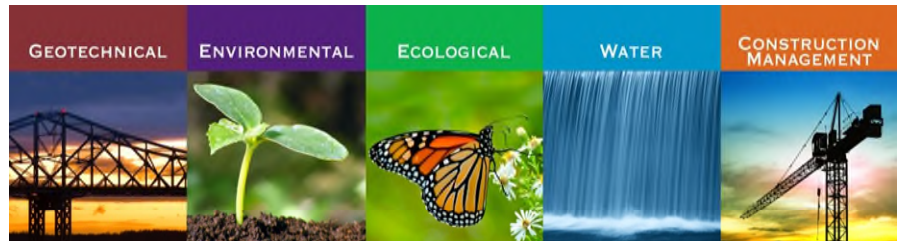




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ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES

117-125 & 129 Whalley Avenue
New Haven, CT

October 2020

File No. 050045791.17



PREPARED FOR:

St. Luke's Development Corp.
New Haven, Connecticut

GZA GeoEnvironmental, Inc.

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October 13, 2020
File No. 05.0045791.17

St. Luke's Development Corp.
111 Whalley Ave.
New Haven, Connecticut, 06511

Attention: Dr. Samuel Andoh

Re: Analysis of Brownfields Cleanup Alternatives - DRAFT
117-125 & 129 Whalley Avenue
New Haven, CT

GZA GeoEnvironmental, Inc. (GZA) is pleased to present this Analysis of Brownfields Cleanup Alternatives (ABCA) to St. Luke's Development Corp. for the properties at 117-125 & 129 Whalley Avenue in New Haven, Connecticut (hereafter collectively referred to as the Site). The ABCA was prepared based on GZA's 2016 Phase I and Phase II/III Environmental Site Investigations of the Site prepared for the City of New Haven and the October 2020 Draft Remedial Action Plan and is subject to the Limitations described in Appendix A of the report.

We trust this report satisfies your present requirements; should you require additional information, please call the undersigned at (860) 286-8900.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Christopher J. Frey, LEP
Senior Project Manager

Kathleen A. Cyr, P.E., LEP,
Consultant/Reviewer

Adam T. Henry LEP
Associate Principal

Attachment: ABCA Report



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1.0 INTRODUCTION AND BACKGROUND

GZA GeoEnvironmental, Inc. (GZA) has prepared this Analysis of Brownfields Cleanup Alternatives (ABCA) on behalf of St. Luke's Development Corp. (SLDC) for the 117-125 & 129 Whalley Avenue parcels in New Haven, Connecticut (hereafter collectively referred to as the Site) in support of a proposal to the Environmental Protection Agency (EPA) to provide a grant to facilitate the cleanup and redevelopment of the Site. The ABCA identifies areas of the Site requiring remedial actions and applicable cleanup standards, provides information regarding the degree of impacts, the nature and extent of contaminants of concern and provides an analysis of reasonable alternatives, taking into account such factors as effectiveness, implementability, costs, and sustainability, and identifies the preferred cleanup methods, based on the analyses performed.

1.1 SITE LOCATION

The site consists of two contiguous parcels located at 117-125 Whalley Avenue and 129 Whalley Avenue (herein referred to as "the Site"). The 117-125 and 129 Whalley Avenue parcels are approximately 200 feet northeast of the corner of Whalley Avenue and Sperry Street in an area of mixed residential and commercial development in New Haven, Connecticut. The nearest downgradient surface water body in the vicinity of the Site is the West River, located approximately 1 mile southwest of the Site.

A Site Locus Plan is attached as Figure 1.

The Site consists of two contiguous parcels totaling approximately 0.61 acre and containing two commercial buildings. The parcels and buildings are as follows:

Address	Map/Block/Lot	Parcel Size	Improvements
117-125 Whalley Avenue	295/301/33	0.35 acres	10,534-square foot (gross area) commercial building and asphalt parking
129 Whalley Avenue	295/301/34	0.26 acres	3,900-square foot garage building and asphalt parking

The Site is served by municipal water and sewer services and the buildings are supplied with natural gas. Portions of the 117-125 Whalley Avenue building are heated with fuel oil stored in aboveground storage tanks.

1.2 PREVIOUS SITE USES

117-125 Whalley Avenue was historically developed with multiple residences until 1929 when the residences were demolished, and a building was constructed for use as an automotive service center. From approximately 1929 to 1995, the property was occupied by various automotive service centers including: Goodrich Super Service Inc. Auto Repairs; Smeltzer Safety Service; Whalley Super Service; Superior Auto Top Co; Maloney Motors Autos; Champion Auto Service Repairs; Champion Auto Safety Service Inc.; and Champion Auto Brake. In addition, the property also operated as a gasoline filling station from approximately 1929 through at least 1973. Circa 1995, the property was converted to multi-tenant commercial use and since that time has been occupied by various commercial/retail



occupants including various restaurants. Records indicate that six (6) underground storage tanks (USTs) containing petroleum products were removed from 125 Whalley Avenue prior to 1990.

129 Whalley Avenue was historically occupied by a residence until the early 1930s when it was converted to commercial use. From the early 1930s through approximately 1960, the property was used for offices and as headquarters for a plumbing company, operations unknown. The property was occupied by New Haven Chrysler-Plymouth Inc. Used Car Division, which performed both auto sales and auto repair services, in the early 1970s for an unknown amount of time. The property was then occupied by Acme Auto Body from approximately 1974 through at least 1980. Since the early 1990s, the property has been occupied by Aamity Car and Truck Rental which also performed repairs.

1.3 PREVIOUS SITE ASSESSMENT FINDINGS

Several environmental site assessment investigations (ESAs) have been completed at the Site including the following:

- Phase I Environmental Site Assessment (ESA), GZA, May 2016
- Phase II ESA, GZA, May 2016
- Supplemental Environmental Assessment, GZA, October 2016

Note the May 2016 Phase I and II ESAs included the neighboring 34-36 Sperry Street and 10-12 Dickerman Street properties, which are not included in this ABCA. Investigations of the Site by GZA in 2016 identified the following areas of concern (AOCs):

117-125 Whalley Avenue

- AOC-10 Historical property uses including automotive services
- AOC-11 Historical underground storage tanks (USTs)
- AOC-12 Suspect drain
- AOC-13 Potential fill

129 Whalley Avenue

- AOC-14 Inground hydraulic lifts
- AOC-15 Floor drain
- AOC-16 Oil storage
- AOC-17 Overhead doors
- AOC-18 Potential fill

The 2016 investigations of the Site included the exploration and analysis of soils from 19 soil borings and the sampling and analysis of groundwater from three monitoring wells installed at the Site (See Figure 2). The soil samples (one from each boring) were analyzed for extractable total petroleum hydrocarbons (ETPH). In addition, certain soil samples were also analyzed for volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and the RCRA-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver). See Table 1 in Appendix B. Three groundwater samples were analyzed for VOCs, PAHs, arsenic and lead. See Table 2 in Appendix B.

ETPH was detected in soil samples SB-1 (6-8) (842 mg/kg), SB-3 (6-8) (1,190 mg/kg) and SB-A (9-11) (541 mg/kg) at concentrations above the Residential Direct Exposure Criteria (R-DEC). In addition, arsenic (10.9 mg/kg) and the PAH



compound benzo(a)anthracene (1.04 mg/kg) were detected in soil sample SB-13 (0-2) at concentrations above their respective R-DECs.

The ETPH detected at sample locations SB-1, SB-3 and SB-A appeared to be related to a release from the inground hydraulic lifts (AOC-14) while the constituents in soil at sample location SB-13 appeared to be related to the presence of fill (AOC-13 and AOC-18).

No impacts to groundwater were detected.

January 2018 Hazardous Building Materials Assessment

In January 2018, GZA conducted a hazardous building materials (HBM) assessment for the buildings located at the Site¹. The major conclusions are as follows:

- **Asbestos:** The laboratory confirmed the presence of asbestos containing material (ACM) in roofing materials and pipe insulation at the Site. In the 117-125 Whalley Avenue building: asbestos was found in the roof above Music Haven, Whalley's Fish Restaurant, and in the roof above and basement beneath Papa John's Restaurant. In the 129 Whalley Avenue building: asbestos was confirmed in the main roof at up to 10% chrysotile, primarily found in the insulation block. Supplemental sampling for ACM containing materials was recommended at the 117-125 Whalley Avenue building after Papa John's Restaurant is vacated, allowing full access to the property.
- **Lead Paint:** Twelve paint chip samples were collected for analysis of lead. Lead was identified to be present in nine samples collected from the Site buildings. One sample was reported to contain lead at concentrations above 0.5% by dry weight, the level the USEPA and Connecticut defines a coating as a lead-based paint (LBP).
- **PCBs:** Four samples were collected from interior and exterior portions of the Site buildings. Analysis of those samples did not identify the presence of PCBs above laboratory reportable limits.

1.4 PROJECT GOAL – SITE REUSE PLAN

St Luke's Development Corporation's plans to redevelop the Site for residential use. Conceptually, the existing buildings and other structures on the property will be demolished and a new 5-story 50,000-square foot building would be constructed that would include affordable rental units on the upper floors and commercial space on the lower floor.

The goal of the redevelopment project is to increase affordable housing, homeownership rates, and community wellbeing in the area. The completed redevelopment will include a green space for the residents to enjoy, and the increased pedestrian traffic will benefit not only the new businesses but the established businesses in the area. A conceptual architectural plan for the property is presented in Appendix C.

¹ The 2018 assessment included the neighboring 34-36 Sperry Street and 10-12 Dickerman Street properties, which are not included in this ABCA



2.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

2.1 CLEANUP OVERSIGHT RESPONSIBILITY

The Site is not currently in a regulatory program. However, according to GZA's 2016 Phase I ESA, the 129 Whalley Avenue parcel appears to meet the definition of an "establishment" under the Connecticut Transfer Act because the property was occupied by an auto body shop between approximately 1974 and 1980². Therefore, if a qualifying transfer of the 129 Whalley Avenue parcel occurred, or if the Site were required to enroll in the CTDEEP Voluntary Remediation Program (VRP) as a condition to receive state or federal funding, the RSRs would apply. Under the Transfer Act or VRP programs, remediation of soil and/or groundwater would be overseen by a Connecticut Licensed Environmental Professional (LEP), unless CTDEEP determined otherwise. The hazardous materials abatement of the buildings would be conducted/overseen by a licensed abatement contractor.

2.2 LAWS, REGULATIONS AND STANDARDS APPLICABLE TO CLEANUP

As discussed above, the Site is not currently in a regulatory program; however, the Connecticut Department of Environmental Protection (CTDEEP) Remediation Standard Regulations, Sections 22a-133k-1 through 22a-133k-3, inclusive, of the Regulations of Connecticut State Agencies (RCSA) are the cleanup goals that are evaluated in this ABCA.

Because the Site is located within a GB-classified groundwater area, the RSR criteria that are potentially applicable to soils include the Direct Exposure Criteria (DEC) and the Pollutant Mobility Criteria (PMC), the Surface Water Protection Criteria (SWPC), and the Groundwater Volatilization Criteria (GW-VC). Descriptions of each of the criteria are presented below.

2.2.1 Direct Exposure Criteria (DEC)

In soil, compliance with DEC is evaluated through comparison of mass-based concentrations of contaminant constituents to established numerical criteria. The purpose of the DEC standard is to protect human health from risks associated with direct contact and/or ingestion of soil contaminants.

The DEC is applicable to soil within 15 feet of ground surface. Separate criteria are established for residential (R-DEC) and industrial/commercial (I/C-DEC) areas; however, use of the less stringent industrial/commercial criteria requires the owner of the property to place an environmental land use restriction (ELUR) on the land records that prohibits residential activities. The DEC do not apply to "inaccessible soils", which are defined as soils more than four feet below ground surface, two feet below qualifying pavement (>3-inches thick), or below an existing building, provided an ELUR prohibiting disturbance of the soils has been recorded for the whole parcel or the area of the release. Further, the DEC do not apply to polluted fill beneath qualifying pavement if such fill is polluted only with semi-volatile substances, petroleum hydrocarbons and metals (in concentrations not to exceed two times the applicable DEC) provided an ELUR is placed on the land records to prohibit disturbance of the soils in the subject area. Because redevelopment of the Site for residential use is proposed, the soil investigation results (Appendix B) were compared to the R-DEC.

² Any final opinion or determination as to whether a transaction is subject to the Connecticut Transfer Act is a legal one and advice of counsel should be obtained.



2.2.2 GB Pollutant Mobility Criteria (GB-PMC)

The purpose of the PMC is to protect underlying groundwater from impacts from contaminants leaching from impacted soils. For most constituents, this evaluation can be performed by either: 1) analyzing samples for total mass concentrations and comparing these results directly to PMC criteria presented in the RSRs, or 2) subjecting soil samples to the Synthetic Precipitation Leaching Procedure (SPLP) and analyzing the resulting extract, then comparing the results to the GWPC and/or PMC. The PMC do not apply to soils that are “environmentally isolated” (for example, below a building) provided an appropriate ELUR is in place, or to soil located below the seasonal high groundwater table in an area with a GB groundwater classification, such as the Site. In addition, the PMC do not apply to polluted fill on a parcel if such fill is polluted only with coal ash, wood ash, coal fragments, asphalt paving fragments or any combination thereof, public water is available, fill placement was not prohibited by law at the time and a few other conditions.

Because the Site is located in a Class GB area, the soil data summary table (Appendix B) provides the GB-PMC for comparison purposes.

2.2.3 Groundwater Volatilization Criteria (GWVC)

The purpose of the GWVC is to protect human health from risks associated with off-gassing of volatile compounds from contaminated groundwater and inhalation of those volatile vapors migrating through building slabs. Separate criteria are established for residential (R-GWVC) and industrial/commercial (I/C-GWVC) areas; however, use of the less stringent industrial/commercial standards requires the owner of a property to place an ELUR on the land records prohibiting residential activities. Because redevelopment of the Site for residential use is proposed, the groundwater results (Appendix B) were compared to the R-GWVC. However, as previously noted, no impacts to groundwater were identified.

2.2.4 Surface Water Protection Criteria (SWPC)

The purpose of the SWPC is to determine whether impacted groundwater that discharges to a surface water body might interfere with the attainment of surface water quality standards in that water body. The Site groundwater is inferred to eventually discharge to the West River, located approximately 1 mile southwest of the Site, therefore, groundwater the groundwater results (Appendix B) were compared to the SWPC. However, as previously noted, no impacts to groundwater were identified.

2.2.5 Groundwater Protection Criteria (GWPC)

The purpose of the GWPC is to protect human health from risks associated with consuming contaminated groundwater. The GWPC is a baseline criterion applicable to areas with GA groundwater classification; however, through Section 22a-133k-3(A)(3), the GWPC are also protective of existing untreated drinking water uses of groundwater in GB areas. Because the Site is located in a Class GB groundwater area and groundwater is not believed to be used for drinking purposes (or any other purposes), the GWPC is not applicable to the Site. Further, as previously noted, no impacts to groundwater were identified.



3.0 EVALUATION OF CLEANUP ALTERNATIVES

3.1 RELEASE AREAS REQUIRING REMEDIATION

Based on an evaluation of the data, GZA identified two release areas that require remediation of soil to achieve compliance with the RSRs as described below. The remedial areas are shown on Figure 2.

3.1.1 AOC-14 Inground Hydraulic Lifts

Three inground hydraulic lifts are located beneath the 129 Whalley Avenue building. At the time of GZA's 2016 investigations, the lifts were reportedly out-of-service. Sampling and analysis of soils at 14 soil borings in the area of the inground hydraulic lifts was completed in May and August 2016 and results confirmed ETPH in soil samples SB-1 (6-8') (842 mg/kg), SB-3 (6-8) (1,190 mg/kg) and SB-A (9-11) (541 mg/kg) at concentrations above the R-DEC (500 mg/kg) but below the GB-PMC (2,500 mg/kg).

3.1.2 AOCs-13 and 18 Fill

Previous investigations identified fill material consisting of sand with brick and asphalt at shallow depths beneath certain areas of the Site. The concentrations of arsenic (10.9 mg/kg) and the PAH benzo(a)anthracene (1.04 mg/kg) were detected in sample SB-13 (0-2) at concentrations above the R-DEC. Based on the RSR exemption for polluted fill discussed above in Section 2.4.2, compliance with the GB-PMC is not required. because the impacts are located in an area where a paved parking is proposed to be constructed during Site redevelopment, however R-DEC compliance must also be achieved.

3.2 CLEANUP ALTERNATIVES CONSIDERED

This section identifies various reasonable remediation alternatives that were considered in response to the environmental contamination issues identified at the Site. The following potential remedial alternatives were considered:

No Action. The "No Action" alternative is the option of not conducting any cleanup at the Site.

Excavation and Off-site Disposal. Excavation can be done using an excavator for impacted fill and soils. The waste material would be brought to a state permitted treatment/recycling facility or a solid or hazardous waste disposal facility.

Environmental Land Use Restriction (ELUR). The CTDEEP allows for polluted soils to remain in place provided they meet the definition of inaccessible soil and/or environmentally isolated soil and an ELUR has been recorded on the land records prohibiting disturbance of the soil and/or infiltration of water through the soil. Based on the proposed Site redevelopment, polluted soil within the footprint of the building to be constructed could be rendered inaccessible (and environmentally isolated, if such soils are identified) provided the ELUR prohibits the demolition of the building and floor slab and (if required) infiltration of precipitation into the soils. In other areas at the Site, soils could be rendered inaccessible under pavement (at least 3 inches thick) for fill polluted only with semi-volatile substances, petroleum hydrocarbons and metals (in concentrations not to exceed two times the applicable DEC), under pavement and two feet of clean soil or under at least four feet of clean soil, provided the ELUR prohibited the removal of the pavement and/or disturbance of the polluted soils. In the latter two cases, polluted soils at depths of less than two feet (if pavement is planned) or less than 4 feet (in areas planned for landscaping) would require excavation and off-site disposal as described above.



Often, a combination of soil excavation and application of ELURs is used to meet the goals of Site redevelopment.

Abatement of hazardous building materials and removal of inground hydraulic lifts prior to building demolition is included in the cleanup activities and would be completed according to State regulation and standard industry practices.

A summary of the cleanup alternatives for the remedial areas at the Site is provided in the table below:

Table 1- Summary of Remedial Alternatives Considered

Remedial Area	Soil Contaminants	Remedial Alternatives
AOC 14 - In ground hydraulic lifts at 129 Whalley Ave	ETPH >R-DEC	<ul style="list-style-type: none"> • No action • Excavation and Off-site Disposal • No excavation; "cap" polluted soils with building and more than four feet below ground (exterior) and use an ELUR (Area A see Figure 2) • Combination of excavation and ELUR
AOC 13 and 18 Potential Fill	PAHs, Arsenic >R-DEC	<ul style="list-style-type: none"> • No action • Excavation and Off-site Disposal • No excavation; relocate and "cap" polluted soils with building or clean soils pavement and use an ELUR (Area A and/or B see Figure 2) • Combination of excavation and ELUR
HBM: Ceilings of 117-125 and 129 Whalley Ave, and basement of 125 Whalley Ave	Asbestos	<ul style="list-style-type: none"> • No action • Removal of HBM
HBM: Interior walls of 117-125 and 129 Whalley Ave	Lead Paint	<ul style="list-style-type: none"> • No Action • Removal of Lead-based Paint • Demolish Building and conduct TCLP sampling to determine compliance

3.3 EVALUATION OF CLEANUP ALTERNATIVES AND COST ESTIMATES

3.3.1 Effectiveness

Alternative #1 - No Action: The "No Action" alternative is not an effective means of preventing exposure to human health or the environmental from the contamination at the Site.



Alternative #2 - Excavation and Off-site Disposal of Polluted Soils and Removal of Hazardous Building Materials: The removal of polluted soils and hazardous building materials is an effective way to permanently eliminate the source of and prevent exposure to the contamination. Abatement of HBM is necessary prior to the planned demolition of the existing Site buildings. Impacted soil source removal includes the excavation, loading, transportation and off-site disposal of contaminated soils. This alternative is proven, provides close to 100 percent certainty in its effectiveness, and allows for unrestricted use of the property, provided all impacted soil can be removed.

Alternative #3 – Leave Polluted Soils in Place Beneath Caps and Record an ELUR: Rendering polluted soil inaccessible using the proposed building and/or pavement is an effective way to prevent exposures through direct contact with the contaminated soil by creating a physical boundary through construction of an overlying building, qualifying paved surface or placement of clean soils of sufficient thickness. In addition, the planned constructed building will prevent infiltration of precipitation from contacting and leaching contaminants from underlying impacted materials (if any are identified above GB-PMC) and degrading Site groundwater quality. The overlying soils and structures would be preserved and maintained through the application of an ELUR on the Site land records to prohibit demolition of the building and/or pavement and disturbance of the underlying polluted soils.

Alternative #4 – Combination of Excavation and Use of an ELUR: A combination of soil excavation and application of ELURs can be an effective means of preventing exposure to human health or the environmental from the contamination at the Site and be a cost effective method to meet the goals of Site redevelopment.

3.3.2 Implementability

Alternative #1 - No Action: The “No Action” alternative requires no implementation.

Alternative #2 - Excavation and Off-site Disposal of Polluted Soils: This method will require removal, handling, disposal characterization, and transportation of contaminated soil and hazardous building materials to one or more facilities for disposal depending on the nature of the waste material. Abatement of HBM is necessary prior to the planned demolition of the existing Site buildings. Under this Alternative, the ETPH-impacted soils would be excavated and temporarily stockpiled onsite for waste characterization analysis and post-remediation confirmation soil samples would be obtained from the walls and floors of the excavated area and submitted for laboratory analysis to confirm remedial action goals have been achieved. Fill excavated during construction activities would be segregated, stockpiled and sampled for waste characteristics. Dependent on the analytical results, the stockpiled soils would be either be removed and transported to a permitted soil treatment/recycling facility or permitted landfill facility or reused on-site. Remaining excavated areas would be backfilled using clean borrow pit or quarried soils free of contaminants. It is anticipated that placement of clean backfill may be necessary in areas of soil removal. This is a relatively easy method to implement as no specialized equipment is required, and many qualified contractors are available to do the work.

Alternative #3 – Leave Polluted Soils in Place Beneath Caps and Record an ELUR: This alternative is relatively easy to implement and incorporate into the Site redevelopment plan. The implementation of an ELUR will require an A-2 survey demarcating the limits of the ELUR subject areas, analysis of a title search to identify interests in the land and potentially obtaining subordination agreements for those interests if necessary, the preparation and submittal of an ELUR application to the CTDEEP, and recording of the ELUR once approved on the land records. The ELUR would prohibit the demolition of the building, qualifying paved surfaces, removal of overlying clean soils and the disturbance of the underlying environmentally impacted soils and require an operations and maintenance plan specifying how the “caps” are maintained.



Alternative #4 – Combination of Excavation and Use of an ELUR: A combination of soil excavation, abatement of HBM materials, demolition of the existing Site buildings and application of ELURs can be a relatively easy method to implement for the reasons described above.

3.3.3 Preliminary Cost Estimates

These estimated costs are based on our professional judgment and experience with similar work undertaken in previous projects. The costs presented are approximate cost opinions and are provided for the purpose of evaluating alternative remedial programs. These estimates involve approximate quantity evaluations and quantities and unit costs may vary based on actual conditions encountered, future variations in market pricing, and other factors.

The preliminary opinion of cost includes only those cost items identified and should not be assumed to include other costs such as legal, administrative, permitting or others. The preliminary opinion of cost also does not include any costs with respect to third-party claims, fines, penalties, or other charges which may be assessed against any responsible party because of either the existence of present conditions or the future existence or discovery of any such conditions.

Alternative #1 - No Action: The “No Action” alternative will not have any cost implications.

Alternative #2 - Excavation and Off-site Disposal of Polluted Soils: The excavation of ETPH-impacted soils at AOC 14 would occur after the 129 Whalley Avenue building had been demolished and demolition materials removed and the in-ground hydraulic lifts have been drained of fluids and removed. Under this Alternative, the ETPH-impacted soils at AOC-14 and arsenic/PAH-impacted fill materials at AOC-13 would be excavated and temporarily stockpiled onsite for waste characterization analysis. In addition, all shallow fill excavated during Site redevelopment activities would be excavated, segregated, and stockpiled. Post-remediation confirmation soil samples would be obtained from the walls and floors of the excavated area and submitted for laboratory analysis to confirm remedial action goals have been achieved. Based on the results of waste characterization analyses, the stockpiled soils would either be reused on-Site or be removed and transported to a permitted soil treatment/recycling facility or permitted landfill facility and the excavated area would be backfilled using clean borrow pit or quarried soils free of contaminants. The proposed remedial area is shown in Figure 2. The associated cost of implementation of Alternative #2 is provided below.

Alternative #2 Excavation and Off-Site Disposal of Polluted Soils	Estimated Costs
Tasks	
Pre-Remedial Testing	\$12,000
Remedial Planning	\$5,000
Contractor Bidding/Selection/Contract Execution /Mobilization Activities	\$5,000
Soil Management Plan/Permitting	\$8,000
Field Oversight/Post-Remedial Sampling	\$25,000
Removal of In-Ground Hydraulic Lifts	\$20,000
AOC-14 Contracted Services-Soil Excavation/Disposal/Transportation/Laboratory Analysis (335 cubic yards/500 tons)	\$70,000 to \$100,000
AOCs-13/18 Contracted Services Soil Excavation/Placement/Regrading (1,500 to 2,000 tons)	\$82,500 to \$110,000
Soil Management Plan/Permitting	\$8,000



Alternative #2 Excavation and Off-Site Disposal of Polluted Soils	Estimated Costs
Tasks	
AOC-14 Clean Soil Backfill (500 tons)	\$18,000
HBM Abatement Costs	\$50,000 to \$60,000
Receptor Survey	\$2,500
Remedial Action Report	\$10,000
Verification Report	\$15,000*
Total Remediation Activities – Estimated Cost	\$331,000 to \$398,500

* Assumes based on current data that groundwater monitoring is not required for RSR compliance.

Alternative #3 - Rendering All Site Impacted Soil Inaccessible: Under this Alternative, all impacted soils and Site fill materials would be excavated, temporarily managed in stockpiles and tested for environmental constituents of concern (COCs) and dependent on test results would be moved, regraded and capped either below the proposed building (ELUR Subject Area A) or the paved parking areas and two feet of clean soils (ELUR Subject Area B), and rendered inaccessible through the application of an ELUR on those areas of the Site. Proposed ELUR remedial areas are shown in Figure 2. In addition, HBM from the planned demolition of the existing Site buildings would be removed and transported offsite to an appropriate permitted disposal facility. The associated cost of implementation of Alternative #3 is provided below.

Alternative #3 - Rendering All Site Impacted Soil Inaccessible or Environmentally Isolated	Estimated Costs
Tasks	
Pre-Remedial Testing	\$12,000
Remedial Planning	\$5,000
Contractor Bidding/Selection/Contract Execution /Mobilization Activities	\$5,000
Soil Management Plan/Permitting	\$8,000
Field Oversight/Characterization	\$25,000
AOCs-13/14/18 Contracted Services-Soil Excavation/Placement/Re-grading (1,500 to 2,000 tons)	\$82,500 to \$110,000
HBM Abatement Costs	\$50,000 to \$60,000
Removal of In-Ground Hydraulic Lifts	\$20,000
Preparation and Application of ELUR of Property Land Records	\$35,000
Receptor Survey	\$2,500
Remedial Action Report	\$10,000
Verification Report	\$15,000*



Total Remediation Activities – Estimated Cost	\$270,000 to \$307,500
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* Assumes based on current data that groundwater monitoring is not required for RSR compliance.

Alternative #4 – Combination of Excavation and Use of an ELUR: Under this Alternative, ETPH-impacted soils at AOC-14 would be excavated and transported to a permitted soil recycling facility or disposed at a permitted landfill. Impacted Site fill would be capped either below the proposed building (ELUR Subject Area A) or paved parking areas (ELUR Subject Area B), dependent on the nature and concentrations of COCs in the soils, and rendered inaccessible through the application of an ELUR on those areas of the Site. Proposed soil excavation and ELUR remedial areas are shown in Figure 2. The associated cost of implementation of Alternative #4 is provided below.

Alternative #4 Combination of Excavation and Use of an ELUR	Estimated Costs
Tasks	
Pre-Remedial Testing	\$12,000
Remedial Planning	\$5,000
Contractor Bidding/Selection/Contract Execution /Mobilization Activities	\$5,000
Soil Management Plan/Permitting	\$8,000
Field Oversight/Post-Remedial Sampling	\$25,000
Removal of In-ground Hydraulic Lifts	\$20,000
AOC-14 Contracted Services-Soil Excavation/Disposal/Transportation/Laboratory Analysis (500 tons)	\$70,000 to \$100,000
AOC-14 Clean Soil Backfill (500 tons)	\$18,000
AOCs-13 and 18 Contracted Services Excavation/Placement/Reg-grading Site Fill Materials (1,500 to 2,000 tons)	\$82,500 to \$110,000
HBM Abatement Costs	\$50,000 to \$60,000
Removal of In-Ground Hydraulic Lifts	\$20,000
Preparation and Application of ELUR of Property Land Records	\$35,000
Receptor Survey	\$2,500
Remedial Action Report	\$10,000
Verification Report	\$15,000*
Total Remediation Activities – Estimated Cost	\$378,000 to \$445,500

* Assumes based on current data that groundwater monitoring is not required for RSR compliance.

This cost range assumes up to of 500 tons of accessible impacted soils removed and the excavation, relocation and placement of up to 2,000 tons of impacted fill material to designated ELUR subject areas at the Site. The soil disposal costs were estimated at non-hazardous disposal. Actual costs would be based upon remediation contractor bids to be



obtained prior to implementation. The alternative costs do not include regulatory reporting requirements, programmatic and general project management, field contingencies and other applicable fees.

3.3.4 Recommended Cleanup Alternative

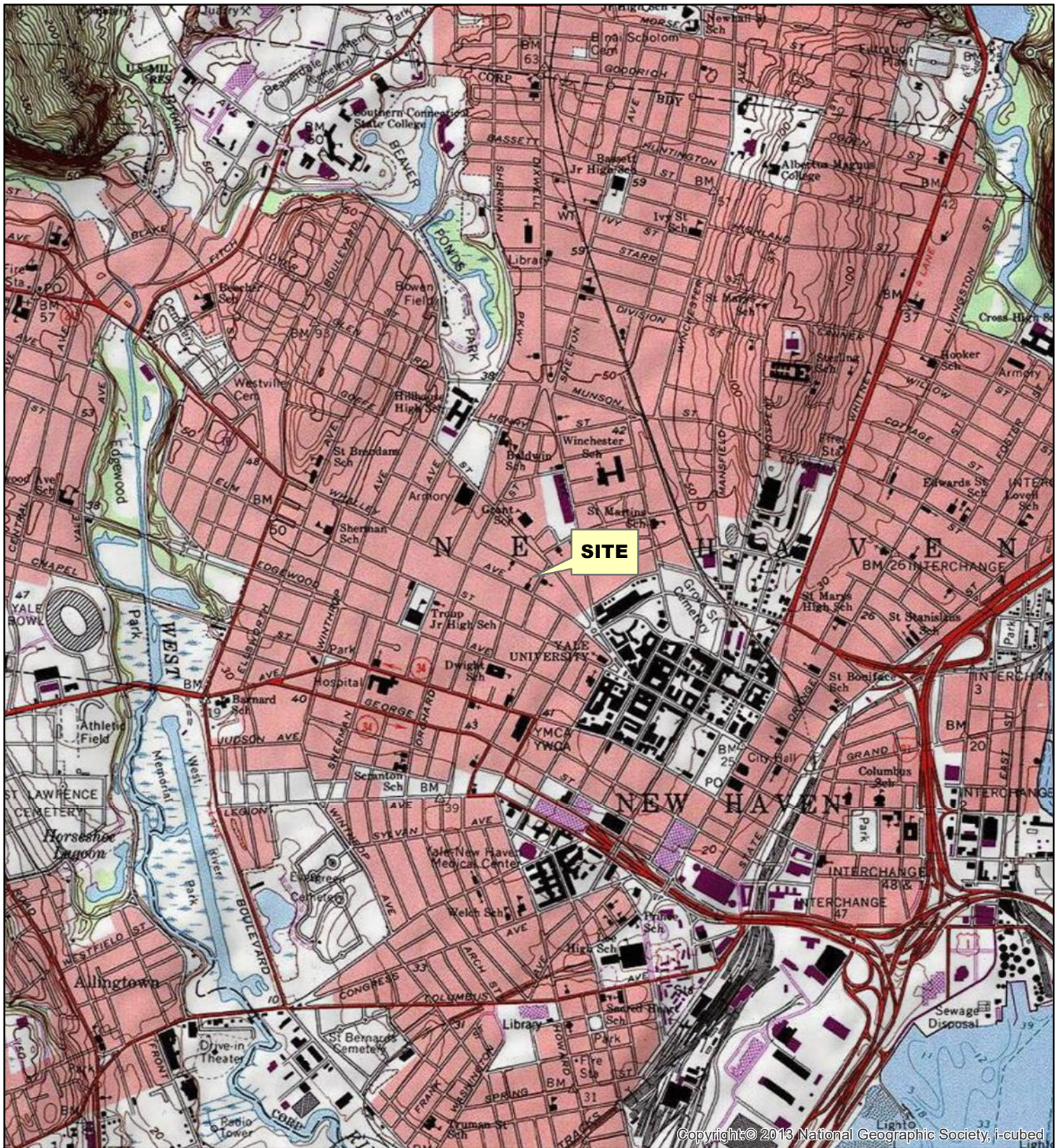
The recommended cleanup alternative is Alternative #4 Combination of Excavation and Use of an ELUR. Alternative #1: No Action cannot be recommended since it does not address risks posed by impacted soils identified at the Site. Alternative #2 is an effective method to mitigate potential exposures from polluted soil but the additional costs are not commensurate with the benefit to human health and the environmental that would be achieved compared to Alternatives 3 and 4. Alternative #3 could potentially be a less expensive option than Alternative #2, but the excavation and offsite transport and disposal of the most highly impacted soils from AOC-14 under Alternative #2 would be more effective in the mitigation of the potential risks posed by those soils and so would provide a greater level of protection to future site occupants and allow for a higher capitalization of the property, so for this reason, Alternative #4 is the recommended alternative.

DRAFT



Draft

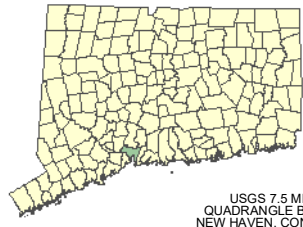
FIGURES



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GZA GeoEnvironmental, Inc.
 Engineers and Scientists
 www.gza.com



USGS 7.5 MINUTE
 QUADRANGLE BASE MAP
 NEW HAVEN, CONNECTICUT
 1997

SITE LOCUS

34-36 SPERRY STREET AND 10-12 DICKERMAN STREET
 NEW HAVEN, CONNECTICUT

Source: TOPO! maps are USGS topographic maps, Copyright: © 2011 National Geographic Society, i-cubed and are provided by arcgisonline.com.

PROJ MGR: ATH	REVIEWED BY: ATH	PROJECT NO. 05.0045791.00
DESIGNED BY: ATH	DRAWN BY: MJS	DATE: 05-16-16

THIS MAP HAS BEEN COMPILED FROM OTHER MAPS AND/OR SOURCES OF INFORMATION.
 THIS MAP SHOULD NOT BE CONSTRUED AS A MAPS SURVEY, NOR USED FOR CONSTRUCTION PURPOSES.



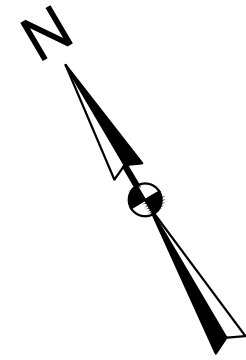
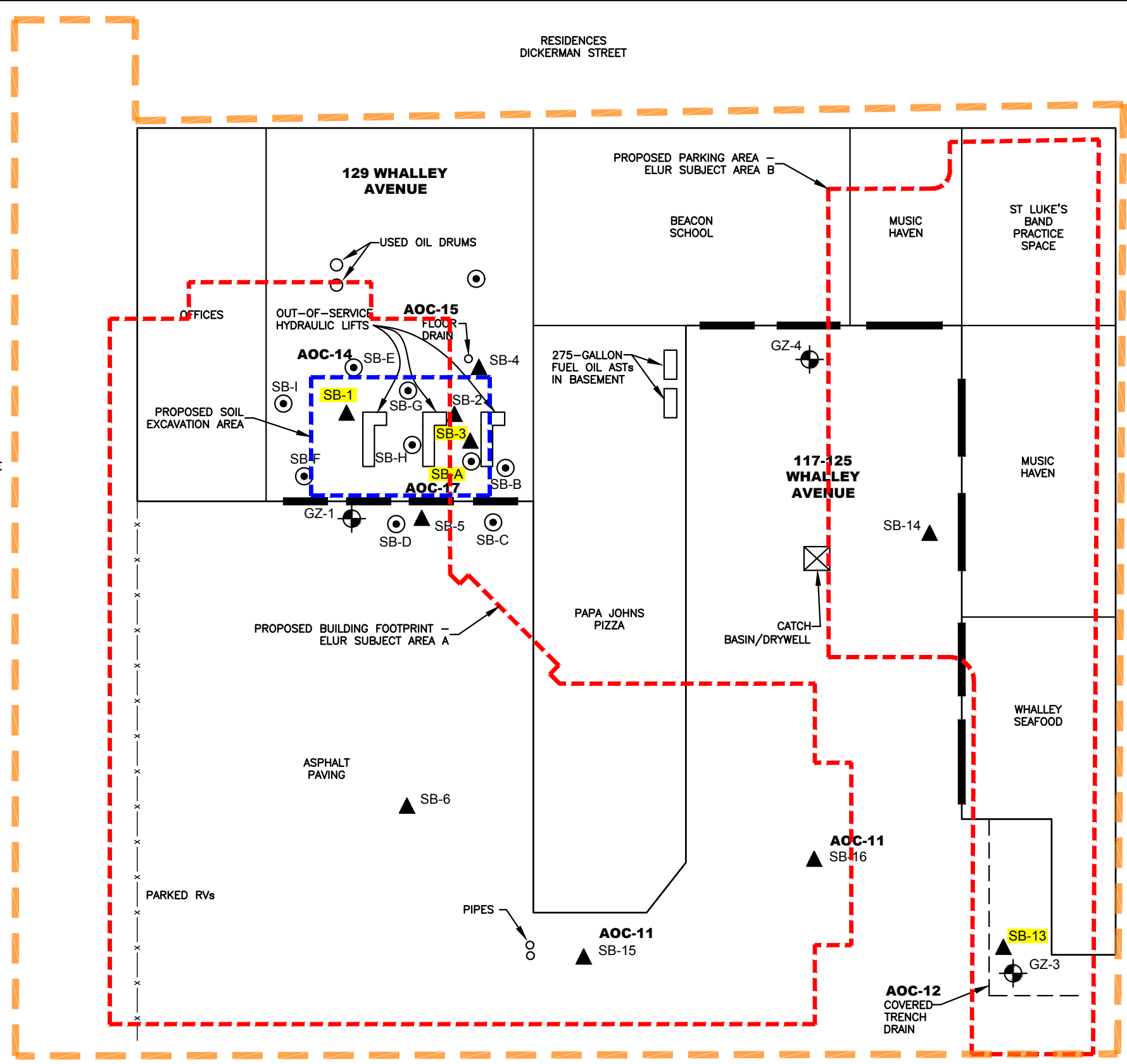
Scale in Feet



FIGURE

1

© 2016 - GZA GeoEnvironmental, Inc. GZA-U:\45,500-45,999\45791.h91 City of New Haven\CAD\Figures\F2 SITE LO.dwg [2] October 06, 2020 - 1:47pm michael.tumolo



LEGEND

- SITE BOUNDARY
- OVERHEAD DOOR
- CHAINLINK FENCE
- GZA MONITORING WELL
- GZA SOIL BORING (MAY 2016)
- GZA SOIL BORING (AUGUST 2016)
- SB-# LOCATIONS WHERE COC CONCENTRATIONS EXCEED RSR CRITERIA

117-125 Whalley Avenue	
AOC #	Description
10	Historical property uses including automotive services
11	Historical USTs
12	Suspect drain
13	Potential Fill

AOCs 10 and 13 apply to the entire parcel and are not depicted

129 Whalley Avenue	
AOC #	Description
14	Inground hydraulic lifts
15	Floor drain
16	Historical and current use for auto repair/auto body
17	Overhead doors
18	Potential Fill

AOCs 16 and 18 apply to the entire parcel and are not depicted

- NOTES:**
1. THE BASE MAP WAS DEVELOPED FROM A GZA FIELD SKETCH AND THE SCALE IS APPROXIMATE.
 2. THE LOCATION OF THE SELECTED SITE FEATURES AND SAMPLE LOCATIONS WERE APPROXIMATELY DETERMINED BY BOTH LINE OF SIGHT AND TAPE MEASUREMENTS FROM EXISTING TOPOGRAPHIC SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

NO.	ISSUE/DESCRIPTION	BY	DATE

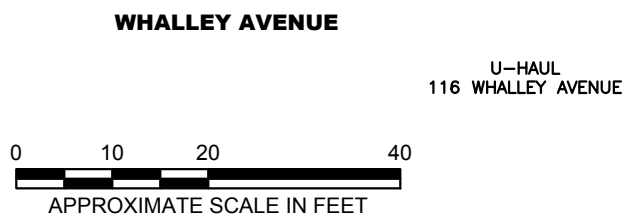
UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

SITE LAYOUT AND PROPOSED REMEDIATION AREAS

**117-125 AND 129 WHALLEY AVENUE
NEW HAVEN, CONNECTICUT**

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: CITY OF NEW HAVEN
PROJ MGR: ATH DESIGNED BY: MSNW DATE: 10-5-2020	REVIEWED BY: ATH DRAWN BY: MJS PROJECT NO. 05.0045791.17
CHECKED BY: SCALE: 1"=20' REVISION NO.	FIGURE 2 SHEET NO.

STOP & SHOP
PLAZA
150 WHALLEY
AVENUE





**APPENDIX A
LIMITATIONS**

Draft



USE OF REPORT

1. GeoEnvironmental, Inc. (GZA) prepared this Report on behalf of, and for the exclusive use of our Client at the stated time for the stated purpose(s) and location(s) identified in the Report. Use of this Report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work.
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services at the same time, under similar conditions, and at the same or a similar property. No warranty, expressed or implied, is made.

BASIS OF OPINION OF COST

4. GZA's opinion of cost is based on limited data which may not be sufficient to identify each and every condition existing at the site which may constitute noncompliance with applicable governmental statutes, rules, and regulations or constitute a release of oil or hazardous materials and/or may require remediation.
5. The costs on which the preliminary opinion of cost is based are limited to those conditions which were described in the Report.
6. Observations described in the Report were made under the conditions stated therein. Where access to portions of a structure or site was unavailable or limited, GZA renders no opinion as to the condition of those portions of the site or structure.
7. The conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by the Client.

COST ASSUMPTIONS

8. While the preliminary opinion of cost represents our professional judgment in this matter, actual conditions encountered during remediation may result in higher or lower costs.
9. The preliminary opinion of cost includes only those cost items identified, and should not be assumed to include other costs such as legal, administrative, permitting or others. The preliminary opinion of cost also does not include any costs with respect to third-party claims, fines, penalties, or other charges which may be assessed against any responsible party because of either the existence of present conditions or the future existence or discovery of any such conditions.
10. The Report contains approximate cost opinions for purposes of evaluating alternative remedial programs. These estimates involve approximate quantity evaluations. Actual quantities and unit costs may vary. A preliminary cost opinion of this nature is likely to vary substantially from Contractors' Bid Prices and is not to be considered the equivalent of nor as reliable as Contractors' Bid Prices. Prices for similar work undertaken in the future will be subject to variations



in market pricing, which are not within GZA's control. Detailed quantity and cost estimating should be performed by professional, experienced cost estimators to determine actual cost.

RELIANCE ON INFORMATION PROVIDED BY OTHERS

11. In preparing the Report, GZA may have relied on certain information provided by the Client, state and local officials, and other parties referenced therein available to GZA at the time of the evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

CODES AND REGULATIONS

12. GZA used reasonable care in identifying and interpreting codes and regulations which are relevant to the costs estimated. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

13. Governmental agencies' interpretations, requirements, and enforcement policies vary from region to region, district office to district office, from state to state, and between federal and state agencies. In addition, statutes, rules, standards, and regulations may be legislatively changed and inter-agency and intra-agency policies may be changed from present practices. GZA has used its experience and judgment in making assumptions as to how anticipated changes in regulatory policies may affect remediation costs.

ADDITIONAL SERVICES

14. It is recommended that GZA be retained to provide engineering services during any final design, construction and/or implementation of any remedial measures recommended in this report. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



APPENDIX B
2016 DATA SUMMARY TABLES

Draft

Table 1
Summary of Soil Analytical Results 2016
GZA Job #: 45791.01

Sample Location (feet below grade)	CT RSRs		SB-1 (6-8)	SB-2 (6-8)	SB-3 (6-8)	SB-4 (1-2)	SB-5 (0-2)	SB-6 (1-3)	SB-13 (0-2)	SB-14 (0-2)	SB-15 (8-10)	SB-16 (8-10)	SB-A (9-11)	SB-B (6-8)	SB-C (6-8)	SB-D (6-8)	SB-E (6-8)	SB-F (6-8)	SB-G (6-8)	SB-H (6-8)	SB-I (6-8)
	R-DEC	GB-PMC																			
Sample Date			5/4/2016	5/4/2016	5/4/2016	5/4/2016	5/4/2016	5/4/2016	5/5/2016	5/5/2016	5/5/2016	5/5/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016	8/26/2016
Metals (mg/kg)																					
Arsenic	10	NA	NT	NT	NT	6.58	11.1	2.78	10.9	9.47	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Barium	4700	NA	NT	NT	NT	35.3	71.4	55.8	32.3	38	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Cadmium	34	NA	NT	NT	NT	ND<0.45	0.52	ND<0.52	ND<0.43	ND<0.51	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chromium	100	NA	NT	NT	NT	8.39	13.1	6.92	8.06	11.9	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Lead	400	NA	NT	NT	NT	55.5	366	317	95.7	24.1	ND<4.93	154	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mercury	20	NA	NT	NT	NT	0.149	0.392	0.112	0.337	0.232	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
SPLP Metals (mg/L)																					
Arsenic	NA	0.50	NT	NT	NT	NT	ND<0.025	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Lead	NA	0.15	NT	NT	NT	NT	0.093	NT	NT	NT	NT	<0.010	NT	NT	NT	NT	NT	NT	NT	NT	NT
PCBs 8082 (mg/kg)																					
Aroclor-1254	1	0.005	0.157	ND<0.0521	ND<0.0533	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND<0.0525	ND<0.0531	NT	NT	NT
VOCs 8260 (mg/kg)																					
1,2,4-Trimethylbenzene	500*	28	NT	NT	NT	ND<0.0057	NT	NT	ND<0.0062	NT	ND<0.0045	ND<0.0046	NT	NT	NT	NT	ND<0.0022	ND<0.0058	NT	NT	NT
Naphthalene	1000	56	NT	NT	NT	ND<0.0057	NT	NT	ND<0.0062	NT	ND<0.0045	ND<0.0046	NT	NT	NT	NT	ND<0.0022	ND<0.0058	NT	NT	NT
SVOCs 8270 (mg/kg)																					
Anthracene	1000	400	NT	NT	NT	NT	ND<0.352	NT	0.48	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Benzo(a)anthracene	1	1	NT	NT	NT	NT	0.435	NT	1.04	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Benzo(a)pyrene	1	1	NT	NT	NT	NT	0.51	NT	0.806	ND<0.176	NT	NT	NT	NT	NT	NT	ND<0.162	ND<0.179	NT	NT	NT
Benzo(b)fluoranthene	1	1	NT	NT	NT	NT	0.64	NT	0.871	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Benzo(g,h,i)perylene	8.4*	1*	NT	NT	NT	NT	0.435	NT	0.543	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Benzo(k)fluoranthene	8.4	1	NT	NT	NT	NT	ND<0.352	NT	0.449	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Chrysene	84*	1*	NT	NT	NT	NT	0.533	NT	1.03	ND<0.176	NT	NT	NT	NT	NT	NT	ND<0.162	ND<0.179	NT	NT	NT
Dibenzo(a,h)anthracene	1*	1*	NT	NT	NT	NT	ND<0.177	NT	0.233	ND<0.176	NT	NT	NT	NT	NT	NT	ND<0.162	ND<0.179	NT	NT	NT
Fluoranthene	1000	56	NT	NT	NT	NT	0.928	NT	2.42	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Indeno(1,2,3-cd)pyrene	1*	1*	NT	NT	NT	NT	0.363	NT	0.509	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Phenanthrene	1000	40	NT	NT	NT	NT	ND<0.352	NT	1.9	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
Pyrene	1000	40	NT	NT	NT	NT	0.766	NT	1.62	ND<0.35	NT	NT	NT	NT	NT	NT	ND<0.324	ND<0.356	NT	NT	NT
SPLP SVOCs (µg/L)																					
Phenanthrene	NA	40.00	NT	NT	NT	NT	NT	NT	0.09	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
CTDEP ETPH (mg/kg)																					
ETPH	500*	2500*	842	28.8	1,190	ND<21.8	28.4	48.3	115	ND<23	ND<21.2	ND<19.8	541	ND<19.7	72.4	165	ND<21	ND<20	ND<21.4	ND<21.6	36.4

Notes:

NT = indicates Not Tested

ND = indicates Non Detected above the laboratory reporting limit.

NA = Not Applicable

Bold = indicates one or more of the reference standards exceeded

1. All samples collected by GZA and analyzed by ESS Laboratories, Cranston, RI

2. Only detected constituents are shown.

3. RSRs = Connecticut Remediation Standard Regulations (2013)

4. R-DEC = Residential Direct Exposure Criteria

5. I/C-DEC = Industrial/Commercial Direct Exposure Criteria

6. GB-PMC = Class GB Pollutant Mobility Criteria

* = 2015 Recommended Criteria Values for Common Additional Polluting Substances; site specific CTDEEP approval is required

Table 2
Summary of Groundwater Analytical Results
GZA Job #: 45791.00

Sample ID	CT RSRs			DUP	GZ-1	GZ-3	GZ-4
Sample Date	SWPC	R-GWVC	I/C-GWVC	5/13/2016	5/13/2016	5/13/2016	5/13/2016
Metals (ug/L)							
Lead	13	NE	NE	ND< 10.0	ND< 10.0	ND< 10.0	ND< 10.0
Arsenic	4	NE	NE	ND< 2.5	ND< 2.5	ND< 2.5	ND< 2.5
VOCs 8260B (ug/L)							
VOCs	Varies			ND< 1.0	ND< 1.0	ND< 1.0	ND< 1.0
SVOCs 8270 (ug/L)							
SVOCs	Varies			ND< 0.19	ND< 0.19	ND< 0.19	ND< 0.19

Notes:

ND = indicates Non Detected above the laboratory reporting limit.

NE = indicates standard Not Established

1. All samples collected by GZA and analyzed by ESS Laboratories, Cranston, RI
2. RSRs = Connecticut Remediation Standard Regulations (2013)
3. SWPC = Surface Water Protection Criteria
4. R-GWVC = Residential Groundwater Volatilization Criteria
5. I/C-GWVC = Industrial/Commercial Groundwater Volatilization Criteria



APPENDIX C
ARCHITECT'S CONCEPTUAL PLAN

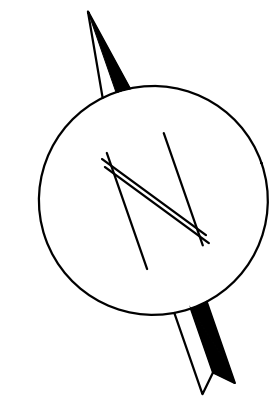
Draft

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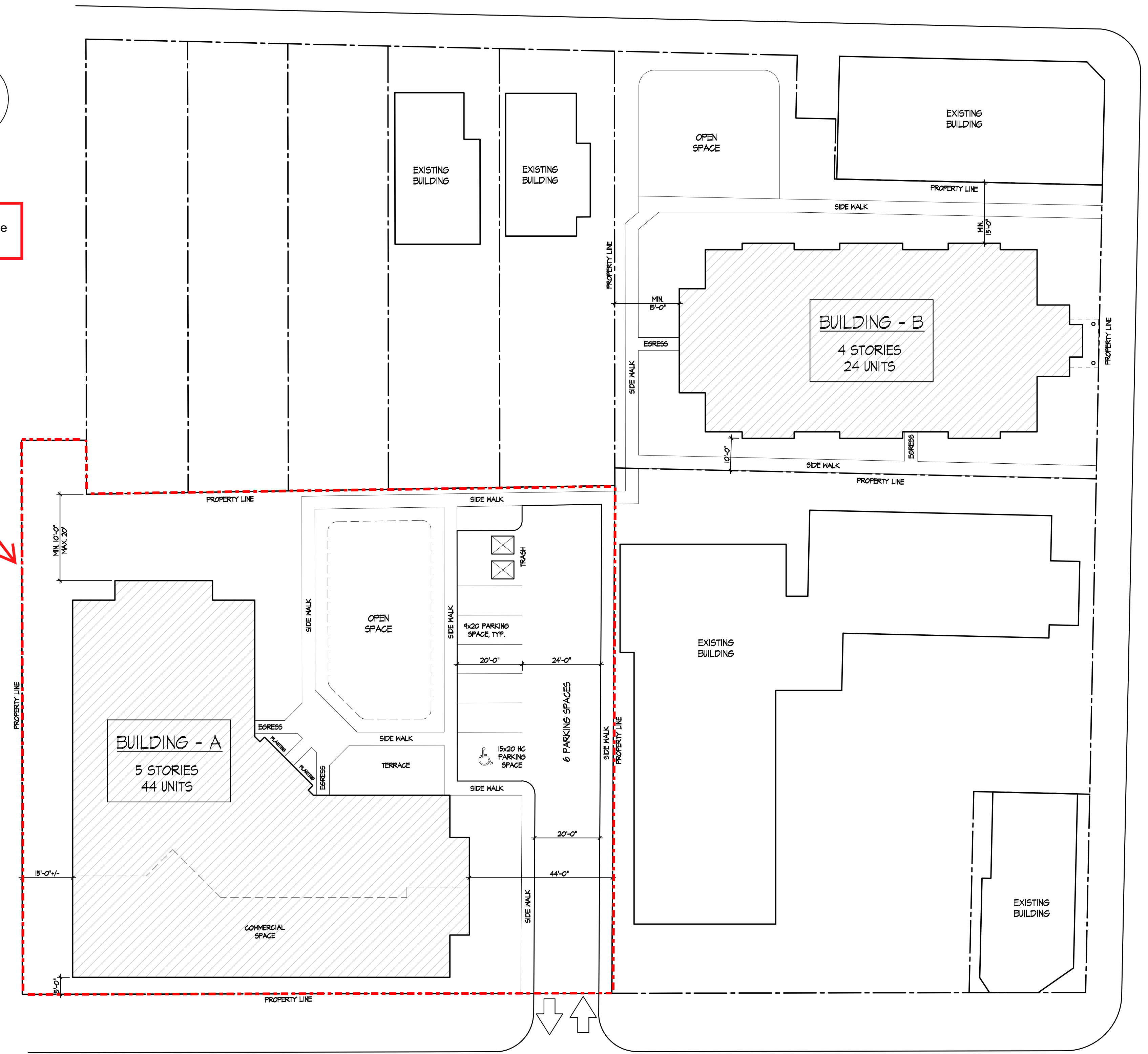
DICKERMAN STREET

SPERRY STREET

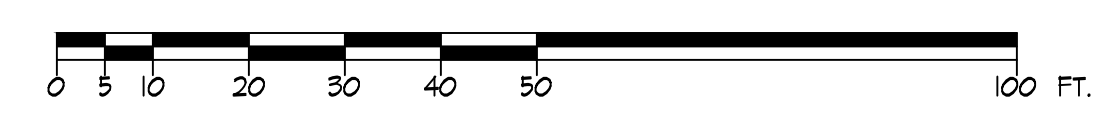
WHITNEY AVENUE



PROPERTY BOUNDARY
117-125 & 129 Whalley Ave



PROPOSED ARCHITECTURAL SITE PLAN
SPL.0 1"=20'-0"



PROJECT:
**ST. LUKES
AFFORDABLE HOUSING
DEVELOPMENT**
117 WHALLEY AVENUE
NEW HAVEN, CT

ISSUE	DATE	DESCRIPTION

PHASE:
SCHEMATIC DESIGN

**PAUL B. BAILEY
ARCHITECT**
110 AUDUBON STREET
NEW HAVEN, CONNECTICUT 06510
203 · 776 · 8888 F 203 · 772 · 1365

DATE: 1-30-2020 DRAWN BY: RGS
SCALE: AS NOTED CHECKED BY: PB
JOB NO: 20-047

DRAWING NAME:
**PROPOSED ARCHITECTURAL
SITE PLAN**

SP1.0



GZA GeoEnvironmental, Inc.