SITE SAMPLING AND INVESTIGATION PLAN

Haller Testing Laboratories, Inc.
336-340 Leland Avenue
Plainfield City, Union County, New Jersey
PI No. G000006924

Remedial Investigation, Remedial Design &
Remedial Action Services
Term Contract No. A86325

JANUARY 2016

Prepared for:

New Jersey Department of Environmental Protection
Site Remediation Program
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1.0 Introduction

H2M Associates, Inc. (H2M) has been contracted by the New Jersey Department of Environmental Protection (NJDEP) to perform site-specific Remedial Investigations, Remedial Designs and Remedial Actions at multiple sites throughout the state (NJDEP Term Contract A86325). This Site Sampling and Investigation Plan (SSIP) was prepared on behalf of the NJDEP and outlines the scope of work proposed to investigate soil and groundwater contaminated by chlorinated volatile organic compounds (CVOCs) at the Haller Testing Laboratories, Inc. (HTL) site located at 336-340 Leland Avenue in Plainfield City, Union County, New Jersey (hereinafter referred to as the Site or subject property). NJDEP Case Number 94-6-3-0931 was issued in relation to NJDEP's response to the emergency removal of a moisture density gauge from the site on June 15, 1994. United States Environmental Protection Agency (USEPA) Identification Number (USEPA ID No.) NJD986578284 and NJDEP Program Interest Number (PI No.) G000006924 was assigned to the case in response to the detection of contaminants of potential concern related to former operations at the property that had impacted groundwater quality in the surrounding area.

This site investigation is being performed to confirm the presence of and delineate the extent of tetrachloroethene (PCE), trichloroethene (TCE), chloroform, and 1,1,1-trichloroethane (TCA) impacted soils beneath selected areas at the site including the former discharge pits, the area beneath the building, former drum storage areas, and drywell/pit areas; as well as to confirm groundwater flow direction and characterize the current vertical and horizontal extent of chlorinated compounds in groundwater.. Historical site information and a summary of previous investigations conducted at this Site are presented in H2M's *Background Investigation/Conceptual Approach Report for Haller Testing Laboratories, Site (PI No. G000006924)*, dated October 2015. All work proposed herein, will be conducted in accordance with applicable NJDEP's *Administrative Requirements for the Remediation of Contaminated Sites N.J.A.C. 7:26C* (July 1, 2013), *Technical Requirements for Site Remediation 7:26E* (July 1, 2013), *Underground Storage Tanks N.J.A.C. 7:14B* (July 1, 2013), *NJDEP Field Sampling Procedures Manual* (August 2005), and applicable NJDEP guidance documents, and in accordance with the *Programmatic Health & Safety Plan* (H2M, May 2014), *Master Quality Assurance/Quality Control Management Plan* (H2M, May 2014), and also the *Site Specific Health and Safety Plan* (SSHASP) and *Site Specific Quality Assurance Project Plan* (SSQAPP).

2.0 Site Description, Physical Setting and Site History

2.1 Site Location and Description

The subject property is located at 336-340 Leland Avenue in Plainfield City, Union County, New Jersey. The property is identified as Tax Block 405, Lots 7 and 14, on the Plainfield City Tax Maps and is approximately 0.461 acres (**Figure 1** is the site location map, and **Figure 2** is the facilities location map). Leland Avenue fronts the property to the east/northeast and Watson Avenue borders the property to the west/southwest. A church and child care facility borders the Site on the south side of the subject property near Leland Avenue, and a residential properties are present on the southeastern and southwestern sides of the property near Watson Avenue. A vacant commercial property is adjacent to the Site to the north (along Leland Avenue).

The subject property currently contains a partially-collapsed one-story concrete block and brick structure with a parking area to the south. The parking area is currently being used by the next door church and day care facility. The eastern side of the building (fronting Leland Avenue) contains asphalt paving and a sidewalk is present between the asphalt and the street. The western side of the main building is a yard with fill material at surface (consisting of a mixture of stone and crushed concrete and brick). An undeveloped overgrown vegetated area is located on the north and northwestern sides of the main building. The Site is partially fenced. Fencing is present along Leland Avenue, and damaged chain-link fence is present along the northwestern and southeastern property boundaries. The fencing along the Watson Avenue property boundary has been removed, but the fence poles remain.

The original building was constructed in 1921, with a non-attached garage/small building structure added in 1950. In the late 1970's, a residential property located on Lot 14 on Watson Avenue was razed and the yard area was thereafter used as a facility storage area by HTL for their operations.

2.2 Surrounding Land Use

Since approximately 1927, the property has been used as an industrial property with a commercial store and a residence on a portion of the property facing Watson Avenue.

The surrounding properties to the north and east have historically been primarily residential and commercial/light industrial. A church/child care facility is located at 350 Leland Avenue (at the intersection with North Avenue) which is south of the Site adjacent to the property.

2.3 Utilities

The property may have been historically heated using fuel oil which was stored in an aboveground storage tank (AGST, noted in several site visits in 1993). The AGST was noted to be 275-gallons, and last known to be empty and removed from the site. Currently the building is vacant and unused and in a dilapidated condition.

There is no private potable well use within the City of Plainfield or at the Site. The Site is serviced by public water. There is currently no electrical service to the Site. Electricity has historically been provided to the Site by PSE&G.

The City of Plainfield does not have any records of installation of a septic system at the subject property. The Site has historically been served by Plainfield Municipal Utilities Authority sanitary sewer.

Historically the building had two discharge drainage pits located at the Site. These drainage pits were discovered during an August 29, 1985 site inspection by the NJDEP and consisted of two unlined ditches, one on the northwestern (also referred to in documentation as 'north(ern)' or 'west') and one on the southeastern rear area of the main building (also referred to as 'south(ern)' or 'east'). According to notes from NJDEP's inspection on August 29, 1985, the discharge to the northwestern pit reportedly flowed from the sink in the asphalt testing and wet rooms floor drains. The source of the discharge to the southeastern pit was the sinks in the chemistry lab and slop sinks in the testing machine room. Discharge to these pits did not cease until approximately January 1993 when business operations ceased due to bankruptcy and foreclosure.

2.4 Physical Setting

2.4.1 Site Topography and Drainage

The soil type at the site and in the drainage area is classified as a mixture of Boonton Series, Haledon series, and Urban Land. Boonton-Urban land-Haledon complex makes up approximately 4.3 percent (%) of the soil and Raritan-Urban land-Passaic complex makes up 95.7% of the soil on the Site. The Boonton and Haledon Series are described as moderately-well and poorly-drained soils formed in glacial till. The predominant soil type onsite is coarse sand mixed with gravel, which is listed as part of Soil Group A (course-textured soils with high infiltration rates).

The Boonton-Urban land-Haledon complex is characterized by a slope of 0 to 8 percent slope and Raritan-Urban land-Passaic complex is characterized by a slope of 0 to 3 percent. Both soil compositions have a very high runoff rate due to lower permeability.

The topography at the Site is relatively flat and based on the USGS topographic maps, the site elevation is approximately 120 feet above mean sea level. It should be noted that during the July 15, 2015 site inspection, H2M and NJDEP observed that the site grade appears to have been altered by the placement of several feet of fill material on the area of the Site between the main building and Watson Avenue. The date of filling is unknown, and the source of the fill placed by an unknown party is also unknown (it appears to be construction debris). As a result of the placement of fill, the five (5) Site monitoring wells have been covered and were not observed during the site visit.

2.4.2 Surface Water and Wetlands

The closest surface water body to the subject property is Green Brook located approximately 0.63-miles west of the property. According to historic aerial photographs and topographic maps reviewed for the Site, and the C. C. Vermeule topographic maps (1870-1887, Map 32), there were no streams historically present and no streams or wetlands were ever located at the subject property. The nearest surface water body is Green Brook, located approximately 3,300 feet from the Site.

2.4.3 Geologic Setting

HTL is located in the Piedmont Lowland Section of the Piedmont Physiographic Province of the Appalachian Highlands. The Site is underlain by Triassic-age Passaic (formerly Brunswick) Formation shale, which is overlain by surficial glacial moraine (stratified drift) deposits of the late Wisconsinan glaciation. The unconsolidated surficial glacial till deposits are unconsolidated or semi-consolidated and occur as alternating zones of sand, silt and clayey deposits that are poorly sorted with approximately 5 to 50% pebbles, cobbles and boulders.

The underlying bedrock of the Passaic shale is part of the Lower Jurassic and Upper Triassic portions of the Newark Group. These non-marine reddish-brown and grayish-red siltstone and shales generally trend toward the northeast and dip to the northwest. A soil boring (B-24) was advanced to bedrock by Weston Solutions (Weston) in 2002. Glacial till overburden (described as varying degrees of red-brown fine to coarse-grained sand and medium gravel) was encountered from 0 to 65 feet below ground surface (bgs), and weathered shale bedrock was encountered at approximately 65 feet bgs.

Several igneous bodies (basalt flows) are intercalated within the Newark Group and form the Watchung Mountains to the north of the Site. A north-south running fault is located approximately 1,000 feet to the west of the Site and dips to the east.

Groundwater is present in varying quantities in unconsolidated and consolidated deposits in the region. Groundwater yield in the glacial overburden is typically less than 10 gallons per minute (gpm) with an estimated hydraulic conductivity of 10-4 centimeters per second (cm/sec). The Passaic Formation is the major aquifer in Union County and underlies most of the County. It is used as a main aquifer for public drinking water in Union County, and public supply wells in the vicinity of the Site range in depth from 73 to 708 feet. Water in this formation occurs in the joints and fractures. These joints and fractures become progressively tighter and fewer with increasing depth below land surface. Only moderate quantities of water can be stored or transmitted in these fractures. Groundwater flow direction in the area of the Site is likely influenced by the pumping of the Netherwood public supply wells (operated by New Jersey America Water Co.), the closest of which are located 550 to 1,000 feet north of the intersection of North and Leland Avenues (**Figure 2**). PCE impacts at these supply wells caused New Jersey American Water Company to construct a packed tower aeration unit at the Netherwood Treatment Plant (NTP) Facility to remove PCE and TCE in the water supply. The NTP currently treats groundwater withdrawn from all twelve (12) of the Netherwood public supply wells (NJDEP Unknown Source Investigation for NJ American Water Co., Netherwood Wells 1, 2 & 3 Contamination, May 2013).

Five (5) overburden monitoring wells were previously installed at the HTL Site to a maximum depth of 45 feet below ground surface (bgs). Groundwater was encountered at approximately 37.6 to 38.4 feet bgs. The water levels gauged at Site monitoring wells indicate that the groundwater flow direction is to the east and the hydraulic gradient is approximately 0.01. These monitoring wells were not found during inspection due to fill material that has been placed at the property.

2.5 Site History and Previous Investigations

A review of the historical resources shows that the site was originally undeveloped until 1921 when the main site building was constructed on the property. Between 1927 and 1993, the facility onsite operated as Haller Testing Laboratories, Incorporated (HTL). During this time period the facility was used as a research and materials testing laboratory for materials used in construction and engineering, including concrete and asphalt.

During HTL's occupancy, no additions were made to the main building that housed HTL's operations. In 1950, a small garage was built along the southern property boundary. The portion of the subject property facing Watson Avenue contained a two-story store built previously. The store use was converted to use as a residential dwelling between 1950 and 1956. This residence was razed by 1984. Since that time, the southwestern area of the subject property has been used for equipment storage.

Groundwater Investigations

The USEPA retained Weston Solutions to conduct a Site Investigation Prioritization (SIP) investigation and to prepare a Site Inspection Prioritization Report (SIPR) for the HTL property. The SIP investigation was conducted between November, 2001 and February 2002 and included installation and sampling five (5) onsite monitoring wells. Monitoring wells were installed on the southeast of the main building (MW01), in the former subsurface at the southeastern pit area (MW02), the northern discharge pit (MW03) area, and MW-04 and MW05 were installed on the southwest (Watson Avenue) end of the subject property. Samples were analyzed for Target Compound List (TCL) organic compounds and Target Analyte List (TAL) metals.

No sample was collected from MW01, but the reason was not given for this decision. MW02, MW03, MW04, and MW05 all contain PCE, but only wells MW03, MW04 and MW05 are at concentrations that exceed the NJDEP Groundwater Quality Standard (GWQS) of 1 micrograms per liter (µg/L). TCE was only detected in MW03 and at a concentration below the GWQS. Bis(2-ethylhexyl)phthalate was detected in MW02 (13 µg/L) and MW03 (16 µg/L) at concentrations that exceed the GWQS of 3 µg/L. The site is for the most part flat, however groundwater flow is expected to flow for the most part to the east.

Groundwater investigations have been conducted offsite at neighboring properties, these offsite groundwater investigations have revealed a chlorinated solvent plume in the area surrounding HTL. According to the 2011 NJDEP Bureau of Environmental Measurements and Site Assessment (BEMSA) Unknown Source investigation report, fifty-nine (59) groundwater samples were taken from the chlorinated solvent plume; of all these samples the highest PCE concentration (166.82 µg/L) was found in a groundwater sample taken in a parking lot at 1125 North Avenue, which is located south of the HTL building.

Soil Vapor/Soil Gas Investigations

As a result of the soil and groundwater sampling and subsequent Unknown Source Investigation conducted for indoor air contamination, three (3) subsurface depressurization systems were installed in 2012 at 1) Vision of God Family Worship Church/Faheemah's Child Care Center (350 Leland Avenue,

Block 405, Lots 8 & 9); 2) Fleck Industries (400 Leland Avenue, Block 402, Lot 1); and 3) Plainfield Welding & Fabricators and North East Collision Auto Repair Center (1130 North Avenue, Block 402, Lot 2). These systems are still in operation and under oversight by NJDEP Bureau of Maintenance and Monitoring (BOMM).

3.0 Understanding

Investigation activities performed by the NJDEP and USEPA have indicated HTL is a likely contributor to the chlorinated volatile organic contamination identified at the Netherwood Wellfield as well as to other properties, including the downgradient Thomas D. Colavito site (**Figure 2**).

The following summarizes H2M's conclusions based on the background information reviewed from previous site investigations and Unknown Source Investigations:

- The findings from the previous investigations conducted by various parties including USEPA and NJDEP at various sites throughout the Plainfield Industrial Area substantiates that the PCE groundwater plume impacting the Netherwood Wellfield supply wells is emanating from the HTL Site. However, the previous investigations did not identify any concentrated source areas at the HTL site.
- The 1993 and 2003 onsite investigations conducted at the HTL site identified the presence of VOCs, SVOCs, PCBs, pesticides, and metals in and on-soil at concentrations that exceed the NJDEP Soil Cleanup Criteria (SCC). To date, no delineation of impacted soil has been completed at the Site. Additionally, although VOC contaminants were confirmed to be present onsite, the concentrations of VOCs quantified in the samples are not indicative of a source area. Therefore, the source and extent of the VOCs in soil and groundwater at the HTL Site has not been determined.
- There may be other potential sources, in addition to the HTL Site, also contributing to the PCE contamination of the Netherwood wells. Groundwater collected from monitoring wells at Inplant Systems/Roy Stange site (upgradient or sidegradient and to the north/northwest of the HTL Site) also contained PCE in excess of the NJDEP standards. No subsurface investigation has been completed at the former Specialty Corp./Hamrah-Emerson Co. facility (a former dry cleaning facility) adjacent to HTL to the northwest and between the HTL and Inplant Systems/Roy Stange properties.
- Based on the most recent groundwater investigation performed in 2011 and 2012 by NJDEP, the groundwater contaminant plume extends off-site at least 1,000 feet downgradient in the easterly direction. The groundwater zone most impacted by PCE is from 27 to 30 feet bgs. Investigations of the vertical profile of groundwater impacts in the area surrounding the HTL Site show that PCE impacts are present to a depth of approximately 60 feet bgs, where the top of bedrock is encountered. While vertical profiling of PCE concentrations in groundwater has been conducted in the surrounding area, the concentrations of PCE have been observed to reduce with depth; however, the concentrations at the top of bedrock (approximately 60 feet) remain above the NJDEP GWQS of 1 µg/L. Vertical delineation of the groundwater contaminant plume is incomplete at and downgradient of the HTL Site.

- The results from one groundwater gauging event (February 2002) show that groundwater flow was to the east on this date. A clear understanding of the groundwater flow regime at the HTL Site has not been established to date. A groundwater investigation at the Inplant property to the north found that groundwater flow was to the southwest. These conflicting groundwater flow directions indicate that a clear understanding of the groundwater flow regime has not been clearly established to date for the HTL Site.

- The potential for exposure through vapor intrusion (VI) was identified as part of the Thomas D. Colavito USI and three (3) subsurface depressurization systems have been installed by NJDEP at properties in the vicinity of the HTL Site, including a system at the adjacent and assumed downgradient property at 350 Leland Avenue. Given the current knowledge of existing vapor intrusion, it will be necessary to evaluate the results of a groundwater investigation at the Site for the potential for VI impacts of the groundwater plume on neighboring residences and other sensitive receptors.

3.1 Areas of Concern to be Investigated

The results of previous investigation activities undertaken by the NJDEP, NJDEP subcontractors, and USEPA have indicated the presence of chlorinated volatile organic compounds, primarily PCE, within soil and groundwater at the Haller Testing Laboratories Site located 336-340 Leland Avenue. While the concentrations detected within the soil and groundwater at the subject property is not indicative of a concentrated source area, additional sampling may help to identify additional on-site sources of the off-site PCE contaminant plume. Additionally, while prior investigations to date have focused on historic solvent use and impacts, the 1993 and 2003 investigations did investigate other constituents of concern. The 1993 investigation found SVOCs, PCBs, pesticides, and metals were present in soil at concentrations that exceed the NJDEP SCC. The 2003 investigation found that in addition to chlorinated VOCs, the SVOC bis(2-ethylhexyl)phthalate was detected in groundwater at MW02 and MW03 at the Site at concentrations that exceed the NJDEP GWQS. To date, no delineation of impacted soil or groundwater has been completed at the Site.

During the Site visit and compilation of the Background Investigation report, H2M identified the following areas of concern at the Site.

- *AOC-1 Former Southeastern Drainage Pit*
  Historically the southeastern drainage pit (**Figure 3**) received discharge from building operations involving chlorinated solvents (discharge from the sinks in the chemistry lab and slop sinks in the testing machine room). Surface soil samples have been collected from this area that exceed the SCC. Soil borings will be advanced in this AOC.

- *AOC-2 Former Northwestern Drainage Pit*
  Historically the northwestern drainage pit (**Figure 3**) received discharge from building operations involving chlorinated solvents (from the sink in the asphalt testing area and wet room floor drains). Surface soil samples have been previously collected from this area that exceed the SCC. Soil borings will be advanced in this AOC.

- *AOC-3 Former Drum Storage Pad*
  The former drum storage pad areas is where waste and product drums (e.g., TCA) were historically stored at the rear of the main building (**Figure 3**). This is an area of concern because the drums may have leaked into the ground while being stored or spills may have occurred on the drum storage pad behind the building. Surface soil samples have been previously collected from this that exceed the SCC. Soil borings will be advanced around the drum storage pad AOC.

- *AOC-4 Former Drum Storage Area behind Garage*
  Drums were historically stored behind the separate garage building at the Site (**Figure 3**). Results for surface soil samples from a previous soil investigation found that soil impacts were present at concentrations that exceed the SCC. Soil borings will be advanced in this AOC.

- *AOC-5 Former Fuel Oil Aboveground Storage Tank*
  A 275-gallon fuel oil aboveground storage tank was previously present at the Site (**Figure 3**). A surface soil sample collected in this area of the Site found soil impacts present at concentrations that exceed the SCC. A soil boring will be advanced in this AOC.

- *AOC-6 Yard Storage*
  The areas where facility storage (including drums, concrete, waste) is an AOC at the Site (**Figure 3**). Soil borings will be advanced throughout the area to evaluate impacts of facility operations on this AOC.

- *AOC-7 Dry Well*
  During the July 2015 Site visit, a concrete block area was observed on the northern side of the main building (**Figure 3**). This area appears to be a dry well or discharge area. No samples have previously been collected at this AOC, therefore a soil boring will be advanced in this AOC to evaluate potential impacts from this AOC.

- *AOC-8 HTL Main Laboratory Building Footprint*
  For approximately 65 years the main building at the Site was used by HTL for asphalt and concrete testing (**Figure 3**). The operational activities included laboratory testing and storage of hydrochloric acid and chlorinated solvents, including TCA. Slop sinks and floor drains were observed by NJDEP during historic site inspections. Due to the structural condition of the building, an internal inspection was not conducted during the July 15, 2015 reconnaissance. Based on the history of questionable environmental practices by HTL during their operations at the subject property, the footprint of the main building is considered an AOC and soil borings will be advanced within this AOC following demolition of the main building.

- *AOC-9 Fill Material in Yard Area*
  Fill material was placed at the Site from the area behind the main building and garage to Watson Avenue sometime between 2003 (when monitoring wells were installed) and 2015 (**Figure 3**). The source of this fill material is unknown. Soil samples will be collected from the fill material (assumed to be the top two feet) from soil borings advanced for each of the AOCs located in the yard area between the main building, garage, and Watson Avenue.

- *AOC-10 Groundwater*

  Groundwater impacts have been documented in the wells installed in the glacial overburden at the Site (MW02, MW03, MW04 and MW05; MW01 was not sampled) and therefore groundwater is an AOC at the Site.

  Based on previous investigations, conflicting groundwater flow directions have been observed onsite and at the nearby Inplant site to the north. Groundwater flow in the shallow water-bearing zone at the Site was observed to be to the east based on one partial groundwater gauging event at the Site (2002). The offsite Inplant groundwater investigation found PCE and TCE were present in groundwater samples, and groundwater flow at the Inplant property was from northeast to southwest. This is perpendicular to the groundwater flow observed in onsite monitoring wells at the HTL Site.

  Vertical delineation of groundwater quality was conducted to the top of bedrock for nearby sites and is documented in the Unknown Source Investigation for the Thomas D. Colavito site and the Unknown Source Investigation conducted for the Netherwood Wellfield Well 1, Well 2, and Well 3 (2013). Based on these reports, vertical delineation offsite has shown that the most impacted water-bearing zone is in the area of 27 to 30 feet bgs. No information related to groundwater flow direction was collected during either of these USI studies.

  The deeper water-bearing zone is in the Passaic Formation bedrock. Groundwater flow in the underlying bedrock would be expected to be influenced by the pumping of the Netherwood Wellfield supply wells; however, no investigation of the deep water-bearing zone quality or direction of groundwater flow has been completed at the Site or in the surrounding area.

  Vertical and horizontal delineation of contaminants of concern in the shallow water-bearing zone is needed at the Site. Additionally, the actual shallow groundwater flow direction at the Site needs to be resolved. The wells previously installed at the Site have been covered with fill material or paved over with asphalt, and will be located and abandoned; therefore, five (5) overburden (shallow) monitoring wells will be installed at the Site to evaluate groundwater flow and current groundwater quality at the Site during the first phase of investigation. In order to assist with establishing the direction of groundwater flow, the three (3) offsite Inplant monitoring wells will be included as part of the groundwater monitoring network, and therefore will be surveyed when the new HTL site wells are installed and sampled as part of the groundwater sampling event. In addition to shallow groundwater monitoring wells at the HTL Site, three (3) deeper (bedrock) monitoring wells are proposed to vertically delineate groundwater impacts at the Site. Three additional monitoring wells will be included in the second phase of investigation, if needed.

4.0 Remedial Investigation Activities

4.1 Objectives

H2M understands that the objectives of the remedial investigation are as follows:

- Characterize the site to determine whether additional contamination exists at the property at higher concentrations than previously detected;
- Characterize the current vertical and horizontal extent of chlorinated compounds (including PCE, TCE, TCA, and chloroform) in groundwater and the contaminants concentrations compared to previous investigations;
- Establish groundwater flow direction; and
- Assess the surrounding properties for the presence of vapor intrusion issues and identify any potential sensitive receptors.

Based on the information available and reviewed for the Site and surrounding area, the investigation activities described in the following sections are proposed to identify and delineate contaminants at the property and to assess groundwater impacts to the surrounding area.

4.2 Investigation Approach

In an effort to achieve the objectives identified above, the following activities are proposed to be completed in association with the remedial investigation:

- Management of main building structural and security issues at the subject property;
- Community Relations/Public Notification
- Geophysical survey of the property and location of existing five (5) monitoring wells at the Site;
- Soil and groundwater investigation;
- Location and abandonment of five (5) existing monitoring wells at the Site;
- Well search;
- Site survey;
- Receptor Evaluation (including results of well search); and
- Reporting.

Each aspect of the proposed investigation is further discussed in the following sections.

4.3 Structural Issues at Main Building and Site Security

During the NJDEP and H2M site reconnaissance on Wednesday, July 15, 2015, it was observed that the rear (southeast, south, and southwest portions) of the main building at the HTL Site had collapsed and that the south, southeast and southwest walls of the structure are poorly supported.

The security of the Site has been compromised by removal of the fence on the Watson Avenue end of the Site, leaving only the fence poles. In addition, the eastern and western fences are damaged. No fence is present on the northwest side of the Site between the Specialty Corp. and HTL Site. No fence is present

on the east side of the Site between Visions of God Family Worship, Inc., and Faheemah's Child Care Center.

Additionally, the site investigation necessitates the installation of soil borings and monitoring wells, and potentially digging test pits for uncovering buried objects and accessing discharge points and for locating the buried monitoring wells. Heavy equipment to be used in performing this work includes drill rigs and backhoe/excavators, which will be positioned in close proximity to the existing building structure. The site investigation also necessitates the need to collect samples within the footprint of the building structure (AOC-9), which, given the dilapidated condition of the building, is also unsafe to do. There is concern that the vibrations caused by the use of heavy equipment in close proximity to the building may adversely affect the remaining unsupported or partially supported walls and roof of the structure. The drilling activity could result in a hazard to personnel at the site, or to the building on the nearby property (located approximately 6 feet from the northwest wall of the main building). Additionally, since the parking area between the HTL building and the child care facility is accessed and used by the child care facility, the condition of the building poses a greater concern.

For the reasons stated above, drilling in the vicinity of the partially-collapsed building is unwise due its questionable structural integrity. Based on these observations, stabilization or demolition of the building prior to remedial investigation activities will be necessary to provide for a safe working condition.

In addition, the Site security should be addressed by replacement or repair of fencing prior to the start of stabilization or demolition of the main building and investigation at the subject property.

The building stability and potential demolition, as well as site fencing will be addressed by NJDEP prior to initiation of remedial investigation field activities.

4.4 Public Notification/Community Outreach

A minimum of two weeks prior to initiating planned field activities associated with the remedial investigation, property owners and tenants within 200 feet of the 502 South Main Street property boundary will be notified of field activities. A fact sheet will be prepared providing information on site conditions and describe the field investigation activities that will be taking place. The fact sheet will also include H2M and NJDEP contact information. If it is found that there is a language barrier in this neighborhood, H2M will assist in obtaining information on alternate language(s) that may be needed so that all parties are aware of the investigation being conducted at the Site. The City of Plainfield municipal clerk's office and the Union County Office of Health Management will also be sent copies of the fact sheet. Additionally, H2M will support the NJDEP Community Relations Coordinator in developing notification letters, factsheets and checklists for distribution and support the NJDEP at public meetings, as necessary.

4.5 Utility Clearance/Geophysical Survey

In preparation for the intrusive activities, H2M's drilling subcontractor will request utility mark-outs for the property being investigated through the NJ One Call service. Additionally, prior to initiating any intrusive

field activities, a geophysical survey will be performed to clear all locations for subsurface borings by a subcontractor engaged by H2M. The geophysical subcontractor will also perform a survey inside the site building in preparation for drilling of the interior borings.

The geophysical survey will identify the location of any buried metallic piping and appurtenances including piping, tanks, vaults, or utilities. The geophysical survey will consist of methods including ground penetrating radar (GPR), electromagnetic (EM) and pipe locator scans. Real time data will be provided by the geophysical subcontractor with results for clearance of sampling locations. Detected utilities will be marked by the geophysical contractor on the ground using the colors established by the American Public Works Association. A report including an electronic scaled map will be prepared by the geophysical subcontractor detailing the detected features and any subsurface utilities present in the sampling locations in relation to permanent structures.

In addition to utility clearance, the geophysical surveyor will conduct site-wide survey for buried objects of features, including the two former drainage pits (AOC-1 and AOC-2) and the gasoline tank denoted on a 1950 Sanborn. If necessary, the geophysical survey will also be used to assist in the location of the five (5) existing monitoring wells that are currently buried under fill or have been paved over with asphalt.

4.6 Soil and Initial Groundwater Investigation

Based on the historical information reviewed, there are several specific AOCs that will be targeted during the soil and groundwater investigation. Each AOC is shown on **Figure 3**. A summary of sampling activities, by AOC, is provided below. Proposed sample locations are shown on **Figure 4.** During Phase 1, the soil investigation will include twenty-six (26) on-site soil borings to evaluate the AOCs discussed in Section 3.1. The soil sample locations will focus on potential source areas.

The groundwater investigation will consist of two phases. Phase 1 of the investigation will include: twenty-six (26) groundwater sample locations that are advanced at the same locations as the soil borings (plus 5 contingent locations, if needed); five (5) shallow overburden groundwater monitoring wells; and three (3) intermediate (bedrock) monitoring wells. Soil borings will be advanced by an individual who is licensed by NJ to drill soil borings. Monitoring well will be installed by a NJ-licensed well driller. Based on the results of investigation, delineation samples may be needed offsite. Phase 2 groundwater investigation will include off-site delineation sampling in a second mobilization, as necessary, and will consist of up to twenty (20) additional groundwater sampling locations and three (3) additional groundwater monitoring wells drilled by a NJ-licensed well driller.

4.6.1 Phase 1 - AOCs-1 & 2-Former Southwestern and Northwestern Drainage Pits, AOC-3-Drum Storage Pad, and AOC-7-Former Dry Well

Historically, the sinks in the chemistry lab and the slop sink in the testing machine room discharged into an unlined drainage pit on the southeast side of the main building (AOC-1). The discharge to the northwestern drainage pit was originating from the sink in the asphalt testing and wet room floor drains (AOC-2). Drums of chlorinated VOCs (TCA) and waste were stored on the concrete pad at the rear of the main building (AOC-3). The historic use and discharge of TCA and wastewater from the testing laboratory

for concrete, asphalt and building materials and the presence of contaminants in these areas documented during previous investigations (including VOCs, SVOCs, PCBs, and metals), indicate that former site operations have impacted surface soil and groundwater at the Site. Additionally, a gasoline tank was noted near the southeast corner of the main building (at the rear of the building) and has not been investigated.

Ten (10) soil borings will be installed on the exterior of the main building adjacent to the building footprint and in the location of the two (2) former drainage pits, along the edge of the drum storage area, and at the gasoline tank area (**Figure 4**). Borings will be installed using a Geoprobe® to a depth of approximately 65 feet (the top of bedrock).

For two (2) soil borings, Geoprobe® Direct Image® MiHpt (a combined Membrane Interface Probe [MIP], and Hydraulic Profiling Tool and Electrical Conductivity [EC] testing) will be employed as a screening tool for soil and groundwater in an effort to hydraulic characteristics and lithology and determine the depth of the highest contaminant concentrations. Membrane Interface Probe (MIP) will be used at eight (8) of the ten (10) soil borings. MIP provides real-time direct sensing capabilities for in-situ detection of distributions and relative magnitude of VOC contaminants. Field screening using MIP will assist in identifying contaminant zones for sampling and for establishing well screens for the permanent monitoring wells. MIP will be employed from grade continuously down to the terminal depth of the boring. The MIP downhole equipment to be used will include the downhole interface probe, trunkline (with heated trunkline capability), connection section and drive head; and probe rods. The detector will be outfitted with a photoionization detector (PID), flame ionization detector (FID), and halogen specific detector (XSD). **Figure 4** identifies the two locations where MiHpt profiling will be conducted.

Soil samples will be collected from intervals with elevated direct sensing readings. Three (3) soil samples are proposed for each soil boring location. Direct-push technology (DPT) will be used at each location to advance dedicated Macro-Core liners to the desired sample depth. Soil samples for laboratory analysis will be collected from a 6-inch interval using a hand-held coring device (e.g., Encore™, Terra Core Soil Sampler®, or equivalent sampler). At each boring location, field observations including the color, composition, and presence of visible contamination and/or odors will be noted for recovered soil in all dedicated Macro-Core liners.

Additionally, up to three (3) groundwater samples will be collected from each of the borings at the depth interval(s) exhibiting elevated direct sensing readings. If the MIP does not indicate the presence of any elevated direct sensing readings, two (2) samples will be collected: the shallower of the two groundwater samples will be collected at the groundwater interface, and the second groundwater sample will be collected from the interval above the bedrock surface. Groundwater samples will be collected from select intervals using a discrete sealed screen groundwater sampler driven to the desired depth for sample collection. The groundwater samples will be retrieved with either a Teflon® lined bailer or via inertial pumping with Teflon® lined tubing with a foot or ball-check valve attached at one end.

Based on the results of previous soil investigations, soil and groundwater samples will be submitted under chain of custody to a NJDEP certified laboratory for analysis for the full Target Compound List/Target Analyte List (TCL/TAL). Soil samples will be analyzed via: TCL volatile organics plus 15 (VO+15) tentatively-identified compounds (TICs) via USEPA SW-846 8260C; TCL semivolatile organic compounds plus 15 TICs (SVOC+15) by USEPA SW-846 8270D; TCL organochlorine pesticides and PCBs (USEPA SW-846 8081B and 8082A); and TAL metals (USEPA SW-846 6010C and 7471B). Groundwater samples will be analyzed for: TCL VO+15 by USEPA SW-846 8260C; TCL SVOC+15 by USEPA SW-846 8270D; TCL organochlorine pesticides and PCBs (USEPA SW-846 608, 8081B, and 8082A); and TAL metals by USEPA SW-846 200.7 and 200.8. The analytical data from these results will be provided in accordance with NJDEP Reduced Laboratory Data Deliverables format (N.J.A.C. 7:26E, Appendix A, Section II) and NJDEP Hazsite/Electronic Data Deliverable (EDD).

Soil cuttings will be returned to the boreholes unless deemed to be grossly contaminated. The surface will be patched with like material (asphalt, concrete, or topsoil). Soil that is deemed grossly contaminated or excess soil cuttings generated during the soil investigation that cannot be returned to the borehole will be drummed and temporally staged on-site for waste characterization and transport and disposal at a certified disposal facility. Boreholes for soil and groundwater screening locations deeper than 50 feet below surface grade (bgs) will require a NJDEP soil boring permit, which will be secured by the drilling subcontractor. All boreholes that are deeper than 25 feet will be grouted. The surface will be patched with like material (e.g., asphalt, concrete, topsoil, gravel).

4.6.2 Phase 1 - AOC-4 - Former Drum Storage Area Behind Garage, AOC-5 - Fuel Oil AGST, AOC-6- Yard Storage, and AOC-9 - Fill Material

Drum and materials storage was present from the rear of the main building and garage building to the Watson Avenue property boundary. Soil sampling in the area behind the garage building and at the former AGST found that VOCs, SVOCs, pesticides, and metals were present in surface soil. Based on historical reports and observations made during the site inspection as well as sampling, soil and groundwater impacts are known or suspected throughout these areas.

Up to ten (10) borings will be installed between the southern end of the main building and garage, and Watson Avenue. The soil borings will be placed in grid-like pattern (**Figure 4**). Borings will be advanced using a Geoprobe® to a depth of approximately 65 feet (the top of bedrock), which corresponds to approximately 10 to 15 feet into the water table. Boring depths may extend deeper depending on the results of field screening. MIP will be employed as a screening tool at eight (8) of the soil borings in an effort to determine the depth of the highest VOC contaminant concentrations. Additionally, MiHpt will be used at two (2) of the ten (10) locations to capture VOC concentrations via MIP, as well as HPT and EC data. The MiHpt locations are shown on **Figure 4**.

Soil samples will be collected from intervals with elevated MIP or MiHPT direct sensing VOC readings from the original site grade (approximately 2 feet bgs) to 65 feet bgs. It is anticipated that up to three (3) subsurface soil samples will be collected from each soil boring location. DPT will be used to advance dedicated Macro-Core liners to the desired sample depth. Soil samples for laboratory analysis will be

collected from a 6-inch interval using a hand-held coring device (e.g., Encore™, Terra Core Soil Sampler®, or equivalent sampler). In addition, samples of fill material placed at the surface of the Site (0 to 2 feet) will be collected and analyzed to characterize the fill in three (3) locations throughout the yard. These samples will be collected from locations where elevated VOCs are detected (based on field screening using a PID, or visual staining or olfactory indications of impact are identified. These fill samples will be analyzed via: TCL VO+15 via USEPA SW-846 8260C; TCL SVOC+15 by USEPA SW-846 8270D; TCL organochlorine pesticides and PCBs by USEPA SW-846 8081B and 8082A; and TAL metals by USEPA SW-846 6010C and 7471B.

Additionally, up to three (3) groundwater samples will be collected from each of the borings at the depth interval(s) exhibiting elevated direct sensing readings. If the MIP/MiHPT does not indicate the presence of any elevated direct sensing readings, two (2) samples will be collected: the shallower of the two groundwater samples will be collected at the groundwater interface, and the second groundwater sample will be collected from the interval above the bedrock surface. Groundwater samples will be collected from select intervals using a discrete sealed screen groundwater sampler for laboratory analysis. The groundwater samples will be retrieved with either a Teflon® lined bailer or via inertial pumping with Teflon® lined tubing with a foot or ball-check valve attached at one end.

Based on the results of previous soil investigations, soil and groundwater samples will be submitted under chain of custody to a NJDEP-certified laboratory for analysis for the full TCL organics and TAL inorganics analysis. Soil samples will be analyzed via: TCL VO+15 via USEPA SW-846 8260C; TCL SVOC+15 by USEPA SW-846 8270D; TCL organochlorine pesticides and PCBs by USEPA SW-846 8081B and 8082A; and TAL metals by USEPA SW-846 6010C and 7471B. Groundwater samples will be analyzed for: TCL VO+15 by USEPA SW-846 8260C; TCL SVOC+15 by USEPA SW-846 8270D; TCL organochlorine pesticides and PCBs by USEPA SW-846 608, 8081B, and 8082A; and TAL metals by USEPA SW-846 200.7 and 200.8. The analytical data from these results will be provided in accordance with NJDEP Reduced Laboratory data deliverables will be NJDEP Appendix A Reduced Deliverables format.

Soil cuttings will be returned to the boreholes or will be drummed as discussed in Section 4.6.1 above. Boreholes for soil and groundwater screening locations deeper than 50 feet bgs will require a NJDEP soil boring permit and boreholes that are deeper than 25 feet will be grouted. The surface will be patched with like material (e.g., asphalt, concrete, topsoil, gravel).

4.6.3 Phase 1 - AOC-8 - HTL Main Laboratory Building Footprint

For approximately 65 years the main building at the Site was used by HTL for asphalt and concrete testing. The operational activities included laboratory testing and storage of hydrochloric acid and CVOCs, including TCA. Due to the structural condition of the building, an internal inspection was not conducted during the July 15, 2015 reconnaissance; however NJDEP inspectors had observed floor drains in the building. Based on the history of questionable environmental practices by HTL and discharge of CVOCs and wastes during their operations at the subject property, the footprint of the main building is considered an AOC.

Up to six (6) soil borings are proposed to be advanced within the main building footprint fashioned in a grid like pattern, and biased toward areas of stained concrete, floor drains, or cracks (**Figure 4**). Borings will be installed using a Geoprobe® to a depth of approximately 65 feet (to bedrock). Boring depths may not extend the full depth should field screening indicate no impacts are present. MIP will be employed at each soil boring location as a screening tool in an effort to determine the depth of the highest VOC contaminant concentrations. Additionally, MiHpt profiling of the subsurface (capturing MIP, HPT and EC data) will be performed in one (1) location. The MiHpt location is shown on **Figure 4**.

Soil samples will be collected from intervals with elevated VOCs based on MIP or MiHpt readings. It is anticipated that up to three (3) subsurface soil samples will be collected from each soil boring location. DPT will be used to advance dedicated Macro-Core liners to the desired sample depth. Soil samples for laboratory analysis will be collected from a 6-inch interval using a hand-held coring device (e.g., Encore™, Terra Core®, or equivalent sampler).

Additionally, up to three (3) groundwater samples will be collected from the boring locations at the depth interval(s) exhibiting elevated VOCs based on MIP or MiHpt sensing readings. If the MIP does not indicate the presence of any elevated direct sensing readings, two (2) samples will be collected: the shallower of the two groundwater samples will be collected at the groundwater interface, and the second groundwater sample will be collected from the interval above the bedrock surface. Groundwater samples will be collected from select intervals using a discrete sealed screen groundwater sampler. The groundwater samples will be retrieved with either a Teflon® lined bailer or via inertial pumping with Teflon® lined tubing with a foot or ball-check valve attached at one end.

The soil and groundwater samples will be submitted under chain of custody to a NJDEP-certified laboratory for analysis for the full TCL organics and TAL inorganics. Laboratory data deliverables will be NJDEP Appendix A Reduced Deliverables format.

4.6.4 Phase 1 - ACO-10: Chlorinated Compounds in Groundwater

Based on the historic data from Site investigation, PCE is present in the overburden water-bearing zone at a depth of 37.6 to 38.4 feet bgs. No vertical delineation or evaluation of shallow groundwater impacts or of groundwater in the underlying bedrock has been undertaken at the Site.

Groundwater flow is to the east based on one partial groundwater gauging event (2002). The water levels gauged at Site monitoring wells indicate that the groundwater flow direction is to the east and the hydraulic gradient is relatively flat (approximately 0.01 feet per foot). Offsite investigations indicate that groundwater impacts are present to the east of the Site, as well as upgradient to the northwest. Vertical delineation offsite has shown that the most impacted water-bearing zone is in the area of 27 to 30 feet bgs. No vertical delineation or evaluation of shallow groundwater impacts or of groundwater in bedrock has been undertaken at the Site.

In order to characterize the current groundwater conditions, the overburden monitoring wells that were previously installed have been buried either under fill or asphalt. H2M will search for each well. If possible

to repair the wells once they are found, a licensed New Jersey driller will raise the surface casing and redevelop each well.

If the wells cannot be found or repaired, it is proposed that up to five (5) permanent monitoring wells be installed at the Site to evaluate groundwater flow and quality. MIP direct sensing will be utilized to determine the depth of highest contaminants for well construction. MIP logging will be performed in the borings to depths of approximately 65 feet below grade (to the top of bedrock).

At each boring, up to three (3) groundwater samples will be collected from discrete intervals biased to depths of elevated direct sensing readings based on the results of the MIP. If the MIP does not indicate the presence of any elevated direct sensing readings, two (2) samples will be collected: the shallower of the two groundwater samples will be collected at the groundwater interface, and the second groundwater sample will be collected from the interval above the bedrock surface. Groundwater samples will be collected using an exposed screen discreet point sampler driven to the desired depth for sampling. The groundwater data will be confirmed through lab analysis before final selection of well completion and screen depth(s). Groundwater samples will be laboratory analyzed for TCL organics and TAL inorganics for the initial sampling event. Subsequent groundwater sample analysis may be reduced to only VOCs or a combination of VOCs and other organics or inorganics based on the results of the initial sampling event. The groundwater analytical data will be provided in NJDEP Reduced Laboratory Data Deliverables format.

The proposed locations of permanent monitoring wells are not shown on the proposed sampling map (**Figure 4**) because locations will be selected based on the results of investigation activities.

The groundwater data will assist in final selection of well completion and screen depth(s) for the proposed permanent groundwater monitoring wells discussed in Section 4.8. Based on the results, clustered wells screened at various depths may be needed.

4.7 Phase 1 - Test Pit

Should an unexplained anomaly be identified during the geophysical survey or other suspected buried structure be identified (e.g., a suspected buried tank at the reported location of a gasoline tank along the southwestern corner of the building), the anomaly will be excavated to establish the nature of the anomaly. It is assumed that up to three (3) test pits will be excavated to ground-truth anomalies identified at the Site. The subsurface conditions identified at the excavated anomaly will be photo-documented. If indications of contamination are observed (e.g., staining, elevated total VOC readings based on PID screening of soil), up to two soil samples will be collected for laboratory analysis for the full TCL organic compounds and TAL inorganic analytes.

4.8 Phase 1 - Permanent Well Construction

4.8.1 Overburden Wells

Vertical and horizontal delineation of contaminants of concern in the shallow water-bearing zone is needed at the Site. Additionally, the actual shallow groundwater flow direction at the Site needs to be resolved.

As previously discussed in Section 4.6.4, if the five (5) overburden monitoring wells that were previously installed cannot be found or repaired and made usable, up to five (5) permanent monitoring wells will be installed at the Site to evaluate groundwater flow and quality.

Following the receipt and review of groundwater analytical results for the samples collected from discreet groundwater samplers discussed in Section 4.6, five (5) overburden monitoring wells will be installed at the Site to a maximum depth of 65 feet below ground surface (the top of bedrock). Depending on the groundwater sample results and vertical contaminant distribution, well couplets consisting of a shallow monitoring well and intermediate bedrock monitoring well may be installed at a minimum of three (3) of these five (5) locations to evaluate groundwater quality and allow for evaluation of groundwater flow in the deeper water-bearing zone. It is Actual completion depths and well screen intervals for the overburden wells will be selected following review of the analytical data from the discreet groundwater samples collected during initial screening and MIP logging and MiHpt profiling.

The monitoring wells may be constructed using Rotosonic drilling methods due to the presence of fill material and the presence of residential and day care property use adjacent to the property. Well casing will be 2-inch diameter Schedule 40 PVC conforming to ASTM D1784-11 and ASTM D1785-12. The pipe shall be joined using internally-threaded flush joints. A water tight locking cap and padlock (intended for outdoor service) shall be installed on the top of the casing. The two-inch diameter well screen shall be five-feet long and installed to a depth as directed by the H2M field geologist based on the analytical results from the soil and groundwater investigation. The wells will be finished with flush-mounted completions using water tight road boxes, anchored in a concrete surface seal. The monitoring wells will be installed under the direct supervision of a licensed New Jersey Well Driller. NJDEP well permits will be obtained by the drilling subcontractor.

Soil cuttings will be will be drummed, labeled and temporarily staged at the site for transport and disposal at a certified disposal facility, based on analytical results.

The onsite monitoring wells will be sampled to determine if contamination is higher on the HTL Site than the surrounding sites and to assess if contamination has increased or declined. If required, additional monitoring wells will also be installed to determine more precise groundwater flow direction in the shallow water-bearing zone, and to and help identify possible source areas on the subject property.

Based on the results of the groundwater investigation in the shallow overburden water-bearing zone, and in particular, if chlorinated VOC concentrations are identified above a GWQS at a depth within 15 feet above bedrock, bedrock monitoring wells will be installed. The proposed locations for three (3) bedrock

monitoring wells will be identified, if needed, to assess groundwater flow direction and water quality in the second water-bearing zone below the Site. The three additional monitoring wells will be included in the second phase of investigation, if needed.

4.8.2 Bedrock Wells

In addition to shallow groundwater monitoring wells at the HTL Site, three (3) deeper (bedrock) monitoring wells are proposed to vertically delineate groundwater impacts at the Site. The bedrock wells will be installed during Phase 2 of the groundwater investigation.

If chlorinated VOC concentrations are identified above a GWQS at a depth within 15 feet above bedrock, three (3) double-cased bedrock monitoring wells will be installed. The bedrock wells will be at the location of highest VOC concentration to assess if the bedrock aquifer has been impacted by chlorinated VOCs, and located across the Site to allow for triangulation of groundwater flow.

The bedrock wells will be drilled using a Rotosonic drill rig due to the presence of fill across the site, and to minimize generation of dust due to the presence of residential properties and a day care adjacent to the site. During the installation, a PID will be used to screen soil cuttings for indications of VOC contamination. In addition, field observations including the color, composition, and presence of visible contamination and/or odors will be noted on a boring/well installation log.

Bedrock well construction will include drilling a 10-inch diameter boring and setting a 6-inch diameter surface casing a minimum 10 feet into bedrock following NJDEP protocol (N.J.A.C. 7:9D) for the construction of a bedrock monitoring well. The surface casing will be cemented into bedrock and the casing and borehole shall be sealed in accordance with N.J.A.C. 7:9D-2.9 and 2.10 and the cement grout will be allowed to set for a minimum of 24 hours prior to drilling a 6-inch boring to the terminal depth.

The bedrock monitoring wells will be constructed of 2-inch diameter Schedule 40 PVC (conforming to ASTM D1784-11 and ASTM D1785-12) 0.010-mil slotted screen and inner well casing. The length of the screen and the depth will depend on the depth of the fracture zone that yields the first water. The 2-inch PVC well screen and riser pipe shall be joined using internally threaded flush joints. An appropriate size sand filter pack will be used from depth to two (2) feet above the top of the screen. The remaining annular space will be grouted to within 0.5 to 1.0 feet of the surface. A water tight locking cap and padlock (intended for outdoor service) shall be installed on the top of the casing. The well will be finished with a flush-mounted completion using a water tight road box, anchored in a concrete surface seal. The well will be installed under the direct supervision of a licensed New Jersey Well Driller.

Soil cuttings will be will be drummed and staged on-site, or at the approved staging location, for transport and disposal at a certified disposal facility based upon analytical results.

4.8.3 Well Development

Following well repair and/or installation, all wells will be developed in accordance with the methods specified in the NJDEP Field Sampling Procedure Manual using either a submersible pump and/or block

and surge techniques. During well development, specific conductance, pH and temperature will be recorded on well development record sheets along with other pertinent information such as initial depth to groundwater, well volume and depth to well bottom before and after purging.

Well development will continue until either a turbidity free discharge is achieved, or the evacuation of ten well volumes. Purged water will be placed into 55-gallon drums, labeled, and staged onsite in a location approved by the property owner for appropriate off-site disposal once test results become available. Well construction details will be recorded on a well construction log, and well development details will be recorded on a well development record form.

4.8.4 Well Sampling

After a minimum of two weeks following installation and development, the monitoring wells will be purged and sampled in accordance with the Technical Requirements for Site Remediation, N.J.A.C. 7:26E, *et seq.*, as well as the August 2005 NJDEP Field Sampling Procedures Manual. A calibrated PID with a 11.7 eV lamp will be used to field screen for total VOCs in the headspace of the wells prior to sampling and the static water level will be measured to the nearest hundredth (0.01) foot. Following a complete round of water level readings each monitoring well will be purged and sampled using a submersible style pump via low-flow methodology. During the purging process, Water Quality Indicator Parameters (e.g. pH, temperature etc.) will be recorded at 5-minute intervals until stabilization has occurred over three (3) consecutive readings at which time a sample will be collected and submitted to a certified state laboratory under chain of custody.

Additionally, in order to assist with establishing the direction of groundwater flow, the three (3) offsite Inplant monitoring wells will be included as part of the groundwater monitoring network. Static water levels in these wells will be measured, and sampled as part of the groundwater sampling events.

The groundwater samples from the on-site wells and the Inplant wells will be analyzed for volatile organic compounds with a forward library search for tentatively identified compounds (TCL VO+15 using USEPA SW-846 Method 8260C). Depending on the whether other contaminants were detected during the initial groundwater sampling event to evaluate AOC 10 (i.e., samples collected using discrete screen point groundwater samplers as discussed in Section 4.6.4), analysis may also include TCL semivolatile organics, pesticides and polychlorinated biphenyl (PCBs), and TAL inorganic compounds. Laboratory data deliverables will be provided in the NDJEP Appendix A Reduced Deliverables format.

Purged groundwater will be placed in closed-top 55-gallon drums, labeled, and staged onsite in a location approved by the NJDEP and/or property owner for later off-site disposal once test results become available.

4.9 Phase 2 - Groundwater Investigation

Phase 2 groundwater investigation will include off-site delineation sampling in a second mobilization, as necessary, and will consist of up to twenty (20) additional groundwater sampling locations and three (3) additional shallow groundwater monitoring wells. Offsite groundwater at the 20 additional groundwater

sampling locations will be investigated using MIP and groundwater samples will be collected as described in Section 4.6.4. If needed, the three (3) off-site overburden monitoring wells will be installed as described in Section 4.8.1.

4.10 Investigation-Derived Wastes

Prior to the drilling operations, a temporary pad to be used for equipment decontamination will be constructed at a location along the west side of the property. Decontamination fluids shall be collected and containerized and not be allowed to drain directly to the ground or run off onto the street. The decontamination fluids generated shall be collected and stored in Department of Transportation- (DOT-) approved closed-top 55-gallon drums. Drums shall be moved and/or staged at the facility in a location designated by H2M and approved by NJDEP and/or the property owner, for transport and disposal to a certified disposal facility once analytical results become available.

It is anticipated that during the course of the field investigation activities, investigation-derived waste (IDW) will be generated. Decontamination water will be collected and placed in 55-gallon drums, along with any purged groundwater or excess groundwater sample that may remain following the groundwater sample collection. Minimal soil IDW is expected to be generated during the soil sampling. For the soil IDW and any personal protection waste (e.g., sampling gloves) that is generated, the IDW will be drummed and the drums will be labeled and temporarily stored on the subject property until waste disposal classification data is available to determine proper disposal methods.

IDW will be segregated based on field observations and by matrix (e.g., aqueous, solid), containerized in 55-gallon DOT-approved drums, and sampled for waste characterization by the Toxicity Characteristic Leaching Procedure (TCLP) and RCRA characteristics as necessary.

4.11 Site Survey

In order to prepare accurate site plans, a New Jersey-Licensed land surveyor will determine the coordinates and elevations of any permanent monitoring wells, temporary well points, and soil borings. This information will be utilized for the determination of groundwater elevations and for the generation of groundwater contours.

A New Jersey-licensed land surveyor will be contracted to prepare a base map to include a boundary and topographic survey of the site. Monitoring wells and sample locations will also be surveyed for location and elevation. All survey data will be based upon the New Jersey State Plane Coordinate System (NAD83) and National Geodetic Vertical Datum (NGVD) of 1988. The accuracy of the survey will be maintained horizontally to 0.1 foot and vertically to 0.01 foot. Mapping shall adhere to standards described in the NJDEP document *Geographic Information System Digital Data Standards* and include the requirements set forth in the New Jersey State Board of Professional Engineers and Land Surveyors Administrative Rules and Regulations.

The topographic site map will be prepared with a minimum contour interval of 2 feet (2 ft), accurate to one half of the contour interval, and will include locations and elevations of all monitoring wells and sampling points. The elevations of the top of PVC casing (inner and outer casing) of each on-site monitor well, as

well as elevation of the ground surface at each newly-installed monitoring well will be surveyed to the nearest 0.01 feet. The horizontal location of the wells will be surveyed to the nearest 1/100th of a second latitude and longitude. The NJ-licensed surveyor will complete and submit NJDEP Monitoring Well Certification Form B's for each well survey.

Additionally, to assist with establishing the direction of groundwater flow, the three (3) offsite Inplant monitoring wells will be included as part of the groundwater monitoring network, and therefore these wells will also be surveyed.

Additionally, horizontal and vertical control points shall be established for the site. The licensed surveyor shall install two (2) concrete survey monuments marked with durable caps and identifying numbers. These monuments shall be located horizontally by the New Jersey Plane Coordinate System (NAD83) and vertically by the National Geodetic Vertical Datum (NAVD88).

4.12 Initial Receptor Evaluation

An initial receptor evaluation will be conducted pursuant to N.J.A.C.7:26E-1.12 thru 1.15. An ecological receptor evaluation will be conducted at a later phase once off-site groundwater data is available.

The steps described in the following sections will be undertaken to complete the receptor evaluation:

Land Use

H2M will conduct a land use receptor evaluation in accordance with N.J.A.C.7:26E-1.13. The receptor evaluation will include an identification of all current land uses at the site and of properties located within 200 feet of the site boundary; addresses of each residence, school or child care center, park, playground or other recreation area within 200 feet of the site boundary and plotted onto a map; and identifying any proposed changes of land use at the site and each property located within 200 feet of the site boundary that the municipality has approved a change in land use along with a map depicting the location of the change in relation to the areas being remediated.

Groundwater

A well search will be conducted in accordance with N.J.A.C.7:26E-1.14 within 90 days of detecting groundwater impact to identify wells that may be impacted by contamination that has or may have emanated from the site. A file search will be requested from the NJDEP Bureau of Water Allocation (BWA) for well records pertaining to monitoring and domestic wells within 0.5-mile of the down-gradient edge of the contaminant plume; and all industrial, irrigation, public supply wells, and wells with water allocation permits within 1-mile of the down gradient edge of the contaminant plume. The results of the BWA well search will be cross-referenced with local records obtained from local health departments and water purveyors if potable wells are identified from the well search,

Vapor Intrusion

Potential receptors for the vapor intrusion (VI) pathway will be evaluated in accordance with N.J.A.C.7:26E-1.15(a) to determine the need to conduct a VI investigation. The VI receptor evaluation will

include an evaluation of groundwater analytical data collected onsite in relation to Vapor Intrusion Screening Levels for groundwater ($VISL_{GW}$) and if concentrations exists above screening levels, determining the flow direction of the shallow groundwater; determining whether free product pursuant to N.J.A.C. 7:26E-2.1(a)14 is present at each groundwater sampling location; identifying the distance between structures, subsurface utilities, sensitive populations and groundwater impacts; and determining the specific use for structures identified, including the presence of residences, schools or child care centers, whether each structure has a basement, crawl space, or is constructed on a slab, and the approximate square footage of each building footprint (If necessary). If based on the evaluation, a vapor intrusion investigation is determined to be necessary due to groundwater concentrations exceeding their respective NJDEP generic VISL, NJDEP's Immediate Care Unit will be notified.

4.13 Data Validation and Electronic Data Deliverables

Validation of data requires that appropriate quality assurance and quality control (QA/QC) procedures be followed, and that adequate documentation is included for all data generated both in the laboratory and in the field. A third party data validator will review this information, "flag" data with qualifiers when QA/QC criteria are not met, and prepare the data validation reports. The documents presented will be used to evaluate the usability of laboratory-generated analytical data. Laboratory analytical data will be prepared in NJDEP Hazsite/Electronic Data Deliverable (EDD).

4.14 Reporting

The field data, laboratory data, as well as any physical evidence observed at the subject property and the surrounding area will be assimilated and a basic Conceptual Site Model (CSM) will be constructed. The CSM will include an assessment and evaluation of the contaminant source area; a review of geologic and hydrogeologic characteristics of the aquifer; an assessment of plume characteristics (e.g., concentrations, extent and migration potential within the aquifer); and identification and assessment of potential migration pathways that may impact receptors. The CSM will assist in evaluating next steps with respect to any additional investigations and/or remedial actions, as necessary.

Following the completion of field investigation activities, the generated information and data will be detailed within a Remedial Investigation (RIR). The RIR will include findings from the receptor evaluation; soil and groundwater sampling; tabulated and mapped data; electronic data deliverables (EDDs) and copies of laboratory data; a discussion of the data findings; an assessment of groundwater plume impacts and potential for receptor exposure based on the CSM developed for the subject property, along with any recommendations for additional investigation and/or remedial measures as may be appropriate.

FIGURES