTRATION MAP

SAMPLED: 2/11/09 AND 9/10/09

DATE: 10/7/09	DWG #: 4	SCALE: 1"=10'	DRN.: DM	APP.: AE

BROWNFIELDS
PHASE II ENVIRONMENTAL
SITE ASSESSMENT

64 ELM STREET
BRATTLEBORO, VERMONT
SMS # 2008-3834

KAS# 505080133

May 2009

Prepared for
Windham Regional Commission
139 Main Street, Suite 505
Brattleboro, Vermont 05301

Prepared by

www.kas-consulting.com

368 Avenue D, Suite 15 • P.O. Box 787 • Williston, VT 05495 • 802-383-0486 • Fax 802-383-0490

APPENDIX D

Indoor Air Quality Sampling Data Summary

KAS

Indoor Air Quality Sampling Data Summary
64 Elm Street
Brattleboro, VT
Page 1 of 1

Sample ID *Sample Depth (ft.)* *PID reading (ppm)* *Sample Date*	*64 Elm Street Basement* *0' (on floor)* *0.1* *9/17/08*	*65 Elm Street First Floor* *0' (on floor)* *0.1* *9/17/08*	*66 Elm Street Second Floor* *0' (on floor)* *0.1* *9/17/08*	*67 Elm Street Background* *0' (on ground)* *0.1* *9/17/08*	VTDOH Median Concentration µg/m^3 *	OSHA PEL ppm **	NIOSH REL ppm ***	VOSHA PEL ppm ****
TO-15 (4 hour regulators)								
Benzene	ND<1.6	ND<1.6	ND<1.6	ND<1.6	0.49	-	0.1	-
Toluene	**4.4**	**3.2**	**4.5**	ND<1.9	8.75	200	100	-
Ethylbenzene	ND<2.2	ND<2.2	ND<2.2	ND<2.2	1.00	100	100	100
Total Xylenes	ND<2.2	ND<2.2	ND<2.2	ND<2.2	3.20	100	100	100
MTBE	ND<1.8	ND<1.8	ND<1.8	ND<1.8	-	-	-	-
1,3,5-trimethylbenzene	ND<2.5	ND<2.5	ND<2.5	ND<2.5	-	-	25	25
1,2,4-trimethylbenzene	ND<2.5	ND<2.5	ND<2.5	ND<2.5	-	-	25	25
1,4-Dichlorobenzene	ND<3.0	ND<3.0	ND<3.0	ND<3.0	-	75	-	-
1,2-Dichlorobenzene	ND<3.0	ND<3.0	ND<3.0	ND<3.0	-	50	50	50
Tetrachloroethene (PCE)	ND<3.4	ND<3.4	ND<3.4	ND<3.4	0.57	100	-	25
Trichloroethene (TCE)	ND<2.7	ND<2.7	ND<2.7	ND<2.7	0.41	100	-	50
1,1-Dichloroethane	ND<2.0	ND<2.0	ND<2.0	ND<2.0	-	100	100	100
cis-1,2-Dichloroethene	ND<2.0	ND<2.0	ND<2.0	ND<2.0	-	-	-	-
trans-1,2-Dichloroethene	ND<2.0	ND<2.0	ND<2.0	ND<2.0	-	-	-	-
Chloroform	ND<2.4	ND<2.4	ND<2.4	ND<2.4	0.38	50	2	2
Chloromethane	ND<1.0	**1.1**	ND<1.0	**1.1**	-	100	-	-
Styrene	ND<2.1	ND<2.1	ND<2.1	ND<2.1	0.63	100	50	50
Vinyl Chloride	ND<1.3	ND<1.3	ND<1.3	ND<1.3	-	1	-	-
Ethanol	**4.7**	**5.3**	**2.5**	**2.5**	-	1000	1000	1000
Cyclohexane	**2.1**	ND<1.7	ND<1.7	ND<1.7	-	300	300	300
2,2,4 Trimethylpentane (isooctane)	**4.9**	**5.1**	**2.6**	ND<2.3	-	-	-	-
Total Reported VOCs	**16.1**	**14.7**	**9.6**	**3.6**	-	-	-	-

NOTES:

All values reported in µg/m^3, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the standards are shaded.

Detection limits above the standards are shaded.

- = No PRG Available

* VTDOH Median Concentrations are from a 1999 study conducted by the Department of Health where the indoor air at 60 homes in rural Vermont was sampled.

APPENDIX E

Indoor Surfaces (Swipe) Sampling Data Summary

KAS

Swipe Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 1 of 3

Soil Sample *Location* *Sample Date*	*Swipe-1* *Window Sill - South Side 1st Floor* *9/17/08*	*Swipe-2* *Window Sill -North Side 1st Floor* *9/17/08*	*Swipe-3* *Ceiling - 2nd Floor* *9/17/08*	*Swipe-2 Duplicate* *Window Sill -North Side 1st Floor* *9/17/08*
PAHs, EPA Method 8270				
Acenaphthene	ND<5	ND<5	ND<5	ND<5
Acenaphthylene	ND<5	ND<5	ND<5	ND<5
Anthracene	ND<5	ND<5	ND<5	ND<5
Benzo(a)anthracene	**6.**	ND<5	ND<5	ND<5
Benzo(b)fluoranthene	**10.**	ND<5	ND<5	ND<5
Benzo(k)fluoranthene	ND<5	ND<5	ND<5	ND<5
Benzo(a)pyrene	**6.**	ND<5	ND<5	ND<5
Benzo(g,h,i)perylene	ND<5	ND<5	ND<5	ND<5
Chrysene	**10.**	ND<5	ND<5	ND<5
Dibenzo(a,h)anthracene	ND<5	ND<5	ND<5	ND<5
Fluoranthene	**14.**	ND<5	ND<5	ND<5
Fluorene	ND<5	ND<5	ND<5	ND<5
Indeno(1,2,3-cd)pyrene	ND<5	ND<5	ND<5	ND<5
2-Methylnaphthalene	ND<5	ND<5	ND<5	ND<5
Naphthalene	ND<5	ND<5	ND<5	ND<5
Phenanthrene	**8.**	ND<5	ND<5	ND<5
Pyrene	**12.**	ND<5	ND<5	ND<5
Total Reported PAHs	**66**	ND	ND	ND

NOTES:
All values reported in μg/100cm^2, unless otherwise indicated.
ND<1.0 = Not Detected< Detection Limit
Results reported above detection limits are indicated in bold

Swipe Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 2 of 3

Soil Sample	*Swipe-1*	*Swipe-2*	*Swipe-3*	*Swipe-2 Duplicate*	Brookhaven Laboratory	
Location	*Window Sill - South Side 1st Floor*	*Window Sill -North Side 1st Floor*	*Ceiling - 2nd Floor*	*Window Sill -North Side 1st Floor*	Acceptable Levels	
Sample Date	*9/17/08*	*9/17/08*	*9/17/08*	*9/17/08*	Regulated area	Unrestricted area
TOTAL METALS (mg/kg, dry)						
Total Antimony	**20**	**13**	**50**	**12**	n/a	n/a
Total Arsenic	**13**	**3.2**	ND<0.3	**8.7**	15	1
Total Beryllium	ND<0.3	ND<0.3	ND<0.3	ND<0.3	3	0.2
Total Cadmium	**32**	**5.2**	ND<0.3	**5.8**	3	0.2
Total Chromium	**2100**	**51**	ND<0.3	**89**	70	3.3
Total Copper	**520**	**2500**	**1.4**	**6900**	n/a	n/a
Total Lead	**8500**	**1600**	**8.3**	**2600**	26.9	4.3
Total Mercury	**2.0**	**1.3**	ND<0.05	**1.4**	n/a	n/a
Total Nickel	**100**	**44**	**0.8**	**67**	200	10
Total Selenium	**1.1**	ND<0.3	ND<0.3	**0.5**	n/a	n/a
Total Silver	ND<0.3	ND<0.3	ND<0.3	**0.4**	n/a	n/a
Total Thallium	ND<0.3	ND<0.3	ND<0.3	ND<0.3	n/a	n/a
Total Zinc	**3300**	**440**	**27**	**750**	n/a	n/a

NOTES:
All values reported in μg/100cm^2, unless otherwise indicated.
Brookhaven National Laboratory Standards, May 23, 2007
ND<1.0 = Not Detected< Detection Limit
Results reported above detection limits are indicated in bold
Values above the Brookhaven Unrestricted Area Standards are shaded
Detection limits above the Brookhaven Standards are shaded.
NA = No standard available

KAS

Swipe Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 3 of 3

Soil Sample	*Swipe-1*	*Swipe-2*	*Swipe-3*	*Swipe-2 Duplicate*
	Window Sill - South Side	*Window Sill -North Side 1st*		*Window Sill -North Side 1st*
Location	*1st Floor*	*Floor*	*Ceiling - 2nd Floor*	*Floor*
Sample Date	*9/17/08*	*9/17/08*	*9/17/08*	*9/17/08*
TPH DRO				
TPH 8100	**28000**	**45000**	ND<1000	**64000**

Soil Sample	*Swipe-1*	*Swipe-2*	*Swipe-3*	*Swipe-2 Duplicate*	*TSCA Cleanup*
	Window Sill - South Side	*Window Sill -North Side 1st*		*Window Sill -North Side 1st*	
Location	*1st Floor*	*Floor*	*Ceiling - 2nd Floor*	*Floor*	*Standard*
Sample Date	*9/17/08*	*9/17/08*	*9/17/08*	*9/17/08*	
PCBs, EPA Method 8082					
Aroclor - 1016	ND <0.5	ND <0.5	ND <0.5	ND <0.5	-
Aroclor - 1221	ND <0.5	ND <0.5	ND <0.5	ND <0.5	-
Aroclor - 1232	ND <0.5	ND <0.5	ND <0.5	ND <0.5	-
Aroclor - 1242	ND <0.5	ND <0.5	ND <0.5	ND <0.5	-
Aroclor - 1248	ND <0.5	ND <0.5	ND <0.5	ND <0.5	-
Aroclor - 1254	**15**	**3.9**	ND <0.5	**3.3**	**-**
Aroclor - 1260	**2.4**	ND <0.5	ND <0.5	ND <0.5	-
Total PCBs	**17.4**	**3.9**	ND	**3.3**	**1.0**

NOTES:
All values reported in μg/100cm^2, unless otherwise indicated.
ND<1.0 = Not Detected< Detection Limit
Results reported above detection limits are indicated in bold

APPENDIX F

Wood Floor Sampling Data Summary

Wood Floor Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 1 of 4

Sample	*Wood Floor -1*	*Wood Floor -2*	*Wood Floor -3*	Hazardous
Sample Depth (in.)	*0-0.5"*	*0-0.5"*	*0-0.5"*	Waste
PID reading (ppm)	*40*	*875*	*978*	Standard
Sample Date	*9/17/08*	*9/17/08*	*9/17/08*	
TPH DRO				
TPH 8100	**57000**	**110000**	**230000**	**50000**

Sample	*Wood Floor -1*	*Wood Floor -2*	*Wood Floor -3*	TSCA
Sample Depth (in.)	*0-0.5"*	*0-0.5"*	*0-0.5"*	Clean-up
PID reading (ppm)	*40*	*875*	*978*	Standard
Sample Date	*9/17/08*	*9/17/08*	*9/17/08*	
PCBs, EPA Method 8082				
Aroclor - 1016	ND <1	ND <2	ND <0.6	-
Aroclor - 1221	ND <1	ND <2	ND <0.6	-
Aroclor - 1232	ND <1	ND <2	ND <0.6	-
Aroclor - 1242	ND <1	ND <2	ND <0.6	-
Aroclor - 1248	ND <1	ND <2	ND <0.6	-
Aroclor - 1254	**57**	**89**	**20**	-
Aroclor - 1260	ND<1	ND <2	ND <0.6	-
Total PCBs	**57**	**89**	**20**	**1**

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the applicable standards are shaded.

NA = No PRG Available

Wood Floor Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 2 of 4

Sample *Sample Depth (ft.)* *PID reading (ppm)* *Sample Date*	*Wood Floor -4* *0-0.5"* *0.5* *2/4/09*	*Wood Floor -5* *0-0.5"* *26.2* *2/4/09*	*Wood Floor -6* *0-0.5"* *305* *2/4/09*	Hazardous Waste Standard
PAHs, EPA Method 8270				
Acenaphthene	**0.6**	**0.3**	ND<4	-
Acenaphthylene	**0.3**	**0.2**	ND<4	-
Anthracene	**0.3**	**1.0**	ND<4	-
Benzidine	**5**	**5**	**70**	
Benzo(a)anthracene	**1.8**	**1.6**	**9**	-
Benzo(b)fluoranthene	**2.3**	**2.3**	**20**	-
Benzo(k)fluoranthene	**1.8**	**1.8**	**7**	-
Benzo(a)pyrene	**1.1**	**1.2**	**13**	-
Benzo(g,h,i)perylene	**1.2**	**1.3**	**14**	-
Benzoic Acid	**20**	**20**	**200**	
bis(2-Ethylhexyl)phthalate	**150**	**150**	**28000**	-
Butylbenzylphthalate	**17**	**34**	**90**	-
Chrysene	**4.4**	**5.1**	**14**	-
Carbazole	ND<2	ND<2	ND<40	-
2,4-Dinitrophenol	**10**	**10**	**200**	
2,4-Dinitrotoluene	**3**	**3**	ND<40	
3,3-Dicholorbenzidine	**2**	**3**	ND<40	
Di-n-butylphthalate	**220**	**120**	ND<40	-
Di-n-octylphthalate	**17**	**26**	**160**	-
Dibenzo(a,h)anthracene	**1.6**	**1.7**	**24**	-
Dibenzofuran	ND<2	ND<2	ND<40	-
Fluoranthene	**3.0**	**3.4**	**8**	-
Fluorene	**1.3**	**1.3**	ND<4	-
Hexachloroethane	ND<2	**2**	ND<40	
Indeno(1,2,3-cd)pyrene	**1.5**	**1.6**	**21**	-
2-Methylnaphthalene	**12**	**7.0**	**10**	-
2-Methylphenol	**6**	**4**	ND<40	-
3,4-Methylphenol	**7**	**5**	**70**	
4-Nitrophenol	**5**	**7**	**80**	-
3-Nitroaniline	**2**	**3**	ND<40	
4-Nitroaniline	**3**	**8**	ND<40	
Naphthalene	**6.7**	**6.5**	**7**	-
n-Nitroso-di-n-propylamine	ND<2	**10**	ND<40	
n-Nitrosodiphenylamine	ND<2	**5**	ND<40	
Phenanthrene	**9.8**	**10**	**14**	-
Phenol	**8**	**6**	**60**	-
Pyrene	**5.3**	**7.0**	**10**	-
Total Reported PAHs	**530**	**474**	**29101**	**50,000.**

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the hazardous waste standard are shaded

NA = No PRG Available

Wood Floor Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 3 of 4

Sample *Sample Depth (ft.)* *PID reading (ppm)* *Sample Date*	*Wood Floor -4* *0-0.5"* *0.5* *2/4/09*	*Wood Floor -5* *0-0.5"* *26.2* *2/4/09*	*Wood Floor -6* *0-0.5"* *305* *2/4/09*
VOCs, EPA Method 8260b			
Benzene	ND<0.8	ND<0.2	ND<2
Toluene	ND<0.8	**22**	**300**
Ethylbenzene	ND<0.8	**4.8**	**70**
mp-Xylene	**0.9**	**19**	**280**
o-Xylene	ND<0.8	**7.8**	**130**
MTBE	ND<2	ND<0.05	ND<5
1,3,5-trimethylbenzene	**1.7**	**4.0**	**12**
1,2,4-trimethylbenzene	**5.9**	**9.8**	**37**
Naphthalene	**30**	**4.3**	**12**
IsoPropylbenzene	ND<0.8	**0.6**	**8**
n-Propylbenzene	ND<0.8	**0.9**	**7**
tert-Butylbenzene	ND<0.8	ND<0.2	ND<2
sec-Butylbenzene	ND<0.8	**0.8**	ND<2
p-Isopropyltoluene	ND<0.8	**1.1**	**13**
1,4-Dichlorobenzene	ND<0.8	ND<0.2	ND<2
1,2-Dichlorobenzene	ND<0.8	ND<0.2	**4**
n-Butylbenzene	ND<0.8	**0.2**	ND<2
Tetrachloroethene (PCE)	ND<0.8	ND<0.2	ND<2
Trichloroethene (TCE)	ND<0.8	ND<0.2	ND<2
1,1-Dichloroethane	ND<0.8	ND<0.2	ND<2
cis-1,2-Dichloroethene	ND<0.8	ND<0.2	ND<2
trans-1,2-Dichloroethene	ND<0.8	ND<0.2	ND<2
1,2,3-Trichloropropane	ND<0.8	ND<0.2	ND<2
Chloroform	ND<0.8	ND<0.2	ND<2
Styrene	ND<0.8	ND<0.2	ND<2
Vinyl Chloride	ND<2	ND<0.05	ND<5
2-Butanone (MEK)	ND<8	ND<2	**70**
4-Methyl-2-pentanone(MIBK)	ND<8	**4.3**	**70**
cis-1,3-Dichloropropene	ND<0.8	ND<0.2	ND<2
Total Reported VOCs	**39**	**75**	**873**

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

NA = No PRG Available

Wood Floor Sampling Data Summary
64 Elm Street
Brattleboro, Vermont
Page 4 of 4

Sample	*Wood Floor -4*	*Wood Floor -5*	*Wood Floor -6*
Sample Depth (in.)	*0-0.5"*	*0-0.5"*	*0-0.5"*
PID reading (ppm)	*0.5*	*26.2*	*305*
Sample Date	*2/4/09*	*2/4/09*	*2/4/09*
Flashpoint			
Flashpoint	**>200**	**>200**	**>200**

NOTES:

All values reported in degrees F.

Results reported above detection limits are indicated in bold

Soil Sample	*Wood Floor -4*	*Wood Floor -5*	*Wood Floor -6*
Sample Depth (ft.)	*0-0.5"*	*0-0.5"*	*0-0.5"*
PID reading (ppm)	*0.5*	*26.2*	*305*
Sample Date	*2/4/09*	*2/4/09*	*2/4/09*
TOTAL METALS (mg/kg, dry)			
Total Antimony	**4**	**13**	**6.8**
Total Arsenic	**6**	**5.9**	**48**
Total Beryllium	ND<1	ND<1	ND<1
Total Cadmium	**7**	**7.0**	**13**
Total Chromium	**170**	**760**	**85**
Total Copper	**410**	**910**	**1100**
Total Lead	**760**	**4900**	**1900**
Total Mercury	**1.1**	**2.2**	**3.8**
Total Nickel	**72**	**140**	**28**
Total Selenium	ND<1	ND<1	ND<1
Total Silver	ND<1	ND<1	ND<1
Total Thallium	ND<1	ND<1	ND<1
Total Zinc	**440**	**590**	**370**

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the Residential Region IX PRGs are shaded.

Detection limits above the Residential Region IX PRGs are shaded.

NA = No PRG Available

APPENDIX G

Concrete Floor Sampling Data Summary

KAS

Concrete Sampling Data Summary - Basement Floor
64 Elm Street
Brattleboro, Vermont

Concrete Sample *Sample Depth (in.)* *Sample Date*	*CS-1* *0-0.5"* *10/8/08*	*CS-2* *0-0.5"* *10/8/08*	*CS-3* *0-0.5"* *10/8/08*	*CS-4* *0-0.5"* *2/3/09*	*CS-5* *0-0.5"* *2/3/09*	*CS-6* *0-0.5"* *2/3/09*	*CS-7* *0-0.5"* *2/3/09*	*CS-8* *0-0.5"* *2/3/09*	*CS-9* *0-0.5"* *2/3/09*	*CS-10* *0-0.5"* *2/3/09*	*CS-11* *0-0.5"* *2/3/09*	*CS-12* *0-0.5"* *2/3/09*	*CS-13* *0-0.5"* *2/3/09*	*CS-14* *0-0.5"* *2/3/09*	*Duplicate* *CS-5* *0-0.5"* *2/3/09*	TSCA Clean-up Level	Hazardous Waste Standard
TPH DRO																	
TPH 8100	**1800**	**11000**	**2800**	**4300**	**11000**	**5200**	**8400**	**3000**	**3200**	**3600**	**4100**	**3600**	**2500**	**90**	**10000**	-	**50,000**
PCBs, EPA Method 8082																	
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Aroclor - 1254	**3.3**	**1.7**	**12**	**0.5**	**3.4**	**1.8**	**0.9**	**1.2**	**6.9**	**8.7**	**11**	**1.9**	**4.5**	**0.3**	**2.8**	-	-
Aroclor - 1260	**0.6**	**0.3**	**1.5**	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.4	ND <0.4	ND <0.1	ND <0.2	ND <0.1	ND <0.1	-	-
Total PCBs	**3.9**	**2.0**	**14**	**0.5**	**3.4**	**1.8**	**0.9**	**1.2**	**6.9**	**8.7**	**11**	**1.9**	**4.5**	**0.3**	**2.8**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX H

Masonry Walls and Pillars Sampling Data Summary

KAS

First Floor Wall Sampling Summary
64 Elm Street
Brattleboro, Vermont

Concrete Sample *Sample Depth (in.)* *Sample Date*	*1W-1* *0-0.5"* *2/4/09*	*1W-2* *0-0.5"* *2/4/09*	*1W-3* *0-0.5"* *2/4/09*	*1W-4* *0-0.5"* *2/4/09*	*1W-5* *0-0.5"* *2/4/09*	*1W-6* *0-0.5"* *2/4/09*	*1W-7* *0-0.5"* *2/4/09*	*1W-8* *0-0.5"* *2/4/09*	*1W-9* *0-0.5"* *2/4/09*	*1W-10* *0-0.5"* *2/4/09*	*1W-11* *0-0.5"* *2/4/09*	*1W-12* *0-0.5"* *2/4/09*	*1W-13* *0-0.5"* *2/4/09*	*1W-14* *0-0.5"* *2/4/09*	*Duplicate* *1W-2* *0-0.5"* *2/4/09*	TSCA Clean-up Level	Hazardous Waste Standard
TPH DRO																	
TPH 8100	**820**	**1100**	**1300**	**740**	**120**	**130**	**80**	**540**	**170**	**580**	**670**	**2600**	**420**	**760**	**920**	-	**50,000**
PCBs, EPA Method 8082																	
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1254	**0.7**	**1.0**	**2.6**	**1.1**	**180**	**180**	**0.6**	**1.1**	**0.8**	**1.9**	**1.1**	**1.4**	**0.8**	**0.7**	**0.8**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <9	ND <9	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Total PCBs	**0.7**	**1.0**	**2.6**	**1.1**	**180**	**180**	**0.6**	**1.1**	**0.8**	**1.9**	**1.1**	**1.4**	**0.8**	**0.7**	**0.8**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

KAS

Second Floor Wall Sampling Summary
64 Elm Street
Brattleboro, Vermont

Concrete Sample *Sample Depth (in.)* *Sample Date*	*2W-1* *0-0.5"* *2/11/09*	*2W-2* *0-0.5"* *2/11/09*	*2W-3* *0-0.5"* *2/11/09*	*2W-4* *0-0.5"* *2/11/09*	*2W-5* *0-0.5"* *2/11/09*	*2W-6* *0-0.5"* *2/11/09*	*2W-7* *0-0.5"* *2/11/09*	*2W-8* *0-0.5"* *2/11/09*	*2W-9* *0-0.5"* *2/11/09*	*2W-10* *0-0.5"* *2/11/09*	*2W-11* *0-0.5"* *2/11/09*	*2W-12* *0-0.5"* *2/11/09*	*2W-13* *0-0.5"* *2/11/09*	*2W-14* *0-0.5"* *2/11/09*	*2W-15* *0-0.5"* *2/11/09*	*2W-16* *0-0.5"* *2/11/09*	*Duplicate* *2W-16* *0-0.5"* *2/11/09*	TSCA Clean-up Level	Hazardous Waste Standard
TPH DRO																			
TPH 8100	**4,200**	**2,000**	**1,600**	**4,200**	**440**	**350**	ND<50	**70**	**50**	**380**	**560**	**630**	**660**	**720**	**380**	**4,500**	**4,000**	-	**50,000**
PCBs, EPA Method 8082																			
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.2	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.2	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.2	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.2	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.2	-	-
Aroclor - 1254	**0.3**	**1.4**	**0.8**	**1.0**	**0.8**	**0.9**	**0.5**	**0.5**	**0.6**	**1.0**	**1.1**	**0.7**	**1.2**	**4.6**	**0.9**	**3.9**	**4.4**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	-	-
Total PCBs	**0.3**	**1.4**	**0.8**	**1.0**	**0.8**	**0.9**	**0.5**	**0.5**	**0.6**	**1.0**	**1.1**	**0.7**	**1.2**	**4.6**	**0.9**	**3.9**	**4.4**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

KAS

Basement Wall Sampling Summary
64 Elm Street
Brattleboro, Vermont

Concrete Sample	*BW-1*	*BW-2*	*BW-3*	*BW-4*	*BW-5*	*BW-6*	*BW-7*	*BW-8*	*BW-9*	*BW-10*	*BW-11*	*BW-12*	*BW-13*	TSCA	Hazardous
Sample Depth (in.)	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	*0-0.5"*	Clean-up	Waste
Sample Date	*2/3/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	*2/11/09*	Level	Standard
TPH DRO															
TPH 8100	**3,800**	**290**	**8,000**	**240**	**3,900**	**190**	**70**	ND<50	**80**	**740**	**80**	**970**	**90**	-	**50,000**
PCBs, EPA Method 8082															
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1254	**0.4**	**1.0**	**4.1**	**0.5**	**1.6**	**0.6**	**0.5**	**0.6**	**1.0**	**11.0**	**0.4**	**3.1**	**0.3**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.2	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.4	ND <0.1	ND <0.1	ND <0.1	-	-
Total PCBs	**0.4**	**1.0**	**4.1**	**0.5**	**1.6**	**0.6**	**0.5**	**0.6**	**1.0**	**11.0**	**0.4**	**3.1**	**0.3**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

KAS

Basement Pillars Sampling Summary
64 Elm Street
Brattleboro, Vermont

Concrete Sample *Sample Depth (in.)* *Sample Date*	*BP-1* *0-0.5"* *2/3/09*	*BP-2* *0-0.5"* *2/3/09*	*BP-3* *0-0.5"* *2/3/09*	*BP-4* *0-0.5"* *2/3/09*	*BP-5* *0-0.5"* *2/3/09*	*Duplicate* *BP-5* *0-0.5"* *2/3/09*	TSCA Clean-up Level	Hazardous Waste Standard
TPH DRO								
TPH 8100	**280**	**1400**	**390**	**220**	**370**	**360**	-	**50,000**
PCBs, EPA Method 8082								
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Aroclor - 1254	**0.4**	**0.8**	**0.4**	**0.4**	**0.7**	**0.7**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-	-
Total PCBs	**0.4**	**0.8**	**0.4**	**0.4**	**0.7**	**0.7**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX I

Floor Joists Sampling Data Summary

Wood Floor Joists Summary
64 Elm Street
Brattleboro, Vermont

Composite Floor Joint Sample *Sample Date*	*FJ-1* *2/3/09*	*FJ-2* *2/3/09*	*FJ-3* *2/3/09*	*FJ-4* *2/3/09*	*FJ-5* *2/3/09*	*FJ-6* *2/12/09*	*FJ-7* *2/12/09*	*FJ-8* *2/12/09*	*FJ-9* *2/12/09*	*FJ-10* *2/12/09*	*Duplicate FJ-1* *2/3/09*	TSCA Clean-Up Level	Hazardous Waste Standard
TPH DRO													
TPH 8100	**55,000**	**85,000**	**47,000**	**21,000**	**16,000**	**4,900**	**7,100**	**100,000**	**170,000**	**160,000**	**69,000**	-	**50,000**
PCBs, EPA Method 8082													
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Aroclor - 1254	**3.9**	**0.8**	**0.5**	**0.2**	**0.7**	**4.5**	**3.3**	**2.7**	**7.9**	**4.4**	**3.7**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.2	ND <0.2	ND <0.2	ND <0.2	ND <0.1	ND <0.2	-	-
Total PCBs	**3.9**	**0.8**	**0.5**	**0.2**	**0.7**	**4.5**	**3.3**	**2.7**	**7.9**	**4.4**	**3.7**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX J

Window Caulking Sampling Data Summary

Window Caulking Summary
64 Elm Street
Brattleboro, Vermont

Concrete Sample *Sample Date*	*WC-1* *2/4/2009*	*WC-2* *2/4/2009*	*WC-3* *2/11/2009*	TSCA Clean-up Level	Hazardous Waste Standard
TPH DRO					
TPH 8100	**9,400**	**4,500**	**7,600**	-	**50,000**
PCBs, EPA Method 8082					
Aroclor - 1016	ND <0.1	ND <0.1	ND <1	-	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <1	-	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <1	-	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <1	-	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <1	-	-
Aroclor - 1254	**4.9**	**1.2**	**30**	-	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <1	-	-
Total PCBs	**4.9**	**1.2**	**30**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX K

Window Casing Sampling Data Summary

Window Casing Summary
64 Elm Street
Brattleboro, Vermont

Window Casing Sample *Sample Date*	*Window -1* *2/12/09*	*Window-2* *2/12/09*	*Window-3* *2/12/09*	*Window-4* *2/12/09*	*Window-5* *2/12/09*	*Window-6* *2/12/09*	*Window-7* *2/12/09*	*Duplicate Window-2* *2/12/09*	TSCA Clean-Up Level	Hazardous Waste Standard
TPH DRO										
TPH 8100	**7,000**	**8,100**	**8,800**	**6,100**	**4,700**	**5,200**	**9,600**	**8,600**	-	**50,000**
PCBs, EPA Method 8082										
Aroclor - 1016	ND <0.2	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Aroclor - 1221	ND <0.2	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Aroclor - 1232	ND <0.2	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Aroclor - 1242	ND <0.2	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Aroclor - 1248	ND <0.2	ND <0.1	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Aroclor - 1254	**11**	**3.0**	**7.9**	**2.0**	**6.7**	**11**	**2.6**	**5.7**	-	-
Aroclor - 1260	ND <0.2	**0.4**	ND <0.2	ND <0.1	ND <0.2	ND <0.5	ND <0.1	ND <0.2	-	-
Total PCBs	**11**	**3.4**	**7.9**	**2.0**	**6.7**	**11**	**2.6**	**5.7**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX L

Paint Sampling Data Summary

Paint Sampling Summary
64 Elm Street
Brattleboro, Vermont

Paint Grab Sample *Sample Date*	*Paint-1* *2/3/2009*	*Paint-2* *2/3/2009*	*Paint-3* *2/3/2009*	TSCA Clean-Up Level	Hazardous Waste Standard
TPH DRO					
TPH 8100	**5000**	**7000**	**19000**	-	**50,000**
PCBs, EPA Method 8082					
Aroclor - 1016	ND<2	ND<2	ND<0.4	-	-
Aroclor - 1221	ND<2	ND<2	ND<0.4	-	-
Aroclor - 1232	ND<2	ND<2	ND<0.4	-	-
Aroclor - 1242	ND<2	ND<2	ND<0.4	-	-
Aroclor - 1248	ND<2	ND<2	ND<0.4	-	-
Aroclor - 1254	**16**	**39**	**12**	-	-
Aroclor - 1260	ND<2	ND<2	ND<0.4	-	-
Total PCBs	**16**	**39**	**12**	**1**	-

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

PRG = Preliminary Remediation Goal

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Cleanup Level are shaded

APPENDIX B

Masonry Walls Profiling Samples Data Summary

KAS

Masonry Profiling Data Summary
Former Tri-State Auto Parts
Brattleboro, Vermont

64 Elm Street
Brattleboro, Vermont

Masonry Sample *Sample Depth (in.)* *Sample Date*	*P-1* *0-1/8"* *9/10/09*	*P-2* *1/8"-1/4"* *9/10/09*	*P-3* *1/4"-1/2"* *9/10/09*	*P-4* *0-1/8"* *9/10/09*	*P-5* *1/8"-1/4"* *9/10/09*	*P-6* *1/4"-1/2"* *9/10/09*	*Duplicate P-1* *0-1/8"* *9/10/09*	*Duplicate P-2* *1/8"-1/4"* *9/10/09*	*Duplicate P-3* *1/4"-1/2"* *9/10/09*	TSCA Standard
PCBs, EPA Method 8082										
Aroclor - 1016	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Aroclor - 1221	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Aroclor - 1232	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Aroclor - 1242	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Aroclor - 1248	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Aroclor - 1254	**0.4**	**0.2**	**0.2**	**0.2**	ND <0.1	ND <0.1	**0.2**	**0.2**	**0.1**	-
Aroclor - 1260	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	ND <0.1	-
Total PCBs	**0.4**	**0.2**	**0.2**	**0.2**	ND	ND	**0.2**	**0.2**	**0.1**	1.0

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Standard of 1 ppm are shaded

APPENDIX C

Basement Masonry Wall Sample Data Summary

Additional Basement Masonry Sampling Data Summary
Former Tri-State Auto Parts
Brattleboro, Vermont

Masonry Sample *Sample Depth (ft.)* *Sample Date*	*BW-14* *0-0.5"* *9/10/09*	*BW-15* *0-0.5"* *9/10/09*	*BW-16* *0-0.5"* *9/10/09*	*BW-17* *0-0.5"* *9/10/09*	*BW-18* *0-0.5"* *9/10/09*	*Duplicate BW-18* *0-0.5"* *9/10/09*	TSCA Standard
PCBs, EPA Method 8082							
Aroclor - 1016	ND <2	ND <0.5	ND <2	ND <900	ND <1	ND <0.4	-
Aroclor - 1221	ND <2	ND <0.5	ND <2	ND <900	ND <1	ND <0.4	-
Aroclor - 1232	ND <2	ND <0.5	ND <2	ND <900	ND <1	ND <0.4	-
Aroclor - 1242	ND <2	ND <0.5	ND <2	ND <900	ND <1	ND <0.4	-
Aroclor - 1248	ND <2	ND <0.5	ND <2	ND <900	ND <1	ND <0.4	-
Aroclor - 1254	**14**	**4.8**	**17**	**8200**	**3**	**2.5**	-
Aroclor - 1260	ND<2	ND <0.5	ND<2	ND<900	ND<1	ND <0.4	-
Total PCBs	**14**	**4.8**	**17**	**8200**	**3**	**2.5**	1.0

NOTES:

All values reported in mg/kg, dry, unless otherwise indicated.

ND<1.0 = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Values above the TSCA Standard of 1 ppm are shaded

APPENDIX C

Remedial Option Cost Estimates
And
Example Hazardous Building Material Removal Specifications

Option 1: Renovation of "Old" Building, Demolition of "New" Building
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Task	Task Description						Subcontractor Costs	COMMENTS and ASSUMPTIONS
	Costs							
1.0	**Structural Engineer Assessment (for building)**						**$50,000**	
2.0	**Soil Removal, Disposal and Replacement / Removal of Hazardous Sump Sediment**							
	Pavment removal, testing and disposal or recycling.	**1**	@	**$5,000**	**/each**	**$5,000**		Assume six inches base course, $0.30/sf demo, $20/ton recycling, double total to include hauling costs
	Contaminated Soil Excavation	**365**	@	**$20**	**/yd3**	**$7,300**		Assumes 365 cy excavation of soils > Industrial RSLs for PAHs, As, Pb, & PCBs, 540 ton at $100/ton for solid waste landfill disposal
	Contaminated Soil Transport/Disposal (Solid waste landfill)	**540**	@	**$100**	**/ton**	**$54,000**		Assumes 0.6 cubic yards sump excavation; 1 ton disposal and trucking as hazardous waste for $1,000
	Fill for Soil Excavation	**121**	@	**$10**	**/yd3**	**$1,210**		Assumes 121 cubic yards backfill at $20/yd
	Haz Soil (sump) Excavation	**0.6**	@	**$50**	**/yd3**	**$30**		
	Haz Soil (sump) Characterization	**1**	@	**$250**	**/each**	**$250**		
	Haz Soil (sump) Transport/Disposal	**1**	@	**$1,000**	**/ton**	**$1,000**		
	Confirmatory Sampling and Analysis	**40**	@	**$350**	**/each**	**$14,000**		Analyze for PCBs, two metals, PAHs
	QAPP, Communication, Sampling and Report	**1**	@	**$12,000**	**/each**	**$12,000**	**$94,790**	Quality Assurance Project Plan, meetings, site work and report preparation
3.0	**Removal and Disposal of >10 ppm PCB Contaminated Concrete / Concrete Cap Installation**							
								Assumes 500 square feet of concrete removed to a depth of approximately 4 inches to yield 6 cubic yards of concrete
	Demo 500 ft^2 (6 cubic yds) of concrete floor	**500**	@	**$20**	**/ft2**	**$10,000**		Utilized KAS cost for 165 yards of new concrete
	Contaminated Concrete Disposal (Solid waste landfill)	**9**	@	**$100**	**/ton**	**$900**		Assumes concrete is a solid, not hazardous, waste
	New Concrete	**165**	@	**$300**	**/yd3**	**$49,500**	**$60,400**	
4.0	**Hazardous Cinder Block Wall Removal and Disposal ("Newer" Building)**							
								Assumes 40' long wall, 12' high = 480 square feet of wall
								Assumes approximately 540 8x8x16 cinder blocks, each @ 29 lbs, totaling approximately 8 tons of blocks
	Demo 40'x12' Cinder Block Wall w/PCB hazwaste	**480**	@	**$20**	**/ft2**	**$9,600**		Assumes all cinder blocks are hazardous waste
	Cinder Block Disposal (Haz)	**8**	@	**$250**	**/ton**	**$2,000**	**$11,600**	
4.1	**Demolition of "Newer" Building**							
	Remove/Dispose of ACBM flooring and mastics	**385**	@	**$5**	**/ft2**	**$1,925**		Assume $15 per square foot for building demolition
		2800	@	**$15**	**/ft2**	**$42,000**	**$43,925**	Assume 1400 square feet per floor, 2 floors for new building = 2800 square feet total
5.0	**Hazardous Brick Wall Removal and Disposal ("Older" Building)**							
								Assumes 25' long wall, 9' high = 225 square feet of wall, with 2 ranks of 7.5"x2.4"x3.5"-in bricks
								Assumes 13.5 bricks per square foot in double wall = 3038 bricks in wall
								Assumes 36 pounds of brick per square foot = 5.4 tons of brick in wall
								Assumes all bricks are hazardous waste
	Demo 25'x9' Brick Wall w/PCB hazwaste (2 ranks of brick wall)	**225**	@	**$20**	**/ft2**	**$4,500**		
	Brick Wall Disposal (Haz)	**11**	@	**$250**	**/ton**	**$2,750**	**$7,250**	
6.0	**Wood Floor, Floor Joists, Windows, Doors Removal and Disposal**							**Replacement windows and doors not included in costs.**
								Assume all flooring, joists are disposed as hazardous waste
								Assumes 6,936 square feet of flooring, 3.0 inches thick of red oak or equivalent
								Assumes (21) 9x11 inch joists, 28 feet long, (6) 9x11 inch joists, 40 feet long
								Assumes 44 lbs per cubic foot of wood: total = 51 tons
	Demo wood floor and joists as PCB hazwaste	**6936**	@	**$20**	**/ft2**	**$138,720**		Assumes $75,000 for structural engineering oversight, labor to shore building
	Joist, Floor Disposal	**51**	@	**$200**	**/ton**	**$10,243**		
	Engineering design, shoring of structure	**1**	@	**$75,000**	**lump**	**$75,000**	**$223,963**	
7.0	**Paint Removal (interior old building)**							
								Assume 293 lineal feet in 'old' building with 14 foot walls on two floors = 293x14x2 = 8204 square feet
								Assume 1/2 inch wall removal to achieve < 1 PPM PCB
								Disposal costs assume 5 lbs brick and 8 lbs blast media per square foot is hazardous waste
	Sandblast Lead and PCB contaminated paint on walls	**8204**	@	**$50**	**/ft2**	**$410,200**		Cost estimates from B. Morganstern, DecTam, North Reading, MA
	Disposal of blast media and brick/concrete from wall	**33**	@	**$250**	**/ton**	**$8,183**	**$418,383**	
8.0	**Window Caulk Removal**							
								Assume PCB contaminated but not to hazardous levels
	Remove/Dispose ACM-PCB caulk from 45 windows/7 doors	**52**	@	**$300**	**each**	**$15,600**	**$15,600**	Assume PCB contaminated but not to hazardous levels
9.0	**Exterior Paint**							
	Assume some exterior paint is PCB, sandblast	**5040**	@	**$50**	**/ft2**	**$252,000**		Assume 180 feet by 28 feet = 3020x28 = 5040 square feet
	Disposal of blast media and brick/concrete from wall	**33**	@	**$250**	**/ton**	**$8,183**	**$260,183**	Assume 1/2 inch wall removal to achieve < 1 PPM PCB
								Disposal costs assume 5 lbs brick and 8 lbs blast media per square foot is hazardous waste
								Cost estimates from B. Morganstern, DeTam, North Reading, MA
10.0	**Roof**							
	Assuming roof is ACM per report quantities	**7000**	@	**$5**	**/ft2**	**$35,000**	**$35,000**	Assumes 7,000 sq ft at $5/ft2 for disposal
11.0	**Other Abatement-Related Items**							
	Remove/Dispose of ACM Pipe Insulation	**12**	@	**$80**	**/ln.ft.**	**$960**		
	Abatement Plans and Specifications	**1**	@	**$2,500**	**/each**	**$2,500**		
	Shifts EH&S Monitoring	**15**	@	**$650**	**/shift**	**$9,750**		
	Samples for dust confirmation post cleanup of haz-waste	**10**	@	**$140**	**/each**	**$1,400**		
	NIOSH 5503 Mod Method Air Samples (PCBs) (3/day)	**45**	@	**$175**	**/each**	**$7,875**	**$22,485**	
	Subcontractor Costs						**$1,243,580**	Rounded sum
	15% Engineering, Consulting, Permitting						**$186,540**	Project management, coordination, consulting, reporting, pre-design, as-builts, permitting, etc.
	Plus 20% Contingency						**$248,720**	
	TOTAL ESTIMATE (ALSO SEE TABLE 6 OF TEXT)						**$1,678,840**	Details of construction contingency separated from demo contingency on Table 6

Option 2: Demolition of Entire Complex and Testing of Excavated Soil
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Task	Task Description						Subcontractor Costs	COMMENTS and ASSUMPTIONS
	1.0 Removal and Disposal of Hazardous Sump Sediment and Additional Soil Sampling							
	Pavment removal, testing and disposal or recycling.	1	@	$5,000	/each	$5,000		Assume six inches base course, $0.30/sf demo, $20/ton recycling, double total to include hauling costs
	Contaminated Soil Excavation	365	@	$20	/yd3	$7,300		Assumes 365 cy excavation of soils > Industrial RSLs for PAHs, As, Pb, & PCBs, 540 ton at $100/ton for solid waste landfill disposal
	Contaminated Soil Transport/Disposal (Solid waste landfill)	540	@	$100	/ton	$54,000		Assumes 0.6 cubic yards sump excavation; 1 ton disposal and trucking as hazardous waste for $1,000
	Fill for Soil Excavation	121	@	$10	/yd3	$1,210		Assumes 121 cubic yards backfill at $20/yd
	Haz Soil (sump) Excavation	0.6	@	$50	/yd3	$30		
	Haz Soil (sump) Characterization	1	@	$250	/each	$250		
	Haz Soil (sump) Transport/Disposal	1	@	$1,000	/ton	$1,000		
	Confirmatory Sampling and Analysis	40	@	$300	/each	$12,000		Analyze for PCBs, two metals, PAHs
	QAPP, Communication, Sampling and Report	1	@	$10,000	/each	$10,000	$90,790	Quality Assurance Project Plan, meetings, site work and report preparation
	2.0 Hazardous Brick Wall Removal and Disposal ("Older" Building)							
								Assumes 25' long wall, 12' high = 300 square feet of wall, with 2 ranks of 4-in bricks
	Demo 25'x9' Brick Wall w/PCB hazwaste (2 ranks of brick wall)	600	@	$20	/ft2	$12,000		Assumes 6.5 bricks per square foot = 1950 bricks per wall
	Brick Wall Disposal (Haz)	11	@	$250	/ton	$2,750	$14,750	Assumes 36 pounds of brick per square foot = 5.4 tons of brick per wall; 10.8 tons in two walls
	3.0 Paint Removal (Interior old building)							
								Assume 280 lineal feet in 'old' building with 12 foot walls on two floors = 280x12x2 = 6720 square feet
								Assume 1/2 inch wall removal to achieve < 1 PPM PCB
	Sandblast Lead and PCB contaminated paint on walls	6720	@	$50	/ft2	$336,000		Disposal costs assume 5 lbs brick and 8 lbs blast media per square foot is hazardous waste
	Disposal of blast media and brick/concrete from wall	44	@	$250	/ton	$11,000	$347,000	Cost estimates from B. Morganstern, DecTam, North Reading, MA
	4.0 Interior Asbestos Removal							
	Remove/Dispose of ACBM flooring and mastics	385	@	$5	/ft2	$1,925		Cost estimate from RPF Associates, Ind. Northwood, NH
	Remove/Dispose of ACM Pipe Insulation	12	@	$80	/ln.ft.	$960		
	Abatement Plans and Specifications	1	@	$2,500		$2,500	$5,385	
	5.0 Window Caulk Removal							
	Remove/Dispose ACM-PCB caulk from 50 windows/4 doors	54	@	$300	lin ft	$16,200	$16,200	Assume PCB contaminated but not to hazardous levels
	6.0 Roof Removal							
	Assuming roof is ACM per report quantities	7000	@	$5	/ft2	$35,000	$35,000	Assumes 7,000 sq ft at $5/ft2 for disposal
	7.0 Wood Floor, Floor Joists, Windows, Doors Removal and Disposal							
								Assume all flooring, joists are disposed as hazardous waste
								Assumes 11,000 square feet of flooring, 2 inches thick of red oak or equivalent
								Assumes 14 8x8 inch joists, 30 feet long, 6 8x8 inch joists, 40 feet long
	Demo wood floor and joists as PCB hazwaste	6600	@	$20	/ft2	$132,000		Assumes 44 lbs per cubic foot of wood: total = 47 tons
	Joist, Floor Disposal	49	@	$200	/ton	$9,800		Assumes $75,000 for structural engineering oversight, labor to shore building
	Engineering design, shoring of structure	1	@	$75,000	lump	$75,000	$216,800	
	8.0 Hazardous Cinder Block Wall Removal and Disposal (Building Addition)							
	Demo 75'x12'x28' Cinder Block Wall w/PCB hazwaste	480	@	$20	/ft2	$9,600		Assumes 35' long wall, 12' high = 480 square feet of wall
	Cinder Block Disposal (Haz)	8	@	$250	/ton	$2,000	$11,600	
	9.0 Demolition - Non-Hazardous Building Materials							
								Assume $15 per square foot for building demolition
								Assume 1300 square feet per floor, 2 floors for new building = 1300 square feet total
								Assume 3500 square feet per floor, 2 floors for old building = 7000 square feet
								Assumes basement of old building is under new building, and removed nonhazardous walls used as fill
	Building demo	8300	@	$15	/ft2	$124,500	$124,500	Total square footage = 1300+7000= 8,300
	11.0 Air Monitoring for Asbestos							
	Shifts EH&S Monitoring	20	@	$650	/shift	$13,000		Costs from RPF Associates, Inc. of Northwood, NH
	Samples for dust confirmation post cleanup of haz-waste	10	@	$140	/each	$1,400		
	NIOSH 5503 Mod Method Air Samples (PCBs) (3/day)	60	@	$175	/each	$10,500	$24,900	
	Subcontractor Costs						$886,925	
	15% Engineering, Consulting, Permitting						$133,040	Project management, coordination, consulting, reporting, pre-design, as-builts, permitting, etc.
	Plus 10% Contingency						$88,690	
	TOTAL ESTIMATE (ALSO SEE TABLE 6 OF TEXT)						**$1,108,655**	

Option 3A: Demolition of Entire Complex
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Task	Task Description						Subcontractor Costs	COMMENTS and ASSUMPTIONS
	Costs							
1.0	**Removal and Disposal of Hazardous Sump Sediment and Additional Soil Sampling**							
	Pavment removal, testing and disposal or recycling.	**1**	**@**	**$5,000**	**/each**	**$5,000**		Assume six inches base course, $0.30/sf demo, $20/ton recycling, double total to include hauling costs
	Contaminated Soil Excavation	**365**	**@**	**$20**	**/yd3**	**$7,300**		Assumes 365 cy excavation of soils > Industrial RSLs for PAHs, As, Pb, & PCBs, 540 ton at $100/ton for solid waste landfill disposal
	Contaminated Soil Transport/Disposal (Solid waste landfill)	**540**	**@**	**$100**	**/ton**	**$54,000**		Assumes 0.6 cubic yards sump excavation; 1 ton disposal and trucking as hazardous waste for $1,000
	Fill for Soil Excavation	**121**	**@**	**$10**	**/yd3**	**$1,210**		Assumes 121 cubic yards backfill at $20/yd
	Haz Soil (sump) Excavation	**0.6**	**@**	**$50**	**/yd3**	**$30**		
	Haz Soil (sump) Characterization	**1**	**@**	**$250**	**/each**	**$250**		
	Haz Soil (sump) Transport/Disposal	**1**	**@**	**$1,000**	**/ton**	**$1,000**		
	Soil Sampling and Analysis	**20**	**@**	**$300**	**/each**	**$6,000**		Analyze for PCBs, two metals, PAHs
	QAPP, Communication, Sampling and Report	**1**	**@**	**$5,000**	**/each**	**$5,000**	**$79,790**	Quality Assurance Project Plan, meetings, site work and report preparation
2.0	**Hazardous Brick Wall Removal and Disposal ("Older" Building)**							
								Assumes 25' long wall, 12' high = 300 square feet of wall, with 2 ranks of 4-in bricks
	Demo 25'x9' Brick Wall w/PCB hazwaste (2 ranks of brick wall)	**600**	**@**	**$20**	**/ft2**	**$12,000**		Assumes 6.5 bricks per square foot = 1950 bricks per wall
	Brick Wall Disposal (Haz)	**11**	**@**	**$250**	**/ton**	**$2,750**	**$14,750**	Assumes 36 pounds of brick per square foot = 5.4 tons of brick per wall; 10.8 tons in two walls
3.0	**Paint Removal (Interior old building)**							
								Assume 280 lineal feet in 'old' building with 12 foot walls on two floors = 280x12x2 = 6720 square feet
								Assume 1/2 inch wall removal to achieve < 1 PPM PCB
	Sandblast Lead and PCB contaminated paint on walls	**6720**	**@**	**$50**	**/ft2**	**$336,000**		Disposal costs assume 5 lbs brick and 8 lbs blast media per square foot is hazardous waste
	Disposal of blast media and brick/concrete from wall	**44**	**@**	**$250**	**/ton**	**$11,000**	**$347,000**	Cost estimates from B. Morganstern, DecTam, North Reading, MA
4.0	**Interior Asbestos Removal**							
	Remove/Dispose of ACBM flooring and mastics	**385**	**@**	**$5**	**/ft2**	**$1,925**		Cost estimate from RPF Associates, Ind. Northwood, NH
	Remove/Dispose of ACM Pipe Insulation	**12**	**@**	**$80**	**/ln.ft.**	**$960**		
	Abatement Plans and Specifications	**1**	**@**	**$2,500**		**$2,500**	**$5,385**	
5.0	**Window Caulk Removal**							
	Remove/Dispose ACM-PCB caulk from 50 windows/4 doors	**54**	**@**	**$300**	**lin ft**	**$16,200**	**$16,200**	Assume PCB contaminated but not to hazardous levels
6.0	**Roof Removal**							
	Assuming roof is ACM per report quantities	**7000**	**@**	**$5**	**/ft2**	**$35,000**	**$35,000**	Assumes 7,000 sq ft at $5/ft2 for disposal
7.0	**Wood Floor, Floor Joists, Windows, Doors Removal and Disposal**							
								Assume all flooring, joists are disposed as hazardous waste
								Assumes 11,000 square feet of flooring, 2 inches thick of red oak or equivalent
								Assumes 14 8x8 inch joists, 30 feet long, 6 8x8 inch joists, 40 feet long
	Demo wood floor and joists as PCB hazwaste	**6600**	**@**	**$20**	**/ft2**	**$132,000**		Assumes 44 lbs per cubic foot of wood: total = 47 tons
	Joist, Floor Disposal	**49**	**@**	**$200**	**/ton**	**$9,800**		Assumes $75,000 for structural engineering oversight, labor to shore building
	Engineering design, shoring of structure	**1**	**@**	**$75,000**	**lump**	**$75,000**	**$216,800**	
8.0	**Hazardous Cinder Block Wall Removal and Disposal (Building Addition)**							
	Demo 75'x12'x28' Cinder Block Wall w/PCB hazwaste	**480**	**@**	**$20**	**/ft2**	**$9,600**		Assumes 35' long wall, 12' high = 480 square feet of wall
	Cinder Block Disposal (Haz)	**8**	**@**	**$250**	**/ton**	**$2,000**	**$11,600**	
9.0	**Building Demolition**							
								Assume $15 per square foot for building demolition
								Assume 1300 square feet per floor, 2 floors for new building = 1300 square feet total
								Assume 3500 square feet per floor, 2 floors for old building = 7000 square feet
								Assumes basement of old building is under new building, and removed nonhazardous walls used as fill
	Building demo							Total square footage = 1300+7000= 8,300
		8300	**@**	**$15**	**/ft2**	**$124,500**	**$124,500**	
10.0	**Air Monitoring for Asbestos**							
	Shifts EH&S Monitoring	**20**	**@**	**$650**	**/shift**	**$13,000**		Costs from RPF Associates, Inc. of Northwood, NH
	Samples for dust confirmation post cleanup of haz-waste	**10**	**@**	**$140**	**/each**	**$1,400**		
	NIOSH 5503 Mod Method Air Samples (PCBs) (3/day)	**60**	**@**	**$175**	**/each**	**$10,500**	**$24,900**	
	Subcontractor Costs						**$875,925**	
	10% Engineering, Consulting, Permitting						**$87,590**	Project management, coordination, consulting, reporting, pre-design, as-builts, permitting, etc.
	Plus 10% Contingency						**$87,590**	
	TOTAL ESTIMATE (ALSO SEE TABLE 6 OF TEXT)						**$1,051,105**	

Option 3B: Demolition of Entire Complex
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Costs

Task	Task Description						Subcontractor Costs	COMMENTS and ASSUMPTIONS
1.0	**Removal and Disposal of Hazardous Sump Sediment, Additional Soil Sampling**							
	Pavment removal, testing and disposal or recycling.	**1**	**@**	**$5,000**	**/each**	**$5,000**		Assume six inches base course, $0.30/sf demo, $20/ton recycling, double total to include hauling costs
	Contaminated Soil Excavation	**365**	**@**	**$20**	**/yd3**	**$7,300**		Assumes 365 cy excavation of soils > Industrial RSLs for PAHs, As, Pb, & PCBs, 540 ton at $100/ton for solid waste landfill disposal
	Contaminated Soil Transport/Disposal (Solid waste landfill)	**540**	**@**	**$100**	**/ton**	**$54,000**		Assumes 0.6 cubic yards sump excavation; 1 ton disposal and trucking as hazardous waste for $1,000
	Fill for Soil Excavation	**121**	**@**	**$10**	**/yd3**	**$1,210**		Assumes 121 cubic yards backfill at $20/yd
	Haz Soil (sump) Excavation	**0.6**	**@**	**$50**	**/yd3**	**$30**		
	Haz Soil (sump) Characterization	**1**	**@**	**$250**	**/each**	**$250**		
	Haz Soil (sump) Transport/Disposal	**1**	**@**	**$1,000**	**/ton**	**$1,000**		
	Soil Sampling and Analysis	**20**	**@**	**$300**	**/each**	**$6,000**		Analyze for PCBs, two metals, PAHs
	QAPP, Communication, Sampling and Report	**1**	**@**	**$5,000**	**/each**	**$5,000**	**$79,790**	Quality Assurance Project Plan, meetings, site work and report preparation
2.0	**Hazardous Brick Wall Removal and Disposal ("Older" Building)**							
								Assumes 25' long wall, 12' high = 300 square feet of wall, with 2 ranks of 4-in bricks
	Demo 25'x9' Brick Wall w/PCB hazwaste (2 ranks of brick wall)	**600**	**@**	**$20**	**/ft2**	**$12,000**		Assumes 6.5 bricks per square foot = 1950 bricks per wall
	Brick Wall Disposal (Haz)	**11**	**@**	**$250**	**/ton**	**$2,750**	**$14,750**	Assumes 36 pounds of brick per square foot = 5.4 tons of brick per wall; 10.8 tons in two walls
3.0	**Paint Removal (Interior old building)**							
								Assume 280 lineal feet in 'old' building with 12 foot walls on two floors = 280x12x2 = 6720 square feet
								Assume 1/2 inch wall removal to achieve < 1 PPM PCB
	Sandblast Lead and PCB contaminated paint on walls	**6720**	**@**	**$50**	**/ft2**	**$336,000**		Disposal costs assume 5 lbs brick and 8 lbs blast media per square foot is hazardous waste
	Disposal of blast media and brick/concrete from wall	**44**	**@**	**$250**	**/ton**	**$11,000**	**$347,000**	Cost estimates from B. Morganstern, DecTam, North Reading, MA
4.0	**Interior Asbestos Removal**							
	Remove/Dispose of ACBM flooring and mastics	**385**	**@**	**$5**	**/ft2**	**$1,925**		Cost estimate from RPF Associates, Ind. Northwood, NH
	Remove/Dispose of ACM Pipe Insulation	**12**	**@**	**$80**	**/ln.ft.**	**$960**		
	Abatement Plans and Specifications	**1**	**@**	**$2,500**		**$2,500**	**$5,385**	
5.0	**Window Caulk Removal**							
	Remove/Dispose ACM-PCB caulk from 50 windows/4 doors	**54**	**@**	**$300**	**lin ft**	**$16,200**	**$16,200**	Assume PCB contaminated but not to hazardous levels
6.0	**Roof Removal**							
	Assuming roof is ACM per report quantities	**7000**	**@**	**$5**	**/ft2**	**$35,000**	**$35,000**	Assumes 7,000 sq ft at $5/ft2 for disposal
7.0	**Wood Floor, Floor Joists, Windows, Doors Removal and Disposal**							
								Assume all flooring, joists are disposed as hazardous waste
								Assumes 11,000 square feet of flooring, 2 inches thick of red oak or equivalent
								Assumes 14 8x8 inch joists, 30 feet long, 6 8x8 inch joists, 40 feet long
	Demo wood floor and joists as PCB hazwaste	**6600**	**@**	**$20**	**/ft2**	**$132,000**		Assumes 44 lbs per cubic foot of wood: total = 47 tons
	Joist, Floor Disposal	**49**	**@**	**$200**	**/ton**	**$9,800**		Assumes $75,000 for structural engineering oversight, labor to shore building
	Engineering design, shoring of structure	**1**	**@**	**$75,000**	**lump**	**$75,000**	**$216,800**	
8.0	**Hazardous Cinder Block Wall Removal and Disposal (Building Addition)**							
	Demo 75'x12'x28' Cinder Block Wall w/PCB hazwaste	**480**	**@**	**$20**	**/ft2**	**$9,600**		Assumes 35' long wall, 12' high = 480 square feet of wall
	Cinder Block Disposal (Haz)	**8**	**@**	**$250**	**/ton**	**$2,000**	**$11,600**	
9.0	**Building Demolition**							
								Assume $15 per square foot for building demolition
								Assume 1300 square feet per floor, 2 floors for new building = 1300 square feet total
								Assume 3500 square feet per floor, 2 floors for old building = 7000 square feet
								Assumes basement of old building is under new building, and removed nonhazardous walls used as fill
								Total square footage = 1300+7000= 8,300
	Building demo	**8300**	**@**	**$15**	**/ft2**	**$124,500**	**$124,500**	
10.0	**Air Monitoring for Asbestos**							
	Shifts EH&S Monitoring	**20**	**@**	**$650**	**/shift**	**$13,000**		Costs from RPF Associates, Inc. of Northwood, NH
	Samples for dust confirmation post cleanup of haz-waste	**10**	**@**	**$140**	**/each**	**$1,400**		
	NIOSH 5503 Mod Method Air Samples (PCBs) (3/day)	**60**	**@**	**$175**	**/each**	**$10,500**	**$24,900**	
	Subcontractor Costs						**$875,925**	
	10% Engineering, Consulting, Permitting						**$87,590**	Project management, coordination, consulting, reporting, pre-design, as-builts, permitting, etc.
	Plus 10% Contingency						**$87,590**	
	TOTAL ESTIMATE (ALSO SEE TABLE 6 OF TEXT)						**$1,051,105**	

COST DETAILS - SLAB FOUNDATION (OPTION 2)
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

CONCEPTUAL ENGINEER'S OPINION OF PROBABLE COST
FOR
PROPOSED BUILDING OPTION
64 ELM STREET BRATTLEBORO, VERMONT
PREPARED BY PATHWAYS CONSULTING, LLC (Project No. 11897)

February 11, 2010

Item	Item Description	Quantity	Unit	Unit Cost	Total Cost
	Site Work				
1	Common Excavation (Excavation Material Placed in Existing Foundation)	500	CY	$12.00	$6,000.00
2	Common Fill	1,960	CY	$14.00	$27,440.00
3	Concrete Foundation Demolition (Disposal On Site)	43	CY	$50.00	$2,150.00
4	Compacted Crushed Gravel (2-foot Thickness)	545	CY	$35.00	$19,075.00
5	3/4-inch Crushed Stone (2-foot Thickness)	115	CY	$45.00	$5,175.00
6	Reinforced Concrete Foundation and Footings	196	CY	$400.00	$78,400.00
Site Work Total					**$138,240.00**
	Mobilization/Demobilization/Miscellaneous Work & Cleanup				
7	Mobilization/Demobilization (Assume 7.5% of Construction Cost)	1	LS	$5,880.00	$5,880.00
8	Miscellaneous Work & Cleanup (Assume 5% of Construction Cost)	1	LS	$10,368.00	$10,368.00
Mobilization/Demobilization/Miscellaneous Work & Cleanup Total					**$16,248.00**

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION PROJECT COST	$154,488.00
10% CONSTRUCTION COST CONTINGENCY	$23,173.20
TOTAL ENGINEER'S OPINION OF PROBABLE COST	$177,661.20

NOTE: This Engineer's Opinion of Probable Cost (EOPC) was established from a conceptual plan which was developed from New England EnviroStrategies, INC, Dated February 2010, and Developed by Pathways Consulting, LLC. In providing this EOPC, the Client understands that Pathways Consulting, LLC (Pathways) has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that this EOPC was developed on the basis of our experience with other project of similarity. Pathways makes no warranty, express or implied, that the bids or the negotiated cost of the Work will not vary from this EOPC. If formal plans are developed for this project, Pathways must be notified so that this EOPC can be revised to reflect actual design conditions and updated construction costs.

COST DETAILS - POROUS PAVEMENT (OPTION 3A)
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

CONCEPTUAL ENGINEER'S OPINION OF PROBABLE COST
FOR
POROUS PAVEMENT PARKING LOT OPTION
64 ELM STREET BRATTLEBORO, VERMONT
PREPARED BY PATHWAYS CONSULTING, LLC (Project No. P3557)

February 3, 2010

Item	Item Description	Quantity	Unit	Unit Cost	Total Cost
	Site Work				
1	Common Excavation (Excavation Material Placed in Existing Foundation)	415	CY	$12.00	$4,980.00
2	Common Fill	358	CY	$14.00	$5,012.00
3	Concrete Foundation Demolition (Disposal On Site)	31	CY	$50.00	$1,550.00
4	Crushed Stone (ASHTO No. 3 Gradation) (16-inch Thickness)	386	SY	$45.00	$17,370.00
5	3/8-inch Pea Gravel (3-inch Thickness)	72	CY	$35.00	$2,520.00
6	Bank-Run Gravel (NHDOT 304.1) (12-inch Thickness)	97	CY	$32.00	$3,104.00
7	3/4-inch Washed Stone (ASHTO No. 57 Gradation) (4-inch Thickness)	290	CY	$50.00	$14,500.00
8	Porous Bituminous Concrete Pavement (6-inch Thickness)	191	TN	$175.00	$33,425.00
9	Granite Curb	385	LF	$35.00	$13,475.00
10	Pavement Marking (4-inch White Line)	433	LF	$1.00	$433.00
11	Pavement Marking (Handicap Symbol)	2	EA	$250.00	$500.00
12	Impermeable Liner (1 Layer 12 Mil Polyethylene, overlapped)	7,818	SF	$1.17	$9,147.06
13	Warning Tape	1	LS	$500.00	$500.00
Site Work Total					**$101,536.06**
	Mobilization/Demobilization/Miscellaneous Work & Cleanup				
12	Mobilization/Demobilization (Assume 7.5% of Construction Cost)	1	LS	$7,615.20	$7,615.20
13	Miscellaneous Work & Cleanup (Assume 5% of Construction Cost)	1	LS	$5,076.80	$5,076.80
Mobilization/Demobilization/Miscellaneous Work & Cleanup Total					**$12,692.01**

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION PROJECT COST	$114,228.07
15% CONSTRUCTION COST CONTINGENCY	$17,134.21
TOTAL ENGINEER'S OPINION OF PROBABLE COST	$131,362.28

NOTE: This Engineers Opinion of Probable Cost (EOPC) was established from a conceptual plan which was developed from New England EnviroStrategies, INC, Dated February 2010, and Developed by Pathways Consulting, LLC. In providing this EOPC, the Client understands that Pathways Consulting (Pathways) has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that this EOPC was developed on the basis of our experience with other project of similarity. Pathways makes no warranty, express or implied, that the bids or the negotiated cost of the Work will not vary from this EOPC. If formal plans are developed for this project, Pathways must be notified so that this EOPC can be revised to reflect actual design conditions and updated construction costs.

COST DETAILS - STANDARD PAVEMENT (OPTION 3B)
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

CONCEPTUAL ENGINEER'S OPINION OF PROBABLE COST
FOR
STANDARD PAVEMENT PARKING LOT OPTION
64 ELM STREET BRATTLEBORO, VERMONT
PREPARED BY PATHWAYS CONSULTING, LLC (Project No. P3557)

February 3, 2010

Item	Item Description	Quantity	Unit	Unit Cost	Total Cost
	Site Work				
1	Common Excavation (Excavation Material Placed in Existing Foundation)	350	CY	$12.00	$4,200.00
2	Common Fill	504	CY	$14.00	$7,056.00
3	Concrete Foundation Demolition (Disposal On Site)	31	CY	$50.00	$1,550.00
4	Sand (6-inch Thickness)	145	SY	$22.00	$3,190.00
5	6-inch Minus Dense Graded (18-inch Thickness)	435	CY	$35.00	$15,225.00
6	3/4-inch Minus Dense Graded (6-inch Thickness)	145	CY	$40.00	$5,800.00
7	Bituminous Concrete Pavement (6-inch Thickness)	292	TN	$95.00	$27,740.00
8	Granite Curb	385	LF	$35.00	$13,475.00
9	Pavement Marking (4-inch White Line)	433	LF	$1.00	$433.00
10	Pavement Marking (Handicap Symbol)	2	EA	$250.00	$500.00
11	Marking Tape	1	LS	$500.00	$500.00
Site Work Total					**$75,469.00**
	Mobilization/Demobilization/Miscellaneous Work & Cleanup				
11	Mobilization/Demobilization (Assume 7.5% of Construction Cost)	1	LS	$5,660.18	$5,660.18
12	Miscellaneous Work & Cleanup (Assume 5% of Construction Cost)	1	LS	$3,773.45	$3,773.45
Mobilization/Demobilization/Miscellaneous Work & Cleanup Total					**$9,433.63**

ENGINEER'S OPINION OF PROBABLE CONSTRUCTION PROJECT COST	$84,902.63
15% CONSTRUCTION COST CONTINGENCY	$12,735.39
TOTAL ENGINEER'S OPINION OF PROBABLE COST	$97,638.02

NOTE: This Engineers Opinion of Probable Cost (EOPC) was established from a conceptual plan which was developed from New England EnviroStrategies, INC, Dated February 2010, and Developed by Pathways Consulting, LLC. In providing this EOPC, the Client understands that Pathways Consulting (Pathways) has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that this EOPC was developed on the basis of our experience with other project of similarity. Pathways makes no warranty, express or implied, that the bids or the negotiated cost of the Work will not vary from this EOPC. If formal plans are developed for this project, Pathways must be notified so that this EOPC can be revised to reflect actual design conditions and updated construction costs.

Corrective Action O/M Cost Details
Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan
64 Elm Street Brownfields Project
Brattleboro, Vermont

Standard Paving O&M				**Porous Paving O&M**				
Number of Occurrences	Current Cost	Total Line Item Net Present Value	Item	Number of Occurrences	Current Cost	Total Line Item Net Present Value	Item	Reference
3	$ 2,000	$5,690	Crack sealing every 8 years	15	$ 950	$11,591	Repainting every two years	Pathways Consulting LLC
15	$ 950	$11,591	Repainting every two years	1	$ 4,750	$6,115	Sweeping every year	UNH Stormwater Center
1	$ 4,750	$4,625	Skim coat at 20 years 50 tons @ $95/ton	1	$ 5,000	$4,869	Patching	Pathways/NE2S
5	$ 1,500	$6,929	Reporting every five years	5	$ 1,500	$6,929	Reporting every five years	NE2S estimate
		$28,835	**TOTAL (2.7% real discount rate used)**			**$29,503**	**TOTAL (2.7% real discount rate used)**	U.S. OMB Circular A-94

Payment Schedule	Year	Standard Asphalt Crack Sealing	Repainting	Standard Asphalt Skim Coat	Reporting	Sweep Porous Asphalt	Patching Porous Asphalt
2011	1					$ 300	
2012	2		$ 950			$ 300	
2013	3					$ 300	
2014	4		$ 950			$ 300	
2015	5				$ 1,500	$ 300	
2016	6		$ 950			$ 300	
2017	7					$ 300	
2018	8	$ 2,000	$ 950			$ 300	
2019	9					$ 300	
2020	10		$ 950	$ 4,750	$ 1,500	$ 300	
2021	11					$ 300	
2022	12		$ 950			$ 300	
2023	13					$ 300	
2024	14		$ 950			$ 300	
2025	15				$ 1,500	$ 300	$ 5,000
2026	16	$ 2,000	$ 950			$ 300	
2027	17					$ 300	
2028	18		$ 950			$ 300	
2029	19					$ 300	
2030	20		$ 950		$ 1,500	$ 300	
2031	21					$ 300	
2032	22		$ 950			$ 300	
2033	23					$ 300	
2034	24	$ 2,000	$ 950			$ 300	
2035	25				$ 1,500	$ 300	
2036	26		$ 950			$ 300	
2037	27					$ 300	
2038	28		$ 950			$ 300	
2039	29					$ 300	
2040	30		$ 950			$ 300	

BID DOCUMENTS & TECHNICAL SPECIFICATION

{SITE or PROJECT NAME}
{LOCATION}

ASBESTOS ABATEMENT & RELATED WORK

{DATE}

CONTENTS:

PART I

INVITATION TO BID

INVITATION TO BID

The **{ EDIT }** requests proposals from New Hampshire-licensed asbestos contractors for the **{EDIT NAME / PROJECT**}: Asbestos Abatement & Related Work. Bids will be received at the **{EDIT for CONTACT INFO**}, attention {**CONTACT NAME**}, by 2:00 PM on {**DATE**}.

The Project Specification and Bid Documents may be obtained by contacting RPF Associates, Inc., 320 First NH Turnpike, Northwood, NH 03261, 603-942-5432. Bid Documents and Specifications will be provided at the prebid conference.

A mandatory pre-bid conference is scheduled for {**DATE AND TIME**}. The prebid conference will be held at the {**SITE NAME**}.

All bids for this project are subject to the provisions of all applicable federal, state, and local codes, laws, and ordinances. The {**EDIT NAME**} (Owner) reserve the right to reject any or all bids, or any parts thereof, as it deems in its best interest.

The successful bidder will be required to furnish certificates of insurance, naming the {**EDIT NAME**} as additional insured, and **{Edit for Bid bond and P&P as needed** } payment and performance bond equal to 100% of the contract sum, as required in the Contract Documents.

PART II

INSTRUCTION TO BIDDERS

INSTRUCTION TO BIDDERS
(Total of 3 Pages)

PART 1: SUCCESSFUL BIDDER

1.1 The bid will be awarded based on the Owner's evaluation. Owner reserves the right to waive irregularities in bidding process.

1.2 Criteria that may be used in the evaluation of bids, in addition to bid pricing and where applicable to the particular project, include the following factors:

(1) Responsiveness to the bidding requirements;
(2) Specific experience with similar projects in nature and size;
(3) Background and experience of staff member to be assigned to the project;
(4) Availability and locality of the firm;
(5) Ability to communicate ideas;
(6) Capacity and ability to provide necessary disciplines;
(7) Qualifications of any subcontractors;
(8) Accuracy in estimating time and cost requirements;
(9) Quality of references and past experience;
(10) Cost of project.

1.3 On award, the Successful Bidder will be required to enter a formal, written agreement, signed by the successful bidder and the purchasing agency.

PART 2: COPIES OF BID DOCUMENTS

2.1 Set of Bid Documents may be obtained by contacting RPF Associates, Inc. (603-942-5432). Complete sets of Bid Documents shall be used in preparing bids. Neither the Owner nor the Owner's Representative shall be held responsible for errors or misrepresentations resulting from the use of incomplete sets of Bid Documents.

2.2 The Owner and Owner's Consultant make the Bid Documents available for the purposes of obtaining bids on the Work and for no other reason or use.

PART 3: EXAMINATION OF SITE AND CONTRACT DOCUMENTS

3.1 Before submitting a Bid, each Bidder must: (a) examine the Contract Documents thoroughly; (b) attend a mandatory Prebid Conference, as scheduled by the Owner, in order to review the site conditions or other local conditions which may affect cost, progress or performance of the Work; (c) be familiar with and review all applicable federal, state, and local laws, ordinances, codes, regulations, and standards that may affect the cost, performance, progress, or other aspects of the Work; (d) correlate the Bidder's observations of the work, estimates of material to be removed, conditions of the work, and requirements of the Contract Documents; and (e) confirm all quantities of ACM to be removed.

3.2 Prior to submitting each Bid, the Bidder will, at no cost to the Owner or Owner's Representative, make additional investigations and tests as required and deemed necessary to determine and prepare the Bid for performance of the Work in accordance with the time, price, technical requirements, and other terms and conditions of the Contract Documents.

3.3 The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with the requirements of the Bid Documents and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for the performance of the Work.

PART 4: INTERPRETATIONS

4.1 All questions about the meaning or intent of the Contract Documents shall be submitted in writing to the Owner's Representative. Only questions answered by formal, written addenda will be binding.

PART 5: BID SECURITIES, INSURANCE, AND BONDING

5.1 Every Bid submitted shall be accompanied by a certified check, treasurer's check, of Bid Bond, issued by a surety licensed to provide such services under the laws of the State of New Hampshire, and made payable to the Owner. The amount of the bid security shall be 5% of the total Bid Price, but in no case more than $50,000.00 or less than $250.00.

5.2 The Bid Security of Successful Bidder will be retained until the Successful Bidder and the Owner have executed the Abatement Agreement and the required Contract Securities have been furnished. If the Successful Bidder fails to execute the Abatement Agreement and furnish all required Contract Securities within 7 days prior to commencement of Work, the Owner may annul the Notice of Award and the Bid Security of that Bidder will be forfeited. Bid Securities of all other Bidders will be returned within 30 days of the Bid opening.

5.3 The Successful Bidder (and all subcontractors) shall, at all times, comply with all requirements of the Workmen's Compensation laws of New Hampshire, and shall deliver to the Owner, prior to the commencement of work, evidence of such compliance, and shall maintain such insurance (including asbestos specific coverage) as shall protect Contractor and Owner from claims for damages because of damage to property and/or bodily injury, including death, which may arise during Contractor's operations under this Agreement.

The Successful Bidder (and all subcontractors) will maintain in full force and effect:

A. Comprehensive General Liability insurance written on occurrence form, including complete operations and asbestos coverage, personal injury liability coverage, broad form property damage liability coverage, and contractual liability coverage insuring the agreements contained herein. Minimum limits of liability carried on such insurance shall be $1,000,000 each occurrence, combined single limit for bodily injury and property damage.

B. Automobile liability insurance for owned, non-owned, and hired vehicles. The minimum limit of liability carried on such insurance shall be $250,000 each accident, combined single limit for bodily injury and property damage.

5.4 The successful bidder will be required to furnish a Contractor's Performance Bond and a Labor and Materials Payment Bond equal to the full amount of the Contract Price. A surety company licensed to provide such services in the State of New Hampshire shall issue all such bonds.

PART 6: CONTRACT TIME AND LIQUIDATED DAMAGES

6.1 The time and scheduling requirements for the Work of the Contract are as stated in the Contract Documents. Requirements of the Work include advance notification to federal, state, and local agencies as indicated in the Contract Documents. All such notifications and permit filing are the responsibility of the Successful Bidder and must be completed to allow for completion of the Work within the time and scheduling requirements of the Contract Documents.

PART 7: SUBCONTRACTORS

7.1 Upon request by the Owner, Bidders shall provide a list of all subcontractors and other persons and organizations proposed to be utilized by the Bidder for performance of the Work. Such a list shall include an experience statement and qualifications of such subcontractors, individuals, and organizations. Based on an evaluation by the Owner, the Owner may request an acceptable substitute for any such subcontractors, individuals, and organizations without increase in the Bid Price.

7.2 The Bidder shall be fully responsible to the Owner for acts and omissions of any subcontractors, individuals, and organizations of or utilized by the Contractor, and of persons either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by the Contractor provided, however, that nothing contained in this Agreement shall create any contractual relationship between any subcontractor and the Owner.

PART 8: BID FORM

8.1 The Bid Form is included herein. Bid Forms must be completed in ink or by typewriter.

8.2 Bids by corporations must be executed in the corporate name by the President or a Vice President. The corporate address and state of incorporation shall be shown below the signature.

8.3 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown below the signature.

8.4 All names must be printed below the signatures.

8.5 The Bid Forms must be completed in full, including all submission of any requested documentation and Bid Securities, for consideration by the Owner. Submission of incomplete Bids will render the Bid unacceptable.

PART 9: SUBMISSION OF BIDS

9.1 Unless otherwise noted, bids shall be submitted to the Owner as noted on the Bid Form. Bids shall be submitted in a sealed envelope marked with the Project Name and name and address of the Bidder. Mark such sealed envelopes with the notation "Bid Enclosed".

9.2 Bids may be modified or withdrawn by an appropriate document duly executed and delivered to the place where Bids are to be submitted at any time prior to the opening of the bids.

9.3 Owner will notify the successful bidder upon completion of sufficient review and investigation of the submitted bids. At such time, the Owner will prepare the Asbestos Abatement Agreement to be entered into by the Owner and successful bidder.

PART 10: AWARD

10.1 All bids for this project are subject to the provisions of all applicable federal, state, and local codes, laws, and ordinances. The Owner reserves the right to reject any or all bids, or any parts thereof, as the Owner deems in its best interest.

10.2 The Owner reserves the right to negotiate terms and conditions with the Successful Bidder and the right to disregard any or all non-responsive or conditional Bids.

10.3 Owner will evaluate the Bids as indicated in Part 1. The Owner may conduct investigations as deemed necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders, proposed subcontractors and other individuals or organizations to do the Work.

-End Instruction To Bidders-

PART III

BID FORM

BID FORM
LUMP SUM {EDIT AS NEEDED}& UNIT RATE PRICING

{EDIT NAME}
Asbestos Abatement & Related Work: {**PROJECT NAME**}
Abatement Specification No. { or section etc **XXX**}

Owner:

{**EDIT**}

Name of Bidder: _____

{**EDIT FOR PROJECT**}

Lump Sum Pricing:

Having carefully and comprehensively examined the plans and specifications for the above mentioned project, the undersigned proposes to furnish all labor, materials, and incidentals called for by the said documents at the below listed Lump Sum Prices and Unit Rates. Proposed Pricing is based on the Bidder's field measurements of materials to be removed and assessment of conditions of the work. Bidder has, to their satisfaction, completed all necessary field observations, measurements, and assessments of conditions and has a full understanding of the requirements of the Project Specification.

LUMP SUM BID PRICING TABLE

Item	Description of ACBM Removal [1]	Bid Amount
Lump Sum Price 1	Conduct abatement of all designated accessible ACBM in the **{EDIT},** as indicated in the Specification and Attachment 1.	**$**_____
Lump Sum Price 2	Conduct abatement of all designated accessible ACBM in the **{EDIT**}, as indicated in the Specification and Attachment 1.	**$**_____
Lump Sum Price 3	Conduct abatement and repair of all designated accessible ACBM in the {**EDIT**}, as indicated in the Specification Attachment 1.	**$**_____

{Etc. EDIT AS NEEDED}

{OR USE UNIT RATE PRICING AND REQUEST ESTIMATE MAN DAYS PER PROJECT WITH TOTAL COST BASED ON UNIT RATES AND TIME}

Alternate Unit Rate Pricing:

Provide Unit Rate Prices per 8-hour man day for NH-licensed asbestos abatement worker and site supervisor, all inclusive for labor, materials, disposal, and other incidentals for conducting additional ACBM abatement work as may be requested by Owner in writing (applies for alternate work only other than that included in the lump sum work above. Owner must approve specific alternate work in writing as change order).

UNIT RATE BID PRICING TABLE

Item	Description of ACBM Removal	Bid Amount
Alternate Unit Rate Price No. 4	Conduct abatement of hidden ACBM and other ACBM as may be designated in writing by Owner. Price per man day for NH-licensed asbestos abatement worker.	**$**_____
Alternate Unit Rate Price No. 5	Conduct abatement of hidden ACBM and other ACBM as may be designated in writing by Owner. Price per man day for NH-licensed asbestos abatement supervisor.	**$**_____

Time Constraints: The undersigned agrees to complete the work within the time constraints stated in the Specification and Contract Documents and agrees to guarantee substantial completion of the work of this project in accordance with the schedules established by the Owner.

Bid Submittals: Submit detailed list of any warnings, letters of deficiencies, or violations received within the last 3 years from any local, State, or Federal agency. Submit list of references and include project names, project contacts and phone numbers, description, and project size for the five (5) most recent similar sized asbestos abatement projects completed in the New Hampshire area. Use Reference Form attached to this Bid Document and submit other references and experience as deemed necessary by bidder as an attachment to the bid.

Provide bid security with submitted bids as indicated in the Bid Documents.

Submit list of proposed crew sizes, schedule milestones for each phase, resumes of site supervisors and project manager, back-up site supervisor, and project manager. Submit names, addresses, and project references for all proposed subcontractors.

Provide copy of current State licenses for company (entity), supervisors, and workers. Provide copy of original training certificates and most current annual refresher certificates for proposed work crew.

Insurance: The successful bidder must meet all insurance requirements as indicated in the Contract Documents. Certificates of such insurance coverage must be provided to the Owner listing the Owner as an additional insured. Certificates of insurance must also be provided for all subcontractors to be used by the Contractor. Insurance must include asbestos-specific coverage for work tasks to be performed.

Statement of Examination and Review of Work Requirements: By submitting this Bid, the Bidder certified: (a) the Bidder has examined the Contract Documents thoroughly; (b) the Bidder attended the mandatory Pre-bid

Conference, as scheduled by the Owner, and has completed sufficient review of the site conditions or other local conditions which may affect cost, progress or performance of the Work; (c) the Bidder is familiar with and reviewed all applicable federal, state, and local laws, ordinances, codes, regulations, and standards that may affect the cost, performance, progress, or other aspects of the Work; (d) the Bidder has adequately correlated the Bidder's observations of the work, conditions of the work, and requirements of the Contract Documents; and (e) Bidder has confirmed all quantities of ACM to be removed. The Bidder has made all additional investigations and tests as required and deemed necessary to determine and prepare the Bid for performance of the Work in accordance with the time, price, technical requirements, and other terms and conditions of the Contract Documents.

The submission of this Bid constitutes an incontrovertible representation by the Bidder that the Bidder has complied with the requirements of the Bid Documents and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for the performance of the Work.

Communications: All communications concerning the bid requirements, technical and administrative requirements, and other conditions of the work shall be addressed to RPF Associates, Inc.

Bids Due: Owner must receive completed bid documents no later than 2:00 p.m. on {**EDIT DATE**} All bidders must attend the mandatory prebid conference to be held at the Project Site at {**EDIT AS APPLICABLE**}.

Addenda: Receipt of Addenda Numbers __ through __ is hereby acknowledged.

Right to Reject: Owner reserves the right to reject any bid or portion thereof as the Owner deems in its best interest.

Authorized Signature:

Bidder: _____Date:_____

Address:_____

Phone and Fax: _____

Authorized Signature:_____

Printed Name and Title:_____

--End Bid Form

ABATEMENT SPECIFICATION { or SECTION # XXXX}

EXPERIENCE AND REFERENCE FORM
ASBESTOS ABATEMENT & RELATED WORK

1.

Project Name and Location:		
Project Contact Name:	Contact Company Name:	Phone Number:
Air Testing/Consultant Name:	Project Contact:	Phone Number:
Size and Description of Work:		

2.

Project Name and Location:		
Project Contact Name:	Contact Company Name:	Phone Number:
Air Testing/Consultant Name:	Project Contact:	Phone Number:
Size and Description of Work:		

3.

Project Name and Location:		
Project Contact Name:	Contact Company Name:	Phone Number:
Air Testing/Consultant Name:	Project Contact:	Phone Number:
Size and Description of Work:		

4.

Project Name and Location:		
Project Contact Name:	Contact Company Name:	Phone Number:
Air Testing/Consultant Name:	Project Contact:	Phone Number:
Size and Description of Work:		

5.

Project Name and Location:		
Project Contact Name:	Contact Company Name:	Phone Number:
Air Testing/Consultant Name:	Project Contact:	Phone Number:
Size and Description of Work:		

CONTRACTOR PRE-BID SIGN-IN SHEET

{EDIT PROJECT NAME}

Date: {**EDIT DATE**}

Company Name	Representative Name	Address	Phone Number	Email

LEAD PAINT WORK PLAN DRAFT

U.S. Department of Navy, Portsmouth Naval Shipyard: Building 188

Below is a summary of work procedures to be used during demolition activity that affects assumed lead-based paint (LBP) at Building 188 by XXXXXXXX (Contractor) and their subcontractor(s). The complete Government specification and contract documents should be referenced for administrative requirements and more detailed technical requirements for the work.

CONTENTS:

GENERAL

Site: Various painted surfaces are present, including both intact and damaged, flaking paint on the building. Due to the age of the building, P&S Construction has assumed that the paint is lead-based paint (LBP) for the purposes of completing the scheduled demolition tasks.

Qualifications: The Contractor shall provide necessary labor and equipment to perform the LBP related work tasks. All workers shall be properly trained in accordance with State DEP and OSHA 1926.62 requirements for construction activity involving LBP and exposure to lead.

Schedule: All work will be scheduled as agreed between Contractor and Contract Officer and as stated in the Contract Documents.

Exclusion: The scope of this plan is limited to the specific assumed LBP indicated herein. In the event that any additional hazardous materials are encountered, other suspect lead, suspect asbestos, or other hazards are identified by the Contractor's OSHA-Competent Person/Supervisor, immediately notify the Project Certified Industrial Hygienist and Contract Officer. In addition, the potential for lead contamination on soil or in subsurface soil is beyond the scope of this plan. It is recommended that sufficient soil sampling be performed to document possible lead concentrations in the soil at the site prior to redevelopment. Based on the results of the soil testing, soil remediation may be required (beyond the scope of this plan).

Contractor shall obtain copies of pertinent building inspection records and provide copies on site to their OSHA competent person and site industrial hygienist to confirm analytical results of any additional suspect material that may be encountered during the work. The Contractor site supervisor shall be an OSHA competent person . The OSHA competent person will monitor all site tasks and will conduct additional

inspections during demolition as deemed necessary to identify other potential hazards. Contractor shall coordinate with the industrial hygienist project designer for any site inspections and work plan modifications needed.

SUMMARY OF WORK

General: Contractor shall take reasonable precautions to prevent the release of lead to the environment, including the cleanup, removal and appropriate disposal of all visible lead-based paint debris generated by the project. Activities that may result in the release of lead to the environment include, but are not limited to, removal of lead paint by using open-flame burning or torching, machine sanding or grinding without high-efficiency particulate exhaust control, uncontained hydro blasting or high-pressure washing, abrasive blasting or sandblasting without containment and high-efficiency particulate exhaust control and using heat guns operated above 1,100 degrees Fahrenheit. Contractor shall fully clean all lead waste and debris generated as a result of the work.

Contractor shall isolate the work area using a regulated area in accordance with 29 CFR Part 1926.62. Only authorized, trained personnel will be allowed in the lead work areas during activity involving disturbance eof LBP. A personnel and equipment decontamination facility, or wash station, will be provided adjacent to the work area. The Contractor shall coordinate with the Contract Officer to notify all workers, contractors, subcontractors, and occupants of the presence of LBP in accordance with 29 CFR Part 1926 and of the need to prevent any disturbance to the LBP during incidental work and other related work at the site.

Loose, non-intact paint will be removed using wet methods, HEPA-vacuums, hand tools, proper packaging and waste storage/disposal and qualified, lead-trained individuals in accordance with current State of Maine and federal regulations. Ground and other surface areas in and around the building will cleaned of all visible paint chips and suspect paint debris. All paint scrapings and loose debris shall packaged as lead hazardous waste. Contractor shall coordinate with Contract Office for transport to proper waste dumpster and other waste handling issues. The Government shall be responsible for off site waste transportation and disposal. Waste shall be disposed of as lead hazardous waste in lieu of proper Toxicity Characteristic Leaching Procedure (TCLP) waste testing and analytical results showing that the waste is non-hazardous.

Following removal of all loose, non-intact LBP and cleaning of the ground and other surfaces, standard demolition of the structure will be performed by Contractor with care to minimize dust and debris involving remaining LBP on building surfaces. All work practices shall comply with current State DEP, EPA, and US DOL OSHA Standards, including but not limited to 29 CFR Part 1926.62. Demolition waste containing LBP shall be properly containerized, subjected to TCLP testing for waste characterization, and then transported and disposed of in accordance with local, State and federal requirements.

Air Monitoring: At the discretion of Contractor, the subcontract Industrial Hygienist may perform ambient area air monitoring at perimeter location to document airborne lead concentrations during activity involving disturbance of LBP. If performed, results of air monitoring shall be provided to Contractor for distribution to workers, other contractors, and Contract Officer. This monitoring is recommended by the Industrial Hygienist/Project Designer.

Visual Inspections: During the course work the Contractor's site supervisor shall conduct ongoing inspections of the work to document that the work is completed in compliance with state and federal regulations. Additionally, the Industrial Hygienist will perform observations of the work tasks involving lead

scraping/removal activity and visual inspections prior to demolition to ensure that loose paint and visible, accessible paint debris has been removed.

OSHA Monitoring: The subcontract Industrial Hygienist shall conduct personal monitoring in accordance with 29 CFR 1926.62 during the course of activity involving the scraping and cleaning of LBP. Results of exposure monitoring shall be provided to Contractor for distribution to workers and Contract Officer.

STOP WORK

Contractor shall stop work and do not proceed until corrective measures are implemented in the event that any of the below occur:

- Failure to work in accordance with state and federal regulations or this plan.
- Lead exposure monitoring results that exceed the OSHA eight (8) hour time-weighted average (TWA) of 50.0 ug/m^3 of air.
- If ambient area sampling performed, elevated ambient air as determined by CIH.
- Other potential safety and health emergencies and changes in conditions of the work as required.

REGULATORY REQUIREMENTS

The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations.

Federal Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

OSHA: U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

Respiratory Protection, Title 29, Part 1910, Section 134 of the Code of Federal Regulations

Construction Industry, Title 29, Part 1926, of the Code of Federal Regulations

Access to Employee Exposure and Medical Records
Title 29, Part 1910, Section 2 of the Code of Federal Regulations

Hazard Communication, Title 29, Part 1910, Section 1200 of the Code of Federal Regulations

Specifications for Accident Prevention Signs and Tags, 29 Part 1910, Section 145 of the CFR

Lead in Construction United States Environmental, 29 Part 1926.62 of the Code of Federal Regulations

DOT: U. S. Department of Transportation, including but not limited to:

Hazardous Material Regulations, Title 49, Part 171-180 Code of Federal Regulations (CFR)

EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:

40 CFR 260, Hazardous Waste Management Systems: General
40 CFR 261, Identification and Listing of Hazardous Waste
40 CFR 262, Generators of Hazardous Waste
40 CFR 263, Transporters of Hazardous Waste
40 CFR 264, General Contractors and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265, Interim Status Standard for General Contractors and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268, Land Disposal Restrictions

RCRA: Resource Conservation and Recovery Act; 42 U.S.C. 6901 to 6992k.

State of Maine Requirements: which govern lead in construction work or hauling and disposal of lead waste materials.

Local Requirements: all local requirements that govern asbestos abatement work or hauling and disposal of asbestos waste materials.

TRAINING AND WORKER PROTECTION

Worker Training For LBP Related Work: All workers are to be trained in accordance with 29 CFR 1926. 62 Workers will be trained in the dangers inherent in handling lead, LBP, and lead waste and in proper work procedures and personal and area protective measures.

Workers shall also receive appropriate hazard communication training in accordance with 29 CFR Part 1910, Section 1200 and 29 CFR Part 1926.62.

Medical Examinations: Medical examinations will be provided for all workers to be engaged in abatement work. The Medical Exams, at a minimum, will meet OSHA requirements as set forth in 29 CFR 1926.

Protective Clothing: All workers scraping and removing LBP will don disposable full-body coveralls (Tyvek or equivalent) and disposable head covers, prior to and during all work in the Work Area. Cloth full-body coveralls and hats will be worn by all workers in the Work Area. Provide other protective equipment as needed and not limited to hard hats, gloves, eye protection, protective shoes.

Respiratory Protection: All workers will have completed necessary instruction and training in the proper use of respiratory protection. All workers will always wear a respirator, properly fitted on the face in the Work Area from the start of any operation that may cause airborne lead until the Work Area is completely decontaminated. Respiratory protection will be based on the lead concentrations encountered in the Work Area and, for work start up, based on sufficient documentation of exposures during recent similar work activity. All respirators will be NIOSH-approved. The Contractor shall comply with ANSI Z88.2 - 1992 "Practices for Respiratory

Protection" (and most current revisions) and OSHA 29 CFR 1910 and 1926, as applicable, during all work. Respiratory protection will be used at all times that there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental.

Workers Entering the Work Area: Each time the lead Work Area is entered, workers will remove all street clothes in the changing (clean) room of the Decontamination Unit and put on new disposable coverall, new head cover, and a clean respirator. Workers will then proceed through the shower room to the equipment (dirty) room and put on work boots.

Decontamination Procedures: All workers will adhere to the following personal decontamination procedures whenever they leave the Work Area: Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the Work Area: When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. Workers will fully wash and clean themselves and equipment leaving the site to prevent the removal of lead and associated dust and debris from the work.

Within the Work Area: Workers will not eat, drink, smoke, chew tobacco or gum in the Work Area. To eat, chew, drink or smoke, workers shall follow the procedure described above, and then dress in street clothes before entering the non-Work Areas.

Electrical Hazards: All temporary power will be supplied through ground fault circuit interrupter (GFCI) devices. All temporary power shall be provided in compliance with OSHA's Construction Industry Safety and Health Standards.

Emergency Procedures: Contractor shall provide a written Emergency Action and Fire Prevention Plan for the site work as required by 29 CFR 1910.38.

Water used for clean, decontamination and wet-scraping of LBP shall be collected and packaged for disposal as lead waste. Care will be used to prevent water used to clean or remove LBP from migrating out of the work area.

POTENTIAL LEAD HAZARD:

The disturbance or dislocation of lead containing materials or LBP may cause lead dust or fumes to be released into the buildings atmosphere, thereby creating potential health hazards to workmen and building occupants. Apprise all employers at site, workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazards, other possible site hazards, and of proper work procedures that must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified LBP or lead material, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to lead. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

Complete, and coordinate with Owner's Representative as applicable, all communication of hazards in strict accordance with 29 CFR 1926.62 and other applicable OSHA, EPA and State regulations. The Contractor and all subcontractors shall provide OSHA-competent persons on-site in accordance with 29 CFR Part 1926 to inspect for potential job site hazards, including but not limited to potential hazards associated with asbestos, lead, and other possible suspect materials that may be encountered during construction work.

SUBMITTAL REQUIREMENTS

Submittal Schedule: Submittals will be provided by the Contractor and as specified in the Contract Documents. Copies of testing results, supervisor site logs, and inspection reports shall be provided. Statements attesting the proper training of workers as well as inclusion of all workers in appropriate OSHA required safety and health programs will also be provided by Contractor.

WORK AREA PREPARATION

Material Safety Data Sheets: Provide OWNER with MSDS for any materials to be used on sight in accordance with OSHA regulations. Coordinate the approval and use of any such materials, not limited to approval with regard to compatibility with any scheduled replacement materials as applicable.

General Preparation Work:

The lead work area shall be demarcated with warning signs posted at the entrance points and perimeter access points. Warning barrier tape and other barriers will be installed around the perimeter of the work as necessary to restrict access. Warning signs will read as follows:

LEGEND

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

Decontamination Units / Wash Stations:

Provide personnel and equipment decontamination or wash down facilities in accordance with OSHA requirements. Require that the personnel decontamination unit be the only means of ingress and egress for the Work Area. Require that all materials exit the Work Area through the equipment decontamination unit. Provide portable shower units, sufficient for personnel decontamination in accordance with OSHA regulations, and cascaded filter units on drain lines from showers or any other water source carrying lead-contaminated water from the Work Area. Properly contain and package all waste water for disposal or filtering in accordance with current local, state, and federal requirements. Do not discharge water unless all necessary testing and permitting has been completed as applicable in accordance with State and local requirements.

REMOVAL, CLEAN-UP, AND DISPOSAL

Inspections: Prior to commencing Work of this Section, the affected Work Area must pass an inspection by the

Contractor OSHA Competent Person to document that sufficient area preparations are completed. Maintain all work area isolation and controls during work of this section. The Contractor shall conduct routine and regular inspections of surrounding areas beneath, as applicable, and adjacent to the work areas for containment breeches and leaks. The Contractor is responsible for completing any clean up and decontamination work that is necessitated due to breeches and leaks.

Drop Cloth Barrier:

Over any surfaces beneath lead to be removed in the work areas, install as a drop cloth a clear 6-mil sheet plastic in all areas where lead removal work is to be carried out. Install Secondary Barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift. Remove Secondary Barrier at end of each work shift or as work in an area is completed. Carefully pack in lined disposal drums.

Wet Removal - General**:**

Thoroughly wet mist LBP covered components prior to and during removal to reduce lead dust dispersal into the air. Thoroughly wet mist lead to be removed prior to and during scraping and/or sanding to reduce lead dust dispersal into the air. Maintain materials as adequately wetted during Work and as required by this specification. Accomplish wetting by a fine spray (mist) of water. Saturate material sufficiently to wet without causing excess dripping or migration of water from the work area.

As it is removed, simultaneously pack material into appropriate lined disposal drums. Clean outside and move to the equipment decontamination unit for further cleaning, storage and disposal.

As applicable and possible, provide adequate inspection to detect, prevent and correct damage from liquids and other debris that escape the work area. Adequately wash all floor substrates and other building surfaces following lead work using an appropriate all-purpose or lead specific cleaner as needed to clean residual film. Inspect ground and perimeter areas for visible paint debris or other suspect debris and remove and package such material as lead waste.

Airborne Lead Exposure:

General: Use work procedures that result in 8-hour TWA airborne lead exposure less than the required limits established by OSHA and as described herein. If airborne lead exposure exceeds this level immediately stop work and revise work practices and engineering controls to maintain level within the required limits.

G. Removal of Loose, non-intact Paint

Conduct removal of all loose, non-intact paint using wet scraping methods and hand tools.

Demarcate the work areas and waste dumpster to prevent unauthorized access in accordance with 29 CFR 1926, including use of barrier tape, signs, critical and primary barriers, and other precautions as deemed necessary. All lead related removal work involving abrasive blasting shall be performed utilizing a negative pressure enclosure system. The work area shall be isolated from non-work areas by constructing and installing containment barriers around each work area. Residue on the components will be removed with wire bristle nylon hand brush. This work will be repeated until all loose paint has been removed from substrate.

Clean all debris that may be encountered during paint removal from the floor area and elevated surfaces using a combination of HEPA vacuuming and wet wiping methods. Perform continuous cleaning in work area. Utilize a HEPA vacuum to collect residual lead containing paint and blast media remaining on flooring areas and elevated surfaces. This work will be repeated until all visual debris has been removed from substrate. Do not allow dry sweeping in work area. Continually mist work area with water to contain lead contaminated dust dispersal during lead enclosure work and debris collection process. All waste generated during the removal process will be packaged into appropriate waste containers and segregated for testing for proper disposal or disposal as hazardous waste.

Polyethylene sheet barriers and air filtration units must be used to isolate the work area if any mechanical blasting methods are to be used. During use of any blasting methods, provide worker training and safety in accordance with OSHA 1926.62 requirements and equipment manufacturer's instructions and guidelines. Provide proper personal protective equipment and respiratory protection in accordance with OSHA 1926.62 requirements.

INDUSTRIAL HYGIENE CONSULTANT

The Contractor will provide services of an industrial hygiene consultant for observation of lead scraping tasks and air monitoring as indicated herein. The Contractor's site supervisor shall complete all visual inspections necessary to ensure the work areas are adequately cleaned prior to consultant's verification inspection.

LEAD WORK AREA CLEARANCE

The Work Area is cleared following lead scraping activities when visual inspection confirms that all loose LBP has been removed from the building components and substrates and no visible paint debris is present on the perimeter ground surfaces. Following full demolition and packaging of waste, a second visual inspection of the ground and perimeter areas will be performed by the Contractor Site. Clearance shall be met once the entire work area is found to be free of visual paint chips and suspect debris.

End.

EDIT Client/Project Name *Edit note: Use this spec for stand alone or insert section w/ master spec format with full or spot IH monitoring – if prepared for GC, need to edit some responsibilities and replacement of some Owners with GC. If no monitoring or IH oversight tasks, edit accordingly (definitions/roles/inspections/monitoring/submittals). For NH Contract work – see NH Contract Spec. Caution – this is boiler plate only and not a fit for all. Carefully edit sections especially front end, prep and removal sections. Highlight any edits made for ease of technical review and proofing.*

Specification (or Section) Edit- 01733 - Asbestos Abatement & Related Work

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

General provisions of the Contract, including General and Supplementary Conditions and Other Abatement Specification Sections, apply to the work of each of the Specification Sections.

1.2 PROJECT SCOPE-OF-WORK/ACBM TO BE REMOVED

General: All asbestos abatement work is to be completed in accordance with the requirements set forth herein. The scope-of-work includes the removal, transport, and disposal of designated asbestos-containing building materials (ACBM or asbestos-containing material, ACM) at the **edit** building name, located in **edit** address. All work is to be completed in accordance with the schedules stated herein, in the Contract Documents, and as designated by the **edit** client name (Owner). It is essential that all work be phased and scheduled as required to facilitate Owner's renovation and upgrade work. All work is to be completed in strict accordance with applicable local, **edit -** State of New Hampshire **or** Massachusetts **or** Maine (State), and federal codes and regulations and the requirements stated in this specification and Contract Documents.

Contract Documents: Indicate the work of the Contract and related requirements and conditions that have an impact on the project. This abatement specification, along with other construction specification sections and drawings, shall be considered part of the Contract Documents.

Table 1 below includes the listing of ACBM to be removed, packaged, transported, and disposed of in accordance with the Contract Documents. In addition, the scope of work includes the following related:

Edit as applicable-

- Removal, packaging and disposal of all polychlorinated biphenyl (PCB)-containing materials, including lighting ballasts and transformer oils.

- Removal, packaging and disposal of all mercury-containing equipment (switches, thermostats, fluorescent bulbs, etc.)

- Lead-based paint (LBP) is present on various surfaces throughout the buildings. Reference Owner Survey Report for more information. In lieu of additional appropriate lead testing performed at Contractors discretion and expense, Contractor shall assume painted surfaces contain lead. As such, all work practices at the site must be in conformance to the US DOL Occupational Safety and Health Administration (OSHA) regulatory requirements contained in 29 CFR 1926.62. (**edit note –for residential work, may not be valid/other rules)**

Please note that, for any ACBM scheduled to remain in the building, care must be taken to avoid disturbance of these materials throughout the duration of this project. Reference full inspection reports for discussions and additional information and limitations of Owner survey. All quantities listed Table 1 are approximate only and, unless otherwise direct by Owner in writing, Contractor shall remove all **edit - or** all designated ACBM in the **xxxx** building **xxxx**. Contractor shall conduct necessary field measurements and site review as deemed necessary by Contractor to delineate the scope of work and site conditions prior to submittal of bid. Contractor shall note on bid any discrepancies between Contractor field measurements and listings of work stated herein.

Edit -Or, use for LBP as applicable in stead of above Lead paint reference – do not use for residential work

Lead Paint: Owner survey report includes listing of results for limited XRF lead screening conducted for construction related purposes and the majority of the painted surfaces were found to contain concentrations of lead ranging from trace amounts up to concentrations sufficient to define the paint as lead-based paint. Contractor shall remove all paint in a safe manner using work procedures that are in full compliance with 29 CFR Part 1926.1101 and other applicable State and federal regulations and guidelines for the safe removal, proper waste packaging, transport and disposal of LBP and lead based substances. For the purposes of this project, all painted surfaces shall be handled as lead-containing or lead-based paint. In the event the Contractor wishes to conduct additional testing to prove various painted items are lead free, such additional testing shall be conducted by Contractor's qualified, State-licensed lead inspector at no additional cost to Owner. The State-licensed lead inspector must certify each specific area tested and if lead is present or not in full compliance with the most current State rules and US Department of Housing and Urban Development (HUD) requirements for lead inspections.

Edit, include below if guano issues-

Guano: Guano (bird feces) and other organic matter (feathers, bones, body parts, carcasses, etc.) may pose a health threat to workers who come in contact with them or inhale the airborne particles from them. Every precaution should be taken to ensure that renovation workers and other occupants are protected from the diseases carried or transported by avian species. Proper, safe work procedures, cleaning and disposal of guano shall be used during the work.

Edit as applicable -

Other potential hazardous building material: Contractor's OSHA-competent person shall inspect the work place for other potential hazardous building material, including but not limited to, mercury, PCBs, containerized product, and other related building materials and universal waste. If encountered during the work immediately notify Owner's Representative and Contractor shall use only qualified, trained workers to properly remove, package, transport, and dispose (or recycle) of such material in strict compliance with all local, State, and Federal requirements.

Reference full inspection reports for discussions and additional information and limitations of Owner survey.

TABLE 1
ACBM REMOVAL WORK LISTING

Building Material	Location	Approximate Quantity	EPA Category
Building 17			
Pipe wrap tape	2nd floor: Section D south east corner	6 linear feet	Friable RACM
Pipe insulation (various types)	Basement: Crawlspace 2nd floor Engineering office and Section F	650 linear feet	Friable RACM
Pipe fitting insulation (various types)	Crawlspace 2nd floor	90 Pipe Fittings	Friable RACM
Tank Insulation (3 tanks)	Crawlspace	600 square feet	Friable RACM
Pipe and pipe fitting insulation debris	Crawlspace, Soil Area	800 square feet	Friable RACM
Building Seam Caulk	Along seams of adjoining buildings, Exterior	300 linear feet	Category II Nonfriable
Duct Caulk	3rd Floor: Section C, Starch Grinder room	15 linear feet	Category II Nonfriable
Building 18			
Duct insulation	Building 18: 1st floor 18B	120 linear feet	Friable RACM

1.3 WORK SCHEDULES:

All work shall be completed in accordance with the schedule requirements as indicated by the Owner and as stated in the Contract Documents. **Edit – if specific start and completion dates known, list out**.

All work shall be strictly coordinated and scheduled by the Contractor as indicated by and approved by Owner, the Owner's industrial hygiene consultant (IH Consultant), and General Contractor. Work will be phased as required to facilitate Owner operations, general occupancy of the site, and general construction activity. Contractor must provide proposed daily schedules to Owner, General Contractor, and IH Consultant for each phase of work and each Owner work request. Adequate advance notice must be provided to Owner and the IH Consultant prior to any schedule changes. Start and completion dates for the work and specific phasing requirements must be submitted to Owner, General Contractor, and IH Consultant for approval.

1.4 CONTRACTOR ESTIMATES

Estimates: Contractor pricing must be based on the Contractor's field measurements and assessment of the conditions and requirements of the Work, in addition to requirements of the Specification. Listings of ACBM and non-

ACMs and noted conditions for the work areas provided by Owner are intended for informational purposes to assist the Contractor in the Contractor's delineation of the work. It is the responsibility of the Contractor to verify all such project information as necessary to satisfy the Contractor as to the requirements of the work for each specific phase of the project. The Contractor must notify Owner and the IH Consultant of any conflicting information or clarifications required for the preparation of any bids, estimates, and submittal documentation. Unless otherwise stated by Owner, the Contractor is responsible for the removal of all designated ACBM at Owner facility, so designated by the Owner.

1.5 EXISTING CONDITIONS

Prior to commencement of work, inspect areas in which work will be performed. Prepare a listing of damage to structure, surfaces, non-ACM insulations, equipment or surrounding properties that could be misconstrued as damage resulting from the work. Contractor is responsible for all damages to equipment, furnishings, finishes and building surfaces in the work area and adjacent caused by the Contractor during the course of abatement and general housecleaning. Use care to prevent damages to existing surfaces during installation of solid barriers, critical barriers and primary isolation barriers. Contractor is responsible for completing all repairs to damaged items/surfaces caused by the work. In addition, all tape, adhesive, and other staining and damage must be fully repaired by Contractor to meet or exceed existing conditions.

1.6 POTENTIAL ASBESTOS & OTHER RELATED HAZARD

The disturbance or dislocation of asbestos-containing materials may cause asbestos fibers to be released into the buildings atmosphere, thereby creating potential health hazards to workmen and building occupants. Apprise all employers at site, workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazards, other possible site hazards, and of proper work procedures that must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified asbestos-containing materials, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to airborne asbestos and lead dust. Such measures shall include the procedures and methods described herein, and compliance with regulations of applicable federal, state and local agencies.

Complete, and coordinate with Owner's Representative as applicable, all communication of hazards in strict accordance with 29 CFR 1926.1101 (k) and other applicable OSHA and State regulations. The contractor shall coordinate with Owner's Representative to review all existing inspection records and testing results as needed. An inspection of accessible areas of the building has been performed and copies of the inspection report have been previously provided to the bidders and selected contractor. In the event that other suspect material are encountered (or previously inaccessible spaces are accessed) that are not identified in the inspection report as having been properly inventoried and testing, then immediately cease work that would impact such materials and notify Owner's Representative such that proper testing and inspection can be performed.

The Contractor and all subcontractors shall provide OSHA-competent persons on-site in accordance with 29 CFR Part 1926 to inspect for potential job site hazards, including but not limited to potential hazards associated with asbestos and ACBM, and to inspect for other possible suspect materials that may be encountered during construction work. All site personnel working in areas containing ACBM shall be apprised of the locations, types and quantities of ACBM present and all such personnel shall be provided a minimum of asbestos awareness level training (for non asbestos contractors) or additional training as indicated herein.

The work site contains ACBM, lead-based paint and lead-paint, guano, potential PCBs, mercury and other potentially hazardous materials. Review all site survey reports and conduct ongoing inspections of the work areas to identity potential hazardous material that may be encountered. Provide OSHA competent person to supervise and review work procedures and conduct ongoing work area inspections. Properly train all affected personnel at the job site based on the hazards and hazardous material to be encountered, impacted or disturbed including but not limited to ACBM, lead in paint, PCBs, solvents, and mercury.

1.7 CONTRACTOR USE OF PREMISES:

General: The Contractor shall limit his use of the site to the work indicated, so as to allow for Owner operations and general construction activity. Confine operations at the site to the specified work areas of the Specification. Take all precautions necessary to protect the site, buildings, any occupants, and surrounding areas from work-related hazards during the construction period. Maintain building in a safe and structurally sound condition throughout the work. Maintain access to the public and other trades in designated areas (for example, stairwells) as indicated herein and as otherwise noted by Owner. Provide additional barriers and site security as needed to accommodate such access.

Install solid barriers to prevent unauthorized access and visibility from adjacent, public or Owner-occupied areas as designated by Owner and using materials and construction methods approved by Owner. Contractor shall work in cooperation with, and coordinate all work with Owner and the IH consultant.

1.8 STOP WORK:

If Owner or the IH Consultant presents a written or verbal stop work order immediately and automatically stop all work. Do not recommence work until authorized in writing by Owner and IH Consultant.

1.9 PROJECT COORDINATION

A. Administrative and Supervisory Personnel:

Site Supervisor: Provide a full-time Site Supervisor who is experienced in administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is the Contractor's Representative responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials.

- Experience and Training: The Site Supervisor must have completed a course at an EPA Training Center or equivalent certificate course in asbestos abatement procedures, and have had a minimum of five (5) years on-the-job training in asbestos abatement procedures. The Site Supervisor must also have adequate experience working on similar projects.

- Accreditation/Qualifications: The Site Supervisor is to be (1) a Competent Person as required by OSHA in 29 CFR 1926, and (2) accredited and certified in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C; and (3) licensed in accordance with current State requirements.

B. Pre-Construction Conference:

An initial progress meeting, recognized as "Pre-Construction Conference" will be convened by Owner prior to the start of work for each phase. This meeting will be held to review the scope-of-work, scheduling, coordination, and contractor plan of action and submittals, as applicable.

C. Daily Log:

Daily Log: Maintain at the work area a daily log documenting the dates and time of but not limited to, the following items:

- Visitations; authorized and unauthorized
- Personnel entering and leaving the work area (name, certification, expirations) – use specification form.
- Special or unusual events, i.e. barrier breaching, equipment failures, accidents
- Documentation of (1) daily inspections and test results, (2) removal of any sheet plastic barriers, (3) inspections prior to application of encapsulation, enclosure or any other operation that will conceal the condition of ACMs or the substrate from which such materials have been removed, (4) removal of waste materials from work area and site, including exact number of waste bags/containers, (5) decontamination of work area and equipment, and (6) final inspection/air test results.

1.10 STANDARDS

Applicability of Standards: It is the Contractor's responsibility to complete all work in accordance with (or exceeding) all applicable industry standards and guidelines. Except where Contract Documents include more stringent requirements, all applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents. Standards are made a part of the Contract Documents by reference. Where compliance with an industry standard is required, comply with the most current standards in effect as of date of Contract Documents.

Conflicting Requirements: Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer to Owner and IH Consultant any requirements that are different or conflicting; outline the more stringent requirement before proceeding.

Comply with applicable standards including, but not limited to, American National Standards Institute (ANSI) standards and American Society for Testing and Materials (ASTM) standards.

1.11 CODES, REGULATIONS, AND STANDARDS

Adhere to work practices and procedures set forth in applicable codes, regulations and standards related to work. Obtain permits, licenses, inspections, and similar documentation, as well as payments and similar requirements associated with codes, regulations, and standards.

The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of personnel as required by the applicable Federal, State, and local regulations. The Contractor shall hold Owner and IH Consultant harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees, or his subcontractors.

All work performed under this contract shall comply with applicable provisions, including most current versions, and not limited to the listed codes and regulations.

Federal Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

OSHA: U.S. Department of Labor, Occupational Safety and Health Administration, including but not limited to:

Occupational Exposure to Asbestos, Tremolite,
Anthophyllite, and Actinolite; Final Rules
29 CFR 1910.1001 and 29 CFR Part 1926.1101

Respiratory Protection
Title 29, Part 1910, Section 134 of the Code of Federal Regulations

Construction Industry
Title 29, Part 1926, of the Code of Federal Regulations

Access to Employee Exposure and Medical Records
Title 29, Part 1910, Section 2 of the Code of Federal Regulations

Hazard Communication
Title 29, Part 1910, Section 1200 of the Code of Federal Regulations

Specifications for Accident Prevention Signs and Tags
Title 29, Part 1910, Section 145 of the Code of Federal Regulations

DOT: U. S. Department of Transportation, including but not limited to:

Hazardous Material Regulations
Title 29, Part 171-180 Code of Federal Regulations

EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:

Asbestos Abatement Projects; Worker Protection Rule
Title 40 Part 763, Sub-part G of the Code of Federal Regulations

Asbestos School Hazard Abatement Reauthorization Act (ASHARA)
Training Requirements of (AHERA) Regulation
Asbestos Containing Materials in Schools Final Rule & Notice
Title 40, Part 763, Sub-part E, Code of Federal Regulations

Asbestos Hazard Emergency Response Act (AHERA) Regulation
Asbestos Containing Materials in Schools Final Rule & Notice
Title 40, Part 763, Sub-part E of the Code of Federal Regulations

National Emission Standard for Hazardous Air Pollutants (NESHAPS)
National Emission Standard for Asbestos, Title 40, Part 61, Sub-part A,
and Sub-part M (Revised Sub-part B) of the Code of Federal Regulations

Local Requirements: Abide by all local requirement that govern asbestos abatement work or hauling and disposal of asbestos waste materials.

edit for state -

Massachusetts State Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

- Department of Labor ad Workforce Development, Revised 453 CMR 6.00
- Department of Environmental Protection, 310 CMR 7.00, 7.09, 7.15
- Department of Environmental Protection 4.10(2)(c); 7.15: U Asbestos
- Most current revisions, memos, guidelines and policy statements

State of New Hampshire Requirements: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

- Asbestos Management Rules, N.H. Admn. Rules Ch. He-P 5000
- Asbestos Management and Control, N.H. Admn. Rules Ch. Env-A 1800
- Asbestos Management and Control, N.H. RSA Ch. 141-E
- Solid Waste Management Act, N.H. RSA Ch. 149-M and N.H.RSA Ch.147-A
- Solid Waste Rules, N.H. Admn. Rules Ch. Env-Wm 100-300 and 2100-2800, 3900

Maine Department of Environmental Protection: which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

- Chapter 425 Asbestos Management Regulations

1.12 DEFINITIONS

1.12.1 General Definitions

General: Definitions contained in this Article are not necessarily complete, but are general to the extent that they are not defined more explicitly elsewhere in the Contract Documents.

Indicated: This term refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.

Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by Owner's representative", "requested by the "IH Consultant", and similar phrases. However, no implied meaning shall be interpreted to extend the IH Consultant's responsibility into the Contractor's area of construction supervision.

Approve: The term "approved," where used in conjunction with the Owner or the IH Consultant's action on the Contractor's submittals, applications, and requests, is limited to the responsibilities and duties of the IH Consultant as indicated in the Contract Documents. Such approval or acceptances do not express or claim any certification of completeness, compliance, or approval of programs and documentation, including but not limited to review of analytical results, historical information, and interpretations. Such approval shall not release the Contractor from responsibility to fulfill Contract Document requirements, unless otherwise provided in the Contract Documents.

Regulation: The term "Regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work, whether they are lawfully imposed by authorities having jurisdiction or not.

Furnish: The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."

Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations."

Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

Installer: An "Installer" is an entity engaged by the Contractor, either as an employee, subcontractor or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

The term "experienced," when used with the term "Installer" means having a minimum of 5 previous projects similar in size and scope to this project, and familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.

Project Site is the space available to the Contractor for performance of the work, either exclusively or in conjunction with others performing other construction as part of the project.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests.

IH Consultant: This is the entity employed or engaged as industrial hygiene consultant as described in the Contract Documents. All references to Owner's Consultant, Air Monitoring Consultant, or Consultant with regard to asbestos abatement in the Contract Documents in all cases refer to the IH Consultant. The IH Consultant will represent Owner during abatement and until final payment is due. The Owner representative may also constitute other persons

representing Owner, other than the IH Consultant or consultant, as indicated by Owner. Owner's instructions to the Contractor will be made directly to the Contractor or forwarded through the IH Consultant. **(Edit note – if not full time monitoring or management, need to edit accordingly)**

Site Supervisor: This is the Contractor's Representative at the work site. This person will be the Competent Person required by OSHA in 29 CFR 1926 and licensed Site Supervisor/Foreman as required by the State. Provide licensed supervisor at each individual work site during work.

1.12.2 Definitions - Asbestos Abatement:

Accredited or Accreditation (when referring to a person or laboratory): A person or laboratory accredited in accordance with section 206 of Title II of the Toxic Substances Control Act (TSCA).

Adequately Wet: Means sufficiently mix or penetrate with liquid to prevent the release of particulate. If visible emissions are observed coming from the asbestos-containing material, then that material has not been adequately wetted. The absence of visible emissions is not sufficient evidence, or measure, of a material being adequately wet.

Aerosol: A system consisting of particles, solid or liquid, suspended in air.

Air Monitoring: The process of measuring the fiber content of a specific volume of air.

Amended Water: Water to which a surfactant has been added to decrease the surface tension to 35 or less dynes.

Asbestos: The asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite. For purposes of determining respiratory and worker protection both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered as asbestos.

Asbestos-Containing Material (ACM): Any material containing more than 1% of asbestos of any type or mixture of types.

Asbestos-Containing Building Material (ACBM): Surfacing ACM, thermal system insulation ACM, or misc. ACM in or on interior structure or other parts of a building.

Asbestos-Containing Waste Material: Any material that is or is suspected of being or any material contaminated with an asbestos-containing material that is to be removed from a work area for disposal.

Asbestos debris: Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Authorized Visitor: Owner, the IH Consultant, testing lab personnel, emergency personnel or a representative of any federal, state and local regulatory or other agency having authority over the project.

Barrier: Any surface that seals off the work area to inhibit the movement of fibers.

Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
Category I Non-Friable ACM: means ACM packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1% asbestos. Also see definition for Regulated ACM.

Category II Non-Friable ACM: means any non-friable ACM, except for Category I Non-Friable ACM.

Ceiling Concentration: The concentration of airborne substance that shall not be exceeded.

Certified Industrial Hygienist (C.I.H.): An industrial hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene.

Critical Barrier: Polyethylene sheeting, typically 6-mil polyethylene sheeting, over windows, doors, and air passageways separating the work area from non work area portions of the building. Critical barriers remain in place until clearance testing or inspections are completed and results meet clearance test criteria.

Demolition: The wrecking or taking out of any building component, system, finish or assembly of a facility together with any related handling operations.

Disposal Bag: A properly labeled 6 mil thick leak-tight plastic bags used for transporting asbestos waste from work and to disposal site.

Contractor: The general contractor or the general contractor's subcontractor engaged to perform asbestos related activities must be licensed by the State, as applicable, and in accordance with **edit -** NH Admn. Rule He-P 5000 **or** MA Department of Labor ad Workforce Development, Revised 453 CMR 6.00 **or** Maine Department of Environmental Protection Chapter 425 Asbestos Management Regulations. All workers and site supervisors engaging in asbestos activity must also be trained and licensed in accordance with current State regulations and 40 CFR Part 763 (AHERA).

Encapsulant: A material that surrounds or embeds asbestos fibers in an adhesive matrix, to prevent release of fibers.

- Bridging encapsulant: an encapsulant that forms a discrete layer on the surface of an in situ asbestos matrix.
- Penetrating encapsulant: an encapsulant that is absorbed by the in situ asbestos matrix without leaving a discrete surface layer.

Encapsulation: Treatment of asbestos-containing materials, with an encapsulant and application of appropriate post removal encapsulant on substrate and containment barriers.

Enclosure: The construction of an air-tight, impermeable, permanent barrier around asbestos-containing material to control the release of asbestos fibers into the air.

Excursion Limit: Ensure that no employee is exposed to airborne concentrations of asbestos in excess of 1.0 fibers per cubic centimeter of air (1.0 f/cc) as averaged over a sampling period of thirty (30) minutes, as determined by PCM analysis in accordance with NIOSH Method 7400 and as indicated in 29 CFR Part 1926. Also referred to as the short-term exposure limit, (STEL).

Filter: A media component used in respirators to remove solid or liquid particles from the inspired air.

Friable Asbestos Material: Material that contains more than 1.0% asbestos and that can be crumbled, pulverized, or reduced to powder by hand pressure when dry. This also includes materials which, when subjected to removal methods and other disturbances, may release fibers and dust due to the abatement actions.

Glovebags: Provide glovebags for removal of pipe insulation in accordance with 29 CFR Part 1926.

HEPA Filter: A High Efficiency Particulate Air (HEPA) filter capable of trapping and retaining 99.97% of asbestos fibers greater than 0.3 microns in diameter.

HEPA Filter Vacuum Collection Equipment (or vacuum cleaner): High efficiency particulate air filtered vacuum collection equipment with a filter system capable of collecting and retaining asbestos fibers. Filters should be of 99.97% efficiency for retaining fibers of 0.3 microns or larger.

High-efficiency particulate air filter: (HEPA) refers to a filtering system capable of trapping and retaining 99.97 percent of all monodispersed particles 0.3 um in diameter or larger.

Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.

Permissible exposure limit (PEL): the Contractor shall ensure that no employee is exposed to an airborne fiber concentration of asbestos in excess of 0.1 f/cc of air as an eight (8) hour time-weighted average (TWA) in accordance with 29 CFR Part 1926.

Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.

Pressure Differential and Ventilation System: A local exhaust system, utilizing HEPA filtration capable of maintaining a pressure differential with the inside of the Work Area at a lower pressure than any adjacent area, and which cleans re-circulated air or generates a constant air flow from adjacent areas into the Work Area.

Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

Regulated ACM (RACM): RACM means friable ACM, Category I Non-friable ACM that has been rendered friable, Category I ACM that will be or has been subjected to sanding, cutting, grinding, or abrading (abrasive action), or Category II Non-friable ACM that has a high probability of becoming, or has become, crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of renovation or demolition operations. Grinding means breaking into small pieces or fragments.

Repair: Returning damaged ACBM to an undamaged condition or to an intact state so as to prevent fiber release.

Respirator: A device designed to protect the wearer from the inhalation of harmful atmospheres.

Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

Time Weighted Average (TWA): The average concentration of a contaminant in air during a specific time period.

Visible Emissions: Any emissions, coming from RACM, ACM, or ACM waste material, which is visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Waste Shipment Record: Means the shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of ACM waste.

Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with amended water or diluted removal encapsulant and afterwards thoroughly decontaminated or disposed of as asbestos-contaminated waste.

Work Area: The area where asbestos-related work or removal operations are performed which is defined and/or isolated to prevent the spread of asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by 29 CFR 1926.

1.13 NOTICES:

A. U.S. Environmental Protection Agency

Send proper written notification as required by USEPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M) to the regional Asbestos NESHAPS Contact - Reno/Demo Clerk - at least 10 working days prior to beginning any work which will directly or indirectly result in disturbance of asbestos-containing materials. Post notifications at job site.

B. State and Local Agencies:

Send written notification as required by state and local regulations prior to beginning any work on asbestos-containing

materials. At least 10 working days prior to the start of work, submit appropriate notification to the **EDIT FOR STATE**: Commonwealth of Massachusetts in accordance with 310 CMR 7.15 and 453 CMR 6.12 **OR** New Hampshire Department of Environmental Services, Air Resources Division **OR** Maine Department of Environmental Protection. Post notifications at job site.

Notify all local emergency agencies of the abatement work to be completed as required. Obtain all necessary building permits as required.

C. Permits

All asbestos containing waste is to be transported by an entity maintaining a current "DOT Common Hauler Permit" specifically for asbestos-containing materials, as required for transporting of waste asbestos-containing materials to a disposal site.

D. Licenses:

Maintain current licenses as required by applicable state and local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract. Post all company, supervisor, and worker licenses at work area entrance.

E. Posting and Filing of Regulations:

Posting and Filing of Regulations: Post all notices required by applicable federal, state and local regulations. Maintain at least one (1) copy of applicable federal, state and local regulations and standards at each job site. Post copies of the specification at the job site.

1.14 SUBMITTAL REQUIREMENTS

A. Submittal Schedule:

Submittals will be provided by the Contractor and as specified herein including (1) Preconstruction Submittal Documentation prior to start of work and (2) Project Closeout Submittals within 25 days upon completion of on-site work. Submit ongoing submittals as required herein and as specified by the Owner and IH Consultant. Provide at the job site a copy of all current submittal packages and related documentation. Ongoing submittals will also be submitted as required for the Pre-construction and Closeouts and may not be limited to:

- Schedule updating or modifications as needed, including description and explanations as applicable.
- Revise proposed methods of work procedures as required. Requests for revisions in work procedures must be approved by the Owner and IH Consultant.
- Updated notifications and permitting.
- Updated licenses and training records for all personnel at the site or for new personnel to work at the site

B. Submittal Preparation

Package and furnish each submittal appropriately and include statements detailing minor variations and limitations. Include Contractor's certification that the submittal information complies with the Contract Document and Specification requirements. Two complete copies of each submittal package shall be furnished to Owner in accordance with the schedules stated herein.

Submittal packages shall be in a neat and orderly fashion, will include an index, and shall be compiled in the order requested herein. Clearly mark and label all sections of the submittal documents.

Do not include, as part of the Submittal Package required herein, other documents not specifically detailed herein. Additional submittal documentation to be provided by the Contractor as the Contractor deems appropriate shall be submitted as a separate supplemental submittal package and marked as such.

Submittal packages that do not meet the requirements herein may not be accepted and will be returned to the Contractor for re-submission.

By “approval” or acceptance of submittals, Owner, Owner and IH Consultant do not express or claim any certification of completeness, compliance, or approval of programs and documentation, not limited to review of analytical results, historical information, and interpretations.

Contractor is solely responsible for compliance with Specification and regulatory requirements associated with the work and submittal documentation.

C. Preconstruction Submittal Documentation:

Provide the following Preconstruction Submittal Documentation prior to the start of each phase of work as indicated by IH Consultant:

. Notifications: Copies of dated EPA, State, and local notifications.

. Waste Hauler and Landfill Permits and notifications. Submit names, address, and licenses for the waste hauler and disposal facilities.

. Names, addresses, experience, and references for any subcontractors the Contractor proposes to utilize for Work. State if any subcontractor asbestos workers or supervisors are to be used or whether only Contractor employees.

. Names and 24-hour phone numbers/pagers for Project Superintendent and other key personnel for the Contractor.

. List of personnel to be on-site. Copies of all company, supervisor, and worker licenses and certifications required and in accordance with this Specification. Copies of current training certificates for workers and supervisors.

. Report from Medical Examination: conducted within last 12 months as part of compliance with OSHA medical surveillance requirements for each worker who is to enter the Work Area.

. Notarized Certifications: Submit certification signed by an officer of the abatement contracting firm and notarized that exposure measurements, medical surveillance, and worker training records are being kept in conformance with 29 CFR 1926. Certify the dates for primary and secondary HEPA filter changes for neg. air units.

. Respiratory Protection Schedule: Submit level of respiratory protection intended for each operation required by the project. Include supporting documentation of previous exposure monitoring on a sufficient number similar project and operations in accordance with OSHA requirements. Copy of written respiratory protection program.

. Proposed schedule and phasing, containment layouts, and summary of approach and detail of any special work procedures to be used if not included or addressed in the abatement specification.

. Material Safety Data Sheets: for all materials to be used on-site not limited to encapsulants, spray adhesives, etc. Note: It is Contractor's responsibility to notify other contractors in accordance with applicable OSHA regulations.

. Contingency Plan: Prepare a site specific contingency plan for emergencies including fire, accident, power failure, pressure differential system failure, supplied air system failure, or any other event that may require modification or abridgement of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of

an emergency. The emergency contingency plan must be in accordance (meet or exceed the requirements of) with applicable OSHA requirements.

. Other submittals required by the Contract Documents or as indicated by Owner.

D. Closeout Submittals

At a minimum, the following Closeout Submittals will be provided upon substantial completion of each phase and prior to final completion of each phase of work.

. Copies of daily logs in accordance with this specification; Copies of analytical results and calculations for all air sampling completed by the Contractor during the project. Copies of specification daily sign in sheets.

. A copy of each waste manifest and chain-of-custody form, signed by the transporter and disposal facility operator, indicating that waste was packaged and disposed of properly. Include a description of any temporary storage facilities used including, dates, times, and locations of temporary storage. Note: In accordance with NESHAPS, submit all waste manifest documentation within 35 days from transport of waste from the site (provide interim submittals during the work as needed to comply with federal regulations). Note: copies of waste shipment records in progress shall also be provided to IH Consultant and Owner immediately upon removal of waste from site.

. Copy of the Pre-construction Submittals for the work. Do not submit personnel training and licensing documentation (other than daily log information) unless the information is not included in the original Preconstruction Submittal Documentation. Other submittals required by Contract Documents.

1.15 AIR MONITORING:

A. Area Monitoring

Work Area Isolation: The purpose of Owner and IH air monitoring is to aid in the detection of faults in the work area isolation such as:

. Contamination of areas outside of the work area isolation barriers
. Failure of filtration or rupture in the differential pressure system
. Contamination of air outside the building envelop with airborne asbestos fibers.

Should any of the above occur immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the IH Consultant.

IH Consultant may monitor airborne fiber counts in the Work Area. The purpose of this air monitoring will be to detect airborne asbestos concentrations that may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

B. Clearance Air Monitoring

Work Area Clearance: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to an acceptable level, the IH Consultant will sample and analyze air per applicable regulations and this specification.

C. Stop Action Levels:

Inside Work Area: Maintain an average airborne count in the Work Area of less than 0.10 fibers per cubic centimeter. If the fiber counts rise above this figure for any sample taken, revise work procedures to lower fiber counts. In this event, stop all work, leave pressure differential system in operation, and coordinate with Owner and the IH Consultant as needed.

Outside Work Area: If any air sample taken outside of the Work Area exceeds the base line concentration levels, immediately and automatically stop all work except corrective action.

If it is determined by the IH Consultant that the high reading was the result of a failure of Work Area isolation measures initiate the following actions:

- Immediately erect new critical barriers as set forth herein to isolate the affected area from the balance of the building. Erect Critical Barriers at the next existing structural isolation of the involved space (eg. wall, ceiling, floor).
- Decontaminate the affected area in accordance with the procedures stated herein.
- Require that respiratory protection as set forth herein be worn in affected area until area is cleared for re-occupancy in accordance with the work area clearance requirements.
- Leave Critical Barriers in place until completion of work and insure that the operation of the pressure differential system in the Work Area results in a flow of air from the balance of the building into the affected area.
- If the exit from the clean room of the personnel decontamination unit enters the affected area, establish a decontamination facility consisting of a Shower Room and Changing Room as set forth herein at entry point to affected area.
- After Certification of Visual Inspection in the Work Area remove critical barriers separating the work area from the affected area. Final air samples will be taken within the entire area.

If the high reading was the result of other causes initiate corrective action as determined by the Owner and IH Consultant.

Effect on Contract Sum: Complete corrective work with no change in the Contract Sum if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control.

D. Analytical Methods:

Owner reserves the right to use either phase contrast microscopy (PCM) and/or transmission electron microscopy (TEM) to analyze air samples. PCM analysis will be performed using the NIOSH 7400 method at the job site or at an off-site laboratory. TEM will be used as Owner deems necessary and for analysis of samples collected for air clearance purposes. All TEM analysis will be performed using the analysis method set forth in the AHERA regulation 40 CFR Part 763 App. A.

E. Schedule of Air Samples:

Prior to the start of work: The IH Consultant may collect air samples to establish a base line before start of work. Base line is an action level expressed in fibers per cubic centimeter that is twenty-five percent greater than the largest of the following:

. Average of the PCM samples collected outside each Work Area
. Average of the PCM samples collected outside the building
. 0.01 fibers per cubic centimeter

Daily: From start of work involving Temporary Enclosures through the work of Project Decontamination, IH Consultant may be collecting samples on a regular basis. Sampling will be completed inside and outside of the work area.

. At HEPA Exhaust areas
. Non work-area portions of the building adjacent to Critical Barriers
. At entrance to the Decontamination Unit Clean Room
. At least one sample outside the building
. Adjacent occupied areas of the building
Clearances: See the Air Clearance Requirements.

F. Laboratory Testing:

The services of a testing laboratory will be employed by Owner to perform laboratory analyses of the air samples. Samples will be sent overnight on a daily basis, so that verbal reports on air samples (PCM analysis) can be obtained within 24 hours. The Contractor will have access to all air monitoring tests and results. Results of all air monitoring tests will be available at the job site on a daily basis. Also see the requirements for air clearance testing. TEM sample analysis may take longer than 24 hours.

G. OSHA Monitoring and Additional Testing:

Additional Testing: The Contractor may conduct his own air monitoring and laboratory testing. If he elects to do this the cost of such air monitoring and laboratory testing shall be at no additional cost to Owner.

OSHA Compliance Monitoring: Contractor must provide for collection and laboratory analysis services of Contractor's OSHA personal exposure samples, including daily TWA and STEL monitoring.

1.16 TEMPORARY FACILITIES

General: Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work. Owner must approve all connections to utilities and facility components. Provide temporary portable waste and power sources for all exterior work as indicated and coordinated with Owner, as applicable.

A. Water Service:

Temporary Water Service Connection: All connections to the Owner's water system shall include back-flow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves, on fresh water supply lines located outside the work area only, shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

Hot Water: as approved by Owner and Owner's Representative, may be secured from the building hot water system, provided back-flow protection is installed at point of connection as described in this section under Temporary Water Service connection, and if authorized in writing by Owner.

B. Electrical Service:

General: Comply with applicable OSHA, NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service. Provide temporary power panels and extensions as required.

Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate GFCI's exterior to Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type ground fault circuit interrupters (GFCI) equipped with test button and reset switch for all circuits to be used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work. Provide sufficient power cords to complete the Work and for the IH Consultant to use as required for the performance of air monitoring and clearance testing.

Lamps and Light Fixtures: Provide general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

C. First Aid:

First Aid Supplies: Comply with governing regulations and recognized recommendations within the construction industry.

D. Fire Extinguishers:

Fire Extinguishers: Provide Type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

E. Execution

General: Use qualified tradesmen for installation of temporary services and facilities. Locate temporary services and facilities where they will serve the entire project adequately and result in minimum interference with the performance of the Work. Coordinate all such work with Owner.

- Require that tradesmen be licensed as required by local authorities.
- Relocate, modify and extend services and facilities as required during the course of work so as to accommodate the entire work of the project.

1.17 PRESSURE DIFFERENTIAL AND AIR CIRCULATION SYSTEM

A. Monitoring

Continuously monitor and record the pressure differential between the Work Area and the building outside of the Work Area. Maintain accurate records of time and locations of testing on-site and in daily logs.

B. HEPA Filtered Fan Units:

Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Units must meet the requirements of all applicable regulations and standards. Provide certification of filter change dates. Also see applicable Specification Sections.

1.18 WORKER PROTECTION

Comply with respiratory protection requirements as specified in this specification and applicable regulations. Provide worker protection as required by the most stringent OSHA and/or EPA regulations and industry standards applicable to the work. The following procedures are minimums to be adhered to regardless of fiber count in the Work Area.

A. Worker Training:

AHERA Accreditation: All workers are to be accredited as Abatement Workers as required by the AHERA regulation 40 CFR 763 Appendix C to Subpart E, April 30, 1987. All training must be current. Workers that have training that expires during the work must either renew the training or must not be allowed to continue work until refresher training certification is provided.

All removal of thermal systems insulation is OSHA Class 1 asbestos work and shall be completed in strict accordance with 29 CFR Part 1926.1101. Recent EPA regulations and interpretations of certain nonfriable ACBM, such as floor tile and mastic, define it as Category I nonfriable ACM. However, Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading is defined as Regulated ACM. The EPA NESHAPs regulation defines grinding as breaking into small pieces. In addition, OSHA defines ACM flooring abatement as Class II asbestos work. As such all flooring work must be completed in accordance with 29 CFR 1926.1101.

Train, in accordance with NESHAPs and 29 CFR 1926, all supervisors and workers in the dangers inherent in handling

asbestos and breathing asbestos dust, in proper work procedures and personal and area protective measures, confined space, and other hazards anticipated during the work. All workers and supervisors must be licensed and certified as required by applicable State regulations. All workers must have adequate experience completing similar projects in accordance with State and federal rules and regulations.

Train all workers in accordance with 29 CFR Part 1926 on the work place hazards present at the site, including but not limited to confined space entry, lock-out/tag-out, hazard communication, fall hazards, and other general construction hazards anticipated for the work.

B. Medical Examinations:

Provide medical examinations for all workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an 8 hour Time Weighted Average. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the Work Area for any reason. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926 and 29 CFR 1910.20. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

C. Protective Clothing:

Coveralls: Provide cloth full-body coveralls and hats, and require that they be worn by all workers in the Work Area. Require that workers change out of coverall in the Equipment Room of the Personnel Decontamination Unit. Dispose of coverall as asbestos waste at completion of all work.

Other: Provide other personal protective equipment as required by OSHA regulations and industry standards, not limited to: hard hats, eye protection (goggles), gloves, fall safety, and footwear.

D. Entering Work Area:

Each time Work Area is entered, remove all street clothes in the changing (clean) room of the personnel decontamination unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots. Only properly licensed/certified personnel shall enter the decontamination unit and work area. All personnel entering the work area must post their State license at the decontamination unit entrance.

E. Decontamination Procedures:

Require all workers to adhere to the following personal decontamination procedures whenever they leave the Work Area:

- HEPA vacuum all gross debris from the protective clothing prior to entering the equipment room of the decontamination unit. When exiting area, remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

- Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

- Carefully wash face piece of respirator inside and out. Each worker leaving the work area must shower completely with soap and water. Rinse thoroughly. Proceed from shower to clean room and change into street clothes or into new disposable work items.

F. Within Work Area:

Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area. Maintain proper use of personnel protective equipment.

G. Respiratory Protection:

Provide sufficient respiratory protection in accordance with applicable OSHA requirements in addition to ANSI and NIOSH standards. Select proper level of protection based on personnel exposure monitoring and the applicable OSHA Permissible Exposure Limits.

Instruct and train each worker involved in asbestos abatement or maintenance and repair of asbestos-containing materials in proper respiratory use and require that each worker always wear a respirator, properly fitted on the face in the Work Area from the start of any operation, which may cause airborne asbestos fibers until the Work Area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered and as required for other toxic or oxygen-deficient situations encountered.

Except to the extent that more stringent requirements are written directly into the Contract Documents, the following regulations and standards have the same force and effect (and are made a part of the Contract Documents by reference) as if copied directly into the Contract Documents, or as if published copies were bound herewith. Where there is a conflict in requirements set forth in these regulations and standards, meet the more stringent requirement.

OSHA - U.S. Department of Labor Occupational Safety and Health Administration, Safety and Health Standards 29 CFR 1910, Section 1001 and Section 1910.134. 29 CFR 1926.

CGA -Compressed Gas Association, Inc., New York, Pamphlet CGA G-7,"Compressed Air for Human Respiration", and Specification CGA G-7.1 "Commodity Specification for Air".

ANSI - American National Standard Practices for Respiratory Protection, ANSI Z88.2-1992, and most current revisions.

NIOSH - National Institute for Occupational Safety and Health

Respiratory Protection Program: Comply with ANSI Z88.2 - 1992 (and most current revisions) "Practices for Respiratory Protection" and OSHA 29 CFR 1910 and 1926. Require that respiratory protection be used at all times that there is any possibility of disturbance of asbestos-containing materials whether intentional or accidental.

Require that a respirator be worn by anyone in a Work Area at all times, regardless of activity, until the area has been cleared for re-occupancy.

Regardless of Airborne Fiber Levels: The minimum level of respiratory protection used must be half-face negative pressure respirator with high efficiency filters during pre-cleaning and abatement of nonfriable ACBM and PAPR’s during abatement of friable ACBM. Provide and complete all necessary fit testing for respiratory protection in strict accordance with applicable OSHA regulations.

In the event that applicable OSHA PEL's (8-hour TWA and 30-minute STEL) are exceeded, stop work. Do not recommence work until work procedures, including use of engineering controls, are modified to maintain exposures within the acceptable PEL's.

1.19 TEMPORARY ENCLOSURES

Work areas are to be considered contaminated during the work and shall be completely isolated from other parts of the building such that asbestos fibers cannot pass through or beyond the perimeters of the work area and into non work areas. Should areas beyond the work area become contaminated with asbestos as a result of the Contractor's work, the Contractor shall be responsible for cleaning non-work areas as required. All costs including cleaning, decontaminating, monitoring and testing shall be borne by the contractor.

Contractor shall construct temporary containment enclosures in each work area as required in the Contract Documents and as required by Owner. Prior to proceeding with work of each of the following Specification Sections, coordinate and complete inspections of the work in progress with the IH Consultant as indicated and requested by Owner and the

IH Consultant. Proceed with work sequentially as listed or indicated.

Prior to conducting pre-cleaning work, completely isolate the Work Area from other parts of the building so as to prevent asbestos-containing dust or debris from passing beyond the isolated area. Should the area beyond the Work Area(s) become contaminated with asbestos-containing dust or debris as a consequence of the work, clean those areas in accordance with the decontamination and cleaning procedures indicated in this Specification. Perform all such required cleaning or decontamination at no additional cost to Owner.

Place all tools, scaffolding, staging, etc. necessary for the work in the area to be isolated prior to completion of Work Area isolation. The Owner and/or Owner's Representative will remove of all uncontaminated, non-fixed equipment, furniture, and other items from the Work Areas. Disable ventilating systems or any other system bringing air into or out of the Work Area. Disable system by disconnecting wires, removing circuit breakers, by lockable switch or other positive means that will prevent accidental premature restarting of equipment.

Complete all lock-out and tag-out of power and air handling systems to, and within, the Work Area. Coordinate all lock-out and tag-out with Owner. Provide lock-out and tag-out in strict accordance of applicable OSHA regulations. Complete lock-out and tagging of all other equipment and systems as needed to complete the work in a safe manner. Coordinate with Owner and local fire department authorities the handling of heat and smoke detectors in the work areas, including sealing of detectors during work and removal of seals at the completion of work or shifts.

1.20 REGULATED ACM

All ACM (and ACBM) to be removed during the Work of the Contract Documents shall be handled as Regulated ACM (RACM). This is based on the types of ACBM present, conditions of the material, anticipated impact of removal and decontamination methods, and other related conditions.

PART 2 - PRODUCTS

2.1 RELATED DOCUMENTS

General provisions of the Contract, including General and Supplementary Conditions and other Abatement Specification Sections, apply to the work of each of this Section.

2.2 PRODUCTS

Provide new or used materials and equipment that are undamaged and in serviceable condition. Provide only materials and equipment that are recognized as being suitable for the intended use and in strict compliance with appropriate standards. Do not bring products, materials, and equipment to the Owner's site or Owner work areas that are damaged or contain construction or potential contaminated debris.

Warning Signs, Caution Signs and Demarcation: Provide all demarcation, warning signs, caution signs, and other postings required for the work and in accordance with State and federal codes and regulations.

Polyethylene Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, in 6.0 mil thickness, clear or black as indicated.

Duct Tape: Provide duct tape in 3" widths with an adhesive which is formulated to stick aggressively to sheet polyethylene.

Spray Cement: Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

Foam Pack: Provide foam pack for sealing small crevices and cracks at critical barriers as required. All foam pack must be approved by Owner and local authorities, not limited to the Fire Department.

Scaffolding: Provide all scaffolding, ladders and/or staging, etc. as necessary to accomplish the work of this contract.

Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection and use of all scaffolding shall comply with all applicable OSHA provisions.

-Equip rungs of all metal ladders, etc. with an abrasive non-slip surface.
-Provide a nonskid surface on all scaffold surfaces subject to foot traffic.

First Aid Supplies: Comply with governing regulations and recognized recommendations within the construction industry.

Fire Extinguishers: Provide Type "A" fire extinguishers for temporary offices and similar spaces where there is minimal danger of electrical or grease-oil-flammable liquid fires. In other locations provide type "ABC" dry chemical extinguishers, or a combination of several extinguishers of NFPA recommended types for the exposures in each case.

Wetting Materials: For wetting prior to disturbance of Asbestos-Containing Materials use either amended water or a removal encapsulant:

Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the Asbestos-Containing Material and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

Disposal Bags: Provide 6 mil thick leak-tight polyethylene bags labeled as required by applicable sections of this Specification and federal and state regulations.

Fiberboard Drums of Equivalent: Provide sufficient quantity of fiber board drums or equivalent (as determined by IH Consultant) for packaging of wire mesh and other contaminated materials with sharp or rough edges.

Disposal Bag/Container Labels and Signs: Provide leak-tight waste bags or containers for disposal of asbestos-containing materials with labels in accordance with OSHA, EPA, and the latest revisions to the US Department of Transportation requirements, not limited to material identification number (#NA2212), material packaging group (PGIII), and labels. Warning labels will also include:

Legend: DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

In accordance with NESHAPS, label each waste bag with the name of the waste generator and address where the material was generated. Include the Contractor name and address on each label also. Attach label in a sufficient manner such that they are properly sealed to or on the containers.

Label all waste bags, containers, and transport vehicles as required by applicable U.S. Department of Transportation Rules and Regulations.

Coveralls: Provide disposable full-body coveralls and head covers in accordance with State and federal regulations. Provide a sufficient number for all required changes, for all workers in the Work Area. Provide sufficient number for use by IH Consultant.

Other PPE: Provide other personal protective equipment as required by OSHA regulations and industry standards, not limited to: hard hats, eye protectives, gloves, and footwear.

Respiratory Protection: Provide respiratory protection in strict accordance with ANSI Z88.2 - 1992 "Practices for Respiratory Protection" and 29 CFR 1926 and 1910.134. The respirators will be sanitized and maintained in accordance with manufacturer's specifications and recommendations. Provide sufficient respiratory protection based on applicable ANSI and NIOSH standards. Select proper level of protection based on personnel exposure monitoring

and the applicable OSHA Permissible Exposure Limits. Use only respirators and filter that are NIOSH-approved for use with asbestos and other atmospheres anticipated during the work.

Edit – included if needed - Solvents: Provide appropriate solvent materials to aid in the removal of flooring materials and mastics. Such materials should be "low-odor" rated and all MSDS's shall be submitted to the Owner for approval prior to storing or using such materials at the job site. Contractor is solely responsible for all environmental and worker protection precautions required for the safe use, clean-up, and disposal of such materials. Additional air testing (area and personal exposure monitoring) must be completed by the Contractor (at no additional cost to the Owner) depending on the solvents to be used and as necessary to ensure a safe environment for site workers and adjacent public. Assure compatibility with replacement materials prior to installation of solvents. Note: Charcoal pre-filters will be required on all HEPA exhaust/filter equipment during use of solvents.

Construction Materials: Provide other construction materials such as plywood, strapping, studs, other related abatement materials, etc., as required to complete the work in accordance with this Specification.

2.3 WATER SERVICE

Temporary Water Service Connection: All connections to Owner's water system shall include back-flow protection. Valves shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water will not damage existing finishes or equipment.

Water Hoses: Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into each work area and to each Decontamination Unit. Provide fittings as required to allow for connection to existing wall hydrants or spouts, as well as temporary water heating equipment, branch piping, showers, shut-off nozzles and equipment.

Hot Water: may be secured from the building hot water system, provided back-flow protection is installed at point of connection as described in this section under Temporary Water Service connection, and if authorized in writing by Owner.

2.4 ELECTRICAL SERVICE:

General: Comply with applicable OSHA, NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electric service. Contractor shall provide licensed electrician for performance of electrical work.

Temporary Power: Provide service to Decontamination Unit sub-panel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the buildings main distribution panel. Sub-panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work.

Voltage Differences: Provide identification warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.

Ground Fault Protection: Equip all circuits for any purpose entering Work Area with ground fault circuit interrupters (GFCI). Locate GFCI's exterior to Work Area so that all circuits are protected prior to entry to Work Area. Provide circuit breaker type GFCI equipped with test button and reset switch for all circuits to be used for any purpose in work area, decontamination units, exterior, or as otherwise required by national electrical code, OSHA or other authority. Locate in panel exterior to Work Area.

Electrical Power Cords: Use only grounded extension cords; use "hard-service" cords where exposed to abrasion and traffic. Use single lengths or use waterproof connectors to connect separate lengths of electric cords, if single lengths will not reach areas of work. Provide sufficient power cords to complete the Work and for the IH Consultant to use as required for the performance of air monitoring and clearance testing.

Lamps and Light Fixtures: Provide general service incandescent lamps or fluorescent lamps of wattage indicated or required for adequate illumination as required by the work or this section. Protect lamps with guard cages or tempered glass enclosures, where fixtures are exposed to breakage by construction operations. Provide vapor tight fixtures in work area and decontamination units. Provide exterior fixtures where fixtures are exposed to the weather or moisture.

2.5 PRESSURE DIFFERENTIAL AND FILTRATION:

General: Supply the required number of HEPA filtered fan units to the site in accordance with this Specification. Use fan units that meet the following requirements.

Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Provide units whose cabinets are:

-Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance
-Arranged to provide access to and replacement of all air filters from intake end
-Mounted on casters or wheels

HEPA Filters: Provide units whose final filter is the HEPA type with the filter media (folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame. Certify most recent dates for filter changes and approximate hours of usage. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL586 label to indicate ability to perform under specified conditions.

Pre-filters: which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. Provide units with the following pre-filters:

First-stage pre-filter: low-efficiency type (e.g., for particles 100 um and larger)
Second-stage (or intermediate) filter: medium efficiency (eg., effective for particles down to 5 um)

Provide appropriate charcoal pre-filters during all work involving use of solvents to minimize odors. Allow HEPA units to run for a sufficient period of time after use of solvents to allow for adequate number of air changes and filtration to adequately dilute odors.

Safety and Warning Devices: Provide units with the following safety and warning devices:

Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter
Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge
Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge)
Audible alarm if unit shuts down due to operation of safety systems

Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.

APPENDIX D

Health and Safety Plan

New England
ENVIROSTRATEGIES, INC.
One Tremont Street • 2nd Floor
Concord • NH 03301

SITE-SPECIFIC HEALTH & SAFETY PLAN

For

64 Elm Street Redevelopment Project

Brattleboro Vermont

Phase II

Demolition, paving and monitoring activities

Prepared by New England EnviroStrategies, Inc.

Project Number: 09011 D03

Site Work: February – March 2010

I. HEALTH & SAFETY PLAN APPROVAL & PREPARATION

This plan has been approved by New England EnviroStrategies, Inc. as indicated below. It should not be deviated from without prior written approval.

Approved by:

_____ _____

W. James Griswold, Senior VP, New England EnviroStrategies, Inc. Date

Health & Safety Plan prepared by:

_____ _____

Michael Robinette, Staff Scientist, New England EnviroStrategies, Inc. Date

II. HEALTH AND SAFETY BRIEFING (Prior to the site activities listed herein)

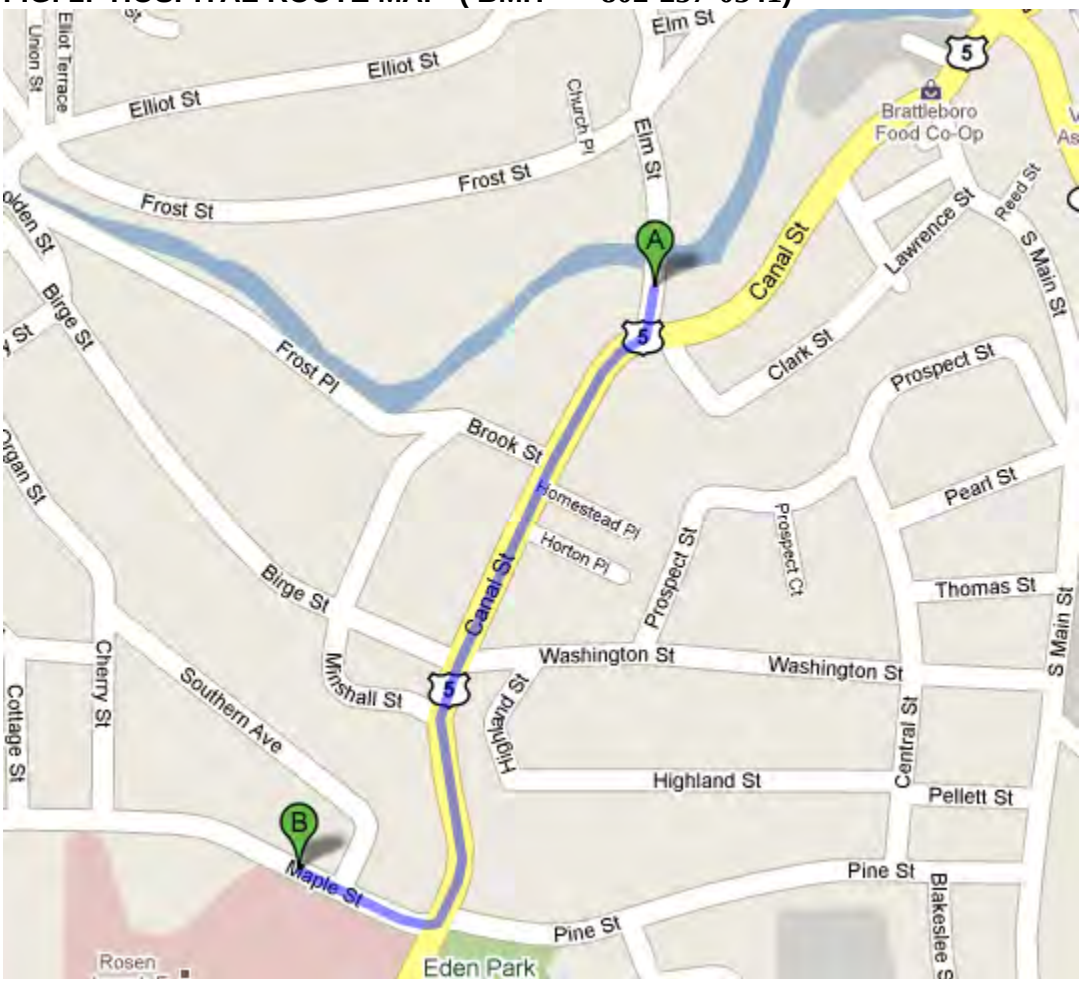
I have read, understand, and agree to follow this, or my own Company's Health & Safety Plan.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

III. EMERGENCY CONTACT & RESPONSE INFORMATION

FIRE DEPARTMENT Emergency 9-1-1 http://www.brattleborofire.org/ 103 Elliot Street Brattleboro, VT 05301 802-254-4831 (non-emergency)	**RESCUE** Emergency 9-1-1 http://www.brattleborofire.org/ 103 Elliot Street Brattleboro, VT 05301 802-254-4831 (non-emergency)
POLICE DEPARTMENT Emergency 9-1-1 http://www.brattleboropolice.com/ 230 Main Street, Suite 102 Brattleboro, VT 05301 802-257-7946 (non-emergency)	**AMBULANCE** Emergency 9-1-1 **Rescue Inc. - Division 1** 541 Canal Street - PO Box 593 Brattleboro, VT 05302 (802) 257-7679
HOSPITAL Brattleboro Memorial Hospital http://www.brattleborohospital.org 17 Belmont Avenue Brattleboro, VT 05301 802-257-0341	**POISON CONTROL CENTER** Northern New England Poison Center Serving Maine, New Hampshire and Vermont 22 Bramhall St Portland, ME 04102 Emergency Phone: (800) 222-1222 http://www.nnepc.org/
CHEMTREC Chemical Transportation Emergency Center 2501 M Street Northwest Washington, D.C. 20037 1.800.424.9300	**Public Works Department** 211 Fairground Road Brattleboro, VT 05301 Phone: 802-254-4255, Fax: 802-257-2316
TOWN OFFICE Barbara Sondag, Town Manager, 251-8102 Catrina Lawley, Executive Secretary, 251-8100 230 Main Street, Suite 208 Brattleboro, VT 05301 802-251-8151 Fax: 802-257-2322	**New England EnviroStrategies, Inc.** One Tremont Street Concord, NH 03301 **CONTACT INFORMATION** Telephone – 603-856-8815 Cell – 603-566-7316 Fax – 603-856-8816
Demolition Contractor To be determined	**Asbestos Removal Contractor** To be determined

FIG. 1: HOSPITAL ROUTE MAP (BMH 802-257-0341)



A 64 Elm St, Brattleboro, VT 05301

1. Head **south** on **Elm St** toward **Canal St**	go 141 ft total 141 ft
2. Turn **right** at **Canal St** About 1 min	go 0.4 mi total 0.4 mi
3. Turn **right** at **Maple St** Destination will be on the left	go 436 ft total 0.5 mi

B Brattleboro Memorial Hospital
17 Belmont Avenue, Brattleboro, VT 05301 - (802) 257-0341

This health and safety plan is intended to address measures conducted by New England EnviroStrategies (NE2S) personnel in support of remedial activities to be conducted at the 64 Elm Street site by additional remedial contractors, including observation of hazardous material removal, observation of building demolition and observation of geotechnical foundation and/or paving operation.

IV. SITE DESCRIPTION

The building is a two-storey, brick construction structure dating to the 19th century located at 64 Elm Street in Brattleboro, Vermont. The first and second floor heights are approximately 14 feet. The basement height is approximately 9 feet from floor to bottom of joists of first floor. A cinderblock addition was constructed on north end of the building, and has shorter walls. One must descend approximately four or five steps (about three feet) to the second floor of the addition, suggesting a wall height of eleven feet for the addition. The wall height in the addition is obscured by the ceiling, which the old building lacks.
The building has a granite block foundation approximately 8.5 feet high along Elm Street and the south side of the building. A partial (4 feet high) granite foundation comprises opposite wall, which is also partly brick and has windows that were bricked over and buried. The older portion of the building is approximately 104 feet long, 27 feet wide on the interior. The south end of the building juts out eastward, and is 42 feet wide. The addition extends 20 feet northward from the former northern end of the building. It is 35 feet wide, and wraps around the east side of the original building. The addition does not extend into the basement.

Floor joists are roughly 11" x 8" in cross-section and positioned eight (8) ft on center. Tall windows, some filled with cinderblock, some boarded, are located between the joists. Floors are comprised of two-inch thick wooden planks, with approximately one inch of diagonally-placed subflooring and tongue in groove wood overlayment. Interior brick walls are located approximately 25 feet in from northern end of original building. A cinderblock and brick wall is located on the north end of the basement.

Previous Site Characterization Data

Site Contaminant Distribution (Soil and Groundwater)

Tables 1a through 1c and Table 2 from the site's Analysis of Brownfields Cleanup Alternatives/Corrective Action Plan (ABCA/CAP) are attached and provide a summary of Site analytical data for soils and groundwater. Additional information regarding contaminants in those media is provided below.

- PCBs: Aroclor 1254 has been detected in overburden soils throughout the Site at moderate concentrations exceeding Environmental Protection Agency Regional Screening Levels (RSLs) for residential and industrial use at depths ranging from 0 to

11 feet bgs. The distribution of PCBs in Site soil is not consistent with a specific source area, but is likely generally related to the historic use and handling of PCB-containing materials in and around the Site building during its industrial history.

- Petroleum-related compounds: Low to moderate levels of various PAH compounds have been detected at concentrations exceeding the Industrial RSLs along the north and northeast side of the building (Figure 5 and Table 1c). Moderately-high concentrations of TPH (2700 mg/kg) and various PAHs were detected in sample SS-1 at a depth of 7 ft bgs. This boring location (SB08-1) is located near an access door on the northeast side of the building and may reflect release of waste oils in this area.

- VOCs: Only trace/ND concentrations of VOCs have been detected in Site soil.

- Metals: Arsenic was detected in all soil samples at concentrations exceeding Residential and Industrial RSLs. The highest concentration of arsenic was detected in the shallow subsurface at boring location SB08-2 (12 mg/kg, Duplicate 29 mg/kg) on the northeast side of the building. Figure 7 presents a posting map of lead concentrations in Site soils. Moderate concentrations of lead were also detected in the same sample (490 mg/kg) which exceeds Residential RSL, but is less than the Industrial RSL. Various metals were detected in other soil samples at concentrations below the residential RSLs.

- Groundwater: Site groundwater as measured in the onsite monitoring wells is generally free of contamination. PCB contamination was detected in four (4) of the six (6) monitoring wells as a result of the initial round of groundwater sampling conducted in January 2009. However, two (2) subsequent rounds of monitoring, conducted in September and October 2009 indicated concentrations of PCBs below laboratory reporting limits in all Site monitoring wells. It is possible that initial PCB detections resulted from cross-contamination of field sampling equipment or from an error in sampling protocol.

Site Contaminant Distribution (Building Materials)

Contaminants in structural materials that are hazardous or exceed the Toxic Substances Control Act (TSCA) offsite disposal (>25 mg/kg) criteria, which will be disposed of offsite consist of:

- Total PCB concentrations of 180 mg/kg in two composited samples from grab samples taken from cinder block walls on the first floor of the addition. The office located in the northeast corner of the building was paneled and samples were not collected from the walls.

- TPH concentrations exceeding the 50,000 mg/kg hazard concentration in all second floor joists and two of five first floor joists

- Total PCB concentrations (20 to 89 mg/kg) and TPH concentrations (57,000 to 230,000 mg/kg) exceed hazardous levels in three composited wooden floor samples collected to a depth of one half inch. Two samples were composited from eleven first

floor grab samples, and one sample was composited from five second floor grab samples.

- Total PCB concentrations (54 to 89 mg/kg) exceed hazardous levels in sump sediments. TPH concentrations in one of the three same sources exceed TPH hazardous concentration.

- An approximately 25-foot long section of masonry wall on the west side of the basement contains total PCB concentrations in excess of ten (10) mg/kg. One sample in the section contains a total PCB concentration of 8,300 mg/kg.

Building materials containing between ten (10) and 25 mg/kg of total PCBs which may require encapsulation or removal include:

- Window caulking from a sample from the new building contained 30 mg/kg total PCBs;

- Windows 1 and 6 each contained 11 mg/kg total PCBs.

- Paint spilled on first floor that seeped to the basement walls was sampled in three locations and each contained 12 to 39 mg/kg PCBs (Aroclor 1254) and TPH concentrations up to 19,000 mg/kg.

Building materials containing between one (1) and ten (10) mg/kg of total PCBs which may require encapsulation or removal under a renovation option include:

- Concrete floor in basement

- Floor joists (first and second floors)

- First floor walls of older building (associated with paint)

- Some portions of second floor walls of older building (associated with paint)

- Some portions of western basement wall and southeast basement wall near doorway and stairwell.

- Window caulking (one sample from a window on each floor of old building) contained 1.2 and 4.9 mg/kg total PCBs.

- Window casing shavings Windows 2,3,4,5 and 2 duplicate contained 2.0 to 7.9 mg/kg total PCBs. Concentrations were not grouped by KAS in one concentration range.

Two interior surveys and testing indicated that asbestos is present in insulation of piping found in the northeast corner of the old building, window caulk in windows and doors, and tile flooring and adhesive in the building addition. The roof could not be accessed during the surveys, and for the purposes of estimating costs is assumed to be asbestos containing.

Lead was present in all paint samples collected. Lead concentrations ranged from 0.085 percent by weight (850 mg/kg) to 0.62 percent by weight (6,200 mg/kg), with one notable exception – one red paint sample from the western exterior of the addition. This sample contained 7.5 percent lead by weight, or 75,000 mg/kg. The exterior west wall of the addition painted red, as was the upper part of the second story of the exterior north wall. The rest was painted white, but it is not known if the white paint covers the red paint. Paint on the east exterior wall of the addition suggests that the red paint on the second story does not underlie the white paint covering the rest of the wall. The Vermont Occupational Safety and Health Administration (VOSHA) considers any amount of lead in paint to be hazardous, and has specific guidelines for removal contractors.

Work Areas

The work areas at the site are in an urban area bounded on one side by Elm Street and other properties for the other three sides.

Site Activity Assignments

Activity	Activity Description	Date(s)	Level of Protection	Employee	Notes
1	Observation of asbestos, PCB and paint removal activities	TBD 2010	D (modified)	TBD	Hard hat and steel toed boots required (see PPE). Cold weather clothing as needed. NE2S personnel to remain outside of hot zones and contaminant reduction zones.
2	Building demolition	TBD 2010	D (modified)	TBD	Hard hat and steel toed boots required (see PPE). Cold weather clothing as needed. NE2S personnel to be vigilant in avoiding dangerous areas during demolition and to observe all safety zones set up by the contractors.
3	Foundation cap or pavement installation	TBD 2010	D (modified)	TBD	Hard hat and steel toed boots required (see PPE). Cold weather clothing as needed. NE2S personnel to be vigilant in avoiding dangerous areas during construction and to observe all safety zones set up by the contractors.

Hazard Assessment

Potential hazards anticipated while conducting Site activities include

- Chemical exposure to PCBs, TPHs, PAHs, metals and VOCs via inhalation, ingestion, and absorption

- Physical hazards due to proximity to demolition and disposal operations;
- Slip, trip and fall;
- Traffic related hazards;
- Weather related hazards; and
- Utility related hazards

V. WORK PRACTICE RECOMMENDATIONS AND CONTINGENCY PLAN

Chemical exposure will be minimized for each of the anticipated exposure paths. Ingestion and absorption hazards will be mitigated by the use of personal protective equipment, and safe work practices as indicated below for specific site activities. NE2S personnel will remain outside of any 'hot zone' or 'contaminant reduction zone' delineated by removals contractors. Inhalation exposure will be minimized through a combination of work site positioning of personnel up-wind from removal and demolition operations. When possible, breathing zone air monitoring using a PID and a particulate monitoring program instituted by the removal contractors will be observed.

Inhalation exposure hazard reduction

Breathing zone air monitoring will be conducted using a PID for volatile organics and particulate monitoring for asbestos particles. Previous site investigation has not indicated significant TPH and VOCs in the surface and structural media.

- **Action I level 2.5 ppm total VOC**

In the event that sustained breathing-zone concentration is the referenced concentration, work will be suspended in order to notify the project manager and to take measures to reduce breathing zone concentrations. Mitigating measures may include:

- Repositioning of personnel relative to work activities to a more up-wind location
- The use of industrial fans to dissipate breathing zone VOCs
- Cessation of remedial activities until such time as the levels decline to below 1 ppm

In the event that non-PPE mitigation measures are unable to reduce breathing zone concentration to **1 ppm**, work will be suspended and conditions of the work re-evaluated until mitigation measures can be undertaken.

- **Action I level for visible friable asbestos**

In the event that visible friable asbestos is identified, NE2S staff will vacate the premises until mitigative measures can be taken by the asbestos-removal contractors, possibly consisting of removal and disposal of the friable asbestos or until other measures, e.g., misting with water to minimize the potential for friable material to become airborne are undertaken.

General Work Practices

General safe work practices will be used at the site to mitigate risks associated with absorption and ingestion of potentially contaminated media, including good "house-keeping" practices of maintaining a clean working environment and proper use of PPE. Workers shall be vigilant in identifying and anticipating dangerous conditions and taking appropriate actions to avoid same.

Work Area Control

During demolition and removal operations, heavy equipment, including but not limited to; cranes, backhoes, front end loaders and trucks will be in use on site. Thus, NE2S workers may be exposed to swinging equipment during lifting, or may be exposed to crushing hazards if equipment falls or is carelessly lowered and may further pose a crushing hazard to hands and/or feet. Rough edges, exposed sharp building materials may cause cuts and abrasions.

Proximity to field activities will be limited to reduce the probability of occurrence of physical injury and chemical exposure of field personnel, visitors, and the public. Work area control will be achieved through the use of three zones (exclusion zone, contamination reduction zone, and support zone). The exclusion and contamination reduction zones will be established for demolition, removal and transport activities. The area outside of the exclusion and contamination reduction zones will be considered the support zone. Access to the exclusion zone will be limited to authorized personnel only. A first aid kit will be kept in the support zone.

Environmental and demolition samples collected during demolition will be processed in the exclusion zone. The decontamination of demolition equipment, using portable equipment, will be performed in the contamination reduction zone.

Traffic Safety

Site activities will include numerous types of heavy equipment entering and leaving the site. NE2S workers may be involved in monitoring removal amounts via dump trucks or roll offs and must use caution in approaching or being in the vicinity of same. High visibility clothing, including reflective vests will be worn by site personnel. Vehicle traffic will be controlled, if necessary, through a combination of traffic cones and warning signs, high visibility tape, and positioning of Site vehicles.

Weather

Field work will possibly be conducted in cold weather conditions. Health risks related to cold exposure include hypothermia, frostnip, and frostbite. Proper clothing, consumption of warm non-alcoholic beverages, taking indoor warming breaks, and monitoring co-workers for symptoms of cold related illness can all reduce the risks associated with cold exposure.

- **Hypothermia** is related to a lowering of core body temperature and is indicated by symptoms such as shivering, fatigue, loss of coordination, slurred speech, and disorientation. Preventative activities include proper cold weather clothing, insulated gloves, socks, hats and outer garments that are compatible with other chemical and physical hazard PPE required at the Site. The consumption of warm, non-alcoholic beverages and taking warming breaks is also recommended.

- **Frostnip and Frostbite** are skin conditions resulting from skin exposure to the cold. Symptoms begin with a whitening of the skin (frostnip), progress to a waxy appearance of the skin that is firm on the surface, but resilient below, and finally to deep frostbite where tissues are cold and hard. The risk of frostbite can be reduced by the same precautions listed for hypothermia with extra attention given to protecting exposed skin from wind and cold. Professional medical attention is required if frostbite is indicated.

Decontamination

All non-disposable field equipment will be decontaminated before each use and between samples to avoid cross-contamination between samples and to ensure the health and safety of the field crews. Areas for decontamination will be in the contaminant reduction zone. Sampling equipment will be decontaminated by washing between sampling collection and processing. All other non-disposable sampling equipment and PPE will be decontaminated by washing with a phosphate-free detergent solution. Decontamination water will be disposed of at ground surface in unpaved areas (or) in contaminated soils to be removed from the site and disposed of at an appropriate licensed facility

In general, the following decontamination procedure will be used for nondisposable sampling equipment and PPE:

1. Set up a sampling equipment decontamination/wash area. Fill three containers (e.g., 5-gallon buckets) with tap water. Add Alconox™ or an equivalent phosphate-free detergent to one of the tap water containers according to the manufacturer's directions. Align the containers in the following manner: Tap water, detergent solution, tap water.

2. In the first container of tap water, rinse the item to remove as much soil, water, contamination, etc., as possible. Change this water frequently.

3. In the second container of detergent solution, wash the item using a scrub brush or other suitable cleaning tool. Discard this wash water and create a new detergent solution when necessary.

4. In the third tap water container, rinse the item to remove any traces of detergent. Change this water frequently.

Activity Specific Work Practices: Observation of hazardous materials removal, building demolition and cap/pavement installation. Confirmatory sampling as needed.

PPE: Level D, plus nitrile rubber gloves will be worn during sample collection and processing.

Maintain alertness and safe position relative to drilling equipment.

Maintain alertness regarding foot and vehicle traffic.

Breathing zone monitoring using a 10.2 eV lamp PID.