REVISED REMEDIAL ACTION PLAN
FORMER AMERBELLE PROPERTY
104 EAST MAIN STREET
VERNON, CONNECTICUT
REM ID #6194

PREPARED FOR:
Town of Vernon
14 Park Place
Vernon, Connecticut 06066

PREPARED BY:
GZA GeoEnvironmental, Inc.
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November 2015
File No. 45441.00

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November 3, 2015
GZA File 05.0045441.00

Town of Vernon
14 Park Place
Vernon, Connecticut 06066

Attention: Mr. John Ward

Re: Final Remedial Action Plan
Former Amerbelle Property
104 East Main Street, Vernon, Connecticut
REM ID #6194

Dear Mr. Ward:

GZA GeoEnvironmental, Inc. (GZA) has prepared the attached Final Remedial Action Plan (RAP) for the Former Amerbelle Property located at 104 East Main Street in Vernon, Connecticut (Site). The Site is an establishment and a Form III for the property has been filed under the Connecticut Transfer Act (Transfer Act). Per the Transfer Act, the development of this RAP is required prior to remediation of the Site. The RAP provides recommended remediation activities proposed for areas of environmental concern where contaminants in soil and/or groundwater exceed residential and commercial Remediation Standard Regulation criteria. Per the Transfer Act and prior to the finalization of this RAP, notification of remedial activities was made, followed by a 45-day public comment period, which closed on October 18, 2015. No public comments were received. This report is subject to the Limitations in Appendix A.

We appreciate the opportunity to partner with you to address soil and groundwater issues at this important property where redevelopment is planned. Should you have any questions or require additional information on the proposed remedial measures, please contact the undersigned, at your convenience.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

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Glossary of Frequently-used Abbreviations

ALC	Aquatic Life Criteria
AOC	Area of Concern
AST	Aboveground Storage Tank
ATV	all-terrain vehicle
BDL	below detection limits
bgs	below ground surface
DCB	dichlorobenzene (a specific chemical) COC Constituent of Concern
CGS	Connecticut General Statutes
CSM	Conceptual Site Model
CTDEEP	Connecticut Department of Energy and Environmental Protection
CVOC	Chlorinated Volatile Organic Compound
DEC	Direct Exposure Criteria
DNAPL	Dense non-aqueous phase liquid
DQA	Data Quality Assessment
DQO	Data Quality Objective
DUE	Data Usability Evaluation
ELUR	Environmental Land Use Restriction
EPA	Environmental Protection Agency (U.S.)
EPH	Extractable Petroleum Hydrocarbon (a category of chemicals)
ESA	Environmental Site Assessment
ETPH	Extractable Total Petroleum Hydrocarbons (a category of chemicals)
eV	Electron volt (unit of measure)
fbg	feet below grade (unit of measure)
GA-PMC	Pollutant Mobility Criteria applicable in Class GA Groundwater Area
GB-PMC	Pollutant Mobility Criteria applicable in Class GB Groundwater Area
GPR	Ground Penetrating Radar
GWPC	Groundwater Protection Criteria
GWVC	Groundwater Volatilization Criteria
GZA	GZA GeoEnvironmental, Inc.
I/C-DEC	Industrial/Commercial Direct Exposure Criteria
LCS	Laboratory Control Sample
LNAPL	Light non-aqueous phase liquid
MEK	methyl ethyl ketone (a specific chemical)
mg/Kg	milligrams/kilogram (unit of measure, equivalent to parts per million)
mg/L	milligrams/liter (unit of measure, equivalent to parts per million)
MRLs	Minimum (Laboratory) Reporting Limits
MS	Matrix spike
MSD	Matrix spike duplicate
msl	Mean sea level (a reference elevation) MW Monitoring well
ORP	Oxidation reduction potential
OVM	Organic vapor meter

PAH	Poly Aromatic Hydrocarbon (a category of chemicals)
PCB	Polychlorinated Biphenyl (a category of chemicals)
PCE	Perchloroethylene (a.k.a. tetrachloroethylene, a specific chemical)
PID	Photoionization Detector
PMC	Pollutant Mobility Criteria
PP	Priority Pollutants
ppmv	parts per million by volume (unit of measure)
psi	pounds per square inch (unit of measure)
PVC	Polyvinyl chloride (typically material of construction of monitoring well)
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
R-DEC	Residential Direct Exposure Criteria
RCP	Reasonable Confidence Protocols
RCRA	Resource Conservation and Recovery Act
RSRs	Remediation Standard Regulations
SB	Soil boring
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	Semi-Volatile Organic Compound (a category of chemicals)
SVVC	Soil Vapor Volatilization Criteria
SWPC	Surface Water Protection Criteria
TCA	1,1,1-Trichloroethane (a specific chemical)
TCE	Trichloroethene (a.k.a, trichloroethylene, a specific chemical)
TCLP	Toxicity Characteristic Leaching Procedure
TP	Test pit
µg/Kg	micrograms/kilogram (unit of measure, equivalent to parts per billion)
µg/L	micrograms/liter (unit of measure, equivalent to parts per billion)
USGS	United State Geologic Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound (a category of chemicals)
VPH	Volatile Petroleum Hydrocarbons (a category of chemicals)

1.0 INTRODUCTION

GZA GeoEnvironmental, Inc. (GZA) was retained by the Town of Vernon (Town) to complete a Remedial Action Plan (RAP) for the former Amerbelle Mill property located collectively at 104 East Main Street and 5 Brooklyn Street, Vernon, Connecticut (Site). GZA has submitted under separate cover a Phase III Data Gap Investigation Report (Phase III) that summarizes soil, groundwater and sediment testing at the Site which was the basis for the development of the RAP. The Phase III should be reviewed in conjunction with the RAP. Both the Phase III and the RAP have been funded by the State of Connecticut Department of Economic and Community Development (DECD) Remedial Action and Redevelopment Municipal Grant Program.

GZA had previously submitted a preliminary RAP, which has been public noticed and the 45-day public comment period closed on October 18, 2015. Upon final review and approval of this RAP, the final remedial design and bid packages will be prepared and submitted to the Town.

The objective of this RAP is to address released contaminants or constituents of concern (COCs) in the soil and groundwater of the Site at concentrations above the remedial criterial established within the Connecticut Remediation Standard Regulations (RSRs) with the goal to allow for redevelopment and reuse of the property for residential and/or commercial purposes. The RAP was developed based in part on results of the Phase III data gap investigations and in part based on information presented in the following reports of previous environmental investigations of the Site, as made available to GZA:

- GeoDesign, Inc.: *Phase II Environmental Assessment*, Amerbelle Corporation, February 2004.
- GeoDesign, Inc.: *Phase I Environmental Site Assessment*, Amerbelle Corporation, March 2004.
- Metcalf & Eddy, Inc.: *Field Task Work Plan for Amerbelle Textiles*, Revision 1, October 2005.
- Metcalf & Eddy, Inc.: *Target Brownfields Assessment Report, Amerbelle Textiles*, August 2006.
- Fuss & O'Neill, Inc.: *Quality Assurance Project Plan Addendum-Supplemental Phase II/Limited Phase III Environmental Site Assessment, Amerbelle Corporation,* November 2008.
- Fuss & O'Neill, Inc.: *Limited Phase II/Limited Phase III Environmental Site Assessment*, *Amerbelle Textiles*, December 15, 2009.

This report is subject to the Limitations in Appendix A and those of our contract with the Town.

1.1 REGULATORY SETTING

The Site is an "establishment" having generated more than 100 kilograms of hazardous waste at the Site within a one month period. As a result of the transfer of ownership of the Site to the Town and the filing of a Form III on May 11, 2004, the Site is subject to the Connecticut Transfer Act (Chapters 22a Section 134 et seq. of the Connecticut General Statutes). The Site has been assigned remediation identification number 6194 and the Town of Vernon is listed as the certifying party. By signing the Form III, the Town has agreed to investigate the parcel in accordance with the prevailing standards and guidelines and to remediate any pollution from a release of hazardous wastes or hazardous substances from the site in accordance with the remedial criteria established within the RSRs. According to the CTDEEP, investigation, remediation, and closure of the Site can be performed by a Licensed Environmental Professional (LEP).

2.0 CONCEPTUAL SITE MODEL

A brief summary of Site use history and physiographic setting and an updated Conceptual Site Model (CSM) is provided in the following sections. This information was developed based on the information provided in previous Phase I, II and III assessments by others, as listed in Section 1 above and as developed by GZA through completion of Phase III Data Gap investigations. The updated CSM was developed in consideration of the physical setting of the Site, constituents of concern identified as released at Areas of Concern (AOCs) identified at the Site, inferred release mechanisms and likely fate and transport mechanisms for each release.

2.1 BUILDING USES AND MATERIAL STORAGE

Details on storage tank and building uses at the Site were presented in GZA's Phase III report. The table below briefly summarizes tank and transformer areas and building uses.

HISTORICAL BUILDING USES AND MATERIALS STORAGE		
BUILDING/AREA	***USES/ACTIVITIES***	***CHEMICALS/MATERIALS***
Buildings 1 & 2	Raw materials, flammables, organic coatings storage; Mixing (S side); Hazardous waste storage (NW side).	Formaldehyde, toluene, isopropyl alcohol, hazardous waste.

HISTORICAL BUILDING USES AND MATERIALS STORAGE		
Building 2	Loading dock; Materials storage; temporary fuel storage.	Fabrics, fuel (temporary tank trailers at loading dock).
Buildings 3, 4 & 5	General storage, pumps for fire suppression water.	None identified.
Building 6	No identified uses.	None identified.
Building 7	Solvent coating lines; Thermal ozidizers for VOC gas destruction, Loading dock.	MEK, toluene.
Building 8	Water filtering; Water holding tanks; Piping for process and cooling water; 55-gal drums of waste oil on containment palettes; Mixing operations; Wastewater treatment operations; Dye house	Wastewater, waste oil, dyes (mixing and in process)
Building 9	General storage; chemical storage, Dye storage	Fabric, chemicals, dyes
Building 11	Equipment, oil, chemical and dye storage; Dyeing operations (pre-1927); Loading dock; Elevator (W wall)	Equipment, oils, chemicals, dyes, hydraulic oil (elevator)

HISTORICAL BUILDING USES AND MATERIALS STORAGE		
Building 12	Machine shop, Storage; Maintenance; Welding, Turning; Miling, Grinding, Electrical repair; Parts cleaning	Parts, machine oil, solvents, welding as, cutting oils.
Building 13	Latex coating lines; storage of latex (E side); Storage of fabric (w side)	Latex coating chemicals
Building 14	Textile dyeing and finishing; Loading docks; textile storage; Elevator; dye mixing room; Wastewater/floor drain sump; pH neutralizing (two, 7,500 gal neutralization ASTs); Chemical storage in drums;	Dyes, finishing chemicals, formaldehyde, sodium hydroxide, citric acid, soda ash, sodium bicarbonate, wastewater
Boiler Room	Boiler room (along with Bldg. 6)	No. 2 fuel oil.
Former Solvent USTs	Former 5,000 and 3,000-gallon steel USTs south of Bldg. 14 (removed 1993); earlier tanks at same location removed 1972	Xylenes, historically Stoddard oil
Exterior Fuel Oil ASTs Area	Two, 18,000-gal fuel oil ASTs E of Bldg. 13 (inactive); Two, former 20,000-gal fuel oil USTs (removed 1989);	Fuel oil. (Contaminated soil removed in 1989)

HISTORICAL BUILDING USES AND MATERIALS STORAGE		
Exterior Transformer Area	Electrical transformers (three) located S of Bldg. 7 and NW of Bldg. 13	Dielectric oils (removed)

In addition to the tanks described in the table above, the aboveground storage tanks (ASTs) listed below were identified as being located on the Site:

- One 27,000-gallon production water supply tank
- One 500-gallon tank containing sodium hydroxide for dyeing processes
- Two 275-gallon finishing resin tanks
- One 275-gallon tank containing sodium hydroxide for pH neutralization
- One 275-gallon tank containing sulfuric acid for pH neutralization
- One 10,000-gallon hot water storage tank.

2.2 PHYSIOGRAPHIC SETTING

The Site is located within the Hockanum River Valley in the northwestern portion of Vernon, Connecticut. The walls of the valley rise steeply to the north and south of the Site and the valley floor drops away steeply immediately to the northwest of the Site. The elevation of the ground surface at the Site ranges from approximately 480 to 460 feet MSL west to east drops off steeply to the north to American Mill Pond to an elevation of approximately 430 feet's. Area topography is depicted on Figure 1.

The Hockanum River runs from southeast to northwest through the Site within a stone lined raceway. The raceway, starting from Paper Mill Pond to the southeast, passes below the northeast portion of Building 14, Brooklyn Street and Buildings 7 and 5 in the northern portion of the Site and spills down into American Mill Pond to the northwest (see Figure 2). A small dam controlling the hydraulic head of the upper portion of the raceway and Paper Mill Pond is located southeast of Building 5.

2.3 BEDROCK AND SURFICIAL GEOLOGY

According to the *Bedrock Geological Map of Connecticut* (Rodgers, Yale University, 1985), bedrock beneath the Site is mapped as the Glastonbury Gneiss, consisting of light colored medium to coarse grained, well foliated, granitic gneiss.

The *Surficial Materials Map of Connecticut, USGS* (Stone, et. al., 1992) indicates unconsolidated deposits in the southern portion of the Site consist of sand and gravel over

sands and transition to glacial tills in the northern portion of the Site. In general, overburden materials from borings completed at the Site were observed to consist of densely packed sands and silts with various amounts of gravel, cobbles and boulders encountered at depth. Foreign materials, such as coal ash, brick and asphalt fragments were observed in soils sampled at several borings, predominately in the northern portion of the Site, indicating that much of the area below the north campus of buildings is underlain by urban fill. The thickness of the overburden materials was found to vary across the Site, from less than 3 feet to 27 feet below grade.

2.4 HYDROGEOLOGY

Groundwater was reported at depths ranging from 4.5 feet (well ME-1) to 18.33 feet bgs (well ME-6) and was encountered below the bedrock surface across much of the Site. Based on groundwater elevation data collected at the site on April 30, 2015, groundwater is inferred to flow generally to the northwest across the Site in the western portion of the Site and is presumed to discharge to the American Mill Pond, and in the northeast to flow westward to the adjacent property (Daniels Mill) and the American Mill Pond beyond (see Figure 2).

The Hockanum River and American Mill Pond are classified by the State of Connecticut as B (CTDEP, 2015). Such inland surface waters are known or presumed to be suitable for the following designated uses: recreational use, fish and wildlife habitat, agricultural and industrial supply, and other legitimate uses (CT Water Quality Standards 2013).

2.5 AREAS OF CONCERN (AOCs) AND CONSTITUENTS OF CONCERN (COCs)

Twenty-five AOCs were identified at the Site, based on previous studies by others and GZA's recent Phase III Data Gap investigation, as follows:

- AOC 1 - Former xylene USTs south of Building 14
- AOC 2 - Building 14 south loading dock
- AOC 3 - Building 14 west loading dock
- AOC 4 - Northwest corner of Building 14
- AOC 5 - Building 14 wastewater conveyance trenches
- AOC 6 - Southeast corner of Building 14
- AOC 7 - Building 12, Maintenance
- AOC 8 - Slope west of Buildings 1 and 2
- AOC 9 - Building 13, Latex Coating
- AOC 10 - Building 2 loading dock
- AOC 11 - Buildings 1 and 2, Coating Storage
- AOC 12 - Building 3, Storage
- AOC 13 - Building 7, Solvent Coating
- AOC 14 - Fuel oil ASTs

- AOC 15 - Transformers
- AOC 16 - Building 7 loading dock
- AOC 17 - Building 9, Dye Storage
- AOC 18 - Building 8, Former Dye House
- AOC 19 - Building 11, Former Dyeing/ Current Chemical Storage
- AOC 20 - Building 11 loading dock
- AOC 21 - Former off-site gasoline station
- AOC 22 - Fill
- AOC 23 - Groundwater
- AOC 24 - Raceway
- AOC 25 - American Mill Pond.

Attached Table 1 provides a list of AOCs and constituents of concern (COCs) inferred to be associated with each AOC based on our knowledge of historical Site operations. Table 1 also briefly describes our inferred conceptualized mechanisms for the potential release of COCs to the environment. The locations of the AOCs are shown on Figure 2.

2.6 CONCEPTUAL SITE MODEL

Considering the available data from previous and current environmental investigations at the Site, GZA developed a Conceptual Site Model (CSM) that was used as a guide for selecting remedial methods incorporated into this RAP.

Subsurface investigations completed at the Site by others and by GZA (Phase III) indicated unconsolidated materials underlying the site generally consist of sand with varying amounts of gravel, cobbles and silt. The thickness of overburden materials was found to range from less than 3 feet to 27 feet below ground (boring AOC-20-2, located within the Building 8 loading dock area). The thickness of soils over much of the Site is less than 10 feet and appears to thicken toward the northern most boundary of the Site.

GZA notes that access to areas within certain portions of the Site, particularly within building interiors, was limited by structures or materials present within the buildings; in some cases cobbles and/or boulders were encountered below floor slabs, which resulted in drilling refusal. Where refusal prevented observation of soil down to the water table, GZA used data obtained from groundwater samples downgradient of Site AOCs as additional lines of evidence to assess potential releases.

The primary release mechanism for the majority of the Site's AOCs (those located within historical process areas and former material handling and storage areas), is inferred to be the release of hazardous constituents or petroleum/oils to the building's floor slab or exterior paved surfaces. Constituents from these releases are expected to have migrated across floors and pavement surfaces and impacted shallow soils below via cracks and/or joints within those surfaces. Exceptions to this pattern would be release of

chemicals/petroleum directly to the subsurface soil from the base of conveyance trenches, pits in the building floors, sub-surface drain lines, and/or underground storage tanks (USTs) formerly located at the Site.

Soils below the northern building complex are widely impacted by metals (chiefly arsenic and lead), poly-nuclear aromatic hydrocarbons (PAHs) and extractable total petroleum hydrocarbons (ETPH) primarily from coal ash in fill, and incidental releases of petroleum from historical operations.

Data indicate there are two areas requiring remedial action in the northern section of the Site where elevated concentrations of constituents of COCs appear to be the result of separate releases and not related to fill: The release of petroleum apparently associated with the former 20,000- gallon fuel oil USTs at AOC 15 and releases of petroleum and chlorinated volatile organic compounds (CVOCs), primarily perchloroethylene (PCE), below Building 11. Concentrations of constituents within these areas are above remedial criteria established by the State of Connecticut under the RSRs and will require some form of active remedial effort to reduce constituent concentrations and/or potential threats of exposure. Potential options for the remediation of these areas are discussed in detail in Section 5.0.

Soils within the southern parcel have only indicated minor impacts and data from that area do not indicate that management or exposure from these soils would pose a concern.

Given the relatively permeable native soils at the Site, releases from Site AOCs would have the potential to migrate downward through subsurface soils to the water table below. In the case of chlorinated solvents, since they are relatively immiscible in water and typically have densities greater than water, a solvent release of a sufficient quantity could form a dense non-aqueous phase liquid (DNAPL) which could migrate down through saturated soils (below the water table) to the bedrock surface, and potentially into bedrock cracks and joints.

The depth to bedrock groundwater was measured to range from 4.5 feet bgs at well ME-1 to greater than 27 feet bgs at well GZ-8 and appears to drop off sharply near the northern boundary of the Site. The water table was encountered below the bedrock surface at most monitoring wells constructed at the Site. Groundwater was only encountered within the overburden soils at monitoring wells GZ-8, AM-1, AM-7 and GZ-4, (the latter two wells are both located within Building 11). Overburden monitoring well GZ-5, located to the north of Building 11, was found dry when gauged on April 30 and May 7, 2015.

Based on depth to bedrock groundwater measurements made at Site wells during groundwater sampling on April 30, 2015, bedrock groundwater flow at the Site is inferred to generally be to the north-northwest in the western portion of the site and to the north-northeast in the eastern portions of the Site, before turning westward and southwest

toward American Mill Pond in the northwestern corner of the Site. Bedrock groundwater apparently discharging to American Mill Pond in the western portion of the Site and to the northeast toward East Main Street. The more eastward groundwater flow direction in the eastern portion of the Site differs from what was depicted in previous investigations. Based on measurements taken through the floor of Building 7 to the raceway below, it appears that the groundwater table is below the base of the raceway, at least within the northern portion of the Site and inferred groundwater flow patterns don't appear to be affected by that hydraulic feature.

As the gradient of the raceway is quite steep and flow through the raceway is rapid and with high energy it was inferred that conditions there would not constitute a depositional environment wherein contaminant constituents might be expected to accumulate. Instead potential impacts to the river system were assessed at the downstream American Mill Pond where dissolved and particulate contaminant constituents released from the Site would more likely be expected to be present.

Sampling and analysis of Site groundwater indicated three areas where concentrations of COCs in groundwater were elevated to levels exceeding RSR numeric criteria:

- An apparent dye release downgradient of the northwestern corner of the Building 14 where blue tinged groundwater was observed and aniline was reported above Surface Water Protection Criteria (SWPC) in groundwater from ME-2;

- Building 7 loading dock area where lead was reported above the SWPC in groundwater at well AM-1. GZA notes, AM-1 was installed by others and found to be in poor condition during the sampling round conducted in April 2015. When GZA attempted to sample this well, it was found to have poor recharge and could not be sampled using low-stress purging methods. As such, a grab sample was obtained. The sample concentrations detected in this well are suspect due to high turbidity and suspended solids within the sample; and

- Building 11 area where concentrations of metals and PAHs were reported above SWPCs (AM-7) and CVOCs (PCE and vinyl chloride) were reported above R-GWVCs.

Groundwater compliance with the RSRs cannot be assessed by collecting samples at one instance in time. Collection and analysis of groundwater over four quarterly events is required to demonstrate compliance with RSR remedial criteria to account for differences due to seasonal variability. GZA notes that multiple alternatives are allowed under the RSRs to determine compliance with the SWPCs. These alternatives are presented in detail within Section 3.0. Additional rounds of ground monitoring will be conducted after remedial activities are completed to produce the data required to demonstrate compliance with SWPCs and GWVCs.

Sampling and analysis of sediment from the Hockanum River, upstream and downstream of the Site, indicated impacts from metals (chromium, lead, and mercury) were higher in downstream samples than in upstream samples relative to the Site. Concentrations of these constituents were also at levels above threshold effects screening benchmark criteria. However, concentrations of PAHs were higher in upstream samples than in downstream samples, indicating potential impacts from upstream sources as well. Further, no direct release or direct migration of these constituents from the site to the pond were identified as part of the Site investigations.

We note CTDEEP and USGS have identified the American Mill Pond and Hockanum River as impaired and the water quality of the river no longer supports one or more designated uses for a Class B surface water body due to its history of heavy industrial use, urbanized setting and impacts from historical point and nonpoint source discharges. The impacts to sediments both upstream and downstream of the Site is reflective of the degraded quality of the river due to its urban setting and historical industrial usage.

The data set population generated through this study is very small (3 samples upgradient in Paper Mill Pond and 3 samples downgradient in American Mill Pond) and is intended to be used as a screening tool to identify if there is a potential of impacts from historical Site use to the aquatic ecology of the Hockanum River. Based upon the results, a potential for impacts was identified, but because contaminants in sediments in river environments are typically heterogeneously distributed (e.g., higher concentrations are likely found in slower flow areas than in faster flow areas), conclusions drawn from this data set regarding impacts from the Site are very limited. Further evaluation of sediment conditions through a formal Ecological Risk Assessment is needed to reach any definitive conclusions as to whether the presence of those constituents present a significant risk of impacts to the ecology of that aquatic system that would require a remedial action.

3.0 APPLICABLE RSR CRITERIA

In 1996, the CTDEEP adopted the RSRs which set criteria for certain constituents in soil, soil vapor and groundwater and provides some alternative methods of demonstrating that cleanup has been achieved at sites in Connecticut. The RSRs were revised in June 2013. These regulations apply to many sites, including those which are under order by the CTDEEP, those which enter the CTDEEP's Voluntary Remediation Program, and those "establishments" which are transferred and thus subject to the Connecticut Transfer Act process. The Site is subject to the RSRs as a result of being in the Transfer Act based upon a May 11, 2004 transfer and Form III filing. The Site has been assigned remediation identification number 6194 and the Town of Vernon is the certifying party. According to the CTDEEP, investigation, remediation, and closure of the Site can be performed by a Licensed Environmental Professional (LEP).

As the Site is located in a GB Groundwater area, the RSR criteria that are applicable to contaminant constituents in soil at the Site are the Direct Exposure Criteria (DEC) and

the GB Pollutant Mobility Criteria (GB-PMC). The RSR criteria that are applicable to the groundwater at the Site are the Groundwater Volatilization Criteria (GWVC) and the Surface Water Protection Criteria (SWPC). As Site groundwater is classified as GB, Site groundwater plumes are not discharging to a GA groundwater classified area and there is no documented use of groundwater within 500 feet downgradient of the Site, the Groundwater Protection Criteria (GWPC) are not applicable to groundwater conditions at the property. A description of applicable RSR criteria and their applicability is provided below:

3.1 DIRECT EXPOSURE CRITERIA (DEC)

The purpose of the DEC standard is to protect human health from risks associated with contact with and either direct or incidental ingestion of contaminants present in soil. Compliance with Direct Exposure Criteria (DEC) is evaluated through comparison of mass-based concentrations of contaminant constituents in soils to numerical criteria established within the RSRs. Compliance with the DEC can be shown when the 95% upper confidence level of the mean of COC concentrations within a release area are less than the DEC. Otherwise, compliance is shown when all reported concentrations within the release area are less than the DEC.

Separate criteria are established for residential (R-DEC) and industrial/commercial (I/C-DEC) areas. However, use of the less stringent industrial/commercial standards requires the property not to be used for residential purposes and the owner of the property to place an Environmental Land Use Restriction (ELUR) on the property land records prohibiting residential use of the property by successive owners.

The DEC are applicable to soil within 15 feet of ground surface, however, certain exemptions may be applied. The DEC standards do not apply to “inaccessible soils”, which are defined as soils more than four feet below ground surface or two feet below qualifying pavement (≥3-inches thick) or below an existing building, provided an ELUR is in effect prohibiting the disturbance of the overlying soil, pavement and/or building.

Fill polluted only by semi-volatile compounds, petroleum hydrocarbons and metals in excess only of the direct exposure criteria may also be considered inaccessible if below ≥3-inches thick concrete or bituminous concrete surface provided an ELUR is in effect prohibiting the disturbance of the overlying soil, pavement and/or building and metal concentrations do not exceed two times the DEC. DECs also do not apply to soils polluted with metals, petroleum hydrocarbons and semi-volatile organic compounds if the pollution has resulted from the incidental release from the normal operation of motor vehicles or normal paving and maintenance of bituminous concrete surfaces. Other variances and exemptions also apply.

3.2 POLLUTANT MOBILITY CRITERIA (PMC)

Concentrations of contaminant constituents in soil are also regulated based on the Pollutant Mobility Criteria (PMC). The purpose of the PMCs are to protect against the potential degradation of underlying groundwater from contaminant constituents in soils leaching into the groundwater due to the infiltration of precipitation through the soils. Separate PMC standards are contained within the RSRs for sites located within Class GA and GAA groundwater areas versus those located within Class GB groundwater areas. Because the Site is located in a Class GB groundwater area, contaminant constituents in Site soils are also regulated by the GB-PMCs.

Inorganic constituents (metals and cyanide) and PCBs are evaluated based on subjecting soil samples to the Synthetic Precipitation Leaching Procedure (SPLP) and comparing the concentrations of constituents in the extracts to the leachate-based PMC. As a conservative screening approach, when SPLP data are not available the maximum potential leachable concentrations of contaminants in soil can be estimated by dividing the total mass concentration by twenty and assuming 100% of contaminants are leached from the soils. Actual leachable concentrations are generally well below this calculated maximum.

For organic constituents, this evaluation can be performed by either: 1) using samples analyzed for total mass concentrations and comparing directly to PMC criteria presented in the RSRs, or 2) subjecting soil samples to the SPLP and comparing the concentrations of constituents in the extracts to the GWPC and/or leachate based PMC.

The GB-PMC do not apply to soil located below the seasonal high groundwater table, or to soils that have been rendered “environmentally isolated” (i.e., below a building, other permanent structure or approved engineered control), as long as an appropriate ELUR has been established. The PMCs do not apply to fill material that has been solely polluted from coal ash, wood ash or asphalt fragments, as long as public water is supplied to the site and is available within 200 feet of the Site and VOCs are not above the PMCs. Additionally, the PMCs do not apply to petroleum hydrocarbons and SVOCs if the pollution is due solely to normal operations of motor vehicles or paving and maintenance of asphalt. Other variances and exemptions also apply.

3.3 GROUNDWATER PROTECTION CRITERIA (GWPC)

The GWPC apply to areas where groundwater is or may be used as a potable water supply. Because the Site is located within a GB area and area residents are supplied public drinking water, the GWPC are not applicable to the groundwater at the Site.

3.4 SURFACE WATER PROTECTION CRITERIA (SWPC)

The SWPC are intended to provide an indication as to whether polluted groundwater discharging to a surface water body could potentially cause degradation to the quality of the surface water to a level where applicable Water Quality Standards are not being met. Compliance with the SWPC must be met at the point of discharge of the groundwater plume to the surface water body and may be determined by either a direct comparison of constituent concentrations to established numeric standards or by a number of alternative methods, including calculation of alternative SWPC criteria based on dilution ratios or calculation of Site-specific SWPC, with approval of the Commissioner.

Compliance with SWPC is demonstrated when either the concentration of contaminant constituent immediately upgradient of the surface water body or the 95% upper confidence limit of the arithmetic mean of representative samples of the entire plume are either below or equal to the SWPC of over four seasonal quarters of groundwater monitoring completed within a two-year period.

3.5 GROUNDWATER VOLATILIZATION CRITERIA (GWVC)

GWVC are intended to protect human health from risks associated with inhalation of volatile organic vapors which could potentially enter into occupied building areas from VOC contaminants present within groundwater below the structure. 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 establish an ELUR on the property preventing the use of the property (or the applicable portion of the property) for residential usage. The GWVC are applicable to VOC concentrations in groundwater to depths of 15 feet below ground surface or the lowest level floor slab of an overlying structure.

Compliance with GWVC is demonstrated when either the concentration of contaminant constituents in groundwater within 15 feet below the structure or ground surface are either below or equal to the GWPC or soil vapors below the structure are equal to or below applicable criteria (see below) of over four seasonal quarters of monitoring completed within a two-year period. Other alternative Site-specific GWVC may be calculated for a site, with approval from the Commissioner.

3.6 SOIL VAPOR VOLATILIZATION CRITERIA (SVVC)

Where GWVC may be exceeded, SVVC can be used as an alternate means of demonstrating compliance. SVVC are intended to provide an indication as to whether concentrations of gaseous phase volatile organic compounds in unsaturated soils are at levels that could pose an unacceptable risk of exposure to occupants within a building or some other habitable structure if those vapors were to intrude into and accumulate within that structure. Separate criteria are established for residential (R-SVVC) and

industrial commercial (I/C-SVVC) areas. However, use of the less stringent industrial/commercial standards requires the owner of a property to establish an ELUR on the property preventing the use of the property (or the applicable portion of the property) for residential usage. Compliance with SVVC may be achieved when the concentration of the volatile vapor below the structure are found to be less than the established numeric criteria at each representative sample location. Remediation of groundwater is not required if mitigating steps can be constructed to prevent the migration of vapors into the structure, with approval of the commissioner. Other exemptions include indoor air monitoring within the structure and demonstration that vapors will not accumulate within a structure above established hazard indexes.

In general, where the RSRs do not contain numeric criteria for substances detected at concentrations of potential concern, the RSRs require that risk-based calculations be made, using formulae contained in the RSRs to develop criteria. Such criteria are subject to approval by the CTDEEP. In some cases, CTDEEP has developed draft criteria for certain Additional Polluting Substances and indicated that site-specific approval of these values can be requested and are likely to be approved. Some COCs detected on Site will require development and CTDEEP approval of criteria for additional polluting substances prior to Site verification as follows:

Soils: formaldehyde, methanol, ammonia as nitrogen, ethylene glycol, propylene glycol, 1,2,4-trichlorobenzene, benzo(ghi)perylene, chrysene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, 2-methylnaphthalene, acenaphthene

Soil Vapor: 1,3,5-trimethylbenzene, 4-ethyltoluene, bromodichloromethane, carbon disulfide, cis-1,2-dichloroethene, cyclohexane, dichlorodifluoromethane, ethanol, hexane, isopropylalcohol, propylene, tetrahydrofuran, and trans-1,2-dichloroethene

Groundwater: aniline, formaldehyde, methanol, ammonia as nitrogen, phenolics, barium, 1,2,4-trichlorobenzene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, acenaphthene, benzo(ghi)perylene, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, 2-methylphenol (o-cresol), and dimethylphthalate

As part of this RAP, draft 2008 values for DEC and PMC were used where possible for evaluating the need for remediation.

4.0 REMEDIAL ACTION PLAN AREAS

A number of AOCs at the Site were fully characterized during Phase I, II and III investigations by others and no further action or remediation is warranted. The following AOCs were fully characterized, meet RSR criteria, do not fall under any of the conditions noted above and, as such, require no further action or remediation:

AOCs REQUIRING NO FURTHER ACTION

- AOC 1 - Former Solvent Underground Storage Tanks
- AOC 2 - Building 14 south loading dock
- AOC 3 - Building 14 west loading dock
- AOC 4 - Building 14 former finishing department/dye mixing room
- AOC 5 - Building 14 wastewater conveyance trenches
- AOC 6 - Southeast corner of Building 14
- AOC 8 - Slope west of Buildings 1 and 2
- AOC 9 - Building 13, Latex Coating
- AOC 10 - Building 2 loading dock
- AOC 11 - Buildings 1 and 2, Coating Storage
- AOC 20 - Building 11 loading dock
- AOC 21 - Former off-site gasoline station
- AOC 25A - American Mill Pond (surface water only)

Based on results of the Phase III Data Gap investigations and of previous investigations completed by others, due to concentrations of contaminant constituents exceeding RSR remedial criteria, remedial actions were found to be needed at the following AOCs:

- AOC-7 Bldg. 12 Former Maintenance/Machine Shop
- AOC-12 Bldg. 3 General Storage Area
- AOC-13 Bldg. 7 Solvent Coating Lines
- AOC-14/15 18,000 Gallon Fuel Oil ASTs/Former Transformer Pad
- AOC-16 Bldg.7 Loading Dock
- AOC-17 Bldg. 9 Dye Storage
- AOC-18 Bldg. 8 Former Dye House
- AOC 19 Bldg. 11
- AOC 23 Site Groundwater

In addition, constituent concentrations in sediments sampled from the American Mill Pond downstream of the Site were elevated in comparison with upgradient samples and were above benchmark screening values, indicating need for further investigation through completion of a Baseline Ecological Risk Assessment (BERA).

A summary of the findings of the Phase III Data Gap environmental assessment of the twenty-five AOCs investigated at the Site is provided in Table 1. The following sections provide a brief summary of GZA's findings with regard to the above AOCs identified as requiring remedial actions based on the Phase III Data Gap investigations. An assessment of remedial alternatives to achieve compliance with RSR criteria for each of these AOCs is provided in Section 5.0. A description of the selected remedial action plan for each AOC is provided in Section 6.0.

GZA understands that the Town of Vernon is contemplating implementation of ELURs or other mechanisms that would allow contaminated soil to remain in place. In addition, plans for future site renovations include the demolition of many of the existing structures, leaving some existing buildings and/or structures in place. A conceptual plan for the development of the Site is presented in Appendix B. This proposed Remedial Action Plan was developed in the understanding that applications of ELURs on the property is in keeping with the intended future use of the Site.

AOC 7: FORMER MAINTENANCE / MACHINE SHOP

The former Maintenance/Machine Shop is located within the lower floor of Building 12 and was used for machining of parts and the repair and maintenance of equipment used in operations throughout the facility. Building 12 is to be left standing as part of the planned Site redevelopment.

Our review of the reports of previous Site investigations made available to GZA found no information indicating that previous environmental investigations had been conducted within this AOC. Therefore, under the Phase III Data Gap Investigations, GZA sampled soils from two Geoprobe® borings (AOC-7-1 and AOC-7-2) advanced to 4 feet below the lower building floor slab. Analysis of soils for VOCs, ETPH and PAHs indicated ETPH was reported below the laboratory MRL in sample AOC-7-1 (0.5-2). However, a concentration of ETPH at 8,000 mg/Kg was reported in soils sampled from 0.5 to 2 feet of depth at boring AOC-7-2. This concentration is above the I/C-DEC and GB-PMC of 2,500 mg/Kg, indicating the need for some form of remedial action to be completed to address these impacts.

Based on this finding, an exploration boring (GZ-8) was completed to the north AOC-7-2 and outside of the building within Brooklyn Street. A monitoring well was also installed within the boring across the water table to assess if the petroleum release may have migrated beyond the buildings foundation or remains confined within that structure.

During the advancement of that boring, a petroleum odor was noted and PID screening values of 225 and 365 ppm were recorded for soils sampled from above and below the water table (encountered approximately 9 feet bgs), respectively. Based on those observations, soils sampled from just above the water table (7 to 9 feet bgs) and groundwater from the well completed at GZ-8 were submitted for analysis of ETPH. In addition a grab sample of the soils was also submitted for analysis of EPA Method 8260 VOCs. The results of those analyses indicated concentrations of ETPH and VOCs were below the laboratory minimum reportable limits within those samples.

Based on these data, no indication was found that the petroleum release had migrated beyond the footprint of that building at any appreciable concentrations and that remedial actions can be confined to the footprint of that building. Some form of remedial action is

required at this AOC to mitigate potential hazards or threats from exposure to petroleum constituents in excess of R-DECs and GB-PMCs.

AOC 12: BUILDING 3 GENERAL STORAGE

Building 3 is located in the northwest corner of the site and is immediately east of building 2. Building 3 was reportedly formerly used for general storage of textiles and other materials. This building is slated to be left standing under current Site redevelopment plans.

Analysis of soils at boring SB-104, advanced through the concrete floor slab by Fuss & O'Neill in 2009, indicated the presence of several PAH constituents and metals above background. One PAH constituent (benzo(b)fluoranthene) was reported at a concentration equal to the GB-PMC and I/C-DEC. Analysis of deeper soils at boring AM-6 (5 to 7 ft. bgs) by GeoDesigns in 2004 indicated the presence of ETPH at a concentration of 770 mg/Kg, above the R-DEC.

GZA's assessment of the data obtained at this location found these impacts to be consistent with and typically representative of the general condition of the degraded fill reported below the floor slabs across the northern complex of buildings. Based on the above analytical results, we assume that the fill material below the floor of the entire building contains constituent concentrations above R-DECs and will require some form of remedial action to achieve compliance with the RSR criteria.

AOC 13: BUILDING 7

Building 7 is located in the central portion of the northern building complex and formerly contained the solvent coating operations (containing primarily toluene, isopropyl alcohol and methyl ethyl ketone or MEK). The raceway passes under the eastern portion of the building, below the location of the former solvent coating lines. This building is slated to be demolished under current site redevelopment plans.

One shallow soil boring (SB-103) was advanced to the north of the western end of the former coating line by Fuss & O'Neill in 2009. Analysis of soils from 0.5 to 2.0 feet of depth indicated the presence of elevated concentrations of metals, ETPH (600 mg/Kg) above the R-DEC and certain PAHs at concentrations above the I/C-DECs and GB-PMCs. However, as the PAHs are associated with coal ash observed in soils there, these constituents are inferred to be exempt from the GB-PMCs.

In April 2015, GZA sampled shallow soils at three Geoprobe® borings (AOC-13-1, AOC-13-2 and AOC-13-3). Laboratory analyses of soils sampled from AOC-13-3 from 0.5 to 2 feet bgs indicated that concentrations of certain PAHs were above the I/C-DEC. A trace concentration (0.0051 mg/Kg) of 1,1,1-trichloroethane was also detected.

GZA's assessment of this area was that sufficient data is available to assume the fill underlying this portion of the Site is equally degraded across the footprint of the building west of the raceway. Due to the presence of coal ash in the fill material, PAHs constituents in soils there are recognized as exempt from the GB-PMCs. Therefore, some form of remedial action is necessary to mitigate potential hazards or threats from exposure to petroleum constituents and PAHs in excess of R-DECs.

AOC 14/15: 18,000–GALLON FUEL OIL TANKS AND FORMER TRANSFORMER PAD

Two 18,000-gallon No. 2 fuel oil tanks are located within a steel building between Brooklyn Street and Building 7 and east of Bldg. 13. The tanks are mounted within a concrete containment structure on which the surrounding building rests. It was reported that two underground 20,000-gallon fuel oil tanks had also been located within the same concrete containment structure from 1948 to 1989 and that the structure at that time had an earthen base and was backfilled with sand. Due to the sand backfill, the tanks were subject to state regulations for underground tank facilities. The tanks were reported to initially contain No. 6 fuel oil and later were used for the storage of re-refined off specification and specification used fuel oils until they were removed in 1989.

It was reported that a tightness test completed on the older tanks in 1989, prior to their removal, showed that one of the tanks failed established tightness criteria for that time. No documentation was found that confirmation soil samples were collected from below the tanks at the time of their removal. However, it was reported that an analysis of a composite sample of soils removed with the tanks showed ETPH present at 150 mg/Kg, as were low concentrations of 1,1,1-trichloroethane, toluene and trace metals. PCBs were reported as below laboratory reportable limits.

Documents indicate tanks on trailers within a concrete containment structure in the parking area west of Building 2 were used as a temporary fuel oil storage facility for the Site until the existing 18,000-gallon storage tanks were installed in 1991. No indication was made relating to where the temporary storage facility was located. It was reported that a concrete floor was poured to form a base for the containment structure and the metal building was constructed to fully enclose the structure. GZA understands that this building and the tanks will be removed under the current Site redevelopment plans.

No direct investigations of soils was conducted within this building as the presence of the tanks and current containment structure made the area inaccessible to sampling. GZA notes, however, that analysis of soils from boring SB-111, northwest of the adjacent former electrical transformer pad (AOC-15) and just outside the northeast corner of the containment structure for AOC-14, reported ETPH at 3,900 mg/Kg and PAHs at concentrations greater than 12 mg/Kg, both above the I/C-DEC and GB-PMCs for those compounds. ETPH was also reported at 3,300 mg/Kg in the soil sampled from adjacent boring AOC-15-2, in excess of the I/C-DEC and GB-PMC. The boring is located on the west side of the pad, between the pad and the AOC 14 fuel oil containment building.

As no stains were reported on or near the concrete surface of the pad, it is inferred that the elevated ETPH reported in soils at AOC-15-2 and boring SB-111 are related to a release from the adjacent petroleum storage area at AOC-14, as indicated by impacted soils removed from the area in 1989. GZA understands the building, containment structure and the tanks will be removed as part of the planned restoration of the Site. Based on the above data, GZA infers that remedial actions will be required at this AOC after the tanks and containment structure are removed from the area.

AOC 16: BUILDING 7 LOADING DOCK

The loading dock for Building 7 is located on the southwest side of the building and opens to a paved parking area to the south. The building was formerly used for solvent coating of textiles after dyeing and finishing. Building 7 is to be demolished under the planned site redevelopment program.

Previous investigations included the analysis of soils from four borings (AM-1, ME-5, SB-117 and SB-118) advanced within the parking area outside (to the south) of the loading dock. Analysis of shallow soils (0.5 to 3.0 ft. bgs) indicated the presence of elevated concentrations of arsenic and PAHs in the soil at concentrations greater than the I/C-DECs. ETPH was also reported at a concentration above the R-DEC at boring AM-1. Low levels of ammonia (140 mg/Kg) and certain metals above background concentrations were also reported.

With the exception of arsenic, reported at 122 mg/Kg at boring AM-1, results of SPLP analysis of Site soils indicated all metals and PAHs tested leached at concentrations below GB-PMCs. Arsenic at AM-1 and PAHs is inferred to be exempt from PMCs as it is apparently related to coal ash observed in soils at that boring.

With the exception of ETPH and ammonia, the reported detected constituents are inferred likely to be representative of impacts associated with the fill material which underlies the majority of the building complex north of Brooklyn Street. Based on our review of the existing data set, additional investigations of deeper soils in the immediate vicinity of the loading dock were completed to better define the vertical extent of impacts there.

In April 2015, GZA sampled shallow and deeper soils within boring (AOC-16-1) to refusal (11 feet bgs) for ETPH, metals and ammonia to better define the vertical extent of impacts within that area. Arsenic was reported above the I/C-DEC at 11.7 mg/Kg in the 0 to 2 foot sample at AOC-16-1. SPLP analysis of that sample indicated all metals tested leached at concentrations below GB-PMCs. Concentrations of metals were reported below the DECs in soils from 9 to 11 feet bgs. ETPH and ammonia were reported below laboratory MRLs in that deeper sample. The above data do not indicate that impacts extended to deeper depths at that location. Based on the above data, some form of

remedial action is necessary to mitigate potential hazards or threats from exposure to arsenic and PAHs in excess of the I/C-DECs and ETPH in excess of the R-DECs.

AOC 17: BUILDING 9

Building 9 is located near the southeast corner of the northern building complex and was reportedly formerly used for general storage and dye storage prior to 1927. A 1989 survey of the Site reported storage of miscellaneous chemicals on the ground floor of the building. This building is to remain standing under current site redevelopment plans.

Earlier investigations included analysis of one shallow soil sample (SB-107 0.5 to 2.0 ft. bgs) obtained near the center of the room. ETPH was reported above the R-DEC at 680 mg/Kg and arsenic was reported at 22.9 mg/Kg, above the I/C-DEC. SPLP analysis of that sample indicated arsenic to leach below the GB-PMC. The vertical extent of the ETPH impacted soils within this area was not assessed by this investigation.

Phase III data gap investigations included the advancement of 0ne Geoprobe® boring (AOC-17-1) to bedrock or refusal at 4.5 feet bgs. Sampling of shallow soils obtained from 2 to 4 feet bgs reported ETPH and halogenated VOCs to be below laboratory MRLs. The above data do not indicate impacts at deeper depths to soils at that location. Based on these data, some form of remedial action is necessary to remediate potential exposures to petroleum constituents and arsenic in excess of R-DECs and I/C-DEC.

AOC 19: BUILDING 11

Building 11 is located in the northeast corner of the northern building complex and was formerly used for storage of equipment, as well as drums of oils and other chemicals. Prior to 1927, the building was reportedly used for dyeing operations. The lower floor contains a concrete trench system in the floor which was used to convey infiltrating groundwater out of the building (presumed to discharge to the American Mill Pond). The trench may also have been used for the conveyance of waste dye process water as well. This building is indicated as likely to be preserved under current redevelopment plans.

Soils were previously sampled and analyzed within this area at three shallow borings (SB-108, SB-109 and SB-110) and one deeper boring (AM-7) as part of previous investigations. The following is a synopsis of the analytical results indicating a release of constituents at those locations:

SB-109 (1.75') - PCE at 36 mg/Kg, TCE at 2 mg/Kg, ETPH 4,700 mg/Kg, As at 10.8 mg/Kg, Pb at 6030 mg/Kg;

SB-108 (1.75') - ETPH at 230 mg/Kg;

SB-110 (1.75') - PCE at 0.015 mg/Kg;

SB-119 (1.75') - PCE at 0.0072 mg/Kg

AM-7 (3'-4') - ETPH at 83 mg/Kg

The reported concentrations of PCE and TCE at SB-109 are greater than the GB-PMCs. The concentration of PCE is also greater than the R-DEC. The concentration of ETPH at SB-109 is also greater than the I/C-DECs and GB-PMCs. The concentrations of arsenic and lead are above the I/C-DECs, but did not leach at concentrations above the GB-PMC under extraction by the SPLP. We note that based on the results of subsequent sampling, we believe that the locations of borings SB-108 and SB-109 may have been erroneously reversed in earlier reports.

As part of GZA's Phase III Data Gap investigations the following additional investigations were completed within this area:

- Sampling of a soil vapor from below the floor slab at nine points in the area and hydraulically downgradient to boring SB-109 for Method TO-15 VOCs;
- Advancement of up to 9 Geoprobe® borings to 12 feet bgs or refusal (AOC-19-1 through AOC-19-9) and analysis of soils for CVOCs and ETPH; and
- Installation of one overburden groundwater well (GZ-4) within boring AOC-19-7 and analysis of groundwater for RCRA 8 metals, VOCs, and SVOCs.

GZA sampled soil vapor from 11 points (SV-1 through SV-9 and SV-15 and SV-16) within the northern portion of Building 11 and analyzed samples for VOCs by EPA Method TO-15. The VOCs reported in vapors below the floor slab were reported at concentrations well below R- and I/C-SVVCs. The highest concentrations of PCE were reported at SV-15 and SV-7 (at 756 ppb and 711 ppb, respectively), located near the northeast corner of the room. PCE was reported at 496 ppb at SV-8, near the northeast wall of the building and below 100 ppb at the remainder of the locations.

Based on these results, GZA advanced nine soil borings through the floor slab of the building. Borings AOC-19-6 and AOC-19-7 were completed at or near the locations of soil vapor sampling points SV-15 and SV-7, respectively. AOC-19-5 was completed near point SV-8. GZA notes again that multiple sampler refusals were encountered at AOC-19-8 and AOC-19-9; borings could not be advanced past 2.5 feet of depth at those locations. Additionally, a thick concrete floor slab also prevented completion of planned borings to the north and west of AOC-19-7, inferred possibly to be a buried loading dock or a building footing.

Laboratory analyses of soil samples indicate the highest concentrations of PCE were reported in soils sampled from boring AOC-19-7 in the northeast corner of the room. PCE concentrations were reported at 1,700 mg/Kg and 1,200 mg/Kg from soils sampled at 2-4 and 4-6 feet bgs, respectively. Both concentrations are above the I/C-DEC and GB-PMC

for that compound. PCE was also reported above the R-DEC and/or GB-PMC in soils sampled from borings AOC-19-4, AOC-19-5 and AOC-19-9.

The highest concentration of ETPH reported was 33,000 mg/Kg from soils sampled from at AOC-19-6 from 0.5 to 2 feet bgs. ETPH was reported above the I/C-DEC and GB-PMC in soils sampled from that boring, as well as from borings AOC-19-1, AOC-19-2, AOC-19-4, AOC-19-5 and AOC-19-7. ETPH was reported below the laboratory MRLs in the remaining soil samples.

In addition to the above, GZA installed overburden monitoring well GZ-4 at boring AOC-19-7 where highest concentrations of PCE were reported in soils to allow assessment of "worst case" impacts to groundwater at that location and allow gauging for the presence of PCE as a separate phase liquid. The well screen was installed on top of the bedrock surface and was screened from approximately 2.5 to 10.5 feet bgs. On April 30, 2015, the well was gauged and groundwater was sampled from the well. Groundwater was measured at 9.44 feet below ground surface and gauging of that well with an interface probe found no indication that separate phase product was present there.

Laboratory analysis of groundwater from that well reported PCE at 5,900 µg/L and TCE at 24 µg/L. The concentration of PCE was reported above the Industrial/Commercial Groundwater Volatilization Criteria (I/C-GWVC) of 1,500 µg/L.

The concentrations of metals, PCE and ETPH reported in soils at this AOC indicate remedial action will need to be undertaken to reduce concentrations to levels which are compliant with applicable RSR criteria or to render conditions there to a status that will eliminate potential exposure pathways to future occupants of the building. As the concentration of PCE in groundwater indicates a potential exposure threat from VOC vapors there, remediation of PCE will likely require some form of active remediation, as vapor extraction or chemical oxidation to reduce the concentrations present in soils there, followed by some form of active or passive sub-floor ventilation system to preclude potential exposures from vapors emanating upward from the groundwater, through soils to the inhabitable building space above.

<u>AOC 23: SITE GROUNDWATER</u>

GZA collected groundwater from existing and newly installed wells on three occasions April 30, May 18 and October 2, 2015. Sampling and analyses of groundwater from those wells was completed as follows:

AM-1 (metals, PAHs, ammonia 4/30/15)
AM-7 (metals, PAHs, VOCs 4/30/15)
ME-1 (metals, SVOCs, aniline, ammonia, phenol 4/30/15)
ME-2 (metals, SVOCs, aniline, ammonia, phenol4/30/15) (metals, SVOCs, VOCs aniline, 10/2/15)

ME-6 (metals, PAHs, VOCs)
MW-01 (metals, PAHs, VOCs)
MW-02 (metals, SVOCs, aniline, ammonia, phenol)
MW-03 (metals, SVOCs, aniline, ammonia, phenol)
GZ-1 (metals, SVOCs, aniline, ammonia, phenol)
GZ-2 (metals, SVOCs, aniline, ammonia, phenol)
GZ-3 (metals, VOCs and PAHs)
GZ-4 (metals, PAHs, VOCs)
GZ-5 (Not sampled – well dry at time of sampling)
GZ-6 (Not sampled – well dry at time of sampling)
GZ-7 (Not sampled – well dry at time of sampling)
GZ-8 (Not sampled – well dry at time of sampling)
GZ-9 (Not sampled – well dry at time of sampling)

Based upon the results of groundwater sampling, the following observations were made with regard to the three identified Site plumes:

Wells ME-1, ME-2, GZ-1, GZ-2, and MW-02 - Potential releases from historical fabric dyeing and coating operations at Building 14:

Groundwater in the area north and west of Building 14 is characterized by generally low concentrations of metals, SVOCs and ammonia below SWPC. Additionally, low levels of phenols were detected in ME-2 and aniline was detected at 0.47 mg/L in exceedence of the SWPC. GZA notes, that a black/blue color was observed in the well purge water at ME-2, likely indicative of the presence of aniline dye. Based upon our groundwater sample results, it appears a release of dye is present in Building 14 upgradient (southeast) of that well likely from the conveyance trenches or piping at AOC-4.

As part of the additional Phase III data gap investigations of this plume, GZA attempted to install a deeper bedrock well approximately 20 feet northwest and downgradient of ME-2 to assess deeper groundwater quality downgradient of that well. The well borehole was drilled to a depth of 35 feet, however, due to the apparent competent (non-fractured) bedrock, groundwater did not enter the bore hole after 24 hours. The well borehole was abandoned and deeper bedrock well GZ-7 was installed adjacent to the southwest corner of Building 13 to 35 feet bgs. Investigations found groundwater to be at or below the bedrock surface in that area.

Although groundwater monitoring completed in April and October 2015 indicated that aniline was present above the SWPC in well ME-2, aniline was reported below the laboratory MRL and SWPC in downgradient wells MW-02 and GZ-7 (October 2015) located to the northwest and upgradient of the American Mill Pond. As the concentration of aniline in groundwater is below the SWPC prior to the point of discharge to the pond, no exceedance of the SWPC is inferred there and impacts from this plume to Site groundwater quality are not inferred by this data set to require a remedial response.

However, four seasonal quarterly sampling event within 24 months or 12 rounds of groundwater sampling within 12 months are required to be completed to demonstrate compliance.

Wells AM-1 – Building 7 Loading Dock Area

Low concentrations of ammonia and SVOCs were detected in groundwater sampled from AM-1. The concentration of lead, at 0.031 mg/L was reported above the numeric SWPC of 13 mg/L. We note however that lead was reported below laboratory reportable limits in groundwater in downgradient well ME-6. Therefore, no exceedance of the SWPC for lead is inferred by this data set.

Other constituents tested were reported at concentrations below SWPC. GZA notes that, due to a very poor recharge of groundwater to AM-1, low flow groundwater sampling could not be completed at this well without excessive drawdown. As such, a grab groundwater sample was collected from that well. Therefore, this sample could be subject to upward bias do to elevated turbidity within that sample.

Wells AM-7, ME-6, and GZ-4 – Buildings 8 and 11

Copper, lead, mercury and zinc and several SVOCs were reported at concentrations above the SWPC numeric criteria in groundwater from well AM-7, located within Building 11. A low concentration of PCE (1.8 µg/L) was also reported in that sample, well below SWPC and Residential-Groundwater Volatilization Criteria (R-GWVC). GZA notes that, due to the very low rate of recharge of groundwater to that well during sampling, low flow sampling could not be completed without incurring excessive drawdown at that well. A grab sample was therefore obtained and tested from AM-7. Based on this circumstance, concentrations may be biased upward due to elevated turbidity in that sample.

PCE was reported at a concentrations of 5,900 µg/L in groundwater at GZ-4, greater than the SWPC and the I/C-GWVC. Additionally, vinyl chloride was reported above the I/C-GWVC in groundwater at ME-6, located just outside Building 11 to the north. Based upon our groundwater sample results, it appears a groundwater plume with concentrations of metals, SVOCs and VOCs above SWPC and VOCs at concentrations greater than I/C-GWVCs is present below Bldg. 11. Concentrations of COCs in the groundwater plume downgradient of the Site has not been assessed under this program.

5.0 ASSESSMENT OF REMEDIAL ALTERNATIVES

GZA's analysis of Site characterization data has identified conditions at ten of the twenty-five AOCs at the Site where some form of remedial action will be required to achieve compliance with applicable RSR criteria. Since the same remedial methods can be applied to multiple AOCs with similar environmental conditions, we have organized the remaining Sections of this RAP to group AOCs by remedial methods, where applicable, for

expediency. The table below groups AOCs that require further action or remediation by environmental condition:

Grouped AOCs	Summary Environmental Condition
AOC 12 **AOC 13** **AOC 17** **AOC 18**	Degraded fill below the floor slab of Buildings 3, 7, 8 and 9 containing coal ash and asphalt with concentrations of metals (primarily arsenic), ETPH and PAHs at levels greater than R-DECs and I/C-DECs. Note: PAHs in soils are inferred exempt from GB-PMCs due to the presence of coal ash.
AOC 7	Soils below floor of Building 12 containing concentrations of ETPH above the I/C-DEC and GB-PMC.
AOC 14 **AOC 15**	Soils adjacent to the former electrical transformer concrete pad and presumed below the two 18,000-gal USTs and containment building containing ETPH above the I/C-DEC and GB-PMC.
AOC 16	Building 7 loading dock soils with concentrations of arsenic and PAHs greater than I/C-DEC R-DECs and ETPH greater than R-DEC.
AOC 19	Soils beneath the floor of Building 11 with metals greater than I/DECs, ETPH and VOCs greater than I/DECs and GB-PMCs and VOCs in groundwater greater than SWPCs and I/C-GWVCs.
AOC 25	Sediments in American Mill Pond with concentrations of metals greater than Threshold Effects Criteria (TECs).

In several of the environmental conditions above, an environmental land use restriction (ELUR) could be employed to achieve compliance with RSRs remedial criteria. An ELUR is an institutional control that is placed on the property deed which restricts certain activities at the Site. ELURs are prepared by the environmental consultant and an attorney and licensed surveyor. There are many options or different types of land use restrictions available and using any one of the options usually allows for soils (all of them or a portion below a certain depth) to be left in place in-lieu of remediation by excavation or some other physical remedial approach. For the purposes of the RAP, we assessed the following land restriction options:

1. *Property Wide Residential Activity Restriction* – By applying this restriction, the entire Site or a portion of the Site would be restricted to industrial/commercial use. Using the restriction allows for the use of the less stringent I/C-DEC. If this option is used, any activity relating to a residence or dwelling, including but not limited to a house, apartment, or condominium or a school, hospital, day care center, playground or outdoor recreational area, would not be allowed.

2. *Rendering soils environmentally inaccessible* – When exceedences of the R-DEC or I/C-DEC are observed, the application of an ELUR to render soils inaccessible is a way to achieve compliance with the RSRs. Soils may be rendered as inaccessible with the application of an ELUR if they meet one of the following criteria:

   - More than 4 feet below the ground surface;
   - More than 2 feet below a 3 inches thick (or more) paved surface (depth can include road base materials);
   - Directly below 3 inches (or more) of pavement if contaminants are petroleum hydrocarbons, PAHs or metals (metals must be less than 2 times the applicable DEC);
   - Beneath a building; or
   - Beneath another structure that is used to prevent contact with underlying soils and has been approved, as such, by the CTDEEP Commissioner.

   The application of an ELUR restricting the disturbance of the overlying clean soil, pavement or structure over the affected soils would be necessary to enable the soils to be defined as inaccessible under the RSRs.

3. *Rendering soils environmentally isolated* – When exceedences of the GB-PMC are observed, the application of an ELUR to render soils environmentally isolated is a way to achieve compliance with the RSRs. Soils are defined as environmentally isolated with the application of an ELUR if they are:

   - Beneath a building or other structure approved by the Commissioner and
     - Are not a continuing source of pollution;
     - Not polluted with volatile organic compounds; and
     - Above the seasonal high water table

As in the case above, the application of an ELUR restricting the demolition of the overlying building or structure or the disturbance of the overlying floor would be necessary to enable the soils to be defined as inaccessible under the RSRs.

A discussion of the remedial methods considered in each of the AOC groups follows.

5.1 AOCS 12, 13, 17 AND 18 - DEGRADED FILL BELOW BUILDINGS 3, 7, 8 AND 9 AND AOC 7 - BLDG. 12

As outlined in the sections above, results of earlier and current Phase III Data Gap investigations indicated that soils below the complex of site buildings north of Brooklyn Street typically consist of urban fill containing asphalt fragments and coal ash. Soils below Bldg. 1 (AOC 12), Bldg. 7 (AOC 13), Bldg. 8 (AOC 18) and Bldg. 9 (AOC 17) were reported to

contain concentrations of PAHs, ETPH and metals (primarily arsenic and lead) at levels greater than R-DECs and I/C-DECs. Concentrations of certain PAHs were also reported above GB-PMCs, however, PAHs concentrations were found to be associated with the presence of coal ash and therefore are inferred to be exempt from the pollution mobility criteria.

In addition to the above, soils below Bldg. 12 (AOC 7) were found to contain concentrations of ETPH at levels above I/C-DECs and GB-PMCs.

Under current Site plans, Buildings 1, 3, 9, 11 and 12 are to remain in place and Buildings 7 and 8 are to be demolished. We understand that future site use plans under consideration for the property include potential residential usages. The Site is located in a GB area and public water is supplied to the Site and surrounding neighborhood. Therefore, the remedial goal for Site AOCs is compliance with the R-DECs and GB-PMCs.

5.1.1 DECs

Under the RSRs there are various options that may be deployed to bring the soils impacted with ETPH, metals and PAHs above the R-DECs into compliance with Connecticut RSR remedial criteria. The following remedial alternatives were evaluated to address these DEC exceedances:

1. Removal of the concrete floor slab above the affected areas and the direct excavation of the impacted soils.
2. Enhanced bioremediation of elevated concentrations of ETPH and PAHs through the injection of an oxidizer (hydrogen peroxide solution) and bioventing the soils; but does not address exceedances of metals.
3. Leave the concrete floor slabs in place over the affected areas and the application of an ELUR on the areas to prevent the disturbance of the slabs and soils and render the soils below inaccessible.

Excavation of Soils

Under our assessment, option 1 was rejected due to GZA's observations of the site indicating the foundations supporting the buildings within this area are constructed of fieldstone and mortar. Due to the age of the structures (some greater than 100 years) there is the potential that the mortar with the walls has degraded through time and the adjacent soils are now supporting lateral loading being imparted on the walls from the weight of the overlying buildings. Removal of impacted soils from adjacent to the foundations supporting these buildings could potentially destabilize the foundations and make them prone to potential collapse. Therefore, some form of shoring or support of the walls would be required to safely excavate the soils below the floor slabs within these areas and protect against potential damage to the structures. Stabilizing these structures would be cost prohibitive.

Enhanced Bioremediation

Enhanced bioremediation involving the advancement of the rate of the natural destruction of organic contaminants by indigenous microorganisms (*e.g.* yeast, fungi, or bacteria) naturally present in contaminated soil and water and eat and digest organic substances through the application of nutrients and energy in the form of oxygen. Under this assessment, the enhancement of the natural biodegradation of ETPH and PAH compounds in soils below the Site buildings through the application of a dilute Hydrogen Release Compound (HRC) or oxidizing solution (e.g., Hydrogen Peroxide) and venting soils was assessed as a potential remedial option for this Site to address organic impacts. Inorganic soils exceeding RSR criteria could not be brought into RSR compliance with this approach.

In a conventional bioventing system, oxygen is delivered to impacted soils by forcing air through the unsaturated soils through evenly spaced subsurface wells using an electric blower. The increased level of oxygen delivered by the injected air into the unsaturated zone, strips volatile organic compounds, enhances the activity of the native bacteria present in the soils and stimulates the natural biodegradation of hydrocarbons present there.

This option was rejected due to the following factors:

- It is difficult to get an even application of the HRC compounds into unsaturated soils. An uneven application can result in biological growth being limited to the region near the injection well and inadequate contaminant-microorganism contact throughout the contaminated zone.
- This effort and costs required for the purchase of the chemicals and construction of a bioventing system over the wide area of impacts below the northern building complex are estimated to be high.
- Remediation of the areas of impacts to concentrations below R-DECs and GB-PMCs through enhanced bioremediation techniques is estimated to take one to three years and does not meet the goal of the site development program to complete required remedial activities within nine months (by June 2016).

Application of an Environmental Land Use Restriction to Render Soils below Floor Slabs Inaccessible

As GZA's investigations of the Site have indicated that concrete floor slabs within the impacted areas are greater than 3 inches in thickness, soils directly below the floor slab containing petroleum hydrocarbons, PAHs or metals[1] at concentrations exceeding the DECs may be rendered as inaccessible soils under the Connecticut RSRs and allowed

[1] Metal concentrations are less than 2 times the I/C-DEC.

to remain in place through the application of an ELUR restricting the disturbance of the overlying concrete and the impacted soils below.

Due to the need for expediency to complete the required remedial efforts at the Site and the relative low cost and level of effort, the application of an ELUR to render these soils in accessible was selected as the preferred remedial alternative for those AOCs.

5.1.2 AOC 7 - Petroleum Impacted Soils Exceeding R-DECs and GB-PMC below Building Bldg. 12

Soils below the northwestern portion of Bldg. 12 (AOC 7) were found to contain concentrations of ETPH at levels above R-DECs and GB-PMCs. Soil and groundwater sampling completed outside the building and to the northwest (downgradient) of the affected area did not detect petroleum constituents at levels exceeding applicable remedial criteria. Based on that data, no indication was found that the petroleum release had migrated beyond the footprint of that building at any appreciable concentrations and that proposed remedial actions for the area can be confined to the footprint of that building.

The following systems/scenarios were assessed as remedial alternatives to mitigate potential hazards or threats from the petroleum constituents present below Building 12 in excess of R-DECs and GB-PMCs.

1. Removal of the concrete floor slab and the direct excavation of the impacted soils to the bedrock surface.
2. Enhanced bioremediation of elevated concentration ETPH and PAHs through the injection of an oxidizer (hydrogen peroxide solution) and bioventing the soils.
3. Application of an Environmental Land Use Restriction to render soils below the floor slab and building inaccessible and environmentally isolated.

Scenario 1 was rejected, as in the previous section, due to the potential for the weakening and possible destabilization of the building's foundation that could result from removal of impacted soils that are acting to support that structure and the prohibitive costs that would be associated with the construction of shoring or support of the walls needed to safely excavate soils from below the floor slab.

Scenario 2 was not selected based primarily on the projected cost for the installation and operation of the system and uncertainties regarding the ability of the system to remediate the impacted soils to program target levels within the nine month time frame of the site development plan.

As Bldg. 12 is to be left standing in place under current site development plans, it is recommended that ETPH in soils below the concrete floor exceeding I/C-DECs and GB-

PMCs be left in place and rendered inaccessible and environmentally isolated through the application of an ELUR restricting the demolition of Bldg. 12 and the disturbance of the floor slab and the underlying soils.

5.2 AOCS 14/15 – EXTERIOR SOILS IMPACTED WITH PETROLEUM ABOVE I/C-DECS AND GB-PMCS

Soils sampled from areas between the former transformer concrete pad and the former fuel oil tank containment building was found to contain concentrations of ETPH (up to 3,900 mg/Kg) and PAHs (as high as 12,000 µg/kg) above the I/C-DEC and GB-PMC. This area of impact is understood to be most probably related to a historical release of No. 2 fuel oil from two 20,000-gallon underground storage tanks reported when underground storage tanks and impacted soils were removed from the area in 1989. The former UST locations are now below the current fuel oil storage tank containment building. It is our understanding that the containment structure and the tanks at AOC 14 will be removed by the Town as part of the planned restoration of the Site. Investigation of soils in the area was obstructed by the two 18,000-gallon storage tanks within the containment structure. Therefore the full extent of impacts to soils from this release could not be determined under the previous investigations. For the purposes of this RAP, we therefore assume that these soils below the footprint of the containment structure are impacted from the historical petroleum release and will require remediation under this program.

The following systems/scenarios were assessed for the remediation of the petroleum hydrocarbons in the soils within this area.

1. The direct excavation of the impacted soils to the bedrock surface.
2. Enhanced bioremediation of elevated concentration ETPH and PAHs through the injection of an oxidizer (hydrogen peroxide solution) and bioventing the soils.
3. Construction of “engineered” control consisting of an impermeable cap over the affected areas (to prevent direct exposure to impacted materials below and impacts to underlying groundwater from the infiltration of precipitation through the affected soils) and the application of and ELUR on the area to render the soils below inaccessible and environmentally isolated.

Scenario 2 was not selected based primarily on the projected cost for the installation and operation of the system, uncertainties regarding the ability of the system to remediate the impacted soils within the nine month time frame of the site development plan, as outlined in the section above.

Construction of an impermeable cap described under scenario 3 would typically require the excavation and or grading of the surface above the impacted soils in preparation for the placement of the cap, and placement of a base layer of some relatively impermeable fill, placement of an impermeable membrane over the area with welded sections at the seams to prohibit the infiltration of precipitation, placement of a layer of sand or some

permeable fill above to allow drainage of precipitation off the membrane surface and placement of a cap of soils and pavement or other surface (including shallow plantings) over the area to protect against damage of the underlying structure. As indicated above, an ELUR would need to be placed on the area to restrict the disturbance of the cap and the soils below and to render the impacted soils inaccessible and environmentally isolated.

The approval of an "engineered control" as a remedial solution by the CTDEEP requires the review and approval of the design plan by CTDEEP prior to construction, development and implementation of an inspection and maintenance program for the cap and implementation of a long term (30 year) groundwater monitoring program after construction to demonstrate the continued effectiveness of the cap (preventing the infiltration of precipitation through the impacted soils and mobilization of contaminants and degradation of the underlying groundwater). The approval also requires the placement of a sum of money under the control of the CTDEEP sufficient in amount to complete inspection, maintenance and monitoring activities as financial assurance that these activities can be carried out as required into the future.

Based on the projected costs for the construction and continued care of the system, as well as the carried legacy and logistical complexities related to the need for the continued maintenance of such a structure, Scenario 3 was not selected as a remedial option for this AOC.

Due to the high level of assurance of the effectiveness of the measure and the relative short period of time needed for its completion, the direct excavation and offsite transport and disposal was selected as the preferred remedial option for this AOC. Details of the areas, volumes and completion of this method are outlined in Section 6.4.

5.3 AOCS 16 – EXTERIOR SOILS IMPACTED WITH ETPH, METALS AND PAHS ABOVE R AND I/C-DECS

Soil samples from this area contained concentrations of PAHs and metals (particularly arsenic) in excess of I/C-DECs and PAHs above GB-PMCs. However, as the soils in this area were found to contain coal ash fill and the PAHs appear related to the presence of that fill, the fill is inferred to be exempt from the GB-PMC under the RSRs. Due to the presence of arsenic at concentrations greater than two times the I/C-DEC, this area cannot be directly paved to achieve compliance with I/C-DEC.

Based on the above factors, the following remedial scenarios were assessed for this AOC:

1. The direct excavation of the impacted soils to the bedrock surface.
2. Excavation of 2 to 4 feet of soil and the placement of 2 feet (plus pavement) or 4 feet (without pavement) clean soils as a cap over the area and the placement of an ELUR on the area to render the soils below inaccessible.

Excavation of the loading dock area from Building 7 to Brooklyn Street is planned. Since the Town plans to redevelop the area surrounding the proposed excavation as graded areas without overlying pavement or buildings, excavation will initially be to 2 feet below grade. The excavation would extend from Brooklyn Street to the foundations of Buildings 7 and 9 to the north and east. The excavation would extent approximately 40 feet west of Building 9 to the concrete slab covering the raceway. After excavating to 2 feet below grade, samples would be collected from the base of the excavation and be analyzed for total arsenic. If soils at the base of the excavation exceed R-DEC, the Town will have to decide whether to backfill the area with clean soil and install pavement that is 3-inches thick or more (to render soils below inaccessible) or to continue excavation to 4 feet below grade, so soils could be rendered inaccessible below 4 feet of clean fill without pavement.

5.4 AOC 19 – SOILS AND GROUNDWATER BELOW BUILDING 11 IMPACTED WITH ETPH AND METALS AND CHLORINATED VOCS

Soils below the floor of Building 11 are impacted by metals (primarily arsenic and lead) at concentrations above R-DEC and ETPH at levels above R-DECs, and GB-PMCs and, below the northern portion of the building, chlorinated VOCs (primarily PCE and TCE) at levels above R-DEC and GB-PMCs. Additionally, analysis of groundwater in well GZ-4, screened in the saturated soils below the northern portion of the building, indicates groundwater below the northern portion of the building contains elevated concentrations of chlorinated VOCs at levels above the SWPC and R-GWVCs. Under the current development plans for the Site, Building 11 is to be left standing.

The following remedial alternatives were evaluated to address these DEC exceedances:

It is recommended that the exceedance of the R-DECs and GB/PMCs by metals, PCE and ETPH in soils below the floor slab of Building 11 be address through the implementation of an environmental land use restriction over the footprint of the building that would prohibit the disturbance of the floor slab or underlying impacted soils, the demolition of the building and the infiltration of precipitation through the impacted soils below. However, this plan would require that VOCs present in the soils or groundwater be remediated to the maximum extent prudent.

In order to address the RSR requirement for environmentally isolated soils that VOCs must be remediated to the maximum extent prudent, the following systems/scenarios

were assessed for the remediation of the petroleum hydrocarbons and chlorinated VOCs in soils and groundwater below the floor slab in the northern portion of Building 11:

1. Reduction in concentrations through enhanced bioremediation and air stripping of the contaminants in the unsaturated soils via a forced air bioventing system and within the saturated soils and groundwater below through a combined air sparging / vacuum extraction system. This method may also require the installation of some form of active or passive sub-floor ventilation system to impede potential migration of organic vapors from any remaining VOCs upward into the inhabitable building space.

2. The direct excavation and proper off site transport and disposal of the impacted unsaturated soils and the in situ chemical destruction of chlorinated solvents and petroleum hydrocarbons in the underlying groundwater and saturated soils through direct injection of chemical oxidizers (e.g., ozone, hydrogen peroxide, potassium permanganate and or a formulated product such as *Plume Stop®*), installation of an impermeable membrane vapor barrier over the base and up the sides of the excavated area, backfilling the area with clean soils and the installation of an active vacuum ventilation system below the reconstructed floor slab.

3. Excavation of impacted soils above the water table, placement of soils within lined roll offs and direct application of chemical oxidant solution into the soils to chemically destroy petroleum hydrocarbons and chlorinated VOCs, the in situ chemical destruction of petroleum hydrocarbons and chlorinated VOCs in the saturated soils and water table below through chemical injection (as described in Scenario 2 above), the placement of the treated soils back into the excavation after treatment, and the installation of an active vacuum ventilation system below the reconstructed floor slab to preclude the potential migration of remnant vapors into building.

4. Removal of the concrete floor and chemical destruction of petroleum hydrocarbons and chlorinated VOCs in the unsaturated and saturated soils through the installation of an infiltration gallery over the area of impacted soils and three groundwater injection wells into the saturated overburden materials. A chemical oxidant would be applied to the surface soils via a manifolded system of perforated pipes and allowed to infiltrate under gravity down through the unsaturated soils and to treat/destroy petroleum and VOC contaminants present within those soils. Additionally, chemical oxidant or a formulated product such as Plume Stop® would be injected directly into the groundwater to remedy impacts there. As a final step, a passive ventilation system would be installed above the infiltration gallery and the floor slab reconstructed.

During our investigations of this AOC, it was noted that the upper floors of Bldg. 11 are being supported in part by a line of steel columns down through the center of the lower floor of the building. Plans depicting the construction of the building are unavailable. Therefore, it is unknown whether the columns are supported by the underlying bedrock, concrete footings, or pilings set within the soils. Additionally, the foundations of the building are fieldstone and mortar constructions as observed to be the case for other buildings within the complex. Based on these conditions, Scenarios 2 and 3 were rejected as the excavation of soils from below the floor of the building could potentially lead to the destabilizing of the structural support provide by the foundation walls and columns for the building and create a potential for the damage or collapse of the structure.

Enhanced bioremediation proposed in Scenario 1 was also rejected as the estimated time that would likely be required for concentrations of organic constituents to be degraded to levels meeting Site remedial criteria would not meet the goal of the site development program to complete required remedial activities within nine months (by June 2016).

Therefore, chemical destruction through application of chemicals through an infiltration system as outlined in Scenario 4 along with a passive soil vapor venting system is the selected remedial action for this AOC. Details regarding the construction of this system are outlined in Section 6.7.

5.5 AOC 25 – SEDIMENTS IN AMERICAN MILL POND IMPACTED WITH METALS ABOVE EFFECTS THRESHOLD BENCHMARKS

Sediments at the bottom of the impounded portions of the Hockanum River (ponds), found upstream and downstream of the Site buildings, contain concentrations of metals (cadmium, chromium, lead, and mercury) and PAHs that are elevated compared to effects threshold screening level benchmarks. Concentrations of metals in downstream sediments are greater than upstream concentrations. Analytical data infer releases from historical Site operations and/or upstream sources may have impacted sediments within the American Mill Pond at levels that could result in potential adverse impacts to benthic biota in the pond (ecological risk). We note that the sediment data set is limited and contaminants in sediment are often unevenly distributed in such a shifting, fluvial aquatic system.

5.6 SOIL MANAGEMENT AT OTHER AREAS

GZA notes that soils may be excavated from portions of the Site in order to construct foundations should any new buildings be proposed. The materials excavated for new buildings will include shallow fill materials that have low level impacts below the RSRs but must be managed as “polluted soil” due to the presence of asphalt fragments, coal ash and other low level contaminants from historical mill operations or poor quality fill. A soil management plan should be developed and implemented to address “polluted soil” that will be excavated but does not fall under the five specific contamination conditions listed

in the table above. If design of the new buildings allows placement of excavated soils as fill below buildings, the fill could be made to be inaccessible and environmentally isolated with ELUR and therefore would not pose a risk to Site occupants. However, if the excavated materials must be exported off-Site, then the materials should be properly recycled or disposed of at a facility that can accommodate "polluted fill". Excavated materials from the Site should not be considered "clean fill" based on available data.

Please note that under all remedial alternatives discussed in this RAP, a compliance groundwater monitoring program (Site-wide) consistent with the RSRs will be required at the completion of the work (see Section 7.0). Since Site-wide compliance groundwater monitoring is described later in this RAP, we have not repeated groundwater monitoring procedures as part of the remedial methods described below in Section 6.0. Based on past groundwater monitoring and the physical properties of the primary constituents of concern, we do not anticipate compliance monitoring will trigger the need for further remedial actions. We will be prepared, however, to address future groundwater data as it is received, if data does not demonstrate groundwater compliance.

6.0 REMEDIAL ACTION PLAN

6.1 PRE-REMEDIATION ACTIVITIES

6.1.1 Public Notice

In accordance with the requirements of Section 22a-134(a)(i) of the Connecticut General Statutes, a public notice of remedial action was completed for the site to alert the general public of the planned remedial action and provide the opportunity for public comment on the planned remedial actions for the Site. The following actions were completed in accordance with requirements of the above cited Statute:

- A six (6) by four (4) foot sign was erected on the 105 East Main Street property at and maintained for greater than forty-five (45) days. The sign which was clearly visible from East Main Street and included the words "ENVIRONMENTAL CLEAN-UP IN PROGRESS AT THIS SITE. FOR FURTHER INFORMATION CONTACT: John Ward Town of Vernon at 860-870-3665".

- A legal notice of pending remedial action was published in the Journal Inquirer, a newspaper having a substantial circulation within the Town of Vernon and surrounding area, on September 3, 2015. The published notice provided contact information for persons whom may be reached with comments or inquiries and the location where the Draft Remedial Action Plan and supporting documents could be reviewed upon request.

- Copies of the draft remedial action plan and supporting documents were made available for public viewing at the Administrative Department on the third floor of

the Town Memorial Hall Building in Vernon, Connecticut beginning September 3, 2015.

- A letter of notification of pending remedial action was sent to the acting Director of the North Central District Health Department in Enfield Connecticut on August 28, 2015 and providing contact information for the Town Administer, John Ward, if any inquiries were requested.

- The 45-day public review period closed on October 18, 2015 According to the town, they received no comments or questions with regard to the planned remedial activities within that period.

Copies of the letter and published public notice and a photograph of the erected sign are presented in Appendix C.

6.1.2 Health and Safety Plans

Health and Safety and Soil Management Plans will be implemented during construction to address exposure to and management of the contaminated materials that may be generated. The Contractor(s) performing environmental remediation must prepare a Site-specific Health & Safety Plan for the protection of its workers, other Contractors on-site and the general public. This plan must be provided prior to site work.

6.1.3 Site Preparation

According to current site development plans, Buildings 2, 7, 8, 13 and 14 are to be demolished by the Town. Coordination with the Town to sequence remediation and demolition to prevent inadvertent mixing of contaminated and non-contaminated soils will be necessary. Building demolitions are separate activities not included as part of this RAP.

All utilities that are present at and in the near vicinity of remediation areas must be de-energized and cut-off upstream of the remediation areas to allow unrestricted access for excavation within the remediation areas. We understand that the Town will de-energize and cut-off utilities at location(s) of its choice so as to control future reconnections of utilities.

6.2 AOCS 12, 13, 17 AND 18 – ENVIRONMENTAL LAND USE RESTRICTION ON DEGRADED SOILS BELOW BUILDINGS 3, 7, 8 AND 9

We understand the intended future use of the property may include some combination of commercial use for offices and retail operations mixed with residential use. Environmental investigations have indicated that degraded urban fill materials are present below much of the complex of Site buildings north of Brooklyn Street.

Concentrations of ETPH, PAHs and metals (primarily arsenic and lead) were identified in soils below Buildings 3, 7, 8 and 9 at concentrations above R-DECs and I/C-DECs. Under current site development plans, Buildings 1, 2, 7, 8 and 14 are to be demolished by the Town. Therefore, to mitigate existing or potential environmental risks related to potential exposure contaminants of concern present in this fill material after demolition, we recommend that the concrete floor slabs be left intact and in place as part of the demolition process and that an ELUR will be placed on the portion of the northern Site parcel currently covered by the footprint of the northern complex of buildings. The ELUR will restrict the disturbance or removal of the concrete slabs and the soils below to render the soils as "inaccessible" under the RSRs and exempt from the DECs. The ELUR can be lifted and modified once final development plans are understood.

The ELUR will allow fill materials with contaminants that exceed the DECs to remain in place, while protecting Site workers and/or occupants from future exposure to impacted soils. Site development plans must consider the ELUR and its limitations when designating excavation areas or demolition of buildings. Since maintaining an appropriate cover is a key element of the ELUR, it will not be finalized and implemented until Site development is complete. The ELUR requires a designation of Regulated Areas that will be inaccessible, environmentally isolated or limited in their use. The Regulated Areas must be represented on an A-2 Level Survey Map of the Site which will be placed on file with Vernon Land Records.

6.3 AOC 7 - ENVIRONMENTAL LAND USE RESTRICTION ON PETROLEUM IMPACTED SOILS BELOW BUILDING 12

An area below the concrete floor slab of Bldg. 12 in the vicinity of boring AOC-7-2 was identified to contain concentrations of ETPH in shallow soil at 8,000 mg/Kg, above the I/C-DEC and GB-PMC. Additional testing outside the building confirmed ETPH does not exceed RSR criteria beyond the building footprint. Under current site development plans, Buildings 12 is to be left standing by the Town. Therefore, to mitigate potential environmental risks related to possible exposure to petroleum contaminants below the floor, an ELUR will be placed on the portion of the southern property parcel covered by the footprint of Building 12. The ELUR will restrict the demolition of the building and disturbance or removal of the concrete slabs and the soils below to render the soils as "inaccessible" and "environmentally isolated" under the RSRs and exempt from the DECs and PMCs.

6.4 AOCS 14/15 – EXCAVATION OF PETROLEUM IMPACTED SOILS BELOW EXISTING 18,000-GALLON FUEL OIL TANKS AND CONTAINMENT BUILDING AND AOC 15 (EXISTING TRANSFORMER PAD)

A release of fuel (Number 2) oil is suggested by documentation of a failed tank tightness test for former USTs which were removed in 1989 and were co-located with current 18,000-gallon ASTs at AOC 14. Access to this area is restricted by the presence of existing ASTs

and their concrete containment structure. Based upon our soil sampling result and the reported failed tank tightness test, impacts to soils below AOC-14 are likely. However, if the containment structure is removed and no evidence of a release is noted, then no action would be recommended other than excavating soils at AOC-15 to at least 2 feet and collecting a confirmation sample to show soils below 2 feet are compliant. If soils are not compliant, then an additional 2 feet of soils would need to be removed and an ELUR applied rendering soils inaccessible.

If impacts were observed at AOC-14, excavation of the ETPH impacted soils at the AOC 15 transformer pad will be completed at the same time as the AOC 14 excavation since these two areas are adjacent.

The remedial soil excavation will be completed after the steel ASTs, their concrete containment and the surrounding metal building are removed to allow access to the potentially impacted soils below the containment.

It is our understanding the Town plans to redevelop the area surrounding the proposed excavation as landscaped areas without overlying pavement or buildings, therefore excavation will initially be to 2 feet below grade across the approximately 30 foot by 40 foot area surrounding the tanks and encompassing the west half of the transformer pad footprint, where elevated ETPH was detected. After removal of 2 feet of soil, confirmation samples will be collected at 2 feet below grade and approximately 10 samples will be analyzed for ETPH. If soils at the base of the excavation exceed R-DEC or GB-PMC; excavation must continue until results comply with R-DEC at 500 mg/kg and GB-PMC at 2,500 mg/Kg.

We anticipate excavation will be limited to select areas where petroleum impacts are evident. However, it is possible that the entire area beneath the AST containment is impacted with petroleum. Therefore, as a contingency, we have estimated the soil excavation area will be 30 feet by 40 feet, and will extend to 7 feet below grade beneath the concrete containment (approximate depth to top of bedrock).

Soil excavation at AOC 14 and 15 is anticipated to generate approximately 350 to 370 cubic yards of impacted soil if the entire 30 foot by 45 foot area is contaminated down to the top of bedrock at approximately 7 feet below grade. A more likely scenario is that petroleum impacts above GB-PMC will be limited to smaller areas where the former USTs or their piping failed. Also, excavation may be limited to 2 feet below grade (volume of approximately 100 to 120 cubic yards) if samples at 2 feet deep are in compliance with the R-DEC and GB-PMC. We note that soil above GB-PMC will have to be excavated down to rock unless a building or impermeable cap is planned over the area which would allow the soils to be rendered “environmentally isolated”. At this time, it is our understanding that new buildings will not be constructed over the excavation areas after remediation.

6.5 AOC 16 – EXCAVATION OF SOILS SOUTH OF BUILDING 7 AT LOADING DOCKS

Soil sampled from this area exceed R-DEC and I/C-DEC and contain coal ash. Fill contaminated due to coal ash is exempt from the GB-PMC under the RSRs. Soil samples from this area were found to contain ETPH, arsenic and PAHs at concentrations exceeding R-DECs. GZA notes, this area is a loading dock with a sloped asphalt driveway that is approximately 3.5 to 4 feet below grade by the loading dock doors. The soils in excess of RSR criteria are located near the loading dock doors. As such, if the loading dock were to be removed and soils brought to grade, it is likely the detected arsenic and PAH concentrations would be at least 4 feet below the ground surface. As such, an ELUR rendering soils within this area inaccessible would be an option. The other option would be to excavate soils in the loading dock area from Building 7 to Brooklyn Street.

It is our understanding the Town plans to redevelop the area by the loading docks as landscaped areas without overlying pavement or buildings. Therefore, soils will be excavated to a maximum of 4 feet below grade and the area and backfilled with clean soils to render the remaining residual contaminants in underlying soils as inaccessible. The area of excavation would extend from Brooklyn Street to the foundations of Buildings 7 and 9 to the north and east and to the west from Building 9 to the concrete slab covering the raceway.

Soil excavation at AOC 16 is anticipated to generate approximately 330 to 350 cubic yards of impacted soil if the entire 40 foot by 55 foot area is removed down to four feet below grade. However, excavation may be limited to 2 feet below grade (approximate volume of 165 to 175 cubic yards) if samples at 2 feet deep are in compliance with R-DEC. At this time, it is our understanding that new buildings will not be constructed over the excavation areas after remediation. If soils at the base of the excavation exceed R-DEC, the Town will have to decide whether to backfill the area with clean soil and install pavement that is 3-inches thick or more (to render soils below inaccessible) or to continue excavation to 4 feet below grade, so soils could be rendered inaccessible below 4 feet of clean fill without pavement.

The total volume of impacted soil that needs to be excavated from the Site to achieve compliance with the RSRs will vary depending on selection of final cover (landscaping, pavement, new buildings) for the areas that have been identified and analytical results for samples collected at each stage of the remedial process. We estimate the volume of excavated impacted soil could range from 340 to 810 cubic yards.

We note that the contaminated soils that are excavated from AOCs 13, 14, 15 and 16 could potentially be used as fill within the footprint of Building 2, which has a basement and based on discussions with the Town will be demolished during Site redevelopment. Placement of the impacted soils within the Building 2 footprint and then construction of a new building over this area would render the impacted soils “inaccessible” and “environmentally isolated” below a building with an ELUR. The basement level of

Building 2 is estimated to be 40 feet by 70 feet by 8 feet high, with a volume of approximately 933 cubic yards. Therefore, the estimated maximum volume of contaminated soil from AOCs 13, 14, 15 and 16 would potentially fit in the Building 2 area as long as a basement is not planned for the new building that will cover the Building 2 area.

6.6 MANAGEMENT OF SOIL, STORMWATER AND GROUNDWATER

6.6.1 Management of Soil during Remedial Excavation

The full extent of the remedial excavation areas are not yet known, but have been estimated based on available data. Excavation will proceed to the limits noted above, or will be adjusted based on field observations and/or analytical testing results. All materials excavated during remedial activities will be observed for visual and olfactory indications of contamination and field- screened with a photoionization detector (PID) by a qualified environmental scientist.

At this time we anticipate the impacted soil will be directly loaded to trucks for off-Site disposal or relocated on-Site, if design of the proposed buildings has room for such fill placement. Based on soil testing completed to date and waste characterization results, excavated soils can be combined for disposal due to the presence of similar contaminants at similar concentrations.

During excavation, the remedial contractor will follow the procedures below.

- The contractor will prevent contaminated soil from falling to the ground as it is loaded to shipping containers. Shipping containers will be placed adjacent to the excavation area and plastic sheeting will be laid down around the container to contain soils that might fall from the excavator as loading proceeds. At the end of remedial excavation, soils that have fallen to the ground will be cleaned up by the contractor and the residual soils and plastic sheeting will be placed in the shipping container for disposal.

- Pavement and concrete removed to access underlying soils is typically not suitable as fill and is usually removed and disposed of off-Site. However, if proposed building design includes fill areas that do not require structural fill, then re-use of these materials on-Site may be possible. The excavation contractor will perform excavation and material handling in a manner that limits mixing of materials with different levels and/or types of contamination. The contractor will excavate material by methods that will permit observation of exposed subsurface soils to reduce the potential of mixing contaminated soils with uncontaminated soils. During material handling, boulders, building debris, large slab pieces, etc. will be removed and stockpiled separately.

- Soil excavated from areas with polluted soil that have been previously documented to exceed RSR numerical criteria will not be subject to re-characterization unless the soil exhibits contamination that differs from what is already known about the impacted area or the receiving facility requires additional analyses.

- Designated polluted soil that is to be removed off-Site for disposal will be characterized for waste disposal prior to the start of remedial excavations and existing data will be used by the remedial contractor to the extent allowed by the disposal facility. We note that each disposal facility requires unique characterization data (although there is significant overlap between facilities) and some supplemental data may be required just prior to disposal. In addition, the sampling frequency will be determined by the receiving disposal or recycling facility selected by the remedial contractor. Polluted soil will not be removed from the Site for off-site disposal or recycling until all appropriate documentation (waste profiles, bills of lading) are prepared and approved by the receiving facility. The Town will be responsible for execution (signing) of environmental shipping documents and manifests, and for making required state or local notifications.

  Although not anticipated, if stockpiling of impacted soils prior to loading for disposal is requested by the remedial contractor (as a more cost effective or efficient means of remediation), or stockpiling of soil is required due to unanticipated conditions encountered during the soil remediation, then an alternative soil management plan should be developed by GZA to ensure proper materials handling during remediation and the procedures below should be followed by the remedial contractor.

- Prior to the commencement of earthwork activities at the Site, material stockpile areas, if any, will be cleared and prepared to receive material. CTDEEP's General Permit for Contaminated Soil and/or Sediment Management should be referenced for specific requirements and permit applicability depending on the size, location and nature of stockpiles.

- Stockpile areas will be graded such that stormwater run-on and run-off is diverted around and away from stockpiled materials. A snow fence with hay bales and silt fence will be placed continuously around the perimeter of the stockpile area. Stockpile slopes will be no steeper than three horizontal to one vertical (3H:1V). The stockpile area will be fenced or blocked off to limit contact of Site workers and passers-by with stockpiled materials. The area will be visibly marked with appropriate signs warning of potential hazards.

- The first lift of stockpiled materials will be placed on 20-mil thick, polyethylene sheeting. Stockpiled materials will be graded to shed water and covered with a minimum of 20-mil thick polyethylene sheeting at the end of each workday. The cover sheeting will be overlapped and weighted to form a continuous waterproof barrier over the material. The stockpile cover will be maintained to prevent water from entering the stockpiled materials; blowing dust; and contact between contaminated material, uncontaminated soil, Site workers, and the environment.

- Drainage effluent from the stockpiles will be managed in a manner that will not cause injury to public health, water quality of nearby surface water bodies, public or private property, or existing or completed work. The contractor may allow run-off from the stockpile area to flow through hay bales and onto the Site if the runoff has not been in contact with polluted or potentially polluted soils. The transfer of materials from the excavation to the stockpile areas will be conducted in such a manner as to prevent the loss or spread of polluted or potentially polluted materials across the site. Excavation, material handling, and stockpiling will be performed in a manner that limits the mixing of materials with different levels and/or types of pollution to the extent practicable. Details for sedimentation and erosion control and drainage effluent management will be conducted in accordance with the General Permit for Stormwater Management during Construction.

6.6.2 Guidelines for Importing Borrow

Prior to delivering borrow material to the Site, information related to any potential source of contamination (i.e. previous environmental site assessments, etc.) at the borrow source will be provided by the party providing the borrow material.

If material other than crushed stone from a quarry is used, the borrow material must be free of contamination (including petroleum constituents) and must be tested and demonstrated to not exceed ½ the RSR criteria for naturally occurring chemical constituents. Borrow material will be considered acceptable for use at the Site provided that the substance concentrations do not exceed ½ of either the R-DEC and/or GA-PMC with the following exception; borrow material will not be considered acceptable for use at the Site if any concentrations of PCBs, VOCs, pesticides or herbicides are detected

After remedial excavation is complete, the excavation will be filled with clean borrow materials. Backfill shall be placed in 12-inch lifts and compacted. The borrow materials/backfill shall be covered by polyethylene sheeting to prevent infiltration of rainwater while stockpiled on the Site.

6.6.3 Construction Dewatering

Groundwater has been observed to be below the surface of bedrock in the vicinity of the remedial excavation areas and no dewatering is anticipated for the remedial excavations.

6.6.4 Confirmation Sampling

Confirmation sampling of remediation areas to document mitigation of constituents above RSR criteria will be required where contaminated soils have been excavated for off-Site disposal.

6.6.5 Sample Collection/Analyses

Soil samples will be collected at the limits of excavation following the removal of contaminated materials as noted in the above sections. Soil samples will be preserved and submitted to a Connecticut state certified laboratory for analyses. Applicable laboratory procedures may include:

- Petroleum Hydrocarbons – CT DPH ETPH Method
- PAHs – EPA Method 8270
- Arsenic – EPA Method 6010

Detection limits for analyses shall conform to the RSR criteria. Appropriate QA/QC protocols outlined in the RCP guidance documents will be followed.

6.6.6 Off-Site Disposal/Recycling of Contaminated Materials

Waste classification will be performed in accordance with federal and state regulations regarding the disposal and recycling of contaminated material. Contaminated material designated for off-site disposal or recycling will require testing of parameters required by the disposal facilities permit. Frequency of waste classification sampling will be determined by the disposal facility permit.

6.7 AOC 19 - REMEDIATION OF VOC-IMPACTED SOILS BELOW BLDG. 11 USING IN SITU CHEMICAL OXIDATION

Elevated concentrations of petroleum hydrocarbons and chlorinated VOCs present in the soil and groundwater below the floor of the northern portion of Building 11 will be remediated through the installation of an infiltration gallery over the area of affected soils and groundwater within the building. A liquid chemical oxidizing compound (e.g. potassium permanganate, hydrogen peroxide) will be delivered to the surface soils via a

manifolded system of perforated pipes and allowed to infiltrate under gravity down through the unsaturated soils into the groundwater below. In addition, the delivery system would be supplemented through the installation of three vertical injection wells spanning the water table through which chemical oxidant and/or a commercially formulated reagent such as Plume Stop®[2] would be injected directly into the water column. The injected compounds will be delivered to the soils and groundwater from the integrated gallery and injection well system in sufficient volume to ensure chemical loading is maintained as necessary to impart an even and complete delivery of chemicals to the organic contaminants within unsaturated soils and groundwater and allow the in situ chemical destruction of those compounds.

Additionally, a passive sub-floor ventilation system will be installed above the infiltration gallery at the time the floor slab is reconstructed to mitigate the potential for the migration of VOCs vapors volatilizing from impacted soils and groundwater into the building interior.

Soils below the floor of Building 11 are also impacted with ETPH and metals that must be addressed. Since the soils are below a building that will remain in place as part of redevelopment, an ELUR will be used to render soils below Building 11 "inaccessible" (to address metals and ETPH at concentrations that are greater than R-DEC and "environmentally isolated" (to address soils with residual ETPH that might be above GB-PMC but will remain in place). Since the RAP intends to place an ELUR on other portions of the Site, adding the Building 11 area to the ELUR will require minimal additional cost.

The environmental consultant to the Town will obtain the applicable state and local permits required to install and apply chemicals through the infiltration gallery and operate the venting system. Permit approvals will be obtained before additional remedial activities listed below are commenced.

6.7.1 Floor Removal

The concrete floor over the area of VOC impacted soils in Building 11 will be saw cut and removed for disposal. Care will be taken by the contractor to not disturb soils below the floor. The concrete floor will be segregated from underlying soil and no soil will be disposed of along with the concrete. As sections of the floor slab are removed, they will be taken to a clean staging area where larger pieces of concrete can be crushed so that concrete meets the size requirements of the disposal/recycling facility. If concrete is stained it will be segregated from non-stained portions of the floor. Stained concrete would imply impacts and stained material may require recycling and/or disposal at a different facility than clean concrete.

[2] Plume Stop® is a formulated activated carbon reagent manufactured by Regenesis

Alternately, the clean concrete can be crushed on site and can be reused as fill material during redevelopment if it is not impacted or in an area where an ELUR will be applied if it is impacted. If the concrete is not used on-Site as fill, it should be disposed of as demolition debris or recycled. Disposal at a landfill as cover material is also a suitable concrete disposal option. The concrete debris should not be used as unrestricted clean fill because it may have surficial staining caused by minor petroleum or other chemical drips and spills from former Amerbelle manufacturing operations.

6.7.2 Removal of Sub-Slab Piping and Sumps

A survey of the area below the floor of Bldg. 11 will be completed using ground penetrating radar to identify shallow pipe, trenches, sumps and other structures buried within 2 feet of the base of the floor of the building. All such identified items will be excavated and removed to eliminate the potential of creating preferential pathways for the movement of the chemical oxidant solution which could cause an uneven delivery and distribution of reactants to the soils and groundwater below. The piping will be cut off at the limits of the planned infiltration gallery area and the piping remaining at the edges will be capped. The piping will be disposed of as scrap, if it is metal and/or non-porous material (and free of sediment), or as remediation waste, if it is made of porous material (e.g., concrete, tile, bituminous fibrous piping, etc.).

6.7.3 Installation of the Infiltration Gallery and Vertical Injection Wells

After removal of the overlying floor slab, a sub-slab gallery infiltration system will be installed directly on top of the area of impacted soils and covered with a permeable granular fill material with the intent that the new floor will be constructed above, when finished. Four infiltration pipes will be laid out in parallel rows along the length of the building, spaced approximately 10 feet apart, and joined together through a manifold fitting at the southern end to make up the gallery infiltration system. The delivery system manifold will be connected to a chemical storage/mixing tank via a transfer pipe, which will extend through the western foundation wall to the tank and mixing system outside the building.

Additionally, this system will be supplemented through the installation of three 2-inch diameter injection wells along the center of the impacted area, spaced at about 30 foot intervals,. The wells will be installed down through the unsaturated and saturated soils to the bedrock surface and screened across the water table. The wells will also be joined through a manifold pipe fitting at the ground surface and connected to a transfer pipe which will extend through the western foundation wall to a second pump, tank and mixing system outside the building.

After installation of the gallery, well and transfer piping systems is completed, a layer of permeable granular material (like a crushed processed stone product) will then be installed above the impacted soil area, surrounding and covering, to a depth of

approximately six inches above, the gallery delivery system, manifolds and transfer piping to provide a bed of permeable granular material which will allow delivery of the reagents from the infiltration gallery directly to the surface of the impacted soils.

The transfer/delivery piping will be connected to a pump and valved control system that allow the controlled delivery of chemical reagents from the tanks to the infiltration gallery and well injection systems. Details of the design and specifications of the infiltration gallery, piping, tank and pumping system will be presented as part of the future specification design phase of the project.

6.7.4 Installation of Sub-Slab Passive Venting System

An approximately 3-inch layer of clean bedding sand will be placed above the infiltration gallery and a system of self-contained corrugated subfloor ventilation gallery panels will be installed along the length of the opened floor area on top of the base sand. The venting panels will be connected by solid manifold piping which will extend through the foundation wall or extend up through the floor and then piped to the roof of the building. A passive rotating turbine fan will be installed on the top of the exit pipe above the roof to maintain air flow through the venting pipes and exhaust collected vapors outside the building. The passive venting will ensure vapors from the contaminant zone do not enter the (future) occupied building spaces.

6.7.5 Floor Restoration

The concrete floor of Building 11 will be restored so that the Building is again useable. The new concrete floor will be 4 to 6-inches thick with a welded wire mesh reinforcement system.

6.7.6 System Installation, Monitoring and Maintenance

The above grade piping for the chemical infiltration delivery system, soil venting system and associated valves, sampling ports and other equipment will be installed after the new floor has cured sufficiently to bear the weight of the equipment and workers. We assume that the equipment for the chemical infiltration and injection well delivery systems will may be located inside or outside of the building, based on current redevelopment plans.

Once the chemical infiltration gallery and well injection systems are installed, measurements will be taken at monitoring well points that will be installed through the floor into the base of the saturated soils. The delivery systems will be adjusted, as needed, to meet design specifications and to increase the effectiveness and efficiency of the chemical delivery. Samples of groundwater below the building will be collected prior to system start up and will be submitted to a laboratory for analysis to determine the baseline concentrations of contaminants in groundwater below Building

11. Data will be analyzed and documented by the environmental consultant so that remedial progress can be measured.

The chemical delivery systems will be operated intermittently with a series of injections being administered over an assumed 3-year period if need be with monthly Site visits by the environmental consultant to confirm systems are operational, maintain the systems and collect samples for laboratory analysis.

6.7.7 Reporting

Observations and results from maintenance and monitoring of the chemical infiltration delivery system passive venting systems will be summarized in an annual report. At this time, we have assumed three years of operation of the remedial systems, after which the system's effectiveness will be evaluated and recommendations for continued monitoring, system modification or system closure will be provided to the Town.

6.8 AOC 25 AMERICAN MILL POND SEDIMENT ECOLOGICAL RISK ASSESSMENT

American Mill Pond and Hockanum River have been identified by CTDEEP and the USGS as an impaired waterway due to its history of heavy industrial use, urbanized setting and impacts from historical point and nonpoint source discharges. Sampling and analysis of sediments from the Hockanum River upstream and downstream of the Site indicated both metals and PAHs are present at concentrations above accepted threshold effects level screening level benchmarks. Certain metals (cadmium, chromium, lead and mercury) were found to be more elevated in downstream samples than in upstream samples. However, no direct release or direct migration of these constituents from the site to the river were identified. No impacts to surface water of the river were indicated through that sampling program. The impacts to sediments both upstream and downstream of the Site reflect the degraded quality of the river due to its urban setting and historical industrial usage.

Since the existing pond sediment analytical data set is very limited (3 from Paper Mill Pond and 3 from American Mill Pond) it is premature to draw conclusions concerning impacts from the Site to American Mill Pond. Historical impacts to sediments upstream have been documented at levels that could potentially impact ecological receptors of the American Mill Pond and as such further assessment will be completed under a Baseline Ecological Risk Assessment (BERA).

The BERA will be completed to assess whether a potential risk of impact to receptors in the river may be posed by metals in sediments that are potentially present within the American Mill Pond from historical discharges from the former Amerbelle Mill Site. The BERA will involve the collection and chemical analysis of sediments from both the Site

area (American Mill Pond) and upstream reference area (Paper Mill Pond) to evaluate if there is a potential risk and the relative magnitude of risk, if identified.

To complete this task, sediment samples will be collected on Site at five (5) locations within the American Mill Pond and five (5) reference locations within the upstream Paper Mill Pond during this investigation. Figure 3 presents the locations of the proposed sediment-sampling locations within the Site and reference areas. The results of the analyses of these samples will be evaluated together with the data from the three previous samples obtained from these locations to allow development of statistically representative end point concentrations from each area.

Sample will be taken at locations within quiescent, depositional areas outside of the main flow path of the river. Samples will be collected using an Ekman, Ponar dredge, push corer or hand auger sampler dependent on the type of substrate present. All reusable equipment contacting sediments will be decontaminated between sampling locations, as described in Section 6.8.1 below.

Sediment samples will be collected from each location from the upper 4 inches of the substrate to be consistent with depths sampled during previous investigations and will allow for consistency in data evaluation and risk assessment/management. Samples will be logged to provide descriptions of sediment characteristics such as color, grain size, sorting, texture, and any other pertinent soil characteristics. The sediment's textural properties will be determined using the modified Burmesiter soil classification system and recorded on field data sheets.

Each sample location will be geospatially located using a portable Trimble Pro XRS GPS unit (or equivalent) global positioning system (GPS) with sub meter accuracy. The GPS unit will use the Connecticut State plane-coordinate "Universal Transverse Mercator" (UTM). The time of the survey will be recorded and the depth to the top of the surface-water/sediment interface will be measured using a weighted tape. Sampling intervals and the total depth sample depth will also be recorded.

Sediments collected at each location will be homogenized in disposable aluminum pans using disposable wooden or plastic spatulas and placed into pre-cleaned sampling containers supplied by the analytical laboratory. All chemical samples will be analyzed for metals by USEPA SW864 Method 6010C or 6020 (including for mercury by Method 7471A) and percent solids. In addition, grain size analyses will be performed on three samples collected within the site and reference areas.

6.8.1 Equipment Decontamination

Reusable sampling equipment will be decontaminated between sampling locations before each use as follows:

• Alconox® and potable-water wash
• Potable-water rinse
• Reagent grade isopropanol rinse (to thoroughly wet the equipment with isopropanol)
• Analyte-free water rinse
• Air drying
• Decontamination solutions will be collected for disposal

6.8.2 Sediment Chemical Assessment

A benchmark comparison will be used to evaluate analytical results at each sampling station: We will compare metals concentrations to TEC- and PEC bulk sediment benchmarks.

6.8.3 Bulk Sediment (TEC and PEC) Benchmarks

End Point Concentrations (EPCs) of metal COPECs will be calculated and compared to TEC and PEC benchmarks. Specifically, Central Tendency Exposures (CTEs) (i.e., the 95% UCL of the arithmetic mean of bulk sediment COPEC values within a waterway reach) and Reasonable Maximum Exposures (RMEs) (i.e., either the maximum value or 95% Upper Confidence Level (UCL) of the data set will be compared to respective TEC and PEC benchmarks.

Tables will present the analytical results for each sampling station, the TEC and PEC benchmarks and hazard quotients (sediment concentration/benchmark concentration). Hazard quotients will be calculated for RME and CTE EPCs of the data sets in relation to the selected TEC no effects and PEC effects benchmarks as follows:

RME EPCs to TECs
CTEs EPCs to TECs
RME EPCs to PECs
CTE EPCs to PECs

GZA will assume that sediment concentrations less than the TECs and below the background concentration will not present a risk from historical releases from the Site and concentrations that exceed the PEC benchmark will be interpreted to indicate a more probable risk potential. The relative magnitude of risk posed by contaminants will be assessed through comparisons of CTE and RME hazard quotients in relation to PECs. The uncertainties section of the report will include a discussion of potential risks posed by sediment contaminants that are below background, but above the sediment screening benchmark values. The PECs will be used to evaluate the probable risk of contaminants found present in sediments and provide insight on the potential magnitude of risk posed by concentrations present.

6.8.4 Risk Characterization Support of Sediment Community

Results for the measurement endpoints will be integrated in weight of evidence evaluations for each assessment endpoint. The following sections discuss this weight of evidence evaluation.

A weight of evidence table for each sampling station will be presented, where results of each measure of effect is summarized and categorized in terms of Risk Indication, Magnitude of Response, Reliability of Result, Strength of Association, and Overall Judgment and Reliability. An example of the weight of evidence tables is presented below. The categories are defined in the following discussion.

Risk Indication

This column will state whether the "measure of effect" results indicated there was or was not a potential risk of harm to the subject receptor. For each measure of effect the risk indication (Risk or No Risk) is defined by an objective threshold result:

Comparisons to Sediment Benchmarks:

No Risk = All TEC-based and EqP-based TQs less than 1.
Risk = one or more TEC values exceeded and SEM/AVS ratio is greater than 1.

Invertebrate Tissue Compared to Tissue Benchmarks:

No Risk = All measured or estimated on-Site tissue concentrations less than corresponding tissue benchmark.

Risk = one or more on-Site tissue concentrations are than the corresponding tissue benchmark.

Magnitude of Response

The Magnitude of Response for the measure of effect, either toward potential Risk or No Risk according to the Risk Indication, is designated as High, Moderate, or Low based on the criteria presented below. Where appropriate, explanatory notes will be presented with the tables.

Comparisons to TEC-type benchmarks:

One or more TEC-based benchmark > 1 = High to Low toward Risk depending on the number of COPECs that exceed the TEC, and the magnitude of the exceedances.

None of TEC-based benchmarks > 1 = Moderate or High toward No Risk based on the magnitude of differences between the TEC and COPEC concentrations.

Comparisons to PEC-type benchmarks:

One or more PEC-based benchmark > 1 = Moderate or High toward Risk, depending on the number of COPECs that exceed the PEC, the chemical and the magnitude of the exceedances.

None of PEC-based benchmarks > 1 = Low or Moderate toward Risk based on the chemical and magnitude of differences between the PEC and COPEC concentrations.

Reliability of Result

This category is intended to present a judgment as to the representativeness, accuracy, and precision of the result for the measure of effect, and is expressed as High, Moderate, or Low.

The Reliability of Result for the toxicity tests was judged based on the percent coefficient of variation (CV). Judgments as to Reliability of Result for toxicity tests were made as follows:

CV < 25% = High
25% ≤ CV ≤ 50% = Moderate
CV > 50% = Low

Chemical analytical laboratories are expected to yield reproducible results, with an adequate degree of precision to evaluate whether the sample contained contaminants at concentrations that exceed the benchmark or other value to which it is being compared. Therefore, the Reliability of Result is judged to be high for measures of effects that are based on an actual laboratory result (e.g., comparing sediment concentrations to sediment benchmark values).

Strength of Association

Strength of Association refers to how well or directly a measure of effect (regardless of the Magnitude of Response or Reliability of Result) is linked to potential adverse effects to the subject receptor in the field.
Results for comparisons to TEC-type benchmarks are considered to have a low strength of association.

Results of Weight of Evidence Evaluation

Results of the Weight of Evidence evaluation for each sediment sampling station will be summarized in a Weight of Evidence table. The table below is presented as an example.

EXAMPLE STATION 1
Conclusion: No Risk of Harm

Measure of Effect	Risk Indication	Magnitude of Response	Reliability of Result	Strength of Association	Overall Judgment & Reliability
Comparisons to Benchmarks TEC & PEC	Risk	Moderate: 1 PEC-TQ > 1, 4 TEC-TQs > 1 w/ average of 2.4	High	Low	PR – Low

Notes: NR = No Risk, PR=Potential Risk, TQ = Toxicity Quotient

7.00 GROUNDWATER WELL INSTALLATION AND MONITORING PROGRAM

After Site Characterization and remedial actions are complete, the RSRs require groundwater monitoring to demonstrate the effectiveness of the remedial actions undertaken and demonstrate compliance with RSR remedial criteria. Groundwater analytical results must demonstrate that 1) any groundwater plumes detected as a result of on-site releases are compliant with RSR groundwater criteria; and 2) groundwater downgradient of remedial areas meets groundwater criteria. At a minimum, four seasonal quarters of groundwater monitoring collected over a two year period are required for demonstration of compliance.

Based upon the results of groundwater sampling, the observations were made with regard to the three identified Site plumes:

Wells ME-1, ME-2, GZ-1, GZ-2, GZ-7 and MW-02 - Potential releases from historical fabric dyeing and coating operations at Building 14:

Generally, low concentrations of metals and SVOCs were detected in groundwater sampled from these wells with concentrations reported below SWPC. In addition, low levels of phenols were detected in ME-2 and ammonia in wells AM-1, ME-2, MW-02, GZ-1, and GZ-2. GZA notes, that a black/blue color has been observed in the well purge water at ME-2, which is likely a dye. Based upon our groundwater sample results, it

appears a release has occurred. At well ME-2, aniline was detected at 0.47 mg/l which exceeds the SWPC. However, we note that aniline was reported below the laboratory MRL and SWPC in downgradient wells MW-02 and GZ-7. Therefore, it is apparent that there is no exceedance of the SWPC by aniline at the point of discharge of this plume to the downgradient water body. Therefore, a remedial response is not required for this plume. However, four seasonal quarterly sampling events within 24 months or 12 rounds of groundwater sampling within 12 months are required to demonstrate compliance is maintained.

Wells AM-7, ME-6, GZ-4, GZ-9 MW-2 – Building 11

Copper, lead, mercury and zinc and several SVOCs were reported at concentrations above the SWPC numeric criteria in groundwater from well AM-7, located within Building 11. A low concentration of PCE (1.8 µg/L) was also reported in that sample, well below SWPC and Residential-Groundwater Volatilization Criteria (R-GWVC). GZA notes that, due to the very low rate of recharge of groundwater to that well during sampling, low flow sampling could not be completed without incurring excessive drawdown at that well. A grab sample was therefore obtained and tested from AM-7. Based on this circumstance, concentrations may be biased upward due to elevated turbidity in that sample.

Similar to soil analytical results for Building 11, elevated concentrations of PCE and its breakdown products were detected in groundwater in well GZ-4 installed below the floor of the northern end of Building 11. PCE was detected at concentrations ranging from 1.8 µg/L in sample AM-7 to 5,900 µg/L in sample GZ-4. The concentration of PCE reported in GZ-4 is greater than the SWPC and the R-GWVC. In addition, the concentration of vinyl chloride was reported above the R-GWVC in downgradient well ME-6, located just north of (outside) Building 11. We note however, that vinyl chloride and other VOC constituent were reported below laboratory reportable limits in that well and adjacent well GZ-9 when sampled in October 2015. Based upon our groundwater sample results, it appears a groundwater plume with concentrations of metals, SVOCs and VOCs above SWPC and VOCs at concentrations greater than R-GWVCs is present in this area, apparently due to releases identified in Building 11. Based on current data, groundwater flow downgradient of Building 11 appears to be west-southwest to the American Mill Pond.

As the injection of chemical oxidant is the remedial method selected for treatment of the petroleum and chlorinated organic contaminants within the soil and groundwater within Building 11, one or more additional groundwater monitoring wells will have to be installed in the area directly downgradient and outside the Building 11 footprint to monitor residual concentration of reagents in groundwater downgradient of the building 11 and prior to discharge to the pond. As we understand future site development plans will also include the adjacent Daniels Mill parcel, the additional downgradient wells will be installed within that parcel as part of the concurrent investigations of that property.

Subsequent to installation of the proposed new well(s), four seasonal sampling events within 24 months or 12 rounds of groundwater sampling within 12 months are required to demonstrate groundwater compliance. We note that the full groundwater sampling program will be dependent on the initial analytical results for groundwater from the proposed wells.

Wells AM-1 – Building 7 Loading Dock Area

Concentrations of ammonia, metals, and SVOCs were detected in groundwater sampled from AM-1. The concentration of lead, at 0.031 mg/L was reported in exceedance of the numeric SWPC of 0.013 µg/L. Other constituents tested were reported at concentrations below SWPC. GZA notes that, due to a very poor recharge of groundwater to AM-1, low flow groundwater sampling could not be completed at this well without excessive drawdown. As such, a grab groundwater sample was collected from that well. Therefore, results for this sample could be subject to upward bias do to elevated sample turbidity. Based upon groundwater results, additional testing is required to confirm whether a release that has impacted groundwater has occurred.

8.0 LIMITATIONS

Our Site evaluation was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and we observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. Our findings and conclusions must be considered not as scientific certainties, but our professional opinion concerning the significance of the limited data gathered during the course of the data gap Site assessment. Specifically, we do not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by us during our supplemental environmental Site assessment. This assessment is subject to the Limitations presented in Appendix A.

This study and report have been prepared on behalf of and for the exclusive use of the Town of Vernon solely for use in an environmental evaluation of the Site. This report and findings contained herein shall not, in whole or in part, be disseminated or conveyed to any other party, nor used by any other party in whole or in part, without our prior written consent. GZA's aggregate liability to all parties who my come to rely on this report is limited to the amount set forth in the Terms and Conditions of our contract and is not hereby expanded. No other warranty, express or implied, is made.

TABLES

Table 1
AOC Assessment Summary

Amerbelle Mills
Rockville, Connecticut

Area Of Concern (AOC)	AOC Description	Condition Summary/Data Gap Analysis	GZAs Data Gap Investigation																				
					Laboratory Analysis Performed																		
			Number of Borings (shallow <4 feet; deep >4 feet)	Samples collected	VOC-8010 (halogenated)	VOC-8020 (aromatics)	ETPH	PAH/SVOCs	Total RCRA-8 Metals	SPLP RCRA-8 Metals	Formaldehyde	Methanol	Ammonia	Glycols	PCBs	Aniline	Phenol	Grain Size Analysis	Total Organic Carbon	Hardness	Findings	Recommendations
AOC 1 - Former Solvent USTs	Location of former 5,000 and 3,000-gallon xylene steel USTs which were removed in 1989. Historical Site map indicates 5,000-gallon Stoddard solvent and 3,000-gallon Xylene USTs were also formerly located at this AOC.	Prior reports indicate one tank to have failed a tank tightness tests conducted and prior to the UST removals. No post-excavation confirmation soils samples were obtained. Analysis of groundwater from downgradient well AM-3 in January 2004 showed no evidence of a release. No direct investigations of soils had been conducted at this AOC. The status of soils at this AOC was identified as a data gap.	8 deep	AOC-1-1 (8-10), AOC-1-2 (8-10), AOC-1-3 (8-10), AOC-1-4 (8-10), AOC-1-5 (8-10), AOC-1-6 (8-10), AOC-1-7 (8-10), AOC-1-8 (8-10)		X	X	X													Soil samples collected below inferred bottom of UST excavations reported ETPH at concentrations of 74 and 330 mg/kg, indicating the presence of a release of petroleum hydrocarbons. Additional explorations in and around the area indicated ETPH release confined to former tank graves at concentrations below remedial criteria.	No further action
AOC 2 - Bldg. 14 South Loading Dock	Three loading docks located on the south side of Building 14. These loading docks may have been used to service the former dye operations, chemical finish storage and former textile finishing areas.	Soils from nearby boring AM-3(3-5' bgs) had low concentrations of VOCs (2,2-dimethyl hexane) and ETPH (240 mg/Kg). No investigations were previously completed in the immediate vicinity of the loading docks to assess the presence or absence of a release within those areas.	3 shallow	AOC-2-1 (0.5-2), AOC-2-2 (0.5-2), AOC-2-3 (0.5-2)			X	X	X		X	X	X	X							No COCs were detected in soil samples from borings AOC-2-1 and AOC-2-3. Several metals were detected at AOC-2-2 at concentrations below R-DECs, similar to those found Site wide, and are inferred likely associated with fill. Methanol was detected at 20 mg/kg in AOC-2-2, significantly below R-DEC and GB-PMC and is inferred to represent a minor release related to transfer and handling of textile finishing chemicals at the loading dock.	No further action
AOC 3 - Bldg. 14 West Loading Dock	There are three loading docks located on the west side of Building 14. These loading docks are near and may have been used to service the former dye operations, chemical finish storage and former textile finishing areas.	Investigations of this AOC were limited to boring/wells AM-2 and ME-1. Low concentrations of ETPH, PAHs and metals were reported in soils at ME-1; potentially due to presence of fill. No soil analyses was performed at AM-2. Insufficient investigations had been completed to assess the presence or absence of a release at this AOC.	1 shallow/ 1 deep	AOC-3-1 (0.5-2), AOC-3-2 (4-6)		X	X	X	X		X	X		X							Metals were reported in soils at AOC-3-1 and AOC-3-2 at concentrations below R-DEC at concentrations similar to Site-wide soils and are inferred related to fill. Trace concentrations of methanol and formaldehyde reported in shallow soils at AOC-3-2 well below the R-DEC and GB-PMC is inferred as representative of minor incidental release related to transfer and handling of textile finishing chemicals at the loading dock.	No further action
AOC 4 - Northwest Corner of Bldg. 14. Finishing Department	The northwest corner of Building 14 was formerly used for textile dyeing operations and consists of dyeing areas and a former Dye/Mixing Room. Several wastewater conveyance trenches were observed in the AOC. Seeps of dye from cracks in foundation and around exhaust vents have been reported and in 1997, dye-impacted water was observed infiltrating a sewer line excavation near this AOC.	Previous investigations of this AOC were limited to boring/well ME-2 and AM-8. Formaldehyde at a low concentration was detected in soils at AM-8. Groundwater at AM-2 contained low concentrations of aniline dye and ETPH. Copper, chromium, and lead were detected in AM-2 in exceedance of the SWPC. The potential for a release of process chemicals and dyes from this area has not been adequately characterized by the current data set to assess this AOC.	6 shallow/ 6 deep	AOC-4-1 (4-6), AOC-4-2 (0.5-2), AOC-4-3 (0.5-2), AOC-4-4 (2-4), AOC-4-5 (4-6), AOC-4-3A (2-4), AOC-4-3B (0.66-2), AOC-4-3B (2-4), AOC-4-3C (0.66-2), AOC-4-3C (2-4), AOC-4-3D (0.5-2), AOC-4-3D (2-4)		X	X	X	X		X	X		X							Several metals were detected in AOC-4 soil samples similar to those found Site wide and are likely from poor quality fill. Trace VOCs were detected in soils in the dye mixing room at concentrations below criteria. ETPH reported at AOC-4-3 (0.5-2) at 470 mg/Kg indicating the presence of a release. Additional explorations and analysis of soils determined at and surrounding the boring indicated ETPH release is confined to area of AOC-4-3 at concentrations below RSR criteria.	No further action
AOC 5 - Wastewater Conveyance Trenches	Extensive trenches and pits were observed in Building which were formerly used to channel dye and finishing process wastewater to the former onsite wastewater treatment system located on the west side of building. Seepage from these trenches may be the source of dye which was observed groundwater.	Explorations were limited to soils at borings AM-8, AM-9 AM-10 AM-11. Low concentrations of VOCs (xylenes, ethylbenzene and formaldehyde) and metals were reported in soils at AM-8 and AM-11. Investigations were found insufficient to adequately demonstrate the presence or absence of a release of chemical dye and/or finishing process wastewaters from the conveyance trenches beneath Building 14. This conditions was identified as a data gap.	2 shallow/ 4 deep	AOC-5-2 (5-7), AOC-5-3 (2-3.25), AOC-5-4 (6-8), AOC-5-5 (4-5.5), AOC-5-6 (4.5-6.5)		X	X	X	X		X	X	X	X							Several metals were detected in AOC-5 soil samples similar to those found Site wide and are inferred related to fill. Trace concentration of formaldehyde was detected in soil at AOC-5-5, well below RSR criteria. VOCs were not detected in groundwater sampled from downgradient wells in Brooklyn Street. Therefore, only minor release of formaldehyde is inferred.	No further action
AOC 6 - Southeast Corner of Bldg. 14. Finishing/Chemical Storage Area	The southwest interior of Bldg. 14 was formerly used for treatment and finishing of textile products prior to dyeing.	Explorations in this AOC were limited to boring AM-9 where low concentrations of VOCs, ETPH , metals and PAHs reported in deeper soil from 7 to 9 ft. bgs. Analysis of shallow soils was not completed. Investigations were found insufficient to adequately characterize releases to sub-slab soils from former operations within the area and to constitute a data gap.	2 shallow	AOC-6-1 (0.5-2), AOC-6-2 (0.5-2)		X	X		X												Several metals were detected in soil AOC-6 at concentrations similar to those found Site wide and are inferred to be a product of poor quality fill.	No further action
AOC 7 - Bldg. 12 Maintenance/Machine Shop	The ground floor of Building 12 was formerly used for the repair and maintenance of parts and equipment.	No investigations were previously completed within this area. The presence or absence of a potential release of oils and/or solvents to the soils below the floor slab had not been assessed.	2 shallow / 1Deep/ 1 Monitoring well	AOC-7-1 (0.5-2), AOC-7-2 (0.5-2), GZ-8 (5-7)		X	X	X													ETPH was detected in soil boring AOC-7-2 in area of a pit observed in the floor at 8,000 mg/kg in exceedance of R-DEC and GB-PMC. Analysis of soils and groundwater at GZ-8 outside the building to the west found ETPH exceeding RSR criteria confined to building footprint.	Application of an ELUR to Building 12 rendering soils below environmentally isolated and inaccessible. Recommend additional post-remediation groundwater sampling.
AOC 8 - Wooded Slope West of Bldgs. 1 and 2	There is an undeveloped wooded area on the Site west of Buildings 1 and 2. This wooded area slopes steeply to American Mill Pond. Solid waste was reported to be observed in this area and dye impacted water was reported to be seeping from face of slope.	This area has a very steep slope which is unsafe to perform investigations on. Impacts from dye to groundwater within the area are to be assessed through sampling and analysis of groundwater in upgradient wells MW-02 and GZ-7.	No Borings Performed	Assessed remotely through upgradient groundwater wells ME-2, MW-02 and GZ-7.																	Sampling of groundwater at upgradient well ME-2 detected Aniline at a concentration slightly exceeding SWPCC, inferred as likely related to dye release reported downgradient of Bldg. 14. Additional groundwater monitoring at downgradient wells MW-02 and newly installed well GZ-7 reported aniline to be below laboratory reportable limits. No exceedance of SWPC is inferred.	No further action
AOC 9 - Bldg. 13 Former Latex Coating Area	Water based latex coatings were formerly applied to textile products in Building 13.	Shallow soils borings SB-101 and SB-102 were advanced within this AOC. Low concentrations of PAHs were detected in a shallow soil sample collected from SB-102. The presence of PAHs in SB-102 is inferred likely related to degraded fill and not indicative of a release. As such, no data gaps were identified with respect to this AOC.	No Borings Performed	No Samples Collected																	No investigation conducted	No further action

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Amerbelle Mills
Rockville, Connecticut

Area Of Concern (AOC)	AOC Description	Condition Summary/Data Gap Analysis	GZAs Data Gap Investigation																			
			Number of Borings (shallow <4 feet; deep >4 feet)	Samples collected	Laboratory Analysis Performed																Findings	Recommendations
					VOC-8010 (halogenated)	VOC-8020 (aromatics)	ETPH	PAH/SVOCs	Total RCRA-8 Metals	SPLP RCRA-8 Metals	Formaldehyde	Methanol	Ammonia	Glycols	PCBs	Aniline	Phenol	Grain Size Analysis	Total Organic Carbon	Hardness		
AOC 10 - Building 2 Loading Dock	The loading dock is located on the west side of Building 2 and was likely used to service Buildings 1 and 2. Building 2 was formerly used for storage of organic coatings and chemicals and Building 1 formerly contained a hazardous waste storage area.	Three borings were advanced outside of the loading dock area (SB-112, SB-113, and SB-114) and shallow soil samples collected. The three soil samples submitted contained low concentrations of metals and SB-112 contained PAHs below applicable criteria, and inferred related to ash in fill. No indication of a release due to former site operations was reported and no data gaps identified.	No Borings Performed	No Samples Collected																	No investigation conducted	No further action
AOC 11 - Buildings 1 and 2	Building 2 was formerly used for storage of organic coatings and chemicals and Building 1 formerly contained a hazardous waste storage area in the lower area.	Sub-slab sampling in sub-basement area was reported as not possible as the concrete slab directly overlies bedrock. Bis(2-ethylhexyl)phthalate and ammonia were detected in groundwater at MW-2, at lower concentrations than the up gradient well. No stains or other indications of a release were observed within the building. No data gaps were identified with respect to this AOC.	No Borings Performed	No Samples Collected																	No investigation conducted	No further action
AOC 12 - Building 3 General Storage	Building 3 was formerly used for general storage of textiles and other materials.	Soil at two borings completed in this AOC (SB-104 and AM-6) were reported to contain low concentrations of metals. PAHs were reported at concentrations above R-DECs and GB-PMCs. ETPH at AM-6 also above R-DEC . The detected metals, ETPH, and PAHs are inferred to be from poor quality fill and minor incidental releases. As Bldg. 3 is to remain in place under current development plans, the current data set was inferred as adequate to address Site fill. No data gaps were inferred for this AOC.	No Borings Performed	No Samples Collected																	PAHs and ETPH are present in shallow soils below the floor at concentrations above R-DECs. Bldg. 3 is to remain in place under current development plans.	Application of an ELUR to prevent disturbance of Building 3 floor slab and underlying soils and rendering soils below inaccessible.
AOC 13 - Building 7 Former Solvent Coating Lines	Building 7 formerly contained the solvent coating operations. The raceway passes under the eastern portion of the former location of the coating lines. The solvent coating operation primarily used toluene, isopropyl alcohol and methyl ethyl ketone (MEK)) in its process.	A shallow soil sample was collected from to the north of the western end of this AOC. Low concentrations of metals, PAHs, and ammonia were detected in the sample. ETPH was detected at 600 mg/kg, below I/C-DECs and GB-PMCs. No investigation of soils were completed directly within the area of the former coating lines. Therefore, a potential for a release from this area was not inferred to have been adequately characterized by the former data set.	3 shallow	AOC-13-1 (0.5-2), AOC-13-2 (0.5-2), AOC-13-3 (0.5-2)	X	X	X	X												PAHs detected in boring AOC-13-1 and AOC-13-2, coincident with fill. Trace ETPH, and 1,1,1-trichloroethane detected in AOC-13-3 below applicable criteria. PAHs in AOC-13-3 exceed R-DEC. Prior SPLP analysis by former consultants indicated PAHS below GB-PMCs. Building 7 to be demolished under current Site redevelopment plans.	Leave existing floor slabs intact and in place after building removed. Application of an ELUR to prohibit disturbance of slab and soils and render soils below inaccessible.
AOC 14 - 18,000-Gallon Fuel Oil ASTs	Two 18,000-gallon No. 2 fuel oil ASTs are located within a steel building between Brooklyn Street and Building 7. These ASTs are within a concrete containment area. Prior to the installation of these two 18,000-gallon ASTs, it was reported there were two 20,000-gallon oil USTs present from 1949 to 1989. The tanks were reported to contain No. 6 fuel oil and re-refined off specification and specification used fuel oils.	Prior to removal of the USTs, it was reported one of the tanks failed a tightness test and no post-excavation confirmation soil samples were obtained after removal of the USTs. A composite sample collected at the time of tank removal had a reported concentration of 150 mg/kg of ETPH. Soils sampled to the east at borings SB-111 and AOC-15-3 indicated release of ETPH below the tanks is likely present. Additional soil sampling is recommended after tanks and containment structure is removed by the Town.	No Borings Performed	No Samples Collected																	Analysis of soils east and adjacent to the containment structure indicates a release of petroleum and PAHs at concentrations above R-DECs and GB-PMCs is likely present in this area.	Testing of soils after removal of ASTs, excavation and removal of soils with impacts above R-DECs and GB-PMCs to at least 4 feet of depth and confirmation sampling. Potential option of backfilling with clean soils and application of ELUR to render soils below inaccessible if remaining impacts limited to DEC exceedances. Potential excavation of soils to bedrock (~7 feet bgs) may be required.
AOC 15 - Former PCB Transformer Area	Four oil-cooled electrical transformers were formerly located on concrete pad within fenced enclosed area. Three of the transformer reportedly contained PCB dielectric fluid.	One shallow soil sample (SB-111) collected adjacent to northwest corner of the pad reported ETPH (3,900 mg/Kg) and PAHs (as high as 12 mg/kg) above the I/C-DECs and GB-PMCs, indicating a release. The vertical and horizontal extent of the release of the release of petroleum constituents has not been adequately characterized by the single shallow soil sample and PCBs have not been assessed.	3 shallow	AOC-15-1 (0.25-2), AOC-15-2 (0.25-2), AOC-15-3 (0.5-2.5)			X							X							PAHs were detected in boring AOC-15-1 and AOC-15-3 below applicable criteria. ETPH was detected in AOC-15-2 at 3,300 mg/kg in exceedance of R-DEC and GB-PMC. Based on proximity, AOC-14 (the two 18,000-gallon ASTs) is inferred likely the source of ETPH in soils at this AOC. .	Testing of soils after removal of ASTs, excavation of shallow impacted soils into the western portion of the area and application of an ELUR to render remaining soils inaccessible
AOC 16 - Building 7 Loading Dock	Building 7 was formerly used for solvent coating of textiles prior to dyeing. The loading dock may have been used to service the former solvent coating operations.	Analysis of soils at borings AM-1, ME-5, SB-117, and SB-118 reported elevated concentrations of several metals and arsenic at concentrations up to 122 mg/kg (AM-1), exceeding I/C-DECs. PAHs were also detected in exceedance of R-DEC and GB-PMC. ETPH was detected at 920 mg/kg in AM-1. At SB-117, ETPH was reported at 58 mg/Kg and ammonia was reported at 140 mg/Kg. ETPH was detected in groundwater at well AM-1. Elevated metals and PAH concentrations are inferred to be associated with ash in fill reported in shallow soils. ETPH was inferred as associated with incidental release for trucks and vehicles. Additional investigations of ETPH and ammonia recommended to better define degree and extent of those releases.	1 deep	AOC-16-1 (9-11)			X		X	X			X								Soils found to contain metals (primarily arsenic) exceeding I/C-DECs. PAHs and arsenic PM may be considered exempt from PMCs as exceedances appear to be associated with coal ash present in shallow soils there. Release of ammonia and ETPH found to be limited and inferred related to incidental releases at loading dock.	Excavation of shallow soils to 4 feet of depth and confirmation sampling. Backfill with clean soils and application of an ELUR if remaining soils above R-DECs to render inaccessible.
AOC 17 - Building 9	Building 9 was formerly used for general storage and dye storage prior to 1927. In 1989, a survey of the site reported storage of miscellaneous chemicals on the ground floor of the building.	Soils from boring SB-107 (0.5-2') were reported to contain ETPH at concentration of 680 mg/kg and arsenic at 22 mg/Kg in exceedance of R-DEC. Reported metal concentrations area inferred to be associated with impacted fill and not indicative of a release from former facility operations. The vertical extent of the ETPH impacted soils within this area was not assessed by this investigation and identified as a data gap.	1 shallow	AOC-17-1 (2-4)	X		X														No COCs detected in soil boring AOC-17-1.	Application of an ELUR on floor slab of Building 9 and underlying soils to render soils below building inaccessible

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Amerbelle Mills
Rockville, Connecticut

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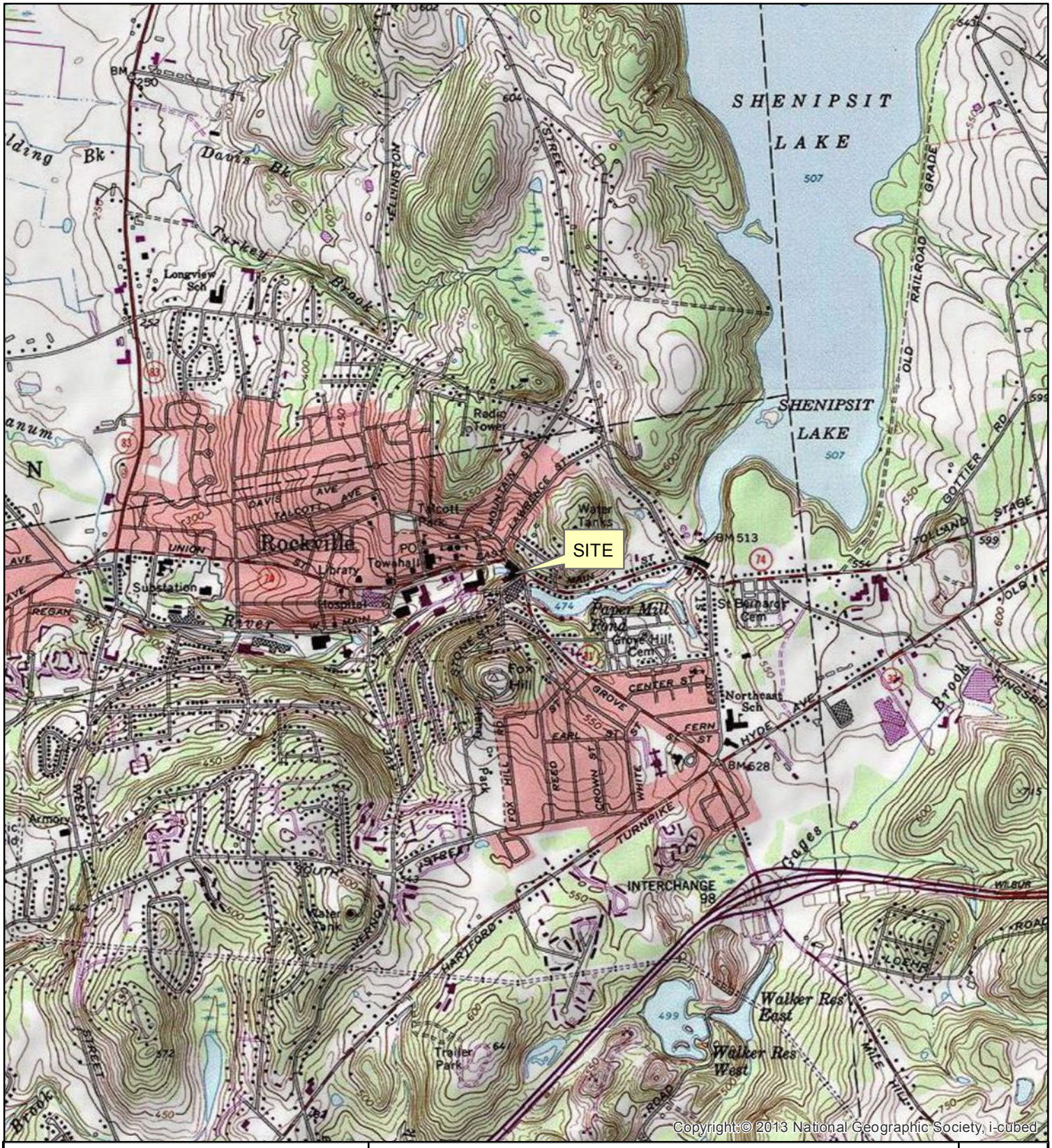
			Number of Borings (shallow <4 feet; deep >4 feet)	Samples collected	Laboratory Analysis Performed																Findings	Recommendations
					VOC-8010 (halogenated)	VOC-8020 (aromatics)	ETPH	PAH/SVOCs	Total RCRA-8 Metals	SPLP RCRA-8 Metals	Formaldehyde	Methanol	Ammonia	Glycols	PCBs	Aniline	Phenol	Grain Size Analysis	Total Organic Carbon	Hardness		
AOC 18 - Building 8	Prior to 1927, it was reported the building was a dye house and test dry cleaning was performed on the upper stories of the building and the waste tetrachloroethene (PCE) was stored within the building. More recently, the building was used to filter water pumped from the Hockanum River prior to its use as process water. Several sand filters in poor condition were observed within this building. Process wastewater was discharged to the sanitary sewer from the building. Floor drains present in the basement of the buildings also discharge to the sanitary sewer.	Two shallow soil samples were previously collected (SB-105 and SB-106). Low concentrations of metals were detected in both samples. Several PAHs in exceedance of R-DEC were detected in SB-106. Concentrations of metals and PAHs are likely from Site wide poor quality fill and not indicative of a release from former facility operations. Shallow soils from SB-105 were reported to contain low concentrations of PCE (at 41 ug/kg), ammonia (at 74 mg/kg). ETPH reported at 130 mg/kg in SB-106. The concentrations are below applicable R-DEC and GB-PMC. Additional investigation of PCE and ETPH was recommended to better characterize degree and extent of those constituents in fill below the building.	5 deep	AOC-18-1 (0.8-2.8), AOC-18-1 (7-9), AOC-18-2 (0.5-2.5), AOC-18-2 (5.5-7.5), AOC-18-3 (0.5-2.5), AOC-18-3 (8-10), AOC-18-4 (0.5-2), AOC-18-4 (8-10), AOC-18-5 (0.5-2), AOC-18-5 (14-16)	X		X														Soils underlying building found to be degraded urban fill containing coal ash. Soils contain low levels of CVOCs and ammonia. ETPH was reported above R-DEC in shallow soils at AOC-18-4. PAHs also reported is shallow soils exceeding R-DECs at SB-106. Building 8 to be demolished under current Site redevelopment plans.	Leave existing floor slabs intact and in place after building removed. Application of an ELUR to prohibit disturbance of slab and soils and render soils below inaccessible.
AOC 19 - Building 11	Prior to 1927 the building was used for dyeing operations. Post 1927, the building was used for the storage of equipment and drums of oils and other chemicals. The building has a concrete trench system at grade level which was reported to convey infiltration groundwater out of the building. However, the trench may have been used for the conveyance of waste dye process water. The trench system is presumed to discharge to the American Mill Pond.	Three shallow borings (SB-108, SB-109, and SB-110) and one deep boring (AM-7) were advanced within this AOC. A soil sample from boring SB-109 contained TCE at 2 mg/kg, PCE at 36 mg/kg, ETPH at 4,700 mg/kg, arsenic at 10.8 mg/kg, lead at 6030 mg/kg, and ammonia at 190 mg/kg. Low concentrations of VOCs were reported at SB-110. At SB-108, ETPH was also detected at 230 mg/kg and ETPH at AM-7 was reported at 83 mg/Kg. The detection of VOCs and ETPH is indicative of a release. Concentrations of metals were reported in the four borings and is inferred indicative of coal ash in fill and not indicative of a release from former facility operations. The full lateral and vertical extent of the release of ETPH and CVOCs was not fully characterized and was considered a data gap.	2 shallow/ 7 deep	AOC-19-1 (0.5-2), AOC-19-1 (8-10), AOC-19-2 (0.5-2), AOC-19-2 (6-7.5), AOC-19-3 (5-7), AOC-19-4 (0.5-2), AOC-19-4 (10-12), AOC-19-5 (8-10), AOC-19-5 (13.5-15.5), AOC-19-6 (0.5-2), AOC-19-6 (4.5-6.5), AOC-19-7 (2-4), AOC-19-7 (6-8), AOC-19-8 (0.5-2.5), AOC-19-9 (0.5-2.5)	X		X														Arsenic and lead at concentrations exceeding I/C-DECs were reported in soil at SB-109. ETPH and VOCs were detected in several shallow and deep soil borings. ETPH concentrations ranging from non-detect to 33,000 mg/kg and PCE detections range from non-detect to 1,700 mg/kg were detected. ETPH and PCE exceeded R-DECs and GB-PMCs at several locations in soils below northern portion of building.	Installation of a chemical infiltration gallery above VOC impacted soils and vertical injection wells into saturated soils below, in situ remediation of VOCs and petroleum below building through application of chemical oxidant and formulated product (Plume Stop®) and installation of passive venting system. Application of ELUR to render remaining soils below building inaccessible and environmentally isolated.
AOC 20 - Building 11 Loading Dock	The loading dock for Building 11 is located on the north side of the building.	One boring was advanced (SB-119) and two wells installed (AM-5 and ME-6) to assess this AOC. Analysis of shallow soils at boring SB-119 (0.5-2.0 ft. bgs) indicate low concentrations of metals and ETPH, consistent with those found Site wide, and PCE at 0.0072 mg/kg. Groundwater from bedrock well ME-6 was reported to contain PCE at 0.21 mg/l and TCE at 0.22 mg/l, below applicable criteria. Based upon the reported findings, it appears a release has occurred in the AOC. Additional investigations were recommended to better defined vertical and lateral extent of the release of PCE.	1 shallow/ 2 deep	AOC-20-1 (9-11), AOC-20-2 (0.5-2), AOC-20-2 (24-27), AOC-20-3 (0.5-2)	X	X	X	X												PAHs detected in boring AOC-20-1 and AOC-20-2were inferred as related to poor quality fill. Several VOCs, including PCE, were detected in three of the four soil samples. PCE and ETPH reported in sample AOC-20-2 from 24-27 feet bgs was below seasonal high water table and therefore exempt from GB-PMC. Based upon the findings of our investigation, it appears impacts at AOC-20-2 from a release to groundwater from upgradient AOC-19.	No further action
AOC 21 - Former Gasoline Station	A former gasoline service station was located east of Building 14 in an area that is currently a park.	Sampling of groundwater from onsite wells was completed in 2006. No indications of a release from the former gasoline station was observed in Site wells. Based upon groundwater elevation contours it appears the former gasoline station is downgradient of the Site. The potential for the migration of petroleum constituents from a potential offsite release downgradient of the Site was adequately characterized through previous groundwater sampling events and no data gaps remain.	No Borings Performed	No Samples Collected																	No investigation conducted	No further action
AOC 22 - Site Fill	Impacted fill containing asphalt fragments, coal ash brick and other miscellaneous materials has been identified across the site at depths up to 13 feet bgs.	Impacts typically include elevated concentrations of metals (particularly arsenic and lead), PAHs and occasionally ETPH. Arsenic and PAHs are often reported above DECs. It is GZA's opinion that sufficient data is available from investigations completed to date to adequately address site fill and actions to mitigate potential threats from hazards from exposure through application of a Site-wide ELUR restricting residential development and use and other measures incorporated under current redevelopment plans.	No Borings Performed	No Samples Collected																	No investigation conducted	Seek exemption for PMC due to coal ash, application of ELUR on areas where concentrations of ETPH, PAHs and metals found to exceed R-DECs to render soils below building floor slabs inaccessible.
AOC-23 Site Groundwater	Analysis of site groundwater has indicated the presence of chlorinated VOCs in groundwater the northeast portion of the site, presumably from the release of those constituents identified within Building 11. In addition, concentrations of metals (copper, lead and zinc) were reported at concentrations above respective SWPC in groundwater at well AM-7, located within Building 11, presumably from the release of dye and process water from operations at Bldg. 14.	Previous investigations indicated ETPH was detected at trace concentrations in groundwater at the Site and at 11,000 ug/L at well W-1. PCE was detected at 210 ug/L at well ME-6, in exceedance of the GWPC and SWPC and TCE was detected at 220 ug/L in exceedance of the GWPC and R-GWVC. At well AM-7, PAHs and metals were detected in exceedance of SWPC. At well ME-2, were detected in exceedance of SWPC as well as trace concentrations of acetone, SVOCs, ammonia, formaldehyde and aniline dye. Incomplete characterization of the extent of groundwater contamination across the Site was inferred and additional installation and sampling of wells was recommended.	GZA installed 3 bedrock wells and 2 overburden wells. In addition, GZA sampled 8 existing wells installed by others.	GZ-1, GZ-2, GZ-3, GZ-4, AM-1 (grab), AM-7 (grab), ME-1, ME-2, ME-6, MW-01, MW-02, MW-03	X	X	X	X	X		X	X	X			X	X	X	X	X	Sampling and analysis of Site groundwater indicated three areas where concentrations of COCs in groundwater were elevated: An apparent dye release downgradient of the northwestern corner of the Building 11 where blue tinged groundwater is observed and aniline was reported above SWPC in groundwater from ME-2; However, sampling of groundwater in downgradient wells MW-02 and GZ-7 indicates aniline to be below laboratory reportable limits. Building 7 loading dock area where lead was reported above the SWPC in groundwater at well AM-1; and Building 11 area where concentrations of metals and PAHs were reported above SWPCs (AM-7) and CVOCs (PCE and vinyl chloride) were reported above I/C-GWVCs.	Remediation of impacted soils at Building 7 loading dock and below Building 11 is proposed. Four seasonal quarters of Post-remediation / compliance ground monitoring necessary to demonstrate compliance with RSR criteria.

Table 1
AOC Assessment Summary

Amerbelle Mills
Rockville, Connecticut

Area Of Concern (AOC)	AOC Description	Condition Summary/Data Gap Analysis	GZAs Data Gap Investigation																			
			Number of Borings (shallow <4 feet; deep >4 feet)	Samples collected	Laboratory Analysis Performed																Findings	Recommendations
					VOC-8010 (halogenated)	VOC-8020 (aromatics)	ETPH	PAH/SVOCs	Total RCRA-8 Metals	SPLP RCRA-8 Metals	Formaldehyde	Methanol	Ammonia	Glycols	PCBs	Aniline	Phenol	Grain Size Analysis	Total Organic Carbon	Hardness		
AOC 24 - Raceway	The Hockanum River is channeled through a stone-lined raceway which flows northeast through the Site and discharges to American Mill Pond. The race way passes below the eastern corner of Building 14, Brooklyn Street, Building 7, Building 5.	The steep gradient of the raceway and high energy flow are not conducive to reliably assess if a release to this feature may have occurred. Instead, potential impacts from historical discharges will be evaluated through sampling of sediment and surface water from American Mill Pond (see AOC-25).	No Borings Performed	No Samples Collected																	No investigation conducted	No further action
AOC 25 - American Mill Pond	American Mill Pond is located in the northern portion of the site. It is suspected that process waste waters may have been discharged to the pond prior to institution of wastewater treatment operations at the Site.	No investigations have been completed within this area. Potential impacts from historical discharges had not been defined.	6 surface water and 6 sediment samples	American Mill Pond: AOC-25 SW-1, AOC-25 SW-2, AOC-25 SW-3, AOC-25 SED-1, AOC-25 SED-2, AOC-25 SED-3				X	X				X			X	X	X	X	X	Ammonia, SVOCs, and aniline were not detected in the surface water samples both upgradient and downgradient of the Site. Metals were also not detected, with the exception of barium, which was reported to range in concentrations from 0.022 to 0.024 mg/l in upgradient Paper Mill Pond samples and from 0.022 to 0.023 mg/l in American Mill Pond. The reported hardness of the surface water samples were similarly close, ranging from 24.5 to 25.5 mg/l in upstream Paper Mill Pond and from 24 to 24.6 mg/l in downstream American Mill Pond samples. Phenolic were detected above the laboratory MRL in one sample (AOC-25 SW-4) from the upstream Paper Mill Pond at 0.022 mg/l.	No impacts to surface water inferred - No further action
				Paper Mill Pond: AOC-25 SW-4, AOC-25 SW-5, AOC-25 SW-6, AOC-25 SED-4, AOC-25 SED-5, AOC-25 SED-6				X	X				X			X	X	X	X	X	Concentrations of and metals (cadmium, chromium, lead, and mercury) were found elevated in downstream sediment samples in comparison to upstream sample and at concentrations exceeding benchmark screening criteria. PAHs also detected at concentrations exceeding screening level benchmark criteria, but were reported at equivalent or higher concentrations in upstream samples. Therefore, not inferred to result from a release from the site.	Potential for risk of impacts from metals in sediments - Completion of limited Baseline Ecological Risk Assessment recommended

FIGURES



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Engineers and Scientists
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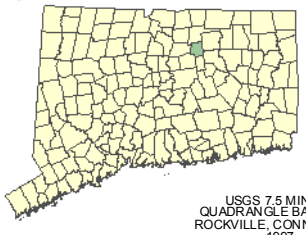

USGS 7.5 MINUTE QUADRANGLE BASE MAP: ROCKVILLE, CONNECTICUT 1997

SITE LOCUS

104 EAST MAIN STREET
VERNON, CONNECTICUT

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

PROJ MGR: CJF	REVIEWED BY: GTB	PROJECT NO. 05.0045441.00
DESIGNED BY: AJT	DRAWN BY: MJS	DATE: 04-30-15

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

0 1,000 2,000 4,000 6,000 8,000
Scale in Feet

N

FIGURE
1

© 2015 - GZA GeoEnvironmental, Inc. J:_45,000-45,499\45441 Amerbelle\GIS\mxd\FIG 1 SITE LOCUS.mxd, 4/30/2015, 3:00:53 PM, max.strubel

LEGEND

- OVERHEAD DOOR
- AOC-1 AREA OF CONCERN
- GZA SOIL BORING
- GZA SOIL VAPOR SAMPLE
- OVERBURDEN MONITORING WELL
- BEDROCK MONITORING WELL
- SOIL BORING BY OTHERS
- DESTROYED MONITORING WELL
- EXISTING BUILDING TO REMAIN
- NEW BUILDING PLANNED
- PLANNED EXCAVATION AREA (DEPTHS WILL VARY DEPENDING ON CONFIRMATION SAMPLING)
- CHEMICAL INFILTRATION TREATMENT AND SUBFLOOR VENTING

0 15 30 60 90
SCALE IN FEET

NOTE:

AOCs NOT SHOWN ON PLAN ARE SITE-WIDE AOCs
AOC-22 SITE-WIDE FILL
AOC-23 SITE-WIDE GROUNDWATER

NOTES:

1. THE BASE MAP WAS DEVELOPED FROM A PDF OF A FIGURE PROVIDED BY FUSS & O'NEILL ENTITLED "PROPOSED AND EXISTING SAMPLING LOCATIONS, AMERIBELLE TEXTILES", DATED AUGUST 2009, ORIGINAL SCALE: 1"=60'. FIGURE 2. ALL SITE FEATURE LOCATIONS ARE APPROXIMATE.

NO.	ISSUE/DESCRIPTION	BY	DATE

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TOWN OF VERNON
VERNON, CONNECTICUT

REMEDIAL ACTION PLAN
EXCAVATION AND IN SITU SOIL TREATMENT

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

PROJ MGR: DJR	REVIEWED BY: DJR	CHECKED BY:	FIGURE
DESIGNED BY: DJR	DRAWN BY: MJS	SCALE: 1"=30'	2
DATE: 11-03-15	PROJECT NO. 05.0045441.00	REVISION NO.	SHEET NO.

©2015 - GZA GeoEnvironmental, Inc. GZA-J:_45,000-45,499\45441 Ameribelle\45441-00.gpk\CAD\Figures\9999\Fig 2 RAP EXCV AND SVE AREAS.dwg [2] November 03, 2015 - 10:31am mac.stricbel

NO.	ISSUE/DESCRIPTION	BY	DATE

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TOWN OF VERNON
VERNON, CONNECTICUT

SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

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

PREPARED FOR:

PROJ MGR: CJF	REVIEWED BY: GTB	CHECKED BY:	FIGURE
DESIGNED BY: AJT	DRAWN BY: MJS	SCALE: AS SHOWN	3
DATE: 05-06-15	PROJECT NO. 05.0045441.00	REVISION NO.	

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APPENDIX A
LIMITATIONS

GEOHYDROLOGICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or 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 expressly 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 Proposal for Services and/or Report 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. Conditions other than described in this report may be found at the subject location(s).

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, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

6. Water level readings have been made in test holes (as described in the Report) and monitoring

wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

Compliance with Codes and Regulations

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

Screening and Analytical Testing

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

Interpretation of Data

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

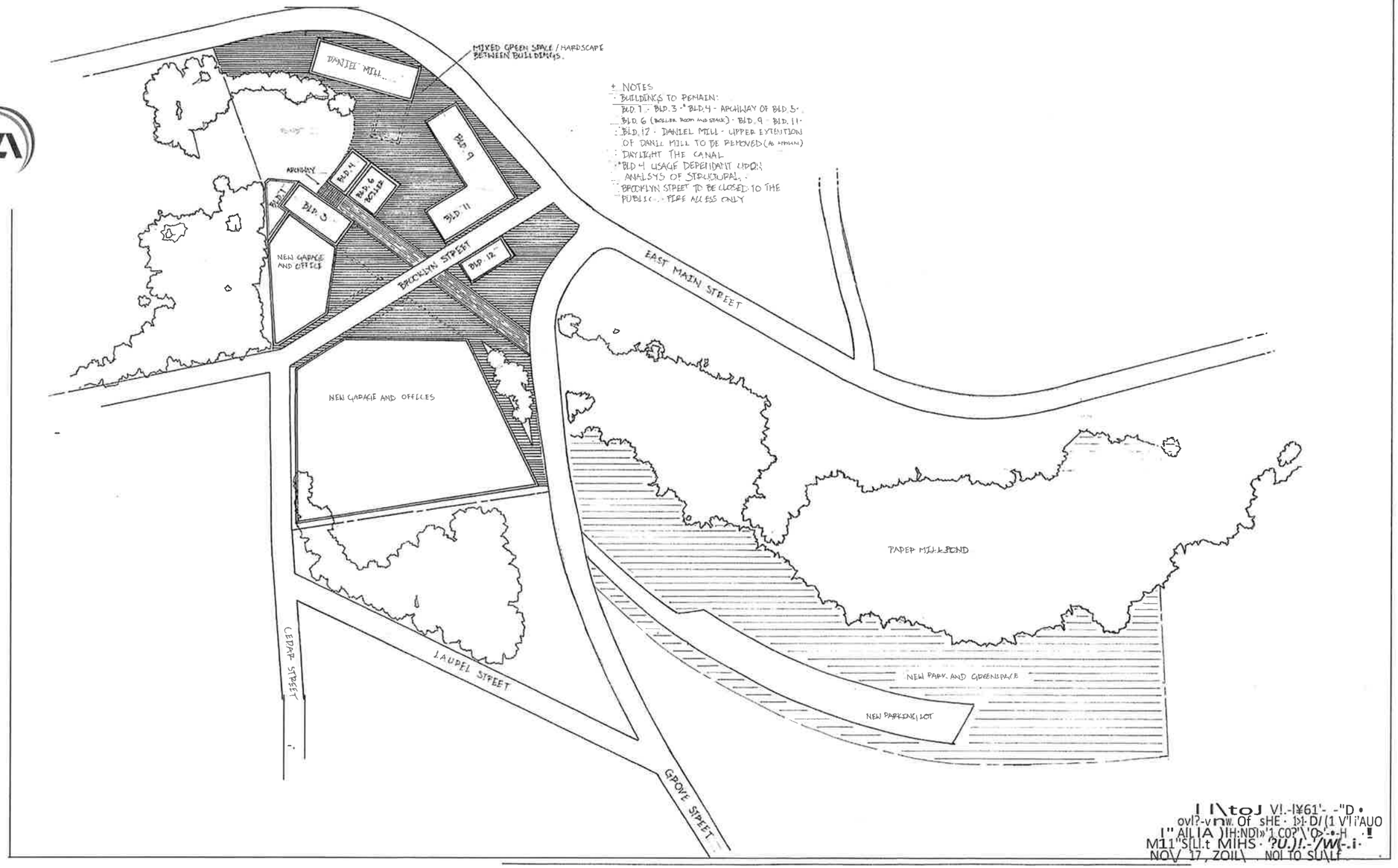
Additional Information

12. In the event that the Client or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

Conceptual Site Model

13. Our opinions were developed, in part, based upon a comparison of site data to conditions anticipated within our Conceptual Site Model (CSM). The CSM is based on available information, and professional judgment. There are rarely sufficient data to develop a unique CSM. Therefore observations over time, and/or space, may vary from those depicted in the CSM provided in this report. In addition, the CSM should be evaluated and refined (as appropriate) whenever significant new information and/or data is obtained.

APPENDIX B
TOWN OF VERNON CONCEPTUAL DEVELOPMENT PLAN



+ NOTES
BUILDINGS TO REMAIN:
BLD. 7 · BLD. 3 · *BLD. 4 · ARCHWAY OF BLD. 5 ·
BLD. 6 (BOILER ROOM AND STACK) · BLD. 9 · BLD. 11 ·
BLD. 12 · DANIEL MILL · UPPER EXTENTION OF DANIL MILL TO BE REMOVED (AS NOTED)
DAYLIGHT THE CANAL
*BLD 4 USAGE DEPENDANT UPON ANALSYS OF STRUCTURAL.
BROOKLYN STREET TO BE CLOSED TO THE PUBLIC. FIRE ACCESS ONLY

GZA

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APPENDIC C

DOCUMNTATION OF PUBLIC NOTICE OF INTENT TO REMEDIATE

GZA

Proactive by Design

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

600 Winding Brook Drive
Suite 402
Glastonbury, CT 06033
860-286-8000
www.gza.com

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

August 28, 2015
File No. 05.0045441.00

Michael Caronna
Acting Director of Health
31 North Main Street
Enfield, CT 06082

Re: Public Notification of Remedial Activities
104 East Main Street and 5 Brooklyn Street
Vernon, Connecticut

Dear Mr. Caronna:

In accordance with Sections 22a-134a(i) of the Connecticut General Statutes, notice is hereby provided of the intent to conduct remediation of environmental conditions existing at the property located at 104 East Main Street and 5 Brooklyn Street, Vernon, Connecticut to meet the requirements established in Sections 22a-133k-1 through 3 of the Regulations of Connecticut State Agencies. This notice is for your information only and no action is required on your part. For additional information, please contact:

Mr. John Ward
Town Administrator
Town Hall Memorial Building
14 Park Place
Vernon, Connecticut 06066
860-870-3665
jward@vernon-ct.gov

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Gordon T. Brookman, P.E., LEP
Principal

j:_45,000-45,499\45441 amerbelle\45441-00.gtb\public notice\letter to director of health dept.docx

PUBLIC NOTICE

PUBLIC NOTICE
OTICE TO CREDITORS
ESTATE OF
maine A. Patterson, AKA
Germaine Alphonsine
Verheist (15-0465)

Hon. Michael M. Darby,
ge of the Court of Probate,
ater Manchester Probate
rict, by decree dated
ust 26, 2015, ordered that
laims must be presented to
fiduciary at the address
w. Failure to promptly
sent any such claim may
lt in the loss of rights to
over on such claim.

Debra C. Daniels
Clerk

fiduciary is:
rida G. Tyszka
Old Forge Road
st Hartland, CT 06091

rnal Inquirer
tember 3, 2015

LIQUOR PERMIT
OTICE OF APPLICATION

s is to give notice that I,
k D. Collins, 48 Hurlbut
, Tolland, CT 06084-2314
ve filed an application
carded 8/20/2015 with the
pt. of Consumer
tection for a Cafe Liquor
rmit for the sale of
oholic liquor on the
mises at 87 West Rd.
ington, CT 06029-3718.
e business will be owned
Collins Restaurant Group
C. Entertainments will
nsist of: Acoustics (Not
plified) Disc Jockeys
raoke and Live Bands
monstrance/objections
st be filed by: 10/1/2015
Max D Collins
August 25, 2015

urnal Inquirer
gust 27, 2015
ptember 3, 2015

PUBLIC NOTICE
NOTICE TO CREDITORS
ESTATE OF
Joan R. Corbin
(15-00428)

The Hon. Marianne Lassman Fisher, Judge of the Court of Probate, Greater Windsor Probate District, by decree dated September 1, 2015, ordered that all claims must be presented to the fiduciary at the address below. Failure to promptly present any such claim may result in the loss of rights to recover on such claim.

Randall Graff
Assistant Clerk

The fiduciary is:
Louis W. Flynn, Jr., Esq.
Brown, Paindiris & Scott, LLP
36 School Street
Glastonbury, CT 06033

Journal Inquirer
September 3, 2015

PUBLIC NOTICE
NOTICE TO CREDITORS
ESTATE OF
Thomas Matthew Burns,
AKA Thomas M. Burns
(15-00426)

The Hon. Marianne Lassman Fisher, Judge of the Court of Probate, Greater Windsor Probate District, by decree dated September 1, 2015, ordered that all claims must be presented to the fiduciary at the address below. Failure to promptly present any such claim may result in the loss of rights to recover on such claim.

Randall Graff
Assistant Clerk

The fiduciary is:
Pamela Conrad
33 Commodore Avenue
Shelton, CT 06484

Journal Inquirer
September 3, 2015

PUBLIC NOTICE

PUBLIC NOTICE

IE ELLINGTON REGISTRARS OF VOTERS WILL ONDUCT A PUBLIC LOTTERY FOR EACH PARTY AND ACH MULTIPLE OPENING OFFICE TO DETERMINE THE ORIZONTAL ORDER OF CANDIDATES WITHIN EACH ARTY FOR THE NOVEMBER 3, 2015 MUNICIPAL ALLOT.

HE LOTTERY WILL BE CONDUCTED AT THE TOWN LERK'S OFFICE, ELLINGTON TOWN HALL, 55 MAIN TREET ON THURSDAY, SEPTEMBER 17TH AT 10 A.M.

urnal Inquirer
eptember 3, 2015

PUBLIC NOTICE

FAMILY COURT FOR THE STATE OF DELAWARE
NOTICE OF FAMILY COURT
PROTECTION FROM ABUSE ACTION

Spring M. Howe-Bates, (Respondent)
etitioner, Clifford S. Hunt has filed a Petition for an Order of rotection From Abuse against you in the Family Court of the tate of Delaware for Kent County. Case No. 15-21683

court hearing has been scheduled for September 8, 2015 at 0:00 am. The Family Court is located at 400 Court Street, over, DE 19901. If you fail to appear the hearing may roceed without you.

PUBLIC NOTICE

PUBLIC NOTICE

A Republican Municipal Primary for the office of First Selectman will be held on September 16, 2015 in the town of Ellington, CT. Any registered Republican is eligible to vote in this primary. Due to renovations at Crystal Lake School, please note that all voting will take place in the auditorium vestibule at Ellington High School, 37 Maple Street. Polling hours will be from 6 a.m. to 8 p.m.

Important dates to remember are as follows:

September 11, 2015 - mail in registrations for new voters or unaffiliated voters must be postmarked by this day.

September 15, 2015 - 12:00 noon is the last day for new voters and unaffiliated voters to register in person.

For any questions, please contact the registrar's office at 860-870-3107.

Journal Inquirer
September 3, 2015
September 9, 2015

PUBLIC NOTICE

LEGAL NOTICE
VERNON, CONNECTICUT

In accordance with Section 22a-134a(i) of the Connecticut General Statutes, the Town of Vernon hereby gives notice that it intends to conduct environmental remediation of the property located at 104 East Main Street and 6 Brooklyn Street (AKA former Amerbelle Corporation) in Rockville, Connecticut, to meet the requirements of Sections 22a-133k-1 through 3 of the Regulations of Connecticut State Agencies ("R.C.S.A"). A copy of the draft Remedial Action Plan and supporting environmental technical reports will be made available for view by interested persons by request in Town Hall Memorial Building - Administration Department - 3rd Floor, 14 Park Place, Vernon, Connecticut. Public comments on the remedial action plan may be submitted in writing to Mr. John Ward, Town Administrator, Town Hall Memorial Building, 14 Park Place, Vernon, Connecticut 06066, with a copy to Mr. Gordon Brookman, LEP, GZA GeoEnvironmental, Inc., 655 Winding Brook Drive, Glastonbury, Connecticut 06033.

Journal Inquirer
September 3, 2015

PUBLIC NOTICE

SOUTH WINDSOR PLANNING & ZONING COMMISSION

Notice is hereby given that there will be a Public Hearing on Tuesday, September 8, 2015, at 7:30 PM in the Madden Room of the South Windsor Town Hall to consider the following:

1. Appl. 15-45P, Design Professionals, Inc. Signage Text Amendment - request to modify Table 6.5.8.A. Building Signs, Maximum Number to be "None"; and to add to Additional Requirements to allow building signage to be permitted on three sides of the building
2. Appl. 15-46P, Evergreen Walk Lifestyles Center Drive-Through Text Amendment - request to add Buckland Road Gateway Zone "Section 4.2.8.E under Permitted Uses" to allow drive through facilities subject to specific Design Standards listed; modify "Section 4.2.8.G Prohibited Uses" to delete the prohibition of Drive-through windows; and to add to "Section 10 Definitions" a Drive-Through definition

Copies of the application are on file in the office of the Town Clerk or/and the Planning Department, and at www.southwindsor.org. At this hearing, interested persons

ENVIRONMENTAL CLEAN-UP
in progress at this site
For further information contact
JOHN WARD
Town of Vernon
14 Park Place - Vernon, Connecticut
860-870-3665