Analysis of Brownfields Cleanup Alternatives/ Evaluation of Corrective Action Alternatives

Congress and Main Redevelopment Project
10 Maiden Lane
10 and 12 Congress Street
83-87, 89, and 99 North Main Street
St. Albans, Vermont 05478

44°48'46.70" N, 73°4'55.93'' W
DEC Site #2018-4811

January 11, 2019

Prepared For:
City of St. Albans
100 North Main Street
St. Albans, Vermont 05478

LE·Environmental

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EXECUTIVE SUMMARY

This document is an Analysis of Brownfields Cleanup Alternatives (ABCA) as defined by the United States Environmental Protection Agency (USEPA) and an Evaluation of Corrective Action Alternatives (ECAA) as defined by the Vermont Department of Environmental Conservation (DEC). The purpose of this ABCA/ECAA is to identify potential corrective action alternatives to mitigate human health and environmental risk posed by soil and soil vapor contamination at 10 Maiden Lane, 10 and 12 Congress Street, 83-87, 89, and 99 Main Street in the City of St. Albans, Vermont (Site).

The Site consists of six separate parcels, totaling approximately 1-acre of land, with five buildings, in downtown St. Albans City. The surrounding area includes residential/institutional/commercial properties. The Site is entirely developed with structures, parking lots, and a retaining wall. There are five separate structures located on the Site.

Current redevelopment plans for the Site include the demolition of four buildings (85-87 Main, 89-91 Main, 10 Congress, and 10 Maiden Lane). A new three-story 25,000 square foot commercial building will be constructed along the entire frontage of North Main St. The first floor will be 4,400 SF of retail space, and the second and third floors will be 9,600 SF each of office space. A 4-story, 24-unit market rate housing structure will be constructed in the southeast corner of the lot along Maiden Lane, and a 4-story, 30-unit affordable housing structure will be constructed at the corner of Congress St. and Maiden Lane. The new structures will share a fire wall and will sit on a foundation that also acts as a retention wall to allow for parking spaces underneath the buildings. The building at 12 Congress St. will remain as a mixed multi-family residential and light commercial structure.

Environmental investigations conducted on the Site have revealed the presence of polycyclic aromatic hydrocarbons (PAHs), lead, and arsenic above statewide urban background in soils on the Site, which is consistent with urban fill or "'development soils" typically found in urban downtowns.

Elevated levels of naphthalene and acrolein were reported in soil vapor samples collected throughout the Site. Concentrations of benzene, acrolein, chloroform,1,2-dichloroethane, and ethyl acetate were reported above the residential indoor air screening thresholds in the indoor air samples collected from 12 Congress Street. The benzene concentrations were less than the ambient air concentrations, indicating the source for benzene is likely the outdoor air. The other contaminants identified may be attributed to vapor intrusion since they were comparable to the sub-slab concentrations.

Three possible corrective action alternatives were evaluated, including partial contaminant soil removal and installation of a minimum 18" clean cap (Alternative A), removal of all contaminated soil (Alternative B), and a "no action" alternative. Alternatives A and B would also include installation of an active sub-slab depressurization system at 12 Congress Street, and passive sub-slab depressurizations systems in the two new buildings. Based on a quantitative evaluation of corrective action alternatives, the highest scoring Alternative A is recommended. The other alternatives evaluated were not recommended due to costs, and compromises in the use of the Site. Preparation of a corrective action plan is recommended for Alternative A.

1.0 INTRODUCTION AND SITE BACKGROUND

This document is an Analysis of Brownfields Cleanup Alternatives (ABCA) as defined by the United States Environmental Protection Agency (USEPA) and an Evaluation of Corrective Action Alternatives (ECAA) as defined by the Vermont Department of Environmental Conservation (DEC). The purpose of this ABCA/ECAA is to identify potential corrective action alternatives to mitigate human health and environmental risk posed by soil and soil vapor contamination at 10 Maiden Lane, 10 and 12 Congress Street, 83-87, 89, and 99 Main Street in the City of St. Albans, Vermont (Site). LE Environmental LLC (LEE) prepared this ABCA/ECAA for City of St. Albans, the current Site owner. A Site Location Map is included in Appendix A.

A. Description and Environmental Setting

The Site consists of six separate parcels, totaling approximately 1-acre of land, with five buildings. The center of Site coordinates are 44°48'46.70" north latitude and 73°4'55.93'' west longitude.

The Site is located on the southeast corner of the intersection of North Main Street and Congress Street in the downtown area of the City of St. Albans. The surrounding area includes residential/institutional/commercial properties along North Main Street, Congress Street, Bank Street, and Maiden Lane. Taylor Park occupies the next block to the south. The area becomes residential to the east (uphill) and more commercial/industrial in nature toward the west (downhill). The Site's topography drops toward the west. The Site is entirely developed with structures, parking lots, and a retaining wall.

There are five separate structures located on the Site. Each of these structures is slated for demolition during redevelopment except 12 Congress Street. Following is a description of each of the structures on the Site:

- 83-87 North Main Street: a 2-story wood-frame structure, slab on grade, with a brick façade. The structure appears to have been built circa 1912, and the rear portion was added before 1920 as a garage. A gasoline UST was installed there between 1920 and 1926. Historic environmentally sensitive uses at this location included a print shop, and an automotive sales and service station with gasoline dispensing. This building is vacant and the property shares a paved alleyway to the south with 81 North Main Street.
- 89 North Main Street: a 2-story wood-frame structure with a basement that extends beneath the front part of the building. The basement contains utilities and an out of service fuel oil AST. Its fill and vent pipes remain on the side of the building but the pipes are not connected to the AST. The structure was built prior to 1884, with more recent expansion in the rear (after 1959). Historic environmentally sensitive uses at this address included millinery, and a machine shop. This building is vacant.
- 99 North Main Street: The former structure at 99 North Main Street (The Elms) was built between 1906 and 1912 and it remained at that location until it burned down between 1995 and 2008. It replaced a previous structure in the same location. This part of the property is now a gravel parking lot. Historic environmentally sensitive uses at this address included a millinery.
- 10 Congress Street: a 2-story wood frame structure with a basement. The basement contains utilities and an out of service fuel oil AST. The structure was built prior to 1884. No historic environmentally sensitive uses were identified. The building contains vacant office space on the 1st floor and a law office on the 2nd floor.
- 12 Congress Street: a 2-story wood frame structure with a full basement. The basement contains utilities and is used to store supplies for the salon. The structure was built prior to 1884. Historic environmentally sensitive uses at this addresses included a dry cleaner from at least 1936 to 1940. The ANR Atlas indicates that Ideal Cleaners operated for 20 years from 1940 to 1960. City directory information reviewed by LEE indicates its operations may have begun as early as 1929 and may have lasted through 1946.The building contains a salon on the 1st floor and vacant residential apartments on the 1st and 2nd floors. This building will remain as-is during redevelopment.
- 10 Maiden Lane: a 3-story residential apartment building with a walk-out basement. This building contains 23 residential apartments, some of which are currently occupied. The building at was constructed circa 1953. There was a fuel oil UST at this address that was closed in-place in 2006. Limited but detectable fuel oil contamination was encountered when the UST was closed. This part of the property had parts of two hotels on it historically, as well as an auto shed. At least one of the hotels burned down and the 1901 Sanborn map notes the presence of fire debris.

The overall Site was developed prior to 1876, which was the oldest historical reference found to date. The 1876 development consisted of several buildings along

North Main Street and Congress Street, and the Welden House Hotel along Maiden Lane. The property remained similarly developed through 1896, when the Welden House burned down. Documented uses of the property since 1884 have included retail shops (bicycling, groceries and fish, printing, harnesses, marble, auto parts, paint, glass and wallpaper, books, stationary), service shops (dry cleaning, auto sales and service with gasoline dispensing, barbers, tailors, doctors, dentists, and lawyers), manufacturing (machine shop, vulcanizing, millinery), and residential apartments.

LEE completed a Phase I ESA report for the project location on May 3, 2018. The following Recognized Environmental Conditions (RECs) were identified:

1. Historic use of 12 Congress Street as a dry cleaner.
2. A gasoline underground storage tank (UST) shown on the south side of 83-87 North Main Street on the 1926 Sanborn map.
3. Historic use of the property for a vulcanizing plant (83 North Main Street, 1926).
4. Historic use of the property as a machine shop (89 North Main Street, 1906-1920).
5. Fuel oil contamination in soil and groundwater in the vicinity of a closed in place 5,000-gallon UST at 10 Maiden Lane.
6. Historic use of the property as a millinery (89 North Main Street, 1889 and 97-99 North Main Street, 1884-1889).
7. Potential soil contamination from the 1980's fire at 99 North Main Street, and the 1896 fire that destroyed the Welden Inn.

A geophysical investigation was performed on June 13, 2018, to investigate the former gasoline UST location noted on the historic Sanborn map. Subterra Locating Services of Colchester conducted a ground penetrating radar investigation in the area of the former gasoline UST. Only one anomaly was detected in the investigation, and it was determined to be buried piping associated with a water suppression system for the adjoining building. The anomaly was not believed to be associated with a UST.

B. Phase II ESA Results / Conceptual Site Model

LEE performed a Phase II ESA consisting of a soil, groundwater, and sub-slab soil vapor evaluation in November 2018.[1] An Additional Phase II ESA consisting of groundwater and indoor air sampling was completed in January 2018.[2]

[1] LE Environmental LLC, Brownfields Phase II Environmental Site Assessment, Congress and Main Redevelopment Project, September 14, 2018, Revised November 13, 2018.
[2] LE Environmental LLC, Additional Phase II Environmental Site Assessment, Congress and Main Redevelopment Project, November 13, 2018.

Soils at the Site consisted of sand with varying amounts of silt, overlaying a dense glacial till layer. Evidence of charred wood and ash were noted in the soil borings advanced at the northwest portion of the Site, in the gravel parking lot, where a building burned in the 1990s. Evidence of charred wood, ash, and bricks were also noted in the soil borings advanced in the parking lot behind the Maiden Lane apartments, where a hotel burned in the late 1800s.

Concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) were observed in soils throughout the Site. Levels of lead, arsenic, and PAHs were noted above statewide urban background in soils on the Site, which is consistent with urban fill or "development soils" typically found in urban downtowns. No Volatile Organic Compound (VOCs) or other metals were reported above regulatory standards in the soil samples. Toxicity characteristic leaching procedure (TCLP) lead and TCLP mercury analysis indicates the metal concentrations found in the soil would not render the soil hazardous waste.

Groundwater was found to flow in a westerly or northwesterly direction, at an approximate hydraulic gradient of 6-8%. The laboratory results indicate that two VOCs (acetone, and 1,2,4-trimethylbenzene) were present above the laboratory reporting limits, but well below the Vermont Groundwater Enforcement Standards (VGES), in the sample collected from MW-1. A low level of acetone, well below the VGES was also noted in MW-2. No other VOCs were reported in the groundwater samples.

Concentrations of total arsenic, total barium, total chromium, total lead, and total selenium were reported in the groundwater samples collected in July 2018. The concentrations were well below the VGES for these metals except for the arsenic and lead concentrations in MW-1. The turbidity in the groundwater sample from MW-1 was higher than the other groundwater samples due to slow groundwater recharge. Due to this finding, an additional groundwater sample was collected from MW-1 in December 2018. The turbidity of the sample was significantly lower than the July 2018 sampling event, and there were no exceedances of the VGES. Arsenic and lead were not reported in the follow-up sample obtained from MW-1, indicating the previously reported concentrations were due to sediment in the sample and were not indicative of the aquifer conditions.

Four sub-slab soil gas samples were obtained from three of the existing buildings on-Site. An outdoor ambient air sample was also collected for comparison purposes. Several VOCs were reported in the sub-slab soil gas samples. None of the reported VOC concentrations exceeded vapor intrusion (VI) residential sub-slab soil gas screening values except for naphthalene and acrolein in all four samples. The reported acrolein concentration also exceeded the industrial sub-slab soil gas screening value in Subslab-2. The concentration of Acrolein in the ambient air sample also exceeded the VI residential sub-slab soil gas screening value.

Naphthalene was not detected in the ambient air sample, but the laboratory detection limit was elevated to just above the VI residential sub-slab soil gas screening value. Indoor air sampling was recommended at 12 Congress Street, to determine if vapor intrusion was occurring at this structure, which will remain during redevelopment.

Concentrations of benzene, acrolein, chloroform,1,2-dichloroethane, and ethyl acetate were reported above the residential indoor air screening threshold in the indoor air samples collected from 12 Congress Street. The benzene concentrations were less than the ambient air concentrations, indicating the source for benzene is likely the outdoor air. The other contaminants identified may be attributed to vapor intrusion since they were comparable to the sub-slab concentrations reported. The concentrations reported in the basement were higher than those reported on the first floor.

KD Associates, Inc. performed asbestos inspections at the 83-87 and 89 North Main Street Buildings, 10 Congress, and 10 Maiden Lane in July and August 2018. Asbestos containing building materials were detected in each of the buildings. These materials included vinyl flooring and mastic, sink undercoating, pipe insulation, roof tar, roofing paper, shingled roofing, window glazing, mudded joint fittings, gypsum board, window glazing, and foundation coatings.

TCLP lead testing was performed for a representative building materials sample from each existing structure. The results of the testing indicated that the waste characterization samples contained insufficient extractable lead to render the combined waste stream hazardous by reason of toxicity.

C. Proposed Redevelopment Plan

Current redevelopment plans for the properties include the demolition of four buildings (85-87 Main, 89-91 Main, 10 Congress, and 10 Maiden Lane). A new three-story 25,000 square foot commercial building will be constructed along the entire frontage of North Main St. The first floor will be 4,400 SF of retail space, and the second and third floors will be 9,600 SF each of office space. A 4-story, 24-unit market rate housing structure will be constructed in the southeast corner of the lot along Maiden Lane, and a 4-story, 30-unit affordable housing structure will be constructed at the corner of Congress St. and Maiden Lane. The new structures will share a fire wall and will sit on a foundation that also acts as a retention wall to allow for parking spaces underneath the buildings. The building at 12 Congress St. will remain as a mixed multi-family residential and light commercial structure.

2.0 SENSITIVE RECEPTOR IDENTIFICATION AND ASSESSMENT

Potential sensitive receptors identified included the potential impact on soil and soil vapor beneath the Site, and contact and inhalation risks to building tenants and Site users.

A. Buildings in the Vicinity

One building on the Site (12 Congress Street) will remain as-is during redevelopment. Two new buildings will be constructed on the Site concurrent with redevelopment. Concentrations of naphthalene and acrolein were present in sub-slab vapor slightly above regulatory screening levels throughout the Site. Concentrations of VOCs above residential indoor air screening levels were reported in the indoor air at 12 Congress. The sub-slab vapor concentrations reported at the Site are low enough to be mitigated by a passive system in the newly constructed buildings, but the building at 12 Congress will need an active system given its existing construction. The system for the new buildings will be designed to allow for an active system to be initiated if needed in the future.

B. Utility Corridors

Utility corridors in the vicinity of the Site include buried water, sewer and storm drain lines. Based on the sampling results to date, it does not appear that the Site poses an environmental risk to nearby utility lines.

C. Wetlands and Surface Water Bodies

The nearest body of water is Stevens Brook, located approximately 2,000 feet to the west of the Site. The ANR Natural Resources Atlas does not depict any wetlands advisory areas in the vicinity of the Site. Overland transport of contaminated sediment to Stevens Brook is a theoretical risk, but the relatively immobile and insoluble nature of the contaminants implies the risk to surface water as a result of the identified contamination is minimal.

D. Public and Private Water Supplies

The Site and surrounding area are served by a municipal water system. There are no private or public wells, wellhead protection areas, or large groundwater withdrawal permits on or near the Site.

E. Site Users

The Site users may come into contact with shallow soils if excavations occur. However, the exterior grounds are primarily used for parking, and no garden or playgrounds were noted on the Site. The concentrations of VOCs reported in the

indoor air at 12 Congress indicate a sub-slab depressurization system should be installed in that building. The newly constructed buildings will have passive vapor systems installed as a protective measure to Site users.

3.0 IDENTIFICATION OF CORRECTIVE ACTION ALTERNATIVES

Corrective action is warranted to reduce human and environmental exposure to PAHs. Per Section 35-503(c) of the I-Rule, corrective action alternatives that eliminate exposure pathways to sensitive receptors have been identified. A minimum of two corrective action alternatives must be considered according to the I-Rule. These include:

1) An alternative that reduces the toxicity, mobility, or volume of the hazardous materials released to the extent feasible. This alternative shall minimize the need for long term management at the Site; and,
2) An alternative that involves little or no treatment but controls impacts to sensitive receptors through engineered controls, containment, long term monitoring, and institutional controls.

Corrective action alternatives that satisfy these criteria have been addressed in this section, as well as a "no-action" alternative that leaves the Site in its current condition with the only change being restriction on all access. The alternatives considered include the following:

1) Alternative A: Removal of a portion of the contaminated soil and installation of a clean cap.
2) Alternative B: Removal of all contaminated soil.
3) Alternative C: No action alternative, including fencing and filing of an institutional control to prohibit occupancy of the property.

4.0 EVALUATION OF CORRECTIVE ACTION ALTERNATIVES

Section 35-503(d) of the I-Rule indicates that each proposed cleanup alternative shall be evaluated for nine specific criteria, including:

1) Compliance with legal requirements.
2) Overall protection of human health and the environment.
3) Long-term effectiveness and permanence.
4) Reducing toxicity, mobility or volume through treatment.
5) Short-term effectiveness.
6) Implementability.
7) Cost.
8) Environmental impact and sustainability.
9) Community acceptance.

LEE has evaluated the three corrective action alternatives outlined in Section 4.0 using the following criteria established per the I-Rule. In addition, an additional criteria was assessed to meet EPA requirements: 10) addressing consistency of the corrective action alternative with the intended redevelopment goal. EPA's required evaluation criteria of the alternative's climate change resiliency is addressed in #8. A summary of the ranking criteria is included in Appendix D. The results of the ranking are as follows. A higher score equates to a more advantageous outcome.

Table 5-1: Summary of Corrective Action Alternatives Ranking

Criteria	Alternative A	Alternative B	Alternative C
1. Compliance with legal requirements	5	5	3
2. Overall protection of human health and environment	5	5	3
3. Long-term effectiveness and permanence	3	5	1
4. Reducing toxicity, mobility or volume through treatment	1	1	1
5. Short-term effectiveness	5	5	5
6. Implementability	5	5	5
7. Cost	3	1	5
8. Environmental impact and sustainability/resiliency	3	1	5
9. Community acceptance	5	3	1
10. Consistency with Redevelopment Goal	5	5	1
Total ranking	40 points	36 points	30 points

A. Alternative A: Removal of a portion of contaminated soil and installation of a clean cap

This alternative specifies that a portion of contaminated soil would be removed, transported, and disposed of off-Site at an approved facility. The contaminated soil removal would be necessary to accommodate the redevelopment. A clean cap will be placed throughout the Site, which will consist of either a minimum of 18" of clean soil, or a minimum of 6" of concrete or asphalt (foundations, sidewalks, parking lots, and driveways). The caps would isolate the contaminated soil from exposure. Clean soil for capping would be imported from an off-Site source.

Preliminary calculations indicate that approximately 6,270 cubic yards, or 9,400 tons, would be removed from the Site to accommodate the redevelopment and the clean cap. Characterization soil testing would be needed to fulfill disposal facility acceptance requirements. The contaminated soils will be properly transported and disposed of in accordance with state and federal regulations. The closed-in-place UST at 10 Maiden Lane would be removed from the Site and disposed of at an approved facility as well.

Clean fill would be imported to the Site. The clean soil source would be tested for the presence of contaminants to ensure it meets applicable regulatory standards. A

layer of geotextile fabric would be placed under the clean cap, to serve as a warning layer in the event of soil erosion or unauthorized excavations.

A sub-slab depressurization system would be installed at 12 Congress Street, similar to a radon gas system. Suction pits would created below and through the existing basement slab. A radon gas removal fan and piping would be installed on the exterior of the building. Additionally, a passive sub-slab depressurization system would be installed in the two newly constructed buildings. The systems will be constructed with crushed stone, a 15-mil membrane, foam insulation, and PVC piping. The exact piping configuration would be identified the final architectural plans and in the Corrective Action Plan so as not to interfere with planned building uses.

A certificate of completion would be filed with the City of St. Albans. The certificate of completion would note the presence of residual contaminated soils, the presence of sub-slab depressurization systems, and the need to coordinate future excavation activities with the DEC.

This alternative would provide overall protection of human health and the environment, and would serve as a long-term remedy to the contamination. This alternative can be implemented using readily available local technologies. Long-term monitoring and inspections of the soil cap and sub-slab depressurization systems, and possible operations and maintenance costs to repair damage would be required. The environmental impact, sustainability, and climate change resiliency of this alternative are better than a complete soil removal alternative due to less trucking and fuel consumption. Community acceptance is anticipated with this alternative.

Information on current prices for excavation equipment and necessary construction supervision and coordination were used to estimate the cost for Alternative A. This information, contained in Appendix D, indicates that the cost for this alternative is approximately $910,000 including a 20% contingency.

B. Alternative B: Removal of all contaminated soil

This alternative specifies that all contaminated soils at the Site would be transported and disposed of off-Site at an approved facility. The extent of the contaminated soil is assumed to be approximately 12’ below grade.

Preliminary calculations indicate that approximately 19,360 cubic yards, or 29,040 tons, would be removed from the Site. Characterization soil testing would be needed to fulfill disposal facility acceptance requirements. The contaminated soils will be properly transported and disposed of in accordance with state and federal

regulations. The closed-in-place UST at 10 Maiden Lane would be removed from the Site and disposed of at an approved facility as well.

Clean fill would be imported to the Site. The clean soil source would be tested for the presence of contaminants to ensure it meets applicable regulatory standards.

A sub-slab depressurization system would be installed at 12 Congress Street, similar to a radon gas system. Suction pits would created below and through the existing basement slab. A radon gas removal fan and piping would be installed on the exterior of the building. Additionally, a passive sub-slab depressurization system would be installed in the two newly constructed buildings. The systems will be constructed with crushed stone, a 15-mil membrane, foam insulation, and PVC piping. The exact piping configuration would be identified the final architectural plans and in the Corrective Action Plan so as not to interfere with planned building uses.

A certificate of completion would be filed with the City of St. Albans. The certificate of completion would note the presence of sub-slab depressurization systems.

This alternative would provide overall protection of human health and the environment, and would serve as a long-term remedy to the contamination. This alternative can be implemented using readily available local technologies. Long-term monitoring and inspections of the sub-slab depressurization systems, and possible operations and maintenance costs to repair damage would be required. The environmental impact of this option is extensive given the amount of trucking that would be required to dispose of the soil. A significant amount of fuel consumption would be required for this option, and community opposition may occur due to the amount of truck traffic and disturbance in the community.

Information on current prices for excavation equipment and necessary construction supervision and coordination were used to estimate the cost for Alternative B. This information, contained in Appendix D, indicates that the cost for this alternative is approximately $2,200,000 including a 20% contingency.

C. Alternative C: No Action Alternative

This alternative specifies that the Site would remain as-is without capping contaminated soils. Under a no-action scenario, no remediation or redevelopment would take place and the Site would need to be fenced off to prevent access and exposure to contamination. No soils would be relocated or transported off-Site. A activity use restriction would be filed with the City of St. Albans noting the presence of contaminated soils, and the need to coordinate future excavation activities with the DEC.

The principal steps in performing this alternative would include: installation of additional chain link fencing and signage; creating a permanent record of the fence location; and filing of an activity use restriction.

This alternative would comply with all legal requirements, would provide overall protection of human health and the environment, and would provide short term and long-term effectiveness and permanence. This alternative can be implemented using readily available local technologies (fencing), and would not trucking or earth work. Long-term monitoring and inspections of the fencing, and possible operations and maintenance costs to repair damage would be needed. The environmental impact, sustainability, and climate change resiliency is favorable due to a low carbon footprint. However, the presence of contaminants in shallow soils at the Site does pose a risk to surface waters via overland flow during storm events. Community acceptance would likely be minimal since the Site is located in a highly visible portion of the downtown area.

Information on current prices for excavation equipment and necessary construction supervision and coordination were used to estimate the cost for Alternative C. This information, contained in Appendix D, indicates that the cost for this alternative is approximately $21,000 including a 20% contingency.

5.0 IMPACTED THIRD PARTIES/ADJOINING PROPERTY OWNERS

There are no known current impacted third parties at this time. Interested third parties for this Site include the City of St. Albans, and the State of Vermont Department of Environmental Conservation.

The following table summarized the interested third parties for this site along with their contact information.

Interested Third Party	Name and Address	Telephone Number
City of St. Albans	City of St. Albans 100 North Main Street St. Albans, VT 05478	(802) 524-1500
State of Vermont	Kristi Herzer Brownfields Response Program Waste Management and Prevention Division 1 National Life Drive, Davis 1 Montpelier, VT 05620-3704	(802) 461-6918

The following is a table summarizing the adjoining property owners. The existing conditions map in Appendix A depicts the locations of these properties.

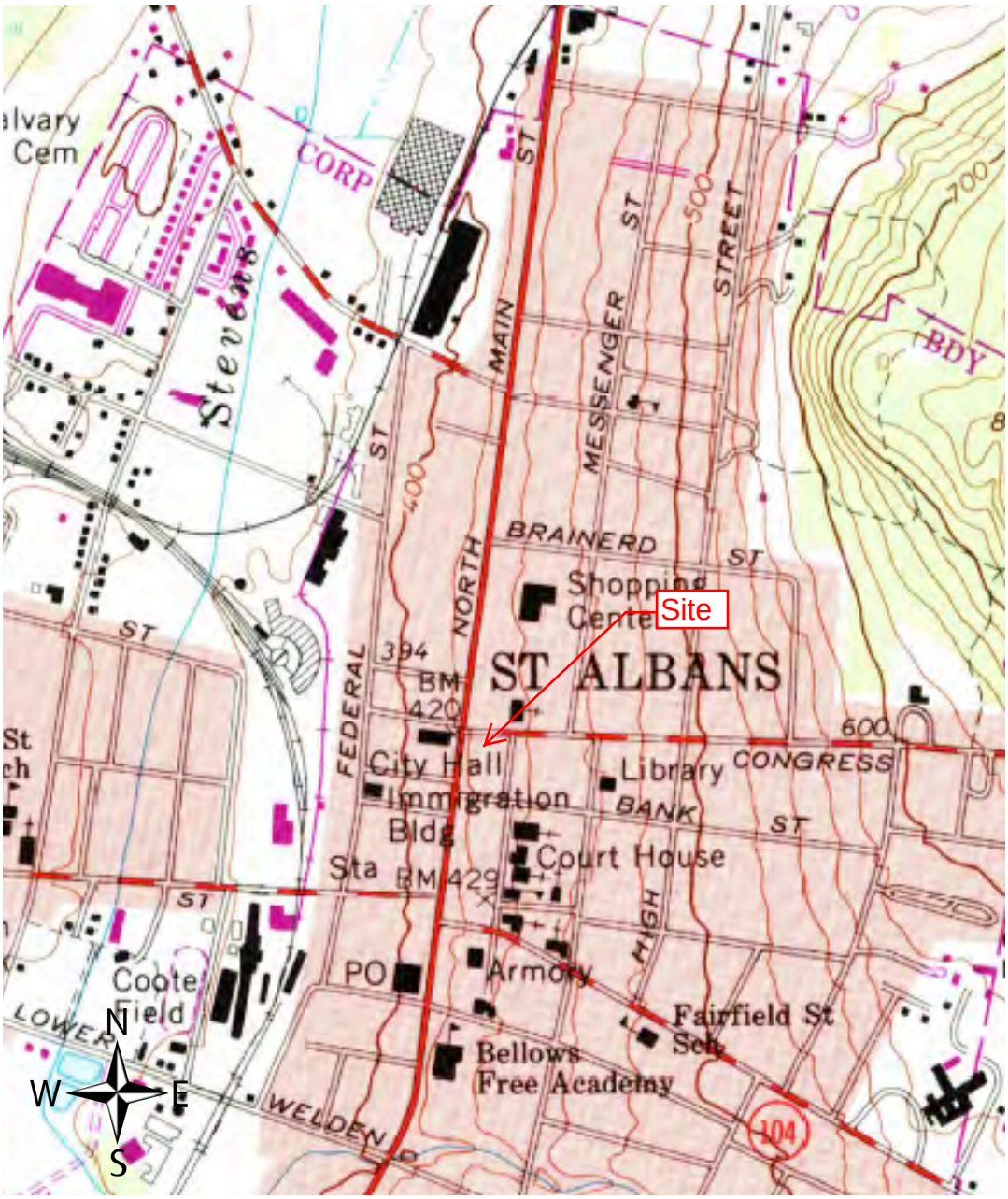
Property Address	Tax Map ID	Property Owner	Owner's Address/ Contact information
80-84 Main Street	23063080	John D. Robertson	US Consulate Guangzou, Unit 4090, Box 2179DPO, AP 96521-2179 or 4171 AIT Tapei Place APT. 24 Dulles, VA 20189 wbtf@hotmail.com
86 North Main Street	23063086	Lili A Gamache	98 Fairfield Hill Road St. Albans, VT 05478 802-309-9993, lgbabycake@gmail.com
92-94 North Main Street	23063086	Hannah Lyford	1927 Bradley Hill Road Milton, VT 05468
100 North Main Street	23063100	City of St. Albans	PO Box 867 100 North Main Street (802) 524-1500
104 North Main Street	23063104	Celey P. Gamache Family Trust	85 High Street St. Albans, VT 05478
81 North Main Street	14063081	Victoria I. Isham	100 Church Road St. Albans, VT 05478
77-79 North Main Street	14063077	James L. Levy	79 North Main Street St. Albans, VT 05478
25 Bank Street	14005025	Telephone Operating Company of Vermont, LLC	Consolidated Communications PO Box 182558 Columbus, OH 43218-2558 207-535-4189 norwood.cohan-smith@consolidated.com
29-31 Bank Street	14005029	Leahy Properties, LLC	C/O David Leahy 3331 Imperial Manor Way Mulberry, FL 33860
11 Maiden Lane	14056015	St. Albans Free Library	11 Maiden Lane St. Albans, VT 05478
13 Maiden Lane	14056013	Connor Brothers Rail City, LLC	1100 US Route 2 Berlin, VT 05602
109 North Main Street	11063109	North Main Street, LLC	218 Maquam Shore Road Swanton, VT 05488
17 Congress Street	11022017	Steven B. North	12 Grandview Drive, #12 South Burlington, VT 05403
29-31 Congress Street	11022025	First Baptist Church	29 Congress Street St. Albans, VT 05478

6.0 RECOMMENDED CORRECTIVE ACTION ALTERNATIVE

Based on the evaluation of cleanup alternatives, the highest scoring alternative, Alternative A: Removal of a portion of contaminated soil and installation of a minimum 18" clean cap the recommended cleanup alternative for the Site. This alternative is technically feasible for remediating shallow soil contamination, will protect Site-users from exposure. Alternative B was not recommended due to costs and detrimental environmental impacts due to trucking. Alternative C was not recommended due to its limitations on Site use. LEE recommends that a CAP be developed incorporating Alternative B as its remediation strategy.

APPENDIX A

MAPS AND PLANS

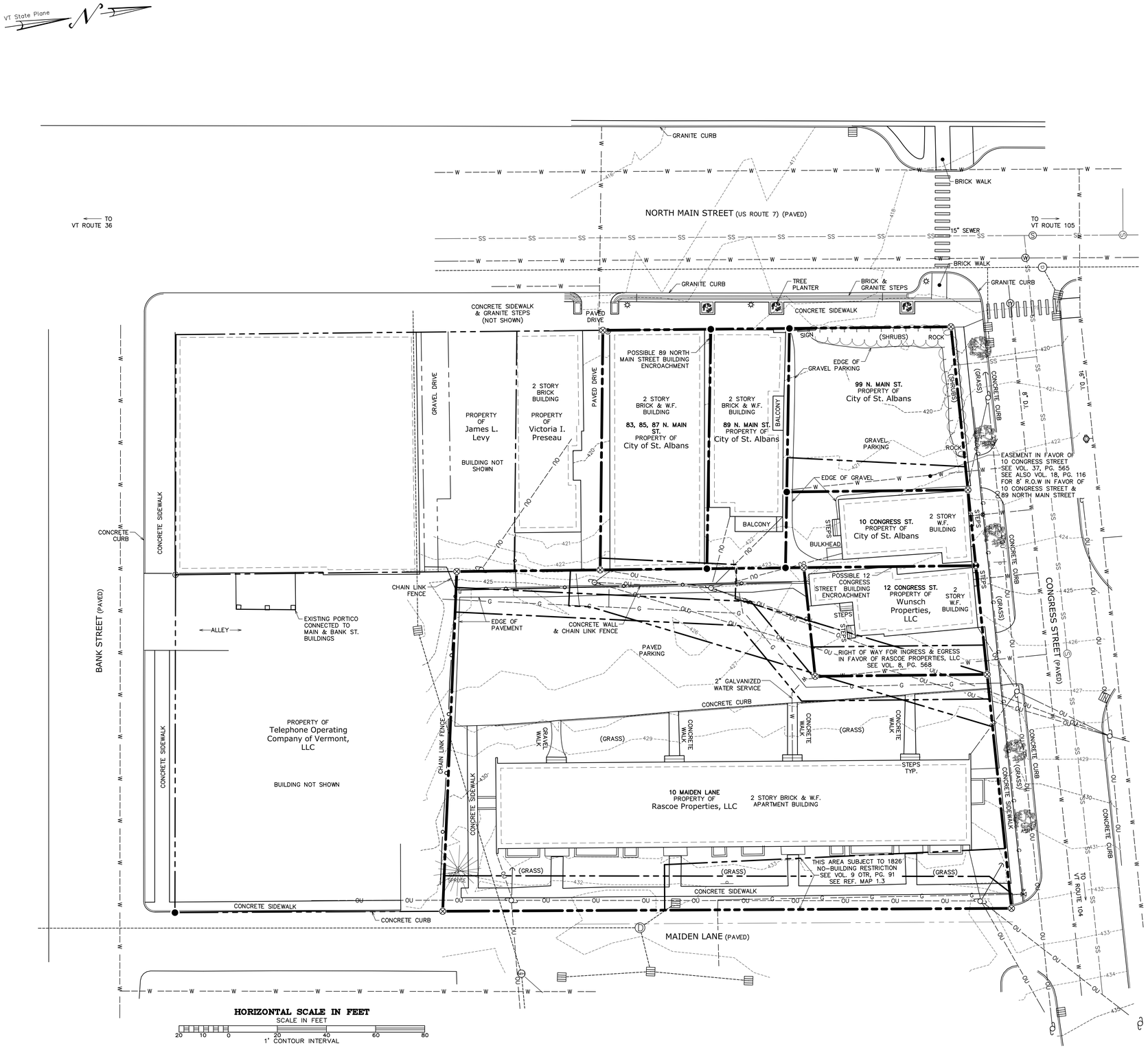


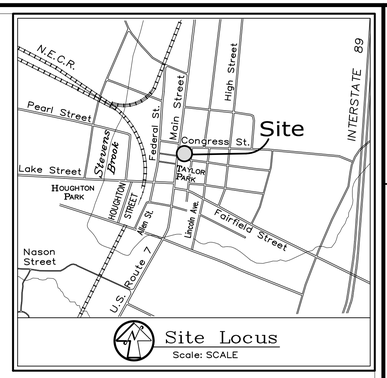
Congress and Main Redevelopment
St. Albans, Vermont

LE·Environmental

Site Location Map

LEE# 18-112
Date: June 18, 2018
Source: USGS





Legend

	RECOVERED EXIST. IRON PIPE / REBAR
3	INSTALLED 7/8" DIA. REBAR & CAP FLUSH UNLESS NOTED
	RECOVERED CHISELED DEPRESSION
	EXIST. UTILITY POLE & GUY ANCHOR
	LIGHT POLE
W	GATE VALVE
S	SEWER MANHOLE
	CURB STOP
	CATCH BASIN
	CONIFER TREE
	DECIDUOUS TREE
	PROPERTY BOUNDARY
	RIGHT-OF-WAY / EASEMENT LIMIT
	CALCULATED POINT
	CHAINLINK FENCELINE
	ROAD CENTERLINE
OU	OVERHEAD ELEC. LINES
G	GAS LINE
301	MINOR CONTOUR LINE
300	MAJOR CONTOUR LINE

PROJECT: 18003
DATE: March 21, 2018
DESIGN: PHC
DRAWN: RHW
CHECKED: PHC
APPROVED: PHC

Tel. 802-524-2113
Fax. 802-524-9681
CCE CROSS CONSULTING ENGINEERS, P.C.
103 Fairfax Rd.
St. Albans, Vermont 05478

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Existing Conditions Site Plan

City Of St. Albans
St. Albans, VT

Congress & Main Redevelopment
N. Main & Congress
St. Albans, VT

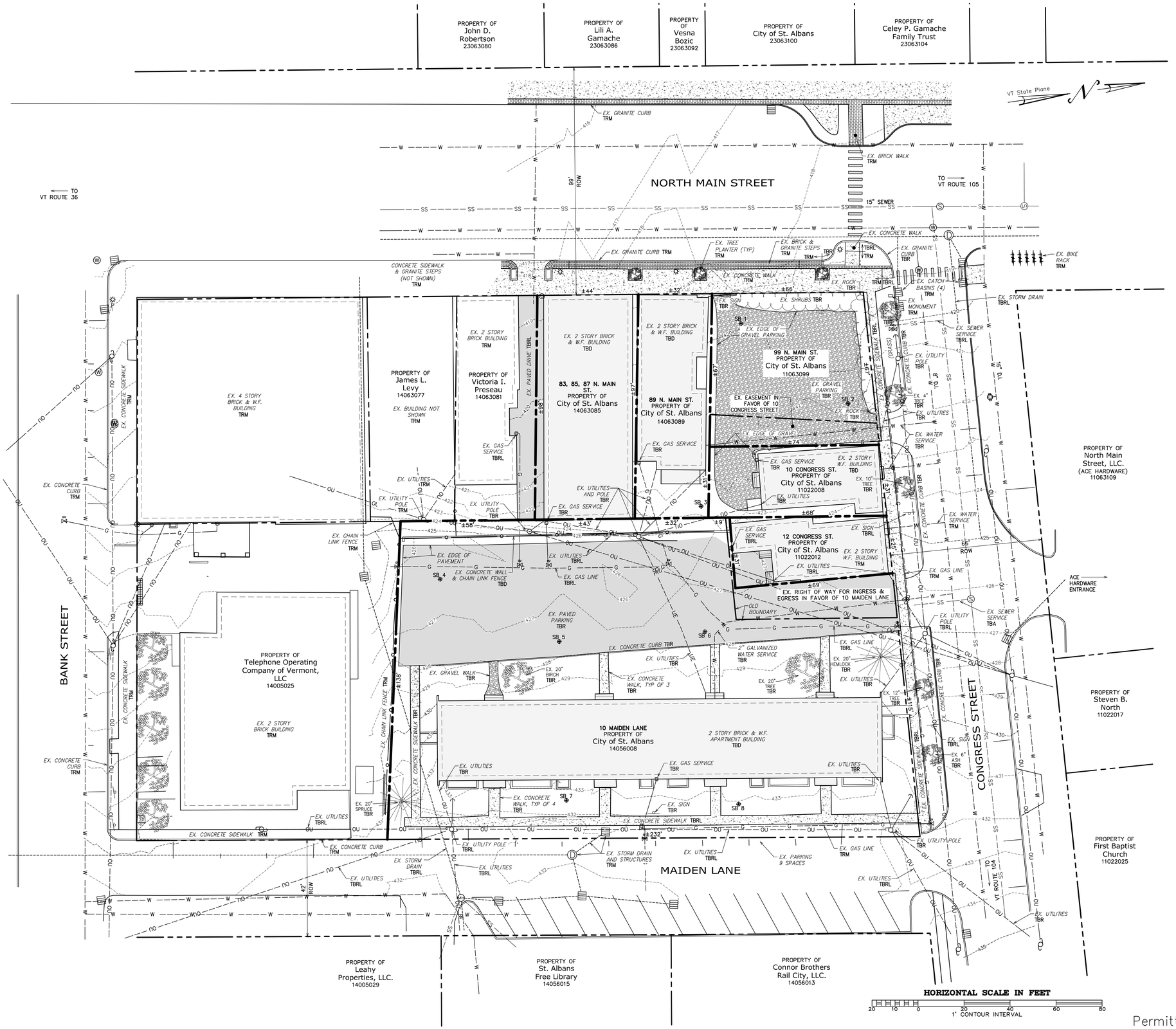
CIVIL

C-1

SHEET C-1 OF 1

Preliminary

Q:\2018 Drawings\18003- COSA, Survey, Corner Main & Congress St\Current\C-1 Existing Conditions Plan.dwg Plotted: 3/28/2018 8:42:36 AM



ABBREVIATIONS:

EX	EXISTING
TBA	TO BE ABANDONED
TBD	TO BE DEMOLISHED
TBR	TO BE REMOVED
TBRL	TO BE REPLACED
TRM	TO REMAIN
SB	SOIL BORING

Permitting – COSA October 15, 2018

PROJECT: 18003
DATE: June 29, 2018
DESIGN: PHC
DRAWN: NRB
CHECKED: PHC
APPROVED: PHC

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Existing Conditions And Demolition Plan

City Of St. Albans
St. Albans, VT

Congress & Main Redevelopment

N. Main & Congress St. Albans, VT

CIVIL

C-2

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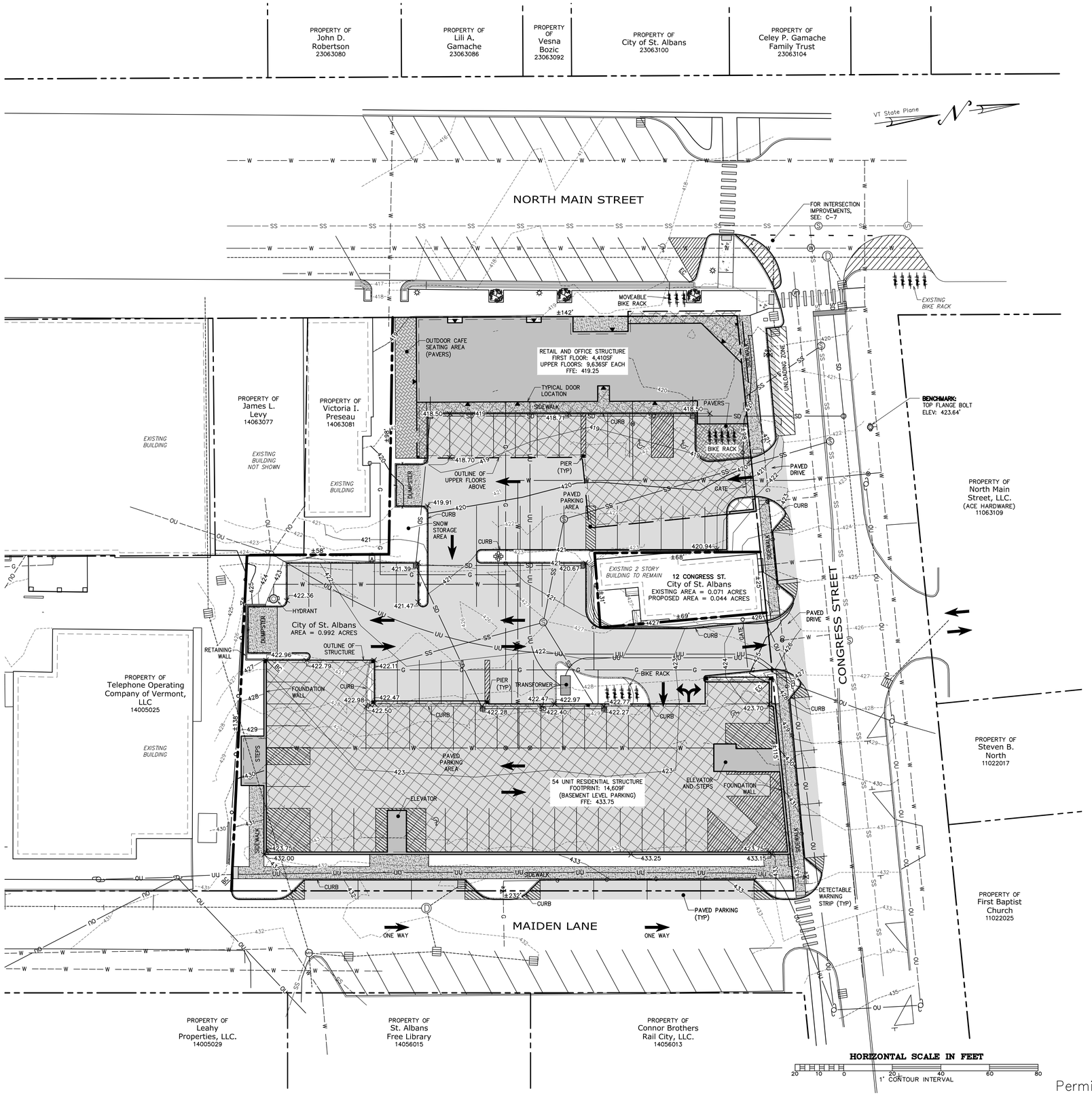

Permitting – COSA October 15, 2018

PROJECT: 18003
DATE: June 29, 2018
DESIGN: PHC
DRAWN: NRB
CHECKED: PHC
APPROVED: PHC

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Fax: 802-524-9681
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Site And Grading Plan

City Of St. Albans
St. Albans, VT
Congress & Main Redevelopment
N. Main & Congress St. Albans, VT

CIVIL

C-3

Q:\2018 Drawings\18003- COSA, Survey, Corner Main & Congress St\Current\C-3 Site And Grading Plan.dwg Plotted: 10/12/2018 11:36:16 AM

PLANT SCHEDULE

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE		REMARKS
AE	3	Acer rubrum xfreemanii `Sienna`	Sienna Red Maple	2 1/2 - 3" CAL.		B&B, Full
AA	2	Acer rubrum `Armstrong`	Armstrong Red Maple	2 1/2 - 3" CAL.		B&B, Full
AS	1	Acer saccharum `Green Mountain`	Green Mountain Sugar Maple	2 1/2 - 3" CAL.		B&B, Full
SHRUBS	**QTY**	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**	**SPACING**	**REMARKS**
AG	3	Amelanchier x grandiflora `Autumn Brilliance`	`Autumn Brilliance` Serviceberry	5 - 6' HT./B&B		Multi-stem
CS	20	Cornus sericea `Kelseyi`	Kelsy Dwarf Dogwood	18 - 24" SPD	42" o.c.	Full
RH	32	Rhus aromatica `Gro-Low`	Gro-Low Fragrant Sumac	18 - 24" SPD	60" o.c.	Full
SB	33	Spiraea x bumalda `Anthony Waterer`	Anthony Waterer Spirea	24 - 30" SPD.	42" o.c.	Full
GRASSES	**QTY**	**BOTANICAL NAME**	**COMMON NAME**	**SIZE**	**SPACING**	**REMARKS**
CX	95	Calamagrostis x acutiflora `Karl Foerster`	Karl Foerster Feather Reed Grass	2 GAL.	30" o.c.	

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0 10 20 40 Feet

Congress and Main Redevelopment

St. Albans, Vermont

No.	Revision	Date	Appvd.

Designed by: MKW
Checked by:
Issued for: PERMIT APPLICATION
Date: June 21, 2018

Drawing Title
Planting Plan

Drawing Number
LA-1.00

Sheet of

Project Number
58063.00

Saved Thursday, June 28, 2018 3:50:43 PM MWILLARD Plotted Thursday, June 28, 2018 5:09:07 PM Willard, Michael

3 WEST VIEW

Scale: 1/8" = 1'-0"

2 SOUTH

Scale: 1/8" = 1'-0"

1 EAST VIEW (MAIDEN LANE)

Scale: 1/8" = 1'-0"

A1

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MARKET RATE APARTMENTS

ST. ALBANS, VERMONT

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3 FOURTH FLOOR UNIT LAYOUT

Scale: 1/8" = 1'-0"

2 SECOND & THIRD FLOOR UNIT LAYOUT

Scale: 1/8" = 1'-0"

1 FIRST FLOOR UNIT LAYOUT

Scale: 1/8" = 1'-0"

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SHEET INFORMATION

ILLUSTRATIONS

Drawn By: MSM
Checked By: x

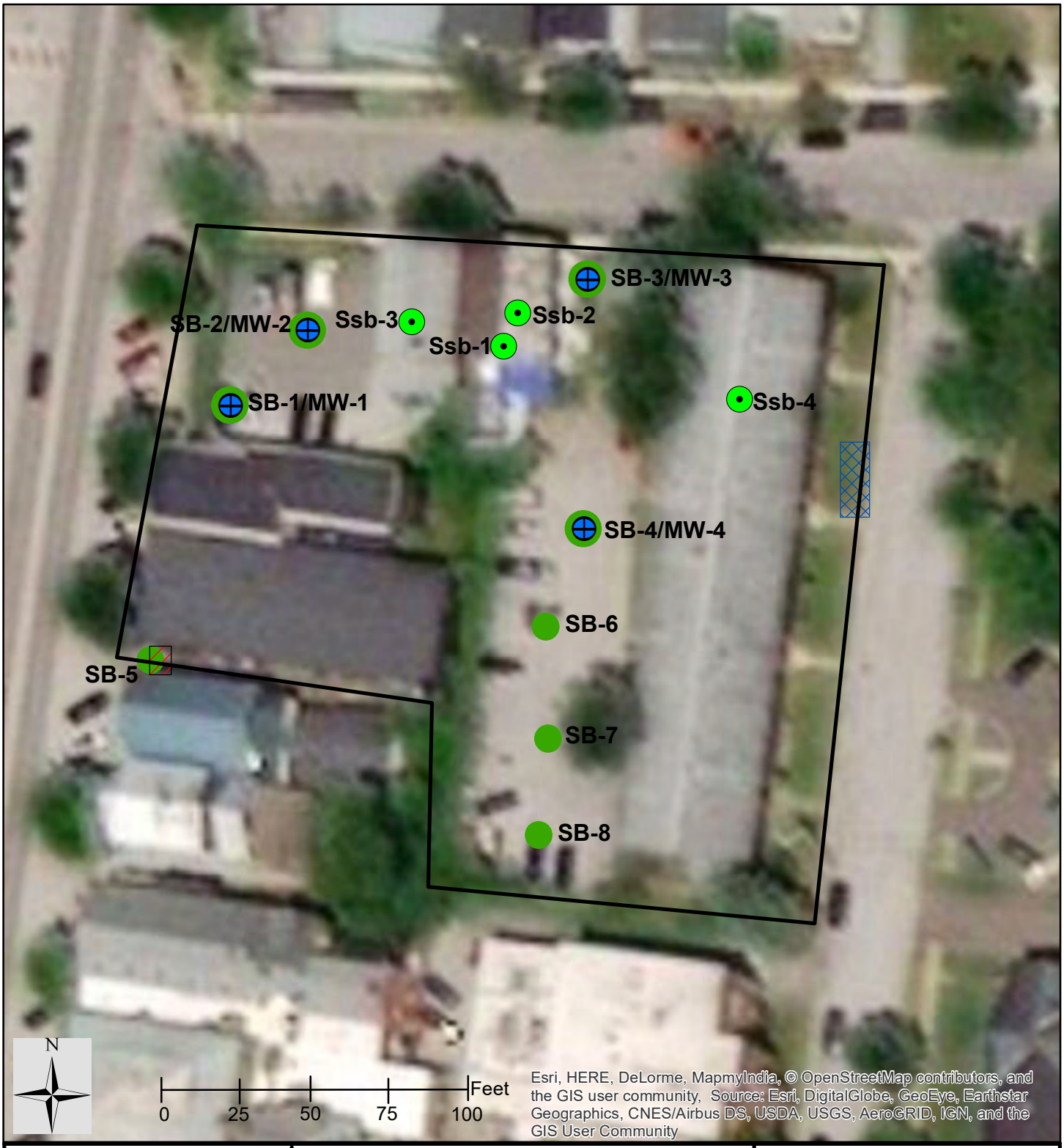
Revisions:

Sheet:
A2.2

Date:
15 OCT 2018

APPENDIX B

PHASE II ESA DATA SUMMARY

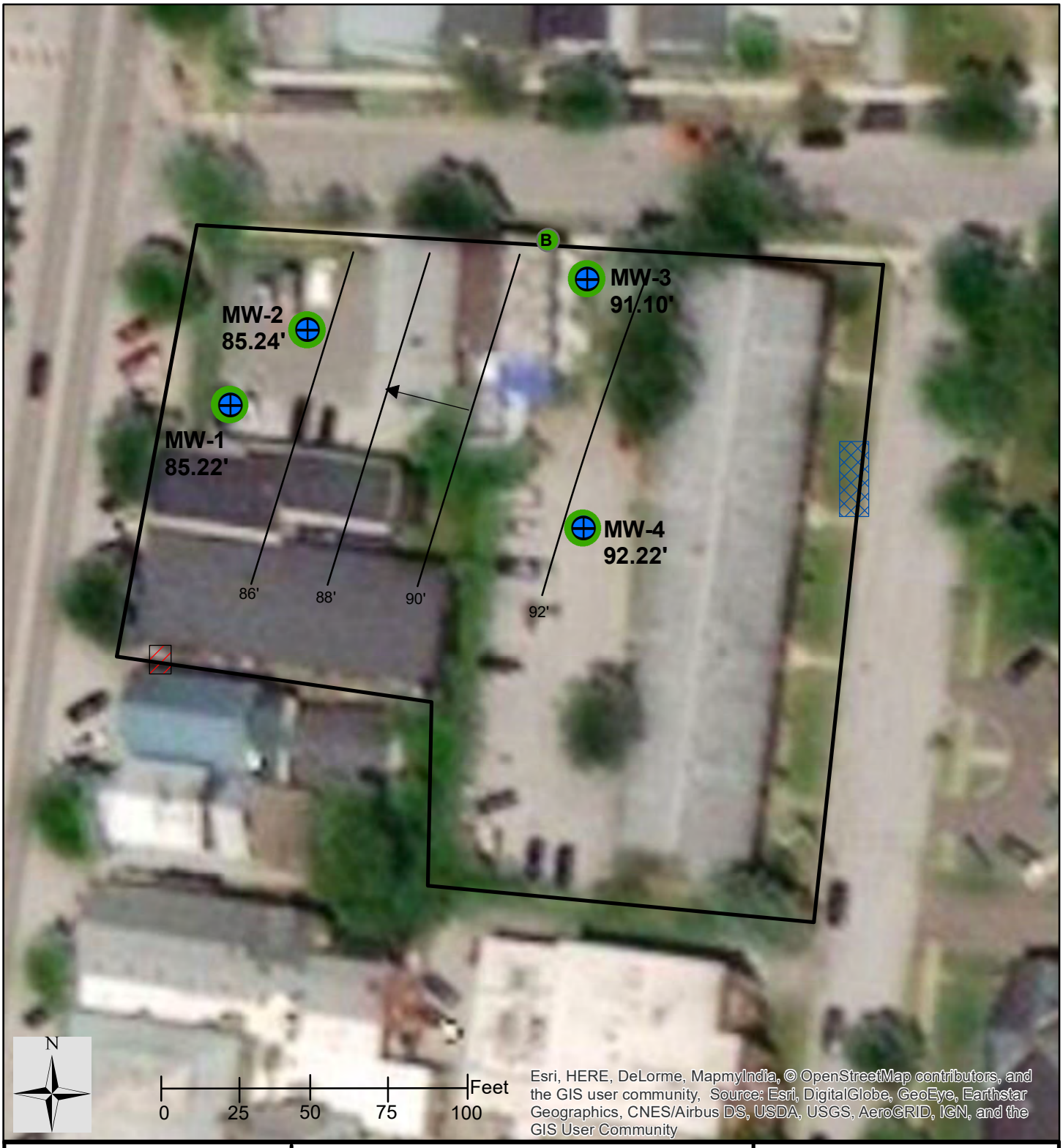


LEE
LE·Environmental
21 North Main Street Unit #1
Waterbury, Vermont
Phone: 802-917-2001
www.leenv.net

Site Map
Congress and Main Redevelopment Project
St. Albans, Vermont

Legend
- SB-X: Soil Boring
- GW-X: GW Well
- Ssb-X: SS Vapor Point
- Former Gasoline UST
- Former Fuel Oil UST (closed in-place)

Drawing Date: 9/12/18
LEE Project #: 18-112



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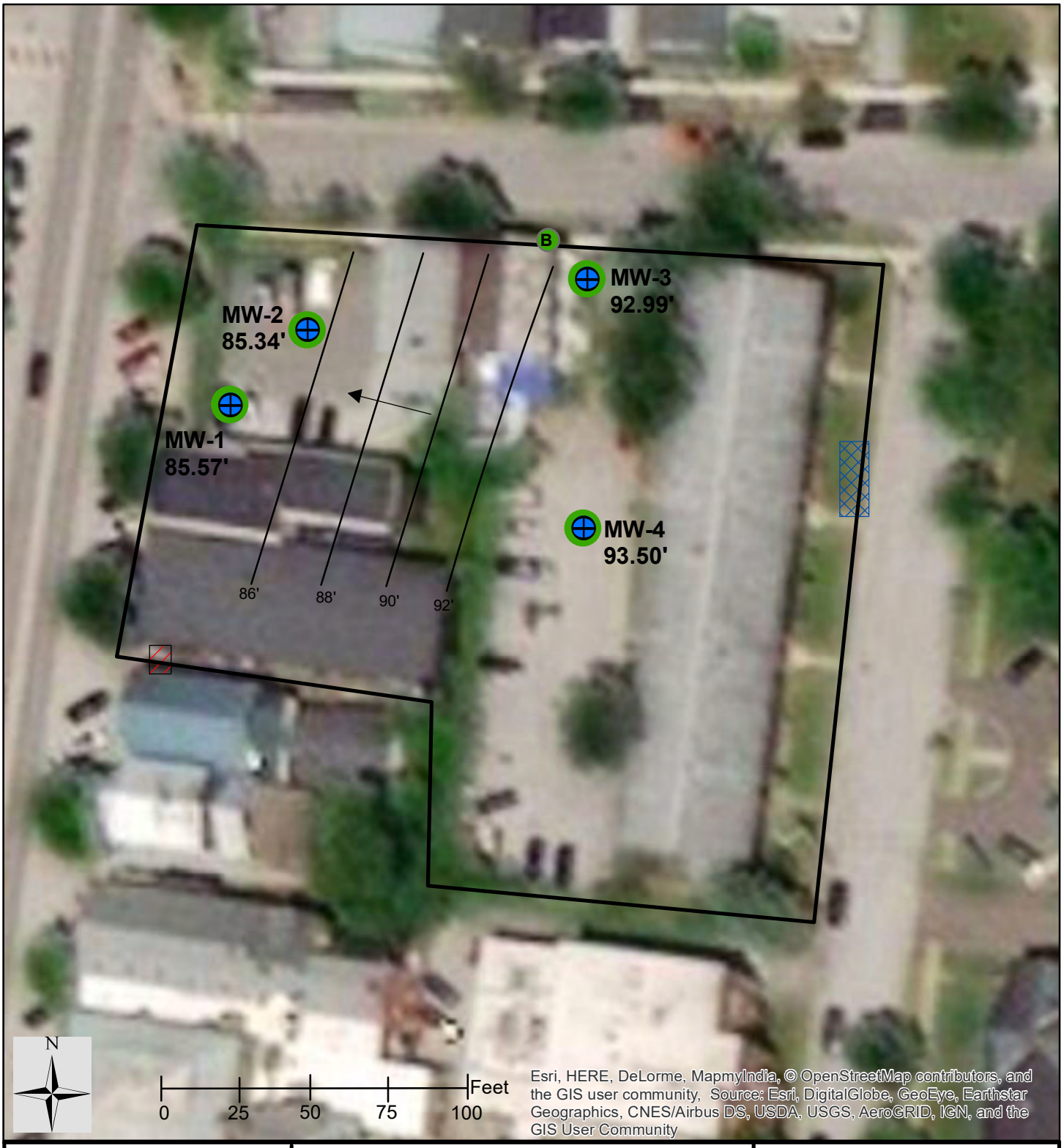
Groundwater Contour Map
Congress and Main Redevelopment Project
St. Albans, Vermont

LEE #18-112

Legend
- Monitoring Well with GW elevations measured in feet
- Arrow indicates estimated groundwater flow direction
- B Benchmark 100'

Measure Date: 7/18/18
Drawing Date: 9/12/18



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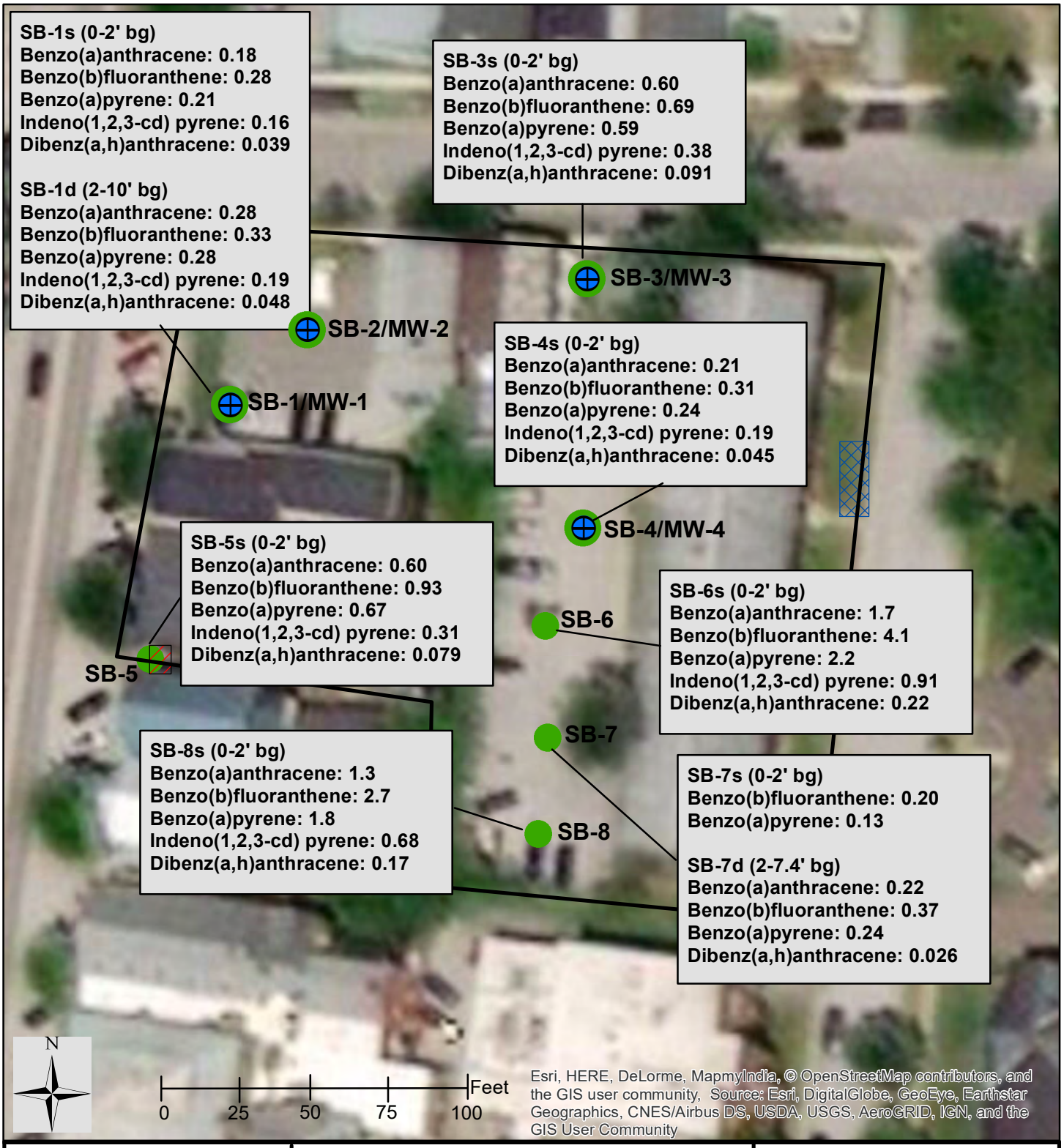
Groundwater Contour Map
Congress and Main Redevelopment Project
St. Albans, Vermont

LEE #18-112

Legend
- Monitoring Well with GW elevations measured in feet
- Arrow indicates estimated groundwater flow direction
- B Benchmark 100'

Measure Date: 12/11/18
Drawing Date: 1/8/19



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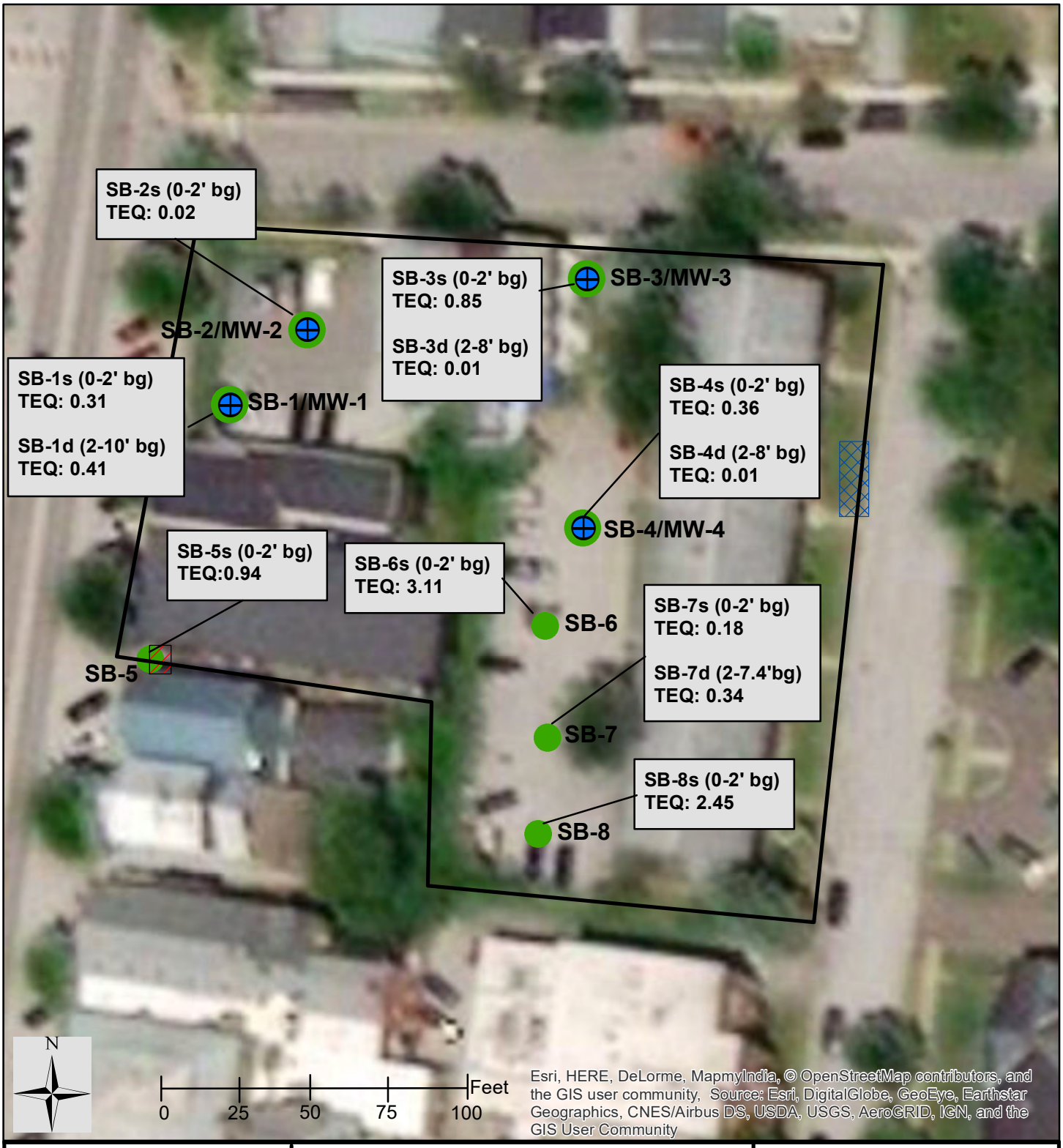
Soil Contaminant Map-PAHs
Congress and Main Redevelopment Project
St. Albans, Vermont

Legend

● Soil boring/soil sample with PAH concentrations exceeding residential standards reported in (mg/kg)

Sample Date: 7/9/18
Drawing Date: 9/12/18
LEE Project # 18-112



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Soil Contaminant Map- B[a]P TEQ
Congress and Main Redevelopment Project
St. Albans, Vermont

Legend

● Soil boring/soil sample with B[a]P TEQ concentrations reported in (mg/kg)

Sample Date: 7/9/18
Drawing Date: 9/12/18
LEE Project # 18-112

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Soil Contaminant Map-Metals
Congress and Main Redevelopment Project
St. Albans, Vermont

Legend

● Soil boring/soil sample with contaminant concentrations exceeding residential standards reported in (mg/kg)

Sample Date: 7/9/18
Drawing Date: 9/12/18
LEE Project # 18-112

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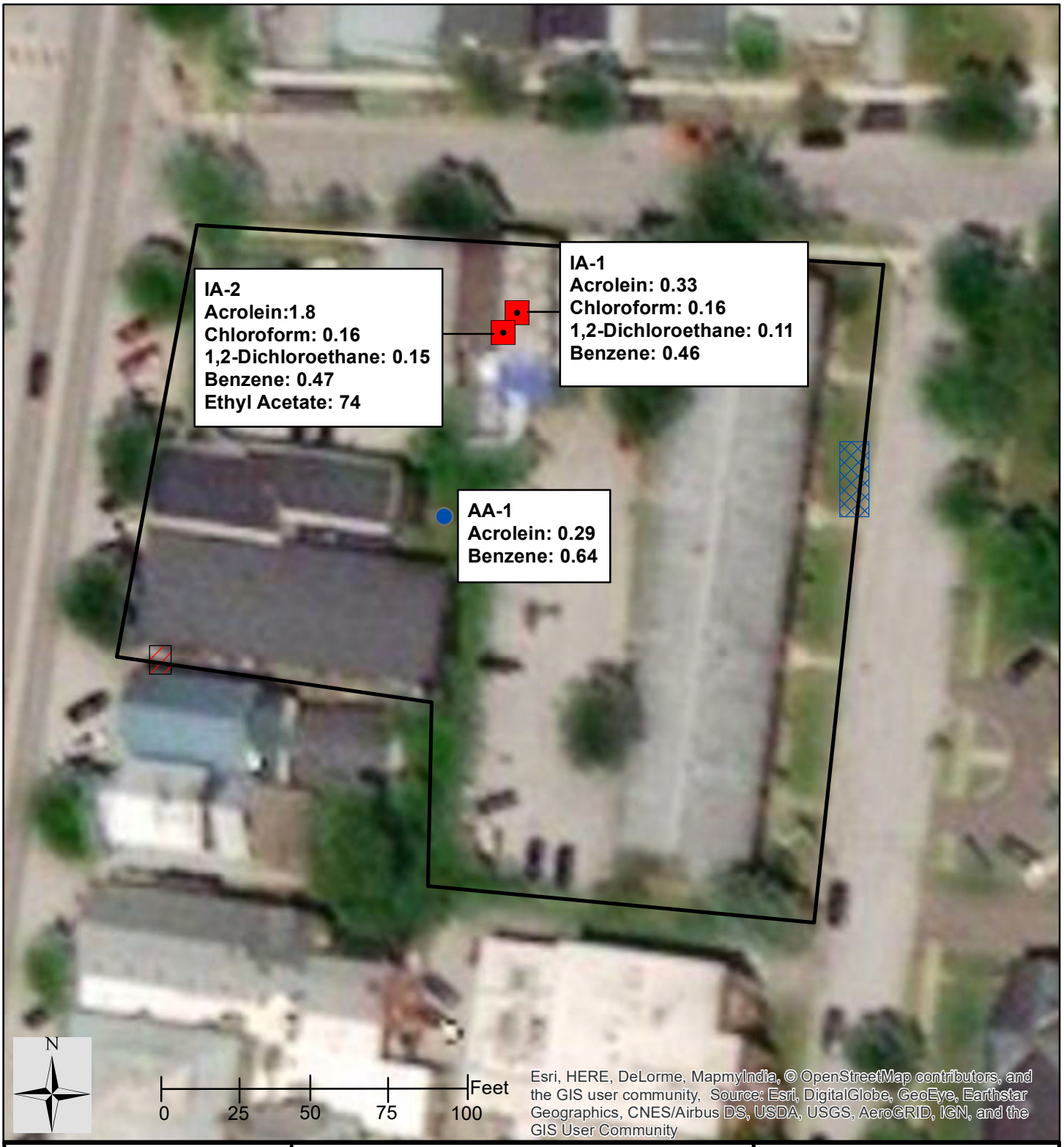
Sub-Slab Soil Vapor Contaminant Map Congress and Main Redevelopment Project St. Albans, Vermont

Legend
- Subslab Soil Gas Sample
- Ambient Air Sample (concentrations in ug/m3) Residential Screening Value exceedances noted
- Former Gasoline UST
- Former Fuel Oil UST

Sample Date: 7/18/18
Drawing Date: 9/12/18



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Indoor Air Contaminant Map Congress and Main Redevelopment Project St. Albans, Vermont

Legend
- Indoor Air Sample
- Ambient Air Sample (concentrations in ug/m3) Residential Screening Value exceedances noted
- Former Gasoline UST
- Former Fuel Oil UST

Sample Date: 12/11/18
Drawing Date: 1/8/19

Liquid Level Monitoring Data
Brownfields Phase II ESA
Main and Congress Redevelopment
St. Albans, Vermont

Measurement Date: July 18, 2018

Well I.D.	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	93.20	-	7.98	-	-	-	-	85.22
MW-2	93.95	-	8.71	-	-	-	-	85.24
MW-3	99.70	-	8.60	-	-	-	-	91.10
MW-4	100.48	-	8.26	-	-	-	-	92.22

Notes:
All Values Reported in Feet
btoc - Below Top of Casing
Elevation data relative to 100' at northeast corner of 12 Congress St

Liquid Level Monitoring Data
Brownfields Phase II ESA
Main and Congress Redevelopment
St. Albans, Vermont

Measurement Date: December 11, 2018

Well I.D.	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	93.20	-	7.63	-	-	-	-	85.57
MW-2	93.95	-	8.61	-	-	-	-	85.34
MW-3	99.70	-	6.71	-	-	-	-	92.99
MW-4	100.48	-	6.98	-	-	-	-	93.50

Notes:
All Values Reported in Feet
btoc - Below Top of Casing
Elevation data relative to 100' at northeast corner of 12 Congress St

Brownfields Phase II Environmental Site Assessment
Soil Sampling Data Summary
Congress and Main Street
St. Albans, Vermont

Soil Sample *Sample Depth (ft bg)* *PID reading (ppm)* *Sample Date*	*SB-1s* *0-2* *0.0* *7/9/18*	*SB-1d* *2-10* *0.3* *7/9/18*	*SB-2s* *0-2* *0.0* *7/9/18*	*SB-3s* *0-2* *0.1* *7/9/18*	*SB-3d* *2-8* *0.1* *7/9/18*	*SB-4s* *0-2* *0.1* *7/9/18*	*SB-4d* *2-8* *0.3* *7/9/18*	*SB-5s* *0-2* *0.0* *7/9/18*	*SB-6s* *0-2* *0.1* *7/9/18*	*SB-7s* *0-2* *0.0* *7/9/18*	*SB-7d* *2-7.4* *0.1* *7/9/18*	*SB-8s* *0-2* *0.1* *7/9/18*	*Duplicate* *2-10* *0.3* *7/9/18*	EPA Residential RSL (mg/kg)	EPA Industrial RSL (mg/kg)	VSL Residential (mg/kg)
VOCs, EPA Method 8260C (mg/kg)																
Dichlorodifluoromethane	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	87	370	NA
Chloromethane	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	110	460	NA
Vinyl Chloride	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	0.059	1.7	NA
Bromomethane	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	ND<0.2	6.8	30	NA
Chloroethane (ethyl chloride)	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	14,000	57,000	NA
Trichlorofluoromethane	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	23,000	350,000	NA
Diethyl Ether	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	NA	NA
Acetone	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	ND<2	NA	670,000	NA
1 ,1-Dichloroethene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	230	1,000	NA
Methylene chloride	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	57	1,000	NA
Carbon disulfide	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	770	3,500	NA
MTBE	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	47	210	647
trans-1,2-Dichloroethene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	23,000	150
1,1-Dichloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	3.6	16	NA
2,2-Dichloropropane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	NA	NA
cis-1,2-Dichloroethene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	2,300	135
2-Butanone(MEK)	ND<0.5	ND<0.5	ND<0.5	ND<0.06	ND<0.5	ND<0.06	ND<0.5	ND<0.5	ND<0.5	ND<0.07	ND<0.06	ND<0.5	ND<0.5	NA	190,000	26000
Bromochloromethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	630	129
Tetrahydrofuran(THF)	ND<0.5	ND<0.5	ND<0.5	ND<0.6	ND<0.5	ND<0.6	ND<0.5	ND<0.5	ND<0.5	ND<0.7	ND<0.6	ND<0.5	ND<0.5	NA	NA	NA
Chloroform	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	0.32	1.4	NA
1,1,1-Trichloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	8,100	36,000	NA
Carbon tetrachloride	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	2.9	0.247
1 ,1-Dichloropropene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	NA	NA
Benzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	5.1	0.442
1,2-Dichloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	2	0.175
Trichloroethene (TCE)	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	6	0.442
1,2-Dichloropropane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1	4.4	NA
Dibromomethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	24	99	NA
Bromodichloromethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	0.29	1.3	NA
4-Methyl-2-pentanone(MIBK)	ND<0.5	ND<0.5	ND<0.5	ND<0.6	ND<0.5	ND<0.6	ND<0.5	ND<0.5	ND<0.5	ND<0.7	ND<0.6	ND<0.5	ND<0.5	33,000	140,000	NA
cis-1,3-Dichloropropene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1.8	8.2	NA
Toluene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	47,000	4640
trans-1,3-Dichloropropene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1.8	8.2	NA
1,1,2-Trichloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1.1	5	NA
2-Hexanone	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	200	1,300	NA
Tetrachloroethene (PCE)	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	100	1.46
1,3-Dichloropropane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1,600	23,000	NA
Dibromochloromethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	8.3	39	NA
1,2-Dibromoethane(EDB)	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	0.036	0.16	NA
Chlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	1,300	273

NOTES:
Soil Screening Levels (RSL/SSL) from July 2017 Vermont DEC Investigation and Remediation of Contaminated Properties Rule
Shaded cell = reporting limit exceeds RSL/VSL.
NA = No RSL/VSL available

Brownfields Phase II Environmental Site Assessment
Soil Sampling Data Summary
Main and Congress Street
St. Albans, Vermont

Soil Sample	*SB-1s*	*SB-1d*	*SB-2s*	*SB-3s*	*SB-3d*	*SB-4s*	*SB-4d*	*SB-5s*	*SB-6s*	*SB-7s*	*SB-7d*	*SB-8s*	*Duplicate*	EPA Residential RSL (mg/kg)	EPA Industrial RSL (mg/kg)	VSL Residential (mg/kg)
Sample Depth (ft bg)	*0-2*	*2-10*	*0-2*	*0-2*	*2-8*	*0-2*	*2-8*	*0-2*	*0-2*	*0-2*	*2-7.4*	*0-2*	*2-10*			
PID reading (ppm)	*0.0*	*0.3*	*0.0*	*0.1*	*0.1*	*0.1*	*0.3*	*0.0*	*0.1*	*0.0*	*0.1*	*0.1*	*0.3*			
Sample Date	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*			
VOCs, EPA Method 8260C (mg/kg) (continued)																
1,1,1,2-Tetrachloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	2	8.8	NA
Ethylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	25	2.21
mp-Xylene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	**0.057**	ND<0.07	ND<0.06	ND<0.05	ND<0.05	550	2,400	NA
o-Xylene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	**0.073**	ND<0.07	ND<0.06	ND<0.05	ND<0.05	650	2,800	NA
Styrene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	6,000	35,000	NA
Bromoform	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	19	86	NA
IsoPropylbenzene (cumene)	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1900	9900	NA
Bromobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	290	1,800	NA
1,1,2,2-Tetrachloroethane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	0.6	2.7	NA
1,2,3-Trichloropropane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	0.11	0.00324
n-Propylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	3,800	24,000	NA
2-Chlorotoluene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1,600	23,000	NA
4-Chlorotoluene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1,600	23,000	NA
1,3,5-trimethylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	12,000	264*
tert-Butylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	7,800	120,000	NA
1,2,4-trimethylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	240	264*
sec-Butylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	7,800	120,000	NA
1,3-Dichlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	NA	NA
p-Isopropyltoluene (p-cymene)	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	NA	NA
1,4-Dichlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	2.6	11	NA
1,2-Dichlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1,800	9,300	NA
n-Butylbenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	3,900	58,000	NA
1,2-Dibromo-3-chloropropane	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	NA	0.064	0.00327
1,2,4-Trichlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	24	110	NA
Hexachlorobutadiene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	1.2	5.3	NA
Naphthalene	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	NA	17	1.42
1,2,3-Trichlorobenzene	ND<0.05	ND<0.05	ND<0.05	ND<0.06	ND<0.05	ND<0.06	ND<0.05	ND<0.05	ND<0.05	ND<0.07	ND<0.06	ND<0.05	ND<0.05	63	930	NA
Total Reported VOCs	ND	ND	ND	ND	ND	ND	ND	ND	**0.130**	ND	ND	ND	ND	-	-	-

NOTES:
IROCP = July 2017 Vermont DEC Investigation and Remediation of Contaminated Properties Rule
Shaded cell = reporting limit exceeds USEPA or Vermont Residential Soil Screening Value
NA = No RSL/VSL available

Brownfields Phase II Environmental Site Assessment
Soil Sampling Data Summary
Main and Congress Street
St. Albans, Vermont

Soil Sample	*SB-1s*	*SB-1d*	*SB-2s*	*SB-3s*	*SB-3d*	*SB-4s*	*SB-4d*	*SB-5s*	*SB-6s*	*SB-7s*	*SB-7d*	*SB-8s*	*Duplicate*	EPA Residential RSL (mg/kg)	EPA Industrial RSL (mg/kg)	VSL Residential (mg/kg)	VT Statewide Background Soil Concentration (mg/kg)
Sample Depth (ft bg)	*0-2*	*2-10*	*0-2*	*0-2*	*2-8*	*0-2*	*2-8*	*0-2*	*0-2*	*0-2*	*2-7.4*	*0-2*	*2-10*				
PID reading (ppm)	*0.0*	*0.3*	*0.0*	*0.1*	*0.1*	*0.1*	*0.3*	*0.0*	*0.1*	*0.0*	*0.1*	*0.1*	*0.3*				
Sample Date	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*	*7/9/18*				
TOTAL METALS, EPA Method 6020 (mg/kg, dry)																	
Total Arsenic	**2.9**	**8.5**	**4.7**	**7.0**	**5.3**	**10**	**6.8**	**71**	**7.2**	**16**	**21**	**6.6**	**10**	NA	NA	NA	16/16
Total Barium	**39**	**110**	**36**	**130**	**66**	**110**	**92**	**130**	**77**	**52**	**240**	**78**	**150**	NA	220,000	11,700	NA
Total Cadmium	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	**0.81**	ND<0.5	ND<0.5	ND<0.5	ND<0.5	**0.63**	NA	980	7.15	NA
Total Chromium	**6.8**	**19**	**11**	**19**	**21**	**15**	**22**	**24**	**13**	**11**	**26**	**17**	**23**	NA	NA	NA	NA
Total Lead	**66**	**220**	**11**	**430**	**11**	**530**	**21**	**240**	**230**	**50**	**120**	**150**	**270**	400	800	NA	41/111
Total Mercury	ND<0.1	**0.67**	ND<0.1	**0.24**	ND<0.1	ND<0.1	ND<0.1	**8.9**	**0.18**	**0.16**	**0.40**	**0.45**	**0.73**	NA	46	10.9	NA
Total Selenium	ND<0.5	**2.1**	**1.3**	**1.8**	**1.7**	**1.8**	**1.8**	**0.7**	**0.67**	**1.2**	**1.4**	**1.4**	**1.4**	NA	5,800	382	NA
Total Silver	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5	NA	5,800	247	NA
PAH EPA Method 8270 (mg/kg)																	
Naphthalene	**0.022**	**0.026**	**0.018**	**0.033**	ND<0.008	**0.019**	ND<0.008	**0.077**	**0.14**	**0.011**	**0.027**	**0.11**	**0.029**	NA	17	1.42	NA
2-Methylnaphthalene	**0.011**	ND<0.008	ND<0.007	**0.0095**	ND<0.008	**0.015**	ND<0.008	**0.050**	**0.14**	**0.0083**	**0.010**	**0.032**	ND<0.008	240	3,000	NA	NA
1-Methylnaphthalene	ND<0.007	ND<0.008	ND<0.007	ND<0.008	ND<0.008	**0.011**	ND<0.008	**0.033**	**0.17**	**0.0082**	**0.0092**	**0.021**	ND<0.008	18	73	NA	NA
Acenaphthylene	**0.042**	**0.043**	ND<0.007	**0.091**	ND<0.008	**0.052**	ND<0.008	**0.16**	**1.2**	**0.048**	**0.046**	**0.34**	**0.045**	NA	NA	NA	NA
Acenaphthene	ND<0.007	ND<0.008	ND<0.007	**0.012**	ND<0.008	**0.011**	ND<0.008	**0.019**	**0.057**	ND<0.008	ND<0.008	**0.016**	ND<0.008	3,600	45,000	NA	NA
Fluorene	**0.0074**	ND<0.008	ND<0.007	**0.021**	ND<0.008	**0.015**	ND<0.008	**0.037**	**0.23**	**0.0096**	ND<0.008	**0.025**	ND<0.008	2,400	30,000	NA	NA
Phenanthrene	**0.14**	**0.11**	**0.019**	**0.47**	ND<0.008	**0.26**	ND<0.008	**0.61**	**3.5**	**0.11**	**0.14**	**0.35**	**0.10**	NA	NA	NA	NA
Anthracene	**0.030**	**0.037**	ND<0.007	**0.11**	ND<0.008	**0.048**	ND<0.008	**0.13**	**0.64**	**0.023**	**0.037**	**0.15**	**0.032**	18,000	230,000	NA	NA
Fluoranthene	**0.35**	**0.40**	**0.031**	**1.2**	ND<0.008	**0.46**	ND<0.008	**1.2**	**4.5**	**0.21**	**0.43**	**1.5**	**0.38**	2,400	30,000	NA	NA
Pyrene	**0.30**	**0.36**	**0.024**	**1.0**	ND<0.008	**0.43**	ND<0.008	**0.93**	**3.2**	**0.18**	**0.33**	**1.2**	**0.30**	1,800	23,000	NA	NA
Benzo(a)anthracene	**0.18**	**0.28**	**0.016**	**0.60**	ND<0.008	**0.21**	ND<0.008	**0.60**	**1.7**	**0.098**	**0.22**	**1.3**	**0.23**	0.16	2.9	NA	NA
Chrysene	**0.22**	**0.28**	**0.017**	**0.65**	ND<0.008	**0.29**	ND<0.008	**0.74**	**2.9**	**0.14**	**0.30**	**1.5**	**0.25**	16	290	NA	NA
Benzo(b)fluoranthene	**0.28**	**0.33**	**0.021**	**0.69**	ND<0.008	**0.31**	ND<0.008	**0.93**	**4.1**	**0.20**	**0.37**	**2.7**	**0.36**	0.16	2.9	NA	NA
Benzo(k)fluoranthene	**0.10**	**0.14**	**0.0075**	**0.27**	ND<0.008	**0.11**	ND<0.008	**0.33**	**1.4**	**0.071**	**0.13**	**1.1**	**0.13**	1.6	29	NA	NA
Benzo(a)pyrene	**0.21**	**0.28**	**0.015**	**0.59**	ND<0.008	**0.24**	ND<0.008	**0.67**	**2.2**	**0.13**	**0.24**	**1.8**	**0.25**	NA	NA	0.076/1.54*	NA
Indeno(1,2,3-cd)pyrene	**0.16**	**0.19**	**0.012**	**0.38**	ND<0.008	**0.19**	ND<0.008	**0.31**	**0.91**	**0.054**	**0.094**	**0.68**	**0.092**	0.16	2.9	NA	NA
Dibenz(a,h)anthracene	**0.039**	**0.048**	ND<0.007	**0.091**	ND<0.008	**0.045**	ND<0.008	**0.079**	**0.22**	**0.015**	**0.026**	**0.17**	**0.025**	0.016	0.29	NA	NA
Benzo(g,h,i)perylene	**0.15**	**0.16**	**0.012**	**0.31**	ND<0.008	**0.18**	ND<0.008	**0.25**	**0.78**	**0.060**	**0.075**	**0.54**	**0.069**	NA	NA	NA	NA
Total Reported PAHs	**2.24**	**2.68**	**0.193**	**6.53**	ND	**2.90**	ND	**7.16**	**27.99**	**1.38**	**2.48**	**13.53**	**2.29**	--	--	--	--
PAH Toxicity Equivalency as B[a]P	**0.31**	**0.41**	**0.02**	**0.85**	**0.01**	**0.36**	**0.01**	**0.94**	**3.11**	**0.18**	**0.34**	**2.45**	**0.34**	NA	NA	NA	0.026/0.580
TCLP METALS, EPA Method 6020 (mg/L)														Vermont Hazardous Waste Standard (mg/L)			
TCLP Lead	NT	ND<0.5	NT	ND<0.5	NT	ND<0.5	NT	ND<0.5	ND<0.5	NT	ND<0.5	ND<0.5	ND<0.5	5.0			
TCLP Mercury	NT	NT	NT	NT	NT	NT	NT	ND<0.01	NT	NT	NT	NT	NT	0.2			

NOTES:
EPA Regional Screening Levels, VT Screening levels, and VT Background Concrentrations from Vermont DEC Investigation and Remediation of Contaminated Properties Rule dated July 27, 2017
NA = No screening level or background concentration available
*VSL for B(a)P presented as residential/industrial
Vermont Statewide Background Concentration presented as rural/urban; The Background Concentration values are used when the background value for benzo(a)pyrene (TEQ) or arsenic is greater than the VSL.
ND<xx = Not Detected< Detection Limit; Results reported above detection limits are indicated in bold
Detection limits and reported concentrations equal to or above the residential regulatory standard are shaded

Toxic Equivalency Calculations
Main and Congress Street
St. Albans, Vermont

Soil Sample SB-1s

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	**0.18**	0.1	0.018
Chrysene	**0.22**	0.001	0.00022
Benzo(b)fluoranthene	**0.28**	0.1	0.028
Benzo(k)fluoranthene	**0.10**	0.01	0.001
Benzo(a)pyrene	**0.21**	1	0.21
Indeno(1,2,3-cd)pyrene	**0.16**	0.1	0.016
Dibenz(a,h)anthracene	**0.039**	1	0.039
		Total Benzo(a)pyrene Equivalent =	**0.31**

Soil Sample SB-1d

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	**0.28**	0.1	0.028
Chrysene	**0.28**	0.001	0.00028
Benzo(b)fluoranthene	**0.33**	0.1	0.033
Benzo(k)fluoranthene	**0.14**	0.01	0.0014
Benzo(a)pyrene	**0.28**	1	0.28
Indeno(1,2,3-cd)pyrene	**0.19**	0.1	0.019
Dibenz(a,h)anthracene	**0.048**	1	0.048
		Total Benzo(a)pyrene Equivalent =	**0.41**

Soil Sample: SB-2s

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	**0.016**	0.1	0.0016
Chrysene	**0.017**	0.001	0.000017
Benzo(b)fluoranthene	**0.021**	0.1	0.0021
Benzo(k)fluoranthene	**0.0075**	0.01	0.000075
Benzo(a)pyrene	**0.015**	1	0.015
Indeno(1,2,3-cd)pyrene	**0.012**	0.1	0.0012
Dibenz(a,h)anthracene	ND<0.007	1	0.0035
		Total Benzo(a)pyrene Equivalent =	**0.02**

Soil Sample: SB-3s

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	**0.60**	0.1	0.06
Chrysene	**0.65**	0.001	0.00065
Benzo(b)fluoranthene	**0.69**	0.1	0.069
Benzo(k)fluoranthene	**0.27**	0.01	0.0027
Benzo(a)pyrene	**0.59**	1	0.59
Indeno(1,2,3-cd)pyrene	**0.38**	0.1	0.038
Dibenz(a,h)anthracene	**0.091**	1	0.091
		Total Benzo(a)pyrene Equivalent =	**0.85**

Soil Sample: SB-3d

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	ND<0.008	0.1	0.0004
Chrysene	ND<0.008	0.001	0.0000045
Benzo(b)fluoranthene	ND<0.008	0.1	0.00045
Benzo(k)fluoranthene	ND<0.008	0.01	0.000045
Benzo(a)pyrene	ND<0.008	1	0.0045
Indeno(1,2,3-cd)pyrene	ND<0.008	0.1	0.00045
Dibenz(a,h)anthracene	ND<0.008	1	0.0045
		Total Benzo(a)pyrene Equivalent =	**0.01**

Soil Sample: SB-4s

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	**0.21**	0.1	0.021
Chrysene	**0.29**	0.001	0.00029
Benzo(b)fluoranthene	**0.31**	0.1	0.031
Benzo(k)fluoranthene	**0.11**	0.01	0.0011
Benzo(a)pyrene	**0.24**	1	0.24
Indeno(1,2,3-cd)pyrene	**0.19**	0.1	0.019
Dibenz(a,h)anthracene	**0.045**	1	0.045
		Total Benzo(a)pyrene Equivalent =	**0.36**

Soil Sample: SB-4d

Contaminant	Concentration (mg/kg)	Toxicity Equivalency Factor	Toxicity Equivalents to Benzo(a)pyrene
Benzo(a)anthracene	ND<0.008	0.1	0.0004
Chrysene	ND<0.008	0.001	0.0000045
Benzo(b)fluoranthene	ND<0.008	0.1	0.00045
Benzo(k)fluoranthene	ND<0.008	0.01	0.000045
Benzo(a)pyrene	ND<0.008	1	0.0045
Indeno(1,2,3-cd)pyrene	ND<0.008	0.1	0.00045
Dibenz(a,h)anthracene	ND<0.008	1	0.0045
		Total Benzo(a)pyrene Equivalent =	**0.01**

Brownfields Phase II Environmental Site Assessment
Groundwater Sampling Data Summary
Main and Congress Street

Groundwater Sample	*MW-1*	*MW-2*	*MW-3*	*MW-4*	*Duplicate*	Vermont
Depth to Groundwater (Ft)	*7.98*	*8.71*	*8.60*	*8.26*	*8.26*	Groundwater
pH (standard units)	*7.31*	*6.86*	*7.26*	*7.17*	*7.17*	Enforcement
Conductivity (umhos)	*1,000*	*4,250*	*2,140*	*1,942*	*1,924*	Standard
Temperature (celcius)	*15.3*	*15.4*	*16.3*	*17.2*	*17.2*	
Turbidity (n.t.u.)	*1,100*	*15.1*	*4.69*	*21.6*	*21.6*	
Sample Date	*7/18/18*	*7/18/18*	*7/18/18*	*7/18/18*	*7/18/18*	
VOCs, EPA Method 8260c (ug/l)						
Dichlorodifluoromethane	ND<5	ND<5	ND<5	ND<5	ND<5	1000
Chloromethane	ND<2	ND<2	ND<2	ND<2	ND<2	30
Vinyl Chloride	ND<2	ND<2	ND<2	ND<2	ND<2	2
Bromomethane	ND<2	ND<2	ND<2	ND<2	ND<2	10
Chloroethane	ND<5	ND<5	ND<5	ND<5	ND<5	NA
Trichlorofluoromethane	ND<5	ND<5	ND<5	ND<5	ND<5	2100
Diethyl Ether	ND<5	ND<5	ND<5	ND<5	ND<5	NA
Acetone	**13**	**78**	ND<10	ND<10	ND<10	700
1 ,1-Dichloroethene	ND<1	ND<1	ND<1	ND<1	ND<1	7
Methylene chloride	ND<5	ND<5	ND<5	ND<5	ND<5	5
Carbon disulfide	ND<5	ND<5	ND<5	ND<5	ND<5	NA
Methyl-t-butyl ether (MTBE)	ND<5	ND<5	ND<5	ND<5	ND<5	40
trans-1,2-Dichloroethene	ND<2	ND<2	ND<2	ND<2	ND<2	100
1,1-Dichloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	70
2,2-Dichloropropane	ND<2	ND<2	ND<2	ND<2	ND<2	NA
cis-1,2-Dichloroethene	ND<2	ND<2	ND<2	ND<2	ND<2	70
2-Butanone(MEK)	ND<10	ND<10	ND<10	ND<10	ND<10	4200
Bromochloromethane	ND<2	ND<2	ND<2	ND<2	ND<2	90
Tetrahydrofuran(THF)	ND<10	ND<10	ND<10	ND<10	ND<10	NA
Chloroform	ND<2	ND<2	ND<2	ND<2	ND<2	80*
1,1,1-Trichloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	200
Carbon tetrachloride	ND<2	ND<2	ND<2	ND<2	ND<2	5
1 ,1-Dichloropropene	ND<2	ND<2	ND<2	ND<2	ND<2	NA
Benzene	ND<1	ND<1	ND<1	ND<1	ND<1	5
1,2-Dichloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	5
Trichloroethene (TCE)	ND<2	ND<2	ND<2	ND<2	ND<2	5
1,2-Dichloropropane	ND<2	ND<2	ND<2	ND<2	ND<2	5
Dibromomethane	ND<2	ND<2	ND<2	ND<2	ND<2	NA
Bromodichloromethane	ND<1	ND<1	ND<1	ND<1	ND<1	80*
4-Methyl-2-pentanone(MIBK)	ND<10	ND<10	ND<10	ND<10	ND<10	560
cis-1,3-Dichloropropene	ND<1	ND<1	ND<1	ND<1	ND<1	0.5
Toluene	ND<1	ND<1	ND<1	ND<1	ND<1	1000
trans-1,3-Dichloropropene	ND<1	ND<1	ND<1	ND<1	ND<1	0.5
1,1,2-Trichloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	5
2-Hexanone	ND<10	ND<10	ND<10	ND<10	ND<10	NA
Tetrachloroethene (PCE)	ND<2	ND<2	ND<2	ND<2	ND<2	5
1,3-Dichloropropane	ND<2	ND<2	ND<2	ND<2	ND<2	NA

Groundwater Enforcement Standard from Groundwater Protection Rule and Strategy, 12/16

ND<xx = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Detection limits and reported concentrations or above the enforcement standard are shaded

NA = No current enforcement standard

* means the indicated enforcement standard is for total trihalomethanes

Brownfields Phase II Environmental Site Assessment
Groundwater Sampling Data Summary
Main and Congress Street

Groundwater Sample *Sample Date*	*MW-1* *7/18/18*	*MW-2* *7/18/18*	*MW-3* *7/18/18*	*MW-4* *7/18/18*	*Duplicate* *7/18/18*	VGES
VOCs, EPA Method 8260c (ug/l)						
Dibromochloromethane	ND<2	ND<2	ND<2	ND<2	ND<2	80*
1,2-Dibromoethane(EDB)	ND<1	ND<1	ND<1	ND<1	ND<1	0.05
Chlorobenzene	ND<2	ND<2	ND<2	ND<2	ND<2	100
1,1,1,2-Tetrachloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	70
Ethylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	700
mp-Xylene	ND<1	ND<1	ND<1	ND<1	ND<1	10000
o-Xylene	ND<1	ND<1	ND<1	ND<1	ND<1	10000
Styrene	ND<1	ND<1	ND<1	ND<1	ND<1	100
Bromoform	ND<2	ND<2	ND<2	ND<2	ND<2	80*
IsoPropylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
Bromobenzene	ND<2	ND<2	ND<2	ND<2	ND<2	NA
1,1,2,2-Tetrachloroethane	ND<2	ND<2	ND<2	ND<2	ND<2	NA
1,2,3-Trichloropropane	ND<2	ND<2	ND<2	ND<2	ND<2	5
n-Propylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
2-Chlorotoluene	ND<2	ND<2	ND<2	ND<2	ND<2	100
4-Chlorotoluene	ND<2	ND<2	ND<2	ND<2	ND<2	100
1,3,5-trimethylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	4
tert-Butylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
1,2,4-trimethylbenzene	**1.8**	ND<1	ND<1	ND<1	ND<1	5
sec-Butylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
1,3-Dichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	600
p-Isopropyltoluene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
1,4-Dichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	75
1,2-Dichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	600
n-Butylbenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
1,2-Dibromo-3-chloropropane	ND<2	ND<2	ND<2	ND<2	ND<2	0.2
1,3,5-Trichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	40
1,2,4-Trichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	70
Hexachlorobutadiene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
Naphthalene	ND<5	ND<5	ND<5	ND<5	ND<5	20
1,2,3-Trichlorobenzene	ND<1	ND<1	ND<1	ND<1	ND<1	NA
Total Reported VOCs	**15**	**78**	ND	ND	ND	

Groundwater Enforcement Standard from Groundwater Protection Rule and Strategy, 12/16

ND<xx = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

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Brownfields Phase II Environmental Site Assessment
Groundwater Sampling Data Summary
Main and Congress Street

Groundwater Sample *Sample Date*	*MW-1* *7/18/18*	*MW-2* *7/18/18*	*MW-3* *7/18/18*	*MW-4* *7/18/18*	*Duplicate* *7/18/18*	VGES
TOTAL METALS, EPA Method 6020a (mg/l)						
Total Arsenic	**0.012**	**0.0039**	ND<0.001	**0.0022**	**0.0020**	0.010
Total Barium	**0.29**	**0.13**	**0.21**	**0.19**	**0.19**	2
Total Cadmium	ND<0.001	ND<0.001	ND<0.001	ND<0.001	ND<0.001	0.005
Total Chromium	**0.017**	ND<0.001	ND<0.001	**0.0034**	**0.0031**	0.100
Total Lead	**0.15**	**0.0018**	ND<0.001	**0.0019**	**0.0018**	0.015
Total Mercury	0.00029	ND<0.0001	ND<0.0001	ND<0.0001	ND<0.0001	0.002
Total Selenium	**0.015**	**0.0066**	**0.0032**	**0.0066**	**0.0054**	0.05
Total Sliver	ND<0.001	ND<0.001	ND<0.001	ND<0.001	ND<0.001	0.1

Groundwater Enforcement Standard from Groundwater Protection Rule and Strategy, 12/16

ND<xx = Not Detected< Detection Limit

Results reported above detection limits are indicated in bold

Detection limits and reported concentrations or above the enforcement standard are shaded

NA = No current enforcement standard

Brownfields Phase II Environmental Site Assessment
Subslab Vapor Sampling Summary
Main and Congress Redevelopment Project

Analyte Category/Compound	Subslab-1 Concentration ug/m^3	Data Qualifier	Subslab-2 Reported Concentration ug/m^3	Data Qualifier	Subslab-3 Reported Concentration ug/m^3	Data Qualifier	Subslab-4 Reported Concentration ug/m^3	Data Qualifier	Ambient Air Reported Concentration ug/m^3	Data Qualifier	I-Rule VI Screening Values, Sub-Slab Soil Gas (residential, ug/m3)	I-Rule VI Screening Values, Sub-Slab Soil Gas (industrial, ug/m3)
Sample Date:	7/18/18		7/18/18		7/18/18		7/18/18		7/18/18			
Propene	**45**		**63**		**4.1**		**4.3**		**0.92**	J	NA	NA
Freon12(Dichlorodifluoromethane)	**2.4**		**2.2**		**2.3**		**2.3**		**2.2**		3,500	15,000
Chloromethane (methyl chloride)	ND<0.33		ND<0.36		ND<0.33		ND<0.34		**0.31**	J	3,100	13,000
Freon 114 (1,2-Dichloro-1,1,2,2-tetrafluoroethane)	ND<0.84		ND<0.93		ND<0.84		ND<0.86		ND<1.0		NA	NA
Vinyl Chloride	**0.097**	J	**0.20**		ND<0.17		ND<0.17		ND<0.21		3.7	62
1,3-Butadiene	ND<0.34		ND<0.38		ND<0.35		ND<0.35		ND<0.43		3.1	14
Bromomethane	ND<0.33		**0.96**		ND<0.33		ND<0.34		ND<0.41		170	730
Chloroethane (ethyl chloride)	ND<0.33		ND<0.36		ND<0.33		ND<0.34		ND<0.41		350,000	1,500,000
Ethanol	**230**		**380**		**70**		**110**		**6.9**	J	NA	NA
Acetonitrile	**0.57**	J	**1.8**		**0.65**	J	**0.34**	J	**0.60**	J	2,100	8,800
Acrolein	**1.6**	J	**3.1**		**1.6**	J	**0.99**	J	**0.81**	J	0.7	2.9
Acetone	**160**		**120**		**94**		**74**		**13**		1,100,000	4,500,000
Trichlorofluoromethane (Freon 11)	**1.6**		**1.5**		**1.5**		**1.4**		**1.1**		NA	NA
Isopropyl Alcohol (2-Propanol)	**100**		**180**		**8.3**		**10**		**1.5**	J	7,000	29,000
Acrylonitrile	ND<0.87		**0.21**	J	ND<0.87		ND<0.89		ND<1.1		1.4	6.0
1,1-Dichloroethene	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		7,000	29,000
2-Methyl-2-Propanol (tert-butyl Alcohol)	**1.8**		**17**		**1.8**	J	**0.60**	J	ND<2.3		NA	NA
Methylene Chloride	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		3,400	41,000
3-Chloro-1-propene (Allyl Chloride)	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		16	68
Trichlorotrifluoroethane	**0.45**	J	**0.50**	J	**0.49**	J	**0.51**	J	**0.43**	J	1,000,000	4,400,000
Carbon disulfide	**8.5**		**1.4**	J	**0.66**	J	**0.28**	J	ND<2.3		24,000	100,000
trans-1,2-Dichloroethene	ND<0.18		**0.22**		ND<0.18		ND<0.18		ND<0.23		NA	NA
1,1-Dichloroethane	ND<0.16		ND<0.18		ND<0.17		ND<0.17		ND<0.21		58	260
Methyl tert-Butyl Ether (MTBE)	ND<0.89		ND<0.98		ND<0.89		ND<0.91		ND<1.1		360	1,600
Vinyl Acetate	**3.8**	J	**6.1**	J	**2.6**	J	**2.5**	J	ND<11		7,000	29,000
Methyl Ethyl Ketone (2-butanone)	**3.8**		**5.8**		**3.8**		**2.6**		**2.7**		170,000	730,000
cis-1,2-Dichloroethene	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		NA	NA
Diisopropyl Ether	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		730	3,100
Ethyl Acetate	**2.0**		**2.3**		**1.2**		**0.54**	J	**1.7**	J	2,400	10,000
n-hexane	**0.43**	J	**0.95**	J	**0.18**	J	**0.26**	J	**0.25**	J	24,000	100,000
Chloroform	**0.49**		**1.1**		**1.4**		ND<0.18		ND<0.23		4.1	18
Tetrahydrofuran	**4.9**		**6.0**		**0.25**	J	**0.22**	J	ND<1.1		70,000	290,000
Ethyl tert-Butyl Ether	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		NA	NA
1,2-Dichloroethane	**0.13**	J	ND<0.20		ND<0.18		ND<0.18		ND<0.23		3.6	16
1,1,1-Trichloroethane	ND<0.18		**0.16**	J	**0.13**	J	ND<0.18		ND<0.23		170,000	730,000
Isopropyl Acetate	ND<1.8		ND<2.0		ND<1.8		ND<1.8		ND<2.3		NA	NA
1-Butanol	**9.4**		**25**		**4.5**		**12**		**17**		NA	NA
Benzene	**0.54**		**0.78**		**1.2**		**0.19**		**0.25**		4.3	35
Carbon Tetrachloride	**0.42**		**0.34**		**20**		ND<0.18		**0.33**		16	68
Cyclohexane	ND<1.8		**0.34**	J	ND<1.8		ND<1.8		ND<2.3		35,000	150,000
tert-Amyl Methyl Ether	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		NA	NA
1,2-Dichloropropane	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		9.4	41
Bromodichloromethane	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		2.5	11
Trichloroethene	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		6.7	23
1,4-Dioxane (Dioxane)	ND<0.87		**2.1**		**0.62**	J	**0.41**	J	ND<1.1		19	82
2,2,4-Trimethylpentane (Isooctane)	**0.21**	J	**0.25**	J	ND<0.87		ND<0.89		ND<1.1		NA	NA
Methyl Methacrylate	ND<1.8		ND<2.0		ND<1.8		ND<1.8		ND<2.3		24,000	10,000
n-heptane	**0.41**	J	**0.83**	J	**0.17**	J	**0.28**	J	ND<1.1		NA	NA

Notes:
ND<X means compound not present above MRL indicated; J=estimated concentration less than the MRL but greater than or equal to the MDL.
IROCP = July 2017 Vermont DEC Investigation and Remediation of Contaminated Properties Rule
NA = Not Available (no guidance level)
Reporting limits in excess of or equal to DEC residential sub-slab soil gas screening values are shaded

Brownfields Phase II Environmental Site Assessment
Subslab Vapor Sampling Summary
Main and Congress Redevelopment Project

Analyte Category/Compound	Subslab-1 Concentration ug/m^3	Data Qualifier	Subslab-2 Reported Concentration ug/m^3	Data Qualifier	Subslab-3 Reported Concentration ug/m^3	Data Qualifier	Subslab-4 Reported Concentration ug/m^3	Data Qualifier	Ambient Air Reported Concentration ug/m^3 7/18/18	Data Qualifier	I-Rule VI Screening Values, Sub-Slab Soil Gas (residential, ug/m3)	I-Rule VI Screening Values, Sub-Slab Soil Gas (industrial, ug/m3)
cis-1,3-Dichloropropene	ND<0.92		ND<1.0		ND<0.92		ND<0.94		ND<1.1		NA	100
Methyl Isobutyl Ketone (4-methyl-2-Pentanone)	**1.6**		**4.6**		**1.9**		**0.33**	J	**0.19**	J	100,000	440,000
trans-1,3-Dichloropropene	ND<0.87		ND<0.96		ND<0.87		**0.23**	J	ND<1.1		NA	100
1,1,2-Trichloroethane	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		5.8	26
Toluene	**4.3**		**4.2**		**2.1**		**1.1**		**0.83**	J	170,000	730,000
Methyl Butyl Ketone (2-Hexanone)	**0.60**	J	**0.96**	J	**0.52**	J	**0.34**	J	**0.39**	J	1,000	4,400
Dibromochloromethane	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		NA	NA
1,2-Dibromoethane (ethylene dibromide)	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		0.16	0.68
n-Butyl Acetate	**0.86**	J	**1.1**		**0.48**	J	**0.37**	J	ND<1.1		NA	NA
n-Octane	**0.92**		**1.2**		**0.44**	J	**0.37**	J	ND<1.1		NA	NA
Tetrachloroethene	ND<0.18		ND<0.20		**0.22**		**0.44**		**0.15**	J	21	170
Chlorobenzene	**0.13**	J	**0.16**	J	ND<0.87		ND<0.89		ND<1.1		1,700	7,300
Ethylbenzene	**1.4**		**1.6**		**1.0**		**0.77**	J	ND<1.1		37	160
m,p- Xylenes	**5.0**		**5.7**		**3.5**		**2.0**		**0.36**	J	3,500	15,000
Bromoform	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		85	370
Styrene	**1.0**		**1.2**		**0.56**	J	**0.47**	J	ND<1.1		35,000	150,000
o- Xylenes	**2.1**		**2.5**		**1.6**		**0.83**	J	ND<1.1		3,500	15,000
n-Nonane	**2.4**		**2.3**		**0.72**	J	**0.83**	J	ND<1.1		700	2,900
1,1,2,2-Tetrachloroethane	ND<0.18		ND<0.20		ND<0.18		ND<0.18		ND<0.23		1.6	7.0
Isopropylbenzene (cumene)	**0.17**	J	**0.19**	J	ND<0.87		ND<0.89		ND<1.1		14,000	58,000
alpha-Pinene	**6.9**		**8.0**		**2.9**		**1.5**		**0.31**	J	NA	NA
n-propylbenzene	**0.43**	J	**0.51**	J	**0.31**	J	**0.24**	J	ND<1.1		35,000	150,000
3-Ethyltoluene	**1.3**		**1.6**		**0.96**		**0.74**		ND<1.1		NA	NA
4-Ethyltoluene	**0.59**	J	**0.71**	J	**0.46**	J	**0.36**	J	ND<1.1		NA	NA
1,3,5-Trimethylbenzene	**0.71**	J	**0.84**	J	**0.44**	J	**0.39**	J	ND<1.1		NA	NA
alpha-Methylstyrene	ND<0.85		ND<0.95		ND<0.86		ND<0.87		ND<1.1		NA	NA
2-Ethyltoluene	**0.50**	J	**0.59**	J	**0.34**	J	**0.31**	J	ND<1.1		NA	NA
1,2,4-Trimethylbenzene	**2.6**		**3.2**		**1.5**		**1.8**		**0.16**	J	240	1,000
n-Decane	**6.3**		**5.7**		**1.8**		**3.0**		**0.18**	J	NA	NA
Benzyl Chloride	ND<1.8		ND<2.0		ND<1.8		ND<1.8		ND<2.3		1.9	8.3
1,3-Dichlorobenzene	**2.2**		**3.4**		ND<0.89		ND<0.91		ND<1.1		NA	NA
1,4-Dichlorobenzene	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		8.5	37
sec-Butylbenzene	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		NA	NA
(4) p-Isopropyltoluene (p-Cymene)	**0.62**	J	**0.54**	J	**0.28**	J	**0.28**	J	ND<1.0		NA	NA
1,2,3-Trimethylbenzene	**0.72**	J	**0.90**	J	**0.36**	J	**0.56**	J	ND<1.0		5.2	22
1,2-Dichlorobenzene	ND<0.89		ND<0.98		ND<0.89		ND<0.91		ND<1.1		7,000	29,000
d-Limonene	**5.7**		**7.3**		**3.3**		**4.4**		**0.25**	J	NA	NA
1,2-Dibromo-3-Chloropropane	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		0.0056	0.068
n-Undecane (hendecane)	ND<0.87		ND<0.96		ND<0.87		**3.6**		ND<1.1		NA	NA
1,2,4-Trichlorobenzene	ND<0.90		ND<1.0		ND<0.91		ND<0.92		ND<1.1		70	290
Naphthalene	**1.0**		**1.2**		**1.4**		**1.1**		ND<1.1		1.0	8.0
n-Dodecane	**2.6**		**3.4**		ND<0.87		**3.2**		**0.64**	J	NA	NA
Hexachlorobutadiene	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		4.3	19
Cyclohexanone	**2.7**		**2.9**		**1.2**		**1.0**		**0.51**	J	730	3,100
tert-butylbenzene	ND<0.87		**0.41**	J	**0.20**	J	**0.24**	J	ND<1.1		NA	NA
n-Butylbenzene	ND<0.87		ND<0.96		ND<0.87		ND<0.89		ND<1.1		NA	NA
Total Reported VOCs	**634**		**891**		**249**		**253**		**53**			

Notes:
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IROCP = July 2017 Vermont DEC Investigation and Remediation of Contaminated Properties Rule
NA = Not Available (no guidance level)
Reporting limits in excess of or equal to DEC residential sub-slab soil gas screening values are shaded

Brownfields Phase II Environmental Site Assessment
Indoor Air Sampling Summary
Main and Congress Redevelopment Project

Analyte Category/Compound	IA-1 Concentration ug/m^3	Data Qualifier	IA-2 Reported Concentration ug/m^3	Data Qualifier	Ambient Air Reported Concentration ug/m^3	Data Qualifier	I-Rule Air Screening Levels (residential, ug/m3)	I-Rule Air Screening Levels (industrial, ug/m3)
Sample Date:	12/11/18		12/11/18		12/11/18			
Propene	**21**		**73**		ND<0.70		NA	NA
Freon12(Dichlorodifluoromethane)	**2.0**		**2.0**		**2.1**		100	440
Chloromethane (methyl chloride)	**0.39**		**0.42**		**0.43**		94	390
Freon 114 (1,2-Dichloro-1,1,2,2-tetrafluoroethane)	ND<0.68		ND<0.74		ND<0.68		NA	NA
Vinyl Chloride	ND<0.15		ND<0.16		ND<0.15		0.11	1.86
1,3-Butadiene	ND<0.28		ND<0.31		ND<0.28		0.094	0.41
Bromomethane	ND<0.27		ND<0.29		ND<0.27		5.2	22
Chloroethane (ethyl chloride)	ND<0.27		ND<0.29		ND<0.27		10,000	44,000
Ethanol	**44**		**200**		**3.3**	J	NA	NA
Acetonitrile	ND<0.69		ND<0.76		ND<0.70		63	260
Acrolein	**0.33**	J	**1.8**		**0.29**	J	0.021	0.088
Acetone	**140**		**1,100**	D	**3.8**	J	32,000	140,000
Trichlorofluoromethane (Freon 11)	**1.1**		**1.2**		**1.1**		NA	NA
Isopropyl Alcohol (2-Propanol)	**52**		**190**		**0.31**	J	210	880
Acrylonitrile	ND<0.69		ND<0.76		ND<0.70		0.041	0.18
1,1-Dichloroethene	ND<0.15		ND<0.16		ND<0.15		210	880
2-Methyl-2-Propanol (tert-butyl Alcohol)	ND<1.5		**0.55**	J	ND<1.5		NA	NA
Methylene Chloride	**0.36**	J	**0.25**	J	**0.25**	J	100	1,200
3-Chloro-1-propene (Allyl Chloride)	ND<0.70		NR		NR		0.47	2
Trichlorotrifluoroethane	**0.43**	J	**0.44**	J	**0.44**	J	NA	NA
Carbon disulfide	ND<1.5		ND<1.6		ND<1.5		730	3,100
trans-1,2-Dichloroethene	ND<0.15		ND<0.16		ND<0.15		NA	NA
1,1-Dichloroethane	ND<0.13		ND<0.15		ND<0.13		1.8	7.7
Methyl tert-Butyl Ether (MTBE)	ND<0.72		ND<0.79		ND<0.72		11	47
Vinyl Acetate	ND<7.0		**4.9**	J	**7.1**		210	880
Methyl Ethyl Ketone (2-butanone)	**0.75**	J	**2.3**		**0.29**		5,200	22,000
cis-1,2-Dichloroethene	ND<0.15		ND<0.16		ND<0.15		NA	NA
Diisopropyl Ether	ND<0.72		ND<0.72		NR		730	3,100
Ethyl Acetate	**10**		**74**		ND<1.5		73	310
n-hexane	**0.22**	J	**0.25**	J	**0.22**	J	730	3,100
Chloroform	**0.16**		**0.16**	J	ND<0.15		0.12	0.53
Tetrahydrofuran	**0.69**		**2.1**		ND<0.71		2,100	8,800
Ethyl tert-Butyl Ether	ND<0.70		NR		NR		NA	NA
1,2-Dichloroethane	**0.11**	J	**0.15**	J	ND<0.15		0.11	0.47
1,1,1-Trichloroethane	ND<0.15		ND<0.16		ND<0.15		5,200	22,000
Isopropyl Acetate	**0.30**	J	NR		NR		NA	NA
1-Butanol	**2.7**		NR		NR		NA	NA
Benzene	**0.46**		**0.47**		**0.64**		0.13	1.05
Carbon Tetrachloride	**0.38**		**0.37**		**0.39**		0.47	2.0
Cyclohexane	ND<1.3		**0.27**	J	ND<1.3		6,300	26,000
tert-Amyl Methyl Ether	ND<0.72		NR		NR		NA	NA
1,2-Dichloropropane	ND<0.15		ND<0.16		ND<0.15		0.28	1.2
Bromodichloromethane	ND<0.15		ND<0.16		ND<0.15		0.076	0.33
Trichloroethene	ND<0.15		ND<0.16		ND<0.15		0.2	0.70
1,4-Dioxane (Dioxane)	ND<0.70		ND<0.77		ND<0.71		0.56	2.5
2,2,4-Trimethylpentane (Isooctane)	ND<0.70		NR		NR		NA	NA
Methyl Methacrylate	ND<1.5		ND<1.6		ND<1.5		730	3,100
n-heptane	**0.17**	J	**0.23**	J	**0.25**	J	NA	NA

Notes:
ND<X means compound not present above MRL indicated; J=estimated concentration less than the MRL but greater than or equal to the MDL.
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NR = Not Reported
Contaminant detections indicated in **bold**. Exceedances of the DEC residential air screening values are shaded
Reporting limits in excess of or equal to DEC residential sub-slab soil gas screening values are shaded

Brownfields Phase II Environmental Site Assessment
Indoor Air Sampling Summary
Main and Congress Redevelopment Project

Analyte Category/Compound	IA-1 Concentration ug/m^3	Data Qualifier	IA-2 Reported Concentration ug/m^3	Data Qualifier	Ambient Air Reported Concentration ug/m^3	Data Qualifier	I-Rule Air Screening Levels (residential, ug/m3)	I-Rule Air Screening Levels (industrial, ug/m3)
Sample Date:	12/11/18		12/11/18		12/11/18			
cis-1,3-Dichloropropene	ND<0.74		ND<0.82		ND<0.75		0.7	3.1
Methyl Isobutyl Ketone (4-methyl-2-Pentanone)	ND<0.70		ND<0.77		ND<0.71		3,100	13,000
trans-1,3-Dichloropropene	ND<0.70		ND<0.77		ND<0.71		0.7	3.1
1,1,2-Trichloroethane	ND<0.15		ND<0.16		ND<0.15		0.18	0.77
Toluene	**0.73**		**0.54**	**J**	**0.47**	**J**	5,200	22,000
Methyl Butyl Ketone (2-Hexanone)	ND<0.72		**0.20**	**J**	ND<0.72		31	130
Dibromochloromethane	ND<0.15		ND<0.16		ND<0.15		NA	NA
1,2-Dibromoethane (ethylene dibromide)	ND<0.15		ND<0.16		ND<0.15		0.0047	0.02
n-Butyl Acetate	**5.5**		**23**		ND<0.72		NA	NA
n-Octane	ND<0.72		ND<0.79		ND<0.72		NA	NA
Tetrachloroethene	ND<0.15		ND<0.16		ND<0.15		0.63	5.11
Chlorobenzene	ND<0.70		ND<0.77		ND<0.71		52	220
Ethylbenzene	**0.12**	**J**	ND<0.76		ND<0.70		1.1	4.9
m,p- Xylenes	**0.33**	**J**	**0.23**	**J**	**0.28**	**J**	100	440
Bromoform	ND<0.70		ND<0.77		ND<0.71		2.6	11
Styrene	**0.18**	**J**	ND<0.77		ND<0.71		1,000	4,400
o- Xylenes	**0.14**	**J**	ND<0.77		**0.11**	**J**	100	440
n-Nonane	**0.14**	**J**	**0.14**	**J**	ND<0.72		21	88
1,1,2,2-Tetrachloroethane	ND<0.15		ND<0.16		ND<0.15		0.048	0.21
Isopropylbenzene (cumene)	ND<0.70		ND<0.77		ND<0.71		420	1,800
alpha-Pinene	**1.7**		**0.29**	**J**	ND<0.70		NA	NA
n-propylbenzene	ND<0.72		ND<0.79		ND<0.72		1,000	4,400
3-Ethyltoluene	ND<0.70		NR		NR		NA	NA
4-Ethyltoluene	ND<0.70		ND<0.77		ND<0.71		NA	NA
1,3,5-Trimethylbenzene	ND<0.70		ND<0.77		ND<0.71		NA	NA
alpha-Methylstyrene	ND<0.70		NR		NR		NA	NA
2-Ethyltoluene	ND<0.72		NR		NR		NA	NA
1,2,4-Trimethylbenzene	**0.16**	**J**	ND<0.77		**0.10**	**J**	7.3	31
n-Decane	**0.16**	**J**	NR		NR		NA	NA
Benzyl Chloride	ND<1.5		ND<1.6		ND<1.5		0.057	0.25
1,3-Dichlorobenzene	ND<0.72		ND<0.79		ND<0.72		NA	NA
1,4-Dichlorobenzene	ND<0.72		ND<0.79		ND<0.72		0.26	1.1
sec-Butylbenzene	ND<0.70		NR		NR		NA	NA
(4) p-Isopropyltoluene (p-Cymene)	**0.18**	**J**	NR		NR		NA	NA
1,2,3-Trimethylbenzene	ND<0.69		NR		NR		5.2	22
1,2-Dichlorobenzene	ND<0.72		ND<0.79		ND<0.72		210	880
d-Limonene	**0.81**		ND<074		ND<0.68		NA	NA
1,2-Dibromo-3-Chloropropane	ND<0.69		ND<0.76		ND<0.70		0.00017	0.002
n-Undecane (hendecane)	**0.19**	**J**	NR		NR		NA	NA
1,2,4-Trichlorobenzene	ND<0.70		ND<0.77		ND<0.71		2.1	8.8
Naphthalene	ND<0.68		ND<074		ND<0.68		0.03	0.24
n-Dodecane	ND<0.69		NR		NR		NA	NA
Hexachlorobutadiene	ND<0.70		ND<0.77		ND<0.71		0.13	0.56
Cyclohexanone	**0.17**	**J**	NR		NR		730	3,100
tert-butylbenzene	ND<0.70		NR		NR		NA	NA
n-Butylbenzene	ND<0.70		NR		NR		NA	NA
Total Reported VOCs	**288**		**1,679**		**22**			

Notes:
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Reporting limits in excess of or equal to DEC residential air screening values are shaded

Brownfields Phase II Environmental Site Assessment
Groundwater Sampling Data Summary
Main and Congress Street
St. Albans, Vermont

Groundwater Sample *Sample Date*	*MW-1* *12/11/18*	*Duplicate* *12/11/18*	VGES
TOTAL METALS, EPA Method 200.8 (mg/l)			
Total Arsenic	ND<0.001	ND<0.001	0.010
Total Barium	**0.14**	**0.14**	2
Total Cadmium	ND<0.001	ND<0.001	0.005
Total Chromium	ND<0.001	ND<0.001	0.100
Total Lead	ND<0.001	ND<0.001	0.015
Total Mercury	ND<0.0001	ND<0.0001	0.002
Total Selenium	**0.025**	**0.026**	0.05
Total Sliver	ND<0.001	ND<0.001	0.1

Groundwater Enforcement Standard from Groundwater Protection Rule and Strategy, 12/16
ND<xx = Not Detected< Detection Limit
Results reported above detection limits are indicated in bold
Detection limits and reported concentrations or above the enforcement standard are shaded
NA = No current enforcement standard

APPENDIX C

SUMMARY OF RANKING CRITERIA

CLEANUP RANKING CRITERIA
Congress and Main Redevelopment, St. Albans, Vermont

1) Compliance with Legal Requirements
1-Clearly out of compliance with one or more legal requirements
3-uncertain legal status.
5-compliant with legal requirements based on experience

2) Overall protection of human health and environment
1-ineffective protection of human health and environment
3-somewhat effective; may result in risk reduction
5-highly effective based on experience

3) Long-term effectiveness and permanence
1-ineffective and /or not permanent
3-somewhat effective or permanent, requires long-term oversight
5-highly effective and permanent based on experience

4) Reducing toxicity, mobility or volume through treatment
1-No waste treatment proposed and no treatment benefit
3-Waste treatment proposed, uncertain treatment benefit.
5-Waste treatment proposed that clearly results in reduced toxicity, mobility or volume.

5) Short-term effectiveness
1-ineffective immediately following implementation
3-somewhat effective immediately following implementation
5-highly effective immediately following implementation

6) Implementability
1-difficult to implement using readily available technologies
3-possible to implement using technologies that may or may not be locally available
5-high likelihood of implementation using readily available local technologies

7) Cost
1-highest predicted implementation costs
3-middle predicted implementation costs
5-lowest predicted installation

8) Environmental impact and sustainability/climate change resiliancy
1-highest negative impact on sustainability and climate change considerations
3-median or neutral impact on sustainability and climate change considerations
5-lowest negative impact on sustainability and climate change considerations

9) Community acceptance
1-likely to be met with opposition by the local community
3-May be met with some opposition but other factors may compensate
5-unlikely to be met with opposition by the local community

10) Consistency with Redevelopment Goal
1-not consistent with redevelopment goal
3-somewhat consistent with redevelopment goal, may include design compromises
5-will allow redevelopment to proceed as intended

APPENDIX D

BUDGETARY COST ESTIMATES

Budgetary Cleanup Cost Estimate - Option A
Removal of a Portion of Contaminated Soil and Installation of Protective Soil, Concrete, and Asphalt Caps
Congress and Main Redevelopment Project
St. Albans, Vermont
January 2019

Task	Category	Description	No.		Per Unit Cost	Unit	Item Cost	Markup Factor	Total Item Cost	**Subtotals**
1.0	**Final Design / Permitting / Contractor Bid Support**									
	Project Coordination / Bid Support	Geologist	20	@	$100.00	/hr	$2,000.00	1.00	$2,000.00	
	Final Design / Bid Support	PE	25	@	$125.00	/hr	$3,125.00	1.00	$3,125.00	
	Principal Review	Principal	2	@	$125.00	/hr	$250.00	1.00	$250.00	
	Contractor Preparation / Coordination	Geologist	12	@	$100.00	/hr	$1,200.00	1.00	$1,200.00	**$6,575**
2.0	**Construction Inspection and Oversight (10 DAYS)**									
	Construction Inspection (10 Visits)	Geol./Engin.	50	@	$100.00	/hr	$5,000.00	1.00	$5,000.00	
	Travel (10 Visits)	Geol./Engin.	20	@	$100.00	/hr	$2,000.00	1.00	$2,000.00	
	Mileage (10 Visits)	Expense	1050	@	$0.545	/ea	$572.25	1.00	$572.25	**$7,572**
3.0	**Construction Costs (Site Work)**									
	Mobilization / Demobilization	Expense	1	@	$5,000.00	/ls	$5,000.00	1.00	$5,000.00	
	Soil Erosion Control	Contractor	1	@	$7,000.00	/ea	$7,000.00	1.00	$7,000.00	
	Common Excavation	Expense	7,440	@	$8.98	/cy	$66,811.20	1.00	$66,811.20	
	Granular fill	Expense	155	@	$9.96	/cy	$1,543.80	1.00	$1,543.80	
	Asphalt (Aggregate Surface Course)	Expense	560	@	$38.88	/cy	$21,772.80	1.00	$21,772.80	
	Geotextile fabric	Expense	4,840	@	$1.01	/sy	$4,888.40	1.00	$4,888.40	
	Concrete Sidewalks	Expense	6,800	@	$6.52	/sf	$44,336.00	1.00	$44,336.00	
	Seed	Expense	28	@	$14.00	/lb	$392.00	1.00	$392.00	
	Top Soil	Expense	80	@	$28.87	/cy	$2,309.60	1.00	$2,309.60	
	Closed UST Removal/Disposal	Expense	1	@	$5,000.00	/ea	$5,000.00	1.00	$5,000.00	
	Characterization Sampling	Expense	20	@	$900.00	/ea	$18,000.00	1.00	$18,000.00	
	Contaminated Soil Disposal (Daily Cover)	Expense	9,094	@	$51.00	/ton	$463,794.00	1.00	$463,794.00	
	Contaminated Soil Disposal (Disposal)	Expense	311	@	$80.00	/ton	$24,880.00	1.00	$24,880.00	
	Clean Soil Sampling	Expense	2	@	$1,000.00	/ea	$2,000.00	1.00	$2,000.00	**$667,728**
4.0	**Construction Costs (SSV Systems)**									
	Crushed Stone	Expense	230	@	$31.90	/cy	$7,337.00	1.00	$7,337.00	
	15 mil membrane	Expense	19,000	@	$0.71	/sf	$13,490.00	1.00	$13,490.00	
	4" Concrete Slab	Expense	6000	@	$6.52	/sf	$39,120.00	1.00	$39,120.00	
	4" perforated SDR 35 PVC Pipe	Expense	600	@	$1.25	/lf	$750.00	1.00	$750.00	
	3" SCH 40 PVC	Expense	200	@	$1.86	/lf	$372.00	1.00	$372.00	
	4" PVC End Cap	Expense	4	@	$5.00	/ea	$20.00	1.00	$20.00	
	4"x3" PVC TEE	Expense	4	@	$14.00	/ea	$56.00	1.00	$56.00	
	4"x4" SRD 35 TEE	Expense	4	@	$12.00	/ea	$48.00	1.00	$48.00	
	Labor-plumber	Expense	30	@	$80.00	/hr	$2,400.00	1.00	$2,400.00	
	Radonaway Fan	Expense	4	@	$250.00	/ea	$1,000.00	1.00	$1,000.00	
	Sensor / Alarm	Expense	4	@	$80.00	/ea	$320.00	1.00	$320.00	
	Fittings / Tubing	Expense	4	@	$25.00	/est	$100.00	1.00	$100.00	
	Electrical / Installation	Expense	1	@	$500.00	/ls	$500.00	1.00	$500.00	
	Radon System at 12 Congress	Expense	1	@	$5,000.00	/ls	$5,000.00	1.00	$5,000.00	
	Monitoring Travel (2 Visits)	Geologist	10	@	$60.00	/hr	$600.00	1.00	$600.00	
	Monitoring (2 Visits)	Geologist	10	@	$90.00	/hr	$900.00	1.00	$900.00	
	Mileage	Expense	650	@	$0.57	/ea	$370.50	1.00	$370.50	
	PID	Expense	2	@	$80.00	/day	$160.00	1.00	$160.00	
	Micromanometer	Expense	1	@	$500.00	/ea	$500.00	1.00	$500.00	
	Temp/Humidity Pen Rental	Expense	2	@	$15.00	/day	$30.00	1.00	$30.00	
	Miscellaneous Tubing	Expense	2	@	$20.00	/ea	$40.00	1.00	$40.00	
	Reporting	Geologist	6	@	$90.00	/ea	$540.00	1.00	$540.00	**$73,654**
5.0	**Completion Report Preparation**									
	Report	Geol./Engin.	16	@	$100.00	/hr	$1,600.00	1.00	$1,600.00	
	Review	PE	8	@	$125.00	/hr	$1,000.00	1.00	$1,000.00	**$2,600**

Cleanup Cost	**$758,129**
20% Contingency	**$151,626**
Total Cost For Project	**$909,754**

Budgetary Cleanup Cost Estimate - Option B
Removal of all Contaminated Soil
Congress and Main Redevelopment Project
St. Albans, Vermont
January 2019

Task	Category	Description	No.		Per Unit Cost	Unit	Item Cost	Markup Factor	Total Item Cost	**Subtotals**
1.0	**Final Design / Permitting / Contractor Bid Support**									
	Project Coordination / Bid Support	Geologist	20	@	$100.00	/hr	$2,000.00	1.00	$2,000.00	
	Final Design / Bid Support	PE	25	@	$125.00	/hr	$3,125.00	1.00	$3,125.00	
	Principal Review	Principal	2	@	$125.00	/hr	$250.00	1.00	$250.00	
	Contractor Preparation / Coordination	Geologist	12	@	$100.00	/hr	$1,200.00	1.00	$1,200.00	**$6,575**
2.0	**Construction Inspection and Oversight (15 DAYS)**									
	Construction Inspection (15 Visits)	Geol./Engin.	75	@	$100.00	/hr	$7,500.00	1.00	$7,500.00	
	Travel (15 Visits)	Geol./Engin.	30	@	$100.00	/hr	$3,000.00	1.00	$3,000.00	
	Mileage (15 Visits)	Expense	1575	@	$0.545	/ea	$858.38	1.00	$858.38	**$11,358**
3.0	**Construction Costs (Site Work)**									
	Mobilization / Demobilization	Expense	1	@	$5,000.00	/ls	$5,000.00	1.00	$5,000.00	
	Soil Erosion Control	Contractor	1	@	$7,000.00	/ea	$7,000.00	1.00	$7,000.00	
	Common Excavation	Expense	19,360	@	$8.98	/cy	$173,852.80	1.00	$173,852.80	
	Closed UST Removal/Disposal	Expense	1	@	$5,000.00	/ea	$5,000.00	1.00	$5,000.00	
	Characterization Sampling	Expense	59	@	$900.00	/ea	$53,100.00	1.00	$53,100.00	
	Contaminated Soil Disposal (Daily Cover)	Expense	28,729	@	$51.00	/ton	$1,465,179.00	1.00	$1,465,179.00	
	Contaminated Soil Disposal (Disposal)	Expense	311	@	$80.00	/ton	$24,880.00	1.00	$24,880.00	
	Clean Soil Sampling	Expense	2	@	$1,000.00	/ea	$2,000.00	1.00	$2,000.00	**$1,736,012**
4.0	**Construction Costs (SSV Systems)**									
	Crushed Stone	Expense	230	@	$31.90	/cy	$7,337.00	1.00	$7,337.00	
	15 mil membrane	Expense	19000	@	$0.71	/sf	$13,490.00	1.00	$13,490.00	
	4" Concrete Slab	Expense	6000	@	$6.52	/sf	$39,120.00	1.00	$39,120.00	
	4" perforated SDR 35 PVC Pipe	Expense	600	@	$1.25	/lf	$750.00	1.00	$750.00	
	3" SCH 40 PVC	Expense	200	@	$1.86	/lf	$372.00	1.00	$372.00	
	4" PVC End Cap	Expense	4	@	$5.00	/ea	$20.00	1.00	$20.00	
	4"x3" PVC TEE	Expense	4	@	$14.00	/ea	$56.00	1.00	$56.00	
	4"x4" SRD 35 TEE	Expense	4	@	$12.00	/ea	$48.00	1.00	$48.00	
	Labor-plumber	Expense	30	@	$80.00	/hr	$2,400.00	1.00	$2,400.00	
	Radonaway Fan	Expense	4	@	$250.00	/ea	$1,000.00	1.00	$1,000.00	
	Sensor / Alarm	Expense	4	@	$80.00	/ea	$320.00	1.00	$320.00	
	Fittings / Tubing	Expense	4	@	$25.00	/est	$100.00	1.00	$100.00	
	Electrical / Installation	Expense	1	@	$500.00	/ls	$500.00	1.00	$500.00	
	Radon System at 12 Congress	Expense	1	@	$5,000.00	/ls	$5,000.00	1.00	$5,000.00	
	Monitoring Travel (2 Visits)	Geologist	10	@	$60.00	/hr	$600.00	1.00	$600.00	
	Monitoring (2 Visits)	Geologist	10	@	$90.00	/hr	$900.00	1.00	$900.00	
	Mileage	Expense	650	@	$0.57	/ea	$370.50	1.00	$370.50	
	PID	Expense	2	@	$80.00	/day	$160.00	1.00	$160.00	
	Micromanometer	Expense	1	@	$500.00	/ea	$500.00	1.00	$500.00	
	Temp/Humidity Pen Rental	Expense	2	@	$15.00	/day	$30.00	1.00	$30.00	
	Miscellaneous Tubing	Expense	2	@	$20.00	/ea	$40.00	1.00	$40.00	
	Reporting	Geologist	6	@	$90.00	/ea	$540.00	1.00	$540.00	**$73,654**
5.0	**Completion Report Preparation**									
	Report	Geol./Engin.	16	@	$100.00	/hr	$1,600.00	1.00	$1,600.00	
	Review	PE	8	@	$125.00	/hr	$1,000.00	1.00	$1,000.00	**$2,600**

Cleanup Cost	**$1,830,199**
20% Contingency	**$366,040**
Total Cost For Project	**$2,196,238**

Budgetary Cleanup Cost Estimate - Option C
No Action Alternative
Congress and Main Redevelopment Project
St. Albans, Vermont
January 2019

Task	Category	Description	No.		Per Unit Cost	Unit	Item Cost	Markup Factor	Total Item Cost	**Subtotals**
1.0	**Final Design / Permitting / Contractor Bid Support**									
	Project Coordination / Bid Support	Geologist	5	@	$100.00	/hr	$500.00	1.00	$500.00	
	Final Design / Bid Support	PE	3	@	$125.00	/hr	$375.00	1.00	$375.00	
	Principal Review	Principal	0.5	@	$125.00	/hr	$62.50	1.00	$62.50	
	Contractor Preparation / Coordination	Geologist	1	@	$100.00	/hr	$100.00	1.00	$100.00	**$1,038**
2.0	**Fence Installation**									
	Mobilization / Demobilization	Expense	1	@	$500.00	/ls	$500.00	1.00	$500.00	
	Chain Link Fence - 6ft	Expense	910	@	$16.28	/lf	$14,814.80	1.00	$14,814.80	**$15,315**
3.0	**Completion Report Preparation**									
	Report	Geol./Engin.	4	@	$100.00	/hr	$400.00	1.00	$400.00	
	Review	PE	1	@	$125.00	/hr	$125.00	1.00	$125.00	**$525**

Cleanup Cost	**$16,877**
20% Contingency	**$3,375**
Total Cost For Project	**$20,253**