



July 3, 2007

Michelle Tipple
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, New York 12561

Re: **Cornerstone Enterprises, Inc. Brownfield Cleanup Program Site – Remedial Investigation Work Plan**; 33 East Main Street, Pawling, Dutchess County, New York;
Conrad Geoscience File #RP060080
NYSDEC Spill #90-12530
NYSDEC BCA #C314116

Dear Ms. Tipple:

Conrad Geoscience Corp. has prepared the enclosed Draft Remedial Investigation Work Plan for the above referenced Brownfield Cleanup Program (BCP) site.

If you have any questions or comments regarding this work plan, please feel free to contact us. We look forward to receiving approval from the State to implement this Plan.

Sincerely,

CONRAD GEOSCIENCE CORP.

Christopher B. Brown, CPG
Senior Hydrogeologist

CBB/seg

enclosure

cc: Nathan Walz– NYSDOH
Kelly Liffland
Kimberlea Rea

FINAL

REMEDIAL INVESTIGATION WORK PLAN
CORNERSTONE ENTERPRISES, INC.

VILLAGE OF PAWLING
DUTCHESS COUNTY, NEW YORK

NYSDEC SPILL #90-12530
NYSDEC BCP Site #C314116

Prepared For:

NYSDEC Region 3
21 South Putt Corners Road
New Paltz, New York 12561

Prepared By:

Conrad Geoscience Corp.
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Poughkeepsie, New York 12601

July 3, 2007



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1.0 INTRODUCTION

The BCP application submitted to NYSDEC by Cornerstone Enterprises has been accepted (BCP Site #C314116). The work plan proposed herein is designed to determine the extent of contaminants in soil and groundwater at the subject property in accordance with BCP regulations and guidance documents.

2.0 SITE DESCRIPTION AND HISTORY

The subject property is located at 33 East Main Street in the Village of Pawling, New York (Figure 1). The property was operated as an automotive maintenance facility and retail gasoline sales station until 1985 (Riley's Garage). The 0.19-acre property situated on the south side of East Main Street includes a 10,000 ft² building (two-story plus basement), and a parking lot in the western part of the property. A tributary to the East Branch Croton River borders the eastern property boundary, and flows to the south (Figure 2).

Historical Sanborn Fire Insurance Maps dated 1910, 1924 and 1924-1943 were reviewed to assemble additional information pertaining to the operating history of the subject property. These maps depict three underground storage tanks (USTs) along the northern portion of the subject property. The adjoining property to the west is also depicted as having two USTs. Locations of on-site USTs according to the Sanborn Maps are depicted on Figure 2.

In 1991, NYSDEC assigned Spill #9012530 to the property, based on information from a new owner indicating that he had acquired the property in 1989 without knowledge of "buried drums and tanks." This spill file was closed by NYSDEC on June 30, 1991. At that time, NYSDEC personnel inspected the subject property and identified two USTs. NYSDEC inspection reports also refer to a floor drain in the garage that discharged to the adjacent stream. Three USTs were registered for the subject property by a prior owner from June 1992 through June 1997, including two 2,000-gallon USTs and one 150-gallon UST. PBS #3-600242 was assigned to the facility. In May of 2003, the current owners purchased the subject property and registered the tanks under the current ownership.

Soil samples were collected by a potential buyer sometime prior to 2003. Petroleum-related compounds were detected at concentrations exceeding 6NYCRR Part 375 guidance values.

3.0 OBJECTIVES

Following is a summary of the objectives of this Remedial Investigation (RI) work plan:

- Establish the lateral and vertical extent of petroleum-contaminated soil in the vicinity of suspected on-site sources (tanks, fuel dispensers and dispenser piping).



- Determine if site-related contaminants have contaminated groundwater.
- Determine if contaminants that originated on site may have migrated to adjacent properties.
- Verify the discharge location of floor drains, and sample soil or groundwater at the outfall location.
- Assemble information regarding the distribution and extent of subsurface contaminants and contaminant sources sufficient for preparation of a Remedial Work Plan.

4.0 FIELD ACTIVITIES PLAN

4.1 Task 1: Subsurface Investigation

4.1.1 Subsurface Soil Sampling

According to the Petroleum Bulk Storage (PBS) Facility Information Sheet, there are currently three underground storage tanks (USTs) at the site. Spillage or leakage from these tanks or the fuel dispensing system are likely to have released petroleum hydrocarbons into soil and/or groundwater. An IRM is being proposed to pump the contents of these USTs into properly labeled 55-gallon drums. The IRM work plan is being submitted to NYSDEC under separate cover. Drums will be stored in the on site building pending waste characterization and off-site disposal.

In accordance with NYSDEC technical guidance document DER-10, soil borings will be placed in the vicinity of the tanks and associated piping, and in other potential areas of discharge (Figure 3). Borings will also be completed along the southern and eastern property boundaries to determine if site related contaminants may be migrating off the subject property. Sampling is also proposed along the western property boundary to determine if contaminants from up-gradient sources may have impacted the site. Two soil samples will be collected from beneath the floor of the basement slab, immediately south of the suspected UST locations. A total of 22 soil boring locations are depicted on the attached site plan (Figure 3). Additional borings will be completed, if necessary, to delineate the extent of contaminants.

Soil borings around the building will be completed using a track-mounted Geoprobe™ unit equipped with 5-foot long, 1 3/4-inch diameter core barrels (macro-cores) fitted with acetate liners. All soil borings will be conducted in accordance with NYSDEC/USEPA protocols. Borings will be sampled continuously from the ground surface to a maximum depth of 20 feet below grade, to groundwater, or to refusal, whichever is encountered first. The project geologist will keep a detailed log of each core: lithology, grain size, stratigraphic changes, color, and occurrence of groundwater will be recorded. Conrad Geoscience will screen soil samples in the field for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) and headspace techniques. PID readings will be recorded by the project geologist. Soil



cuttings that are visibly contaminated, exhibit elevated PID readings, or an obvious petroleum odor will be placed in 55-gallon drums and staged on-site pending waste characterization and off-site disposal. Soil cuttings which do not exhibit these criteria will be used to backfill the boring from which they were removed.

Soil samples from beneath the basement floor will be collected using a rotary hammer-drill and hand augering tools. Borings will be sampled continuously from the ground surface to a maximum depth of 4 feet below the concrete slab. The project geologist will keep a detailed log of each core: lithology, grain size, stratigraphic changes, color, and occurrence of groundwater will be recorded. Conrad Geoscience will screen soil samples in the field for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) and headspace techniques. PID readings will be recorded by the project geologist. One sample from each boring will be submitted to a NYSDOH approved laboratory for analysis of the STARS lists of VOCs and semi-volatile organic compounds (SVOCs) via USEPA Methods 8260 and 8270, respectively, and the eight RCRA metals. Additional borings may be conducted based on findings from these two locations.

4.1.2 Groundwater Sampling

Groundwater samples will be collected from up to 10 borings using the Geoprobe SP-16 groundwater sampling tool, or temporary well screens. Sampling locations, depicted on Figure 4, are along property boundaries and down-gradient of suspected contaminant sources. Locations were chosen to evaluate the potential for site-related contaminants to impact adjacent properties, and to evaluate the extent to which contaminants may have migrated onto the subject property.

Soil borings will be cored in advance of collection of groundwater samples, screened in the field using a PID and headspace techniques and logged in accordance with the procedure outlined in Section 4.2.1. Soil samples from three of the ten locations (30%) will be submitted for laboratory analysis in accordance with the protocol established for subsurface soil samples. Soil cuttings that are visibly contaminated, exhibit elevated PID readings, or an obvious petroleum odor will be placed in 55-gallon drums and staged on-site pending waste characterization and off-site disposal. Soil samples will be screened in the field using a PID and headspace techniques. Temporary well screens, if used, will remain in place. Samples will be submitted to a NYSDOH approved laboratory for analysis of the TCL list of VOCs via USEPA Method 8260, SVOCs via USEPA Method 8270, and the eight RCRA metals. Groundwater flow direction may be determined based on the elevation of groundwater in the borings. Installation of permanent wells and surveying top-of-casing elevations are not being proposed at this time.

4.1.3 Surface Soil Sampling

In order to evaluate the extent of contaminants in surface soil, six surface soil samples will be collected from the southern part of the subject property. Sample locations will be biased to locations under and adjacent to the former ramp location as depicted in historical Sanborn Fire Insurance Maps (Figure 3). Samples will be collected from a depth of 0-2 inches below ground surface after the removal of the vegetative cover. Soil samples will be analyzed for the STARS



list of VOCs and SVOCs via USEPA Methods 8260 and 8270, respectively, and the eight RCRA metals.

4.2 Task 2: Floor Drain Tracing and Outfall Sampling

Conrad Geoscience will open and inspect the floor drain in the garage interior and inspect the building for other potential contaminant pathways (broken concrete, sinks, piping, etc.). The outfall of this drain will be located by visual inspection or by mechanical snake, and will be confirmed using dye-tracing techniques. It is anticipated that this drain discharges into the adjacent stream. If the discharge location of this drain is on land, surface and subsurface soil will be sampled. If the discharge is to the adjacent stream, samples of stream-bottom sediments will be collected from locations up-stream, down-stream and at the discharge location of the drain. Samples will be submitted to a NYSDOH approved laboratory for analysis of the TCL list of VOCs via USEPA Method 8260, SVOCs via USEPA Method 8270, and the eight RCRA metals.

One soil sample is also proposed to be collected at the location of the floor drain in the building interior. Samples will be collected using the procedure outlined above if the area is accessible with the Geoprobe, or by using hand tools if Geoprobe access is limited. Samples will be submitted to a NYSDOH approved laboratory for analysis of the TCL and STARS list of VOCs via USEPA Method 8260, STARS SVOCs via USEPA Method 8270, and the eight RCRA metals.

If target compounds are detected above guidance values in the vicinity of the floor drain, or in borings conducted in the building interior, additional soil sampling will be implemented to delineate contaminant distribution.

4.3 Task 3: Remedial Investigation Reporting

Upon receipt of laboratory reports, Conrad Geoscience will prepare a Remedial Investigation Report, which will include the following:

- Summary of site history.
- A description of field tasks and methods.
- Analytical results in table format (copies of laboratory reports will be appended).
- Comparison of soil and groundwater quality to applicable standards criteria and guidance.
- A discussion of the nature and extent of contamination.
- Site Location and Soil Boring/Sample Location maps.
- Conclusions and recommendations, including the need for remediation.

In addition to the above, the Remedial Investigation Report will include a private well survey for homes and businesses within a one-half mile radius of the site. The private well



survey will be conducted by reviewing the customer list of the public water supplier and conducting an area visit.

5.0 SAMPLING and ANALYSIS PLAN, QA/QC

A table summarizing soil, groundwater and quality control samples to be collected is provided below. Conrad Geoscience personnel have adopted standard operating procedures, which ensure sample integrity and quality. Standard operating procedures for soil sample collection, soil boring installation and decontamination of sampling tools are appended.

SAMPLE TYPE/AREA	ANALYSIS			
	STARs VOCs	TCL VOCs	STARs SVOCs	8 RCRA Metals
<i>Underground Storage Tank Area</i>				
Geoprobe Soil Samples	22	0	22	22
Surface Soil Samples	6	0	6	6
Soil Samples from Groundwater Borings	3	0	3	3
Groundwater Samples	0	10	10	10
<i>Floor Drain Discharge Location</i>				
Soil/Sediment Samples	0	Up to 3	Up to 3	Up to 3
<i>Quality Control</i>				
Trip Blank – Groundwater Samples	0	1	0	0

6.0 SITE SPECIFIC HEALTH & SAFETY PLAN

In accordance with NYSDEC and OSHA requirements, a site specific Health and Safety Plan is appended as a separate document (Appendix B).

7.0 COMMUNITY AIR MONITORING PLAN

In accordance with NYSDEC and NYSDOH requirements, a site specific Community Air Monitoring Plan is appended as a separate document (Appendix C).

8.0 SCHEDULE

We anticipate completing field work as summarized in this plan within the months of July and August 2007. Report preparation is planned for the month of September 2007. The



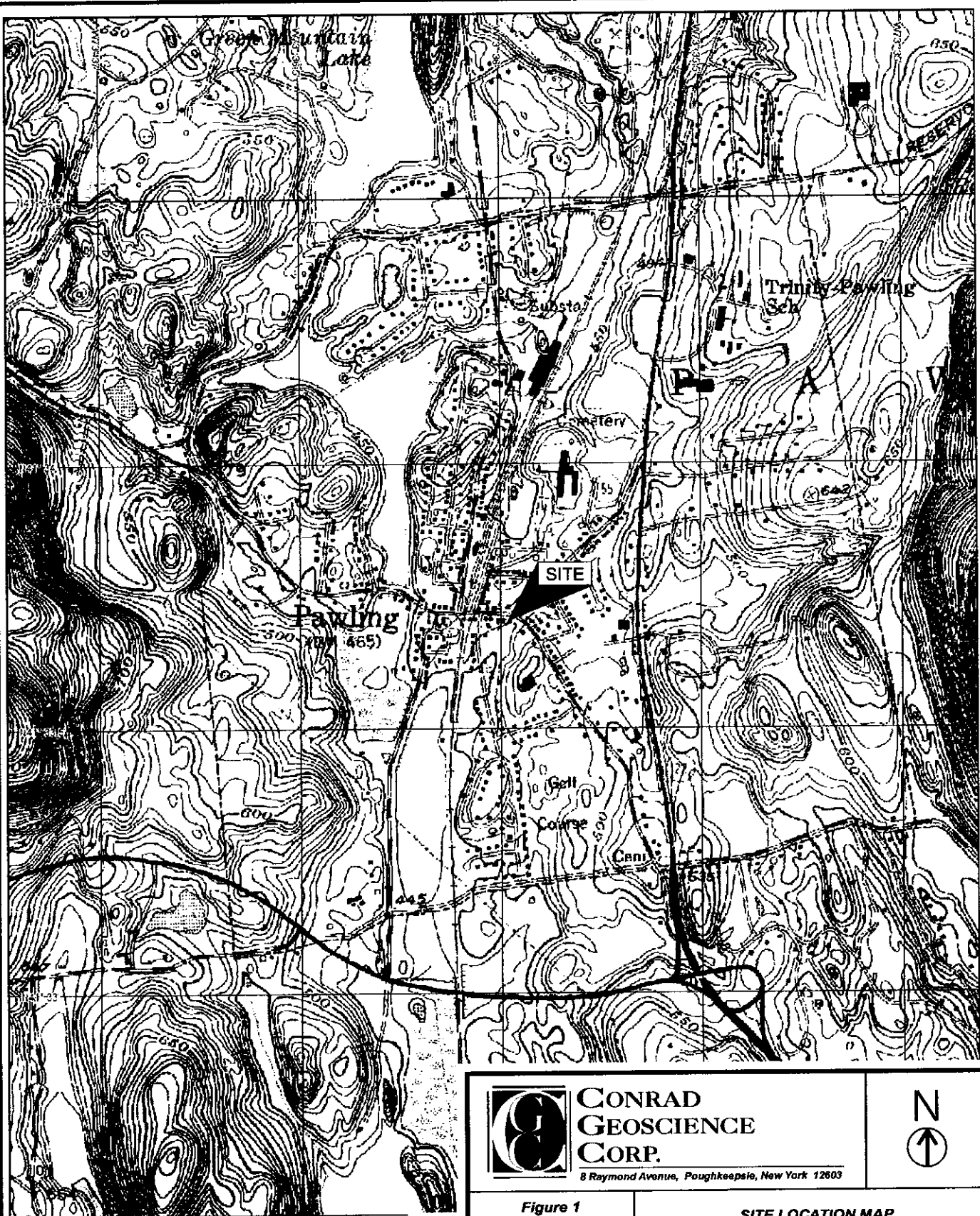
number of field days required for each task are outlined below. The IRM to evacuate the contents of the tanks will be completed during the month of July, in advance of field activities.

Task 1 - Subsurface Investigations	Subsurface soil sampling – Exterior	3 field days	July/August 2007
	Subsurface soil sampling - Interior	0.5 field days	July/August 2007
	Groundwater sampling	1.5 field days	August 2007
Task 2 - Floor drain inspection	Drain tracing and outfall sampling/inspection	1 field day	August 2007
Task 3 –Investigation Reporting	Report preparation	3 weeks	September 2007

*Laboratory turnaround time will be 5 business days.



FIGURES



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS



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8 Raymond Avenue, Poughkeepsie, New York 12603

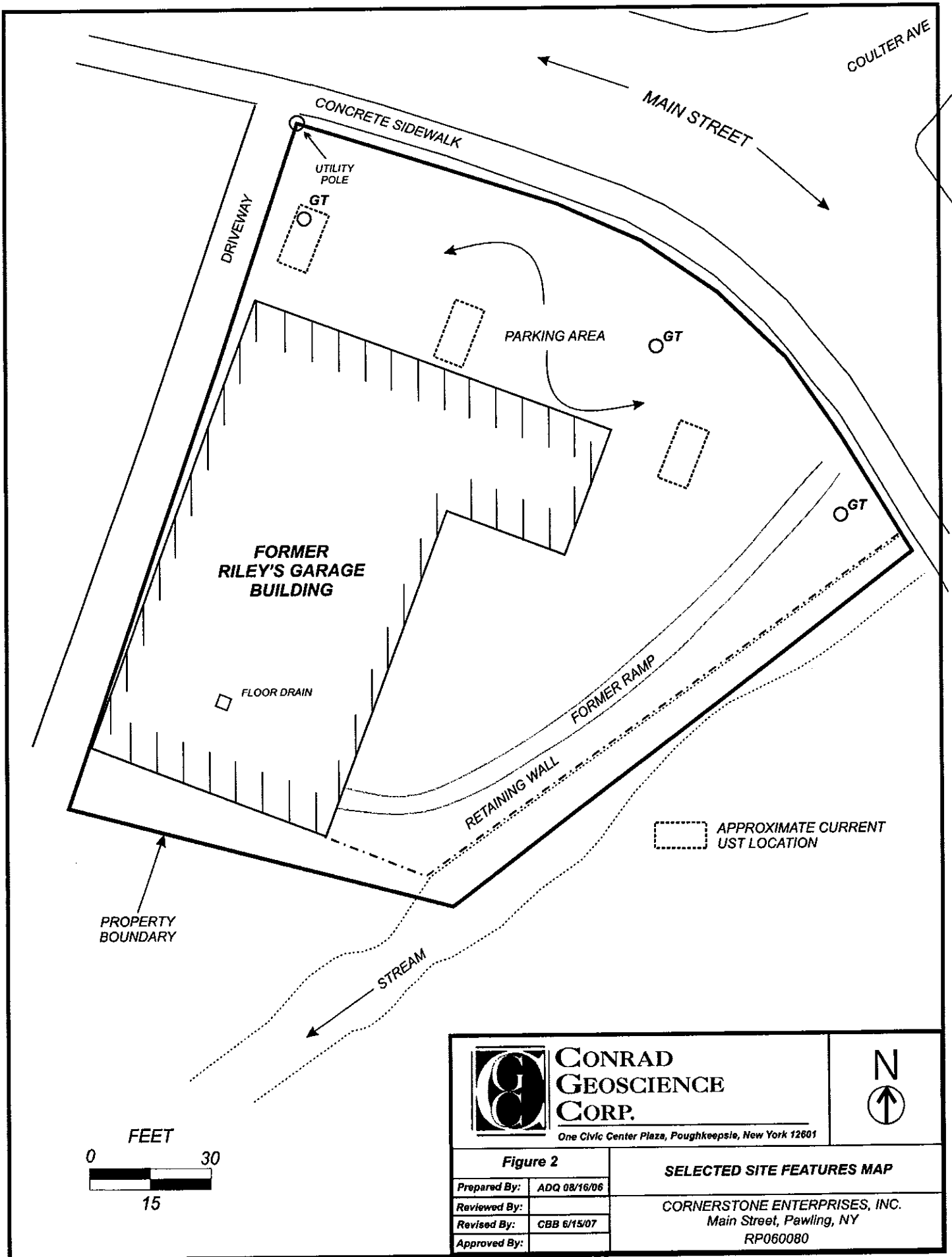




Figure 1

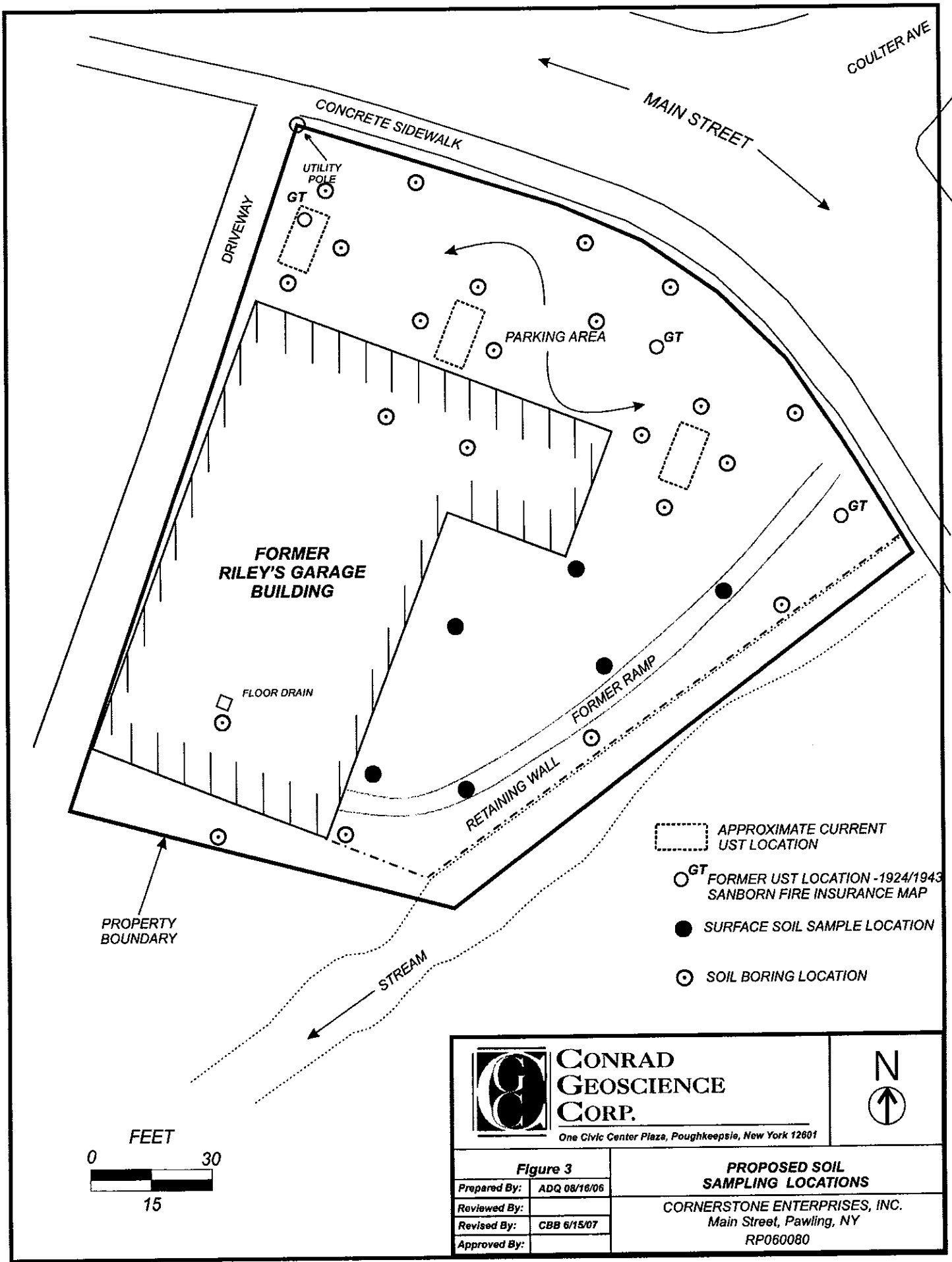
SITE LOCATION MAP





Prepared By: ADQ 03/30/06
 Reviewed By:
 Revised By:
 Approved By: CBB 03/30/06

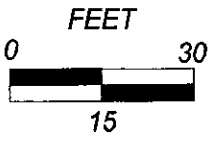
FORMER RILEY'S GARAGE
 Main Street, Pawling, NY
 RP060080



 CONRAD GEOSCIENCE CORP. <small>One Civic Center Plaza, Poughkeepsie, New York 12601</small>		
Figure 2		SELECTED SITE FEATURES MAP
Prepared By:	ADQ 08/16/06	CORNERSTONE ENTERPRISES, INC. Main Street, Pawling, NY RP060080
Reviewed By:		
Revised By:	CBB 6/15/07	
Approved By:		



-  APPROXIMATE CURRENT UST LOCATION
-  GT FORMER UST LOCATION -1924/1943 SANBORN FIRE INSURANCE MAP
-  SURFACE SOIL SAMPLE LOCATION
-  SOIL BORING LOCATION

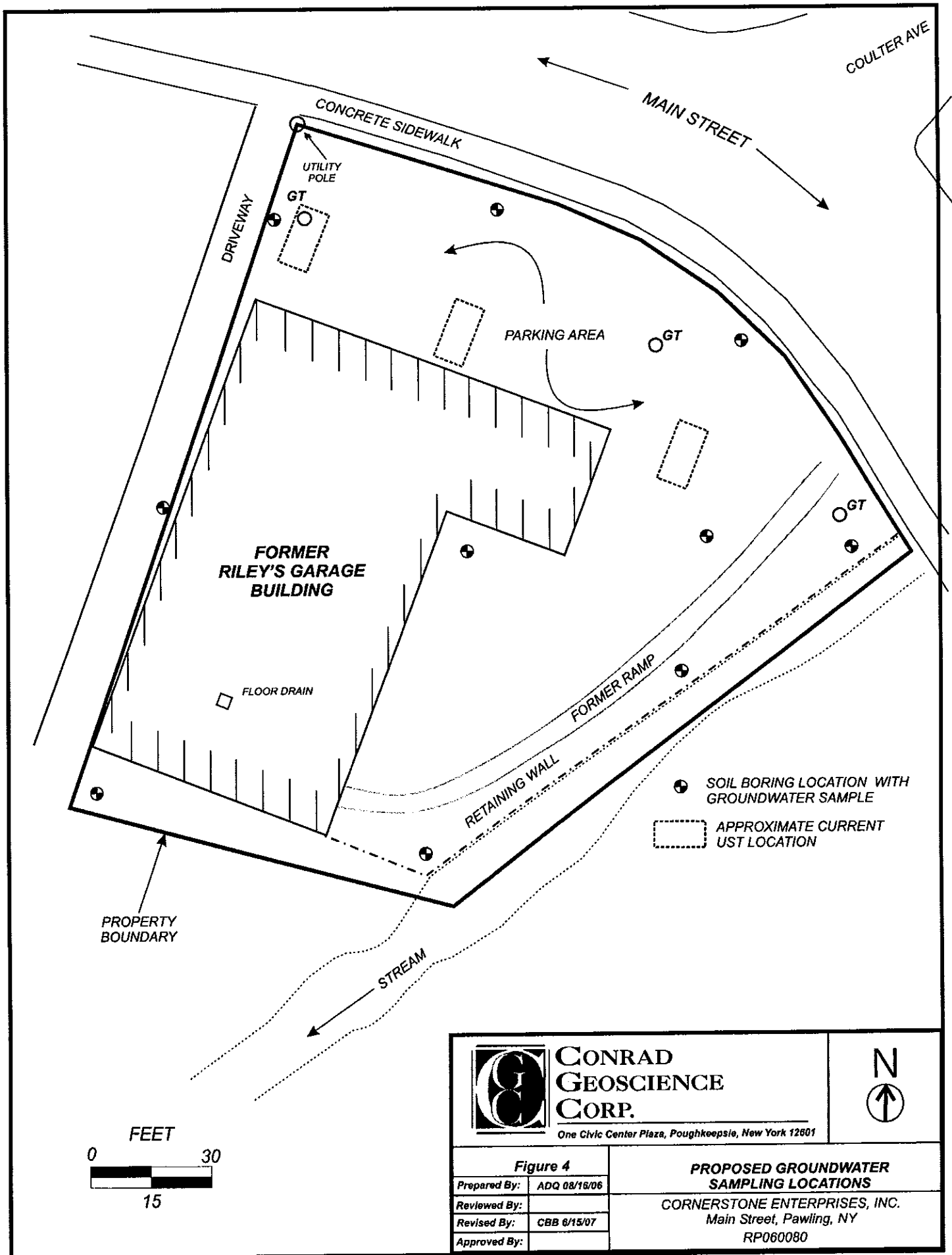


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Figure 3		PROPOSED SOIL SAMPLING LOCATIONS CORNERSTONE ENTERPRISES, INC. Main Street, Pawling, NY RP060080
Prepared By:	ADQ 08/16/06	
Reviewed By:		
Revised By:	CBB 6/15/07	
Approved By:		



COULTER AVE

MAIN STREET

CONCRETE SIDEWALK

DRIVEWAY

UTILITY POLE

GT

PARKING AREA

GT

FORMER RILEY'S GARAGE BUILDING

FLOOR DRAIN

FORMER RAMP

RETAINING WALL

GT

SOIL BORING LOCATION WITH GROUNDWATER SAMPLE

APPROXIMATE CURRENT UST LOCATION

PROPERTY BOUNDARY

STREAM



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One Civic Center Plaza, Poughkeepsie, New York 12601



Figure 4	
Prepared By:	ADQ 08/16/06
Reviewed By:	
Revised By:	CBB 6/15/07
Approved By:	

APPENDIX A

Standard Operating Procedures

STANDARD OPERATING PROCEDURES

CONRAD GEOSCIENCE CORP.

DECONTAMINATION

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for decontaminating equipment used in the sample collection process. Decontamination is a quality assurance measure that prevents cross-contamination between samples. It is also a health and safety precaution that minimizes worker exposure to contaminants.

Equipment requiring decontamination may include personal protective equipment, sample collection tools and devices, monitoring and measuring equipment, and heavy equipment (augers, backhoes, vehicles).

2.0 CONSIDERATIONS

All reusable sampling equipment will be thoroughly cleaned according to the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner. Field notes will mention procedures used to decontaminate equipment.

3.0 MATERIALS/EQUIPMENT

- Cleaning liquids and containers/dispensers (soap/detergent solutions, tap water, distilled water, methanol, nitric acid, etc.)
- Paper towels.
- Disposable gloves.
- Waste containers (plastic bags, drums, etc.)
- Decontamination vessels (buckets, steel pans, plastic bins, etc.)
- Cleaning brushes.
- Polyethylene sheeting.

4.0 DECONTAMINATION

Decontamination is primarily a process of rinsing with liquids that may include detergent solutions, tap water, distilled water, acids, and methanol. Air drying or wiping may be employed after decontamination.



4.1 PROCEDURE

- Remove gross contamination from the equipment by brushing, then rinsing with tap water.
- Wash with a detergent or soap solution, such as Alconox and tap water.
- Rinse with tap water.
- Rinse with methanol.
- Rinse with de-ionized water.
- Rinse with nitric acid (10%)
- Rinse with de-ionized water
- Repeat process as necessary.

Avoid placing decontaminated material on ground or in contact with potentially contaminated surfaces. All decontaminated items will be wrapped in aluminum foil or sealed in closeable bags to avoid recontamination.

Large items, such as augers, drilling rods and backhoe buckets will be decontaminated using pressurized hot water or steam, then rinsed with tap water. If overt contamination is absent, no additional decontamination will be required.



STANDARD OPERATING PROCEDURES

CONRAD GEOSCIENCE CORP.

SOIL BORING, MONITORING WELL INSTALLATION, FORMATION SAMPLING AND BOREHOLE SEDIMENTS

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to describe the considerations and procedures, and to establish the guidelines for drilling (soil borings, wells, piezometers) and formation sampling activities in unconsolidated formations. There are several drilling techniques available: Hollow-stem auger, cable tool, hydraulic rotary, cased-hole rotary, air rotary, and direct push. Formation (sediment/soil) sample collection includes disturbed (drill cuttings), intact (split spoon), and undisturbed (Shelby-tube or Denison-core).

The objective is to collect representative subsurface information and to prepare a borehole for potential completion as a groundwater monitoring well or piezometer. Consequently, lithological data is the most essential information that can be collected during drilling. These data characterize subsurface conditions, describe hydrogeologic coefficients qualitatively and/or quantitatively, and identify optimal locations for screened zones if wells are constructed.

Data can be obtained through the physical examination and testing of formation samples, as well as knowledge regarding groundwater levels. Thus, drill fluid mix, fluid loss, rate of drilling, lengths of split spoon and Shelby-tube/Denison-core recovery, etc. must be monitored by the on-site hydrogeologist or geologist.

2.0 DRILLING TECHNIQUE SELECTION

Do not permit the driller to use a drilling rig that appears to be substandard, in disrepair, etc., and/or is questionable as to whether or not the rig has the capabilities to accomplish the goals of the drilling program. The drilling rig must be capable of:

- A. Penetration of all anticipated subsurface materials and formations at a desired rate, and construction of a borehole of desired diameter (for the anticipated well, if applicable, including the placement of a gravel or sand pack and necessary formation sealing material such as bentonite or cement).
- B. Collection of samples of aquifer fluids during the drilling process and prior to well construction, while at the same time minimizing the potential for cross-contamination. The method used should prevent cross-contamination between surface soils and groundwater or between different stratigraphic units.



- C. Collection of intact and/or undisturbed soil samples from the center line or sidewall of the borehole. The objective requires drilling to be halted while soil samples are taken from the bottom or side of the incomplete borehole.
- D. Completion of the borehole into a well (monitoring or observation) or piezometer during the initial construction process (i.e., constructing a well or piezometer as the borehole is drilled, or constructing a well or piezometer in the borehole immediately after the drilling tools are removed.
- E. Implementation of borehole geophysical logging (when applicable and possible) to enable more accurate vertical and horizontal extrapolation of borehole data.
- F. Completion of a well or piezometer, if applicable, in the borehole following a time lapse for interpretation of geological or geophysical data from the borehole.

3.0 DRILLING TECHNIQUE DESCRIPTION

- 3.1 Hollow-Stem Auger (HSA) – HSA is often the preferred method for drilling in unconsolidated sediments, especially for shallow to moderately deep borings and wells. This drilling method is rapid and extremely effective in most cohesive sediments, but less so in loose sandy material. Penetration may be up to 150 feet below land surface (bls) depending on the size of the rig, drilling conditions, and the diameter of the auger flight; however, depths up to 250 feet bls have been achieved under optimal conditions. A major advantage of this technique is that normally no fluids are introduced into the formation. If the auger flights can be removed and the integrity of the borehole maintained, then electrical and radiation (e.g., gamma, neutron, etc.) geophysical logs can be run. Casing, screen, and sampling devices can be lowered through the hollow stem by removing the removable plug at the bottom of the auger flights, and gravel packing and cementing can be accomplished within the hollow stem. However, this can be difficult, especially below the water table. Auger flight outside diameters (OD) range from 4 inches (in.) to 12 in. The diameter of a well that can be constructed inside the hollow stem is limited, therefore, to between 2 and 8 inches.
- 3.2 Direct-Push Drilling (DPD) - Direct-push drilling machines include several brand names of drilling devices, the most commonly known are Geoprobe and SIMCO which rely on hydraulically powered, static and dynamic percussion force driven core-barrels and/or rotary augers for subsurface sampling or setting monitoring wells. These drilling units can be mounted on standard commercial vehicles (trucks, vans) or on all-terrain vehicles, or specially designed track-mounted vehicles supplied by the manufacturer. Optional equipment includes an augerhead, overhead hydraulic winches and mast, and automatic drop hammers. This drilling method is rapid and extremely effective in most cohesive sediments, but less so in loose sandy material, unless specialized tooling is used (dual-tube



sampling systems). This drilling technique is typically used for collection of shallow soil and groundwater samples (less than 50 feet bls), however, drilling depths in unconsolidated sediments have been documented as deep as 200 feet bls, or more, depending on the size of the rig, and drilling conditions. Shallow refusal can be encountered in terrain in which heavier drilling machines would not fail to penetrate, due to the lightweight nature of these tools. Advantages of this technique also include the low-profile, maneuverability, and specialized tooling available for by the manufacture for collection of a wide range of site characterization data (down-hole groundwater sampling tools, electrical conductivity logging, down-hole photo-ionization detectors, cone penetrometers, hydraulic conductivity testing, etc). DP machines can also be fitted with hollow-stem augers for installation of standard 2-inch diameter monitoring wells.

- 3.3 Hydraulic Rotary (HR) – HR is often the preferred method for drilling in consolidated material (bedrock). This drilling method uses a rotating bit to drill (advance) the borehole. Drill cuttings are removed using a recirculating drilling fluid (mud or water). Although setting up the drilling equipment is slow, the drilling process is reasonably fast. In the mud-rotary method, drilling mud forms a cake on the borehole wall, which prevents excessive loss of fluid to the formation being drilled. The hydrostatic pressure combined by the weight and density of the mud slurry keeps the hole open. This allows the drill rods to be removed from the borehole and geophysical logs (electric and radiation) to be run in the open borehole.

In reverse hydraulic rotary drilling, the drilling fluid moves downward through annular space and then up the drill pipe. If the drilling fluid does not contain mud, then sufficient water flow is required as make-up water, because the borehole wall is not sealed; therefore, significant water loss can occur to the formation being drilled. The borehole is held open by hydrostatic pressure only. A serious obstacle to this drilling method occurs when the static water level is less than 15 feet below land surface because of insufficient hydrostatic head difference between the borehole and the water table. However, the problems of excessive water loss and shallow depths to water may be overcome by using mud as the drilling fluid.

In mud-rotary drilling, the drilling fluid (mud) moves downward through the drill pipe and then upward through that annular space. Therefore, the borehole is held open by hydrostatic pressure and the mud cake lining the wall of the borehole. The mud-rotary method can be used to construct moderate to deep wells in unconsolidated (and consolidated) material, while the reverse rotary technique can be used to construct moderate to deep wells in unconsolidated materials only. The principal disadvantage may be the difficulty in removing mud cake from the formation at the screened zone. Extensive well development may be required to remove the mud cake.



- 3.4 Cased-Hole Rotary – Several new rotary drilling techniques have been developed in which a steel casing is advanced with an air-rotary or mud-rotary drill. This technique is highly desirable for use in exploratory drilling at monitoring sites, or sites where cross-contamination is a concern, because water and soil samples may be collected under conditions which preclude contamination from shallower depths. Unfortunately, these methods can be expensive and cost-benefit analysis should be employed prior to selecting the drilling technique. Furthermore, this technique is extremely effective in boulder or cavernous zones which would inhibit or preclude drilling using other techniques. Drilling results are comparable to cable-tool drilling, but with greatly enhanced speeds. In all the cased-hole techniques, the main benefit is that the only portion of the borehole which is open, is at the bottom of the drill casing; thus, no soil or water from shallower depths can move down and impact the depth drilled and/or sampled. Electrical geophysical logs cannot be run through the steel-cased borehole, however, radiation logs (e.g., gamma, neutron, etc.) can be run.

Presently, there are three cased-hole rotary techniques, which include:

- A. The drill-through casing hammer technique, in which the casing is advanced by percussion with a casing hammer or vibratory driver similar to the method used in borehole drilling by the air-rotary method. The casing hammer can also pull out the casing (air drilling only).
- B. The Odex™ Drilling System (European system), which “pulls” the casing using a fixture attached to an air-hammer type drill bit (air drilling only).
- C. The Barber™ Drilling System, in which drilling is done with a top-head drive and a rotary table that spins casing into the ground. Casing can be fitted with a carbide “shoe” to cut boulders and an air hammer can be used above the bit. Air or mud rotary can be used to lift cuttings.

Two potential problems may be encountered using cased-hole rotary technique, which include: 1) “sand heave” when drilling stops (which can be quickly drilled or bailed out); and 2) possible aeration of water in the cased borehole if volatiles are being tested (which can be overcome by pumping or bailing the standing water out before sampling). The minimum drill casing diameter is 6 inches and depth is limited to approximately 450 feet.

- 3.5 Air Rotary – This drilling method uses a rotating bit to drill, and high-velocity compressed air to remove cuttings from the borehole. A pneumatic down-hole hammer is often used to add percussion to the rotary drilling action. This drilling method is very fast and it is most suitable for penetrating hard bedrock when other methods prove ineffective. The major drawback of this method is the loss of low yielding aquifers, as the high-velocity compressed air can temporarily (or in some cases permanently) plug those zones. The borehole may be cased or uncased



depending on geological conditions. If an open borehole is drilled, then electrical and radiation (e.g. gamma, neutron, etc.) geophysical logs can be run. If a cased borehole is drilled, then only radiation geophysical logs can be run.

Four potential problems may be encountered when using the air-rotary technique:

- A. When a prolific aquifer is tapped, the compressed air may not be able to lift the water to the surface.
- B. Aeration of water in the borehole (and finished well) immediately prior to sampling can interfere with a number of inorganic and organic water quality parameters.
- C. Low-yield water entry zones may not be identified because the air pressure prevents water from entering the borehole. Care should be taken to prevent overdrilling of the borehole.
- D. Air rotary drilling can induce the migration of volatile organics to the surface or adjacent structures, causing potential aesthetic or health and safety concerns

If the air rotary technique is used, care should be taken to monitor the air compressor for oil leaks and potential contamination sources (oil filters, leaks on hoses or hose couplings, etc.)

4.0 DECONTAMINATION

Drilling equipment decontamination procedures are outlined in the field equipment decontamination SOP. Proper decontamination in accordance with regulatory guidelines must be clearly documented in the field notebook.

5.0 PROCEDURE FOR DRILLING

- 5.1 It is the job of the on-site geologist to document all drilling activities.
- 5.2 Monitor and record drill fluid mix, speed of rotation, pressure on the drill fluid, rate of drilling, and lengths of auger flights, drill rods or casing in the borehole.
- 5.3 Confirm that the drill rods and core barrel are straight, or discontinue drilling.
- 5.4 Pay particular attention to the advancement of the boring because differences in the rate of drilling may be indicative of differences in subsurface geological conditions (e.g., sand and gravel versus clay).



- 5.5 Maintain a continuous dialogue with the driller to track and keep informed of all drilling activities (e.g., the speed of the drill and drilling pressure, difficult and easy drilling conditions, etc.).
- 5.6 Collect formation samples as described below in Section 6.0. Sample jars must be labeled appropriately (e.g., project number and name, site location, boring number, data, sample interval, blow counts, and initials of Conrad Geoscience personnel collecting sample).
- 5.7 Record geologic information in the geologic log form and in the field notebook.
- 5.8 Handle and ship split spoon sample jars carefully to avoid breakage and handle and ship tubes or cores carefully to prevent disturbance.

6.0 PROCEDURES FOR FORMATION SAMPLING

- 6.1 Intact formation sampling will be implemented using split-spoon samplers (which are driven), Shelby-tube samplers (which are pushed), or Denison-core samplers (which are rotated) depending on the drilling technique employed. Formation samples will be retained in suitable size jars for physical descriptions and potential physical and chemical analysis. The appropriately labeled jars and tubes will be stored in a safe place to avoid breakage, agitation, and freezing. Intact formation samples will be collected as described in the workplan at specified intervals (e.g., at 5-foot increments below land surface) and at each major change in subsurface materials. Hydrogeologic information will be recorded on a geologic log form and in the field notebook. Detailed descriptions of the type(s) of intact sample(s) collected, sampling intervals and conditions, and objectives(s) of the sample collection will be provided in the workplan.
- 6.2 Disturbed formation samples (drill cuttings) will be examined continuously throughout the entire depth of the borehole. If applicable to the study and/or stated in the workplan, borehole cuttings will be collected from the circulating auger flight which lift cuttings to land surface (hollow stem auger technique), from the sand bailer (cable-tool technique), from the recirculating drilling fluid (mudflume) which transports cuttings to land surface (mud rotary and related techniques), or from the compressed air used to carry cuttings to land surface (air rotary and related techniques).
- 6.3 Headspace screening will be done when volatile organic compounds (VOCs) are among the target contaminants. Disturbed formation samples are most commonly used for screening of VOCs and can be stored in properly labeled zip-lock bags. To ensure a representative reading, soil samples should be containerized as quickly as possible after exposure to the atmosphere. Headspace readings using a photoionization detector (PID) are obtained by sealing the soil sample in a zip-lock plastic bag, allowing the temperature to reach room temperature, then



inserting the intake of the PID into the partially unzipped bag and recording the PID response. PID readings will be recorded on a geological log form or in the field notebook, or both.

- 6.4 The soil cores from the wells drilled at the site are used for lithological identification. The first 18 inches of soil for each borehole will be collected intact using a split-spoon sample, a Shelby-tube sampler, or Denison-core sampler. Split-spoon samples may be collected continuously from boreholes for cluster wells; single well and/or Piezometer boreholes may be split-spooned throughout drilling or at specified intervals or changes in lithology. The conditions for sampling will be specified in the work plan.
- 6.5 Before collecting and retaining soil and/or sediments collected with the split-spoon sampler, the top several inches will be removed from the sampler and discarded to eliminate any sediment that may have caved into the bottom of the borehole.

7.0 MONITORING WELL INSTALLATION

- 7.1 With hollow stem augers, the bottom plug is removed, and the augers raised six inches, rotated and returned to the bottom of the hole to ensure removal of all material from the hole.
- 7.2 The well screen and riser pipe are fitted together using flush-threaded joints. No adhesives or other compounds are to be used on the joints. The length of the screen and the slot size shall be determined by the field geologist depending on subsurface conditions. The assembled screen and riser are then placed into the borehole, with care taken to center them in the hole. Centralizers may be employed if necessary.
- 7.3 The annular space surrounding the screened section of the monitoring well and two feet above the top of the screen are then filled with clean silica sand to form a filter pack.
- 7.4 A bentonite seal is emplaced above the filter pack by pouring bentonite chips or pellets into the hole. The bentonite seal shall be two feet thick to prevent vertical flow within the boring.
- 7.5 The remaining length of the bore hole is then backfilled with grout, or native material, to within two feet of the ground surface. Sand is not a recommended backfill material because the grain size may be different than the surrounding formation resulting in unintended vertical transport of contaminants.
- 7.6 A steel standpipe is placed around the riser and extends to a depth of two feet below ground surface. The steel riser is stabilized by emplacing concrete in the



outer annulus around the riser to a depth of two feet. The concrete extends in a one-foot radius from the steel pipe.

- 7.7 The riser is fitted with a lockable cap. Alternatively, the inner PVC riser can be fitted with a lockable cap. All completed wells shall be marked with their respective well numbers on the inside of the cap.



STANDARD OPERATING PROCEDURES

CONRAD GEOSCIENCE CORP.

COLLECTION OF SOIL SAMPLES FOR LABORATORY ANALYSIS

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for laboratory analysis. This SOP is applicable to soil samples collected from split-spoon samplers during drilling, Direct-push soil cores (Geoprobe™), hand auger samples, grab samples from stockpiled soils, surface samples, test pit samples, etc.

2.0 CONSIDERATIONS

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact or in suspected source areas. Soil samples can be collected at the surface, shallow subsurface, or at depth. When samples are collected at depth, the water content should be noted, since, generally “soil sampling” is often restricted to the unsaturated zone. Equipment selection will be determined by the depth of the sample to be collected. A thorough description of sampling locations and proposed methods of sample collection should be included in the work plan.

Commonly, surface sampling refers to the collection of samples at a 0 to 6 inch depth interval. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan. Collection of surface soil samples is most efficiently accomplished with the use of a stainless steel trowel or scoop. For samples at greater depths, a decontaminated bucket auger or power auger may be needed to advance the hole to the point of sample collection. To collect samples at depths greater than approximately six feet, the use of a drill rig and split-spoon core barrels will usually be necessary. In some situations, sample locations are accessed with the use of a backhoe.

3.0 MATERIALS/EQUIPMENT

1. A work plan outlining soil sampling requirements
2. Field notebook, field form(s), maps, chain-of-custody forms, and custody seals
3. Decontamination supplies



4. Sampling (split-spoon core barrel, stainless steel hand auger, stainless steel trowel, etc.)
5. Stainless steel spoons or spatulas, or discrete samplers
6. Disposable gloves
7. Laboratory-supplied sample containers with labels
8. Cooler with wet ice
9. Polyethylene sheeting
10. Black pen and indelible marker
11. Zip-lock bags and packing material
12. Tape measure
13. Paper towels or clean rags
14. Masking and packing tape
15. Overnight (express) mail forms

4.0 DECONTAMINATION

All reusable sampling equipment will be thoroughly cleaned in accordance with the decontamination SOP. Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and plastic sheeting will be changed after each use and discarded in an appropriate manner.

5.0 PROCEDURE

- 5.1 Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned according to the decontamination SOP. If samples are to be collected to depth, then the boring must be advanced with thoroughly cleaned equipment to the desired sampling horizon, and a different thoroughly cleaned sampler must be used to collect the sample.
- 5.2 The sampling depth interval for split-spoon sampling is usually one sample for every five feet. Additional samples may be collected at the discretion of the field



geologist or project manager. Samples are obtained using the standard penetration test (SPT) which involves driving the core barrel using a 140-pound drop weight (hammer). The number of hammer blows for each six-inch drive distance shall be recorded on the boring log.

The split spoon is opened upon removal from the bore hole. The amount of recovery will be noted on the boring log. Photographs are sometimes advisable at this point. A graduated scale should appear in each photo. Sampling depth interval for Geoprobe™-style soil samples is typically every 5 feet. A different sampling interval may be employed at the discretion of the field geologist or project manager.

The sample is then logged by the field geologist: Soil or rock type, depth range in feet, grain size, roundness, sorting, moisture, color, degree of apparent contamination, PID readings, remarks. Soil types will be in accordance with the Uniform Soil Classification System (USCS). Dates and times of sampling will be noted in the field notebook, in addition to drilling equipment used, special problems encountered, etc.

- 5.3 Using disposable and a pre-cleaned, stainless steel spatula or spoon, extract the soil sample from the sampler, measure the recovery, and separate the wash from the true sample. Where allowed by regulatory agency(ies), disposable plastic spoons may be used. Discrete samplers are required VOC sampling in some states (PA). These devices are obtained, pre-packaged, from the laboratory, and special sample collection directions are followed.
- 5.4 Place the sample in a laboratory-supplied, pre-cleaned sample container. This should be done as quickly as possible, and this is especially important when sampling for volatile organic compounds (VOCs). Samples to be analyzed for VOCs must be collected prior to other constituents.
- 5.5 The sample container will be labeled with the appropriate information such as client name, site location, sample identification (location, depth, etc.), date and time of collection, and sampler's initials.
- 5.6 If soil samples are to be composited in the field, then equal portions from selected locations will be placed in a clean steel container and homogenized. Alternatively, several samples may be submitted to the laboratory for compositing by weight. The method used is dependent upon regulatory requirements. Specific compositing procedures shall be approved by the appropriate regulatory agency and described in the work plan. Samples to be analyzed for VOCs will not be composited unless required by a regulatory agency.
- 5.7 After the sample has been collected, labeled, and logged in detail, it is placed in a zip-lock bag and stored in a cooler at 4°C.



- 5.8 A chain-of-custody form is completed for all samples collected. One copy is retained and two are sent with the samples in a zip-lock bag (taped to the cooler lid) to the laboratory. A custody seal is placed on the cooler prior to shipment.
- 5.9 Samples collected from Monday to Friday are to be delivered to the laboratory within 24 hours of collection. If Saturday delivery is unavailable, samples collected on Friday must be delivered by Monday morning. Check the work plan to determine if any analytes require a shorter delivery time. Friday sampling is to be avoided when possible.
- 5.10 The field notebook and appropriate forms should include, but not be limited to the following: client name, site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, etc. A site map should be prepared with exact measurements to each sample location.
- 5.11 All reusable sampling equipment must be thoroughly cleaned in accordance with the decontamination SOP. Following the final decontamination (after all samples are collected), the sampling equipment is wrapped in aluminum foil. Discard any gloves, foil, plastic, etc. in an appropriate manner that is consistent with site conditions.



APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN

Remedial Investigation Work Plan
Cornerstone Enterprises, Inc.
33 East Main Street
Village of Pawling, New York, 12564
NYSDEC Spill No. 90-12530
Brownfield Cleanup Program No. C314116

Prepared by: _____ Date: _____

Approved by: _____ Date: _____
Health and Safety Manager

Approved by: _____ Date: _____
Project Manager

EMERGENCY REFERENCES:

Ambulance: Notify 9-1-1
Fire: Notify 9-1-1
Police: Notify 9-1-1
Hospital: New Milford Hospital
21 Elm Street
New Milford, CT 06776
(860) 355-2611

DIRECTIONS TO HOSPITAL:

Head southeast on East Main Street toward Liffland Lane – go 0.6 mile
Continue on CR-67/Quaker Hill Road – go 3.2 miles
Turn right at CR-67 – go 1.5 mile
Continue on Wakeman Road – go 1.4 miles
Turn left at CT-37 - go 5.2 miles
Turn right at Kent Road/US-7 – go 2.7 miles
Turn left at Bridge Street toward US-202 – go 0.8 mile
Turn left at Elm Street – go 312 feet
Arrive at New Milford Hospital



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Figure 1: Site Location Map

Figure 2: Site Features Map

Figure 3: Route to Nearest Hospital

Attachment A: HASP Receipt and Acceptance Form

Attachment B: HASP Pre-Entry Briefing Attendance Form

Attachment C: Supervisor's Accident Investigation Report Form

Attachment D: Chemical Hazard and MSDS Sheets



1.0 Introduction

1.1 HASP Applicability

This site-specific Health and Safety Plan (HASP) has been developed by Conrad Geoscience (CGC). It establishes the health and safety procedures to minimize potential risks to personnel involved with the remedial investigation activities at the Cornerstone Enterprises, Inc. (Former Riley's Garage) Site (the Site) located in the Village of Pawling, Dutchess County, New York. This HASP applies to all personnel potentially exposed to safety and/or health hazards related to the activities described in Section 3.0 of this document.

This HASP has been prepared to comply with the applicable requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). Activities covered by this HASP must be conducted in complete compliance with this HASP and with all applicable Federal, State, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply will be excluded from site activities.

This HASP will be distributed to each person involved with investigative activities at the site. Each person must sign a copy of the attached HASP Receipt and Acceptance Form (see Attachment A).

1.2 Organization/Responsibilities

The implementation of health and safety at this project location will be the shared responsibility of the Project Manager (PM), the Health and Safety Manager (HSM), the Project Site Safety Officer (SSO) and all other personnel who conduct activities at the site.

- The Project Manager (PM) is Christopher Brown.
- The Health and Safety Manager (HSM) is Christopher Brown.
- The Project Site Safety Officer (SSO) is Andria Quinn.

1.2.1 Project Manager (PM)

The Project Manager (PM) has the primary responsibility for ensuring the overall health and safety of this project. As such, the PM is responsible for ensuring that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Ensuring that all personnel to whom this HASP applies have received a copy of it;
- Providing the SSO with updated information regarding environmental conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO;
- Maintaining regular communications with the SSO; and
- Coordinating the activities of all subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project.



1.2.2 Health and Safety Manager (HSM)

The Health and Safety Manager (HSM) is responsible for the preparation, interpretation and modification of this HASP. Modifications to this HASP which may result in less stringent precautions cannot be undertaken by the SSO without the approval of the HSM. Specific duties of the HSM include:

- Writing, approving and amending the HASP for this project;
- Advising the SSO on matters relating to health and safety on this site;
- Recommending appropriate personal protective equipment (PPE) and air monitoring instrumentation to protect personnel from potential site hazards;
- Conducting accident investigations; and,
- Maintaining regular contact with the SSO to evaluate site conditions and new information which might require modifications to the HASP.

1.2.3 Site Safety Officer (SSO)

All field technicians are responsible for implementing the safety requirements specified in this HASP. One (1) technician will be designated to serve as the Site Safety Officer (SSO). The SSO will be appointed by the PM. The SSO will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where non-compliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Ensuring that all personnel to whom this HASP applies have submitted a completed copy of the HASP Receipt and Acceptance Form (see Attachment A);
- Ensuring that all personnel to whom this HASP applies have attended a pre-entry briefing prior to entering the work zone;
- Maintaining a high level of health and safety consciousness among employees at the work site;
- Procuring and distributing the PPE needed for personnel involved with this project;
- Procuring the air monitoring instrumentation required and performing air monitoring for field activities;
- Verifying that all PPE and health and safety equipment is in good working order;
- Setting up and maintaining the work zones and ensuring proper cleanup of all site personnel;
- Notifying the PM of all non-compliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within established restricted areas to ensure that required safety and health procedures are being followed;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing as required by Section 10.3 of this HASP; and
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.



1.2.4 Field Personnel and Covered Subcontractor Personnel

All field personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Reading this HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Receipt and Acceptance Form (see Attachment A) and documentation of medical surveillance and training to the PM prior to the start of work;
- Attending the required pre-entry briefing prior to beginning on-site work;
- Bringing forth any questions or concerns regarding the content of this HASP to the PM or the SSO prior to the start of work;
- Reporting all accidents, injuries and illnesses, regardless of their severity, to the SSO; and
- Complying with the requirements of this HASP and the requests of the SSO.

1.2.5 Contractors

In addition to other requirements referenced in this HASP, all contractors are required to:

- Provide appropriate PPE for their employees;
- Ensure, via daily inspections, that their equipment is maintained in good working condition;
- Operate their equipment in a safe manner; and
- Appoint an on-site safety coordinator to interface with the SSO.

1.3 Modification of this HASP

The procedures in this HASP have been developed based on general knowledge of the site, proposed tasks, and anecdotal information from previous investigations at the site. Should additional information become available regarding potential on-site hazards, it may be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the HSM before such modifications are implemented.

Any significant modifications must be incorporated into the written document as addenda and the HASP must be re-issued. The PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the PM. The HASP addenda will be distributed during the regularly scheduled meetings so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.



2.0 Site Description and History

The Cornerstone Enterprises property is located at 33 East Main Street in the Village of Pawling, New York (Figure 1). The property was operated as an automotive maintenance facility and retail gasoline sales station until 1985. The 0.23-acre property, situated on the south side of East Main Street, includes a two-story, 3,000 ft² building, and a parking lot in the western part of the property. A tributary to the East Branch Croton River borders the eastern property boundary, and flows to the south (Figure 2).

In 1991, NYSDEC assigned Spill #9012530 to the property, reportedly based on information that from a new owner that he had acquired the property in 1989 without knowledge of “buried drums and tanks.” This spill file was closed by NYSDEC on June 30, 1991. At that time, NYSDEC personnel inspected the subject property and identified two underground storage tanks (USTs). NYSDEC inspection reports also note a floor drain in the garage that discharged to the adjacent stream. In June 1992, three USTs were registered for the subject property, including two 2,000-gallon USTs and one 150-gallon UST. PBS #3-600242 was assigned to the facility. In September 2003, the current owners purchased the subject property.

Based on conversations with NYSDEC personnel in July 2006, soil samples were collected by a potential buyer sometime prior to 2003. Data from these samples are not available to Conrad Geoscience, however, petroleum-related compounds were reportedly detected in these samples at concentrations exceeding NYSDEC TAGM guidance values.

On January 22, 2007, NYSDEC accepted the Site into the Brownfield Cleanup Program (BCP Site #C314116).



3.0 Scope of Work

3.1 Remedial Investigation Work Plan

On January 22, 2007, NYSDEC accepted the Cornerstone Enterprises, Inc. site into the Brownfield Cleanup Program (BCP Site #C314116). Conrad Geoscience has prepared the following Remedial Investigation Work Plan for the above referenced BCP site:

3.1.1 Task 1: Subsurface Investigation

According to the Petroleum Bulk Storage (PBS) Facility Information Sheet, there are currently three underground storage tanks (USTs) at the site. Contaminants from these tanks or the fuel dispensing system are likely to have released petroleum hydrocarbons into soil and/or groundwater. We propose to drill up to 20 soil borings in the vicinity of the tank system (Figure 3). Soil borings will be completed using a track-mounted Geoprobe™ unit equipped with 5-foot long, 1 ¾-inch diameter core barrels (macro-cores) fitted with acetate liners. Boring locations will be placed to ensure coverage in the vicinity of the USTs. All soil borings will be conducted in accordance with NYSDEC/USEPA protocols. Borings will be sampled continuously from the ground surface to a maximum depth of 20 feet below grade, to groundwater, or to refusal, whichever is encountered first. The project geologist will keep a detailed log of each core: lithology, grain size, stratigraphic changes, color, and occurrence of groundwater will be recorded.

Conrad Geoscience will screen soil samples in the field for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID) and headspace techniques. PID readings will be recorded by the project geologist. One sample from each boring will be submitted to a NYSDOH approved laboratory for analysis of the STARS lists of VOCs and semi-volatile organic compounds (SVOCs) via USEPA Methods 8260 and 8270, respectively.

Groundwater samples will be collected from up to four of the borings using the Geoprobe SP-16 groundwater sampling tool, or temporary well screens. Samples will be submitted to a NYSDOH approved laboratory for analysis of TCL and STARS list of VOCs via USEPA Method 8260.

3.1.2 Task 2: Floor Drain Tracing and Outfall Sampling

Conrad Geoscience will open and inspect the reported floor drain in the garage interior. The outfall of this drain will be located by visual inspection or by mechanical snake, and will be confirmed using dye-tracing techniques. Based on information provided by the current property owner, this drain discharges to the adjacent stream. If the discharge location of this drain is on land, surface or subsurface soil will be sampled. Samples will be collected using either hand tools or a track-mounted Geoprobe™ unit, as summarized in Task 1. Samples will be submitted to a NYSDOH approved laboratory for analysis of the TCL and STARS list of VOCs via USEPA Method 8260, STARS SVOCs via USEPA Method 8270, and the eight RCRA Metals.



4.0 Chemical Hazard Assessment and Controls

4.1 Chemical Hazards

The predominant contaminants potentially encountered during the subsurface investigation in soil and groundwater include: volatile and semi-volatile organic compounds (VOCs and SVOCs); and inorganic metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. Chemical Hazard and MSDS Sheets are provided in Attachment D.

4.1.1 Table: Chemical Hazards of VOCs and SVOCs

VOCs								
Name	Skin Absorption	PEL ⁽¹⁾ (PPM)	REL ⁽²⁾ (PPM)	STEL (PPM)	IDLH (PPM)	TLV ⁽³⁾ (PPM)	IP (ev)	Carcinogen
Methyl-tert butyl ether	Yes	NA	NA	NA	NA	50	NA	Suspected
1,2,4-Trimethylbenzene	Yes	NA	25	NA	NA	25	8.27	
1,3,5- Trimethylbenzene	Yes	25	NA	NA	NA	25	NA	
Benzene	Yes	1	0.1	1 ⁽²⁾	500	0.5	9.24	X
Ethylbenzene	Yes	100	100	125 ⁽²⁾	800	100	8.76	
Isopropylbenzene	Yes	NA	NA	NA	NA	50	NA	
n-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
n-propylbenzene	Yes	NA	NA	NA	NA	NA	NA	
p-isopropyltoluene	NA	NA	NA	NA	NA	NA	NA	
Sec-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
Tert-butylbenzene	Yes	NA	NA	NA	NA	NA	NA	
m & p-xylene	Yes	100	100	150 ⁽²⁾	900	100	8.56	
Methylene chloride	Yes	25	NA	125 ⁽¹⁾	2300	50	11.32	X
Naphthalene	Yes	10	10	15 ⁽²⁾	250	10	8.12	
o-xylene	Yes	100	100	150 ⁽²⁾	900	100	8.56	
Toluene	Yes	200	100	150 ⁽²⁾	500	50	8.82	
SVOCs								
Name	Skin Absorption	PEL ⁽¹⁾ (PPM)	REL ⁽²⁾ (PPM)	STEL (PPM)	IDLH (PPM)	TLV ⁽³⁾ (PPM)	IP (ev)	Carcinogen
Acenaphthylene (4)	NA	NA	NA	NA	NA	NA	NA	
Acenaphthene (4)	Yes	NA	NA	NA	NA	NA	NA	
Anthracene (4)	Yes	NA	NA	NA	NA	NA	NA	
Benzo(a)anthracene (4)	No	NA	NA	NA	NA	NA	NA	X
Benzo(a)pyrene (4)	Yes	0.2	0.1	NA	NA	0.2	NA	X
Benzo(b)fluoranthene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Benzo(g,h,i) perylene (4)	Yes	NA	NA	NA	NA	NA	NA	
Benzo(k)fluoranthene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Chrysene (4)	Yes	0.2	0.1	NA	NA	0.2	NA	X
Coal Tar Pitch Volatiles	NA	0.2 ⁽³⁾ mg/m ³	0.1 mg/m ³	NA	80 mg/m ³	0.2 mg/m ³	NA	X
Dibenzo(a,h)Anthracene (4)	Yes	NA	NA	NA	NA	NA	NA	X



Fluoranthene (4)	Yes	NA	NA	NA	NA	NA	NA	Suspected
Fluorene (4)	Yes	NA	NA	NA	NA	NA	NA	Suspected
Indeno(1,2,3-cd)pyrene (4)	Yes	NA	NA	NA	NA	NA	NA	X
Phenanthrene (4)	Yes	0.2	0.1	NA	NA	0.2	NA	X
Pyrene (4)	Yes	0.2	0.1	NA	NA	0.2	NA	X

- 1 - OSHA Permissible Exposure Limit
- 2 - NIOSH Recommended Exposure Level
- 3 - ACGIH Threshold Limit Value
- 4 - PELs are listed for these items under Coal Tar Pitch Volatiles
- 5- Benzene Soluble fraction
- C - Ceiling limit

- PEL Permissible Exposure Limit (OSHA Standard)
- TLV Threshold Limit Value (American Conference of Governmental Industrial Hygienists [ACGIH] Guidance)
- REL Recommended Exposure Limit (NIOSH Guidance)
- STEL Short Term Exposure Limit

OSHA PELs, ACGIH TLVs, and NIOSH RELs are time-weighted averages (TWAs), which are defined as concentrations for a normal 8-hour work day and 40-hour work week to which almost all workers can be exposed repeatedly without suffering adverse health effects.

STEL is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to be likely to cause impairment of self-rescue or to precipitate accidental injury. The STEL is a 15-minute TWA that will not be exceeded at any time during the workday. STELs are used by OSHA, ACGIH, and NIOSH for chemical exposure criteria.

4.1.2 Chemical Hazards of Metals of Concern

Arsenic:

Exposure Routes: Inhalation, skin absorption, skin and/or eye contact ingestion

Symptoms: Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen].

Target Organs: Liver, kidneys, skin, lungs, lymphatic system.

Cancer Site: Lung & lymphatic cancer.

The OSHA Permissible Exposure Limit (PEL) for arsenic is 10 ug/m³ as an 8-hour time-weighted average (TWA).



Barium:

Exposure Routes: Inhalation, ingestion, skin and/or eye contact.

Symptoms: Irritation eyes, skin, upper respiratory system; skin burns; gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia.

Target Organs: Eyes, skin, respiratory system, heart, central nervous system.

The OSHA PEL for barium is 500 ug/m³ as an 8-hour TWA.

Cadmium:

Symptoms: Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen].

Target Organs: Respiratory system, kidneys, prostate, blood.

Cancer Site: Prostatic & lung cancer.

The OSHA PEL for cadmium is 5 ug/m³ as an 8-hour TWA.

Chromium:

Exposure Routes: Inhalation, ingestion, skin and/or eye contact.

Symptoms: Irritation eyes, skin; lung fibrosis (histologic).

Target Organs: Eyes, skin, respiratory system.

The OSHA PEL for chromium is 1000 ug/m³ as an 8-hour TWA.

Lead:

Exposure Routes: Inhalation, ingestion, skin and/or eye contact.

Symptoms: Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension.

Target Organs: Eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue.

The OSHA PEL for lead is 50 ug/m³ as an 8-hour TWA.



Mercury:

Exposure Routes: inhalation, skin absorption, ingestion, skin and/or eye contact.

Symptoms: Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria.

Target Organs: Eyes, skin, respiratory system, central nervous system, kidneys.

The OSHA PEL for mercury is 100 ug/m³ as an 8-hour TWA.

Selenium

Exposure Routes: inhalation, ingestion, skin and/or eye contact.

Symptoms: Irritation eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage.

Target Organs: Eyes, skin, respiratory system, liver, kidneys, blood, spleen.

The OSHA PEL for selenium is 200 ug/m³ as an 8-hour TWA.

Silver

Exposure Routes: inhalation, ingestion, skin and/or eye contact.

Symptoms: Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance.

Target Organs: Nasal septum, skin, eyes.

The OSHA PEL for silver is 10 ug/m³ as an 8-hour TWA.

4.2 Chemical Exposure and Control

4.2.1 Chemical Exposure Potential

The primary route of exposure during site activities in areas contaminated with VOCs, SVOCs and inorganic metals is direct dermal contact, accidental or incidental ingestion, and inhalation of contaminant laden dust. The following work areas and site related activities are areas where chemical exposure is possible:

- Areas where drilling activities will be conducted.
- Contact with soil boring cores and samples.
- Contact with purge water from soil borings and samples.



4.2.2 Chemical Exposure Control

The soil generated from completed soil borings and the surrounding work area will be continuously monitored using a photo ionization detector (PID) during site activities. The PID is an appropriate direct-read monitoring instrument given the suspected presence of VOC contamination in on-site soil. The contaminant detected in the soil boring installation area with the lowest permissible exposure level (PEL) is benzene, which has a 1 ppm PEL. The benzene threshold limit value (TLV) (listed in 29 CFR 1910.1200, Table Z-2) of 10 ppm (based on mixtures containing benzene) will be used on-site. PPE will be upgraded to include half-face respirators and Tyvek suits (Level C) if airborne concentrations of contaminants are identified at 10 ppm above background levels in the breathing zone for five minutes during on-site activities. If Level C PPE is required, Conrad Geoscience will use a 4-gas meter to monitor oxygen, hydrogen sulfide, carbon monoxide and lower explosive limit levels in the breathing and work zones.

If PID readings in the areas above and surrounding the work area exceed 250 ppm above background levels, all on-site activities will be suspended. Future PPE selected will depend on the nature and concentrations of the contaminants encountered. First aid equipment will be available based on MSDS requirements.

First aid equipment will also be available during all field activities.

The following chemical exposure control measures will be implemented during the proposed investigations:

- The SSO will perform air monitoring (see Section 6.1) in the worker's breathing zone to determine exposure to VOCs during field activities. If exposures exceed the action levels, respiratory protection, as discussed in Section 7.2, will be donned.
- To avoid direct dermal contact with potentially contaminated media, chemical protective clothing, as described in Section 7.1, will be required when collecting samples and decontaminating sampling equipment.
- Although highly unlikely, exposure to all of the contaminants of concern may occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 9.0 address personal hygiene issues that will limit the potential for contaminant ingestion.



5.0 Physical Hazards and Controls

5.1 Utility Hazards

5.1.1 *Underground Utilities*

New York law requires that, at least 48 hours prior to initiation of any subsurface work, a utility clearance be performed at the site. The driller will contact Dig Safely New York (1-800-962-7962) to request a mark-out of underground utilities in the proposed sampling areas. Work will not begin until the required utility clearances have been performed. Public utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, the driller must exercise due diligence and try to identify the location of any private utilities on the properties being investigated. This requirement can be fulfilled in several ways, including:

- obtaining as-built drawings for the areas being investigated from the property owner;
- visually reviewing each proposed excavation location with the property owner or knowledgeable site representative;
- identifying a no-drilling/digging zone; or
- hand digging in the proposed drilling/excavation locations if insufficient data is available to accurately determine the location of the utility lines.

Natural gas and municipal water transmission and service lines are likely to be in the right-of-way parallel to Main Street. The exact location of these utilities is not known at this time. A mark-out of utilities leading to the subject property will be requested from the Underground Facilities Protection Organization.

5.1.2 *Overhead Utilities*

Be particularly aware of overhead power lines in the work area. Any vehicle or mechanical equipment capable of having parts of its structure elevated (drill rig, crane, etc.) near energized overhead lines shall be operated so that a clearance of at least ten (10) feet is maintained. If the voltage is higher than 50kV, the clearance shall be increased four (4) inches for every 10kV over that voltage. Overhead utility lines are located along the south side of Main Street and cross a portion of the parking lot on to the north of the building on the site.

5.2 Traffic Concerns

Work is being performed at exterior locations where traffic may be a concern (i.e. adjacent to East Main Street and Coulter Avenue). The following precautions should be followed. All are designed to draw attention to the work and to warn other people of the activities.

- Notify the property owner of your work location, dates of work and the anticipated work times. Suggest the possibility of a detour around the work area.
- Wear an orange safety vest. If work is being performed at dawn, dusk or evening, the vests must have reflective tape.
- Set up traffic cones 50 feet in front of the work area. "Work Zone" signs should also be placed in a conspicuous area to warn others of your presence.



Traffic moves along East Main Street and Coulter Avenue at all times of the work day. The Metro North train station and parking lot are to the north of the subject property. Increased traffic volume will occur during morning and evening rush hour.

5.3 Drilling Hazards

Use of a Geoprobe drilling probe to complete soil borings will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hardhats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities. Additionally, the following safety requirements must be adhered to:

- All drill probes and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.
- The driller must never leave the controls while the tools are operating unless all personnel are kept clear of operating equipment.
- Drillers, helpers and geologists must secure all loose clothing when in the vicinity of drilling operations.
- Only equipment that has been approved by the manufacturer may be used in conjunction with site equipment and specifically to attach sections of drilling tools together.

5.4 Noise Exposure

The use of the drilling probe will generate noise levels that will require the use of hearing protection in the immediate vicinity. Appropriate earmuffs or earplugs (i.e., with an NRR greater than 25 dB) should be worn to prevent overexposure. The general rule of thumb is that if you have to raise your voice to be understood by someone who is standing 3 to 5 feet away from you, the noise levels are likely to be above 85 dB and therefore require the use of hearing protection.

5.5 Back Safety

Using the proper techniques to lift and move heavy pieces of equipment, such as drums of investigation-derived wastes, is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects.

- Use mechanical devices to move objects, such as drums of investigation derived wastes, that are too heavy to be moved manually.
- If mechanical devices are not available, ask another person to assist you.
- Bend at the knees, not the waist. Let your legs do the lifting.
- Do not twist while lifting.
- Bring the load as close to you as possible before lifting.
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards.



5.6 Electrical Safety

If using portable tools that are electrically powered, follow the safety precautions listed below:

- Check to see that electrical outlets used to supply power during field operations is of the three (3) wire grounding type.
- Extension cords used for field operations should be of the three (3) wire grounding type and designed for hard or extra-hard usage. This type of cord uses insulated wires within an inner insulated sleeve and will be marked S, ST, STO, SJ, SJO or SJTO.
- NEVER remove the ground plug blade to accommodate ungrounded outlets.
- Do not use extension cords as a substitute for fixed or permanent wiring. Do not run extension cords through openings in walls, ceilings or floors.
- Protect the cord from becoming damaged if the cord is run through doorways, windows or across pinch points.
- Examine extension and equipment cords and plugs prior to each use. Damaged cords with frayed insulation or exposed wiring and damaged plugs with missing ground blades must be removed from service immediately.
- All portable or temporary wiring which is used outdoors or in other potentially wet or damp locations must be connected to a circuit that is protected by a ground fault circuit interrupter (GFCI). GFCI's are available as permanently installed outlets, as plug-in adapters and as extension cord outlet boxes. Do not continue to use a piece of equipment or extension cord that causes a GFCI to trip.
- When working in flammable atmospheres, be sure that the electrical equipment being used is approved for use in Class I, Division I atmospheres.
- Do not touch a victim who is still in contact with current. Separate the victim from the source using a dry, non-metallic item such as a broom stick or cardboard box. Be sure your hands are dry and you are standing on a dry surface. Turn off the main electrical power switch and then begin rescue efforts.

5.7 Thermal Stress

The hazards of both heat and cold stress are addressed in this HASP.

5.7.1 Heat Stress

Types of Heat Stress

Heat related problems include heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash can occur when sweat isn't allowed to evaporate, leaving the skin wet most of the time and making it subject to irritation. Fainting may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. Heat exhaustion results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.



Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. Early recognition and treatment of heat stroke are the only means of preventing brain damage or death. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling. Immediate medical assistance is needed in case of heat stroke. Dial 911 to request an ambulance.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

- decline in task performance
- incoordination
- decline in alertness
- unsteady walk
- excessive fatigue
- reduced vigilance
- muscle cramps
- dizziness

Susceptibility to Heat Stress Increases due to:

- lack of physical fitness
- lack of acclimation
- increased age
- dehydration
- obesity
- drug or alcohol use
- sunburn
- infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternate job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. Do not depend on thirst to signal when and how much to drink. For an 8-hour work day, 50 ounces of fluids should be consumed.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.



- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above-mentioned measures will be the joint responsibility of the PM and SSO. Potable water and fruit juices should be made available each day for the field team.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method:

Check radial pulse rates by using fore- and middle fingers and applying light pressure to the pulse in the wrist for one (1) minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beats/minute, shorten the next work cycle by one-third and keep the rest period the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, shorten the work cycle again by one-third.

5.7.2 Cold Stress

Types of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30°F. The fluids around the cells of the body tissue freeze, causing the skin to turn white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There may be a tingling, stinging or aching feeling in the effected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95°F. This must be taken as a sign of danger and exposure to cold must be immediately terminated. Productive physical and mental work is limited when severe shivering occurs.



Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40°F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A face mask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and water proof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or a similar type of synthetic material that wicks away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it may become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20°F.

Dehydration occurs in the cold environment and may increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.



6.0 Air Monitoring

6.1 Direct Reading Instruments

Air monitoring will be conducted using standard hand-held air monitoring devices (PID) as summarized in Section 4.2.2.

Soil generated from soil boring activities will be continuously monitored using a PID during drilling. The PID is an appropriate direct-read monitoring instrument given the suspected presence of VOC contamination in on-site soil.

If Level C PPE is required, Conrad Geoscience will use a 4-gas meter to monitor oxygen, hydrogen sulfide, carbon monoxide and lower explosive limit levels in the breathing and work zones.

6.2 Personal Air Sampling

OSHA does not require the collection of personal air sampling during the proposed activities. As such, this type of monitoring will not be conducted by personnel during any of the proposed tasks.



7.0 Personal Protective Equipment

Personal protective equipment (PPE) will be worn during site activities to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants.

In general, field activities will be conducted in Level D PPE, as described in the table below. PPE will be upgraded to Level C if air monitoring demonstrates VOCs in the breathing zone exceeding the guidance values outlined in Section 4.2.2.

7.1 Chemical Protective Clothing

The following tables describe the Level D and Level C PPE and chemical protective clothing to be worn for general site activities and for certain specific tasks.

Level D PPE

PPE Item	Task 1	Task 2
Hard Hat	✓	
Steel Toed Safety Shoes	✓	✓
Safety Glasses with Sideshields	✓	✓
Traffic Vests	*	*
Inner PVC/Outer Nitrile Gloves	✓	✓
Hearing Protection	✓	

Level C PPE

PPE Item	Task 1	Task 2
Hard Hat	✓	
Steel Toed Safety Shoes	✓	✓
Safety Glasses with Sideshields	✓	✓
Traffic Vests	*	*
Inner PVC/Outer Nitrile Gloves	✓	✓
Hearing Protection	✓	
Half-Face Respirator	✓	✓
Tyvek Protective Suit	✓	✓

Task 1 – Geoprobe Soil Boring Investigation

* - when working in or near streets

Task 2 – Floor Drain Tracing and Outfall Sampling

* - when working in or near streets



7.2 Respiratory Protection

Level D PPE: No respiratory protection required. Air monitoring devices will be used to determine when PPE will be upgraded to include respiratory protection (Section 4.2.2 and 6.1).

Level C PPE: Half-mask, air-purifying respirator equipped with organic vapor/PM100 cartridges.

Respiratory protection will also be worn if odors become objectionable at any time, if respiratory tract irritation is noticed, or if VOCs are detected in the breathing zone as discussed in Section 4.2.2. All on-site personnel who are expected to wear respiratory protection must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator they plan to wear during the proposed activities.

7.3 Other Safety Equipment

The field team will bring the following additional safety items to the site for use as necessary:

- Portable, hand-held eyewash bottles
- First aid kit
- Portable communications equipment
- Fire Extinguisher



8.0 Site Control

8.1 Work Zones

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, work areas along with personal protective equipment requirements will be clearly identified. Work areas or zones will be designated as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November, 1985. They recommend the areas surrounding each of the work areas to be divided into three zones:

- Exclusion or "hot" Zone
- Contamination Reduction Zone (CRZ)
- Support Zone

8.1.1 Exclusion Zone

An exclusion zone (work zone) will be established around each boring location. This zone will move as work progresses to each boring location. This zone should be large enough (i.e. 20 foot radius) to protect unprotected personnel from contact with vapors or dusts that may arise from these operations as well as the physical hazards associated with the operation of heavy equipment. Traffic cones or tape will be used to demarcate the active exclusion zone.

All personnel entering the exclusion zone must be trained in accordance with the requirements defined in Section 10.2 of this HASP and must wear the prescribed level of personal protective equipment.

8.1.2 Contamination Reduction Zone

The decontamination zone will be established adjacent to the exclusion zone. Personnel will remove contaminated gloves and other disposable items in this area and place them in a plastic bag until they can be properly disposed of. Reusable equipment, if any, will be decontaminated with tap water, deionized water, methanol, nitric acid and a liquid detergent solution. A complete description of decontamination procedures is presented in Appendix A to the Remedial Investigation Work Plan.

8.1.3 Support Zone

At this site the support zone will include the area outside of the decontamination zone.

8.2 Safety Practices

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone.
- Smoking is prohibited in all work areas. Matches and lighters are not allowed in these areas.



- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
- Beards or other facial hair that interfere with respirator fit are prohibited.
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the project work plan.



9.0 Decontamination

9.1 Personal Decontamination

Proper decontamination is required of all personnel before leaving the site. Decontamination will occur within the contamination reduction zone. Disposable PPE will be removed in the decontamination zone and placed in lined garbage bags.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning.

Regardless of the type of decontamination system required, a container of potable water and liquid soap will be made available so employees can wash their hands before leaving the site for lunch or for the day.

9.2 Equipment Decontamination

Reusable equipment, if any, will be decontaminated with tap water, deionized water, methanol, nitric acid and a liquid detergent solution. A complete description of decontamination procedures is presented in Appendix A to the Remedial Investigation Work Plan.



10.0 Medical Monitoring and Training Requirements

10.1 Medical Monitoring

All personnel performing activities covered by this HASP must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance physical examination and/or an initial baseline physical examination within the last year prior to performing any work on the site covered by this HASP.

10.2 Health and Safety Training

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an annual 8-hour refresher-training course and/or initial 40-hour training course within the last year prior to performing any work on the sites covered by this HASP.

10.3 Pre-Entry Briefing

The SSO will conduct a pre-entry briefing before site activities begin. HASP receipt and acceptance sheets will be collected at this meeting. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project. Attendance of the pre-entry meeting is mandatory and will be documented by the SSO. An attendance form is presented in Attachment B.



11.0 Emergency Response

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." On-site personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). Response actions will be limited to evacuation and medical/first aid as described within this section below. As such this section is written to comply with the requirements of 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include:

- employee training,
- alarm systems,
- escape routes,
- escape procedures,
- critical operations or equipment,
- rescue and medical duty assignments,
- designation of responsible parties,
- emergency reporting procedures and
- methods to account for all employees after evacuation.

11.1 Employee Training

Employees must be instructed in the site-specific aspects of emergency evacuation. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed. The SSO must verify the specific evacuation procedures that the facility prefers contractors follow in the event of a facility-related emergency. This information will be communicated to the field team during the pre-entry briefing.

11.2 Alarm Systems/Emergency Signals

An emergency communication system must be in effect at all sites. The most simple and effective emergency communication system in many situations will be direct verbal communication. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communication must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from drilling probe) and anytime a clear line-of-sight can not be easily maintained among all personnel because of distance, terrain or other obstructions.

Verbal communication will be adequate to warn on-site personnel of hazards associated with the immediate work area. However, the two person sampling team may be split up during the day to expedite sampling. Each team member will be equipped with a cellular phone to ensure immediate communication can occur between each other. These phones can also be used to contact local emergency responders.



11.3 Escape Routes and Procedures

The SSO will verify the escape routes from each work area with a facility representative. Assembly areas must also be identified. The escape routes and assembly areas will be reviewed during the pre-entry briefing. All personnel on site are responsible for knowing the escape route from the site and where to assemble after evacuation.

11.4 Rescue and Medical Duty Assignments

The phone numbers of the police and fire departments, ambulance service, local hospital, and project representatives are provided in the emergency reference sheet and on the cover of this HASP. This sheet will be posted in the site vehicle.

In the event an injury or illness requires more than first aid treatment, the SSO will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The SSO will relay all appropriate medical information to the on-site project manager and the HSM.

If the injured employee can be moved from the accident area, he or she will be brought to the contamination reduction zone where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on-site. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.5 Designation of Responsible Parties

The SSO is responsible for initiating emergency response. In the event the SSO can not fulfill this duty, the HSM or PM will take charge.

11.6 Employee Accounting Method

The SSO is responsible for identifying all personnel on-site at all times. On small, short duration jobs this can be done informally as long as accurate accounting is possible.

11.7 Accident Reporting and Investigation

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation and report. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An accident investigation form is presented in Attachment C of this HASP. The Supervisor of the injured personnel and the HSM should be notified immediately of the injury.

If a subcontractor personnel is injured, they are required to notify the SSO. Once the incident is under control, the subcontractor will submit a copy of their company's accident investigation report to the SSO.



EMERGENCY REFERENCES

Ambulance: Notify 9-1-1

Fire: Notify 9-1-1

Police: Notify 9-1-1

Hospital – New Milford, CT: New Milford Hospital
21 Elm Street
New Milford, CT 06776
(860) 355-2611

Directions to Hospital:

Head **southeast** on **East Main Street** toward Liffland Lane – go **0.6 mile**

Continue on **CR-67/Quaker Hill Road** – go **3.2 miles**

Turn **right** at **CR-67** – go **1.5 mile**

Continue on **Wakeman Road** – go **1.4 miles**

Turn **left** at **CT-37** - go **5.2 miles**

Turn **right** at **Kent Road/US-7** – go **2.7 miles**

Turn **left** at **US-202** – go **0.8 mile**

Turn **left** at **Elm Street** – go **312 feet**

Arrive at New Milford Hospital

Project Representatives:

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Clinton Corners, New York

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ATTACHMENT A

Health and Safety Plan Receipt and Acceptance Form



ATTACHMENT B

Health and Safety Plan Pre-Entry Briefing Attendance Form



ATTACHMENT C

Supervisor's Accident Investigation Report Form



SUPERVISOR'S ACCIDENT INVESTIGATION REPORT

Injured Employee _____ Job Title _____

Home Office _____ Division/Department _____

Date/Time of Accident _____

Location of Accident _____

Witnesses to the Accident _____

Injury Incurred? _____ Nature of Injury _____

Engaged in What Task When Injured? _____

Will Lost Time Occur? _____ How Long? _____ Date Lost Time Began _____

Were Other Persons Involved/Injured? _____

How Did the Accident Occur? _____

What Could Be Done to Prevent Recurrence of the Accident? _____

What Actions Have You Taken Thus Far to Prevent Recurrence? _____

Supervisor's Signature _____ Title _____ Date _____

Reviewer's Signature _____ Title _____ Date _____

Note: If the space provided on this form is insufficient, provide additional information on a separate page and attach. The completed accident investigation report must be submitted to the Health and Safety Manager within two days of the occurrence of the accident.



ATTACHMENT D
Chemical Hazard and MSDS Sheets



RCRA Metals



Volatile Organic Compounds



Semi-Volatile Organic Compounds



FIGURES



APPENDIX C

Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

Remedial Investigation Work Plan
Cornerstone Enterprises, Inc.
33 East Main Street
Village of Pawling, New York, 12564

NYSDEC Spill No. 90-12530

Brownfield Cleanup Program No. C314116

Prepared For:

NYSDEC Region 3
21 South Putt Corners Road
New Paltz, New York 12561

Prepared By:

Conrad Geoscience Corp.
One Civic Center Plaza, Suite 501
Poughkeepsie, New York 12601

May 16, 2007



This Community Air Monitoring Plan (CAMP) was prepared and is to be implemented in conformance with the NYSDOH Generic Community Air Monitoring Plan as contained in Appendix 1A of the DRAFT DER-10 TECHNICAL GUIDANCE FOR SITE INVESTIGATION AND REMEDIATION, December 2002 (12/25/02); and TAGM 4031.

SITE DESCRIPTION

The subject property is located at 33 East Main Street in the Village of Pawling, New York (Figure 1). The property was operated as an automotive maintenance facility and retail gasoline sales station until 1985 (Riley's Garage). The 0.19-acre property, situated on the south side of East Main Street, includes a 10,000 ft² building (two-story plus basement) and a parking lot in the western part of the property. A tributary to the East Branch Croton River borders the eastern property boundary, and flows to the south (Figure 2).

In 1991, NYSDEC assigned Spill #9012530 to the property, based on information from a new owner indicating that he had acquired the property in 1989 without knowledge of "buried drums and tanks." This spill file was closed by NYSDEC on June 30, 1991. At that time, NYSDEC personnel inspected the subject property and identified two underground storage tanks (USTs). NYSDEC inspection reports also note a floor drain in the garage that discharged to the adjacent stream. In June 1992, three USTs were registered for the subject property, including two 2,000-gallon USTs and one 150-gallon UST. PBS #3-600242 was assigned to the facility. In September 2003, the current owners purchased the subject property. The site was accepted to the Brownfield Cleanup Program (BCP Site #C314116) in December 2006.

SCOPE OF WORK

Conrad Geoscience will be conducting a Remedial Investigation (RI) in order to determine the extent of contaminants in soil and groundwater at the subject property in accordance with BCP regulations and guidance documents. The RI will include the installation of up to twenty soil borings, collection of soil and groundwater samples, and tracing of a floor drain in the former garage building. Real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the work zone will be necessary during this investigation. Depending on results of the soil boring investigation, it may be necessary to excavate, clean and remove the on-site buried storage tanks as an Interim Remedial Measure (IRM). Air and particulate monitoring, as described in this plan, would be implemented during the IRM.

Continuous real-time air monitoring will be necessary during all ground intrusive activities. Ground intrusive activities include, but are not limited to, the installation of



soil borings, soil sample collection, groundwater sample collection, or any tank-related investigations.

VOC MONITORING, RESPONSE LEVELS, AND ACTIONS

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the work zone/boring location) on a continuous basis during ground intrusive activities. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a photoionization detector (PID), which will be calibrated at the start of each work day. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

All 15-minute readings will be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

PARTICULATE MONITORING, RESPONSE LEVELS, AND ACTIONS

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate



exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level, and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ug/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for State (DEC and DOH) personnel to review.

