M-0817
February 18, 2014

Kathy Castagna
EPA New England - Region 1
5 Post Office Square, Suite 100
Mail Code (OSRR07-3)
Boston, MA 02109-3912

Re: **Analysis of Brownfield Cleanup Alternatives**
116 Cook Avenue, Meriden, CT

Dear Ms. Castagna:

The following is an Analysis of Brownfield Cleanup Alternatives (ABCA) for the brownfield site located at 116 Cook Avenue in Meriden, CT. This ABCA has been prepared as a requirement of the U.S Environmental Protection Agency (EPA) Brownfields Cleanup Grant awarded to the City of Meriden.

I. Introduction and Background

a. Site Location

The site consists of 2.8 acres with a vacant 72,473 ft^2 4-story building located at 116 Cook Avenue in Meriden, Connecticut. The building is adjacent to the Factory H building, a former cutlery industrial complex, which was recently demolished. A site location map is provided as Figure 1.

b. Previous Site Use(s) and Previous Cleanup Remediation

Currently, the site is vacant. Historically, the site was used for silverware, cutlery and possible pewter manufacturing during the late 1800s in addition to gun manufacturing in the early 1900s. During the 1970s, the building was converted into medical offices and was most recently used by the Meriden Medical Center until approximately the year 2000. A site aerial photograph is provided as Figure 2.

A number of environmental investigations as well as cleanup activities have been conducted at the site from 1987 to 2011 including the following:

- ERL Environmental Investigations, February 1987, April 1989
- ERL Remedial Action, June 1989
- Rizzo Environmental Investigations, October 1999, December 1999, January 2000
- Geoquest Environmental Review, April 2003
- AECOM, Phase I ESA, November 2009
- Tighe & Bond, Phase II ESA, February 2011
- Tighe & Bond, Phase III ESA, November 2011

From these investigations, it has been determined that the site has been impacted by former industrial activities. Notably, lead was detected in the soil above cleanup criteria during the ERL investigations. This prompted the CT Department of Energy and the Environment (CTDEEP) to require the excavation and removal of lead-impacted materials to cleanup criteria existing at the time. The Meriden Medical Center removed the lead-impact materials in 1989. The impact was concentrated in

an ash layer beneath the parking lots in two excavation areas (Areas 1 and 2) from a depth of 2 inches to 2 feet below ground surface. The cleanup standard that existed at the time was leachable lead at a concentration of 0.5 ppm by EP Toxicity. This is higher than the current standard, GB Pollutant Mobility Criteria (GB PMC) of 0.15 mg/L by SPLP extraction.

Approximately 1,200 cubic yards (CY) of material characterized as hazardous for lead was removed from Areas 1 and 2 on 116 Cook Avenue. Area 2 soils were also found to be impacted by gasoline constituents but that was attributed to an off-site, upgradient gasoline station. At the time, active remediation was being performed at the gas station. Approximately 10 CY of petroleum-impacted material was removed from Area 2. The CTDEEP inspected the site after the cleanup and issued a compliance letter, dated June 2, 1989, indicating that no further action was required. Generally CTDEEP's policy is that no further remediation is required once the CTDEEP approves the cleanup even if the cleanup standard becomes more stringent. However, if the land use changes or if the site will be redeveloped, as is this case, the CTDEEP policy may no longer apply. The Rizzo investigation evaluated the groundwater for metals and VOCs and soil vapor and indoor air (inside the building at 116 Cook Ave) for VOCs. Results of these investigations did not indicate any constituents above cleanup standards; however, the actual data was not available for review. The investigations were summarized in the Geoquest Environmental Review report. Geoquest did not conduct any investigations and only reviewed the existing data.

The AECOM Phase I ESA identified 14 Recognized Environmental Conditions (RECs) at the site.

c. Site Assessment Findings

The City of Meriden contracted with AECOM in 2009 for a Phase I ESA and with Tighe & Bond in 2011 for Phase II and III ESAs. A description and current status of the Recognized Environmental Conditions (RECs) that were investigated during the ESAs is provided below.

- **REC-4** – Urban Fill

  Extractable Total Petroleum Hydrocarbons (ETPH), Polycyclic Aromatic Hydrocarbons (PAHs), and metals were detected in the industrial-impacted fill material that is prevalent throughout the site. ETPH, PAHs, and metals (antimony, arsenic, copper, and lead) were detected above the Residential (RES) Direct Exposure Criteria (DEC), Industrial/Commercial (I/C) DEC, and/or GB PMC. The remediation conducted in 1989 used cleanup standards that are less stringent than the current Remediation Standard Regulations (RSRs) but it was approved by CTDEEP in 1989. The Phase II ESA found additional fill areas that were unknown in 1989. The Phase III ESA delineated the fill areas and determined the remediation required to achieve compliance with the RSRs.

- **REC-5** Former Medical Office

  Further evaluation of the radiological REC is unnecessary based on a conversation with Jan Nguyen of the Nuclear Regulatory Commission (NRC) Region 1 regarding the status of the NRC license (#06-05686-02) that previously included operations at 116 Cook Avenue. Ms. Nguyen indicated the following:

- The NRC removed the facility located at 116 Cook Avenue from the license and released the site for unrestricted use in a NRC letter dated June 16, 1999.
- A radiological investigation of 116 Cook Avenue was conducted in November 1998 that included a Geiger counter survey and wipe samples and no contamination was found. NRC reviewed and approved the investigation.
- Only diagnostic nuclear medicine was conducted at 116 Cook Avenue which included x-rays and low level nuclear medicine such as Technesium99 which has a half-life of 6 hours and is gone in 60 days and would have not resulted in residual radiological contamination.

- **REC-6** – On-Site Soil

  The on-site soil has been impacted by the fill that has been deposited at the site. ETPH, PAHs, and metals (antimony, arsenic, copper, and lead) were detected above the RES DEC, I/C DEC, and/or GB PMC. The Phase II and III ESAs delineated the extent of soil impacts to determine the remediation required to achieve compliance with the RSRs.

- **REC-7** – On-Site Groundwater

  Metals, VOCs, and SVOCs were detected in the groundwater indicating impacts from the fill material. Vinyl chloride was detected above the RES Groundwater Volatilization Criteria (GWVC) and I/C GWVC in the northeastern and eastern areas of the site. The source of the vinyl chloride is undefined at this time and additional investigation would be required to determine the extent and source of impact. Two soil vapor points were installed in the vicinity of the two monitoring wells that exceeded the RES GWVC and I/C GWVC of vinyl chloride and were analyzed for VOCs. Both soil vapor points had concentrations well below RSR criteria.

- **REC-8** Off-Site Groundwater

  Barium and nickel were detected in the upgradient well and are likely due to background conditions. At this time, it does not appear that an upgradient source is significantly impacting groundwater quality at the site.

- **REC-10 –** Underground Fuel Oil Tank

  Based on the review of CTDEEP records, the 10,000-gallon heating oil UST was installed in 1977. This UST has exceeded the regulatory life expectancy. ETPH was detected in the soil above the RES DEC and is comingled with the VOC impacts at REC-11. Additionally, aromatic VOCs and PAHs were detected in the soil and groundwater located downgradient of the UST suggesting a historic release has occurred. Phenanthrene was detected in groundwater above the Surface Water Protection Criteria (SWPC). The City was proactive and removed residual oil and water from the UST in 2012 to prevent a release. The City used its own funding for this effort. The UST location is shown on Figures 2 and 3.

- **REC-11** – Historic Site Use

  Tricholoroethene (TCE) was detected in the borings associated with REC-10, the 10,000-gallon fuel oil UST. These borings are also in close proximity to Factory H near a side door. It is possible that spent solvents were historically

discharged from this side door. The concentrations detected in the soil ranged from 4.5 to 190,000 µg/Kg with two boring locations above the RES DEC of 56,000 µg/Kg. This elevated concentration could have resulted from a surface release since it was detected at a depth of 2 to 3 feet below ground surface. The Phase III ESA delineated the extent of TCE impact in the soil. TCE was also detected in the groundwater at a nearby monitoring well. ETPH was also detected in the soil which originated from REC-10 and is comingled with the TCE. The UST also appears to be within the area of TCE impact. Figure 3 presents the location of borings and impacted soil.

- **REC-12** – Staining of Concrete in Elevator Mechanical Room and 55-Gallon Drum

  Concrete around the elevator reservoir in Wing C was observed to be stained with hydraulic oil. A petroleum odor was also noted during the Phase I ESA. No floor drains were observed in this room. PCBs and ETPH were not detected in the soil beneath the concrete slab suggesting a subsurface release has not occurred. A soil vapor point was installed in this area and analyzed for VOCs. Results of the soil vapor were well below RSR criteria.

- **REC-13** - Transformer

  A transformer is present at the southern exterior side of Wing D. No visible evidence of staining was observed. One boring was installed in this area and a soil sample collected for the analysis of PCBs. No evidence of a release was found. This REC is considered closed.

- **REC-14** - Generator

  A natural gas fueled generator is present on the southern exterior side of Wing D. The generator may have replaced a diesel generator at some point in the past. No visible evidence of staining was observed. One boring was installed in this area and a soil sample collected for analysis. Arsenic and lead were detected in the soil above the RES DEC. ETPH was also detected but below cleanup criteria. These COCs are attributed to the industrial-impacted fill material and not a release from the generator. This REC is considered closed.

d. Project Goal

The City of Meriden conducted a Preliminary Reuse Planning and Market Analysis for Factory H Area in 2009, using funding from an EPA Brownfield Assessment Grant. This report contained a comprehensive redevelopment plan for 116 Cook Avenue and the adjacent INSILO Factory H site. The redevelopment plan for the site includes the removal of a vacant building that attracts vandals, illegal activity, and brings down neighboring property values. The plan outlined a number of improvements to 116 Cook Avenue that would reintegrate two vacant industrial sites into the community and in the process improve the environment, social fabric, and health of the community. The redevelopment of 116 Cook Avenue will create a mixed-use development with approximately 14,880 square feet of commercial space and three floors of 44 new residential units. The total proposed redevelopment, including those of Factory H, would create 86 units of housing and just over 35,000 square feet of commercial space.

II. Applicable Regulations and Cleanup Standards

a. Cleanup Oversight Responsibility

The site will be entered in the CT Voluntary Remediation Program (VRP) (CGS 22a-133x). The CTDEEP will delegate the site to a Licensed Environmental Professional (LEP). The LEP will keep EPA and CTDEEP appraised of remediation progress throughout the project.

b. Cleanup Standards for Major Contaminants

Cleanup standards for remediation conducted under the Cleanup Grant will be the remediation criteria listed in the CTDEEP Remediation Standard Regulations (RSRs) (RCSA 22a-133k). CTDEEP's intent in developing the RSRs was to define the following:

- Minimum remediation performance standards
- Specific numeric clean-up criteria
- A process for establishing alternative site-specific standards, if warranted

In general, RSR criteria are used to remediate contaminated environmental media (i.e., soils and groundwater). RSR criteria are not specifically applicable to building interiors and sediment.

The RSRs apply to efforts to remediate contaminated soil, surface water, soil vapors, or a groundwater plume at or emanating from a release area or AOC, provided that the remedial action is required by the following:

- CGS Chapter 445 (Hazardous Waste) or Chapter 446K (Water Pollution Control); or
- Relevant subsections of CGS 22a-133 (Voluntary Clean-up) including but not limited, any such action required to be taken or verified by a Licensed Environmental Professional, except as otherwise provided in the regulations.

The RSRs contain cleanup criteria for both residential and industrial/commercial settings. The cleanup criteria for remediation at the site under the Cleanup Grant will be residential as the Project Goal includes residential development as discussed in I.d. above.

c. Laws & Regulations Applicable to the Cleanup

Laws and regulations that are applicable to this cleanup include the Federal Small Business Liability Relief and Brownfields Revitalization Act, the Federal Davis-Bacon Act, the CT Voluntary Remediation Program (VRP) (CGS 22a-133x), CTDEEP Remediation Standard Regulations (RSRs) (RCSA 22a-133k), CT Significant Environmental Hazard Program (CGS 22a-6u), CTDEEP Underground Storage Tank Regulations (RCSA 22a-449) and City of Meriden by-laws. Federal, state, and local laws regarding procurement of contractors to conduct the cleanup will be followed.

In addition, all appropriate permits (e.g. call-before-you-dig, soil transport/disposal manifests) will be obtained prior to the work commencing.

III. Evaluation of Cleanup Alternatives

Based on the results of previous investigation conducted at the site, three remedial alternatives were considered to address contamination at the site including:

- Alternative #1: No Action
- Alternative #2: Capping
- Alternative #3: Excavation with Off-Site Disposal

To satisfy EPA requirements, the effectiveness, implementability and cost of each alternative was considered prior to selecting a recommended cleanup alternative, as discussed below.

a. Alternative #1 – No Action

The No-Action alternative is included as a baseline for comparison to the other proposed alternatives. The No-Action alternative assumes that the property will continue to exist as is and none of the proposed actions listed in the other alternatives would be initiated. The No-Action alternative would not provide for mitigation of the actual or potential risks posed by the site contamination at the property and would not be protective of human health and/or the environment.

Effectiveness

The effectiveness of the No-Action alternative in achieving project goals (i.e. controlling or preventing receptors exposure to contamination at the site) would be negligible. Under the No-Action alternative, there would be a continued presence of contaminants in soil and groundwater, which could pose long-term health risks to the public.

Implementability

Implementation of the No-Action alternative would be fairly straightforward. The site would be left in its current state. Previously identified hazardous building materials and contaminants in soil would still pose a threat to public health and the environment.

Cost

Direct costs associated with the No-Action alternative would be negligible (upkeep of the property and building) and the lowest of the proposed remedial alternatives presented herein. Indirect costs could include the inability to obtain funding and the potential liabilities associated with the continued presence of site contamination.

b. Alternative #2 – Capping

The Capping remedial alternative includes placing an impermeable cap of a predetermined thickness over the impacted soil located on site. This alternative requires approval by the CTDEEP prior to implementation as well as continued monitoring and maintenance of the cap.

Effectiveness

Capping is an effective way to prevent resident receptors from coming into direct contact with contaminated soils and fill at REC-4/Urban Fill and REC-6/On-Site Soil. However, capping is not an effective way to control exposures associated with the VOCs and potential vapor intrusion at REC-

11/Historic Site Use. Nor is it allowed by CTDEEP under the RSRs. Capping is also not an effective way to control exposures associated with the fuel oil at REC-10/Underground Fuel Oil Tank nor is it allowed by CTDEEP under the UST Regulations.

Implementability

Capping is easy to implement, although ongoing monitoring and maintenance of the cap will require periodic coordination and reporting. This alternative would work for REC-4/Urban Fill and REC-6/On-Site Soil but require the preparation and submittal of an Engineered Control Variance request to CTDEEP and posting of a surety. This alternative would not be allowed by CTDEEP for REC-11/Historic Site Use or REC-10/Underground Fuel Oil Tank.

Cost

Relative to each of the remedial alternatives presented herein, costs associated with Capping are high. A preliminary Opinion of Probable Cost for Capping for REC-4/Urban Fill and REC-6/On-Site Soil is approximately $1,200,000.

c. Alternative #3 – Excavation & Off-Site Disposal

The soil excavation alternative includes the physical removal and off-site disposal of impacted soil, collection of confirmatory sidewall and bottom samples for laboratory analysis to document complete removal of impacted soil, and the placement and compaction of backfill material within the excavation area.

Effectiveness

Soils contaminated with ETPH and VOCs exceeding RSR standards have been identified in soil at the site. The benefit of soil excavation is that the impacted soils can be permanently removed from the site within a relatively short timeframe. It is anticipated that complete removal could be accomplished since the impacted soil is located along the building exterior and contaminants do not appear to have migrated from the boundaries of the site. Another benefit would be that excavation equipment used for UST removal would already be on-site and available for excavation activities. Soil excavation activities will require a temporary increase in truck traffic on local roads.

Implementability

Soil excavation and off-site disposal is a commonly used remedial method. The soils excavated from the site should not pose a significant risk of exposure to contractors or the general public if properly managed. Based on contaminant concentrations identified, the soils could likely be disposed at a landfill for use as cover material or sent off for recycling at an asphalt batching facility. Soil impacts appear limited to the area located south of the site building and no limitations to excavation are anticipated except for the adjacent building or slab if the impact extends that far.

Coordination (e.g. dust suppression and monitoring) during cleanup activities and short-term disturbance to the community (e.g. trucks transporting contaminated soils and backfill) are anticipated. However, ongoing monitoring and maintenance will not be required following excavation and offsite disposal.

Cost

Relative to each of the remedial alternatives presented herein, costs associated with soil excavation and off-site disposal are moderate. Exact costs depend on the contractor's means and methods for removal, costs for labor, materials, and off-site disposal. Because soil excavation is a commonly used remedial method, is highly effective and quick to implement, and is cost effective, it is the proposed remedial option for the site.

Removal and proper disposal of hydraulic oil in the elevator reservoirs and piping is also recommended under Alternative #3 to prevent the possibility of leaks or spills from the elevators which may impact the environment resulting in costly remediation.

IV. Recommended Cleanup Alternative

The recommended cleanup alternative is Alternative #3: Excavation with Off-Site Disposal for REC-11/Historic Site Use and REC-10/Underground Fuel Oil Tank and REC 12/hydraulic oil removal and disposal.

Alternative #2: Capping for REC-4/Urban Fill, REC-6/On-Site Soil and other RECs not addressed by this ABCA should be further evaluated for once redevelopment plans are finalized for the site. Capping can be integrated into the redevelopment construction efforts thereby saving the City time and costs.

Alternative #1: No Action, cannot be recommended, since it does not address the site risks. Alternative #2: Capping, is not allowed by CTDEEP for REC-11/Historic Site Use and REC-10/Underground Fuel Oil Tank. Alternative #3, Excavation with Off-Site Disposal, is cost prohibitive for REC-4/Urban Fill and REC-6/On-Site Soil. For these reasons, a combination of Alternative #2 Capping and Alternative #3 Excavation with Off-Site Disposal is the recommended alternative.

a. Estimated Remediation Costs

The total preliminary Opinion of Probable Cost for REC-10, REC-11, and REC-12 is **$235,000**. The ETPH soil impacts from REC-10 are comingled with the TCE soil impacts at REC-11. Additionally, the UST at REC-10 appears to be within the TCE soil impacts at REC-11 and would have to be removed as part of soil excavation for TCE impacts.

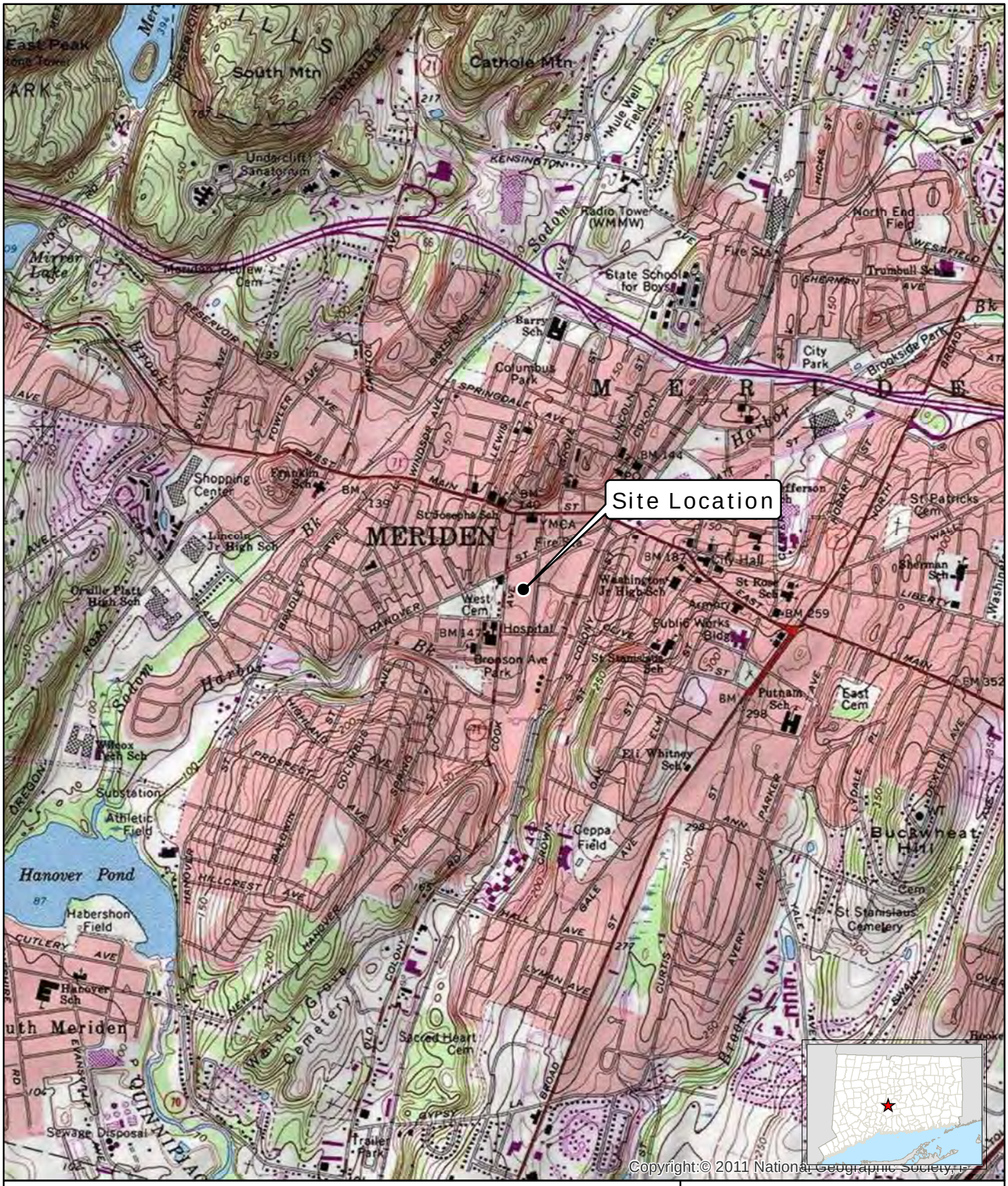
If you have any questions or comments, please contact me at (860) 704-4761.

Very truly yours,

TIGHE & BOND, INC.

James T. Olsen, LEP
Senior Project Manager, Associate

Enclosures Figure 1 – Site Location Map
Figure 2 – Site Aerial Photograph
Figure 3 – UST Location and Soil Exceedances



LEGEND

- Site Location

Source: U.S Geological Survey, in cooperation with CTDEEP, Office of Information Management

Based on USGS Topographic Map for Meriden CT, Rev. 1992, 1:24,000

Map Date: September 2013

1:24,000

0 1,000 2,000

Feet

N

FIGURE 1
SITE LOCATION MAP

116 Cook Avenue
Meriden, Connecticut

September 2013

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SCALE IN FEET
0 80' 160'
GRAPHIC SCALE

N

FIGURE 2
SITE AERIAL PHOTOGRAPH

116 Cook Avenue
Meriden, Connecticut

DATE: September 2013
SCALE: 1" = 80'
FIGURE 2

Tighe&Bond
www.tighebond.com

Tighe & Bond, Inc. J:\M\M0817 Meriden Brownfields\116 Cook Ave & 85 Cooper St\Cleanup Grant Oversight\ABCA\116 Cook.Meriden.Figure 2 & 3.Tank Locations.dwg

09/06/2013

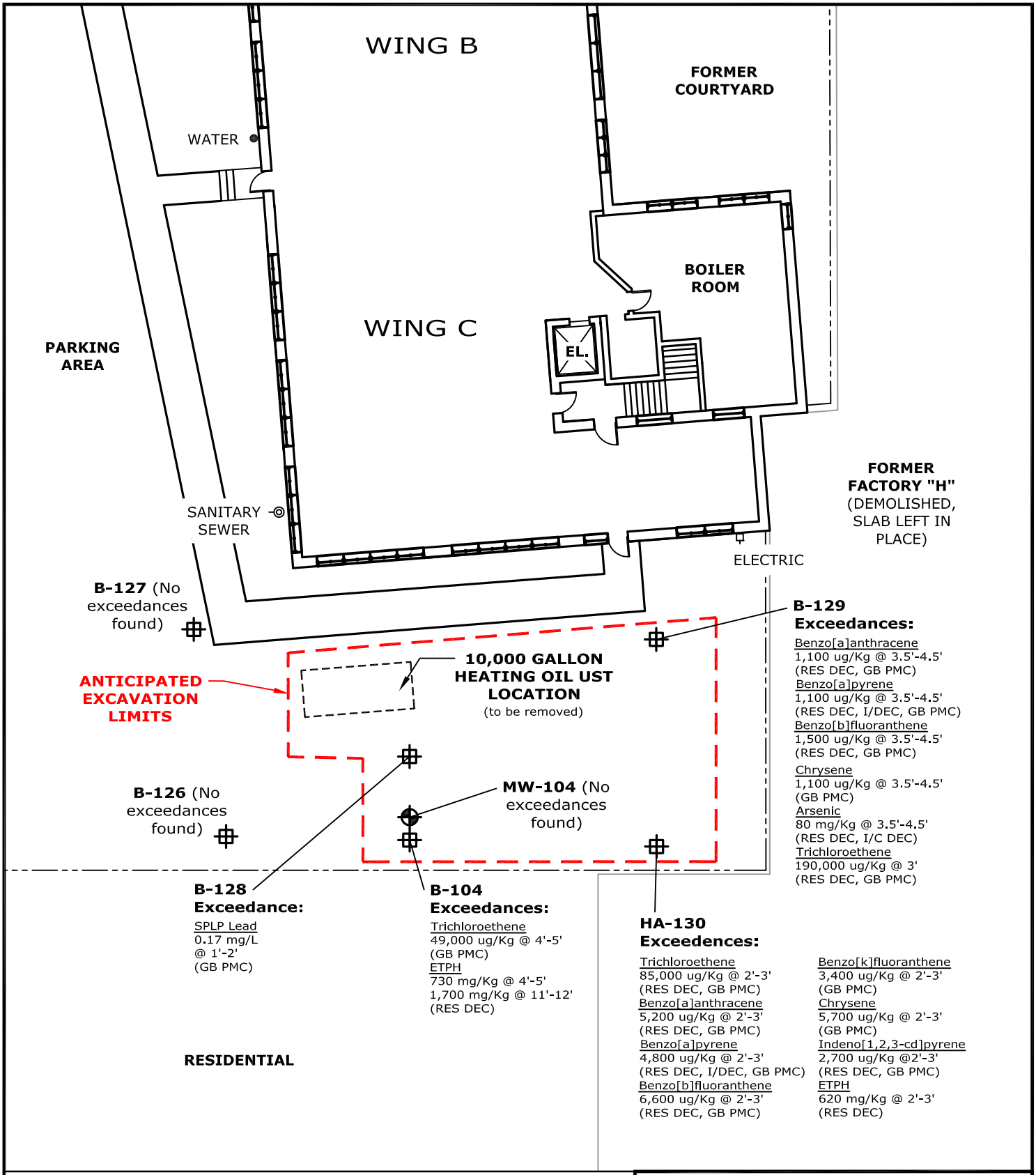

FIGURE 3
UST LOCATION AND SOIL EXCEEDENCES

116 Cook Avenue
Meriden, Connecticut

DATE: September 2013
SCALE: 1" = 20'
FIGURE 3

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12/02/2013